

ADDITIONAL ELEMENTS IN INDIAN FLORA

VOLUME - I

U.P. SAMADDAR
and
B. ROY



BOTANICAL SURVEY OF INDIA

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**BOTANICAL SURVEY OF INDIA
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FOREWORD

Since the publication of Sir J.D. Hooker's *Flora of British India*, a number of new taxa and new records were described, from time to time by various authors working on Indian plants. These are scattered in different journals and research publications. Taxonomists working on revisions, monographs and all those contributing to revised *Flora of India* volumes have to individually search through all literature pertaining to family/ genus they are working. In the absence of computerised literature system every worker has to waste a lot of time in putting together the literature. To help all these workers, Shri U.P. Samaddar, Senior author and Shri B. Roy have done a tremendous job of bringing together all the scattered literature on Indian plants. This will not only help all workers dealing with Indian plants but also computerising literature which is being organised in our library.

This volume reproduces all details published on about 480 new taxa and new records since *Hooker's Flora of British India*. It is hoped that this publication will be widely welcomed by all workers of *Flora of India* as it would save a lot of time for them.

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P.K. Hajra
Director

PREFACE

The influx of the account of plants occupying unique position as new entrants for its distinct characters in scattered literatures, advocates the role of new materials to be looked in isolation and without access to which sustainable advances in the preparation of "Floras" are very much difficult if not impossible.

Besides publication of the semimonographic "Flora of India" (National Flora), this proximity of presenting the account of the additional elements in the flora of the country (after the "Flora of British India" by J.D. Hooker, 1872-97) is not only to assist the national efforts in preparing the subsequent volumes of the National Flora, other Floras, Revisions and Monographs but also to meet the evergrowing demands of the scientists, scholars and public in having the original details of it within a consolidated piece of work.

The Indian region has a large variety of flora. The objective of the present text is to highlight the details of the additional elements from different phytological regions of explored, underexplored and unexplored areas which are also drawing attention and intensifying the interest for biodiversity in the country, now taking precedence over the other concerns. Many of the plants included here, are indicated with degree of threat in the "Red Data Book of Indian Plants." Thus this information on new elements is not only pioneer to more complete works but also a link of the previous and present works.

During the course of the perusal of innumerable scientific papers, records and comprehensive lists and books (Calder *et al.* 1926; Razi 1959; Nayar and Ramamurthy 1973; Ghose 1976, 1977, 1979; Nayar & Karthikyan 1981, 1984; Ghose 1985 and Naithani 1990) about 480 selected taxa including infraspecific, new records and descriptions of 6 new genera dealt by various authors as new elements are taken here for detail appraisal of the additional wealth in the Indian Floras.

Since the communications and efforts made in earlier enumerations on the above subject are devoid of thorough information about description, distribution, habitat, phenological data, location of the herbarium materials and important remarks; a detailed account reproducing the original contents felt useful. The prediction of phenological data (in some cases) has been made from dates of the collections (presumed to be in fertile condition), from the other sources and marked with asterisk. The notes at the last para of new species furnishes the distinctions from allied species and other information including epithet.

The second part relates to the plants reported as its first occurrence in India and extension of phytogeographical ranges of the species further. The plants which have been introduced and reported with sign of being quite at home in Indian habitat are also considered as new entrants in the flora of the country.

To distinguish between authors of same surname, abbreviated available names of most of the Indian authors (from "Authors of plant Names" edited by R.K. Brummit & C.E. Powell) are placed here. Added mention of new homes of two or three of such species described as new to science from India with particular locality but reported its availability recently from other places are kept in first part of the book. Name or status of the species has been maintained as mentioned by author of that particular literature. All the species are arranged alphabetically. Apart from botanical names in alphabetical sequence in the index, a separate index chapter has been prepared with species in alphabetical sequence under respective families. The correct name of the species appears in bold letters. All important synonyms of the species, in new records are also given.

Keeping in view of the earlier shortfalls the present compilation, prepared by this author with the assistance, makes a separate identity with the format of own, saturated with detail information of the additional species from present boundaries of India. Though the present attempt is a leap to bridge the gap with full account of the species, it is a work of many volumes and neither fullness or completeness are possible in a particular volume like this. And also the work can not be claimed from errors and lacuna free, as some variations still may exist for different styles of presentation of the information by different authors.

It is hoped that this book, apart from above mentioned objectives, will stimulate the individual and group to have fuller understanding about the new elements for scientific study and to make further intensive searches aiming at conservation of its diversity by exploration and development. Thus this book, no less than the basis for preparation of the floras, is a ready answer with complete proportion in a portable form to those who have no access to earlier works because of the absence of gathering of the information.

U. P. Samaddar

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Abelmoschus tuberculatus* Pal & Singh var. *deltoidifolius
T.K. Paul & M.P. Nayar (Malvaceae) in Bull. Bot. Surv. India 24
(1-4) : 215-217, 1982 (1983).

Annual erect herb ca 1 m high. Leaves deltoid, 3-5-lobed; base broadly cordate to truncate; apex acute; margin dentate, 4-10 × 5-10 cm, 5-7-nerved at the base; both surfaces hispid; petioles 2-8 cm long. Stipules linear, 3-5 mm long, hispid. Flowers axillary, solitary; pedicel 4-8 mm long, accrescent, up to 1.5 cm. Epicalyx with 8-10 subequal segments, linear, 5-7 mm long, accrescent, up to 1.2 cm, appressed, strigose. Calyx tube ca 1 cm long, 5-6 mm broad; sepals 5, spathaceous straight on both surfaces. Petals 5, obovate, yellow with fleshy base and rounded apex, 1.5-3.5 × 1-1.5 cm; outer surface with a few scattered tribrachiate stellate hairs towards the apex; inner surface glabrous. Staminal column 0.8-1 cm long, antheriferous throughout; filaments ca 1 mm long. Ovary ovoid ca 3 mm high and ca 5 mm across, pubescent; style glabrous; stigma 5-lobed, scarlet. Capsule 1.5-5 cm long and ca 1.5 cm across, ovoid to oblong with ca 8 mm long tapering apex, densely studded with bristle-bearing tubercles. Seeds rounded, 4-5 mm in diameter, dark-brown, densely villous; hilum roundish, dark brown or black, glabrous.

Type : B. M. Wadhwa & D. M. Verma 7581 (Holotype CAL).

Flowering & Fruiting : September - November.

Distribution : INDIA : Rajasthan, Madhya Pradesh, Gujarat.

Herbarium specimens : INDIA : Rajasthan ; Jhalawar, Sept. 19, 1964, B. M. Wadhwa & D. M. Verma 7581 (CAL); *ibid.*, Sept. 21, 1964, B. M. Wadhwa & D. M. Verma 7524 (Paratype CAL); *ibid.*, Sept. 14, 1964, B. M. Wadhwa 5452 (CAL). Madhya Pradesh ; Saugor District; Saugor C. P. Cantonment, Oct. 14, 1906, A. A. Islyath 28710 (ISIM). Gujrat; Sasangir to Junvania (Saurashtra), Oct. 5, 1953, H. Santapau 16328 (BLATT).

Notes : According to Paul & Nayar (*l.c.*) : This new taxon is easily recognizable by its 3-5-lobed, deltoidiform leaves and larger densely villous seeds (4-5 mm in diameter) whereas *Abelmoschus tuberculatus* Pal & Singh is characterised by pinnatisect leaves and smaller glabrous seeds (ca 3 mm in diameter).

Growing mostly in black clayey soil.

***Abutilon neelgherrense* Munro ex Wt. var. *fischeri* T.K. Paul & M.P. Nayar (Malvaceae) in Bull. Bot. Surv. India 25 (1-4) : 183-184. 1983 (1985).**

Erect, branched undershrub or shrub, densely stellate velutinous. Leaves 7-9.5 × 5.5-8 cm, broadly ovate, base ve condete, apex acute to acuminate, coarsely crenate to dentate or nearly entire, 7-9 nerved at the base, both the surface stellate pubescent, denser in the lower surface; petioles 3-8 cm long, densely stellate pubescent. Stipules 5-12 mm long, linear, stellate pubescent. Flowers in axillary loose corymbose racemes; peduncle with 3-5 flowers, 7-9 cm long, densely stellate-pubescent; pedicel 2-3.5 cm long, jointed near the apex, densely stellate pubescent. Calyx campanulate; lobes 5, connate below the middle, 6-10 × 4-5 mm, ovate to ovate lanceolate, acute to acuminate, each with one prominent midvein, both surfaces stellate pubescent, persistent. Corolla c 1.5 cm across, yellow; petals 5, 10-15 × 8-13 mm, broadly obovate, apex rotund or truncate, margin of the base ciliate. Staminal column c 0.5 cm long, conical at the base, tubular towards the apex, densely stellate hairy, antheriferous towards the apex, filaments 2-3 mm long. Ovary c 3.5 × 3 mm, ovoid, stellate tomentose, 8-12 loculed, 2-3 ovules in each locule; style branched, c 3 mm long, as many as the carpels; stigmas capitate. Schizocarp c 1.2 × 1.3 cm, subcylindric, deeply indented at the apex; mericarps 8-12, c 14 × 5 mm, flattened reniform with a short mucro, densely pubescent with both long and short stellate hairs. Seeds 2-3 in each mericarp, c 2 mm across, subreniform, glabrous, hilum pubescent.

Type : C. E. C. Fischer 1581 (Holotype CAL).

Flowering : January.

Distribution : INDIA : Tamil Nadu.

Herbarium specimen : INDIA : Tamil Nadu ; Coimbatore District, Coonoor river beach, 363 m, Jan. 10, 1910, C.E.C.Fischer 1581 (CAL).

Notes : According to Paul & Nayar (*l.c.*) : This interesting taxon is easily distinguished from the type of *A. neelgherrense* Munro ex Wt. in having shorter (c 5 mm) densely stellate pubescent staminal column, whereas in the type (*A. neelgherrense* Munro ex Wt.) it is longer (8-10 mm) and glabrous.

The varietal epithet of this taxon is named after C.E.C. Fischer, the co-author of Gamble's Flora of Madras Presidency.

Acacia minutifolia Ragu., A. Mahad. & Thoth. (Mimosaceae)
in Ind. J. For. 14(1) : 65-66.1991.

Shrubs up to 1.5 m high ; thorns binate, 5.0-6.0 cm long, 0.5-0.7 cm thick at base, stout, greyish white and hallow. Leaves bipinnate, rachis with 4-6 pinnules and with a blackish gland just below the lowermost pinnules; pinnule 0.5-1.0 cm long, paripinnate. Leaflets 4-5 pairs, 2 × 1 mm, lower leaflets much smaller than the upper larger ones, elliptic, apex acute, base oblique, nerves not prominent; stipules 0. inflorescence peduncles slender 1.5-2.0 cm long, bracts 2, 1 × 1 mm, middle to above the middle, hyaline, rotundus, apex cuspidate, base sagittate, one nerved. Flowers in globose heads, yellow, 0.7 × 0.7 cm; florets 5 mm long, many. Calyx cup shaped, 1.0 × 0.5 mm, shortly lobed, light green. Corolla 1.5 × 0.5 mm, united, exserted, slightly five lobed, lobes acute. Stamens free, many; filaments 3-4 mm long, slender; anthers yellow, basifixed, 0.5 × 0.5 mm. Ovary 1.7 × 0.5 mm, white villous, one celled; style puberulous, elongate, 4 mm long, stigma small, terminal. Pods 1-4, axillary, linear, flat, 2.5-6.0 × 0.4-0.6 cm, glabrous, curved, slightly monoliform, reticulate, 2-5 seeded; seeds elliptic, 1-2 mm long.

Types : *Ragupathy* 1039 (A : Holotype MH; B : Isotype CAL).

Flowering & Fruiting : March*.

Distribution : INDIA : Tamil Nadu.

Herbarium specimens : INDIA : Tamil Nadu; Thanjavur District, Mar. 7, 1989, *Ragupathy* 1039 (A in MH ; B in CAL).

Notes : According to Ragu. *et al.* (*l.c.*) : *Acacia minutifolia* Ragu. *et al.* sp. nov. is allied to *A. wightii* Baker but differs from it in the number of leaflets and their size. The type of *A. wightii*, present in the Central National Herbarium, Howrah was examined, it is interesting to point out that the leaflets in type species range from

5-15 pairs per pinnule and are 3-5 mm long as against 4-6 pairs of leaflets ranging from 1-2 mm in length, as in the new species.

A few plants were collected in Rajamadam coastal scrub jungle. This species grows in sand dunes of low nutrient soil. The associated plants in the habitat include *Carrissa spinarum* L., *Canthium perviflorum* Lam., *Desmodium biarticulatum* (L.) F.v.Muell. and *Indigofera asplathoides* Vahl ex DC.

Acacia tanjorensis Ragu., Thoth. & A. Mahad. (Mimosaceae) in *J. Econ. Tax. Bot.* 14(3) : 751, 1990.

Trees, 5-6 m tall, bark ash coloured; stem with ridges and furrows, lenticellate; stipular spines short, binate, axillary, recurved. Leaves biparipinnate : a distinct gland on the rachis below the first pair of pinnules; pinnules 2-3 pairs, subopposite to opposite, 4.0-7.0 cm long; leaflets 6-8, 3.0-15.0 × 2.0-5.0 mm, oblong to ovate-oblong, oblique at base, entire, obtuse at apex, slightly mucronate, glabrous. Inflorescence spicate, axillary 4.0-7.0 cm long. Flowers white, 5.0-7.0 × 2.0-3.0 mm, minutely pedicellate. Calyx campanulate, 1.0-1.8 mm long, shortly 5 lobed, segments 0.5-1.0 mm long, acute at apex, faintly nerved, hyaline, glabrous. Petals 5, free, 3.0-5.0 × 0.5-1.0 mm, lanceolate, obtuse at base, entire acute at apex, faintly one nerved, glabrous, hyaline. Stamens many, free, filaments 5.0-7.0 mm long; anthers yellow, bifid 0.2 mm, basifixed. Ovary sessile, 1.0-1.8 mm long, subglobose, glabrous; style 5.0-8.0 mm long, slender; stigma minute. Pods 4.0-8.5 × 1.5-2.5 cm, oblong, flat, acute at apex and mucronate, base attenuate, margin undulate, thick veined, mucronate, glabrous, reticulately veined and undulate, at times sinuate between the seeds 1-5 seeded; seeds ovate or elliptic, 0.5-1.0 × 0.3-8.0 cm, brownish.

Types : *Ragupathy* 264 (Holotype MH; A: Isotype CAL).

Flowering : January-April. **Fruiting** : April onwards.

Distribution : INDIA : Tamil Nadu.

Herbarium specimens : INDIA : Tamil Nadu ; Thanjavur District

Kodiakkarai, Feb. 3, 1987, *Ragupathy* 264(MH); *ibid.* 264 A (CAL).

Notes : According to Ragu, *et al.* (*l.c.*): *Acacia tanjorensis* Ragu, *et al.* sp. nov. is closely allied to *Acacia modesta* Wall., but differs in the size and shape of the leaflet and pod characters.

The species is common in sandy soil in the coastal forest.

Aconogonum pangianum G.D. Pal & Maiti (Polygonaceae) in Bull. Bot. Surv. India 26 (1 & 2) : 95-96. 1984 (1985).

Erect to semierect herbs, rooting at nodes towards base, 10-35 cm long, delicate; stem terete, 2-4 mm across; hairs concentrated below the nodes and dense above, but sparsely pubescent below, reddish green; stipules tubular, truncate, 4-8 × 4-6 mm, pubescent to the younger parts, membranous, pale green. Leaves elliptic-lanceolate to elliptic, 2-5 × 0.8-2 cm, acute, entire, base acute, thickly pubescent below, sparsely pubescent above, 3-6 pairs of secondary nerves; petioles 0.3-0.6 cm long, pubescent. Inflorescence a spiciform raceme, 2-5 cm long, terminal, rarely axillary, pubescent; bracts lanceolate-acuminate, 2-3 mm long, pubescent, membranous. Flowers sessile to subsessile, yellow; pedicels minute or absent, pubescent, bracts ovate-lanceolate, about 1.5 mm long, sparingly hairy. Perianth 5, 2 outer usually smaller, oblong, ca 2 × 1 mm, slightly enlarged at maturity of nut, entire, acute, glabrous. Stamens 5-6, 0.8 mm long; filaments flat, glabrous; anthers ovate, dorsifixed. Ovary trigonous, 0.5-0.6 × 0.2-0.3 mm, glabrous, brown; styles 3, 0.2-0.3 mm long, hyaline; stigma 3, capitate, deep brown, nuts turgidly trigonous with sharp acute angles, ca 2 × 1 mm, reflexed, glabrous, black.

Types : G. D. Pal 77734 (Holotype CAL; Isotypes CAL, ASSAM).

Flowering & Fruiting : April.*

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh; Subansiri District, Pange, 3000 m, Apr. 19, 1980, G. D. Pal 77734 (CAL & ASSAM); Subansiri District, Tale valley, 3500 m, Apr. 18, 1980, G.D. Pal 77707 (CAL & ASSAM).

Notes : According to Pal & Maiti (*l.c.*) : It is related to *Aconogonum complanatum* (Hook. f.) Hara but can be differentiated by its size about 10-35 cm tall, leaves 2.5 × 0.8-2 cm, spiciform raceme 2-5 cm long, lanceolate-acuminate bracts, yellow flowers, stamens 5-6, 0.8 cm long and reflexed mature nuts.

This plant grows in moist loose sandy soil near water source and under shade. The specific epithet is based on the type locality of the plant.

***Aegle marmelos* (L.) Corr. var. *mahurensis* Zate (Rutaceae)**
in Ind. J. For. 5(1): 36-37.1982.

Moderate-sized shortly armed or unarmed tree. Leaves pinnately 3-foliolate; leaflets 5-10 × 2.5-5.0 cm, ovate-lanceolate, entire, subacute or acuminate. Flowers greenish-white in short axillary panicles. Fruits depressed globose, 4-5 × 5-6 cm; rind grey or yellowish; pulp sweet, thick, orange coloured.

Types : Zate 671 (A : Holotype & B: Isotype: all in the Herbarium of Marthwada University, Aurangabad).

Flowering & Fruiting: April August.

Distribution : INDIA: Maharashtra.

Herbarium specimens : INDIA: Maharashtra (Marathwada); Nanded, Mahur, Zate 671 a-b (Herbarium of Marathwada University, Aurangabad).

Notes : According to Zate (*l.c.*): Allied to var. *marmelos* but differing in it shortly armed or unarmed branchlets, thorns absent or 0.5 cm; leaf 5-10 × 2.5-5 cm, entire; fruit depressed globose 4-5 × 5.6 cm (5-6 cm in dia.), rind grey or yellowish, in contrast, var. *marmelos* is having thorn 1.2-2.5 cm; leaf 4-12 × 2-5.5 cm; fruit globose, 5-10 cm in dia., rind yellowish.

Rare, only occasionally seen on gravelly slopes of hill forest.

This peculiar variety was noted for the first time by Haines (1921: 171) from ravines of the Santhal Parganas in Orissa. Later it was also recorded from Wadwal Nagnath in Osmanabad District

of Marathwada (Naik, 1976:66). But both these authors did not describe the same due to vegetative condition of their specimens. It has now been collected in flowering as well as fruiting condition from Mahur and deserves distinct varietal status.

Aeschynanthus andamanensis Goel, Vasudeva Rao & Mehrotra (Gesneriaceae) in Bull. Bot. Surv. India 31(1-4): 154-156, 1989 (1992).

Epiphytic, succulent herbs. Stems drooping, terete, green with swollen nodes, occasionally rooting at nodes. Leaves opposite, rarely alternate, fleshy, dark green above, light green below, penninerved elliptic-ovate to broadly lanceolate with entire margins, 8.0-14.0 × 3.5-6.0 cm; midrib thick, sunken on upper surface, flat on lower surface or slightly raised, broadening towards base below, lateral nerves obscure; apex acute; base ovate-rounded, sometimes oblique; petioles thick, terete, green, 0.8-1.0 cm long. Flowers 2-4, in terminal cymes, zygomorphic. Bracts yellowish-green, 13.0-16.0 × 3.0-6.0 mm, linear-lanceolate to lanceolate, acuminate. Pedicels 10.0-15.0 × 1.0 mm, elongated in fruits, prominently ribbed. Calyx lobes 5, divided to less than half way down, 6.0-15.0 × 3.0-8.0 mm, glabrous, light green; lobes triangular-ovate, subsimilar, obtuse, truncate at base. Corolla scarlet throughout, curved, tubular, bilabiate, 30-40 mm long; lobes ovate, obtuse, 4.0-5.0 × 5.0-6.0 mm, glabrous outside, except for sparsely glandular hairy on the lobes; tube fleshy, glandular hairy on the inner side at base, sparsely thin hairy above. Stamens 4, didynamous, epipetalous; filaments stout, sparsely gland-tipped hairy, 30.0-35.0 mm long; anthers adhering in pairs, brown coloured, 2.5-3.5 mm long, longitudinally dehiscent. Gynoecium 40.0-50.0 mm long, excluded (included in corolla tube in protandrous flowers); style simple, 14.0-16.0 mm long, glandular hairy; stigma capitate; ovary 25.0-32.0 mm long; disc 1.0-1.5 × 1.5-2.5 mm, glabrous, annular. Capsules 25.0-30.0 × 0.25-0.35 cm, linear, tapering at both the ends. Seeds numerous, small, ca 0.75 mm long with 2 long white hairs near the hilum and one at the apex.

Types : A.K. Goel 16636 (A: Holotype CDRi; B,C, D: Isotypes CDRi, CAL).

Flowering & Fruiting : September November.

Distribution : INDIA : S. Andamans.

Herbarium specimens : INDIA: South Andamans; Alexandria Island, Oct. 26, 1986, A.K. Goel 16636 (A in CDRI; B, C, D in CDRI & CAL). North Andamans ; Saddle Peak Range, Lamia Bay Slope, ± 200 m, Mar. 28, 1977, N.P. Balakrishnan 5417 A,B (Paratypes PBL).

Notes : According to Goel *et al.* (*l.c.*) : A species, distinct from *Aeschynanthus parasiticus* (Roxb.) Wall. in having leaves broader (3.5-6.0 cm), elliptic-ovate to broadly lanceolate, base somewhat rounded or oblique; calyx lobes triangular ovate, obtuse; corolla 30.0-40.0 mm long, scarlet throughout, without any marks and stripes at mouth and lobes, corolla tube with stout glandular hairs at base inside; longer capsules, 25.0-30.0 cm.

This is a beautiful occasional epiphytic, succulent herb on Ficus tree-trunk growing in most shady places along sea shore with scarlet flowers. The specimens could not be matched with the known species of *Aeschynanthus* Jack., housed at PBL, CAL, DD, CDRI and LWG herbaria.

Agapetes subansirica G.D. Pal & Thoth. (Vacciniaceae) in Bull. Bot. Surv. India 26 (3-4): 239-241. 1984 (1986).

An epiphytic shrub ca 1.5 m high; stems terete with ridges extending towards the petioles, lenticellate; persistent buds along the stem and 3-4 mm away from petioles and leaf-scars; buds covered with 2 to 3 leafy scales; scales linear-lanceolate, acuminate or subulate, with generally strong midrib, 2-7 by 1-2 mm. Leaves alternate, oblong lanceolate, 25-32 by 3-8 cm, acute to acuminate, entire, base rounded, glabrous, coriaceous, secondary veins along with main vein prominent beneath but obscure above, marginal veins continuous with the marginal loops, ca 2-3 mm away from margin; petioles 1.0-1.5 cm long, glabrous, channelled. Flowers in fascicles, axillary on older part of stem, showing corymbose nature; peduncle 2-3 cm long, subtended by clusters of bracts, thickened upwards,

glabrous. Flowers 16-25, aggregated at the top \pm 5 mm across; pedicels, 1-2 cm long, swollen towards the cupule; cupules prominent, 2.0-2.5 mm diam., pinkish green, glabrous; bracts lanceolate, 1-2 mm long, acute, glabrous. Calyx campanulate; 5 mm long lobes 5, oblong-triangular, ca 2.0×1.5 mm, acute, entire, with prominent midrib beneath, glabrous, yellowish. Corolla cylindrical-tubular, ca 8 mm; lobes 5, linear-oblong, ca 3×1 mm, acute, glabrous, pinkish green. Stamens 10, ca 8 mm long; base of filaments united; anther lobes 2mm long, styles 6 mm long, stigma inconspicuous. Fruit unknown.

Types : G.D. Pal 78214 (Holotype CAL; A: Isotype ARUN)

Flowering : April.*

Distribution: INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh; Subansiri District, Begi, 190 m, Apr.24, '80, G.D. Pal 78214 (CAL) & 78214 A (ARUN).

Notes : According to Pal & Thoth.(l.c.): *Agapetes subansirica* Pal et Thoth., is allied to *Agapetes disper* Airy Shaw but can be distinguished by the leaves being alternate, oblong lanceolate, 25-32 \times 3-8 cm; petioles 1.0-1.5 cm long; pedicels 1-2 cm long; cupules 2.0-2.5 mm in diam.; corolla glabrous on both sides and stigms being inconspicuous.

The plant is growing on tree trunks along the river bank in dense subtropical forest.

Agrostis munroana Aitch. & Hemsley subsp. *indica* Bhattacharya & S.K. Jain (Poaceae) in Bull. Bot. Surv. India 25 (1-4): 205-208. 1983(1985).

A loosely caespitose annual grass. Culms erect to ascending, rarely geniculate below, 40-60 cm long, glabrous and shining, 4-6 noded, nodes glabrous. Sheaths covering almost whole length of the internodes, tight to loose, glabrous and striate. Ligules membranous, oblong, obtuse, 1.5-6.0 mm long. Leaves linear-lanceolate, acuminate, flat, bases round, 10-30 cm long, 3.0-6.5 mm broad, scaberulous on

surfaces, margins often scabrid. Inflorescence and effuse, pyramidal, 15-25 cm long, 4-10 cm broad panicle; branches bare in lower half. Spikelets 2.0-3.5 mm long. Callus shortly hairy; pedicels 3.0-4.5 mm long, scabrid. Glumes equal or subequal, elliptic-oblong, acute, subhyaline, 2.0-3.5 mm long, 1-nerved, 1-keeled, keels scabrid. Lemma oblong-lanceolate, truncate, crenate, subhyaline to hyaline, 1.5-2.2 mm long, obscurely 5-nerved, densely hairy all over the dorsal surface and margins, 1-keeled, keel glabrous; awned or unawned, awn when present dorsal, midbasal, straight, very delicate, included or shortly exerted. Palea nearly equal to the lemma in length, linear-lanceolate, acute, hyaline, generally obscurely 2-nerved, 1-keeled, keel glabrous. Rhachilla may be produced as a short point. Stamens 3; anthers 0.55-0.75 mm long. Ovary obovoid, 0.3-0.5 mm long; styles 2, distinct, 0.15-0.20 mm long; stigmas 0.5-0.6 mm long. Caryopsis ellipsoid to ellipsoid-oblong, 0.2-0.4 mm long; embryo minute.

Types : *Janardhanan* 52862 (A: Holotype CAL; B: Isotype BSD).

Flowering & Fruiting : August - October.

Distribution : INDIA: Himachal Pradesh, Jammu & Kashmir & Uttar Pradesh.

Herbarium specimens : INDIA : Himachal Pradesh; Karcham-Brue Road, nearly 2 km from Baspa valley, Aug. 27, 1973, *Janardhanan* 52862 (A in CAL; B in BSD). Himachal Pradesh; Rakecham, Baspa Valley, 4000 m, Aug. 13, 1973, *Janardhanan* 52677 (BSD); Chamba, 3200 m, Sept. 9, 1898, *Lace* 1856 (CAL). Uttar Pradesh; Garhwal, Valley of Flowers, 3900 m, Oct. 8, 1962, *U. C. Bhattacharyya* 24376 (BSD); Kumaon, Dhauri Valley, 2500-3000 m, Aug. 7, 1886, *Duthie* 6231 (CAL); Garhwal, Brahmatal, 3500 m, Oct. 5, 1963, *U. C. Bhattacharyya* 31063 (BSD). Paratypes: Jammu & Kashmir; Gulmarg, 3000 m, Aug. 18, 1958, *Nanda* 1599 (CAL); Gulmarg, 3000 m, Aug. 1939, *Hartland s. n.* (DD); Sangam Valley above Liddarwat, 3500-4000 m, Aug. 10, 1893, *Duthie* 13535 (CAL); Yamhara Pass, 4000-4300m, Aug. 13, 1893, *Duthie* 13582 (CAL); Pirpass, 3330-3835 m, Sept. 14, 1958, *Rao* 7680 (BSD).

Notes : According to *Bhattacharyya & Jain (l.c.)*: Though the geographical distribution of this taxon is almost similar to the subspecies *munroana* but their altitudinal distribution is quite

distinct, the new ssp. *indica* occurring mostly below 3500 m whereas ssp. *munroana* always above it. It has much stouter habit, longer and broader leaves and an effuse panicle. In floral characters it is similar to subspecies *munroana*.

Endemic to India.

Common in moist open grounds or on hilly slopes amongst boulders.

Indica refers to India, country of the type locality of this grass.

Agrostis tungnathii Bhattacharya & S.K. Jain (Poaceae) in Bull. Bot. Surv. India 25(1-4): 204-205. 1983(1985).

An annual caespitose grass. Culms ascending, very slender, 20-40 cm long, glabrous, up to 3-noded, nodes glabrous. Sheaths covering almost whole length of the internodes, tight, glabrous and striate. Ligules membranous, oblong, truncate, 1-4 mm long. Leaves linear, acuminate, flat, bases round, up to 10 cm long, 1-2 mm broad, scaberulous on surfaces and margins; lower leaves cauline and nearly filiform. Inflorescence a contracted, linear, 6-8 cm long, 5-10 mm broad panicle; main axis terete, erect, glabrous or scabrid; branches 3-5-nate, terete or angular towards tip, scabrid. Spikelets 3-4 mm long, purplish-green. Callus with short hairs; pedicels 1.3-1.5 mm long, scabrid. Glumes unequal, acute, subhyaline, 1-nerved, 1-keeled, keels scabrid; lower glume longer, ovate-lanceolate, 3-4 mm long; upper shorter, oblong-lanceolate, 2.7-3.2 mm long. Lemma ovate-oblong, truncate, subhyaline, 2.3-2.5 mm long, 4-nerved, hairy on entire dorsal surface and margins, 1-keeled, keel glabrous; awned, awn dorsal, subbasal, straight, scabrid, 3.0-3.5 mm long. Palea ovate-oblong, acute, hyaline, ca 1.2 mm long, obscurely 2-nerved, 1-keeled, keel glabrous. Rhachilla produced as a short point, glabrous. Stamens 3; anthers 1.0-1.2 mm long. Ovary obovoid, ca 0.3 mm long; styles 2, distinct, ca 0.18 mm long; stigmas 0.3-0.5 mm long, plumose. Caryopsis ellipsoid, 0.4-0.7 mm long; embryo minute.

Types : Bhattacharya 1524 (A: Holotype CAL; B: Isotype BSD).

Flowering & Fruiting : After rainy season.

Distribution : INDIA : N.W. Himalaya (Uttar Pradesh).

Herbarium specimens : INDIA: Uttar Pradesh; Chamoli, on the way to Tungnath, 4000 m, Aug. 29, 1978, *Bhattacharya* 1524 (A in CAL; B in BSD).

Notes : According to *Bhattacharya & Jain (l.c.)*: Allied to *A. royleana* Trin. but differs from it in having Lemma ovate-oblong; 4-nerved; palea lanceolate, acute; anthers long. *Agrostis tungnathii* is characterized by narrow spicate panicle.

An Alpine grass. Commonly grows in open dry places amongst boulders, occasionally associated with members of *Asteraceae*. Endemic.

The specific epithet *tungnathii* refers to the name of a hill 'Tungnath' in north-west Himalaya, from where the type material had been collected.

***Albizia arunachalensis* K.C. Sahni & H.B. Naithani** (*Mimosaceae*) in *Indian Forester* 105 (4): 274-275. 1979.

Small handsome tree, 5-10 m high, diam. 23 cm, with a spreading crown, young shoots lenticelled, tomentose. Leaves alternate, bipinnate; petiole 3-4 cm long, tomentose, with a prominent gland in the middle; primary rhachis 18-30 cm long tomentose with 2-3 conspicuous glands at the tip; pinnae 12-14 pairs, opposite or sub-opposite, 3-11 cm long, secondary rhachis tomentose, upper-side grooved, one rarely two glands present at the tip; leaflets 10-26 pairs, 7-10 mm × 2-3 mm. falcate, narrowly-oblong, apex acute, base truncate and parallel to the secondary rhachis, upper surface dark green, puberulous or glabrous, lower surface light green, pubescent, margin ciliate, mid vein prominent on the lower surface and placed towards upper margin, secondary veins 1-3 on the lower margin, faint. Inflorescence a pedunculate globose head; peduncle up to 10 cm long, tomentose 5-6 together, head creamish 4-7 cm across with 20-40 sessile flowers. Calyx funnel shaped, 8 mm long, tomentose outside; teeth 5, 1 mm long, densely villous at tip acute. Corolla funnel shaped, creamish, tomentose outside ca 10 mm long; lobes 5, 1.5-2 mm long, densely villous at tip acute. Stamens numerous, 3.2 cm long, connate into a tube which is shorter than corolla tube; anthers minute. Ovary sessile, 3 mm × 0.5 mm; style filiform, ca

2 cm long. Pods 13.5 cm × 2 cm brown pubescent, veined, flat, acute at both ends, margins thick. Seeds 8-20 greenish yellow ca 5 mm × 2.5 mm oblong.

Type : Sahni & Naithani Ser.II.' NO. 416 (Holotype DD).

Flowering & Fruiting : April-October.*

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Kameng District, near Munna Dirang, 1577 m, Apr. 8, 1977, Sahni & Naithani Ser. II. No. 416 (DD); *ibid.*, Oct. 28, 1977, Bennet & Naithani 3243 (Paratype DD).

Notes : According to Sahni & Naithani (*l.c.*): Allied to *Albizia mollis* Baiv., but differs in having leaflets with truncate base, parallel to the secondary rachis, faint secondary veins, pods up to 20 seeded, seeds oblong and smaller.

Alectra parasitica A. Rich. var. *chitrakutensis* M. A. Rau (Scrophulariaceae) in Bull. Bot. Surv. India 3(1): 25-27. 1961.

A root parasite, changing black on drying. Stems rhizomatous, perennating, underground parts of stem strongly developed, 2-3 cm, thick, horizontally extending with numerous axillary buds in the axils of closely set scale leaves. Slender tubular haustorial structures coiled around rhizome. Rhizome orange-yellow in colour with a stale odour, easily broken. Shrinks considerably on drying and turns black.

Inflorescences terminal on the rhizome, flower bearing portion of erect axes 5 to 20 cm long, angular, purplish in colour, hispid. Leaves very small, mostly scale-like, hispid, largest 0.6 cm long, linear oblong, obtuse. Racemes rather loose. Floral leaves or bracts linear as long or longer than the sessile or almost sessile flowers. Bracteoles very slender as long as the calyx-tube in open flower, persistent. Calyx campanulate, hairy outside but glabrous within, lobes shorter than the tube, deltoid, acute. Corolla about 1 cm, glabrous, yellow with purple streaks. Filaments short glabrous, anther cells slightly unequal, obtuse. Ovary globose, style long.

inflexed. Capsule globose, 0.5 cm diameter splitting into 4-valves. Seeds many, minute, cuneiform.

Type : M. A. Rau 3724 (Holotype BSD-Acc.No. 2739).

Flowering & Fruiting : September November.

Distribution : INDIA: Uttar Pradesh.

Herbarium specimen : INDIA: Uttar Pradesh; Banda District, Chitrakut, Nov. 13, 1957, M. A. Rau 3724 (Acc. No. 2739 BSD).

Notes : According to Rau (*l.c.*): The genus *Alectra* of the Scrophulariaceae includes more than fifty species of parasitic herbs which are distributed in Africa, South America, Australia and India. While the majority of the species are found in tropical Africa, with some species common to Australia, two species are recorded from Brazil, one from Arabia and three from Madagascar. Two species are so far known from India viz. *A. indica* Benth. and *A. thomsonii* Hook.f. *A. thomsonii* has been previously collected in the South India, Madhya Pradesh and Bihar and recently it was reported from the Banda District of Uttar Pradesh (Raizada 1958, Rau & Rao 1959). The specimens collected by Rau and recorded in the above paper, however, on further examination revealed some differences and could not be satisfactorily compared with any of the existing specimens either at the Calcutta Herbarium or the Forest Research Institute Herbarium at Dehra Dun. Since the African species are not represented in the Indian Herbaria, the opinion of the authorities at Kew was sought and the specimens have been kindly examined by them and identified as *A. parasitica* A. Rich., a species quite widely distributed in East and North-East Africa. Further they have reported that the Indian specimens can be distinguished from the African by the strongly rhizomatous development of the underground parts of the stem. Some African species show a tendency towards forming rhizomes but in none is it so marked. Accordingly they have suggested that the Indian plant may be recognised as a variety of *A. parasitica* A. Rich.

Very near to *A. parasitica*. Vegetatively it can be distinguished by the strongly rhizomatous development of the underground parts

of the stem. Rhizome perennating with numerous axillary buds in the axils of closely set scale leaves.

The plant is Found to grow under the shade of the shrubby *Vitex negundo* L., apparently parasitic on its roots.

Alysicarpus narimanii S. M. Almeida & M. R. Almeida (Papilionaceae) in J. Bombay Nat. Hist. Soc. 85(2): 395-398.1988.

An erect to decumbent, slender, branched herb, 50-90 cm tall. Stem striate, with 2 prominent ribs, hairy. Leaves alternate varying in size and shape, ovate to linear-oblong, 2-3 cm long, 0.5-0.8 cm broad, entire, rounded at base, shortly mucronate at the apex, hairy on the margins and on both the sides of the midvein underneath, reticulately veined, shortly petioled. Petiole slender, about 0.5 cm long, with few; short, scattered, brown hairs at the junction of the lamina, stipulate. Stipules linear-lanceolate, 2-2.5 cm long, acuminate, with many parallel nerves. Inflorescence axillary and terminal racemes. Rachis slender, striate, almost glabrous or with few scattered hairs. Flowers dark-straw coloured, shining, binate on equal sized stalks arising from a raised joint on the rachis. Stalks about 0.2 cm long, slender, with few brown hairs, bracteate. Bracts broadly ovate, 0.5-0.7 cm long, 0.2 cm broad, hairy on the margins, rounded at base, narrowing abruptly from both the sides towards the apex and terminating in a long erect acumen, deciduous. Calyx tubular almost covering the pod. Sepals 5, linear oblong, 0.5-0.7 cm long, 0.1 cm broad, narrowing to the base into a short stalk, terminating in a long acumen at the apex; hairs yellow, erect. Outer sepals slightly broader and with longer claws than the rest of the sepals, many nerved. Corolla membranous, veined, clawed, brittle. Wings and keels almost fused in dry materials and difficult to segregate. Staminal tube about 1-1.5 cm long, shorter than the corolla. Stamens in two bundles, nine united and one free. Out of the 9 united stamens four stamens with longer filaments alternate with the five shorter ones. Pods 3-3.5 cm long 4-6 segmented; segments easily separating into individual compartments, reticulately veined, flat, compressed, sometimes quadrangular. Apical segment with capular prolongation, without any reticulations and bears a

thick style with a prominent stigma; basal segments narrowing to the stalk. Stalk 3-3.5 cm long, yellow, softly hairy. Seeds rounded, brown, compressed, smooth, solitary in each segment.

Type : *H. Santapau* 2982 (Holotype BLAT).

Flowering & Fruiting : October*.

Distribution : INDIA: Maharashtra.

Herbarium specimens : INDIA: Maharashtra; Khandala, Oct. 18, 1943, *H. Santapau* 2982 (BLAT); Trombay, Sept. 22, 1962, *G. L. Shah* 10593 (Paratype BLAT).

Notes : According to S.M. Almeida & M.R. Almeida (l.c.): *Alysicarpus narimanii* is more or less similar to *A. heyneanus* Wight & Arnott in its external appearance but it differs from it by: leaves ovate to linear-oblong, shortly mucronate at apex; flowers distant on the rachis; sepals with yellow, persistent, bulbous based hairs, sepals acuminate at apex, almost covering the entire pod; pods not constricted, reticulately veined; apical segment with triangular prolongation without any reticulation. Whereas *A. heyneanus* is having: leaves obovate, mucronulate at apex. Flowers more or less compact on rachis; sepals glabrous or with few scattered deciduous hairs, sepals acute at apex, pods exposed, only basal few segments are covered by calyx; pods deeply constricted, all segments with prominent transverse ribs, apical segments with short prolongation.

The species is named after late Dr. Nariman A. Irani, well known for his contribution to the taxonomic studies on the Flora of Matheran.

***Ammannia nagpurensis* T. Mathew & M.P. Nayar (Lythraceae)**
in Bull. Bot. Surv. India 31 (1-4): 158-161. 1989 (1992).

Annual, glabrous herbs. Stems up to 30 cm long, erect, sparsely branched, usually with one or two basal branches, four-winged. Leaves simple, opposite decussate, 3-15 × 0.5-3.0 mm, linear-oblong with auriculate-cordate base, acute at apex, entire, glabrous,

membranous, semi-amplexicaulous. Flowers in axillary simple or compound pedunculate cymes; peduncles filiform; primary peduncles 8-15 mm long; secondary peduncles up to 7 mm long, (1-) 3-7 (-15) flowers per cyme; pedicel 1.5-2 mm long; bracteoles 2, at the base of pedicel. Calyx tube campanulate, ca 1 mm long, lobes 4, subrotundate, mucronate. Petals 4, 0.5-1 mm long, obovate, inserted at the rim of calyx tube, pink, caducous. Stamens 4, inserted on the middle of calyx tube, filaments 0.5-0.6 mm long, anthers borne level with the base of petals. Ovary 0.75-1 mm long, globose, wall membranous, 2-loculed, many ovules in each locule; style distinct, 0.75-1 mm long, persistent in fruits; stigma capitate. Capsules up to 2 mm across, globose, exserted, opening irregularly. Seeds many, minute, 0.35 × 0.25 mm, ovoid, brown.

Types : Subramanyam 4717 (Holotype CAL; Isotype MH).

Flowering & Fruiting : October - November.

Distribution : INDIA: Maharashtra, Gujrat.

Herbarium specimens : INDIA: Maharashtra; Nagpur District, Starky Point, Nov. 7, 1946, Mirashi 252 (BLAT); *ibid*, Jalankeri farm, 283 m, Nov. 20, 1957, Subramanyam 4717 (CAL, MH). Gujrat; Dangs, Unai, Westward along Rly. line, Nov. 3, 1953, Santapau 17268 (BLAT); Saurashtra, Sasangir to Junvania, Oct. 5, 1953, Santapau 16359 (BLAT).

Notes : According to Mathew & Nayar (*l. c.*): Growing in paddy-fields, river-banks and other moist places.

A. nagpurensis T. Mathew et Nayar is closely allied to *A. multiflora* Roxb. but can easily be distinguished from it by having: sparsely branched stem, very long peduncles (up to 15 mm), subrotund calyx lobes with mucronate tip, stamens as long as or shorter than the calyx tube and flowers and fruits lax, whereas in the latter species stem densely branched, peduncles shorter (up to 5 mm), calyx lobes triangular with acute or acuminate apex, stamens longer than the calyx tube and flowers and fruits crowded. Spermoderm of both the species have been studied under the Scanning Electron Microscope (SEM) and observed that the shape, orientation as well as thickenings of the cells are different from each other.

This species is named after its type locality.

Andrographis nallamalayana J.L. Ellis (Acanthaceae) in Bull. Bot. Surv. India 8(3 & 4): 362-363. 1966 (1967).

Herbs procumbent, glabrous, puberulous in young condition, drying black, ± 50 cm long; stems radiating from the woody root stock, inconspicuously quadrangular. Leaves opposite, obovate to elliptic-ovate or ovate depending on seasons, entire, attenuate at base, inconspicuously imbedded with minute cystoliths, extipulate, 3-6 nerved, $\pm 7.5 \times 3.0$ cm. Bracteoles linear-elliptic, puberulous, glandular, small. Pedicels puberulous, glandular, ± 1.5 cm long. Calyx 5-lobed to the base; lobes linear, puberulous within, puberulous, and glandular without, up to 1.7 cm long. Petals bilabiate, white with maroon streaks on the upper lip, glabrous within, but sparsely hirsute near the attachment of filaments, pubescent and glandular without and more so on the lower lip, ± 0.7 cm long; tube ± 0.5 cm long. Stamens 2, epipetalous; filaments triquetrously winged, the wing towards the innerside ending near the attachment with an inwardly curved extension; anthers exerted, 2-celled with the lower one thickly bearded below, the other shortly pointed. Ovary superior, bicarpellary, syncarpous with 4-6 ovules in each cell, minutely puberulous, constricted below to a solid base; styles sparingly hairy with inconspicuously bifid stigmata. Fruits capsular, oblong or elliptic, sharply pointed, sparsely glandular when young, $\pm 1.5 \times 0.4$ cm; seeds 4-6, rugose, brown, situated on retinaculae; retinaculae falcate, spoon-shaped near the top.

Types : Ellis 25546 (A: Holotype CAL; B-P: Isotypes MH).

Flowering & Fruiting : March-August.

Distribution : INDIA : Andhra Pradesh.

Herbarium specimens : INDIA : Andhra Pradesh; Kurnool District, Nallamalais, Ahobilam, Aug. 29, 1965, Ellis 25546 (A: CAL; B-P: MH); *ibid.*, Chelama, July 4, 1963, Ellis 16709 A-E (Paratypes MH); *ibid.*, Mar. 18, 1965, Ellis 23715 A-J (Paratypes MH).

Notes : According to Ellis (*l.c.*) : Allied to *Andrographis beddomei* Clarke, but differs in being a low decumbent herb, having both

axillary and terminal inflorescences, calyx lobes longer, and plants drying dark green or black.

***Andrographis neesiana* Wt. var. *rotundifolia* Sreem.**
(Acanthaceae) in Bull. Bot. Surv. India 8 (1): 91. 1966.

Erect herbs, 35-50 cm tall; stems 2-3 mm thick, profusely branched, sparsely scabrescent, more densely so on younger parts, dark greenish black when dry, obscurely 4 angled, often rooting at lower nodes; nodes slightly swollen, densely brownish hairy. Leaves 1.3-3.5 × 1-3.3 cm, opposite, founded, or suborbicular, chartaceous, minutely puberulous on both surfaces, obtuse at apex, rounded or subcordate at base, margins entire with scattered bulbous based hook like hairs; nerves 4-5 pairs; petioles 1-2 mm long, scabrous. Flowers many, in terminal condensed subcapitate panicles; peduncles short, densely glandular-hispid; pedicels 3-5 mm long, slightly elongating in fruit, densely glandular hispid. Bracts ± 2 mm, ovate-lanceolate, acute, densely glandular-hispid. Bracteoles two, each 1.5 × 0.5 mm, linear-oblong-or oblong-lanceolate acute, glandular-hispid. Calyx-lobes five, each 5 × 1 mm, cleft almost to the base, linear-oblong, acute, glandular-hispid. Corolla 1.2-1.4 cm long, pale creamy-yellow with purple streaks and spots within, ventricose, prominently two-lipped, upper lip slightly bifid, lower prominently three-lobed, densely glandular-pubescent without, less densely so within. Stamens two; filaments densely hispid at the base, sparsely towards the tip; anthers of the two stamens adhering together in bud, ditheous, thecae subequal, white-bearded. Ovary two-celled, elliptic-oblong or oblong, hispid; style hispid throughout; stigma minutely bifid. Capsules 1.8-2 × 0.5 cm, linear-oblong to oblong, densely glandular-hispid. Seeds 2 mm in diameter, ellipsoid, pitted, several in each capsule.

Types : *Sreemadhavan* 862 (A: Holotype CAL; B-G: Isotypes MH).

Flowering & Fruiting : September*.

Distribution : INDIA : Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu (Madras); Coimbatore

District, Boluvampatti hills, 1100 m, Sept. 24, 1963, *Sreemadhavan* 862(A in CAL; B-G in MH).

Notes : According to *Sreemadhavan (l.c.)*: *Andrographis neesiana* Wt. var. *rotundifolia* Sreem. differs from the typical variety in having stems profusely branched and leaves smaller, very shortly petioled, rounded or suborbicular, obtuse at apex, rounded or subcordate at base with 4-5 pairs of nerves.

***Androsace garhwalicum* Balodi & Singh (Primulaceae) in Bull. Bot. Surv. India 30 (1-4): 176-177. 1988 (1990).**

Cushion forming, perennial, stoloniferous herbs; stems 1-5 cm long, simple, glabrous. Leaves 2.5-5 × 1.5-2 mm, closely imbricating, oblong-lanceolate, or lanceolate, entire, acute or subobtuse, lower leaves longer, laxly ciliate, sessile, upper leaves glabrous or ciliate. Flowers 6 mm across, on solitary scapes, scapes 1.0 cm long, glabrous or sparsely ciliate; bracts 4 mm long, solitary at the base of scapes; calyx 3 mm long, 5-lobed to half way down, acute or obtuse, densely ciliate; corolla tube minute, lobes 5.5mm long, obcordate, pale blue; stamens ca 1.5 mm long, anthers 0.5 mm long; ovaries ca 0.5 mm long, globose, styles ca 0.5 mm long. Fruit ca 1 mm long, globose; seeds 2.

Types : *U. C. Bhattacharyya* 29497 (A: Holotype CAL; B: Isotype BSD).

Flowering & Fruiting : Time not reported.

Distribution : INDIA : Uttar Pradesh. ³

Herbarium specimens : INDIA : Uttar Pradesh; Chamoli Garhwal, Hemkund, 4200 m, *U. C. Bhattacharyya* 29497 (A in CAL; B in BSD).

Notes : According to *Balodi & Singh (l.c.)* : This is an undescribed species closely allied to *Androsace selagini* (*A. selago* Hook. f. & Th.) in having solitary and bracteate scapes, but differs in having longer scapes (1 cm) bracts smaller than the flowers, not silky, leaves oblong-lanceolate or lanceolate, not incurved, in *A. selagini*, scapes

are less than 5 mm long; bracts equalling the flowers, silky, leaves linear or cuneate obovate, incurved.

Anemone raui Goel & U.C. Bhattach. (Ranunculaceae) in J. Bombay Nat. Hist. Soc. 79 (3): 641-643. 1982 (1983).

Erect herbs 50-75 cm high, 0.4-0.6 cm thick; root stock perennial. Stem 30-50 cm long, base stout covered with fibrous remains of petioles, glabrous, villous at involucreal joints. Radical leaves long petiolate, petioles 12-32 cm long, narrowly sheathing at base; lamina 9-18 (-20) cm across, palmately 3-lobed, deeply cordate, subglabrous, hairy chiefly on nerves; segments sessile, unequally broadly obovate, deeply or shallowly 3-partite, cuneate, 5-10 × 4.5-9 cm; secondary segments again 3-lobed, irregularly coarsely serrate. Inflorescence a variously divided lax dichasial cyme, never in umbels. Involucres of first order-2, sessile, each 3-5 × 4-6 cm; broadly obovate, cuneate, subglabrous, hairy on nerves on both surfaces; segments trifid, cuneate, each segment 3-lobed, irregularly serrate; involucres of the second order and above, smaller, broadly obovate, cuneate, segments 3-lobed with acute apex, 1.5-3.0 cm long; peduncles 5-15 cm long. Pedicels 2.5-8 cm long; median always smaller, slightly puberulous to pubescent above. Perianth-5, narrowly obovate, 9-15 × 4-6 mm, white, glabrous. Stamens 20-35; filaments 1.5-3.0 mm long, complanate to filiform, unequal, anthers 0.8-1.2 mm long, outer linear-elliptic, inner broadly ovate. Pistils 3-6, sessile, 3.0-3.5 mm long, glabrous, ovary compressed, linear-ovate with gently curved style, tapering into obtuse stigmatic apex. Achenes few (1-4) attaining maturity, flat, elliptic-ovate, 5-7 × 3-4 mm, symmetrical; style persistent, slightly curved, contiguous to achene, narrowly margined. Seeds flat, 5-6 × 2.5 mm long, broadly lanceolate, dark brown glabrous.

Type : A.K. Goel 64419 A (Holotype BSD).

Flowering & Fruiting : July September.

Distribution : INDIA : Uttar Pradesh.

Herbarium specimens: INDIA : Uttar Pradesh; Garhwal, Gangi, 3000 m, Aug. 12, 1978, A. K. Goel 64419 A (BSD); Kumaon, Below Odiyar, 2900 m, Aug. 8, 1972, C. M. Arora 49738 (Paratype BSD);

Below odiyar, 3300 m, Aug. 6, 1972, C.M. Arora 49636 (Paratype BSD).

Notes : According to Goel & Bhattacharyya (*l.c.*): Allied to *Anemone elongata* D. Don, but differs in its large 9-18 (-20) cm across leaves; inflorescence a dichasial cyme; perianth narrowly obovate, smaller, 9-15 × 4-6 mm; stamens 20-35; pistils 3-6; achenes 1-4, elliptic-ovate beak slightly curved. Seeds glabrous.

Common on open grassy slopes, between rocks and near streams in temperate regions.

The species has been named in honour of Dr. M.A. Rau, a well known botanist, plant explorer and retired Dy. Director, Botanical Survey of India, Northern Circle, Dehra Dun.

***Anoectochilus nicobaricus* N.P. Balakr. & Chakr. (Orchidaceae)**
in Bull. Bot. Surv. India 20 (1-4): 80. 1978 (1979).

Terrestrial erect herbs, 15-30 cm high; stem slightly decumbent at base, rooting at lower nodes; leafy part up to 2 cm long; lower nodes covered with scarious remnants of leaf-sheaths. Leaves 3-4, ovate, elliptic, obliquely rounded or acute at base, acute at apex, 3-6 cm long, 2-4 cm wide, dark purplish with golden reddish reticulate venation above, dark brownish beneath; petioles with sheaths 1.0-1.5 cm long; sheaths 5-8 mm long, saccate, loose-fitting. Inflorescence 4-8-flowered, solitary, terminal; scape slender, 7-15 cm long, puberulous; sterile bracts 2-3, ovate-lanceolate, acuminate, 1.0-1.5 cm long, scarious, sheathing at base; rachis 4-6 cm long; bracts similar to sterile bracts, 8-12 mm long. Flowers 4-6 per rachis, ± 1.5 cm long, white, reddish hairy outside on sepals, with two pink spots at apex of lip; ovary with pedicel fusiform, 1.2-1.5 cm long, reddish pubescent. Dorsal sepal ovate, acuminate, hyaline at margins, 8-9 mm long, 4-5 mm wide, adnate to petals forming a hood, glandular hairy outside. Lateral sepals lanceolate, obliquely auricled at base, 10-11 mm long, 4-5 mm wide, 1-nerved, glandular hairy outside. Lip ± 1.2 cm long; spur protruding beyond lateral sepals,

parallel to ovary, laterally compressed, obtuse with 2 papillose calli on back wall in side; blade channelled in middle, basal lobes rounded, erect; claw \pm 3 mm long, with 6-8 slender unequal lobes on either side along incurved margin; apical lobe bilobed with a minute tooth at apex in between lobes; lobes widely diverging, obliquely oblong-subquadrate, truncate-obtuse at apex, \pm 4 mm long, \pm 2.5 mm wide. Column oblong, acuminate, \pm 6 mm long, erect, with 2 lamellae in front intruding into spur; rostellum 2-fid, with 2 stigma on either side; pollinia 2, calavate, divided into numerous lobules; caudicle long, turned upwards with a shield-like lanceolate disc at tip.

Types : Chakraborty 3226 (A: Holotype CAL; B-C : Isotypes PBL).

Flowering : December.

Distribution : INDIA : Nicobar Island.

Herbarium specimens : INDIA: Great Nicobar Island; 6 km on East West Road, Dec. 1, 1975, in flowers, P. Chakraborty 3226 (A in CAL; B-C in PBL).

Notes : According to Balakrishnan & Chakraborty (*l.c.*): This species differs from the nearest allied *A. geniculatus* Ridl. mainly in the petioles and sheaths being shorter; leaves dark purplish with golden red veins above, light brownish beneath; flowers 5-8; bracts and sepals shorter; spur obtuse; claw of lip with 12-16 lobes; lip not geniculate, only slightly curved; apical lobes shorter and narrower. It is also allied to *A. albolineatus* Par. & Reichb. f. but differs in having more (4-8) flowers per inflorescence; base of lip shorter than claw; appendages on claw of lip shorter, fewer and spur obtuse, not cleft at apex, also not keeled inside on front wall.

Endemic to Great Nicobar Island and in shaded places.

Apluda blatteri Sur (Poaceae) in Bull. Bot. Surv. India 28 (1-4): 193. 1986 (1988).

Herb annual, branched. Culms 13 cm long, glabrous. Leaves 1.5-3.1 cm long and 1.5-2.5 mm wide, linear lanceolate tapering upwards

to a fine point, ligules short ciliate. Panicles up to 3 cm long, bearing clusters of trios of spikelets, spathe at the base of the trios, ovate to ovate-oblong. Sessile spikelet hermaphrodite, 6 mm long, one flowered. Lower involucral glume 6 mm long and 1.5 mm wide, chartaceous, many nerved, tip bidentate. Upper involucral glume 5.5 mm long and 3 mm wide, boat shaped, compressed, keeled 5-7 nerved. Lemma 4 mm long, 2 fid at the tip, middle portion hardy, awned, awn up to 1 cm long, with twisted column; palea 1.5 mm long, oblong to broad ovate, nerveless; stamens 3, anthers 3 mm long; stigmas 2. Pedicelled spikelet 4.2 mm long. Lower involucral glume 4.2 mm long and 1.5 mm wide, lanceolate, multinerved. Upper involucral glume 4.1 mm long and 1.5 mm wide, lanceolate, 5-6 nerved. Lower floret empty. Lemma 4 mm long, lanceolate, acute; palea 3 mm long hyaline, nerveless, lanceolate. Upper floret hermaphrodite, palea small, ovate, ovate-oblong, stamens 3, style 2, stigmas plumose.

Type : *Father E. Blatter 2594* (Holotype CAL).

Flowering : October*.

Distribution : INDIA : Rajasthan.

Herbarium specimen : INDIA : Rajasthan; Mount Abu, Oct. 13, 1916, *Father E. Blatter 2594* (CAL).

Notes : According to Sur (*l.c.*): *Apluda blatteri* differs from *Apluda mutica* L. in the shorter habit with culms 13 cm long, shorter leaves, shorter panicles (3 cm long), sessile spikelet with one floret.

Still recently the above the genus *apluda* was reprinted in India by one species only. The grass in being named in honour of the collector *Father E. Blatter*.

Ardisia meghalayensis M.P. Nayar & G.S. Giri (Myrsinaceae) in *J. Bombay. Nat. Hist. Soc.* 72 (3): 825-826. 1975(1976).

Shrub. Branches subterete, ferruginous and densely pilose when young. Leaves petiolate, petiole 8-10 mm long, ovate-lanceolate, 6-8 cm × 2.5-3.5 cm, basi cuneate, apex acute or acuminate, margin

dentate-crenate, chartaceous, upper surface when young pubescent, undersurface along the nerves hairy, densely glandulose punctate, nerves on the upper surface immersed, and nerves on the undersurface prominent. Inflorescence lateral, subcorymbose, 3-5 cm long, densely pilose hirsute, shorter than the leaves; flowers hirsute and pilose; pedicel \pm 1.5 cm long, bracteate; bracts linear 5-7 mm long, pubescent. Sepal 5 lobed united $\frac{1}{3}$ at the base, lanceolate, 5-7 mm \times 1-1.5 mm, acuminate, ciliate glandulose-punctate. Petal 5, subsymmetrical, imbricate, united shortly at the base, ovate-elliptic, 5-6 mm \times 4-4.5 mm, glandulose punctate. Stamens 5, shorter than petals, another 3-3.5 \times 1-1.5 mm, acute, filament 0.5-0.8 long. Ovary subglobose, glabrous; style 3-4 mm long, stigma inconspicuous.

Type : J/M No. 903 (CNH Acc. No. 279310, CAL).

Flowering : May*.

Distribution : INDIA : Maghalaya.

Herbarium specimen : INDIA: Meghalaya; Jaintia Hills, Pangle woods, 1333-1666 m, May 1873, J/M No. 903 (CNH Acc.No. 279310, CAL).

Notes : According to Nayar & Giri (*l.c.*): This differs from *A. blumei* A.DC. in having smaller leaves (6-8 cm \times 2.5-3.5 cm), subcorymbose, inflorescence and longer pedicel (1.5 cm long). The presence of 4 to 6 leaves at the nodes is very characteristic in *A. meghalayensis* whereas in *A. blumei*, the leaves are large (13 cm \times 3.5 cm), the inflorescence is paniculate and pedicels are shorter \pm 4 mm long.

Argyreia arakuensis N.P. Balakr. (Convolvulaceae) in Bull. Bot. Surv. India 3 (2): 163-165. 1961(1962).

Stem twinning, terete, solid, up to 8 m long, densely appressed-tomentose to pale fulvous woolly as are the petioles and inflorescences. Leaves large, ovate to orbicular, 6-20 \times 5-17 cm, base very rarely rounded, apex acute or shortly broad-cuspidate, mucronulate, upper surface sparsely appressed-hispid, lower surface densely white, greyish or fulvous woolly-tomentose, midrib and the 5-13 nerves

prominent beneath, minor nerves many, subparallel; petioles shorter than the blade, 1-8 cm long, densely woolly-tomentose. Flowers in subcapitate cymes; peduncle shorter than the petiole, up to 6 cm long, tomentose or woolly. Pedicels 3-7 mm long. Bracts prominent, persistent; outer bracts large, foliaceous, ovate-elliptic, acute, shortly petiolate, 1.5-2.5 × 0.5-2.0 cm (smaller and narrower in cymes towards the apex of the stem), pinnately veined, densely fulvous tomentose beneath, appressed-hispid above, inner bracts narrower, linear-oblong or spatulate, obtuse or broadly acute at apex, narrowed at base, 1-2 cm long, 2-4 mm wide, with a single main nerve, lateral nerves not prominent, indumentum as on outer bracts. Sepals slightly unequal, hispid-pubescent outside on exposed regions, glabrous inside and covered regions; the two outer sepals linear-oblong, spatulate, acute, ± 1.75 cm long; the three inner sepals linear-oblong, narrowed to the apex, acuminate, ± 1.5 cm long. Corolla funnel-shaped, ± 4.5 cm long, pale to dark pinkish purple, darker at the throat, limb shallowly lobed, soon reflexed, mid-petaline bands and upper portion of tube hispidulous. Stamens and style included. Filaments pilose at base. Ovary glabrous, 4-celled. Fruit not present.

Types : Balakrishnan 540 (A: Holotype CAL; B-F: Isotypes CAL).

Flowering : August September.*

Distribution : INDIA: Andhra Pradesh.

Herbarium specimens : INDIA: Andhra Pradesh; Araku valley, Visakhapatnam District., 800 m, Sept. 14, 1961, Balakrishnan 540A-F (CAL); *ibid.*, Aug. 23, 1960, Balakrishnan 10751 A-F (Paratypes MH).

Notes : According to Balakrishnan (*l.c.*) : The species differs from *A. sericea* by having peduncle shorter than the petiole, outer bracts when foliaceous, always pinnately reticulate; leaves densely appressed hairy above, not shining beneath; whereas *A. sericea* is characterised by longer peduncle than its petiole; outer bracts foliaceous, palmately 3-5 nerved; leaves sparsely hairy above and silky shining beneath. Another related species *A. choisyana* with leaves being elliptic-oblong, rounded at base, twice as long as broad differs from both

the species *A. arakuensis* & *A. sericea* in which leaves are ovate, deeply cordate at base, as broad as long.

Argyrolobium album U.C. Bhattach. (Papilionaceae) in Bull. Bot. Surv. India 14 (1-4): 175-177. 1972(1975).

Plants perennial, branches long, slender 30-50 cm decumbent, diffuse from perennial rootstock, adpressed strigose in younger parts glabrescent below. Leaves rather remote digitately trifoliolate, petiole longer than leaflets stipules small linear, leaflets petiolulate, obovate spatulate longer than broad, terminal largest, lateral slightly falcate, 0.8-1.5 cm by 0.5-0.8 cm, glabrous above adpressed strigose beneath denser when young, entire obtuse or minutely mucronate glaucous when dry. Peduncle leaf opposed, slender 2-5 flowered adpressed strigose, bracteoles minute setaceous. Calyx bilobed, upper slightly shorter and more deeply cleft than the lower, lobes narrow lanceolate moderately strigulose, as long as corolla or slightly shorter 0.4-0.5 cm mid-anterior lobe narrow. Corolla white, standard nearly subequal with lower calyx lobe, 0.5-0.6 cm. Pods 2-2.5 cm long, 0.2 cm broad straight or tip slightly falcate, densely adpressed strigulose when young, lesser on maturity, hairs facing forward, seeds 8-10 black discoid bluntly mucronate not shining.

Types : *U. C. Bhattacharyya* 39416 (Holotype BSD; A-E: Isotypes BSD).

Flowering & Fruiting : August*.

Distribution : INDIA : Punjab.

Herbarium specimens : INDIA: Punjab; Gurdaspur District, in *Pinus* belt near Dhar along the road leading to Dharamsala from Pathankote, 800 m, Aug. 30, 1969, *U. C. Bhattacharyya* 39416 & 39416 A-E (BSD).

Notes : According to *Bhattacharyya (l.c.)* : *Argyrolobium album* *Bhattacharyya* closely allied to *A. trigonelloides* Jaub. et Spach but differs in having perfectly white flowers, petiole mostly longer than leaflets, much longer and slender pods with 8-10 seeds.

In India only two species of *Argyrolobium* are reported to occur

and the third Persian species *A. trigonelloides* Jaub. et Spach was supposed to be distributed in Scinde (Baker in FBI 2: 64. 1879), but has not been reported from India. The present taxon apparently simulating *A. roseum* Jaub. et Spach is clearly different from the latter in having much smaller white flowers and leaves with longer petioles and leaflets petiolulate, with very different shape.

***Arisaema setosum* A.S. Rao & D.M. Verma (Araceae) in Bull. Bot. Surv. India 11 (1&2): 196-197. 1969 (1971).**

Dioecious. Rhizome creeping, ca 1 cm thick. Leaf solitary, pedate; petiole ca 33 cm long, ca long, ca 4 mm thick at base; median petiolule and common petiolules of lateral pairs of leaflets 6-15 mm long; leaflets 5, lanceolate or oblanceolate with the lateral leaflets slightly oblique, unequal, 12-20 cm long, 4-6 cm broad, caudate-acuminate, margins slightly undulate; basal lateral nerves sub-marginal, free, upper ones anastomosing variously towards margins. Peduncle arising directly from the rhizome an distinct from the petiole, sheathed, 4.5-7 cm long 2-3 mm thick; sheaths 3-4, membranous, acute, outer ovate, inner lanceolate, the innermost equal to or slightly longer than the peduncle. Spathe tubular below, 7-9 cm long; tube cylindric, 3.2-3.5 cm long, ca 1.5 cm wide; limb ovate-lanceolate, 3.6-5.2 cm long, ca 2 cm broad, base auriculate, apex caudate, ca 5 mm long; auricles reniform, ca 10 mm long, ca 5 mm wide, Spadix sessile; floriferous part ca 2 cm long; appendage shorter than the floriferous part, ca 2.5 mm thick at base, topped with a tassel of filaments; filaments numerous, ca 3-5 cm long pinkish-green (vide R.S.Rao). Male flowers sparse; stipe 1.5-2.5 mm long; anthers 4-5, globose, minute. Female flowers contiguous; ovary ovoid, style short, attenuate; stigma capitate.

Type : *R.S. Rao* 17907 A, ♀ (Holotype CAL).

Flowering : November.*

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA : N.E.F.A.; Siang District , Sirang to Guizing, Nov. 20, 1958, *R.S Rao* 17907 (A, ♀ in CAL; B, ♂ Paratype, in ASSAM).

Notes : According to Rao & Verma(*l.c.*) : Differs from all other species of *Arisaema* in the short peduncle arising from the rhizome separately from the petiole and the tasselled appendage.

***Artabotrys nicobarianus* D. Das (Annonaceae) in Bull. Bot. Surv. India 11 (1 & 2): 194-195. 1969 (1971).**

A scandent shrub. Leaves thickly coriaceous, elliptic, caudate, at the apex, base cuneate, both surfaces glabrous, 10-13.5 cm long and 4.5-6 cm broad, main lateral nerves about 10 pairs; petiole about 5 mm long, glabrous. Flowers greenish many on fasciculate branches of hooked peduncle; minute brown-tomentose persistent bracts present on those branches; pedicels slender 0.7-1.2 cm long, pubescent. Sepals 3, ovate acute, tomentose out-side, about 4 mm long and as broad as long. Petals 6 in 2 series, outer longer than the inner; outer petals clawed, limb linear-lanceolate with a pointed apex, both surfaces tomentose, about 2 cm long and 5 mm broad; inner petals united at the clawed portion and limb free sub-clavate to cylindrical, grey-tomentose, about 1 cm long. Stamens many, about 1.5 mm long, top of the connectives beak-shaped in front, otherwise convex at the top, filaments prominent, anther cells short. Carpels a few, about 5 mm long, densely strigose; ovaries ovoid; stigma sessile. Ripe carpels not known.

Types : *K. Thothathri & S.P. Banerjee* 11524 (Holotype CAL; Isotype CAL).

Flowering : March. *

Distribution : INDIA : Nicobar Islands.

Herbarium specimens : INDIA: Great Nicobar; Galathea Bay to Pulobaha Bay, Mar. 26, 1966, *K. Thothathri & S.P. Banerjee* 11524 (CAL).

Notes : According to Das (*l. c.*): *Artabotrys nicobarianus* Das is closely allied to *A. stolonifera* Elm. but differs from the latter in the habit, the absence of *inflorescent* stolons, shorter pedicels, sepals and petals being smaller, inner petals united at the clawed portion and limb free cylindrical. Collected from the forest.

Arundinella kannanorica V.J. Nair, Sreek. & N.C. Nair (Poaceae) in J. Bombay. Nat. Hist. Soc. 80 (2): 396-398. 1983(1984).

Annuals. Culms 20-50 cm tall, erect, slender; nodes glabrous. Leaves 2-5 cm long and 2-5 mm broad, mostly basal, lanceolate, base rounded or shallowly cordate, glabrous or covered with sparse tubercle-based hairs, especially along the margins. Sheaths 1-8 cm, lower ones shorter and upper ones much longer than the internodes, striate, glabrous or ciliate along one margin. Ligule, a row of hairs. Panicles 10-40 cm long, lax, willowy; branches 1-12 cm long, ascending, alternate or rarely whorled, slender, filiform, angular, bearded the nodes with long silky hairs, purple; rhachis flexuous, angular and scaberulous; pedicels 2-15 mm long, slender, angular, scaberulous. Spikelets 5-6 mm long, lanceolate, acuminate, turgid, pale-green or purple, glabrous. Lower glumes 3.5-4.5 × 1.0-1.5 mm, ovate-lanceolate, strongly 3-nerved, purple glabrous. Upper glumes 5.0-5.5 × 1.25-1.50 mm, ovate-lanceolate, caudate or long-acuminate, strongly 5-nerved, greenish with purple tinge, glabrous. Lower floret male; lemma 2.75-3.00 × 1.0-1.5 mm, ovate-oblong, obtuse, faintly 5-nerved, lateral nerves very close, pale-green, membranous and glabrous; palea 2.0-2.5 × 0.50-0.75 mm, elliptic-lanceolate, 2-keeled and auriculate at base, 2-nerved, hyaline, glabrous; stamens 3, anthers 1.0-1.5 mm long, filaments short. Upper floret bisexual; callus bearded, hairs 0.25-0.50 mm long; lemma 1.75-2.00 × 0.50-0.75 mm, ovate or elliptic, tip with a geniculate awn, dorsally covered with numerous wart-like outgrowths, chest-nut brown when fully matured, awn 8-10 mm long, geniculate, column c 4 mm long, chest-nut brown; palea 1.25-1.50 × 0.4-0.5 mm, oblong, acute, 2-nerved, with a few wart like outgrowths on the dorsal surface; lodicules 2, each c 0.30 × 0.25 mm, obovate, denticulate at apex; stamens 3, anthers 1-2 mm long, violet, filaments short; ovary c 0.25 × 0.15 mm, ovate, glabrous; styles c 0.5 mm long, stigmas c 1 mm long, pink, feathery.

Types : P.V. Sreekumar 71822 (Holotype CAL; Isotypes K, MH).

Flowering : October- November*.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Cannanore District, Bela (in between Kumbla and Bedudka), \pm 100 m, Nov.23, 1981, P. V. Sreekumar 71822 (CAL, K, MH); Cannanore District, Paramba (on way to Bendudka), Oct. 16, 1981, P.V. Sreekumar 71718 (Paratype MH).

Notes : According to Nair *et al.* (*l.c.*) : Differs from *Arundinella laxiflora* Hook.f. in; branches villous at nodes; panicle branches ascending; keels of lower palea glabrous; upper lemma $2/3$ the length of lower lemma, thick, coriaceous, muricate, tip rounded, not toothed; callus of upper floret densely bearded.

Frequent in dry rocky areas and open grass lands, and other very dry localities along with other grasses such as *Arundinella mesophylla* Nees, *Bhidea burnsiana* Bor and a few *Dimeria* spp.

Arundinella setosa Trin. var. *nilagiriana* Subba Rao & Kumari (Poaceae) in J. Bombay Nat. Hist. Soc. 72(3): 827-828. 1975(1976).

A perennial grass with whitish woolly base, culms up to 30 cm, slender, terete, smooth, almost glabrous, \pm striate, erect; nodes glabrous. Leaf blades narrow, linear, tapering to a point, striate, 7.5-9 \times 0.2-0.4 cm, hirsute on both sides with tubercle based hairs, ciliate on margins with similar hairs; sheaths clasping the culms, striate, hirsute as leaf blades; ligule very thin, membranous, hairy with long white silky hairs. Inflorescence an erect panicle, 8-12 cm long; axis terete, striate, scabrid; branches 3-6 cm, alternate, distant; pedicels often in pairs, one long-one short, dilated below the spikelet, scaberulous and always with long bristles near the tip. Spikelets 5-7 mm long, gaping. Lower glume 5-6.5 mm long, dark purple in colour, ovate-acuminate, shortly aristate, firm, 3-nerved, nerves anastomosing at the tip, bristly with tubercle based colourless hairs; upper glume 5.5-7 mm long, light yellow, membranous, ovate-acuminate, the upper one third forming a narrow beak clasping the awn, 5 nerved, nerves anastomosing at the tip, pubescent. Lower floret $\hat{\sigma}$; lemma 3-4 mm long, membranous, rounded on the back, oblong-obtuse, keeled, scaberulous without in the upper half; palea

elliptic-obtuse, a little shorter narrower and thinner than the lemma, rather flat; stamens 3; anthers 1.5 mm long. Upper floret usually (♂), rarely (♀); lemma 2-2.5 mm long with a hairy callous, shining, scabrid without, lanceolate with a stout twisted awan at the apex in between two colourless scabrid setae; palea almost of the same size and texture; awan up to 7-8 mm long, geniculate, scabrid; column 3 mm long, chestnut brown; stamens 3; anthers 2 mm long; ovary smooth, 1 mm long; styles 2-2.5 mm long; stigmas plumose, 1.5 mm long. Caryopsis unknown.

Types : G.V. Subba Rao & G.R. Kumari 19795 (A: Holotype CAL; B-F: Isotypes MH).

Flowering : September.*

Distribution : INDIA : Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Nilgiri District, near Koilbetta at Ebanad, 1850 m, Sept. 11, 1970, Subbarao & Kumari 19795 (A in CAL; B-F in MH); *ibid.*, Mar. 25, 1972, Subbarao 40477 A-J (Paratypes MH).

Notes : According to Rao & Kumari (*l.c.*): This taxon is allied to *Arundinella setosa* Trin. var. *lanifera* Fisch. but differs from it in having hirsute glumes.

***Aspidopterys balakrishnanii* R.C. Srivast. (Malpighiaceae) in J. Econ. Tax. Bot. 4(3): 1003-1005. 1983.**

Climbers. Stems woody; branches slender. Leaves opposite, broadly elliptic or ovate, 9-12 × 7-8.5 cm, bases rounded or shallowly cordate, apices acuminate, glabrous above, sparsely villous beneath; hairs dense and rusty brown on midribs and veins; young leaves more villous. Racemes panicle, pubescence rusty villous; flowering axis 12-16 cm long; pedicels 2.5-6 mm long, ca 0.25 mm thick, densely villous when young, becoming glabrous later on, in fruits elongated, ca 1-1.8 cm long, articulated at ca 8 mm below calyx; buds 1.5-3 × 1-2 mm, glabrous; bracts 4-6 mm long, villous; bracteoles ca 0.75 mm long, villous; sepals ca 1 × 0.5 mm, glabrous. Samaras 3-winged, ovate, 2-3 × 2-2.5 cm, each wing extended into an auricle, auricles ovate ca 1-1.2 × 0.5-0.7 cm, carpophores ca 2.5 mm long.

Types : Haines 561 (Holotype CAL; Isotype CAL).

Flowering & Fruiting : August - December.

Distribution : INDIA : W. Bengal, Uttar Pradesh.

Herbarium specimens: INDIA : N. Bengal (West Duars); Lower tendu forest, Haines 561 (CAL). Uttar Pradesh; Nainital, Tanakpur, Awasthi 367 (Paratype LWG).

Notes : According to Srivastava (*l.c.*) : This species is closely allied to *A. nutans* (Roxb.) DC., but differs in wings of samaras extended into an ovate auricles at base and pubescence of leaves, size and shape of buds. Another species *A. orbiculata* has a dorsal wing with crista on the nucleus, while in present species the base of wings is extended into ovate auricle.

The species is named in honour of Dr. N.P. Balakrishnan.

Aspidopterys cordata (Wall.) Juss. var. *vermae* R.C. Srivast. & N.P. Balakr. (Malpighiaceae) in Bull. Bot. Surv. India 25(1-4): 228-229. 1983 (1985).

Climbers. Stems woody, young branches white tomentose or woolly. Leaves orbicular or ovate-cordate, 7.5-14 × 5-13.5 cm, cordate at bases, acuminate at apices with broad based and abrupt acumen, glabrous above, white tomentose below; petioles 2.2-6 × 0.15-0.3 cm, white tomentose. Panicles axillary or terminal, 9-17 cm long, lax, few branched; pedicels (in furits) ca 18 × 0.75 mm, articulated at ca 9 mm from base, white tomentose above the articulation. Samaras broadly elliptic or almost ovate, 3.5-4.5 × 2.4-3.5 cm, entire to slightly at bases, retuse at apices, pale grey to greyish-brown, ecristate; carpophores ca 2 mm long.

Types : Wadhwa 60930 (A: Holotype BSI; Isotype BSI).

Flowering & Fruiting : August - November.

Distribution : INDIA : Gujrat.

Herbarium specimens : INDIA : Gujarat; Dangs forest, Ahwa, Wadhwa 60930 A & 60930 (BSI).

Notes : According to Srivastava & Balakr. (*l.c.*): Differs from the allied variety var. *cordata* in samaras being fewer, larger, broadly elliptic or almost ovate, pale grey or greyish brown, never deep brown.

Differences between two varieties are: Decomposed panicles, 10-22 flowered; pedicels (in fruits) *ca* 14 mm long; samaras narrowly elliptic, tapering at base, 2.75-3 × 2.0-2.2 cm, dark brown in colour, margins wavy are the characters in variety *cordata*; whereas, the variety *vermae* is characterised by compound panicles, 4-6 flowered; pedicels (in fruits) *ca* 18 mm long; samaras broadly elliptic, rounded at base, 3.5- 4.5 × 2.4-3.5 cm, grey to greyish-brown in colour, margins entire.

The varietal epithet is given in honour of Dr. D. M. Verma's contributions in plant taxonomy.

***Aspidopterys jainii* R.C. Srivast. (Malpighiaceae) in J. Jap. Bot. 59 (11): 329. 1984.**

Scandent shrub. Stem woody, branches and branchlets glabrous or sub-glabrous. Leaves lanceolate, 7-17 × 1-5 cm, entirely glabrous; petioles *ca* 2 cm long, glabrous; lateral nerves 4-5 pairs; obtuse at base, acuminate at apex. Inflorescence paniculate, axillary or terminal; opposite or whorled; panicles shorter than leaves, pubescent when young, glabrous or sub-glabrous when mature; bracts foliaceous; bracteoles *ca* 1.5 mm long, acute. Fruiting pedicels articulate, glabrous or sub-glabrous towards apex. Samaras ovate-elliptic, 2-3.5 × 1.3-2.2 cm, narrowed towards apex, membranous, glabrous, brown, ecristate.

Types : U. N. Kanjilal 4622 (Holotype ASSAM; Isotype DD).

Flowering & Fruiting : Time not mentioned.

Distribution : INDIA : Meghalaya.

Herbarium specimens : INDIA: Meghalaya; Khasi hills, Mahadeo, 3000 ft., U.N. Kanjilal 4622 (ASSAM, DD).

Notes : According to Srivastava (*l.c.*): This species differs from the allied species *A. oxyphylla* (Wall.) Juss. in its glabrous, typically

lanceolate leaves; in panicles being less branched and shorter than leaves and ovate elliptic samaras.

The specific epithet of this species is given in honour to Dr. S. K. Jain's contributions in the field of taxonomy.

Aspidopterys wallichii Hook. f. var. **dehradunensis** R.C. Srivast. (Malpighiaceae) in J. Econ. Tax. Bot. 4(3): 1025. 1983.

Climbers, stems woody, branches glabrous or glabrescent, reddish-brown. Leaves ovate elliptic, 10.5-20 × 4.5-7 cm, acute or obtuse at bases, acuminate at apices, glabrous above, white woolly beneath; petioles 1.8-2.5 cm long, white tomentose or woolly. Panicles axillary or terminal, 20-30 cm long; pedicels (in fruits) ca 2-2.3 cm long, 0.75 mm thick, articulated below middle, pubescent above articulation. Samaras elliptic, 1.6-2.4 × 1.3-2 cm, wavy margined, retuse at apices, deep brown with white shades, ecristate; carpophores ca 3 mm long.

Types : *Anonymous* s.n. (A: Holotype & Isotype DD).

Flowering & Fruiting : November January.

Distribution : INDIA : Uttar Pradesh.

Herbarium specimen : INDIA: Uttar Pradesh; Dehra Dun, near Gorkha lines, *Anonymous* s.n. A (DD).

Notes : According to Srivastava (*l.c.*) : Differs from var. *wallichii* in having: small elliptic samaras with strongly wavy margin, brown; pedicels articulated below middle.

The varietal epithet derives from type locality.

Astragalus badrinathensis M.P. Sharma, Aswal & Mehrotra (Papilionaceae) in J. Econ. Tax. Bot. 14(1): 113-114. 1990.

Perennial acaulescent herbs, ca. 5-10 cm high; leaves and inflorescence emerging directly from the rootstock. Rootstock covered by persistent leaf bases. Leaves paripinnately compound; petioles ca. 1.0-2.2 cm long; rachis ca 3.0-5.0 cm long, sparsely pubescent, hairs spreading; leaflets 14-20, 4.0-6.0 × 2.0-3.0 mm, obovate, oblong-

obovate, oblanceolate, obtuse, mucronate, glabrous above, hairy on the margins and midrib beneath. Stipules free, 0.7-1.1 cm long, membranous, pilose at the margins and tips. Inflorescence 2-3-flowered, almost sessile at the crown of rootstock or shortly peduncled, peduncle 2.0-3.0 mm long. Bracts ca 4.0-6.0 mm long, linear, pilose with vertical black and spreading white hairs. Pedicels 3.0-4.0 mm long, pilose. Calyx tubular, 1.0-1.2 cm long, pilose, with vertical black and spreading white hairs; teeth 5, subequal, 2.0-3.0 mm long, glabrous claw 7.0-8.0 mm, blade 10.0-12.0 mm long; wing 1.6-1.7 cm long; claw 9.0-10.0 mm long, blade 7.0-8.0 mm long, oblong; keel 1.4-1.5 cm, claw 9.0-10.0 mm, blade 5.0-6.0 mm long. Stamens diadelphous (9+1), vexillary stamen free, remainder connate. Ovary pilose, stipitate, stipe 1.0 mm or less; style filiform, incurved; stigma capitate. Pod (immature) 1.2 cm long with ca 7.0 mm long straight tip.

Types : M. P. Sharma 15734 (A: Holotype CDRI; B-D: Isotypes CDRI).

Flowering & Fruiting : July September.

Distribution : INDIA: Uttar Pradesh.

Herbarium specimens : INDIA: Uttar Pradesh; Chamoli District., Vasudhara near Badrinath, 3400 m, Aug. 17, 1986, M. P. Sharma 15734 A-D (CDRI).

Notes : According to Sharma *et al.* (*l. c.*): This species is closely allied to *A. pseudopsilacanthus* Ali, but differs by acaulescent habit, leaflets with glabrous upper surface, comparatively larger stipules (0.7-1.1 cm long), calyx with vertical black and spreading white hairs and non-panduriform vexillum.

The species has been named after 'Badrinath', the famous holy shrine of Hindus in Garhwal Himalayas.

Atalantia racemosa Wight var. *bourdillonii* K.N. Nair & M.P. Nayar (Rutaceae) in Ind. J. For. 13(1): 69-70.1990.

Erect shrubs or moderate trees 2-15 m high, armed or unarmed; branchlets slender, terete, glabrous. Leaves alternate, 1-foliolate, elliptic-oblong or ovate-oblong grading to sub-obovate, 6.0-9.5 (-16)

× 2.5-4.0 (-6) cm, base narrowly to broadly cuneate, obtusely-acuminate at apex, the acumen ca 5 mm long, tip emarginate, margins subentire, highly coriaceous, prominently pellucid-punctate, pale above, brownish beneath on drying, glabrous; petioles 5-10 mm long, deeply channelled above, articulated with the leaf blade; midrib prominently raised above and beneath, secondary nerves 12-22 pairs, arising at angles of 5—60° with the midrib, almost all clearly marked, tertiaries very reticulate. Inflorescences axillary, racemes, 1-3 cm long; peduncles single or paired, slender, glandular, glabrous. Flowers short pedicelled, subglobose in buds, greenish-yellow. Calyx 4-partite, lobes rounded ca 1 mm long, ca. 1.5 mm wide, margins thin, sparsely to well ciliate, marked with many conspicuous, pellucid glands. Petals 4, oblong or obovate, 3.0-4.5 mm long, 1.5-2.0 mm wide, obtuse at apex, clawed at base, veins and glands often indistinct, glabrous. Stamens 8, the filaments fused into a staminal tube throughout their entire length (ca 2 mm long) or one or two sometimes free, glabrous anthers 1.0-1.5 mm long, oblong. Disc cupular, ca 0.5 mm high, ca 1.0 mm wide. Ovary oblong, ca 1 × 1 mm, 2 or sometimes 3 locular, with two ovules in each locule, with one large, conspicuous, pellucid gland (ca 0.25 mm high, ca 0.5 mm wide) at top of each locule; styles very short, ca 0.5 mm high, cylindrical; stigma not clearly distinguished from style, scarcely larger than styles ca 1 mm high with 2 or 3 stylar canals. Fruits subglobose, 7 × 7 mm, green when young.

Type : T. F. Bourdillon 160, (Holotype CAL-Acc. No. 76452).

Flowering : December April. *Fruiting* : April onwards.

Distribution : INDIA : Tamil Nadu, Karnataka, Kerala.

Herbarium specimens : INDIA: Tamil Nadu; Kannyakumari District., Vallachithodu, Lower Kodayar, 600 m, Mar. 28, 1981, Henry 70666 (CAL, MH). Karnataka; Coorg, LIP No. 2, Dec. 1937, N. L. Bor 9122 (DD), Range officer 28 (DD). Kerala; Quilon District, Naduvanoorkadavu, 125 m, Feb. 17, 1979, C. N. Mahanan 61129 (CAL, MH); *ibid.*, Colartoopuzha, 60 m, Feb. 27, 1899, T. F. Bourdillon 160, Acc. No. 76452 (CAL), Trichur District, Pullankandam R. F. , 100 m, Apr. 11, 1977, K. Ramamurthy 49298 (CAL, MH).

Notes : According to K.N. Nair & Nayar (*l.c.*): The present variety is closely allied to the typical one and *A. racemosa* var. *henryi* Swingle (A variety described from southern yunnan, China). Var. *racemosa* can be characterised by the presence of secondary nerves 8-12 pairs; stigma capitate without stylar canals; ovary glandular; whereas both vars. *bourdillonii* and *henryi* are characterised by the secondary nerves 12-22 pairs; stigma not clearly distinguished from the style with stylar canals corresponding to the number of locules of ovary; ovary glandular. Again var. *bourdillonii* differs from var.

henryi in having flowers subsessile; glands present on the calyx; ovary 2 or sometimes 3 locular, with one large conspicuous pellucid glands at top of each locule; stylar canals (2 or 3) and connective of anthers without oil glands; stigma scarcely longer than style; whereas var. *henryi* can be characterised by flowers on pedicels of 3-5 mm long; glands absent on the calyx; ovary distinctly 4-locular, with one medium sized pellucid gland at top of each locule; stylar canals 4, with 2 oil glands in the space between two canals; connective of anthers with one oil gland at tip; stigma shorter than style.

In evergreen forests at an altitude of 60-600 m. Common in the localities.

Baliospermum calycinum Muell.-Arg. var. **bracteatum** Chakrab. & N.P. Balakr. (Euphorbiaceae) in J. Econ. Tax. Bot 7(2): 359. 1985.

Shrub up to 2 m tall, dioecious. Leaves obovate-oblong, 14-18 cm long, 4.5-7.5 cm broad, rounded at base, glandular-dentate at margins, shortly caudate at apex, chartaceous, glabrous above, thinly pubescent on the nerves beneath; lateral nerves 8-11 pairs; petiole ca 3 cm long. Male inflorescences: thyrsiform, long-pedunculate, 15-20 cm long, adpressed yellow puberulous towards apex, glabrous towards base; bracts foliaceous, narrow, oblong to lanceolate, 2-2.5 cm long, successively smaller. Male flowers: pedicels 2-3 mm long; sepals 5, more or less orbicular, 1.5-2.5 mm long; sparsely adpressed yellow-puberulous; stamens 12, ca 2 mm long; anthers ca 0.5 mm

long; disc-glands 5, transversely oblong. Female flowers & fruits: unknown.

Type : A. S. Rao 48252 (Holotype CAL).

Flowering (Male) : October.*

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimen : INDIA: Arunachal Pradesh; Lohit District., Korom village, on way to Bishmak Nagar, Oct.5, 1969, A.S. Rao 48252 (CAL).

Notes : According to T. Chakrab. & Balakr. (*l.c.*): Differs from var. *calycinum* in the foliaceous bracts of male inflorescences.

***Bambusa cacharensis* R.B. Majumder (Bambusoideae) in Bull. Bot. Surv. India 25 (1-4): 237-238. 1983 (1985).**

Tall bamboo like *Bambusa tulda*; young shoots without white powdery excretions below the culm-sheaths; sheath-blades orange-yellow and spreading at right angle to the axis (blades erect in *B. tulda* and *B. pallida*). Culm-sheaths 12-15 cm long and 25-27 cm broad, covered on the back with chocolate-brown sharp spicular hairs; blade with wavy auricles with thick rigid cilia on the margins and short dense hairs outside on the body (hairs absent in auricles of *B. tulda* and *B. pallida*). Panicle occupying the whole culm, spikelets aggregated at the nodes of the ultimate branchlets. Spikelets 3-3.5 cm long and 3-6-flowered, rhachilla internodes articulated; florets 10-15 mm long, glossy green.

Types : Majumder 74265 (A: Holotype CAL; B: Isotype ASSAM).

Flowering : Time not mentioned.

Distribution : INDIA : Assam.

Herbarium specimens : INDIA: Assam; Cachar, Lakhimpur, Mar Bastee, Majumder 74265 (A in CAL & B in ASSAM).

Notes : According to Majumder (*l.c.*): Common in the Brahamaputra valley and in the Cachar. Easily spotted in the field due to the coloured reflexed blades of the culm sheaths.

Bauhinia ornata Kurz ssp. *mizoramensis* Bandy., B.D. Sharma & Thoth. (Caesalpiniaceae) in Nord. J. Bot. 12 (2): 223. 1992.

Leaves 20 cm in length, 19-21.5 cm in breadth, broadly ovate, 15-nerved, bifid c 1/2 their length into subacute lobes at apex, cordate at base, glabrous above, pubescent below; petioles 8.2-9.5 cm long, pubescent. Racemes compound, corymbose, 18.5 × 9.5 cm, ferruginous pubescent. Buds c 6 × 5 mm, subovoid, acute at apex, pubescent. Receptacle c 2.5 mm long, cylindrico-turbinate, slightly oblique at apex, pubescent. Peducels 2-2.5 cm long, pubescent. Bracts c 4 mm long, subulate; bracteoles similar, situated above the middle of pedicel. Calyx 3-lobed. Petals 5, c 1.1 × 0.8 cm, obovate, obtuse at apex, veined, glabrous inside, densely ferruginous pubescent outside; claw c 2 mm long, pubescent. Fertile stamens 3; filaments glabrous, appressedly puberulous at base; anthers 2 mm long; sub-elliptic. Staminodes 4, 2-3 mm long. Stipe c 1 mm long, pubescent; ovary c 5 × 2.5 mm, densely pubescent; style c 5 mm long, pubescent; stigma c 1 mm across, capitate. Pod unknown.

Type : R. Dutta 33793 (Holotype CAL).

Flowering : Time not mentioned.

Distribution : INDIA : Mizoram.

Herbarium specimen : INDIA: Mizoram; Mizo Hills, R. Dutta 33793 (CAL).

Notes : According to Sharma & Thoth. (*l. c.*): Differs from ssp. *ornata* in having persistently pubescent leaf-under surfaces and compound corymbose racemes with furruginous pubescence.

The apical portion of all the stamens were found to be eaten up by insect. The longest filament was noted to be 1.3 cm. The description of the anthers are based on those taken out from mature buds.

Bauhinia ornata ssp. *ornata* is restricted only to Burma whereas ssp. *mizoramensis* is known only from the type locality in NE India.

Beilschmiedia deomalica Bennet & Chandra (Lauraceae) in Ind. J. For. 9 (3): 273. 1986.

A medium sized tree, 12-16 m tall, branched. Leaves simple, alternate 9-13 × 5-6 cm, subcoriaceous, glabrous, elliptic or elliptic oblong, both ends acute or sometimes apex obtuse, midrib and 7-10 pairs of lateral nerves prominent beneath, petiole 1 cm long canaliculate. Fruit a berry, 6.5-7 cm long and ± 2.5 cm in diameter, oblong, cylindrical, rounded at both ends, fleshy, blue black on ripening, fruiting pedicel ± 1 cm long.

Types : Bennet & Chandra 3746 (A: Holotype DD; B: Isotype DD).

Flowering & Fruiting : March.*

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Siang District., Deomali Forest Division, Mar. 18, 1982, Bennet & Chandra 3746 A-B (DD).

Notes : According to Bennet & Chandra (*l. c.*): This species is allied to *B. brandisii* Hook. f. but differs in having the leaves coriaceous, 9-13 × 4-6 cm, petiole ± 1 cm long. In contrast *B. brandisii* is characterised by leaves thinly coriaceous, 10-20 × 5-7.5 cm; petiole usually 2-3 cm long.

Bhidea fischeri Sreek. & B.V. Shetty (Poaceae) in Kew Bull. 42(3): 683-685. 1987.

Annual. Culms 20-40 cm high, erect; upper nodes villous, lower ones glabrous. Leaves 1-8 × 0.1-0.3 cm, lanceolate, base narrow or rounded. Sheaths slightly keeled. Ligules membranous, truncate at apex. Racemes 1 or 2, 1-4 cm long, shortly exerted from spathes; joints 4-5 mm long, linear-turbinate, extremely oblique at apex, coriaceous, densely villous on one side. Spikelets greenish-yellow, usually in groups of 3, one sessile and the others pedicelled. Sessile spikelets 10-14 mm long (excluding an arista, 4-6 mm), lanceolate, awned. Callus 2-3 mm long, sharply acute, densely silky villous. Lower glume 7-8 × 1-1.5 mm, lanceolate, acuminate, coriaceous, faintly 3-5-nerved, keels narrowly winged, wings subequal, hyaline. Upper glume 5-6 × 1.5-2 mm, 3-lobed, with a broad arista, 6-8 mm

long, coriaceous, faintly 5-7-nerved, margins infolded, hyaline. Lemma 4-5 × 1-1.5 mm, notched, awned, subcoriaceous, margins delicate, hyaline. Awns 35-45 mm long, geniculate, column 14-16 mm long, chestnut-brown, bristle pale, scaberulous. Palea 1.5-2 × 0.5-0.75 mm, ovate, acute, delicate, hyaline. Stamens 3, anthers 1.5-2 mm long. Grain 3-4 × 0.75-1 mm, oblong. Pedicelled spikelets 10-12 mm long, lanceolate, acuminate. Pedicels 3-4 mm long, turbinate, densely villous on one side. Callus glabrous or sparsely bearded. Lower glume 7-10 × 1.5-2 mm, oblique-lanceolate, acuminate, chartaceous, faintly 7-9-nerved, broadly winged on one side, wing hyaline. Upper glume 10-12 × 1-1.25 mm, lanceolate, aristate, chartaceous, faintly 3-nerved, slightly keeled, margins hyaline.

Types : P. V. Sreekumar 71754 (Holotype CAL; Isotypes K, MH).

Flowering & Fruiting : October*.

Distribution: INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Cannanore District, Mukkarikandam, ± 50 m, Oct. 18, 1981, P. V. Sreekumar 71754 (CAL, K, MH).

Notes : According to Sreekumar & Shetty (*l.c.*) : This is allied to *B. burnsiiana* Bor. The distinguishing characters are: in species *B. fischeri*, spikelets 10-14 mm long, usually in groups of 3, one sessile and 2-pedicelled; joints of racemes 4-5 mm long, slender, abscission extremely oblique, 1.5-2 mm long; callus 2-3 mm long; lower glumes of sessile spikelets—keels narrowly winged, wings subequal in width; awns 35-45 mm long, stout; upper glume of pedicelled spikelet distinctly aristate; whereas, spikelets 6-8 mm long, in groups of 2, one sessile and the other pedicelled; joints of racemes 2-3 mm long, stout, abscission slightly oblique, c 0.5 mm long; callus up to 1 mm long; lower glumes of sessile spikelets—keels broadly winged, wings unequal in width; awns up to 20 mm long, slender; upper glume of pedicelled spikelet sharply acute, not aristate; in species *B. burnsiiana* Bor.

Found along open grasslands and dry rocky plateau, growing along with *B. burnsiiana* and a few *Dimeria* *ssp.*; rare.

Bidens tetraspinosa Majeed Kak & Javeid (Asteraceae) in J. Bombay Nat. Hist. Soc. 79 (1): 175. 1982.

Diffused or ascending annual herbs. Roots also arising from the lower nodes. Stems sulcate, much branched; upper leaves linear, 7-10 cm long, acute, irregularly serrate; lower leaves entire or remotely toothed, base cuneate or sessile; outer phylleries 2-6, linear lanceolate 6×3 mm, yellow with brown streaks, obtuse, membranous; receptacular bracts oblong, receptacle flat or dome shaped, pitted, 4 mm dia. Flowers homogamous, $3-4 \times 1.5$ mm, outer ones slightly shorter; pappus 4, on the four corners of the quadriangular ovary, smooth without serra, 2 shorter (0.5-1 mm) and 2 longer (1.5-1.8 mm); corolla campanulate, 5 fid; stamens with apical acute appendages; stigma rays shorter, linear. Achenes cunate, $3-4.2 \times 1.5-2$ mm, 4 angled, striate flat top, with 4 unequal smooth spines; shorter ones 1-1.2 mm; longer ones 2 mm long; margins retroserrate (sometimes serrate, rarely absent in one or two margins).

Type : AMK 624 (Holotype, Herbarium, University of Kashmir, Srinagar).

Flowering & Fruiting : August*.

Distribution : INDIA : Kashmir.

Herbarium specimens : INDIA: Kashmir; Near Leper Hospital (Nagin Lake), 1600 m, Aug. 15, 1976, AMK 624 (Herbarium University of Kashmir, Srinagar); Sunderbal-Leper Hospital side (Srinagar), 1600 m, AMK 625, 627 (Paratypes).

Notes : According to Kak & Javeid (*l.c.*) : The species is close to *Bidens cernua* L., but differs from it in having linear leaves, more than 10 cm long; ovary smooth, nerver hispidulous. Achenes with 4 unequal spines, two shorter ones smooth, 2 longer ones with or without retrose barbs.

Plants are found mostly swamps, lowland areas and on floating islands. The same species was subsequently collected in two other localities in Srinagar District, Shalimar 1700 m, in marshy places; and Anchar lake 1600 m on floating islands. The holotype was collected in a gregarious patch on the margin of floating Islands.

Biermannia jainiana S.N. Hegde & A.N. Rao (Orchidaceae) in Bull. Bot. Surv. India 26 (1. & 2): 97-99. 1984 (1985).

Roots many, 30-40 cm long, filiform, grey. Stem 4-7 cm long, decurved, with many dense roots and dried leaf bases in the lower half, leafy in the upper half. Leaves 6-17 × 1.2-2.5 cm, up to 8 in number, oblong-oblongate, acute. Unequally obliquely bilobed at apex, alternate, 3-7 mm apart, sheathing and twisted upwards at base, jointed, undulate at the outer margins and entire at the inner margins. Older ones drooping laterally and the younger held up horizontally, fleshy, flat, ensiform, subfalcate or not. Inflorescence 2-6 racemes, leaf opposed, 3.6 cm long, shorter and held beneath the leaves; 3-6-flowered, lax; rachis club-shaped, terete, with 2 or 3 short sterile bracts at intervals of 1.0-1.5 cm, grooved at the axils. Flowers non-resupinate, restricted to the distal thickened portion of the rachis, not widely opening; perianth lobes distinctly apiculate ca 1.5 cm across the lateral sepals and ca 0.9 cm across the lip and odd sepal, white, the basal 1 or 2 bloom much earlier than the terminal ones. Bracts 1.5-2.0 × 1-2 mm, much shorter than the ovary, broadly ovate, acute, keeled abaxially towards the apex. Ovary 1.0-1.5 cm long, 3-angled, narrowly winged along the ridges. Sepals 7-9 × 4.5-5.0 mm, elliptic-oblong or ovate-oblong, concave, 5-nerved. Lateral petals 5.5-7.0 × 3.0-3.5 mm, shorter and narrower than the sepals, elliptic-oblong, obtuse, concave, 3-nerved. Lip 5.5-7.0 × 3-4 mm, superior, immobile, parallel to the column, fleshy, entire, with narrow erect subundulate lateral margins, truncate and thickened at apex into a cubic apicule on the dorsal side, with sparse short papillae on the apicule; disc concave, with many brownish ciliae within; ciliae simple or unequally bilobed and glandular at the tip, dense at the base and sparse towards the apex of lip. Column ca 3.5 × 2.0 mm short, stout; foot ca 3 mm long, running obliquely downwards, with a knob-like erect median callus at the tip; callus sparsely gland-dotted and purple tinged. Anther 2-celled; anther cap broadly ovate, shortly beaked over the rostellum. Pollinia 2, ovoid, with a spatulate membranous caudicle and a small gland at the base. Rostellum simple, beaked over the stigmatic surface, slightly bent upwards. Stigmatic surface obcordate, excavate, opaque, with a median vertical line. Capsule 7-8 × 0.5 cm, sessile, linear-oblong,

distinctly 3-angled, narrowly winged at the ridges, narrowed towards apex.

Type : Hegde 4192 (Holotype Orchid Herbarium, TIPI).

Flowering : May. *Fruiting* : June.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; West Kameng District, Sessa, ca 1100 m, May 5, 1982, Hegde 4192 (Orchid Herbarium, TIPI); Paratypes: May 11, 1982, CAL; Hegde CAL;4194: May 19, 1982, Hegde 4241 (ASSAM); May 19, 1982, Hegde 4269, 4270,4271 & 4272 (Orchid Herbarium, TIPI).

Notes : According to Hegde & Rao (*l. c.*): The genus *Biermannia* King et Pantl. is so far known to consist of 4 species viz. *B. quinquicallosa* King et Pantl. from Jaintia Hills, *B. bimaculata* King et Pantl. from Sikkim, *B. ciliata* (Ridl.) Garay from Malaya and *B. decumbens* (Griff.) Tang & Wang ex Merrill & Metcalf from Burma.

The genus is characterised by (1) a short stem being 3-8 fleshy leaves with few flowered racemes, (2) the erect column with foot placed at an angle, (3) saccate lip attached to the foot, parallel to the column, (4) two rounded pollinia attached to a spatulate caudicle with a small gland at base.

Interestingly, the specimen although resembled *Phalaenopsis* in gross morphological characters, produced flowers of intermediate characters of the genera *Phalaenopsis* and *Biermannia*. Further study revealed it to be a new taxon belonging to the genus *Biermannia* and described as *B. jainiana* Hegde et Nageswara Rao.

B. Jainiana is allied to *B. quinquicallosa* but can be differentiated by: Leaves 6-17 cm long; inflorescence leaf opposed, shorter than leaves; flowers more than two; lip with ciliate disc, calli absent, with a distinct dorsal apicule, whereas in *J. quinquicallosa*: Leaves 3 cm long; inflorescence axillary equalling the leaves, one or two flowered; epichile with 4 transverse calli. Also differs from: large plant; sepals apiculate; labellum concave, truncate, apiculatum.

Rare pendulous epiphytes generally found in subtropical wet forest under the shady portions of tree trunks.

This species is dedicated in honour of Dr. S. K. Jain, Ex-Director, Botanical Survey of India, Howrah.

Blepharis lawsonii G.S. Giri & R.N. Banerjee. (Acanthaceae) in *Blumea* 28: 363-366. 1983.

Much branched creeping herb; stem terete, with one line of deflexed hairs, often rooting at the nodes, internodes (3-)5-15(-25) mm long. Leaves simple, verticillate, usually 4 at nodes, sessile, obovate, (3-)5-7(-10) × (2-)2.5-4(-6) mm, coriaceous or subcoriaceous, apex rounded or shortly mucronate, margin entire, lateral nerves obscure, younger leaves often sparsely setose. Flowers axillary, solitary, sessile. Bracts 2, oblong, 0.75-1.0 × 0.5-0.75 mm, apex apiculate, trinerved, margin towards apex setose ciliate, outside puberulous, inside glabrous. Bracteoles 8(4 pairs); outside puberulous, inside towards the apex at least 1/4th of the whole length hairy, rest glabrous, apex acuminate, margin long ciliate, reticulate, main nerves raised beneath, first pair ovate or ovate-oblong, 2.0-2.5 × 1.25-1.5 mm, trinerved; second pair keeled, lanceolate or ovate-lanceolate, 4.0-4.5 × 1.75-2.0 mm, trinerved; third pair ovate-elliptic or oblong-elliptic, 5.5-6.0 × 2.75-3.0 mm, trinerved; fourth pair keeled, obovate, 7.0-8.0 × 3.0-3.5 mm, uninerved. Sepals 4 in two opposite pairs; membranous, outside puberulous, inside glabrous, margin ciliated, reticulate; outer pair larger, anterior sepal oblong or oblong-lanceolate, 8.5-9.5 × 2.5-3.0 mm, apex acute, trinerved, posterior sepal lanceolate or elliptic-lanceolate, 8.5-9.5 × 2.0-2.5 mm, apex bifid, binerved; inner pair, smaller, lanceolate, 7.0-7.5 × 2.0-2.5 mm, apex acuminate, uninerved. Corolla bilabiate; tube 3.5-4.5 mm long, outside glabrous, inside with a ring of plumose hairs below the attachment of stamens; upper lip very short or rudimentary; lower lip well developed, 5.5-6.5 mm long from throat of the tube, trilobed, middle lobe smaller, outside densely puberulous, inside densely covered with hooked or deflexed white hairs, membranous, margin ciliated, finely nerved. Stamens 4, not differing in size and attachment,

filaments 1.25-1.5 mm long, thicker at the base, glabrous, prolonged above the insertion of the anther; anthers 1.5-1.75 × 0.5 mm, one-celled, margin and apex long ciliated, dorsally glabrous or almost glabrous. Ovary cylindrical, 1.5 mm long, glabrous, style 2.5-3.0 mm long, glabrous, base of the style produced downwards encircling the top of the ovary forming an inverted cup-like structure, stigma inconspicuous. Ovary bilocular with one large ovule in each locule. Fruit unknown.

Type : M. A. Lawson 314 (Holotype CAL).

Flowering : December.*

Distribution : INDIA : Tamil Nadu, Kerala.

Herbarium specimens : INDIA: Tamil Nadu; Malabar Coast, Cape Comorin, Dec. 21, 1893, M. A. Lawson 314 (CAL); Cape Comorin June 26, 1971, T. A. Rao 8203 (CAL). Kerala; Kerala Coast, Kovalum, June 8, 1971, T. A. Rao 8115 (CAL).

Notes : According to Giri & Ban. (*l.c.*): The species is closely related to *Blepharis exigua* (Zoll.) Valet. ex Back. but differs in much branched creeping habit with internodes very short, leaves smaller obovate, bracts oblong, apiculate, bracteoles at least 1/4th of its length towards the apex hairy inside, lower lip of corolla densely hooked hairy inside and densely puberulous outside. In *B. exigua* the internodes are long, 2.5 to 5.5 cm, leaves larger, elliptic or elliptic-oblong, 1.5-5.0 × 0.5-2.5 cm, bracts ovate acuminate, bracteoles glabrous inside, lower lip of corolla sparsely hooked hairy inside and glabrous outside.

Small prostrate herb growing along the granite rocky sea shore. The species is named after M. A. Lawson who collected the specimen for the first time.

***Bothriochloa parameswaranii* Sreek., Malathi & V. J. Nair** (Poaceae) in J. Bombay Nat. Hist. Soc. 85(1): 163-165. 1988.

Perennials. Culms 10-30 cm high, erect or geniculate; nodes glabrous. Leaves lanceolate, 2-10 × 0.2-0.3 cm, base rounded,

glabrous or shortly villous, midrib prominent. Ligules ovate, acute, 1-2 mm, membranous. Racemes 2-4, digitate or subdigitate, each 2-4 cm long, purplish; joints 2-3 mm long, linear, ciliate. Sessile spikelets oblong or elliptic, 3-4 mm long, callus bearded; lower glume oblong, 3-3.5 × 1-1.25 mm, acute or subacute, chartaceous, flat or with a shallow depression, faintly 7-9-nerved, keels pectinate towards apex, margins hyaline, ciliate; upper glume ovate-lanceolate, 3-3.5 × 1-1.5 mm, chartaceous, 3-5-nerved, villous in the upper half, margins hyaline; lower floret empty; upper floret bisexual; first lemma ovate-oblong, 2.5-3 × 1-1.25 mm, rounded at apex, delicate, hyaline, faintly 3-5-nerved; palea absent; second lemma stipitate, 1-2 mm long, awn 10-15 mm long, column 6-8 mm, chestnut-brown; palea absent; stamens 3, anthers 1-1.25 mm; ovary oblong, 0.5-0.75 mm, styles c 1 mm long, stigmas 1-1.5 mm, feathery. Pedicelled spikelets oblong, lanceolate, 3-4 mm long; pedicels 2-3 mm long, villous; lower glume oblong-lanceolate, 3-4 × 1 mm, chartaceous, 11-15-nerved, with 1-4 shallow pits, keels shortly pectinate; upper glume and lower floret similar to those of sessile spikelet; upper floret male or empty; second lemma oblong-acute, 2-3 mm long, delicate, hyaline, faintly 3-nerved; lodicules 2, obovate, each c 0.5 × 0.25 mm, concave at apex.

Types : P. V. Sreekumar 71858 (Holotype CAL; Isotypes K & MH).

Flowering : February.*

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Idukki District, Eravikulam National Park, ± 2100 m, Feb. 14, 1981, P. V. Sreekumar 71858 (CAL, K & MH).

Notes : According to Sreekumar *et al.* (*l. c.*): This species is allied to *B. Kuntzeana* but differs from it in having culms up to 30 cm tall, slender; leaf-blades up to 10 cm long, 2-3 mm wide; nodes entirely glabrous; sessile spikelets smaller, up to 4 mm long; pits on the lower glume of the pedicelled spikelets 1-4, shallow and anthers 1-1.25 mm long. In contrast, *B. Kuntzeana* is characterised by culms 40-80 cm tall, stout; leaf blades 30-50 cm long, 4-6 mm wide; nodes densely bearded; sessile spikelets 4.5-5 mm long; pit

on the lower glume of the pedicelled spikelets solitary, deep; anthers c 2 mm long.

Rare. Grassland at the higher elevations.

The specific epithet is in honour of Dr. M. Parameswaran Nayar Ex-Director, Botanical Survey of India.

Brassaiopsis andamanica R. N. Banerjee (Araliaceae) in Indian Forester 94 (10): 775-777. 1968.

Small trees. Stem unarmed (?). Leaves simple, petiolate, lamina rounded, 17-35 cm diam., palmately 5-8 lobed, central one largest 11-19 × 7.5-10 cm, apex acuminate, acumination 1.5 cm long, base cordate, margin entire, sometimes distantly very minutely serrulated, lateral nerves ± 6, in young both surfaces-pubescent, soon glabrescent, ventral surface sparingly stellate-pubescent near the ribs, reticulations of nerves prominent, lamina chartaceous; petioles 22-37 cm long, unarmed, thick, rusty pubescent, denser towards the base of lamina. Stipules interpetiolar, adnate to the base of the petiole. Inflorescence terminal ± 60 cm long, sub-corymbose, much branched, stout, rusty tomentose, lateral branches erect, rusty tomentose, bearing matured umbels at the top. Bracts 0.5 cm long, boat shaped, woody, persistent. Peduncles 2.5-16 cm long. Bracteoles ± 2 mm long concave, acute, tomentose, densely aggregated at the top of the peduncle. Umbels many flowered, 2.5-6 cm in diam. Flowers pedicellate, bisexual. Pedicels 1-1.8 cm long, rusty tomentose. Sepals 5, 1-2 mm long, tomentose, alternate to petals. Petals 5, 2-3 mm long, reflexed, triangular, 1-nerved, apiculate, thick, dorsal surface tomentose, ventral surface thickly ribbed. Stamens 5, alternate to petals 3-6 mm long. Ovary 1-chambered. Style 2 mm long, persistent. Fruits 1-1.2 cm long, 0.7 cm wide, oblong.

Types : S. Kurz s.n. (Holotype CAL-Acc. No. 193177; Isotype CAL-Acc. No. 193178).

Flowering & Fruiting : Time not mentioned.

Distribution : INDIA : Andamans.

Herbarium specimens : INDIA : South Andaman; Black Creek, S. Kurz s.n. (CAL-Acc. Nos. 193177-78).

Notes : According to Ban. (*l.c.*): Allied to *B. miti* C.B. Clarke but distinguished in having lamina membranaceous, margin entire or minutely serrulated, inflorescences sub-corymbose, petals thick coriaceous, reflexed thickly ribbed on ventral surface and fruits oblong and big.

Two specimens of a plant collected by S. Kurz from Andamans who named it as *Araliopsis andamanica* Kurz. Later on Kurz (1870) was of opinion that these specimens should be referred to *Panax palmatum* Roxb. which again was considered by him to be a species of *Brassaiopsis* Decne. et Planch. and therefore made a new combination as *B. palmata* Kurz. The critical studies in the Herb. CAL, confirmed that Kurz's material has got sufficient characters for meriting as a distinct species. The generic name *Brassaiopsis* Decne et Planch, was established by Harms (1894) as the valid name for the genus for which kurz proposed the name *Araliopsis* Kurz, but never described his new genus. Hence it is desirable to give the new name to the taxon mentioning the synonyms and description to it. Specific epithet suggested by Kurz, on the specimens, after the place of occurrence, is retained.

Synonyms with reference to new Taxon:

Brassaiopsis andamanica R. N. Ban. spec. nov.

Araliopsis andamanica Kurz Veg. And. Isls. 39. 1870, *nom. nud.*
Panax palmatum Kurz *l. c.* non Roxb. (1832).

Brassaiopsis palmata Kurz in Journ. Asiat. Soc. Bengal 39 (2): 77. 1870, *pro parte*, et in For. Fl. Brit. Burma 1:537. 1877, *pro parte*; C.B. Clarke in Hook. f. Fl. Brit. India 2:735. 1879, *pro parte*.

***Bridelia nicobarica* Chakrab. & Vasudeva Rao (Euphorbiaceae)**
in J. Econ. Tax. Bot. 5(4): 945-946. 1984.

Tree, 4-5 m tall; branchlets terete, brown, 1.5-6 mm thick, minutely adpressed brownish-to whitish-pubescent, becoming glabrescent. Leaves oblong to elliptic, 4.5-10 cm long, 1.5-4.5 cm

broad, acute to obtuse at base, entire and somewhat reflexed at margins, shortly acuminate to apiculate at apex, coriaceous, glabrous and glossy above, minutely adpressed brownish-to whitish-pubescent beneath, turning dark brown above when dry; midrib slightly raised above, prominently raised beneath; lateran nerves 5-8 pairs, arising at an average angle of 45° with the midrib, somewhat prominent above, distinct beneath, mostly straight or sometimes irregularly or uniformly curved; branching near the margin (not in the marginal nerve); tertiary nerves somewhat prominent above and beneath, percurrent, unbranched and forked in equal proportions; petiole 4-10 mm long, 0.8-2 mm thick, minutely adpressed-pubescent; stipules not seen. Inflorescences (seen only in fruiting condition) axillary, glomerulate, many-flowered; bracts orbicular-deltoid, 0.6-1 mm-long. Male flowers: not seen. Female flowers: 4-4.5mm diam. (seen only below the fruit), sessile; calyx tube turbinate, yellowish or tawny-tomentellous; sepals 5, triangular, acute, 1-1.5 mm long, 1-1.2 mm broad, yellow or tawny-tomentellous outside, glabrous inside; petals and disc not seen. Drupes sessile or subsessile, ovoid to ellipsoid, 13-15 mm long, 8-9 mm diam., glabrous, smooth, bilocular, yellowish-green (*teste collectore*), black when dry; seeds plano-convex.

Types : N. G. Nair 3523 (A: Holotype PBL; B: Isotype PBL).

Fruiting : February*.

Distribution : INDIA : Andaman Nicobar Islands.

Herbarium specimens : INDIA: Andaman-Nicobar-Inlands; Car Nicobar Island, Sawai, Feb. 24, 1976, N. G. Nair 3523 A-B (PBL).

Notes : According to Chakrab. & Vasud. (*l.c.*): Although, for diagnostic purposes, *B. nicoborica* is differentiated from *B. tomentosa*, the new species is perhaps even nearer to *B. nooteboomii* T. Chakrab. (in J. Econ. Taxon. Bot. *Ined.*) of Thailand, differing in the much shorter adpressed hairs (up to 0.4 mm long) of the vegetative parts, the relatively smaller leaves with glossy upper surface, the fewer lateral nerves which are more or less straight, and arising at an average angle, of 45° with the midrib and the larger, ovoid or ellipsoid drupe.

The new taxon differs from the related *B. tomentosa* Bl. in the

coriaceous leaves with glossy upper surface, the fewer lateral nerves and the ovoid or ellipsoid drupe.

Scarce, on clayey soil at sea level.

Calamus dransfieldii Renuka (Arecaceae) in Kew Bull. 42 (2): 433-435. 1987.

Solitary or clustering, moderate-sized rattan climbing high into the canopy. Stem to 8 m long, with sheaths 3.5 cm diam., without sheaths 2.5 cm, in ternodes to 23 cm long. Leaf sheath pale green, sparingly spiny; spines to 1 cm long, with a bulbous base; knee conspicuous; ocrea absent; flagellum 6 m long. Leaf ecirrate, to 2 m long; petiole to 55 cm, armed with spines to 5 mm; rachis armed with distant row of spines to 0.5 mm; leaflets pale green, long-acuminate, narrowly lanceolate, regularly arranged, 45 × 2 cm; veins ciliate on both surfaces, cilia to 2 cm; leaf tips armed with short bristles. Inflorescence flagellate, male and female inflorescences superficially similar, to 3.5 m long with up to 4-5 partial inflorescences each to about 20 cm long, branching once in each sex; subtending bracts closely sheathing, prolonged at the distal end into a lanceolate point, densely armed with small spines to 1 cm long; rachillae to 3 cm long, subtending bracts cylindrical at the base and expanded into a cup at the upper region. Staminate flower about 8 mm long, stamens 6; filaments shortly epipetalous; anthers medi-fixed; pistillode present. Female flowers to 4 mm long. Fruit unknown.

Types : *Renuka* 2982(♀) (Holotype MH; Isotypes K, Herbarium of Kerala Forest Research Institute).

Flowering : December January.*

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Palghat District, Dhoni Hills, moist deciduous forest, 275 m, Jan. 31, 1982 & Dec. 16, 1983, *Renuka* 2982 (♂) : MH, K, KFRI; 'Paratypes' *Renuka* 2983 (♂) ; *Renuka & Nambiar* 2501, Sterile, (KFRI).

Notes: According to Renuka (*l. c.*): This species comes under the group VI of Beccari and Hook. f. in J. D. Hooker's 'Flora of British

India (1892)', and can be identified from *C. huegelianus* Mart. and *C. gamblei* Becc. by the presence of long-ciliate (2 cm) pale green leaflets, pale green leaf sheath with conspicuous knee which is sparingly spiny, by the absence of brown tomentum and longer papery spines on the sheath.

The new species is named after Dr. J. Dransfield in appreciation of his contribution to the knowledge of the rattans.

***Calamus lacciferus* Lakshmana & Renuka (Arecaceae) in J. Econ. Tax. Bot. 14 (3) : 707-709. 1990.**

Clustering, high climbing rattan. Stem very thin at the base, 0.5 to 0.8 cm in diameter, getting thicker upwards, distally with sheath to 3.5 cm in diameter, without sheath to 1.5 cm. Sheath green in the basal portions and greyish green distally, sparingly spiny; spines bulbous based, to 0.5 cm long, knee very conspicuous, devoid of spines. Leaf ecirrate, to 2 m long including petiole; petiole 30-40 cm long, convex on both sides, armed with small spines; rachis with recurved spines on the under surface, when cut exudes a milky latex; leaflets regular linear-lanceolate, leaftip ciliated 65×2.8 cm, gradually becoming smaller towards the tip, the terminal leaflets 20×1.2 cm; terminal pair slightly united at the basal region; 3 veined, midvein ciliated dorsally on the upper half of leaf; lateral veins ciliated ventrally on the upper half. Inflorescence long, flagellate, primary sheath tightly sheathing, spiny; secondary sheaths tubular, inflated at the mouth; partial inflorescence to 15 cm long, rachillae to 5 cm long, arched and recurved, the upper ones gradually becoming shorter to 1 cm long, involucrophorum stalked conspicuously callous at its axilla next to the axis; involucre disc shaped, fruiting perianth pedicelled. Fruits round 12×2 cm; scales yellow with brown border, shiny, arranged in 19 vertical rows, deeply channelled in the middle. Endosperm ruminant, usually seen near water course. Behaves like a runner. From the basal nodes new shoots and roots are produced. The flagella gets modified into new plants. This is a regular habit of the species.

Types : Renuka 4078 (Holotype CAL; Isotypes K, KFRI).

Fruiting : May.*

Distribution : INDIA : Karnataka.

Herbarium specimens : INDIA: Karnataka; evergreen forests, 950 m May 18, 1988, *Renuka* 4078 (CAL, K, KFRI).

Notes : According to Lakshmana & Renuka (*l.c.*): This species comes under the group VIII of Beccari (1908). This can be distinguished from other species of the group with the sparingly spiny, greyish green sheath, the regular habit of producing new shoots as a modification of the flagella and form the exudation of milky latex from rachis and petiole when cut.

The species is named *lacciferus* due to the presence of latex in the rachis and petiole.

Calamus lakshmanae Renuka (Arecaceae) in J. Econ. Tax. Bot. 14(3): 703-704. 1990.

Clustering, high climbing rattan. Stem with sheath 1-2.5 cm in diameter, without to 1 cm. Sheath yellowish green to green, densely armed with yellowish, bulbous based spines to 1 cm long, pointing horizontally or upwards, distal younger sheaths with lesser spines and with brown markings. Knee present. Ocrea not seen. Leaf ecirrate, to 1.65 m long including petiole; petiole to 22 cm, armed with small, sometimes curved spines; rachis convex on both sides towards the basal portion while triangular in the upper portion of the leaf, with many small recurved spines; leaflets regular, linear lanceolate, tip not ciliate, 45 × 2 cm, size gradually diminishing towards the distal region, terminal leaflets 17 × 0.8 cm, terminal pair confluent to more than half of its length, 3 veined, lateral veins ciliated on the dorsal surface and midvein is ciliated on the ventral surface, margin spinulose. Inflorescence long, pendulous, partial inflorescence to 60 cm long, attached well above the mouth of its own sheath; primary sheath tightly sheathing, with small spines; secondary sheaths tubular infundibuliform lightly sheathing, to 3.5 cm long, narrow at base and flat on the inner side, with 3 or 4 small prickles in the distal region; rachillae to 10 cm long, attached above the mouth of its own sheath; involucrephorum not stalked;

involucre cup shaped; fruiting perianth slightly callous at base. Fruit ovate, 1×0.7 cm, stigma 3 mm long, scales when young bright green in colour, in 26 vertical rows, channelled along the middle. Endosperm ruminant.

Types : Renuka 4086 (Holotype CAL; Isotypes KFRI).

Fruiting : March*.

Distribution : INDIA : Karnataka.

Herbarium specimens : INDIA: Karnataka; 85 m, Mar. 14, 1989, Renuka 4086 (CAL, KFRI).

Notes : According to Renuka (*l.c.*) : This species comes under the group IX of Beccari (1908). This can be distinguished from other species of this group with the yellowish green sheath, confluent terminal leaflets and the bright green young fruits.

The new species is named after Mr. A. C. Lakshmana, Conservator of forests, Karnataka in appreciation of his dedicated work in protection and propagation of Calamus species in Karnataka forests.

Calamus prasinus Lakshmana & Renuka (Arecaceae). in J. Econ. Tax. Bot. 14(3): 705-707.1990.

Solitary high climbing rattan. Stem with sheath to 3 cm; without sheath to 1.2 cm. Sheath pale green, densely armed with spines to 1 cm. Knee conspicuous. Leaf ecirrate, to 2.5 m long including the petiole; petiole to 30 cm long, convex on both sides, armed with small prickles, recurved spines underneath; rachis triangular, recurved spines on the ventral side, petiole and rachis when cut exudes a milky latex; leaflets 50×2.5 cm, terminal pair united basally, shining green, shallow linear pits can be recognised on the ventral side in the living condition; 3 veined, veins ciliated on the upper half only, lateral veins ciliated on the dorsal surface, midvein ciliated on the ventral surface; cilia up to 1 cm. Inflorescence long, pendulous; primary sheath two keeled, spiny, tightly sheathing, tip lacerated; partial inflorescence to 18 cm long; secondary sheath not spiny, tubular, tightly sheathing; rachillae to 5 cm long, arched and recurved, arising from just above the mouth of the sheath;

involucrophorum stalked, to 3 mm long, attached above the mouth of its own sheath; involucre disc shaped. Fruit round, when young bright green in colour. Scales yellow, shining deeply channelled along the middle, arranged in 26 rows. Endosperm ruminant.

Types : Renuka 4082 (Holotype CAL; Isotypes KFRI, K).

Flowering & Fruiting : May.*

Distribution : INDIA: Karnataka.

Herbarium specimens : INDIA : Karnataka; Karnataka Cane Plantation, 15 m, May 30, 1988, Renuka 4082 (CAL, KFRI, K).

Notes : According to Lakshmana & Renuka (*l.c.*): The diagnostic features are its solitary nature, light green sheath with spines, shining green leaflets and the bright green young fruit. This species comes under the group VIII of Beccari (1908).

The species is named *prasinus* due to the bright green colour of the young fruit.

Calamus stoloniferus Renuka (Arecaceae) in *J. Econ. Tax. Bot.* 14(3): 701-703. 1990.

Clustering, high climbing rattan. Stem with sheath to 3 cm, without sheath to 1.2 cm. Sheath green, sparingly spiny spines to 2 cm long. Knee present, devoid of spines. Ocrea present in young stages, tapering. Leaf ecirrate, to 1.75 m long; petiole length ranges from 15 cm to 85 cm; rachis with long spines to 2.5 cm, distally with recurved spines on the ventral side; leaflets 45 × 3.5 cm (seedling leaflets are wider up to 5.5 cm), linear lanceolate, the terminal pair confluent basally, apical 5-6 leaflets crowded together, these leaflets are more obtuse, margin spinescent, 3-5 veined, midvein only very sparsely ciliated. Inflorescence long, flagellate, primary sheath in male inflorescence expands to a laminar structure at the mouth, in female inflorescence tapering at the mouth; secondary sheath tightly sheathing, in male it is extended to a point at one side at the mouth, not spiny, male and female rachillae to 9 cm long, attached at the mouth of the sheath; involucrophorum

not stalked; involucre cup shaped. Fruit round, 1 cm long fruiting perianth explanate, scales in 16 vertical rows, yellow with brown border, not channelled. Endosperm not ruminant.

Types : Renuka 4085 (Holotype CAL; Isotypes KFRI).

Flowering & Fruiting : March.*

Distribution : INDIA : Karnataka.

Herbarium specimens : INDIA: Karnataka; Karnataka Cane Plantation, 85 m, Mar. 14, 1989, Renuka 4085 (CAL, KFRI).

Notes : According to Renuka (*l.c.*): The species comes under the group II of Beccari and this can be easily differentiated from others with the presence of stolon green sheath with sparsely distributed spines, wide leaflets and the terminal basally united leaflets. Due to the presence of stolon, which is not a common feature in *Calamus*, the species is named as *stoloniferus*.

Calanthe keshabii S. Z. Lucksom (Orchidaceae) in Ind. J. For. 15 (2): 136-138. 1992.

Terrestrial, pseudobulb 1.5-3.5 × 1-2.5 cm, ovoid, annulated, arising from a stout, smooth rhizome at an interval of 6.7 cm. Leaves 3-4, unequal, elliptic-lanceolate, acute, lamina 18-25.5 × 5-7.5 cm, petiole 6-9 cm long. Inflorescence 17-30 cm long, terete, smooth; peduncle 14-25.5 cm long with one spatulate bract; bract 1-2 cm long, raceme 3.5-7 cm, long with 4-10 drooping pedicellate flowers; pedicellate ovary 1.2-2 cm long, curved. Flowers 2-3.5 cm across, whitish purple; flowering bracts 1.4-1.8 × 0.6-0.6-7 cm. Sepals subequal, 5-nerved, acuminate; dorsal sepal 1.6-1.8 × 0.7-0.8 cm spreading, elliptic-oblong, slightly concave; lateral pair 1.9-2 × 0.7-0.8 cm, falcate. Petals 1.4-1.5 × ca 0.2 cm, linear-oblong, involute, subacute. Lip 1.3-1.4 × 0.9-1.1 cm, shortly clawed, 3-lobed, lateral lobe falcately oblong, blunt, pointing forward, mesochile a straight narrow isthmus, epichile bilobulate with deeply fimbriate margin; disc with 2 shallow longitudinal calli; spur 1.2-1.4 cm long, straight, cylindroconic. Column ca 7 × 4 mm. Anther ca 3 × 2 mm, ovate, slightly beaked. Pollinia 8, translucent, pale yellow.

Types: Lucksom 205 (a: Holotype CAL; Isotype b-d: Forest Department Herbarium, Gangtok).

Flowering : May. *Fruiting:* August.

Distribution : INDIA : Sikkim.

Herbarium specimens : INDIA: Sikkim; Sikkim-Chungthang valley, Shibgyar, 2000-2500 m, May 1, 1991, Lucksom 205 (a in CAL & b-d in Forest Dept. Herbarium, Gangtok).

Notes: According to Lucksom (*l. c.*): The new taxa is closely allied to *Calanthe alpina* Hook. f. from which it differs by: Pseudobulb 1.5-3 cm, ovoid, thick, leaves 3-4, 18-28 × 5-7.5 cm, petiole 6-9 cm long, with dark spots on upper surface; raceme 4-10-flowered, partly or fully open; flowers 2-3.5 cm across, whitish purple with 2 yellow lamellae; sepals 1.6-2 cm long, petals 1.4-1.5 cm long, linear-oblong and lip 3-lobed, lateral lobes falcately oblong, epichile deeply fimbriate, bilobulate, disc with 2 longitudinal lamellae; whereas, the species *C. alpina* is having the characters: Pseudobulb 2-2.5 cm long, cylindrical, thin; leaves 2-3, 15-18 × 3.5-5 cm, petiole 2.5-5 cm, without any spots on upper surface; raceme 4-5 flowered, partly open; flowers 2 cm across, white, with red dull lamella; sepals sub-equal ca 1 cm long; petals elliptic lanceolate, 8 mm long; lip without lateral lobes, semi-orbicular, margins deeply fimbriate.

It grows in shady floor in temperate forests.

The fresh specimens collected in May 1991 and it was found that the characters studied in these specimens were entirely different from the other *Calanthe* species. Terrestrial, pseudo-bulbous plants, with large plicate leaves. Inflorescence on a tall spike arising from leaf axis. Lip adnate to the short column throughout its whole length and 8 pollinia are some of the characteristic features which justify the placement of this taxa under the genus *Calanthe* of sub-tribe *Bletinae*.

The new species is named after Sri Keshab Chandra Pradhan, Advisor to the Govt. of Sikkim (Ex- Chief Conservator of Forests) who has contributed significantly for conservation of indigenous orchids of Sikkim.

Camellia siangensis T. K. Paul & M.P.Nayar (Theaceae) in Bull. Bot. Surv. India 27 (1-4): 92-93. 1985 (1987).

Trees c 5 m high. Young stem purplish, glabrous. Leaves simple, alternate, elliptic to oblong-elliptic, 6.5-10 × 2.5-4.0, apex acuminate, sharply serrulate, puberulous only along the midrib on the upper surface; petioles 5-8 mm long, densely pubescent. Flowers solitary, axillary or terminal, perulate; pedicel 1.0-1.5 mm long. Perules forming a shallow involucre about 8-10 mm long, lunate to suborbicular, 1-6 mm long and broad, outer surface densely hairy towards the apex, inner surface with appressed hairs, persistent. Corolla c 1.5 cm across; petals 6, outer 4.7-8 × 5-6 mm, inner 2, c 12 × 6 mm, oblong. Androecium c 10 mm long, stamens c 20, filaments of the outer stamens irregularly connate to form a fleshy cup. Ovary 2.0-2.5 × 2.0 mm, densely hairy; styles 3, 1.0-1.5 mm long, free, erect; stigmas simple. Fruits not known.

Types : Rolla S. Rao 17781 (A: Holotype CAL; B-D: Isotypes CAL).

Flowering : November.*

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Siang F. D., Minguing-Takepokong, 1150-1775 m, Nov. 18, 1958, Rolla S. Rao 17781A (CAL); *ibid.*, Rolla S. Rao 17781 B,C, D (CAL).

Notes : According to Paul & Nayar (*l.c.*) : This species is allied to *C. lutescens* Dyer but differs in having: Tree habit (c 5 m), pedicel 1.0-1.5 mm long, outer surface of the bracteoles and sepals hairy towards the apical portion, androecium longer, c 10 mm, styles erect, 1.5-2.0 mm long and simple stigmas; whereas *C. lutescens* Dyer is a shrub (2-3 m high), flowers sessile, outer surface of the bracteoles and sepals glabrous, androecium 4-5 mm long, styles recurved, c 1 mm long and capitate stigmas.

Capillipedium magdaleni M.R. Almeida (Poaceae) in J. Bombay. Nat. Hist. Soc. 72(3) : 813-814. 1975 (1976).

An erect or sub-erect perennial grass, occurring on sides of a waterfall, sufrutescent, below, interlaced, copiously geniculately branched, ± 20 cm tall, sometimes proliferous. Internodes up to 3 cm long. More than half of the internode is always covered by a leaf-sheath. Nodes glabrous. Leaf-sheath ± 3 cm long, mostly, adpressed to the internodes except in case of some basal sheaths which are divaricate, ending in a ciliate, bilobed, membranaceous ligule. Leaves up to 4 cm long and ± 3 cm broad, linear-lanceolate, slightly acuminate. Inflorescence in a terminal panicle, with 1-4 joints, 1-2 cm long (excluding the length of the awns). Rachis capillary, glabrous. Spikelets in pairs; one sessile and other pedicellate, dull-brown in colour. Sessile spikelets $\pm .2$ cm long, linear-lanceolate, with a prominent callus near the base, containing a pistillate flower; outer glume ± 2 mm long linear-lanceolate, acute, 5-nerved, slightly villous on the back, keeled along the margins; inner glume ± 1.5 mm long, linear-lanceolate, acute at the apex, 3-nerved, glabrous; outer lemma sometimes ± 1 mm long, linear-acuminate, hyaline, unnerved or sometimes represented by awn, ± 2 cm long, with a dilated base, inner lemma is represented by an awn which is ± 6 cm long, without a dilated base; palea absent; lodicules 2, small, spathulate, hyaline. Ovary ± 2 mm long, with 2 plumose stigmas which are ± 1 mm long. Pedicelled spikelets ± 3 mm long, lanceolate, without a callus, containing staminate flowers. Pedicels ± 1 mm long with a median translucent groove; outer glume ± 3 mm long, lanceolate, acute at apex, keeled along the margins, 7-9 nerved, glabrous; inner glume ± 2.5 mm long, lanceolate, slightly acuminate, keeled and ciliate along the margins, hairy on the back on upper half; upper lemma ± 2 mm long, ovate-lanceolate, hyaline; lower lemma and paleas are absent, stamens 3; anthers ± 1.5 mm long.

Types : M.R. Almeida 2566 (Holotype BLAT ; Isotype K).

Flowering : November.*

Distribution : INDIA : Karnataka.

Herbarium specimens : INDIA : Karnataka ; Agumbe, Nov. 1972, M.R. Almeida 2566 (BLAT & K) ; *ibid.*, Nov. 3, 1973, M.R Almeida 2941 (Paratypes BLAT).

Notes : According to Almeida (*l.c.*) : This grass is seen at only one spot growing on the sides of a waterfall on rocky substratum. It differs from other species of *Capillipedium* in having comparatively longer awns and is very closely allied to *Capillipedium filiculme* (Hook.f.) Stapf, from which it could be distinguished by its perennial nature, plants less than 61 cm tall ; nodes glabrous ; leaves \pm 4 cm long ; spikelets dull-brown and awn 5-7 cm long. *Capillipedium filiculme* (Hook. f.) Stapf, in contrast, is characterised as an annual grass; plants 61-91 cm tall, nodes bearded; leaves 6-10 cm long, spikelets pale-green or white and awn 1-2 cm long.

The species is dedicated to M. R. Almeida's mother, Megdelin.

Capparis nilgiriensis Subba Rao, Kumari & V. Chandras. (Capparaceae) in J. Bombay Nat. Hist. Soc. 78 (1): 146-148. 1981.

Scandent shrubs \pm 3 m high; branches irregularly spreading ; branchlets terete, glabrous, more or less flexuous, sparingly armed with slightly ascending small spines on few branches; cataphylls few, linear. Leaves simple, 4.0-11.3 \times 1.5-4.2 cm, ovate or elliptic to oblong, non-coriaceous, glabrous, margins entire and non-recurved, obtuse or rarely emarginate at apex, almost round at base; nerves 5-7 pairs, looped near margins, midrib and nerves prominent underneath, reticulations not prominent; petioles 6-10 mm long, glabrous, deeply canaliculate with uneven margins. Flowers axillary, up to 4 cm across, solitary or sometimes conferted with up to 4 towards the apex of a twig, lower ones supra axillary; hypsophylls 2.5-4 mm long, linear, minutely puberulous, thick, incurved; pedicels 1.5-3.0 cm long, rarely more, slightly dilated at apex, ultimately glabrous. Sepals 4, subequal, concave; outer sepals 7.5-8.0 \times 4.5-5.0 mm, ovate, obtuse, puberulous outside; linear sepals 7.5-8.0 \times 3.5-5.0 mm, elliptic to obovate, tomentose on both sides, obtuse, narrowed towards base. Petals 4, white; two lower petals free, 2.1-2.5 \times 0.7-1.1 cm elliptic to obovate, tomentose, subacute at apex, narrowed towards base; upper two petals 1.9-2.3 \times 0.6-1.0 cm, oblong-obovate, tomentose outside, obtuse to subacute, united at base forming inside a tomentose cream coloured callus. Stamens 16-24, exerted, filaments 2.0-3.0 cm long, glabrous; anthers \pm 2 mm long, basifixed. Gynophore

2.0-2.2 cm, glabrous; ovary 3-4 mm long, ovoid or spindle shaped, furrowed, densely pubescent, slightly beaked; ovules many in 4 parietal placentas. Fruit not present.

Types : *Subba Rao* 40259 (A : Holotype CAL; B-F: Isotypes MH).

Flowering : March April.*

Distribution : INDIA: Tamil Nadu.

Herbarum specimens : INDIA : Tamil Nadu (Madras State) : Nilgiri District. Chinnacoonoor, 950 m, Mar. 16, 1972, *Subba Rao* 40259 (A in CAL; B-F in MH); *ibid.*, Malappurampatti to Chinnacoonoor, 950 m, Apr. 18, 1973, *Subba Rao* 42492 A-H (Paratypes MH); Coimbatore District., Kuridimalai, 700 m, Apr. 5, 1960, *Shetty* 10215 A-H (Paratypes MH); Coimbatore District., Anaikatty (Papamalai), 760 m. Mar. 17, 1970, *Viswanathan* 470 A-E (Paratypes MH); Tirunelvi District. Courtallam, Honey Falls, 366 m, Mar. 20, 1958, *Subramanyam* 5595 A-J (Paratypes MH); Madurai District, Sirumalai, 1000 m, Apr. 26, 1958, *Subramanyam* 5789 A-F (MH).

Notes : According to *Rao et al. (l.c.)* : Allied to *Capparis brevispina* DC. but differs from it in : glabrous branchlets; glabrous and non-coriaceous leaves with obtuse tip and non-recurved margins, reticulation not prominent; deeply canaliculate petioles with uneven margins; inner sepals tomentose on both sides and less number of stamens.

***Caragana beefensis* Sas. Biswas (Papilionaceae) in Ind. J. For. 9 (1): 70-71.1986.**

Shrub, 1.8-4 m high, erect, stem up to 5 cm diameter. Dwarf shoot 0.4-1 cm long, internodes 1.5-5 cm long. Bark grey-brown. Leaf-rachis 3.9 cm long, sulcate, spinescent when old, base 1.1-2.5 mm diameter. Stipules 2, 5-8 mm long, spinescent. Leaflets 10-14, opposite, rarely sub-opposite or alternate, 0.8-2.5 cm long, 0.7-1.75 cm broad, obovate, elliptic-oblong, sericeous on both surfaces, veins 13-16 pairs, \pm raised, parallel; apex retuse, mucronate. Inflorescence 1-3 flowered umbels; peduncle 2-5 cm long, pubescent. Flowers 1-2, 2-2.5 cm long; pedicels 4-7.3 mm long, pubescent. Bracts 3, 5.

9-7 mm long, 1.9-2.2 m broad, lanceolate, hyaline, margin ciliate. Calyx 1.5-1.7 cm long, 1.3-1.45 cm broad; tube 0.9-1 cm long, silky-pubescent, reticulate; sepals 2.8-3 mm long, 1.5-2 mm broad, acute, margin ciliate. Corolla exerted, yellow; standard 2.2-2.5 cm long, 1.4-1.5 cm broad, orbicular, apex retuse, incurved, claw 5 cm long, 4 mm broad; wings 2.3-2.5 cm long, 0.4-0.55 cm broad, apex obtuse, auricle 0.2 cm long, claw 1 cm long, curved; keel 2.1-2.3 cm long, 0.45-0.5 cm broad, auricle obtuse or absent, apex \pm obtuse, claw 1.3 cm long, straight. Stamens diadelphous, 2-2.5 cm long; anthers 0.4-0.6 mm long. Ovary 1.5 cm long, 0.15 cm diam., linear silky-tomentose; style 6 mm long.

Type : Sas. Biswas 4228 (Holotype DD).

Flowering : May. *

Distribution : INDIA: Uttar Pradesh.

Herbarium specimens : INDIA : Uttar Pradesh (N.W. Himalaya) Tehri Garhwal in Yamuna Forest Division, Beef, 2440-2745 m., May, 1973, Sas. Biswas 4228 (DD); Biph, 2592 m., May 31, 1960, Sahni 26889 (Paratype DD).

Notes : According to Biswas (*l.c.*) : The Genus *Caragana* Lam., is represented in India by six species (Baker in Fl. Brit. Ind. 2: 115-117. 1876).

The above species distinctly differs from *Caragana brevispina* Royle ex Benth., in its larger habit; shape and size, hairy surfaces of leaflets, shorter auricle and much longer claw of wing and keel without or obtuse auricle. In contrast, *C. brevispina* is characterised by 1-1.8 m high shrub, leaflets 8-14, 0.45-1.1 \times 0.4-0.5 cm, glabrous above and pubescent beneath; auricle of wing petals 3-4 mm and claw 4-4.5 mm, much curved; auricle of keel petal, straight subobtuse and claw 6-7 mm.

The present taxon is found in Yamuna Forest Division between 2440-2745 m whereas *C. brevispina* occurs between 1830-2290 m in Chakrata Forest Division of Tehri Garhwal Circle, U.P.

The species is named after the locality of occurrence of taxon.

Caragana beefensis Sas. Biswas var. **auriculata** Sas. Biswas (Papilionaceae) in Ind. J. For. 9 (1) : 71-72. 1986.

Leaflets with conspicuously raised 12-14 pairs of veins. Peduncle 3-4 cm. Calyx 1-1.3 cm long, 1-1.3 cm broad. Wing petal with 4-5 mm long auricle. Keel petal with 1-1.5 mm long auricle. Pod 4.5-5 cm long, 0.45-0.5 cm broad, pubescent, villous inside.

Type : *Gamble 23750* (Holotype DD).

Flowering & Fruiting : April August.*

Distribution : INDIA: Uttar Pradesh.

Herbarium specimens : INDIA : Uttar Pradesh (N.W. Himalaya); Tehri Garhwal, Mundali (Jaunsar), 2440 m, May 1892, *Gamble 23750* (DD); Mundali Forest, 2440 m, May 1896, *Gamble 25787* (Paratype DD); Mundali, 2440 m, June 11, 1936, *Parkinson 7086*; Deota, May 12, 1904, *Hole s.n.*; Mussoorie, Apr. 25 & Aug. 10, 1914, *Ahmad s.n.* (Paratypes DD).

Notes : According to Biswas (*l.c.*) : var. *auriculata* is distinctly different from var. *beefensis* in its 3-4 cm long peduncle and shape and size of auricles in wings and keels. In Dehra Dun Herbarium (DD) the specimens belonging to var. *auriculata* are identified with *C. brevispina* Royle, from which the former can be separated by its larger habit, 2.5 × 1.7 cm leaflets, larger peduncle, auricle of wings 4-5 mm.

The collections of this species from Mundali in Chakrata Forest Division and Mussoorie, etc., all may suggest its common occurrence in the area.

Caragana brevispina Royle ex Benth. var. **gamblei** Sas. Biswas (Papilionaceae) in Ind. J. For. 9(1): 72. 1986.

Leaflets always pubescent on both surfaces.

Type : *Gamble 25783* (Holotype DD).

Flowering : June.*

Distribution : INDIA: Uttar Pradesh.

Herbarium specimen : INDIA: Uttar Pradesh (N.W. Himalaya); Ringali Forest, 2135m., June, 1896, *Gamble* 25783 (DD).

Notes : According to Biswas (*l.c.*) : var. *gamblei* differs from var. *brevispina* by character mentioned above. As regards the texture of leaflets, Benthum in Royle's *Illust. Bot. Himal.*: 198.1835 describes the plants as 'subtus pubescentibus' (lower surface pubescent). Since the description appears to have been based on the holotype, one would presume that the upper surface of leaflets of the holotype were glabrous. The above specimen shows its leaflets pubescent or hairy on both surfaces throughout its all stages of growth. While in the specimens of var. *brevispina* the leaflets in mature stage are glabrous and pubescent beneath, and thereby conform well with Bentham's original description.

***Carex asraoi* D.M. Verma (Cyperaceae) in J. Econ. Tax. Bot. 7(3) : 605-608. 1985**

Perennial herbs, 50-80 cm high. Rhizome woody. Stems trigonous, 20-40 cm high, leafy below; basal sheaths dark brown. Leaves slightly shorter than the stem, linear, acute, 5-7 mm broad, margins and midrib above antrorsely scabrous. Bracts lower 2-3 foliaceous, slightly shorter than the panicle, upper gradually setaceous. Inflorescence depaniculate, interrupted, 30-40 cm long; panicle branches hairy; secondary panicles solitary or 2-3 together; peduncles slender, trigonous, 4-10 cm long, glabrous or pubescent. Spikelets numerous, androgynous, linear-cylindric, 7-35 mm long; cladophylls ocreaeform; male part 3-8 mm long; female part 4-27 mm long. Male glumes elliptic-oblong, acute or mucronate, 3.5-4.5 mm long, brownish. Female glumes oblong-lanceolate, aristate, 4-5mm long, pubescent or glabrescent, brownish, arista up to 2 mm long. Utricles suberect, stipitate, ellipsoid, trigonous, membranaceous, 5.6 mm long, stramineous, pubescent, scabrid on the upper part, marginal nerves usually prominent; beak long, with scabrid margins; mouth hyaline, bidentate. Stamens 2-3; anthers linear, 2.5-3.0 mm long. Style about 1.5 mm long, base thickened; stigmas 3. Nuts stipitate, ellipsoid, triquetrous, about 3 mm long, apiculate.

Types : *D. Prain* s.n. (Holotype CAL Acc. No.513623; Isotypes CAL Acc. Nos. 514189, 514190).

Flowering & Fruiting : April.*

Distribution : INDIA: Nagaland.

Herbarium specimens : INDIA : Nagaland; Pulinaladza, 7700 ft, Apr. 23, 1886, *D. Prain* s.n. (CAL-Acc. Nos. 513623, 514189, 514190).

Notes: According to Verma (*l.c.*) : Allied to *Carex prainii* C.B. Clarke but differs in its narrow leaves and aristate female glumes.

The species is named after a distinguished Indian Botanist Dr. A.S. Rao.

Carex nairii Ghildyal & U.C. Bhattach. (Cyperaceae) in J. Econ. Tax. Bot. 8(2): 479. 1986.

Perennial, 12-15 cm high. Rhizome very short, woody. Stems slender, obsolete triquetrous, scaberulous on the angles above, 0.3 mm thick. Leaves few, clustered at the base, flat, shorter than the stem, long, acuminate, 1.0-1.5, mm, broad; sheaths, whitish, membranaceous, ultimately fibrous. Inflorescence racemose, 3.5-6.0 cm long; lowest 2 bracts subfoliaceous, much shorter than the stem, spathaceous, lowest 2-3 cm long; spikelets 2-4, upper 2 fastigate, lower 1-2 distant, long peduncled; terminal male or with a female flower at base, linear, subulax, 7-10mm long, subsessile; laterals female, linear-cylindric, 9-13 mm long 6-10 flowered lax, peduncled; peduncles capillary, scaberulous; male glumes lanceolate, 5 mm long, acute, ferruginous; female glumes ovate, truncate, mucronate, ferruginous, main body 2.5 × 0.7 mm, midrib yellow; mucro 0.5-0.7 mm long, hispidulous. Style slightly thickened at the base, stigmas 3. Utricles shortly stipitate, obovate, ellipsoid, trigonous, coriaceous, not inflated, 2 lateral nerves prominent, abruptly beaked, densely hispidulous, olivaceous, 2.5-2.7 × 0.7 mm, hispidulous, ferruginous; beak very short bidentate. Nuts subsessile, ovoid, triquetrous, 2.7 mm long, ferruginous.

Types : Nair 37034 (A: Holotype BSD; B & C: Isotypes BSD).

Flowering & Fruiting : July.

Distribution : INDIA: Jammu & Kashmir.

Herbarium specimens : INDIA : Kashmir; on way to Amarnath, 3700 m, July 27, 1966, Nair 37034 A-C (BSD).

Notes : According to Ghildyal & Bhattacharyya (*l.c.*) : It is closely allied to *Carex oligocarya* Clarke but differs in having female spikelets 6-10 flowered, female glumes ovate, truncate mucronate ferruginous and utricles very shortly beaked.

Occurs in rock crevices at alt. 3700 m.

The species is named in honour of its type collector, Dr. N.C. Nair, Ex-Joint Director, Botanical Survey of India.

Carex nandadeviensis Ghildyal, U.C. Bhattach. & Hajra (Cyperaceae) in Ind. J. For. 9(1) : 90-92. 1986.

Perennial, 20-27 cm high. Rhizome short, woody, densely caespitose. Stems slender, triquetrous, 0.5 mm thick, smooth. Leaves clustered at base, subequalling to slightly exceeding the stem, 1.5-2.0 mm broad; sheaths straw-brownish, ultimately fibrous. Inflorescence racemose, 7-10 cm long; bracts subfoliaceous, shorter than stem, shortly sheathed, lowest up to 8 cm long; spikelets 3-5, sessile or lower 2 shortly peduncled; peduncle 0.5-2.5 cm; terminal male or with 2-3 female flowers at tip, linear or subclavate, 23-27 × 4 mm, single or rarely with a short female spikelet at base; lateral spikelets female, linear or subclavate, subdense or lax flowered at base, 7-27 × 2-6 mm; male glumes lanceolate, 5.0 × 1.2 mm, ferruginous with hyaline margins; female glumes lanceolate, acuminate, acute or mucronulate, 3.5-4.0 × 1.0 mm, purplish-brown; mucro 0.2-0.5 mm long, smooth. Style 1.3-1.5 mm long, uniformly slender; stigmas 3. Utricles sessile, erect, membranaceous, not inflated, obsoletely trigonous, ovoid ellipsoid, hirtous, 3.7-4.0 × 1.0 mm, abruptly beaked, nerveless, olivaceous; beak 1.2 mm long, bidentate. Nuts (immature) sessile, obovoid, triquetrous, 1.7-2.0 × 1.0 mm, olivaceous.

Types : P.K. Hajra 73974 (A : Holotype CAL; B: Isotype BSD).

Flowering & Fruiting : July.

Distribution : INDIA : Uttar Pradesh.

Herbarium specimens : INDIA : Uttar Pradesh ; Chamoli District, Nanda Devi National Park, on the way to Bhojgara from Ramni, July 5, 1982 P.K. Hajra 73974 (A in CAL ; B in BSD).

Notes : According to Ghildyal *et al.* (*l.c.*) : This species is closely allied to *Carex setosa* Boott, but differs in having shorter and smooth peduncles, female glumes lanceolate, acute or mucronulate, purplish-brown, utricles ovoid-ellipsoid, not shining and the nuts obovoid.

Occurs in alpine grasslands.

The species is named after its type locality, Nanda Devi National Park in India.

Casearia insularis Vasudeva Rao & Chakrab. (Flacourtiaceae)
in J. Econ. Tax. Bot. 5(4): 991-992. 1984.

Shrubs or small trees, 2-3 m high; young shoots brown-tomentose; branchlets greyish or brownish, terete, 1.5-7 mm thick, rough, pustulate-lenticellate, glabrous, striate and scattered-whitish-puberulous when young. Leaves usually broad, oblong, elliptic to suborbicular, sometimes obovate, 4-8 (-11) cm long, 2-3 (4.5) cm broad, mostly \pm inequilateral, obtuse to rounded or occasionally truncate at base, entire to shallowly crenate at margins, obtuse to rounded or sometimes acuminate (acumen 5-10 mm long, obtuse) or occasionally truncate at apex, coriaceous, blackish brown above when dry, pale brown beneath, glabrous above, glabrous to sparsely puberulous on midrib beneath, pellucid punctate; midrib flat above, raised beneath; lateral nerves slender, 5-8 pairs, faint above, prominent beneath, usually more or less uniformly curved and \pm parallel to each other, anastomosing near margin; minor nerves indistinct or faint above, somewhat prominent beneath, \pm transverse; petiole 3-13 mm long, 1-1.8mm thick, sulcate or channelled above; sparsely puberulous to glabrous. Inflorescences axillary, fasciculate,

mostly many-flowered; bracts small, puberulous. Flowers: pedicels 2-3 mm long, ca 0.6 mm thick, scattered and \pm adpressed tawny-puberulous; sepals 5, shortly connate, broad, oblong, ovate to almost orbicular, 2.5-3 mm long, 2-2.5 mm broad, rounded, scattered \pm adpressed tawny pilosulous outside, glabrous or often sparsely pilosulous near the margin inside, ciliolate at margin; stamens 8, filaments 1-1.3 mm long, glabrous; anthers usually oblong, 0.8-1 mm long; staminodes under 1 mm, alternating with stamens, yellowishpilose (densely at apex); ovary ovoid, ca 2mm long, ca 1 mm diam., glabrous, style ca 0.2 mm long, stigma peltate. Fruits ovoid or ellipsoid, brownish green or greenish (*teste collectore*), black when dry, 17-20 mm long, 11-12 mm diam., glabrous, ridged; fruiting pedicel 3-4 mm long.

Types : *Balakrishnan* 5389 (A : Holotype CAL; B-F : (Isotypes PBL).

Flowering & Fruiting : March.*

Distribution : INDIA : Andaman Nicobar Islands.

Herbarium specimens : INDIA : Andaman - Nicobar Islands; North Andaman Island, Saddle Peak Range, Lamia Bay slope, Mar. 31, 1977, *Balakrishnan* 5389A (CAL); *ibid.*, *Balakrishnan* 5389 B-F (PBL) *ibid.*, *Balakrishnan* 5375, 5425 (Paratypes PBL).

Notes : According to Vasud. & Chakrab. (*l.c.*) : Closely related to *C. grewiaefolia* Vent., differing in the terete branchlets, the relatively smaller, coriaceous leaves which are less pubescent, the fewer lateral nerves and the shorter fruiting pedicels.

Common or scattered in inland hill forest or scrub forest on rocky loam or red laterite soil between 400-700 m above *m.s.l.*

***Ceropegia huberi* Ansari (Asclepiadaceae) in Bull. Bot. Surv. India 10(2) : 219-221. 1968 (1969).**

A perennial ^{††}twining herb. Tuber up to 4.5 × 4.0 cm, subglobose, giving out slender roots from sides and bottom. Stem branching, glabrous, terete, about 2 m long. Leaves opposite, petiolate; petioles

up to 3.5 cm long, glabrous, grooved on the upper side with a minute gland on either side at the base; lower leaves ovate-acuminate, 12.0×4.8 cm, upper leaves lanceolate, acuminate, 5.0×1.5 cm; lamina subcoriaceous, margin ciliolate, gland dotted; lateral nerves 3-5 pairs. Flowers white, many, in lateral sub-umbellate cymes; peduncles hirsute, up to 16 cm long; bracts small, subulate, 2-3 mm long; pedicels pubescent, up to 1.7 cm long. Calyx 5-partite, about 3 mm long, lobes 2.5 mm long. Corolla up to 12 mm long, straight; tube 5 mm long, obtusely angled, pale pinkish and minutely scabrid along the nerves outside, glabrous, pinkish purple with dark purple longitudinal lines inside, broader in the centre; lobes 7×10 mm, ovate, deeply cordate, broader than long, the sides jointed in the upper $2/3$ part forming a circular flattened, slightly inclined, head, ± 1.7 cm in diameter. Corona biseriate; outer corona cupular, 5-lobed, entire, glabrous, ± 0.7 mm long; inner of 5 elongated conical creamy yellow processes, lobes about 2 mm long, arising in between outer corona lobes, densely hairy on the dorsal side only, convergent, apices obtuse, opposite and incumbent on the anthers. Pollen-masses erect, minute, yellow, almost conical in shape. Gynostegium 1.5-2.0 mm long. Follicles in pairs (immature) ± 6 cm long, tapering at both ends, glabrous. Seeds many, $\pm 5 \times 3$ mm, ovate, oblong, prominently margined; coma ± 10 mm long.

Types : Ansari 105001 (A : Holotype CAL; B: Isotype K; C-L: Isotypes, in different herbaria).

Flowering : August September. *Fruiting* : September October.

Distribution : INDIA: Maharashtra.

Herbarium specimens : INDIA : Maharashtra; Ratnagiri District., Amba Ghat, ± 610 m, Aug. 29, 1967, Ansari 105001 (A: CAL, B:K & C-L in different herbaria); *ibid.*, Ansari 105033 A-L (Paratypes BSI); *ibid.*, Aug. 7, 1909, Shevade s.n. A-C (Paratypes BSI).

Notes : According to Ansari (*l.c.*): This species belongs to section *Buprestis* H. Huber, but is quite distinct from all the other species of the section in its flowers being quite small; shape of the corolla lobes being ovate and deeply cordate with circular flattened head, tube being angular, smaller than the lobes; outer corona cupular and inner conical elongated.

During the course of studies on the *Ceropegia* of western India, 3 unidentified sheets, collected by S.V. Shevade, from Cooke's collection were found to be interesting. Since the specimens were scanty, the material was collected again (by M.Y. Ansari), from the same locality after a lapse of nearly 60 years. After a thorough study (by M.Y. Ansari), the material was sent to Dr. H. Huber at Wurzburg (West Germany) for his critical examination and comments. He comments "This species might be included into Section *Buprestis* Huber (Mem. Soc. Broter., 12: 66. 1957) but occupies a somewhat isolated position. In some respect, it is unique among all India species of the genus because of her reduced corolla tube, copying the shape of various African species and feel sure that it is quite a distinct species of eminent interest as it is not identical with any species known to me up to now".

A very elegant and fascinating species growing on rocky crevices and gravelly slopes of hill among grasses. It can be easily distinguished from the rest of the species by its external morphological characters such as angular, reduced corolla tube having a broad circular flattened, slightly inclined, head over it.

Vern. Name : *Kharpudi*.

The species is named in honour of Dr. Herbert Huber of Botanical Institute and Botanical Garden, Wurzburg University, Wurzburg (West Germany) in appreciation of his monumental work on the genus *Ceropegia* Linn.

Ceropegia jainii Ansari & B.G. Kulk. (Asclepiadaceae) in Bull. Bot. Surv. India 22 (1-4), 221-222. 1980 (1982).

An erect herb, 6-10 cm in height with subglobose or depressed tubers. Stem unbranched, rarely 2, from the same tuber, sparingly pubescent in the upper half, glabrous in the lower half. Leaves 2-4 × 0.5-1.0 cm, opposite petiolate, upper elliptic-linear, lower elliptic, green and hairy above and along the margins, pale and glabrous beneath, except the nerves; petiole 1-2 mm long, hairy; bracts 1.5-2 mm long ; pedicel 4-6 mm long, hairy or glabrescent. Calyx 2.5 mm long, glabrous straight. Corolla up to 2 cm long,

curved, purplish throughout except lower half of inflated base which is greenish; tube 9-10 mm long, subcylindrical, inside pale greenish with longitudinal purple lines, with globosely inflated base in the lower 1/3-1/2 part, glabrous inside & outside; lobes 9-10 mm long, purple, linear-oblong, glabrous above except inside the ovate-deltoid base which is short bristly white hairy with margins of the lobes slightly reflexed, acute and connate at apex forming an avoid or subglobose head, ca 7 mm across. Outer corona cupular, of 5 deeply bifid, deltoid lobes, 1.5 mm in height, hairy along the margins, slightly longer than the gynostegium; inner processes ca 2.5 mm long, linear-subspathulate, erect. Pollen masses ascending minute, yellow. Gynostegium ca 2 mm long. Follicles not seen.

Types : Kulkarni 121885 (A : Holotype CAL; B-C: Isotypes BSI; D: Isotype CAL; E: Isotype K; F: Isotype BLAT).

Flowering : August.

Distribution : INDIA: Maharashtra.

Herbarium specimens : INDIA: Maharashtra; Ratnagri District, Ambolighat, Aug. 13, 1971, Kulkarni 121885 (A & D in CAL; B-C in BSI; E in K; F in BLAT).

Notes : According to Ans. & Kulk. (*l.c.*) : Similar to *Ceropegia pusilla* Wt. et Arn. in its dwarf habit and unflowered cymes, but differs in its leaves being elliptic, flowers up to 2 cm long only, corolla lobes ovate and pilose inside at the base only, and equal to the tube.

The distinguishing features in detail of *C. jainii* sp. nov. and *C. pusilla* Wt. et Arn. are : plant 6-10 cm high; leaves elliptic, 2-4 cm long; corolla 1.8-2 cm long, lobes almost equal to tube; corolla tube purple except pale greenish in lower half of inflated base, longitudinal purple lines inside; corolla lobes linear-oblong, purple, glabrous above from ovate-deltoid base with white bristly hairs inside; outer corona 5, bifid, bristly hairy inside & along margin; inner erect, purple towards base, above yellow in former species where as the later is characterised by: plant 7-15 cm high; leaves linear, 3-5 cm long; corolla up to 2.8 cm long; lobes distinctly shorter than tube; corolla tube inflated in the lower 1/3 part; corolla lobes linear-oblong and glabrous all over ; outer corona 5, bifid minutely ciliate; inner erect.

The species is named in honour of Dr. S. K. Jain, Ex-Director, Botanical Survey of India.

***Ceropegia maccannii* Ansari (Asclepiadaceae) in Bull. Bot. Surv. India 22(1-4) : 227 -229. 1980 (1982).**

Erect herbs, 30-100 cm high with subglobose tuberous roots. Stems firm, terete, pubescent above. Leaves 9-12 × 4-6 cm, ovate-lanceolate, acute or acuminate, base mostly acute, sometimes rounded, hairy above glabrous beneath except nerves; petiole 1-2 cm long, hairy and grooved above. Flowers 6-10 in lateral subumbellate cymes; peduncles up to 3.5 cm long, hirsute; bracts 3-4 mm long; pedicels 6-10 mm long, hairy. Calyx 4-5 mm long, hairy on the dorsal side. Corolla 1.7-2.3 cm long, curved; tube 1.5-2.0 cm long with largely inflated base (8-10 × 6-7 mm) in the lower half, merging into narrow cylindrical part above, purplish-grey outside, dark purple with inconspicuous greenish-white streaks inside, glabrous inside except for a ring of white hairs at the bottom of the inflated base only; lobes 2-3 × 2 mm, obovate, acute at tips, creamy white outside, yellowish-orange inside, glabrous, connate at tips forming a minute obovate or obconic head 2-3 mm in diameter. Outer corona cupular, 5-lobed, each with a short notch in the middle or slightly bifid, hairy along the margins and inside; inner corona thick, fleshy, hairy, sub-clavate, ca twice as long as the outer, white, erecto-divergent. Ovary 1.5-2.0 mm long, bicarpellary; pollen masses yellow. Follicles in pairs, 1.5 × 0.5 cm, glabrous. Seeds small, comose.

Types : Ansari 97574 (A: Holotype CAL ; B-C: Isotypes BSI; D: CAL; E: K; F : BLAT).

Flowering : July-August. *Fruiting* : September-October.

Distribution : INDIA: Western India (Endemic to Maharashtra).

Herbarium specimens : INDIA: Maharashtra; Sinhadh Hills, Pune District, Aug. 7, 1964, Ansari 97574 (A & D in CAL, B & C in BSI, E in K, F in BLAT); Purandhar, Pune District, (only Flowering Specimens), Blatter 21900; Santapau 7125, 7128-29 (BLAT); Rolla Rao 88649; Sinhadh Hills, Puri 5679, 5681; Cooke s.n.; Ansari 99846, 99973, 101207, 97574; V. Reddi 101207 A (BSI).

Notes : According to Ansari (*l.c.*): Similar to *Ceropegia panchganiensis* Blatt. et McC. in its narrow cylindrical corolla tube and corona but differs in cymes being many flowered; corolla under 2.4 cm long, tube largely inflated in the lower half, lobes very small, inner corona white, erecto-divergent. Also differs from *C. lawii* Hook. f. in the shape and size of the corolla and corona.

Being erect and broad-leaved this species was mistaken for *C. lawii* Hook. f. — the only species then known from Western India. Similarly, the other erect and broad-leaved *Ceropegias* from this region, *viz.* *C. panchganiensis* Blatt. et McCann (in Journ. Bomb. Nat. Hist. Soc. 36 : 534-535. 1933) and *C. sahyadrica* Ans. et Kulk. (1971) were also mistaken for *C. lawii*. The identity of *C. lawii* Hook. f. was not clear to most workers (including the author). Under the circumstances, Venkata Reddi (1968) amended the description of *C. lawii* Hook. f. and included the present new species which happened to be fairly represented in herbaria under the name *C. lawii*. It was only after the recent collections (made after a lapse of considerable time) of true *C. lawii* Hook. f. (Wadhwa 12773 at BSI; Type photo! CAL) and true *C. Panchganiensis* Blatt. et McC. (Ansari 105090, BSI), which faithful to their respective protologues that the present new species was noticed as distinct from the others.

Among the Indian *Ceropegias*, the present new species has the smallest corollalobes (2-3 mm long). Even under cultivation, though the vegetative parts may gain in size, but the flowers do not increase beyond 2.3 cm in length. At present restricted to Pune district, but likely to be found on hill tops of adjacent areas of other districts also. In contrast to above description of *C. maccannii*, *C. lawii* is characterised by over 2.5 cm long; base slightly inflated in the lower 1/3 of the tube, the upper $\frac{2}{3}$ subcylindrical gently enlarging towards the mouth; corolla lobes 6-7 mm long, hairy or glabrous; outer corona Saucer-shaped, of 10 equal sized, obtuse lobes; inner corona terete, linear, erect, ca 4-5 times longer than outer, sparsely hairy towards base.

Vern. Name : Kharpudi.

This species is named in honour of Charles McCann, the renowned botanist who was closely associated with the study of the

Flora of Western India in general and of the genus *Ceropegia* Linn. in particular.

***Ceropegia rollae* Hemadri (Asclepiadaceae) in Bull. Bot. Surv. India 10(2) : 123-125 1968.**

Erect herb 30-100 cm high; root a subglobose perennial tuber (edible); stem fleshy clothed with short coarse bulbous hairs. Leaves opposite, occasionally 3 at each node, petioles 0.3-1.5 cm long, lamina broadly ovate, apex acute, 2.5-6 x 2-4 cm bulbous hairy above and along margins, glabrous beneath. Flowers in peduncled subumbellate cymes arising from between the petioles, and terminal; pedicels 0.4-1 cm long, stiff hairy; bracts linear, subulate, 0.3-0.5 cm long, bracteoles 0.2 cm long. Calyx divided to base, sepals 0.3-0.5 cm long, linear lanceolate and sparsely hairy. Corolla 2.3-3.5 cm long; tube 1.5-2.5 cm long and 0.3-0.4 cm across at narrowest portion, glabrous and white outside turning pale lilac in lower half, slightly inflated at base, inflated part 0.5-0.8 x 0.4-0.6 cm; tube internally glabrous except for a ring of white hairs in inflated part, dark purple in lower half extending a little further up in striated manner; lobes linear oblong, 0.8-1.3 x 0.25 cm connate at apex, white, glabrous within and without. Corona bi-seriate, outer corona saucer-shaped, 0.3 cm across of 5 lobes, yellow with purple inside, white hairy along margins, inner corona of 5 erect processes ca 0.3 cm long, yellow with white tips. Pistil ca 0.175 cm long bicarpellary, apocarpous with their styles united above into a pentagonal stigma, glabrous; ovules many, pollenia erect and sessile, pollen masses bright yellow, corpusculum dark red. Fruit a pair of follicles, linear, terete, tapering at the ends 4.5-6 x 0.4-0.5 cm. Seeds many, comose, ovoid marginate 0.6 x 0.2-0.3 cm.

Types : Hemadri 107472 (A: Holotype CAL; B & C : Isotypes BSI; D: Isotype K; E: Isotype L).

Flowering & Fruiting : September - October (also grew in flower in the month of July at BSI Experimental Garden).

Distribution : INDIA: Maharashtra.

Herbarium specimens : INDIA : Maharashtra; Poona District, on the open top of Dhak Khila, about 27 km west of Junnar, \pm 1300 m, Sept. 29, 1965, Hemadri 107472 (A in CAL; B & C in BSI; D in K; E in L); on the open top of Durga Khila, \pm 1200 m, about 30 km west of Junnar, Oct. 1, 1965, Hemadri 107547 (A & B : Paratypes BSI; C: Paratype CAL; D: Paratype K). The type materials noted above also distributed to other herbaria.

Notes : According to Hemadri (*l.c.*) : Similar to *Ceropegia lawii* Hook. f. and *C. panchganiensis* Blatt. et McC. in its erect nature but is distinct from them in having linear oblong corolla lobes and less inflated base of corolla tube.

Dr. H. Huber of Botanisches Institut and Botanischer Garten Der Universitat, Wurzburg (West Germany) comments "The position of this species is slightly more intricate. Its erect stem and the shape of the corolla design it to belong to Sect. *Buprestis* Huber (in Mem. Soc. Broter. 12 : 29, 1957) but when keyed out, this species seems to belong to rather to Sect. *Indopegia* Huber (*l.c.* 65) because of the rather conspicuous hyaline pubescence within the inflated part of the corolla tube. This apparently links the two sections together, a fact not particularly unexpected because Sect. *Buprestis* somehow must have evolved from Sect. *Indopegia* as already indicated in my plate XVI... and feel sure the species in question is of eminent interest and is a distinct, separate species."

Vern. Name : *Kharpudi*.

The species is named in honour of Shri Rolla Seshagiri Rao, Botanical Survey of India.

***Ceropegia santapau* Wadhwa & Ansari (Asclepiadaceae) in Bull. Bot. Surv. India 10(1) : 95-97. 1968.**

A perennial twining herb. Tuber 2-2.5 \times 1.5-2 cm, subglobose, giving out slender roots from the sides and bottom. Stem glabrous, sparingly hairy, terete, usually unbranched, about 1-1.5 m in length. Leaves opposite, petiolate; petioles up to 3.5 cm long, glabrous, grooved on the upper side with a minute gland on either side at

the base; lower leaves ovate-acuminate, 6.5-8.5 × 2.5-4 cm; upper leaves ovate acuminate, 4-5 × 1-1.5 cm; lamina sub-coriaceous with bulbous based hairs; margin ciliolate, gland dotted; lateral nerves 3-5 pairs. Flowers 4-9, in lateral subumbellate cymes, greenish white to white; peduncles hirsute, 2-5 cm long, terete; bracts 2-3 mm long, subulate; pedicels up to 1 cm long, terete, pubescent or hirsute. Calyx 5-partite, 3.5 mm long; lobes 3 mm long, 3-nerved, lateral ones very faint, ciliate on the mid nerve on dorsal side. Corolla up to 1.5 mm long, straight or slightly curved; tube 1 cm long, faintly angular, glabrous within and minutely scabrous along nerves outside, inflated at the base, pale purple tinged within near the base; lobes about 1/3 the length of the corolla, up to 5 mm long, orbicular, inflexed and connate at tips forming a subglobose head, broader than long. Corona uniseriate of 5 elongated, conical, pale yellow processes; lobes 2 mm long, convergent, densely hairy on the dorsal sides, jointed near the base, obtuse, opposite and incumbent on anthers. Pollen-masses erect, minute, yellow, ellipsoid, attached to the reddish-brown corpusculum by minute caudicles. Gynostegium 1.5-2 mm long. Follicles in pair, up to 7 cm long, tapering at both ends, glabrous. Seeds many, 7 × 3 mm, ovate, oblong, prominently margined; coma ± 1.5 cm long.

Types : Wadhwa 109640 (A : Holotype CAL; B: Isotype K; C-H : Isotypes, in different herbaria).

Flowering : August September. *Fruiting* : September October.

Distribution : INDIA: Western Ghats Maharashtra.

Herbarium specimens : INDIA : Maharashtra ; Satara District, along Mahad ghat near about mile-stone No. 30/7 from Mahabaleswar, ± 1160 m, Aug. 19, 1966, Wadhwa 109640 (A: CAL; B: K; C-H in different herbaria); *ibid.*, Sept. 13, 1966, Wadhwa et Ansari 109651 (A: Paratype CAL; B-O: Paratypes BSI).

Notes : According to Wadhwa & Ansari (*l.c.*) : The taxon is found on precipitous slopes and belongs to section *Buprestis* H. Huber, and has superficial resemblance with *C. evansii* McCann, but differs in having smaller straight or slightly curved flowers : corolla lobes small and orbicular, corona uniseriate and smaller follicles.

The distinguishing characters in details of the new taxon and of *C. evansii* are: the flowers, in the former, 1.5 cm long, stright or slightly curved; calyx lobes 3 mm long; corolla tube 1 cm long, pale purple tinged within near the base, rest white, faintly angular, minutely scabrous along the nerve outside; corolla lobes up to 5 mm long, orbicular, not folded on the back, 1/3 the length of corolla, pale green to white, glabrous within and without; corona uniseriate of 5 elongated, conical, pale-yellow processes; lobes 2 mm long, convergent, densely hairy on the dosal side, jointed near the base; follicles up to 7 mm long, in pairs; whereas in the later species, flowers are 3.5 cm long, curved; calyx lobes 8-10 mm long; corolla tube 2.6 cm long, lower half purple within, greyish outside, the upper half ash-coloured, striated with faint greenish lines, glabrous within and without; corolla lobes 8 mm long, obovate-oblong, folded on the back, pale lemon yellow in the upper part, gradually passing in to white below, glabrous outside softly puberulous inside; corona biseriata; outer cupular of 5 deltoid obtuse lobes, ciliate within and along the margin, yellow, inner lobes linear, yellow tinged with red, 2 mm long; follicles up to 15 cm long, in pairs.

Dr. H. Huber of Botanical Institute and Botanical Garden, Wurzburg University, Wurzburg (West Germany), critically examined the material and comments, "This species might be included into section *Buprestis* H. Huber, wherein it evidently belongs to the same group of species as *C. evansii* Mc Cann..... and feel sure that this is quite a distinct species of eminent interest as it is not identical with any species known to me up to now."

The vernacular name of this species is '*Kharpudi*'.

The species was named after Rev. Fr. Dr. H. Santapau, S.J., F.N.I., who did extensive work on botany of the western India.

***Chionanthus ramiflorus* Roxb. var. *peninsularis* Ravikumar & Lakshmanan (Oleaceae) in Bull. Bot. Surv. India 31 (1-4): 163-165. 1989 (1992).**

Trees, up to 15m tall; bark smooth, greyish with lenticels; branches terete or subangular. Leaves elliptic or elliptic-lanceate,

cuneate at base, acute or shortly acuminate at apex, 2.5 -13 × 1.2-6 cm, entire to undulate along margins, coriaceous, glabrous, light green above, pale green beneath; lateral veins 8-12 pairs. Petioles 1-3.5 cm long, glabrous. Flowers in lax, axillary, cymose panicles, up to 8 cm long, 3-5 in each cyme, glabrous, pale yellow; bracts minute, subulate, glabrous, caducous in infrutescences; pedicels terete, ca 2 mm long, ca 0.25 mm thick, glabrous. Calyx-tube ca 2 mm long, sepals 4, triangular, acute at apex, each ca 1 mm long, glabrous. Petals 4, valvate, oblong-elliptic, acute at apex, ca 4 × 1 mm, margins hyaline, incurved, connate in pairs, pale yellow. Stamens 2, each ca 1.5 × 1 mm; filaments attached to the base of the corolla, alternate; anthers oblong, ca 1.25 × 1 mm, glabrous, yellow; connective broad. Ovary ovoid to subglobose, ca 1.25 × 0.75 mm; style very short; stigma obscurely bifid. Infrutescences 7-14 cm long, stout. Fruits ellipsoid, oblique, acute to short acuminate at apex, 3-3.5 × 1.4-1.7 cm, smooth, glossy, green when young, brownish black when mature, 1-2 in number; stalks 4-8 mm long, stout, jointed; endocarp hard, stony.

Types : V. Lakshmanan 87782 (Holotype CAL; Isotypes K, MH).

Flowering & Fruiting : January May.

Distribution : INDIA: Tamil Nadu, Kerala & Karnataka.

Herbarium specimens : INDIA : Tamil Nadu; Madurai District, High wavy's Mountains, Hospital valley, ± 1600m, Jan. 22, 1988, V. Lakshmanan 87782 (CAL, K, MH); *ibid.*, May 26, 1989, Lakshmanan 91042 (Paratype MH); Nursery valley, High wavy's Mountains, ± 1350m, May 28, 1989, Lakshmanan 91082, (Paratype MH); Kerala; Kottayam District; Devicolam, Umaiya Malai Shola, ± 2000 m, Apr. 18, 1966, Shetty 27322 (Paratype MH); Karnataka; Chickmagalur District, Bababudangiri, Athikandi Estate, ±1600 m, Mar. 1, 1984, Vajravelu 77892 (Paratype MH).

Notes : According to Ravikumar & Lakshmanan (*l.c.*) : *Chionanthus ramiflorus* Roxb. var. *peninsularis* can be easily distinguished from the var. *ramiflorus* by the fruits being ellipsoid, oblique, acute to short acuminate at apex, 3-3.5 × 1.4-1.7 cm, smooth, brownish black whereas in the typical variety the fruits are oblongoid, obtuse at apex, 1.5-2 × 0.5-0.8 cm, ribbed, grey.

Uncommon tree sparsely scattered along the streams of evergreen forests and sholas.

***Chorispora sabulosa* Camb. var. *eglandulosa* Narayanswamy ex Naithani & Uniyal (Brassicaceae) in Ind. J. For. 5 (3) : 245. 1982.**

Perennial, 2.5-8 cm high; branches from the base, glabrous. Leaves in basal rosette, pinnatifid; pinnae entire, obtuse, 13-30 cm long, 3-9 mm broad. Flowers ca 6 mm across, in 3-12 flowered up to 7 cm long racemes; pedicels ca 5 mm long; sepals 3 mm long, petals 6 mm long; stamens ca 4 mm long, anthers 0.75 mm. Fruits moniliform, eglandular siliquae.

Type : N.L. Bor's collector 228 (Holotype DD).

Flowering & Fruiting : July-August.*

Distribution : INDIA : Himachal Pradesh.

Herbarium specimens : INDIA : Himachal Pradesh; Lahul, Bara, Lacha, Aug. 26, 1938, N.L. Bor's collector 228 (DD); Lahul, July 5, 1938, Kaliang -Ka- Jot, N.L. Bor's Collector 62 (Paratype DD).

Notes: According to Naithani & Uniyal (*l.c.*) : *Chorispora sabulosa* Camb. var. *eglandulosa* Narayanswamy ex Naithani & Uniyal differs from var. *sabulosa* in having eglandular siliquae.

***Chrysopogon pseudozeylanicus* K.G. Bhat & Nagendran (Poaceae) in Reinwardtia 10(2) : 128-130. 1985.**

A perennial grass. Culms ca 90 cm high, tufted, erect, smooth; nodes glabrous. Leaves chiefly basal, up to 50 cm long and 5 mm wide, upper leaves shorter, linear-acute, glabrous, margins minutely spinulose, midrib below scaberulous; sheaths keeled, basal ones silky at base, upper glabrous; ligule of short hairs. Panicle ca 10 cm long, contracted; peduncle glabrous except at nodes; nodes shortly pubescent; branches capillary, in 3-4 whorls, unequal, lowest up to 3.5 cm long upper shorter, smooth, tip oblique, bearing one sessile and two pedicelled spikelets. Sessile spikelets ca 5 mm long, laterally

compressed; callus *ca* 1 mm long, bearded with brown hairs. Glumes 2, coriaceous, subequal, *ca* 5 mm long; lower one linear-oblong, 4-nerved, nerves obscure, tip spinulose near apex; upper lanceolate, shortly pubescent, 3-nerved, keeled, keel shortly ciliate, margins ciliate, tip 2-lobed with an awn up to 5 mm long. Lower lemma empty, oblong, subacute, 2.5-3 mm long, 2-nerved, hyaline, ciliate, epaleate. Upper lemma enclosing a bisexual floret, linear, 3-3.5 mm long, hyaline, shortly 2-lobed with a geniculate awn, paleate; awn up to 2.5 cm long, column *ca* 1 cm long, twisted, white hairy; palea *ca* 1.5 mm long, linear-oblong, hyaline. Lodicules 2, *ca* 0.5 mm long. Stamens 3; anthers *ca* 2 mm long. Grains not seen. Pedicelled spikelets male, 4-5 mm long, ovate-lanceolate, acuminate; pedicels 3.5-4 mm long, sides densely ciliate. Glumes 2, membranous; lower 4-5 mm long, ovate-lanceolate, acuminate, 5-nerved, lateral nerves submarginal, minutely ciliate; upper *ca* 4 mm long, lanceolate, acute, 3-nerved, margins ciliate. Lower lemma 2.5-3 mm long, oblong-lanceolate, hyaline, nerveless or 2-nerved, margins ciliate. Upper lemma similar but smaller, 3-nerved, margins ciliate, enclosing a male floret.

Types : K. G. Bhat 550 (A: Holotype CAL; B : Isotype K).

Flowering : November.*

Distribution : INDIA: Karnataka.

Herbarium specimens : INDIA : Karnataka ; South Kanara District, Charmadi ghat, about 15 km from Kotigehar on the way to Dharmasthala, Nov. 24, 1977, K. G. Bhat 550 (A in CAL and B in K).

Notes: According to Bhat & Nagendran (*l.c.*) : Allied to *C. zeylanicus* Nees ex Steud., but differs in having shorter pedicelled spikelets and panicles, and basal sheaths silky at base.

Cinnamomum chemungianum M. Mohanan & A.N. Henry (Lauraceae) in J. Bombay Nat. Hist. Soc. 88 (1): 97-99. 1991.

Shrubs or small trees, 3-4 m tall; branches slender, terete; terminal buds small, minutely sericeous. Leaves 3-7 × 2-4 cm, thinly coriaceous, smooth and glossy above, sparsely appressed pilose

beneath when young, ovate, caudate acuminate at apex with 1-2 cm long acumen, rounded at base; lateral nerves reaching $\frac{3}{4}$ of the length; petioles 0.6 -1 cm long, glabrous, concave above. Inflorescence a much reduced panicle, up to 4 cm long, glabrous, axillary or pseudoterminal; peduncles 1.5-2 cm long, glabrous; pedicels 4-6 mm long. Flowers 1-1.2 cm long. Perianth lobes 6 in two whorls of 3 each, c 1.5 mm long, appressed pilose, red, ovate, acute at apex; tube c 3 mm long, pilose. Stamens many in 3 rows, c 1.5 mm long; anthers truncate, 4-loculed, glandular; filaments villous; staminodes c 0.5 mm long, ovate, acute. Ovary c 2×1.5 mm, subglobular, 1-ovuled; styles 1 mm long; stigmas faintly 3-lobed. Berries c 1.4×1 cm, ellipsoid.

Types : M. Mohanan 61830 (Holotype CAL and Isotypes MH-Acc. Nos. 136396-97).

Flowering & Fruiting : December March.

Distribution : INDIA : Kerala.

Herbarium specimens: INDIA: Kerala; Thiruvananthapuram District, along the slopes of Chemungi, alt. c 1450 m, May 19, 1979, M. Mohanan 61830 (CAL and MH-Acc. Nos. 136396-97).

Notes: According to Mohan & Henry (*l.c.*) : This species is closer to *C. filipedicellatum* Kosterm., but differs from it by the smaller ovate leaves rounded at base and minutely pilose beneath, shorter panicles, peduncles and pedicels, and larger flowers. It is also nearer to *C. travancoricum* Gamble but differs by the smaller, microscopically pilose (densely pubescent in *C. travancoricum*), ovate leaves with rounded base; glabrous panicles (densely pubescent racemes in *C. travancoricum*); and shorter perianth lobes.

The differentiation among these species of cinnamomum : leaves 3-7 by 2-4 cm, ovate, caudate acuminate at apex, rounded at base, sparsely appressed pilose beneath; panicles up to 4 cm long, glabrous; peduncle up to 2 cm long; pedicel 4-6 mm long; flowers 1-1.2 cm long and perianth lobes up to 1.5 mm long in *C. chemungianum* whereas in *C. filipedicellatum*, leaves are 4-5.5 by 8-13 cm, linear-lanceolate, obscurely acuminate at apex, acute at base, glabrous, (microscopically hairy when young) ; panicles up to 10 cm long,

glabrous (minutely puberulous at nodes); peduncle up to 3 cm long; pedicel 5-15 mm long; flowers 2-2.5 mm long; perianth lobes up to 2 mm long; and *C. travancoricum* is characterised by leaves 2-6 by 3.5-8 cm, elliptic to subovate, obscurely acuminate at apex, acute base, densely appressed pilose beneath; racemes up to 3 cm long, appressed pubescent; peduncle up to 1 cm long; pedicel 1-3 mm long; flowers 2.5-3 mm long; perianth lobes up to 4 mm long.

This rare plant grows in the dense forests along slopes of chemungi.

***Cinnamomum nicolsonianum* Manilal & Shylaja (Lauraceae)**
in Bull. Bot. Surv. India 28 (1-4) 111-113. 1986 (1988).

Moderate sized trees up to 15 m, leaves opposite, comparatively thin, moderately hairy on the under surface, sparsely hairy above, elliptic, large, 7-9 cm broad, 19-20 cm long, apex obtuse, base cuneate, three nerves prominent, starting from the base and running up to the apex; transverse nervules parallel and prominent especially on the under side; panicles axillary, much smaller than the leaves, up to 10 cm long; flowers borne towards the upper part of the long slender panicle; flowers few (15-30), pedicels short sepals 2-3 mm long, tomentose. Fruit characters similar to those of *C. malabatum*.

Types : *Shylaja* CU 26217 (Holotype MH : Isotype CALI).

Flowering : February.*

Distribution : INDIA: Malabar.

Herbarium specimens : INDIA : Malabar; Peruvannamuzhi, Feb.2,1980, *Shylaja* CU 26217 (MH and CALI).

Notes : According to Manilal & Shylaja (*l.c.*) : The Genus *Cinnamomum* Schaeffer of Lauraceae consists of about 250 species (Willis, 1973). Kostermans (1964) lists 452 binomials, including synonyms, under this genus. Due to the wide variability in the morphological characters and the amazing uniformity of floral characters, a lot of confusion was prevailing in the taxonomy of this

genus, which has been settled to a great extent recently by Kostermans (1983).

Allied to *C. malabatum* (Burm. f.) Bercht. & Presl, but differs from it by the opposite leaves which are sparsely hairy above; axillary, few-flowered, insignificant panicles up to 10 cm long; and the tepals being 2-3 mm long. In contrast, the *C. malabatum* is characterised by : leaves opposite or sub-opposite, glabrous above; panicles pseudo-terminal lax, many-flowered up to 25 cm long; flowers many, tepals 3-3.5 mm long.

While *C. malabatum* in general, can be easily identified when in bloom due to the large, showy panicles, in the case of *C. pauciflorum*, the inflorescence is so insignificant that one may not be able to judge whether the tree is in bloom or not without a close observation.

Common in the plains and foot hills of the Western Ghats of Kerala.

The species is named in honour of Dr. Dan H. Nicolson, Smithsonian Institution, for his valuable contribution to the study of plants of peninsular India.

***Cleidion alongense* Bennet & Chandra (Euphorbiaceae) in Indian Forester 3 (10): 846-848. 1985.**

A tree ca 8 m tall, monoecious. Leaves glabrous petiole, 5-6.5 cm long, upper surface with a longitudinal groove, 4-8 mm towards the tip and 3-5 mm towards the base rugose and dull brown on drying; lamina 16-32 cm long, 6-13 cm broad; elliptic oblong, abruptly obtuse acuminate at apex, acute at base, margin crenate dentate, secondary veins 8-10 pairs. Male spiciform racemes 7-15 cm long, axillary, drooping, pubescent. Flowers sessile or subsessile and arranged in interrupted clusters on the rachis, 2-2.5 mm in diameter; pedicel 0 ± 1 m long; bracts 1-1.5 mm long, ovate. Perianth 3, 1 mm long, puberulous, ovate acute. Stamens 50-70, 1-1.5 mm long; connective projected out and slightly curved. Female flowers solitary axillary with two bracts at the base and one little above on the peduncle; bracts 1-2 mm long, ovate-lanceolate; peduncle 5-10 mm

long. Perianth 5, 2-2.5 mm long, ovate-lanceolate, acuminate. Styles 3, 1-1.5 cm long, bifurcated almost up to the base, branches filiform.

Types : Bennet & Chandra 3703 (A : Holotype DD; B-D: Isotypes DD).

Flowering : September*.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh ; Komkar, Sept. 7; '82 Bennet & Chandra 3703 A-D (DD).

Notes : According to Bennet & Chandra (*l.c.*) : Allied to *Cleidion javanicum* Blume but differs in having larger leaves, shorter male spiciform racemes and more stamens.

***Cleisostoma sikkimense* S.Z. Lucksom (Orchidaceae) in Ind. J. For. 15 (1) : 27-29. 1992.**

Epiphytic. Stem 3-17 cm long, brached , erect. Leaves 3-9, 6.7-11.5 cm × 1.1-1.5 cm, oblong, obliquely bilobed, sheath c 1 cm long. Inflorescence 13-20 cm long, a panicle, extra-axillary, perpendicular to the main axis, 10-20 flowered. Flowers c 5 cm across, whitish purple; floral bract 1-1.2 mm long, triangular; sepals and petals pale green with 2 brown bands just within the margin; sepals equal, 2.8-3mm × 1.6-1.8mm; petals 1.9-2 mm × 0.8-1 mm. Labellum 3-lobed, hypochile further extends to a short infundibuliform spur, lateral lobes erect, triangular with tip pointing forward, mesochile a short isthmus, epichile triangular, disc with a vertical plate running from the base of spur up to the basal part of apical lobe forming a granular broad callus; the mouth of the spur septed, back wall of the spur with a large lunate shaped fleshy 2-lobbed callus just under the column. Rostellum with 2 curving plates. Anther truncate 0.8 mm × 0.5 mm, whitish purple. Pollinia 2, c 0.25 mm long, translucent orange yellow, bifid; caudicle scapula like c 0.55 mm long, translucent white; disc orbicular.

Types : Lucksom 204 (a: Holotype G. T. K. & b-d : Isotypes Forest Department Herb.).

Flowering : May June. *Fruiting* : August September.

Distribution : INDIA : Sikkim.

Herbarium specimens : INDIA : Sikkim; Leeving 4500' June 8, 1990, Namchebong, R.F., 1500' May 10, 1991, Rumtek, 6000' June 16, 1991, *Lucksom* 204 (a in G.T.K. & b-d in Forest Department Herb.)

Notes: According to Lucksom (*l.c.*) : The species is closely allied to *Cleisostoma subulatum* Bl. but differs in the Characters : stem 3-17 cm long, branched; leaves 6.5-11.7 × 1.1-1.6 cm, obliquely bilobed; inflorescence perpendicular to the main axis, 13-20 cm long, flowers c 5 mm across, sepals 2.8-3 mm × 1.6-1.8mm; labellum 3 lobed, lateral lobes erect with tip pointing forward, apical lobe, horizontal flat, obtuse and at base with a granular calli, spur back wall callus lunate shaped not broadening downwards but with a semi-circular sinus and meeting with the vertical longitudinal plate occluding the spur mouth; anther truncate. In contrast in *C. subulatum*, stem is 15-30 cm long; leaf 6-10 cm × 6-9 mm, acuminate; inflorescence pendulous, 25 mm long; flowers 6-7 mm across; sepals 4 mm × 2 mm; labellum, 3 lobed, lateral lobes with apiculate tip, pointing each other; apical lobe concave acute; spur back wall callus, broadening downwards with a semicircular sinus and meeting the front wall callus occluding the spur mouth; anther depressed, long beak.

As the species seem to be endemic to Sikkim and have been collected from the various parts of the state, it is named after the state 'Sikkim'.

This species grows on the tree trunks and the branches where the shade is adequate.

This new species has been collected recently from different parts of Sikkim. The fresh specimens were critically studied throughout two flowering seasons and found to be distinctly different from the other *Cleisostoma* species. The lip base produced into short truncate spur, interior of spur occluded by a dorsal scale or calli on the front and back wall and bifid pollinia are the characters of the genus *Cleisostoma* Bl. of the sub-tribe *Sarcanthinae*.

***Clematis connata* DC. var. *lanceolata* Sas. Biswas** (Ranunculaceae) in Ind. J. For. 8(1): 61-63. 1985.

Scandent shrubs. Branches sulcate with more than 6 fibrovascular bundles, glabrous, brownish. Leaves 5-7 foliolate, 10-30 cm long. Leaflets 5.5- 8 × 1.4-3.2 cm, lanceolate, serrate, ± lobed or otherwise acute, basal nerves 1-6, glabrous or ± pubescent along the nerves beneath in young leaves. Flowers light yellow, 3-9 in oppositely arranged panicles, panicles 4.5-9 cm, peduncle 3-5.2 cm long. Bracts 3.5 × 1 mm, foliaceous. Sepals 1-1.6 × 0.25-0.8 cm, lanceolate, hairy on both surface, without ribs. Stamens 7.5-8 mm long, anthers 3-3.1 mm long, filaments hairy throughout. Achenes pubescent.

Type : Sahni 21545 (Holotype DD).

Flowering & Fruiting : September.

Distribution : INDIA: N.W. Himalaya. -

Herbarium specimen : INDIA : N.W. Himalaya ; Tehri Garhwal, Kaudia (Tehri Forest Division), Sept. 30, 1954, Sahni 21545 (DD).

Notes : According to Biswas (*l.c.*) : Closely allied to *Clematis connata* but it differs from the var. *connata* in having 5-7 foliolate leaves, lanceolate leaflets & sepals and indistinctly connate petiole, whereas the var. *connata* is having the characters : 3-5 foliolate leaves; leaflets broadly ovate with cordate base; petiole connate and sepals oblong.

The above variety can easily be separated from *Clematis acuminata* ssp. *sikkimensis* Hk. f. et Thoms. var. *clarkei* Bruhl by more number of leaflets, sepals pubescent on both sides, margin densely tomentose and filaments hairy, not enveloping the anthers.

***Coelogyne ghatakii* T.K. Paul, S.K. Basu & M.C. Biswas** (Orchidaceae). in J. Bombay Nat. Hist. Soc. 86(3) : 425. 1989 (1990).

Epiphytic or sometimes lithophytic herb. Pseudobulb 5.5 × 2 cm, ovoid-oblong, 4-angled with 4 grooves, dark-green. Leaves 2, petioled; petiole 2-3 cm long, glabrous, channeled; lamina 10-15 × 2.5-3.0 cm,

elliptic-lanceolate, apex acute to acuminate, entire, gradually tapering at base, dark-green, coriaceous, 6-7 nerved. Inflorescence c 12 cm long, erect; peduncle c 6.5 cm long, shorter than the leaves, slender, glabrous, green, naked, raceme with 6 to 8 flowers, basal portion covered with overlapping distichous brownish glumes. Flowers open successively, pedicellate, 1-1.5 cm across, greenish yellow; pedicel 5-10 mm long, slender, erect. Sepals 3, spreading, subequal, oblong-lanceolate, acute, entire, glabrous, 3-nerved, 6-7 × 3 mm; petals 2, spreading, 6-7 × 0.5 mm, linear, entire, apex obtuse, glabrous, 1-nerved. Labellum c 7 × 5, mm deeply 3-lobed, glabrous, greenish yellow; lateral lobes 4 × 1.5 mm, ovate oblong, obtuse, entire with 2-3 brownish patches; midlobe 4.5 × 3.5 mm, subquadrate, recurved, retuse, narrow at base, base with a brown dot, entire, undulate, with 3-4 brown dots; keels 2, prominent on epichile extending near to the apex, yellowish, entire. Column c 5 mm long, 1.5-2 mm across, winged on the upper part, wings serrate, light yellow; anther 1, c 1.5 mm long and broad, light yellow; pollinia 4, c 1 mm, oval, whitish yellow.

Types : Ghatak 2213 (A: Holotype CAL ; B, C, D: Isotypes—Manipur Univ. Herb.).

Flowering & Fruiting : April June.

Distribution : INDIA: Manipur.

Herbarium specimens : INDIA: Manipur; Imphal valley, Apr. 20, 1988, Ghatak 2213 A: CAL, B, C, D: Manipur Univ. Herb.).

Notes : According to Pal *et al.* (*l.c.*) : The new species has been collected in a remote area of Imphal valley. In the fresh specimens it is found that the flowers are small and open successively in the inflorescence, i.e., only few at a time whereas the others are still in bud condition. The scape-base is naked but the base of the rachis has a series of distichous glumes and these characters are of the section *Ancipites* Pfitz & Kranzle. of the genus *Coelogyne*.

The new species is closely allied to *Coelogyne griffithii* Hook. f. of the above mentioned section but having leaf comparatively smaller (10-15 × 2.5-3 cm); inflorescence shorter (12-14 cm) 6-8 flowered, 1-1.5 cm across, greenish yellow; sepals smaller (0.6-0.7

× 3 cm), 3-nerved; petals smaller (6-7 × 0.5 mm); lateral lobes of labellum ovate-oblong, keels 2; column broadly winged. On the other hand *C. griffithii* has the characters of large leaf (11.5-26.0 × 3-6 cm); longer inflorescence (15-34 cm), 6-18 flowered, flowers are light brownish 1.5-2 cm across; larger sepals (1.0 -1.3 × 0.3 0.6 cm), 5-nerved ; petals large (10-13 × 1 mm) ; lateral lobes of labllum rounded, keels 5; column narrowly winged.

The new species grows on tall trees as well as on moss-covered rocks in the Imphal Valley.

It is named in honour of Prof. J. N. Ghatak of Manipur University, a leading Plant Taxonomist in India who collected this species.

***Cometes surattensis* Burm. var. *ambajiensis* Bedi & Madala** (Illecebraceae) in *Ind. J. For.* 4(4) : 327-328 1981.

An annual, erect, dichotomously branched, hairy herb. Stem 5 to 15 cm tall, terete, lower internodes stunted, younger parts more pubescent. Leaves opposite, sessile, pubescent, elliptic lanceolate, 5 to 15 mm long and 3 to 6 mm broad. Stipules setaceous, 0.5 to 2 mm long with slightly broader base. Flowers numerous, raised on filiform hairy peduncles; each peduncle having a cluster of three flowers, 3 to 7 mm long and 3 to 6 mm broad; mostly median flower alone perfect. Bracts dimorphic, lower and outer clawed, margins irregularly cut, projecting downward or outwards; upper bracts when young smaller, less branched and projecting upward; the older bracts more pubescent, yellowish brown, pinnatipartite, enlarged, much branched, encircling and overtopping the cluster of 3 flowers. Perianth lobes 5, unequal in size, pubescent outside, erect, lanceolate; apex mucronate projecting backward; margin hyaline, slightly dissected to ciliate. Stamens included, subperigynous and connate at the base; 5 perfect taller, alternating with five narrow membranous staminodes. Anthers versatile. Ovary ovoid-lanceolate; style filiform erect; stigma 3-toothed, reclinate; ovule erect; testa membranous. Utricle acute, enclosed in the perianth lobes. Seed obovoid, planoconvex, erect with large chalaza, ovoid blackish spot on the

convex side. Seeds mostly two from each cluster of 3 flowers, very rarely 1 or 3 seeds also observed.

Types : *Bedi* 10.079 (Holotype in Herbarium, Department of Botany, M.S. University of Boroda, Boroda ; B-C : Isotypes in FRI Herb. DD).

Flowering & Fruiting : October and onwards*.

Distribution : INDIA : Gujarat.

Herbarium specimens : INDIA : Gujarat; North Gujrat, North of Ambaji town, old mining Sites (Copper -Zinc -Lead) Oct. 16, 1979, *Bedi* 10.079; *ibid.*, Oct. 15, 1979, *Bedi* 10.002 (Paratype); Dec. 17, 1979, *R.K.M.* 204 & Apr. 28, 1980, *R.K.M.* 323 (All paratypes in Herbarium, Deptt. of Botany, M.S. University of Baroda); *ibid.*, *Bedi* 10.079 B-C (DD).

Notes : According to *Bedi & Madala (l.c.)* : This var. is close to *Cometes surattensis* Burm., but differs from it by: pubescent (herb.); leaves sessile (pubescent) lesser broad; perianth longer than filament and style filiform but not curved.

Common among grasses on open gravelly places in old and new mining sites (Copper-Zinc-Lead) where very few other plants grow. Often also collected from dry, rocky, steep, stream bed.

Connarus parameswaranii Ramam. & Rajan (Connaraceae) in *J. Bombay Nat. Hist. Soc.* 85(2) : 390-392 , 1988.

Liana; branches spreading, innovations densely stellate-plumose, brownish, velvety, old branches greyish, warted, lenticels present. Leaves imparipinnate, 1-2 pairs; rachis 5-13 cm long, brownish velvety. Leaflets 4-14 × 3-7 cm, ovate to obovate, coriaceous, leathery, apex abruptly acuminate, base rounded, rarely narrow; nerves 4-7 pairs, ascending from the main nerve jointed near the margin, inconspicuous above, distinct below, midrib brownish hairy; petiolules 3-4 mm long, thick, warty, dense tomentose. Panicles 16.5 cm long, terminal, brownish, velvety with numerous flowers. Flowers bisexual; bracts subulate, lanceolate, densely pubescent without, glabrous within. Sepals 5, each 4-5 × 1-2 mm, connate at base, persistent

in fruit. Petals 5, each 4-5 × 1-2 mm, oblong, glabrous. Stamens 10, connate at base, epipetalous; filaments short. Pistil 1; ovary hairy; style slender; stigma capitate. Follicles immature 1-2.5 × 0.3-1.5 cm ellipsoid, oblique, inflated, stipitate, beaked, brownish tomentose pubescent within, suture curved on ventral side, straight on dorsal side; seed solitary, arillate at base.

Types : Ramamurthy 66582 (Holotype CAL; Isotypes MH Acc. Nos. 138699-138700).

Flowering : March.*

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Idukki District, Adimali Reserve Forest, 1800 m, Mar. 29, 1980, Ramamurthy 66582 (CAL, MH).

Notes : According to Rammurthy & Rajan (l.c.) : *Connarus parameswaranii* is allied to *Connarus sclerocarpus* (Wight & Arn.) Schellenb., but differs chiefly in : leaflets ovate obovate, apex abruptly acuminate, nerves not distinct above, brownish hairy at midrib only; panicles stellate pubescent, velvety; petals glabrous and follicles ellipsoid, minutely beaked, brownish tomentose.

The specific name is given in honour of Dr. M. Parameswaran Nayar, Ex-Director, Botanical Survey of India.

Cotoneaster confusus Klotz ex Arv. Kumar & Panigrahi (Rosaceae) in Bull. Bot. Surv. India 31(1-4): 108-110. 1989 (1992).

Erect woody shrubs with dark brown and irregular branches; older branches with leaf-scars of fallen leaves, younger branchlets glabrescent or glabrous, occasionally tomentose, older branches glabrous. Leaves 3-7 × 1-3.5 cm, subcoriaceous, elliptic, elliptic-oblong, obovate-oblong, obovate, or oblong-lanceolate, apex acute or obtuse, generally mucronulate, sometimes retuse, base cuneate, upper surfaces glabrous, lower ± glabrous but margin sometimes hairy; petioles 4-11 mm long, ± glabrous. Inflorescences 5-16-flowered, peduncles and pedicels glabrous. Flowers about 4-5 mm

long. Floral cups about 3-4 mm long, sparsely pilose, calyx teeth 1-1.5 mm long, tomentose or villous. Petals 3 mm, suborbicular or clawed, base of the claw villous. Carpels 2, 3 mm long, ovary 1 mm, tomentose, style 2 mm long, glabrous. Pomes 7-10 mm long, globose or turbinate, dark brown or black. Nutlets 2, the upper parts emerging from floral tubes.

Type : *Schlich* s.n. (Holotype CAL- Acc. No. 153866).

Flowering : May. *Fruiting* : June-October.

Distribution : INDIA: Kashmir; Himachal Pradesh, Uttar Pradesh, Sikkim; PAKISTAN.

Herbarium specimens: INDIA: Kashmir; Kistawar, Nagin Siru, 1800-3850 m Sept.22,1958, *T.A. Rao* 7864 (BSD); Waskar-Dagwan, 3500 m, Sept. 9, 1979, *B.M. Wadhwa* 66898 (BSD). Himachal Pradesh; Simla, on road below Rothneyl, 2300 m, Sept. 15, 1876, *Gamble* 1394 B (CAL - Acc. No. 153861); Simla, Suijoli, Mahasu road, 2200 m, June 27, 1877, *H. Gamble* 4417D (CAL Acc. No. 153863); Nirrkh, June, 1883, *Schlich* s.n. (CAL Acc. No. 153852); June 1883, *Schlich* s.n. (CAL-Acc. No. 153858); Simla, 2290 m (7500), May, *Schlich* s.n. (CAL-Acc. No. 153866); Jaunsar, Deota, 2440 m, May 1894, *T.W. Forster* 52 (CAL); Simla, June 24, 1903, *Kalka*. ... 19008 (CAL); Simla, 2440 m, Oct. 1907, *A. Meebold* 5078. (CAL); Simla, 1908, *A.R. Tucker* s.n. (CAL-Acc. No. 561283). Uttar Pradesh; Mussoorie; June 1869, *G. King* s.n. (CAL-Acc. No. 153881); Mussoorie, 1869, *G. King* s.n. (CAL-Acc. No. 153889); Garhwal valley of Nabun, (?) *G. King* 315 (CAL-Acc. No. 153876); Kumaon, Tola, Gory valley, Aug. 15, 1900, *Inayat* 24358 (CAL, DD); Garhwal, *G. King* s.n. (3 sheets, CAL-Acc. Nos. 153883, 153890 & 153891); Garhwal on way to Trijuginarayan, 2000 m, May 24, 1972, *B.D. Naithani* 47949 (BSD); Tehri-Garhwal, Pinsar, 2440 m, Sept.23, 1974, *M.V. Viswanathan* 54881 (BSD); Mussoorie, Zabbarkhet, 2135 m, Oct.11,1985, *A. Kumar & G. Panigrahi* 1651 (CAL - 9 sheets). N.W. India; *Royle* ? 387 (CAL-Acc. No. 153875). Sikkim; *J.D. Hooker* s.n. (CAL- Acc. No. 153925), *p.p.* including only one left hand lower specimen. PAKISTAN : above Sambalpat, 2135-2440 m, Oct.5,1888, *J.F. Duthie* 7470 (CAL).

Notes : According to Kumar & Panigrahi (*l.c.*) : In describing

Cotoneaster stracheyi Klotz (1966) commented that "*C. stracheyi* is a hybrid between *C. acuminatus* Lindley and *C. obtusus* Lindley or *C. Confusus* Klotz est". But for this incidental reference to *C. confusus* Klotz, he has nowhere published the name validly (Art. 36.1). Naithani's (1984) reference to *C. confusus* Klotz as allegedly published in "Bull. Bot. Surv. India 5: 213. 1963 et in Wiss. Z. Univ. Halle 15: 539. 1966", must be treated as an erroneous presumption. Further *C. confusus* resembles *C. affinis* Lindley in habit, size and shape of leaves, colour of petals and number of nutlets, but *C. affinis* differs from the former in having its younger branches densely pubescent, leaves obovate to elliptic, but never oblong-lanceolate; lower surfaces of leaves densely pubescent; petioles, peduncles, pedicels and floral cups pubescent and pomes dark purple.

***Cotoneaster parkinsonii* Panigrahi & Arv. Kumar (Rosaceae)**
in Bull. Bot. Surv. India 31 (1-4): 110-113. 1989 (1992).

A rigid shrub, erect, semi-evergreen; short shoots spirally arranged on the main stem, young branches strigose-villous but older ones become glabrous, brown and rough, dark-purple or dark-brown. Leaves 8-17 × 5-11 mm, ± spiral, coriaceous or subcoriaceous, elliptic or broad-elliptic, apex obtuse or rounded, mucronulate, base generally rounded or obtuse, sometimes broad-cuneate, upper surfaces bright and glabrous, lower surfaces ash-grey-brown, sparsely villous when young and subglabrous or glabrous at maturity; petioles 2-4 mm, strigose-pilose. Stipules 1-1.5 mm long, subulate, margin pilose. Inflorescences 6-11 mm long, 1-6-flowered; pedicels 2-3 mm long, villous. Floral cups 4-5.5 mm long, strigose-villous when young, but sparsely strigose at maturity; calyx teeth 1.5-2 mm long, densely villous or tomentose. Petals 3.5-4 mm, white, patent, obovate, clawed at base and nearly subglabrous, 3-5 veins arising from base of the claw and branched towards the apex. Stamens about 15 in number; anthers ditheous, dorsifixed, filaments 2-3 mm long. Carpels 2, 4-6.5 mm long, upper portion of the ovary woolly, styles 2, glabrous, emerging outside the floral cup, stigma capitate. Seeds / nutlets 2 in number, 4×3 mm when enclosed in young fruit, but not fused; ripe pome unknown.

Type : C.E. Parkinson 5992 (Holotype DD; Photo - CAL).

Flowering & Fruiting : June.*

Distribution : INDIA: Uttar Pradesh (Known by The type collection only).

Herbarium specimen : INDIA : Uttar Pradesh; Almora District, Pindow valley, Dwali, 2440 m, June 12, 1935, C.E. Parkinson 5992 (DD; Photo-CAL).

Notes : According to Kumar & Panigrahi (l.c.) : *Cotoneaster schlechtendalii* Klotz resembles *C. parkinsonii* Panigrahi et A. Kumar in being erect shrubs with leaves elliptic, apex rounded, not emarginate, inflorescences 1-6-flowered, petals patent and nutlets 2, but it differs in having shorter petioles (1-2mm), lower surfaces of the leaves strigose tomentose and nutlets fused. *Cotoneaster poluninii* Klotz (species endemic to Nepal) also resembles *C. Parkinsonii* but differs in having smaller leaves (6-12 × 3-6 mm), lower surfaces tomentose, upper surfaces sparsely pilose; petioles shorter (1-2 mm) and inflorescence with 3-9 flowers.

The taxon is named in honour of the collector of holotype.

Crotalaria naikiana Zate (Papilionaceae) in Ind. J. For. 5(1): 35-36. 1982.

Erect herb, 50-60 cm tall, clothed all over with short appressed grey hairs. Branches few, ascending, terete. Leaves exstipulate, petiole ± 2 mm long; lamina oblanceolate, 2.5-7.5 × 1.0-2.0 cm, glabrescent above densely silky beneath, tapering at the base, obtuse and retuse or apiculate at apex. Flowers in terminal racemes up to 15 cm long; bracts linear, minute; bracteoles 2, linear, ± 4mm long; pedicels 4-6 mm long, slender. Calyx densely silky; tube 2-3 mm long; lobes subequal, linear to linear lanceolate, 9-10 × 2-3 mm, upper two distinct broader than the lower ones. Corolla 8-10 mm long, yellow, standard petal dorsally pubescent at apex, keel petals densely ciliate along margins. Pods sessile, oblong, glabrous, rather included within the calyx, 2-4 seeded; seeds reniform yellow, shining.

Types : Zate 924 (a: Holotype & b-d: Isotypes, in Herbarium of Marathwada University, Aurangabad).

Flowering & Fruiting: September November.

Distribution : INDIA: Maharashtra.

Herbarium specimens : INDIA : Maharashtra ; Nanded District, Kinwat, Ambadi, Zate 924 a-d (Herbarium of Marathwada University, Aurangabad).

Notes : According to Zate (*l.c.*) : Allied to *C. linifolia* L. and *C. tecta* Roth., but differing from both in its larger leaves (2.5-7.5 × 1.0-2.0 cm); shorter racemes; calyx 9-10 × 2-3 mm, upper calyx lobes distinct; seed pods oblong, 8 × 4 mm, pale brown, seeds 2-4. In contrast *C. linifolia* L. is characterised by : Leaf 1.2-4.5 × 0.3-0.8 cm; calyx 5-6 × 2-4 mm; seed pods quadrate to ovate-oblong, 4 × 3 mm, black; seeds 8-10. And *C. tecta* Roth is having with leaf 1.5-4.0 × 0.8-1.2 cm ; calyx 6-8 × 1-2 mm; seed pods oblong 12-14 × 4 mm, pale brown, seeds 9-12 (-25).

Rare on hill-slopes in forest openings, locally abundant. The species has been named in the honour of Dr. V.N. Naik of the Department of Botany, Marathwada University, Aurangabad.

***Crotalaria paniculata* Willd. var. *nagarjunakondensis* Thoth.** (Papilionaceae) in Bull. Bot. Surv. India 6 (1) : 67. 1964 (1965).

An undershrub up to 1 m high, fulvous villous. Leaves simple, alternate, exstipulate, ovate-elliptic to obovate, 3.5-6.9 × 1.6-2.9 cm, shortly petiolate, villous, entire, cuneate at base, acute at apex, mucronulate; lateral nerves 6-7 pairs; petioles 2-3 mm long. Inflorescence a panicle, 13-20.7 cm long. Flowers yellow, pedicellate; pedicels 7-12 mm long; bracts and bracteoles distinctly cordate, cuspidate, recurved, bracts 5-6 × 3-5.5 mm; bracteoles 2, smaller than bracts, situated just at the base of the calyx tube. Calyx tube 7-10 mm long; lobes 5, mostly oblong, at times ovate, densely brown silky. Standard 1.3-1.7 cm long, ovate to orbicular with a short claw, brown silky on the back; wings obovate to oblong; keel petals connate, much incurved. Stamens 10, monadelphous, dimorphous. Ovary pilose; style long, incurved at base; stigma small, bearded; ovules

2. Pod ovoid, 10-12 × 6-7 mm, inflated with a recurved, persistent style, pilose, 1-2-seeded; seeds black.

Types : *Thothathri* 9764 (A: Holotype CAL; B-E : Isotypes CAL).

Flowering & Fruiting : November.*

Distribution : INDIA: Andhra Pradesh.

Herbarium specimens : INDIA : Andhra Pradesh; Nalconda District, hills surrounding Nagarjunakonda Valley, 300m, Nov. 26, 1961, *Thothathri* 9764 A-E (CAL).

Notes : According to *Thoth. (l.c.)* : *Crotalaria paniculata* Willd. var. *nagarjunakondensis* *Thoth.* differs from *C. paniculata* Willd. var. *paniculata* in having distinctly cordate bracts, shortly petiolate leaves and in the absence of stipules.

The plant is an undershrub, growing up to 1 m in height. It occurs in large populations in the hills at an altitude of 300 m. The flowers are handsome yellow.

***Crotalaria willdenowiana* DC. Subsp. *glabrifoliolata* J.L. Ellis (Papilionaceae) in Bull. Bot. Surv. India 6 (1) : 97-98. 1964 (1965).**

Robust perennial herbs, 20-30 cm tall, woody in aged plants; branches numerous, spreading, terete, sparsely clothed with adpressed hairs, tomentose in younger branches; root stock woody, branched, tinged deep yellow. Leaves trifoliolate; petioles up to 4 mm long, pubescent; leaflets variable, 2 × 1 mm in dry periods up to 2 × 1 cm in rainy seasons, oblanceolate, emarginate, apiculate, glabrous above, adpressedly tomentose beneath; petiolules ± 1 mm long, pubescent; stipules entire, minute, ovate-lanceolate. Flowers 2-10, in axillary and terminal racemes; peduncles and pedicels with adpressed and spreading hairs; calyx ± 3 mm long, 5-lobed, united to half their lengths, tomentose without, glabrous within; corolla yellow, papilionaceous; standard ± 9 × 7 mm, more conspicuously parallel-maroon veined without than within, adpressedly hairy without; wing petals ± 6 × 2 mm, glabrous; keel petals ± 6 × 2 mm, glabrous; stamens 10, monadelphous, dimorphous, 5 big alternating with 5 small, persistent as filiform structures around dry legumes; 5 big

anthers conical, basifixed, 5 small anthers roundish, attached at an angle to filaments; ovary sessile, superior, 1-ovuled; styles \pm 3 mm long, abruptly incurved at base, tomentose upwards; stigmata small, hairy. Legumes 5×4 mm, obliquely subglobose, strongly beaked, tomentose, 2-seeded; seeds $\pm 2 \times 3$ mm, reniform, gray, shiny.

Types: Ellis 13536 (A: Holotype MH; B-M: Isotypes MH).

Flowering & Fruiting : Almost throughout the year.

Distribution: INDIA: Tamil Nadu (Madras).

Herbarium specimens : INDIA : Tamil Nadu (Madras); Coimbatore, compound of Gandhi Memorial Library, Dec. 12, 1961, Ellis 13536 A-M (MH); *ibid.*, Mar. 3, 1963, Ellis 16255 A-E (Paratypes MH).

Notes: According to Ellis (*l.c.*) : Allied to *Crotalaria willdenowiana* DC. subsp. *willdenowiana* but differs in having leaflets glabrous on the upper surface, lesser amount of pubescence on younger branches and root stocks being deep yellow.

This plant is commonly seen in and around Coimbatore Town, and the taxon is geographically isolated from *Crotalaria willdenowiana* DC., for the latter taxon is not seen growing in or around Coimbatore Town.

***Croton caudatus* Geisel. var. *obovoideus* N.P. Balakr. & Chakrab. (Euphorbiaceae) in Bull. Bot. Surv. India 25 (1-4): 190-191. 1983 (1985).**

Scandent or scandent shrubs; young shoots ochraceous stellate-tomentose to hirtellous-tomentose; branchlets scattered stellate scabrid pubescent. Leaves narrowly to broadly cordate to ovate or ovate-elliptic or ovate oblong, 6-18 cm long, 2-10 cm broad, cordate, truncate to rounded at base, coarsely denticulate-serrulate to subserrulate at margin, acuminate to acute or obtuse at apex, membranous, scattered stellate-hispidulous, scabrid pubescent to subglabrous (with hairs only on nerves) above, scattered scabrid-pubescent or softly tomentellous beneath, strongly 3-nerved at base with 1-2 accessory nerves per side; lateral nerves more or less

prominent above, distinct beneath, 3-6 pairs above the basal; nervules indistinct to prominent above, more or less prominent beneath; glands at base 2-4, stipitate, scattered at margin; petioles 0.5-5 cm long, 1-3 mm thick, scattered stellate-scabrid-pubescent or tomentellous; stipules laciniate with glandular tips, 6-13 mm long. Racemes terminal and lateral androgynous or entirely male or female, 12-30 cm long, more or less stellate tomentellous; bracts subulate, lanceolate to linear, 1-5 mm long, fringed with sessile glands at margin. Male Flowers: 1-5 in fascicles, somewhat stellate tomentellous; pedicels 3-9 mm long; sepals 5, triangular-oblong or ovate to ovate-oblong, 2-3.5 mm long, 1-3 mm broad; petals 5, narrowly elliptic, oblong, obovate to oblanceolate or elliptically to orbicularly subspathulate, 2.5-4 mm long, 1-2.5 mm broad; stamens 20-36, 3.5-5 mm long; anthers oblong or obovoid. Female Flowers: solitary, somewhat stellate-tomentellous; pedicels 2-4.5 mm long; sepals 5, oblong to ovate or triangular-oblong, 2.5-4.5 mm long, 1-2.5 mm broad, stellate-villous at base inside, fringed with or without sessile glands at margin; petals 0-5, filiform; ovary obovoid, 3-4 mm long, densely ochraceous stellate-hispidulous, hirsute to hirsute-tomentose; styles 3, bifid, 6-9 mm long. Capsules obovoid, 1.9-2.3 cm long, 1.5-1.9 cm diam., bluntly 3-angled, submuriculate, subtruncate at apex, scattered stellate-scabrid-pubescent; seeds oblong, 12-15 mm long, 7-9 mm broad, brown, sparsely stellate-pubescent.

Types : *Sebastine* 25343 (A : Holotype MH; B-D : Isotypes MH).

Flowering: March-October. *Fruiting* : May-November.

Distribution: INDIA: Endemic to western ghats of Kerala, Tamil Nadu.

Herbarium specimens: INDIA: Kerala, Kotayam District; Velara, 525 m, Aug. 21, 1965, *Sebastine* 25343 A(MH), *ibid.*, *Sebastine* 25343 B-D (MH). Paratypes : Kerala ; District, Unknown: Kuzhuthuruthy River Bank, May 4, 1961, *Subramaniam* 70886 (BSI); Travancore, Apr. 26, 1896, *Bourdillon* 826 (CAL); *ibid.*, no date, *Calder & Ramaswami* 1345 (CAL); *ibid.*, Achankoil to Makona, Sept. 5, 1913, *Rama Rao* 1594 (CAL); Idikki District: Pamba Valley, Mar. 22, 1973, *Sharma* 43952 (MH); Triveny, Oct. 11, 1972, *Sharma* 42473 (MH); Kottayam District: Mudurapalai, Riverside, June, 13, 1963, *Sebastine* 16432 (MH); Peruvanthanam to Pulluparai, May 22, 1965,

Vivekananthan 23946 (MH); Trichur District: Adirapilli Reserve, Sept. 13, 1976, *Ramamurthy* 48499 (MH); Orukombankutty to Parambikulam, Apr. 18, 1977, *Ramamurthy* 49359 (MH); Pullankandam R.F., Apr. 11, 1977, *Ramamurthy* 49293 (MH). Tamil Nadu: Coimbatore District, Anaimalai Hills, Aug. 30, 1913, *Fischer* 3638 (CAL); Tirunelveli District, Shencottah to Aryankavu, Sept. 8, 1913, *Calder & Ramaswamy* 685 (CAL).

Notes: According to Balakr. & T. Chakrab. (l.c.) : Differs sharply from all other known varieties of this species in the obovoid capsule and ovary.

Scattered in the evergreen forests ascending up to about 900 m.

***Cryptocarya insularis* Vasudeva Rao & Chakrab. (Lauraceae)** in J. Econ. Tax. Bot. 6(2): 446. 1985.

Tree \pm 10 m high, branchlets blackish, terete, often somewhat flattened when young minutely \pm adpressed tawny or rusty-puberulous. Leaves oblong to triangular-ovate, 7-13 cm long, 3-5.5 cm broad, usually unequal and truncate to rounded at base, entire, obtuse to acute or often apiculate at apex, stiffly coriaceous, glabrous, or adpressed rusty-puberulous on midrib above, minutely scattered and adpressed rusty-puberulous beneath, on drying dark brown above, paler and somewhat glaucescent beneath; midrib depressed above, raised beneath; secondary nerves 5-8 pairs, faint to indistinct above, prominent beneath, \pm arcuate ; tertiary nerves faint or indistinct above, somewhat prominent beneath, mostly branched, scalariform; quaternary nerves somewhat prominent beneath reticulate, petiole 10-15 mm long, 1.5-2 mm thick, flat and sulcate above, adpressed - puberulous. Inflorescences terminal and axillary, paniculate, up to 6 cm long, adpressed ochraceous-puberulous, peduncle up to 2 cm long. Flowers sessile, 3-4 mm long, \pm 3 mm diam. ; perianth tube \pm turbinate, 1.5-1.8 mm long, 1.5-2 mm diam., densely and softly \pm adpressed ochraceous-puberulous; tepals 3 + 3, broadly ovate or elliptic or often \pm orbicular, 1.5-2 mm long, 1.5 mm broad, minutely adpressed ochraceous-puberulous outside, sparsely adpressed-puberulous inside; fertile stamens 9, in 3 whorls;

filaments 0.6-1 mm long, puberulous, those of third whorl biglandular with \pm orbicular glands (0.3-0.5 mm diam.); anthers ovoid to suborbicular, 2-celled, 0.5-0.7 mm long; staminodes 3 \pm conical, \pm 0.8 mm long, puberulous; ovary unilocular, uniovulate; style \pm 1 mm long, stigma inconspicuous. Fruits ovoid, \pm 20 mm long, \pm 15 mm diam., glabrous, black when dry.

Types: N.G. Nair 852 (A: Holotype PBL; B: Isotype PBL).

Flowering & Fruiting : February.*

Distribution: INDIA: Andaman Nicobar Islands.

Herbarium specimens : INDIA : Andaman Nicobar Islands; South Andaman Island, Dhanikhari, Feb. 6, 1974, N.G. Nair 852 A(PBL); *ibid.*, N.G. Nair 852 B (PBL); N.G. Nair 852 (CAL, L).

Notes : According to Vasud. & Chakrab. (*l.c.*) : Differs from *Cryptocarya andamanica* Hook. f., in the sessile flowers and smaller fruits.

Rare in Inland forests at about 50 m altitude.

Curcuma kudagensis K.C. Velayudhan, V.S. Pillai & V.A. Amalraj (Zingiberaceae) in J. Econ. Tax. Bot. 14 (2) : 476-479. 1990.

Rhizome ellipsoid, white inside, 2-2.5 \times 1-1.5 cm, sessile tubers absent, lateral roots fibrous, slightly fleshy ones terminating in elongated fusiform tubers to 5 \times 1.5 cm, white within. Leaves elliptic to lanceolate or oblong-lanceolate, to 30 \times 11 cm, chartaceous, tuberculate pubescent, base obtuse or cuneate, margin entire apex tapering, acuminate; ligule to less than 0.4 mm. Inflorescence 7 cm long, lateral, lax, peduncle to 9 cm; coma bracts 3-4, not spreading, 1.0-0.4 cm; light pink; fertile bracts 8-9, 2.5 \times 1.2 cm, pale yellow green with purple tip; cincinni 2 flowered. Flowers 4-5 cm long, highly exserted, from bracts; calyx less than 1 cm, three lobed, corolla bright yellow, tube 1.5 cm, upper lobe oblanceolate, 2 cm long, concave, laterals lanceolate, 1.5 cm long, glabrous; lateral staminodes oblong with rounded tip, labellum suborbicular, bright yellow, deeply two lobed; filament 5-6 mm, anther deep yellow, thecae 7 mm,

connective very narrow, basal spur 1-1.5 mm; ovary oblong, 5 mm; fruits absent.

Types : V 3561 (Holotype E; Isotypes NBPGR New Delhi and Regional Station, Vellanikkara, Kerala).

Flowering : May*.

Distribution : INDIA: Karnataka.

Herbarium specimens : INDIA : Karnataka; Thalakkaveri, Coorg District, 1300 m, May 9, 1988, V 3561 (E, NBPGR New Delhi and Regional Station, Vellanikkara, Kerala).

Notes : According to Velayudhan *et al.* (*l.c.*): Resembling *C. neilgherrensis* Wight by lateral inflorescence, pubescent leaves, pinkish leaf sheath/petiole but differing by the lax inflorescence, smaller and fewer coma bracts, highly exserted flowers, deeply-lobed labellum and very long fusiform root tubers.

Small and sparse population on grassy slopes of sholay vegetation. The specific epithet *kudagensis* has been based on the district name Coorg since the species has been found to be localised in distribution.

Curcuma malabarica K.C. Velayudhan, V.A. Amalraj & V.K. Muralidharan (Zingiberaceae) in *J. Econ. Tax. Bot.* 14(1) : 189-191.1990.

Rhizome ovate-spherical, 10.5 × 4.1 cm, whitish grey inside; sessile tubers cylindrical, 16 × 3.1 cm, grey to very light blue inside, strongly aromatic and taste bitter; stipitate tubers, white inside. Leaves elliptic obovate, to 60 × 16 cm, glabrous, purple streaks along the midrib dorsally on the distal half portion only, fading at maturity, margin entire, acuminate. Inflorescence a spike, 38 to 45 cm, appearing before or along with leaves (vernal) from sessile tubers; peduncle to 25 cm; coma bracts 3-4, elliptic, purple, 7 × 2.9 cm; fertile bracts ovate to obovate, green tinged with light purple lines, 5 × 3.7 cm. Flowers 5 cm, more or less equal to the bract; calyx a transparent tube, 3-lobed, split on one side; corolla lobes pale pink or pale reddish white; lip emarginate and dark yellow at the tip; anther connective narrow, basal spur curved and pointed, 1.5 mm; ovary trilocular, axile placentation; fruit and seed unknown.

Types : AV 158 (Holotype MH; Isotypes E and National Herbarium, NBPGR, New Delhi).

Flowering : May*.

Distribution : INDIA: West Coast of S. India.

Herbarium specimens : INDIA : Kerala; Trichur District, Pavaratty, May 1, 1988, AV 158 (MH, E and National Herbarium, NBPGR, New Delhi).

Notes : According to Velayudhan *et al.* (*l.c.*) : It resembles *C. caesia* Roxb., in having purple streaked midrib, purple tinted petiole, sessile tuber with pale greyish blue flesh, vernal flowering and purple coma. But differs in the presence of glabrous leaf, the purple streak along midrib fading at maturity, flowers equal to bracts and petals being light pinkish white.

This species occurs very frequently throughout the sandy coastal belt of Kerala and also at times found to be occupying the transition zones between sandy coastal belt and midlands along the streams in paddy lands. The tubers are sometimes used as a substitute for arrow root by local people.

List of live collections of *C. malabarica* maintained at NBPGR, Regional Station, Vellanikkara.

1. 227-S.Wynaad Kerala 2. 244-CPCRI, Kasaragod 3. 231-Midukkur, 4. 247 Kazaragod, 5. 317-S.Karnataka 6. 318-S. Karnataka 7. 368 S. Karnataka 8. 489- N. Kerala 9. 493 N. Kerala 10. 495- N. Kerala 11. 534-N. Kerala 12. 543-N. Kerala 13. 546- N. Kerala 14. 556-N. Kerala 15. 572-N. Kerala 16. 679-S. Kerala 17. AV 158-Pavaratty.

Curcuma raktakanta Mangaly & M. Sabu (Zingiberaceae) in *J. Econ. Tax. Bot.* 12(2): 475-477. 1988.

Perennial rhizomatous herbs, 40-60 cm tall, with pseudostem and peduncle purple to violetish. Rhizome aromatic, medium sized, conical, c 3 × 2.5 cm, greyish to yellow inside, whitish towards the periphery, with many finger-shaped elongated sessile tubers and

with fusiform root tubers. Root tubers c 5×2.5 cm, yellow inside with white peripheral region. Plants with 4-6 leaves, lamina $35 \times 45 \times 10-12$ cm, green, puberulent below, glabrous above, oblong lanceolate, base and tip acuminate. Spike lateral, produced early in the season (April-June, depending on the first monsoon), c 35 cm tall; scape c 20 cm, fertile bracts 8-10, $5-5.5 \times 5$ cm, broadly ovate, tip rounded, green, with pink tip, glabrous, lower one-third portion fused to neighbouring ones to form a pouch; each bract subtending a cincinni of 3-4 flowers, one opening at a time. Bracts of coma 6-8, deep pink, linear, 7×4 cm, fused only at the base, tip spreading. Bractoles white to light pink, outer one larger, 2.5×1.5 cm, innermost 2.2×0.8 cm. Flowers as long or slightly smaller than bracts, c 5 cm, calyx tubular, 1.5 cm, white, 3-lobed at apex, deeply cleft on one side, glabrous. Corolla light pink, glabrous, lobes unequal, dorsal lobe 2×1.5 cm, mucronate, hood 0.5 cm; laterals c 1.5×1.3 cm, tip rounded. Staminodes pale yellow; laterals c 2×1 cm, a patch of glandular hairs at the centre on the inner side of the lateral staminodes, other parts glabrous, included within the dorsal corolla lobes, tip slightly incurved. Lip broad, c 2×2.2 cm, light yellow with a median dark yellow band, glabrous, margin wavy, with a median cleft. Stamen white, c 4 mm, spurred at base, spurs 2 mm, divergent; crest absent, glandular hairs present on the back surface of the connective. Stigma slightly exerted from the anther. Epigynous glands two, 0.5 cm long, dark yellow. Ovary 0.5 cm, densely pubescent, trilocular with many ovules on axile placenta.

Types : Mangaly CU 10346 (A: Holotype MH; B: Isotype CALI; C : Isotype E).

Flowering : June.*

Distribution : India: Kerala.

Herbarium specimens : INDIA : Kerala ; Neerickode, Ernakulam District, Sea-level, June 3, 1983, Mangaly CU 10346 (A: MH; B: CALI and C:E).

Notes : According to Mangaly & Sabu (*l.c.*) : *C. raktakanta* closely resembles *C. caesia*, but differs from it in the yellowish to grey colour of the rhizome, purple colour of the pseudostem and peduncle due

to the purple colouration of their encircling bracts, absence of purple colouration on the leaves and light pink colour of the petals. Also it differs from *C. zedoaria* by the absence of purple colour on the leaf. The plant produces only lateral spikes.

It grows mostly in coconut grooves and adjacent places on the bank of the river and estuaries at sea-level. In places where it was collected between Cochin and Guruvayoor near Parur, growing sympatrically with *C. caesia* Roxb. but the new species flowers about two weeks earlier. Another species *C. zedoaria* (Christm.) Rosc., is found in midlands and lower elevations of Western Ghats.

The specific epithet is derived from Sanskrit for the colour of pseudostem and peduncle.

Dalbergia duarensis Thoth. (Papilionaceae) in Bull. Bot. Surv. India 14(1-4): 192. 1972 (1975).

A large tree, branches glabrous. Leaf imparipinnate, alternate, stipulate, 17-18 cm long; leaflets 13-17, oblong, 2.5-4.5 × 1.2-1.7 cm, alternate, entire, obtuse at apex, narrow to rounded at base, glabrous, coriaceous, lateral veins 8-10 pairs; rachis and petiolule glabrous, petiolule 2-3 mm long, stipule deciduous. Flowers not known. Infructescence 4.5-6 cm long, rachis and branches perfectly glabrous. Pod indehiscent, linear-oblong, flat, 4.5-6 × 0.9-1 cm, stalked, acute at apex, abruptly narrowed below, glabrous 1-2-seeded, reticulated opposite the seeds; seed reniform, 3-3.5 × 2 mm, compressed.

Type : Heawood 104 (Holotype CAL).

Fruiting: October.

Distribution: INDIA: West Bengal.

Herbarium specimen : INDIA: West Bengal; North Bengal, Alipore Duars, Mahakalaguri. Oct. 1891, Heawood 104 (CAL).

Notes : According to Thothathri (*l.c.*): *D. duarensis* Thoth. is related to *D. sericea* G. Don but differs in the glabrous, young shoots, and leaves, oblong leaflets, perfectly glabrous inflorescence and

larger, linear-oblong pods. It is placed in the section *Dalbergia* under the series '*Lanceolarieae*'.

According to field information, the plant is a large tree in Duarjungles. It is leafless during the beginning of hot season.

***Dalbergia stipulacea* Roxb. var. *stipulacea* f. *puberula* Thoth.** (Papilionaceae) in Bull. Bot. Surv. India 17 (1-4): 68. 1975 (1978).

Inflorescence an axillary panicle, 6-9 cm long, rachis and branches of the panicle brown puberulous. Flowers pedicellate; pedicels 2.5-3.5 mm long, brown puberulous; bract and bracteoles too puberulous.

Type : G. Rogers 968 (Holotype CAL).

Flowering : March - July*.

Distribution : INDIA: Sikkim, West Bengal; BURMA.

Herbarium specimens : INDIA: W. Bengal; Mungpoo, 800 m, July 1914, *Cousins* 45 (CAL). Sikkim; Ryang valley, Mar. 1878, *Lister* s.n. (CAL). Myanmar Plateau; 1200 m, Apr. 1908, *Lace* 3108 & 3138 (CAL); upper chindwin, 1665 m, Apr. 1915, *Mackenzie* 20 (CAL).

Notes : According to Thothathri (*l.c.*) *D. stipulaceae* Roxb. f. *puberula* Thoth., differs from the typical plant in the rachis, branches of the panicle and pedicels of the flowers being puberulous to pubescent at times.

***Dalbergia travancorica* Thoth.** (Papilionaceae) in Reinwardtia 8 (Part 2): 329-331. 1972.

Scandent shrub; branchlets puberulous, younger parts rusty pubescent. Leaf imparipinnate, alternate, stipulate, 8-11 cm long, rachis puberulous; leaflets mostly 5, rarely 7, elliptic, 4-6 x 2-3.5 cm, lower ones always smaller than upper larger ones, entire, coriaceous, rounded at base, mostly obtuse to retuse at apex, rarely acute, glabrous above, brown puberulous to pubescent below, lateral veins not distinct, petiolule silky pubescent, 2-4 mm long, stipule

prominent, oblong, 7-9 mm long, shortly acuminate, brown pubescent. Inflorescence short, axillary panicle, 2.5-5 cm long, 2-3 cm wide, rachis and branchlets pubescent. Flowers 7-8 mm long, pedicellate; bract very conspicuous, gibbous ovate-triangular, 2-3 mm long, pubescent without, bracteoles 2, ovate-oblong, on either side of the calyx-tube and embracing the same, pubescent without; pedicels short, 4-5 mm long, pubescent. Calyx campanulate, 4-5 mm long, pubescent without, 5-toothed, anterior 3 triangular-ovate, smaller, posterior 2 ovate-rounded, larger than the anterior ones. Corolla vexillum ovate-orbicular to ovate-oblong, 6-7 mm long, deflexed, retuse at apex, blade auricled below, distinctly clawed; wings ovate-oblong, clawed, keels boat-shaped, clawed, connate above at their apex, all petals glabrous. Stamens 9, monadelphous, sheath 6-7 mm long, split open dorsally, filaments free on their upper one fourth. Ovary oblong, 5-6.5 mm long, distinctly stipitate, glabrous except the pubescent, dorsal suture, 3-ovuled, style slender, stigma minute. Pod oblong, 3 × 0.7 cm, flat, glabrous, smooth, long stalked, 1-seeded.

Type : Collector ? s. n. (Holotype MH-Acc. No. 17025).

Flowering & Fruiting : Time not mentioned.

Distribution : INDIA: S. India.

Herbarium specimens: INDIA: South India; Travancore Hills (without definite locality), Collector? s.n. (MH-Acc. No. 17025).

Notes: According to Thothathri (*l. c.*): *D. travancorica* Thoth., is allied to *D. rubiginosa* Benth., but differs in the elliptic, rounded leaflets and conspicuous, persistent bracts which remain even after fruiting. The presence of conspicuous, persistent bracteoles which remain even after fruiting in the former, differ also from *D. congesta* Grah. ex Wt. & Arn.

***Dalbergia volubilis* Roxb. var. *assamica* Thoth. (Papilionaceae)**
in Bull. Bot. Surv. India 17 (1-4): 67. 1975 (1978).

A large woody climber. Leaf imparipinnate, alternate, 13-18.5 cm long; leaflets 9, 3.5-5.2 × 1.7-3.2 cm, alternate, elliptic-oblong, entire, retuse at apex, narrow to rounded at base, glabrous; rachis glabrous,

petiolule 2-3 mm long. Flower not known. Infructescence terminal and axillary panicle, 6-14.5 cm long. Pod indehiscent, elliptic-oblong, 6.5-7 × 2-2.5 cm, acute at apex, narrowed at base, glabrous, uniformly smooth without any reticulations, 1-seeded; seed reniform.

Type : U. Kanjilal 6574 (Holotype CAL).

Fruiting : January April*.

Distribution : INDIA: Meghalaya (Assam).

Herbarium specimens : INDIA: Assam ; Mayantang valley, Khasia & Jaintia hills, Jan. 1916, U. Kanjilal 6574 (CAL); Fort Lungleh, 1000-3000 m, South Lushai Hills, Apr. 1899, Gage 196 (CAL).

Notes : According to Thothathri (*l.c.*) : *D. volubilis* var. *assamica* differs from the typical plant in having widely oblong pods without any reticulations on its surface.

Decaschistia cuddapahensis T.K. Paul & M.P. Nayar (Malvaceae) in *Geobios* 2 (2) : 156-157. 1983.

Perennial shrub. Young stem and branches pubescent with yellowish brown stellate hairs. Leaves 8-13 × 5-8 cm, ovate or oblong, apex acute, obtuse or truncate, subcordate at base, margin crenato-serrate or denticulate, both surfaces densely stellate velutinous, upper surface dark-brown, lower surface yellowish-brown in colour, 5-7-nerved at the base, middle nerve with an elliptical gland at the base below; petioles 0.5-2 cm long, indumentum like stem. Stipules 4-8 mm long, entire or 2-3 parted, densely stellate pubescent, deciduous. Flowers solitary, axillary; pedicel 1-1.5 cm long, not jointed, stellate-tomentose. Epicalyx segments 10, connate at the base, 8-12 × 3-5 mm, lanceolate to ovate, acute, outside densely stellate hairy, inside moderately appressed with stellate hairs. Calyx 5-lobed; sepals connate below middle, 1.6-2.0 × 4-6 mm, deltoid, acuminate with one prominent nerve, outside densely stellate hairy, inside sparsely appressed with stellate hairs, glabrescent except the margin and apical portion. Corolla 3-5 cm long, yellow with maroon centre, outside densely stellate pubescent, inside glabrous. Staminal column 1.5-1.8 cm long, antheriferous throughout; filaments c 1 mm

long. Capsule enclosed within the calyx, c 1 × 1 cm, globose, 10-valved, loculicidally dehiscent, outside densely stellate hairy, inside glabrous, shiny. Seeds one in each locule, c 5 × 3 mm, reniform, ascending, sparsely hairy.

Types : *J. L. Ellis* 14332 (Holotype CAL; Isotype Acc. No. 28457 MH).

Flowering & Fruiting : July March.

Distribution : INDIA: Andhra Pradesh, Tamil Nadu.

Herbarium specimens : INDIA: Andhra Pradesh; Cuddaph District, Swamipadhlu Kodur, 550 m, July 23, 1962, *J. L. Ellis* 14332 (CAL); Acc. No. 28457 (MH); Chittoor District, besides the road to Thirumalai-Thirupathi Hills, 600 m, *K. Subramanyam* 6878 (CAL); Cuddaph District, Ballipalle, 150 m, *J. S. Gamble* 16561 (CAL) (in part). Tamil Nadu ; N. Arcot District, Mamandur, Mar. 2, 1914, *s. l.* 10188 (MH).

Notes : According to Paul & Nayar (*l.c.*): *Decaschistia* Wt. & Arn. consists of 17 species, most of which occur in S. E. Asia and one is reported from Australia. Only 3 species have already been reported to be occurring in peninsular India. *D. cuddapahensis* is an additional species of restricted distribution occurring in the semi-dry region of southern Andhra Pradesh and Northern Tamil Nadu with a distribution range in the Cuddapah, Chittoor and N. Arcot Districts.

Differs from *D. rufa* Craib in having larger (8-13 × 5-8 cm), ovate or oblong leaves, petiole length about one eighth to one tenth of the lamina and longer sepals (1.6-2.0 cm); whereas in *D. rufa* Craib the leaves are smaller (3.5-7.5 × 4.0-7.0 cm), almost rounded, petiole-length about half to one-third of the lamina and shorter sepals (1-1.2 cm).

The specific epithet is coined after the type locality of the plant.

Dendrobium anamalayanum Chandrab., V. Chandras. & N.C. Nair (Orchidaceae) in *J. Bombay Nat. Hist. Soc.* 78 (1-3): 575. 1981.

Herbs; pseudobulbs 2-3 × 1.5-2 cm, greenish pink, ovoid, covered with membranous sheaths. Leaves 2-7.2 × 0.6-2 cm, elliptic oblong or elliptic-lanceolate, glabrous, acute, sheathing at base. Scape up to 12 cm long, 5-many-flowered. Flowers ± 16 mm across, white with pink tinge; bracts 6-9 × 1.5 mm, lanceolate, 5-nerved, glabrous; pedicels with ovary up to 1.1 cm long, faintly grooved above. Dorsal sepal ± 1.1 × 0.4 cm, obliquely oblong or oblong obovate, obtuse at apex; lateral sepals ± 1.1 × 0.4 cm, falcately-oblong-lanceolate, subacute, united to form a mentum. Lateral petals ± 1.2 × 0.4 cm, oblanceolate, obtuse at apex. Lip ± 9 × 9 mm, broadly obovate in outline, 3-lobed with broad sinuses in-between the lobes; side-lobes distinct, tooth-like; mid-lobe ± 6 mm broad, rhomboid-ovate, distantly serrulate; disc fleshy, broadened and 3-toothed at apex. Column short, foot long; anther ± 1 × 1.5 mm, 2-loculed; pollinia four, ± 1 mm long, oblong, compressed. Capsules ± 2 × 1.1 cm, ellipsoid, obtusely trigonous, obscurely ribbed.

Types : Chandrabose 57259 (Holotype CAL; Isotypes MH-Acc. Nos. 101248, 101249, 107842, 107843).

Flowering & Fruiting : July November*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Coimbatore District, Anamalai, Kavarakal, July 22, 1978, Chandrabose 57259 (CAL, MH-Acc. Nos. 101248, 101249, 107842, 107843); Coimbatore District, Anamalai, Konalar, Nov. 16, 1980, Chandrabose 69048 (Paratypes MH-Acc. Nos. 107844-46).

Notes : According to Chandrabose *et al.* (*l.c.*): Allied to *Dendrobium nanum* Hook. f. but differs in having the lip not clawed, broadly obovate, mid-lobe rhomboid-ovate, side-lobes distinct and disc 3-toothed at apex.

A common epiphyte on trees in the evergreen forests and sholas at an altitude ranging from 1450 to 1975 m. The gregarious flowering of the plants with their white flowers is an eye-catching and attractive sight throughout the forest.

Dendrobium diodon Reichb. f. subsp. **kodayarensis** Gopalan & A.N. Henry (Orchidaceae) in J. Econ. Tax. Bot. 12(2): 487. 1988.

Epiphytes, pseudobulbs crowded, ovoid (somewhat conical), 1-1.5 × 0.8-1 cm; stem up to 1 cm long, 2-4-leaved at flowering time. Leaves 0.8-2.7 × 0.4-0.8 cm, linear-oblong, obtuse, unequally notched at apex. Flowers 2-5, in terminal racemes 3.5-4 cm long; bracts 5.7 × 1.5-2 mm, ovate, acuminate. Dorsal sepal 10-11 × 2.5-3 mm, oblong-lanceolate, acuminate, 3-veined; lateral sepals 9-10 × 3.5-4 mm, falcately ovate-oblong, acuminate, connate at base to form a sac, 3-veined. Petals 8-11 × 2-3 mm, oblanceolate, acute, 3-veined. Lip 11-13 × 8 mm, rhomboidly cuneate, 3-lobed; lateral lobes 7-8 × 6.5-7 mm, incurved, acute; midlobe 3-5 × 7-8 mm, broadly triangular, irregularly toothed. Disc ridged up to base of midlobe and terminating in a 2-toothed callus. Column 2 × 2 mm; pollinia 4, in 2 pairs, waxy. Ovary with pedicle 6 mm long. Capsules up to 7 × 5 mm, somewhat globular.

Types : Gopalan 81452 (Holotype CAL; Isotypes MH. Acc. Nos. 140841- 140844).

Flowering : March*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Kanyakumari District, Upper Kodayar, on way to Muthuku-Zhivayal, Mar. 26, 1984, Gopalan 81452 (CAL); *ibid.*, Gopalan 81452, Acc. Nos. 140841 140844 (MH).

Notes : According to Gopalan & Henry (*l. c.*): Allied to *D. diodon* Reichb. f. subsp. *diodon* but differs in: Leaves smaller; petals oblanceolate; lip midlobe shorter than lateral lobes, and disc ridged up to base of midlobe and terminating in a 2 toothed callus.

Dendrobium diodon Reichb. f., essentially of Sri Lankan origin, and the occurrence of this new subspecies at the southern end of W. Ghats in India is of phytogeographical interest.

Dendrobium panduratum Lindl. subsp. **villosum** Gopalan & A.N. Henry (Orchidaceae) in J. Bombay Nat. Hist. Soc. 87(1) : 128 129. 1990.

Epiphytic or lithophytic herbs; pseudobulbous stems 3-15 cm long, elongate, flat, narrowed at base, broader towards apex; young leafy stem arises from the anterior side; mature (old) leafless flowering stem enclosed by sheath (sometimes with one or two leaves at apex). Leaves 1-10 × 0.2-1.5 cm, linear-lanceolate, sessile, acute, membranous. Flowers white in terminal or axillary, zigzag, 2-7 flowered racemes up to 8 cm long; bracts minute, ovate. Dorsal sepal 7-8 × 2.5-3 mm, elliptic, obtuse-mucronate, 3-veined, gland-dotted; lateral sepals 9-10 × 2.5-3 mm, falcately ovate-lanceate, obtuse-mucronate, 5-veined, gland-dotted. Petals c 7 × 2 mm, oblanceate, acute, margin fringed above the middle, 3-veined, gland-dotted. Lip c 10 × 6 mm, panduriform, 3-lobed; lateral lobes small, acute, incurved, villous within, 3-veined, veins branching at apex; midlobe c 4 × 5 mm, broadly ovate or orbicular, irregularly crenulate, undulate, acute and recurved at apex, villous at base within, 5-veined; disc thick, villous within, 5-veined, outer veins branched; mentum c 4 mm long, spur-like, straight or slightly incurved; 2-lobed at tip. Column c 6 × 1 mm, 3-toothed, operculum attached to the middle; pollinia 4, in pairs, waxy. Ovary with pedicel 5-8 mm long. Fruits globose.

Types : Gopalan 88699 (Holotype CAL; Isotypes MH Acc. Nos. 144695-144701).

Flowering & Fruiting : September*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Tirunelveli Kattabomman District, Inchikkuzhi in Kannikatty R.F., Sept. 20, 1988, Gopalan 88699 (CAL & MH-Acc. Nos. 144695-144701).

Notes : According to Gopalan & Henry (*l.c.*) : Allied to *Dendrobium panduratum* Lindl. subsp. *panduratum* but differs in: dorsal sepal elliptic, obtuse-mucronate; lateral sepals obtuse-mucronate; petals fringed above the middle; and lip-lateral lobes and base of midlobe, and disc villous within. The subspecies *Panduratum* on the other hand is characterised by: dorsal sepal oblong-lanceolate, acuminate; lateral sepals acuminate; petals not fringed above the middle; lip and disc glabrous.

Dendrocalamus sahnii H.B. Naithani & Bahadur
(Bambusoideae) in Indian Forester 108(3): 212-214. 1982.

A thin bamboo. Culms up to 3 m tall, 2-3 cm in diam., soft, pale green, striate, internodes 8-20 cm long. Culm sheaths variable in size, ca 20 × 9 cm, glabrous-shining within, rough with scattered stiff brown hairs outside, truncate at the top; blades 2-2.5 cm long, ovate-lanceolate; ligule toothed or fimbriate. Leaves not seen. Inflorescence a panicle, bearing at intervals of 5-9 cm dense glabrous heads of spikelets 2.5 cm in diam., supported by scarious bracts. Spikelets 0.9-1.5 × 0.5 cm; glumes 2, ovate, keeled, nerved, ciliate on keels and margins; lemmas 1 × 0.8 cm, orbicular, thin, many-nerved, ciliate on margins; palea 1 cm long, bifid or acute at apex, 2-keeled, ciliate on keels; stamens 6, as long as the palea, anthers yellow with a short hairy point at apex; ovary conic, hairy, style long, stigma single and hairy. Caryopsis not present.

Type : H. B. Naithani ser. II No. 902 (Holotype DD).

Flowering : April*.

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh; Subansiri District, Zoram, ca 1800 m, Apr. 28, 1977, H. B. Naithani ser. II No. 902 (DD).

Notes : According to Naithani & Bahadur (*l.c.*): Allied to *Dendrocalamus hamiltonii* Nees et Arn. ex Munro, but differs in having much thinner culms, toothed or fimbriate ligule of culm sheaths, larger spikelets, yellow anthers with a short hairy point and a single stigma.

The species grows along with another bamboo *Phyllostachys assamica* Gamble ex Brandis at an altitude of about 1800 m in the hills; not common.

The taxon is dedicated to Prof. K. C. Sahni, Ex-Forest Botanist and Director Biological Research (Retd.), Forest Research Institute & Colleges, Dehra Dun for his valuable contribution to the flora of Arunachal Pradesh.

Derris brevipes Baker var. **travancorensis** Thoth. (Papilionaceae) in Bull. Bot. Surv. India 6 (1): 67-68. 1964 (1965).

A dwarf shrub. Leaves imparipinnate, alternate, stipulate, 14-16.2 cm long; stipules ovate-oblong, acute; leaflets 7, ovate to ovate-oblong, 4.2-6.6 × 2.9-3.4 cm, subcoriaceous, shortly cuspidate, entire, rounded at base, exstipellate; lateral nerves 6-8 pairs; petiolules 6-10 mm long; rachis and petiolule sparsely hairy. Flowers unknown. Pod flat, oblong, 9.5-14 × 2.5-3.3 cm, densely clothed with short, brown, silky hairs, narrowly winged on both the sutures, reticulately veined, 2-3 seeded. Seeds reddish brown, oblong, 2.5-2.7 × 1.5-1.7 cm.

Type : Bourdillon s.n. (Holotype MH-Acc. No. 17409).

Fruiting : November*.

Distribution : INDIA: Kerala.

Herbarium specimen : INDIA: Kerala; Travancore, Velleva mally, 2333 m, Nov. 19, 1890, Bourdillon s.n. (MH-Acc. No. 17409).

Notes : *Derris brevipes* Baker var. *travancorensis* Thoth., differs from *D. brevipes* Baker var. *brevipes* in having much longer, 2-3-seeded pods, pod up to 14 cm long; whereas in var. *brevipes*, pod up to 5.5 cm long.

Derris kanjilalii K.C. Sahni & H.B. Naithani (Papilionaceae) in Indian Forester 102 (8): 492. 1976.

A scandent shrub. Stems lenticelled. Leaves stipulate, 18-21 cm long; leaflets 9, 4-8 cm long, 2-3.5 cm broad, ovate-oblong, entire, opposite, thin notched at tip; petiolule 4 mm long, glabrous. Inflorescence a raceme, crowded at nodes; rachis glabrous. Flowerers 1 cm long, 4 mm broad, pedicellate; pedicels 3-8 mm long, glabrous. Bracts ovate; bracteole 2. Calyx cup-shaped, 3 mm long, 2.5 mm broad, glabrous entire or minutely toothed. Corolla exserted; standard 9-11 mm long, 3.5 mm broad, ovate orbicular; wing 8 mm long, 2 mm broad. Stamens 10, monadelphous. Ovary 8 mm long, 1 mm broad, pubescent; style glabrous. Pods 6-8 cm long, 1.7 cm broad

with persistent calyx cup, faintly reticulate, glabrous, winged on both the sutures; wing \pm equal or well developed on upper surface.

Type : Sri Ram 246 (Holotype DD).

Flowering & Fruiting : Time not mentioned.

Distribution : INDIA: Uttar Pradesh.

Herbarium specimen : INDIA: Uttar Pradesh; Pilibhit, Sri Ram 246 (DD).

Notes : According to Sahni & Naithani (*l.c.*): *Derris Kanjilalii* Sahni and Naithani, allied to *Derris monticola* (Kurz) Prain, but differs in glabrous nature of petiole, rhachis and pedicels; leaflets 9, ovate-oblong, notched at tip; calyx cup, glabrous, entire or minutely toothed.

The species is being named in honour of late Sri P. C. Kanjilal I. F. S. for his Contributions on Forest Botany of Uttar Pradesh.

Digitaria pennata (Hochst.) T. Cooke var. ***shettyana*** R.P. Pandey, Parmar & B.L. Vyas (Poaceae) in *J. Econ. Tax. Bot.* 5 (2): 475-476. 1984.

Tufted perennial grass 30-40 (- 70) cm high, with bulbously thickened culm bases; cataphylls silky. Leaf blades 3.5-7.0 \times 0.2-0.5 cm, linear or linear-lanceolate, finely acuminate, sparsely hairy; sheath 1.0-5.0 cm long, striate, sparsely hairy; ligules membranous, up to 2.5 mm long. Inflorescence composed of 5-12, long, stiff radiating racemes in 1-2 whorls. Racemes 5-15 cm long; rhachis slender, subtriquetrous, glabrous throughout its length; pedicels triquetrous, scabrous, unequal of the paired spikelets. Spikelets c. 3 mm long, erect, binate or rarely solitary, lanceolate, acute, silky. Glumes 4; lower involucral glume rudimentary or minute, hyaline, ovate, truncate scales, rarely absent; upper involucral glume 2.5-3.0 mm long, lanceolate acute, membranous, 3-nerved, pubescent out side between the nerves; lower lemma similar to upper involucral glume, acute, 5-nerved, faintly pubescent between the nerves, empty; upper lemma c. 2.75 mm long, lanceolate, acuminate,

chartaceous, glabrous, hermaphrodite; its palea smaller, narrowly elliptic-oblong, chartaceous. Stamens 3. Stigma 2, feathery; ovary ellipsoidal. Seeds c 1.5×0.5 mm, oblong ellipsoid, glabrous.

Types : B. V. Shetty 6659 (A: Holotype CAL; B D: Isotypes BSJO).

Flowering & Fruiting : August November.

Distribution : INDIA: Rajasthan.

Herbarium specimens : INDIA: Rajasthan; Jalore, near Sareh Mandir, Sept. 21, 1978, B. V. Shetty 6659 A (CAL); B. V. Shetty 6659 B- D (BSJO).

Notes : According to Pandey *et al.* (*l.c.*) : Allied to variety *pennata*, but differs in having the rachis glabrous throughout while in var. *pennata* the rachis is pinnately hairy. Rocky habitat.

The varietal epithet is in honour of Mr. B. V. Shetty BSI, for his valuable contribution to the flora and vegetation of Rajasthan.

***Dimeria balakrishnaniana* Ravikumar, Sreek. & Lakshmanan** (Poaceae) in Kew Bull. 45 (3): 573 575. 1990.

Annual. Culms 12 25 cm high, erect; nodes villous. Leaves linear lanceolate, acuminate at apex, rounded at base, $4 - 6.7 \times 0.2 - 0.5$ cm, villous; midrib prominent; sheaths 2 -3.5 cm long, keeled, villous above, glabrous below; ligule c 1 mm long, membranous, fimbriate. Racemes solitary, very rarely paired, each 2 4 cm long; rachis flattened, c 1.5 mm wide, wavy and ciliate along margins, glabrous at apex. Spikelets elliptic or ovate elliptic, 4 5 mm long; callus hairs 1-1.5 mm long. Lower glume oblong lanceolate, shortly acuminate at apex, $4 - 4.5 \times 0.75 - 1$ mm, chartaceous, ciliate along the dorsal side except towards apex. Upper glume ovate-lanceolate, acuminate at apex. $4.5 - 5 \times 1.5 - 2$ mm, coriaceous, broadly winged, wings c 0.5 mm wide, corky in the lower 2/3, papery towards apex, ciliate along margins, scabrid towards apex. Lower floret empty; lemma elliptic-lanceolate, $2 - 2.5 \times 0.75 - 1$ mm, delicate, faintly 1- nerved, hyaline, margins ciliate in the upper half. Upper floret

bisexual; lemma 2.5 3 × 1 1.5 mm, notched and awned in the sinus, delicate, 1-nerved, glabrous; awn 10 12 mm long, slender, column 3 4 mm long, twisted, brown, bristle 6 8 mm long, pale, scabrid; stamens 2, anthers 1 -1.5 mm long; ovary ellipsoid, c 0.25 0.5 mm; styles 1 1.5 mm long, slender; stigmas 1 1.5 mm long, feathery.

Types : Lakshmanan 87543 (Holotype CAL; Isotypes K, MH).

Flowering : January*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Madurai District, High Wavy's Mountains, Nursery valley, ± 1600 m, Jan. 22, 1988, Lakshmanan 87543 (CAL, K & MH).

Notes : According to Ravikumar *et al.* (*l.c.*): *Dimeria balakrishnaniana* differs from *D. borii* in having villous nodes, prominently keeled leaf sheaths, broad rachis c 1.5 mm wide and the lower glumes not winged whereas in the latter species the nodes are glabrous, leaf sheaths not prominently winged, rachis narrow, c 1 mm wide and the lower glumes with a corky wing.

Along the marshy, grassy hill slopes found associated with *Utricularia roseopurpurea* Stapf ex Gamble, *U. uliginosa* Vahl, *Burmanna coelestis* D. Don and *Emilia scabra* DC.; locally abundant.

The specific epithet is named to honour Dr. N. P. Balakrishnan, Botanical Survey of India.

Dimeria copeana Sreek. V.J. Nair & N.C. Nair (Poaceae) *in* J. Bombay Nat. Hist. Soc. 78 (1-3): 577 579. 1981.

Tufted, stoloniferous, perennial. Culms 20- cm, capillary. Nodes bearded. Leaves 20 45 × 0.1 0.2 cm, linear, acuminate, sparsely villous on upper surface. Sheaths shorter than the internodes, glabrous or very sparsely villous at base. Ligule a small membrane, fimbriate at apex. Racemes 2, 8-10 cm long, slender. Rhachis 0.25 0.5 mm wide, trigonous, more or less zig zag, obscurely

winged, scabrid on the margins. Spikelets 3.5 - 4.5 mm long, 2-flowered, oblanceolate, firmly compressed, adpressed to the rachis, sparsely hairy. Callus 0.25 - 0.5 mm long, hairy. Lower glumes 3-4 mm long, oblong, acute, coriaceous, scabrid. Upper glumes 4-4.5 mm long, elliptic, acute, straight on the back and slightly curved towards the tip, scabrid, margins hyaline, villous. Lower floret empty, lemma c 2.5 × 0.6 mm, oblanceolate, acute, one-nerved, hyaline, ciliate on the margins above, epaleate. Upper floret bisexual, lemma 3 - 3.5 mm long, epaleate, oblong, acute shortly bifid at apex, hyaline, awns 8 - 10 mm long, slender with a dark column and pale scabrid bristle. Stamens 2; anthers c 2 mm long, narrow, linear; filaments short. Ovary c 0.3 mm long, ovate. Styles 2, each c 0.4 mm long, slender. Stigma c 10 mm long, feathery. Grain c 2.25 × 0.3 mm, oblong, acute towards tip, compressed.

Types : P. V. Sreekumar 66736 (Holotype CAL; Isotypes K, MH).

Flowering & Fruiting : March*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala ; Alleppey District, Thrikkunnappuzha, Mar. 13, 1980, P. V. Sreekumar 66736 (CAL, K & MH).

Notes : According to Sreekumar *et al.* (*l. c.*): This species is allied to *D. trimenii* Hook. f. but differs from it in having leaf blades 20 - 40 cm long, 1 - 2 mm broad, villous only on upper surface; sheaths shorter than the internodes; ligules frimbriate at apex; racemes 8 - 10 cm long; rhachis trigonous, at the most 0.5 mm wide; margins scabrid; spikelets oblanceolate, sparsely hairy; lower glumes glabrous or scabrid; upper glumes sparsely hairy, margins not ciliate; margins of the lemmas of the lower florets long ciliate; awns 10 - 12 mm long, whereas the species *D. trimenii* Hook. f. is having the characters: Leaf blades up to 15 cm long, ± 0.5 mm broad, villous on both surfaces; sheaths longer than the internodes; ligules rounded at apex; racemes up to 6.5 cm long; rhachis of the racemes flat, 1 - 1.5 mm wide; margins of the rhachis thickly pilose; spikelets oblong - acute, densely hairy; lower glumes densely hairy; upper

glumes densely hairy, margins ciliate; margins of lemmas of lower florets entire; awns up to 8 mm long.

The species is named after Dr. T. A. Cope of the Herbarium, Royal Botanic Gardens, Kew.

Dimeria keralae N.C. Nair, Sreek. & V.J. Nair (Poaceae) in *J. Bombay Nat. Hist. Soc.* 80 (3): 626-629. 1983 (1984).

Annuals. Culms 10-30 cm tall, erect, slender, purplish; nodes bearded. Leaves 2-5 cm long and 1-2 mm broad, linear-lanceolate, glabrous or covered with a few tubercle-based hair along the margins; midrib prominent. Sheath 2-6 cm, shorter than the internodes, keeled, loose, glabrous. Ligule a thin ovate membranous. Racemes 2, each 2-5 cm long, usually unequal and interwined. Rhachis c. 0.25 mm wide, flat on one side, angular on the other side, glabrous. Spikelets 4-5 mm long, oblanceolate, coneate at base, distant and pedicelled. Pedicels 1-1.5 mm, joints extremely oblique. Callus 1-2 mm long, extremely acute at base covered with golden yellow hairs 1-1.5 mm long. Lower glumes 3.5-4 × 0.75-1 mm, oblong-linear, slightly emarginate and hyaline-winged at apex, coriaceous, glabrous. Upper glumes 4-5 × 0.75-1 mm, oblong-lanceolate, minutely winged at apex, with hyaline wings along the margins which are hairy, and also with a few long hairs at the tip, coriaceous and glabrous elsewhere. Lower floret empty; lemma 3-4 × 0.3-0.5 mm, oblanceolate, 1-nerved, delicate, hyaline and ciliate along the upper margins; upper floret bisexual; lemma 3-4 × 0.75-1 mm notched at apex, with a very long, stout awn in between, delicate and 1-nerved in the lower half, subcoriaceous in the upper, glabrous; awn 20-30 mm long, stout, geniculate, column 10-15 mm long, twisted, chestnut brown, bristles pale and scabrid, palea very minute, 0.5-0.75 × 0.15-0.25 mm, ovate-lanceolate, nerveless, delicate, hyaline, shortly ciliate along the margins; lodicules 2, each c. 0.5 × 0.3 mm, obovate, 3-lobed at apex; stamens 2, anthers 1-1.5 mm long, pale yellow with violet margins, filaments short; ovary c. 0.5 × 0.25 mm, elliptic, styles c. 0.5 mm long, slender, stigmas c. 1 mm long, narrow, pink, plumose; grain 2-2.5 × 0.4-0.5 mm, linear-oblong, with basally attached palea.

Types : P. V. Sree Kumar 71717 (Holotype CAL; Isotype I. MH)

Flowering & Fruiting : October*.

Distribution INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Cannanore District, Paramaba, on way to Bandudka, \pm 150 m, Oct. 16, 1981, P. V. Sree Kumar 71717 (CAL, K, MH). *ibid.*; Oct. 17, 1981, P. V. Sree Kumar 71727 (Paratype); Periyé, near the cashew project, \pm 50 m, Oct. 18, 1981, P. V. Sree Kumar 71755 (Paratype MH).

Notes : According to Nair *et al.* (*l.c.*): This species is allied to *Dimeria santapau* Almeida but differs from it in having sheaths keeled; racemes 2, unequal in length, intertwined, 3-5 cm long; spikelets 8-10 in each raceme and c 4.5 mm long; lower glumes 3-3.5 mm long, oblong-obtuse, with hyaline wing at apex; upper glumes c 4.5 mm long, keels minutely winged at apex only and with a hyaline wing at the tip; lower lemmas oblanceolate; upper floret paleate; whereas in species *Dimeria santapau* sheaths are not keeled; racemes solitary, straight up to 2 cm long; spikelets 2-7 in each raceme, c 0.7 mm long; lower glumes 4-4.5 mm long, elliptic-acute, not winged at apex; upper glumes c 7 mm long, keels winged all along; lower lemmas linear-acute; upper floret epaleate.

Further, the species is quite distinct from other species of the genus previously described from India, in the characters:

Racemes are unequal in length and intertwined with each other; both the lower and upper glumes possess hyaline wings at their tips; callus is sharply acute, long and with golden yellow hairs; awns are long and stout, with a very long column; upper floret is paleate; grain is closely adpressed with the basal part of the palea and it is very difficult to separate them. Fairly common in open, dry rocky grasslands along with other grasses like *Bhidea burnsiana* Bor, *Danthonidium gammiei* (Bhida) C. E. Hubb., and *Dimeria bialata* C. E. C. Fischer.

Dimeria kollimalayana M. Mohanan & A.V.N. Rao (Poaceae)
in J. Bombay Nat. Hist. Soc. 80 (3): 615-617. 1983.

Annuals. Culms 10 - 20 cm tall; nodes sparsely bearded. Leaves 2 6 × 0.3 - 0.4 cm, lanceolate, rounded at base, villous with tubercle based hairs, midrib prominent. Sheaths 1.5 cm, basal ones longer than the internodes. Upper ones shorter, keeled, covered with sparse tubercle based hairs in the upper half. Racemes 2, each 2 - 3 cm long, divergent. Rhachis c 0.75 mm wide, flattened, keeled in a zig zag manner, margins glabrous. Callus hairs 0.5 - 1 mm long. Spikelets 4 - 4.5 mm long, oblong lanceolate, acuminate villous. Lower glumes 3.5 - 4 × 0.3 - 0.5 mm, linear lanceolate, acuminate, scabrid. Upper glumes 4 - 4.5 × 1 - 1.25 mm, linear lanceolate, acuminate, winged at apex, densely villous with a few long hairs at tip, margin hyaline. Lower floret empty; lemma 1.5-2 × 0.3 - 0.5 mm oblanceolate delicate, hyaline, faintly 1 -nerved, margin ciliate in the upper half. Upper floret bisexual; lemma 2.5 - 3 × 0.75 - 1 mm, 2 lobed at apex, awned in between, lobes acuminate, delicate, faintly 1 -nerved; awns 8 - 10 mm long, geniculate, column c 3 mm long, brownish, twisted, bristle pale, scabrid; stamens 2, anthers 0.5 - 0.75 mm long; filaments short; ovary c 0.25 mm long, elliptic, styles c 0.25 mm long, slender, stigmas c 0.75 mm long feathery; grains c 2 × 0.4 mm oblong.

Types : M. Mohanan 56208 (Holotype CAL; Isotypes MH).

Flowering & Fruiting : February*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Salem District, Kollimalai, 1200 m, Feb. 19, 1982. M. Mohanan 56208 (CAL, MH).

Notes : According to Mahanan & Rao (*l.c.*) : The species is closely allied to *Dimeria deccanensis* Bor but differs from it by culms of up to 20 cm tall, ligule not ciliate; racemes up to 3 cm long; rhachis margins glabrous; callus up to c 1 cm long; spikelets 4 - 4.5 mm long; glumes shortly acuminate at apex; lower glumes glabrous & anthers up to 0.75 mm long. Whereas *D. deccanensis* Bor is having the characters of culms up to 70 cm tall; ligule a ciliate membrane; racemes 4 - 7 cm long; rhachis margins ciliate; callus up to c 0.5 mm long; spikelets 2.5 - 3.5 mm long; glumes acute at apex; lower glumes villous; anthers c 1.5 mm long.

The Genus *Dimeria* R. Br., consists of 40 species all over the world of which 20 species are so far reported from India (Willis 1973, Santapau & Henry 1973). Fischer (1957) recorded only 10 species from the former Presidency of Madras. Bor (1969) described 25 species and 4 varieties of which only 18 species are from India, others being from Burma and Sri Lanka, Almeida (1970), Sree Kumar *et al.* (1981 & 1982) made three new additions making the total 21.

D. Kollimalayana grows on the exposed slopes of hills in Sothuparai, Kollimalai.

Dimeria raizadae V. J. Nair, Sreek. & N.C. Nair (Poaceae)
in Ind. J. For. 6 (2): 163 165. 1983.

Annual or perennial. Culms 30 60 cm tall, erect; nodes glabrous. Leaves 4 10 × 0.2 0.4 cm, linear lanceolate, base rounded, villous with long or short, simple or tubercle based hairs, especially on the lower surfaces and along the margins, midrib prominent. Sheaths 2 10 cm, shorter than the internodes, keeled, glabrous or covered with sparse tubercle based hairs especially towards the upper half. Ligule ca. 1 mm long, a thin ovate membrane, fimbriate at apex. Racemes 2, on a shortly exerted peduncle, each 6 -10 cm long. Rhachis 0.75 1 mm wide, flattened, shortly ciliate along the margins. Spikelets 3-3.5 mm long (excluding the awn of the upper glume), ovate lanceolate, sparsely hairy. Callus hairs 1.0 1.5 mm long. Lower glumes 3 3.5 × 0.75 1 mm, linear lanceolate, acuminate or very shortly awned, ciliate in the lower half and also along the margins. Upper glumes 3 3.5 × 1 1.25 mm (excluding awn), ovate lanceolate, acuminate, awned, awn 0.5 0.75 mm long, ciliate along dorsal lower half and shortly ciliate along the margins. Lower floret empty; lemma 1.75 · 2 × 0.5 0.75 mm, obovate, acute, delicate, hyaline, 1-nerved, ciliate along the margins except in the lower quarter. Upper floret bisexual; lemma 2 2.5 × 0.75 1 mm, 2 -lobed at apex, awned in between, lobes acuminate, delicate, 1 -nerved, glabrous; awn 6 10 mm long, geniculate, column ca 3 mm long, twisted, brownish,

bristle pale and scabrid. stamens 2, anthers 1-2 mm long, filaments short. Ovary ca 0.15 mm long, elliptic, styles ca 0.5 mm long, slender, stigmas 0.75-1 mm long, feathery.

Types : P. V. Sreekumar 71812 (Holotype CAL; Isotypes K, MH).

Flowering : October*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala : Calicut District, Pokkunnamalai near Nanminda, ± 850 m Oct. 29, 1981, P. V. Sreekumar 71812 (CAL, K & MH).

Notes: According to Nair *et al.* (*l. c.*): This species is allied to *Dimeria thwaitesii* Hack., but differs from it in having culms stout; nodes entirely glabrous; ligules ca 1 mm long, fimbriate at apex; peduncles shortly exserted, 0.5 - 0.75 mm wide below the inflorescence; racemes 2-3 in number, each 6-10 cm long; rhachis 0.75-1 mm wide, margins shortly ciliate; spikelets 3-3.5 mm long; callus hairs 1-1.5 mm long; upper glumes sparsely ciliate and anthers 1-2 mm long ; whereas the species *D. thwaitesii* is having the characters ; culms very slender, capillary; nodes sparsely bearded; ligules membranes ca 0.5 mm long, ciliate at apex; peduncles long exserted, up to 0.25 mm wide below the inflorescence; raceme solitary, up to 4 cm long; rhachis of racemes at the most 0.5 mm wide, margins long ciliate; spikelets (excluding awns) 4-4.5 mm long; callus hairs up to 0.5 mm long; upper glumes densely ciliate and anthers ca 0.5 mm long.

The plants are found in dry open grasslands and grassy hill slopes; locally common.

The specific epithet is in honour of Prof. M. B. Raizada in recognition of his outstanding contribution to Indian Agrostology.

***Dimorphocalyx balakrishnanii* Chakrab. & Premanath**
(Euphorbiaceae) in J. Econ. Tax. Bot. 4 (3): 1013-1016. 1983.

Tree, about 9 m tall, nearly glabrous, monoecious; branchlets greyish, terete, 1.2-5 mm thick. Leaves elliptic to oblong or often ovate elliptic, 8-21 cm long, 3.5-7.5 cm wide, acute or occasionally obtuse at base, usually entire or rarely shallowly repand-crenate at margins, acuminate to acute or occasionally rounded at apex, thinly chartaceous, on drying brown or black brown above, pale brown beneath; secondary nerves slender, alternate to opposite along the midrib, 7-10 pairs, faint to somewhat prominent above, distinct beneath, uniformly curved or curved abruptly near the margin, joining the superadjacents forming loops; tertiary nerves indistinct to somewhat prominent above, faint to distinct beneath, reticulate; petioles 4-12 mm long, 1-2.5 mm thick, channeled above; stipules deltoid or triangular, 1-2 mm long, subpersistent. Inflorescences cymose, terminal (and axillary?), few-flowered, usually androgynous or occasionally bearing a solitary female, long-pedunculate (20-30 mm long) with inconspicuous rachis (umbellate) or epedunculate with 5-7 mm long rachis; bracts triangular to linear-subulate, 2-6 mm long. Male flowers: pedicels 2.5-3 mm long, sparsely puberulous to glabrous; calyx cupshaped, shallowly to deeply 5-lobed, sparsely fulvous-puberulous to glabrous outside, glabrous inside, 3-4 mm long; the lobes broadly triangular to deltoid or ovate-oblong or elliptic, 1-3 mm long, minutely ciliolate at margins; petals 5, narrowly elliptic to oblong or elliptic-spathulate or obovate-oblong to oblanceolate, 7-10 mm long, 2-5 mm wide; disc glands 5, free; stamens 4 + 5 or 5 + 5 or 5 + 6, the outer free, the inner monadelphous, the outer filaments 2.5-4 mm long, the inner united filaments 4-6 mm long (the basal connate portion 2-3 mm long), pilose near the base; anthers ellipsoid to suborbicular or broadly oblong or ovoid, 0.8-1.2 mm long. Female flowers: pedicels 2-4 mm long, fulvous-puberulous or often subglabrous; sepals 5, unequal, oblong to elliptic-oblong or narrowly obovate-oblong to oblanceolate, fulvous-puberulous outside (at least near the base), adpressed puberulous or sometimes subglabrous inside accrescent; petals 5, narrowly oblong to oblanceolate, 10-11 mm long, 3-3.5 mm wide, caducous; disc glands connate in a ring; ovary subglobose, 2-2.8 mm long, 2.8-3 mm diam., densely fulvous or tawny-puberulous or tomentellous, 3-lobed; style 3, 7-8.5 mm long,

connate below into a column (0.5) 2-2.5 mm long, bifid above, the stylar column densely puberulous. Capsules: prominently 3-lobed, about 15 mm long, 15 mm diam., fulvous-puberulous, black-brown when dry; fruiting pedicels 10-12 mm long; fruiting sepals 8-18 mm long, 3-7 mm wide; seeds broadly oblong-ellipsoid, \pm 10 mm long, \pm 6 mm diam., with rounded dorsal surface, smooth, brown.

Types: Ansari 1368 (A: Holotype CAL; B-E: Isotypes PBL).

Flowering & Fruiting: May-June.

Distribution: INDIA: Andaman-Nicobar Islands.

Herbarium specimens: INDIA: Andaman-Nicobar Islands; Havelock Island, Without locality, \pm 40 m alt., May 15, 1974, Ansari 1368 (A in CAL; B-E in PBL). South Andaman Island, Goplakabang 1890, King's Collector s.n. (Paratype CAL- Acc. No. 412226); without locality, 1900, Prain's Collector 60 (Paratype CAL).

Notes: According to T. Chakrab. & Premanath (*l. c.*): The type was collected from the inland evergreen forests of Havelock Island and found growing on sandy soil at about 40 m alt. It was noted to be a common tree with white flowers. *D. balakrishnanii* has apparently disappeared from the South Andaman Island and perhaps presently occurs only on Havelock Island where it must also be very rare. It seems possible that this species was mistaken as the common *Blachia andamanica* at the time of its collection in 1974; it could never be collected again from Havelock Island after that though the plants of *Blachia* were collected several times. The primary forests of the small Havelock Island are now under considerable stress due to increasing human settlement and deforestation and *D. balakrishnanii* may eventually disappear from that island also. Therefore, it is desirable that this plant should be traced out immediately and introduced into the Tropical Botanic Garden in South Andaman Island and other gardens for its conservation.

Differs from all other species of the genus by its androgynous inflorescences.

Dipcadi maharashtrensis Deb & S. Dasgupta (Liliaceae) in J. Bombay Nat. Hist. Soc. 72 (3): 822-823. 1975 (1976).

Herbs bulbous, scapigerous; bulbs globose, small, about 2.5 cm × 2.5 cm, tunicate, rooting profusely from the base. Leaves radical, about 6, shorter than the scape, 25–30 cm × .5–.7 cm, linear, broadest at the middle, plicate, entire, acute, coriaceous, glabrous; veins parallel, 8–14 in number. Scape long, about 36 cm long, about .4 cm across at the base, narrowing upwards to .1 cm across at the apex, slender, terete, glabrous, naked. Raceme about 13 cm long, loose, bearing about 12 flowers; bracts persistent, much longer than the pedicels, 1–2 × .3–.35 cm, entire, subulate, coriaceous. Flowers bisexual, regular, distantly placed; pedicels stout, 2–3 mm long. Perianth 1.1–1.3 cm long, petaloid, biseriate, of 3 segments each, outer ones longer, united upto 1/3 from the base, campanulate, inner ones united up to 2/3 from the base, tubular; perianth lobes 2–2.5 mm broad; obovate-lanceolate, obtuse, tuberculate at the subapex; nerves 5, convergent towards the apex. Androecium of 6 stamens, adnate to the perianth; filaments flat, adnate to the inner perianth tube, remaining free for about 1 mm above; anthers 2 celled, oblong, 2.5–2.7 × .6–.7 mm, dorsifixed, introse, dehiscent longitudinally, gynoecium of 3 carpels, syncarpous; ovary superior, stalked, broadly oblong, 3.5–4 × 2.5–3 mm, glabrous, trilobular, with numerous ovules in axile placentas; style stout, 4–5 mm long, about .7 mm across; stigma globose, obscurely trilobed; stalks short, .5–.7 mm long, .7–1 mm across. Fruit unknown.

Type : B. Rukmini Bai 433 (Holotype BLAT).

Flowering : September*.

Distribution : INDIA: Maharashtra.

Herbarium specimen : INDIA: Maharashtra ; Panchgani, Sept. 5, 1955, B. Rukmini Bai 433 (BLAT).

Notes : According to Deb & Dasgupta (*l. c.*): This species near to *Dipcadi ursulae* Blatter but differs in having leaves shorter than the scape, loose raceme, subulate, acuminate, coriaceous bracts, shorter pedicels and broadly oblong ovary.

The bulb was collected from Panchgani, Maharashtra by B. Rukmini Bai (B. R. 433) on September 5, 1955 and cultivated in St. Xavier's College, Bombay where it flowered in September.

Dipcadi ursulae Blatt. var. **longiracemosae** Deb & S. Dasgupta (Liliaceae) in J. Bombay Nat. Hist. Soc. 72 (3): 823. 1975 (1976), et in Fasc. Fl. Ind. 7: 11. 1981.

Herbs scapigerous, bulbous; bulbs ovoid, small, about 3 cm in diam. tunicate, rooting from the base. Leaves radical, 30-40 cm × 5-1.5 cm, linear, glabrous, entire, acute, veins parallel, 12-20. Scape one or two, arising from the bulb, 30-45 cm long, .4-1.2 cm across, terete, smooth naked. Raceme 10-15 cm long, dense in early stage, loose when matured, 22-30 flowered; bracts persistent 1-1.3 × 3-4 cm, deltoid, long acuminate, scarious, plicate, entire, much longer than the pedicel. Flowers bisexual, regular, white; pedicels 4-7 mm long. Perianth 9-1.1 cm long, petaloid, biseriata, of 3 segments each; outer ones longer, united up to 1/3 from the base, campanulate, lobes obovate-lanceolate, recurved at the middle, obtuse, tuberculate at the subapex; inner ones shorter, united up to 2/3 from the base, tubular, lobes obovate-lanceolate, obtuse, recurved at the tip, hooded; nerves 5-7, prominent, convergent towards the apex. Androecium of 6 stamens; filaments linear, adnate to the inner perianth tube, remaining free for 2-3 mm above, anthers 2 celled, linear-oblong, 3-3.5 mm × about .7 mm, dorsifixed, introrse, dehiscing longitudinally. Gynoecium of 3 carpels, syncarpous, ovary sessile, superior, narrowly obovate-oblong, trisulcate, 4.5 mm × about 1 mm, glabrous, trilocular, with numerous ovules in axile placentas; style 4.5-4.7 mm long, stout, broadening above; stigma trilobed. Capsule unknown.

Type : P. V. Bole 743 (Holotype BLAT).

Flowering : August.

Distribution : INDIA: Maharashtra.

Additional report : Gujrat, Western Deccan.

Herbarium specimens : INDIA: Maharashtra; Girnar Hill, Junagadh, Aug. 25, 1958, P. V. Bole 743 (BLAT); Rozi, Aug. 29, 1952. P. V. Bole 851 (Paratype BLAT), Ansari 88785.

Notes : According to Deb & Dasgupta (*l.c.*) : Allied to *D. ursulae* Blatt. var. *ursulae* differing in having longer scape with more flowers in the raceme and sessile ovary.

Common.

Diplospora andamanica N.P. Balakr. & N. G. Nair (Rubiaceae) in Bull. Bot. Surv. India 24 (1-4): 31-32. 1982 (1983).

Shrub, 3-4 m tall; branchlets glabrous; stipules ovate, long acuminate, 5-7 mm long, ca 3 mm broad at base, pubescent outside, hairy and bristly at base inside. Leaves elliptic-lanceolate, acute to subde-current at base, acuminate at apex, entire at margins, 5-11 cm long, 1.5-3.5 cm broad, coriaceous, dark green and glabrous above, pale puberulous below; lateral nerves 10-12 pairs, interarching near margins; petioles 3-5 mm long, 1.0-1.5 mm thick, glabrous. Cymes axillary, umbellate, minutely puberulous, 2-4 mm long; bracts ovate, acuminate, ca 2 mm long, puberulous; bracteoles 2 at the base of the pedicels, coherent at base, ovate, triangular, ca 1 mm across, puberulous, pedicels 1-3 mm long, glabrous. Calyx-tube 2-3 mm long; lobes 4, short triangular, pubescent and shortly ciliolate. Corolla white, glabrous outside; tube 2.0-2.5 mm long, glabrous outside, densely villous at throat; lobes 4, overlapping anticlockwise, orbicular-obovate, 2.0-2.5 mm long. Stamens 4, at the throat of corolla tube; filaments short; anthers dorsifixed, ca 2 mm long. Ovary 2-celled, with 2 pendulous ovules in each cell; disc short annular, entire; style ca 1.5 mm long, pubescent towards the apex; stigmatic lobes 2, ovate, ca 2 mm long, ca 1 mm broad, villous. Fruits obovoid to clavate, 6-8 mm long, ca 3 mm thick, glabrous, with 4 short persistent calyx-lobes at apex.

Types : Balakrishnan & Nair 4762 (A: Holotype CAL: B-D: Isotypes PBL; E: Isotype L).

Flowering & Fruiting : December*.

Distribution : INDIA: Andaman Island.

Herbarium specimens : INDIA: North Andamans; Saddle Peak, ca 600 m, Dec.1, 1976, Balakrishnan & Nair 4762 (A in CAL, B-D in PBL; E in L).

Notes : According to Balakr. & Nair (*l.c.*) : It is allied to the Malaysian *D. Kuntleri* King & Gamble and the Philippine *D. fasciculata* Elm. but differs from both in leaves being thinner, elliptic-lanceolate; lateral nerves 10-12 pairs; petioles shorter; fruits obovoid, clavate.

***Dolomiaea baltalensis* Dar & Naqshi (Asteraceae) in J. Bombay Nat. Hist. Soc. 87 (2): 278-279. 1990.**

Perennial, acaulescent herbs. Leaves radical, petiolate. Petioles 3-10 cm long, flattened, ± sheathing at the base, channelled, woolly. Lamina ovate to elliptic-ovate, slightly cordate, cuneate or somewhat rounded at base, 5-10 × 3-7 cm, entire or very shallowly and irregularly lobed, spinulosely dentate, densely woolly above, densely white-tomentose, beneath. Capitula homogamous, discoid, 7-24 in number, corymbose, oblong, expanded above after anthesis, up to 4 cm long, peduncled. Peduncles stout, 0.5-4.5 cm long channelled, woolly. Involucral bracts multiseriate, imbricate, serrulate; outer ovate-lanceolate, often woolly at least at base, appressedly hairy towards apices; inner lanceolate to oblong-lanceolate, long-acuminate, scarious, longer than outer ones, appressedly pubescent, more so in apical half. Florets actinomorphic, hermaphrodite. Corolla purple, tubular, tube slender, ± 1 cm long; limb inflated, about as long as tube, 5-partite. Stamens 5; filaments slender, c 4 mm long, glabrous; anthers sunken, 6-7 mm long, bases sagittate with ciliate-lacerate, ± 2 mm long tails. Style slender, ± 2 cm long, glabrous, bifid at apex; stigmatic lobes 2 mm long. Cypsela cuneate-obovoid, 5-7 mm long, indistinctly 4-angled, ± compressed, often slightly curved, glabrous, ashygrey with irregular transverse black streaks or yellowish, nearly smooth, shining; apex prominently rimmed, umbonate. Pappus many, 2-3 or multiseriate, brown, deciduous; hairs unequal, barbellate, cohering at the base into a ring.

Types : *G.H. Dar* 3899 (Holotype KASH; Isotypes KASH, K & E).

Flowering & Fruiting : August-September*.

Distribution : INDIA: Kashmir.

Herbarium specimens : INDIA: Kashmir; Baltal, Sonamarg (Sind Valley) 3000 m, Sept. 2, 1982, *G. H. Dar* 3899 (KASH, K & E); Pransur Sonamarg (Sind Valley); 3500 m, above meadowland, Aug. 27, 1983, *G.H. Dar* 8325 (Paratypes KASH, K & E).

Notes : According to Dar & Nakshi (*l.c.*) : The genus *Dolomiaea* was first recognised by A. P. de Candolle (in Guill., Arch. Bot. 2: 230. 1833) on the basis of the Himalayan *D. macrocephala*

(Wallich) DC., but was not considered as different from *Jurinea* Cass., by Bentham and Hooker f. (Gen. Pl. 2: 474. 1873), a treatment since then followed by most botanists. However, *Dolomiaea* is now regarded as distinct from *Jurinea* (Ling in *Acta Phytotax, Sin* 10: 85-90. 1965). In fact the former shows close affinity with *Saussurea* DC. rather than with *Jurinea*. *Dolomiaea baltalensis* resembles *D. macrocephala* (Wallich) DC. in habit but differs in having ovate to elliptic ovate, entire or very shallowly and irregularly lobed, densely woolly leaves, longer peduncles and darker capitula. On rocky slopes.

***Drabopsis brevisiliqua* Naqshi & Javeid (Cruciferae) in J. Econ. Tax. Bot. 5 (4): 963-966. 1984.**

Annual erect herb, 3-5.5 cm tall. Scapes leafless. Leaves basal, in rosettes, ovate-oblong to spatulate, simple or rarely dentate, glabrous, 1-2 cm long, stellately hairy on margins. Flowers yellow, dense, lax in fruit, up to 2 mm in diam. Sepals erect \pm equal at base, inner minutely saccate at base, glabrous, oblong-ovate, $1.5 \times 1.8 \times 1$ mm. Petals erect, yellow, spatulate, subemarginate, 1.5×0.5 mm. Filaments simple, edentate. Pedicels glabrous, spreading or ascending, 1-3 mm long. Siliquae spreading, glabrous, terete, up to 12.5 mm long; valves striated, median vein distinct. Stigma sessile, capitate; septum membranous. Seeds uniseriate brown, ovate-oblong, $1.3 \times 0.3-0.5$ mm, mucilaginous. Cotyledons accumbent.

Types : A. R. Naqshi 3784 (Holotype KASH); A. R. Naqshi 3171, 3133a (Isotypes KASH).

Flowering : Time not mentioned.

Distribution : INDIA: Kashmir.

Herbarium specimens : INDIA: Kashmir; Harwan (on hill top, in association with *D. verma* C. Koch) A. R. Naqshi 3784 (KASH); *ibid.*, A. R. Naqshi 3171 & 3133a (KASH); Ajas, M. Abubaker & Zafar Reshi 2285, 2284, 2283, 2282 & 2281 (Paratype KASH); Univ. Campus, Kaweeta 15 (Paratype KASH); Harwan 12 (Paratype KASH); Pahalgam, A. R. Naqshi s.n. (Paratype KASH).

Notes : According to Naqshi & Javeid (*l. c.*): It is very close to only species *D. verma* C. Koch differing particularly in its smaller size in general, glabrous leaves and sepals, non-flexuose and fruiting scapes and small siliquae. *Drabopsis* a small genus in the crucifera now having only two species one is known from Central Asia, Himalaya, Pakistan, Iran and Turkey. The only species previously known is *D. verma* C. Koch., is characterized by oblong- spathulate, entire or weakly dentate leaves, yellow flowers and slightly curved small siliquae. The plant is up to 15 cm tall, aphyllous, branching from the base, scape lax and flexuose in fruiting. *D. verna* C. Koch., grows in moist places, dried up sandy beds, in stones along moist slopes, and sometimes may occur as a weed.

***Drypetes bhattacharyai* Chakrab. (Euphorbiaceae) in J. Econ. Tax. Bot. 7 (2): 453-454. 1985.**

Dioecious shrub or tree, 2-20 m high; bark white, pungent (*test collectore*); branchlets terete, glabrous, 2-4 mm thick, scattered ochraceous puberulous when young. Leaves mostly narrow, elliptic to oblong-elliptic, acute (and symmetrical to asymmetrical) at base, entire at margins, acutely to obtusely acuminate (acumen 7-25 mm long) or acute or mucronate at apex, coriaceous, glabrous, glossy above, pale greenish to brownish or often blackish brown (yellow in natural condition) when dry; midrib flat above, raised beneath; secondary nerves slender, 5-15 pairs; prominent or occasionally faint above, distinct beneath, multi-arcuate curvipinnate; minor nerves mostly prominent on both surfaces, reticulate; petiole 4-14 mm long, 1-2 mm thick scattered and ± adpressed ochraceous puberulous to glabrous, sulcate above. Inflorescences axillary, also in the axils of fallen leaves, few-flowered. Male flowers (only buds seen): pedicel 5-8 mm long, 0.5-0.8 mm thick, scattered adpressed ochraceous (often rusty) puberulous; sepals 4, orbicular, 5-7 mm broad, sparsely puberulous outside (especially towards base), white ciliolate at margins; stamens 10-13, filament 1-2 mm long (immature), anthers ± 2 mm long, oblong; disk with lobulate margin lobes produced outwards embracing the base of filaments. Female flowers: pedicel 4-10 mm long, 0.5-1 mm thick, scattered adpressed

puberulous (ochraceous or rusty) to glabrous; sepals not seen; disk annular, pubescent; ovary globose or ellipsoid, 2-3 mm diam, glabrous unlobed, bilocular; style 0.2-0.3 mm long; stigmas 2, flabellate, 1-2 mm broad. Drupes subcubical-globose or subcubical-oblong, 12-18 mm long, 10-15 mm diam., mostly truncate at apex, unlobed or scarcely lobed, glabrous, bilocular, green, turning orange-red, blackish-brown when dry.

Types : Hore 7971 (A: Holotype PBL; B: Isotype PBL).

Flowering & Fruiting : April-October.

Distribution : INDIA : Great Nicobar Islands.

Herbarium specimens : INDIA: Great Nicobar Islands; Dogmar river bank, Sept. 22, 1980, Hore 7971A (PBL), *ibid.* Hore 7971 B (PBL); *ibid.* Hore 7967, 7970 (PBL); Kopenheat, Feb. 3, 1980, Dwivedi 7804 (PBL); *ibid.*, Sept. 27, 1980, Hore 8226 (PBL); *ibid.*, July 25, 1976, Balakrishnan 4020 (PBL)-♂; Koshin Don, Sept. 21, 1980, Dwivedi 8001 (PBL)-♂; Campbell Bay, forest behind marine quarters, May 7, 1984, T. Chakraborty 10307 (PBL).

Notes : According to T. Chakrab. (*l.c.*): Closely related to *D. assamica* (Hook. f.) Pax & Hoffm., differing principally in the fewer stamens, the glabrous ovary and the glabrous fruits with longer pedicels.

Common in littoral forest or river bank forest or mixed forest or inland forest on sandy or clayey soil at very low altitudes.

The new species is named in honour of Dr. G. N. Bhattacharya, Professor in Botany, Viswa-Bharati, Santiniketan.

***Drypetes ellisii* S. P. Mathew & Chakrab. (Euphorbiaceae) in J. Econ. Tax. Bot. 14 (3): 623-625. 1990.**

Trees, ca 10 m high; branchlets blackish-brown, terete, smooth, 2-8 mm thick, glabrous. Leaves elliptic to oblong, 11-16.5 cm long, 4-5.5 cm broad, more or less symmetric, subobtuse to subacute at base, entire at margins acute to acuminate acumen up to 10 mm long and acute to obtuse) at apex, thinly coriaceous, glabrous, glossy,

greenish brown when dry; midrib flat above, raised beneath; lateral nerves slender, 8 - 9 pairs, prominent; minor nerves prominent, finely reticulate; petioles 9 - 11 mm long, pulvinate at apex, mostly geniculate. Flowers: unknown. Infructescences axillary, solitary, or fruits in pairs. Drupes subglobose, 12 - 13 mm diam., glossy, smooth glabrous, thin-walled, orange when ripe, pale brown when dry, 1 locular, 1-seeded; disk annular; pedicels 5 - 7 mm long, glabrous.

Types : Mathew 20279 (Holotype CAL; Isotype PBL).

Fruiting : May*.

Distribution : INDIA : South Andaman Island.

Herbarium specimens : INDIA: South Andaman Islands; Mount Harriet, May 17, 1990, Mathew 20279 (CAL, PBL).

Notes : According to Mathew & Chakrab. (*l.c.*): Closely related to *D. andamanicae* (kurz) Pax & Hoffm., differing in the leaves being entire with fewer lateral nerves and prominent minor nerves and nervules and the fruits being smaller and subglobose.

The leaves resemble those of *D. assamica* (Hook. f.) Pax & Hoffm. of sect. *Sphragidia* but the petioles are longer, slender, apically pulvinate and geniculate.

The species is rare in inland hill forests on sandy loam at about 200 m above MSL.

It is named after Dr. J. L. Ellis, BSI.

Dumasia villosa DC. var. *arunachalensis* Predeep & M.P. Nayar (Papilionaceae) in *J. Jap. Bot.* 66 (5): 276 - 279. 1991.

Herbaceous twining climber, 3 - 5 m long. Stem very slender, c 1 mm diam., sparsely retrorse pubescent in juvenile. Stipules lanceolate, 2 - 3.5 × 1 mm, striate, sparsely pubescent. Leaves pinnately trifoliolate, 4.5-8 cm long; petiole 1.8-3.7 cm long, canaliculate above, sparsely to densely pubescent; rachis 0.5- 2 cm long; petiolules 1 - 2 mm long; leaflets, ovate, elliptic, rarely suborbicular, (1-) 2 - 3.5 × 1 - 2.5 cm, retuse, sometimes obtuse, apiculate at apex, obtuse to rounded at base in terminal leaflets,

subtruncate to truncate in lateral leaflets, chartaceous, sparsely to densely adpressed pubescent above, sparsely so below, densely spreading pubescent along margin, 5-6 secondary veins runs upwards making an obtuse angle, gradually diminishing inside the margin during its course. Inflorescence axillary pseudoracemes, unbranched, 2-5 cm, 10-20 flowered, 3 flowers per node; bracts lanceolate, 1-1.5 × 0.5 mm, pubescent; bracteoles 2, clasping the calyx tube, lanceolate, 1.5 × 0.5 mm, similar to bracts. Flowers c 18 mm long, yellow coloured; pedicels 2-3 mm long. Calyx campanulate, 9 mm long, 4 mm wide at obliquely subtruncate mouth, gibbous at base, membranous, glabrate. Standard obovate, 17 × 7-8 mm, apex emarginate, auricles rounded, 1 × 2 mm, lateral callosities long, starting from inner edge of auricle, claw 7 mm long. Wings 14-16 × 2.5-3 mm, lamina oblong, 5 mm long, rounded at apex, truncate at base, claw 9-11 mm long. Keels 14-15 × 2.5-3 mm, lamina semi circular, 4-5 mm long, rounded or subacuminate at apex, lateral callosities long and prominent, connate along the convex ventral margin, claw c 10 mm long. Stamens diadelphous, 9+1, vexillary stamen c 15 mm long, tube 14 mm long, free part of filaments ± 2 mm long, anthers uniform. Pistil stipitate for 1-1.5 mm, ovary 5-6 × 0.5-0.75 mm, glabrous, ovules, style long, 8-10 mm long, bulbous near bent, upcurved for c 2 mm, stigma globose. Pods oblong, 2.2-2.8 × 0.4-0.5 cm, acuminate at apex, cuneate at base, compressed, glabrous, 3-5-seeded.

Types : R. S. Rao 1457 (Holotype CAL; Isotype CAL).

Flowering & Fruiting : October*.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh (NEFA): But Camp, Oct. 22, 1955, R. S. Rao 1457 (CAL); Jabrang, Oct. 16, 1955, R. S. Rao 1307 (Paratype CAL, ASSAM).

Notes : According to Pradeep & Nayar (*l.c.*) : Allied to *D. villosa* DC. var. *villosa* but differs from it in having the glabrous pods and spreading pubescence along the leaflet margins; whereas leaflets without marginal pubescence and pods are densely pubescent to villous in *D. villosa* DC. var. *villosa*.

Ecdysanthera lakhimpurensis S.K. Srivast. & Mehrotra (Apocynaceae) in *Candollea* 41 (2): 381-383. 1986.

Large shrub, branches terete, young one flattened, channelled, glabrous. Leaves simple, opposite, estipulate, (sheathing cover on each node) 4.5-6.5 × 1.6-2.3 cm, ovate or ovate-elliptic, acute or acuminate, base cuneate, entire, glabrous, membranous or somewhat chartaceous, midrib distinct on both the surfaces, lateral nerves 3-5 pairs, nearly inconspicuous; petioles 1-1.2 cm long, glabrous. Cymes axillary or terminal, minutely pubescent, trichotomous, 4-7 × 3-4 cm, bracts 1 mm long, ovate, acute, glabrous. Flowers 5 × 2 mm, pedunculate, hermaphrodite, peduncle 1.5-2.8 cm long, pedicels 2 mm long, minutely pubescent, bracteoles triangular, 1-1.5 mm long. Calyx 5-lobed, sepals 1.5 mm long, ovate, acute, glabrous, jointed each other at half of the length. Corolla membranous 5-lobed, jointed each other at 1/3 of the length from the apex somewhat rounded. Stamens 5, epipetalous, nearly 2 mm long, attached nearly at the base of the petal lobe, filament short, anther sagittate, spur long. Pistil 2-2.5 mm long, ovary superior, rounded, nearly 1.5 mm in diam., minutely pubescent at the top, style nearly 1 mm long, stigma simple conical. Fruit unknown.

Types : S. K. Srivastava 16105 (Holotype CDRI; Isotype CDRI).

Flowering : March-April.

Distribution : INDIA : Assam.

Herbarium specimens : INDIA: Assam ; North Lakhimpur Dulung R. F., ± 350 m, Apr. 24, 1986, S. K. Srivastava 16105 (CDRI).

Notes : According to Srivastava & Mehrotra (*l.c.*): This genus is represented by 8-10 species distributed in Malayan region and China, one species viz., *E. micrantha* from India. The plant is found growing on the slopes along the dry rocky rivers in moist climatic condition.

Ecdysanthera lakhimpurensis Srivastava & Mehrotra is allied to *E. micrantha* A.DC. but differs in having smaller leaves, ovate or ovate-elliptic, glands on the axil of the lateral nerves, flowers and corolla much larger, stamens sagittate, flattened, much longer, pistil twice long.

***Elaeagnus kanaii* Momiyama var. *osmastonii* Malhotra & D. Basu (Elaeagnaceae) in Bull. Bot. Surv. India 26 (1 & 2) : 121-122. 1984 (1985).**

Shrubs, leave ellipsoid, upper surface dark brown, appressed hairy, petiole short. Fruit pedicelled, pedicels 1.0 cm long, thickened near the attachment of fruit.

Types : *Osmaston* 859 A & B (Holotype DD).

Fruiting : October and before*.

Distribution : INDIA : Garhwal.

Herbarium specimens : INDIA: Garhwal; 2400 m, Khatik Swami Reserve, Oct. 31, 1917, *Osmaston* 859 A & B (DD); Girgaon, Kumaon (1500 m), June 11, 1958, *T. A. Rao* 6619 (BSD).

Notes : According to Malhotra & Basu (*l.c.*): It differs from *E. Kanaii* var. *typica* in having leaves appressed hairy on upper surface, short petiole; fruit flat at top, brownish spotted, scaly and pedicel 1 cm long. Whereas, *E. Kanaii* var. *typica* is characterised by: Pedicels 2: 2 cm long; fruit apiculate, silvery scaly; leaves stellately hairy on the upper surface.

Elaeagnus kanaii Momiyama var. *osmastonii* Malhotra et D. Basu is named after the collector A. F. Osmaston.

***Elatostema lineolatum* Wt. var. *setosum* A.N. Henry (Urticaceae) in Bull. Bot. Surv. India 6 (2 4): 317 318. 1964.**

Herbs or undershrubs, dioecious, 30 110 cm tall; stems setose. Leaves 2.5 14 × 1.5 4.5 cm alternate, subsessile, linear-lanceolate, oblong-lanceolate or obliquely lanceolate, coarsely crenate, toothed or serrate in the upper half, both surfaces with small appressed hairs together with long patent setose hairs, apex acuminate or cuspidate, base long cuneate; stipules 8 11 × 2 3 mm, lanceolate, setose. Flowers minute, regular, often in clusters, in axillary, almost sessile, capitate, involucrate receptacles; bracts of the involucre rounded, oblong or ovate, minutely hairy; the outer bracts with a dorsal spur or horn, bases more or less confluent into a fleshy, circular or lobed

disc. Male flowers: Perianth lobes 4, rounded, obtuse; stamens 4, opposite to the perianth lobes; filaments distinct, inflexed in bud and springing back elastically at anthesis; anthers 2-celled, dehiscing longitudinally; bracteoles many, mixed with the flowers, oblong, sparsely hairy on the coast and tips. Female flowers: Perianth lobes 3, minute, shorter than the ovary, ovate-lanceolate, acute; ovary superior, erect, 1-celled; ovule solitary, erect basal; style 0; stigma penicillate; bracteoles many, mixed with the flowers, oblong, ciliate. Achenes \pm 1 mm long, ellipsoid, acute, 4-6 ribbed, subtended by the minute perianth lobes.

Types : Henry 16983 (A: Holotype MH; B N: Isotypes MH).

Flowering & Fruiting : May August*.

Distribution : INDIA: Tamil Nadu (Madras).

Herbarium specimens : INDIA: Madras; Tirunelveli District., Agastiyamalai Hills, Aug. 22, 1963, Henry 16983 A N (MH); *ibid.*, May 26, 1963, Henry 16322 A F (Paratypes MH).

Notes : According to Henry (*l.c.*) : It differs from the typical variety by the presence of long patent setose hairs on the stems and leaves both surfaces.

Elymus harsukhii H.S. Dubey & S.N. Dixit (Poaceae) in J. Econ. Tax. Bot. 12 (1): 227-229. 1988.

Caespitose perennial; culms 17-25 cm high, slender or stout, glabrous. Leaf blades 7-13 cm long, convolute to flat, filiform, scaberulous or shortly pilose above, glabrous beneath; ligule 0.5 mm wide, truncate; sheaths retrose-pilose in dry rocky habitats to scabrous in sandy situations. Spike 4.5-13.5 cm long, nodal interval (10) 14-23 mm, rachis margin scabrid. Spikelet 15-30 mm long, 5-10-flowered. Glumes subequal to unequal, the lower 3.20-5.0 \times 0.75-1.0 mm, the upper 4.5-6.0 \times 1.0-1.20 mm, oblong-lanceolate or elliptic 3-4 nerved, glabrous on the nerves with 3-6 hispid cilia on the central nerve towards the tip, tip blunt, acute or cuspidate, the cusp up to 1.20 mm long. Lemma callus 1 \times 1 mm hairy on the margin, lemma 6-10 \times 1.20 mm, elliptic

- lanceolate, 5-6-nerved, the nerves fairly prominent on the dorsal surface, long hairy on the back, the tip produced into a 20-48 mm long awn, the awn considerable inflated at the base. Palea 6-8 × 1.20 mm, oblong, spinulose on the keel in the upper 2/3, the tip nearly round. Anthers 1.5-2.5 mm long. Gynoecium 1-2 × 0.25 mm with 1.50 mm long. Caryopsis 4-6 × 0.20 mm, compressed, rachilla shortly bristly.

Types : Murugessan 65618 (A: Holotype CAL; B: Isotype BSD).

Flowering & Fruiting : July - August.

Distribution : INDIA : Himachal Pradesh, Kashmir; PAKISTAN, Chitral.

Herbarium specimens : INDIA: Kashmir; on way to Amarnath, 3800 m, Aug. 14, 1983, Murugessan 65618 (A in CAL; B in BSD) Ladakh, Gummi-Zojila, 2300m, July 15, 1976, B. M. Wadhwa 58528 (BSD); Himachal Pradesh: Lahul, Sisoo, 3400 m, July 5, 1973, U. C. Bhattacharyya 51813 (BSD); Sisoo, 12000 m, July 5, 1938, N. L. Bor 12362 (DD); Patsco, 3660 m, July 3, 1941, N. L. Bor 13152 (DD); Chotadara, 3600 m, July 21, 1972, U. C. Bhattacharyya 48787 (CAL).

Notes : According to Dubey & Dixit (*l.c.*) : The species is allied to *Elymus jacquemontii* (Hook. f.) Cope, differing in having glumes glabrous on the back with 3-6 hispid cilia on the central nerve towards the tip of the upper glume only, lemma long hairy on the back, anther 1.5-2.5, long, palea keeled scabrid in the upper 2/3, tip subrotund.

The specific epithet 'harsukhii' of the taxon commemorates Duthie's distinguished collector "Harsukh".

Eragrostis santapau K. G. Bhat & Nagendran (Poaceae) in *Reinwardtia* 10 (2): 127-128. 1985.

A tufted annual. Culms 6-20 cm high, slender; nodes glabrous. Leaves up to 9 cm long and 3 mm wide, linear, acute, margins non-glandular upper surface pilose, lower glabrous; sheaths glabrous, bearded at mouth; ligule a pubescent ridge. Panicle up to 20 cm

long, open; peduncle glabrous except at branch axils; branches alternate, spreading, bearded in axils, up to 3 cm long. Spikelets 5-10 mm long and 2-2.8 mm wide, ovate-oblong, up to 20-flowered, pale green or olive-grey, sometimes tinged with pink; rachilla persistent; pedicels non glandular; shorter than spikelets except the terminal ones, the latter up to 10 mm long. Glumes 2, 1-nerved, ovate, acute; lower 1.2-1.7 mm long; upper 1.6-1.8 mm long. Lemmas ca 2 mm long, ovate acute, 3-nerved, lateral nerves prominent. Paleas persistent, obovate-oblong, shorter than lemmas, keels scabrid. Stamens 3; anthers ca 0.3 mm long. Lodicules 2, minute, cuneate. Grains 0.6-0.8 mm long, globose or oblong, dorsally slightly flattened.

Types : K. G. Bhat 794 (A: Holotype CAL; B: Isotype K).

Flowering & Fruiting : December*.

Distribution : INDIA : Karnataka.

Herbarium specimens : INDIA: Karnataka ; Coorg District, Mercara, Dec. 18, 1980, K. G. Bhat 794 (A in CAL & B in K) and K. G. Bhat 1003 (Paratype, Mysore University Herbarium).

Notes : According to Bhat & Nagendran (*l.c.*): Allied to *E. poaeoides* P. Beauv. and *E. cilianensis* (All.) Vignolo-Lutati, but differs in having bearded panicle branch axils, smooth leaf-margins and the absence of crateriform glands in the pedicels.

Growing in moist soil.

Eria connata J. Joseph, S.N. Hegde & Abbar. (Orchidaceae) in Bull. Bot. Surv. India 24 (1-4): 114-116, 1982 (1983).

Caespitose, erect, pseudobulbous epiphytes, with many thin wiry roots and fresh arcuate or pendulous leafy flowering shoots. Old Pseudobulbs 5-15 × 0.7-1.0 cm, leafless, subcylindric, slightly compressed, subclavate, erect, green, obliquely noded, with progressively shorter internodes telescoping at tip, bereft of persisting sheath fibres and persisting for more than one season. Fresh shoots arising from the base of the old pseudobulbs, slender, pendulous

(or acutate) with about 4-6 sheathing scales at the lower nodes and leaves at the apex, after anthesis axis of the fresh shoot slowly becomes erect and swells into a pseudobulbous stem. Leaves 6-8 × 1.0-1.7 cm, 4 (-5), sessile, terminal, narrowly elliptic, subfalcate towards the apex, acuminate, bistichous, bifarious, distinctly 5- or 7-nerved, deciduous. Inflorescence racemose heads, one or two axillary or leaf opposed, subsessile, dense, globose or subglobose, proteranthous. Flowers many, crowded, bracteate, shortly pedicellate and slightly arcuate, not widely opening, fragrant, white with yellow lips. Bracts 6.0-7.5 × 5.0-6.5 mm, unequal, lowest the largest, broadly ovate, acute or sunorbicular, obtuse, much longer than the ovary, erect, concave, concealing the ovary, 5-nerved, gland dotted. Pedicel with ovary 5-6 × ca 1 mm, densely pubescent, arcuate, Perianth unequal, gland dotted, 3-nerved; sepals sparsely obscurely papillose without. Dorsal sepal 3.5-4.0 × 2.5-3.0 mm, ovate, obtuse, hooded over the column. Lateral sepals 7-8 × 2.0-2.5 mm, obliquely oblong-lanceolate, obtuse, thickened at apex externally, attached to the lateral sides of the foot of the column and connate along the lower margins up to the middle forming a long (almost equalling the ovary) tubular mentum with scrotoform tip and closely enveloping the lip. Lateral petals 3-4 × 1.5-2.0 mm, much narrower and a little shorter than the sepals, ovate-lanceolate, blunt at tip, thin. Lip 6.0-6.5 × 2.0-2.5 mm, narrowly oblanceolate, 3-lobbed, longer than the dorsal sepals and petals, but shorter than the lateral sepals included, straight, cymbiform, shallowly saccate at the very base, sparsely gland dotted, attached to the tip of the long foot, longitudinally 3-ridged; lateral ridges much broader and thicker and not continuous with the midlobe, median ridge very narrow, dilated at the apex and joins with the thickened midlobe, sidelobes 4.5-5.0 mm long, erect, narrow, involute at the margins; midlobe 1.5-2.0 × ca 2.0 mm, orbicular, fleshy, flat convex, warted adaxially, golden yellow. Column ca 2 mm long, short, stout, erect, with a long foot; foot 3.5-4.5 mm long, broader, parallel to and subequal with the ovary, dilated and slightly incurved at the tip, prominently 3-ridged within; anther ca 1.0 × 1.5 mm, terminal 2-celled; pollinia yellow, 8 in two groups of four each, pyriform, long-stalked with a common obscure disc. Capsules ca 11 × 3 mm, shortly pedicelled, densely pubescent, 6-ridged, green.

Types : N. R. Abbareddy 62391 (A: Holotype CAL; B - C: Isotypes ASSAM; D: Isotype MH).

Flowering : July - August. *Fruiting* : Late August - September.

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh; Sessa, Kameng District, Aug. 7, 1980, 1099 m, N. R. Abbareddy 62391 (A in CAL; B - C in ASSAM; D in MH); Kalakrang, July 22, 1980, 1200 m, S. N. Hegde 4045 (Paratype ASSAM); Khellong, 1500 m, S. N. Hegde 3168 2 (Paratype Orchid Herbarium, Tipi).

Notes : According to Joseph *et al.* (*l.c.*) : This species is allied to *E. pumila* Lindl. but can easily be distinguished by the absence of creeping rhizome; by the presence of tubular mentum formed by the connate lateral sepals, subequal to the ovary, lateral lobes of the lip being very narrow instead of lanceolate acuminate; and pollinia being long stalked.

The union of the lateral sepals more than half way along the lower margins forming a long tubular mentum sub-equalling the ovary, the narrow obscure side lobes of the lip and the long stalked pollinia at once separate it from other species of *Eria*, making it quite distinctive.

Epiphyte on main trunks of trees in evergreen subtropical main forests at 1100 m - 1500 m altitude.

Eria lohitensis A.N. Rao, Harid. & S.N. Hegde (Orchidaceae) in J. Bombay Nat. Hist. Soc. 86 (2): 229 - 231. 1989.

Epiphyte. Stems about 20 cm long and 8 mm thick, clavate. Leaves up to 6, terminal, about 15 × 2 cm, oblong-lanceolate, acuminate, shortly petioled. Inflorescences many, arising laterally from the stem at various intervals from middle on the stem to subterminus. Inflorescence 2-flowered, about 3.5 cm long. Rachis white pubescent, with two sterile bracts at short intervals. Floral bract about 8 × 4 mm shorter than the pedicellate ovary, acute. Flowers about 2 cm long, white. Dorsal sepal about 10 × 2 mm, lanceolate, acuminate, white pubescent outside, 3 - nerved. Lateral

sepals about 10×5 mm, obliquely ovate-triangular, acuminate, forming a mentum with the foot of column, white pubescent outside, 3 nerved. Petals about 8.0×1.5 mm, oblong-lanceolate, acute to acuminate, 3 -nerved. Lip about 7 mm long 3 mm broad across the lateral lobes, shorter than the sepals and petals, 3-lobed; lateral lobes 4 mm long, rounded, with 2 prominent parallel vertical lamellae inbtween on the disc; midlobe 3 mm long, oblong, acute, ciliate at margines, with a median vertial hairy ridge on the disc. Column about 2 mm long, with a long foot which is in curved at apex. Anther cap semiglobular, 4-celled. Ovary with pedicel about 1 cm long, white pubescent.

Type : *Heridasan* 2185 (Holotype, Arunachal Forest Herbarium).

Flowering : May.

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimen : INDIA : Arunachal Pradesh; Lohit District, Mailang Mithumna, 1600 m, May 11, 1985, *Haridasan* 2185 (Arunachal Forest Herbarium).

Notes : According to Rao *et al.* (*l.c.*) : *Eria lohitensis* is allied to *E. cristata* Rolfe which is reported from Burma and Thailand but can be easily distinguished from the latter by the presence of acuminate, 3 nerved sepals instead of acute, 5 nerved sepals and oblong ciliate midlobe of lip instead of broadly ovate midlobe of lip which is entire at margin.

The new species is endemic and belongs to section *cylindrolobus* Bl. of Genus *Eria* & can be distinguished from the rest of species of section by the presence of lip with ciliate midlobe.

Eria muscicola (Lindl.) Lindl. var. *brevilinguis* J. Joseph & V. Chandras. (Orchidaceae) in Bull. Bot. Surv. India 15 (3-4): 267 269. 1973 (1976); Ratha Krishnan & Chithra in J. Econ. Tax. Bot. 5: 1004. 1984.

Tiny, bulbous, creeping epiphytic orchid on branchlets of tree: Pseudobulbs moniliform, in large spreading clusters, $3 \text{ } 9 \times 2 \text{ } 6$ mm, more or less dorsiventrally compressed, ovoid to oblong, greenish yellow, glabrous with one or two mild ridges, bereft of

leaves. Fresh shoots from lower side of the bulbs, very short, ± 3.2 cm high (with the raceme), usually with two radical distichous leaves with one or more sheaths and inflorescence. Leaves $5.0 - 15.0 \times 3.0$

8.0 mm, ovate, finely scabrous, abruptly narrowed into a short conduplicate and articulated sheathing base, cuspidate at tip, many nerved; midrib prominent beneath. Inflorescence a raceme, $1.0 - 2.8$ cm high, erect, 1 - 2 flowered only; scape filiform, short, with or without a sterile bract. Flowers very conspicuous, large ($8.0 - 13.5$ mm), greenish-yellow, second, geniculate, perianth more or less spreading beyond the middle, very shortly pedicellate. Bracts $\pm 5.0 \times 2.5$ mm, lanceolate, acuminate, erect, encircling the peduncle and the pedicel, usually both fertile (rarely one sterile). Ovary short, ± 1 mm long, geniculate holding the flower at right angles to the peduncle. Sepals and lateral petals narrowly lanceolate, long acuminate at tip, 3 nerved. Dorsal sepal $7.5 - 12.0 \times 1.5 - 2.0$ mm; lateral sepals as long as or a little shorter than the dorsal, $2.5 - 3.5$ mm broad towards the base, falcately lanceolate, united with the long incurved foot of the column forming a broad saccate mentum. Lateral petals $6.0 - 9.0 \times 1.5 - 2.0$ mm, as broad as but shorter than the dorsal sepal. Lip $\pm 4 \times 2$ mm, inconspicuous, quite small compared to other perianth parts, sessile, immovably attached to the tip of the foot of the column, slightly deflexed at the middle, conduplicate, finely puberulous on the abaxial surface towards the distal half along the median sector, reflexed and slightly spreading towards the apex, ligulate when spread out, with a median oblong callus at base, closely trinerved along the median line, rounded and finely crumpled along the apical margin, more or less retuse at tip. Column very short; foot along, ± 3 mm, projecting downwards for about $1/3$ of its length and then bent forward for the rest. Pollinia 8, in 2 groups of 4 each, pyriform.

Types : *Joseph* 44630 (A: Holotype CAL- Acc. No. BSI/SC 86140; B K: Isotypes MH Acc. Nos. BSI/SC 86141 - 86150).

Flowering : October*.

Distribution : INDIA: Kerala.

Additional report : Karnataka.

Herbarium specimens : INDIA: Kerala; Trivandrum District, from

Western Slopes of Agustyamalai, 1800 m, (77° 14' 77°-15' E Long., and 8°36' 8°37' N Lat). Oct. 6, 1973, *Joseph* 44630A (CAL- BSI/ SC Acc. No. 86140); *ibid.*, *Joseph* 44630 B-K (MH BSI/SC Acc. Nos. 86141 86150).

Notes : According to Joseph & Chandrasekaran (*l.c.*): *Eria muscicola* (Lindl.) Lindl. var. *brevilinguis* Joseph et Chandrasekaran is allied to *E. muscicola* (Lindl.) Lindl. var. *oblonga* Trim. reported from Central Province, Ceylon from which it differs, mainly in the lip being ligulate and sessile instead of ovate-lanceolate and clawed towards base, and in having a median callus at its base instead of none.

Thwaites collection (*Thwaites C. P. 2355*) from Central Province, Ceylon in the Madras Herbarium (under Acc. no. 62022) and referred to by Thwaites (1861) King & Pantling (1898) and Henry Trimen (1898) has been studied by (Joseph & Chandrasekaran). The flowers are 2 or more per raceme, and smaller \pm 5.5 mm long than present variety. Lip \pm 4.0 \times 1.5 mm, lanceolate, narrowed into a stalk, acute and reflexed at tip, margins wavy and without a callus at the base but trinerved along the median ling.

The *en masse* flowering of these tiny plants with their upright racemes of greenish-yellow flowers, almost concealing the rest of the plant body is an eye-catching and attractive sight.

Eria muscicola (Lindl.) Lindl. var. *Ponmudiana* M. Mohanan & A.N. Henry (Orchidaceae) in J. Econ. Tax. Bot. 8 (2): 425.(1986).

Tiny epiphytic herbs, 2.2 2.3 cm tall; pseudobulbs 2 3 diam., crowded, ovoid, compressed with many ridges. Leaves 8 15 \times 2 3 mm, usually 2, with one or more sheaths beneath, elliptic or oblanceolate, scabrous on both surfaces, acute at apex with a mucro, narrowed to a short sheathing petiole; midrib prominent beneath. Racemes 1.5 2.6 cm long, erect, mostly 2 flowered (rarely 1); scapes filiform. Flowers up to 7 mm long, white, subsessile; bracts c 2.5 mm long, ovate, acuminate at apex, glabrous. Dorsal sepals 5 6.5 \times 1.5 1.8 mm, narrowly lanceolate, acuminate at apex, glabrous;

lateral sepals as the dorsal, broader at base. Petals $5 \times 1 \times 1.5$ mm, lanceolate, acuminate at apex. Lip $3.4 \times 1 \times 1.1$ mm, sessile or shortly clawed, attached to the foot dilated in the middle, puberulous beneath, retuse at apex with a median callus. Column short, up to 1 mm long; foot c 2.5 mm long; mentum saccate. Pollinia 8 in 2 groups of 4 each.

Types : M. Mohanan 69213 (Holotype CAL; Isotypes MH - Acc. Nos. 136394 136395).

Flowering : June August.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Trivandrum District, Ponmudi, \pm 900 m, Aug. 16, 1980, M. Mohanan 69213 (CAL, MH-Acc. Nos. 136394 136395).

Notes : According to Mohanan & Henry (*l.c.*): This rare orchid grows on moist tree trunks and rocks of the Sholas near lower Sanitorium, Ponmudi.

This new variety is allied to *Eria muscicola* (Lindl.) Lindl. var *brevilinguis* Joseph & Chandras but differs in having pseudobulbs small 2-3 diam., scabrous, with many ridges; tiny herbs; leaves oblanceolate with short petiole; flowers white, small.

Eria tiagii Manilal, C.S. Kumar & Wood (Orchidaceae) in J. Econ. Tax. Bot. 5 (2): 483-486. 1984.

Small, epiphytic pseudobulbous herb; pseudobulbs compressed and usually connected end to end by slender, thread-like rhizomes, often sheathed. Leaves 2-3, sessile, oblanceolate, $2 \times 4 \times 0.1 \times 0.4$ cm, apiculate, mid vein prominent beneath, others inconspicuous. Inflorescence terminal on the leafy pseudobulb, flexuous. Scape \pm 3.5 cm long. Bracts small, ovate lanceolate, smaller than pedicels. Flowers white; dorsal sepal linear-lanceolate, acuminate, 3 veined, laterals 3 veined, connate below, forming together with foot of the column, a saccate mentum. Petals linear-acuminate, 3 veined. Lip clawed at base, shorter than sepals, disc with 2 slightly linear calli at base, margin of the basal region entire, distal and crenulate (epichile fimbriate). Pollinia 8.

Types : Sathish Kumar SV 10736 (Holotype CALI, Isotype K).

Flowering : Time not mentioned.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA : Kerala ; Silent Valley Forests, Palghat District, Sathish Kumar SV 10736 (CALI, K).

Notes : According to Manilal *et al* (*l. c.*): The genus *Eria* Lindl. consists of about 650 species of epiphytic herbs, distributed throughout the east (Jayaweera, 1981). About 11 species occur in South India (Hooker, 1885; Santapau & Kapadia, 1966; Joseph, 1982).

E. muscicola var. *brevilinguis* Jos. et Chandr. is reported (Joseph and Chandrasekaran, 1973) to differ from var. *oblonga* Trim. in that while in the latter the lip is without a median callus, is ovate-lanceolate and clawed towards the base, the former has a lip that is ligulate and sessile and with a median callus at the base. The present species has some affinity with *E. muscicola* var. *brevilinguis*. It is also related with *E. dalzelli* Lindl. (syn. *Dendrobium filiforme* Wight), which although a very variable plant (Hooker, 1885) is quite different from the former (Wight, 1963).

The comparative study of the taxonomic characters of the 3 plants shows that var. *brevilinguis* is characterised by: leaves ovate, finely scabrous, abruptly narrowed into a short conduplicate and articulated sheathing base, conduplicate at tip ; leaf sheaths one or more, not peculiar; inflorescences 1-2 flowered, erect, flowers greenish yellow, secund; floral bracts lanceolate, acuminate, encircling the peduncle and peduncle and pedicel; petals and sepals narrowly lanceolate, long, acuminate at apex, entire on the margin; lip sessile, puberulous on the abaxial surface towards the distal half along the median sector, with a median callus at base, more or less retuse at tip. Whereas in species *E. dalzelli*, leaves are linear-obovate or obovate, narrowed into a short, articulated sheathing base, mucronate at apex; leaf sheaths 3-4, wavy at margin, acute or mucronate, at apex, smooth outside; inflorescences many flowered, erect, flowers pale creamy yellow, generally secund or subsecund; floral bracts broad at base, lanceolate, acuminate, curved at apex, much longer than the ovary pedicel; petals and sepals triangular-acute to lanceolate

acute or subacute, fringed on the margin with gland tipped, translucent hairs; lip clawed, not puberulous, callosities altogether absent, mucronate or pointed at apex ; In contrast, *E. tagii* is characterised by: leaves oblanceolate, not scabrous, gradually narrowed into a conduplicate, nonarticulate sheathing base, apiculate at apex, leaf sheaths 3-4, shortly pectinate and crumpled at margin, (apiculate at apex), papillate outside; inflorescences 6-11 flowered, flexuous, flowers pure white, not secund but zigzag; floral bracts ovate lanceolate embracing the pedicel alone, shorter than the ovary; petals and sepals linear-lanceolate, acuminate at apex, margin without hairs; lip clawed, underneath towards distal half with short fleshy hairs, obtus at apex.

The species is named after Prof. Y. D. Tiagi of the University of Udaipur, Rajasthan, India.

***Eriocaulon nairii* Chandrab. & Chandras. (Eriocaulaceae) in J. Bombay Nat. Hist. Soc. 79 (1): 165-167. 1982.**

Herbs up to 30 cm tall; stems 10-30 cm long, densely covered with leafy sheaths, branched at apex. Leaves 2-5 × 0.4-1 cm, many, dense, in spirals, along the upper part of the stems, lanceolate or ensiform, glabrous except at sheathing base, acute or acuminate at apex, 18-25 nerved. Peduncles 1-3, 10-18 cm long, 5-ribbed, glabrous; sheaths up to 5 cm long, oblique at the mouth, glabrous. Heads 1-1.3 × 0.6-0.8 cm, depressed globose, androgynous; involucre bracts ± 4 × 2 mm, black, obovate, concave, rounded at apex, erose when old, glabrous, receptacle ovoid, plano-convex, villous with long hairs. Male flowers: calyx segments 3, one free ± 2 × 1.2 mm, the other two connate into a lobed sheath ± 2 × 1.7 mm, obovate, sub-obtuse or subacute, serrulate at apex, papillose hairy near the tip. Corolla tube ± 1 mm long, obconical, glabrous; petals 3, white, unequal, one larger than the other two, larger petal ± 5.5 × 0.5 mm, smaller ones ± 1 × 0.3 mm, linear-oblanceolate, acute, with a black gland near the tip, densely pilose with long white hairs. Stamens 6, filaments subulate ± 1.2 mm long; anther ± 0.5 mm, black. Abortive ovary black, 3-lobed. Floral bract ± 3.5 × 1.2 mm

oblanceolate, concave, acuminate with a pointed tip, papillose without, pilose hairy from the base, 1-nerved. Pedicels ± 1.2 mm long. Female flowers: Sepals 3, each $1.8 - 2.2 \times 1 - 1.2$ mm, black, free, subequal, obovate, subobtuse, pilose along the margins and at base. Petals 3, white, each $2.5 - 3.5 \times 0.3 - 0.5$ mm, one little longer than the other two, linear-oblanceolate, acute with a black gland near the tip, densely pilose with long white hairs. Ovary $\pm 0.6 \times 0.5$ mm, yellow, suborbicular, 3-lobed glabrous, 3-loculed, 1 ovule in each locule; style $0.5 - 0.7$ mm long, filiform, 3-fid, stylar branches $1.5 - 1.8$ mm long. Floral bract $\pm 4.5 \times 2.5$ mm orbicular obovate, concave, acuminate with a pointed tip, serrulate at apex sparsely hairy without. Pedicels ± 0.7 mm long. Capsules $\pm 0.7 \times 1.1$ mm, depressed globose, 3-lobed, glabrous, 3-seeded; seeds $\pm 0.6 \times 0.5$ mm, yellow, ovoid, obscurely striate.

Types : Chandrabose 65821 (Holotype CAL; Isotypes MH Acc. Nos. 108772 - 108778).

Flowering & Fruiting : February*.

Distribution : INDIA : Tamil Nadu.

Herbarium specimens : INDIA : Tamil Nadu; Coimbatore District, Anamalai, Konalar, Feb. 16, 1980, Chandrabose 65821 (CAL & MH Acc. Nos. 108772 - 108778).

Notes : According to Chandrabose & Chandrasekaran (*l.c.*): Allied to *Ericaulon longicuspis* Hook. f., but differs in having stems elongate up to 30 cm long; peduncles 1 - 3, 5-ribbed, sheaths shorter than the leaves; two calyx segments of male flowers connate and the other one free; sepals of female flowers broadly obovate; and seeds with horizontal striations.

The species grows in tufts on grassy slopes especially in wet places at an altitude of about 1900 m.

This species is named in honour of Dr. N. Chandrasekharan Nair, Ex-Joint Director, Botanical Survey of India.

Ermania kachrooi Dar & Naqshi (Brassicaceae) in J. Bombay Nat. Hist. Soc. 87 (2): 277 - 278. 1990.

Perennial, 8–15 cm tall, ascending suberect, totally glabrous herbs, branched from above the base. Basal rosette of radical leaves absent. Lower cauline leaves subfleshy, spatulate, 8–16 mm long, 3–8 mm broad, narrowed below into stalk-like lower half sheathing at base, (3–4) 5-many toothed in the apical half; upper cauline leaves oblanceolate to linear, small, entire. Racemes 10–18 flowered, bracteate below, 5–6 cm long in fruit. Flowers 4–5 mm wide. Pedicels 4–5 mm long, ascending, unilateral. Sepals subequal, 2.5–3 mm long, elliptic or obovate oblong, the lateral pair often purplish, saccate at base. Petals light pink, 4–5 × 1.5–2 mm, spatulate, submarginate or somewhat entire. Stamens 2:3 mm long. Ovary subcylindric oblong, many-ovuled; stigma, sessile, capitate, usually depressed or subretuse. Siliquae subcylindric when young, linear-oblong when mature, compressed, up to 36 mm long, 1.5–2 mm broad; valves glabrous, mid vein often obscure; septum complete, veinless. Seeds many, uniseriate, obovoid elliptic, 1–1.5 × 1 mm, brown, nonmucilaginous when wet; radicle accumbent.

Types : G. H. Dar 3934 (Holotype KASH; Isotype KASH).

Flowering & Fruiting : September (CD.)

Distribution : INDIA : Kashmir.

Herbarium specimens : INDIA: Kashmir; Baltal, Sonamargh (Sind Valley), 3200 m, Sept. 2, 1982, G. H. Dar 3934 (KASH).

Notes : According to Dar & Naqshi (*l.c.*) : *Ermania kachrooi* differs from *E. stewartii*, *E. kashmiriana* and *E. himalayensis* by the absence of basal rosette of radical leaves and presence of lower cauline leaves which are narrowed into stalk-like lower half, and (3–4) 5-many toothed in the apical half. It can readily be separated from *E. stewartii* and *E. kashmiriana* by its totally glabrous surface. However, it resembles glabrous forms of *E. himalayensis* but can be differentiated by the presence of usually 5-many toothed, nonrosulate lower cauline leaves, shorter fruiting racemes, pedicels, and stamens, mostly obscure midvein on the valves.

On rocky slopes.

Ermania kashmiriana Dar & Naqshi (Brassicaceae) in J. Bombay Nat. Hist. Soc. 87 (2) 274–277. 1990.

Perennial, 3-10 (-15) cm tall, decumbent to suberect herbs, much branched from the base, leafy throughout, pilose with white hairs except the siliquae. Radical leaves subfleshy, thickish, densely rosulate, spatulate-obovate, 1-2 cm long, 3-10 mm broad, 3-5 toothed towards the apex or \pm entire, pilose. Cauline leaves oblanceolate to linear, entire, smaller, usually functioning as bracts, pilose. Racemes dense, many flowered, bracteate, up to 10 cm long in fruit. Flowers 4-6 mm in dia. Pedicels up to 7 mm long in fruit, ascending, turning to one side at maturity, pilose. Sepals subequal, 2-3 mm long, oblong-elliptic or obovate-elliptic, pilose, the lateral two often purplish, saccate at base. Petals purple, sometimes turning white when dry, 5-7 \times 1.5-2.5 (-3) mm, spatulate, subemarginate to \pm entire. Stamens tetradynamous, 3 : 4 mm long. Ovary sub cylindrical-oblong, many ovuled; stigma sessile, capitate, usually depressed and subretuse. Siliquae subcylindric when young, linear-oblong when mature, compressed, up to 42 mm long, 2 mm broad; valves glabrous, midvein usually less distinct; septum complete, veinless. Seeds many, uniseriate, obovoid-elliptic, 1.5-1.7 \times 1 mm, brown, non-mucilaginous when wet; radicle accumbent.

Types : G. H. Dar 7786 (Holotype KASH).

Flowering & Fruiting : August*.

Distribution : INDIA: Kashmir.

Herbarium specimens : INDIA: Kashmir; Shalimar, Sonamargh (Sind valley), 3900 m, rocky slopes along the alpine meadows, Aug. 20, 1983, G. H. Dar 7786 (KASH); Pranshur, Sonamargh (Sind valley), 4000 m, rocky slopes along mountains top with fruit lying flat on sand, Aug. 26, 1983, G. H. Dar 8296 (Paratype KASH); Nilnai, Sonamargh (Sind valley), 4100 m, on sandy slope at mountain top, Aug. 26, 1983, G. H. Dar 8301 (Paratype KASH).

Notes : According to Dar & Naqshi (*l. c.*) : *Ermania kashmiriana* resembles *E. stewartii* (T. Anderson) O. Schulz and *E. himalayensis* (Cambess.) O. Schulz in habit but differs from the former by its dense, many flowered racemes up to 10 cm long in fruit, longer (3-4 mm) stamens and narrower (2 m wide) siliquae. It can be distinguished from the latter by its radical leaves ranging from

3 10 mm in width and 10 20 mm in length, shorter fruiting pedicels (up to 7 mm), longer stamens (up to 4 mm), longer siliquae (up to 42 mm) which are glabrous and do not exceed 2 mm in width and usually lack a prominent midvein on their valves. From the glabrous forms of *E. himalayensis* it can be easily distinguished by its pilose surface in almost all the parts except siliquae.

***Eulaliopsis duthiei* Sur** (Poaceae) in J. Bombay Nat. Hist. Soc. 72 (3): 815 817. 1975 (1976).

Herb-Perennial. Culms: simple; tufted; woolly at the base, 30 33 cm × 1 mm erect, unbranched, glabrous; 4 5 noded. Leaves: 4 15 cm × 1 1.5 mm; tapering into a sub-pungent acumen; concave; base obtuse; fimbriate; sheath glabrous, ligule of short hairs. Racemes: 2; terminal; slender, sessile spikelet; 4 - 4.5 mm long, callus hairy. Lower involucral glume: 3.5 mm × 1 mm; elliptic oblong; chartaceous; 2 3 toothed; 5-nerved; lower part of the glume ciliate with long hairs. Upper involucral glume: 4.5 mm × 1.3 mm; membranous ovate lanceolate 2-dentate; 3 5 nerved; awn very short, subterminal, 0.7 mm long, lower floral glume: empty; 3 mm × 1.5 mm; oblong; obtuse; irregularly 2 dentate; hyaline; one nerve at the middle. Palea 0. Upper floral glume; Hermaphrodite: 3.5 mm × 1 mm; linear; hyaline; 2 dentate; awned. Awn: 6 8 mm long. Palea: 1.5 mm long; densely ciliate at the top. Stamens: 2. Anther 2.5 mm long; filament very short. Ovary: oblong. Style: long. Stigma 2.

Type : J. F. Duthie 14 (Holotype CAL).

Flowering : June*.

Distribution : INDIA : Uttar Pradesh.

Herbarium specimen : INDIA: Uttar Pradesh; Ganga Valley (Tehri Garhwal), June 11, 1883, J. F. Duthie 14 (CAL).

Notes : According to Sur (*l.c.*) : This species differs from *Eulaliopsis binata* (Retz.) Hubbard in the simple culms, shorter leaves; shorter sessile spikelet; shorter awn of upper glume; shorter awn of upper lemma and sterile lower floret. The differentiating

characters of the 3 species are: culms branched, leaves 30-60 cm × 6.5-7.5 mm; sessile spikelet 3.5 mm long; awn of upper glume 1-1.5 mm long; awn of upper lemma 3-4.5 mm long in *E. binata*; but culms are simple; leaves 15-20 cm × 2 mm, sessile spikelets 5 mm long; awn of upper glume 8-8.5 mm long, awn of upper lemma 18-20 mm long in *E. sykesii*; whereas culms simple but leaves 7-14 cm × 1.5 mm; sessile spikelets 4-4.5 mm long; awn of upper glume 0.7 mm long; awn of upper lemma 6-8 long in *E. duthiei*.

Eulophia nicobarica N.P. Balakr. & N. G. Nair (Orchidaceae) in Bull. Bot. Surv. India (15 (3-4): 271-273. 1973 (1976).

Perennial terrestrial herbs; pseudobulbs tuberous, partly above the ground, oblong-ellipsoid, 2.0-3.5 cm long, 1.5-2.5 cm broad. Leaves 3-4, sheathing at base, linear-lanceolate to elliptic-lanceolate, acute at apex, entire, 20-65 cm long, 2-4 cm broad, glabrous; main nerves 5-7. Scape erect, appearing with the leaves, lateral from the pseudobulbs, 30-45 cm long; sheaths 3-5, 6-8 × 1-1.5 cm, thin scarious, covering the scape; racemes 13-16 cm long; bracts lanceolate, acuminate, 2-5 cm long, 3-8 mm broad, many nerved, scarious, almost as long as the flowers. Flowers 12-15, densely arranged, opening centripetally, ± 3 cm across; ovary with pedicel 1.5-2.5 cm long, ± 2 mm thick, green glabrous. Sepals oblong-ob lanceolate, apiculate, greenish brown with a green band on midrib outside, yellowish at margins, purplish brown inside; middle sepal 18-22 mm long, 8-12 mm broad, 10-12 nerved; lateral sepals 20-24 mm long, 10-13 mm broad. Petals obovate, rounded and wavy at apex, 1.0-1.4 cm long, 0.8-1.0 cm broad, yellow. Lip attached to base of column, oblong to elliptic-oblong in outline, crisped at margins of midlobe, 20-22 mm long, 10-12 mm broad, many nerved, yellow with purple streaks on disc; middlelobe recurved, crested with many yellow elongated tubercles on disc; lateral lobes erect, not prominent; spur ovoid, obtuse, slightly curved, ± 5 mm long, ± 2 mm broad. Column elliptic-obovate, winged at lateral margins, apiculate at apex, incurved, ± 10 mm long, ± 7 mm broad, yellow with purple streaks near rostellum; operculum ± 3 mm across, purplish spotted with 2 blunt horns at

apex; pollinia 2, transversely ovoid, grooved at base, \pm 2 mm long, waxy; stipe \pm 1 mm long; disc elliptic, \pm 2 mm long viscid, white.

Types : N. G. Nair 1647 (A: Holotype CAL; B-F: Isotypes PBL).

Flowering : June July.

Distribution : INDIA : Car Nicobar Island.

Herbarium specimens : INDIA: Car Nicobar; Near Passa, June 15, 1974, N. G. Nair 1647 (A in CAL; B-F in PBL).

Notes : According to Balakr. & Nair (*l.c.*) : *Eulophia nicobarica* Balakr. & N. G. Nair, sp. nov. (sect. *Eulophia*) Allied to *Eulophia squalida* Lindl. and *E. elata* HK. f., but differs in bracts being as long as the flowers, 2-5 cm long; sepals larger, oblanceolate, obtuse, apiculate, many-nerved; petals yellow, obovate, obtuse; lip yellow with purple streaks on disc, many nerved and with many yellow elongate tubercles on disc. Fairly Common in moist shaded places with sandy loam and a fair percentage of clay.

***Euodia lunu-ankenda* (Gaertn.) Merrill var. *tirunelvelica* A.N. Henry & Chandrab. (Rutaceae) in Bull. Bot. Surv. India 15 (1 & 2): 144-145. 1973 (1976).**

Tree, 5-7 m tall; branches yellowish; scarred, glabrous. Leaves 3-foliolate, oppsite, crowded towards ends of branches; petioles 2.5-5.8 cm long, glabrous. Leaflets 4.7-8 \times 1.5-3 cm, elliptic-lanceolate or oblanceolate, membranous, glabrous, entire, acuminate at apex, cuneate and somewhat unequal sided at base. Flowers 3-4 mm across, white, unisexual, in axillary, slender, sparse, spreading, glabrous, braceate, paniculate cymes; pedicels 1.5-3 mm long; sepals 4, imbricate; petals 4, valvate or slightly imbricate; disk 4-lobed, pubescent. Male flowers: stamens 4, inserted at base of disk; filaments subulate, glabrous; anthers oblong; pistillode present. Female flowers: Ovary pubescent, deeply 4-lobed, ovules 2 in each locule; style basilar, thick; stigma obsoletely 4-lobed; staminodes 4, with small barren anthers. Fruit unknown.

Types : Henry & Chandrabose 19224 (A: Holotype CAL; B-F: Isotypes MH).

Flowering : May July*.

Distribution : INDIA : Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Tirunelveli District, Agastyamalai, July 2, 1964, *Henry & Chandrabose* 19224 (A: CAL; B-F : MH); May 22, 1901, *Barber* 2934 (Paratype MH).

Notes : According to Henry & Chandr. (*l.c.*) : This new variety differs from the typical variety in having small, membranous leaves crowded towards the ends of branches, and flowers in slender, sparse, spreading, glabrous, paniculate cymes.

A rare plant; only few trees were observed on exposed rocky slopes and along the outskirts of evergreen forests at the top of Agastyamalai hills. In 1915, J. S. Gamble while examining *Barber* 2934, indicated on the herbarium sheet that it belonged to a variety of *Euodia lunuankenda* but left it undescribed.

***Euphorbia katrajensis* Gage var. *kasaragodensis* V.J. Nair, M.S. Binoj Kumar & R. Ansari (Euphorbiaceae) in *J. Econ. Tax. Bot.* 14(2): 471. 1990.**

Herbs, erect, up to 10 cm high; stems unbranched or rarely branched from the base, terete, filiform, glabrous; internodes 0.5–2 cm long, nodes annular. Leaves opposite, linear-oblong to linear-lanceolate, oblique at base, entire or distantly serrate acute-apiculate at apex, 10–20 × 1–2 mm, sparsely hairy; petioles ca 1 mm long, glabrous; stipules oblong, fimbriate; ca 0.5 mm in diam. Cyathia solitary, axillary, or apparently terminal; peduncle ca 2 mm long; involucre turbinate, ca 1 mm in diam., glabrous outside, puberulous inside; involucre lobes 4, triangular laciniate, ca 1 mm long, hairy; glands 4, transversely oblong, slightly concave; limb of glands ca 1.5 mm long ca 2.5 mm wide, entire on lateral margins, sparsely undulate on distal margins. Male florets: Many; pedicel ca 1 mm long; filament articulate over the pedicel; anther subglobose, transversely dehiscent; bracteoles filiform, ca 1.5 mm long; peripheral bracteoles laciniate, hairy, ca 1 mm long. Female florets : Gynophore ca 2 mm long; ovary ca 2 mm in diam., glabrous; styles 3, each

bifid; stigma capitate. Capsules ca 3 mm in diam., obtusely keeled, glabrous. Seeds obtusely quadrangular, ca 1×0.75 mm, smooth.

Types : *R. Ansari* 74431 (Holotype CAL; Isotype MH).

Flowering & Fruiting : September - October*.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala ; Cannanore District, Bela, Oct. 1, 1982, *R. Ansari* 74431 (CAL, MH); Bela, Kasaragod District, Sept. 30, 1989, *M. S. Binoj Kumar* 85075 (Paratype MH).

Notes : According to Nair *et al.* (*l.c.*) : Differs from *Euphorbia katrajensis* Gage var. *Katrajensis* by the smaller size of the plant, acute apiculate apex of the leaves, with broader, up to 2.5 mm wide limb of glands and by the oblong fimbriate stipules.

Sparse, in lateritic rocky open areas.

The original Cannanore district was subsequently divided into two districts namely Cannanore and Kasaragod. The type locality of this taxon falls under Kasaragod Dist. and the new variety is named after it.

Euphorbia santapau A.N. Henry (Euphorbiaceae) in Bull. Bot. Surv. India 6 (2-4): 329-330. 1964 (1965).

Fleshy, glabrous shrubs or trees with milky juice, 1.5-8 m tall; branches numerous, curving upwards, jointed, 5-9-winged; wings thin, lobulate with one pair or short, sharp, divaricate stipular spines on each lobe. Leaves 3-4 mm long, as broad as long, subsessile, fleshy, broadly ovate or suborbicular, entire, glabrous, apiculate at apex, obtuse at base, soon deciduous. Cyathia 4-9 mm across, greenish-yellow, single (not in triads), a little above the axils of stipular spines, more towards the apices of branches, each supported by two opposite, broadly triangular, obtuse, thick, pinkish bracts; peduncles 2-4 mm long, stout, fleshy. Lobes of the involucre 5-8, each ± 2 mm across, cucullate, irregularly toothed. Glands 5-8, transversely oblong, fleshy, spongily pitted above. Male flowers many, in 5-8 fascicles (only before anthesis the fascicles are easily

recognisable); stamens quite enveloped in the very broad sheathing somewhat lacerate bracteoles; filaments thick, glabrous, jointed above the middle; anthers yellow, erect, 2-celled; the cells subglobose, opening longitudinally. Female flowers shortly pedicellate; perianth lobes 3, minute, triangular, subacute; ovary trigonous; pinkish; styles 3, connate to the middle, above that free; stigmas bilobed, papillose. Capsules 7-10 mm across, trigonous, plano-convex in the longitudinal aspect, separating into 3 bivalved, 1-seeded cocci, from a persistent axis; cocci laterally compressed, smooth, glabrous; seeds \pm 3 mm across, almost spherical, smooth, glabrous, brownish, the raphe yellowish-brown.

Types : Henry 17353 (A: Holotype CAL; B-F: Isotypes MH).

Flowering & Fruiting : May - August*.

Distribution : INDIA: Tamil Nadu (Madras).

Herbarium specimens : INDIA: Tamil Nadu; Agastyamalai Hills, Trinunelveli District., 1650 m, Aug. 27, 1963, Henry 17353 (A: CAL; B-F: MH); *ibid.*, May 27, 1963, Henry 16349 A-F (Paratypes MH).

Notes : According to Henry (*l. c.*) : Allied to *E. antiquorum* Linn., but differs by the branches 5-9-winged, cyathia single (not in triads), in condensed peduncles, lobes of the involucre 5-8, and stamens quite enveloped in the very broad sheathing bracteoles.

The specific name is given in honour of Rev. Dr. H. Santapau, S. J., F. N. I., Ex-Director, Botanical Survey of India, Calcutta, for his significant contributions to the taxonomy of Indian plants.

Eurya arunachalensis G.S. Giri, G.D. Pal & T.K. Pal (Theaceae)
in J. Bombay Nat. Hist. Soc. 87 (2): 282. 1990.

Shrubs, 3-4 m high; young stems and branches striate, hirsute with ferruginous hairs, become glabrescent at maturity. Leaves alternate, elliptic or oblong-lanceolate, 2.5-4.5 \times 1.0-2.0 cm; apex acute or shortly acuminate; base acute; margin serrate towards the apex, lower half subentire to entire, slightly revolute at maturity; coriaceous, both surfaces glabrous, shiny, become dull green to yellowish brown on drying; veins 7-10 on either side of midvein,

arcuate, midvein and lateral veins prominently depressed above, raised underneath, midvein with a few simple ferruginous hairs towards the base; petioles strong, canaliculate, 1-2 mm long with a few simple ferruginous hairs.

Flowers axillary, solitary or two together, sometimes from the axils of fallen leaves, dioecious, fragrant; pedicels 1.0-1.5 mm long, glabrous; bracts broadly triangular or suborbicular with obtuse to rounded apex, 1.0-1.5 × 1.0 mm, glabrous; bracteoles 2, adpressed at the base of sepals, broadly triangular to ovate acute, 1.0-1.5 × 1.0 mm, glabrous, persistent. Floral disc pilose. Sepals 5, free, oblong-orbicular, 2.0 × 1.5 mm, apex obtuse, rounded or rarely mucronate, fleshy, deeply concave, margin membranous, finely ciliate or fringed, glabrous without, golden-brown adpressed hairy within. Corolla 5-lobed, connate below the middle, fleshy, glabrous, white; tube c 0.75 mm long; lobes, broadly ovate, 2.0-3.0 × 1.75-2.0 mm, apex obtuse, margin entire. Stamens 5, free; filaments ribbon-like, 1.5-1.75 mm long, glabrous; anthers oblong, 0.75-1.0 mm long, dorsifixed, longitudinally dehiscent. Ovary subglobose, c 1 mm long, bilobed, bilocular; styles 2, connate below the middle, upper free part slightly reflexed, glabrous; stigma simple. Fruit unknown.

Type : A. R. K. Sastry 42065 (Holotype CAL).

Flowering : March-May.

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Saling vicinity about 32 km. S. E. of Hapoli, Subansiri F. D., Apr. 18, 1965, A. R. K. Sastry 42065 (CAL); Pariea, Kameng F. D., 2781 m., Apr. 2, 1957, G. Panigrahi 6375 (3 specimens, CAL).

Notes : According to Giri *et al.* (*l.c.*) : *Eurya arunachalensis* is allied to *Eurya nitida* Korth. but differs in having hirsute branchlets, leaves with depressed veins above, floral disc hairy, stamens 5 and ovary with 2 styles; whereas the latter species has branchlets glabrous, veins on the upper surface of leaves not depressed, floral disc glabrous, stamens 15 and ovary with 3 styles.

Evrardia asraoa J. Joseph & Abbar. (Orchidaceae) in Bull. Bot. Surv. India 25(1-4): 232-234. 1983 (1985).

Leafless, fleshy decumbent deep brick-red dwarf saprophytes. Creeping rhizome slender, fleshy, horizontal, white, producing fleshy dwarf spreading branches; dwarf branches white, corolloid, with scales at nodes concealing tiny accessory buds and with scattered shortly hairy warts. Inflorescence an erect spike of 5-7 flowers. Scape 6-10 cm, with many sheathing scales, brick-red; scales about 7, tubular at base and oblique at mouth, distant. Flowers few, lax, brick-red, fleshy, sessile, non-resupinate. Floral bracts ca 15 × 7 mm, as long as or longer than the ovary, ovate-lanceolate, obtuse to acute, erect, concave, enveloping the ovary, with a distinct median nerve and two faint laterals, sparsely papillose externally. Odd sepal ca 7.5 × 4.0 mm, ovate, obtuse, incurved at tip, concave, 1-nerved, papillose externally more so towards the base. Lateral sepals ca 11.5 × 4.0 mm, longer than the odd sepal, oblong-lanceolate, obtuse, with a distinct midnerve and two faint laterals, papillose externally more so towards the base. Lateral petals ca 10 mm long and ca. 3 mm broad towards the base and much narrower above, obtuse, 1-nerved. Lip ca 14 × 13 mm, superior, T-shaped, saccate at base and notched at apex; epichile 2-winged; wings irregularly crumpled at margins, finely papillose, orange-yellow; outer margins running down to the base of the mesochile as two erect lamellae leaving a channel in between; mesochile unequally and obscurely many fringed, papillose; sac ca 3 mm in diameter, subglobose, be-gibbous, with two glands one on each side of the sac and a distinct vertical median ridge. Column ca 5.0 × 2.5 mm, short, with a narrow neck and a swollen head; anther dorsal, elongate, 2-celled; anther cap broadly lanceolate, with long narrow beak, auricular at base and hinged to the column with a short stalk, persistent; stalk broad at base and narrow above; pollinia narrowly clavate in two groups, sectile, united at the pseudocaudicular region ending in a membranous discoid viscidium; rostellar process simple, shorter than the anther beak, grooved abaxially, porrect; stigmatic surface conspicuous, large, semi-circular, almost exceeding the sides of the column and filling up the space between the rostellar process above and stigmatic processes below; stigmatic processes 2, flat, oblong, slightly diverging, a little thick, vertical with revolute margins. Ovary ca 14 × 4 mm, oblong, with a short neck, finely puberulous, swollen.

Types : Joseph 73566 (A: Holotype CAL; B-D: Isotypes ASSAM; E: Isotype MH).

Flowering : August September.

Distribution : INDIA : Meghalaya.

Herbarium specimens : INDIA: Meghalaya; Khasi hills, Pynursla ca 1500 m, Aug. 26, 1980, Joseph 73566 (A in CAL, B-D in ASSAM & E in MH).

Notes : According to Joseph & Abbareddy (*l. c.*) : *Eurardia asraoa* Joseph et Abbareddy, is closely allied to *E. poilanei* Gagnep., but distinctive mainly in the absence of elongate terminal lobules for the epichile wings, in the presence of deeply irregular crose mesochile flangs instead of irregularly dented, in the presence of simple rostellar process instead of forked.

Eurardia asraoa Joseph et Abbareddy also resembles *Hetaeria inverta* (W. W. Sm.) Schlu. (*Zeuxine inverta* W. W. Sm.) in the habit but differs in having flowers nonresupinate, stigma single, large, transverse and ovary papillose hairy. In the later species : Flowers are resupinate: stigma, two, small, lateral and ovary glabrous.

The allied species *Eurardia poilanei* Gagnep., is hitherto known only from Vietnam, the type locality, and Thailand. Our species is quite scarce, and its discovery forms an addition to the orchid flora of India and also extends the distribution range of the genus. With further exploration and dilligent search in likely habitats, this species may be found in other areas of Meghalaya and elsewhere.

The genus *Eurardia* Gagnep., was described on the basis of two collections of *Eurard* and *Poilane* from Vietnam with *E. poilanei* as the type species. It was subsequently discovered in Thailand also. A Saprophyte collected in Pynursla has proved to belong to this genus but a distinct species, which is now described.

Eurardia Gagnep., is closely allied to *Anoectochilus* Bl. in habit, haibitat and in the general morphology of flowers, but is distinctive in being aphyllous, flowers being nonresupinate and in the nonformation of hood by the adherence of odd sepal with the lateral petals.

Rare, in shady forest floor near boulders.

The specific epithet is in honour of Dr. A. S. Rao, who has made intensive collection and critical study of orchids of Khasi Hills.

Festuca nandadevica Hajra (Poaceae) in Ind. J. For. 6 (1): 79-80, 1983.

30-70 cm high herb; culm smooth; nodes 2-3, glabrous dark-coloured. Leaf blade hairy, linear lanceolate, finely acuminate involute or flat, 1.5-3.0 mm broad, 3-18 cm long, with minute auricles, margins scaberulous; ligule lacerated, ca 2 mm long. Panicle 25-30 cm long, lax nodding; rachis scabrid; branches binate, 4-9 cm long. Spikelets 1-3 flowered, green hairy, 8-12 mm long; rachilla scabrid. Glumes subequal, lanceolate-acuminate, scaberulous, 3-4 mm long, 1-nerved. Lemma ovate-lanceolate, 7-8 mm long, scaberulous, faintly 5-nerved, terminally awned; awn slender, erect or reflexed, 10-15 mm long, minutely scabrid. Palea linear-oblong, 7-8 mm long, scaberulous, faintly 2-nerved, 2-toothed. Anthers 3, 1.5-2.0 mm long. Ovary 2.5-5.0 mm long, minutely hispidulous at tip.

Types : P. K. Hajra 73285 (A: Holotype; B: Isotype BSD).

Flowering & Fruiting : August-September.

Distribution : INDIA: Uttar Pradesh.

Herbarium specimens : INDIA: Uttar Pradesh ; Chamoli District, Nandadevi National Park, Deodi to Ramani, P. K. Hajra 73285 (A in CAL & B in BSD); *ibid.*, P. K. Hajra 73380 A-C (Paratypes BSD).

Notes : According to Hajra (*l.c.*) : Allied to *F. leptopogon* Stapf but differs in its leaf blades being up to 3 mm broad; presence of minute auricles at leaf base; lemma scaberulous with entire tip.

The plants are found in shady places in Rhododendron-Betula forests, scattered at an altitude of 3500-3550 m.

Firmiana colorata (Roxb.) R. Br. var. *subglabra* V. Abraham & Dutt (Sterculiaceae) in Indian Forester 107 (6): 364-366, 1981.

Tree 4-5 m tall; branches many, spreading; leaves crowded at the ends of branches, wine red in colour when young, almost glabrous, 12.5-16.5 cm long, 14-21 cm broad, deeply cordate at the base, usually 3-lobed, occasionally 5-lobed; lobes broadly triangular, acuminate, main nerves 3-5; petioles 20-25 cm long stipules lanceolate, erect when young, recurved when old, caducous, 3-5 mm long, 2-2.5 mm broad; sparsely stellately hairy. Inflorescence towards the tips of branches, appears before the leaves, deep scarlet (Hort. Col. Chart R. Hort. Soc. 19/1), in short panicles, almost glabrous or very sparsely covered with orange-red stellate hairs; rachis of inflorescence 4-11 cm long, 2-5 mm broad at base; peduncles irregularly scattered along the rachis and supporting a fascicle of 2-7 pedicels, each of which is 0.5-1.3 cm long, 0.5 mm thick, glabrous or sparsely covered with orange red stellate hairs; jointed at about the middle. Flowers 1.5-2 cm long, 0.4-0.6 cm broad. Perianth tube salver-shaped, glabrous, deep scarlet towards the pedicel, wine-red in colour, sparsely hairy at the base inside; perianth lobes 5, sometimes 6-7, broadly triangular with acute tips, 2-2.5 mm long, 3-4 mm broad. Stellately hairy at the margins, hairs orange-red, stellate, with 7-10, short, radiating branches. Petals represented by a 5-lobed, thick appendage at the inner base of the perianth tube. Androgynophore 2.5-3 cm long, exerted almost to half the length bearing at its top the sessile anthers; anthers usually 30, in five bundles of 6 each, closely covering the carpels. Carpels 5 rarely 4, free, at the tip of the androgynophore, 1 mm long, glabrous, usually 2-ovuled, style recurved, short. Follicles stalked, membranous 7-9 cm long, 3-3.5 cm broad, leaf-like with conspicuous reticulate venation, elliptic-oblong, apex mostly retuse, rarely entire or apiculate, dehiscing longitudinally, stalk 1-1.2 cm long. Seeds usually 2, one adhering to each margin, elliptic-oblong, 1 cm long, 0.6-0.7 cm thick, attached longitudinally to the valve, broader at one end, slightly narrowing to the other, brown or yellowish, reticulate when dry.

Types : Dutt 139 (A: Holotype BLAT; B-F: Isotypes K).

Flowering & Fruiting : May-August*.

Distribution : INDIA: Maharashtra.

Herbarium specimens : INDIA: Maharashtra; Trombay Hill, 100 m, May 16, 1966, Dutt 139 (A: BLAT; B F: K); *ibid.*, Aug. 5, 1968, Dutt 2128 (A: Paratype BLAT; B-F: Paratypes K).

Notes : According to Abraham & Dutt (*l.c.*): *Firmiana colorata* (Roxb.) R. Br. var. *subglabra* Abraham and Dutt, related to *F. colorata* (Roxb.) R. Br. var. *colorata* is described. It differs from the latter in having subglabrous, deep scarlet inflorescence, very sparsely covered with orange red stellate hairs.

In a personal communication about this specimen, Sir George Taylor, Director, Royal Botanic Gardens, Kew, writes "..... I have to concur with your remarks concerning the distinctness of Dutt 139 from the typical form of *Firmiana colorata* (Roxb.) R. Br..... it could be described as a new variety of *Firmiana colorata*....."

Fissistigma santapaui D. Das (Anonaceae) in Bull. Bot. Surv. India 10 (3 & 4): 266. 1968 (1969).

Tree (?), about 13 m high. Leaves coriaceous broadly oblong, shortly acuminate at the apex, base rounded, glabrous both surfaces, 16-22 cm long and 6-9 cm broad, main lateral nerves about 16 pairs faint above prominent beneath; petiole puberulose about 1.5 cm long. Flowers bisexual, leaf-opposed 8-10 flowered cyme; peduncle about 5 mm long pedicels whitish pubescent, about 1.5 cm long, minutely bracteate at the middle and the base. Sepal 3, valvate, connate at the base, ovate acuminate greyish pubescent outside and the base within about 2 mm long and 1.5 mm broad. Petals 6 in 2 series, subequal, whitish-brown, oblong apex obtuse, fleshy about 1 cm long and 0.5 cm broad outer petals brown-pubescent outside, whitish pubescent within; inner petals reddish and concave at the base within, narrower than the outer, pubescent both surfaces. Stamens numerous, about 2 mm long, connectives broad and recurved at the tip anther cells linear, filaments short. Carpels 7-8 about 2.5 mm long, ovaries oblong, pubescent, ovules many in 2 rows; style prominent, linear, stigma curved pointed at the apex. Ripe carpels not known.

Type : G. Panigrahi 27678. Acc. No. 28885 (Holotype ASSAM).

Flowering : March*.

Distribution : INDIA : Assam (s.l.).

Herbarium specimens : INDIA: Assam ; Dulong Reserve Forest, from Bagjam Path through the forest, Mar. 10, 1962, G. Panigrahi 27678, Acc. No. 28885 (ASSAM).

Notes : According to Das (l.c.): This species is closely allied to the Burmese species *F. minuticalyx* (Mc Gregor et Smith) Chatterjee, but differs from the latter by its larger glabrous leaves with lateral nerves indistinct above, pedicels stouter and shorter with whitish hairs, minute bract present at the middle and the base of the pedicels, sepals greyish pubescent, petals shorter oblong obtuse, subequal but inner narrower, stamens longer.

The species is named in honour of Late Father H. Santapau.

Friesodielsia khoshooi Vasudeva Rao & Chakrab. (Annonaceae) in J. Econ Tax. Bot. 6 92): 435 436. 1985.

Climber, branches terete, 2 6 mm thick, reddish-brown or dark brown, ± densely tawny-hirsute, becoming glabrescent. Leaves oblong-elliptic, 13 -23 cm long, 5 10 cm broad, subcordate at base, entire at margins (the margins tending to curl upwards when dry), acute to acuminate at apex (acumen acute or obtuse, up to 15 mm long), thinly coriaceous, glabrous above except for the densely yellow-pilose midrib, thinly tawny-tomentose beneath, on drying dark brown or blackish-brown midrib channelled above, prominently raised beneath; lateral nerves 12 17 pairs, faint and depressed above, distinct and raised beneath, usually parallel to each other and curved abruptly near the margins or sometimes more or less uniformly curved (somewhat arcuate); tertiary nerves indistinct to faint above, distinct beneath, scalariform; petiole 4 8 mm long, 2 4 mm thick, tawny-hirsute. Flowers: extra- axillary, solitary, yellow or creamy yellow (teste collectore); buds triquetrous; pedicel 30 (-40) mm long, ± 1 mm thick, densely golden-brown sericeous; bracts in the middle of the pedicel, subulate, 4 5 mm long; sepals 3, broadly triangular-

acuminate, 5-7 mm long; 2.5-3 mm broad; densely golden-brown or tawny sericeous or hirsute outside, adpressed-puberulous inside, midrib obscure; outer petals 3, linear-lanceolate, triquetrous, 35-45 mm long, \pm 8 mm broad, concave at base, coriaceous, \pm densely golden-brown or tawny sericeous outside, glabrous inside, midrib prominent; inner petals 3, ovate-lanceolate to triangular-lanceolate, acutely long-acuminate, 10-12 mm long, 3-4.5 mm broad, sparsely puberulous to glabrous outside, glabrous inside; stamens numerous, narrowly cuneate, \pm 2 mm long, connective flat-topped, oblique; ovaries numerous, oblong, 1.5-2.5 mm long, densely golden-brown or tawny hirsute; style geniculate or straight; stigma flat, broad. Fruits oblong-ellipsoid, 13-14 mm long, 8-9 mm diam., apiculate, scattered and \pm adpressed tawny hirsute, pale green (teste collectore), blackish-brown or dark brown when dry, 1-seeded; fruiting stipes 4-5 mm long, \pm 1 mm thick.

Types : *T. Chakraborty* 10193 (A: Holotype CAL; B-E: Isotypes PBL).

Flowering : April-May. *Fruiting* : August.

Distribution : INDIA : Andaman-Nicobar Islands.

Herbarium specimens : INDIA: Andaman-Nicobar Islands; Great Nicobar Island, 44 km on east-west road, Apr. 27, 1984, *T. Chakraborty* 10193 (A in CAL; B-E in PBL); Lakshman Beach, Aug. 17, 1975, *Balakrishnan* 2928 (Paratype PBL); Laful, May 12, 1980, *Hore* 7569 (Paratype PBL).

Notes : According to Vasud & Chakrab. (*l.c.*): Closely related to *F. argentea* (J. Sinclair) van Steenis of Malesia, differing principally in the relatively larger (especially broader) leaves, the subcordate leaf base, the non-glaucous lower leaf surface, the 12-17 pairs of lateral nerves, the shorter petiole, the much longer pedicel of flowers, the broader petals and the much shorter stipes of the fruits.

Common or rare in inland forest or evergreen forest (once noted along water course) or rocky loam up to about 150 m altitude.

Fuirena tuwensis M.B. Deshp. & G.L. Shah (Cyperaceae) in Bull. Bot. Surv. India 10 (2): 239-240, 1968 (1969); Verma &

Chandr. in Bull. Bot. Surv. India 20 : 142. 1978; Sharma, Singh, Raghavan & Despande Fl. Karnataka 311. 1984.

Perennial herbs, rhizomatus, 15 -60 cm tall; stem simple, faintly striate, glabrous or nearly so; internodes 4 - 15 cm long. Leaves 3 - 20.5 × 0.3 - 0.7 cm, linear lanceolate, 3 - 5-nerved, glabrous above, hairy beneath, acuminate, sheathing at base; margins entire, slightly incurved, hairy, sheaths 2 - 6 cm long, hairy, with annular membrane at the mouth. Rachis puberulous, rachilla glabrous. Spikelets 6-15 mm long, oblong, in axillary and terminal subpaniculate clusters. Bracts 3 - 11 mm long, membranous, hairy, cuspidate. Glumes 2 - 3 mm long, obovate or cyme biform, membranous, spotted brown, pubescent in upper half on back and with ciliate upper margins strongly 3 - nerved, nerves uniting into a strong, more or less hispidulous mucro. Hypogynous scales 3 ± 1.5 mm long, petaloid, battledore-shaped, glabrous clawed, obtuse at apex, subhastate at base; hypogynous bristles 3, shorter than the scales, cylindrical scabrid. Stamens 3; filaments longer than the scales. Nut ± 1.5 mm long, trigonus with acute angles, smooth, shortly beaked; stigmas 3, shorter than style, hairy.

Type : Despande 1726 (Holotype, Herbarium, Sardar Patel University, Vallabh Vidyanagar).

Flowering & Fruiting : October*.

Distribution : INDIA: Gujrat.

Additional report : Karnataka, Madhya Pradesh

Herbarium specimens : INDIA: Eastern Gujrat ; Tuwa, Oct. 23, 1966, Despande 1726 (Sardar Patel University, Vallabh Vidyanagar). Madhya Pradesh: Shivapuri, Panigrahi 6033B.

Notes : According to Despande & Shah (*l.c.*): Occasionally among grasses, growing in association of *Cyperus difformis* L. & *Fuirena ciliaris* Roxb. in moist ground along margins of ditches of the road side.

This species differs from other *Fuirena* sp. in having peculiar hypogynous scales.

Gagea pamirica Grossh. var. **spitiensis** Balodi & Uniyal (Liliaceae) in Bull. Bot. Surv. India 30 (1-4): 178. 1988 (1990).

Bulbiferous, small 7-11 cm high herbs, bulbs 6-9 mm long, ovoid, profusely rooting at the base, outer scales fibrous; radical leaves 5.6-10 cm long, solitary or 2, linear, base broad, fleshy forming the bulbs, glabrous or hairy on the margins; cauline leaves 0.2-4.5 cm long, linear, acute, gradually decreasing in size upwards, alternate, glabrous or hairy, bearing bulbils in the axils; bulbils ca 0.5 mm long; bracts indistinct. Flowers 6-8.5 mm long, terminal, solitary; pedicels 5-7.5 mm long, hairy or glabrous; perianth lobes 6-8.5 mm long; oblong-lanceolate, acute, erect, 3-nerved, 2-seriate, yellow; filaments 2-2.5 mm long, dilated at the base; anthers 1.5-1.6 mm long, broadly oblong; ovary 2.5-3 mm long; style 1.5-2 mm long.

Type : U. C. Bhattacharya 48975 (Holotype BSD).

Flowering : Time not mentioned.

Distribution : INDIA : Himachal Pradesh.

Herbarium specimen : INDIA: Himachal Pradesh; Lahul & Spiti, U. C. Bhattacharya 48975 (BSD).

Notes : According to Balodi & Uniyal (*l.c.*) : The variety differs from typical variety in having with long pedicels, perianth with 3-nerved and dilated filaments.

Galium confertum Royle ex Hook. f. var. **laceanum** M.P. Nayar & Malick (Rubiaceae) in Bull. Bot. Surv. India 11 (3-4): 429. 1969 (1972).

Decumbent-ascending, slender, multicauline, perennial (?) herbs with a woody base. Stems branched, quadrangular, patently soft, long white hairy. Leaves 4-5 in a whorl, 0.5-1 × 0.4-0.5 cm, sessile or shortly petioled by narrowing of leaf bases, rounded or obovate-oblong with narrowed base, obtuse or rounded, slightly retuse or mucronate, margins recurved, patently soft white hairs on both sides, 1-nerved, upper leaves smaller. Inflorescences axillary and terminal cymes forming a lax compound panicle. Flowers 2 mm

long, tetramerous; pedicels up to 0.5 mm long, thinly patently hairy or glabrate; calyx tube adnate to the ovary, teeth absent; corolla 2.5–2.8 mm across, divided nearly to the base, tube 0.4 mm long, glabrous within, lobes ovate, 3-nerved, acuminate, glabrous, 1 mm long; stamens 4, inserted on the throat, filaments 0.5 mm long, anthers minute, ovoid, dorsifixed; ovary inferior, glabrous, 2-celled, ovule 1 in each cell; styles 2, 0.5 mm long, divided halfway; stigma globose. Young fruits glabrous.

Type : *J. H. Lace* 469 (Holotype CAL).

Flowering & Fruiting : August*.

Distribution : Himachal Pradesh.

Herbarium specimens : N. W. Himalaya: Bashahr, Rogi cliffs, 3000 m, Aug. 2, 1890, *J. H. Lace* 469 (CAL); Kunawur, 2333–2600 m, Aug. 17, 1847, *Thomson* s. n. (CAL).

Notes : According to Nayar & Malick (*l. c.*) : Closely resembles *Galium confertum* Royle ex Hook. f. (excl. Kunawur 2333–2600 m, 17 Aug. 1847, *Thomson* s. n.) but differs in having glabrous ovary. It also differs in having more dense indumentum.

Gastrochilus corymbosus A. P. Das & S. Chanda (Orchidaceae) in *J. Econ. Tax. Bot.* 12 (2): 401–403. 1988.

An epiphyte. Roots cylindrical, 0.15 cm thick. Old stem covered with dried leaf-bases; open stem 0.2 cm thick; branches \pm 15 cm long with very short (0.3–0.4 cm) internodes. Leaf base sheathing with a slightly widened mouth; lamina ovate, acuminate, 2.2 \times 0.8 cm, thickly fleshy, midvein slightly impressed above; young sheath and lamina brown-spotted. Peduncles axillary, 1.3 cm, remain closely adpressed with the stem; bracts 0.4 cm, oblong, tips rounded; pedicels 0.5 cm. Flowers four opposite decussate, forming a perfect corymb with their labelli projecting towards the centre, 1.8 \times 1.2 cm. Sepals and petals large (0.8 \times 0.4 cm), boat-shaped, much darker brown and larger but few (4–6) blotches on the ventral surface; spur broad (0.7 \times 0.6 cm); labellum much broader, rhomboid, diamond shaped depressed area covered with small brown spots.

Type : A. P. Das 823 (Holotype CAL).

Flowering : October*.

Distribution : INDIA : West Bengal.

Herbarium specimen : INDIA : West Bengal; Darjeeling, 2200 m, Oct. 29, 1982, A. P. Das 823 (CAL).

Notes : According to Das & Chanda (*l.c.*): This species is allied to *Gastrochilus distichum* (Lindley) Kuntze but differs in having much shorter peduncle which remain adpressed with the stem; four opposite decussate flowers forming a perfect corymb; number, size and shape of blotches of sepals, petals and terminal lobe of the lip. The absence of calli and the structure and colour of the terminal lobe of lip are the distinguishing characters to make a distinction in respect of *G. pseudodistichum* (King et Pantl.) Kuntze.

Endemic to Darjeeling and Sikkim Himamayas.

Gaultheria seshagiriana Subba Rao & Kumari (Ericaceae) in Bull. Bot. Surv. India 10 (2): 223-224, 1968 (1969).

Shrub, branches glabrous. Leaves alternate, glabrous, 3.3-12 × 1.5-4.8 cm, ovate lanceolate, tip shortly acuminate, hard and bent to a side, base rounded or broadly cuneate, margin mucronulate serrate; lateral veins 4, the outermost pair raised at the base and not prominent, the inner pair prominent and raising from the base or ± 1 cm above the base, midrib and inner pair of veins channelled on the upper surface and prominently raised on the lower surface; reticulation on upper surface ± prominent and under surface smooth and shining; petiole 3-5 mm long, glabrous. Inflorescence perulate, axillary, racemose, lax up to 2.5 cm long, pedicels 10-12 mm long; bracts and bracteoles at the base of pedicel, bracts lanceolate, 5-6 mm long upper half pubescent on both sides, margin ciliate; bracteoles subopposite, 2-3 mm long, upper half pubescent on both sides, margin ciliate. Calyx cupular, ± 4 mm across, deeply 5-fid; lobes ovoid, acute with obscure midrib, 2.5 × 1.5 mm, pubescent on both sides near the tip, margin ciliate. Corolla broadly campanulate, pinkish white, glabrous, ± 3.5 mm long and ± 5 mm across; lobes triangular, acute, ± 1 mm long, slightly recurved. Stamens 10, ±

3 mm long; filaments subulate, slightly pubescent, 1.5 mm long; anthers oblong-lanceolate \pm 2 mm long, dorsifixed, base rounded, tapering above, each lobe with two apical horns. Ovary 5 lobed, depressed above, \pm 2 mm in diam., almost glabrous; style \pm 3 mm long, glabrous; stigma thickened, subcapitate. Fruit a berry, blue when ripe.

Types : R. S. Rao 17863 (A: Holotype CAL; B: Isotype CAL).

Flowering & Fruiting : November.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Siang Frontier Division, Takepokong, 1737 m, Nov. 19, 1958, R. S. Rao 17863 A & B (CAL).

Notes : According to Subbarao & Kumari (*l.c.*): This Species differs from *Gaultheria dumicola* W. W. Sm. in smaller leaves, nature of venation, longer bracteoles and almost glabrous ovary.

The species is named in honour of the collector Shri Rolla Seshagiri Rao.

***Geissaspis tenella* Benth. var. *malabarica* Sivar. & A. Babu** (Papilionaceae) in J. Econ. Tax. Bot. 5 (4) : 941-942. 1984.

Prostrate or creeping herbs; often purple-suffused; stem slender often rooting at nodes; leaves 4-foliolate; petiole 4 mm long; stipules 6×2 mm; peltate-oblong, shortly acuminate at apex, serrate on the margins, serrations ending in long aristae, basally veined, unequally 2-lobed at base, the shorter one acute, longer one lanceolate-aristate; leaflets very shortly petioluled, obovate, obtuse or retuse at apex, serrations on the margins ending in aristae, basally 3-veined, flowers in long-peduncled, axillary, bracteate racemes; bracts closely imbricate when young, hardly overlapping later, usually 3-4 pairs, ovate-orbicular, base sagittate, margins serrate, serrations ending in long ciliae; calyx deeply 2-lipped, upper lip 2 mm long, light maroon in colour, lower lip longer, entire; corolla exceeding the calyx; standard petal suborbicular, shortly clawed deep maroon within; wings oblong, keels incurved; stamens, 10, monadelphous,

anthers uniform; ovary short-stalked; ovules 2, style long, incurved; stigma terminal; pods 6×3 mm, 1-2 jointed, joints turgid in the middle, reticulate; seeds subreniform.

Types : Babu 37408 (Holotype MH; Isotype CALI).

Flowering & Fruiting : August*.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Malappuram District, Calicut University campus, Aug. 1983, Babu 37408 (MH, CALI); Calicut University campus, Sivarajan 400; Tirur, Babu 37501.

Notes : According to Sivar. & Babu (*l. c.*) : Allied to *Geissaspis tenella* Benth. var. *tenella*, but can easily be distinguished by its maroon flowers.

A common weed especially in the crevices of rocks in moist or wet places on the lateritic slopes.

Genianthus horei Vasudeva Rao (Asclepiadaceae) in J. Econ. Tax. Bot. 6(3): 732-733. 1985.

Twining shrub with latex. Stem brown pubescent-glabrescent, ribbed or slightly angled, lenticellate, ± 0.3 cm diam. Leaves opposite, elliptic, entire, subcoriaceous, apex apiculate, base obtuse, margin thinly revolute, $8.5-14.0 \times 5.0-7.0$ cm, ultimately glabrous, sparsely punctate, greyish in dry condition above, below except along the midrib glabrous and on either side of midrib at base sparsely tomentose, pale brown in dry condition; midrib channelled above, below strongly elevated at base and gradually flattened towards the apex, pubescent-glabrescent; lateral nerves about 10 on each side (at an angle of 45°), looping below the margin, elevated or flat below; finer nerves obscure. Petiole 2-3 cm long, densely brown tomentose. Inflorescence of few-flowered-cymules, 2-3 mm apart on digitately-pinnate racemiform branches, forked at 0.5-0.8 cm from base, arising in between petioles; branches subangulate, densely brown or golden tomentose. Flowers short-pedicellate, yellow. Pedicel about 15 mm long, densely brown tomentose, subangular. Calyx campanulate, 5-lobed almost to the base, brown pubescent outside

glabrous on innerside (without scales); lobes subequal, imbricate, oblong, obtuse, with hyaline margin, ciliate, about 10 mm long, 0.5 mm broad. Corolla rotate or companulate, with a very short tube (tube \pm 0.5 mm long), 5-lobed; lobes valvate, oblong, obtuse, 2.5 mm long, 0.5 mm broad, glabrous outside, innerside white pilose to nearly $\frac{2}{3}$ length and pubescent below. Corona consists of 5 scales; scales flat, apex caudate and bent, adnate to the staminal column. Filaments united to column. Pollinia 2 in each locule of anther. Ovaries free, stigma simple and never projecting beyond the staminal column. Fruits not known.

Types : D. K. Hore 7243 (A: Holotype CAL; B: Isotype PBL).

Flowering : Time not mentioned.

Distribution : INDIA : Great Nicobar Islands.

Herbarium specimens : INDIA: Great Nicobar Island; near Kopenhagen, D. K. Hore 7243 (A in CAL; B in PBL).

Notes : According to M. K. V. Rao (*l.c.*) : The new species shows more affinities to *Genianthus crassifolius* HK. f. and *G. maingayi* HK.f., especially as to the inflorescence being sparingly branched racemose axes bearing flowers in cymules, but differs primarily in having short pedicellate flowers and sessile stigma. From the latter, it also differs widely in the form of leaves.

Rare in the jungles along roadside.

The specific epithet is after the collector Dr. Dipak Kumar Hore.

Gleadovia banerjiana Deb (Orobanchaceae) in J. Bombay. Nat. Hist. Soc. 54 : 799. 1957.

Small leafless herb; parasitic on subterranean roots of *Strobilanthes discolor* T. Anders; stem fleshy, up to 1 cm long, 3 mm diameter. Inflorescence 1-3-flowered, cymose, lateral flowers do not develop. Flowers large, subsessile, 5-7.5 cm long, about 1.5 cm in diameter, fleshy, hermaphrodite, hypogynous, gamopetalous, shortly pedicellate, bracteolate, protandrous. Bracteoles 12 in number, spirally arranged, lanceolate or ovate-lanceolate, spatulate, adnate

at the base, smooth, broad, obtuse or emarginate at the apex, varying in size, 4 from the base, 3-6-veined, 0.4-0.7 × 0.3-0.5 cm; 5th and 6th, 15-18 veined, 1.8 × 1 cm; 7th and 8th, 22-25-veined, 2.0-2.5 × 1.2-1.5 cm; 9th and 10th, 27-30-veined, 2.5-3.0 × 2.0-2.2 cm; 11th and 12th, 30-32-veined, 3.0-3.2 × 2.2-2.5 cm. Calyx gamosepalous, spathaceous, irregularly 5-lobed at the tip, split in nearly 1/3 of its length, 3.5-5 × 3.0-4.5 cm; veins 52, parallel. Corolla gamopetalous, white, rose tinged or light yellow, fleshy, 3.5-5.5 × 3-4.5 cm, veins 33-35; corolla tube broad, slightly incurved, dilated at the throat, limb obscurely 2-lipped, lobes 5, erect, spreading, subequal, obtuse, imbricate with downy moniliform trichomes, which are 2-2.5 mm, 10-15 celled. Stamens 4, epipetalous, adherent up to 0.8 cm in length, inserted, didynamous; filaments stout, longer ones 0.4 cm long, shorter ones 0.25 cm long. Anthers attenuated, adnate, 2-lobed, both the cells perfect longitudinal, base of the anther cells not mucronate, slightly divaricate, connectives produced. Pollen grains round smooth with thin exine. Disc annular, dull white, 1.5 mm high. Gynoecium syncarpous; stigma 2 mm incurved capitate, 2-lobed, tumid, style stout, 8 mm glabrous; ovary ovoid glabrous, superior 8 × 8 mm, one-celled with 4 dichotomously branched parietal placentas, ovuliferous all over.

Type : Deb 2247 (Holotype CAL).

Flowering : April*.

Distribution : INDIA: Manipur.

Herbarium specimen : INDIA: Manipur; Koupru Hill, 6000', Apr. 11, 1954; D. B. Deb 2247 (CAL). cotypes deposited in Dhanamanjari College, Imphal, Manipur and Maharaja Bir Bikram College, Agartala, Tripura.

Notes : According to Deb (*l.c.*): This species comes very near to *Gleadovia kwangtungense* Hu from which it differs in, i) bracteoles not being tomentose, ii) form of the calyx and iii) hairyness of the corolla.

Total parasite on the roots of *Strobilanthes discolor* T. Anders. The flowers are white tinged with rose or light yellow.

The species is named in honour of Dr. Deb's revered teacher Dr. I. Banerjee of Calcutta University.

Glochidion airyshawii N.P. Balakr. & Chakrab. (Euphorbiaceae) in Bull. Bot. Surv. India 25 (1-4): 220-222. 1983 (1985).

Tree, 4-6 m high; branchlets greyish, more or less terete, 2-8 mm thick, shortly rufous to whitish pubescent, glabrescent later on; young branchlets striate and often anafrectuous. Leaves oblong to elliptic-oblong or occasionally widely elliptic-oblong to suborbicular, nearly symmetric, 4.5-7 cm long, 2-3.5 cm wide, equally to subequally rounded on sometimes subotuse at base, entire at margins, acute mucronate or obtuse to rounded or rarely obcordate at apex, firmly chartaceous, glabrous above, shortly rufous to whitish pubescent on major nerves beneath (at least on midrib), on drying dark brown or blackish brown above, brown or reddish brown beneath; secondary veins alternate to opposite along the midvein, 4-7 pairs, slender, faint above, prominent beneath, more or less uniformly curved, joining the superadjacents forming weak loops; tertiary veins indistinct above, somewhat prominent beneath, percurrent, unbranched and forked; petioles 2.5-5 mm long, 1-1.5 mm thick, shortly pubescent; stipules subulate, often deltoid at base, 4-5 mm long, caducous. Inflorescence axillary, sessile, many-flowered (only fruits and few females seen). Male Flowers: not seen. Female Flowers: sessile to subsessile; tepals 3 + 3, free oblong, to ovate-oblong or triangular, 1.5-2.5 mm long, 0.5-1.5 mm wide, the inner tepals smaller than the outer, puberulous outside; ovary depressed-globose, 1-1.2 mm long, 2-2.3 mm diam., densely rufous puberulous, shallowly lobed (4) 5-6 loculed; style shortly conical, (subglobose when young), more or less 1 mm long, 1-1.2 mm thick at apex, 1.5-1.8 mm thick at base, shortly (4) 5-6 fid at apex, hollow at the tip, minutely puberulous at base, persistent, the apical lobes occasionally connivant occupying the apical cavity capsules: depressed, 1.3-1.5 cm diam., distinctly (4) 5-6 lobed with the lobes again somewhat bilobulate, intruded at apex, rufous to whitish puberulous, green (*Teste collectore*) brownish when dry; fruiting pedicels 2-5 mm long; seeds triquetrous, somewhat convex on dorsal surface, 5-6 mm diam., smooth, dark red.

Types : Balakrishnan 1337 (A: Holotype CAL; B: Isotype K; C: F: Isotypes PBL).

Flowering & Fruiting : April May.

Distribution : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA: Andaman and Nicobar Islands ; Middle Andaman Islands, Lataw, near Mayabunder, \pm 20 m, May 4, 1974, Balakrishnan 1337 (A: CAL; B: K; C F: PBL).

Notes : According to Balakr. & Chakrab. (*l. c.*): From the alliance of *G. coccineum* (Buch. Ham.) Muell. Arg. and allied species to be distinguished by smaller leaves, 4.5 7 cm long, 2 3.5 cm wide; fewer loculed ovary (4-) 5 6; style (4-) 5 6 fid at apex; capsule 13 15 mm diam., fewer lobed (4-) 5 6, \pm densely pubescent; whereas *G. coccineum* is characterised by leaves 6 17.5 cm long, 2.5 6 cm wide ovary 8 12 loculed; style shortly 8 12 fid at apex; capsule 15 20 mm diam., 16 20 lobed, sparsely puberulous to \pm glabrous.

Scarce in inland evergreen forests on rocky loam at \pm 20 m above MSL.

Glochidion bilobulatum Vasudeva Rao & Chakrab. (Euphorbiaceae) in *J. Econ. Tax. Bot.* 5(4): 936 937. 1984.

Small tree; branchlets blackish to greyish, terete, 1 8 mm thick, minutely white-pubescent, often somewhat anafraetuous when young. Leaves elliptic to oblong or narrowly so, 4.5 10 cm long, 1.5 5 cm broad, acute attenuate or cuneate-attenuate or sometimes obtuse at base, entire at margins, shortly acuminate (acumen up to 15 mm long) to subacuminate or often acute at apex, glabrous, stiffy coriaceous, on drying grey or reddish brown or blackish brown above, coppery beneath; midrib more or less straight, somewhat channelled above, raised beneath, lateral nerves 6 11 pairs, slender, faint above, more or less distinct beneath, irregularly curved to anafraetuous or curved abruptly near the margin, joining the superadjacents forming loop or anastomosing near margin; minor nerves indistinct above, faint to somewhat prominent beneath, somewhat reticulate; petioles 2 6 mm long, 1 2.5 mm thick, glabrous; stipules triangular to deltoid- acuminate, 1.5 2 mm long,

1.5-2 mm broad. Inflorescences axillary, epedunculate, bisexual, 8-12-flowered. Male flowers: glabrous; pedicels 2-3 mm long, 0.2-0.4 mm thick; tepals 3+3, oblong to elliptic, obtuse, 1.8-2.5 mm long, 0.8-1.2 mm broad, spreading or recurved, the inner tepals slightly smaller than the outer; anthers 3, connate in an oblong mass, about 1 mm long; produced connectives ovate, about 0.4 mm long, erect. Female flowers: pedicels 0-1 mm long *ca* 0.3 mm thick, minutely white-pubescent to glabrous; tepals 3+3, oblong to elliptic, obtuse or acute, 1.5-2 mm long, 0.6-1 mm broad, minutely white pubescent or occasionally glabrescent outside, minutely pubescent to glabrous inside, ciliolate at margin, the inner tepals often slightly smaller than the outer; ovary subglobose, 0.5-0.6 mm long, 0.5-0.8 mm diam., glabrous, strongly 3-lobed with the lobes again bilobulate, trilocular; style columnar, sometimes subtrigonous, 3-3.5 mm long, 0.6-0.8 mm thick, shortly and unequally trifid at apex with the lobes again bilobulate. Capsules not known.

Types : Balakrishnan 5426 (A: Holotype CAL; B-G: Isotypes PBL)

Flowering : March - April.

Distribution : INDIA: Andaman, Nicobar Islands.

Herbarium specimens : INDIA: Andaman-Nicobar Islands ; North Andaman Island, Saddle Peak Range, Lamia Bay slope, Mar. 31, 1977, Balakrishnan 5426A (CAL); *ibid.*, Balakrishnan 5426B G (PBL).

Notes : According to Vasud. & Chakrab. (*l.c.*): Closely related to *G. khasicum* (Muell. Arg.) Hook. f. of E. Himalaya, NE. India and Thailand but distinct in the minutely white pubescent branchlets and tepals of female flowers, the bilobulate lobes of ovary (and therefore the bilobulate lobes of the capsule), the columnar style and the bilobulate apical stylar lobes. The leaf - margins often tend to curl downwards when dry. *G. bilobulatum* was noted to be common in hill forest on rocky loam at about 450 m altitude.

***Glochidion brunneum* Hook. f. ssp. *andamanicum* N.P. Balakr. & Chakrab. (Euphorbiaceae) Proc. Indian Acad. Sci. (Pl. Sci.) 92 (4): 357-359. 1983.**

Trees, about 6m tall, entirely glabrous; branches brown, smooth (*teste collectore*); flowering branchlets striate to terete, 1-5 mm thick. *Leaves* oblong to ovate-oblong, symmetric to asymmetric, (6.5) 10-20 cm long, (3.5-) 5-8 cm wide, equally to unequally rounded or occasionally sub-truncate at base, entire at margins, sub-acute to sub-acuminate or retuse at apex, thinly coriaceous, on drying black above, coppery or blackish-brown beneath; secondary veins alternate to opposite along the midvein, 7-10 (-12) pairs, faint to prominent above, distinct beneath, uniformly curved to somewhat zig-zag or sinuate, joining the superadjacent forming loops (brochidodromous); tertiary veins indistinct above, prominent beneath, percurrent; petioles 3-6 mm long, 1-2.5 mm thick; stipules not seen. Inflorescences axillary, apedunculate. Male flowers: pedicels 5-8 mm long; tepals 3+3, oblong to ovate-oblong, 1.5-2 mm long, 1-1.6 mm wide, the inner tepals slightly smaller than the outer; anthers 8, forming an obtusely conical mass with united to free margins, 1.2 mm long; produced connectives ovate, \pm 0.2 mm long, connivent. Female flowers: pedicels 3-5 mm long; tepals 3+3 unequal; the outer oblong to triangular-oblong, 1.2-1.5 mm long, 0.7-1 mm wide; the inner narrowly oblong to linear, 0.6-1.2 mm long, 0.2-0.6 mm wide; ovary subglobose, about 1 mm long, 1.3 mm diam., unlobed, 5 (-6) loculed; style 1.3-1.5 mm long, columnar, 5 (-6) fid at apex; with somewhat connivent lobes (0.5-0.7 mm long) forming a cup-shaped crown, persistent. Capsules: depressed-globose, 7-9 mm in diam., unlobed, 4-5 (-6)-loculed, reddish-geen (*Teste collectorate*), blackish-brown on drying, with slender irregular ridges or lamellae on the surface fruiting pedicels 6-7 mm long; fruiting style columnar, 1.5-2 mm long; seeds subturbinate, 3.5-4.5 mm in diam., with rounded dorsal surface smooth, dark red.

Types : Balakrishnan 766 (A: Holotype CAL; B-H: Isotypes PBL).

Flowering & Fruiting : December - January.

Distribution : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA: Andaman & Nicobar Islands; South Andaman Island, Wright Myo to Wyssen Skyline, \pm 100 m, Jan. 9, 1974, Balakrishnan 766 (A: CAL, B H: PBL).

Notes : According to Balakr. & T. Chakrab. (*l. c.*): The typical

G. brunneum occurs in Malaya, Borneo, Sumatra and the Natuna Islands (Airy Shaw 1981). The leaf margins of ssp. *a. damanicum* tend to curl upwards when dry. The apical lobes of the columnar style form a cup-shaped crown. The style ultimately transforms into a perfectly columnar fruiting style (probably by way of gradual elongation and thickening of the column beneath the apical lobes) and the apical cup-shaped crown becomes indistinguishable. This plant is scarce in the Wright Myo area of S. Andaman Islands at about 100 m above MSL.

***Glochidion subsessile* N.P. Balakr. & Chakrab. (Euphorbiaceae)**
Proc. Indian Acad. Sci. (Pl. Sci.) 92 (4): 359-361. 1983.

Evergreen trees, 10-15 m high, entirely glabrous; flowering branchlets terete, 1-3 mm thick. Leaves glossy, oblong to elliptic, oblong or sometimes obovate or oblong-oblong, asymmetric to symmetric, 5-11 cm long, 2.5-5 cm wide, unequally to often equally acute, obtuse to rounded or occasionally cuneate at base, entire at margins, shortly acuminate to subacuminate or sometimes rounded at apex, subcoriaceous to chartaceous; secondary veins alternate to opposite along the midvein, 5-8 pairs, slender, faint above, distinct beneath, uniformly curved to zig-zag, joining the superadjacents forming loops (brochiodromous); tertiary veins indistinct above, usually prominent beneath, precurrent; petioles 2-5 mm long, 2 mm thick; stipules not seen. Inflorescence axillary, epedunculate, 10-16-flowered, the males and females usually mixed. Male flowers: pedicels 8-15 mm long, 0.2-0.5 mm thick; tepals 3+3, oblong to obovate-oblong, unequal, 1.5-3 mm long, 0.7-1.5 mm wide; anthers 6, connate in an oblong mass, about 1 mm long; cells linear; produced connections ovate, about 0.3 mm long, erect when mature. Female flowers: pedicels 0-1.5 mm long, 0.4-0.7 mm thick; tepals 3+3, oblong, ovate-oblong to triangular-oblong, unequal, 1-2.5 mm long, 0.5-1.3 mm wide, glabrous to minutely ciliolate at margins, ovary subglobose, 0.8-1 mm long, 1-1.3 mm in diam., slightly lobed, 5-6-loculed; style columnar, sometimes tapering towards base 2-3.2 mm long, shortly 5-6-fid at apex with the lobes again bilobulate, persistent. Capsules: depressed-globose, 1.4-1.8 cm in

diam., distinctly 5-6-lobed with rounded to bilobulate lobes, more or less intruded at apex and base, smooth, brownish on drying; fruiting pedicels 0.5-2 mm long; seeds more or less obovoid 5-6.5 mm in diam., subtriangular, bilobed, smooth, dark red.

Types : Chakrabarty 7345 (A: Holotype CAL; B-H: Isotypes, PBL).

Flowering & Fruiting : February - July.

Distribution : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA: Andaman & Nicobar Islands; South Andaman Island, Mount Harriet, ± 200 m, alt., July 5, 1979, Chakrabarty 7345 (A: CAL & B-H: in PBL); *ibid.*, Mar. 13, 1976. Balakrishnan & Bhargava 3459, 3460 (Paratypes PBL); Nayashahar, May 13, 1976, Nair 3691 (Paratype, PBL).

Notes : According to Balakr. & T. Chakrab. (*l.c.*) : *G. subsessile* can be distinguished from the closely related *G. calocarpum* by the relatively smaller leaves, sessile or subsessile female flowers, columnar style, bilobulate apical stylar lobes and by the shorter fruiting pedicels. Also, the male pedicels possibly tend to be longer and the stylar column apparently not or less prominently striate. As specific demarcation in *Glochidion* is usually narrow, the above differences are perhaps sufficient to warrant treating this plant as a new species. *G. subsessile* is possibly confined to the S. Andaman Island especially on the Mount Harriet range where it is abundant between 100-300 m above MSL in evergreen forests on rocky loam. The only collection outside this mountain range is from a shrub near Nayashahar at sea level.

Gomphostemma nayarii A.S. Chauhan (Lamiaceae) in Bull. Bot. Surv. India 28 (1-4): 182-184, 1986 (1988).

Perennial, erect herb with single stem 35-51 cm high from the root-stock; roots numerous tufted; stem with distinct nodes and internodes, circular at base, quadrangular above, obscurely grooved, densely tomentose with stellate hairs mixed with long spreading hairs. Leaves petioled, opposite decussate, broadly elliptic, acute,

dentate except at the base, lamina 17 18.5 × 9 10 cm with 10 11 lateral nerves, upper surface hirsute with stellate and simple hairs, flocculantly tomentose with stellate hairs beneath; petiole 4 5.5 cm long, densely woolly. Flowers in dense uninterrupted spike borne on independent leafless scape from the root-stock. Bracts 1.3 1.7 × 0.6 0.7 cm, slightly obovate, entire, acute, 3-nerved, sparsely stellate hairy outside, glabrous within. Bracteoles ca 0.7 cm long, linear or oblanceolate, densely tomentose outside, 1-nerved, entire, acute, scarlet. Calyx ca 1.4 cm long, campanulate, pubescent outside with stellate hairs, glabrous within, limbs 5-lobed, lobes triangular, longer than the tube, acuminate, 3-nerved, scarlet. Corolla 2.8 3.2 cm long, yellow gamopetalous, bilabiate, densely villous outside, glabrous within upper lip sub-entire ca 1 cm long, lower lip trilobed 1.2 × 0.9 cm, midlobe slightly emerged. Stamens 4, didynamous, epipetalous, lower pair longer, three-fourth of the filaments profusely hairy except below the anthers, anthers 2-celled, cells parallel, transverse. Ovary superior, placed on a prominent glandular disc, 4-partite, glabrous, style gynobasic, long, glabrous, unequally bifid at the apex. Nutlets usually 4, ca 0.5 cm long, more or less oblong, brown, glabrous, rugose.

Types : A. S. Chauhan 81993 (A: Holotype CAL; B: Isotype ASSAM).

Flowering & Fruiting : September October.

Distribution : INDIA: Meghalaya.

Herbarium specimens : INDIA : Meghalaya; Khasi Hills, Nongstoin, Sept. 5, 1985, A. S. Chauhan 81993 (A: CAL; B: ASSAM); Chauhan 73748 and 74460 (Paratypes ASSAM).

Notes : According to Chauhan (*l.c.*): The genus has been represented by 22sp. from Indian region (Mukherjee, 1940). Allied to *G. inopinatum* Prain, a species reported from Burma but differs in habit, a robust herb with single stem 35 51 cm high from the root-stock; lamina 17 18.5 × 9 10 cm with 10 11 lateral nerves; bracts slightly obovate, entire; corolla densely woolly outside, glabrous within; three-fourth of the filaments profusely hairy except below the anthers.

G. inopinatum Prain, in contrast, is characterised as a small herb with several stems, ca 30 cm high from the root-stock; lamina 7.8 -12.9 × 5 - 7.5 cm with 6 pairs of lateral nerves; bracts ca 1 cm long, obovate dentate; corolla ca 2 cm long, annulate hairy within and filaments hairy at the base only.

Growing in dewse moist and shady places of forest floor. Rare.

The species is named after Dr. M. P. Nayar in dedication to his contribution to Indian flora.

Grewia indandamanica J.L. Ellis & L.N. Ray (Tiliaceae) in *Candollea* 46 (2): 341 - 343. 1991.

A much-branched shrub or an undershrub, up to 1 m high; branches greyish, sparsely stellate-hairy when young, bark wrinkled. Leaves up to 7.0 × 2.8 cm, ovate-elliptic, shortly acuminate, rounded and cordate at base, crenate-serrate, chartaceous to slightly coriaceous; lateral nerves 5, arcuate, reticulations often parallel, nerves and nervules prominent on both the surfaces; petiole darkish in colour, 0.5 cm long, pubescent when young; stipules 0.1 cm long; flowers yellow, 1 cm long, solitary, axillary, flowering buds 0.5 cm long, faintly stellate-tomentose; pedicels up to 0.9 cm long, sparsely puberulous; peduncles up to 1 cm long, jointed in the middle and slightly thickened; bracts 0.2 cm long; bracteoles 0.1 cm long; sepals 1.0 × 0.15 cm, linear-ovate, spatulate, cucullate, obtuse to truncate at base, puberulous without, brown and glabrous within, margins incurved, stellate-tomentose; petals 0.25 × 0.1 cm, ovate-oblong, entire, glabrous without, densely pubescent along margin up to 3/4th the length and in a circle round the gland within, gland more than 1/3rd the petal, glabrous; stamens numerous, filaments 0.6 cm long, filiform, glabrous anthers innate, reniform: torus 0.2 cm long, lower half glabrous and upper half densely stellate pubescent; ovary globose, densely pubescent, 4-celled with 1 ovule in each, style 0.6 cm long, slender, puberulous from base up to 2/3rd the length, glabrous above, stigma slightly expanded and 4-angled. Drupe black, 1 cm across, bilobed, generally unequally so, globose or slightly flattened or angled, wrinkled, sparsely hairy, woody; seed one in each locule, glabrous.

Types : Ellis ANC 12775 (A: Holotype CAL; B-D: Isotypes PBL).

Flowering & Fruiting : October*.

Distribution : INDIA: Andaman Islands.

Herbarium specimens : INDIA: Andaman Islands (borealis); Saddle Peak (726 m msl.), Oct. 18, 1987, Ellis ANC 12775 (A in CAL & B-D in PBL).

Notes : According to Ellis & Ray (*l.c.*) : Allied to *Grewia laevigata* Vahl, but differs from it in having (i) flowers single, (ii) pedicels and peduncles much shorter; (iii) leaves elliptic-ovate, slightly acuminate, and at base rounded to slightly cordate and not attenuate, much smaller, margin crenate-serrate; stipules much smaller, and (iv) fruits sparsely puberulous, faintly angled, grooved.

Airy Shaw (Willis, Dict. Fl. Plants, 1973) has given 150 species of *Grewia* L. as occurring in Africa, Asia and Australia, especially in the tropical belt. Masters (in Hook. f., Fl. Brit. Ind. 1: 383-393, 1872) has accounted for 36 species and varieties from India and surrounding areas. Parkinson (For. Fl. Andaman Is., pp. 104-105, 1923) records three species from the Andaman Islands. He gives doubtfully another plant saying that it is a plant from a mountainous region in Middle Andaman, "... with leaves 1-1.5 in. long, elliptic, crenate-serrate and flowers in the leaf axils"

The presently described species has been collected from Saddle Peak the highest peak in these Bay of Bengal islands (726 m msl.). This region supports a stunted, evergreen-type of forest which may be called Hill-top Forest. The close proximity of the Andaman and Nicobar groups of islands with Equator and the direct influence of both South-West monsoon and north-east monsoon and high humidity have contributed very significantly to the development of humid tropics in these islands. The resultant diversity in the types of vegetation is mainly owing to the influence of all these factors in addition to edaphic factors and availability of ground water. The Saddle Peak again is affected by the altitudinal gradation, in addition to the solar isolation and wind velocity. As the peak is commonly covered by thick clouds, the variation in temperature from the surrounding areas is very marked, thus encouraging plant diversity.

This is very much evident by the climbing bamboo, *Dionochloa andamanica* Kurz, making an impenetrable thicket on the Saddle Peak, amidst which some plants typical of arid zone occur like *Phoenix sylvestris* Roxb., *Rostellutatria procumbens* (L.) Nees, etc.

Habenaria ramayyana Ram. Chary & J.J. Wood (Orchidaceae) in Kew Bull. 36 (2): 235-237. 1981; Manilal, Fl. Silent valley 288. 1988.

Terrestrial herb to 30 cm tall. Rootstock rhizomatous at base, roots fibrous, some terminating in small oblong or ovoid tubers 2 cm long 1.2 cm broad. Stem with 3-4 amplexicaul ovate acute sheaths below, leafy above. Leaves 5-7, alternate, sessile to shortly petiolate, petiole to 1.2 cm long, lamina narrowly elliptic to oblong-elliptic obtuse and mucronate to acute, 4.5-11 × 2-3.7 cm, texture thin, margin minutely papillose. Inflorescence a terminal raceme. Peduncle 8-11 cm long, clothed with c. 5 narrowly elliptic, acuminate, sterile bracts 1.5-2.4 cm long. Raceme 5-7 cm long, 4 cm broad, 4-9-flowered. Floral bracts narrowly elliptic, acute to acuminate, 3-nerved, 14-22 × 4.5-6 mm. Flowers pale pinkish-white. Ovary shortly pedicellate, fusiform, apex rostrate, 18-25 mm long. Dorsal sepal ovate, cucullate, 3-nerved, 6.5-8 × 4-5 mm. Lateral sepals ovate-elliptic, subfalcate, acute, 3-nerved, 7.5-9 × 3-3.5 mm. Petals bipartite; posterior lobe filiform, falcate, obtuse, connivent with dorsal sepal, 8-9 mm long; anterior lobe slightly narrower, filiform, apex acute and curving up, 14-15 mm long. Lip 3-lobed; mid-lobe filiform, deflexed, apex obtuse and pointing towards rhachis, 12-13 mm long; lateral lobes slightly narrower, filiform, apex acute and curving up, 16-18 mm long; spur narrowly cylindrical, slightly dilated towards apex, acute, decurved, 19-27 mm long. Column short, broad, 1 mm long, 2 mm broad. Anther loculi large, 2 × 1.5 mm, with erect canals 1.25 mm long. Pollinia pyriform, 1.5 × 0.75 mm; caudicle 2 mm long; viscidium minute. Staminodes 2, ovoid, 1 mm long. Stigmatic processes 2, elongate, 2 × 0.75 mm. Rostellum small, 1 mm long.

Types : *Ramachandra Chary* 642 (Holotype HY; Isotypes CAL, K, MH).

Flowering : November*.

Distribution : INDIA : Andhra Pradesh.

Additional report : Kerala.

Herbarium specimens : INDIA : Andhra Pradesh; Amrabad Forest Reserve Bahrapur, 700 m, Nov. 9, 1979, *Ramachandra Chary* 642 (HY, CAL, K, MH).

Notes : According to Ramachandra Chary & Wood (*l.c.*): *H. ramayyana* belongs to section *Ate* Hook., distinguished by spreading lateral sepals, truncate bifid or bipartite petals divided into an *anterior* and a *posterior* lobe and the 3 lobed or tripartite labellum. It was compared with material at Kew and Howrah from India, Malaya and Indo-China and was found to be most closely allied to the southern Indian *H. multicaudata* Sedgw. Although having similar filiform petals and labellum lobes, *H. ramayyana* may be distinguished by the longer posterior petal lobe, shorter lateral lobes of the labellum and longer, non-clavate spur, etc.

H. multicaudata is reported from areas with an annual rainfall of 350 cm (Santapau & Kapadia 1966). *H. ramayyana* was collected from an area of relatively low rainfall, approximately 65 cm per annum.

It is named in honour of Dr. N. Ramayya.

Hedychium radiatum A. S. Rao & Hajra (Zingiberaceae) in Bull. Bot. Surv. India 16 (1-4) : 163-166. 1974(1977).

Rhizome creeping, knotted and shortly branched ca 2 cm across, brown outside, light creamy inside; roots 20.0-30.0 cm long, rope like, 2-3 mm across. Stem 0.8-1.0 m high, green with reddish brown tinge. Leaves 18.0-34.0 cm long, 6.0-14.0 cm broad, ovate or ovate-lanceolate acuminate; upper surface glabrous; midrib beneath hairy; ligule 1.0-1.5 cm long, green with reddish brown tinge, glabrous. Spike 8.5-11.0 cm long, cone-like, green with reddish-brown tinge, 11.5-15.0 cm across in flower; bracts 2.0-3.5 × 1.0-3.0 cm, broadly elliptic to obovate, flatly imbricating, 2-3 mm along the margin reddish brown, otherwise green, hairy

at base, 1 flowered; bracteoles tubular, pinkish-green, obliquely convolute, 1.3-1.7 cm long. Flowers 11.0-11.2 cm long, 43-45 per inflorescence, white turning creamy in age, sweet-scented; calyx tubular, pinkish-yellow, 2.8-3.0 cm long, split on the side obliquely, almost equalling the bract, densely hairy at base; corolla tube, 5.0-5.5 cm long, pinkish; lobes linear, subequal, 3.5-4.5 cm long, 0.2-0.3 cm broad, greenish-yellow to yellow or creamy, inrolled; lateral staminodes spatulate, 3.0-3.2 cm long, 0.5-0.7 cm broad; lip 2.6-3.2 cm long, 1.0-1.3 cm broad, unguiculate, bilobed, sinus 0.3-0.5 cm deep; stamen stretched out, red; filament 4.0-5.5 cm long, exceeding the lip by 1.5-2.0 cm; anther 1.2-1.6 cm long, linear, curved, divergent at base; ovary ellipsoid, 0.4-0.5 cm long, creamy; style 10.5-11.0 cm long, white with pinkish tinge; stigma turbinate, red.

Types : A. S. Rao 56655 (A: Holotype CAL; B-C Isotypes ASSAM; D: Isotype BSD).

Flowering : September.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Kameng District, Nyert-sephu-Wana Camp Road, A. S. Rao 56655 (A in CAL; B-C in ASSAM & D in BSD).

Notes : According to Rao & Hajra (*l.c.*): Allied to *H. ellipticum* Buch-Ham. ex J. E. Sm. but differs in its leaves being appressed hairy along the midrib, bracts and calyx pubescent at base; bracts reddish-brown at margin; labellum broader; stamens uniformly red.

Collected originally from Kameng district but cultivated in the woodlands Experimental Garden, Shillong, which bloomed after due acclimatisation and proved to be new species.

Hedychium robustum A. S. Rao & Hajra (Zingiberaceae) in Bull. Bot. Surv. India 16 (1-4): 166. 1974 (1977).

Rhizome creeping, stout, pale brownish outside, light yellowish inside, faintly aromatic; segments ovoid to subglobose, 4.0-5.5 cm across; roots stout 30.0-45.0 cm long, ca 0.5 cm across. Stem 2.6

2.8 m high (very rarely 1.4 - 1.5 m high), 2.8 - 3.5 cm across at base; base sheathed. Leaves 15 - 17 per plant, oblong-lanceolate, 45.0 - 75.0 cm long, 8.5 - 14.0 cm broad; upper surface hairy and along the midrib only underneath; petioles progressively long, from 1- 4 cm, the lowest leaf with the shortest petiole; ligule membranaceous, brownish or greenish-red, 1.5 - 2.0 cm long, bilobed. Spike 22.0 - 32.0 cm long (rarely 20.5 cm); rachis hairy; bracts 12 - 22 in a spike, convolute, lax, hairy, green with brownish blotch, tip minutely fimbriate, 4.0 - 5.0 × 2.0 - 3.5 cm, each primary bract enclosing 9 - 11 successively opening flowers; bracteoles pubescent, brownish-green to green, imbricate, ovate at apex 2.5 - 4.5 × 0.5 - 2.0 cm. Flowers white, slightly fragrant; calyx membranaceous, tubular, split up to 1.0 cm on one side, longer than the bracts, toothed, with corolla-tube exceeding the bract by 1.0 - 2.5 cm; lobes linear, subequal, anterior ones ca 5.0 cm long, lateral lobes 4.0 - 4.5 × 0.2 - 0.4 cm; lateral staminodes spatulate, white, ca 4.5 cm long, 1.5 cm broad; lip suborbicular or broadly spatulate, white with pale yellow tinge in the middle, entire or undulate, ca 4.5 - 5.0 cm long, 3.5 - 4.0 cm broad, shortly clawed; stamen 1.5 - 2.0 cm, shorter than the lip; filament white, 2.0 - 2.5 cm long; anther linear, curved, ca 1.0 cm long, pinkish-green; ovary 0.5 - 1.0 cm long, ellipsoid; stigma white, capitate. Fruits ovoid, 3.2 - 3.5 cm long, 1.0 - 1.2 cm across, pinkish-green, finely hairy; seeds red, arillate; aril of 5 - 6 short filaments twisting and enveloping the seed.

Types : A. S. Rao 56654 (A: Holotype CAL; B-D: Isotypes ASSAM).

Flowering : August - September. *Fruiting* : October - November.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Kameng District, Jamiri, A. S. Rao 56654 (A: CAL & B- D: ASSAM).

Notes : According to Rao & Hajra (*l.c.*): Allied to *H. dekianum* A. S. Rao & D. M. Verma, but differs in its robust habit; large spike; lax flowers; lip lacking a sinus and shorter stamen.

Collected originally from Kameng district but Cultivated in the woodlands Experimental Garden, Shillong, which bloomed after due acclimatisation and proved to be new species.

Hedyotis devicolamensis Deb & R. Dutta (Rubiaceae) in J. Bombay Nat. Hist. Soc. 82 (3): 619-621. 1985 (1986).

Shrubs or undershrubs, 1-2 m in height, branching above; stem quadrangular, or often with prominent ridges, grooved, glabrous. Leaves petiolate, 2.2-11 cm × 0.9-3.5 cm, ovate-lanceolate or elliptic-lanceolate, acuminate at apex, attenuate at base, coriaceous yellowish or pale green when dry, glabrous, rarely pubescent along the margin when young; nerves subopposite, 5-7, on either side, oblique, usually strong; petiole 3-10 mm long; stipules 2.4-4 mm × 7-8 mm, adnate to the petiole at base; pectinate, with 5-9 bristles, pubescent, glandular, black at apex. Inflorescence in terminal and axillary panicles short, stout, umbellate cyme. Flowers pedicelled, 7-10 mm long, heterostylous, bracteate and bracteolate; pedicel 0.5-1 mm long; bracts foliaceous, lanceolate; bracteoles small, fimbriate. Calyx 4-lobed, glabrous; hypanthium ovoid, 1-1.2 mm long; tube 0.8-1 mm long; lobes 2-3 mm × 1-1.5 mm, linear-lanceolate, acute, sparsely pubescent along the margin; dense raphides present all over. Corolla broadly tubular, white, or pale violet; tube 3.5-5 mm long, 1.5-2.5 mm broad, often as long as the calyx lobes. Corolla lobes 2-3 mm × 1-1.5 mm, oblong, acute, incurved and beaked at apex, puberulous outside, minute pubescent inside, dense pubescent at throat. Stamens 4, inserted at the sinus of corolla lobes, included or exserted; filaments 1-1.5 mm long in short styled flower, and 0.2-0.5 mm in long styled flower; anther 1-1.9 mm long, linear. Ovary 2-chambered, many-ovuled on median placenta; style 3-3.5 mm or 4-8 mm long, glabrous; stigma bifid, 0.8-1 mm long, fleshy papillose. Capsule subglobose to oblong, 5-6 mm × 2.5 mm, crustaceous, glabrous, dehiscent septically. Seeds 10-12, angular or plano-convex, narrowly winged, 0.8-1 mm × 0.5-0.6 mm; testa reticulate, brownish in colour.

Types : D. B. Deb 30480 (Holotype CAL) & 30481 (Isotype CAL).

Flowering & Fruiting : September-April*.

Distribution : INDIA : Kerala, Tamil Nadu.

Herbarium specimens : INDIA : Kerala; Kottayam District, Devicolam, Sept. 11, 1968, D. B. Deb 30480 & 30481 (CAL); Umैया Melei, 2025 m, Devicolam, Apr. 17, 1966, B. V. Shetty 27311

(Paratype CAL); Rajamallai, 1950 m, Feb. 2, 1970, *B. V. Shetty* 31783 (Paratype CAL); Devicolam, Jan. 25, 1964, *K. M. Sebastine* 18458 (Paratype CAL). Tamil Nadu; Brahmagiri sholas, 1380 m, *C. E. C. Fischer* 258 (CAL); Coimbatore District, Akkamalai, 1575 m, *J. Joseph* 13768 (MH); Akkamalai R. F. 1500m, *J. Joseph* 15534 (MH); Konalar, *R. Mahali* 65900 (CAL).

Notes : According to Deb & Dutta (*l.c.*): This is almost intermediate between *H. leschenaultiana* DC. and *H. eualata* (Bedd. ex Gamble) Henry et Subram., differing from *H. leschenaultiana* DC. in umbellate panicles, shorter pedicels, calyx lobes very long and corolla tube broader, and from *H. eualata* (Bedd. ex Gamble) Henry et Subram. in shorter flowering branches, shorter pedicels, calyx tube much produced above the hypanthium, corolla tube broader and capsule subglobose to oblong, amongst others. The plant is common at 1500 m - 2025 m in altitude.

Hibiscus hoshiarpurensis T. K. Paul & M.P. Nayar (Malvaceae) in *Bull. Bot. Surv. India* 25 (1-4): 188-189. 1983 (1985).

Perennial herb up to ca 1.5 m high. Stem erect, densely covered with both stiff and soft stellate and few simple hairs, nearly hirsute, without any prickles. Leaves 5.5-10 × 1-4 cm, lanceolate, apex acute, base cuneate to acute, margin irregularly serrate, with one prominent midvein, stellate pubescent on both surfaces; petioles 0.5-2.5 cm long, densely stellate pubescent, nearly hirsute. Stipules ca 5 mm long, linear, covered with simple and few stellate hairs. Flowers axillary, solitary; pedicels 1-4 mm long, not jointed, hairy. Epicalyx segments 10, free to the base, 0.8-1.3 cm long, linear, apex oblanceolate with 3-5 mm long linear appendage arising from the base of the oblanceolate tip, stiff hairy throughout. Calyx 1.2-1.7 cm long, campanulate, divided up to the middle, lobes 1.2-1.7 × 0.3-0.5 cm, deltoid, acuminate, with 1 prominent nerve, outside with stiff simple and stellate hairs, inside glabrous. Corolla bright yellow; petals 5, ca 2.5 cm long, outside sparsely stellate hairy. Staminal column ca 1.5 cm long, antheriferous throughout. Ovary ovoid-oblong, covered with white silky hairs, 5-loculed, many

ovules in each locule; style ca 1.8 cm long stigmas 5. Capsule ca 1.5 cm long and ca 1 cm across, shorter than the calyx, ovoid shortly beaked, densely hairy, dehiscing longitudinally into 5 valves. Seeds 3-4 × ca 2 mm, ovoid reniform, dotted with white scaly structures.

Types : O. P. Misra 41888 (A: Holotype BSD; B: Isotype CAL).

Flowering & Fruiting : September*.

Distribution : INDIA: Punjab.

Herbarium specimens : INDIA: Punjab; Hoshiarpur District, Dholbah, Sept. 22, 1970, O. P. Misra 41888 (A in BSD; B in CAL).

Notes : According to Paul & Nayar (*l.c.*): This interesting species is allied to *H. beddomei* Rakshit et Kundu but differs in having: Leaves lanceolate, unlobed, base cuneate to acute, 5.5-10 cm long, 1-4 cm across, petioles shorter (0.5-2.5 cm) and calyx longer than the capsule. While in *H. beddomei* Rakshit et Kundu leaves are ovate, slightly 3-lobed, base cordate, 5-9 cm long, 5-10 cm across, petiole longer (2.5-5.5 cm) and calyx equal to the capsule.

Hiptage jacobsonii R.C. Srivast. (Malpighiaceae) in Indian Forester 110 (5): 499. 1984.

Climbing shrubs. Branches woody, glabrous. Leaves linear-elliptic, 5.5-8.5 × 1.5-2.5 cm, acute at bases, shortly acuminate at apices, sub-coriaceous, glabrous; petioles 3-4 mm long, glabrous. Panicles axillary or terminal; peduncles 3.5-9 cm long, 0.75-1 mm thick, white appressed tomentose, bracts ca 1.75 mm long; bracteoles ca 1 × 0.75-1 mm. Buds globose or sub-globose, 4-8 × 4-5 mm; sepals 1.5-2 × 1-1.5 mm, calycinal glands 1 mm; petals 10-11 mm, denticulate; anthers ovoid ca 1 × 0.5 mm, filaments ca 5 mm long; styles 12-13 mm long. Samaras pale brown, ecristate; middle wings elliptic or oblanceolate, 38-43 × 10-11 mm, sometimes slightly broader in middle, tapering at both the ends, sub-acute or rounded at apices, glabrous; lateral wings obovate, 18-20 × 7-8 mm.

Type : A.T. Gage 146 (Holotype CAL).

Flowering & Fruiting : March-May.

Distribution : INDIA: Mizoram.

Herbarium specimens : INDIA: Mizoram (Lushai Hills); Acar Forest, Lunglab, 1000 m, A. T. Gage 146 (CAL); Laushai Hills (without locality), Mrs. Pary s.n. (Paratype CAL).

Notes : According to Srivastava (*l.c.*) : This species differs from the allied species *H. benghalensis* (L.) Kurz in having linear-elliptic leaves, thinner peduncles and pedicels, smaller calycinal glands, margins of petals denticulate or sub-denticulate (never fimbriate) and acristate samaras.

The specific epithet is in honour of Late Dr. M. Jacobs for his Contribution to the taxonomy of Malpighiaceae.

Hiptage nayarii R.C. Srivast. (Malpighiaceae) in Indian Forester 110 (5): 499 502. 1984.

Shrubs. Branches woody, rusty tomentose when young, glabrescent with age. Leaves ovate, 7 8.5 × 3 5 cm, bases obtuse or acute, apices abruptly acute, sometimes retuse, young leaves softly tomentose, sub-coriaceous, old ones glabrous and shining above, yellow brown or dull grey-brown beneath; sparsely pubescent on nerves beneath; petioles ca 5 × 1.5 mm, appressed tomentose. Peduncles axillary or terminal, ca 6 7 cm long, tomentose; bracts foliaceous, ovate, 5 6 × 2 mm; bracteoles very minute. Flowers white; pedicels 25 37 mm long, thickened below calyx, brown tomentose; buds oblong, ca 10 × 5 mm; sepals ovate, 4 5 × 1.5 -2 mm., white tomentose, calycinal glands circular, ca 2 mm in diam; petals obovate or sub-orbicular, ca 10 × 4 mm, denticulate, dorsally tomentose; anthers ovoid ca 1 × 0.5 mm, 9 filaments ca 5 mm long, glabrous, 1 filament ca 10 11 mm long, broader at base, glabrous; ovary sericeous, styles 10 12 mm long, sericeous at base, stigma linear.

Types : Sebastine 3673 (Holotype MH; Isotype CAL).

Flowering & Fruiting : June August.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA : Tamil Nadu; Tinnevely District,

Kil Manimuther (Bridge Falls), *Sebastine* 3673 (MH & CAL).

Notes : According to Srivastava (*l.c.*) : This species differs from the allied species *Hiptage sericea* Hook. f. in having ovate leaves with acute or retuse apices, exceptionally long pedicels, foliaceous bracts, abortive or very minute bracteoles, oblong buds and circular calycinal glands.

The specific epithet is in honour of Dr. M. P. Nayar for his valuable contribution in the field of Plant Taxonomy.

Hiptage thothathrii N.P. Balakr. & R.C. Srivast. (Malpighiaceae) in *J. Econ. Tax. Bot.* 4 (3): 985-986. 1983.

Climbers. Stems woody, glabrous; branches with distinct scars on nodes. Leaves-elliptic, 4.5-5.5 × 2.5-3.5 cm, acute at apices, obtuse at bases, glabrous; petioles 5-6 mm long, glabrous. Inflorescence appressed pubescent; pedicels 14-20 mm long, articulated at middle; bracts ca 2 mm long, pubescent; bracteoles abortive or very minute. Buds globose, 5-8 × 3-5 mm; sepals ovate ca 4 × 2 mm, red glabrous, apices rounded, calycinal glands ca 4 × 1 mm; petals sub-orbicular, ca 8 × 5 mm, white tomentose dorsally, fimbriate at margins; short filaments ca 6 mm long, long filaments 10-11 mm long; anthers ovoid, 1-1.5 mm long; ovary sericeous; styles ca 10 mm long. Fruits unknown.

Types : *Balakrishnan* 5377 (Holotype CAL; Isotypes PBL).

Flowering : March.

Distribution : INDIA: N. Andamans.

Herbarium specimens : INDIA : N. Andamans; Saddle Peak, 600-700 m above m. s. l. , *Balakrishnan* 5377 (CAL and PBL).

Notes : According to Balakr. & Srivastava (*l.c.*): This species differs from the allied species *H. parvifolia* W. & A. in having smaller leaves with acute apices, red glabrous sepals and smaller calycinal glands.

This specific epithet is in honour of Dr. K. Thothathri.

Homalium jainii A.N. Henry & Swamin. (Flacourtiaceae) in *J. Bombay Nat. Hist. Soc.* 78 (3): 570-572. 1981.

Trees up to 30 m tall; branches glabrous. Leaves 4-11 × 1.5-4.5 cm, alternate, narrowly oblong to elliptic-lanceate, somewhat coriaceous, glabrous, shining, subentire, gradually acuminate at apex, narrowed into the petiole or obtuse at base; nerves 7-9 pairs, veins distinctly reticulate on both sides; petioles 6-12 mm long, grooved. Flowers 10-12 mm across, greenish yellow, 6-9-merous, scattered in shortly grey tomentose simple racemes up to 20 cm long; pedicels up to 10 mm long, articulated; bracts c 4 × 2 mm, ovate-oblong, subacute, grey tomentose, caducous. Calyx-tube c 4 mm long, obconic, grey tomentose; sepals 5-8 × 1.5-3 mm, oblong to spatulate, obtuse at apex, nerved, tomentose, accrescent. Petals 4-7 × 1.5-3 mm triangular-oblong, similar to the sepals but remaining shorter, tomentose, connivent after anthesis. Disc-glands obovate, slightly lobed, opposite each sepal, velvety. Stamens in fascicles of 6-7 before each petal; 3 between the disc-glands and the rest inserted on the base of petals above the level of disc-glands; filaments 4-5 mm long, sparsely pilose. Ovary tomentose; styles 6-9.

Types : Henry 68929 (Holotype CAL; Isotypes MH-Acc. Nos. 107307-107316).

Flowering : October*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA : Tamil Nadu; Kannyakumari District, on the way to Muthukuzhivayal from Balamore, 1000 m, Oct. 5, 1980, Henry 68929 (CAL & MH Acc. Nos. 107307-107316).

Notes : According to Henry & Swaminathan (*l.c.*): It is allied to *Homalium gradiflorum* Benth. but differs in leaves being narrowly oblong to elliptic lanceate and gradually acuminate at apex; also allied to *Homalium minahassae*, Koord. but differs in having much smaller and narrowly oblong to elliptic lanceate leaves.

Rare in dense evergreen forest, up to 1000 m; also noticed along streams and riverbeds in rocky places.

Observations reveal that this tree flowers very rarely. It is of interest to note that its allied species *Homalium grandiflorum* Benth. distributed in Indo-China, Thai-land, Lower Burma, Malaya Peninsula and Borneo is also reported to flower once in 25 years only.

Homalium Sect. *Pierrea* (Hance) Warb. was so far represented by five species distributed mostly in Philippines, Thailand, Lower Burma, Malaya Peninsula, Java, Borneo and Celebes. Hence the discovery of *H. jainii* Henry & Swamin. in the Western Ghats of Peninsular India extends the distribution of sect. *Pierrea* to the mainland of India which is of Phytogeographical interest.

This species is dedicated to Dr. S. K. Jain, Former Director, Botanical Survey of India, Howrah for his significant contributions to Indian Botany.

***Humboldtia unijuga* Bedd. var. *trijuga* J. Joseph & V. Chandras. (Caesalpiniaceae) in J. Bombay Nat. Hist. Soc. 81(3): 729-730. 1984 (1985).**

Trees 10-15 m high; trunk 15-20 cm in diam., bark greyish brown; branches slender, spreading, branchlets terete, nodes not constricted. Leaves paripinnate, usually with three pairs of leaflets (rarely two or four to five pairs), stipulate; main rachis up to 8.5 cm long with a swollen pulvinous, very narrowly winged between the leaflets. Leaflets 5.2-17.5 × 1.6-5.0 cm, sessile or subsessile, very in size and shape, lanceolate, oblanceolate, elliptic to oblong, coriaceous, glabrous, above, glabrescent below, abruptly acuminate at apex, unequal and oblique at base; main nerves up to 11 pairs forming intra-marginal loops, prominent on lower surface; midrib swollen at base below, more or less warted. Stipules up to 3.2 × 1.1 cm, erect, united along the outer margin about half of its length, lanceolate, oblique at base, bereft of appendage (spur). Flowers bright pink, in fascicles or in very short racemes from tubercles of main trunk or axillary from leafy branchlets, not wide opening. Bracts ± 2.0 × 1.2 mm, ovate, pubescent, acute. Pedicles up to 1.75 cm long, slender, pubescent. Bracteoles two, ± 10 × 7 mm, free, obovate to oblong, pubescent outside, glabrous inside except at base and margins, concave, obtuse to sub-acute. Calyx with a short tube (± 5 mm); lobes four, 8.0-13.0 × 5.0-10.0 mm, imbricate, unequal, elliptic-oblong to obovate, pubescent outside, sparsely puberulous inside, obtuse or subacute. Petals five, each 12.0-17.5 × 7.0-13.0 mm, pink, obovate, glabrous outside, sparsely puberulous at base within,

abruptly obtuse to subacute at tip, shortly clawed at base. Stamens five, ± 2 cm long, alternating the petals, exerted; filaments bright pink, glabrous except at base; anthers ± 4 mm long, oblong, versatile; staminodes five, minute (± 1 mm long), erect, glabrous and acicular at tip, densely pubescent and pinkish at base. Disc densely pubescent. Ovary ± 8 mm long, stipitate, pubescent; style ± 1.8 cm long, glabrous above, pubescent at base; stigma capitate. Immature pod 6.0 10.5 \times 1.0- 2.5 cm, oblong, oblique, puberulous, compressed with persistent stylar beak.

Types : Joseph 44511 (Holotype CAL; Isotypes MH- Acc. Nos. 85902, 85903 & 118572 118574).

Flowering & Fruiting : August October.

Distribution : INDIA: Keala.

Herbarium specimens : INDIA: Kerala; Trivandrum District, Kovilt therimalai near Bonaccord Estate, Oct. 2, 1973; Joseph 44511 (CAL & MH-Acc. Nos. 85902, 85903, 118572 118574; *ibid.*, Aug. 25, 1975, Joseph 55994 (MH Acc. Nos. 118575 118578).

Notes : According to Joseph & Chandrasekaran (*l.c.*): Allied to *H. Unijuga* Bedd. var. *unijuga* but differs mainly in the leaflets being three paired (very rarely two-or four to five paired) instead of one paired and in having five staminodes instead of none.

Hypericum benghalense S. N. Biswas (Hypericaceae) in Bull. Bot. Surv. India 29 (1 4): 53. 1987 (1989).

Glabrous shrubs, 0.8 1.3 m tall. Stems spreading, stout, terete, reddish brown in colour, branches and branchlets (in young) 4 lined gradually 2 lined to terete. Leaves sessile, 1.6 4 \times 0.7 1.6 cm, chartaceous, ovate to elliptic-lanceolate, subattenuate at base, acute, rarely subapiculate at apex, entire, glabrous on both surfaces, rarely punctate, venation obscure at the top prominent beneath. Flowers showy yellow, in 1 2 (-3)- clymbose cymes, 1 5 cm across; bracts 9 10 mm long, linear lanceolate. Sepals 5, 6 7 (-8) mm long, elliptic to elliptic-oblong, acuminate at apex, entire. Petals 5, yellowish 1.9 2.9 cm long, entire, obovate,

prominently veined with few black glands. Stamens 5 adelphous, 1.8-2.1 cm long, c 22 in each fascicle, filaments unequal, glabrous. Ovary 6-8 mm long, ovate-oblong. Styles 1.1-1.3 cm long free, gradually divergent; spreading apex. Capsules 1.5-1.6 cm long, ovate-oblong with vittae. Seeds 1-1.1 mm long, apiculate at both ends; testa finely reticulate longitudinally and transversely.

Types : S. K. Mukherjee 5094 (Holotype CAL; A and B: Isotypes CAL).

Flowering & Fruiting : June - October.

Distribution : INDIA : West Bengal.

Herbarium specimens : INDIA: W. Bengal; Darjeeling, Kalimpong, 1060 m, June 2, 1959, S. K. Mukherjee 5094 (CAL); *ibid.*, S. K. Mukherjee 5094 A and B (CAL).

Notes : According to Biswas (*l.c.*): *H. benghalense* S. N. Biswas is closely allied to *H. dyeri* Rehder in many characters but differs in having leaves completely sessile with subattenuate leaf base, sepals shorter than stamens, ovate-oblong ovary and capsule.

Known only from West Bengal- Kalimpong in Darjeeling district.

Hypericum hookerianum Wt. & Arn. var. *dentatum* S.N. Biswas (Hypericaceae) in Bull. Bot. Surv. India 25 (1-4): 195-196. 1983 (1985).

Glabrous shrubs 1.5-2 m tall. Stems stout, terete, reddish-brown in colour; branches and branchlets terete to slightly angular, compressed. Leaves sub-sessile 2-5 × 1-1.8 cm, ovate-oblong to broadly lanceolate, subrotund to cuneate at base, obtuse to subacute and mucronulate at apex, entire, glabrous on both surfaces, under surface gland-punctate with few black dots. Flowers showy yellow, in 1-3 corymbose cymes, 2-3.5 cm across; bracts deciduous; pedicels stout, subterete to angular, 0.7-1.2 cm long. Sepals 5, (-0.6) 0.7-0.8 cm long, chartaceous to subcoriaceous, obovate, acute at apex, closely dentate towards the top and distantly dentate towards the bottom, persistent. Petals 5, yellowish, 1.7-2 cm long, obliquely obovate, punctate with few black and brown

glands. Stamens 5 adelphous, 0.6–0.9 cm long, numerous in each bundles, filaments unequal, glabrous. Ovary 0.7–1 cm long oblong to ovate oblong; styles 5, free recurved, shorter than ovary. Capsules 1.2–1.4 cm, ovate-oblong tipped with persistent styles. Seeds brownish black \pm 0.5 mm long, oblong to broadly oblong, shortly apiculate, with longitudinal ribs and fine transverse striae in between the ribs.

Type : *K. M. Sebastine* 24992 (Holotype CAL).

Flowering & Fruiting : June–September.

Distribution : INDIA: Tamil Nadu, Sikkim & Meghalaya.

Herbarium specimens : INDIA: Tamil Nadu; (Madras); Perumalmalai, Kodaikanal, \pm 2000 m, July 27, 1965, *K. M. Sebastine* 24992 (CAL); Vattakanal-Kodaikanal, 1900m, Sept. 18, 1968, *D.B. Deb* 30963 (Paratype MH). Sikkim Himalaya; below Changu, 3040 m, Sept. 22, 1926, *J. C. Dawa* 167 (Paratype CAL). Meghalaya: Moflong, June 25, 1949, *M. L. Saikia* 22676 (Paratype ASSAM).

Notes : According to Biswas (*l.c.*) : The new variety differs from the var. *hookerianum* in having its sepals acute at apex closely dentate towards the top and distantly dentate towards the bottom.

***Hypericum humifusum* L. subsp. *suborbiculatum* S.N. Biswas** (*Hypericaceae*) in *Bull. Bot. Surv. India* 29 (1–4): 53–54. 1987 (1989).

A glabrous decumbent or procumbent herb, 5–15 cm tall rooting at the base. Stems subterete to 2-lined, unbranched. Leaves 3.5–9 \times 3–8 mm suborbicular rounded at apex and base, subsessile, petiole up to 1.1 mm long, punctate with black or translucent dots below veins obscure at the top, considerably prominent below but not raised. Inflorescences in terminal cymes, 1–3 flowered, 3–8 mm across; bracts leafy, entire with translucent or brown dots. Flowers pedicels 3–5.5 mm long. Sepals 2.5–2.7 \times 1.2–1.5 mm, lanceolate or broadly so, entire with sessile marginal black glands. Petals 3.2–3.5 mm long, with black dots at the margins or at the apex. Ovary 2.5–2.7 mm long ovoid elliptic, styles 3, 2–2.5 mm long, free, stigma capitellate. Capsules 3.8–5 \times 2.5–2.8 mm, ovate

elliptic, longer than sepals. Seeds \pm 0.6 mm, oblong, rounded at both ends, testa reticulate-scalariform.

Types : *Stainton, Sykes & Williams* 3374 (Holotype CAL; Isotype DD).

Flowering & Fruiting : July September.

Distribution : INDIA: W.Bengal; NEPAL.

Herbarium specimens : INDIA: W. Bengal; Darjeeling District, *S. K. Mukherjee & Party* 645 (Paratype CAL). NEPAL: Near Jagat; 8500 ft. (by small stream in grass, flowers yellow), July 5, 1954, *Stainton, Sykes & Williams* 3374 (CAL, DD).

Notes : According to Biswas (*l.c.*) : *Hypericum humifusum* subsp. *suborbiculatum* S. N. Biswas, is easily recognizable having leaves 3.5-9 \times 3-8 mm, suborbicular; pedicels 3-5.5 mm long. Sepals 2.5-2.7 \times 1.2-1.5 mm, lanceolate to broadly lanceolate with ovate-elliptic capsule 3.8-5 \times 2.5-2.8 mm. Whereas *H. humifusum* L. subsp. *humifusum* is characterized by having leaves 6-14 \times 5-10 mm, oblong or obovate to oblanceolate, pedicels 1.6-1.8 mm long; sepals 3-8.4 \times 2-2.2 mm, ovate to ovate-lanceolate with globose capsule, 4-4.5 \times 3-3.2 mm.

The holotype and the paratype of subsp. *suborbiculatum* S. N. Biswas were misidentified as having affinity with *H. monanthemum* Hook. f. et Thoms. ex Dyer (in Sched. affin. *H. monanthemum*). After a thorough study of the Indian species of the section of *Hypericum*, it can be said without doubt that the subsp. *suborbiculatum* is best suited under the section *Hypericum* and not with the section *Adenosepalum* Spach, in which *H. monanthemum* is generally included by the recent workers, (cf. Robson in Bull. Brit. Mus. Nat. Hist. Bot. 5 (6): 335. 1977). Section *Adenosepalum* has marginal glands or ciliate glands on margins of both sepals and bracts; on the other hand, *H. humifusum* subsp. *suborbiculatum* shows eciliate sepals and bracts throughout.

Subsp. *suborbiculatum* S. N. Biswas is assigned to *H. humifusum* L. as a distinct subspecies as its population is distinctly disjunct in distribution with *H. humifusum* subsp. *humifusum*, the former occurring only in the Eastern and Central parts of Himalayas,

whereas subsp. *humifusum* is localized in its distribution in parts of Tamil Nadu and Karnataka regions of India and in Sri Lanka.

Hypoestes andamanensis Thoth. (Acanthaceae) in Reinwardtia 7 (Part 1) : 1-3. (1965).

A herbaceous undershrub about 60 cm high, branches quadrangular, longitudinally furrowed on opposite sides, glabrous but puberulous at nodes. Leaves exstipulate, petiolate, opposite, simple, subequal, ovate to ovate-oblong, 5.4-13.2 × 2.0-4.5 cm, broadly crenate, acute, narrow and decurrent at base, puberulous on both sides; lateral nerves 7-10 pairs, ascending and united near the margin; petiole 7-17 mm long. Inflorescence axillary and terminal, 1.3-3.0 cm long; flowers in clusters of 3-10 spikelets; bracts 4, in 2 whorls of 2 each, outer whorl connate below and together with inner whorl form an involucre; involucre 8-10 mm long, sparsely puberulous outside, subtended by a subulate bract-like structure; involucral bracts lanceolate, 1-3 nerved, acute to acuminate, inner whorl slightly shorter than the outer; each involucre encloses inside 1 fertile and 1-2 rudimentary flowers, rarely 2 fertile, and 1 rudimentary flower bracteoles hyaline, margin ciliate, 3-3.5 mm long. Calyx 5 sepals, united to form a tube, hyaline, puberulous, 3-4.5 mm long. Corolla pink, puberulous outside, 1.5-2.0 cm long, tube narrow below, bilabiate above; upper lip strap-shaped, entire, acute, parallel nerved; lower lip wider, 3-nerved, 3-lobed; each lobe rounded, middle lobe larger than laterals. Stamens 2, epipetalous, 8 mm long, filaments flat, distinctly veined, sparsely hairy below, anthers 1-celled, mucicous. Ovary superior, oblong, glabrous, 2-celled, ovules 2 in each cell; style slender; stigma bifid. Capsules ellipsoid, 7-9 × 2-2.5 mm, stalked, acute at apex with a mucro, valves longitudinally furrowed on the dorsal side, 2-seeded; seeds ovoid to oblong, 2-3 × 1-2 mm, glabrous, compressed, verrucose, retinacula oblong to conical, white, well developed.

Types : *Thothathri* 9157 (A: Holotype CAL; B-H: Isotypes CAL).

Flowering & Fruiting : February*.

Distribution : INDIA : Andaman Islands.

Herbarium specimens : INDIA: Andaman Islands; North Andaman, forest of Austin II, 30 m, Feb. 1, 1959, *Thothathri* 9157A-H (CAL).

Notes : According to Thoth. (*l.c.*) : Allied to *H. purpurea* (L.) Soland. ex Roem. & Schult. but differing in the inflorescence, shape of involucre bracts and size of capsule.

It is interesting to point out that this plant was found growing in association with other Acanthaceae plants such as *Lepidagathis incurva* D. Don, *Eranthemum palatiferum* Nees, and *Daedalacanthus suffruticosus* T. Anders. All these plants together form a part of the forest undergrowth in Austin II forests, North Andaman.

***Hypoestes thothathrii* Vasudeva Rao & Chakrab. (Acanthaceae)** in J. Econ. Tax. Bot. 5 (4): 989-990. 1984.

Erect herbs, 60-70 cm tall; branchlets terete, 1-7 mm thick, yellowish, glabrous, smooth, subquadrangular and striate when young. Leaves opposite, ovate-elliptic, 7-20 cm long, 2.5-7 cm broad, attenuate at base, entire to shallowly crenate, acute to shortly acuminate (acumen up to 10 mm long), membranaceous, glabrous, on drying green or brownish-green above, greenish beneath; lateral nerves 7-11 pairs, ± prominent and uniformly curved, branching near the margin or joining the superadjacents forming loops; minor nerves indistinct to faint above, somewhat prominent beneath reticulate, petiole 1.3-5 cm long, 0.5-1.2 mm thick. Inflorescences axillary and terminal, arising singly, spiciform, 2.5-6 cm long, glabrous, usually shortly pedunculate (peduncle up to 5 mm long); involucre bracts 2+2 (subtended by successively smaller, spatulate to linear, 6-15 mm long subfoliaceous appendages), lanceolate-attenuate, externally glabrous to subglabrous, 2.5-3 mm diam., the outer whorl 10-14 mm long, connate below into a short tube, the inner whorl alternating with the outer and connate to them at base, free from each other, 9-12 mm long, 1-1.8 mm broad; each involucre enclosing 1 fertile and 1 rudimentary flower; bracteoles linear, ca 4 mm long. Flowers: shortly stipitate (ca 0.5 mm long); calyx 6-7 mm long, very unequally 5-segmented; calyx tube ca

2 mm diam., puberulous outside; segments triangular subulate, 1.2-3 mm long; corolla pink (*Teste collectore*), scattered white puberulous outside, glabrous inside, 2.5-3 cm long, connate below into a tube (10-12 × 1.5-2 mm), bilabiate above; upper lip strap-shaped, 12-14 mm long, 1.8-2 broad, rounded at apex; lower lip much broader, 16-20 mm long, 6-7 mm broad, 3-lobed at apex (the lobes rounded); stamens 2, 13-14 mm long; filaments sparsely puberulous; anthers 1-celled, narrow, ca 3 mm long; ovary oblong, ca 2 mm long, ca 1 mm diam., glabrous, bilocular; locules biovulate; style 15-20 mm long, slender; stigma bifid. Capsules more or less oblong, 10-10.5 mm long (incl. the short stipe), ca. 2.5 mm diam., acute at apex, 2-seeded; seeds oblong, ca 4 mm long, ca 2.2 mm broad, verruculose.

Types : Vasudeva Rao 8601 (A: Holotype CAL; B-C: Isotypes PBL).

Flowering & Fruiting : January*.

Distribution : INDIA: Andaman Nicobar Islands.

Herbarium specimens : INDIA: Andaman-Nicobar Islands; South Andamans, Rutland Island, Barakhari (N. S. Road, 14 km onwards), Jan. 21, 1982, Vasudeva Rao 8601 (A in CAL; B-C in PBL).

Notes : According to Vasud. & T. Chakrab. (*l.c.*) : Closely related to *Hypoestes andamanensis* Thoth. but differs in the glabrous leaves, the longer petiole, the longer inflorescences, the larger involucral bracts, the larger flowers and the larger capsules.

Undergrowth in inland forest, Occasional.

The species is named in honour of Dr. K. Thothathri Ex-Joint Director, Botanical Survey of India.

Illigera gammiei M.P. Nayar & G.S. Giri (Hernandiaceae) in Bull. Bot. Surv. India 25 (1-4): 249-251, 1983 (1985).

Large woody climber stem hollow, longitudinally striate, bark greyish, glabrous or minutely brownish pubescent in the younger parts. Leaves palmately trifoliolate, ovate, (8.0-) 10.0-14.0 (-15.5) × (4.0-) 5.0-6.5(-7.2) cm, apex acute to acuminate, sometimes apiculate;

base usually deeply cordate and sides of the lamina overlapping at the base, rarely subcordate; margin entire, distinctly revolute; 6-8 pairs of nerves arising from the midrib, nerves raised on the lower surface, reticulation prominent; upper surface glabrous, smooth and shiny, lower surface glabrous except for tuft of long, crisped, yellow hairs in the nerve axils, thick coriaceous, upper surface turns dull green to greenish-grey and lower surface becomes grey to greyish-brown on drying; petioles strong, usually remain straight, or upper part sometimes bending, 6-10 cm long, glabrous, longitudinally striate; petiolules (10-) 13-18(-28) mm long, strong, straight or curved, glabrous. Infructescens, axillary or terminal, lax cymose panicle, rachis and peduncle remain glabrous or minutely brownish pubescent in the upper part. Flowers not known. Fruiting petioles up to 10 mm long. Fruits prominently 4-winged; lateral wings 5.0-6.0 × 4.5-5.2 cm, thick with prominent lines make distinct ridges and furrows, ovate or broadly triangular in outline, distal end obtuse to subrounded, margin with distinct crenatures, glabrous and shiny on both sides, dark brown in colour; dorsal wing broadly ovate to hemispherical, rarely triangular (18-) 22-28 (-30) × (9-) 13-18 (-22) mm, apex usually rounded; ventral wing comparatively smaller, sometimes remains as a ridge, (12-) 15-20 (-23) × (5-) 6-10 (-13) mm; both dorsal and ventral wings with ridges and furrows like the lateral wings or sometimes become smooth, crest slightly elevated.

Types : G. A. Gammie 142 (A: Holotype CAL; B-E: Isotypes CAL).

Fruiting : March*.

Distribution : INDIA: Assam.

Herbarium specimens : India: Assam; Makum, Dihing River, Mar. 19, 1894, G. A. Gammie 142 A-E (CAL).

Notes : According to Nayar & Giri (*l.c.*): The species is closely related to *I. khasiana* C. B. Clarke, but can be distinguished by: Fruits distinctly 4 winged, lateral wings longer than broad, ovate to broadly triangular in outline, 5.0-6.0 × 4.5-5.2 cm., obtuse to subrounded at distal end; leaves thick coriaceous, ovate-acuminate, base deeply cordate and sides of the lamina overlapping at the base, whereas the species *I. khasiana* C. B. Clarke, is characterised by:

Fruits strictly 2 winged, lateral wings broader than long, nearly orbicular in outline, 3.0 4.0 × 3.5 5.0 cm, rounded at the distal end; leaves chartaceous to thinly coriaceous, broadly ovate to ovate-oblong, apex usually apiculate, base sub-rounded to shortly cuneate.

The species is named after its collector, G. A. Gammie who made an extensive collection in Assam and Meghalaya.

Impatiens agumbeana Bhaskar & Razi (Balsaminaceae) in J. Bombay Nat. Hist. Soc. 79 (2): 382 383. 1982 (1983).

Epiphytic scapigerous perennial herb, c 10 cm tall, tuberous; leaves 2 5, radical; petiole 3 4 cm long, filiform; lamina 1.5- 1 cm, ovate, obtuse, base acute, margins faintly crenate, crenatures minutely apiculate, pubescent above; flowers in erect scapes, pinkish scape, c. 10 cm long, slender; bracts linear or ovate; pedicels filiform, c 1 cm long, glabrous; sepals ovate, acute, base slightly cordate, 3 nerved, lateral nerves with a short upcurved vein not reaching the apex, margins entire; lip flat, spatulate, 4 mm long; spur straight, 5 mm long, slightly curved, obtuse, cylindrical; standard orbicular wings 11 mm long, 3 lobed, distal lobes more or less confluent, proximal lobe distinct and smaller; dorsal auricle prominent, c 4 mm long, venation open dichotomous; capsules ovoid, many seeded; seeds oblong, brownish, hairy, hairs dense and elongated at either ends of seeds, spirally banded.

Types : Bhaskar 386 (Holotype) & 386 (Isotypes MGM Herbarium, Manasgangotri, Mysore University).

Flowering & Fruiting : July September.

Distribution : INDIA : Karnataka.

Herbarium specimens : INDIA: Karnataka; Shimoga District, Agumbe, Sept. 29, 1973, Bhaskar 386 (MGM).

Notes : According to Bhaskar & Razi (*l.c.*): The species under section *scapigerae* differs from its near relatives *I. stocksii* and *I. lawsonii* in having a distinct cylindrical spur, about 4 mm long, enclosing a distinct dorsal auricle 3 4 mm long, and a slightly lobed distal lobe of wing, wings with open dichotomous venation.

It is rare epiphytic species occurring on huge tree trunks with moss and hygroscopic ferns in sholas. In *I. stocksii* and *I. lawsonii* which are the near relatives of *I. agumbeana* wings have reticulate venation while in the present¹ described taxon wings have open-dichotomous venation. There is also difference in the chromosome number in all the three species. In *I. agumbeana* $n=8$, whereas in *I. stocksii* and *I. lawsonii* $n=7$ and $n=10$ respectively. Further the Genus *Impatiens* L. (Balsaminaceae) has its greatest development in the Indian region and is remarkably local and has maximum amplitude in two well defined regions, namely the himalaya in the North and the Western Ghats in the South. There is no doubt in respect of *Impatiens*, the Western Ghats are the second richest area in the subcontinent and perhaps in the world. The genus contains over 200 species in India, of which 86 species occur in South India as reported earlier by Hooker (1904), Gamble (1915), Blatter (1933), Fischer (1936), and Barnes (1939). Among them, at least 90 percent of the species are restricted to hills of South India. The most important centre of speciation of this genus being in South India (Bhaskar 1981), the species of *Impatiens* have and individuality separate from these recorded from the north or elsewhere. Two of the sections viz., "Scapigeræ" and "Epiphyticae" are exclusively confined to peninsular India. A new "Epiphyticae" species *I. urceolata* Bhaskar has been already recorded as a new species from South India (Bhaskar and Grey-Wilson). Endemism in *Impatiens* has also been reflected in their pollen characters and a "pollen variety" of *I. acaulis* has been reported (Bhaskar et al. 1975).

The species is named after the place of its collection.

Impatiens konalarensis Chandrab., V. Chandras. & N.C. Nair (Balsaminaceae) in J. Bombay Nat. Hist. Soc. 81 (3): 676. 1984 (1985).

Herbs 20- 75 cm high, rooting at lower nodes. Leaves 1 9 × 0.7 4.5 cm, alternate, ovate or elliptic-ovate, crenate, glabrous excepting the nerves, acute or acuminate at apex; base rounded or subacute, sometimes inequilateral; lateral nerves 4 6 pairs, arcuate; petioles up to 6.5 cm long, slender, glabrous. Flowers 1.2 1.5 cm

across, pink, few in contracted racemes; peduncles up to 4 cm long, axillary, slender, glabrous; pedicels ± 7 mm long, slender, glabrous; bracts $\pm 4.2 \times 2.5$ mm, ovate-lanceolate, acuminate, glabrous. Sepals 3; laterals 2, each $\pm 4.5 \times 2.5$ mm, green with pink tinge, obliquely ovate, acute or acuminate, glabrous; posterior sepal $\pm 8.5 \times 5.5$ mm, pink, ovate elliptic, concave, acuminate, glabrous; spur absent. Petals 3, pink; standard petal $\pm 6.5 \times 3.5$ mm, ovate-lanceolate with a pointed acumen, concave, glabrous; wing petals 2, each $\pm 12 \times 5$ mm, glabrous, 2-lobed; terminal lobe $\pm 11 \times 5$ mm, obovate or semi-circular, rounded at apex, auricled at base; side lobe $\pm 5.2 \times 2.5$ mm, oblong, obtuse at apex. Stamens five; filaments ± 4 mm long, free, shortly connate at apex; anthers ± 1 mm long, cohering. Ovary $\pm 3 \times 1$ mm, ovate-elliptic, acute at apex, glabrous; stigma sessile, 5-toothed. Capsules $\pm 9 \times 4$ mm, obliquely ellipsoid, beaked, glabrous; seeds $\pm 4.5 \times 3$ mm, ovoid, tubercled, glabrous.

Types : Chandrasekhar 69013 (Holotype CAL; Isotypes MH Acc. Nos. 126620 126626).

Flowering & Fruiting : November*.

Distribution : INDIA : Tamil Nadu (Madras State).

Herbarium specimens : INDIA: TamilNadu; Coimbatore District, Anamalai, Konalar, Nov. 18, 1980, Chandrasekhar 69013 (CAL, MH Acc. Nos. 126620 26).

Notes : According to Chandrasekhar, Chandrasekaran & Nair (*l. c.*): Allied to *Impatiens elegans* Bedd., but differs in having flowers smaller; standard petal ovate-lanceolate; terminal lobe of wing petal obovate or semicircular; and seeds glabrous, tubercled.

This herb grows usually in the sholas near streams at an altitude of 1950 m.

Impatiens majumdarii L. K. Ghara & Ghora (Balsaminaceae) in *J. Econ. Tax. Bot.* 17 (1): 139. 1993.

Herbs or shrubs up to 1.2 m high; stems branched, nodes swollen, green, often tinged with red. Leaves usually alternate, opposite at apical part, $4 \times 1.4 - 3.5$ cm, elliptic to lanceolate, base cuneate, acuminate at apex, margin crenate to serrulate,

glandular, crenation 3-5 mm apart lower teeth with 1-1.5 mm long glandular bristles, deep green and slightly puberulous above, whitish and glabrous or rarely puberulous beneath, lateral veins 6-8 pairs; petioles 2-19 mm long, glabrous, smooth; stipules 1-1.5 mm long, fimbriate. Flowers usually axillary, in fascicle of 2-3 flowers, bluish violet. Peduncle 3.5-4 cm long, glabrous, slender; pedicels 1.7-2 cm long. Bracts 1-1.5 mm long, glandular at tip, ovate. Lateral sepals 2, 2.5 × 1 mm, ovate-lanceolate, glabrous, green. Lower sepal 11-18 mm long, navicular, abruptly constricted into a 25-30 mm long, curved filiform spur. Dorsal petal 8-10 × 10-12 mm, obcordate-suborbicular, with a shallow crest terminating in acute point. Lateral united petals 20-27 mm long, with a short appendage inserted opposite the sinus of the upper and lower lateral petals; upper petal of each pair 8-10 mm long and 8-11 mm broad, ovoid; lower petal of each pair 12-17 mm long and 11-14 mm broad with a slight emargination distally along the inner margin, elliptic or obovate. Capsule 14 × 2 mm, fusiform.

Types : *Majumdar & Ghara* 1 (A: Holotype CAL; B - E: Isotypes CAL).

Flowering & Fruiting : July - October.

Distribution : INDIA : Meghalaya.

Herbarium specimens: INDIA: Meghalaya; Shillong, Pologround, 1525 m, July 10, 1976, *Majumdar & Ghara* (A - E in CAL).

Notes : According to Ghara & Ghora (*l.c.*) : Grows in shady moist places by the side of the stream and damp hill slopes.

The species is named in honour of Dr. R.B. Majumdar, Ex Regional Botanist, Botanical Survey of India.

Impatiens raziana Bhaskar & Razi (Balsaminaceae) in *J. Bombay Nat. Hist. Soc.* 79 (2): 382 - 383. 1982 (1983).

Annual herbs, prostrate or procumbent, 6 cm long, rooting at nodes, roots fibrous; branchlets arising from basal nodes, opposite, 7-8 cm long; stems quadrangular, glabrous, herbaceous; leaves opposite, ovate or spatulate, 4 × 7 mm, base attenuate, extipulate,

petiolate, apex obtuse, glabrous; flowers solitary, axillary, scarlet, erect; pedicels 7 mm long, very finely pubescent; sepals linear, elliptic, faintly serrulate, veins 3, median distinct, furuculate, furuncles parallel; lip with a very minute spur, arising slightly above the base of lip, lip yellow-tinged, acute; standard ovate, more or less mucronate, glabrous; wings ovate, 2 lobed, smaller lobe fin-shaped, transparent, honey guides prominent; filaments subulate, unequal; carpels ovoid, 2 mm long; capsules glabrous, 3-5 mm long, 2-4 seeded; seeds shiny, black, smooth, globose.

Types : *Bhaskar* 311 (Holotype) & 311 (Isotypes MGM- Herbarium, Manasagangotri, Mysore University).

Flowering & Fruiting : August-September.

Distribution : INDIA: Karnataka.

Herbarium specimen : INDIA: Karnataka; Charmad Ghat (Chickmagalore District), Kotegehar Aug. 26, 1972, *Bhaskar* 311 (MGM).

Notes : According to *Bhaskar & Razi (l.c.)*: Closely related to species complex of *I. oppositifolia*, *I. chinensis*, *I. rivulicola*, but differs in having scarlet flowers, prostrate habit with quadrangular stem; lip with very minute or rudimentary spur arising slightly above the base of lip. It is under section "Annuae".

A rare scarlet balsam, which occurs on grassy plains near Kotegehar, associated with *Justicias*, *Borrerias* and grasses. The species very closely resembles *Lindernias* from distance and escapes notice. Its pollen mass is scarlet in colour. The species is named after Prof. B. A. Razi, former professor of Botany, Mysore University.

***Indigofera byansghatensis* Sas. Biswas (Papilionaceae) in Ind. J. For. 6(4): 318-320. 1983 (1984).**

Shrub, woody, erect, deciduous. Bark brownish, ± smooth, shining. Leaves imparipinnate, 1.3-1.5 cm. Leaflets opposite, oblong, mucronate, adpressedly hairy on both surfaces, hairs eglandular, petiolule 0.6-1 mm. Racemes 2.2-2.5 cm, ± pubescent, pedicels

1.5–2 mm. Flowers many, densely arranged 0.8–1 cm long. Bract 1, 3.5–4 × 2.5 mm, cymbiform, acute, with brown and stiff hairs, ± longer than young buds. Calyx 3 × 2–2.5 mm, hairy. Sepals 1 × 0.5 mm, oblong or ± orbicular, apex obtuse, margin not hairy, claw very small. Wing 8 × 2 mm, apex acute, hairy, auricle ± equal to claw. Keel 8.7–9 × 1.8–2 mm, margin ± hairy, auricle 1 mm long. Stamens 9 + 1, 7–7.5 mm long, anthers 0.5–0.6 mm, apiculate. Ovary 7.6–0.6 mm, linear, glabrous, style 2–2.3 mm.

Type : A. E. Osmaston 245 (Holotype DD).

Flowering : February*.

Distribution : Uttar Pradesh.

Herbarium specimen : INDIA : Uttar Pradesh; Garhwal Byansghat, 1800', Feb. 11, 1914, A. E. Osmaston 245 (DD).

Notes : According to Biswas (*l. c.*): The genus *Indigofera* is widely distributed in the Indian subcontinent. Ali (1958), in his work on the revision of this taxon from West Pakistan and North-Western Himalaya, has mentioned 26 species.

The plant resembles *I. cassioides* Rottl. ex DC. (= *I. pulchella* Roxb.) to some extent but differs in 1.3–1.5 cm long rachis, leaflets 6–13, 3.5–5 × 2.5–3 mm. Calyx 3 × 2–2.5 mm, sepals 2 × 1 mm, standard 9 × 5.5 mm, oblong. Wing 8 × 2 mm, acute keel 1.3–1.5 cm long. Differs from *I. heterantha* Wall. ex Brandis in 3.5 × 2.5 mm, cymbiform bract; 2 × 1 mm, acute sepals; oblong standard; acute, 1 mm long auricled, 1-clawed keel petals and elevation of its occurrence.

The species is named after the locality of occurrence of species.

***Indigofera cassioides* Rottl. ex DC. var. *mussooriensis* Sas.**
Biswas (Papilionaceae) in Ind. J. For. 6 (4): 320–322. 1983 (1984).

Racemes 3–7 × 0.1 cm. Bracts 1.5–3 × 0.5–0.8 mm, linear, lanceolate, shorter than buds, soon caducous. Sepals 4–4.5 × 2.7–3 mm, ± similar, acuminate. Standard 1.1–1.5 × 0.5–0.6 cm. Wing 7–7.5 × 2–2.5 mm. Keel mucronate.

Type : K. S. Katoch 32 (Holotype DD).

Flowering & Fruiting : June.

Distribution : Uttar Pradesh.

Herbarium specimen : INDIA : Uttar Pradesh; Mussoorie, June 7, 1922, K. S. Katoch 32 (DD).

Notes: According to Biswas (*l.c.*): Closely allied to the typical form but differs in bracts being 1.5–3 × 0.5–0.8 mm, shorter than buds, soon caducous, sepals 4.5 × 3 mm, acuminate, wing 7 × 2.5 mm. From *I. himalayensis* Ali it differs in longer, denser and stouter racemes and mucronate standard petal.

The variety is named after the locality of type.

Indigofera gangetica Sanjappa (Papilionaceae) in Bull. Bot. Surv. India 28 (1–4): 225–228. 1986 (1988).

Shrub, 2–2.5 m high, branches spreading, striate, densely spreading white tomentose (bifurcated hairs with very unequal arms) when young, glabrous with age. Leaves 8 cm long, imparipinnate, alternate, stipules 5–6 mm long, linear or curved, setaceous, spreading pubescent without, caducous; rachis 5–7 cm long, canaliculate above, pubescent; stipellae 1 mm long, linear, pubescent, subsistent; petiolules 1 mm long, pubescent; leaflets 21–25, opposite, 10–12 × 4–5 mm, elliptic or oblong, rounded at both ends, mucronate, spreading pubescent on both surfaces, green above, pale below. Racemes 4–5 cm long including 8–12 mm long peduncle; rachis striate, spreading tomentose, compactly many flowered. Flowers 5–6 mm long, pink; pedicels 1 mm long, slender, pubescent; bracts 2 mm long, linear, setaceous, spreading pubescent without; caducous calyx 1–1.8 mm long, campanulate, spreading tomentose; teeth 5, 1.2 mm long, linear, setaceous, dorsal teeth shorter than ventral ones. Standard 5–5.5 × 3–3.5 mm, elliptic-oblong, obscurely clawed at base, acute at apex, densely spreading grey pubescent, wings 4.5–5 mm long, glabrous, clawed at base, upper auricle distinct; keels 5–5.5 mm long, lateral pocket present, densely spreading tomentose. Stamens 5 mm long, diadelphous (9+1),

alternately long and short, anthers apiculate. Ovary 3.5 mm long, linear, glabrous; ovules 5- 8; style 2 mm long, curved; stigma capitate. Pods spreading 1.8-2.4 × 0.3 mm, linear, subcylindric, densely spreading grey tomentose; sutures thin, endocarp smooth; seeds 6 8.

Types : Wallich 5480C *ex parte* (Holotype CAL; Isotypes CAL, K).

Flowering & Fruiting : May August*.

Distribution : INDIA : Himachal Pradesh, Uttar Pradesh.

Herbarium specimens : INDIA: Himachal Pradesh; Rampur, 1400 m, June 14, 1962, N. C. Nair 22666 (CAL, BSD); Jeori, 1550 m, May 25, 1962, N. C. Nair 21824 (CAL, BSD); Kinnaur District, Saraham, 2400 m, May 26, 1962, N. C. Nair 21929 (CAL, BSD); Shong-Tong forest rest house, ca 1957 m, June 11, 1972, K. P. Janardhanan 48384; Simla-Hills, Fagu-Sainj Road, Aug. 7, 1940, M. B. Raizada 11502 (DD); Kulu- Manali, 1500 m, May 25, 1978, B. S. Aswal 9218 (CDRI, Lucknow); Suket State, between Suket & Gere, alt. ± 5000 7000 ft, May 17, 1906, I. H. Burkill 26927 (CAL). Uttar Pradesh; Tehri Garhwal, Magra, 1600 m, July 22, 1964, U. C. Bhattacharyya 33629 (CAL, BSD); Garhwal, G. King s.n. (CAL); Munourie range, 1869, G. King s.n. (CAL); Tehri Garhwal, Maindrot 3500 ft, May 1891, J. S. Gamble 22754 (CAL); Kumaon, 3000 6000 ft, T. Thomson s.n. (CAL); Hasting Pilbu, 7000 ft, June 1883, Dr. Schlich s.n. (CAL); Unknown locality, June 1831, Vicary 207 (CAL); Royle s.n. (CAL-Acc. Nos. 11067, 110790, 110791 and specimen numbered 2 of Acc. No/ 110769); Kumaon, Wallich 5480C *ex parte* (CAL, K).

Notes : According to Sanjappa (*l.c.*): Allied to *I. heteranthae* Wall. ex Brandis, but differs in having branches densely spreading tomentose; stipules long setaceous. Racemes manifest long peduncle, legumes 5 6-seeded, subcylindric, tomentose.

Open areas, altitude 1400 2500 m.

Indigofera himalayensis Ali var. **retusa** Sas. Biswas (Papilionaceae) in Ind. J. For. 6 (4): 322. 1983 (1984).

Leaflets mostly mucronate. Standard petal retuse, 1.1×0.6 cm, margin ciliate. Racemes 0.6–1.1 cm long, 0.5 mm thick, slender, hairy, few flowered. Sepals 1.5×0.5 –0.9 mm. Ovary \pm hairy.

Type : B. L. Gupta s.n. (Holotype DD).

Flowering : September.

Distribution : Uttar Pradesh.

Herbarium specimen : INDIA: Uttar Pradesh; Mussoorie, Sept. 14, 1927, B. L. Gupta s.n. (DD).

Notes : According to Biswas (*l. c.*): Differs from typical var. chiefly in having standard petal retuse in tip, margin ciliate. Racemes up to 1.1 cm long. Ovary more or less hairy.

In scrub jungle.

Indigofera meghalayensis Sanjappa (Papilionaceae) in *Reinwardtia* 10 (Part 2): 227–229. 1985.

Shrub ca 2.5 m tall; branches angular, densely adpressed pubescent, leaves 2.5 cm long, pinnate, alternate; petiole 5 mm long, shallowly canaliculate above, adpressed rusty brown, pubescent; leaflets (5-) 7–9, opposite, 5.8×3.4 mm, elliptic or oblong, rounded at base, obtuse and mucronulate at apex, adpressed brown and white pubescent on both surfaces. Stipules 3–3.5 mm long, linear acuminate, adpressed brown hairy without, petiolules 1.5 mm long. Racemes 4–5 cm long, including peduncles of 1–1.2 cm long, axillary, rachis adpressed rusty brown pubescent, many flowered. Flowers 5–7 mm long, yellow (?), bracts 2.5×5 mm, linear lanceolate, adpressed pubescent without, pedicels 2 mm long. Calyx 3 mm long, campanulate, adpressed rusty brown pubescent without; lobes 2 mm long, linear-acuminate, tube 2 mm long. Standard 6.5×3.4 mm, obovate, obtuse at apex, adpressed white puberulous without; wings ciliate along margins; keels adpressed pubescent without. Stamens 9 + 1, diadelphous. Ovary 4–4.5 mm long, linear, glabrous; style 2–3 mm long, glabrous; stigma capitate. Legumes straight and thinly adpressed pubescent when young.

Type : N. L. Bor 18168 (Holotype DD).

Flowering & Fruiting : April May.

Distribution : INDIA : Meghalaya; BURMA.

Herbarium specimens : INDIA: Meghalaya; Smit, Khasia & Jayantia Hills, Apr. 26, 1944, Bor 18168 (DD). BURMA: Mt. Victoria; 8000', Chhin Hills, 1939, Dikason 8534 (Paratype CAL); unknown locality, Chhin Hills, 1895, Dunn 82 (Paratype CAL).

Notes : According to Sanjappa (*l.c.*): Allied to *I. cylindracea* Grah. ex Baker, but differs from it in having densely adpressed dark rusty-brown indumentum; shorter leaves with fewer leaflets; short, few-flowered racemes; linear-acuminate to calyx lobed, short and rigid pedicels.

Vernacular: "Ma-Thon-Pha-Pai" (Chhin).

Indigofera santapau Sanjappa (Papilionaceae) in Bull. Bot. Surv. India 25 (1 4): 202 203. 1983 (1985).

Annual herbs, 15 35 cm tall, branches few at base; stem and branches reddish, slender, thinly adpressed grey pubescent. Leaves 3 6 cm long, pinnately trifoliate, alternate; petiole 1 2 cm long, faintly canaliculate above, adpressed grey pubescent; leaflets 2.5 4 × 1.2 1.8 cm, obovate or obovate oblong, cuneate at base, rounded and mucronate at apex, thinly adpressed pubescent on both surfaces, thinly small gland-dotted (glands light brown intially turning dark brown), yellowish green above, pale beneath; stipules 2.5 3 mm long, subulate, adpressed pubescent without; petiolules 2 mm long, pubescent; stipels absent. Racemes 4 8 mm long, axillary, sessile, 6 12-flowered; rachis adpressed pubescent and glandular. Flowers 5 mm long, salomon red; pedicels 1 1.5 mm long, pubescent and glandular; bracts 1 mm long, pubescent and glandular without, caducous; calyx 2 mm long, adpressed pubescent and glandular without, lobes 5, 1.5 mm long, tube short; standard 4 mm long, obovate, mucronate, glandular and strigulose without, persistent; wings 2.5 3 mm long, glabrous; keels 4 mm long, glandular and strigulose without, spurred on sides; stamens diadelphous (9+1),

filaments 3-3.5 mm long, persistent; ovary 1.5 mm long, oblong, puberulous and glandular at tip; style 1 mm long, glabrous; stigma capitate. Pods 1-2 × 0.25 cm, subcylindric, straight, reflexed, 3-4 seeded, distinctly torulose, shortly apiculate, densely spreading grey tomentose glandular; sutures thin; obscurely winged on sides, valves twist on dehiscence, endocarp smooth; seeds 1.5 × 1 mm, oblong, rounded at both ends, faintly angular on sides, smooth, shining, dark-brown.

Type : H. Santapau 11397 (Holotype BLAT).

Flowering & Fruiting : September-October*.

Distribution : INDIA : Maharashtra.

Herbarium specimens : INDIA: Maharashtra; Pune District, Vazirghad, Purander, Oct. 9, 1950, H. Santapau 11397 (BLAT); Purander Hill Fort, Oct. 22, 1945, H. Santapau 5339 (Paratype BLAT); Around Vazirghad Fort, Sept. 2, 1945, H. Santapau 7174 (Paratype BLAT).

Notes : According to Sanjappa (*l.c.*): Allied to both *Indigofera barberi* Gamble and *I. trifoliata* L., differs from *I. barberi* in being (a) slender herbs, in having (b) glabrous wing petals, (c) shorter and glabrous styles (d) broader, straight, distinctly torulose and densely spreading tomentose pods; differs from *I. trifoliata* in being (a) slender herbs, in having (b) elongated rachis beyond lateral leaflets, (c) shorter and glabrous styles and (d) narrower, obscurely winged, distinctly torulose, 3-4-seeded, densely spreading tomentose pods.

The species is named in honour of late Father H. Santapau and the species is described based on his collections from Purander.

Indigofera sesquipedalis C.B. Clarke ex Sanjappa (Papilionaceae) in J. Bombay Nat. Hist. Soc. 81 (2): 445-448. 1984.

Undershrub c 60 cm high, copiously branched from the base, branches 15-35 cm long, angular adpressed pubescent when young, terete and glabrous at maturity, rootstock thick. Leaves 2.5-3 cm long, pinnate, alternate, petiole 6-10 mm long, canaliculate above, adpressed pubescent; leaflets (5-) 7-11 (17), opposite, 5-7 × 2

3 mm, tiny, oblong or obovate, rounded to obtuse at base, obtuse at apex, mucronate, glabrescent and green above, adpressed pubescent and pale below; stipules 1-1.5 mm long, subulate, adpressed pubescent without; stipels c. 1 mm long, setaceous; petiolules c. 1 mm long, pubescent. Racemes 2.5-3 cm long, axillary, many-flowered, compact, peduncles 5 mm long, angular, adpressed pubescent. Flowers rose-purple or deep crimson-purple; bracts 1.2-2 mm long, setaceous adpressed pubescent without; pedicels c. 1 mm long; calyx 2 mm long, campanulate, lobes 1.5 mm long, subulate, adpressed pubescent without, tube 0.5 mm long; standard 3.5-4 × 2.5 mm, ovate, rounded at base, acute at apex, mucronulate, thinly puberulous without; wings 3.5 × 1 mm, oblong-ovate, shortly clawed at base, obtuse at apex, thinly pubescent along the margins; keels 4 × 1 mm, spathulate, cuneate at base, acute at apex, spurred, thinly adpressed hairy; stamens diadelphous (9+1), 3-3.5 mm long, anthers sparsely bearded at base; ovary 1.5-2 mm long, oblong, 5-8-ovuled, glabrous; style 1-1.5 mm long, glabrous; stigma capitate. Pods 15-20 × 2-2.5 mm linear, cylindrical, reflexed, sutures thin, valves rounded, shortly apiculate, sometimes faintly torulose, thinly short adpressed pubescent, 5-8-seeded, septate between seeds, endocarp red-spotted; peduncles elongating in fruits. Seeds 2-2.5 × 1.5 mm, cylindrical, truncate at both ends, smooth, reddish brown.

Type : *C. B. Clarke* 38232 (Holotype CAL).

Flowering : May-August. *Fruiting* : August.

Distribution : INDIA: Meghalaya ; Nagaland, Arunachal Pradesh [based on Biswas, Ind. For. Rec. 3 (1): 17. 1941].

Herbarium specimens : INDIA : Meghalaya; Khasia Hills, Shillong, 5000', June 1, 1885, *C. B. Clarke* 38232; Maphlong, 5500', Oct. 18, 1872, *C. B. Clarke* 18598B, 18614 (Paratypes); Normai, 4500', Aug. 25, 1885, *C. B. Clarke* 40103 (Paratype); Boga Pani, 2000', June 1, 1868, *C. B. Clarke* 7296; Shillong, 5000', Oct. 1867, *C. B. Clarke* 5757; Loitlynghat, 5-6000', Dec. 6, 1996, *F. Kingdom-Ward* 2; Khasia, *G. Mann*. s.n. (Acc. No. 11007); Shillong, 5000', May 1890, *Badal Khan* s.n.; Khasia, 6000', *Hooker f. & Thomson* s.n.; Woodlands, New Colony, Shillong, June 4, 1960, *R. K. Rai* 18184; 3-4000', May, *Herb. Sulp. Kurz*. 213, 521; 5000', May 1878. *Forest Herb.* No.

756; 5000', June 1876, *Herb. Sulp. Kurz* 262; Cherrah valley, 6000', 1878, *Gallataly* 217 *pro parte* (Specimen on right hand side only); Shillong, 5000', *E. B. Carter* 851; Dumped to Shillong, 5 6000', June 4, 1911, *Burkill & Banerjee* 35206; Shillong to Dumpep, 4900' 6300', May 29, 1891, *Burkill & Banerjee* 44, May 24, 1911, *Burkill & Banerjee* 45; on the way to Cherrapunji from Shillong between 14th and 15th Mile, June 2, 1958, *R. S. Rao* 2671; Shillong, 5500', Aug. 21, 1886, *C. B. Clarke* 44617A (K, Photo BSI Neg. No. 5328B CAL); Woodlands, Shillong; May 23, 1972, *H. Deka* 38472; Woodlands, Shillong, Sept. 1960, *Collector?* 21734. All above specimens are at CAL. Umber falls, May 18, 1930, *P. C. Kanjilal* 8062; Peak forests, 6000', July 12, 1931, *Shriram Sharma* 9253; Khasia Hills, 5000', June. 1876, *G. Mann* 262, 5000', May 1878, *G. Mann* 756, 4 5000', July 1879, *G. Mann* s.n. ; Assam, locality? *G. Mann* s. n.; *G. Mann* 262, *G. Mann* s.n. (Acc. Nos. 7193, 7194, 7200), Station Nursery, Shillong, June 1949, *G. K. Deka* 22787; Elephant fall, July 22, 1951, *H. Deka* 23273; Mulki, Shillong, 5800, Nov. 10, 1930, *Shivaram Sharma* 8576; Upper Shillong, July 30, 1942, *G. K. Deka* 21444; Woodlands compound, Shillong, May 30, 1973, *S. Das* 13168; Mirang to Nongkhland, June 15, 1958, *G. Panigrahi* 16159; Shillong to Cherrapunji, 14th and 15th miles, *G. K. Deka* 2671; Nongkrem, June 3, 1914, *P. C. Kanjilal* 592 M; *Laitkar*, Shillong, May 20, 1963, *S. K. Kar* 32486 (All above specimens are at ASSAM); Upper Shillong, Sept. 10, 1978, *B. Biswas* 48; Sept. 26, 1978, *Albert Solo* 146; Sept. 7, 1975, *A. Handigae* 10; Laitkon, July 23. 1977, *K. M. Kuruviku* 42; S. E. falls, Shillong, Aug. 23, *Z. Pachuan* 28 (All above specimens are at NEHU, Shillong); Khasia Hills, 5 6000; *G. Mann* 213 (DD); Shillong Peak, 5000; Aug. 10, 1943, *N. L. Bor* 17996, 17997 (DD); Shillong peak, May 17, 1960, *R. V. Sitholey and party* s.n. (LWG Acc. No. 43794); Cherrapunji, 5000', Apr. 29, 1962, *S. Copra & party* s.n. (LWG Acc. No. 48686); Nagaland; Naga Hills, May 1936, *N. L. Bor* 20836 (ASSAM); Naga Hills, 1935, *N.L. Bor* 5330 (DD, K).

Notes : According to Sanjappa (*l.c.*): Some specimens of *Indigofera* collected by C. B. Clarke from Khasia Hills (Meghalaya) were named by him as *I. sesquipedalis* and noted its resemblance with 'Khasia heteranth' (i. e. *I. heterantha* Wall. ex Brandis of Khasia). Other

sheets which resemble *I. Sesquipedalis* were wrongly identified by him as *I. dosua* Ham. (C. B. clarke 7296), *I. heterantha* wall. ex Brandis (C.B. clarke 18598), *I. leptostachya* DC.? (C. B. Clarke 40103) and *I. pulchella* Roxb. (C. B. Clarke 18614).

D. Prain on examination of all the above specimens at CAL has annotated them as '*I. sesquipedalis* C. B. Clarke Mss.' on study of all the above sheets and many other specimens from different herbaria, they were found to represent a distinct species which is allied to *I. heterantha* as was suspected earlier by C.B. Clarke. This species had not been published by Clarke or by others.

Allied to *I. heterantha* Wall. ex Brandis but differs in having shrub less than 1 m high; branches from the base, glabrescent; leaves petiolate; leaflets (5-) 7 11 (-17), thin, glabrescent above and adpressed pubescent below; racemes peduncled; anthers sparsely bearded at base: pods 1.5 2 cm long, deflex spreading; adpressed short pubescent; whereas *I. Heterantha* is characterised by: shrub or tree more than 1 m high; branches above the base, adpressed white pubescent, leaves sessile or sub sessile; leaflets (5-) 7 15 (-25), coriaceous, densely adpressed pubescent on both surfaces; racemes sessile; anthers glabrous at base; pods more than 2 cm long, spreading, adpressed long pubescent.

***Indigofera thothathrii* Sanjappa (Papilionaceae) in J. Jap. Bot. 59 (9): 272 274. 1984.**

Erect herbs 40 60 cm tall; stem and branches angular, fine adpressed pubescent. Leaves 3 4 cm long including a petiole of 1.2 cm long, pinnately trifoliolate, alternate; lateral leaflets opposite, 2 - 2.5 × 0.8 1.8 cm, obovate or oblanceolate, obtuse at base, rounded and mucronulate at apex, pale and subglabrous above, green and fine adpressed pubescent below; stipules 1.2 mm long, subulate, persistent; petiolules 1 1.5 mm long, pubescent; stipels 1 mm long, subulate, persistent. Racemes 5 10 mm long, congested, axillary, 6 8-flowered. Flowers 4 mm long, yellowish pink; pedicels short, fine pubescent; bracts 1.3 mm long, lanceolate, fine pubescent without, caducous. Calyx 1.5 mm long, 5 lobed, fine pubescent

without, lobes 1.1 mm long, subulate, acute. Standard 3.5 mm long, ovate, obtuse and mucronulate at apex, thinly adpressed puberulous without; wings 2.5 mm long, obliquely oblong, shortly clawed at base, obtuse at apex, glabrous; keels 3.5 mm long, shortly spurred on sides, fine pubescent without; stamens diadelphous (9+1). Ovary 2.5 mm long, thinly fine pubescent, 6-8-ovuled; style 1 mm long, glabrous; stigma capitate. Pods 18-20 × 2.5 mm, pendant alongside rachis, linear, subcylindric, straight, shortly apiculate, densely short-adpressed pubescent, glandular, sutures narrow with obscure wings on both sides, valves round, not tortulose, 6-8-seeded; endocarp not spotted. Young seeds cylindric, truncate on one or both ends, smooth. Mature seeds not known.

Types : *H. Pirson* 1412 (Holotype BLAT; Isotype CAL).

Flowering & Fruiting : August - October.

Distribution : INDIA: Uttar Pradesh; NEPAL (Expected to occur in its adjoining parts).

Herbarium specimens : INDIA: Uttar Pradesh; Bhabraich District, Nishangara near Forest Rest House, Sept. 11, 1956, *H. Pirson* 1412 (BLAT, CAL).

Notes : According to Sanjappa (*l.c.*): *Indigofera thothathrii* Sanjappa, very closely resembles *Indigofera trifoliata* L. var. *trifoliata* and var. *nepalensis* Ohashi but differs from them in having branches stout, angular, with densely adpressed minute hairs; leaves distinctly pinnate; leaflets, peduncles, calyx, corolla and style devoid of glands; stipels present, persistent; calyx (1.5 mm long) and corolla white hairy; filaments 3 mm long; pods 18-20 × 2.5 mm, blackish brown, obscurely winged, with densely adpressed minute hairs; valves rounded, never tortulose; seeds 6-8 per pod. In contrast, *I. trifoliata* var. *trifoliata* is characterised by: Branches stout, terete, glabrescent; leaves usually digitate, rarely tending towards pinnate type; leaflets, peduncles, calyx, corolla and style always glandular; stipels absent; calyx (1.5-2 mm long) and corolla usually brown hairy, rarely mixed with white hairs; filaments 6-7 mm long; pods 12-23 × 2-4 mm, deep brown, prominently broad winged, glabrescent; valves faintly to prominently tortulose; seeds 4-8 per pod, 1.5-2 × 1

1.5 mm whereas in *I. trifoliata* var. *nepalensis* branches are slender, terete, glabrescent; leaves digitate; leaflets, peduncles, calyx, corolla and style always glandular; stipels absent; calyx and corolla usually brown hairy; filaments 6-7 mm long; pods 8-10 × 1 mm, light brown, scarcely winged; glabrescent; valves apparently tortulose; seeds 2-4 per pod, 1 × 0.5 mm.

The species is named in honour of Dr. K. Thothathri in appreciation of his contribution to study of the Indian Legumes.

Indigofera tirunelvelica Sanjappa (Papilionaceae) in J. Bombay Nat. Hist. Soc. 79 (3); 647-649. 1982 (1984).

Annual, erect herbs, about 60 cm high; branches woody, angular, light brown pubescent when young, terete, striate and glabrous at maturity. Leaves 3.5-4 cm long, pinnately trifoliolate, alternate; petioles 1-1.3 cm long, slender, canaliculate above, pubescent, glandular; leaflets (10-) 15-20 (-25) × (5-) 10-15 mm; terminal leaflet large, obovate or elliptic-obovate, base obtuse or cuneate, apex obtuse to rounded, mucronulate, uniformly adpressed pubescent on both surfaces; brown punctate-glandular beneath; stipules 0.8-1.2 mm long, subulate, pubescent without, stipels absent; petiolules 1 mm long pubescent. Racemes 5-10 mm long, axillary, sessile, rachis pubescent, glandular, elongating in fruits, up to 20-flowered. Flowers pink, 5 mm long; pedicels short, pubescent, glandular; bracts 1-1.5 mm long, lanceolate, acute, pubescent without, caducous; calyx 2 mm long, 5-lobed, 1-1.5 mm long; adpressed pubescent and glandular without, tube less than 1 mm long; standard 3-5 × 1-1.2 mm, obovate or elliptic, mucronulate, pubescent and glandular without, wings 3-4.5 mm long, obliquely oblong, shortly clawed at base, obtuse at apex, glabrous; keels 3-5 mm long, spatulate, pubescent and glandular without, spurred, spur 1-1.5 mm long, hyaline; stamens diadelphous (9+1), standard stamen free to the base, filaments alternately long and short, anthers apiculate; ovary 1-1.5 mm long, glabrous, 1-2-ovuled; style 1.5 mm long, glandular at base, stigma capitate. Pods 3-6 × 2-2.5 mm, oblong, flattened,

slightly torulose, sharply beaked, upper suture broader, valves prominently veined, adpressed pubescent, glandular; seeds 1 mm across, reddish-brown variously shaped, generally ellipsoid, often truncate at one end.

Types : *M. Sanjappa* 717 (A: Holotype CAL; B-F: Isotypes CAL).

Flowering : November - December. *Fruiting* : December - March.

Distribution : INDIA : Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Tirunelveli District, along the roadside, between Kalakkad and Sengalteri, 300 m, Dec. 18, 1980, *M. Sanjappa* 717 A-F (CAL); Sengalteri to Kalakkad, 1000 m, Feb. 16, 1913, *Hooper and Ramaswami* 39230 (CAL); Near Tiger Falls-way to Mancholai, 333 m, Mar. 4, 1958, *K. M. Sebastine* 5520 (CAL, MH); "Peninsulae Indiae Orientales" (without locality) *R. Wight* s.n. (Royal Botanic Gardens, Kew distribution no. 651 CAL).

Notes : According to Sanjappa (*l.c.*) : Allied to *I. glandulosa* Roxb. ex Willd but differs from it in having pods flattened, wingless, sharply beaked, prominently veined on valves, seeds small, fruiting peduncles shorter.

This species is named after the type locality Tirunelveli ("Tinnevelly") district, Tamil Nadu, India.

***Indigofera trita* L. f. var. *purandharensis* Sanjappa** (Papilionaceae) in Bull. Bot. Surv. India 26 (1-2): 117-118. 1984 (1985).

var. *trita*

Erect undershrub, 50-150 cm tall, branches angular, adpressed white canascent. Leaves 2.5-5 cm long with a petiole of 1.2-2.5 cm long; pinnately trifoliolate, side ones opposite, 1.0-3.5 × 0.5-2 cm, obovate or oblong, sometimes ovate or elliptic rounded at base and apex, sometimes emarginate at apex, fine adpressed grey pubescent on both surfaces; stipules small setaceous; stipels absent. Racemes 1.5-4.5 cm long; sessile or subsessile, axillary, 10-20

flowered, flowers 5 mm long, pink; pedicels short; bracts small, caducous. Calyx 2-2.5 mm long, adpressed white pubescent without, teeth linear, acute. Standard 5 × 1.5-2 mm, orbicular or obovate, fine adpressed white pubescent without; wings 3.5-4 mm long, glabrous; keels 4-4.5 mm long, white pubescent without, spurred on sides. Ovary 3 mm long, glabrous initially, 4-8-ovuled, style 1.5-2 mm long, bent, glabrous; stigma capitate. Pods 2.5-3 × 0.3 cm, divaricate, very rarely deflexed, rigid, straight, tetragonous, spine-pointed, fine adpressed white pubescent, up to 10-seeded; seeds 1.5-2 × 1 mm, oblong, subtetragonous, truncate at both ends or rounded at one end, smooth, yellow or reddish-brown.

var. *Purandharensis* Sanjappa, *ibid.*, 117-118. 1984 (1985).

Differs from *I. tirta* in having longer racemes and flowers; shorter broader, compact and deflexed pods.

Type : *H. Santapau* 11398 (Holotype BLAT).

Flowering : September-October. *Fruiting* : November-December.

Distribution : INDIA : Maharashtra.

Herbarium specimens : INDIA: Maharashtra; Poona, Purandhar, Oct. 9, 1950, *H. Santapau* 11398; *ibid.*, Vazirghad, *H. Santapau* 11399; Sept. 20-30, 1945, *H. Santapau* 8368; slopes below Vazirghad forte, Dec. 29, 1945, *H. Santapau* 8326, 8327; Oct. 13, 1957, *H. Santapau* 22021; Oct. 13, 1957, *G. L. Saha* 9259, 9260. All are in BLAT.

Notes : According to Sanjappa (*l.c.*): This variety is apparently restricted to Purandhar. The medifixed hairs on leaflets, calyx and corolla have black spot at their point of attachment.

Among the varieties of *Indigofera tirta* L. f., this new variety shows more affinities with var. *maffei* (Chiov.) Ali but differs from it in having subcoriaceous leaflets; shorter racemes; broader, compact and deflexed pods.

Indotristicha tirunelveliana B.D. Sharma, Karth. & B.V. Shetty (Podostemaceae) in Bull. Bot. Surv. India 16 (1-4): 157-161. 1974 (1977).

Aquatic herbs. Rhizomes 5–25 cm long 3–7 mm in diameter, sub-erect, sparingly branched below, attached by long hapterae only at base. Leafy shoots 0.5–2.0 cm long simple numerous, densely crowded, completely covering the upper surface of the rhizomes. Leaves $\pm 1.5 \times 0.8$ mm, sessile, simple, arranged in four vertical rows, ovate to ovate lanceolate, entire, subacute at apex, narrowed at base, midrib reaching $\frac{3}{4}$ the length of lamina. Flower-bearing leafy shoots often branched below; the upper few linear leaves more or less connate below forming a sheath, enclosing the basal part of pedicel. Flowers solitary, terminal, regular, bisexual, hypogynous, nonochlamydeous; pedicels 1–2 mm long, lengthening to ± 1 cm in fruit, pale red. Perianth segments 3, persistent, each $\pm 2.5 \times 1.5$ mm, pale green, oblong-obovate, obtuse, concave. Stamens 3, alternating with perianth segments; filaments ± 1 mm long, pale red, slender; anthers $\pm 1.5 \times 1$ mm, greenish, ovate-oblong, basifixed, introse; pollen spheroidal, diameter 17.25–24.5 μ , panporate, pores less than 12, ornamentation obscure (L.O.). Ovary red, sessile, ellipsoid, smooth, 3-loculed; placentation axile, thick; ovules many; stigmas 3, deepred, sessile short, fleshy, papillose. Capsules 2–3 mm long, ellipsoid, 9-ribbed, dehiscent into 3 valves. Seeds $\pm 0.5 \times 0.2$ mm, broadly ellipsoid in outline, smooth.

Types : *Karthikeyan* 40159 (A: Holotype CAL; B S: Isotypes MH).

Flowering & Fruiting : October–February*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Tirunelveli District, Tirukkurungudi, Thulukkanparai, 850 m, Feb. 17, 1972, *Karthikeyan* 40159 (A: CAL & B-S MH); *ibid.*, Sept. 30, 1972, *Sharma* 42112 (Paratype MH).

Notes : According to *Sharma (l.c.)*: Allied to *Indotristicha malayana* Dransfield & Whitmore, but differs in the rhizomes being not flattened; leaves being ovate to ovate-lanceolate in four rows; perianth segments being free and the stigma being fleshy, thick and papillose. Whereas in *I. malayana*, rhizomes flattened; leaves triangular in 3 unequal ranks; perianth lobed; stigmas flattened in vertical plane, with a deeply divided outer margin. Dr. K.

Subramanyam, Ex-Director, Botanical Survey of India, Calcutta who examined the materials of this species comments (personal communication): "the vegetative structure of the specimen is quite distinctive from that of the two described species of *Indotristicha* viz., *I. ramosissima* (Wt.) van Royen and the recently erected *I. malayana* Dransfield & Whitmore. I feel Karthikeyan 40159 comes close to *I. malayana*."

Iphigenia magnifica Ansari & R.S. Rao (Liliaceae) in Bull. Bot. Surv. India 20 (1-4): 162-163. 1978 (1979).

An erect glabrous herb, reaching \pm 60 cm in height. Corms 2.5 \times 2.0 cm, sub-globose, narrowed into a short neck with membranous tunics. Stem generally branching. Leaves many, 14-25 \times 0.5-1.2 cm, grass like, linear-lanceolate, acute base long sheathing. Inflorescence 4-many flowered raceme. Pedicels 2.5-5.5 cm long; grooved, ascending, reaching up to 9.0 cm long in fruiting stage. Bracts \pm 5 cm long, leafy linear or linear-lanceolate. Flowers dark brownish purple; perianth lobes 6, 1-2 \times 0.2 cm, linear subulate or elliptically linear, 1-3 nerved, acute at apex, clawed or not at the base spreading and later reflexed. Stamens 4-6 mm long, purple; anthers 1.5-2.0 \times 1.25-1.5 mm, oblong-ovate, dark purple, without any apicule, pollen yellow; filaments 2.5-4 mm long, always glabrous, swollen either in the middle or towards base. Ovary 3-4 mm long, green, oblong-obovate; styles 3, 1.5-2.5 mm long, united in the lower half, recurved in the upper half to form 3 separate stigmas. Capsule 0.8-1.75 \times 0.5-1 cm, sub-globose to elliptically oblong, trilocular, 3-valved, many seeded; seeds 3 \times 2.5 mm, sub-globose, brown with a white or pale brown conspicuous band of raphe.

Types : Pataskar 118218 (A: Holotype CAL; B-C: Isotypes BSI; D: Isotype CAL; E: Isotype K).

Flowering : September-October. **Fruiting**: October- Under cultivation the plant may continue to flower beyond October.

Distribution : INDIA: Western Ghats.

Additional report : Karnataka.

Herbarium specimens : INDIA : Maharashtra: Dhule District, Dhule, Oct. 5, 1969, *Pataskar* 118218 (A, D: CAL; B-C: BSI; E:K); *ibid.*, Sept. 8, 1970; *Ansari* 104945 (Paratype BSI) : *ibid.*, Kolaba District, Matheran, July 30, 1973, *Ansari* 104948 (Paratype BSI).

Notes : According to *Ansari & Rao (l.c.)*: Similar to *I. indica* (Linn.) A. Gray in having dark coloured flowers, but differs in its size, branching stem, greater number of leaves, longer ascending pedicels; inflorescence many flowered, filaments always glabrous and fruits comparatively smaller. It also differs from *I. robusta* Bak. in having branching stem, longer leaves, anthers without apicule and filaments thickened in the lower region and capsule of larger size.

The description of *I. indica* (Linn.) A. Gray provided in earlier literature is broad-based and may include the present species to some extent. *I. indica* as is normally understood, is comparatively a small, generally unbranched herb having not more than 2-3 flowers with shorter pedicels (0.6-2.5 cm long), filaments hairy (hairs falling off later) fruits larger, oblong or columnar. In fact both *I. indica* and the present new species grow under the same climatic and ecological conditions but they are considered as quite distinct. The flowering periods of both these species are different. The former flowers during June and finishes its life-cycle by July and the later (new species), by September, completing its life-cycle by October end.

Though reported to have been collected in Karnataka the exact localities are not known. Endemic to Western ghats (Red Data Book *l.c.*).

***Iphigenia sahyadrica* Ansari & R.S. Rao (Liliaceae) in Bull. Bot. Surv. India 20 (1-4): 163-164. 1978 (1979).**

A small erect glabrous herb, 8-10 cm in height. Corms 8 × 7-8 mm, globose, narrowed into a short underground neck with membranous tunics. Stem solitary, small. Leaves 4-12 × 0.2-0.3 cm, linear or linear-lanceolate, acute, grass like, sub-opposite or alternate, 3-4 in number, with sheathing base. Inflorescence mostly a 2-flowered corymb; pedicels 2-2.7 cm long, rarely reaching 3 cm in fruits ascending, grooved, ridges sometimes dotted with

papillae (seen in fresh specimens). Bracts 1-2 cm long, linear, leafy. Flower solanaceous-violet; perianth lobes 6, 6-8 × 1.5-2 mm, 5-7 nerved, linear-elliptic or elliptically oblanceolate, spreading. Stamens 2.5-3 mm long, violet coloured; anthers 1 × 1 mm, almost globose; filaments ± 2 mm long, glabrous, terete, broadening towards base. Ovary 1.5 × 1 mm, obovate, green; styles 3, 1 mm long, shortly united at base, free and reflexed above with 3 stigmas. Capsule 1 × 0.6 cm, obovate, small, few-seeded. Seeds ± 2 × 1.5 mm, sub-globose or ovoid, compressed on sides, brown with thread like reduced raphe.

Types : Raghavan 90209 (A: Holotype CAL; B: Isotype BSI; C: Isotype K).

Flowering : August. *Fruiting*: August-September.

Distribution : INDIA : Karnataka.

Herbarium specimens : INDIA: Karnataka ; Shimoga District, Hulical, Aug. 25, 1963, Raghavan 90209 (A: CAL; B: BSI; C: K); *ibid.*, Aug. 24, 1973, Ansari 104952 (A, B: Paratypes BSI; C: Paratype CAL); North Kanara, Haliyal, June 26, 1888, Talbot 1661 (A: Paratype BSI, B: Paratype CAL).

Notes : According to Ansari & Rao (*l.c.*) : Similar to *I. pallida* Bak. and *I. stellata* Blatt. in having light-coloured flowers. The detail distinguishing features of 3 species are : Height in *I. sahydrica*, up to 10 cm; leaves 3-4; inflorescence 2-flowered corymb; pedicels 2-2.7 cm long; flowers solanaceous-violet; perianth lobes 6-8 × 1.5-2 mm, 5-7 nerved, linear-elliptic or elliptic-oblanceolate; stamens 2.5-3 mm long; capsules obovate; seeds with thread like raphe; flowering period late July to August; + colchicine content ± 1%. Whereas *I. pallida* is characterised by: Height up to 25 cm; leaves 6-8; inflorescence generally 3-5 flowered short raceme; pedicels up to 3 cm long; flowers white or pale pinkish; perianth lobes 6-17 × 2-3 mm, 5-7 nerved, linear-subulate or elliptically linear; stamens 5 mm long; capsules generally ellipsoid; seeds with well-developed mass of oval raphe; flowering period early June; + colchicine content 0.5-0.7%; and in *I. stellata* : Height up to 15 cm; leaves 4-6; inflorescence generally 3-7 flowered short raceme; pedicels up to 5.5 cm long; flowers bright pinkish; perianth lobes

6 $10 \times 3 - 4$ mm, 7 - 9 nerved, broadly elliptic or elliptic ovate; stamens 3.5 - 4 mm long; capsules generally sub-globose; seeds with thread like raphe; flowering period July; + colchicine content 1.2 - 2%.

This new species is distinct also from *Iphigenia novaezealandiae* Bak. (from New Zealand) which is reported to be having 2 - 3 short leaves, inflorescence having unflowered white flowers (perianth 4.5 - 6 mm long).

Growing in grassy meadows and on sandy soil. The genus *Iphigenia* of late, has come into prominence due to its colchicine content. Although the seeds of *I. magnifica* sp. nov. has almost similar amount of colchicine as that of *I. indica* (0.5 - 0.7%), it has an advantage of bearing greater number of fruits (15 - 20, at time 30) and seeds than the other known species of the genus. Further, *I. stellata* Blatt. which yields highest percentage of Colchicine (1.2 - 2%).

Isachne bicolor Naik & Patunkar (Poaceae) in Bull. Bot. Surv. India 15 (1 & 2): 157 - 158. 1973 (1976).

Decumbent annual 30 - 45 cm tall; culms smooth; nodes glabrous or pilose. Leaves 35 - 45 \times 3 - 7 mm, narrowly ovate-lanceolate, covered on both surfaces with bulbous-based hairs, nerves 11 - 15 on either side of the midrib, rather conspicuous; margins entire or serrulate, cartilagenous; sheaths covered with hairs or glabrous in the centre, upper usually glabrous except at the margins. Panicle narrowly effuse, 2 - 5 cm long; branches ascending, the lower one 1 - 1.5 cm long. Branches as well as the filiform pedicels with yellow glandular bands. Spikelets broadly ovate, 2.75 - 3.25 mm. Glumes nearly orbicular, apiculate or not, 2.5 - 3 mm in diam., glabrous or with bulbous-based hairs all over the dorsal surface, 5 - 9 nerved. Florets similar; lemmas bicolorous, densely hairy on the back, 2.25 - 2.5 mm in diam., concave. Palea 2 keeled, nearly entirely enclosed by the lemmas.

Types : Patunkar 1849 (A: Holotype; B-E: Isotypes in Herbarium Marathwada University, Aurangabad).

Flowering : October*.

Distribution : INDIA : Maharashtra.

Herbarium specimens : INDIA : Marathwada; Mhaismal Plateau, Aurangabad, Oct.8, 1973, *Patunkar* 1849 A-E (Herbarium Marathwada University, Aurangabad).

Notes: According to Naik & Patunkar (*l.c.*): Very similar to *I. Kinabaluensis* Murr. from Burma but differs in having leaves with rather conspicuous nerves and covered with bulbous-based hairs, longer spikelets with hairy glumes and bicolourous lemmas that are pubescent all over.

This species has been collected from the Mhaismal Plateau in Aurangabad district where it grows in wet situations in association with *Coix aquaticus* Roxb., *Echinochloa colonum* (Linn.) Link, various members of the Cyperaceae and other hygrophytes.

Ischaemum calicutensis Sreek., V.J. Nair & N.C. Nair (Poaceae) in J. Econ. Tax. Bot. 4 (3): 1007-1009. 1983.

Perennials. Culms 30-80 cm long, creeping and stoloniferous; upper nodes sparsely villous, lower ones glabrous. Leaves 2-10 cm long, 8-12 mm broad, lanceolate, long acuminate, base deeply cordate or sagittate glabrous. Sheaths 1-8 cm long, shorter than the internodes keeled, striate, glabrous except one margin which is villous towards mouth. Ligule 1-2 mm long, and ovate, acute membrane. Inflorescence of 2 racemes, 4-6 cm long, densely villous, stout, enclosed in a spathe, 3-10 cm long. Joints of racemes 3-4 mm long, slightly turbinate, densely villous. Sessile spikelets 5-6 mm long, ovate-lanceolate, awned, callus bearded; lower glume 5.0-5.5 × 1.0-1.5 mm, ovate-lanceolate, coriaceous, faintly 7-9 nerved, densely villous except in the upper quarter, hairs 0.5-2.5 mm long, silky, smooth or rarely with a few obscure nodules, margins narrowly and evenly inturned from base to apex; upper glume 5.5-6.0 × 1.0-1.5 mm, boat-shaped or lanceolate when spread, keel rounded except towards apex which is minutely winged, coriaceous, faintly 5-nerved, covered with short adpressed hairs, margins hyaline, shortly ciliate; lower floret male or bisexual with

a rudimentary pistil; lemma 4.5 - 5.0 × 0.75 - 1.00 mm, lanceolate delicate, hyaline, faintly 5 - 7 nerved, margins infolded and ciliate; palea 4.0 - 4.5 × 0.75 - 1.00 mm, oblong - lanceolate, delicate, hyaline, 2 keeled 2 nerved, glabrous; stamens 3, anthers 1.25 - 1.50 mm long, filaments ca 0.5 mm long; upper floret bisexual; lemma 3.0 - 3.5 × 1.00 - 1.25 mm notched, lobes acute, delicate, hyaline, faintly 3 nerved, awn 20 - 25 mm long, column 5 - 10 mm long, brownish, bristle pale, scabrid; palea 2.5- 3.0 × 0.50 - 0.75 mm, oblong, rounded or slightly emarginate at apex, delicate, hyaline, 2-keeled, 2-nerved, glabrous; lodicules 2, each ca 0.5 × 0.3 mm, obovate, oblique and wavy at apex; stamens 3, anthers 1.5 - 2.0 mm long, filament ca 0.5 mm long, ovary ca 0.50 × 0.10 mm, oblong, styles ca 1 mm long, slender, stigmas ca. 1.5 mm long, feathery, flesh-coloured. Pedicelled spikelet 4.5 - 5.0 mm long (excluding pedicels), oblong, acute, awned, callus bearded; pedicels 1.0 - 1.5 mm long, densely villous, hairs 1 - 2 mm long; lower glume 4.5 - 5.0 × 1.0 - 1.5 mm, oblong-lanceolate, coriaceous, faintly 5 - 7 nerved, densely villous except in the upper quarter, hairs 0.5 - 2.5 mm long, silky; upper glume 4.5 - 5.0 × 1.00 - 1.25 mm, boat shaped or ovate - lanceolate when spread, coriaceous, faintly 5 - nerved, densely villous, keel rounded; lower floret male or bisexual with a rudimentary pistil; lemma 4.0 - 4.5 × 0.75 - 1.00 mm, lanceolate, delicate, hyaline, faintly 3 - 5 nerved, margins infolded and ciliate; palea 3.0 - 3.5 × 0.50 - 0.75 mm, oblong-lanceolate, delicate, hyaline, 2 keeled, 2 nerved, glabrous; stamens 3, anthers 1.0 - 1.5 mm long, filaments short; upper floret bisexual; lemma 3.0 - 3.5 × 1.00 - 1.25 mm, notched, lobes acute, delicate, hyaline, glabrous, awn 12 - 15 mm long, column ca 5 mm long, brownish, bristle pale, scabrid; palea 2.0 - 2.5 × 0.50 - 0.75 mm, oblong, rounded at apex, delicate hyaline, 2 keeled, 2 nerved, glabrous; stamens and pistils are similar to that of sessile spikelets.

Types : P. V. Sreekumar 71803 (Holotype CAL; Isotypes K & MH).

Flowering : October.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Calicut District, Pokkunnamalai, near Nanminda ± 850 m, Oct. 29, 1981, P. V. Sreekumar 71803 (CAL, K & MH).

Notes : According to Sreekumar *et al.* (*l.c.*): The new taxon is allied to *Ischaemum tumidum* Stapf ex Bor but differs in having peduncles hardly exerted from the spathe; racemes 4 - 6 cm long, densely villous, joints slightly clavate-turbinate, not swollen; the lower glume ca 5 mm long, smooth not wrinkled, villous; lemma and palea ca 5 mm long; anthers up to 2 mm long; awns 20 - 25 mm long; whereas the sp. *Ischaemum tumidum* is characterised by : Peduncles long exerted; racemes up to 3 cm long, glabrous or sparsely villous; joints of racemes distinctly turbinate, swollen; lower glume of sessile spikelets ca 6 mm long, irregularly wrinkled or at least laterally noduled; lemma and palea of the lower floret of the sessile spikelet ca 4 mm long; anthers of the lower floret 2.5 - 3.0 mm long; awns up to 15 mm long. Occasional along dry, rocky hill slopes.

Ischaemum kannanorensis Sreek., V.J. Nair & N.C. Nair (Poaceae) in J. Econ. Tax. Bot. 4 (3): 1009 - 1011. 1983.

Tufted perennials. culms 15 - 60 cm high, erect or geniculate; upper nodes usually bearded, lower ones either villous or glabrous. Leaves 2 - 10 cm long, 3 - 6 mm broad, lanceolate, long acuminate, base rounded or shallowly or even deeply cordate, villous with sparse tubercle based hairs or glabrous. Sheaths 2 - 6 cm long, shorter than the internodes, striate, keeled, glabrous. Ligule 2 - 3 mm long, an oblong, acute membrane. Inflorescence of 2 racemes 2-5 cm long, stout, enclosed in a spathe, 3 - 6 cm long, glabrous. Joint of racemes 2.5 - 3.0 mm long, clavate or linear - clavate, crustaceous, densely villous on dorsal side, sparsely villous or glabrous along the margins, hairs 0.5 - 1.5 mm long. Sessile spikelets 3.5 - 5.0 mm long, ovate - oblong or oblong- acute, densely hairy or glabrous, awned, callus ca 1 mm long, densely hairy, hairs 0.5 - 2.0 mm long; lower glume 3.5 - 5.0 x 1.25 - 1.50 mm, ovate - oblong, or oblong - acute, crustaceous below, coriaceous above, smooth or wrinkled with a few shallow nodules and ridges, densely villous or entirely glabrous, faintly 11 - 13 nerved, margins narrowly inturred, scabrid above; upper glume 4 - 5 x 1.5 - 2.0 mm, boat-shaped or lanceolate when spread, shortly acuminate, keel humped in the middle, winged and

scabrid above the hump, rounded below, coriaceous, faintly 3-5-nerved, margins infolded, long ciliate in the upper half; lower floret male; lemma 3.5-4.0 × 1.00-1.25 mm, oblong-lanceolate, delicate, hyaline, faintly 3-nerved, margins infolded, glabrous; palea 3-4 × 0.75-1.00 mm, oblong-lanceolate, delicate, hyaline, 2-keeled, 2-nerved, glabrous, stamens 3, anthers 1.0-1.5 mm long, light pink or yellow, filaments 0.3-0.5 mm long; upper floret bisexual; lemma 3.0-3.5 × 1.25-1.50 mm, notched, lobes acute, delicate, hyaline, faintly 3-5-nerved, glabrous, awn 15-20 mm long, geniculate, column 8-10 mm long, brown bristle pale, scabrid; palea 2.5-3.0 × 0.50-0.75 mm, oblong, rounded at apex, delicate, hyaline, 2-keeled, 2-nerved, glabrous; lodicules 2, each ca 0.5-0.4 mm, obovate, oblique, and 3-horned at apex; stamens 3, anthers 1.5-2.0 mm long, light pink or yellow, filament ca 0.5 mm long; ovary ca 0.50 × 0.20 mm, oblong, styles ca. 1 mm long, slender, stigmas ca 1 mm long, creamy coloured, feathery pedicelled spikelet 3.5-5.0 mm, ovate or oblong, usually unawned, very rarely awned; pedicels 2.0-2.5 mm long, linear-clavate, densely villous on dorsal side or sometimes along the margins also; lower glume 4-5 × 1.50-1.75 mm, ovate or oblong, acute winged on one side, wing scabrid, coriaceous, faintly 11-13-nerved, densely villous or glabrous; upper glume 3.5-4.5 × 1.00-1.25 mm, lanceolate, keel angled, winged and scabrid towards apex, glabrous elsewhere; lower floret male, lemma, palea and stamens similar to that of sessile spikelet; upper floret bisexual; lemma 3.0-3.5 × 1.50-1.75 mm, ovate-lanceolate, faintly 3-5-nerved, delicate, hyaline, glabrous; palea, stamens, lodicules and pistil similar to that of sessile spikelet.

Types : P. V. Sreekumar 71713 (Holotyp CAL; Isotypes K, MH).

Flowering : October.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Cannanore District, Paramba, on the way to Bendudka, ± 150 m, Oct. 16, 1981, P. V. Sreekumar 71713 (CAL, K & MH); *ibid.*, Chattamchal, ± 100 m, Oct. 16, 1981, P. V. Sreekumar 71702 (Paratype MH).

Notes : According to Sreekumar *et al.* (*l.c.*): It is allied to *Ischaemum commutatum* Hack., but differs from it in having lower

leaves cordate at base never petioled; joints and pedicels clavate; sessile spikelet ca 4 mm long; lower glume ca 4 mm long, convex on the back, side nodules obscure, densely villous or glabrous, crustaceous; upper glume slightly humped in the middle and keeled; lower glume not or narrowly winged; anthers of the upper forest ca. 2 mm long; whereas the species *Ischaemum commutatum* is characterised by: Lower leaves narrowed or tapering towards base and usually petioled; joints of racemes and pedicels linear-turbinate; sessile spikelet ca 6 mm long; lower glume of sessile spikelet ca 6 mm long, flat on the back with a few side nodules, perfectly smooth and glabrous, coriaceous; upper glume of sessile spikelet not humped in the middle, rounded; lower glume of the pedicelled spikelet broadly winged on one margin; anther of the upper florets ca 3 mm long.

Tufted perennial grasses, growing along roadsides and waste places; usually in moist and damp situation; locally very common; variation in hairiness of spikelets and ornamentation of lower glumes.

Ischaemum copeanum Sreek., V.J. Nair and N.C. Nair (Poaceae) in J. Bombay Nat. Hist. Soc. 82 (2): 390. 1985.

Creeping annuals. Culms 20 - 40 cm high, creeping or geniculate; upper nodes villous, lower ones sparsely villous or glabrous. Leaves 2 - 5 cm long, 4 - 10 mm wide, ovate - lanceolate, acuminate, rounded or shallowly cordate at base, sparsely covered with tubercle based hairs. Sheaths 1 - 5 cm long, shorter than the internodes, striate glabrous. Ligule 1-2 mm, an ovate acute membrane. Inflorescence with 1-2 peduncles from a spathe, peduncles long exerted. Racemes two on each peduncle, 2-3 cm long, slender, sparsely villous. Joints of racemes 3.0 - 3.5 mm long, linear- clavate, coriaceous or chartaceous, densely villous along the margins and dorsal side. Lowest group of sessile spikelets in three, two of them are unawned. Unawned sessile spikelets 4.5 - 5.0 mm long, linear or oblong lanceolate, single flowered, floret male; lower glume 4.5 - 5.0 × 1.0 - 1.5 mm, lanceolate when spread, chartaceous, silky villous in the lower half, hairs 0.5 - 2.5 mm long, margins infolded, scabrid towards apex. Awned sessile spikelet 4.0 - 4.5 mm long, ovate - acute, callus

bearded; lower glume 4.0 4.5 × 1.50 1.75 mm, ovate-oblong, chartaceous, faintly 11 13 nerved, silky villous in the lower half, margins inturned, narrowly winged on one side, scabrid towards apex; upper glume 4.0 4.5 × 1.0 1.5 mm, boat shaped, lanceolate when spread, chartaceous, sharply keeled, faintly or strongly 3 nerved, margins hyaline, ciliate in the upper half; lower floret male; lemma 3.5 4.0 × 1.0 1.5 mm, oblong lanceolate, delicate, hyaline, faintly 3 5 nerved, margins infolded, ciliate in the upper half; palea 3.0 3.5 × 0.75 1.00 mm, oblong-lanceolate, delicate, hyaline, 2-keeled, 2-nerved, glabrous, stamens 3, anthers 1.5 2.0 mm long upper floret bisexual; lemma 3.0 3.5 × 1.0 1.5 mm, notched, lobes acute, delicate hyaline, faintly 3 nerved, awn 10 15 mm long, geniculate, column 4 6 mm long, brown, bristle pale, scabrid; palea 2.5 3.0 × 0.50 0.75 mm, oblong, delicate, hyaline, 2-keeled, 2-nerved, glabrous, with a few wart like dots towards apex; stamens 3, anthers 2.0 3.0 mm long, filaments short; ovary 0.4 0.5 mm long, oblong, styles c 1 mm long, stigmas 1.0 1.5 mm long, feathery. Pedicelled spikelet 4.0 4.5 mm long, oblong-lanceolate or linear-oblong, unawned; pedicels 0.5 1.0 mm long, linear clavate, densely villous; lower glume 4.0 4.5 × 1.00 1.25 mm, linear-oblong, chartaceous, densely villous in the lower half, margins narrowly inturned, scabrid towards apex; upper glume and florets similar in shape and structure to that of the sessile spikelet.

Types : P. V. Sreekumar 71838 (Holotype CAL; Isotypes K, MH).

Flowering : November*.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Cannanore District, Cherkala, ± 250 m, Nov.24, 1981, P. V. Sreekumar 71838 (CAL, K & MH).

Notes : According to Sreekumar *et al.* (*l.c.*) : This species is allied to *Ischaemum burmanicum* Bor, but markedly differs from it by: leaf blades up to 5 cm long, 10 mm wide, ovate-lanceolate, lower ones not petioled, base cordate; nodes bearded, racemes 2 in number on each peduncle & lower glumes- 4.5 mm long, in contrast, *I. burmanicum* is characterised by: leaf blades up to 10 cm long, 15 mm wide, lanceolate, acuminate, lower ones shortly petioled, base

sagittate; nodes glabrous; raceme solitary on each peduncle; lower glumes of sessile spikelets 6.5 mm long.

Slender, creeping or geniculate annuals growing in moist rocky places. A shade-loving species; locally rare.

The species is named after Dr. Thomas A. Cope of the Royal Botanic Gardens, Kew.

Ischaemum malabaricum Sreek., V.J. Nair & N.C. Nair (Poaceae) in Kew Bull. 39 (4): 743-745. 1984.

Annuals. Culms weak, creeping and geniculate; upper nodes villous, lower ones either villous or glabrous. Leaves 1-10 cm × 5-15 mm, triangular, ovate-lanceolate, or lanceolate, acute or long-acuminate, base deeply cordate or sagittate, glabrous or sparsely villous. Sheaths 1-6 cm long, shorter than the internodes, striate, glabrous. Ligule 2-3 mm long, an ovate membrane. Inflorescence of 2 racemes, 2-6 cm long, slender, enclosed in a spathe 2-8 cm long and villous towards base. Joint of raceme 2.5-3 mm long, linear-clavate, slender, rounded on dorsal side, ventrally flat, margins long villous. Sessile spikelets 3.5-4.5 mm long, ovate-oblong, awned, callus bearded; lower glume 3-4 × 1-1.25 mm, ovate-oblong or elliptic, acute, smooth, thin, chartaceous, faintly 9-11-nerved, dorsally covered with long white hairs 1-2 mm long, and also with short hairs except on the upper quarter, margins narrowly and evenly inturned from base to apex; upper glume 3.5-4 × 1.25-1.5 mm, boat-shaped, dorsally rounded, chartaceous, faintly 3-5-nerved, covered with short adpressed hairs, margins hyaline, shortly ciliate; lower glume male; lemma 3.5-4 × 0.75-1 mm, linear-oblong or elliptic lanceolate, acute, delicate, hyaline, 2-keeled, faintly 3-5 nerved, shortly hairy along the margins; palea 3-3.5 × 0.75-1 mm, linear-oblong, acute, delicate, hyaline, 2-keeled, 2-nerved, glabrous, margins inturned; lodicules 2, each c. 0.35 × 0.2 mm, obovate, retuse at apex; stamens 3, anthers c. 1 mm long, filaments short; upper glume bisexual; lemma 2.5-3 × 0.75-1 mm, notched, lobes acute, delicate, hyaline, faintly 3-nerved, shortly ciliate, awn 12-15 mm long, column c. 5 mm long, brown, bristle pale, scabrid; palea 2-2.5 × 0.5-0.75 mm, oblong or oblanceolate, obtuse, rounded at apex, delicate, hyaline, 2-nerved, 2-keeled,

glabrous; lodicules 2, each c 0.5×0.25 mm, obovate, oblique and wavy at apex; stamens 3, anthers 1.5–2 mm long, dirty yellow, filaments short; pistil 2.5–3 mm long, ovary $0.4-0.5 \times 0.1-0.15$ mm elliptic, styles c 1.5 mm long, slender, stigmas c 1 mm long, pink, feathery. Pedicelled spikelet 3.5–4 mm long (excluding pedicels), elliptic-acute, without awns, callus densely villous; pedicels c 2 mm long, linear, dilated at apex, dorsally rounded, ventrally flat, long-villous along the margins; lower glume $3.5-4 \times 0.75-1$ mm, elliptic or oblong, acute, thin, chartaceous, faintly 9–11 nerved, 2-keeled, scabrid along the keels, glabrous or sparsely villous towards base, margins narrowly inturned; upper glume $3.5-4 \times 1-1.25$ mm, elliptic-lanceolate, acute or shortly acuminate, chartaceous, faintly 3-nerved, shortly keeled, minutely hairy, margins hyaline and shortly ciliate; lower floret male; lemma $3-3.5 \times 0.75-1$ mm, elliptic-lanceolate, delicate, hyaline, faintly 3-4-nerved, 2-keeled glabrous except margins which are shortly ciliate; palea $3-3.5 \times 0.5-0.75$ mm, lanceolate, acute, delicate, hyaline, 2-keeled, 2-nerved, glabrous; lodicules of the same size and shape as in the sessile spikelet; stamens 3, anthers c 1 mm long, filaments short; upper floret male; lemma $2.5-3 \times 0.75-1$ mm, elliptic, acute, delicate, hyaline, faintly 3-nerved, shortly keeled, glabrous, margins inturned at apex; palea $2-2.5 \times 0.5-0.75$ mm, linear-oblong, delicate, hyaline, 2-keeled, 2-nerved, glabrous; lodicules 2, similar to those of the sessile spikelet; stamens 3, anthers 1.5–2 mm long, filaments short.

Types : Sreekumar 71720 (Holotype CAL; Isotypes MH, K).

Flowering : October*.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Cannanore District, Paramba, \pm 150 m, Oct. 16, 1981, Sreekumar 71720 (CAL, MH & L); Kumbala, Sea-level, Oct. 17, 1981, Sreekumar 71735; Elimala, \pm 150 m, Oct. 20, 1981, Sreekumar 71763; Calicut district, Kalarimala, \pm 250 m, Oct. 27, 1981, Sreekumar 71790; Pokkunnamalai, near nanmida, \pm 850 m, Oct. 29, 1981, Sreekumar 71802 (All in MH).

Notes : According to Sreekumar *et al.* (*l. c.*) : The new species is allied to *I. tumidum* Bor & *I. semisagittatum* Roxb. but markedly

differs. The comparative study of the taxonomic characters of the 3 species shows that the species *I. tumidum* has truncate or cordate at base of leaves but never sagittate, the lower sessile; nodes glabrous; joints of raceme distinctly turbinate; joints and pedicels stout, coriaceous or crustaceous; lower ligume coriaceous below, chartaceous above and with a few lateral nodules; pedicel up to 1/3 the length of the sessile spikelet; anthers 3 - 3.5 mm long; but in species *I. malabaricum*, leaves are deeply cordate or sagittate at base, the lower sessile; upper nodes villous; joints of raceme linear-clavate; joints and pedicels slender, chartaceous; lower glume chartaceous throughout, without lateral nodules; pedicel over 1/3 the length of the sessile spikelet; anthers 1.5 - 2 mm long; whereas the species *I. semisagittatum* is having the characters of leaves being deeply cordate or sagittate at base, the lower long-petiolate; nodes glabrous; joints of raceme distinctly turbinate; joints and pedicels stout, coriaceous or crustaceous; lower glume coriaceous below, chartaceous above and with a few lateral nodules; pedicel up to 1/3 the length of the sessile spikelet; anthers 2.5 - 3.5 mm long.

The new species is locally very common; in dry localities, usually trailing over old compound walls.

Ischaemum tadulingamii N.C. Nair & Sreek. (Poaceae) in *Blumea* 30 (2): 385 - 387. 1985.

Tufted annuals or perennials. Culms 10 - 30 cm high, erect; nodes glabrous. Leaves linear-lanceolate, 2 - 10 by 0.4 - 0.6 cm, shortly acuminate, narrowed and tapering at the base, sparsely villous with tubercle-based hairs. Sheaths 2 - 8 cm long, equal to or shorter than the internodes, striate, villous with sparse tubercled hairs, throat sparsely villous. Ligule 2 - 3 mm long, ovate, acute, membranous. Racemes 2 or 3.2 - 6 cm long, stout; spathe 2 - 10 cm long, glabrous. Joints of racemes linear, turbinate, 3.5 - 4 mm long, coriaceous, long villous along the margins and dorsal angle. Sessile spikelets ovate-lanceolate, 6 - 7 mm long; callus densely bearded, hairs 1 - 2 mm long. Lower glume ovate-lanceolate, 6 - 6.5 by 1.75 - 2 mm, acuminate, without nodules, chartaceous, distinctly 11 - 13 nerved, with a few long hairs on dorsal side towards

base, margin narrowly and evenly inturned, not winged, scabrid in the upper half; upper glume 5.5–6 by 1.25–1.5 mm, boat shaped or ovate-lanceolate when spread, acuminate, keels rounded except towards the minutely winged and scabrid apex, chartaceous, 3–5 nerved, covered with very short adpressed hairs, especially towards the base, margins inflodded and ciliate in the upper half. Lower floret empty. Upper floret bisexual. First lemma lanceolate, 4.5–5 by 1–1.5 mm, delicate, hyaline, faintly 3 nerved, margins infolded and ciliate in the upper half, glabrous elsewhere. Second lemma lanceolate, 4–4.5 by 1–1.5 mm, delicate, hyaline, faintly 3 nerved, margins ciliolate in the upper half, apex notched, lobes acute. Awn 10–12 mm long, geniculate, column 5–6 mm long, chestnut brown, arista pale, scabrid. First palea elliptic-lanceolate, 4–4.5 by 1–1.25 mm, delicate, hyaline, 2 keeled, margins infolded and ciliate in the upper half. Second palea oblong, 3–4 by 0.75–1 mm, delicate, hyaline, 2 keeled, glabrous, apex rounded. Lodicules of upper floret obovate, 0.6–0.75 by 0.4–0.5 mm, retuse at apex, faintly 5–7 nerved, median nerve prominent. Lodicules of lower floret obovate, oblique; *c* 1 by 0.5 mm, faintly 3–5 nerved, apex wavy and 2 horned. Stamens 3, anthers 1.5–2 mm long. Caryopsis obovate with 2 horns at apex, *c* 2 by 0.75 mm. Pedicelled spikelet ovate-lanceolate, 4–6 mm long, unawned, usually reduced, sterile. Pedicels linear, turbinate, 3–4 mm long, villous along the margins and dorsal angle, hairs 0.5–2 mm long. Lower glume ovate-lanceolate, 4.5–6 by 1.25–1.5 mm, winged on one margin, wing scabrid, smooth, chartaceous, faintly 9–11 nerved, glabrous, margins inturned, scabrid towards sharply at apex; upper glume ovate-lanceolate, 3–5 mm long, keel rounded, glabrous, apex acute. Florets empty.

Types : Sreekumar 71863 (Holotype CAL; Isotypes K, MH).

Flowering : April*.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Idukki District, Eravikulam National Park, 2200m, Apr. 7, 1980, Sreekumar 71863 (CAL, K & MH).

Notes : According to Nair & Sreekumar (*l.c.*): This species is allied to *Ischaemum commutatum* Hackel but markedly differs from

it by: lower leaves not pseudo petiolate, narrowed at base; racemes 2 or 3; joints and pedicels distinctly turbinate; callus hairs 1-2 mm long; lower glumes of the sessile spikelets ovate-lanceolate, acuminate, chartaceous throughout, flat, without nodules, keels not winged; nerves of the lower glumes 11-13, green, distinct; lower floret of the sessile spikelet empty and pedicelled spikelet reduced. In contrast, lower leaves in species *I. commutatum* are usually pseudo-petiolate; racemes 2; joints and pedicels linear, lightly turbinate; callus hairs up to 1 mm long; lower glumes of the sessile spikelets oblong, obtuse, crustaceous below, coriaceous above, usually with a few nodules; keels narrowly winged; nerves on the lower glumes 7-9, faint and very obscure; lower floret of the sessile spikelet male and pedicelled spikelet well developed.

Tufted perennial grasses growing in clumps near edges of streams and along rocky areas in grassland, locally rare.

This species is named after C. Tadulingam, one of the pioneers in the studies on South Indian grasses.

***Ixora beddomei* T. Husain & S.R. Paul (Rubiaceae) in Candollea 41 (1): 87 - 88. 1986.**

Habit unknown; young branches glabrous; stipule 10 mm long, glabrous, inner surface hairy; cusp 5 mm long, glabrous. Leaves 13 $20.5 \times 4.2 - 7.1$ cm, opposite, oblong or elliptic, apex mucronate or acuminate, base acute, glabrous on both the surfaces, coriaceous; reticulately veined with 12 - 14 pairs of lateral anastomosing nerves joining the midrib; petiole 4 - 8 mm long, glabrous. Inflorescence terminal, corymbose, congested, peduncled; peduncle 3 cm long, pubescent; bracts 4 - 7 mm long, linear, acute, pubescent. Flowers 4-merous, pedicellate or sessile, pedicel 0.5 - 1 mm long, pubescent; bracteole 4 mm long, linear, acute, pubescent. Calyx tube 1 mm long, pubescent; lobe 4 mm long, linear, acute, pubescent. Corolla tube 17 - 17.5 mm long, glabrous; lobe 3.5×2 mm, ovate-oblong, acute, glabrous. Stamens 4, attached to the throat; filament 1 mm long; anthers 3 mm long, dorsifixed; style 19.5 - 20 mm long, glabrous; stigma 2 mm long, 2-fid. Fruit unknown.

Types : *Beddome* 3909 (Holotype BM; Isotype K).

Flowering : Time not mentioned.

Distribution : INDIA : Kerala.

Herbarium specimens: INDIA: Kerala; Mally District, Wynaad, *Beddome* 3909 (BM & K).

Notes : According to Husain & Paul (*l.c.*): Allied to *I. lawsonii* but differs in having leaf base acute; calyx tube pubescent and corolla tube 17-17.5 mm long; whereas in *I. lawsonii*: leaf base rounded; calyx tube glabrous and corolla tube 8-13 mm long. Exine reticulations are uniform and round in *I. beddomei*.

Ixora katchalensis T. Husain & S.R. Paul (Rubiaceae) in *Blumea* 30 (1): 153-156. 1984.

Shrub or small tree, \pm 2-5 m high, stem solid, terete, glabrous; internodes 0.6-0.95 cm long; stipule 6-7 \times 4-5 mm long, inner surface hairy, outer glabrous; hairs 1.5-2 mm long with 10 or 11 cells, uniseriate; cusp 1-2 mm long; petiole 1.5-3 cm long, glabrous. Leaves 15-25.5 \times 6.2-11 cm, opposite, petioled, leathery, elliptic-obovate or oblong, base acute, apex obtuse or acuminate, glabrous; reticulately veined with 12-14 lateral anastomosing nerves joining the midrib; upper pair of leaves at the base of peduncle smaller, 2.5-9.8 \times 1.6-6.4 cm, sessile, ovate apex acuminate or acute, base cordate, with a prominent midrib and faint lateral nerves. Inflorescence a brachiate, trichotomous, compound dichasial cyme, terminal corymbose panicle, sometimes cymes in pairs; flowers 120-135 per head, peduncled; peduncle 3-6 cm long, glabrous; bracts 1.5-6 mm long, linear, acute, glabrous, decreasing in size upwards. Flowers 4-merous, white, pedicellate or sessile, those in the forks sessile, ebracteolate; pedicel 4-10 mm long, glabrous; bracteole 1-1.1 mm long, linear, acute, glabrous. Calyx tube 2-2.5 mm long, glabrous; lobes 0.5-1 mm long, triangular, acute, glabrous. Corolla tube 3.1-4.1 cm long, glabrous; lobes 8-9.3 \times 3.5-4 mm, oblong, rounded at apex, bearded at the throat with white hairs. Stamens 4, attached to the throat; filaments 1.5-2 mm long, glabrous; anthers 4.5-5.4 mm long, dorsifixed; ovary 1-1.5 mm long, glabrous; stigma 2-3 mm long, rounded at the top, shortly cleft in the middle by

1/3 from above; style 3.2–4.2 cm long, glabrous. Fruit 8–12 × 12 mm, ellipsoid, ovoid or globose, green.

Types : *P. Chakraborty* 1134 (Holotype PBL) & *P. Chakraborty* 5305 (Isotype PBL).

Flowering & Fruiting : February–May*.

Distribution : INDIA : Andaman & Nicobar Islands.

Herbarium specimens : INDIA: Andaman & Nicobar Islands; North Nicobars, Katchal I., Sea-level, Apr. 22, 1974, *P. Chakraborty* 1134 (PBL); Kamorta I., c 15 m, May 22, 1977, *N. Bhargava* 5031 (PBL); Lamia Bay to Ramnagar, Sea-level, Mar. 29, 1977, *N. P. Balakrishnan* 5325 (PBL); Kapanga, Katchal I., Feb. 27, 1977, *P. Chakraborty* 5305 (PBL).

Notes : According to Husain & Paul (*l.c.*): *Ixora Katchalensis* Husain & Paul is closely related to *I. barbata* Roxb. et Sm. but differs from it in having petiole of 1.5–3 cm long; number of lateral nerves 12–14; number of flowers per head 120–135; bracteole 1–1.1 mm long; glabrous and stigma 2–3 mm long, rounded at the top, shortly cleft in the middle by 1/3 from above. In contrast *Ixora barbata* is characterised by petiole of 0.8–1.5 cm long; number of lateral nerves 10–12; number of flowers per head 60–90; bracteole 1.25–3.1 mm long, glabrous or pubescent and stigma 2–3 mm long, club-shaped, or bifurcated into two short stigmatic arms.

It is evident from study that the material belongs to section *Octobactrum* Brem. (group c), which is characterised by a generally long-pedunculate inflorescence and the presence of a short internode either with reduced and differently shaped leaves or with rudimentary leaves at the base of the peduncle and by the corolla outside glabrous, but the lobes bearded at the base.

Ixora mercaraica T. Husain & S.R. Paul (Rubiaceae) in *Candollea* 41 (1): 88. 1986.

Habit unknown; young branches pubescent; stipule 9 mm long, pubescent all over, inner surface hairy; cusp 5 mm long, pubescent. Leaves 9.9 × 4.4 cm, opposite, ovate, apex acuminate, base rounded,

pubescent on both the surfaces, coriaceous, subsessile; reticulately veined with 13 - 14 pairs of lateral anastomosing nerves joining the midrib; petiole 2 mm long, pubescent. In floescence terminal, corymbose, congested, peduncled; peduncle 8 cm long, densely pubescent; bracts 9 - 13 mm long, pubescent, lower most bract leaf-like, others linear acute. Flowers 4 - merous, trichotomously arranged, central flower of the trichotome sessile and ebracteolate, others pedicellate and bracteolate, pedicel 1.5 - 2 mm long, pubescent; bracteole 9 mm long, linear, acute, pubescent. Calyx tube 1 mm long, pubescent; lobe 6.5 - 8 mm long, linear, acute, pubescent. Corolla tube 13.5 - 17 mm long, glabrous; lobe 4 × 2 mm, ovate-oblong, acute, glabrous. Stamens 4, attached to the throat; filaments 1 - 1.1 mm long, glabrous; anthers 3.75 mm long, dorsifixed; style 15 - 19.5 mm long, glabrous; stigma 2 mm long, 2 fid. Fruit unknown.

Types : *Hohenacker* 439a (Holotype BM; Isotype K).

Flowering : Time not mentioned.

Distribution : INDIA: Karnataka.

Herbarium specimens : INDIA: Karnataka; Mercara, 1847, *Hohenacker* 439a (BM & K).

Notes : According to Husain & Paul (*l.c.*) : The new species is allied to *I. lawsoni* Gamble, but differs in having: leaf surface pubescent; petiole length 2 mm long, pubescent, bracteole 9 mm long; calyx tube pubescent; calyx lobe 6.5 - 8 mm long; corolla tube 13.5

17 mm long; whereas in *I. lawsoni*: leaf surface glabrous; petiole length 5 mm long, glabrous; bracteole 4 - 5 mm long; calyx tube glabrous; calyx lobe 4 mm long; corolla tube 8 - 13 mm long.

In the reticulations, in *I. mercaraica*, where two to three adjacent pores are joined together.

Jainia N.P. Balakr. (Rubiaceae) in *J. Bombay Nat. Hist. Soc.* 77 (1 -3): 116 - 120. 1980.

Herbs or undershrubs, glabrous, unbranched or rarely once branched, often decumbent or rooting at nodes below. Leaves

opposite, decussate, petiolate, glabrous, entire, herbaceous, penninerved; stipules interpetiolar, lanceolate, entire, glabrous, persistent. Inflorescence terminal, pedunculate, capituliform, globose, glabrous; involucre bracts 4 or 5, ovate, white, glabrous; flowers bisexual, small, sessile, bracteolate, arranged in cymes of 1-3 flowers, bracteate. Calyx pentamerous; tube not projecting beyond ovary; lobes 5, ovate lanceolate, white, glabrous, persistent. Corolla white, trimerous, tubular with tube constricted above the middle, glabrous outside, densely villous at throat inside; lobes 3, valvate, erect, densely villous inside. Stamens 3, included below throat, inserted at bottom of corolla-tube introrse, basifixed, longitudinally dehiscent. Disc annular, 4-lobed, glabrous. Ovary bilocular with peltate axile placentae fixed to middle of septa; ovules many; style erect, glabrous, stigma thick, ovoid, erect, unequally 2-lobed, included below the throat. Fruit capsular, globose, subovoid, crowned with calyx, irregularly dehiscent at base with the apical part falling off as a lid; seeds many, subglobose, angular, scrobiculate, red-brown.

Type species : *Jainia nicobarica* N.P. Balakr.

Distribution : INDIA: Great Nicobar Island.

Notes : According to Balakr. (l. c.): This monotypic new Genus, *Jainia* Balakr., belongs to Hedyotideae of Rubiaceae and differs from all other Rubiaceae mainly in the presence pentamerous calyx, and trimerous corolla with three stamens, a combination unknown or extremely rare in the family. However undoubtedly this new genus is closely related to *Coptophyllum* agreeing with it in general habit, terminal capitate inflorescence with involucre bracts and sessile flowers, many-ovuled ovary, and in the dehiscence of fruits. Reference to literature on this genus including the revision by Bremekamp (in J. Arn. Arb. 28: 189. 1947) under the synonymous generic name *Pomazota* Ridl. and the study of specimens in Calcutta and Leiden herbaria show several distinctive features which distinguish this new genus from *Coptophyllum*.

Jainia differs from *Coptophyllum* by: plants are glabrous throughout except corolla tube inside; involucre bracts 4 or 5; corolla glabrous outside, 3 lobed, lobes erect; stamens 3; anthers obtuse; filaments attached to the base of corolla tube; stigmatic lobes erect,

reaching up to mouth of corolla tube; whereas in *Coptophyllum*, plants are having stiff hairs on young parts (leaf margin, stipules, bracts and calyx lobes); involueral bracts 4, 5 or 8; corolla hairy, 4-5 lobes, lobes stellately spreading; stamens 4 or 5; anthers apiculate; filaments attached to the middle or below the middle of corolla tube; stigmatic lobes rectangularly spreading, protruding out of corolla tube.

The genus is named in honour of Dr. S. K. Jain, Ex-Director, Botanical Survey of India.

Jainia nicobarica N.P. Balakr. (Rubiaceae) in J. Bombay Nat. Hist. Soc. 77 (1-3): 117-120. 1980.

Undershrub, 40-60 cm high, glabrous; stem somewhat terete, 5-8 mm thick, woody, glabrous, shortly ascending from base, sometimes decumbent and rooting at base after flowering, simple or rarely branched. Leaves oblanceolate, slightly obliquely cuneate at base, acute at apex, 14-25 cm long, 3-5 cm wide, glabrous and dark green above, pale green and sparsely puberulous beneath; lateral nerves 16-20 pairs arched and anastomosing at margins, prominent beneath; midrib ridged beneath; petioles 1-2 cm long, glabrous; stipules linear lanceolate, broad at base, long-acuminate, 1.3-1.6 cm long, 2-3 mm broad at base, glabrous, persistent. Inflorescence globose, capitulate, 2.0-2.5 cm diam.; peduncle 1-3 cm long, glabrous; bracts of involucre 4-5, ovate, triangular, acute, 7-8 mm long, 4-6 mm wide, glabrous, thick, fleshy, white; bracts of cymes white, ovate lanceolate, 5-8 mm long, 2-4 mm wide; floral bracts linear-lanceolate, or oblong-lanceolate, 3-5 mm long, 1-3 mm wide, white, puberulous outside. Calyx lobes ovate-lanceolate, acute or subacute, erect, subequal, 1-2 mm long, \pm 1 mm wide, minutely puberulous at apex, fleshy, white, persistent, enlarged up to 4 mm long in fruits. Corolla white, tubular, 3-4 mm long, glabrous outside, densely villous inside at throat; lobes 3, valvate, ovate, \pm 1 mm long, fleshy, erect, thickened at margins, villous inside. Stamens 3, included, rarely reaching up to throat of corolla; filaments filiform, \pm 0.75 mm long; anthers oblong, \pm 0.75 mm long,

obtuse at apex, shortly emarginate at base. Ovary united completely with calyx, white; style \pm 0.5 mm long; stigmatic lobes \pm 0.5 mm long, oblong, ovoid, densely papillose. Capsules oblong, ovoid, 7-8 mm long, 5-6 mm wide, thin-walled; seeds numerous, \pm 0.4 mm long, scrobiculate, reticulate alveolate, red-brown.

Types : *Balakrishnan* 5837 (A: Holotype CAL; B-C: Isotypes PBL).

Flowering & Fruiting : June.

Distribution : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA: Great Nicobar Island; Near 15 km on East-West Road, \pm 75 m, June 16, 1977 (in flower & fruit), *Balakrishnan* 5837 (A: CAL, B-C: PBL).

Notes : According to *Balakrishnan (l.c.)*: This type species collected from dense evergreen primary forests, shaded moist places near streams.

***Jasminum cordifolium* Wall. ex G. Don subsp. *andamanicum* S.K. Srivast. & S.L. Kapoor (Oleaceae) in Bull. Bot. Surv. India 25 (1-4): 217 - 219. 1983 (1985).**

Scandent climber, branchlet terete, glabrous. Leaves simple opposite, 7-9.5 \times 3.5-5.0 cm; lamina ovate, acuminate, base rounded or subcordate, entire, thick-chartaceous, glabrous on both the surfaces, midrib impressed above, raised beneath, lateral nerves distinct, ca 7 pairs, interarching far from the margin; petiole 0.8-1.5 cm long, minutely puberulous, channelled, flattened at the base and adnate to the stem to form a narrow wing on the node. Cymes axillary or terminal, trichotomous, hairy, bract 0.4-0.6 cm long, hairy, linear or linear-lanceolate, acute; flower in clusters, 3.2-4.0 cm across, peduncle hairy, pedicel 0.3-0.4 cm long, hairy; calyx 0.6-0.9 cm long, hairy, tube 0.2-0.25 cm long, campanulate, lobes 5-6, 0.5-0.7 cm long, linear, subulate; corolla 2.5-3.0 cm long, glabrous, tube 1.5-1.8 cm long, lobes 6-7, 0.8-1.0 cm long, oblong, acuminate; stamens 2, 0.35-0.45 cm long, glabrous, attached inside the corolla tube at 1/3rd of its length from the base, nearly

sessile or filament 0.1 cm long, anther 0.3 - 0.35 cm long, lobes oblong, connective produced; pistil 1.4 - 1.7 cm long, glabrous, ovary ovate-cylindrical, 0.15 cm long, style 1.0 - 1.3 cm long, slender, stigma 0.2 - 0.3 cm long, broad, bifid. Fruit ovoid or ellipsoid, 0.6 - 1.0 × 0.6 cm.

Types : C. E. Parkinson 302 (A: Holotype DD; B: Isotype DD).

Flowering & Fruiting : January - March.

Distribution : INDIA: Andaman Islands.

Herbarium specimens : INDIA : Andaman Islands; North Baratang, Feb. 11, 1915, C. E. Parkinson 302 A - B (DD); South Andamans, Chiriatapu, Jan. 20, 1916, C. E. Parkinson 891 (Paratypes DD, CAL).

Notes : According to Srivastava & Kapoor (*l.c.*): There are two groups of herbarium specimens of *Jasminum cordifolium*. Though Nilgiri and S. Indian specimens are close to specimens of Andaman Islands they differ from each other.

De Candolle (1844), Clarke (1882), Gamble (1921) and Parkinson (1922) have recorded *J. cordifolium* in their respective publications but have not described any infraspecific taxon in this species. Since the type of *J. cordifolium* Wall. ex G. Don (Wall. Cat. n. 2858 vide G. Don 1837) belongs to Nilgiri Hills, the mainland specimens are treated as subspecies *cordifolium* and the specimens from the Islands are described as a new subspecies, viz. subspecies *andamanicum*.

Jasminum cordifolium Wall. ex G. Don. subsp. *andamanicum* Srivastava & Kapoor subsp. Nov. is allied to subsp. *cordifolium* but differs in having the petioles minutely puberulous, connate at the base to form a narrow wing around the node, 8 - 15 mm long; cymes hairy; bracts hairy inside, 4 - 6 mm long; calyx hairy outside, 6 - 9 mm long; stamens attached inside the corolla tube at 1/3 of its length from the base; style 10 - 13 mm long; distributed in Andaman Islands. Whereas in subspecies *cordifolium*, the characters are : petioles glabrous, not connate at the base, 10 - 30 mm long; cymes glabrous; bracts glabrous inside, 7 - 9 mm long; calyx glabrous outside, 8 - 14 mm long; stamens attached inside the corolla tube at 3/4 of its length from the base; style 16 - 20 mm long; distributed in S. India.

Jasminum simonsii A.K. Sinha, Maiti & G.S. Giri (Oleaceae) in *J. Bombay Nat. Hist. Soc.* 77 (1-3): 305 -307. 1980 (1981); Nithani in *Ind. J. For.* 5: 247. 1982.

Small slender shrub, glabrous to pruinose in younger parts. Leaves simple, ovate to ovate-lanceolate, 7-10 cm × 3.5-4 cm, apex acuminate, base cordate to rounded, entire, glabrous, membranous, puberulous along the major nerves below, 5-nerved, convergent with successive marginal loops. Petiole 10-13 mm, long, glabrous to pruinose, deeply channelled. Inflorescence axillary cyme, unbranched, 2-5 flowered. Peduncle 2-3 cm. Pedicel slender, 1-2 cm long, glabrous or rarely pruinose. Flowers bracteate, bracts subulate, angular, 2-3 mm × 1 mm. Calyx 5-lobed, cupular, teeth acuminate, glabrous. Corolla 5-lobed, tubular, tube 10 mm long, lobes ovate-lanceolate, 6 × 5 mm, acute, glabrous. Stamens 2, included within the tube, filaments 7 mm, anthers 5 mm, oblong, 2-celled. Ovary ovoid, 2 mm diam.; style 12 mm, filiform, glabrous; stigma linear-oblong, bifid. Mature fruits and seeds unknown.

Types : *Simons* s.n. (Holotype CAL Acc. No. 285972; Isotype CAL. Acc. No. 285972A).

Flowering : Time not mentioned.

Distribution : INDIA: Assam, Burma.

Herbarium specimens : INDIA: without any precise locality; *Simons* s.n. (CAL) [*Jasminum attenuatum* Roxb. ex DC. Det. by C. E. C. Fischer, Aug. 12, 1936, Acc. Nos. 285972 & 285972 A].

Notes : According to Sinha *et al.* (*l.c.*) : *Jasminum simonsii* differs from *J. dispernum* Wall., in having glabrous plant body, simple leaves, 5-nerved, lateral nerves united before they reach the margin, unbranched lax cyme with long slender peduncles, dentate acuminate calyx lobes and short corolla tube. It is related to *J. stenopetalum* Lindl., but can be easily differentiated by the acuminate leaves, 5-nerved, glabrous, except the nerves beneath, larger peduncles and pedicels, smaller angular bracts, shorter calyx teeth and 5 shorter ovate corolla lobes.

The specific epithet was chosen based on Mr. Charles J. Simons, who was a pioneer collector in the regions of Khasia hills and Mikir hills.

Jasminum unifoliolatum N.P. Balakr. & N. G. Nair (Oleaceae) in Bull. Bot. Surv. India 24 (1-4): 33-35. 1982 (1983).

Scandent shrubs; branchlets glabrous; young nodes minutely puberulous. Leaves opposite, usually simple, unifoliolate, very rarely with one lateral leaflet, ovate, truncate to subacute at base, acuminate at apex, entire at margins, 7-11 cm long, 4-6 cm wide thickly coriaceous, glabrous, dark green above, glaucous green beneath; lateral nerves 5-7 pairs, ascending and interarching away from margins; petioles articulate, geniculate, 2.0-2.5 cm long, 1-2 mm thick, glabrous. Cymes paniculate, terminal and in upper leaf axils, 12-17 cm long, densely soft short white hairy; bracts linear-lanceolate, 1-2 mm long, densely white hairy at margins. Flowers heterostylous, white, sessile or subsessile; pedicels up to 2 mm long, densely pubescent with soft short white hairs. Calyx-tube ca 2 mm long, pubescent; lobes 4-5, ovate-triangular, ca 1 mm long, densely short white hairy at margins and inside. Corolla funnel-shaped, white, glabrous, with a tube of 1.6-2.0 cm long, 1-2 mm diam; lobes 5, imbricate, ovate, mucronate at apex, 5-6 mm long, 3-4 mm broad. Stamens 2, included; in long-styled flowers affixed above the middle of corolla tube; in short-styled, flowers affixed below the middle of corolla tube; filaments 1.5-2.0 mm long, glabrous; anthers 3.0-3.5 mm long, ca 1 mm broad, dehiscent longitudinally; connective shortly produced and triangular. Ovary enclosed inside the calyx-tube, glabrous, 2-loculed; locules 2-ovuled, sometimes 1-ovuled; style filiform, longer ones up to 2 mm long, shorter ones ca 1 mm long; stigma bilobed, thicker than style, ca 1.5 mm long. Fruit carpels ellipsoid-oblong, 1.2-1.5 cm long, 7-9 mm thick.

Types : Balakrishnan & Nair 4766 (A: Holotype CAL; B-D: Isotypes PBL; E: Isotype L).

Flowering : December. *Fruiting* : March.

Distribution : INDIA: Andaman Island.

Herbarium specimens : INDIA: North Andamans; Saddle Peak, 400-700 m, Dec. 1, 1976, in flower Balakrishnan & Nair 4766 (A in CAL, B-D: in PBL, E in L); *ibid.*, Mar. 27, 1977, in fruits, Balakrishnan 5160 (Pratypes PBL, CAL, L).

Notes : According to Balakr. & Nair (*l.c.*): This species differs from *J. caudatum* Lindl., in leaves being mostly unifoliolate, broader, thickly coriaceous, penninerved; panicles densely short white hairy; cymes lax-flowered; corolla tube and lobes shorter.

The new taxon is found in scrub forests, on red lateritic soil.

***Jatropha maheshwarii* Subr. & M.P. Nayar** (Euphorbiaceae) in Bull. Bot. Surv. India 6(2-4): 331. 1964 (1965).

Monoecious, erect, low-branching, glabrous shrubs, up to 1.5 m tall; bark pale, smooth, papery. Leaves 5-17.5 × 3.5-10 cm, oblong-ovate, peltate or subpeltate, entire, coriaceous, acute to acuminate at apex, rounded at base; venation palmately reticulate, base 3-5-nerved, lateral nerves 5-7 pairs; petioles 4.5-16 cm long; stipules small, scarious, soon deciduous. Flowers yellow, in terminal or rarely leaf-opposed trichotomous cymes, the central flowers of cymes, usually female; pedicels short; bracts 3-8 mm long, lanceolate, acute. Male flowers: sepals 5, imbricate in bud, shortly united at base, each 3-4 mm long, elliptic-oblong, glabrous. Petals 5, contorted, shortly united at base, each 4-5 mm long, linear-elliptic, glabrous without, villous at base within. Disc of 5 distinct glands arranged around the base of the staminal column; glands ovate, minutely stalked. Stamens 8-9; filaments slender, united into a column; anthers linear-oblong, dorsifixed, dehiscent longitudinally. Pistillode absent. Female flowers: sepals 5, imbricate in bud, shortly united at base, each 4-5 mm long, oblong-lanceolate, glabrous. Petals 5, contorted, shortly united at base, each 5-6 mm long, linear-elliptic, glabrous. Disc as in male flower. Ovary ellipsoidal, glabrous, 3-celled; ovules one in each cell, pendulous; styles 3, united below, each limb bilobed; stigmas clavate. Capsules 1.4-1.6 cm long, 1.2-1.4 cm across, oblong-globose or subglobose, brownish, glabrous, rough; seeds ± 1.3 × 0.8 cm, oblong, crustaceous, brownish, shining, caruncle prominent.

Types : Nayar 107 (A: Holotype CAL; B-I: Isotypes CAL).

Flowering & Fruiting : April.*

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Kanyakumari, at Sea label, Apr. 5, 1956, *M. P. Nayar* 107 (A I : CAL).

Notes : According to Subr. & Nayar (*l.c.*) : Allied to *J. villosa* Wight, but differs in plants being glabrous; leaves oblong-ovate, entire, acute to acuminate at apex, rounded at base; and petals united only at base.

The specific epithet is given in honour of Professor P. Maheshwari, Delhi University.

***Jatropha villosa* wight var. *ramnadensis* Ramam.**
(Euphorbiaceae) in Bull. Bot. Surv. India 9(1-4): 278-279. 1967 (1968).

Shrubs erect, low branching, glabrous, ± 1.5 m high; shoots villous-pubescent. Leaves simple, alternate, peltate; petioles usually glabrous or puberulous, ± 22 cm long; lamina palmate, 3-5 lobed, ± 15 cm diam., lobes broadly ovate, acuminate with entire margins; nerves 5-7 from the base, prominent, venation palmately reticulate. Flowers in terminal trichotomous cymes, central flowers of cymes usually female; bracts linear-lanceolate, puberulous without, ± 12 mm long. Male flowers: calyx 5 lobed, united to the middle, ± 4 mm long; lobes broadly ovate, puberulous without; corolla 5 lobed, spatulate, contorted, cohering to the middle, yellow, glabrous without, cohering portion villous within, ± 7 mm long; disc of 5 distinct glands around the base of the staminal column, sessile; glands ovate, pointed at the tips; stamens 8, monadelphous, slender filaments, 5 exterior short and 3 interior long; anthers linear-oblong, dorsifixed, dehiscing longitudinally. Female flowers: calyx 5 lobed, united near the base, lanceolate, puberulous without, ± 4 mm long; corolla 5 lobed, salver-shaped, contorted, cohering to the middle, glabrous without, villous within, ± 8 mm long; disc as in male flowers; ovary ellipsoidal, pubescent, 3-celled; ovules one in each cell, pendulous; styles 3, united below, puberulous, each bifurcating into two stigmata. Capsules oblong-globose or subglobose, brownish, puberulous, rough, ± 18 mm \times 15 mm; seeds oblong, crustulinoshining, caruncle prominent, ± 10 mm long.

Types : Ramamurthy 20937 (A: Holotype CAL; B-E: Isotypes MH).

Flowering & Fruiting : August September.*

Distribution : INDIA: Tamil Nadu (Madras).

Herbarium specimens : INDIA: Tamil Nadu; Ramnad District., Tirupathur taluk, Melamadam forest, Aug. 15, 1964, Ramamurthy 20937 (A in CAL; B E in MH); *ibid.*, Sept. 15, 1965, Ramamurthy 25824 (A: Paratypes CAL; B E: Paratypes MH).

Notes: According to Ramamurthy (*l.c.*): Allied to var. *villosa* but differs in having more or less glabrous branchlets and leaves; lamina palmate, 3 5 lobed; lobes broadly ovate, acuminate; sepals of the male flower united to the middle.

Julostylis polyandra Ravi & Anilkumar (Malvaceae) in J. Bombay Nat. Hist. Soc. 87 (2): 260 262. 1990.

Small tree, 8 15 m high; branches terete, rusty stellate tomentose when young. Leaves reddish when young, simple, alternate, stipulate; stipules linear-oblong, stellate tomentose outside, caducous; petiole 1 8 cm long, terete, stellate tomentose; blade suborbicular to ovate, 4 21 by 2 18 cm progressively snall upwards, often palmately 3 angled or lobed in the upper half, palmately 5 ribbed at base, sparsely stellate tomentose on both sides, prominently so on ribs and veinlets below and usually with an elongate gland with a median slit at the base and lower surface of mid-rib, sometimes also on one or booth innner lateal ribs, base rounded or cauneate, margin subentire. Inflorescence erect mor or less congested pyramidal panicle, branches 2 to many flowered, progressively shorter upwards. Flowers yellow, bisexual; pedicel up to 1.5 cm long; bract elliptic-oblong, 3 by 1 mm, rusty stellate tomentose outside; bracteoles obovate, a little shorter than bract, stellate tomentose outside. Epicalyx accrescent, segments 4-6, slightly connate at base, triangular-ovate, up to 15 by 8 mm, stelate pubescent, subcordate at base, acute to subacute, erect, ultimately spreading. Calyx persistent, connate to the middle, 8 10 by 5 6 mm, stellate tomentose outside,

prominently so on the tube; lobes triangular, subacute, 3 nerved. Corolla yellow with a purple centre; petals 5, free, narrowly obovate, 1.5-2 by 1 cm, stellate pubescent on outer surface and simple hairy on inner surface. Stamens 20 (rarely 17-19), monodelphous, sparsely, glandular hairy; column short 5-7 mm long; apical teeth 5, acicular; filaments slender, purplish, c. 6 mm long; anthers yellow, 1-celled, reniform, ovary c. 2 mm long, densely hairy, bilocular; ovules 2 per loculus, basal axile; style exerted, up to 1.5 cm long with 2 (rarely 1) branches thickened and stellate hairy above the middle, stigma peltate thickened. Fruit indehiscent c. 5 by 6 mm, shortly beaked, densely covered with stellate and simple hairs. Seeds reniform, c. 4 mm long, dark brown closely longitudinally striate with sparse to more or less dense fugaceous stellate hairs. There is much variability in the extent of lobing of the blade, number of glands on the ribs, nature of inflorescence and hairiness of the seed in different plants. The glands are often absent in the smaller upper leaves.

Types : Ravi 2475 (A: Holotype MH; B: Isotype CAL; C: Isotype SNCH Sree Narayana College Herbarium; D: Isotype KFRI).

Flowering & Fruiting : August - January.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Trivandrum District, Ponmude Hills, Aug. 15, 1988, Ravi 2475 (A in MH; B in CAL; C in SNCH; D in KFRI); *ibid.*, Dec. 19, 1988, Ravi 2647 (Paratype SNCH); Pathanamthitta District., Kakki, Sept. 11, 1987, Anil Kumar 70 (Paratype SNCH); *ibid.*, Kakki, Jan. 12, 1988 Anil Kumar 364 (Paratype SNCH).

Notes : According to Ravi & Anil Kumar (*l.c.*): *Julostylis polyandra* sp. nov. is allied to *J. angustifolia* (Arn.) Thw., but differs from the latter in having suborbicular to ovate blade with elongate glands at the base below, large flowers with 4-6 triangular ovate epicalyx segments, cordate at base, sparsely stellate hairy outside, 17-20 stamens and acicular staminal teeth.

Until the discovery of the species described here, *Julostylis* Thw. has been a monotypic genus represented by *J. angustifolia* (Arn.)

Thw., from Sri Lanka (Thwaites 1858) and Kerala (Ramamoorthi & Rajan 1985). The specimens of the new species are collected from the forests of Ponmudi Hills, Trivandrum District and Kakki, Pathanamthitta District, Kerala. In herbarium specimens, the new species has superficial resemblance to *Kydia calycina* Roxb., and hence is often mislabelled in local herbaria.

Juncus rohtangensis Goel & Aswal (Juncaceae) in Ind. J. For. 10 (4): 262-263. 1987.

Densely caespitose rushes. Roots covered with whitish, old, fibrous leaf-sheaths. Stems 5.0-11.0 cm high, erect, hollow. Radical leaves 1, rarely 3, 3.0-6.0 × 0.2-0.3 cm, terete, always more than half the length of stem, linear, canaliculate, multinerved, sheathing basally; leaf-sheath 1.3-3.0 cm long, vaginate. Head solitary, unilateral, strictly 2-flowered, dark brown coloured. Lower bract foliaceous, 15.0-30.0 × 3.0-4.0 mm, sheathing with broad brown margins; upper 5.0-10.0 × 1.5-2.5 mm, glumaceous, brown, equalling or longer than flowers. Flowers distinctly pedicellate; pedicels 1.0-2.5 mm long. Tepals 6, in two whorls of 3 each, dark brown coloured, 4.5-6.5 × 1.25-2.0 mm; outer 3 narrowly lanceolate, acuminate; inner shorter with scarious margins and subacute tips. Stamens 6, shorter than tepals; anthers 2.5-3.25 × 0.5-0.6 mm, linear, apiculate, never twisted, basifixed, 3-5 times longer than filaments; filaments ca 0.75 mm long. Ovary ca 20 × 0.75 mm, triquetrous; style ca 20 mm long, included; stigma 3-fid; lobes 40-60 mm long, linear, 2-3 times longer than style, dark brown, glandular hairy.

Types : B. S. Aswal 10554 (A: Holotype CDRI; B-D: Isotypes CDRI; E: Isotype CAL).

Flowering : July-August.

Distribution : INDIA: Himachal Pradesh.

Herbarium specimens : INDIA: Himachal Pradesh; Lahaul Spiti District., Rohtang Pass, 4000 m, July 27, 1979, B. S. Aswal 10554 (A-D in CDRI & E in CAL).

Notes : According to Goel & Aswal (*l. c.*) : *Juncus rohtangensis* is allied to *Juncus uniflorus* W. W. Smith, but differs from it in larger habit; radical leaves never equalling the hollow stems, always shorter than stems; head strictly 2 flowered; flowers distinctly pedicellate; tepals larger, 4.5–6.5 mm long; anthers apiculate, large, 3–5 times longer than filaments; style included, stigma-lobes 2–3 times longer than style.

The allied species *Juncus uniflorus* W. W. Smith, which occurs in Sikkim, Bhutan and Nepal, is characterised by: plants 2.0–3.0 cm high; radical leaves equalling or shorter than stems; head uniflorate; flowers sessile; tepals up to 3 mm long; anthers smaller, 2–3 times longer than filaments; style exceeding the tepals and stigma lobes slightly longer than style.

Occasional amongst boulders on moist shady slopes along with mosses in alpine passes.

The species has been named after its type locality from which it has been discovered.

***Kalanchoe cherukondensis* Subba Rao & Kumari (Crassulaceae)**
in Bull. Bot. Surv. India 17 (1–4): 177–179. 1975 (1978).

Perennial fleshy erect unbranched herbs. Whole plant reddish brown (greenish red under cultivation); stem glabrous, more than 30 cm high, terete with annular scars of fallen leaves, stouter at base and leafy portion tapering abruptly (gradually tapering under cultivation). Leaves fleshy, opposite, sessile, extipulate, scaly, 1.2–8 × 0.4–6.5 cm (up to 12 × 8.5 cm in cultivation), lamina covered with minute red spots, irregularly crenate, apex round or emarginate (obtuse to acute in young leaves), veins visible; middle leaves larger, broadly spatulate to obovate; lower and upper ones smaller, elliptic. Flowers in paniculate cymes, bracteate; pedicels 6–16 mm long, glabrous to densely clothed with glandular hairs. Calyx reddish brown, glabrous, eglandular, divided nearly to the base; lobes lanceolate, acuminate, 7–13 mm long and 1.5–2.5 mm broad at base. Corolla white, 1–2.2 cm long, 4 lobed; tube 3–9 mm long, glandular pubescent without; lobes lanceolate, acuminate, ±

prominently 7 nerved, glandular pubescent without up to 3/4 of lobe, twisted and overlapping to right in bud. Stmens adnate to corolla tube, glabrous, 8 in two series of different heights, the difference in heights being 1-2 mm from base of tube, lower ones alternate and upper ones opposite to corolla lobes; anthers dichocous, basifixed, connective produced, tip bifid. Hypogynous scales 4, subulate, 1.5-5 mm long. Crappels 4, attenuated into long subulate styles. Follicles unknown.

Type : Subbarao & Kumari 39300 (Holotype CAL).

Flowering : January - April.*

Distribution : INDIA : Andhra Pradesh.

Herbarium specimens : INDIA: Andhra Pradesh; originally in Cherukonda, Visakhapatnam District, 1100 m, Subbarao & Kumari 39300 (a cultivated material later collected on Apr. 17, 1974, of the garden BSL., Southern Circle, Combatore raising from wild Plants growing in rocky place CAL) ; *ibid.*, Cherukonda District Jan. 4, 1968, Subbarao et kumari 29731 A, B, D & E (Paratypes MH).

Notes : According to Subbarao & Kumari (*l.c.*): Allied to *Kalanchoe olivacea* Dalz. & *K. bhidei* T. Cooke but differs from former in having a glabrous eglandular calyx and from latter by externally glandular hairy corolla. The comparative study of the *taxonomic characters* of above 3 species shows that the species *K. cherukondensis* is a reddish brown plant of more than one foot high; leaves broadly spathulate to obovate or elliptic, dotted with blood red spots; pedicels glabrous to densely clothed with glandular hairs; calyx glabrous, eglandular; corolla glandular pubescent outside up to 3/4 of lobe. But the species *K. olivacea* is a olive green plant of one feet high; leaves ovate, elliptic or broadly lanceolate, dotted with blood red spots; pedicels densely colthed with glandular viscid hairs; calyx glandular hairy; corolla tube clothed outside with glandular hairs; whereas the species *K. bhidei* is a reddish colour plant of 2-3ft high and has elliptic leaves, red tinged; pedicels glabrous; calyx glabrous, egandular; corolla glabrous eglandular.

Though the new species appears to be intermediate between *Kalanchoe olivacea* Dalz. and *K. bhidei* T. Cooke but those two plants

are found only in western ghats and *Kalanchoe cherukondensis* is found in Eastern ghats. The Holotype was collected on April 17, 1974, from garden, BSI, Coimbatore (from cultivated material raised from wild plants collected in vegetative condition, growing in rocky areas on Cherukonda, 1100 m, Visakhapatnam, Andhra Pradesh.

Kanjarum Ramam. (Acanthaceae) in Bull. Bot. Surv. India 13 (1 & 2): 153 155. 1971 (1973).

Shrubs with many opposite ascending branches; leaves opposite, broadly ovate, petiolate; leaves of flowering shoots pandurate; petiole winged. Inflorescences at the end of short shoot arising from the axils of ordinary leaves and provided with strongly reduced leaves; flattened spikes with, folded, lateral apparently sterile bracts; bracteoles absent. Calyx 5 partite and lobes are narrower. Corolla curved with upper part ventricose and lower cylindric. Stamens 4, Disc small. Ovary glabrous, 4 celled.

Type species : *Kanjarum palghatense* Ramam.

Distribution : INDIA: Kerala.

Notes: According to Ramamurthy (*l.c.*): *Kanjarum* Ramamurthy belongs to the tribe *strobilanthinae* of Acanthaceae and is allied to the genus *Carvia* Brem. in having large bracts and in the absence of bracteoles but differs from it in the following characters: (1) the short shoot by which the inflorescence is produced is of greater length (2) flattened spikes have lateral bracts folded and apparently sterile (3) bracts have greater number of lateral nerves and the palmately spreading nerves are absent from its base (4) calyx lobes are narrower and (5) corolla lobes are smaller and white. It also resembles *Nilgirianthus* Brem. in having included stamens and the filaments of the outer ones being hirtellous.

Kanjarum palghatense Ramam: (Acanthaceae) in Bull. Bot. Surv. India 13 (1 & 2): 153 155. 1971 (1973).

Shrubs with many opposite ascending branches, ± 2 m high; stem

erect, subtetragonal, nearly glabrous; young shoots puberulous. Leaves simple, opposite; lamina $\pm 15 \times 11$ cm, broadly ovate, cuspidate, margins crenate, base auriculate, pilose on both sides, main nerves up to 10 pairs with reticulate venation; petiole ± 7 cm long, hairy; leaves of flowering shoots pandurate, cuspidate, margins crenate, base auriculate, pilose on both sides, petiole winged. Inflorescences at the end of short shoots arising from the axils of ordinary leaves and provided with strongly reduced leaves, pedunculate spikes ± 5 cm long, the lateral bracts are folded in the flattened spikes and apparently sterile; bracts reaching 2×3 mm, ovate orbicular, glabrous without, puberulous within, membranous with reticulate venation; bracteoles absent. *Calyx* ± 15 mm long, 5 partite, segments linear lanceolate, equal, acute, glabrous except for white hairs from middle portion. *Corolla* ± 2 cm long, white, notched, the upper part ventricose, the lower cylindric, glabrous without, white hairs near the mouth within, upper lip with 3 lobes and lower lip with 2 lobes, rounded or ovate. *Stamens* 4, didynamous, filaments hirtellous, monadelphous, the bases combined in a sheath more or less adherent near the middle of the corolla; anthers oblong, mucicous, 2 celled. Disc small. Ovary glabrous, 2 celled; 2 Ovules in each cell, style linear, hairy; stigma linear.

Types : *Sebastine* 22312 (A: Holotype CAL; B: Isotype CAL; C-F: Isotypes MH).

Flowering : October.*

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Palghat District, Kanjarumpuzha, Oct. 27, 1964, *Sebastine* 22312 (A & B in CAL; C F in MH).

Note : According to Ramamurthy (*l.c.*): This new species found in submargible area.

Lactuca kashmiriana Mamgain & R. R. Rao (Asteraceae) in *J. Bombay Nat. Hist. Soc.* 83 (2): 406-408. 1986.

Perennial herbs. stem c 60-80 cm high, erect, glabrous

paniculately branched above. Leaves c 4 5 × 3 5 cm many from base to middle of the stem mixed with number of smaller leaves at the axils of broader leaves, lower and upper middle leaves with long and winged petiole, membranous, cordate or deltoid, variously toothed, sagittate or auriculed, upper most sharply serrate, ovate or hastate. Inflorescence paniculately branched. Heads c 13 14 × 1 2.5 mm, on terminal branches drooping, narrow, culindric, 2 3 flowered, peduncle small, slender, glabrous, nodding, florets all ligulate, ligule purple or blue. Outer involucrel bracts c 1 1.5 × 0.5 1 mm ovate, inner involucrel bracts 5, equal c 13 14 × 2 2.5 mm linear lanceolate, much narrowed glabrous or bristly hairy with darker centre and hyalined margins, much longer than the outer bracts. Achenes c 6 6.5 mm long oblanceolate gradually narrowed to a long beak, ribs regular, distinct with a conspicuous midrib on one side, 11 12 ribbed on other side, narrowed at both ends from the middle, glabrous, pale yellowish brown slightly larger than the pappus c 4 5 mm pale whitish.

Types : B. M. Wadhwa 67012 (A: Holotype CAL; B: Isotype BSD).

Flowering & Fruiting : September.

Distribution : INDIA: Kashmir.

Herbarium specimens : INDIA: Kashmir; Degwan, B. M. Wadhwa 67012 (A in CAL & B in BSD).

Notes : According to Mangain & Rao (*l. c.*): *Lactuca Kashmiriana* is allied to *Lactuca decipiens* Clarke, but differs in having much smaller outer involucrel bracts (1 1.5 × 0.5 1 mm) than inner involucrel bracts which are very narrow glabrous or sparsely bristly hairy, dark in the centre with hyaline margins. Achenes gradually narrowed to a long beak, glabrous, with distinct and regular ribs, yellowish brown. Erect perennial herbs, florets purple or blue, this species is very distinct from all other species of *Lactuca* but shows slight resemblances to *L. decipiens* which has outer involucrel bracts c 4 6.5 × 1.5 2.5 mm, unequal; inner involucrel bracts much broad; achene abruptly narrowed in to small beak, more or less glabrous or very sparsely hairy, ribs not very distinct; blackish brown.

Lactuca lahulensis Mamgain & R.R. Rao (Asteraceae) in Bull. Bot. Surv. India 27 (1-4): 120-122. 1985 (1987).

Perennial herbs. Stem ca 50-80 cm high, erect, glabrous, unbranched or rarely paniculately branched above. Leaves ca 4-7 × 3-7 cm, upper middle leaves finely membranous with long and broadly winged petioles, segittate or rounded at base, auricled; lamina broadly cordate or deltoid, variously toothed, uppermost leaves sessile, ovate or lanceolate. Inflorescence terminal panicles. Heads ca 14-16 × 2.5-3.0 mm, on subpaniculate branches, more or less clustered, drooping, 3-4 flowered; peduncle small, slender, glabrous, nodding; florets all ligulate; ligule white or purplish. Outer involucre bracts ca 2.0-2.5 × 0.5-1.0 mm, ovate, glabrous; inner involucre bracts 5, equal ca 12-12.5 × 1.0-1.5 mm, narrowly linear lanceolate, glabrous or with few minute bristles, membranous. Achene ca 7-7.5 mm long, abruptly narrowed to a small pale beak, subcylindric, 8-9-ribbed on each face, median rib conspicuous, raised, yellowish-brown, downy, slightly longer than pappus. Pappus 5 mm, pale white.

Types : U. C. Bhattacharya 40772 (Holotype CAL; Isotype BSD).

Flowering & Fruiting : August.

Distribution : INDIA: Himachal Pradesh.

Herbarium specimens : INDIA: Himachal Pradesh; Lahul-Kyelang, 3300 m, U.C. Bhattacharyya 40772 (CAL and BSD).

Notes : According to Mamgain & Rao (*l.c.*): Erect, tall herb on north facing slope. Florets white or purple.

This species very closely resembles *L. rapunculoides* Clarke, but differs in achene being 7-7.5 mm long, abruptly narrowed to a small pale beak; outer involucre bracts 2-2.5 mm long, inner 12-15 mm long, glabrous or with few minute bristles; whereas in *L. rapunculoides* Clarke. Achene is 10-12 mm long, gradually narrowed at both ends, with longer and dark brown beak; outer involucre bracts 3-4 mm long; inner 15-18 mm long with much scattered bristles, particularly at the tip.

Lagenandra nairii Ramam. & Rajan (Araceae) in J. Bombay Nat. Hist. Soc. 80 (3): 613 615. 1983 (1984).

Submerged herbs; rhizomes 1.5 2 cm across, creeping, annulate; roots thick, fibrous; stipular sheath 5 10 cm long, elongate-triangular, leathery, thick, transparent, shiny, glabrous, deciduous, acuminate at apex, 2.5 3 cm wide at base. Leaves 25 40 cm long, alternate, sheathed, arising from the rootstock; leaf blades 12 18 × 4.5 9 cm, elliptic-oblong to ovate, entire or undulate, dark green and punctate above, dense tomentose and pale green beneath, leathery when dry, acute at apex, auricled at base; nerves numerous, distinctly arising from the broad midrib, ascending widely arched upwards to the tip, nervules parallel, linking the ascending nerves; petiole 20 30 cm long, sheathed at base, adaxially grooved, tomentose throughout; sheath thin, transparent, membranous at base. Peduncles 4 5 cm long, thick, convex on both sides up to 5 mm wide, axillary, partly enclosed in the leaf-sheaths. Spathe 4 5 cm long, about 1 cm across, tubular below, constricted in the middle, hairy without; limb ovate, acuminate, slightly twisted clockwise, blunt serrated, more near the base, pinkish; obliquely septate near the constriction within. Male flowers numerous, subterminal, about 5 mm long, oblong near the top of the spadix, crowned with and ovate, fleshy, sterile appendage; anthers sessile, crowded, cupular with one or two small tubular appendages inside. Female flowers 1 2 mm long, separated from the male by a naked portion 6 8 mm long; ovaries sessile, one loculed, many in whorls, warted, punctate; stigma small, globose; ovules 4, basal, elliptic-oblong, striated. Syncarpium enclosed in the persistent, cupular basal part of the spathe; berries 5 8 mm long, ovoid, 4 angled, distinctly warted, warts spinulose; seeds about 5 mm long, obliquely ovate, elongate, striated, longitudinal ridges distinct, punctate.

Types : Rajan 73052 (Holotype CAL; Isotypes MH Acc. Nos. 112271 112275).

Flowering & Fruiting : March*

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Trichur District, Adirappally water falls on the bank of Chalakudi river, 300 m, Mar. 17, 1982,

Rajan 73052 (CAL & MH Acc. Nos. 112271 112275); *ibid.*, Mar. 22, 1981, Ramamurthy 66279 (Paratypes CAL & MH Acc. Nos. 112276 112277).

Notes : According to Ramamurthy & Rajan (*l.c.*) : Allied to *L. undulata* Sastry, but differs chiefly in: stipular sheath longer, elongate triangular, petiole longer than the lamina, dense tomentose; lamina larger, elliptic-oblong to ovate, mostly entire, acute at apex, auricled at base, punctate above, dense tomentose below, becoming leathery on drying, nerves numerous, nervules parallel; peduncle thick, convex on both sides, pilose, not striated; spathe larger, limb blunt serrated, more near the base, long-acuminate at apex; sterile appendage above male inflorescence ovate; berries ovoid, 4 angled, distinctly warted, warts spinulose; seeds obliquely ovate.

The specimens were collected near the base of the Adirappally water falls as fully submerged patches in fresh, running water on the bank of the Chalakudi river.

The specific name is given in honour of Dr. N. Chandrasekharan Nair, D. Sc, Joint Director, Botanical Survey of India, Southern Circle, Coimbatore.

Lagenandra undulata Sastry (Araceae) in Bull. Bot. Surv. India 9(1-4): 294 296. 1967 (1968).

Submerged perennial herbs, in patches. Rootstock creeping, about 5 mm thick, slightly flattened, usually simple; internodes about 4 mm long; roots stout, fibrous. Cataphylls up to 3 cm long, linear-lanceolate, convolute, deciduous. Leaves white punctulate, alternate, petiolate, sheathed; sheaths imbricate, 1 2 cm long, about 2 mm broad, 2 keeled, membranous; petiole 1-7.5 cm long, about 2 mm broad, about equal to the lamina, strongly striate, adaxially deeply grooved; lamina 1.5 9 × 0.5 1.5 cm, elliptic-lanceolate, acuminate, fleshy when fresh, becoming thin on drying, margins undulate, base cuneate; midrib distinct, ventrally channelled, dorsally ridged, with two pairs of lateral nerves, the first pair from the base extending above the middle, the second pair starting about the middle and arched upwards to the tip; other veins few, faint. Peduncle axillary.

partly enclosed in the leaf sheath, about 2 cm long, about 2 mm thick, terete, strongly striate. Spathe about 2 cm long, about 7 mm broad at base, tubular below, constricted in the middle, smooth with emphatic longitudinal parallel veins; limb ovate-acuminate, slightly twisted, apex shortly hooked, dark purple blotched inside, obliquely septate at base within. Male inflorescence subterminal about 3.5 × 2.5 mm cylindric, crowned with a sub-globose, fleshy, minutely awned sterile appendage; anthers sessile, crowded, cupular, with 1 or 2 small tubular appendages inside. Female inflorescence about 3 mm below the male, globose, about 3 mm in diameter; ovaries sessile, 1 celled, many, in 3-4 whorls; stigma large, discoid; ovules 4, about 1 mm long, elliptic-oblong, faintly striate. Young *syncarpium* green, globose, about 4 mm in diameter, enclosed in the persistent, cupular basal part of the spathe.

Types : A. R. K. Sastry 45489 (A: Holotype CAL; B F: Isotypes ASSAM).

Flowering : May.*

Distribution : INDIA: Arunachal Pradesh (NEFA).

Herbarium specimens : INDIA: Arunachal Pradesh; Subansiri District, Amjee, 1220 m, May 21, 1966, A. R. K. Sastry 45489 (A in CAL ; B F in ASSAM).

Notes : According to Sastry (*l. c.*): An Araceous plant forming dense patches on partly submerged rocks in a stream was identified as *Lagenandra* Dalz., a genus hitherto unrecorded in the Himalayan region. Of the 6 known species of this genus, 2 occur in South Concan in the Western Ghats and the other 4 further south, in Ceylon. Thus the present discovery of this genus in Subansiri District in the Eastern Himalayas, is of phytogeographic interest. A tentative identification of these to near either *L. lancifolia* (Sch.) Thw. or *L. thwaitesii* Engler, proved incorrect when verified with reference to authentic specimens of the two species. The Subansiri plants are quite distinctive. Incidentally, the two Calcutta specimens annotated by Engler as *L. lancifolia* (Sch.) Thw. and *L. thwaitesii* Engl. with *Thwaites* C. P. No. 3173 and C. P. No. 3174 respectively (now verified), indicate a transposition of the two numbers as published in *Pflanzenreich* 73: 230-231, 1920.

***Lasianthus andamanicus* Hook. f. var. *ciliatus* Deb & M. Gangop. (Rubiaceae) in J. Bombay Nat. Hist. Soc. 84 (2): 458-459. 1987 (1988).**

Shrubs small, 1-3 m high; branchlets horizontally spreading, glabrous or pubescent, chocolate coloured when dry. Leaves petiolate, 5.5-15 × 2.5-5 cm, elliptic, elliptic-oblong or elliptic-lanceolate, acuminate at apex, acute at base, slightly coriaceous, glabrous, glossy, chocolate above when dry, pale beneath, hirsute or pubescent on midrib, secondary and tertiary nerves; midrib shallow channelled above; lateral nerves 6-10 on either side, opposite or subopposite, subparallel, arched, slightly raised above; nervules parallel, forked, faint; petioles 5-12 mm long, pubescent or hirsute; stipules 3-6 × 1-2 mm, lanceolate, long ciliate above; colleters at base beneath. Inflorescence axillary sessile cymes, 2-4 flowered, ebracteate; bracteoles absent or very minute, ± 1 mm long, triangular, pubescent. Flowers sessile or subsessile, 4-10 mm long, tubular, white; pedicels 0-0.5 mm long, pubescent. Hypanthium ± 0.5 mm long, oblong, pubescent. Calyx ± 1.5 × 2.5 mm, cupular; teeth 4, triangular acute, ciliate above. Corolla tube 8-9 mm long, narrow, pubescent at upper part on both surfaces; lobes 4, ± 3 mm long, oblong, inflexed at apex, pubescent above. Stamens 4, included; filaments minute, adnate below the throat; anthers 2 mm long, linear-oblong. Ovary ± 0.5 mm long, obovoid, 4 celled; ovules solitary per locule, basal, erect; style 8-9 mm long, slender, glabrous; stigma ± 0.5 mm long; 4 lobed, ovate, obtuse; disc 1-1.5 mm across, annular, smooth. Fruits sessile, 5-6 × 3-4 mm, globose or ellipsoid, crowned with persistent calyx teeth, 4 furrowed, purple, blue or black; pericarp thin, pubescent; pyrenes 4, dorsally convex, with irregularly shallow grooves ventrally angled, thick walled, with few raphides. Seeds ± 3 mm long, oblong, short stalked; embryo ± 2.5 mm long; radicle inferior, broader at base, cotyledons thin, ovate, acute.

Types : N. P. Balakrishnan 654 (Holotype CAL; Isotypes E, PBL).

Flowering & Fruiting : November-May.*

Distribution : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA: South Andaman; Beadnabad, ± 50

m, Nov. 30, 1973, *N. P. Balakrishnan* 654 (CAL, E, PBL); Dhanikhari, \pm 50 m, Jan. 31, 1974, *N. G. Nair* 840 (Paratype L, PBL); Dhanikhari, Jan. 16, 1978, *P. Basu* 6641 (Paratype PBL); Little Andaman, Hut Bay, Sea level, Sept. 1, 1976, *N. Bhargava* 4339 (Paratype CAL); North Nicobar, Mildera, \pm 30 m, May 4, 1977, *P. Chakraborty* 5600 (Paratype CAL); Herbertabad, sealevel, Nov. 29, 1975, *Nair* 31-84 Paratype PBL.

Notes : According to Deb & Gang. (*l.c.*): Differing from the typical variety in glabrous or glabrescent tertiary nerves; stipules and calyx tooth long ciliate.

***Lasianthus lucidus* Blume var. *caudisepalus* Deb & M. Gangop.** (Rubiaceae) in *J. Bombay Nat. Hist. Soc.* 84 (2); 458 462. 1987 (1988).

Shrubs 1.8 3 m high; branchlets slender, glabrescent or strigose. Leaves petiolate, 7.5 13 \times 2 4 cm, elliptic-oblong or oblanceolate, caudate-acuminate at apex, acute at base, thin, membranous, glossy; midrib flattened; sparsely strigose; lateral nerves 5-6 on either side, opposite or subopposite, slender, arched; nervules subparallel, forked, inconspicuous above; petioles 4 10 mm long, slender, strigose; stipules 2 3 \times 1.5 2 mm, ovate or triangular, acuminate, strigose, few colleters at base beneath. Inflorescence axillary subsessile cymes, 2 5 flowered; peduncle \pm 1 mm long, strigose; bracteoles \pm 1 mm long, triangular, acute, sparsely strigose. Flowers subsessile, short pedicelled, 14 16 mm long, tubular, white or light lilac, deeper outside; pedicels up to 0.5 mm long, strigose. Hypanthium \pm 1 mm long, obovoid, strigose. Calyx \pm 1 \times 2.5 mm, cupular, strigose above, teeth 4 or 5, triangular, acute. Corolla tube 8-9 mm long, glabrous above, villous beneath at throat; lobes 4, \pm 4 mm long, ovate, sparsely puberulous above, villous beneath. Stamens 4, included; filaments minute, adnate below throat; anthers \pm 1 mm long, oblong. Ovary \pm 0.5 mm long, obovoid, 4 celled; ovules one per locule, basal, erect; style \pm 10 mm long, puberulous above; stigma \pm 1 mm long, 3 lobed, ovate, obtuse, papillose; disc 1 1.5 mm across, flattened, smooth. Fruit sessile, 4 5 \times 4 5 mm, globose,

crowned by calyx lobes, 5 angled, grooved; pericarp thin, glabrous; pyrenes 5, obovoid. Seeds \pm 2 mm long, obovoid, smooth.

Types : Cox & Hutchinson 499 (Holotype K; Isotype E).

Flowering : April August. *Fruiting* : September November.

Distribution : INDIA: Arunachal Pradesh & Meghalaya.

Herbarium specimens : INDIA: Arunachal Pradesh; Subansiri District, Apa Tani valley, Hapoli, 1590 m, Apr. 26, 1965, Cox & Hutchinson 499 (K, E); Apa Tani Valley, 1620 m, Apr. 22, 1965, Cox & Hutchinson 476 (Paratype E); Hapoli, Sept. 30, 1959, G. Panigrahi 19813 (Paratype ASSAM). Meghalaya: Nonglan, 1350 m, Nov. 3, 1873, C. B. Clarke 20049 (Paratype K).

Notes: According to Deb & Gang. (*l.c.*): This differs from the typical variety in having triangular bracteoles and calyx teeth very short, triangular.

Grows in subtropical forest at 1590 1620 m in altitude.

Lecanthus peduncularis (Royle) Wedd. var. **garhwalensis** R.A. Silas & R.D. Gour (Urticaceae) in J. Bombay Nat. Hist. Soc. 87 (2): 280 281. 1990.

Annual dark green herbs. Stem delicate, erect, 1 3 cm long, nearly glabrescent. Leaves opposite, membranous, sub-sessile, crowded towards the tip of the stem, elliptic-ovate, 0.3 0.6 \times 0.2 0.5 cm, base cuneate or subcordate, apex acute or obtuse, margins nearly entire, sparsely ciliated, 3 to penninerved. Stipules linear, 0.1 0.2 cm long, bifid, hyaline. Flower minute, pale green, 1 2 sexual, crowded on 0.3 0.8 cm long receptacles, 0.1 0.25 cm across. Male flowers: perianth 3 4 partite, lobes equal, 0.08 0.15 cm long, ovate, apiculate, style short, glabrous, stamens 4 5, smaller than the perianth lobes. Female flowers: perianth 3 partite, lobes unequal, ovate, apiculate, style short. Achenes red-brown, up to 0.08 cm long, oblong, apiculate, smooth, exceeding the lobes, without a tuft of hairs.

Types : R. A. Silas 6868 (A: Holotype GUH; B D: Isotypes GUH).

Flowering : August September. *Fruiting* : September October.

Distribution : Garhwal Himalaya. (Uttar Pradesh).

Herbarium specimens : INDIA: Uttar Pradesh; Pauri Garhwal District, Dudhatoli, Sept. 8, 1985, 3000 m, R. A. Silas (GUH 6868 A D).

Notes : According to Silas & Gaur (*l. c.*): *L. peduncularis* (Royle) Weed. var. *garhwalensis* is allied to *Lecanthus peduncularis* (Royle) Weed., differing by its comparatively short, delicate stem and smaller leaves with glabrescent surfaces; receptacles 0.3–0.8 cm long; flowers minute, 0.15–0.25 cm across; achenes apiculate, 0.08 cm long, red-brown, without a tuft of hairs.

Rare annual herbs of shaded, moist localities. Found growing on moist old wall and crevices with mosses and other small herbs. Presently, this variety has been collected from temperate Garhwal Himalaya. The varietal epithet is based on the name of the Garhwal region.

***Lepidagathis keralensis* Madhus. & N. P. Singh (Acanthaceae)**
in Kew Bull. 47 (2): 301–303. 1992.

Perennial, prostrate, woody herbs tenaciously attached to hard lateritic soil. Rootstock woody; stem always glabrous, quadrangular, more or less winged, much branched to form a carpet of up to 1 sq. m, rooting at the nodes. Leaves narrowly oblong-lanceolate, acute or blunt acuminate at apex, 10 mm × 3 mm, dark-green with purple margins, rigid, plicate, glabrous, conspicuously nerved. Spikes 1–3, terminal, procumbent, 2 cm long; flowers sessile, c 1 cm long; sterile bracts many (5–8), more or less uniform, up to 10 × 4 mm, oblong-lanceolate, densely pubescent (glandular hairs present when young) each with a stiff, sharply pointed mucronate spine, persistent. Calyx villous, deeply 5-lobed, lobes unequal, persistent, similar to bracts. Corolla 10 mm long, densely hairy in bud, tube cylindric below, suddenly expanded, 2-lipped, upper lip 2-lobed, erect or reflexed, pink, lower lip 3-lobed, pink with white to yellow palate. Stamens 4, didynamous, up to 6 mm long, sparsely hairy, 2-celled,

purple to deep violet in colour. Disc annular; ovary compressed ovoid, 2 mm long, 2 celled with one ovule in each; style slender, 7-8 mm long, hairy at lower ventral region with glands; stigma capitate, slightly bifid. Fruit a conoid, compressed capsule, 6 mm long, glabrous. Seeds 2, flat, soft, hairy with white aril.

Type : *Madhusoodanan* CU 29323 (Holotype MH).

Flowering & Fruiting : December - April.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Kannoor District., Madayippara, barren laterite 'rock' hills, near Arabian (Lakshadweep) sea coast, 40 m, Mar. 1988, *Madhusoodanan* CU 29323 (MH); *Madhusoodanan* CU 50407 (CALI); *Madhusoodanan & Jayakumar* K 11868 (K); Ezhimala (hills of Eastern slope); *Madhusoodanan & Swarupanandan* CU 13451 (K); Pazhyangadi (Payangadi), *Sebastian* CALI 1499 (K); Payangadi, *Sudhir Kumar* CALI 2599 (CALI, K).

Notes : According to *Madhusoodanan & Singh (l.c.)*: This species differs from *L. prostrata* Dalz. in having shorter spikes, the stem always glabrous, much shorter glabrous leaves with an acute or blunt acuminate apex and smaller corolla without brown spots or lines in the palate.

By May, all plant parts, except the rootstock, become dry and dead. New shoots arise from the rootstock on the onset of the monsoon in June. Spiny bracts and calyx help in seed dispersal by attaching to animals.

Leucas mollissima Wall. var. *sebastiana* Subba Rao & Kumari (Lamiaceae) in Bull. Bot. Surv. India 11 (3 & 4): 452-454. 1969 (1972).

Erect herbs, 80-120 cm high; stem quadrangular, covered with silky villous deflexed adpressed hairs; branches slender, slightly bending at the top. Leaves opposite, ovate or ovate-lanceolate, acute, serrate to dentate, cordate or rounded or occasionally cuneate at the base, densely velvety tomentose on both sides more so on the lower

surface; lamina 1.4 - 6 × 0.8 - 3.8 cm; lateral nerves and midrib obscure above and prominent below; petiole up to 8 mm long. Inflorescence in whorls, distant, axillary, many flowered; bracts minute, villous. Flowers subsessile. Calyx tube straight, 5 - 7 mm long, 10 nerved, softly silky villous outside, pubescent within at throat; teeth 10, minute, filiform, silky, alternately shorter. Corolla bilabiate, white, exerted, tube annulate within; upper lip concave, covered with white stiff hairs without; lower lip 3 lobed, middle lobe larger, emarginate. Stamens didynamous, anthers connivent, divaricate. Disc 4 lobed. Ovary 4 lobed; style gynobasic, bifid, upper lobe minute. Nutlets 4, 1.5 - 2 mm long, obovoid, triquetrous, grey, rugose, dull, glabrous.

Types : Subbarao & Kumari 29743 (A: Holotype CAL; B-N: Isotypes MH).

Flowering & Fruiting : December - January.*

Distribution : INDIA: Andhra Pradesh.

Herbarium specimens : INDIA: Andhra Pradesh; Visakhapatnam District., Cherukonda, 900m, Jan. 4, 1968, Subbarao & Kumari 29743 (CAL, MH); Visakhapatnam District., Minumuluru to Kappakonda, 1000 m, Dec. 24., 1967, Subbarao & Kumari 29633 A - F (Paratypes MH).

Notes : According to Subbarao & Kumari (*l. c.*): Allied to *Leucas mollissima* Wall. var. *mollissima* but differs from it in having leaves densely velvety tomentose on both sides, more so on the lower surface; the leaf base variable cordate or rounded or sometimes cuneate.

This variety is named in honour of late Dr. K. M. Sebastine, Ex- Regional Botanist, Southern Circle, Botanical Survey of India, Coimbatore.

Leucas mukerjiana Subba Rao & Kumari (Lamiaceae) in Bull. Bot. Surv. India 10 (3 & 4): 358 - 359. 1968 (1969).

Decumbent herb, ca 45 cm high; stem quadrangular, covered with white, deflexed, silky villous hairs. Leaves sessile, opposite,

decussate, 1.8 3.7 × 1.4 3.4 cm, thick, ovate, cordate, dentate, densely velvety on both sides; lateral nerves 5 6 pairs, midrib and lateral nerves impressed above and raised below. Inflorescence in whorls, axillary, few to many-flowered. Bracts filiform, villous, often equalling calyx tube. Calyx tube 5 mm long, straight, prominently 10 -nerved, villous without and at throat; teeth 10, filiform, ciliate, unequal, much longer than villi of throat. Corolla bilabiate, white, ca 11 mm long, tube naked within; upper lip concave, covered with white stiff hairs without, lower lip 3 lobed, middle lobe larger, emarginate. Stamens didynamous, upper pair shorter, ascending under upper lip; anthers connivent, cells divaricate, ultimately confluent. Disc 4 lobed, lobes equal. Ovary 4 lobed; style gynobasic, bifid, upper lobe minute. Nutlets 4, 1 mm long, triquetrous, obovoid, grey, rugose, dull and hairy at top and base.

Types : Subbarao 28182 (A: Holotype CAL; B D: Isotypes MH).

Flowering & Fruiting : August January.*

Distribution : INDIA: Andhra Pradesh.

Herbarium specimens : INDIA: Andhra Pradesh; Visakhapatnam District, Cherukonda, 1300 m, Aug. 29, 1966, Subbarao 28182 (A in CAL & B - D in MH); *ibid.*, Jan. 4, 1968, Subbarao & Kumari 29741 A U (Paratypes MH).

Notes: According to Subbarao & Kumari (*l. c.*): Allied to *Leucas marrubioides* Desf. but differs from it in having leaves densely velvety on both sides, inflorescence few to many flowered, throat of calyx tube villous, corolla naked within and nutlets grey, rugose, dull, hairy at top and base.

The species is named in honour of Dr. S. K. Mukerjee, Ex-Keeper, Central National Herbarium, who is a specialist in Labiatae.

Leycesteria dibangvalliensis S.K. Das & G.S. Giri (Caprifoliaceae) in J. Bombay Nat. Hist. Soc. 88 (2): 265 267. 1991.

Scandent shrubs, 1.5 2.5 m; branches terete, striate, conspicuously fistulose, sparsely glandular pubescent particularly at

and near nodes, often glabrate or glabrous internodes and older parts; bark thin, dull grey. Leaves simple, stipulate, opposite superposed, nearly equal in pair, ovate to ovate-lanceolate, (8-) 12-15 (-20) × (4-) 7-9 (-12) cm, equilateral or slightly inequilateral; base rounded to subcordate; apex acuminate to caudate-acuminate; margin dentate, teeth ending in distinct gland, often recurved; venation pinnate, 4-8 nerves arise from base of lamina or 2-4 nerves arise from the base and 2-4 nerves sub-basal, in addition to basal nerves 4-6 lateral nerves on either side of midrib; upper surfaces of lamina rugose or rugulose due to impressed reticulations, lower surfaces alveolate due to raised reticulations; lamina thinly coriaceous, on drying turn dull green above and grey to brown beneath; upper surfaces glabrous except pubescent nerves, lower surfaces densely lanuginous throughout, hairs soft, crisped; petioles strongly channelled, (2-) 4-6.5 (-7.5) mm long, sparsely to densely puberulous. Stipules interpetiolar, foliaceous, distinctly unequal in pair, often basally adnate with the petioles, orbicular to suborbicular, reticulations and texture nearly as those of leaves, margin subentire to denticulate, recurved; larger of the pair often reflexed downward, adpressed with branches, (6-) 10-17 (-21) × (9-) 18-25 (-29) mm; smaller of the pair always erect, (4-) 6-14 (-16) × (4-) 9-20 (-22) mm. Inflorescence axillary, pseudo-verticillate, much shorter than subtending leaves, 2-4 cm long peduncles densely clothed with ferruginous glandular hairs, bracteate, bracteolate, 6 flowers in each whorl; flowers sessile or sub-sessile; bracts in series at base of each peduncle and remain enclosed by stipules, ovate-acuminate to narrowly triangular, 3-5 × 1.5-2.5 mm, strongly keeled, upper surfaces dense ferruginously puberulous, lower surfaces glabrous or very sparsely puberulous; bracteole 2-whorled, the bracteoles in outer whorl larger, usually 4, more or less foliaceous, broadly ovate, 5-8 × 3.5-5 mm, base subcordate to truncate, apex acute, margin entire, ciliate, upper surfaces dense ferruginously puberulous, lower surfaces sparsely puberulous, longitudinally veined, membranous; bracteoles in inner whorl adpressed with the receptacle, smaller, ovate or ovate-oblong, other characters like those of outer whorls. Receptacle ovoid attenuate, 6-8 × 3.5-5 mm, straight or slightly curved upward, dense ferruginously glandular pilose. Calyx

concretescent with ovary, calyx-tubes 1-2 mm long, widened towards apices, dense brownish or ferruginously glandular pilose; 5 lobed, lobes subequal or distinctly unequal, ovate-oblong to narrowly oblong, 3.5-5 × 1-1.5 mm, apex acute, glandular pubescent above, glabrous beneath, longitudinally veined, membranous, usually persistent. Corolla whitish, regular to subregular, campanulate or infundibulariform; corolla tubes (10-) 12-14 (-17) mm long, gibbous near the base with five nectaries, gradually widened towards apices, dense ferruginously glandular pilose outside, glabrous or sparsely pilose inside at base; corolla lobes imbricate, equal or subequal, ovate, 6-7 × 3-4.5 mm, apex acute or obtuse, glandular pilose outside, glabrous or glabrate inside. Stamens 5; filaments attached at base of corolla tube, inserted, 13-16 mm long, compressed, sparsely hairy along the whole length or lower part sparsely hairy and upper part densely hairy; anthers remain at the throat of corolla tube, slightly exerted, oblong, 2.75-3 × 1.5-1.75 mm, basifixed, truncate at both ends, curved hairy along the connective dorsally, glabrous ventrally, longitudinally dehiscent. Ovary 5-loculed, ovules many in each locule; style straight, (16-) 18-21 mm long, exerted, densely barbate towards base, sparsely hairy or even glabrous towards apex; stigma capitate or unevenly lobed. Fruit unknown.

Types : S. K. Das 2903 (Holotype CAL; A- D: Isotypes ARUN).

Flowering : December- January.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Dibang valley District, Tiwari Gaon, Mahao Sanctuary, c 1500 m, Jan. 3, 1988, S. K. Das 2903 (CAL; A-D in ARUN).

Notes : According to Das & Giri (l. c.): The new species is closely allied to *L. stipulata* (Hook. f. & Thoms.) Fritsch, but it can be distinguished by the glabrate or even glabrous, conspicuously fistulose branches, large stipules and densely pilose style. On the other hand, in species *L. stipulata* branches are sparsely to densely woolly, usually solid or at times narrowly fistulose; styles glabrous.

This scandent shrub grows in secondary forests and it has been collected at an altitude of c 1500 m.

Lindenbergia titensis Sikdar & Maiti (Scrophulariaceae) in J. Bombay Nat. Hist. Soc. 77 (1-3): 121. 1980.

Perennial herbs, woody below, Stem 50-60 cm long, slender to stout, many branched; branches ascending, slender, terete, pubescent, more often at the apex. Leaves 2.5-8 × 1-2.5 cm, opposite or the uppermost alternate, elliptic-lanceolate, acute, dentate, teeth acuminate, base acute-cuneate, upper surface glabrescent, lower surface pilose or glabrescent or pubescent, nerves distinct on the undersurface; petiole 0.5-2.5 cm long, linear. Racemes 3-8.5 cm long, terminal and axillary, slightly pubescent throughout. Flowers many, alternate and subopposite, sessile or very shortly pedicellate yellowish, aggregate into a compact raceme only at the terminal (2-3 cm) position, otherwise loosely arranged. Bracts 5-9 × 3-5 mm, uppermost leaves gradually passing upwards to bracts, foliaceous, elliptic ovate, acute, denticulate, longer than calyx, pilose on both surfaces. Calyx slightly dimorphic, 3.5-4 mm long, 2-3 mm diam., 5-lobed, about 2/3 part united and 1/3 free, pilose on both surface; each lobe 2 × 2 mm, ovate, acute corolla bilabiate, tube 6-7 mm long, 2-2.5 mm diam., cylindrical, pubescent at the outer surface, posterior lip 2.5-3 × 2.5 mm, obovate with 2 slightly angular lobes, retuse; anterior lip 5.5-6 × 3 mm, apex 3-lobed, lobes rotundate, spreading, obtuse, minutely hairy at the middle inside. Stamens 4, didynamous, free, included; filaments 4-4.5 mm long, inserted 2 mm above the corolla base, filiform, glabrous; thecae subglobose, 0.3 mm diam., connective 0.3 mm long. Ovary 2.5 × 2-2.5 mm, subglobose densely pilose; style 3 mm long, linear, pilose at base only. Mature capsule unknown.

Types : J. K. Sikdar 4519 (A: Holotype CAL; B C: Isotypes CAL).

Flowering : March*.

Distribution : INDIA: West Bengal.

Herbarium specimens: INDIA: West Bengal; Jalpaiguri District, Madarihat Forest Range, Titi, Mar. 5, 1976, J. K. Sikdar 4519 A-C (CAL).

Notes : According to Sikdar & Maiti (*l.c.*): It is closely allied to *L. macrostachya* Benth., but is easily recognisable by ovate leafy

bracts, bracts longer than calyx, ovate calyx lobes, obovate posterior lip of corolla and finally ovary and style base densely hairy. It is also very similar to *L. philippensis* (Cham.) Benth. from which it differs in having elliptic-ovate bract, ovate, acute calyx lobes and densely pilose ovary.

The specific epithet is derived after the name of the locality "Titi" from where it was collected.

Liparis breviscapa A.P. Das & Dorjay (Orchidaceae) in J. Econ. Tax. Bot. 16 (1): 226-227. 1992.

A small (± 14.0 cm), erect, glabrous, terrestrial herb; pseudobulbs small ($\pm 1.6 \times 1.3$ cm), conical. Leaves 2-3, up to 9.0×1.5 cm, sessile, bases sheathing below, ovate-lanceolate, shortly acuminate, plicated, green, nerves brown. Peduncle shorter than leaves, ± 7.5 cm, much thick and stout, ridged, brownish, with only one barren node; racemes simple, ± 3.5 cm long, dense flowered; bracts small, linear-lanceolate; pedicels extremely short. Flowers 10-17, ± 0.15 cm broad, remain nearly adherent to the axis; sepals and petals obovate-oblong, 2-lobed, deflexed, slightly 2-auricled at base, brown; ovary 0.07 cm long, obscurely ridged.

Type : A. P. Das 603 (Holotype CAL).

Flowering : July-August.

Distribution : INDIA: West Bengal.

Herbarium specimen : INDIA: West Bengal; Darjeeling, Birch Hill, 2000 m, Aug. 4, 1981, A. P. Das 603 (CAL).

Notes: According to Das & Lama (*l. c.*): The species is allied to *L. nervosa* (Thunb.) Lindl., but differs in having length up to 15.0 cm tall; leaves 2-3, upper leaf ± 14.0 cm long, nerves brown; inflorescence up to 12.0 cm long; peduncle thick and short with only one barren node; naked peduncle always shorter than the larger leaf; flowers 10-17, larger, comparatively less spreading, lip broader, deflexed brown; whereas in species *L. nervosa*, length of the plants being 25.0 cm or more tall; leaves 2, upper leaf ± 20.0 cm long, green; inflorescence 20.0 cm or more long; peduncle narrow with

three barren nodes; naked peduncle much produced beyond the leaves; flowers many; lip flabelliform, slightly deflexed, brownish green.

The species is also related to *L. deflexa* Hook. f., but the structure of lip is quite different in the two species.

Grows in open places among grasses at an altitudinal distribution of 1400–2000 m. Endemic to the temperate hills of Darjeeling District, West Bengal.

The specific epithet '*breviscapa*' means that the short or dwarf scape is the major character by which one can easily distinguish the new species from *L. nervosa*.

Liparis tigerhillensis A. P. Das & Chanda (Orchidaceae) in J. Econ. Tax. Bot. 12 (2): 403–404. 1988.

Small, erect, glabrous, terrestrial herb, waxy green; rhizomes long, internodes 1.8–6.5 cm \pm 0.2 cm thick; pseudobulbs small (1.2–1.5 \times 0.9–1.2 cm), ovoid, obscurely lobed. Leaves 2, rarely 1, alternate, bases sheathing below; petioles long, \pm 6 cm; lamina of first leaf 6–7.2 \times 4–4.7 cm, entire, obtusely acuminate or slightly caudate; delicately fleshy, whitish green. Peduncles exceeding petioles, with no nodes at the middle, slender, acutely angled; racemes simple, \pm 6 CM, LAX, \pm 10 flowered; bracts 0.3–0.5 cm, lanceolate, acuminate; pedicles slender, 0.8 cm; ovary 0.35 cm; sepals and petals 0.6 cm, linear; lip oblong, 0.8 \times 0.6 cm, deep brown with a shiny and broad midvein, flat, tip obscurely 3-lobed column \pm 0.3 cm, slightly curved, hood like.

Types : A. P. Das 1051 (Holotype, CAL; A & B: Isotypes, CAL; C: Isotype, Herb. Presidency College Calcutta; D: Isotype, Personal Herbarium of A. P. Das).

Flowering : July.*

Distribution : INDIA: Darjeeling & Sikkim Himalaya.

Herbarium specimens : INDIA: West Bengal; Tiger Hill, Darjeeling District, 2500 m, July, 16, 1982, A. P. Das 1051, 1051 A & B (CAL); *ibid.*, A. P. Das 1051 C (Herb. Presidency College, Calcutta); *ibid.*, A. P. Das 1051 D (Personal Herb. of A. P. Das).

Notes : According to Das & Chanda (*l.c.*): This endemic new species is allied to *Liparis rostrata* Reichb. f. and *L. odorata* (Willd.) Lindley, but is a much smaller plant with a different leaf structure and having very small flowers. Bracts are narrowly lanceolate, acuminate and the lip is deep brown with obscure terminal lobes.

Listera nandadeviensis Hajra (Orchidaceae) in Bull. Bot. Surv. India 25 (1-4): 181-182, 1983 (1985).

Terrestrial, erect, slender herbs, 13-20 cm high with fleshy fibrous roots. Stem 9-14 cm below the leaves, glabrous. Leaves 2, sessile, opposite, broadly ovate-cordate, acute, membranous, 1.5-3.0 cm long, 1.5-3.0 cm broad, glabrous, prominently 3-nerved, faintly 8-10 nerved. Peduncle 1.0-2.0 cm long, glandular-pubescent. Raceme slender, 2.0-6.0 cm long, glandular-pubescent, 3-6 flowered. Flowers arranged distantly in the axils of the bracts green, 1.5-2.0 cm long; pedicel 3-4 mm long, glabrous. Floral bracts elliptic to ovate, obtuse, 3-4 mm long, 1-2 mm broad, shorter than the stalked-ovary. Sepals subequal, ovate-lanceolate subfalcate, 5-6 mm long, 1.5-2.0 mm broad, membranous, 1-nerved. Petals narrowly oblong, 5-6 mm long, 1 mm broad, 1-nerved. Lip linear-oblong, 14-15 mm long, 1.5-2.0 mm broad, 3-nerved, apex bifid, lobes narrowly oblong, sinus ca 5 mm long. Column 2.5-3.0 mm long, stout, incurved, with a distinct flap like rostellum. Anther bilobed, ca 1 mm long. Ovary ca 3 mm long, 2 mm broad.

Types : P. K. Hajra 73202 (A: Holotype CAL; B-E: Isotypes BSD).

Flowering & Fruiting : August-September.

Distribution : INDIA: Uttar Pradesh.

Herbarium specimens : INDIA: Uttar Pradesh; Chamoli District, Nandadevi National Park, Himtoli, P. K. Hajra 73202 (A in CAL & B-E in BSD).

Notes : According to Hajra (*l.c.*) : Allied to *L. nepalensis* Balak., but differs in its leaves being prominently 3-nerved; raceme 3-6 flowered; petals narrowly oblong; lip deeply bifid.

On moss covered rocks in *Rhododendron*, *Abies* and *Pinus* forest at altitude varying from 3000–3500m.

Lithocarpus kamengii K.C. Sahni & H.B. Naithani (Fagaceae) in *Indian Forester* 106 (6): 441. 1980.

A large evergreen tree, girth 2–3 m. Bark greyish white, thin. Leaves simple, alternate, 30–33 × 11–14 cm, elliptic-oblong, entire, acuminate at tip, base decurrent, slightly oblique, glabrous above, glaucescent beneath, puberulous on midrib; lateral nerves 18 pairs, prominent beneath, faint above, arcuate; petiole 2 cm long, glabrous or pubescent thick at base. Cupule pale brown, completely enclosing the fruits, aggregated (2–3), usually two fully developed, one abortive, developed one 4 cm across, ovoid, covered with pubescent, scattered, stout, conical, compressed tubercles. Nut brown, ovoid, 2.6 × 3 cm crowned by remains of pubescent styles.

Type : Sahni & Naithani K. C. S. Ser. II No. 935 (Holotype DD).

Flowering & Fruiting : November.*

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimen : INDIA: Arunachal Pradesh; Kameng District, Seppa Road, Nov. 4, 1978, Sahni & Naithani K. C. S. Ser. II No. 935 (DD).

Notes : According to Sahni & Naithani (*l.c.*): Allied to *Lithocarpus milroyi* (Purkayastha) Barnett, but differs in the larger leaves 30–33 × 11–14 cm, lateral nerves 18 pairs; cupule aggregated; nut 2.6 × 3 cm.

Lonicera laceana M.P. Nayar & G.S. Giri (Caprifoliaceae) in *J. Bombay Nat. Hist. Soc.* 80 (2): 385–387. 1983 (1984).

Shrubs or small trees, branches more or less round, solid, glabrous, bark greyish, prominently black-dotted. Winter bud with only one pair of outer scales, scales ovate-oblong 10.0–12.0 × 2.5

3.5 mm, boat shaped, apex acute, glabrous. Leaves opposite-decussate, exstipulate, oblong or elliptic-oblong (4.0-) 6.0-8.0 (-12.0) × (2.5-) 3.0-4.0 (-6.5) cm, base subrounded to subcordate, apex apiculate or mucronate, margin entire, 6-8 pairs of lateral nerves nearly obscure near the margin, reticulations usually prominent on the upper surface, glabrous on both surface, coriaceous, shiny; petioles 4.0-7.0 mm long, glabrous, canaliculate. Inflorescence axillary, 2-flowered, peduncle 2.5-5.5 cm long, somewhat compressed, glabrous; bracts free, linear 5.0-7.0 mm long, as long as or slightly exceeding the ovary, margin distantly glandular, glabrous; bracteoles 2 pairs, free, subulate 0.5-1.0 mm long, inconspicuously glandular at the margin, glabrous. Calyx small, cup like with 5 small truncate limbs, persistent, margin entire or inconspicuously glandular, glabrous. Corolla 10.0-14.0 mm long, prominently gibbous near the base, glabrous without; bilabiate, lower lip oblong, 8.0-10.0 mm long, apex rounded, reflexed, upper lip 4-lobed, unequal, ovate to oblong, apex rounded, margin not ciliated; tube shorter than the lower lip, densely pilose within. Stamens 5, attached near the throat of the corolla tube, filaments short, unequal in length, 3.5-5.0 mm long, stout, pilose at base, glabrous above, anthers large, nearly as long as the filaments, narrowly oblong, dorsifixed. Ovary free, cylindrical, 3-locular, glabrous, 3.0-4.0 mm long; style deflexed, 10.0-12.0 mm long, densely pilose. Berries fleshy, usually one smaller in the pair, oblong or ovoid, glabrous, ± 10 mm long, crowned with the persistent calyx.

Type : *J. H. Lace* 1316 (Holotype CAL).

Flowering & Fruiting : April-June.*

Distribution: INDIA: N. W. Himalaya (Himachal Pradesh).

Herbarium specimens : INDIA: Himachal Pradesh; Kalatop forest, Chamba, 2128 m., Apr. 15, 1896, *J. H. Lace* 1316 (CAL); *ibid.*, 2432 m., June 1896, *J. H. Lace* 1715.

Notes : According to Nayar & Giri (*l. c.*): The species is closely related to *Lonicera heterophylla* Decaisne, but can be easily distinguished by: leaves oblong or elliptic-oblong, not lobed, apex apiculate or mucronate, base subrounded or subcordate, coriaceous,

glabrous, margin entire, not ciliated; corolla glabrous outside, corolla lobes not ciliated at margin. In contrast the species *Lonicera heterophylla* Decaisne is characterized by: leaves elliptic or elliptic-lanceolate, lobed, apex acute or shortly acuminate, base cuneate; leaves membranous, pilose at least on the nerves, margin undulate, distinctly ciliated; corolla hispid hairy outside, corolla lobes ciliated at margin.

The species is named after its collector J. H. Lace who made extensive collections in the Chamba state of Himachal Pradesh.

Maesa andamanica Kurz var. **longipedicellata** M.P. Nayar & G.S. Giri (Myrsinaceae) in Bull. Bot. Surv. India 27 (1-4): 263-264. 1985 (1987).

Small tree, branches glabrous, densely verrucose. Leaves elliptic or elliptic-oblong, 6-13 cm long, 2.5-5.0 cm broad, base cuneate, apex acuminate, margin distantly denticulate, primary nerves 6-12 on each side of the midrib, obscure on upper surfaces of leaves, prominent and raised beneath, reticulations obscure, both surfaces glabrous, chartaceous or membranous, turn brownish on drying; petioles 6-15 mm long, deeply channelled, glabrous. Infructescence axillary racemes, 4.5 cm long, glabrous; bracts narrowly triangular, 1 mm long, glabrous, persistent; fruiting pedicels 5.0-5.5 mm long, glabrous, longitudinally striate; bracteoles 2, remain at the base of fruits, narrowly triangular, 1 mm long, glabrous, persistent. Flowers not seen. Berry nearly globose with persistent calyx and style, 3 mm long, 2.0-2.5 mm across, glabrous, longitudinally striate, verrucose. Calyx 5-toothed, tooth triangular, 1 mm long, 0.75-1.0 mm broad at base, glabrous. Style conical, 1.0-1.5 mm long, glabrous, stigma capitate. Seed globose, black, 1 mm across.

Type : R. L. Heinig 451 (Holotype CAL).

Fruiting : November.*

Distribution : INDIA: S. Andaman.

Herbarium specimens : INDIA: S. Andaman; without precise locality, Nov. 15, 1901, R. L. Heinig 451 (CAL).

Notes : According to Nayar & Giri (*l.c.*): The var. *longipedicellata* differs from var. *andamanica* by elliptic or elliptic-oblong leaves with cuneate base, margin distinctly denticulate, infructescence long (4.5 cm) and longer fruiting pedicels (5.0–5.5 mm); whereas in var. *andamanica* leaves elliptic to ovate-elliptic with rounded or subrounded base, margin entire or rarely obscurely denticulate, infructescence shorter, 1–2 cm and shorter fruiting pedicels 1.5–2.0 mm.

Maesa kanjilalii Majumdar & G.S. Giri (Myrsinaceae) in J. Bombay Nat. Hist. Soc. 78 (1): 149–151. 1981.

Small tree, branchlets slender, glabrous, terete. Leaves petiolate, lanceolate, pale green on drying, glabrous on both surfaces, 12–16 cm long, 3–4.5 cm broad, chartaceous or membranous, shortly attenuate at base, acuminate at apex, broadest below the middle, margin recurved, slightly undulate with albuminous marginal glands, midrib prominent beneath, lateral nerves 9–12 pairs, petiole canaliculate, glabrous, 15–18 mm long. Inflorescence axillary, racemose, sparingly branched, slender, lax, up to 24 cm long, glabrous or very minutely pubescent at the tips. Flowers 3–3.5 mm long, bracteate, bracts linear, 1–1.5 mm long, pedicel slender, up to 9 mm long, glabrous, bracteoles 2, ovate lanceolate, 1 mm long, margin slightly ciliate. Sepals 5, valvate, triangular, 0.75 × 0.5 mm, glabrous, margin scarious, ciliate to erose, without glandular dots. Corolla 5-lobed, lobes reniform, or orbicular, 1.5 mm × 1.25–1.5 mm, margin wavy, papery, finely glandular-lineolate inside, as long as tube. Stamens 5, opposite corolla lobes, filaments inserted within, near the base of the tube, slender, glabrous, 1–1.5 mm long, anthers reniform 0.5 mm long, bilobed, longitudinally split. Ovary semi-inferior, globose, glabrous, nearly 1 mm diameter, style short, stigma dome-shaped, or very indistinctly lobed.

Type : P. C. Kanjilal 8684 (Holotype CAL).

Flowering : October.*

Distribution : INDIA : Meghalaya.

Herbarium specimen : INDIA: Meghalaya; Gauhati Road, 6–7 miles from Shillong, Oct. 14, 1930, P. C. Kanjilal 8684 (CAL).

Notes : According to Majumdar & Giri (*l.c.*): This new species is closely allied to *M. ramentacea* A. DC. but can be easily distinguished by its longer very lax inflorescence, long pedicels (7-9 mm), larger flowers (3-3.5 mm), and irregularly wavy leaf margins, whereas *M. ramentacea* is characterised by shorter inflorescence (nearly half as long or rarely as long as leaves), shorter pedicels (1-2 mm), smaller flowers (2 mm) and entire leaf margins.

It was identified as *Maesa ramentacea* Wall. by D. Chatterjee at Kew who pointed out some difference in inflorescence and indicated the possibility that it could be a variety of that species. Majumdar & Giri however, have discovered several other differences as pointed out above.

The species is named after its collector, *P. C. Kanjilal*.

Maesa nayarii G.S. Giri & S.K. Das (Myrsinaceae) in Bull. Bot. Surv. India 31 (1-4): 178-180. 1989 (1992).

Subscandent trees or shrubs, 5-7 m tall. Branches slender, weak, terete, hollow, longitudinally furrowed, densely ferruginous pilose particularly the younger parts, older parts often become glabrate. Leaves alternate, petiolate; petioles robust, channelled, 4-6 cm long, densely ferruginous pilose; lamina broadly oblong-rectangular, 25-32 × 18-22 cm; base truncate, slightly unequal sided; apex truncate acuminate; margin sharply dentate, denticles ending in glands; midrib and lateral nerves prominent, raised beneath, lateral nerves 15-20 on each side of midrib, slightly winged or scarious beneath, usually forked towards the margin above the middle, each forking ending in marginal denticle; ultimate reticulations obscure; lamina chartaceous; upper surfaces remain green or turn dull green on drying, glabrous throughout or sparsely ferruginous pilose at the base and near the juncture of petiole with lamina; lower surfaces dull green to pale on drying, ferruginous pilose throughout, hairs long and dense along midrib and lateral nerves. Inflorescence axillary much branched panicle, 3-6 cm long, ± length of subtending petioles, densely ferruginous pilose throughout. Flowers pedicellate, bracteate bracteolate; pedicels 1.5-2.5 mm long, fruiting pedicels

often become as long as 7 mm, densely ferruginous pilose; bracts linear or narrowly triangular, 1.25–1.5 mm long, dorsal side densely ferruginous pilose, ventrally glabrous; bracteoles 2, remain closely pressed at the base of flowers, linear, 1.0–1.5 mm long, ferruginous pilose as those of bracts. Calyx cupular, 2.0–2.5 mm long, 1.5–2.0 mm, across densely ferruginous pilose, elineolate; lobes 5, ovate, acute, 1.0–0.5 mm dorsally dense ferruginous pilose, ventrally glabrous, margin entire, ciliate, fine glandular lined. Corolla glabrous, tube 0.5–0.75 mm long; lobes 5, slightly longer than the tube, lobes ovate-rounded, imbricate, 0.75–1.0 mm long, 0.75 mm broad, margin entire or slightly undulate, black glandular lined at the apices. Stamens 5, free, opposite to corolla lobes, included, attached near the middle of corolla tube; filaments 0.5 mm long, glabrous; anthers remain at the throat of corolla tube, reniform, distinctly bilobed, emarginate at apex, pointed and curved at base, basifixed, 0.25 mm long. Ovary semi-inferior, conical, ca 1 mm long, glabrous. Style short, ± 0.5 mm long, glabrous; stigma subequally 3-lobed. Fruit fully adnate to calyx-tube and remain enclose, crowned with persistent calyx lobes and persistent style.

Types : S. K. Das 4038 (A: Holotype CAL; B: Isotype CAL; C: Isotype AFS).

Flowering & Fruiting : April.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; upper Subansiri District, Apr. 26, 1988, S. K. Das 4038 (A & B: CAL; C: AFS).

Notes: According to Giri & Das (*l. c.*): The new species is allied to *M. truncata* A. R. K. Sastry, but can be easily distinguished by larger ferruginous pilose leaves with widely dentate margin; corolla lobes ovate rounded, longer than tube; anther reniform with pointed incurved base. Whereas in *M. truncata*, leaves are smaller brownish pilose with subentire or minute callose denticulate margin; corolla lobes are ovate-acute, shorter than tube; anthers are broadly triangular, lobes divergent at base.

The species is named in honour of Dr. M.P. Nayar, former Director, Botanical Survey of India for the contribution he has made in the field of taxonomic studies of Indian plants.

Maesa truncata Sastry (Myrsinaceae) Bull. Bot. Soc. Beng. in (J. Sen Mem. Vol.) P. 55. 1969.

Tree *ca* 5 m tall, subscaudent. Twigs slender, long, flexuose, terete; young parts sparsely lenticellate, brown velutinous hairy; older parts glabrescent, longitudinally furrowed. Leaves petiolate; petiole 2–4 cm long, densely brown hairy; lamina subelliptic-rectangular, 7.5–17.0 × 6.0–13.5 cm, subcoriaceous, becoming chartaceous on drying; upper surface green, glabrescent, scattered hairy along midrib and lateral nerves at base; lower surface brownish pilose hairy all over, densely so along the main nerves; base rounded-subtruncate; apex truncate, prominently triangular acuminate; acumen up to 2 cm long; margins distantly minute callose-denticulate, often subentire; mid-rib and lateral nerves obscure above, distinct beneath; lateral nerves 8–10 pairs, arcuate, 1–3 times forked to wards the margin. Inflorescence a much branched dense panicle, axillary and terminal, densely ferruginous hairy, *ca* 3 cm long, shorter than petioles; pedicels *ca* 2 mm long, slender; bracts subulate, *ca* 1 mm long; bracteoles 2, minute, calyx cupular, *ca* 2 mm long, elineolate, 5-lobed; lobes *ca* 1 × 1 mm, triangular, subotuse, margins hyaline, long ciliate. Corolla white, brown-blotched, shortly campanulate, *ca* 2 mm long, *ca* 2 mm wide at mouth, glabrous, 5-lobed; lobes imbricate, rounded, *ca* 0.75 × 1.0 mm, slightly shorter than the tube, margins obscurely crenulate. Stamens 5, *ca* 0.5 mm long, included; anthers subreniform, shorter than filaments, ovary semi-inferior; style *ca* 0.75 mm long, clavate, stout, glabrous; stigma sub 3-lobed; ovules many.

Types : A. R. K. Sastry 45387 (A: Holotype CAL; B–F: Isotypes ASSAM).

Flowering : May*.

Distribution : INDIA: Arunachal Pradesh (NEFA).

Herbarium specimens : INDIA: NEFA; Subansiri District, Vicinity of Palin *ca* 1600 m, 27° 40' N. Lat. and 93° 40' E. Long, May 17, 1966, A. R. K. Sastry 45387 (A in CAL; B–F in ASSAM).

Notes : According to Sastry (*l.c.*): This new species is allied to *M. Mollis* (Bl.) A. DC., but the latter species is distinguishable in

its much smaller leaves with acute or rounded base and acuminate apex, much shorter petiole, much shorter inflorescence, rounded calyx lobes, corolla lobes without any lines or markings, long exerted stamens and the stigma with 4 lobes.

Maesa wardii M.P. Nayar & G.S. Giri (Myrsinaceae) in Bull. Bot. Surv. India 17 (1-4): 182-184. 1975 (1978).

Shrub. Branches woody, subterete, hirsute or pilose. Leaves elliptic-oblong or elliptic, 7 - 15 cm long, 5 - 10 cm wide, base subrotundate, apex obtuse, margin prominently dentate, upper surface glabrous, glossy, undersurface initially along the nerves and margins puberulous and sparsely pilose, later on glabrous, main nerves and side nerves on the upper surface distinct, under surface prominent and raised, lateral nerves 10-12 pairs, ascending and branched; petiole 1-1.5 cm long, initially pilose, later on glabrous, thick. Inflorescence axillary, 6-7 cm long, paniculate, laxly many flowered, densely rusty pilose. Flowers 5-merous, \pm 7 mm long; pedicel 2 mm long, densely pilose; bract linear lanceolate, shorter than the pedicel, pilose. Calyx \pm 2.5 mm long, 1.5 mm wide, densely pilose, calyx lobes narrowly triangular. Corolla tubular \pm 4 mm long, 1.5 mm wide, 5-lobed, petal lobes united up to 2/3 of the corolla tube, subrotundate linear. Stamens 5 - smaller than the petals, anther subrectangular, filament 0.7 mm long. Ovary globose; style 1.2-2 mm long, stigma lobed.

Type : F. Kingdon Ward 11241 (Holotype CAL).

Flowering : Time not mentioned.

Distribution : INDIA : Nagaland.

Herbarium specimens : INDIA: Nagaland; Naga Hills, F. Kingdon Ward 11241 (CAL).

Notes : According to Nayar & Giri (l.c.): *Maesa wardii* Nayar et Giri is allied to *Maesa Kurzii* Mez, but differs in having larger laxly arranged inflorescence (6-7 cm long), larger flowers (\pm 7 mm long) and bracts (1-1.5 mm long) shorter than the pedicels (2 mm long); whereas in *M. Kurzii* the inflorescence is shorter (2

2.5 cm long) and condensed, flowers smaller (3.5 mm long) and bracts (1-1.5 mm long) longer than the pedicels (0.5 mm long).

The species is named in honour of F. Kingdon Ward who made valuable collections of plants from inaccessible regions of Eastern Himalayas, Burma and Tibet.

Maesa ziroensis G.S. Giri & G.D. Pal (Myrsinaceae) in J. Bombay Nat. Hist. Soc. 87 (3) 435-437. 1990. (1991).

Shrubs, 2.0-2.5 m tall, erect, branches woody, terete, striate, lenticellate, densely rusty pilose. Leaves alternate elliptic to elliptic-lanceolate (7.0-8.0-11.5 (-13.0) × (2.2-) 2.5-3.0 (-3.5) cm, base acute to subrounded, apex acuminate, margin denticulate, 8-10 nerves on either side of midrib, lateral nerves bifurcate near the margin, one end from marginal loop and the other terminate to a gland at each dentation; upper surfaces sparsely rusty pubescent, lower surfaces densely pubescent, hairs more dense on the nerves and nervules; petioles strong, 0.6-1.0 cm long, densely rusty pubescent. Inflorescence axillary panicles, usually double the length of petioles, densely rusty pubescent; bracts narrowly triangular or subulate, 0.5-1.0 mm long, sparsely hairy without, margin ciliate.

Flowers 5 merous, 2.5 mm across, pedicellate, pedicels 1.0-1.5 mm long, densely rusty pubescent; 2 bracteolate, bracteoles like those of bracts. Sepals broadly ovate, 0.5-0.75 × 0.5 mm, imbricate, dorsally glabrous, ciliolate at margin. Petals joined below the middle, lobes nearly triangular or ovate, 1.0 × 0.5-1.0 mm, apex obtuse, prominently glandular lined, the glandular lines arise from the attachment of filaments to the petals, yellow. Stamens opposite and attached at the base of petal, included within the tube, filaments small, 0.25-0.5 mm long, glabrous; anthers triangular, 0.25-0.5 mm, distinctly notched at apex, divergent at base, dorsifixed, longitudinally splitted. Ovary semi-inferior, subglobose, glabrous, c 1 mm diam. Style short, c 1 mm long, slightly flattened towards apex, glabrous. Stigma capitate or indistinctly lobed.

Types : G. D. Pal 77433 (A: Holotype CAL; B: Isotype CAL; C: Isotype ARUN).

Flowering & Fruiting : September - December.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Lower Subansiri District, Old Ziro - Begi Rd., 6 Km from Old Ziro, 1700 m, Apr. 9, 1980, G. D. Pal 77433 (A & B in CAL ; C in ARUN).

Notes : According to Giri & Pal (*l. c.*): The new species is closely allied to *Maesa perlarius* (Lour.) Merr., but can be easily distinguished by its densely rusty pilose branches; leaves elliptic to elliptic-lanceolate, chartaceous, upper surfaces pubescent, turn black on drying; inflorescence branched axillary panicles; sepals dorsally glabrous; petals joined below the middle and lobes prominently glandular lined.

Grows in moist primary forests along the hilly foot track.

Local name: 'Abanchini' (Apatani).

Melhanianthus balakrishnanii K. Ravikumar, R. Ganesan Ramam. (Sterculiaceae) in Bull. Bot. Surv. India 31 (1-4): 172-174. 1989 (1992).

Herbs, prostrate, stout, stellate-tomentose; taproots up to 50 cm long, woody. Leaves alternate, orbicular to suborbicular, rarely ovate, cordate to truncate at base, obtuse to truncate at apex, 0.4-2.2 × 0.3-2.1 cm, irregularly crenate-dentate along margins, brownish tomentose above, greyish tomentose beneath, with scattered, shiny, resinous glands on both surfaces; veins up to 4-paired, obscure; petiole 0.7-1.3 cm long, terete, tomentose. Stipules filiform, ca 2 mm long, caducous, tomentose, reddish-brown. Flowers axillary and terminal, solitary or in 2-flowered fascicle; peduncles ca 8 mm long, terete, tomentose; pedicels 2-4 mm long, terete, tomentose; bracts oblong-lanceolate, acute at apex, ca 9 × 2 mm, tomentose on both sides; bracteoles oblong-lanceolate, acute at apex, 7-9 × 1-2 mm tomentose on both sides. Sepals 5, equal, ovate-lanceolate, acuminate at apex, ca 8 × 2.5 mm, ciliate along margins, yellow and glabrous inside, grey tomentose outside. Petals 5, obovate, cuneate at base, emarginate at apex, 6-7 × 4-5 mm, venose shorter than sepals, bright

yellow. Staminal cups up to 2 mm long, glabrous, yellow; stamens 5, alternate to staminodes; filaments *ca* 1 mm long, yellow; anthers oblongoid, 1-1.5 mm long, 2-lobbed, yellow; staminodes linear-oblong, obtuse at apex, *ca* 4 mm long, venose, yellow. Ovary ovoid, *ca* 2 mm long, hirsute; styles *ca* 4 mm long, terete, glabrous; stigmas 5-partite, subulate, yellow. Fruit globose, *ca* 5 mm across, 5-locular, 1-4 seeds in each locule. Seeds trigonous, *ca* 2 mm across, muricate, black.

Types : K. Ravikumar & R. Ganesan 86870 (Holotype CAL; Isotypes MH).

Flowering & Fruiting : April.*

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; V. O. Chidhambaranar District, Alankarathattu coast near Tuticorin at Sea Level, Apr. 27, 1988, K. Ravikumar & R. Ganesan 86870 (CAL, MH).

Notes : According to Ravikumar *et al.* (*l.c.*): The species is allied *Melhania cannabina* Wight, and in some characters it is also closely resembles to *M. ovata* (Cav.) Spreng, but markedly differs from them. While *M. balakrishnani* is characterised by prostrate herb; leaves orbicular to suborbicular, rarely ovate, *ca* 2.2 × 2.1 cm; petioles *ca* 1.3 cm long; flowers solitary or 2 in each fascicle; peduncles shorter than the petioles; bracteoles oblong lanceolate; pedicels shorter than the peduncles; calyx lobes *ca* 8 × 2.5 mm; fruits globose, shorter than the calyx; the species *Melhania cannabina* can be characterised by erect shrub; leaves oblong, *ca* 6.3 × 4 cm; petioles *ca* 3 cm long; flowers 2-4 in each fascicle; peduncles shorter or equal to petioles; bracteoles lanceolate; pedicels shorter than the peduncles; calyx lobes *ca* 10 × 4 mm; fruits subgibbous, shorter than the calyx. But the other allied sp. *M. Ovata* is characterised by its prostrate herb; leaves broadly elliptic-ovate or ovate; petioles *ca* 6 mm long; flowers 2-4 in each fascicle; peduncles as long as or longer than the petioles; bracteoles linear; pedicels equal or slightly longer than the peduncles; calyx lobes *ca* 7 × 3 mm; fruits ovate and slightly longer than the calyx.

The new species is rare along the coastal sands, found associated with *Polycarpaea corymbosa* (L.) Lam., *Cleome angustifolia* Forsk., and *Polygala chinensis* L.

The species is named to honour of Dr. N. P. Balakrishnan, Botanical Survey of India.

Melocalamus indicus R.B. Majumder (Bambusoideae) in Bull. Bot. Surv. India 25 (1-4): 236-237. 1983 (1985).

Evergreen scandent bamboo with very long solid culms, arching over tall trees and then hanging downwards with tufts of green leaves at the branch-tips; culm-nodes with woody ring, formed by the persistent lower part of the cylindrical culm-sheaths, infranodal region white scurfy and branches many in tufts, supporting often a solitary large bud that develop into a branch as thick as the main culm. Culm-sheaths cylindrical at length crustaceous and falling away (persistent in *M. compactiflorus*). Panicle large with globular clusters of spikelets on the nodes of the flexuous branches. Spikelets 2-flowered, lower floret sterile and the upper hermaphrodite but without rhachilla extension (present in *M. compactiflorus*).

Type : Majumder 73083 (Holotype CAL).

Flowering & Fruiting : Time not mentioned.

Distribution : INDIA : Assam, Manipur.

Herbarium specimens : INDIA: Assam; Cachar, Bhuban Hill, Majumder 73083 (CAL). Manipur; Malik 942 (CAL).

Notes :According to Majumder (*l.c.*): Common in the tropical low land rain forests of Cachar, Manipur and other adjoining parts of Assam. The culms are used in basket works.

Memecylon collinum N.P. Balakr. & N.G. Nair (Melastomataceae) in Bull. Bot. Surv. India 24 (1-4): 30-31. 1982 (1983).

Small tree, ca 4m; branchlets trete, glabrous. Leaves ovate, elliptic to subobovate, acute at base, obtuse, retuse or subretuse at apex, entire at margins, 4-7 cm long, 1.7-3.8 cm wide, dark green above, pale beneath, yellowish when dry; midrib distinct; lateral nerves obscure; petioles 3-5 mm long, ca 2 mm thick, glabrous. Flowers

purplish with reddish tinge, in peduncled corymbs usually in leafless axils, sometimes from old woody branches; peduncles 4-9 mm long, glabrous; pedicels 2-3 mm long, glabrous; bracteoles 2, basal, triangular, ca 1 mm long and broad. Calyx cup-shaped, ca 3 mm long, 3-4 mm diam., glabrous; lobes minute, triangular, subulate. Petals 4, broadly ovate-orbicular, rounded at apex, ca 3 mm long, ca 4 mm wide, glabrous. Stamens 8; filaments ca 4 mm long, glabrous; anthers ca 1.5 mm long; connective appendage curved, 2.0-2.5 mm long, ca 1.5 mm thick with a dorsal hollow gland at the curve; disc 8-ribbed, glabrous. Ovary adherent and included in calyx, 1-celled; ovules ca 10, on free central placenta; style simple, 4-5 mm long, glabrous; stigma terminal, obscure.

Types : Balakrishnan & Nair 4764 (A: Holotype CAL; B-D: Isotypes PBL).

Flowering : December.

Distribution : INDIA : Andaman Island.

Herbarium specimens : INDIA : North Andamans; Saddle Peak, 500-700 m, Dec. 1, 1976, in flower Balakrishnan & Nair 4764 (A: CAL & B-D: PBL).

Notes : According to Balakr. & Nair (*l.c.*): *M. elegans* Kurz is an endemic species of Andaman Islands. The present new species differs from it in branchlets being terete; petioles shorter; leaves elliptic, retuse to subretuse at apex, 1-nerved and lateral nerves being obscure.

Grows in scrub jungles in lateritic soils.

Memecylon subramanii A.N. Henry (Melastomataceae) in J. Bombay. Nat. Hist. Soc. 77 (1-3): 492-493. 1980.

Erect shrubs, 2-4 m tall, sparingly branched; bark grey, flaking off into small pieces; branchlets stout, strongly 4-angled with narrow wings on the angles. Leaves 20-40 × 6.5-14 cm opposite, sessile or subsessile, lanceate, coriaceous, glabrous, acuminate at apex, cordate at base, penninerved, veins prominent beneath, lateral

veins numerous and joining an intra marginal vein; foliar scleroids filiform, mostly non-branching. Flowers 6-7 mm across, clustered in axillary (also in the axils of fallen leaves on old wood), lax pedunculate cymes; peduncles 6-12 cm long, 4-angled with narrow wings on angles; pedicels 6-9 mm long, slender, surrounded at base with an involucre of bracts; calyx 4-5 mm wide, truncate, shallowly 4-lobed, petals 4, each 3-4 mm across, bluish violet, broadly obovate or subrotund, concave, thin, imbricate in bud, easily dropped at anthesis; disc epigynous, shallowly striate with eight radiating ribs; stamens 8, anthers 1-1.5 mm long, connective with a disc-shaped gland; ovary inferior, unilocular with several ovules on a central placenta; style filiform. Berries 9-10 mm across, globose, crowned by calyx-limb, blackish purple when ripe.

Types : Henry 8407 (Holotype CAL; Isotypes MH).

Flowering & Fruiting : March-August*.

Distribution: INDIA : Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Tirunelveli District, Kanni-Katti, 765 m, Apr. 22, 1972, Henry 8407 (CAL & MH); *ibid.*, Aug. 29, 1963, Henry 17365 (Paratype MH); *ibid.*, Mar. 19, 1917 (Paratypes, Madras Herbarium *South India Flora* No. 14671); Valyar Forest near Kannikatti 1000 m, July 13, 1976, Bhargavan 47482 (Paratype MH).

Notes : According to Henry (*l. c.*): Allied to *Memecylon hookeri* Thwaites, but differs in: flowers larger, clustered in pedunculate lax cymes; peduncles up to 12 cm long and narrowly winged on angles.

This species is dedicated to late Dr. K. Subramanyam, former Director, Botanical Survey of India.

***Microstegium borianum* Sur (Poaceae) in J. Bombay Nat. Hist. Soc. 79 (3): 652-654. 1982 (1983).**

Culms 128 cm long, tall stout, simple, glabrous, pubescent at the nodes and below the panicles. Leaves 25 cm long and 1.5-2 mm wide, lanceolate, acuminate, tubercle based hairs in both surfaces, ligules linear oblong, 2-4.5 mm long; leaf sheath

pubescent. Inflorescence of 3-4 racemes, forming panicle, 5-10 cm long, axis glabrous. Sessile spikelet prominent, 5.5-6 mm long, lanceolate, oblong, pedicel ciliate; lower involucral glume 5.5 mm long, lanceolate, dorsally channelled, chartaceous, tip 2-toothed, 9-nerved, keels ciliate. Upper involucral glume 5.5 mm long, lanceolate acute, chartaceous, keel scabrid, 5-nerved, a small awn at the tip. Lower floret empty, lemma 4.5 mm long, lanceolate, toothed, middle of the margins ciliate, 3-nerved, hyaline; palea 3.5-4 mm long, oblong, hyaline, apex obtuse. Upper floret hermaphrodite; lemma 3.5-4 mm long, ovate-oblong, membranous, hyaline, divided into two lobes from the middle, lobes acute, glabrous, 3-nerved, awned from the sinus, awn 9-10 mm long; palea 3.5 mm long, linear lanceolate, hyaline, bifid, glabrous; stamens 3, anthers 3 mm long, filament small; ovary small, style long, filiform, stigma 2, plumose. Pedicelled spikelet rudimentary.

Type : G. K. Deka 15683 (Holotype CAL).

Flowering : September*.

Distribution : INDIA : Meghalaya.

Herbarium specimen : INDIA: Meghalaya; Khasia & Jaintia Hills, Lowlyngdoh, Sept. 26, 1937, G. K. Deka 15683 (CAL).

Notes : According to Sur (*l.c.*) : *Microstegium* Nees was known to be represented in India by 6 species. One more new species has been found and named here *Microstegium borianum*, sp. nov. from Meghalaya state, Khasia & Jaintia Hills, Lowlyngdoh. This new taxon is near to *M. Petiolare* (Trin.) Bor but differs in less number of racemes (3-4), rudimentary pedicelled spikelet, lower floret empty, bifid palea of upper floret.

***Minuartia ebracteolata* Majumdar & G.S. Giri (Caryophyllaceae)**
in *Candollea* 38 (1): 343-345. 1983.

Erect or loosely tufted perennial herb with vegetative shoots and flowering shoots. Leaves linear, opposite-decussate, (8-) 10-15 (-20) × (0.5-) 0.75-1.0 (-1.5) mm, glandular pubescent, often flexuous, slightly connate at base, acute, entire, 1-3-nerved, lateral nerves

usually subobscure. Internodes very short in the sterile shoots and long in the flowering shoots. Flowering shoots 10–14 cm long, glandular pubescent. Cymes few-flowered, compact, pedicels densely glandular-pubescent, (0-) 1–4 (-5) mm long, ebracteolate. Sepals 5, ovate-oblong or ovate-lanceolate, (3.5-) 4.0–4.5 (-5.0) × 1.5–2.0 mm, strongly trinerved, acute or apiculate at the apex, with broad scarious margins, dorsally glandular-pubescent, erect at anthesis. Petals 5, oblong, 8–9 × 3.5–4 mm, finely veined inside, membranous. Stamens 5, attached to the base of petals; filaments 6–7 mm, glabrous, anthers oblong, 0.5 mm long, dorsifixed. Ovary urceolate, glabrous, styles 3, 2 mm long, glabrous, stigma flattened. Capsules 3-valved, 6–7 mm long valves reflexed at apex on dehiscence seeds ovoid, ca 0.5 mm long, dark red, honeycombed and clearly tubercled.

Types : N. C. Nair 16867 (Holotype CAL; Isotype BSD).

Flowering : June–July. *Fruiting* : August–September.

Distribution : INDIA: Himachal Pradesh, Kashmir; PAKISTAN.

Herbarium specimens : INDIA: Himachal Pradesh; Lahul, Batal, 4000 m, Sept. 11, 1961, N. C. Nair 16867 (CAL & BSD); Lahul, Upper Bhaga valley on metamorphic rocks, 2890–3950 m, June 1865, *Stoliczka* s.n. (CAL); Rotang, 3650 m, June 1941, *Bor* 14512 (CAL); Chamba, Above Tindi, 3040 m, Sept. 15, 1897, *J. H. Lace* 1785 (CAL); Lahul, *Capt. Hey* s.n. (CAL). Kashmir; Pissu Ghati, 3800 m, June 27, 1959, *T. A. Rao* 9726 (CAL & BSD); Troncol, 3340 m, Sept. 13, 1913, *F. E. Koebel* 32 (CAL); Sonmarg hill, Sept. 16, 1959, *T. A. Rao* 9574 (CAL & BSD). PAKISTAN : Gilgit expedition, 1885, *Dr. Giles* s.n. (CAL).

Notes : According to Majumdar & Giri (*l.c.*): Closely allied to *M. Kashmirica* (Edgew.) Mattfeld, but differs by its compact few flowered inflorescence, pedicels usually shorter than sepals, bracteoles absent.

Mycetia listeri Deb (Rubiaceae) in *Blumea* 14 (1): 241–243. 1966.

Shrub small, branching; stem terete, brittle, swollen at the

nodes, pubescent when young. Leaves stipulate, opposite, simple, unequal in pairs, $9-28 \times 0.7-3.5$ cm with some intermediate ones diminutive in form, broadly linear, membranous, entire, long acuminate, attenuated at the base, petiole short, up to 8 mm long, puberulous, lamina slightly falcate, unequal at the base, veins about 12-20 on either side, alternate, arching towards the apex; midrib, veins, and veinlets puberulous beneath, scarcely so above; stipules interpetiolar, foliaceous, ovate-elliptic or lanceolate, obtuse $\pm 0.8-1.5$ cm long, puberulous, ciliate or glandular at the margin. Inflorescence axillary and terminal, shorter than the leaf, di- and trichotomously branching panicle of cymes up to 15 cm across; peduncle erect, up to 3.5 cm long; bracts deciduous, small, varying in shape, sometimes glandular and forming a rim like structure. Flowers pedicellate, bisexual, regular, gamopetalous, epigynous, about 8 mm long and 2 mm across; pedicel slender $\pm 3-8$ mm long. Calyx gamosepalous, 4.5-5 mm long, lobes 5, persistent, chartaceous about 3 mm long, with scattered oblong glands at the margin, tube hemispheric, ± 2 mm across. Corolla white, tubular, $\pm 6 \times 2$ mm, lobes 5, valvate in bud, densely pubescent within about $1/3$ the length in the middle sector. Stamens 5, epipetalous, attached at the base of the corolla lobes; filaments very short, ± 0.3 mm, anthers ± 2.25 mm, linear-oblong, 2-lobed, dorsifixed. Carpels 2, syncarpous; stigma 2-lobed, puberulous; style 1, stigma and style ± 7.5 mm; long; ovary inferior, hemispherical, 2-celled with many ovules in axile placentation. Fruit a berry, ovoid, $\pm 3-4$ mm in diam., 2-chambered; seeds many, minute, angled, ± 0.3 mm.

Types : J. L. Lister s.n. (a: Holotype CAL; b: Isotype CAL).

Flowering & Fruiting : January - May*.

Distribution : INDIA: (Arunachal Pradesh), (N.E.F.A.)

Herbarium specimens : INDIA : N. E. F. A; Shenguh, Daphla hills, 1213 m, 1874-75, J. L. Lister s.n. (a b: CAL); Dafla Hills, Jan. 1890, Badal Khan (Dr. King's collector) 55a-d (Paratypes CAL) flowers white; subansiri F. D., 14.4 km from kimin, 250 m, May 25, 1959, G. Panigrahi 19395 (Paratype ASSAM).

Notes : According to Deb (*l.c.*) : This new species of *Mycetia* Reinw. (Rubiaceae) is based on a collection by J. L. Lister in 1874

75 and subsequently by Dr. G. King's collector Badal Khan in January, 1890 from Dafia Hills, NEFA. The late Dr. G. King's named the taxon *Adenosacme listeri* King MSS which was not published. Later on I. H. Burkill in Rec. Bot. Surv. India 10 (1925) 298 named his specimens (Burkill 36423 & 37321) from the Abor Hills *Adenosacme listeri* King without description. An examination of Burkill's specimens in the herbarium (CAL) reveals that his collection is not conspecific with Lister's, named by King. Very recently G. Panigrahi & S. K. Kar in Bull. Bot. Surv. India 5 (1963) 27 named a collection (Panigrahi 19395) *A. listeri* King ex Burkill, probably without knowing that it was not a validly published name and that the specimen is not conspecific with Burkill's collection, where as it is identical with Lister's.

The generic name *Mycetia* Reinw., has been established as the valid name for *Adenosacme* Wall. Studies on the genus *Mycetia* Reinw. suggest that Lister's collection deserves specific status as suggested by King. Recent collection of the material indicates that the plant exists over a larger area. Hence it is considered desirable to name and describe the species. Specific name suggested by King after the first collector Lister is retained here.

This species is near to *Mycetia longifolia* Kuntze (Rubiaceae) differing in glabrescent broadly linear leaves.

Mycetia mukerjiana Deb & Dutta (Rubiaceae) in Indian Forester 91 (5): 272-274. 1965. et in Sci. & cult. 33: 60. 1967; Deb in Bull. Bot. Surv. India 28: 123. 1986.

Shrub small. Stem terete, glabrous, with spongy bark. Leaves stipulate, opposite, simple, 25-27.5 × 7.5-9 cm, broadly elliptic, glabrous, membranous, entire, acuminate; petiole 2-3 cm, lateral nerves 15-20 on either side, alternate, subparallel, arching at the apex and forming a submarginal vein just below the margin; stipules interpetiolar oblong, obtuse, glabrous 8-9 × 7-8 mm. Inflorescence on leafless nodes, lower down the branch, spreading, divaricate, pedunculate, bracteate; peduncle ± 2 cm; branches short divaricating; bracts small ovate lanceolate up to 6 mm long, scarious. Flowers

pedicellate, bisexual, regular, gamopetalous, about 10 mm long; pedicel $4 \pm$ mm, stout. Calyx gamosepalous, tube short, hemispheric, lobes 5, persistent chartaceous, $8 \times 11.2 \times 2.5$ mm, lanceolate, acuminate, distinctly veined, scattered tomentose. Corolla yellow, gamopetalous, fleshy, tube slightly longer than the calyx lobes, teeth 5, short, reduplicate valvate, hispidulous at the back, long pubescent within. Stamens 5, epiptalous, included within the tube, filaments about 4-5 mm, flattened, adhering to the corolla tube, slightly free above, villous below. Anthers oblong 3 mm long, dorsifixed, puberulous, 2 lobed; lobes parallel, longitudinally dehiscent. Carpels 2, syncarpous; ovary inferior, 1.5-2 mm long, hemispheric, hispidulous, 2 chambered, ovules very numerous on fleshy axile placenta; stigma 2 lobed, ± 2.5 mm long, divaricate, puberulous; style solitary, ± 2.5 mm, villous. Fruit a small hemispheric berry, 2 chambered, (immatured), seeds minute, angled, smaller than .5 mm.

Types : G. K. Deka 16961 (A: Holotype CAL; B: Isotype ASSAM).

Flowering & Fruiting : June*.

Distribution : INDIA: Assam, Mizoram.

Herbarium specimens : INDIA: Assam; Lakhimpur District, Makum hill, June 21, 1938, G. K. Deka 16961 (A in CAL; B in ASSAM).

Notes : According to Deb & Dutta (*l.c.*): This species is nearer to *Mycetia longifolia* O. Kuntze differing in oblong obtuse stipules, broadly elliptic glabrous leaves, smaller inflorescence and larger sepals.

The taxon is named in honour of Dr. S. K. Mukherjee, Ex Keeper, Central National Herbarium, Botanical Survey of India, Sibpore who examined the specimen and considered it as a distinct taxon.

Neanotis monosperma* (Wt. & Arn.) Lewis var. *tirunelvelica
A.N. Henry & Chandrab. (Rubiaceae) in Bull. Bot. Surv. India 17
(1-4): 188-189. 1975 (1978).

Slender herbs; branches ascending, rooting at lower nodes pilose.

Leaves 1 3.5 × 0.5 2 cm ovate, elliptic-ovate or ovate-lanceolate, entire, sparsely pilose, acute or subacute at apex, cuneate at base; petioles up to 1.5 cm long, sparsely pilose, dilated base, stipules interpetiolar, adnate with the petioles, pectinate with 3 4 bristles. Flowers sub-sessile, few in mostly axillary (rarely terminal), simple cymes; peduncles 0-1.5 cm long, filiform, pilose. Calyx-lobes 4, each 2 2.5 × 0.7 1 mm, elliptic-lanceolate, acute, ciliate. Corolla pinkish white, funnel shaped; tube 3.5 4 mm long; lobes 4, each 1.5 × 1.5 mm, broadly ovate, acute, reflexed, hairy at the tip. Stamens 4, inserted on the mouth of corolla-tube; filaments short, anthers dorsifixed. Disc epigynous, cushion-shaped. Ovary 2 loculed, adnate with the calyx-tube; ovules 2 3 in each locule, on placentas arising from the base of septum; style long; filiform, bifid; stigma linear. Capsules 3 × 2.5 mm, subglobose, pilose, crowned with calyx lobes, 2 loculed, dehiscing septicidally. Seeds 2 × 1.5 mm, brownish black, boat-shaped, palmoconvex, excavated on one face, pitted.

Types : Henry 17454A (Holotype CAL; B F: Isotypes MH).

Flowering & Fruiting : September*.

Distribution : INDIA: Tamil Nadu.

Herbarum specimens : INDIA : Tamil Nadu; Tirunelveli District, Manjanamparai in Singampatti R. F., Sept. 4, 1963, Henry 17454 (A in CAL; B F in MH).

Notes: According to Henry & Chandrabose (*l.c.*): Allied to var. *monosperma*, but differs in having flowers arranged in mostly axillary, simple cymes; calyx-lobes 2- 2.5 × 0.7 1 mm (*ca* 0.7 × 0.5 mm in var. *monosperma*), elliptic-lanceolate, acute, ciliate; and capsules *ca* 3 × 2.5 mm (*ca* 2 × 2 mm in var. *monosperma*), pilose, crowned with the prominent calyx-lobes.

Neolitsea nicobarica Goel & Chakrab. (Lauraceae) in J. Econ. Tax. Bot. 6 (2): 450. 1985.

Branched dioecious tree, 6-12 m tall, ultimate branches blackish with linear striations and knotty joints at their bases. Leaves alternate to subopposite; lamina lanceolate, elliptic-lanceolate to

ovate-lanceolate, 6-16 cm long, 2-6 cm broad narrowed into base, stiffly coriaceous, glabrous, pale green when dry, 3-plinerved; midrib prominent above and beneath; secondary nerves 3-5 pairs, prominent; tertiary nerves quite prominent, running parallel to each other at right angles to the primary and secondary nerves; fine reticulations very prominent on both surfaces; petiole 8-24 mm long, 1-2 mm thick, glabrous, somewhat blackish. Inflorescences axillary, pseudumbellate, pedunculate or epedunculate. Male flowers: 3-5 (-7) in each involucre, sessile; involucral bracts 4, decussate, broadly ovate, 4-6 × 4-6 mm, obtuse, brown tomentellous on both sides; tepals 4, ovate, with brown tomentum at base; stamens 6, in 3 whorls, the innermost ones biglandular at base; filament 1.5-2.5 mm long, hairy; anthers 4-celled, introrse. Fruits more or less globose, 7-10 mm diam., wrinkled, yellowish brown.

Types : King's Collector 491 (A: Holotype CAL; B E: Isotypes CAL).

Flowering & Fruiting : February - April*.

Distribution : INDIA : Nicobar Islands.

Herbarium specimens : INDIA: Nicobar Islands; *sine loc. exact.* / Apr. 4, 1884, King's Collector 491 A (CAL); *ibid.*, King's Collector 491 B E (CAL) ♂; Kamorta, Feb. 1875, Kurz *s.n.* (Paratype CAL)- ♀; *sine loc. exact.*, *Exped. Novara*, Jelinek 137 (Paratype CAL)-♂.

Notes : According to Goel & Chakrab. (*l.c.*): It is allied to *N. cassiaefolia* (Bl.) Merr., differing principally in the much smaller fruits.

Nicobariodendron Vasudeva Rao & Chakrab. (Celastraceae) in J. Econ. Tax. Bot. 7 (3): 513-516. 1985.

Dioecious tree. Leaves simple, distichous, exstipulate, petiolate, penninerved. Inflorescences axillary, racemiform, simple or compound. Male flowers: bracteate; calyx 4-5-segmented, imbricate; petal 4-5, free, imbricate inserted on the edge of the disc, alternating with the calyx segments; disc present; stamens 2, free, inserted near the

base of petals, exerted; anthers dorsifixed, 2 celled, longitudinally dehiscent; pistillode somewhat sunken in receptacle. Female flowers: unknown. Fruits drupaceous, unilocular, 1 seeded, subtended by persistent calyx.

Type species : *Nicobariodendron sleumeri* Vasud. & Chakrab.

Distribution : INDIA: Andaman Nicobar Islands.

Notes : According to Rao & Chakrabarty (*l.c.*): The specimen Hore 7236 was found with male flowers-polypetalous with 2 stamens and disc. *P. Chakrabarty* 2226 with female fruitings from Katchal Island found to be so. Although Dr. H. Sleumer (Leiden) who scrutinised the description and the materials suggested to keep this indet for the present (until the study of female flowers and wood), we venture to place it under Celastraceae and describe the taxon since characters are more agreeable to this family. The genus is definitely unique and requires a distinct status and therefore described here to enable future explorers to the islands to look for more material and study in detail.

The genus is named after the group of islands, the Nicobar group, to which Great Nicobar & Katchal Island belong.

***Nicobariodendron sleumeri* Vasudeva Rao & Chakrab.**
(Celastraceae) in *J. Econ. Tax. Bot.* 7 (3): 513-516. 1985.

Tree, 8-35 m high; dioecious; branchlets greyish or brownish or blackish, terete, 1-6 mm thick, glabrous, whitish lenticellate. Leaves oblong-elliptic to obovate elliptic, 5.5-10 cm long, 2-4 cm broad, entire, attenuate at base, abruptly and obtusely acuminate at apex (acumen 5-12 mm long), coriaceous, glabrous, glossy and dark reddish brown or brown or blackish above (when dry), brown and punctate beneath, penninerved; midrib flat or slightly raised above, slightly raised beneath; lateral nerves slender, 5-9 pairs, faint or indistinct above, prominent or faint beneath, arcuate-anastomosing towards margin; minor nerves indistinct or faint above, somewhat prominent to indistinct beneath, reticulate; petiole 3-8 mm long, 1-2 mm thick. Male inflorescences axillary,

racemiform, arising singly or sometimes 2-3-together, simple or sometimes with 1-2 branches near base compound); rachis slender, 4-11 cm long, 0.8-1.2 mm thick at base, striate, sparsely whitish pilosulous; bracts subulate or often triangular or ovate, 1-2 mm long, 0.5-1 mm broad, glabrous or sometimes sparsely white pilosulous outside, white-ciliate at margins. Male flowers: *ca* 2 mm diam.; pedicels 1.2-2 mm long, 0.2-0.3 mm thick, glabrous; calyx 4-5-segmented, *ca* 2 mm long, glabrous; segments oblong to ovate or often triangular-ovate, 1-1.5 mm long, 0.6-1.2 mm broad, obtuse; petals 4-5, inserted on the edges of the disc, alternating with the calyx segments; usually oblong, sometimes ovate, 1.2-1.5 mm long, 0.7-1 mm broad, obtuse, glabrous; disc concave, slightly fleshy, whitish-puberulous; stamens 2, free, lying side by side, inserted near the base of petals, exserted; filaments 1.5-2.5 mm long, slender, with a widened base; anthers orbicular, 0.5-0.7 mm diam.; pistillode small, with a short, filiform style. Female flowers: not seen. Infructescences axillary, 6-10 cm long, simple or often with 1-2 branches near the base (compound); rachis striate, 1-2 mm thick at proximal end, sparsely white-pilosulous. Fruits oblong-ellipsoid or narrowly obovoid, 17-20 mm long, *ca* 10 mm diam., unilocular, contracted at base, rounded or flattened at apex, brown, smooth glabrous, thin-walled, with faint ridges on surface; fruiting pedicel *ca* 3 mm long, 0.8-1 mm thick; sepals 5, oblong, 1.5-2 mm long, 0.8-1 mm broad, obtuse; disc flattened, slightly fleshy, whitish-puberulous; seeds 1 per fruit (undeveloped), attached to the base of the cavity.

Types : Hore 7236 (A: Holotype CAL; B: Isotype L; C-E: Isotypes PBL) ♂

Flowering and Fruiting : October- December*.

Distribution : INDIA : Andaman Nicobar Islands.

Herbarium specimens : INDIA: Andaman Nicobar Islands; Great Nicobar Islands, Near 35 km on East-West road, dense forest at hill top, \pm 100 m, Oct. 22, 1979, Hore 7236 (A: CAL; B: L; C-E: PBL)-♂; rare; Katchal Is., \pm 20 m, Dec. 20, 1974, Chakrabarty 2226 (Paratypes L, PBL) in fruiting fairly abundant.

Notes : According to Vasud. & Chakrab. (*l.c.*): The specimens of *Hore* 7236 A- E bore leaves alternate; flowers (male) in spikes, white, corolla yellowish, fragrant, rare & *Chakrabarty* 2226 (in fruiting) show leaves alternate; glossy green; flowers mostly in terminal cymes; fruit conical, light red, found on way to oil palm, inland forest.

The species is named in honour of Dr. H. Sleumer (Leiden) for critical comments.

Nothaphoebe nicobarica Chakrab. & Vasudeva Rao (Lauraceae) in *J. Econ. Tax. Bot.* 6 (2) : 443-444. 1985.

Tree. 29-40 m high; bark brown or deep red (*Teste collectore*); branchlets terete, 2-8 mm thick, glabrous, somewhat flattened and minutely ochraceous-pubescent when young. Leaves broadly obovate, to oblanceolate, occasionally elliptic-obovate, 8-17 cm long, 3.5-6.5 cm broad, \pm cuneate attenuate at base, entire at margins, abruptly and obtusely acuminate (acumen up to 15 mm long) to subacuminate at apex, stiffly coriaceous, glabrous, on drying blackish-green or blackish-brown above, coppery to pale brownish beneath; midrib \pm flat above, slightly raised beneath; lateral nerves 5-9 pairs, faint to somewhat prominent above, \pm distinct beneath, more or less uniformly curved, anastomosing near the margins; minor nerves indistinct to somewhat prominent above, more or less distinct beneath, reticulate; petiole 5-25 mm long, 1.5-3 mm thick, glabrous. Inflorescences axillary, also borne on the axils of fallen leaves, paniculate, up to 10 cm long, scattered ochraceous-puberulous towards apex, sparsely puberulous towards base; peduncle up to 4 cm long; bracts subulate to triangular, 0.6-2 mm long, puberulous outside, glabrous inside. Flowers: brownish-yellow or light yellow with pungent smell (*Teste collectore*); pedicels 3-4 mm long, 0.5-0.7 mm thick, densely and softly ochraceous-puberulous; perianth semiclosed, \pm 2 mm., diam., densely and softly ochraceous-puberulous outside; tepals 3 + 3, the outer broadly deltoid-triangular to deltoid-ovate, obtuse to acute, 0.5-1 mm long, 0.5-1 mm broad; the inner broadly ovate to suborbicular, obtuse, 1.5-1.7 mm long, 1-1.5

mm broad; stamens 9, triseriate, sessile; anthers 4 celled, suborbicular or squarish, ± 0.4 mm long and broad, the innermost ones extrorse; staminodes minute, puberulous; ovary ovoid, ± 1 mm long, 0.6–0.8 mm diam., glabrous, unilocular, uniovulate; style ± 0.3 mm long, with a small peltate stigma. Fruits not known.

Types : *Dwivedi* 7893 (A: Holotype CAL; B–E: Isotypes PBL).

Flowering : February.

Distribution : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA: Andaman–Nicobar Island ; Great Nicobar Island, 40 km on east-west road, Feb. 22, 1980, *Dwivedi* 7893 (A in CAL & B–E in PBL); *ibid.*, Feb. 14, 1980, *Dwivedi* 7890 (Paratype PBL).

Notes : According to Chakrab. & Vasud. (*l.c.*): Common in inland hill forest at about 20 m altitude. Closely related to *N. panduriformis* (Hook. f.) Gamble or Malaya, but distinct in the relatively smaller, stiffly coriaceous leaves, the cuneate-attenuate leaf-based, fewer lateral nerves and the longer petiole.

Nothaphoebe panduriformis (Hook. f.) Gamble var. ***paucinervia*** Chakrab. & Vasudeva Rao (Lauraceae) in *J. Econ. Tax. Bot.* 5 (4): 997–998. 1984.

Tree, 20–22 m high; branchlets brown, teretish, 3–9 mm thick, glabrous, compressed when young. Leaves broadly cuneate-obovate (often narrowly) to panduriform, 12–26 cm long, 5–14 cm broad, narrowly cordate at base, entire at margins, shortly and abruptly caudate at apex (cauda 10–15 mm long), coriaceous, glabrous, on drying blackish or brownish above, coppery beneath; midrib flat above, raised beneath; lateral nerves 7–12 pairs, somewhat prominent above, distinct beneath, arcuate-anastomosing towards the margin, often joining the superadjacents forming conspicuous loops; minor nerves indistinct to faint above, distinct beneath, scalariform, unbranched and forked; petiole 3–10 mm long, 2–3 mm thick. Inflorescences axillary, also arising from the axils of fallen

leaves, pyramidal-paniculate, 7–15 cm long, pedunculate (the peduncle 1.5–8 cm long, 1.5–3 mm thick), rusty-tomentellous towards apex, sparsely puberulous towards base; bracts triangular, 0.6–1 mm long. Flowers red and yellow (*Teste collectore*) pedicels 5–6 mm long, 0.7–1 mm thick, puberulous; perianth semi-closed, \pm 3 mm diam., rusty-puberulous; or tomentellous outside; tepals 3 + 3, the outer broadly ovate-deltoid or suborbicular, smaller than the inner, ca 1.2 mm long; the inner broadly elliptic-ovate to suborbicular, ca 2 mm long; stamens 9, triseriate, subsessile; filaments ca 0.2 mm long, rusty-pilosulous; anthers 4 celled, suborbicular or squarish, mucronate, 0.5–0.8 mm long and broad, the innermost ones extrorse; staminodes minute, densely pilosulous; ovary ovoid, ca 1.6 mm long, ca 1.2 mm diam., glabrous, unilocular, uniovulate; style ca 0.3 mm long, with a small peltate stigma. Fruits unknown.

Types : D. K. Hore 7222 (A: Holotype CAL; B–G: Isotypes PBL).

Flowering : October*.

Distribution : INDIA : Great Nicobar Island.

Herbarium specimens : INDIA: Andaman–Nicobar Islands; Great Nicobar Island, 25 km on East-West road, Oct. 17, 1979, D. K. Hore 7222 (A in CAL; B–G in PBL).

Notes : According to Chakrab. & Vasud. (*l.c.*): Differs from var. *panduriformis* in the thicker leaves with fewer lateral nerves.

The plant is rare in inland hill forest at about 100 m altitude. *N. panduriformis* was known to occur only in Malaya Peninsula hitherto and therefore, the present report of a new variety of this species from Great Nicobar Island is phytogeographically interesting.

Nothopegia beddomei Gamble var. **wynaadica** J.L. Ellis & V. Chandras. (Anacardiaceae) in Bull. Bot. Surv. India 12 (1–4): 257–258. 1970 (1972).

Small trees, up to 5 m high; young branches maroon in colour, the bark wrinkled, lenticellate and glabrous. Leaves alternate, elliptic-ovate or obovate, abruptly acuminate or caudate, attenuate

at the base, entire, sinuolatus, coriaceous or chartaceous, pale green above, pale brown to whitish beneath, glabrous, petiolate, $\pm 11.0 \times 3.0$ cm; lateral nerves 25-30 pairs, parallel, raised below, reticulations more prominent beneath; petiole maroon in colour, channelled above, twisted. Flowers unisexual; male very small, 2.0×2.0 mm, pale yellow, very shortly pedicellate, in small, sessile clusters which are disposed interruptedly on axillary, sometimes extra-axillary, short, spicate cymes, bracteate; the rachis more rusty-puberulous or pubescent when young. Calyx 4-lobed, the lobes small, $\pm 1.5 \times 1.5$ mm, broadly ovate, entire or faintly crenulate near the tip, glabrous, maroon in colour, and strongly marked with 6-7 dark parallel lines. Petals 4, pale yellow, elliptic-ovate or broadly ovate, about $1\frac{1}{4}$ - $1\frac{1}{2}$ times the length of the calyx lobe, $\pm 2.0 \times 1.5$ mm, glabrous. Stamens 4, inserted at the margin of the slightly quadrangular disc; filaments short, ± 0.5 mm long, glabrous; anthers broadly ovoid, much broader and longer than the filament, $\pm 1.5 \times 1.0$ mm, glabrous. Disc slightly 4-angular, glabrous. Female flower and fruit unknown.

Types : Ellis 27133 (A: Holotype CAL; B-D: Isotypes MH).

Flowering (Male) : April*.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala ; Cannanore District, Chandan-athode, Peria R. F., Apr. 18, 1966, Ellis 27133 (A in CAL, B-D in MH); *ibid.*, Dec. 8, 1967, Ellis 29528 A-D (Paratypes MH).

Notes : According to Ellis & Chandras. (*l.c.*) : Allied to var. *beddomei*, but differs in having the filaments glabrous and much shorter than the large anthers, the petals only about $1\frac{1}{4}$ - $1\frac{1}{2}$ times the length of the calyx lobes, and the male flowers much smaller.

This interesting variety of *Nothopegia beddomei* was collected amidst thick evergreen forests of Chandanathode, a locality situated about 25 km from Manantoddy, Cannanore District, Kerala, at an altitude of 1050 m.

Gamble (1918a, b) has dealt with seven taxa of *Nothopegia* Bl.

that occur in south India in his *Flora of the Presidency of Madras*, and has further delineated in some detail his conception of these taxa in *Kew Bulletin*. His keen observation has made him to recognise three new taxa. Two of his new species, viz., *N. beddomei* and *N. dalzelli* and the present new variety of *N. beddomei* can very easily be differentiated like this: *N. dalzelli* Gamble is characterised by: Racemes are long, up to 10 cm; flowers fairly large, $\pm 3.0 \times 3.0$ mm; sepals petals, pedicels and peduncles rusty-pubescent; filaments slightly pubescent; leaves coriaceous, elliptic-ovate to obovate, shortly acuminate, petioles very thick. In *N. beddomei* var. *beddomei*, racemes are short, less than 4 cm long; flowers rather large, $\pm 4.0-6.0 \times 2.0$ mm; sepals, petals glabrous; peduncles rusty-pubescent; filaments villous; leaves rather thick to chartaceous, elliptic-ovate to obovate, long acuminate or abruptly caudate-acuminate; petioles thin. Whereas *N. beddomei* var. *wynaadica* Ellis & Chandras. is characterised by short racemes, less than 4 cm long; flowers small, $\pm 2.0 \times 2.0$ mm; sepals, petals glabrous; peduncles faintly rusty puberulous; filaments glabrous; leaves rather thin, elliptic ovate to obovate, abruptly caudate acuminate; petioles thin.

Oberonia bisaccata Manilal & C.S. Kumar (Orchidaceae) in *Kew Bull.* 39 (1): 121-122, 1984.

A medium sized, caespitose, epiphytic herb. Leaves 5-13 \times 0.3-2 cm, equitant, jointed at base, basal ones larger, slightly falcate, yellowish green, many-nerved when dry. Inflorescence 10-14 cm long, adnate to the upper leaf, subtended by a falcate bract, sharply deflexed or decurved when young. Bracts 2 \times 1-2 mm, ovate-lanceolate, equalling the ovary, gland-dotted, margin incised. Flowers arranged in close whorls, bracteate, shortly pedicellate, pale yellow. Sepals 1.5-1.7 \times 1-1.2 mm, ovate, boat shaped, acute, nerves indistinct. Petals longer than the sepals, 2 \times 1 mm, obtuse, nerves indistinct. Lip erect, 3-lobed; side-lobes broad, obtuse; mid-lobe 3-fid, central lobule shorter and acute, side lobules longer and obtuse; basal region of lip provided with 2 deep, collateral pouches. Column very short; pollinia 2. Fruit not known.

Type : Satish Kumar SV 10738 (Holotype Herb. U. Calicut; Isotype K).

Flowering : Time not reported.

Distribution : INDIA : Kerala.

Herbarium specimen : INDIA: Kerala ; Silent valley, near dam site, 1982, C. Satish Kumar SV 10738 (Herb. U. Calicut, K).

Notes : According to Manilal & Kumar (*l.c.*): The genus *Oberonia* Lindl., comprises over 300 species distributed from South Africa through Asia to the Pacific, and has been the subject of several recent taxonomic studies (Santapau & Kapadia 1966; Seidenfaden 1968, 1978; Saldanha 1974; Dassanayake & Fosberg 1981). About 80 species are reported to occur in mainland Asia (Seidenfaden 1978).

This *O. bisaccata* is allied to *O. brunoniana* Wight and *O. sebastiana* Vivek. & Shetty but differs from both in having 2 basal pouches on the lip, a 3-fid mid-lobe a basally deflexed or recurved spike, bearing shortly pedicellate flowers; whereas both the species (*O. sebastiana* and *O. brunoniana*) have inflorescence straight or slightly falcate; lip without basal pouches and mid-lobe 2-lobulate. Further, having characters of lip with no basal disc in species *O. sebastiana* and lip with triangular basal disc in species *O. brunoniana* the difference between these two species becomes clear.

The species is found on branches of *Canarium strictum* Roxb.

Oberonia sebastiana B.V. Shetty & Vivek. (Orchidaceae) in Bull. Bot. Surv. India 17 (1-4) : 157-159. 1975 (1978).

Caespitose, pendulous epiphytic herb. Leaves about 6, outer 1.4-4.9 × 0.6-0.8 cm, inner 5.5-28 × 0.9-1.2 cm, distichous, succulent, pale green or yellowish green, laterally compressed, ensiform, acute or acuminate. Inflorescence 17-38 cm long, slightly arcuate, laxly many flowered; rachis flattened; scape 4.9-10.7 cm long, adnate to the upper leaf. Flowers ± 2.6 mm long, yellowish, subverticillate. Bracts 1.6-2 × 1-1.3 mm, little longer than and closely enveloping the ovary, ovate, irregularly erose, acute or acuminate, hyaline, sparsely gland-dotted. Sepals ± 1 × 0.6-1 mm, subequal, reflexed, broadly ovate, entire, acute, hyaline, without nerves and gland dots. Petals 1-1.2 × 0.3-0.4 mm, reflexed, oblong, subentire rounded

at apex, hyaline, without nerves and gland dots. Labellum erect, distinctly 3 lobed, broader than long, 1.4–1.75 mm long, 2.5–2.9 mm broad across the lateral lobes, hyaline, sparsely gland-dotted, mostly 3 nerved, rarely more, middle nerves short straight, side ones longer and ending near the sinus of the midlobe; lateral lobes much larger than the midlobe, encircling the column, subentire; midlobe 0.5–0.8 × 0.6–1 mm, 2 lobulate, lobules equal or unequal subentire; often with a few notches at the tip; sinus 0.15–0.25 × 0.2–0.4 mm, ovary with pedicel ± 1.5 mm long. Capsules 5–6.3 × 2–2.8 mm, oblong, shortly stalked, 6 ribbed, crowned by the marcescent perianth.

Types : B. V. Shetty & K. Vivekananthan 26480 (A: Holotype CAL; B–G: Isotypes MH).

Flowering & Fruiting : October–February.

Distribution : INDIA: Kerala, Tamil Nadu.

Herbarium specimens: INDIA: Kerala; Umaiymalai, Anaimudi slopes, 2075 m, flowering, Nov. 17, 1965, B. V. Shetty & K. Vivekananthan 26480 A (CAL and 26480 B–G MH); Umaiymalai, Anaimudi slopes, 2150 m, fruiting, Feb. 3, 1970, B. V. Shetty & K. Vivekananthan 33404 A–E; Rajamallay, 1950 m, fruiting, Feb. 2, 1970, B. V. Shetty & K. Vivekananthan 31784 A–D; Devicolam, 1550m, with flower buds, Oct. 11, 1963, K.M. Sebastine 17517 A–E; Munnar, 1564 m, fruiting, Oct. 11, 1963, N. C. Rathakrishnan 16238 A–D (all paratypes MH). Tamil Nadu: Grass hills above Iyerpadi, Anaimalai, flowering, Nov. 1901, C. A. Barber 4028 Acc. No. 50152 only (Paratype MH).

Notes : According to Shetty & Vivek. (*l. c.*): Near to *O. wightiana* Lindl., but differs in having longer inflorescence (17–38 cm) with the scape flattened and adnate to the upper leaf, and the labellum much broader (2.5–2.9 mm) than long (1.4–1.75 mm) with two large wing like lateral lobes and a small 2 lobuled midlobe.

Gunnar Seidenfaden [*Dansk Botanisk Arkiv* 25 (3): 1–125, 1968] in his work on "The Genus *Oberonia* in Mainland Asia" treats *O. wightiana* Lindl., under the sub-genus *Apotemnophyllum* Sch., in

Section III which is characterised by small or medium sized plants with leaves jointed, laterally compressed, edged, less than 100 mm long; scape and rachis thin with the flowers pedicelled. The present new species though it finds its nearest congener in *O. wightiana* Lindl., falls in Section IV of the subgenus *Apotemnophyllum* Sch., which is characterised by larger plants having leaves 100-350 mm long. In this section the new species comes close to *O. brunoniana* Wt., but differs in having longer inflorescence, thinner rachis and laxly arranged flowers with wider labellum. The species is named in honour of Late Dr. K.M. Sebastine, Botanical Survey of India.

Oberonia seidenfadeniana J. Joseph & Vajr. (Orchidaceae) in Bull. Bot. Surv. India 13 (3 & 4): 344-345. 1971 (1974).

Small, caespitose epiphytic orchid, on slender branches of small tree. Leaves distichous, jointed at base, progressively larger from base upwards; 4-7, ensiform, equitant, yellowish-green, thick, smallest ones $\pm 2.0 \times 0.4$ cm, largest ones $\pm 6-10 \times 0.7-1.3$ cm. Inflorescence 11-19 cm long with an erect scape and slightly arcuate spike. Scape compressed, as long as or shorter or longer than the terminal leaf, $4-10 \times 0.4-0.8$ cm, subtended by a small falcate bract. Spike $8-11 \times \pm 0.5$ cm, cylindric, tapering into a sterile tail. Flowers golden yellow, sessile, loosely imbricate, erect, adpressed to the axis. Bracts $\pm 3.0 \times 1.5$ mm, lanceolate, irregularly toothed at margins, shortly acuminate at tip, closely enveloping the ovary, erect, persistent, gland-dotted, puberulous. Sepals $\pm 2 \times 1$ mm, ovate, reflexed on the ovary, 1-nerved, mucronate at tip. Petals as long as or a little shorter and much narrower than the sepals, reflexed over the ovary, lanceolate, 1-nerved, obtuse. Lip erect, thick, trilobed, ± 2 mm high and ± 3.5 mm across; sidelobes $\pm 2 \times 1$ mm, oblong, rounded at tip, much larger than the midlobe, encircling the column in front, ends overlapping, 3-nerved, 3-ridged adaxially, uneven at margins, gland-dotted; midlobe small, quadrangular, erect, truncate at tip, entire (or with a shallow sinus). Column short. Capsule $\pm 7.0 \times 3.5$ mm, shortly pedicellate, with marcescent perianth, prominently 6-ribbed.

Types : Joseph 17476 (A: Holotype CAL; B-L: Isotypes MH).

Flowering & Fruiting : September*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Eastern side of Anamalai Hills, Andiparaishola, Coimbatore, 1350 m, Sept. 22, 1962, Joseph 17476 (A in CAL; B L in MH).

Notes : According to Joseph & Vajravelu (*l. c.*): This is allied to *O. platycaulon* Wt., but distinctive mainly in the midlobe of the lip being much smaller than the sidelobes, quadrangular and truncate at apex instead of being large, ovate and trilobulate.

Authors Joseph & Vajravelu pointed out, in the light of their study of specimens both herbarium and fresh collections of *O. platycaulon* Wt. with reference to Wight's Icones and original description, that the description and drawings of the specimen treated under *O. platycaulon* Wt., by Santapau & Kapadia in "the Orchids of Bombay", are more agreeing with their species than any other. Besides the single specimen is reported to have been received by them from mountains, bordering Travancore (Kerala State) from where their collections also hail. Gunnar Seidenfaden (1968) too in his account of the "Genus *Oberonia*, in Mainland Asia", expresses his doubt as to the authenticity of the identification of the specimen as follows "Neither my own, nor Wight's or Lindley's figures have much resemblance with the drawing by Santapau & Kapadia".

The specific epithet is after Gunnar Seidenfaden, in appreciation of his work on the genus *Oberonia* in Asia.

Ophiorrhiza borii Deb & Mondal (Rubiaceae) in J. Bombay Nat. Hist. Soc. 79 (2): 379-381. 1982 (1983).

Herbs small; stem erect, unbranched, ridged, puberulous, internodes 1-3.5 cm long. Leaves opposite, decussate, simple, unequally paired, petiolate; lamina 3-8 × 2-4 cm, ovate or ovate elliptic, acute, subacuminate or obtuse at the apex, entire, acute, or attenuated at the base, puberulous above and on the nerves beneath; nerves 8-10 on either side, subopposite; petioles 0.5-1 cm long, puberulous; stipules subulate with a very broad base,

sometimes bifid dividing almost to the base, 3-8 mm long, puberulous. Inflorescence terminal panicle of helicoid cymes, 2-3.5 cm across, puberulous; peduncles 1-2.2 cm long, puberulous. Flowers bracteate, bracteolate, pedicellate, 6-8 mm long, tubular, pink or white tinged with pink; pedicels 0.5-1.25 mm long, puberulous; bracts 1.5-5.5 mm long, linear, puberulous; bracteoles 1-1.5 mm long, linear puberulous. Hypanthium 1-1.25 mm × 1.2-1.5 mm, obovoid, puberulous. Calyx lobes 5, ovate lanceolate, 0.5-0.8 mm × 0.25-0.5 mm, obtuse, puberulous. Corolla 5-6.75 mm long, tube 3.75-5.5 mm long, slightly swollen at the base, ribbed, pubescent outside, villous below the throat within; lobes 5, lanceolate, 1-1.5 mm × 0.6-0.75 mm, acute at the apex, inwardly curved, strongly keeled at the back. Stamens 5, epipetalous, adnate to the corolla-tube below the middle, inserted; filaments 0.3-0.5 mm long, anthers 1.2-1.5 mm long, linear 2-lobed, 4-celled, dorsifixed, introrse, dehiscing longitudinally. Pollen grains oblate-spheroidal, semilobate in polar outline, polar axis (p) × equatorial axis (e) = 30 μ -(31 μ)-33 μ × 32 μ -(34 μ)-37 μ , 3-colporate; colpi 29 μ -32 μ × 6 μ -6.5 μ tapering to obtuse ends; ora circular, 6 μ -7 μ in diameter, distributed at the equatorial zone; exine 1.75 μ in thickness, sexine 1.5 μ nexine 25 μ , ruglo-reticulate; lumina 0.75 μ -1 μ , muri 0.5 μ -0.75 μ . Ovary 1-2 × 1.2-1.4 mm, 2-loculed, with many ovules on axile placenta; disc 0.5-0.7 mm, high, 0.6-1 mm wide, fleshy, 2-lobed; style as long as corolla, pubescent; stigma capitate, bifid, 0.3-0.4 mm × 0.2-0.3 mm, papillate exerted. Capsules (immatured) obcordate, compressed, puberulous, internally, 2-loculed.

Types : N. L. Bor 4471 (Holotype DD; Isotype K).

Flowering : June.

Distribution : INDIA: Nagaland.

Herbarium specimens : INDIA: Nagaland; Naga hill, Zulhami, about 1800 m, June 24, 1935, N. L. Bor 4471 (DD & K); Naga hill, Thekubama about 1800 m, June 19, 1935, N. L. Bor 4465 (Paratypes DD, K).

Notes : According to Deb & Mondal (*l.c.*): The species allied to *Ophiorrhiza tingens* C.B. Clarke ex Fischer and *O. treutleri* Hook. f. differing from both in subulate stipules, terminal panicle of helicoid cymes and corolla pubescent outside.

This species is described and dedicated to the collector, the late Dr. N.L. Bor.

***Ophiorrhiza caudipetala* Deb & Mondal (Rubiaceae) in Kew. Bull.37(3):483.1982.**

Herbs 15-75cm long, straggling, branching usually from the base, sometimes above; stems slender, quadrangular or ridged, pubescent. Leaves petiolate; lamina 2.5-10 × 1.5-3cm, ovate-lanceolate, acute or acuminate at apex, entire attenuate at base, with 6-9 subopposite lateral veins on either side, scabrous on the upper surface, pubescent on the veins beneath; petioles 0.5-2 cm, pubescent. Stipules 2-6mm long, linear, broader at the base, pubescent. Inflorescence terminal in corymbose helicoid cymes, 1-2.5 cm across branches subopposite, pubescent; peduncles 1-2.5 cm long elongating up to 4 cm when bearing fruits, pubescent. Flowers dimorphic, hetero-stylic pedicellate, bracteate and bracteolate, 6-8.5 mm long, white, pink or yellow; pedicels 1-1.5 mm long, pubescent; bracts and bracteoles 3-7 mm long, similar, linear, pubescent. Calyx campanulate; hypanthium 0.75-1.5 mm long; teeth 5, ovate-lanceolate, 0.75-1.5 × 0.25-0.5 mm, acute, pubescent. Corolla 5.25-7.25 mm long; tube 4-6.25 mm long, cylindrical, broader at the base, pubescent outside, with a villous ring at the throat or below inside; lobes 5, ovate or ovate-lanceolate, 1-2 × 0.75-1.5 mm acute at the apex, inwardly curved, with 0.5-1.5 mm long glandular horn at the back. Stamens 5, epipetalous; in long-styled flowers the filament is adnate at or below the middle of the corolla tube, while in short style ones it is adnate above middle of the tube raising the anthers to the throat of the corolla; filaments 0.5-1.5 mm long; anthers 1-1.75 mm long, linear, 2-lobed, dorsifixed, introrse, dehiscent longitudinally. Pollen suboblate to prolate-spheroidal, semiangular in polar outline, P (polar axis) × E (equatorial axis) = 29-30-32 × 31-(37)-39 μm, tricolporate, colpi 24 × 7 μm, tapering to acute ends; ora ± elongate, 9-10 × 7-8 μm, distributed at the equatorial zone; exine 2 μm, sexine 1.75 μm, nexine 0.25 μm, rugulo-reticulate; lumina 0.75-1 μm, muri 0.6-0.7 μm. Ovary 0.5-1.25 × 0.5-1 mm, 2-loculed with many ovules in each locule on elongated clubshaped axile

placenta; style of two sizes, either as long as the corolla tube and pubescent or 1 / 3rd of the corolla tube and glabrous; stigma 0.75

1.5 mm long, 2 lobed; lobes slightly unequal, ovate-lanceolate, acute or obtuse, warty. Nectary 0.4-0.5 mm thick, fleshy, 2 lobed. Capsule 1.5-2.5 × 3-5.5 mm, obcordate, transversely compressed, with a thickened belt at the middle, pubescent, internally 2-locular, angle of divergence of the locule with the midsepta 46°-50°, locules ovate-oblong with straight tip, dehiscing loculicidally. Seeds numerous, 5-7 angular, 0.3-0.6 × 0.3-0.4 mm, glabrous, brown; testa areolate; areole alveolate, with a thin wall and a number of globules on it.

Types : Clarke 44072 (C: Holotype CAL; E: Isotype BM; A: Isotype K).

Flowering : April-June. *Fruiting*: June-August.

Distribution : INDIA: Meghalaya.

Herbarium specimens : INDIA: Meghalaya; Khasi Hills, East Gorge below Dumpteh ± 1800 m, June 3, 1911, I. H. Burkill & Banerji 35181 (CAL); Shillong ± 1500 m, Apr. 1946, Bor 177 (DD), ± 1830 m, June 4, 1886, C. B. Clarke 44072 C (Holotype CAL), 44072A (Isotype K) & 44072E (Isotype BM) & ± 1800 m, Aug. 9, 1885, C. B. Clarke 38634A (K); Mawphlong, ± 1800 m, Apr. 15-29, 1954, Thakur Rupchand 7604 (L); Pinursla, May 8, 1958, Nayar et al. 50012 (LWG); Shillong peak, ± 1800 m, May 16, 1958, Nayar et al. 50509 (LWG).

Notes : According to Deb & Mondal (*l.c.*): The New species is closely allied to *O. treutteri* Hook. f. but differs in having corolla tube inside villous, lobe ovate-lanceolate, inwardly curved calyx dorsifixed glandular.

Ophiorrhiza chandrasekharanii Subba Rao & Kumari (Rubiaceae) in J. Bombay Nat. Hist. Soc. 81 (1): 156. 1984.

Herbs up to 32 cm tall; stems pubescent, more so towards upper region. Leaves up to 11.2 × 4.6 cm, oblong, oblong-lanceolate or ovate, membranous, scabrous above, glaucous beneath, pubescent on nerves,

shortly acuminate, narrowed at base, margins shortly ciliate; petioles up to 1.5 cm long, tomentose; stipules up to 11×3 mm, narrowly deltoid, acuminate, pubescent. Flowers white, yellow on drying, faintly scented, in axillary and terminal fulvous tomentose corymbs or subcorymbs up to 5 cm across; peduncles up to 4.5 cm long, fulvous tomentose; bracteoles up to 4 mm long, few, persistent, narrow, acute, pubescent, ciliate, midrib obscure. Calyx: tube up to 2 mm long, fulvous tomentose; lobes up to 1.5 mm long, narrow, acute, pubescent, persistent. Corolla ribbed, pubescent without, glabrous within up to 1 mm from base, the rest crispate pubescent within with a row of long white hairs bordering the glabrous portion; tube up to 9 mm long; lobes up to 2 mm long; acute stamens 5, epipetalous, included, attached at about the middle of the glabrous portion of corolla tube; anthers up to 2 mm long; filaments 1.5 mm long, glabrous. Disc epigynous, of 2 large lobes, minutely glandular. Ovary 2 loculed, ovules many on basal ascending placentas; style 2 mm long; stigma 1.5 mm long, narrowly lanceolate, acute, 2 lobed; lobes connate. Capsules up to 8×3 mm, obcordate, compressed, patently pubescent, girt by calyx limb. Seeds many, minute, angled.

Types : Subba Rao 30049 (Holotype CAL; Isotypes MH).

Flowering & Fruiting : June*.

Distribution : INDIA: Andhra Pradesh.

Herbarium specimens : INDIA: Andhra Pradesh; Visakhapatnam District, Vankachinta, June 1, 1968, Subba Rao 30049 (CAL, MH).

Notes : According to Subba Rao & Kumari (*l. c.*): This species is allied to *Ophiorrhiza fasciculata* D. Don but differs from it in having smaller leaves; sparsely scabrous upper leaf surface; much shorter petioles; shorter and narrower stipules; shorter fulvous tomentose peduncles; fewer, much shorter and sparsely pubescent bracteoles.

The specific epithet is in honour of Dr. N. Chandrasekharan Nair, Ex-Joint Director, Botanical Survey of India, Southern Circle, Coimbatore

***Ohiorrhiza nairii* Ramam. & Rajan (Rubiaceae) in J. Bombay Nat. Hist. Soc. 82(1): 174-176. 1985.**

Undershrubs; stems erect, branched, terete, densely hairy; internodes 4-12 cm long. Leaves opposite decussate, simple, unequally paired; lamina 10-15 × 4-7 cm, ovate to elliptic-lanceolate, acuminate, attenuate at base, leathery, coriaceous, very sparsely villous above, minutely villous beneath, more dense on veins; nerves 10-15 pairs; petioles 1-3 cm long, villous; stipules interpetiolar, 5-12 mm long, linear, broadly at base, bilobed; inflorescence terminal, corymb-like, flowers in each peduncle with distinct helicoid arrangement; peduncles villous; pedicels 2 mm long, hairy; bracteoles many, linear, subulate, hairy, calyx tube terete, lobes lanceolate. Corolla 1.5-2 cm long funnel shaped above, ribbed, villous within, more dense near the stamens base, less villous without, veins distinct, corolla tube lobbed. Stamens 5, inserted on the corolla tube; anthers oblong, base densely villous, dorsifixed, introrse, dehiscing longitudinally. Ovary 2-loculed, style filiform, hairy; stigma dilated into 2 lobes, distinctly lanceolate. Fruits obovoid, pilose.

Types : Ramamurthy 66561 (Holotype CAL; Isotypes MH Acc. Nos. 127789-127793).

Flowering & Fruiting : March*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Idukki District, Adimali Reserve Forest, 1800 m, Mar. 28, 1980, Ramamurthy 66561 (CAL & MH Acc. Nos. 127789-127793).

Notes : According to Ramamurthy & Rajan (*l. c.*): Allied to *O. roxburghiana* Wight but differs in: interpetiolar stipules linear, broader at base, bilobed; leaves ovate-lanceolate, larger, thick, coriaceous very sparsely villous above, minutely villous below, more dense on veins; petioles longer; inflorescence corymb-like but flowers in each peduncle with distinct helicoid arrangement; corolla tube smaller; stigma dilated into 2 lobes, distinctly lanceolate and fruits obovoid.

The specific name is given in honour of Dr. N. C. Nair, D. Sc. Ex-Joint Director, Botanical Survey of India, Southern Circle.

Ophiorrhiza pauciflora Hook. f. var. **glabra** Deb & Mondal (Rubiaceae) in J. Bombay Nat. Hist. Soc. 79 (3): 647. 1982 (1983).

Herbs 12–25 cm long; creeping at the base, branching, slender, pubescent. Leaves petiolate, 0.8–1.0 × 0.5–1.8 cm, ovate or oblong, obtuse at the apex, obtuse or slightly attenuated at the base, glabrous or with scattered short hairs above; lateral nerves 4–6 on either side, subopposite, pubescent beneath; petioles 0.3–2 cm long, pubescent; stipules 2–3 mm long, linear, entire, sometimes bifid, glabrous. Inflorescence terminal cyme, 0.5–1 cm across, glabrous. Flowers pedicellate, bracteate, bracteolate, 10–12 mm long, tubular, white; pedicels 0.5–1 mm long, glabrous; bracts 5–6 mm long, linear, with prominent midrib, acute, glabrous; bracteoles 3–5 mm long, linear, with prominent midrib, acute, glabrous. Hypanthium 0.9–1.4 × 1–1.5 mm, obovoid, glabrous; calyx lobes 0.8–1 × 0.6–0.75 mm, ovate, obtuse, glabrous. Corolla 9–11 mm long, tube cylindrical, wide at the mouth, glabrous outside, villous at the middle or slightly above within; lobes 5, ovate, 2.25 × 1.25–2 mm, acute, glabrous. Stamens 5, epipetalous, adnate either above the base or above the middle of corolla, inserted; filaments 0.5–0.75 mm or 1–1.3 mm long, glabrous; anthers 1.25–1.3 mm long, linear, glabrous, bilobed, dorsifixed, introrse, dehiscent longitudinally. Ovary 0.8–1.2 × 0.75–1.25 mm, obovoid, 2-locular, with many ovules in each locule on axile placenta; disc 0.5–0.7 mm high, fleshy, 2-lobed; style either as long as or 1/3rd of corolla tube, glabrous; stigma 2-lobed, 0.5–0.6 mm long and lobes ovate or 0.8–1.3 mm long and lobes ovate-lanceolate.

Type : F. Kingdon Ward 8148 (Holotype K).

Flowering : May*.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimen : INDIA: Arunachal Pradesh; Lohit District, Debi valley (28° 20' N & 96° 37'E), 1500–1800 m, May 3, 1928, F. Kingdon-Ward 8148 (K).

Notes : According to Deb & Mondal (*l.c.*) : Differing from the typical variety in glabrous cyme as well as floral parts and longer flowers.

One flower shows 6 stamens and minute style and stigma; style as long as the height of disc and stigma 0.5 mm long.

Ophiorrhiza seshagiriana Sikdar & Maiti (Rubiaceae) in J. Bombay Nat. Hist. Soc. 78(1-3): 143-145. 1981.

Plant erect, herb to undershrub, stem woody, glabrous, younger part pruinose. Leaves in unequal opposite pair, lanceolate, 5-11 × 1.5-3 cm, base acute, either equal or unequal ends apex, narrowly acuminate, entire, glabrous, greyish beneath, secondary nerves 5-9 pairs; petiole, 5-8 mm long, glabrous. Stipules subulate linear from a broad base, 3 mm long, caducous. Cyme mostly terminal, rarely axillary 1.5-3.5 cm across, with short raceme-like branches having 5-10 flowers; lateral peduncle pruinose. Flowers 5-merous, 10-11 mm long, tubular with reflexed lobes at blooming, glabrous, white; pedicel short, about 1 mm long, pruinose; bracts and bracteoles subulate linear, 1-2 mm long, persistent in fruit. Calyx cupular, 1.2-1.3 mm long, 5-ribbed, lobes triangular-ovate, acute, glabrous. Corolla tubular, tube 5-6 mm long, cylindrical, non-bulbous glabrous-hairy within above anther lobes up to throat, hairs about 1 mm long; lobes linear-oblong, 4-4.5 mm long, veins conspicuous, apex keeled inside, pruinose within but glabrous outside. Stamens 5, introrse, filament attached 2 mm above from the base, about 0.7 mm long, anthers linear-oblong, about 1.2 mm long, yellowish. Ovary 2-celled, style extrorse, filiform, 7-8 mm long, hairy towards base; stigma clavate, 0.4 mm, bilobed. Capsule (immature) obcordate, about 3.5 × 2.8 mm, compressed, divaricate, glabrous. Seeds unknown.

Types : J. K. Sikdar 4681 (A: Holotype CAL; B-E: Isotypes CAL).

Flowering : May.

Distribution : INDIA: West Bengal.

Herbarium specimens : INDIA: West Bengal; Jalpaiguri District, Buxaduar Forest Range, on the way to Sinchu from Buxaduar, ± 1800 m, May 16, 1976, J. K. Sikdar 4681 A-E (CAL).

Notes : According to Sikdar & Maiti (*l.c.*): It is related to *O. heterostyla* Dunn but can be differentiated by its erect habit, cymes

with short raceme like branches, shorter pedicel, triangular-ovate, glabrous calyx lobes, cylindric non-bulbous corolla tube and shorter anther lobes.

This taxon is very easily recognisable by the presence of reflexed corolla lobes at blooming which is also seen in *O. heterostyla* Dunn, the only other representative of Indian *Ophiorrhiza*. In *O. heterostyla* Dunn heterostylous nature is of common occurrence while in this taxon is not visible. A synonym of *O. heterostyla* Dunn., in H.B. Naithani, Fl.Pl. India, Nep. Bhutan.

Grows in shady moist situation along rocky forest paths.

This species is named in honour of Prof. Rolla Seshagiri Rao, Ex-Joint Director-in-Charge, Botanical Survey of India and now Prof. and Head of the Department of Botany, Andhra University, for his valuable contributions to Indian Botany.

***Ophiorrhiza talevalliensis* G.D. Pal & G.S. Giri (Rubiaceae)**
in J. Bombay Nat. Hist. Soc. 87(3): 433-435. 1990 (1991).

Erect or suberect herbs, 20-45 cm high, rarely decumbent, rooting from the lower nodes, unbranched or branching at ground level. Stems terete, fleshy or the lower part woody or subwoody, somewhat compressed, glabrous or dirty brownish verrucose; internodes 3-6 cm long, nodes slightly swollen. Leaves opposite decussate, ovate-elliptic, elliptic or elliptic-lanceolate (1.5-) 5.0-8.0 (-11.0) × (1.0-) 2.0-2.5 (-3.5) cm, base usually acute to cuneate, rarely subrounded; apex acute to acuminate; margin entire; membranous; 6-9 (-12) nerves arise from either side of the midrib, oblique, reticulations not prominent; both surfaces glabrous or slightly verrucose on the nerves beneath; upper surfaces dark brown and lower surfaces remain brownish-green or turn light brown on drying; petioles slender (0.5-) 0.8-1.8 (-3.0) cm long, glabrous or brownish verrucose. Inflorescence terminal cymose panicle, usually unbranched or rarely dichotomously branched, up to 3 cm across, 4-8 flowered. Flowers usually in pairs and rarely unpaired, milky white; peduncles 1.5-5.0 cm long, verrucose; lower bracts leafy, lanceolate, 18-23 × 2.5-4.0 mm, base cuneate, apex acute,

uninerved, glabrous; upper bracts smaller, linear, up to 10 mm long; outer flowers bracteolate, inner flowers bracteolate or ebracteolate, bracteoles linear, 5-8 mm long, uninerved; pedicels up to 2 mm long for paired flowers and 3-5 mm long for unpaired flowers, glabrous or verrucose. Calyx-tube globose or trapezoid, c 2 mm across, prominently costate, costa often decurrent to the pedicels, glabrous or verrucose; lobes 5, usually equal, rarely unequal, narrowly oblong with acute or acuminate apex, 1.0-1.75 mm long, uninerved, glabrous. Corolla narrowly campanulate, up to 2.5 cm long; tubes 1.75-2.0 cm long, 6-8 mm across towards the throat, glabrous without, plumose hairy in the form of a ring from the throat downward about a length of 4-5 mm, hairs bright yellow; lobes 5, ovate, acute, 4-5 × 3.5-4.5 mm, slightly dilated or reflexed, prominently keeled, glabrous. Stamens 5, inserted near the throat of the corolla tube; filaments c 1 mm long, glabrous; anthers embedded within the plumose ring of hairs, oblong, c 2.5 mm long, dorsifixed, distinctly bilobed, lobes narrow at base, longitudinally dehiscent. Disc c 0.5 mm high. Ovary inferior, globose, glabrous; styles 1.0-1.25 cm long, glabrous, included within the corolla-tube and remain below the level of plumose hairs; stigma flat, bilobed. Fruits unknown.

Types : G. D. Pal 77660 (Holotype CAL; Isotype ARUN).

Flowering : April-May.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Lower Subansiri District, Pange Tale Valley Road, Tale valley, 2900 m, Apr. 16, 1980, G. D. Pal 77660 (CAL, ARUN); Pange, 2240 m, Apr. 19, 1980, G. D. Pal 77735 (Paratype ARUN).

Notes: According to Pal & Giri (*l. c.*): *Ophiorrhiza talevalliensis* is an elegant species that grows along the roadside under shade or on the moist forest floor over thick humus. This new taxon is closely allied to *O. bracteata* Korth., but can be differentiated by its glabrous habit, ovate-elliptic to elliptic-lanceolate leaves with acute to cuneate base, larger flowers (up to 2.5 cm long) with corolla tube 1.8-2.0 cm long, tubes densely pilose near the throat within and styles remain below the level of plumose hairs; whereas in the latter species, the stem is pilose and leaves oblanceolate with gradually

tapering base; pedicels rufo-puberulous, flowers smaller (up to 1.8 m long) with corolla tube 1.0 1.25 cm long, tubes two-third hairy from the base upward and styles exceeding the level of plumose hairs.

The new taxon also comes closer to *O. wattii* Fischer, but *O. wattii* is characterised by more or less puberulous habit, larger leaves with caudate apex, smaller flowers (up to 1.3 cm long) with tube pubescent at the middle third within, stamens inserted at the middle of corolla- tube with longer filaments (3.5 5.0 mm long).

Ophiorrhiza tirunelvelica A.N. Henry & Subr. (Rubiaceae) in Bull. Bot. Surv. India 12 (1 4): 277 278. 1970 (1972).

Much branched, decumbent herbs, somewhat woody at base; stems slender, minutely rusty-puberulous. Leaves up to 8.4 × 3.2 cm, linear-lanceolate to elliptic-lanceolate, membranous, glabrous above, glaucous beneath (nerves somewhat puberulous), shortly acuminate at apex, narrowed at base; petioles up to 2.4 cm long, minutely rusty-puberulous; stipules interpetiolar, caducous. Flowers secund on branches of axillary or terminal, solitary, rusty-puberulous cymes; peduncles up to 5 cm long, slender. Calyx-lobes 5, small, persistent. Corolla white, tubular, throat densely hairy; tube 5 6 mm long; lobes 5, each 3 4 × 1 mm, ovate-oblong, acute or shortly acuminate, recurved. Stamens 5, inserted on corolla tube, included; filaments slender; anthers linear. Disc epigynous, glandular, of 2 large lobes. Ovary 2 celled; ovules many on basal ascending placentas; style filiform; stigmas 2, flattened. Capsules 2 3 × 4 5 mm, obcordate, compressed, coriaceous, puberulous, girt by calyx-limb. Seeds minute, angled.

Types : Henry 17419 (A: Holotype CAL; B F: Isotypes MH).

Flowering & Fruiting : September*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Tirunelveli District., Upper Godaiyar, Sept. 2, 1963, Henry 17419 (A in CAL, B F in MH); *ibid.*, Henry 17422 A F (Paratypes MH).

Notes : According to Henry & Subr. (*l.c.*): This species is probably allied to the malayan *Ophiorrhiza rosacea* Ridley; specimens mentioned above have not been matched with any of the *Ophiorrhiza* species as represented in MH, CAL, LE and K.

Osbeckia abrahamii G.S. Giri & M.P. Nayar (Melastomataceae)
in *J. Bombay Nat. Hist. Soc.* 81 (2): 434-436. 1984.

Erect, unbranched or rarely branched herb, up to 1 m tall; stem terete, thick more or less fleshy, hollow, covered with short, rigid hairs, hairs at nodes sometimes larger. Leaves simple, opposite, elliptic or elliptic-lanceolate (3.0-) 4.5-6.5 (-8.0) × (1.2-) 1.5-2.5 (-2.8) cm, base acute to cuneate, apex acute to shortly acuminate, margin entire, main nerves (3-) 5-7, all arising from the base, cross nervules inconspicuous above, prominent beneath; both surfaces covered with short, stiff, subappressed to ascending hairs, hairs on the nerves beneath usually longer, bristly and often appear in groups, becomes dull green to brownish on drying, chartaceous; petioles (3-) 5-9 (-12) mm long, appressed hairy. Inflorescence axillary or terminal, few-flowered short panicle, bracts orbicular, broader than long 2.0-4.0 × 3.5-5.5 mm, appressed hairy above, glabrous beneath, sometimes series of bracts remain persistent on the peduncle. Flowers bisexual, 5-merous, sessile or with a very short pedicel of about 1 mm long. Calyx-tube broadly urceolate, (4.0) 5.0-7.0 (-8.0) × (3.0) 3.5-5.5 (-7.0) cm, densely covered with flat, stellate or very slightly stalked emergences, often intermixed with bristles, hairs on the emergences arise with a downward fashion, brownish. Calyx-lobes 5, distinctly asymmetrical, truncate, broader than long, 2.0-3.5 × 2.5-4.2 mm, unequally two lobed at apex, midrib distinct, patent hairs and emergences occur on the midrib dorsally, otherwise glabrous, long ciliated at margin, deciduous. Intersepalal emergences with a terete stalk and stellate head and tuft of bristles, deciduous. Petals 5, obovate, 16.0-20.0 × 12.0-14.0 mm, ciliated at margin, pink or purple in colour. Stamens 10, equal, filaments 6.0-8.0 mm long, glabrous; anthers twisted, 6.0-7.5 mm long, including a small narrow beak, pore apical, large, connective produced into a small indistinctly lobed collar. Ovary 5.0

7.0 mm long, nearly 1/3 adnate to the calyx-tube, free apical part densely covered with brownish appressed hairs, true crown of bristles; style 16-19 mm long, glabrous, curved, swollen below the punctate stigma. Capsules 7.0-9.0 × 4.5-5.5 (-7.0) mm, broadly urceolate, free portion of the capsules slightly exposed or remain enclosed by the calyx-tube. Seeds small, muricate.

Type : Narayanaswami 1379 (Holotype CAL).

Flowering : August-October. *Fruiting* : September-December.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Travancore, Narayanaswami 1379 (CAL); *ibid.*, Narayanaswami 1707; Silent valley, Palghat District, 875 m, Oct. 11, 1965, Vajravelu 26161; Koni, Travancore, Rama Rao 536; Trichur, Tumbermughi, 75 m, Sept. 12, 1976, Ramamurthy 48476.

Notes : According to Giri & Nayar (*l. c.*): This species is related to *O. aspera* (L.) Blume, but can be easily distinguished by the calyx-tube being densely clothed with stellate emergences, orbicular bracts, asymmetrical calyx-lobes, thick, hollow stems and setose pubescent leaves; whereas in *O. aspera*, calyx-tube is sparsely covered with patent hairs or bristles and without emergences; bracts elliptic with acute or sharply pointed apex, calyx-lobes symmetrical and the stems slender with sparsely pubescent leaves.

O. travancorica Bedd. ex Gamble was reduced to a variety under *O. aspera* by Hansen (1977), where he remarked that the variety is distinguished by the asymmetrical calyx-lobes and curved, strong, prickly bristles on the stem. But *O. travancorica* Bedd. ex Gamble is a different species. On examining the type, verifying the protologue and drawing by Gamble on the type material (Wight 1100), it is seen that, the stem is distinctly covered with downwardly curved, strong, prickly bristles; calyx-lobes not asymmetrical, rather broadly triangular with obtuse or slightly emarginate apex. Whereas in *O. abrahamii*, the stem is covered with very short, rigid and appressed hairs, calyx-lobes broader than long, truncate and typically asymmetrical.

The species is named after Prof. A. Abraham, formerly Professor

of Botany, University of Kerala, Director of Botanic Gardens, Trivandrum, for his contributions to the systematics of the Orchid and Ferns flora of peninsular India.

Osbeckia arunkumarensis M.P. Nayar & G.S. Giri (Melastomataceae) in J. Bombay Nat. Hist. Soc. 81 (2): 436-439. 1984.

Annual, erect, unbranched or rarely branched herb, up to 1.5 m high; stems and branches strongly quadrangular and distinctly winged; densely covered with short rigid appressed or subappressed hairs, hairs on the wing usually longer, older part sometimes become glabrate. Leaves simple, opposite, sub-sessile, thinly coriaceous, ovate to ovate-elliptic or rarely ovate-oblong (6-) 8-14 (-21) × (2.5) 3-4 (-7) cm, base subrounded to subcordate, apex acute to shortly acuminate, margin setosely ciliate, recurved or not, 5-7 nerved, cross-nervules arising from the mid-rib with somewhat a curved nature, other nervules arising from the mid-rib with some what a curved nature, other nervules more or less straight and parallel, nerves and nervules impressed above, raised beneath, upper surface sparsely to densely appressed hairy, hairs short, rigid, lower surface sparsely hairy but long appressed hairs occur on nerves and nervules of lower surface, upper surface turns dull green to black and lower surface becomes brown on drying; petioles (0.5-) 2-3.5 (-5) mm long, appressed hairy. Inflorescence axillary or terminal, usually a many-flowered, lax, cymose panicle, bracts broadly ovate, 2.5-4.5 × 2-4 mm, ciliated at margin, dorsally glabrous or with few patent hairs. Flowers bisexual, 4-merous, sessile. Calyx tube urceolate, 7-8 × 3.0-3.5 mm, adnate to the ovary, glabrous, usually with longitudinal striations. Sepals 4, oblong, acute, 5.5-8.0 × 2.5-4.0 mm, midrib distinct, long ciliated at margin, few to many patent hairs occur on dorsal surface, particularly on the midrib, otherwise glabrous, deciduous. Intersepal emergences with a distinct stalk of 2-4 mm, terminated by a bristle and not with a stellate head, few patent hairs occur on the stalk at the base or near the middle, deciduous. Petals 4, bright mauve or dark to light violet, obovate, 16-18 × 10-14 mm, finely ciliated at margin. Stamens 8, equal; filaments filiform, 6-9 mm long, glabrous, anthers 'S' shaped, 6-9 mm long including a narrow beak, pore small, oblique on the

ventral side at the tip, connective extended into a small collar, collar more or less trilobed, lateral lobes not prominent, anthers not twisted. Ovary nearly 1/2 adnate to the calyx-tube, free portion glabrous or sparsely hairy on the upper part, anther pockets extending nearly to the base of the ovary, ovary glabrous at the top or sometimes with few soft hairs forming an indistinct crown, the hairs deciduous; 4-loculed, placentation axile; style slender, 16-20 mm long, glabrous, slightly swollen below the punctate stigma. Capsules up to 8 mm long, without a crown of bristles at the apex; calyx tube in fruiting condition with a long neck, 12-15 (-18) × 5-7.5 mm, glabrous, whitish with minute black spots. Seeds minute, muricate.

Type : Griffith, Kew Distrib. No. 2248 (Holotype CAL).

Flowering & Fruiting : June-September*.

Distribution : INDIA: Sikkim, Assam, Meghalaya & Bengal; NEPAL.

Herbarium specimens : INDIA : Sikkim; East Himalaya, Griffith, Kew Distrib. No. 2248 (CAL); Sikkim Himalaya, 1875, G. King s.n. Assam: Matharguri to Jongram Route, July 12, 1957, R. S. Rao 10022; Between Dudhnai and Rangguli, Goalpara District, June 25, 1964, R. S. Rao 39113. Meghalaya: Shillong, 1368 m, Aug. 18, 1885, C. B. Clarke 38896E; Khasia, G. Mann s.n. (CAL 171971). Bengal: N. Bengal, Sikkim Terai, 9.68, S. Kurz s.n. (CAL 172004); without precise locality, Sine Coll., s.n. (CAL 171981). NEPAL: Napalja inferior, 1882, [*O. compestris* Ham. in Wall. Num. List. No. 4063 (*nom.nud.*)].

Notes : According to Nayar & Giri (*l.c.*): The new taxon is allied to *O. stellata* but differs from it in having branches distinctly winged, leaves subsessile; calyx-tube glabrous; intersepalal emergences terminated by a bristle. Stellate head absent; capsules without a crown of bristle at the apex. The species *O. stellata* on the other hand is characterised by: branches not winged, leaves petiolate; calyx-tube sparsely to densely covered with stellate or glandular emergences and simple hairs; intersepalal emergences usually with a stellate head; capsules with a distinct crown of bristles at the apex.

Hansen (Ginkgoana, 4: 28. 1977), merged the following taxa and kept them as synonym under *O. stellata* var. *rostrata* (D. Don)

Hansen. These are: *O. campestris* Ham. ex Wall., Num. List. Pl. 143, No. 4063, 1831 (*nom. nud.*) *O. pulchella* Benth. ex Wall. Num. List. Pl. 143, No. 4059 (*nom. nud.*) -*Ceramicalyx pulchellus* Blume, Mus. Bot. Lugduno Batavum 1 : 50. 1849 (Type material : Wallich 4059B) *O. rostrata* var. *pulchella* Triana, trans. Linn. Soc. London 29: 54. 1972 (*nom. nud.*).

The authors (*l. c.*) had the opportunity to examine all the types for the plants referred to above. A critical study support Hansen (1977) in his reduction of *O. pulchella* Benth. ex Wall. Num. List. Pl. 143, No. 4059. 1831 (*nom. nud.*) and *C. pulchellus* Blume, Wallich 4059B to *O. stellata* var. *rostrata* (D. Don) Hansen. But *O. campestris* Ham. ex Wall., Num. List. Pl. 143, No. 4063. 1831 (*nom. nud.*) is specifically distinct and can be easily distinguished as mentioned earlier.

This beautiful species is named in honour of Professor Arun Kumar Sharma, University of Calcutta, for the contribution he has made in the field of cyto-taxonomic studies of Indian plants.

Osbeckia darjeelingensis G.S. Giri & M.P. Nayar (Melastomataceae) in Bull. Bot. Surv. India 25 (1- 4): 241- 243. 1983 (1985).

Erect, branched herbs or small shrubs, stems hexangular, sometime, compressed more or less hollow, densely covered with short, rigid appressed hairs. Leaves opposite, sometimes 3 or 4 in whorls also occur, linear or linear-lanceolate (8.0-) 12.0-15.0 (-18.0) × (0.8) -1.4-2.0 (-2.7) cm, base acute, apex acuminate, margin entire, slightly recurved or not, nerves 5, of which 3 much distinct and impressed above, the marginal 2 inconspicuous on the upper surface and often remain as a small line on the lower surface; both surfaces glabrous or very sparsely scattered small, rigid hairs occur near the margin, small appressed hairs occur on the nerves beneath, nervules inconspicuous above, more or less prominent beneath, both surfaces become dull green to reddish black on drying, chartaceous; petioles (4.0-) 6.0-9.0 (-11.0) mm long, canaliculate, shortly appressed hairy. Inflorescence terminal or axillary panicle; bracts broadly ovate, 4.0-8.0 × 3.5-6.5 mm, acute or obtuse at apex,

margin long ciliated, dorsally sparsely appressed hairy or glabrous, ventrally glabrous, sometimes series of bracts enclosing the basal part of flowers, usually deciduous, rarely persistent. Flowers bisexual, actinomorphic, 4 merous, bright purple, very showy; subsessile or with very short pedicels, fruiting pedicels 1.0–3.0 mm long. Calyx-tube urceolate, sparsely covered with emergences, emergences with a very short terete stalk, 2–4 patent hairs at or near base and a long gland at apex; sometimes patent hairs occur but are always restricted to the base of the calyx-tube. Calyx-lobes 4, oblong-acute to triangular, 4.5–5.0 × 1.5–1.75 mm, long ciliated at margin, midrib distinct, patent hairs and bristles occur only on the midrib, otherwise glabrous, deciduous. Intersepal ar emergences with a terete stalk of 2.0–2.5 mm long, patent hairy along its length, terminated by a strong bristle, stellate head absent. Petals 4, obovate 14.0–18.0 × 9.0–14.0 mm, ciliated at margin. Stamens 8, equal, filaments filiform, 6–8 mm long, glabrous, anthers narrowly oblong 7–8 mm long including a narrow beak, not twisted, pore single, round at apex. Ovary 5–6 mm long, nearly 1/3 adnate to the calyx tube, free portion sparsely appressed hairy, true crown of bristles absent; style 15–20 mm long, glabrous, stigma punctate. Capsules 7.0–10.0 × 4.5–6.0 mm, remain enclosed by the urceolate calyx-tube. Seeds many, small, muricate.

Types : Gamble 7597 (A: Holotype CAL; B: Isotype CAL).

Flowering : October–December. *Fruiting* : November–February.

Distribution : INDIA: West Bengal, Sikkim.

Herbarium specimens : INDIA: West Bengal; Darjeeling Tarai, Panchuai, Oct. 29, 1876, Gamble 20513 (CAL); *ibid.*, Gamble 28021 (CAL); Darjeeling, Jhenaikuri, Dec. 1879, Gamble 7597 (A: CAL; B: CAL); N. Bengal, Siliguri, Oct. 27, 1868, Kurz s.n. (CAL); Buxa Res., W. Duars, Jan. 1880, Gamble 7671 (CAL). Sikkim: Tarai, Ribu s.n. (CAL); Mahanadi, Tarai, 2–400 ft., Dec. 13, 1910, Ribu & Rhomoo s.n. (CAL); Sikkim, J.D. H. s.n. (CAL); without Presice locality Narayanaswami s. n. (CAL).

Notes : According to Giri & Nayar (*l. c.*): Allied to *O. stellata* Ham. ex Ker-Gawl but differs from it in having stem hexangular;

leaves linear to linear lanceolate, 3-5 nerved, both surfaces nearly glabrous; calyx tube sparsely covered with gland-tipped emergences; intersepalar emergences terminated by a strong bristle, stellate head absent; fruiting calyx 10-12 mm long; capsules without a distinct crown of bristles at apex whereas in *O. stellata* stems are subquadrangular; leaves ovate-lanceolate to ovate-oblong, usually 7 nerved, both surfaces densely strigillose with short appressed hairs; calyx-tube densely covered with stellate emergences without glands; intersepalar emergences terminated by a stellate head; fruiting calyx 13-20 mm long; capsules with a distinct crown of bristle at apex.

Osbeckia mehrana G.S. Giri & M.P. Nayar (Melastomataceae)
in Kew Bull. 41 (2): 429-431. 1986.

Erect, much branched, woody shrubs, \pm 3 m high; branches subquadrangular, densely covered with long, soft brownish ascending or subpatent hairs, particularly the younger parts, older branches sometimes becoming hispid or rarely glabrate due to falling of the hairs, leaves (1.5-2.8-3.5 (5.2) \times (0.8-) 1.5-1.8 (-2.5) mm, base cuneate to subrounded, apex acute, margin entire; nerves 5, distinctly impressed above, raised beneath, marginal pair often remaining obscure, lateral nerves obscure on the upper surface; both surfaces densely covered with ascending to subpatent hairs, hairs on the nerves beneath longer and often occurring in groups, lines of crystalliferous cells distinct above, usually unbranched, indistinct or absent, beneath; both surfaces turn dull green to greyish green on drying, chartaceous; petioles (5-) 8-12 (-14) mm long, puberulous. Inflorescence a short axillary or terminal panicle, the panicle sometimes remaining so condensed that the flowers appeared to be in fascicle; bracts small, 2-2.5 \times 1.8-2 mm, ovate, caducous, dorsally covered with long ascending hairs, margin ciliate. Calyx tube 4-5 \times 3.8-4 mm, densely covered with long, simple, ascending hairs, hairs at the bottom of the calyx tube curved, emergences absent. Sepals 5, 2-2.5 \times 1.25-1.5 mm, triangular, midrib \pm prominent, margin long-ciliate, few long patent hairs occurring on the midrib dorsally, otherwise glabrous. Intersepalar emergences with a short rectangular naked stalk and a stellate head, 1-1.5

mm long, head with many stiff hairs or bristles. Petals 5, pink, obovate, 12–14 × 7–8 mm, finely veined, margin ciliate. Stamens 10, filaments 4–5 mm long, glabrous, anthers 5–5.5 mm long including a short narrow beak, pore single, oblique, ventral, connective extended back to a small collar, bilobed. Ovary 3.5–4 mm long, adnate to the calyx tube, anther pockets extended below the middle, free upper part densely covered with long ascending hairs, true crown of bristles absent; style 14–16 mm long, glabrous, distal and thickened, curved, stigma capitate, minutely papillose. Capsules enclosed by the calyx tube. Fruiting calyx 5–7 × 4.5–6.5 mm, sparsely to densely covered with stiff hairs, prominently ridged. Seeds small, muricate.

Types : Mohnan 61706 (Holotype CAL, Photo K; Isotype MH).

Flowering : January–April. *Fruiting* : April–June.

Distribution : INDIA: Tamil Nadu, Kerala.

Herbarium specimens : INDIA: Tamil Nadu; Tinnevely District, Kannikatti to Kalivayalpil, May 31, 1901, Barber 3008 (CAL, K); Agastiamalai, May 22, 1901, Barber 2919 (CAL); Naterikal, 1216 m, Feb. 13, 1913, Hooper & Ramaswami 38520 (CAL, MH) & *ibid.*, Ramaswami 38517 (CAL). Kerala ; Trivandrum District, towards Chemungi, ± 1200 m, Mar. 8, 1979, M. Mohnan 61706 (CAL, photo K, MH); Near Natarikal, Travancore boundary, Mar. 4, 1917, *sine coll.* No. 14492 (MH 21111, 21121). Poonkulam, on the way to Agastyarkudam, 1600 m, Mar. 5, 1980, Mohnan 115996 (MH).

Notes : According to Giri & Nayar (*l. c.*): The species is closely allied to *O. gracilis* Bedd., but can be easily distinguished by dense long hairs on stem, leaves and calyx tube, leaves elliptic with 5 nerves, petioles long (8–12) mm, fruiting calyx tube usually longer than the capsules whereas in *O. gracilis* Bedd., the stem, leaves and calyx tube are thinly covered with short rigid hairs, the leaves linear-lanceolate, 3-nerved, the petioles small (4–8) mm, and the fruiting calyx tube is shorter than the capsules.

The species is named after Prof. P. N. Mehra for his outstanding contribution to the knowledge of Indian Flora.

Osbeckia nayarii G.S. Giri (Melastomataceae) in J. Econ. Tax. Bot. 4 (2): 609-611. 1983.

Erect, branched herb; stem and branches strongly quadrangular and distinctly winged glabrous throughout. Leaves simple, opposite, chartaceous, ovate-elliptic to ovate-lanceolate, (6-) 11-15 (-19) × (2.5-) 2.8-3.8 (-6.5) cm, base cuneate to subrounded, apex acute to acuminate, margin entire, shortly and distantly ciliated, recurved or not, usually 5-nerved, cross-venules arising from the midrib with somewhat a curve nature, other venules more or less straight and parallel, nerves and nervules distinctly impressed above and raised beneath, glabrous on both surfaces or rarely few short appressed hairs occur on the nerves beneath, both surfaces become dull green to black on drying; petioles (3-) 5-10 (-18) mm long, glabrous, strong, canaliculate. Inflorescence axillary or terminal, usually a few-flowered condense panicle; bracts ovate, acuminate 7-9 × 3-4 mm, margin shortly hairy, otherwise glabrous. Flowers bisexual, 4-merous; pedicels 1-2 mm long, glabrous. Calyx tube long, urceolate (8-) 10-14 (-16) × 4-5 (-6) mm, glabrous, smooth. Sepals 4, broadly triangular with a somewhat constricted base, 8-10 × 2.4-4.5 mm, margin with very short and rigid hairs, otherwise glabrous, deciduous. Intersepal emergences rudimentary, remain only as a simple hair, 0.5-0.75 mm long, without patent hairs at the base, deciduous. Petals 4, broadly obovate or obovate-oblong 20-28 × 18-23 mm, nerves distinct; margin sparsely ciliated on the upper part. Stamens 8, equal; filaments filiform, 12-16 mm long, glabrous; anthers 18-22 mm, including a long narrow beak, pore small, oblique, not twisted, connective extended into a small collar, collar irregularly lobed. Ovary 1/2 adnate with the calyx tube, free part glabrous, apex without a crown of bristles or hairs, anther pockets extended nearly to the base of the ovary, ovary 4-loculed, placentation axile; style slender 22-26 (-30) mm long, glabrous, somewhat swollen below the punctate stigma. Capsules 8-10 mm long, without a crown of bristles at the apex; fruiting calyx-tube with a distinct long neck, neck widened at the top (15-) 18-20 (-22) mm long, glabrous. Seeds small, muricate.

Type : C. B. Clarke 44776A (Holotype CAL).

Flowering & Fruiting : September*

Distribution : INDIA: Meghalaya, Assam.

Herbarium specimens : INDIA: Meghalaya; Khasia, *G. Mann* s. n. (CAL- 172003); *ibid.*, 2000 ft, Sept. 14, 1886, *C. B. Clarke* 44776A (CAL). Assam: Pantung forest, Apr. 5, 1938, *K. Biswas* 4119; *Jenkins* s.n. Bengal Or. 4000 ped, *J. D. H. & T.T.* s.n. (CAL- 17005).

Notes : According to *Giri (l.c.)*: The species is closely related to *O. stellata* Ham. ex Ker. -Gawl., but can be easily distinguished by stem and branches distinctly winged; glabrous; leaves glabrous on both surfaces; calyx-tube glabrous; capsules without a crown of bristles at the apex; intersepal emergences rudimentary, remain only as a small hair. The allied species *O. stellata* is characterised by: stem and branches not winged, hairy; leaves densely to sparsely hairy on both surfaces; calyx tube sparsely to densely covered with emergences and patent hairs; capsules with a distinct crown of bristles at the apex; intersepal emergences with distinct stalk and stellate head.

The specific epithet is given in honour of Dr. M. P. Nayar, Jt. Director, Botanical Survey of India who has contributed a lot to the understanding of Melastomataceae of Asia.

Oxyspora senguptae Subr. & M.P. Nayar (Melastomataceae) in Bull. Bot. Soc. Beng. (J. Sen Mem. Vol.) P. 411. 1969.

Shrub. Branches terete or subterete, densely hirsute, hairs 1 1.5 mm long. Leaves opposite, equal or sub equal, ovate or ovate lanceolate, 6 8.5 × 3 4 cm, base obtuse or subtruncate, apex cuspidate, margin crenate-ciliate, upper surface sparsely hairy to glabrescent, nerves and veins on the under surface densely hairy, hairs 1 1.5 mm long, nerves 5, transverse nerves distinct on the upper and lower surfaces, chartaceous; petioles 6 16 mm long, densely hairy. Inflorescence terminal, paniculate, 12 20 cm long minutely puberulous. Flowers 4 merous; pedicels 0.8 1 mm long, calyx tube campanulate, 4 4.5 mm long, sparsely puberulous, 8

costate, 4 lobed; lobes triangular, 0.5-0.8 mm long. Petals 4, elliptic-ovate, 6-6.5 × 3-3.5 mm, apex abruptly acuminate. Stamens 8, pro-minutely unequal; large stamens; filaments 5.5-6 mm long; anthers linear-lanceolate, 5.5-6 mm long, curved, 1-porate, base bi-lobed; connective not produced at the base, ventrally in appendiculate, dorsally minutely tuberculate, tubercle 0.5 mm long; small stamens; filaments 4 mm long; anthers linear-oblong, 3-3.5 mm long; connective not produced at the base, ventrally in appendiculate, dorsally minutely tuberculate, tubercle 0.3 mm long. Ovary concrescent with the calyx tube by 4 septa, extra-ovarial chambers 4; style filiform, 11-12 mm long, glabrous; stigma punctiform.

Types : Herb. Econ. Bot. No. 114 (A: Holotype CAL; B: Isotype CAL).

Flowering : October.*

Distribution : INDIA: Meghalaya.

Herbarium specimen : INDIA: Assam; Shillong (at present in Meghalaya) Oct. 25, 1924, Herb. Econ. Bot. No. 114 A-B (CAL).

Notes : According to Subr. & Nayar (*l. c.*): The new species is allied to *O. vagans* Wall., but differs in leaves being smaller, abruptly cuspidate at apex, sparsely setose above, densely setose beneath; petioles shorter; and petals abruptly acuminate; whereas *O. vagans* wall., is characterised by leaves being larger, acuminate at apex, glabrous above, glabrate beneath; petioles longer; and petals shortly acuminate.

The specific epithet is given in honour of late Professor J. Sen Gupta, former Chief Botanist, Botanical Survey of India.

***Oxytropis shivai* Aswal, Goel & Mehrotra (Papilionaceae) in Ind. J. For. 13 (3): 257-259. 1990.**

Tufted villous, perennial herbs with thick woody roots. Stems prominent, erect, (1.0-) 1.5-3.0 cm long, densely pilose with white hairs. Leaves stipulate; stipules lateral, 5.0-8.0 (-10.0) mm long, deltoid, caudate acuminate, densely pilose with white hairs. Leaves

imparipinnately compound, 2.0–5.0 cm long, canescent; petioles 1.0–2.5 (–3.0) cm long; leaflets 15–21, subopposite, subsessile, 2.5–6.0 (–7.0) × 1.0–2.0 (–2.5) mm, shallowly boat shaped, acutely acuminate; base acute; midrib keeled on dorsal surface. Flowers 8–16, in peduncled globose heads; peduncles 4.5–8.0 (–10.0) cm long, villous; bracts sessile, linear, 4.0–6.0 mm long, villous; pedicels ca 1.0 mm long, villous. Calyx densely pilose with black and white hairs, 6.5–8.0 mm long; teeth 3.0–4.0 mm long, linear. Corolla blue; vexillum 9.0–10.0 × 4.5–5.5 mm; wing 7.5–8.0 × 2.5–3.0 mm, curved, keel 5.5–6.5 mm long, excluding mucro; mucro ca 1.0 mm long, curved. Stamens diadelphous, 9 + 1, vexillary stamen free. Ovary stipitate, 4.5–5.5 × 1.5–1.75 mm, densely pilose; style 3.0–3.5 mm long, curved; stigma terminal, ca 0.5 mm across. Pod stipitate, inflated, membranous, 7.0–9.0 × 4.0–5.0 mm, somewhat oblong-rounded, covered with black and white hairs. Seeds dark brown, somewhat heart shaped, 2.0–2.5 mm long, smooth.

Types : Aswal & Goel 16202 (A: Holotype CDRI; B–E: Isotypes CDRI).

Flowering & Fruiting : August*.

Distribution : INDIA : Jammu & Kashmir.

Herbarium specimen : INDIA: Ladakh (J & K); on way to Fotu-La, 4000 m, Aug. 21, 1986, Aswal & Goel 16202 A–E (CDRI).

Notes : According to Aswal *et al.* (*l.c.*): Closely allied to *O. tatarica* Camb., ex Bunge but differs by 1.5–3.0 cm long, prominent stems; stipules 5.0–8.0 mm long; leaflets subopposite, subsessile, boat shaped with midrib keeled on dorsal surface and acutely acuminate apex; bracts sessile, 4.0–6.0 mm long, teeth as long as the tube; pods 7.0–9.0 × 4.0–5.0 mm.

Oxytropis DC., is represented by ca 300 species in the world distributed mainly in Asia, Europe and North America. It is represented by ca 15 species in India, mostly inhabiting dry mountainous terrains of Western Himalaya.

Occasional on south facing dry slopes.

Palaquium ravii Sasidh. & Vink (Sapotaceae) in *Blumea* 35 (2): 385–387. 1991.

Trees, up to 30 m high. Branchlets 3-5 mm diameter, minutely appressedly tomentose, glabrescent; terminal cone 2-3 mm long, pubescent; stipules ovate to sublanceolate, 1-2 × 0.8-1 mm, pubescent without, glabrous within, caducous. Leaves clustered towards tip of branchlets; petiole 1.5-2.5 cm long, flat above, in sicco light grey, appressed-pubescent, glabrescent; lamina 7-11.5 × 3.5-6.5 cm, obovate, apex obtuse or rounded, base attenuate and shortly decurrent along upper sides of petiole, coriaceous, appressed-pubescent on either side, glabrescent; midrib somewhat raised above, prominent below; secondary nerves 5 or 6 pairs, ascending at an angle of 40°-50° (-60°), but near apex 20°-30°, irregularly archingly joined, prominulous above, prominent below; tertiary nerves widely reticulate, inconspicuous above, prominulous below. Flowers solitary or in 2-8-flowered clusters axillary to leaves and leaf scars; pedicels 7-9 mm long, minutely greyish brown tomentose. Sepals 6, biseriate, obtuse to acute, minutely brownish tomentose without, glabrous within, outer sepals ovate, 4-5 × 2.5-3 mm, inner ones ovate-oblong, 4-5.5 × 2-2.5 mm. Corolla creamy white, at throat woolly but otherwise glabrous; tube 3 mm long, lobes oblong, 5 × 2 mm, acute to rounded or truncate. Stamens 12, biseriate, glabrous; filaments 3 mm long, anthers 1 mm long, apex bifid. Ovary globose, 1.5-2 × 1.5-2 × 1.5-2 mm, hirsute, slightly 12-ribbed, 6-celled; style 7-9 mm long, glabrous; stigma muticous. Fruit obovoid, 2 × 1.5-1.8 cm, glabrous, pericarp brown, 1-2 mm thick, brittle when dry. Seeds 1 or 2, elliptic or orbicular, somewhat planoconvex, 11 × 8 × 4 mm, scar 10 × 4 mm, cotyledons planoconvex, 9 × 6 mm, albumen absent.

Types : Sasidharan 5062 (Holotype MH; Isotypes CALI, KFRI, PDA).

Flowering : April. *Fruiting* : February-March.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Trichur, Peechi Range, Apr. 21, 1988, Sasidharan 5062 (MH, CALI, KFRI, PDA); *ibid.*, Sasidharan 5026 (KFRI, L).

Notes : According to Sasidharan & Vink (*l.c.*): The tropical genus *Palaquium* Blanco (Sapotaceae) occurs from India to Samoa and

comprises some 110 species. The Indo-Sri Lankan region is represented by 11 species out of which 10 are endemic (Van Royen, 1960). Most species of the genus inhabit the low level evergreen forests.

This species differs from the 11 species recorded from the Indo-Sri Lankan region as follows: it differs from *P. bourdillonii* Brandis, *P. canaliculatum* (Thw.) Engl., *P. ellipticum* (Dalz.) Baillon, *P. laevifolium* (Thw.) Engl., *P. pauciflorum* (Thw.) Engl., *P. petiolare* (Thw.) Engl., *P. polyanthum* (Wall.) Baillon, and *P. thwaitesii* Trimen in the absence of an acumen at the leaf tip, from *P. grande* (Thw.) Engl. and *P. obovatum* (Griff.) Engl., in the much smaller leaves and few lateral nerves, and from *P. rubiginosum* (Thw.) Engl., in the much shorter fruit stalk. In the obovoid berry and the obovate obtuse or obovate-rounded leaves it comes closer to *P. obovatum* which, however, lacks the arcuate connections between the secondary nerves and has its tertiary nerves transverse.

An upper canopy tree in evergreen forest.

This species is named in honour of Prof. N. Ravi, Professor of Botany, Sree Narayan College, Quilon.

***Panicum garadei* Raghavan & Karth.** (Poaceae) in Bull. Bot. Surv. India 24 (1-4): 146-147. 1982 (1983).

Perennial grass, ca 1.5 m tall, base woody. Culms erect, slender tough, smooth, glabrous and shining above, pubescent towards the base. Leaf sheaths keeled, more or less compressed, conspicuously veined, margins membranous, lower ones loose, lowermost sheaths finely silky hairy at base, puberulous above; upper closely appressed to the culm, glabrous; blades linear; acuminate 15-25 cm × 3-6 mm, upper surface pilose or glabrous, lower glabrous, sometimes hairy, hairs with tubercle bases, margins cartilaginous, serrulate; ligules 0.5-1.0 mm long, membranous, shortly ciliate. Inflorescence a panicle, 10-30 × 5-15 cm, loose, branches more or less spreading, branches and pedicels glabrous; pedicels usually paired, 1-6 mm long, tips cupular. Spikelets oblong-lanceolate, glabrous, 3-4 mm long; lower glume broadly ovate, 1.7-2 mm long, 3 (5)-nerved, midnerve prominent and raised from the middle and sometimes

prolonged into a short apicula, margins somewhat scarious, minutely puberulous within, glabrous without; upper glume ovate lanceolate, 3 mm long, 5 - 7 - nerved, nerves becoming thicker towards the apex, midnerve very much so, minutely puberulous within, glabrous without. Lower lemma ovate-lanceolate 3 - 3.5 mm long, 5 - nerved, middle 3 - nerves becoming thicker towards the apex, glabrous; palea hyaline, 2.7 mm long, faintly 3 - nerved, margins incurved and slightly keeled. Upper lemma 3 mm long, ovate, striolate, faintly 3 - nerved, the midnerve thick towards the apex, apex minutely hairy, margins rounded and incurved; palea a little shorter than the lemma, otherwise similar.

Types : L. D. Garade s. n. (Holotype CAL; Isotypes BSI, K).

Flowering : September*.

Distribution : INDIA : Karnataka.

Herbarium specimens : INDIA: Karnataka; Dharwar, Sept. 16, 1907, L. D. Garade s. n. (CAL, BSI, K); *ibid.*, Sept. 17, 1907, L. D. Garade s.n. (Paratypes BSI).

Notes : According to Raghavan & Karthik. (*l.c.*): Differs from *P. maximum* Jacq., in having nodes glabrous, leaves linear, ca 25 cm x 6 mm, ligules shorter, lower glume 1/2 the length of the spikelet or nearly so, 3(-5) nerved with the midnerve very much thickened towards the apex and upper lemma striolate.

The specific epithet is named after the collector.

Panicum johnii S.M. Almeida (Poaceae) in J. Bombay Nat. Hist. Soc. 83 (1): 184. 1986.

An erect, tufted annual \pm 90 cm tall with number of fibrous roots. Stems stout, striate with prominent nodes and internodes; internodal region brown. Leaves linear, \pm 30 cm long with prominent mid-veins, narrowing to the apex; ligule of 5 - 6 unbranched hairs; petiole sheathing, 5 - 7 cm long. Inflorescence of terminal, slender, racemose spikes. Rachis grooved, glabrous, 27- 30 cm long, narrowing to the apex. Spikelets small, 2 - 3 mm long, 0.7 - 1 mm wide, acute

at the apex, solitary, articulate, falling entirely at maturity. Pedicel persistent. Outer glume boat-shaped; 5-nerved; 3 nerves prominent, 2 faint. Inner glume 4 nerved, lanceolate, transparent. Stamens 1 2; anthers linear; filaments very short. Ovary oblong; styles 2; stigmas 2, plumose. Caryopsis oblong, compressed with persistent style bases.

Type : SMA 2597 (Holotype).

Flowering : September- October.

Distribution : INDIA: Maharashtra.

Herbarium specimen : INDIA: Maharashtra; Sateli, Savantwadi, Sept. 5 , 1980, SMA- 2597.

Notes : According to Almeida (*l.c.*): *Panicum johnii* comes very close to *P. repens* Linn., in external appearance, but differs from it in the presence of slender racemose spikes. It also comes very near to *Panicum paludosum* Roxb., in external appearance, but differs from it in the presence of stout, grooved rachis narrowing to the apex and in the presence of acute spikelets.

Rare weed in rice-fields.

This species is named after Rev. Fr. John Correia Afonso, S. J. Ex-Principal, St. Xavier's College, Bombay.

Paraboea nagalandiana Deb & R. Dutta (Gesneriaceae) in J. Bombay Nat. Hist. Soc. 85 (1): 168 170. 1988.

Undershrubs 15 30 cm high, with straggling woody stem, rooting at the base, unbranched or dichotomously branching, more or less pubescent. Leaves opposite, decussate, petiolae, 5 17 × 2 5 cm, narrowly oblong or elliptic-lanceolate, acute or subacute at the apex, narrowed to or rounded and slightly unequal at the base, entire at margin, thin coriaceous, pale green above, brownish below, glabrescent above, arachnoid-tomentose on the midrib and nerves below; lateral nerves 6 12 pair, subopposite, oblique, subparallel inconspicuous towards the margin; petiole 5 15 mm long, pubescent. Inflorescence terminal, peduncled racemose panicle,

10 20 × 3.5 cm, pubescent, with a pair of foliaceous bracts at the base. Flowers bracteate, bracteolate, pedicelled, 3–4 mm long, pubescent; bracts solitary, ± 1.2 × 0.3 mm, lanceolate, acute, pubescent; bracteoles solitary, 0.5–1 × 0.2–0.3 mm, linear, acute, pubescent; pedicel 0.3–0.5 mm long, pubescent. Calyx lobed nearly to the base; lobes 5, unequal, 2–3 × 0.2–0.5 mm, narrowly lanceolate. Corolla campanulate; tube short, 0.8–1 mm long, glabrous inside; lobes 5, imbricate, nearly similar, 0.8–1.2 × 0.4–1 mm. Stamens epipetalous, alternate with petals, 2 perfect, 2 staminodes, attached near the base of the corolla tube, glabrous; filaments thick, alternating with the petals, 0.8–1 mm long; anthers large, with widely divergent lobes, 2-celled, 0.2–0.5 mm × 0.3 mm, globose or ellipsoid; pollen grains 3-zonocolporate, spheroidal 15–21 μm; exine 1.5 / μm thick, surface granulate, granules less than 1/μm. Staminodes 2, filaments as long as in fertile stamens, anthers smaller. Disc absent. Ovary 0.8–1 mm long, ovate; ovules in parietal placenta; style as long as the ovary; stigma terminal, simple. Capsule immature ones included within calyx lobes, ± 2.5 × 1 mm, oblong, dehiscent along both the sutures. Seeds few, subglobose, ± 0.8 × 0.6 mm, smooth, reticulate.

Type : A. Meebold 7394 (Holotype CAL).

Flowering : December–January. *Fruiting* : January ?

Distribution: INDIA: Nagaland.

Herbarium specimens : INDIA: Nagaland; Narum, 1200–1500 m, Dec. 1907, A. Meebold 7394 (CAL); Sarpung, 1500 m?, Dec. 1907, A. Meebold 7230 (Paratype BSI).

Notes : According to Deb & Dutta (*l. c.*): Allied to *P. multiflora* (R. Br.) Bl. Burtt differing in narrowly oblong or elliptic-lanceolate leaves, terminal solitary peduncle, racemose panicle, narrowly lanceolate sepals, presence of two staminodes and glabrous ovary amongst others.

As matured flowers and fruits are insufficient, opening of the flower and dehiscence of the fruit could not be described in detail.

Parakaempferia A.S. Rao & D.M. Verma (Zingiberaceae) in Bull. Bot. Surv. India 11 (1 & 2) : 206–208. 1969 (1971).

Perennial, terrestrial herbs. Rhizome creeping, scaly, knotted at base of shoots; roots stout. Stem elongate. Leaves alternate, distichous, contemporaneous with the flowers; sheaths open; ligule short; nerves pinnate. Spikes one to several, radical, around the stem; peduncles slender, enclosed within imbricating bract-like scales; rachis long, slender; bracts several, ascending, 1-flowered; bracteole elliptic. Flowers successively opening from base upwards; calyx shallowly 3 lobed, split on one side; corolla tubular; lobes 3, posterior broader and apiculate; lateral staminodes 2, petaloid; lip obovoid, emarginate; stamen 1; filament short; connective broad; anther crest large, subreniform, entire; ovary 3 celled placentas axile, ovules many; style lying in a staminal groove; stigma turbinate, hairy.

Type species : *Parakaempferia synantha* Rao & Verma.

Distribution : INDIA: Assam.

Notes : According to Rao & Verma (*l.c.*): The plant collected for the experimental garden at Woodlands; Shillong, from N. Lakhimpur was survived, but not bloomed. A critical study of the herbarium specimens showed that while the plant resembled *Kaempferia* L. and *Caulokaempferia* Larsen, it was distinctive in its elongated leafy stem, contemporaneous with the radical spikes.

***Parakaempferia synantha* A.S. Rao & D.M. Verma** (*Zingiberaceae*) in Bull. Bot. Surv. India 11 (1 & 2): 206-208. 1969 (1971). et in 14: 125. 1972.

Rhizome ca 5 mm thick. Stem 40-60 cm high. Leaves 4-6, lower sessile, upper petioled; petiole up to 1 cm high; lamina lanceolate or oblong-lanceolate, 13-24 cm long, 3.3-7 cm broad, base cuneate, apex caudate-acuminate, upper surface glabrous, lower pubescent, particularly along midrib at base; ligule 2-3 mm long, bilobed, pubescent. Spikes 1-3; peduncles 3-6 cm long, ca 1.5 mm thick, villous; rachis 6-12 cm long, villous; bracts 7-11, lanceolate, convolute, 2-2.6 cm long, 6-8 mm broad, acute, scarious margined, pubescent, pinkish, bracteole 6.5-8 mm long, ca 4.5 mm broad, obtuse, pubescent. Calyx ca 1 cm long, pubescent; corolla tube equalling the bracts, white; corolla lobes oblong-lanceolate, 1.5-1.9

cm long, 6-9 mm broad, white with pinkish veins; lateral staminodes oblong, 1.7-2 cm long, 6-7 mm broad, rounded at apex, white with pinkish veins; lip broadly obovoid, 2.5-2.8 cm long, 2.2-2.5 cm broad, white with pinkish veins and a median fleshy band of twin close yellow lines from the base to about centre; filament slender, ca 2 mm long; connective ca 6 mm broad with inflexed edges, purple-red; anther ca 8 mm long; anther crest ca 6 mm high, ca 8 mm broad with deflexed tip, purple-red; ovary ellipsoid, ca 4 mm long, villous; style subequalling the stamen.

Types : D. M. Verma 46585 (A: Holotype CAL; B-G: Isotypes ASSAM).

Flowering : May*.

Distribution : INDIA: Assam, Meghalaya.

Herbarium specimens : INDIA: Assam; N. Lakhimpur, along Kana river, Chaldhwa, May 22, 1966, D. M. Verma 46585 (A in CAL; B-G in ASSAM).

Notes : According to Rao & Verma (*l.c.*): Type species *Parakaempferia synantha* Rao & Verma sp. nov. Species one in Assam.

Pauia Deb & Dutta (Solanaceae) in Indian Forester 91 (6): 363-366. 1965.

Herb annual with perennial base and glabrous succulent stem. Leaves subopposite, entire, ovate, ovate-elliptic. Pedicels axillary, solitary. Flower large lurid yellow. Calyx large, tubular, unlobed, with 5 short teeth, scarcely larger in fruit. Corolla tubular campanulate; teeth 5, deltoid, imbricate in bud. Stamens 5, included within the corolla tube, attached just at the base of the corolla tube; filaments broad below, gradually tapering to a fine apex, hairy; anthers ovate-lanceolate, dehiscent by apical pores. Ovary 2 celled, many ovuled in axile placentation. Style terminal, cylindrical; stigma 2 lobed. Berry oblong. Seeds many compressed, Embryo peripheric.

Type species : *Pauia belladonna* Deb & Dutta.

Distribution : INDIA: (Arunachal Pradesh) N.E.F.A.

Notes : According to Deb & Dutta (*l.c.*): This monotype genus (Family Solanaceae Tribe Atropeae) is nearer to *Atropa* Linn., differing in ovate, ovate-elliptic, subopposite leaves, unlobed calyx with short teeth, stemens attached just at the base of the corolla tube, ovate elliptic anthers dehiscing by apical pores and oblong berry.

The monotype genus is named in honour to Rev. Dr. H. Santapau, Director, Botanical Survey of India, Calcutta, as a token of deep regard and gratitude.

***Pauia belladonna* Deb & Dutta (Solanaceae) in Indian Forester 91 (6): 363-366. 1965.**

Herb annual with perennial base, 1-1.5 m tall. Stem branching dichotomously, terete \pm 2 cm, in diam., at the base; succulent, glabrous, nodes swollen. Leaves simple, subopposite, petiolate, 8-30 \times 5.5-20 cm; petiole 1-4 cm; long, glabrous; lamina ovate or ovate-elliptic, membranous slightly undulate and minutely ciliate at the margin, acuminate at the apex, attenuated at the base, surface with small scurfy scales, more on the upper, falling off in age; veins pinnate, reticulate; midrib distinct, bearing 5-8 pairs of lateral veins on either side, bending gradually downwards and approaching the margin, tertiaries indistinct. Flowers solitary, axillary, pedicellate, regular, bisexual; pedicel 2.5-7 cm, long, succulent, scarcely hairy, gradually tapering at the base. Calyx gamosepalous, tubular, unlobed, sparsely lepidote, densely punctate, frequently with glands containing brown fluid, tube fleshy, thin on drying, 10-20 mm, long, with 5 short teeth \pm 2 mm long, triangular, ciliate at the margin. Corolla gampetalous, tubular 2.5-5 cm long, imbricate in bud densely covered with long multicellular hairs outside, less so inside, teeth 4-5 mm long, deltoid lanceolate. Stamens 5, attached just at the base of the corolla tube, filaments broad below, gradually tapering to a fine apex, \pm 13 mm long and \pm 2 mm wide at the base, hairy; anthers 6.5 mm long, large, 2 lobed, dorsifixed, ovate-lanceolate; mucronate, dehiscing by apical pores; pollen granular, triangular in out line, tricolporate, exine rather thin, smooth, ovary clavate, glabrous, about 5-6 mm long, 2 locular, ovules many in axile

placentation; style stout, about 12-14 mm long, terminal, glabrous; stigma one mm, 2-lobed, ovate-oblong. Fruit a berry, oblong, 30 × 12 mm, (immatured), many seeded. Seeds compressed, ovoid, ± 2.5 mm; testa crustaceous, reticulate, brown; tegment thin, membranous, endosperm mealy; embryo peripheric, cylindrical, ± 2.25 × .5 mm curved; cotyledons 2, planoconcave in transection.

Types : Deb 26422 (A: Holotype CAL; B E: Isotypes ASSAM).

Flowering & Fruiting : July*.

Distribution : INDIA: (Arunachal Pradesh). N. E. F. A.

Herbarium specimens : INDIA: N. E. F. A. ; Tirap Frontier Division, way to wakka (about 6 km away); 2100 m, July 2, 1961, D. B. Deb 26422 (A in CAL; B E in ASSAM).

Notes : According to Deb & Dutta (*l. c.*): The general appearance of the plant particularly the habit and the leaf, indicates apparent similarity with Indian Belladonna namely *Atropa acuminata* Royle ex Lindley.

The specific name is given after Indian Belladonna plant due to its apparent similarity in general appearance particularly in habit and leaf.

Pennilabium proboscideum A. S. Rao & J. Joseph (Orchidaceae) in Bull. Bot. Surv. India 10 (2): 231-233. 1968 (1969); Seidenf. in Opera Bot. 95: 330. 1988.

Small epiphyte; root threadlike, long; stem short ca 1.5 cm, suberect; leaves 4-6, fleshy, elliptic-oblong, bifarious, 3.5-7.5 × 0.8-1.5 cm upper ones (except the terminal) progressively longer, shortly sheathed, twisted and oblique at base, unequally bilobed at apex, the two margins unequally arcuate. Inflorescence a spike, axillary, long peduncled, congested, 1-2 per plant, much shorter than and concealed by the leaves, 4-5 flowered; peduncle compressed at top, grooved between bracts, bracts several, 1.5 mm long, ovate, basal bracts bare. Flowers 15 × 8 mm sessile, suberect, long spurred; perigone purple-dotted creamy-white; sepals obovate, 5-nerved, entire, purple-dots in clusters; dorsal sepal slightly longer, rounded, cuspidate

at apex, lateral sepals 7.5×3.5 mm with unequally curved margins, a little oblique at base, obtuse at apex, carrying dorsally a subterminal recurved little cusp; petals 6.5×2.0 mm oblanceolate, 3 nerved, obtuse; margin entire in the basal half, irregularly sinuate-crenate in the top half; lip sessile, trilobed; midlobe 1.6 mm long, thick, incurved, beak-like, densely papillose; side-lobes 6×2 mm bent at base and stretching forward parallelly, facing each other, falcate, irregularly shortly lobulate at apex, each lobule unevenly toothed; spur 10 mm long, 1.5 mm in diameter, horizontally and pronouncedly protruding; apex blunt; spur mouth large, funnel shaped, the margins flared into a large erect trilobed lamella split on the column-side; midlobe of lamella larger than the sidelobes, slightly incurved; sidelobes auricular lanceolate-obtuse or subulate obtuse; column 1.5 mm high; rostellum 1.5 mm tusk-like, thrust into the lamella through the slit at the spur orifice; caudicle slender; 2 mm long, conically dilated at apex carrying the 2 subglobose pollinia; ovary sessile, slender 27 mm long, glabrous, 3-ridged; fruit erect, slender, 5 cm long, 3-ridged.

Types : A. S. Rao 45622 (A: Holotype CAL; B D: Isotypes ASSAM)

Flowering & Fruiting : July*.

Distribution : INDIA: Meghalaya.

Herbarium specimens : INDIA: Meghalaya: K. & J.Hills, between Umran and Umsaw beside the Gauhati Shillong Road, July 23, 1966, A. S. Rao 45622 (A: CAL; B D: ASSAM).

Notes : According to Rao & Joseph (*l. c.*): Pennilabium J. J. Sm. distinguished by the abbreviated few leaved stem and its characteristically 3-6 bilobed lip, with the large lateral lobes combed at the tips, includes 3 malayan species, of which one *P. angraecum* (Ridl.) J. J. Sm. is described as occurring in Thailand also by Seidenfaden & Smitinand. The presence of this genus in India too is now established by this discovery. *P. proboscideum* is described from material gathered during part of an intensive exploration undertaken for writing a flora of Nongpoh, a station (± 600 m) about midway between Shillong and Gauhati. This species resembles

P. struthio Carr., of Malaya differing from it in its glabrous entire sepals; in the sidelobes of lip lobulate and lobules shortly toothed; in a single large 3-lobed lamella forming the rim of the spurmouth and the ovary glabrous.

***Pholidota convallariae* (Reichb.f.) Hook. f. var. *breviscapa* N.C. Deori & J. Joseph (Orchidaceae) in Bull. Bot. Surv. India 20 (1-4) : 159-160. 1978 (1979).**

Epiphytes. Pseudobulbs small, 1.5-2.5 cm high, oblique closely placed on slender creeping rhizome, 2-leaved. Leaves 4-8.5 × 0.5-0.6 cm, sub-sessile, narrowly lanceolate. Inflorescences a raceme ± 4 cm high at the apex of fresh shoots with many imbricating sheathy bracts around the rachis, from the base of the terminal pseudobulb, erect, as long as or shorter than the leaves; flowering axis short, zigzag with 3-7 flowers. Bracts caducous, cymbiform, longer than and enveloping the pedicelled ovary, ± 7 × 7 mm, rhomboid when spread out. Flowers white, small, glabrous; sepals and petals free, 3-nerved, gland-dotted towards apices; dorsal sepal ± 5 × 3 mm, oblong, retuse; laterals ± 5 × 4 mm, oblong, keeled, apiculate; petals equal 4-5 × 3-5 mm, sub-orbicular, when obtuse; lip cupulate with overlapping marging at apex, sub-orbicular when spread out, ± 4 × 4 mm, with a shallow sinus at apex and ridged callus at base, distinctly 5-nerved; column pink, short, winged at apex; anther pyriform, compressed laterally with thin translucent cell walls; pollinia 4, in pairs held on thread-like straps; ovary green, ridged; pedicel short, slender, pink. Capsule shortly pedicellate, globose-oblong, 6-ridged with marcescent perianth.

Types : A. S. Rao 50902 (A: Holotype CAL; B-G: Isotypes ASSAM).

Flowering & Fruiting : November-December.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh (North Eastern India); Kameng, 43 camp, ± 1666 m, A. S. Rao 50902 (A in CAL; B-G in ASSAM).

Notes : According to Deori & Joseph (*l. c.*): *Pholidota convallariae* var. *breviscapa* Deori et Joseph var. nov. differs from variety *convallariae* (Reichb. f.) Hook. f. in having smaller leaves (± 7 cm long instead of ± 20 cm), in the inflorescences being few flowered (up to 7 only) instead of many flowered (± 18), in the bracts being rhomboid instead of broadly ovate and in the lip being 5 nerved instead of 3 nerved.

The original material collected from Kameng District, Arunachal Pradesh, was introduced into the National Orchidarium in vegetative condition in 1970, where it blooms in early winter.

Phyllanthus andamanicus N.P. Balakr. & N. G. Nair (Euphorbiaceae) in Bull. Bot. Surv. India 24 (1- 4): 35- 36. 1982 (1983).

Shrub, ca 3 m tall; branchlets glabrous; stipules linear lanceolate, broad at base, persistent, 2.0- 2.5 mm long, glabrous, cataphylls ovate-triangular, woody, ca 2 mm long. Leaves alternate, ovate, rounded at base, obtuse to subretuse at apex, entire at margins, 1.0- 3.5 cm long, 0.7- 2.6 cm broad, coriaceous, glabrous; lateral nerves 7- 9 pairs, distinct, ascending and looping towards margins; petioles 1- 2 mm long, glabrous. Flowers in axillary fascicles, forming leafless pseudoracemes towards tips of branchlets; bracts many, imbricate, subulate, lacinate at margins, ca 1 mm long; flowers $\hat{\delta}$ arranged mainly towards upper portion of pseudoracemes; bracts oblique-ovate, sublanceolate, ca 1 mm long; pedicels ca 2 mm long, thin, glabrous; tepals 6, in two rows, ovate, ca 2 mm long, ca 1 mm broad, glabrous; stamens 3; filaments entirely connate; column 1.0- 1.5 mm long, glabrous; anthers 2-celled, ca 1 mm long, longitudinally dehiscent; flowers σ arranged mainly towards the basal parts of pseudoracemes and upper leaf axils; pedicels ca 3 mm long, ca 1.5 mm thick, 3- ridged towards the apex, glabrous; tepals in two rows, broadly ovate, 2.0- 2.5 mm long, ca 2 mm broad, glabrous; disc minute, annular, crenate at apex; ovary sessile, 1.0- 1.5 mm long, 2.0- 2.5 mm thick, glabrous, 3-loculed; each locule 2- ovuled; styles 3, united for half the length; stigma obscure. Capsule depressed-globose, 3-lobed, 4- 5 mm high, 7- 9 mm wide with persistent tepals and style; seeds 6, subreniform, subtrigonal ca 4 mm long, ca 3 mm thick, smooth, brown.

Types : Balakrishnan & Nair 4765 (A: Holotype CAL; B D: Isotypes PBL; E: Isotype L).

Flowering & Fruiting : December*.

Distribution : INDIA: Andaman Island.

Herbarium specimens : INDIA: North Andamans; Saddle Peak, ca 550 m, Dec. 1, 1976, Balakrishnan & Nair 4765 (A in CAL, B D in PBL & E in L).

Notes : According to Balakr. & N.G. Nair (*l.c.*): This species falls under the section *Paraphyllanthus* and approaches near to *P. columnaris* Muell.-Arg., but differs in being a shrub; branchlets glabrous; leaves shorter, ovate, obtuse to subretuse at apex, glabrous, coriaceous, distinctly nerved; petioles glabrous; pseudoracemes shorter; pedicels and perianth glabrous; disc of female flowers very short, annular, crenate and seeds smooth. *P. columnaris* is distributed in Thailand, Burma, N. Malaya and Middle & South Andamans.

It is Restricted to Saddle Peak aarea of N. Andamans at altitudes above 500 m up to the peak at 720 m, in sunny localities and associated with bushes of bamboo, *Memecylon*, *Hopea*, *Symplocos* and *Psychotria*. The soil is red lateritic and more or less dry.

Pileostegia subansiriana H.B. Naithani & Bennet (Hydrangeaceae) in Indian Forester 110 (5): 518. 1984.

Small tree up to 9 m high. Leaves opposite, 11- 21 × 5 - 8 cm, mostly ovate oblong, acuminate, more or less cuneate, nerves 9 - 11 pairs prominent, margin entire; petiole 1 - 3 cm long. Panicle terminal, up to 18 cm long and 17 cm wide, bearing many flowered shortly stalked cymes; bracts ± 1.2 cm long, lanceolate, acuminate, glabrous or sometimes with fascicled hairs. Pedicels 1.5 - 4 mm long. Receptacle obovoid, 1.5 - 2 mm long. Sepals triangular, acute, 1 mm, long, persistent. Petals ovate, cucullate, cohering upwards in a deciduous "calyptra" Stamens 10, filaments 1 - 2 mm long, flattened at the base; anther subglobose, 0.5 mm long. Ovary inferior, 5 celled; style columnar, 1 mm long; stigma knob-shaped with 5 decurent rays of papillae. Capsule 2 - 3 mm long, top-shaped with flat crown. Seeds numerous, oblong, 1 mm long.

Types : Bennet & Naithani 3301 (Holotype DD; Isotype DD).

Flowering & Fruiting : November*.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimen : INDIA : Arunachal Pradesh; Subansiri District, Hapoli to Ponge, 1800 m, Nov. 1, 1977, Bennet & Naithani 3301 (DD).

Notes : According to Naithani & Bennet (*l.c.*): Allied to *Pileostegia viburnoides* Hook. f. and Th., but differs in having longer leaves with 9-11 pairs of nerves, longer panicle and shorter stamens with filaments flattened at the base.

***Pimpinella diversifolia* DC. var. *sarmentifera* Goel & U.C. Bhattach. (Apiaceae) in J. Econ. Tax. Bot. 6(1): 213-215. 1985.**

Erect or decumbent herbs with perennial rootstock. Stems with 30-125 cm long runners arising from nodes and producing adventitious roots at nodes. Stems branched from base, 20-50 cm long, hollow, glabrous in lower portions, hirsute above. Leaves simple to compound, 1-2 pinnate, 1.5 foliate or sometimes pinnatifid, (0.5) 1.0-7.0 × 0.5-8.0 cm; leaflets lanceolate, ovate or orbiculate, puberulous on both the surfaces, densely hairy on nerves below; apex acute to acuminate; base cordate or truncate; margins serrate to doubly serrate; upper leaflets with unequal sides; petiolulate; leaves on runners simple to 3-foliate; petioles 2-25 cm long, sheathing at base. Inflorescence a compound umbel, terminal-axillary or leaf opposed. Bracts 1-3 foliate; linear to lanceolate, entire-serrate, acuminate. Rays (7-) 9 (-15), unequal, 7-30 mm long, pubescent. Bracteoles 3-5, ca 4 mm long, linear setaceous. Pedicels 6-15, unequal, 1.0-8.0 mm long, pubescent. Flowers often sterile, on all umbels. Calyx none. Corolla present, somewhat zygomorphic; petals 0.6-1.5 mm long, subequal, obovate obtuse, with greenish mid-vein. Stamens 5; alternipetalous; filaments ca 1 mm long; anthers ca 0.25 mm long. Fruits broadly ovate, 1.5-1.75 × 2.0 mm, laterally flattened, densely papillose-pilose, never hairy, broader than long;

ridges obscure; furrows 2 vittate; carpophore bifurcate of the apex, ca 0.25 mm long from the base of the fruit; styles 0.75–1.0 mm long, persistent; stigma globose.

Types : A. K. Goel 64313 (A: Holotype BSD; B C: Isotypes CAL).

Flowering & Fruiting : July–October.

Distribution : INDIA : Uttar Pradesh (Garhwal).

Herbarium specimens : INDIA: Uttar Pradesh (Garhwal); Gangi, 3000 m, Aug. 10, 1978, A. K. Goel 64313 (A in BSD; B C in CAL); Nalhan, 3000 m, Sept. 22, 1979, A. K. Goel 67971 A, B (Paratypes BSD); Surkhanda 2800 m, Oct. 15, 1980, A. K. Goel 72605 A, B (Paratypes BSD).

Notes : According to Goel & Bhattacharyya (*l.c.*): The new variety can readily be distinguished from the proper *Pimpinella diversifolia* DC, by its smaller stems branched from base and long runners arising from nodes.

Common on shady moist slopes in temperate *Quercus*, *Rhododendron* and *Abies* forests in humus rich soils.

The varietal epithet *sarmentifera* has been used due to the presence of long runners arising from the nodes of the stems.

***Pimpinella rollae* Billore & Hemadri (Apiaceae) in Indian Forester 108 (11): 712–713. 1982.**

Erect, annual herb, 15–50 cm high. Root tapering, 1.5–3.5 mm thick; secondary roots few, fibrous. Stem 1–4.5 mm across, green to straw coloured on drying, soft, glabrous or at times sparingly white-ciliate on young branches, terete, ± striate; branches many, ascending, usually at certain height on the main stem. Leaf trifoliolate; the upper ones often simple but bi-ternately lobed; petiole slender, 1–4.5 cm long, narrowly vaginate at base, glabrous or sparingly white-ciliate along the margins; leaflets petioluled or sometimes the lateral one sessile-subsessile, lamina membranous,

ovate-lanceolate in outline, margins white-ciliate, variously dentately-
 -dessected or 2-3-nately lobed, lobes, and teeth mucronate. Inflorescence in simple or compound umbels, terminal or leaf-opposed. Primary rays 1-2, filiform, up to 3.5 cm long, glabrous or sparsely white-ciliate in the lower half. Bracts (1-) 2-3, rarely 5, subequal or unequal in size, 0.3-2.5 cm long, leafy linear-lanceolate acute-acuminate, 1-ribbed, ciliate along margins. Secondary rays 1-3, rarely up to 5, 0.55-3 cm long, filiform, glabrous or sometimes sparingly white-ciliate. Bracteoles up to 5, usually 0.1-1 × 0.05-0.2 cm, rarely up to 1.8 × 0.35 cm and leafy, green, thin, linear-lanceolate, narrowed or rounded at base, subulate at apex, 1-ribbed; ciliate along margins. Flowers 2-15, white 1.5 mm across; pedicels filiform 0.2-1 cm long, sometimes reaching up to 2.5 cm in fruits, glabrous. Calyx obsolete. Petals 5, white, 1-1.5 × 0.5-1 mm obcordate in outline with 0.3-0.75 mm long inflexed apex, glabrous or sparsely and minutely ciliate along margins. Ovary minutely papillose; styles 2, short, recurved infructing with their capitate stigmata almost touching the fleshy stylopedis; ovules 2. Stamens 5, alternating the petals; filaments ± 1 mm long, glabrous; anther-lobes broadly orbicular, cordate, glabrous. Fruit laterally compressed globose-subglobose or sometimes almost planoconvex in outline due to abortion of one of the mericarps, 2.5-4 × 2-3 mm, minutely tubercled otherwise glabrous, greenish to light brown or blackish on drying; mericarps 2, sometimes solitary due to abortion, ± ellipsoid with rounded black and incurved commissure. Primary ridges 5 per mericarp, obscure, pale or drying white, vittae 3-4, between 2 primary ridges; carpophores ± 3 mm long.

Types : K.V. Billore 115986 (A: Holotype CAL; B-N : Isotypes — B-E in BSI; F-G in CAL; H in K; I in L; J in GH; K in US; L in MO; M in LE; N in BLAT. All types raised from the seeds of K.V. Billore 115489 A-J.

Flowering & Fruiting : July - November.

Distribution : INDIA: Maharashtra; (Sahyadri Ranges of Western Ghats).

Herbarium specimens : INDIA: Maharashtra; July 15, 1969, (raised from the seeds of K.V. Billore 115489 A-J) K.V. Billore

115986 A-N (A in CAL; B-E in BSI; F-G in CAL; H in K, I in L; J in GH; K in US; L in MO; M in LE; N in BLAT); Harishchandragarh, Thana District, Kedarnath hill slopes, Nov. 17, 1968, *K.V. Billore* 115489 (A-J : Paratypes — A in CAL; Isotypes — B-F in BSI, G in K; H in L; I in BLAT; J in MH).

Notes : According to Billore & Hemadri (*l.c.*): The plant was observed by *K.V. Billore* almost in drying condition in the shade of a steep, overhanging rock on way to Kedarnath temple (popularly known as Harishchandragarh) from Panchnai on 17 11 1968. Seeds (mericarps) were collected and sown in June 1969 in the experimental plots of Botanical Survey of India, Poona. They germinated \pm 100% in the same month, the flowering & fruiting in July & September, the fruit thus obtained was 100% viable. A large number of herbarium specimens were prepared and critically studied in addition to the live material, with reference to all the allied *Pimpinella* spp. *Pimpinella rollae* Billore et Hemadri somewhat resembles weak forms of *P. heyneana* (DC.) Kurz but can readily be distinguished from the latter by its smaller leaves, bracteate and bracteolate flowers and larger, 3 4-vittate fruits. However, the abortion of the mericarp in this new taxon is rather interesting and deserves further study in cytology and floral anatomy.

The plant is so far known from the higher ghats of Harishchandragarh (Thana District) only. However, it would be worthwhile locating the species on the isolated peaks of Sahyadri ranges of the Western Ghats such as Patangarh, Kalsubai hills (Ahmednagar District); Bhimshankar, Khandala etc. (Poona District).

The taxon is dedicated to Dr. Rolla Seshagiri Rao, Ex Director-in-Charge, BSI, in recognition to his valuable contribution to Indian Taxonomy.

***Piper pseudonigrum* Velayudhan & Amalraj (Piperaceae) in J. Econ. Tax. Bot. 16 (1): 247 250. 1992.**

Robust shrubby climber, stem terete, glabrous but rough, swollen at nodes; branching after attaining some height. Leaves alternate, very broadly ovate, coriaceous and glabrous on both sides, dorsally

shiny and ventrally glaucous, lamina up to 22×15.5 cm (largest of all in the *Piper* species so far seen and collected from Silent Valley) tip acuminate, base rounded and equal, three pairs of prominent lateral veins the two lower pairs almost opposite and upper pair alternate at about 3.5 cm from the base; petiole up to 3.2 cm. Male spike up to 20 cm long, purple to greenish purple, drooping, peduncle 2 mm thick with very minute hairs. Flowers in the form of hemispherical receptacles or small cups held on thin pedicels borne alternately and perpendicular to the axis; pedicel and outer surface of the bract sparsely and minutely hairy. Flower 3.5 mm (pedicel 1.5 mm). Stamens two and anthers two-celled, protruding like two eyes from hemispherical cup, dehiscence linear. Female spike also purple to greenish purple, drooping, medium long up to 10 cm, peduncle up to 2.4 cm, glabrous; ovary spherical subtended by a cupular bract having minute hairs; stigma sessile, 3-4-lobed, lobes short and papillate. Fruits ripening through yellow to red, less pungent than that of *P. nigrum* diameter ca 0.8 mm.

Types : AV 202 (Holotype MH; Isotype NBPGR Herbarium).

Flowering : February - April.

Distribution : INDIA: Western Ghats.

Herbarium specimens : INDIA: Kerala; Palghat District, Silent Valley, Apr.6, 1988, AV 202 [MH, NBPGR Herbarium, New Delhi NHCP Herbarium (Paratypes) (Pl. D)] & live potted specimens are kept at this station (Silent Valley: AV 225, AV 274, AV 282, AV 301, AV 304, AV 313; Parambikkulam : V 3468, V 3488, V 3474; Idukki: V 3703, V 3706; Pathanamthitta : V 3839. Karnataka: Coorg: V 3540, V 3554, V 3555; Tamil Nadu: Upper Kodayar: V 4235).

Notes : According to Velayudhan & Amalraj (*l. c.*): Closely related to *P. nigrum* L., but distinct from it in many characters. Male specimens along with female plants were collected from Silent Valley, Idukki, Pathanamthitta and Parambikkulam forests in Kerala, Coorg in Karnataka and Upper Kodayar in Tamil Nadu. Variation in pubescence on spikes, right from pubescent to glabrous, both on male and female spikes, in leaf size from medium to very large and in leaf shape from elliptic to ovate with a slightly cordate base on young

growing was observed. But pedicellate (stalked) and sparsely distributed male flowers on long light purple to purple spikes are distinctive characters without variation; while in *P. nigrum*, the male flowers (bracts) are sessile, dense on light yellow spikes.

The plant resembles *P. nigrum* in habit and leaf morphology, but can be differentiated by the colour of the spike, equal leaf base and pedicellate flowers. It is also related to *P. trichostachyon* and *P. galeatum* in cupular shape of the bract, but distinct from them in the very large ovate leaves, purple spike, less distantly placed florets on thin pedicels and presence of sparse minute pubescence on the outer side of the bract, pedicel and axis.

When both *P. nigrum* and *P. pseudonigrum* were grown *ex situ* at Vellanikkara, the former survived, while the latter succumbed to quick wilt disease revealing its distinct genetic entity. Flowering time of *P. nigrum* is May June.

***Planchonella clarkeiana* Rakesh & Thoth.** (Sapotaceae) in Bull. Bot. Surv. India 31 (1-4): 151. 1989 (1992).

Large tree. Leaves ovate-oblong, narrow to cuneate at base, acute to acuminate at apex, entire margin, 8-10 × 3-4 cm with ca 6 mm long acumen, glabrous on both sides; midrib and nerves prominent below, appressed above, gradually faint towards apex; secondary nerves 5-6, ascending from the midrib at an angle of 40-45° and zigzaggedly extending up to margin curving and joining the next upper one. Petioles 1-1.5 cm glabrous. Flowers not seen. Fruiting calyx persistent, sepals 5, ovate, ca 8 × 7 mm, brown, densely clothed with rough projections. Fruits globose, unlobed, much wrinkled, 2-3 × 2.5-3 cm, glabrous, yellowish in colour; fruiting pedicels 1.3-2 cm long.

Type : *P. Basu* 7366 (Holotype CAL).

Flowering & Fruiting : October.

Distribution : INDIA: Andamans.

Herbarium specimen : INDIA: South Andaman; Oct. 26, 1979, *P. Basu* 7366 (CAL).

Notes : According to Rakesh & Thoth. (*l.c.*): *P. clarkeiana* Rakesh et Thoth., is allied to *P. obovata* (R. Br.) Pierre, but differs in the venation of secondary nerves and globular, much wrinkled, larger fruits.

***Pogostemon travancoricus* Bedd. var. *devicolamensis* B.V. Shetty & Vivek. (Lamiaceae) in Bull. Bot. Surv. India 15 (1& 2): 155-157. 1973 (1976).**

Undershrubs, 1-2 m tall, pigmented deep purple; stems and branches obscurely 4-angled, smooth, glabrous. Leaves 3.8-18.6 × 1.3-6 cm, opposite, ovate to elliptic, rounded or tapering and inaequilateral at base, acute at apex, doubly crenate-serrate, turning black when dry, sparsely hairy above; secondary nerves 4-6 per side, impressed above, raised below; petioles 0.8-8 cm long. Racemes up to 33 cm long, turning black when dry; whorls close; bracts 1-4 mm long, linear; bracteoles 1-2 mm long, linear; pedicels ± 1 mm long, slender. Calyx 4.5-5.5 mm long, tubular, slightly narrowed towards base; teeth 5, subequal, broad at base, narrowed towards the tip, hirsute within. Corolla 7-8.5 mm long, greenish pale yellow, sub-bilabiate, closely veined; upper lip 3-lobed, lateral lobes rounded, sparsely pubescent without, the middle acute, pubescent without; lower lip entire, acute, glabrous. Stamens 4, each 0.8-1.1 cm long, exserted, subequal; filaments of two stamens attached to the upper lip bearded with white hairs at base; anthers reniform. Disc subentire. Ovary 4-partite, glandular; style 0.8-1.3 cm long, filiform; stigma bifid. Nutlets 4, each 0.8-1 mm long, rounded on one side, angled on the other, black with a few deciduous glands.

Types : Shetty & Vivekananthan 33420 (A: Holotype CAL; B-Z: Isotypes MH).

Flowering & Fruiting : February-April*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA; Kerala; Devicolam, Lower Vagavurrai, 1800 m, Feb. 5, 1970, Shetty & Vivekananthan 33420 (A in CAL; B-Z in MH); *ibid.*, Apr. 25, 1966, Shetty & Vivekananthan 27370 A-F (Paratypes MH).

Notes : According to shetty & vivekananthan (*l.c.*). Allied to var. *travancoricus*, but differs in the calyx-teeth being hirsute within; corolla closely veined, lobes of upper lip sparsely pubescent without and the mid-lobe acute at apex.

Polygala jacobii Chandrab. (Polygalaceae) in Bull. Bot. Surv. India 9(1-4): 288. 1967 (1968).

Slender herbs. Stems 5-60 cm long, erect or decumbent, terete, closely branched at base, sparsely hairy. Leaves 0.3-4.5 × 0.2-1.5 cm, shortly petiolate, alternate, subcoriaceous, narrowly ovate, elliptic or linear-oblong, obcordate, obtuse, mucronate at apex, cuneate at base, margins slightly recurved. Flowers axillary or extra-axillary, solitary or in racemes, 1.5-9 mm long, bracteate; bracts small, subulate, ciliate; pedicels 3.5 mm long. Sepals 5; outer sepals 3, unequal, each 1-3 × 1-1.8 mm, ovate, acuminate at apex, ciliate, margins hyaline; inner sepals 2, large, equal, each 3-8 × 1.5-4.5 mm, oblique, ovate-oblong, acuminate at apex, more or less glabrous, margins hyaline. Corolla yellow, petals 3; upper petals 2, each ± 5 × 4 mm, suborbicular, clawed at base; lower ± 4.5 × 4 mm, keel-shaped, crested, clawed at base. Stamens 8, enclosed in the keel petal, filaments united into a sheath, anthers basifixed. Ovary 2-celled; ovules pendulous, one in each cell; style long; stigma incurved, slightly dilated. Capsules 2-5 × 3-6.5 mm, loculicidal, suborbicular, broader than long, obliquely obcordate at apex, margins thick, ciliate. Seeds 3-3.5 × 2-2.5 mm, ovoid, black, silky hairy; caruncle rounded and hairy at the top, furnished with 3 basal appendages; appendages free, conspicuous, suborbicular, membranous, extending downwards to about 2/3 the length of seed.

Types : Chandrabose 28777 (A: Holotype CAL; B K: Isotypes MH).

Flowering & Fruiting : May*.

Distribution : INDIA: Tamil Nadu (Madras).

Herbarium specimens : INDIA: Tamil Nadu; from the banks of Noyil River, Coimbatore town, 467 m, May 9, 1965, Chandrabose 28777 (A: CAL; B K: MH).

Notes: According to chandr. (*l.c.*) : Allied to *P. chinensis* Linn., but differs in having shorter racemes; capsules broader than long; seeds ovoid; appendages of the caruncle winged, suborbicular, membranous, extending downwards to about 2/3 the length of seed.

This species is named in honour of Mr. K. Cherian Jacob, who in the year 1929 after examining specimens of *Polygala* collected by Rangachari from the Central farm, Coimbatore and deposited in the Madras Herbarium, Coimbatore under the Accession numbers 2441 to 2445 and 2463, remarked on the sheets that they belonged to a new species of *Polygala*. He, however, left it undescribed. The specimens referred to above exactly match the specimens under study.

***Polygonum binsarii* Silas & R.D. Gaur** (Polygonaceae) in J. Econ. Tax.Bot. 14 (1): 111 112. 1990.

Annual diffused ascending, densely strigose hairy herbs. Stem non-succulent, branched, 2.5 10 cm long, rooting from the lower joints, strigose hairs red-brown, 0.2 0.8 cm long. Leaves thin, distant, lower ones shortly petiolate upper ones nearly sessile, pale-green, ovate-obovate, 0.8 2.0 × 0.5 1.0 cm entire both surfaces and margin strigose hairy, apex acute, base cuneate. Stipules 2 partite, 0.25 0.3 cm long, hairy. Flowers 2 sexual, pinkish white on terminal, 0.8 2.5 cm long peduncle heads, heads 0.3 0.5 cm across. Solitary flower 0.12 0.15 cm long. Perianth lobes 5, up to 0.1 cm long, apex obtuse or rounded, nearly equal, glabrous. Stamens 4 (usually 3 4), shorter than the perianth lobes, anther lobes ovoid, deep pink; style short; stigma 2 fid. Nuts ellipsoid, dark brown, up to 0.1 cm long, apiculate, obscurely 3 gonous, coriaceous.

Types : R. A. Silas, 7786(A: Holotype GUH;B-D: Isotypes GUH).

Flowering : August-September. *Fruiting* : September October.

Distribution : INDIA: Garhwal- Himalaya.

Herbarium specimens : INDIA: Uttar Pradesh; Pauri Garhwal, Binsar District, Sept. 12, 1985, 2500 m, R. A. Silas, 7786 A D (GUH).

Notes: According to Silas & Gaur (*l.c.*): Rare, annual, herbs of open moist old stone walls, associated with mosses and other small herbs. Presently, this species has been collected from Binsar area of District Pauri Garhwal, Uttar Pradesh, at an elevation of 2500 m.

The species is allied to *P. filicaule* Wall. ex Meissn., but differs by the presence of 0.2–0.8 cm long, red brown strigose hairs covering the plant; leaves broadly ovate, densely strigose hairy; peduncles 0.8–2.5 cm long; flowers minute, 0.1–0.15 cm long; stamens shorter than the perianth lobes; nuts obscurely 3-gonous, smaller than perianth, coriaceous.

This specific epithet is after the name of type locality 'Binsar' of District Pauri Garhwal.

Potentilla panigrahiana Dikshit (Rosaceae) in Bull. Bot. Surv. India 27 (1–4): 107–108. 1985 (1987).

Herbs perennial. Rootstocks ascendent-erect, short branched, imbricately clothed with the relicts of dead stipules. Radical leaves digitately 3-(4)-5-foliolate, 1.5–7.5 cm long; cauline leaves herbaceous, ovate, acute, entire, hairy inside, externally niveo-tomentose. Leaflets sessile, rarely the median leaflets subsessile, obovate, base cuneate, acutely 5–8-serrulated, serrations oblong, upper surfaces soft-appressed-hairy, lower surfaces niveo-tomentose, 2–20 × 2–13 mm. Flowering stems ascendent-erect, 5–12 cm long, overtopping the radical leaves, terete, 1.0–1.5 mm diam., floccose hairy. Inflorescences cyme, 1–6-flowered; pedicels 2.5–6.0 cm long, 0.5–1.0 mm diam., floccose hairy. Episepals 5, oblong, acute, entire or often 2-toothed, slightly shorter than the sepals, externally appressed hairy. Sepals 5, ovate, acute, entire, externally appressed hairy. Petals 5, obovate, slightly retuse, longer than sepals, veins distinct and dichotomously branched forming areoles. Stamens 20. Receptacles saucer-shaped, short, white-hairy. Pistils many; ovary glabrous; styles subterminal, evenly-thickened, three times longer than ovary; stigma swollen, irregular in outline. Achenes glabrous, with smooth surfaces, 1.0 × 0.5 mm.

Type : R. R. Stewart 20137 (Holotype CAL).

Flowering & Fruiting : July-August*.

Distribution : INDIA: Jammu and Kashmir, Sikkim. NEPAL; BHUTAN and CHINA, Tibet.

Herbarium specimens : INDIA: Kashmir; Burjile, Deosai plains side, 4575 m, July 31, 1940, R. R. Stewart 20137 (CAL). Sikkim: Momby, Samdong, Lachung, 5285 m, Aug. 16, 1892, G. A. Gammie 878 (CAL); Llonak, 4390 m, July 28, 1909, Smith & Cave 2010 (CAL).

Notes : According to Dikshit (*l.c.*): *Potentilla panigrahiana*, belongs to the subg. *Hypargyrium* Juzepczuk (1941/1971), sect. *Niveae* Juzepczuk (*l.c.*) as (Rydberg) Juz. In the Himalayas, the species of the sect. *Niveae* exhibit a good plasticity and natural hybridisation seems to be so common that the resultant hybrid species are fully distinct from their parents (Sojak, 1970). Keeping this view in mind, presumes that *P. panigrahiana*, *microspecies nova* (Panigrahi and Purohit, 1983), is of hybrid origin with an undetermined taxon. It resembles *P. saundersiana* in having styles uniformly thickened at base but differs from it in having styles three times longer than ovary.

In leaf character (ternate and digitately 4-5-foliolate) *P. panigrahiana* also resembles *P. nivea* L. However, the style-character at once distinguishes the two species, the former with evenly thickened styles three times longer than the ovary, and the latter with basally thickened and papillate styles as long as the ovary.

The species is named in honour of Dr. G. Panigrahi.

Primula subansirica G. D. Pal (Primulaceae) in J. Bombay Nat. Hist. Soc. 82(3): 617. 1985 (1986).

Perennial scapigerous herbs, 20-30 cm high, efarinose, rusty red; rootstalks oblong to oblong cylindric with fibrous root, thickly pubescent; hairs rusty red, 4-10 celled. Leaves cauline, lamina ovate-cordate, 4.0-6.5 × 3.0-5.5 cm, obtuse, crenate, base cordate,

5-6 secondary nerved, subpubescent above, densely pubescent beneath much along the nerves as well as margin, herbaceous; petioles 7-12 cm long, densely pubescent. Scapes 3-6, longer than leaves, occasionally equal, 13-20 cm long cylindrical, pubescent, with umbel of 2-6 flowers. Flowers monomorphic, erect to semierect, campanulate, purple. Bracts 2-5, broadly lanceolate to oblong-lanceolate, 4-5 × 2.5-3.0 mm, acute, with 1-2 mm rusty red hairs with prominent nerves, pubescent on both surfaces. Calyx 5-lobed, united; lobes oblong, 3.5-4.0 × 0.8-1 mm, with prominent nerves, pubescent beneath, both margin and apex with 1-2 mm long hairs. Corolla campanulate, exannulate, united portion 5 mm glabrescent; limbs 5, obcordate, faintly emarginate, 2.5-3.0 × 5-6 mm, nerves reddish, not much prominent. Stamens 5, inserted at the apex of corolla tube; filament c 2 mm long; anthers ovoid, c 2 × 2 mm; yellow. Ovary ellipsoid, c 2 × 1 mm; style c 2 mm long, equal to the length of limb or slightly longer; stigma capitate. Fruit unknown.

Types : G. D. Pal 78219 (Holotype CAL; A B: Isotypes ARUN, Arunachal Pradesh).

Flowering : April*.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Subansiri District, Begi, 2000 m, Apr. 24, 1980, G. D. Pal 78219 (CAL) & 78219 A B in ARUN (Arunachal Pradesh).

Notes : According to Pal (*l.c.*) : *Primula subansirica* is allied to *Primula erythra* Fletcher but can be differentiated by the presence of 4-10 celled pubescent hairs throughout, scape 13-20 cm long, bracts broadly lanceolate to oblong lanceolate, 4-5 × 2.5-3.0 mm, 2-6 flowered umbel, calyx 3.5-4.0 mm long, shortly united, corolla 7.5-8.0 mm, campanulate, purple.

It grows in forest edges, along the edge of steep hill slopes, on rocky and humus soil in shaded places.

The specific epithet is based on the name of district of type locality Begi.

Psychotria beddomei Deb & M. Gangop. (Rubiaceae) in J. Econ. Tax. Bot. 6(2): 478-479. 1984.

Shrubs or small trees, 4.5-6 m high; branchlets compressed when young, terete in age, glabrous. Leaves shortly petiolate, 6-14 × 1.5-5 cm, obovate, or elliptic, acuminate at apex, incurved at margin, cuneate at base, coriaceous, glabrous, dark green to pale when dry, midribs channelled above, lateral nerves 8-10 on either side, subopposite, arcuate, axil without bacterial glands, nervule reticulations inconspicuous; petioles 5-15 mm long, glabrous, stipules deciduous 8-10 × 5-8 mm, ovate, obtuse or truncate at apex, coriaceous, glabrous above, ferruginous pubescent beneath at base. Inflorescence terminal peduncled umbellate cymes, 5-6 × 4-7 cm, branches 5 or 4 in a whorl, branchlets puberulous; bracts deciduous, ± 2 × 5 mm, fimbriate at margin. Flowers 4.5-5 mm long, subsessile, short tubular, bracteolate; pedicels ± 0.5 mm long glabrous; bracteoles 2-3 mm long, ovate-lanceolate or ovate, acuminate or acute at apex, puberulous above, pubescent beneath. Hypanthium ± 1 mm long, obovoid, glabrous. Calyx short, cupular, ± 1 × 1.5-2 mm, 5-toothed, triangular, acute, puberulous at margin. Corolla tube 1-1.5 mm long, thick, glabrous, lobes ± 1.5 mm long, ovate, thick, inflexed at apex, glabrous. Stamens 5, inserted; filaments minute, adnate at throat, anthers ± 0.5 mm long, oblong, dorsally convex, opening through longitudinal slit. Ovary ± 1 mm long, 2-celled; style 2-2.5 mm long, thin, narrow, wider above; stigma ± 0.5 mm long, capitate, lobes 2, ovate, obtuse or truncate at apex, glabrous. Fruit shortly stalked, 6-7 × 5-6 mm ovoid or globose, smooth, crowned with persistent calyx lobes, glabrous; pyrenes 2.5-6 × 5-5.5 mm, obovoid, obtuse at apex, cuneate at base, thick walled with raphides. Seeds 4-5 × 4.5-5 mm, ovoid, obtuse at apex, cuneate at base, planoconvex, ventrally flat, dorsally smooth, albumen ruminant, embryo ± 2.5 mm long, 1-1.2 mm long, mucronate at base, semi-terete, cotyledons ± 1 mm long, ovate, obtuse at apex, thin, venation inconspicuous.

Type : *Beddome* 3965 (Holotype BM).

Flowering : April-June. *Fruiting* : November-April.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Tirunelvely hills, *Beddome* 3965 (BM); Cheimungee (?), 1200 m (4000'), Apr. 9, 1898, without collector, 969 (Paratype CAL); 900 m (3000'), Apr. 11, 1898, without collector, 960 (Paratype CAL).

Notes : According to Deb & Gang. (*l. c.*): Allied to *P. nudiflora* Wt. & Arn., differing in having bracts and bracteoles, calyx tooth triangular, corolla tube shorter and leaf base cuneate.

In evergreen forest at 900 1200 m altitude.

***Psychotria sekharana* Ramam. & Rajan (Rubiaceae) in J. Bombay Nat. Hist. Soc. 80(3): 621-623. 1983.**

Shrubs; branchlets terete, scars of fallen inter-petiolar stipules and leaves distinct; tender parts compressed. Leaves 12 18 × 2 4 cm, lanceolate to oblanceolate, entire, glabrous, thick, leathery, acute at apex, tapering at base; nerves 2 to 10 pairs arising from the main nerve; nervules distinctly reticulated; main nerve dorsally grooved, shallow; stipules interpetiolar, deltoid, acute or bifid at apex, thick, glabrous, distinct, deciduous; petioles 1 2 cm long. Inflorescence dischotomously corymbose, terminal, dense; peduncles short; bracteoles minute, deciduous. Calyx 1 mm long, campanulate, truncate, sometimes minutely toothed, glabrous. Petals 4 mm long, tubular, white, straight, glabrous without, with a ring of hairs at the mouth within, 5 lobed, lobed halfway, lobes thickened at tip, valvate in bud. Stamens 5, inserted on the mouth of corolla; filaments up to 1 mm long; anthers oblong, dehiscing longitudinally. Ovary 2 loculed; style short; stigma bilobed, thick, distinct. Fruits not seen.

Types : *Ramamurthy* 66275 (Holotype CAL & Isotypes— Acc. Nos. 116341 116343 MH).

Flowering : March*.

Distribution : INDIA : Kerala.

Herbarium specimens : INDIA: Kerala; Trichur District, on the banks of Kannankuzhi river side, 250 m, Mar. 22, 1980, *Ramamurthy* 66275 CAL & MH (Acc. Nos. 116341 116343).

Notes : According to Ramamurthy & Rajan (*l.c.*): Allied to *P. nudiflora* Wight & Arn., but differs chiefly in: leaves lanceolate to oblanceolate, acute at apex; inflorescence dichotomously corymbose; peduncles short; bracteoles minute, deciduous; corolla tube 4 to 5 times longer than the calyx; a ring of hairs at the mouth inside; corolla 5 lobed, lobes thickened at tips; stamens 5, arising near the mouth of corolla.

The specific name is given in honour of Dr. N. Chandrasekharan Nair, D. Sc., Ex-Joint Director, Botanical Survey of India.

***Psychotria silhetensis* Hook. f. subsp. *tomentosa* Deb & M. Gangop. (Rubiaceae) in J. Bombay Nat. Hist. Soc. 80 (2): 466-468. 1983 (1984).**

Shrubs 1.5-2 m high; branches, stout, thick, quadrangular when young, terete in age, ferruginous tomentose. Leaves petiolate, 15-24 × 7-9 cm, elliptic or slightly elliptic-obovate, shortly acuminate at the apex, entire, cuneate or obtuse at the base, coriaceous, glabrous above, densely ferruginous tomentose beneath; midrib stout beneath, less so above, lateral nerves 14-20 on each side, subparallel, arcuate, close, conspicuous beneath, less so above; axil of the midrib and lateral nerves imperforate; nervules reticulate conspicuous beneath, less so above; petioles 1-1.5 cm long, thick, tomentose; stipules deciduous, 1.5-2.5 × 0.6-0.7 cm, ovate caudate-acuminate, coriaceous, glabrous above, pubescent beneath and along the margin. Inflorescence terminal or axillary, long peduncled cymes, 5-8 × 2-8 cm (when fruiting), branches irregular or dichotomous, short or spreading, stout, tomentose; bracteoles minute. Flowers not available. Fruits 0.5-0.6 × 0.3-0.45 cm, subglobose, crowned with calyx (lobes triangular, about 0.05 cm long, ciliate at the margin), glabrescent, shortly stalked; stalks 0.3-0.5 cm; pyrenes solitary, ovoid, planoconvex, acute at the apex, retuse at the base, smooth, thin walled. Seeds 0.4-0.5 × 0.3-0.4 cm, ovoid, acute at the apex, retuse at the base, dorsally convex, smooth, with a longitudinal shallow groove on the ventral side; albumen uniform, thick; micropyle pointing upwards; cotyledons fleshy, oblong.

Type : I. H. Burkill 35726 (Holotype CAL).

Fruiting : November*.

Distribution : INDIA: Assam, Arunachal Pradesh.

Herbarium specimens : INDIA : Assam: North Lakhimpur, Makum, Nov. 1911, I. H. Burkill 35726 (CAL); North Lakhimpur, Dulong Reserve Forest, Nov. 21, 1957, G. Panigrahi 11251 (Paratype CAL); Arunachal Pradesh, Deomali, K. N. Vaid and H. B. Naithani 156 (Paratype DD).

Notes : According to Deb & Gang. (l. c.) : *Psychotria silhetensis* Hook. f. Fl. Birt. Ind. 3: 174. 1880, is based on a collection from Sylhet by De Silva which is extant in Wall. Cat. 8336C (K W, Photo in CAL!). The specimen bearing the same number in CAL, however, does not represent this taxon.

In course of Abor Expedition, I. H. Burkill collected a specimen I. H. Burkill 35726 (CAL) in fruiting condition from Makum, Assam in Nov. 1911. He assigned it doubtfully to *P. silhetensis*. G. Panigrahi collected a similar specimen (G. Panigrahi 11251) in Nov. 1957 from Dulong Reserve Forest, Assam. This is also in similar fruiting condition; and collected from a locality near the former one, which were provisionally considered to form a new variety of *P. silhetensis*. The specimen of K. N. Vaid and H. B. Naithani 156 represented this new taxon. The further study of all the material of *P. silhetensis* and those of the new taxon and in consideration of their distribution, Deb & Gangopadhyay assign these material to a new subspecies. Specimens available bear leaves with stipules, fruits with seeds and persistent calyx.

This differs from *P. silhetensis* Hook. f. subsp. *silhetensis* in having leaves ferruginous tomentose beneath, stipules pubescent beneath and along the margin and smaller broadly ovoid fruit.

The distribution of the typical subspecies *P. silhetensis* Hook. f. subsp. *silhetensis* is as follows: Sylhet (Bangladesh), Khasi Hills, North Cachar, Mizoram, Manipur, Nagaland, Sibsagar district and Dafla Hill of Arunachal Pradesh.

Pternopetalum senii Deb & R.M. Dutta (Apiaceae) in Bull. Bot. Soc. Beng. (J. Sen Mem. Vol.) P. 421-423. 1969.

Herbs erect, slender, perennial, 3-4 cm high, usually simple, glabrous; rhizome up to about 10 × 0.5 cm, terete, subterranean, fleshy, upper part erect, lower horizontal, profusely rooting; stem up to 1 m high, simple scarcely branching, glabrous, erect, slender, fistular. Leaves usually basal, sometimes cauline, long petioled, ovate, 3 pinnate, imparipinnate, membranous, pinnule 9-40 × 4-15 mm; petiole longer than the lamina, up to 25 cm, long, sheathing at the base; pinnae and pinnules opposite, ultimate segments oblong, pinnatipartite, glabrous above, sparsely hispidulous underneath, cuneate at the base, crenate, ciliate at the margin, apiculate. Inflorescence terminal, long peduncled, umbels compound; involucre wanting; rays 20-50, spreading, ascending, subfiliform, unequal, 3.5-6 cm long; umbellules, 2-3 flowered; involucre of a few small bractlets; pedicels 1-3 erect, spreading, unequal, smaller one 1-1.5 mm, longer one 2.5-3 mm, long. Flowers bisexual, small, purple. Calyx teeth barely evident, subulate. Petals oblong, narrowly united. Stamens 5, inflexed in bud, alternating with petals; anthers two, atroviolescent. Styles erect, slender, stylopodium conical; carpophore bifurcate. Fruit oblong, obtuse slightly compressed laterally and a little constricted at the commissure, glabrous, ribs filiform, distinct, subequal; the mericarps subterete in cross section; vittae solitary in the intervals, 2 on the commissure.

Types : Deb 26394 (A: Holotype CAL; B: Isotype ASSAM).

Flowering & Fruiting : July*.

Distribution : INDIA: Arunachal Pradesh (N. E. F. A).

Herbarium specimens : INDIA: Arunachal Pradesh (N. E. F. A): Tirap Frontier Division, Rahu to Wakka, July 2, 1961, Deb 26394 (A in CAL; B in ASSAM).

Notes : According to Deb & Dutta (*l.c.*); This species is allied to *Pternopetalum vulgare* (Dunn) Hand. Mazz., differing in (i) 3 pinnate leaves, (ii) oblong pinnatipartite leaflets and (iii) purplish flowers.

The species is dedicated in honour of late Dr. J. Sen, Deputy Director, Botanical Survey of India, Calcutta.

Pycreus bolei S.M. Almeida (Cyperaceae) in J. Bombay Nat. Hist. Soc. 83 (1): 180-182. 1986.

Tufted herb, ± 30 cm tall. Stems striate. Leaves flat, 27-30 cm long, linear, narrowing to the apex, glabrous with prominent brown midrib. Inflorescence of compact, sessile, stellate, linear spikes, bracteate. Rays 3-4 in number, 4.5-5 cm long, slender, glabrous. Bracts 4-5, glabrous, leaf-like with prominent midrib, 15-20 cm long, 2-3 mm wide, imbricating at the base, curling at the apex after drying. Spikes linear, sessile, 0.7-1.3 cm long, 0.2-0.3 mm wide, straw coloured with 25-40 spikelets. Rachilla not winged, glabrous. Glumes ovate, 0.5-1 mm long, 0.5-0.7 mm wide, aristate, keeled. Keels brown, hyaline on the margins. Stamens 2, small, with slender filaments. Ovary oblanceolate; styles as long as ovary; stigmas 2, equal to the length of the style. Nut oblanceolate, compressed, shortly apiculate, marked with longitudinal rows of tubercles on the surface.

Type : SMA 3438 (Holotype).

Flowering : October-November.

Distribution : INDIA: Maharashtra.

Herbarium specimen : INDIA: Maharashtra; Satarda, Savantwadi, Oct. 22, 1980, SMA 3438.

Notes : According to Almeida (*l.c.*): *Pycreus bolei* resembles *Pycreus globosus* (All.) Reich., in external appearance, but differs from it in the presence of easily detachable, acuminate spikelets and also in the presence of flat rachis and small stamens.

Rare herb in open paddy fields near river banks.

This species is named after Prof. P. V. Bole.

Pycreus lanceolotii S.M. Almeida (Cyperaceae) in J. Bombay Nat. Hist. Soc. 83 (1): 182-184. 1986.

Tufted annual, 5–8 cm tall, with number of slender fibrous roots. Leaves radical, linear, flat, glabrous, 8–10 cm long, 1.5–2 mm broad, tapering to the apex, broader at the base with thick mid-vein and 5–6 prominent lateral veins at the base; margins thick. Scape 5–7 cm long, dull grey, striate, flat, glabrous. Inflorescence of compact spikes forming heads, bracteate. Bracts 3–4, leaf-like, imbricating, much exceeding the rachis, 6–8 cm long, 1–2 mm broad at the base, narrowing to the apex to a point. Midrib thick and prominent, lateral veins faint. Margins thick, glabrous. Rays 3–5 in number, 1–1.5 cm long, striate, glabrous. Spikes radiating, dull grey, distichous. Spikelets oblong, compactly arranged on rachilla, boat-shaped, acute, glabrous, keeled; keel membranous and hyaline on the sides facing the rachilla, brownish towards outside. Stamens 2, much longer than the ovary, projecting beyond the style on maturation; anthers linear; filaments flat. Ovary obovoid; style slender; stigma 2-fid. Nut oblanceolate, shortly beaded, with compactly arranged tubercles on the surface.

Type : SMA 162 (Holotype).

Flowering : May.

Distribution : INDIA : Maharashtra.

Herbarium specimen : INDIA : Maharashtra; Charatha, Savantwadi, May 25, 1977, SMA 162.

Notes : According to Almeida (*l.c.*): *Pycreus lanceolotii* resembles *Juncellus pygmaeus* (Rottb.) Clarke (= *Cyperus pygmaeus* Rottb.) in external appearance, but differs from it in the distichous arrangement of spikelets on the rachis and in the absence of winged keel of the spikelets. *P. lanceolotii* also resembles *P. bolei* in external appearance, but differs from it in the absence of prominent cylindrical rachis and in the presence of long stamens with flattened filaments and linear anther lobes which project beyond the style on maturation.

Rare sedge in wet rice fields.

This species is named after Rev. Fr. Laney Pereira, Ex-Principal, St. Xavier's College, Bombay.

Rhynchoglossum lazulinum A.S. Rao & J. Joseph (Gesneriaceae) in Bull. Bot. Surv. India 9 (1-4): 280-282. 1967 (1968).

Succulent malodorous dense herbs about 6 dm high. Stem cylindrical, smooth. Leaves alternate as well as opposite, long petioled at lower nodes to sessile near the peduncle; lamina obliquely broadly elliptic, 9-2.4 × 3.5-10 cm membranous, acute to acuminate at apex, strikingly unequal, rounded, sub-cordate or decurrent at base, entire margin, with 12-30 slightly arching distinct lateral nerves 5-10 mm apart. Inflorescence a terminal raceme, glabrous, slightly undulate, 14.5-25.5 cm long, few to several-flowered; bract and bracteole subulate about 4 mm long; pedicel stout up to 1 cm long; calyx infundibuliform, about 4 cm long, conspicuously ridged, green; calyx lobes about 11 mm long, much smaller than the calyx tube, ovate, acuminate, callose at tip; corolla bilabiate, bright blue to violet; corolla tube glabrous, about 6 cm long, about 5 mm diam., a little dilated puberulent and prominently bent at the throat; lower lip about 2.5 × 5 cm, 3-lobed, the lobes unequal, suborbicular; upper lip about 2.5 × 3 cm, 2-lobed, the lobes equal, ovate, all lobes obscurely crenulate; stamens didynamous, unequal, the confluent anther flat, about 1 cm broad; disc cuplike 1 mm high; ovary ovoid about 1 cm high, style stout, about 2.5 cm long, stigma obtusely bilobed, about 3 × 2 mm inner surface velvety. Fruit a capsule within the persistent, slightly accrescent calyx. Seeds many, ovoid, small (0.5 × 0.25 mm), the testa brown, reticulate.

Types: Joseph 39716 (A: Holotype CAL; B-F: Isotypes ASSAM).

Flowering & Fruiting : September - November*.

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh (N. E. F. A); Kameng Dist., at Krishna 36 km from Bhallukpong, ca 1250 M, Sept. 10, 1964, on the way to Sessa, Joseph 39716 (A: CAL, B-F: ASSAM); Aka Hills, 1936, N. L. Bor 18179 (Paratype); Baliapara F.T., Nov. 13, 1951, G. K. Deka s.n. (BSI-Acc. No. 29477 Paratype); Subansiri District, on way from Palim to Sayata, Nov. 19, 1964, A. R. K. Sastry 40738 (Paratype).

Notes : According to Rao & Joseph (*l.c.*): The specimen of A. R. K. Sastry 40738 was found on hilly slopes of damp forest

floor and along small streams with *Impatiens*, on black clayey soil. The types were found in shady moist places near the way side, on black humus soil.

Mr. B. L. Burt of the Royal Botanic Gardens, Edinburgh who studied the two sheets of Deka and Bor, noted that the specimens belonged to an undescribed species. He further noted that "Neither of these sheets would be adequate for description as a new species". Subsequent fuller collections of J. Joseph from Kameng and A. R. K. Sastry from subansiri proved to be identical material and has been described as new species.

Rhynchosia fischeri P. Satyanar. & Thoth. (Papilionaceae) in Bull. Bot. Surv. India 28 (1-4): 241-243. 1986 (1988).

Shrubby, branches erect, woody, terete, pubescent with white soft, silky hairs. Leaves trifoliolate, 4.5-9.5 cm long, petiole; stipules 0.3-0.45 cm long, linear or lanceolate, acute or acuminate, longitudinally striated, pubescent on both sides; petioles 1.5-3.3 cm long, erect, puberulous, resinous gland dotted, petiolule of the terminal leaflet 0.5-1.1 cm long; stipels 0.05-0.15 cm long, setiform, often caducous; leaflets diamorphic, 2.2-5.0 × 0.8-2.8 cm, older leaflets broadly elliptic or ovate, mucronulate at apex, cuneate or rounded at base, entire, younger leaflets narrowly lanceolate-elliptic, acuminate at apex, cuneate at base, entire, puberulent above, downy below. Racemes axillary, 1.3-3.3 cm long; peduncles erect, 0.4-1.8 cm long, silky pubescent, resinous gland dotted. Flowers 2-5; bracts ovate-lanceolate, ± 0.2 cm long, acuminate, pubescent on the outer surface, persistent; pedicels erect, 0.2-0.4 cm long, minutely pubescent. Calyx campanulate, 0.5-0.6 cm long, teeth unequally divided, linear or lanceolate, acuminate, densely pubescent with spreading silky hairs. Corolla exserted, 0.7-1.0 cm long; vexillum 0.8 × 0.6 cm, ovate-orbicular, rounded at apex, claw ± 0.2 cm long, auricle ± 0.05 cm long; wings 0.5 × 0.2 cm, narrowly obovate, rounded at apex, claw ± 0.25 cm long, auricles minute; keels 0.8 × 0.3 cm boat-shaped rounded at apex, claw ± 0.25 cm long. Stamens 10, diadelphous (9 + 1), staminal column ± 0.65 cm long, anthers

uniform. Ovary ± 0.2 cm long, pubescent, style ± 0.6 cm long, curved, broadened above, stigma capitate, ovules 2. Pods $1.2 - 1.7 \times 0.5 - 0.6$ cm, oblong, puberulent, inflated, beak minute, incurved, 2 seeded; young seeds sub reniform, sub strophiolate (Mature seeds are not available for study).

Type : C. E. C. Fischer 1374 (Holotype CAL).

Flowering & Fruiting : November.

Distribution : INDIA : Tamil Nadu.

Herbarium specimen : INDIA : Tamil Nadu; Coimbatore District, Dimbam, ± 1165 m, Nov. 15, 1906, C. E. C. Fischer 1374 (CAL).

Notes : According to Satyan. & Thoth. (*l. c.*): *Rhynchosia fischeri* resemble *R. cana* DC, in habit and shares a few other characters, but differs in the soft silky hairs, 2-5 flowers, unequally divided calyx teeth, pubescent ovary and substrophiolate seeds.

The species is named after the collector, C. E. C. Fischer.

Rhynchosia hainesiana P. Satyanar. & Thoth. (Papilionaceae) in Bull. Bot. Surv. India 28 (1-4): 243. 1986 (1988).

Shrubby, branches erect, resinous gland dotted, softly or minutely hirsute, hairs stiff or bristly, spreading, white canescent. Leaves trifoliolate, $1.2 - 2.4$ cm long, petiolate, exstipellate; stipules $0.1 - 0.15$ cm long, linear, persistent, pubescent; petioles $0.4 - 0.7$ cm long, angled, minutely pubescent, petiolule of the terminal leaflet $0.1 - 0.15$ cm long; leaflets monomorphic, $0.6 - 1.5 \times 0.1 - 0.4$ cm, narrowly lanceolate, acute at apex, cuneate at base, margins slightly folded towards lower surface, greenish with glandular hairs above, white silky with minute hairs below. Racemes axillary, ± 1 cm long; peduncles $0.2 - 0.5$ cm long, erect, grey pubescent. Flowers 2; bracts ± 0.1 cm long, subulate, densely canescent, persistent; pedicels $0.2 - 0.3$ cm long erect, filiform, grey pubescent. Calyx campanulate, ± 0.3 cm long, tube short ± 0.1 cm long, teeth unequally divided, pubescent with glandular hairs. Corolla ± 0.5 cm long, exserted; vexillum 0.5×0.4 cm, orbicular, rounded at apex, claw ± 0.1 cm

long, auricles very minute, wings 0.4×0.1 cm, narrowly obovate, rounded at apex, claw ± 0.1 cm long, auricle ± 0.05 cm long, keels 0.45×0.15 cm, falcate, rounded at apex, claw ± 0.1 cm long. Stamens 10, diadelphous (9+1), staminal column ± 0.5 cm long, anthers uniform. Ovary ± 0.1 cm long, glabrescent, style ± 0.5 cm long, slightly broadened above, much curved, stigma capitate, ovules 2. Pods 1.0×0.5 cm, oblong, glabrescent, beak incurved, 2 seeded.

Type : H. H. Haines 3995 (Holotype CAL).

Flowering & Fruiting : March.

Distribution : INDIA: Orissa.

Herbarium specimen : INDIA: Orissa; Angul Forests, Mar. 1917, H. H. Haines 3995 (CAL).

Notes : According to Satyan. & Thoth. (*l.c.*): *Rhynchosia hainesiana* has pods similar to those of *R. cana* DC. and *R. fischeri* Satyan. et Thoth., but differs in having exstipellate leaves; monomorphic, narrowly lanceolate leaflets, with folded margins.

The specific epithet of this taxon is proposed in honour of H. H. Haines.

Rhynchosia jacobii Chandrab. & B.V. Shetty (Papilionaceae)
in Bull. Bot. Surv. India 15 (1 & 2): 139 141. 1973 (1976).

Trailing herbs densely hirsute with short hairs, intermixed with long villous hairs, branching mainly from the base; branches spreading, slender, woody, terete, faintly striate; internodes 0.7 8.0 cm long. Leaves alternate, pinnately trifoliolate; petioles 0.6 3.7 cm long; stipules 0.2 1.1 cm long, linear-lanceolate, hirsute with short hairs, intermixed with long villous hairs without, glabrous within excepting at the tip, distinctly grooved within in-between the nerves. Leaflets ovate-oblong, elliptic-oblong or oblong, entire, mucronate, subcoriaceous, 3 nerved from the base, minutely yellowish gland-dotted beneath; lateral nerves 4 7 pairs from the midrib, nerves and nervules raised on both the sides; petiolules up to 1.8 mm long; stipels absent; terminal leaflets $0.5 4.0 \times 0.4$

2.2 cm, nearly rounded at base; lateral leaflets $0.6 - 3.7 \times 0.4 - 1.9$ cm, inequilateral. Flowers yellow, axillary, usually solitary, occasionally two on the slender rachis; rachis up to 2 cm long, pedicel 1.5 - 2.6 mm long; bracts 2 - 3 mm long, ovate lanceolate, hirsute with short hairs intermixed with long villous hairs without glabrous and distinctly grooved within in-between the nerves. Calyx 6 - 8.5 mm long, hirsute with short hairs, intermixed with long villous hairs; tube ± 2.4 mm long; teeth 5, lanceolate, the lower one ± 4.6 mm long, the rest shorter, ± 3.4 mm long. Corolla papilionaceous; standard 8.25 - 9.0 \times 4.0 - 5.25 mm, obovate with a short claw and inflexed auricles at the base, with red veins; wings 8 - 9 \times 2 mm, obliquely oblong-obovate, distinctly clawed; keels $\pm 8 \times 2.7$ mm, obliquely obovate, distinctly clawed. Stamens ± 9 mm long, diadelphous, 9+1. Ovary $\pm 2.5 \times 1$ mm, subsessile, clothed with long white silky hairs; ovules 2; style ± 6 mm long, slender; stigma capitate. Legume 1.8 - 2.3 \times 0.5-0.7 cm, slightly compressed, subfalcate, acute or subacute with a short beak up to 5 mm long, hirsute with short hairs, intermixed with long villous hairs, usually 2 seeded, rarely 1 seeded, continuous within. Seeds $\pm 4.1 \times 3.3$ mm, brown, subreniform turgid, with an indistinct strophiole.

Types : Shetty & Chandrabose 27989 (A: Holotype CAL; B P: Isotypes MH).

Flowering & Fruiting : July - September*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Tirunelveli District, (Formerly Tinnevely District), Eastern slopes of Mahendragiri Hills, Thulukamparai, 425 m, July 25, 1966, Shetty & Chandrabose 27989 (A in CAL; B P in MH); *ibid.*, Sept. 18, 1916, Rangachari 13545 (Paratype MH Acc. No. 16860).

Notes : According to Chandr. & Shetty (*l.c.*): Allied to *R. minima* DC., but differs in having short dense hirsute hairs intermixed with long villous hairs; leaflets being longer than broad, never deltoid and in having usually solitary and occasionally two flowers on the slender rachis.

The species is named in honour of late Mr. K. Cherian Jacob who after examining a specimen of *Rhynchosia* collected by Rangachari on 18. 9. 1916 from Mahendragiri, Tirunelveli District, which is deposited in the Madras Herbarium, Coimbatore under the Accession number 16860, indicated on the herbarium sheet that it belonged to a new species of *Rhynchosia*. He, however, left it underscribed.

Rhynchosia meeboldii P. Satyanar. & Thoth. (Papilionaceae) in Bull. Bot. Surv. India 28 (1- 4): 243-246. 1986 (1988).

Twing shrubs, branches woody, slender, terete, densely grey silky tomentose, hairs spreading. Leaves trifoliolate, \pm 33 cm long, membranous, puberulent, petiolate; stipules caducous; petioles \pm 10 cm long, grey silky tomentose, petiolule of the terminal leaflet \pm 5 cm long, pubescent; stipels narrow setaceous, \pm 0.5 cm long; leaflets 17.5 \times 19.5 \times 16.5 \times 17.5 cm, broadly ovate-orbicular, acute at apex, rounded at base, entire, puberulous on both surfaces, nerves pubescent. Racemes axillary, more than 33 cm long, grey silky tomentose. Flowers many on lax peduncles; peduncles woody, erect, grey silky tomentose; bracts lanceolate, \pm 0.5 cm long, densely silky pubescent, caducous; pedicels 0.3 \times 0.4 cm long, recurved, filiform; grey silky tomentose. Calyx campanulate, 0.5-0.8 cm long, tube 0.2-0.3 cm long, teeth 0.3-0.5 cm long, upper one slightly 2-cleft, narrow acuminate, grey pubescent. [Corolla, stamens and ovary are not available for study.] Pods 1.8-2.2 cm long, oblong, velvety, mixed with long silky, straight hairs, seeds 0.3 \times 0.4 \times 0.2 \times 0.3 cm, sub-reniform or oblong, dark, nonstrophiolate.

Type : A. Meebold 7582 (Holotype CAL).

Fruiting : December.

Distribution : INDIA: Nagaland.

Herbarium specimen : INDIA: Nagaland; Shibong, \pm 1000 m, Dec. 1907, A. Meebold 7582 (CAL).

Notes : According to Satyan. & Thoth. (l. c.): *Rhynchosia meeboldii* resembles *R. hirta* (Andrews) Meikle & Verdcourt of the subgenus *Cyanospermum* Wight & Arnott in inflorescence and shape of pods,

but differs in membranous, puberulent, acute leaflets; narrow, acuminate calyx lobes; teeth \pm equalling the tube; pods much exceeding the calyx and small, sub-reniform or oblong seeds.

This species is a rather uniform entity that seems most closely related to the subgenus *Eurhynchosia* Wight & Arnott, especially with regard to larger, membranous leaflets, narrow, acuminate calyx teeth and pods much exceeding the calyx. It differs from *Eurhynchosia* in its inflorescence and pod characters. However it represents mixed characters of both the subgenera, namely *Gyanospermum* and *Eurhynchosia*.

The species is named after the collector, A. Meebold.

Rorippa pseudoislandica H.J. Chowdhery & R.R. Rao (Brassicaceae) in Ind. J. For. 8(2): 150 -152. 1985.

Erect, glabrous, branched herbs up to 20 cm tall. Leaves smooth, lyrate-pinnatifid, stalked, 6-11 \times 2-5.5 cm with 4-7 segments on either side, terminal lobe broad, subovate, sinuate toothed. Upper leaves stalked, deeply toothed to pinnatifid. Racemes few-flowered (6-10) not exceeding 10 cm in fruiting. Flowers minute, yellow, 1-1.5 mm across, pedicels up to 1 mm long and 2-4 mm long in fruits (about 1/3 the length of fruit). Sepals 1-1.5 mm long. Petals usually slightly shorter than the sepals (1.0 mm). Stamens six, 1-1.5 mm, long. Ovary 1-1.5 mm, oblong ellipsoid, glabrous. Stigma subsessile. Pods small, broad, 0.9-1.3 cm \times 2-3 mm cylindrical, stalks usually 1/3 the length of pod. Seeds minute, irregularly biseriate.

Types : U. C. Bhattacharyya 21046 (A: Holotype CAL; B C: Isotypes BSD).

Flowering & Fruiting : April.

Distribution : INDIA : Uttar Pradesh.

Herbarium specimens : INDIA : Uttar Pradesh; Hamirpur District, Bela Tal, U. C. Bhattacharyya 21046 (A in CAL; B C in BSD).

Notes : According to Chowdhery & Rao (*l.c.*): This species resembles *R. islandica* (Oeder) Borbas, but can easily be separated

by: plants up to 20 cm, glabrous, leaves obovate in outline with broad pinnatifid lobes, apex rounded; upper leaves stalked; racemes not exceeding 10 cm, few flowered (6-10); pedicel much shorter than the fruit and seeds irregularly biseriate; whereas *R. islandia* is having the characters: plants of up to 70 m tall, slightly hairy; leaves ovate in outline with narrow pinnatifid lobes, apex ovate; upper leaves sessile; racemes about 20 cm long, 20-30-flowered; pedicel as long as the fruit and seeds distinctly biseriate.

Herbs are growing on the shady banks of the lake.

Rosa hirsuta Ghora & Panigrahi (Rosaceae) in Bull. Bot. Surv. India 28 (1-4): 177-178., 1986.

Woody scandent herb with copious short leafy branches; branches and stem densely glandular, prickly and covered with elongated glandular bristles; prickles usually opposite or scattered, flat, with a broad base (to 10 mm) and abruptly tapering to a point, 15 mm long. Leaves up to 5.5 cm long; leaflets 7-11, 10-14 × 5-7 mm, elliptic-obovate, base cuneate, apex obtuse, margin glandular serrate from below the middle, serrulate at apex, slightly hairy above, hispid-glandular beneath, villous on the midrib and veins. Stipules 11 × 2 mm, adnate up to 7 mm from base, apex triangular, margin glandular, pubescent and glandular on both surfaces. Petioles slightly prickly, velutinous and covered with glandular bristles. Flowers solitary, 3.2 cm across. Pedicels 25 mm long, hispid and with glandular bristles. Hypanthia 6 × 4 mm, hispid, with glandular bristles, globose. Sepals 5, 18 × 3 mm, lanceolate, villous on both surfaces, glandular outside margin entire, villous. Petals 5, 20 × 20 mm, obovate. Stamens many, filaments 3-4 mm long. Carpels many, exserted; styles 3 mm long, woolly; stigma globose. Fruits 8 × 10 mm, globose.

Types : Strachey & Winterbottom 5 (Holotype CAL, Acc. No. 151642; Isotype CAL Acc. No. 151641).

Flowering : August. *Fruiting* : September.

Distribution : INDIA : Uttar Pradesh.

Herbarium specimens : INDIA: Uttar Pradesh; Kumaon, Milan

glacier, 3812 m, Aug. 28, 1848, *Strachey & Winterbottom* 5, (CAL, Acc. Nos. 151641-42), 5, Millam, Gori valley, Aug. 14, 1900; *Inayat* 14391 (Paratype CAL Acc. No. 151650); Ralam, 3648 m, Aug. 23, 1848; *Strachey & Winterbottom* 5 (Paratype CAL, Acc. No. 151643), Millam, Sept. 1848, *Strachey & Winterbottom* 5 (Paratype CAL, Acc. No. 151646).

Notes : According to Ghora & Panigr. (*l.c.*) : Grows in temperate climate, from 3,600 3,800 m. In *Rosa sericea* Lindl. (1820, *Rosa* Manogr. 105, t. 12) the leaflets are glabrous, slightly silky hairy beneath on midrib and lateral veins only; stems and branches usually with a few prickles only or sometime mixed with bristles; stipules, pedicels and hypanthia glabrous, smooth.

***Rubia cordifolia* Linn. var. *cordifolia* f. *strigosa* Deb & Malick (Rubiaceae) in J. Bombay Nat. Hist. Soc. 63 (3): 782. 1967; Gaur & Dayal in Van Vigyan 7.4: 1969.**

This differs from the type in having the leaves strigose on both surfaces, more so along the veins underneath and also in hispid stem and petiole.

Types : *G. King* 482 (A: Holotype CAL; B C : Isotypes CAL).

Flowering : May June*.

Distribution : INDIA: Arunachal Pradesh, Uttar Pradesh, Assam; BHUTAN.

Herbarium specimens : INDIA : Arunachal Pradesh ; Jegaon to Poom, Kameng F.D., May 21, 1958, *G. Panigrahi* 16006 (A: Paratype CAL; B: Paratype ASSAM). BHUTAN: Chumbi; Taesicu Doom, June 17, 1984, *G. King* 482 A C (CAL).

Note: According to Deb & Malick (*l.c.*) : The plant is a new forma.

***Rubus ghanakantae* R.S. Rao & J. Joseph (Rosaceae) in Bull. Bot. Surv. India 12 (1 4): 261 263. 1970 (1972).**

Prickly shrub about 2 m high; prickles sparse, small, hooked often absent on flowering twigs. Mature stem glabrous; tender branches cottony pubescent. Leaves simple, 4 - 12 × 1.5 - 4.5 cm, shortly petioled, stipulate, ovate to lanceolate, shortly acuminate, spinulose serrate, glabrous on upper surface with fine pubescence along midrib and veins, lower surface densely pubescent; sometimes petiole and midrib on lower surface with small, tender-hooked scales; stipules entire, 14 mm × 3 mm, lanceolate, acute, longer than petiole, finely villous outside and glabrous inside, deciduous. Inflorescence 4 cm long, sub-corymbose, few-flowered, terminal, velvety-tomentose sparsely intermixed with glandular, capitate bristles. Flowers 2.3 cm in diameter, creamy white, pedicellate; pedicels 14 mm long, densely tomentose, sparsely intermixed with glandular capitate bristles; bracts stipule-like 12 mm × 5 mm, oblong to lanceolate, sub-equally bifid at tip, densely villous outside and glabrous inside; bracteoles setaceous, 5 - 7 mm long, less than 1 mm broad, densely villous outside; sepals 5, united, each 12 mm long and 4-5 mm broad at base, lanceolate, subulate at apex, thick, reflexed, densely tomentose outside; sparsely intermixed with glandular capitate bristles, finely pubescent inside; petals 5, free, inserted on calyx-cup, each 8 × 5 mm, creamy white, obovate, finely hairy on both surfaces; stamens numerous, each 7 mm long, uniseriate along the periphery of calyx-cup; filaments glabrous, anthers dorsifixed, with a tuft of fine hairs at the tip; hairs arising from the ventral side tip of each anther. Carpels numerous, free, each 9 mm long, glabrous, crowded at the centre of calyx-cup on the convex receptacle, inter-mixed with long erect hairs; ovary and style glabrous; stigma laterally diverging, warty; ovule solitary.

Types : Rolla 8086 (A: Holotype CAL; B E: Isotypes ASSAM, K, GH).

Flowering : June*.

Distribution : INDIA : Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Kameng District, ascent of Bomdila, at about 2160 m, nearly 4 - 5 km from Rahung, 92° 30' E, 27° 20' N, June 5, 1957, Rolla 8086 (A in CAL; B E in ASSAM, K, GH).

Notes : According to Rao & Joseph (*l.c.*): *Rubus ghanakantae* is to some extent allied to the Chinese species, *Rubus preptanthus* Focke, but is quite distinct from all the known species of the genus by the presence of characteristic tuft of hairs at the tip of each and every anther.

The distinct type of indumentation with few flowered inflorescence and much larger calyx, separates this new species clearly from *Rubus assamensis* Focke.

Though rather too early to speculate the distribution of this species, as the species grows fairly common along the type locality, it would, however, be quite possible to locate this species along the lower valleys of the Arunachal Pradesh, Himalayas towards the east and also in Bhutan hills towards the west.

Grows along the moist soil slopes leading to the ascent of Bomdila.

Naming of this species made after Shri Ghanakantha Deka, the veteran assistant of the Shillong Herbarium (ASSAM) who has rendered valuable service for the Flora of Assam.

***Rungia latior* Nees var. *anamalayana* Chandrab. & V. Chandras. (Acanthaceae) in J. Bombay Nat. Hist. Soc. 84 (3): 722-723. 1987 (1988).**

Erect or ascending herbs 0.2 -1 m tall, rooting at lower nodes; branchlets pubescent. Leaves 1.5 - 11 × 0.7 - 4 cm, ovate, ovate lanceolate, elliptic-lanceolate or lanceolate, entire or subentire, lanceolate sparsely hispid, obtuse, subacute or shortly acuminate at apex, cuneate at base; lateral nerves 7 -12 pairs, arcuate, prominently reticulate; petioles up to 2.5 cm long, pubescent. Flowers white with violet tinge, crowded in terminal or axillary spikes 2 - 5 cm long; peduncles 0.5 - 5 cm long. Barren bract 8 -10 × 1 - 2 mm, linear lanceolate, acuminate, sparsely hirsute without, ciliate along the margins, 3 nerved. Floral bract 8 - 9 × 2-3 mm, oblanceolate, acute, mucronate, hirsute without, hyaline and ciliate along the margins, 3 nerved. Bracteoles two, each ± 7 × 3 mm, elliptic-oblong, acute,

mucronate, hirsute without along the mid-rib, hyaline and ciliate along the margins. Calyx 5-partite to the base; segments $\pm 6 \times 1$ mm, linear-lanceolate, acuminate, sparsely hirsute without. Corolla 1.6 - 1.8 cm long, 2-lipped, scattered hairy without; upper lip $\pm 7 \times 6$ mm, ovate, acuminate, notched or bifid at apex; lower lip $\pm 10 \times 8$ mm, oblong-obovate, 3-lobed, mid-lobe longer than the lateral ones; tube ± 6 mm long. Stamens 2; filaments ± 5 mm long, glabrous, attached at the mouth of corolla; anthers 2-celled, cells superposed, the lower with basal appendage. Disc cupular. Ovary 1 - 1.5 \times 0.6 - 0.7 mm, ovoid, compressed, glabrous; style 7 - 8.5 mm long, filiform, glabrous; stigma notched or shortly bifid at apex. Capsules $\pm 5.5 \times 3$ mm, ovoid, compressed, acuminate with a short beak, shortly pubescent at the tip, 4-seeded; seeds ± 1.2 mm across, brown, suborbicular, compressed, minutely tuberculate.

Types : Chandrabose 65859 (Holotype CAL; Isotypes MH-5 herbarium sheets).

Flowering & Fruiting : February*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Coimbatore District, Anamalai Hills, Akkamalai R. F., Feb. 19, 1980 Chandrabose 65859 (CAL, MH).

Notes : According to Chandrabose & Chandrasekaran (l. c.): Allied to *R. latior* Nees var. *latior* but the new variety differs in having floral bracts oblanceolate, acute at apex; and bracteoles elliptic-oblong, acute at apex. Distinguishing characters in details for comparison are: Floral bracts 4.5 - 6 \times 3 - 4 mm, orbicular-obovate, rounded at apex, ciliate only along the margins; bracteoles $\pm 5 \times 3.5$ mm, oblong-obovate, emarginate and obcordate or truncate at apex in variety *latior*; whereas in variety, *R. anamalayana*, floral bracts are 8 - 9 \times 2 - 3 mm, oblanceolate, acute at apex, ciliate without and along the margins; bracteole $\pm 7 \times 3$ mm, elliptic-oblong and acute at apex.

The new variety is common along the slopes of the hills in the evergreen forests at an altitude of 1610 m.

Sabia campanulata wall. var. ***kingiana*** M.P. Nayar & S.C. Majumdar (Sabiaceae) in Bull. Bot. Surv. India 24 (1-4): 219-220. 1982. (1983).

A woody climber or scandent shrub with pubescent young shoots. Leaves alternate, lanceolate, 1.0-3.0 × 0.5-1.0 cm, apex acuminate acute at the base, nerves 4-6 pairs. Bud scales present at the base of flowering branch. Flowers solitary, axillary on 1.5-2 cm long peduncles and appearing with the new leaves. Sepals 5, united at the base, about 0.75 mm long. Petals 5, free, ovate to oblong, 3-3.5 × 2-2.5 mm. Stamens 5, free, about 4 mm long, opposite to the petals, extrorse, anther oblong-ellipsoid. Ovary 1 mm bilocular, style 3 mm long, minutely lobed.

Type : G. King s. n. (Holotype CAL Acc. No. 97399).

Flowering : Time not mentioned.

Distribution : SIKKIM: Himalaya.

Herbarium specimen : INDIA: SIKKIM; G. King s. n. (CAL- Acc. No. 97399).

Notes : According to Nayar & Majumdar (*l.c.*): Allied to var. *campanulata*, but differs in: Flowers smaller; Stamens longer than petals; Petals ovate to oblong, 3-3.5 × 2-2.5 mm; whereas var. *campanulata* is characterised by: Flower larger; Stamens shorter than petals; petals subrounded to obovate, 6-10 × 4-7 mm.

Sacciolepis indica (L.) Chase var. ***intermedia*** S.M. Almeida (Poaceae) in J. Bombay Nat. Hist. Soc. 83 (1): 184-185. 1986.

Slender grass ± 45-60 cm tall (including inflorescence) with 4-5 branches from the base having number of fibrous roots. Culms slender, with 3-4 internodes; nodes brown, hairy. Leaves linear, with sheathing leaf bases; leaf bases of basal leaves 3-4 cm long, 4-5 mm broad, many nerved; lamina 12-15 cm long, acicular. Inflorescence of terminal, unbranched, solitary, compressed, paniculate spikes. Rachis 13-15 cm long, striate. Spikelets lanceolate, bracteate, appressed to the rachis, alternate, arranged in twos on unequal pedicels, articulated, falling off at maturity. Pedicels persistent

with prominent articulations of the spikelets. Outer glumes ovate, acute, 1 1.5 mm long, strongly veined; inner glumes 2, ovate-lanceolate, 3 4 mm long, longer than the outer glume, acute, strongly veined, purple. Palea ovate, membranous, 2 2.5 mm long, 1.5 2 mm broad; lemma same as that of palea. Florets unisexual. Male florets with 3 stamens; filaments small; female florets with oblong, compressed ovary; styles 2, equal, slender.

Type : SMA 1393 (Holotype BLAT ?).

Flowering : December January.

Distribution : INDIA: Maharashtra.

Herbarium specimen : INDIA: Maharashtra; Charatha, Savantwadi, Dec. 31, 1977, SMA 1393 (BLAT?).

Notes : According to Almeida (*l.c.*): *Sacciolepis indica* (Linn.) Chase var. *intermedia* comes very near to *Sacciolepis indica* (L.) Chase in floral characters and in external appearance but differs from it in the presence of longer pedicels, acute spikelets and in the absence of scales.

Rare grass in moist places.

Sadiria erecta (Clarke) Mez var. ***longipetiolata*** G.S. Giri, G.D. Pal & H.J. Chowdhery (Myrsinaceae) in *Ind. J. For.* 15 (1): 93 94. 1992.

Erect shrubs, 0.5 1.25 m tall, well branched; branches terete, greyish, glabrous; branchlets slightly angular with longitudinal ridges and furrows, sparsely lenticellate. Leaves alternate, elliptic-lanceolate to obovate-lanceolate, (6-) 9 14 (-16) × (2-) 3 4 (-5.5) cm; base cuneate; apex acuminate; margin unevenly dentate to crenate-dentate; midnerve raised, striate, lateral nerves 6 14 pairs, ending into crenate-dentate margin, reticulations prominent; surfaces of lamina glabrous, chartaceous; petioles 10 12 mm long, terete or slightly angular, glabrous. Inflorescence axillary or terminal panicle or paniculately umbellate; panicles 1.5 4 cm long, 1 3 cm broad; peduncles up to 1.2 cm long, rusty puberulous; bracts ovate-lanceolate, acute, 3 6 mm long; bracteoles 1 2 mm long.

Flower buds triangular-ovate 2-6 × 1-3 mm. Calyx gamosepalous; sepals 5, valvate; calyx tube 1-2 mm long; lobes lanceolate, acute or obtuse, 1.75-0.2 × 0.5-0.75 mm, glabrous. Corolla gamopetalous, 5-lobed, twisted to right; corolla-tube 2-2.5 mm long; lobes ovate to ovate-lanceolate, acute, ± 2 × 1 mm, fleshy, whitish, glabrous. Stamens 5, almost sessile, opposite to corolla lobes and attached at base of corolla-tube; filaments ± 0.25 mm long, glabrous; anthers ovate to oblong-lanceolate, acuminate, 3 × 0.75 mm, dorsally gland-dotted on the crest. Ovary ovoid or globose, glabrous; style cylindric, gradually narrowed upwards, 2.5-2.75 mm long, glabrous; stigma inconspicuous. Fruit not known.

Type : A. R. K. Sastry 40533 (Holotype ARUN).

Flowering : November-December.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimen : INDIA: Arunachal Pradesh; on the way from Begi to Amjee, 5 miles from Begi, Lower Subansiri District, 1400-1500 m Nov. 12, 1964, A. R. K. Sastry 40533 (ARUN).

Notes : According to Giri *et al.* (*l. c.*) : The variety *longipetiolata* var. nov. differs from *S. erecta* var. *erecta* by leaves with distinct dentate margin, long petioles (10-12 mm long), many flowered in floescence and acute corolla-lobes.

In moist and shady places inside subtemperate forests, along the stream on clayey soil with leaf-mould.

Sadiria subsessilifolia M.P. Nayar & G.S. Giri (Myrsinaceae) in Bull. Bot. Surv. India 16 (1-4): 144-146. 1974 (1977).

Shrub, woody, terete, glabrous. Leaves subsessile, large, oblanceolate, 10-20 cm long, 4-7.5 cm wide, base cuneate, apex abruptly acuminate or acute, margin sinuate, pellucid-punctate, upper surface glabrous, undersurface along the nerves puberulous, membranous, main nerves prominent, lateral nerves 10-15 pairs, distinct. Infloescence axillary, subfasciculate or subpaniculate, 2-

3 cm long, densely puberulous. Flowers small, 5 - merous, puberulous; pedicel 2 - 3 mm long, puberulous. Calyx campanulate, 1 - 1.5 mm long, puberulous, lobes triangular. Corolla 1 - 1.2 mm long, petals 5, 3/4 longitudinally united to form a tube, lobes imbricate towards the right. Stamens 5, 0.8 mm long, smaller than petals; filament short, 0.1 mm long; anther triangular, 0.7 mm long. Ovary subglobose; style slender, 1 mm long, subequal in length to the petals. Fruit berry, subglobose, 1-seeded.

Type : I. H. Burkill, R. E. P. 36657 (Holotype CAL).

Flowering & Fruiting : January - February*.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh ; Abor, Rengging, Feb. 20, 1912, I. H. Burkill, R. E. P. 36657(CAL); *ibid.*, above upper Rotung, alt. 1600 m, Jan. 23, 1912, I. H. Burkill R. E. P. 36220 (CAL); *ibid.*, spur above upper Rengging Camp, alt. 1100 m, Jan. 26, 1912, I. H. Burkill R. E. P. 36272 (CAL); *ibid.*, above the head of the Egar, alt. 1600 m, Jan. 23, 1912, I. H. Burkill 36188 (CAL).

Notes : According to Nayar & Giri (*l. c.*): *S. subsessilifolia* Nayar & Giri is allied to *S. griffithii* (Clarke) Mez, but differs in having subsessile, sinuate margined leaves and robust peduncle.

Mez (1902) reduced De Candolle's genus *Pimelandra* to a sub-genus of *Ardisia* and the following species, *Pimelandra griffithii* Clarke, *P. eugenifolia* (Wall.) Hook. f. and *P. erecta* Clarke which could not be assigned to the genus *Ardisia* were segregated to form a new genus *Sadiria* Mez.

The genus *Sadiria* is related to *Antistrophe* DC., but differs in having petals united above the middle, while in the latter the petals are united only at the base. So far five Indian species have been reported under the genus *Sadiria*.

Sageretia coimbatorensis Bhandari & Bhansali (Rhamnaceae)
in J. Econ. Tax. Bot. 5 (4): 921 - 923. 1984.

A large shrub or small tree, branches scandent, alternate, fluted, the margin of the furrow sharp, glabrous, bark of the stem and larger

branches cinereous, often white speckled, armed with thorns, internodes 2-5 cm long. Leaves 4.8-8.7 × 2.5-4.0 cm, ovate or elliptic, rounded at base, acuminate at apex with a callous point, sub-coriaceous, glabrous, smooth, shining above, sharply serrulate, each tooth marked by a deciduous, glandular mucro, lateral nerves 4-5 pairs, camptodromous near the margin, venation impressed above and raised below, tertiary nerves reticulate; petiole 0.8-1.0 cm long, pubescent; stipules 1.2-1.5 mm long, lanceolate, deciduous. Inflorescence axillary and terminal panicles, 4.5-5.0 mm across, sessile, pentamerous, fascicles 5-6 flowered; bracts 1-1.5 mm long, pubescent, deciduous. Sepals 1.5-2.0 mm long, glabrous without and within, thickened at the triangular apex and margin, keeled up to the middle, deltoid, acute. Petals 0.8-1.2 mm long, obcordate, shortly clawed, margin and apex enrolled, deeply cucullate, enclosing the stamens. Stamens 1-1.5 mm long, dorsifixed, filament slender, flat at the base. Disc round or slightly 5-lobed, glabrous, saucer-shaped margin free, thickened around the ovary. Ovary tri-carpellary, tri-locular, hidden by the disc, glabrous; style short, 3-lobed or grooved, lobes coherent; stigma capitate. Fruit unknown.

Type : K. M. Sebastine 1729 (Holotype MH).

Flowering : November - January.

Distribution : INDIA: Southern - Western Ghats; Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Thekkumalai Hills, Coimbatore District, 666 m, Dec. 12, 1956, K. M. Sebastine 1729 (MH - 3 specimens).

Notes : According to Bhandari & Bhansali (*l.c.*): This plant, which is known only from Thekkumalai Hills, Coimbatore, was apparently collected by Sebastine in 1956 and determined by him as *Sageretia parviflora* (Roem & Schult.) G. Don. It differs markedly from the latter species, not only in its general aspect but also in the different shape of the leaves, the glabrous floral parts, having stamens which are larger than the petals and the latter are notched. In *Sageretia parviflora* the leaves are ovate, the floral parts are pubescent, the stamens more or less equal to petals and the latter are emarginate. This species is based on a collection of Sebastine (3 sheets) without fruit.

Sauropus varierii Sivar. & Balach. (Euphorbiaceae) in J. Econ. Tax. Bot. 5(4): 917-919. 1984.

Dwarf, woody shrubs about 1 m tall; younger parts of stem 3-5 angled, often minutely winged along the angles, glabrous, brachiate; brachyblasts 10-15 cm long, compressed, not winged; leaves up to 1.8 × 1.3 cm, broadly elliptic, ovate or orbicular, glabrous, green above, pale beneath secondary veins 4-5 pairs, not raised above, lower leaves smaller; petiole 1-1.5 mm long; stipules almost as long as the petiole, lanceolate. Male flowers: in 2s or 3s from the axils, subdiscoid, 2.5 mm across; bracts and bracteoles minute, acuminate; pedicels 2.5 mm long; calyx segments 6 in 2 series, the outer three larger than the inner, broader than long, inner three as broad as long (1 mm); segments quadrate, glabrous, tips retuse or minutely 2-lobed; stamens 3, filaments united into a short triradiate column; anthers vertical. Female flowers: 4 mm across, usually solitary in the axils, green; pedicels 2 mm long; calyx lobes 6 in two series, inner smaller, orbicular or broadly ovate, acute, outer calyx segments 2.5 mm across, inner 1.5 mm across, accrescent and clasping the fruits, glabrous; ovary depressed at top; styles 3, subcentral, 2-lobed, lobes reflexed; fruit subglobose with a triradiate depression at its beaked tip, 6 mm across, dehiscing into 6 valves; seeds lenticular, black, smooth.

Types : Indu AVS 1579 (Holotype CAL; Isotype MH, CALI).

Flowering & Fruiting : Time not mentioned.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Malappuram District, Kottakkal Arya vaidya Sala Herbal Garden, Indu AVS 1579 (CAL, MH, CALI).

Notes : According to Sivarajan & Balachandran (*l. c.*): The genus *Sauropus* Blume Sect. *Ceratogynum* is reported to have five species in the erstwhile British India (Hooker, Fl. Brit. Ind. 5: 335-336. 1887). Of them, *S. rigidus* Thw. and *S. brevipes* Muell.-Arg. are from Burma and Ceylon respectively and the present day India has only three representative species namely, *S. quadrangularis* (Willd.) Muell.-Arg., *S. compressus* Muell.-Arg. and *S. pubescens* Hook. f.

They differ among themselves in the nature of the male flowers, dehiscence of fruits and pubescence. *S. quadrangularis* is a dwarf glabrous shrub having star-shaped male flowers, with tongue-shaped, obtuse or subacute perianth lobes and is very common in this region along the lateritic slopes and in the crevices of rocks. Its leaves have a characteristic greyish patch on the upper surface. The capsules are valvular with a spreading accrescent calyx. *S. compressus* is described to have irregularly rupturing capsules and *S. pubescens* is distinctive by its quadrate, retuse or bilobed, tomentose male calyx and pubescent branches and leaves. However, in spite of these differences, Airy Shaw in his treatise on Siamese Euphorbiaceae [Kew Bulletin 26 (2): 337. 1972] has emended the circumscription of *S. quadrangularis* to include the other two species as varieties of the former.

During a systematic survey of the plants growing in the AVS Herbal Garden, authors (Sivarajan & Balachandran) came across a very interesting material of *Sauropus*. The original source of collection of the plant is not known. It seems most likely that it is introduced from somewhere in the Western Ghats. Airy Shaw who checked the material on our request suggested that it should belong to *S. quadrangularis* complex (personal communication). Authors (*l.c.*) have both the taxa growing side by side here in the herbal garden and have compared them with the emended descriptions of the species and the varieties given by him. The authors (*l.c.*) are convinced that the material under discussion could not be assigned to *S. quadrangularis* and hence it is described as a new species.

S. varierii is closely related to *S. quadrangularis* (Willd.) Muell.-Arg. (S. Str.) and *S. pubescens* Hook. f. but, differs from the former in its flat, subdiscoid male flowers with broad, retuse or bilobed calyx segments, smaller female flowers and fruiting calyx which does not exceed the diameter of the fruit. From the latter it can be recognised by its glabrous stem and foliage leaves with 4-5 pairs of secondary veins, stipules as long as the petiole and glabrous calyx.

The species is named after late Sri S. P. Varier, the founder of Arya Vaidya Sala, Kottakkal.

Saxifraga chadwellii Wadhwa (Saxifragaceae) in Bull. Bot. Surv. India 28 (1-4): 157-158. 1986 (1989).

Plants densely caespitose, many stemmed, 7.5-11.5 cm tall. Stem very red, copiously covered with brown curled hairs, more so at bases of the leaves and below the flower. Rosette leaves up to 3.3 cm long with long ferruginous, crisped hairs on the margins, often with minute glands, lamina lanceolate, 1.6 × 0.8 cm, apex obtuse, at base gradually narrowed into petiole; cauline leaves a few only, lower ones subpetiolate, upper ones shorter, ovate-lanceolate, 7 × 2.2 mm, all on the margins long ferruginous hairy, hairs crisped, sometimes minute capitulate.

Hypanthium at the base ferruginous hairy. Sepals ovate, 5.0 × 1.6 mm, with long brown hairs on outer surface and margins, nerves 3-5, free. Petals yellow, elliptic, very shortly clawed, 6.0 × 2.5 mm, hardly 1 mm longer than sepals, margins with long curled brownish hairs, nerves 3, lateral nerves bifurcating. Stamens + equal, up to 4.8 mm long, anther sacs producing pollens + 1 mm thick and long. Ovary cup-shaped, styles short, robust, 1.5 mm long; stigma robust. Capsul unknown.

Type : C. Chadwell 185 (Holotype K).

Flowering : July*.

Distribution : INDIA: Kashmir.

Herbarium specimen : INDIA : Kashmir; Ladakh; Pensa La, 4117 m, very red hairy stems; July 26, 1981, C. Chadwell 185 (K).

Notes : According to Wadhwa (*l.c.*): This belongs to section *Hirculus* (Haw.) Tausch., and is related to *Saxifraga montana* H. Sm., but differs in plants with very red stems, copiously covered with brown curled hairs, more so at bases of the leaves and below the flower; leaf margins of both rosette and cauline leaves with brown hairs; sepals ovate with long brown hairs on outer surface and margins; petals elliptic, very shortly clawed, margins with long curled brown hairs.

This taxon has been named after Mr. Christopher A. Chadwell, Slough, Berks (U. K.), who has collected this material from Ladakh from Grassy banks of mountain streams, Occasional.

Saxifraga poluniniana H. Sm. var. *mucronata* U.C. Bhattach. & M.V. Viswan. (Saxifragaceae) in Bull. Bot. Surv. India 15 (3 4): 269 271. 1973 (1976).

Perennial herb forming large hemispheric cushions, 15 20 cm diameter, branches wiry, numerous, caespitose, older dark brown, rigid, naked with remnants of leaf bases. Stem-leaves alternate, sessile, patent or slightly recurved, forming imbricating rosettes at the apex, linear to oblong, 5-7 foveolate, entire, narrow margined, base minutely and sparsely denticulate-ciliate, apex acute, mucronate, nerves obscure above, prominent beneath, 6 12 mm long, 1.5 2 mm broad. Floriferous stem 1.5 2 cm above leaf, glandular hairy with 2 3 erect, glandular, narrow, smaller leaves. Flowers solitary, showy, pale pink to white, many on same cushion. Calyx densely glandular hairy, \pm 5.5 mm long, 3 mm broad, lobes ovate, acute, erect, 3 -nerved, 2.5 3 mm long, 1- 1.5 mm broad. Petals oblong, broad and rounded above, nerves purple, moderately spreading, 12 16 mm long, 5 mm broad. Stamens 5 mm long, anthers red. Ovary sub inferior, style red, 5 mm long, stigma subcapitate.

Types : U.C. Bhattacharyya 37230 (Holotype CAL; A & B: Isotypes BSD).

Flowering : May*.

Distribution : INDIA: Uttar Pradesh.

Herbarium specimens : INDIA: Garhwal; Eastern Chamoli, May 1967, U. C. Bhattacharyya 37230 (CAL; A & B in BSD).

Notes : According to Bhattacharyya & Viswanathan (*l. c.*): *Saxifraga poluniniana* H. Sm. var. *mucronata* Bhattacharyya and Viswanathan var. nov. belongs to the section Kabschia. It is similar to *S. puluniniana* H. Sm. but differs in having larger, mucronate leaves, erect acute calyx and larger flowers with greater number of veins in petals.

Harry Smith (1958) described *S. poluniniana* based on specimens collected from Nepal between Padmara and Burma, Padmara Lagna, 3450 m. It is not, so far, reported from any where else. This variety *mucronata* was collected by U. C. Bhattacharyya, for the first time from Western Himalaya. This newly discovered taxon was collected

between Wan and Kukina Khal 3200 m on dripping south facing moist rock and also on north facing steep rock. It is a handsome plant for growing in temperate, moist rock gardens.

H. Smith (1958) states that the affinity of this species is obscure. It can be placed near to *S. Burseriana* Linn. (Engl. et Irmsch., 1958) from which it differs in not having both erect and patent leaves and the leaves being all glabrous, acute and mucronate, and in petals being erect, clawless.

The differentiating characters between *S. polluniana* var. *mucronata* Bhattacharyya and *S. polluniana* H. Smith are : cushions 15-20 cm diam.; leaf linear to oblong, apex acute, mucronate 6-12 mm long, 1.5-2 mm broad; calyx \pm 5-5 mm long, 3 mm broad, lobes ovate, acute, erect, 2.5-3 mm long, 1.1-5 mm broad, petals oblong, broad and rounded above, nerves more in number than in the "type"; stamens about half as long as petals; style 5 mm long, are characters of the former; whereas in the later, cushions are 10-13 mm diam.; leaf linear, apex sub-acute, 5-6.2 mm long, 1.5 mm broad; sepals ovate, obtuse, tip recurved, 3.5 mm long, 2.5 mm broad; petals upper half sub-orbicular, base narrow, attenuate, 10 mm long, 5 mm broad; stamens about twice shorter than petals; style 4 mm long. Also reported later from Kumaon Hills (J.Econ. Tax.Bot. 5: 397. 1984.)

***Schefflera chandrasekharanii* Ramam. & Rajan (Araliaceae)**
in J. Bombay Nat. Hist. Soc. 79 (1): 163. 1982.

Small trees; branchlets terete, lenticellate, pale shiny, bark papery when dry, scars of the fallen leaves prominent. Leaves alternat at the ends of branchlets, digitately 1-2-foliolate; petioles 0.5-1.5 cm long, terete with swollen sheathing base, glabrous. Leaflets 5-10 \times 3-4 cm, obovate, coriaceous, wavy crenatus, apiculate at apex, tapering equally or unequally at base; nerves reticulate, conspicuously distinct, curved and united at margins on both sides, lower more distinct; petiolules 0.5-1.5 cm long, terete. Flowers bisexual, in terminal umbellate-panicles; each umbel 10-15-flowered; peduncles up to 2 cm long; pedicels 1-2 mm long,

stellately white-tomentose. Calyx c 1 mm long, cup shaped, not lobed, adnate to ovary. Petals 5, each c 1 mm long, ovate, acuminate, inflexed, glabrous, deciduously calypterate. Stamens 5, alternating with the petals, inserted round the epigynous disc; filaments c 2 mm long, incurved; anthers oblong, dorsifixed, dehiscent longitudinally; staminodes absent. Ovary inferior, 5-loculed, one ovule in each locule; style short, connate. Fruits unknown.

Types : Ramamurthy , 66388 (Holotype CAL; Isotypes MH Acc. Nos. 109030 109032).

Flowering : March*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA, Kerala; Idukki District, along Munnar Kumili Road, 2000 m, Mar. 26, 1980; Ramamurthy 66388 (CAL & MH Acc. Nos. 109030 109032).

Notes: According to Ramamurthy & Rajan (*l.c.*) : *Schefflera chandrasekharanii* is allied to *S. bourdillonii* Gamble, but differs chiefly in: leaflets 1-2, larger, obovate, wavy crenate, apiculate at apex, tapering into an equal base; scars of the fallen leaves prominent. Flowers in large terminal umbellate panicles; peduncles and pedicels stellately tomentose; stamens larger than petals, filaments incurved; staminodes absent.

In dense evergreen forest.

The specific name is given in honour of Dr. N. Chandrasekharan Nair, D. Sc., Ex-Joint Director, Botanical Survey of India.

Schefflera pushpangadanii Chakrab. (Araliaceae) in J. Econ. Tax. Bot. 6 (2): 421-422. 1985.

Tree, 10-15 m high. Leaves digitately 14-17-foliolate; leaflets oblong (often narrowly), 12.5-33 cm long, 3-10 cm broad, rounded to truncate at base, entire at margins, mucronate or shortly caudate at apex (cauda up to 12 mm long), coriaceous, glabrous above, glabrous or sparsely whitish stellate-puberulous on midrib and lateral nerves beneath; on drying blackish to greenish above and beneath;

midrib slightly raised (towards base) or flat (towards apex) above, much raised beneath; lateral nerves 9-17 pairs, faint to indistinct above, prominent beneath, abruptly curved and branching near margin, often uniformly curved; tertiary nerves inconspicuous above, faint beneath, reticulate; petiolules 2-7 cm long, 2-3 mm thick, sulcate above, glabrous or sparsely adpressed whitish stellate-puberulous; petiole 30-60 cm long, 8-10 mm thick towards base, 5-6 mm thick towards apex, glabrous to sparsely stellate-puberulous, conspicuously lenticellate towards base. Inflorescences crowded above the leaves (subtended by ca 25 mm long, stiff, triangular-acuminate bracts); main axis 23-50 cm long, somewhat flattend and striate, 3-5 mm thick towards base, sparsely whitish stellate-puberulous; umbellules numerous, scattered along the main axis, many-flowered (ca 30 or more), pedunculate; peduncles (i. e. side-axes) 2-4 cm long, slender, sparsely whitish stellate-puberulous; bracts (subtending the peduncle) triangular, 4-5 mm long, stiff, densely adpressed stellate-puberulous outside, glabrous inside, persistent, bracteoles (subtending the pedicels) oblanceolate or subulate, 1.2-1.8 mm long, puberulous outside, deciduous. Flowers pedicels 4-10 mm long, ± 0.2 mm thick, sparsely whitish stellate-puberulous; calyx rimlike; petals 8, triangular to triangular oblong, ± 2 mm long, 1-1.4 mm broad, calyptrat, sparsely puberulous to glabrous outside deciduous; stamens 8, filaments 2-4 mm long, anthers ellipsoid to oblong, ± 1 mm long; disc, convex, 0.5-0.7 mm above the calyx, 8-lobed, ± 2 mm diam., surmounted by a ring of stigmas; ovary turbinate to campanulate, 1.5-2 mm long, ± 2 mm diam., not or weakly 8-lobed (7-) 8-locular; stigmas 8, sessile, somewhat free, ± 0.3 mm long, apically bilobed. Fruits oblong-ellipsoid or globose, 5.5-8 mm long, 5.5-6 mm diam., prominently 8-angled, glabrous, brown; pedicel 13-17 mm long; seeds unknown.

Types : *Dwivedi* 7886 (A: Holotype CAL; B-D: Isotypes PBL).

Flowering & Fruiting : February-June*.

Distribution : INDIA : Great Nicobar Island.

Herbarium specimens: INDIA: Great Nicobar Island; 38 km on east-west road, 13 Feb. 13, 1980, *Dwivedi* 7886 (A in CAL & B-D in PBL); 25 km on east-west road, Galathea riverside, June 16, 1977, *Balakrishnan* 5791 (Paratypes PBL).

Notes : According to Chakrab. (*l.c.*): Closely related to *Schefflera fastigiata* (Mig.) Vig. of Java but distinct in the 14-17 foliolate leaves, the oblong leaflets rounded or truncate at base and the 9-17 pairs of lateral nerves.

Common in inland hill forest on clayey loam at about 75 m altitude.

Further distinctive features of the new sp. from allied sp. is to be detected.

Schizostachyum arunachalensis H.B. Naithani (Bambusoideae) in Indian Forester 118 (3): 230-231. 1992.

A semiscandent bamboo about 10-15 m high. Culms at first erect and then branches pendulous; nodes swollen with thick 1 cm broad ring of brown hairs; internodes at base 20 cm long and up to 1 m long above, 10-12 cm in girth, smooth, dark green when young turning yellow with age; wall 5-10 mm thick; branch bud 10-8 mm, rounded at apex, keeled; branches 4-2 cm in girth. Culm sheaths 15-26 × 12-14 cm thick, crustaceous, covered with yellow-brown hairs on upper surface, glabrous on undersurface, oblique at the apex, margin with yellow-brown cilia on upper half; imperfect blade 10-25 × 9-11 cm triangular, striate with transverse veins, base rounded, one side larger than other, inflated with reticulate veins, margins with bristles on lower half; ligule narrow, entire. Leaves 30-48 × 7.5-18 cm, oblong lanceolate, base oblique, ending into a 1.5 cm long thick petiole, apex acuminate into a twisted point, glabrous on the both surfaces, margins minutely scabrous; main vein prominent; secondary veins 12-18 pairs; intermedicary 6-8; sheaths glabrous or pubescent ending in a smooth callus and prominent long setaceous, reticulate auricles; ligule oblique, narrow, entire. Inflorescence not known.

Type : H. B. Naithani 1406 (Holotype DD).

Flowering : Not known.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Subansiri

District, Baja near Daporjio, 300 m, Mar. 17, 1986, *H. B. Naithani* 1406 (DD).

Notes : According to Naithani (*l.c.*) : Allied to *Schizostachyum seshagirianum* Majumdar, but differs in having nodes swollen with thick ring of brown hairs; imperfect blade of culm sheath with reticulate veins; leaves 7.5–18 cm broad with 12–18 pairs of secondary veins; leaf-sheath with prominent reticulate auriculate auricles. This locally called Tuchur (Adi and Hill Miri) occurs in wet mountain slopes at an altitude of 300–700 m. Culms of this species are usually attacked by the insects.

***Scirpus dialgamensis* Majeed Kak & Javeid** (Cyperaceae in *J. Bombay Nat. Hist. Soc.* 79(1): 172–175. 1982.

Diffused, erect annual 3–5 cm long, rooting at the base. Culms few, ribbed, terminating in a spike. Leaves equal or slightly shorter than spike, acicular, obtuse, 1-nerved, base sheathing 2–3 mm dia., parallel veined. Spikelets single, ovate, ovoid, 5–7 × 3–4 mm, reddish brown; bracts 1–2 acicular, 10–15 mm long; glumes distichous lower few sterile, upper navicular, 3 × 2 mm, acuminate, 1-nerved; stamens 2, filaments elongate later; style equalling or slightly shorter than ovary; stigma bifid, exerted. Bristles and buttons totally lacking. Nuts ovoid, plano-convex, 2 × 1 mm, reticulations prominent.

Type : AMK 3736 (Holotype, Herbarium of the University of Kashmir, Srinagar).

Flowering & Fruiting : July*.

Distribution : INDIA: Kashmir.

Herbarium specimens : INDIA: Kashmir; Dialgam, opposite to the Agriculture farm (Anantanag), 1700 m, July 15, 1976, AMK 3736 (Herbarium of the University of Kashmir, Srinagar); *ibid.*; Anantanag (Kashmir), AMK 4018 (Paratype).

Notes : According to Kak & Javeid (*l.c.*): The species is allied to *Scirpus fluitans* L., but differs from it in having stems 3–5 cm long, erect, ribbed, branched and leafy at the base; bracts usually

longer than the spikelets; glumes longer than nuts; nut reticulation prominent.

The holotype was collected at wet and marshy places under complete shade of *Salix* & *Populus*. The plants are found near wet and swampy areas on the margins of slow moving streams.

Scleria borii D.M. Verma (Cyperaceae) in Bull. Bot. Surv. India 29 (1-4) 14-16. 1987 (1989).

Perennial herbs, ca 1.2 m high. Stem triquetrous, ca 3 mm across, retrorsely scabrous on the angles. Leaves shorter than the stem, linear, 5-10 mm broad, acuminate, margins and ribs scaberulous above sheath winged; contraligule rotundate, with a brown scarious margin. Bracts lower 3 foliaceous equalling the panicle, upper gradually setaceous. Inflorescence depaniculate, interrupted, ca 30 cm long, panicle branches hairy, secondary panicles solitary, on slender pubescent peduncles. Spikelets unisexual, solitary, though sometimes very close, glumes stramineous, densely red-brown striolate. Male spikelets linear oblong, 2.5-3.0 mm long; glumes elliptic-oblong, acute or mucronate, ca 2.5 mm long. Stamens 3, anthers linear, ca 1.2 mm long. Female spikelets sessile or shortly pedicelled, ca 4 mm long; glumes broadly ovate, acute or aristate, 2.5-4.5 mm long, pubescent or glabrescent. Disc 3-lobed almost to the base, lobes lanceolate, appressed, thin, stramineous slenderly red-brown striolate, denticulate-crenulate at the apex. Nut slightly shorter than the glume, oblate, ca 2 mm long, ca 2.3 mm broad, white, apiculate, faintly reticulately rugose, glabrous or sparsely hairy, subtruncate at the base.

Type : N. L. Bor 17808 (Holotype DD).

Flowering & Fruiting : August-September*.

Distribution : INDIA: Manipur.

Herbarium specimens : INDIA: Manipur; Kangpokpi in grass land, 3000 feet, Sept. 2, 1943, N. L. Bor 17808 (DD).

Notes : According to Verma (*l. c.*): Allied to *Scleria levis* Retz., but differs in its shorter oblate nuts.

The specimen from Manipur, *Bor* 17808, kept in the Herbarium of the Forest Research Institute & College, Dehra Dun (DD) under *Scleria hebecarpa* Nees (= *S. levis* Retz.) was found to have markedly different nuts. While the nuts of *S. levis* Retz., are globose-ovoid, 2.5–3.0 mm long and about 2.5 mm broad, usually longer than broad, sometimes as broad as long, the nuts of *Bor* 17808 were distinctly shorter and oblate, about 2.0 mm long and about 2.3 mm broad, always broader than long. The oblate nuts are somewhat similar in shape to those found in *Scleria oblata* S. T. Blake which again is very distinct with its thick hemispherical obtuse disc lobes. The disc lobes of *Bor* 17808 are thin, lanceolate and toothed. Hence it is described as new species.

***Secamone andamanica* Goel & Vasudeva Rao (Asclepiadaceae)**
in *J. Bombay Nat. Hist. Soc.* 85 (1): 161–163. 1988.

Straggling laticiferous shrubs, 1.5–2.0 m tall. Stems brownish; upper branchlets green with a swollen nodes, glabrescent-brown hairy on the axil and for some length on either side of nodes. Leaves opposite, lanceolate to ovate lanceolate; lamina 3.5–7.0 × 1.0–2.8 cm, thinly coriaceous, darkgreen on adaxial surface, glaucous green on abaxial surface, margin entire, sometimes distantly obscurely serrulate in anterior portion, 11–14-nerved; midrib and primary nerves sunken above, flattened below, nerves looped and joining below margins; base acute to cuneate; apex gradually acuminate; petioles 4.0–7.0 mm long, terete with narrow groove on upper surface with a few brown hairs at base. Inflorescence a dichasial cyme, shorter than leaves, 1.5–2.5 cm long, glabrescent-puberulous. Bracts 0.75–1.0 × 0.5 mm, triangular, yellowish green. Pedicels 3.0–5.0 mm long, puberulous. Flowers greenish yellow, 2.5–3.0 mm across; sepals 5 parted, imbricate, 1.0 × 0.75 mm, oval, puberulous outside, obtuse at apex, ciliolate at margins, without any gland inside, at base. Corolla rotate, tube short, 0.5 × 0.9 mm, abruptly widened to lobes; corolla lobes 1.3–1.5 mm long, twisted to left in bud, later erect, oblong, obtuse, sometimes notched at apex with distinct concave groove flanked by thick calli at base on inner side. Staminal column c 1.0 mm long, completely attached to the

ovary; staminal corona of 5 lobes, very small, subulate, broader and attached just below the middle in-between stamens, free, incurved above; anthers completely united, anther appendage sub-quadrate, fimbriate; pollinia 4, oval transparent, shining attached to viscid somewhat oval corpusculum with 2 very small, thick filaments. Stigma exceeding the stamens, bilobed; style simple; ovary bicarpellate.

Types : A. K. Goel 16604 (A: Holotype CDRI; B: Isotype PBL; C D: Isotypes CDRI).

Flowering : September October.

Distribution : INDIA: South Andamans.

Herbarium specimens : INDIA: South Andamans; Jolly Boys Island, Oct. 24, 1986, A. K. Goel 16604A, C & D. (CDRI) & A. K. Goel 16604 B (PBL).

Notes : According to Goel & Vasudeva Rao (*l.c.*): *Secamone andamanica* differing from the common coastal, rarely inland, scrub *Secamone emetica* (Retz.) R. Br. ex Schultes of Peninsular India and Sri Lanka in the following characters: young stems near nodes globrescent-brown hairy. Leaves broadly lanceolate, gradually acuminate. Staminal corona of 5, free, subulate, incurved segments; anther connective produced into a membranous, subquadrate, fimbriate appendage.

Rare near sea-shore amidst black boulders associated with *Colubrina asiatica*.

Senecio ladakhensis H.J. Chowdhery, Uniyal, R. Mathur & R.R. Rao (Asteraceae) in Ind. J. For. 13 (4): 366. 1990.

Annual, dwarf, slender, glabrous, erect, 5-10 cm tall herbs. Stem branched from the middle. Leaves sessile to subsessile, 0.5-2 × 0.1-0.3 cm, elliptic or oblong-lanceolate, glabrous, blackish green, entire, pinnately few dentate or lobulate or subentire; middle cauline leaves dilated and semiamplexicaule at the base; uppermost linear, bract like. Heads narrowly cylindrical, radiate, 6 × 1-2 mm, few in terminal, lax corymbs, pedunculate; peduncles very slender, up to 10 mm long, pale, glabrous, shining, bracteolate; bracteoles

2, linear-lanceolate. Involucres cylindrical, $6 \times 2-2.5$ mm, involucre bracts 7-8, linear lanceolate, 6×1 mm, acuminate, slender, often reflexed, glabrous, herbaceous. Ray florets 3-4, yellow; corolla 1.5 mm, elliptic-oblong, entire, obtuse; corolla tube 2.5 mm long. Disc florets 3-4, yellow, 4 mm long; corolla limb 1-2 mm long. Achenes 2-2.5 mm long, white.

Types : H. J. Chowdhery & B. P. Uniyal 85802 (A: Holotype CAL, B: Isotype BSD).

Flowering & Fruiting : July - August.

Distribution : INDIA: Jammu and Kashmir.

Herbarium specimens : INDIA : Jammu and Kashmir; District Ladakh, Dras 3500 m, July 27, 1988, H. J. Chowdhery & B. P. Uniyal 85802 A (CAL) and 85802 B (BSD).

Notes : According to Chowdhury *et al.* (*l. c.*): The species is allied to *Senecio subdentatus* Ledeb., but differs in being dwarf, slender herbs, 5-10 cm tall. Leaves sessile to subsessile, elliptic or oblong-lanceolate, entire, pinnately few dentate; heads narrow $5-7 \times 0.1$ mm, bracteolate, bracteoles always 2; involucre bracts 7-8, linear-lanceolate, acuminate, slender, often reflexed. Ray florets 3-4, corolla short, yellow; entire. Disc florets 3-4, corolla 5-lobed. Achenes 2-2.5 mm long; pappus 4-4.5 mm long, deciduous; whereas the species *Senecio subdentatus* is having the characters: 5-25 cm tall herbs; peduncles 1.5-4 cm long; bracteoles 2-5; phyllaries 13, ray florets 7-8. Disc florets numerous; achenes 3.5 mm long; pappus 5-6 mm long.

The species appeared under the shade of boulders by the side of the river Dras, occasional.

Silentvalleya V. J. Nair, Sreek., Vajr. & Bhargavan (Poaceae) in J. Bombay Nat. Hist. Soc. 79 (3): 654-657. 1982 (1983).

Tufted perennial plants. Leaf blades linear. Ligules membranous. Inflorescence an open panicle with several racemes on a central axis. Racemes slender, straight or flexuous. Spikelets solitary at each

node, biseriate, laterally compressed, 6–10-flowered, disarticulating between florets. Callus densely bearded. Glumes unequal; lower glume faintly 1-nerved, upper glume 3-nerved. Lemmas exerted from the glumes; tip entire, long awned; 3-nerved, lateral nerves glabrous and faint. Palea 2-nerved, 2-keeled. Lodicules 2. Stamens 3. Styles 2, stigmas plumose. Caryopsis oblong-lanceolate, terete.

Type species : *Silentvalleya nairii* Nair, Sreekumar & Vajravelu.

Distribution : INDIA: Kerala.

Notes : According to Nair *et al.* (*l.c.*): It belongs to Eragrosteae of family Poaceae and is related to the genus *Diplachne* P. Beauv., from which it differs in the spikelet being laterally compressed; calus densely bearded, upper glume 3-nerved, lemma long awned and with the lateral nerves glabrous and faint.

The generic name denotes the type locality.

Silentvalleya nairii V.J. Nair, Sreek., Vajr. & Bhargavan (Poaceae) in J. Bombay Nat. Hist. Soc. 79 (3): 654–657. 1982 (1983).

Tufted perennial grasses. Culms 40–100 cm high, erect; nodes glabrous. Leaves 40–60 cm long, 0.4–0.6 cm wide, linear with filiform tips, tough, glaucous, villous towards mouth and scabrid or glabrous elsewhere. Sheaths closely fitting, rigid, coriaceous, rough and scabrid. Ligule a narrow truncate membrane. Inflorescence a panicle, 15–30 cm long, with 6–10 racemes scattered along a central axis, each 8–20 cm long. Spikelets ca 8 × 2 mm, oblong-lanceolate, 6–10-flowered with a terminal reduced floret, at times purplish. Lower glumes c 2 × 1 mm, ovate, acute, faintly 1-nerved and glabrous. Upper glumes c 4 × 1.25 mm, lanceolate, acuminate, 3-nerved, lateral nerves faint and visible only in the lower half. Lemmas c 4 × 1.75 mm, ovate-lanceolate, 3-nerved, lateral nerves faint, tip ending in an awn 3–5 mm long which is scabrid. Paleas c 3 × 1 mm, elliptic, 2-keeled, keels minutely winged and shortly ciliate, delicate, glabrous. Lodicules 2, each c 0.3 × 0.15 mm, obovate, 2-horned at apex. Stamens 3; anthers c 1.25 mm long, filaments short. Ovary c 0.4 × 0.25 mm, oblanceolate and shortly stalked.

Styles c 0.3 mm long, stigmas c 0.5 mm long, plumose. Grain c 2 × 0.4 mm, oblong-lanceolate, stalked.

Types : N. C. Nair 64268 (Holotype CAL; Isotypes MH 3 specimens).

Flowering & Fruiting : October April*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Palghat District; Silent Valley dam site, ± 850 m, Oct. 5, 1979, N. C. Nair 64268 (CAL, MH 3 specimens); *ibid.*, ±700 m, Apr. 23, 1980, E. Vajravelu & V. J. Nair 67260 (Paratypes K 1 specimen; MH 4 specimens); *ibid.* Silent valley Reserve Forest, Aruvampara, ± 725 m, Oct. 10, 1979, N. C. Nair 64465 (Paratypes MH 5 specimens).

Notes : According to Nair, *et al.* (*l. c.*): Grows in the crevices of rocks and other similar rocky areas. It is fairly common along the sides of Kunthipuzha river and forms large tufts on the boulders near the proposed Silent Valley dam site. It was also observed along the rocky slopes of Aruvampara but was less common.

The specific epithet is after Dr. N. C. Nair, Ex-Joint Director, Botanical Survey of India, Coimbatore in recognition of his valuable contributions to Indian Botany. His collections also form type materials of this taxon.

Dr. Thomas A. Cope, of the Herbarium, Royal Botanic Gardens, Kew, after critical examination of these specimens gave the following opinion (personal communication)- "..... is a new genus. It is, as you thought, related to *Diplachne* (but not to *Bewsia*), presumably derived from it. *Diplachne* is pantropical and has three awned derivatives. *Gouinia* in America, *Lophacme* in Africa and this new genus in India".

***Sinocrassula indica* (Decne.) Berger var. *paniculata* N.B. Singh & U.C. Bhattach. (Crassulaceae) in J. Econ. Tax. Bot. 6 (1): 211. 1985.**

Biennial plant, stems 12-35 cm long, erect, more or less

unbranched, glabrous. Roots fibrous, branched, linear 4-9 cm long. Leaves lanceolate to ovate, 2-2.5 × 0.3-0.5 cm, spatulate, alternate, sharply acute; rosette leaves rosulate, cuspidate, 2-3 × .4-.7 (-1.0) cm; persistent, 15-25 in number. Inflorescences large panicle, 4-12 × 3-8 cm. Flowers 1.6-4 × 1.1-2.5 mm, hermaphrodite, pinkish-yellowish, pedicillate, bracteate, bracts similar to cauline leaves but smaller in size, 8-12 × 2-3 mm. Sepals broadly triangular, 1.5-2.4 × 1-1.5 mm, acute at the apex. Petals linear to lanceolate, 2.5-3 × 1-1.4 (-2) mm, obtuse at the apex, yellow, thin. Stamens 5 alternate to petal, smaller than the petals, 1.8-2.7 mm, anthers basifixed, reddish, 1-1.2 × .8-1 mm. Carpels connate at the base, 1.2-2 mm long, style beaked slightly outcurved, stigma not distinct. Seeds 1 mm around, ellipsoid. Nectar scales quadrate, emerginate, dark brown.

Types : U. C. Bhattacharyya 33695 (A: Holotype BSD; B: Isotype BSD).

Flowering & Fruiting : July-August.

Distribution : INDIA: Garhwal, Kumaon (Uttar Pradesh).

Herbarium specimens : INDIA : Uttar Pradesh; Tehri Garhwal, Deolsuri, 1800 m, July 26, 1964, U. C. Bhattacharyya 33695 A & 33695 B (BSD); Kumaon, Champawat, 1600 m, July 23, 1969, C. M. Arora 38889 (Paratype BSD).

Notes : According to Singh & Bhattacharyya (*l.c.*): Allied to *S. indica* (Decne.) Berger but differs in having large and loose panicle-inflorescence, very small flowers 1.6-4 × 1.1-2.5 mm and unbranched solitary stems.

***Skimmia arunachalensis* Goel & Mehrotra (Rutaceae) in J. Bombay Nat. Hist. Soc. 86 (2): 226-228 1989.**

Small glabrous, evergreen trees c 3-4 m high. Twigs bright green. Leaves alternate or crowded towards the end of branches, simple, petiolate; petioles 0.5-1.0 cm long; lamina 4.5-14.0 × (1.0-) 2.0-3.5 cm, lanceolate or oblong lanceolate, acuminate to caudate with cuneate, sometimes oblique base, thinly coriaceous, sparsely

gland dotted on both surfaces, nerves indistinct on both sides. Panicles small, dense, terminal or axillary, 0.6–1.2 cm long. Flowers yellowish white, polygamous, subsessile or pedicellate. Pedicels 1.0–1.5 mm long, thick. Bracts and bracteoles 1.5–2.5 × 1.0–2.0 mm, ovate, acuminate, with ciliate margins. Sepals 5, imbricate; 2.0–2.5 × 1.0–1.5 mm, broadly ovate, with ciliate margins, persistent in fruits. Petals 5, 3.0–4.0 × 1.0–1.5 mm, oblong, obtuse. Stamens 5; anthers 2.0 × 0.75 mm, yellowish, dorsifixd; filaments c 1.25 mm long, white, stout, subulate. Ovary ovoid, rudimentary in male flowers; styles divided at top in 3 short stigmatic branches, c 0.5 × 0.5 mm, white; female flowers; only 1–2 develop in subglobose drupes. Pedicels enlarged in fruits, 5–10 mm long. Drupes 9–13 × 7–13 mm, rugose with c 1–2 mm diam., stigmatic scar on top. Seeds ovoid, 6–7 × 4–5 mm, whitish cartilagenous.

Types : A. K. Goel 14216 (A: Holotype CDRI ; B D: Isotypes CDRI).

Flowering & Fruiting : March–June.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Bomdila (West Kameng District), 2500 m, Apr. 2, 1984, A. K. Goel 14216 A–D (CDRI); Bomdila Camp, Apr. 13, 1957, G. Panigrahi 6885 A–D (Paratypes CAL).

Notes : According to Goel & Mehrotra(*l.c.*): On open or shady slopes along with *Salix* along forest edges.

This species is allied to *Skimmia arborescens* T. Anders. ex Gamble but having small, 0.5–1.0 cm long petioles; 0.6–1.2 cm long panicles; petals oblong, 3.0–4.0 mm long; anthers larger, 2 mm long; drupes large, 9–13 mm diam., subglobose, rugose on c 1.5 mm thick pedicels. whereas *S. arborescens* is having anthers smaller, 0.5 mm long, fruit less than 9.0 mm diam., globose, smooth. Rutaceae are represented by 150 genera with 900 species. They are distributed in tropical and warm temperate regions, particularly in South Africa and Australia (Heywood 1978). *Skimmia* Thunb., has about 18 species, mainly from Japan, China, India, Nepal, Bhutan, Pakistan, Afghanistan, Formosa, Burma, Thailand and the

Philippines. So far, three species, namely *S. laureola* (DC.) Sieb. & Zucc., *S. arborescens* T. Anders. ex Gamble and *S. melanocarpa* Rehder are known from the Indian subcontinent (Gamble 1917, Hara 1965). *S. laureola* is distributed in the whole Himalayan range and the other two species are restricted to the Central and Eastern Himalayas.

***Skimmia kamengensis* Goel & Mehrotra (Rutaceae) in J. Bombay Nat. Hist. Soc. 86(2): 228-229, 1989.**

Small tree. Leaves alternate or crowded at the ends of branches, simple, petiolate; petioles 0.8-1.5 cm long; lamina 7.0-14.0 × 2.5-4.2 cm, obovate-oblong, acute to obtuse with cuneate base, coriaceous, sparsely gland-dotted below, thickly gland-dotted above; midrib thick, prominent on both surfaces; lateral nerves indistinct. Panicles lax, terminal, branched, hispid, 5.0-8.0 cm long, many flowered. Flowers cream coloured. Pedicels 3-10 mm long, thick. Bracts and bracteoles 1.0-1.5 × 1.0 mm, ovate, acute with ciliate margins. Sepals 5, imbricate, 1.0-1.5 × 1.25 mm, broadly ovate, obtuse, tomentose with ciliate margins, persistent in fruits. Petals 5, 5.0-6.0 × 1.0-2.0 mm, spatulate, thick, obtuse. Stamens 5, exerted; anthers 2-lobed, 0.75-1.0 × 0.75-1.0 mm, yellowish, dorsifixed, opening longitudinally; filaments 4.0-5.0 mm long, stout, subulate, white. Ovary small, fixed at 0.75 mm across. Disc, 2-celled; style c. 2 mm long, stout; stigma single, capitate. Drupes pyriform, 3.0-6.0 mm across. Seed 1, cartilagenous.

Types : B. N. Mehrotra 2446 (A: Holotype CDRI ; B-C: Isotypes CDRI).

Flowering & Fruiting : April-June.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Bomdila, Kameng District, 3048 m, May 5, 1970, B. M. Mehrotra 2446 A-C (CDRI).

Note : According to Goel & Mehrotra (*l.c.*): It can be readily distinguished from *S. arborescens* by small 0.8-1.5 cm long petioles;

obovate oblong, coriaceous leaves with 10–20 lateral nerves, without arching along margins; panicles larger, 5.0–8.0 cm, loose; bracts small, 1.0–1.5 mm long; sepals 1.0–1.5 mm long with ciliate margins; drupes greenish black, smaller 3.0–6.0 mm diam., pyriform. With the discovery of two new species (*S. Kamengensis* & *S. arunachalensis*) the total number of taxa described under *Skimmia* rises to twenty; of these, *S. laureola* is distributed over the whole Himalayan range and *S. arborescens*, *S. melanocarpa*, *S. arunachalensis* and *S. Kamengensis* are reported from the Central and Eastern Himalayan regions of the Indian subcontinent.

Habitat: On the shady slopes.

Sonchus jainii Chandrab., V. Chandras. & N.C. Nair (Asteraceae)
in *J. Bombay Nat. Hist. Soc.* 81 (1): 149–151. 1984.

Erect herbs 30–75 cm high, glabrous; roots and stems with milky latex. Leaves 2–16 × 1–4.5 cm, in spirals, close in the lower portion, distant above; lower ones narrowly oblong, sinuately lobed or pinnatifid with ovate acute or oblong obtuse segments, sometimes simple, recurved along the margins, glabrous, acute at apex, auricled at base; upper ones simple, ovate lanceolate, subentire, recurved along the margins, glabrous, acute or acuminate at apex, amplexicaul at base with acute auricles. Heads ± 1.7–2 cm long, 1.5–2 cm across, yellow, campanulate, homogamous with all ligulate flowers, pedunculate, in terminal fascicled racemes or panicles; torus slightly depressed. Involucral bracts 6–15 × 2.5–4 mm, many-seriate, coriaceous, glabrous excepting a few hairs at the tip, obtusely acuminate; outer ones gradually shorter, ovate or ovate-lanceolate; inner ones longer, oblong-lanceolate. Flowers yellow, bisexual. Corolla tube 6–7 mm long, linear, sparsely pubescent at throat without; limb 6–7 × 2 mm, narrowly oblong, 5-toothed at apex, teeth ± 0.5 × 0.3 mm. Anthers ± 2.5 mm long, linear-oblong, connate; filaments ± 1 mm long, free, glabrous. Ovary ± 1.5 × 0.9 mm, linear-oblong, ribbed, truncate at both ends, glabrous; style ± 1 cm long, linear, glabrous except near the tip; stigma bifid, arms ± 1.7 mm long, simple. Pappus 8–10 mm long, dull white, smooth, faintly

heteromorphic with thick and finer capillaceous hairs. Achenes $\pm 5 \times 1$ mm, brown, linear-oblong, compressed, strongly 4-ribbed with 2 faint longitudinal nerves in between, smooth, glabrous.

Types : Chandrabose 69015 (Holotype CAL & Isotypes MH-Acc. Nos. 117706 117711).

Flowering & Fruiting : November*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Coimbatore District, Anamalai, Konalar, Nov. 18, 1980, Chandrabose 69015 (CAL & MH-Acc. Nos. 117706 117711).

Notes : According to Chandrabose *et al.* (*l. c.*): This interesting taxon represents a member of the tribe Lactuceae (Syn. Cichorieae), but found it difficult to place new species in the appropriate genus, as this perennial species exhibits: achenes longer, narrowed at both ends; and pappus of finer capillaceous smooth hairs intermixed with thick smooth hairs. F. G. Davies after examining the specimen remarked "..... It does seem to be near *Sonchus*, and at present I would not be certain whether it belongs in this genus or not. There are some rather odd perennial *Sonchus* species and it may be a new one of these". However we treat it as a species of *Sonchus* L. as suggested by F. G. Davies of the Kew Herbarium.

This species grows on the grassy slopes at an altitude of about 2050 m.

This species is named in honour of Dr. S. K. Jain, Director, Botanical Survey of India for his contribution to the taxonomy.

Sonerila arunachalensis G.S. Giri, A. Pramanik & H.J. Chowdhery (Melastomataceae) in Ind. J. For. 15 (1): 95-96. 1992.

Small erect herbs, up to 15 cm high. Stem slender, terete, unbranched, densely covered with spreading ferruginous hairs, hairs ± 1 mm long. Leaves whorled or fascicled, rarely alternate towards base, ovate to ovate-lanceolate, $2.5 \times 1.5-4$ cm; base cordate-aurate or cordate-rounded; apex acute to obtuse; margin

serrate, ciliate; 5-7 nerved from base of lamina and 12-13 nerves higher up on either side of midrib, nerves distinct beneath; chartaceous, sparsely brownish hairy, hairs dense along the nerves beneath; petioles slender, terete. 1-3 cm long, densely brownish hairy, hairs often stiff and hooked. Inflorescence axillary or terminal scorpioid racemes, peduncles slender, 2-5 cm long, angular, brownish hairy, 3-5 flowered, bracts subulate. Flowers 1-2 cm long, ebracteolate, subsessile. Calyx-tube urceolate 5-10 mm long, brownish hairy, hairs often curved with rigid base; lobes 3, broadly triangular, 1 × 1 mm. Petals 3, yellowish-pink, ovate-oblong, 5-10 × 2-4 mm, midrib dorsally with a few hairs. Stamens 3; filaments filiform, 5-6 mm long, glabrous; anthers sickle-shaped, attenuate at apex, 4.5-5.5 mm long. Style slender, 7-9 mm long, glabrous; stigma capitate. Capsule obconical, distinctly 6-ribbed, brownish pubescent, intermixed with curved stiff hairs. Seeds minute, many, muricate.

Types : A. Pramanik 5438 (Holotype CAL; Isotype ARUN).

Flowering & Fruiting : August-September*.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Dibang valley District, Mahao Sanctuary, 1500 m, sept. 15, 1990, A. Pramanik 5438 (CAL & ARUN); Waka, Aug. 27, 1958, Panigrahi 14973 (Paratype CAL).

Notes : According to Giri *et al.* (*l.c.*) : The new species is allied to *S. maculata* Roxb., but can be easily distinguished by its dense ferruginously pubescent stems; petals with scattered hairs dorsally on midrib and capsules distinctly 6-costate, pubescent or hispid.

***Sonerila kannanorensis* G.S. Giri & M.P. Nayar (Melastomataceae)** in Bull. Bot. Surv. India 27 (1-4): 86-89. 1985 (1987).

Small herbs, attaining 6-30 cm high, stem and branches more or less quadrangular, reddish, glabrous, usually rooting higher up from the woody base forming more or less a stiling habit. Leaves opposite decussate, ovate-lanceolate (0.8-) 2.0-4.0 (-6.0) × (0.5-) 1.0

1.5 (-2.0) cm, base distinctly unequal, oblique, apex shortly and bluntly acuminate, pinnately veined, 6-9 nerves arising from each side of the midrib, margin sharply serrate, upper surface covered with scattered whitish hairs, lower surface glabrous or with a few scattered hairs on the nerves, minutely white spotted, remain greenish or turn brownish green on drying, membranous; petioles (0.5-) 1.0-1.5 (-2.8) cm long, glabrous. Inflorescence axillary or terminal scorpioid raceme, 4-10-flowered, peduncle 1.0-2.5 cm long, glabrous, reddish, bracts minute. Flowers 3-merous, purple, pedicels small, not distinct and very often gradually merging with the base of ovary, 1.0-2.5 mm long, glabrous or rarely with a few scattered hairs. Calyx tube urceolate, 4-5 mm long, with a few scattered hairs, lobes broadly triangular, 0.5-0.75 × 0.75-1.0 mm, a few whitish hairs occur on the edges, indistinctly 1-veined. Petals obovate, 6.0-8.0 × 3.0-4.0 mm, midrib dorsally with a few scattered hairs. Stamens 3, filaments 2.5-3.0 mm long, glabrous; anthers broadly ovate apex acute not beaked, 1.5-2.0 mm long, biporis. Ovary glabrous, style 4.5-5.5 mm long, stigma capitate, papillose. Capsules 4.0-5.0 mm long, indistinctly 6-ribbed. Seeds many.

Types : Ramachandran 65288 (Holotype CAL; Isotype MH).

Flowering & Fruiting : December*.

Distribution : India: Kerala, Tamil Nadu.

Herbarium specimens : INDIA: Kerala; Cannanore District, Chandanathode, ± 825 m, Dec. 18, 1979, Ramachandran 65288 (CAL, MH). Tamil Nadu; Pulney Hills, sine Coll. s. n., Acc. No. 21450 (MH).

Notes : According to Giri & Nayar (*l.c.*): The new species is allied to *S. versicolor* Wt. & Arn., but can be easily distinguished by its glabrous stem and branches, smaller leaves, broadly ovate anthers without a prominent beak and smaller fruits. The SEM studies of seed coat reveal the tubercles in *S. kannanorensis* sp. nov. are oval and convex, the portions in between the oval tubercles are covered with large pustules whereas in *S. versicolor* Wt. & Arn., the tubercles pyramidal with a rosette head and the portion in between the tubercles are covered with oval small pustules. The new taxon is also allied to *S. zeylanica* Wt. & Arn., endemic to Sri Lanka, but

differs by larger leaves & pinnate venetion. Endemic to Southern India.

Sonerila dharii V. Prakash & Mehrotra (Melastomataceae) in *Candollea* 43 (1): 143-145. 1988.

A small herb, ca 10-15 cm long with erect or ascending stem. Leaves opposite, long petioled; petiole (0.5-) 1.0-2.5 cm long with brown spreading hairs; lamina 1.0-5.0 cm long, 0.5-2.5 cm broad, ovate to ovate-lanceolate, rounded (-oblique) at base, subacute-obtuse at apex, serrate and ciliate with long spreading hairs on margins, glabrous to sparsely hairy on both surfaces, green above, purple below, 3-7 nerved from base, and 2-3 upper nerves from midrib. Inflorescence terminal. Flowers purple, \pm 2 cm across, 3-merous, 3-8 capitate (crowded) at the end of 2-4 cm long, slender peduncle; pedicels 0 or very short. Calyx-tube ca 4-8 mm long, narrowly funnel-shaped with few hairs, shortly 3-toothed, at mouth. Petals 3 up to \pm 1.2 cm long, elliptic-oblong to lanceolate-elliptic, abruptly acute-acuminate, entire, 1-nerved, glabrous to sparsely hairy along nerves below. Stamens 3, equal, up to 1.2 cm long (including filaments). Anthers yellow, up to 0.7 cm long, attenuate-beaked. Pistil with up to \pm 1 cm long filiform style and simple stigma.

Types : Ved Prakash 14898 (A: Holotype CDRI; B-D: Isotypes CDRI).

Flowering : October*.

Distribution : INDIA: Meghalaya.

Herbarium specimens : INDIA: Meghalaya; Jaintia Hills District, Jarain, \pm 1400 m, Oct. 3, 1985; Ved Prakash 14898 A-D (CDRI).

Notes : According to Ved Prakash & Mehrotra (*l. c.*): This species is allied to *S. maculata* Roxb. (known from N. E. India, Nepal and Burma) but it differs from the latter in having a bit larger flowers in capitate type of inflorescence with weak and delicate habit; in *S. maculata* inflorescence is a scorpioid cyme & plants are robust in nature.

As the new species reported here has well developed stem, it differs from *S. rheedii* Wt. & Arn., *S. rotundifolia* Bedd., *S. wallichii* Benn. (all known from South India) and *S. khasiana* Cl. (known from Meghalaya) which are stemless or with very short stem.

The types and original description of *S. maculata* Roxb., were examined in Kew Herbarium, London, and it was found that the citation of RHEED's (1689) reference ("Hortus Malabaricus", Vol.9: 127, plate 65) by ROXBURGH (1820) under *S. maculata* was incorrect. The scrutiny of literature, revealed that the RHEED's (l. c.) illustration and description belong to *S. rheedii* Wt. & Arn., which is known from Western Ghats of S. India. The type of *S. maculata* Roxb., should be considered Wallich's specimen from Nepal.

The species is named after Dr. M. M. Dhar, Director of the Institute (CDRI).

***Sonerila elegans* Wight var. *beddomei* G.S. Giri & M.P. Nayar** (Melastomataceae) in Bull. Bot. Surv. India 27 (1 4): 72 74. 1985 (1987).

Erect herbs, rarely decumbent, base woody, branches subquadrangular, internodes (0.4-) 1.0 5.0 (-12.0) cm long. Leaves ovate to ovate-lanceolate, (4.0-) 6.0 9.0 (-12.0) × (1.8-) 3.5 4.5 (-6.5) cm, base subrounded to sub-cordate, equal sided, apex acute to shortly acuminate, 2 3 pairs of nerves arising from the base of the lamina and 1 2 pairs arising higher up from the midrib, nerves prominent and more or less winged beneath margin serrate, both surfaces of leaves glabrous or rarely a few scattered hairs occur near the margin, turn dull green or light brown on drying, membranous; petioles (1.5-) 2.0 5.0 (-7.0) cm long, weak, glabrous. Inflorescence branched or unbranched scorpioid cymes, primary peduncles 6.0 8.0 cm long, glabrous, secondary peduncles 0.5 2.0 cm long, glabrous, bracts small, ovate-acute, deciduous, 4 10-flowered; pedicels 4.0 6.0 mm long, glabrous. Calyx tube 7 9 mm long and 3.5 4.0 mm broad at apex, urn-shaped, glabrous, faintly ridged, lobes 2.0 × 1.0 1.5 mm, broadly triangular or ovate, midrib not conspicuous, glabrous; petals broadly ovate or ovate-orbicular,

13 15 × 10 12 mm, midrib prominent, apiculate or mucronate, mauve. Stamens: filaments 6 7 mm long, filiform, glabrous, anthers oblong, 7.5 8.5 mm long including a short beak, pore oblique; style 12 14 mm long, stigma capitate. Capsules turbinate, gradually widened above, 10 12 mm long and up to 6 mm wide at apex, base gradually merging with the pedicel, capsules with 3 strong and 3 inconspicuous ridges. Seeds many, muricate.

Type : *Beddome* s. n. (Holotype CAL).

Flowering : November January. *Fruiting*: January April.

Distribution : INDIA: Kerala (Endemic).

Herbarium specimens : INDIA: Kerala; Palghat hills, 1878, *Beddome* s. n. (CAL); Poovancholai, Palghat District, Apr. 29, 1980, *V. J. Nair* 67348 (CAL, MH); South Malabar, Karimalai in Shola, 1520 m, Jan. 21, 1910, *C. E. C. Fischer* 1646 (CAL).

Notes : According to *Giri & Nayar (l. c.)*: The variety differs from the var. *elegans* by its glabrous peduncles, calyx tubes and capsules.

Wight (Spicilegium Neilgherrense 1 : 58, t. 67/3. 1846) described *Sonerila elegans*, based on a collection from Sispara, Kerala. *S. elegans* is characterised by puberulous calyx tube and hirsute capsules. After type collection *S. elegans* was further collected only from the type locality by *Gamble*. *Beddome* in 1878 and *Fischer* in 1910 collected some materials which were closer to *S. elegans*, but those specimens were characterised by glabrous calyx tubes and glabrous capsules. Subsequent collection other than from Sispara, also show this glabrous nature of calyx tube and capsules. Critical study of all these specimens reveal that these glabrous gatherings are taxonomically distinct from *S. elegans* var. *elegans*.

The variety is named after its collector *R. H. Beddome* who first noted the glabrous flowers and capsules and remarked "cf. *S. elegans* *wight*".

Sonerila gamblei *G.S. Giri & M.P. Nayar* (Melastomataceae) in *Blumea* 31 (1): 235 237. 1985.

Herbs, 8-16 cm high, branched, upper parts densely clothed with scaly hairs, lower parts woody, more or less compressed, often irregularly articulated, rooting from nodes, sometimes strigillose or glabrate. Leaves irregularly arranged on the stem, lamina ovate (0.6-) 1.5-2 (-2.5) × (0.5-) 1-1.5 (-1.8) cm, base subrounded to subcordate, apex acute, margin serrate, 5-7 nerved, midrib prominent, upper and lower surfaces of leaves glabrous or sparsely hairy, minutely spotted, membranous, petioles (5-) 12-18 (-25) mm long, ribbon-like, glabrous or very sparsely hairy at the base of lamina. Inflorescence terminal, scorpioid, 4-6 flowered, peduncles 3-6 cm long, densely clothed with brownish scaly hairs. Pedicels 1-2.5 mm long, densely setose. Calyx tube narrowly urceolate, 5-7.5 mm long, densely covered with scaly hairs; lobes 3, broadly triangular, 1.5-2.5 × 2-3 mm, brownish scaly hairy on dorsal side, glabrous on ventral side. Petals 3, oblong or obovate-oblong, 12-15 × 8-10 mm, apex mucronate, margin entire, midrib distinct, other nerves indistinct, glabrous, scaly on midrib, rose-coloured. Stamens 3, filaments 2-3 mm long, glabrous; anthers 2-3 mm long, without beak, pore apical. Ovary glabrous, style 3.5-4.5 mm long, stigma capitate. Capsule ovoid-oblong, distinctly ribbed, seeds many, minutely tuberculate.

Type : Gamble 13454 (Holotype CAL).

Flowering & Fruiting : November*.

Distribution : INDIA: Tamil Nadu, Kerala.

Herbarium specimens : INDIA: Tamil Nadu; Nilgiri, Gamble 13454 (CAL); Sispara, Nov. 1883, Sine Coll s.n. (MH-21408); Sispara, Nov. 1890, Sine Coll. s.n. (MH-21410). Kerala: Anaimudi adjoining hill, Kottayam District, 2300 m, Nov. 9, 1965, Shetty 26548; without precise locality, Wight s.n. (MH-21402).

Notes : According to Giri & Nayar (l.c.): The species closely related to *Sonerila wightiana* Arn., a species endemic to Ceylon. However, by the nature of the habit it is related to the Indian species *S. speciosa* Zenk. The new taxon can be differentiated from *S. speciosa* and *S. wightiana*. *S. speciosa* is characterised by: Stem fleshy; stem and branches glabrous; anthers with a long and distinct

narrow beak. *S. wightiana* is characterised by: Stem weedy; stem and branches densely hairy; anthers ovate, without a beak, but plant *S. Wightiana* attains 20-50 cm or more height, erect, round. Leaves opposite, usually unequal-sided, petioles densely clothed with rusty brown hairs, both surfaces of leaves densely hairy particularly on the nerves beneath, leaves pinnately veined. Inflorescence without a distinct peduncle; petals 6-8 mm long; whereas *S. Gamblei* is characterised by: stem woody, branches and stem densely hairy, anthers ovate, without a beak; but plant attains 8-16 cm height, lower portion often creeping, articulated, compressed; leaves irregularly arranged on the stem, spiral, whorled or fasciculate, equal-sided; petioles glabrous or with few soft hairs at the base of lamina, both surfaces glabrous or with very few scattered hairs. Inflorescence with a distinct peduncle 3-6 cm long and petals 12-15 mm long.

Grows in damp or wet soil in open areas or in rock crevices.

The species is named after its collector J. S. Gamble, an eminent worker on the flora of South India.

***Sonerila kanniyakumariana* Gopalan & A.N. Henry** (Melastomataceae) in J. Bombay Nat. Hist. Soc. 86 (1): 82-83. 1989.

Succulent herbs 50-65 cm tall; stems pinkish, erect (rarely decumbent and rooting at lower nodes), minutely winged, glabrous. Leaves 0.5-4.2 × 0.5-2.5 cm, upper subsessile, lower shortly petioled, ovate to deltoid, fleshy, glabrous, acute at apex, cordate or subcordate at base, 3-5 nerved; margins serrate, hyaline. Flowers pinkish, 3-5 in terminal scorpioid racemes; peduncles 5-7 mm long, glabrous. Calyx tube 5-8 mm long, funnel shaped, glabrous; calyx lobes 3, each c 3 × 2 mm, triangular. Petals 3, each up to 1.5 cm across, ovate-orbicular, apiculate. Stamens 3; filaments c 5 mm long, thick, glabrous; anthers up to 6 × 2 mm, lanceate, beaked. Style 10-12 mm long; stigma capitellate. Capsules 8-10 × 4-5 mm, funnel shaped, glabrous; seeds c 1 mm long, tuberculate.

Types : Gopalan 77180 (Holotype CAL, Isotypes MH Acc. Nos. 139866-139874).

Flowering & Fruiting : February-March*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Kanniyakumari District, Upper Kodayar, Mar. 20, 1984, *Gopalan* 77180 (CAL & MH-Acc. Nos. 139866 139874); Upper Kodayar on the way to Muthukuzhivayal, Feb. 16, 1983, *Henry* 77001 (Paratypes MH Acc. Nos. 139875 139883).

Notes : According to *Gopalan & Henry (l.c.)*: This species is perhaps allied to the Sri Lankan *Sonerila robusta* Arn., but differs in: glabrous stem; leaves glabrous, serrate, somewhat crowded towards the apices of stems; and capsules funnel shaped, glabrous.

Occurs on exposed rocky slopes and road cuttings in evergreen forests. Rare.

Sonerila sadasivanii Nayar var. *kanniyakumariensis* G.S. Giri & M.P. Nayar (Melastomataceae) in Bull. Bot. Surv. India 26 (3 4): 189 - 190. 1984.

Small herbs, erect or decumbent, up to 50 cm tall, stem and branches strongly quadrangular, winged, woody, lower portion of branches and basal portion of stem often terete, internodes shorter, 5 - 20 mm long, reddish, glabrous. Leaves opposite decusate, elliptic, (2.0) 3.5 6.0 (-8.0) × (0.8-) 1.5 2.5 (-3.0) cm, base acute to subrounded, apex acute, margin serrate, venation palmate, 5 7 nerved, all nerves arising from the base of lamina of which 3 nerves reach up to the top of the lamina, both surfaces glabrous, glossy, often white spotted, thinly coriaceous or chartaceous, turn dull green on drying, petioles 1.5 4.0 cm long, glabrous. Inflorescence axillary or terminal scorpioid raceme, 4-16 flowered, peduncle red, quadrangular, shortly winged 4 6 cm long, glabrous; bracts linear, subulate. Flowers 3 merous; pedicels 7 12 mm long (up to 20 mm in fruit), glabrous. Calyx tube campanulate, 5 7 × 2.5 3 mm, glabrous, lobes 3, broadly triangular, 0.75 1.0 × 2.0 2.5 mm, apex obtuse to rounded, glabrous, pinkish. Petals 3, obovate-oblong, 11 14 × 7 8.5 mm, pink in colour, prominently veined, glabrous. Stamens 3, filaments 5 7 mm long, anthers oblong, 5 6 mm long, abruptly narrowed into a short beak, base sagittate,

pore 2, large, oblique. Style filiform, 10–13 mm long, stigma capitate. Capsules obconic, 8–10 mm long, acutely triangular, widened above, 6-ribbed. Seeds many, cuneate, 0.75–1.0 mm long, tuberculate on dorsal side.

Types : A. N. Henry 70380 (A: Holotype MH; B&C: Isotypes MH).

Flowering : March–April. *Fruiting* : May–September.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Kanniyakumari District, way to vanamutti, ± 1400 m, Mar. 22, 1981, A. N. Henry 70380 A, B & C (MH); Tirunelveli District, Sengaltheri, 900 m, Sept. 19, 1967, Vajravelu 29119 (Paratype MH).

Notes : According to Giri & Nayar (*l.c.*): This interesting new variety can be easily distinguished from *S. sadasivanii* var. *sadasivanii* by its shorter internodes (5–20 mm long), larger pinkish flowers and broadly triangular calyx lobes; whereas in *S. sadasivanii* var. *sadasivanii*, the internodes longer (30–50 mm long), smaller flowers and the calyx lobes triangular.

Sonerila sahyadrica G.S. Giri & M.P. Nayar (Melastomataceae)
in Bull. Bot. Surv. India 26 (3–4): 174–177. 1984 (1986).

Small herbs, stem very short, 0.5–2.0 cm long, unbranched puberulous, bulbous at base. Leaves simple, usually fascicled, rarely alternate or opposite, ovate, (1.0–)2.0–4.0 (-6.5) × (0.8–)1.5–2.0 (-3.0) cm, acute to subrounded at base, acute at apex, margin finely serrate, teeth ciliate, 5–7 pairs of nerves, all arising from the midrib, both surfaces usually densely hairy, hairs soft, whitish; membranous, sometimes purple pigmented, rarely with minute greenish white dots, dull green on drying; petioles (2–)5–10 (-22) mm long, puberulous. Inflorescence terminal or pseudoterminal scorpioid raceme, peduncles unbranched, fleshy, 1.5–6.5 cm long, puberulous, pinkish, 3–10 flowered, rarely solitary, bracts 0.5–1.0 mm long, linear. Flowers pedicellate, pedicels 3–4 mm long, sparsely glandular hairy. Calyx-tube campanulate, 2.5–3.5 mm long, sparsely glandular hairy, lobes 3, triangular, 0.5–0.75 × 0.75 mm, sparsely glandular

hairy at margin. Petals 3, elliptic or elliptic-oblong, 5.0–6.0 × 2.0–2.5 mm, sparsely hairy at margin and on midrib dorsally, pink, mauve or rarely white with pinkish tinge. Stamens 3, filaments 2–3 mm long, anthers triangular or ovate-oblong, 2.0–3.0 mm long without a narrow beak, pore 2, apical. Style 6–7 mm long, glabrous; stigma capitate. Capsules cup-shaped, widened above and with a whitish rim at apex, 2.5–4.0 × 3.0–4.5 mm, sparsely covered with glandular hairs particularly when young, indistinctly ribbed. Seeds many, small, cuneate, 0.5 mm long, minutely tuberculate on dorsal side.

Type : Vivekananthan 48344 (Holotype CAL).

Flowering & Fruiting : Simultaneously from August to November.

Distribution : INDIA: Endemic to Western ghats.

Herbarium specimens : INDIA: Kerala ; Quilon District, Pamba to Anathode, 1050 m, Sept. 30, 1976, Vivekananthan 48344 (CAL); Kallar, Trivandrum District, ± 200 m, Nov. 22, 1979, Mahanan 69241 & *ibid.*, Mohanan 65171; Below Moozhiar, Quilon District, 1000 m, Sept. 3, 1977, Nair 50868 & *ibid.*, Nair 50870; Moozhiar, Quilon District, 1700 m, Sept. 3, 1977, Nair 50872; Mukkadavoo, Trivancore, Aug. 24, 1917: Rama Rao 1415 & *ibid.*, Rama Rao 1416. Karnataka; Kadamakkail R. F., Sambaje, Coorg District, 300 m, Oct. 30, 1981, Srinivasan 68085; Attapadi Hills, South Malabar, 850 m, Oct. 28, 1910, Fischer 2263. Kerala; Poumudi Estate, Trivandrum District, 950 m, Sept. 14, 1977, Nair 51086 & *ibid.*, Nair 51087; between Pallode & Kulatupuzha, Nov. 1901, Sine coll. (MH 21435, 21436); Ponmudi, Trivandrum District, ± 400 m, Dec. 4, 1977, Mohanan 52800. Karnataka; Mysore road, below goodaloor, Sept., 1883, Sine coll. (MH 21423); Tellicherry, Nov. 1910, Meebold 12117.

Notes : According to Giri & Nayar (*l.c.*): The species is allied to *S. rheedii* but differs from it in having stem very short, erect, up to 2 cm long, bulbous at base; leaves nearly fascicled, (1.0-) 2.0–4.0 (-6.5) × (0.8-) 1.5–2.0 (-3.0) cm, base acute to subrounded, both surfaces puberulous, pinnately veined; pedicels (5-10 mm long, puberulous; peduncels 1.5-6.5 cm long, puberulous; pedicels) sparsely glandular hairy; petals 5–6 mm long, sparsely glandular hairy at

margin and on midrib dorsally; filaments 2-3 mm long; anthers without a narrow beak, 2-3 mm long; capsules 2.5-4.0 mm long, very sparsely glandular hairy or glabrous; endemic to Western Ghats; whereas *S. rheedii* Wt. & Arn., is characterised by: Stem distinct, decumbent or creeping up to 20 cm long, rooting at nodes; leaves opposite to subopposite (2.5-) 6.0-9.0 (-13.0) × (1.8-) 3.0-4.0 (-8.0) cm, base subrounded to subcordate, both surfaces puberulous, pinnately veined; petioles 1-4 cm long, puberulous; peduncles 4-10 cm long, puberulous; pedicels sparsely glandular hairy; petals 5-8 mm long, sparsely glandular hairy at margin and on midrib dorsally; filaments 3.5-5.0 mm long; anthers with a long narrow beak, 4.5-6.0 mm long; capsules 2.0-3.5 mm long, glandular hairy.

Endemic to Western Ghats. Grows in marshy slopes or under shades or in moist grasslands and has been collected within and altitude ranging from 200-1700 m.

Sonerila talbotii G.S. Giri & M.P. Nayar (Melastomataceae)
in J. Jap. Bot. 61 (11): 344-348. 1986.

Small herbs, attaining 6-25 cm high, bulbous at base, bulb small, stem and branches weak, indistinctly quadrangular, reddish, sparsely to densely hairy, particularly at the younger parts. Leaves simple, usually opposite-decussate, ovate-lanceolate to lanceolate, (1.2-) 2.0-3.0 (-4.5) × (0.75-) 1.0-1.5 (-1.8) cm, base acute to subrounded, apex acute to shortly acuminate, pinnately veined, 4-5 pairs of secondary nerves arising from the midrib, margin indistinctly serrate or subentire, both surface scattered hairy, hairs whitish, minutely white spotted, both sides of leaves remain green or turn dull green on drying, membranous; petioles (2-) 4-8 (-10) mm long, puberulous. Inflorescence terminal or axillary from the upper leaf axils, 4-10 flowered, scorpioid raceme, puberulous, bracts subulate. Flower 3-merous; pedicel 3-6 mm long, gradually merging with the base of ovary, puberulous. Calyx-tube urceolate, 4-5 mm long, conical, scattered hairy, lobes broadly triangular, 0.5 × 0.75-1.0 mm, scattered hairy on the margin and dorsal side, midrib not prominent. Petals narrowly oblong, 8-10 × 2-3 mm, apex

attenuate, dorsally with a few hairs on the midrib, rose or purple in colour. Stamens remain near the base of the petals, filaments 4-5 mm long; anthers gradually narrowed into a long beak, 5-6 mm long, pore apical, round. Ovary glabrous; style 8-10 mm long, stigma capitate. Capsules ovoid, enclosed by the fruiting calyx-tube; fruiting calyx-tube widened above, indistinctly 3 ribbed, 3.5 × 2.5-4 mm, usually glabrous or rarely with a few hairs at the base when young. Seeds many.

Type : W. A. Talbot 561 (Holotype CAL).

Flowering & Fruiting : Simultaneously from July to September.

Distribution : INDIA: Karnataka, Maharashtra.

Herbarium specimens: INDIA: Karnataka; North Canara, Aug. 4, 1883, W. A. Talbot 561 (CAL); Maharashtra; Ankola, Aug. 25, 1953, J. C. Dhruva 202 (Paratype CAL).

Notes : According to Giri & Nayar (*l.c.*): The new species is closely allied to *S. versicolor* Wt. & Arn., but can be easily distinguished by a number of characters. By the nature of its small capsules it is related with *S. rheedii* Wt. & Arn. Comparison of various characters in *S. talbotii*, *S. versicolor* and *S. rheedii* shows *S. talbotii* is being erect, small, 6-25 cm high, with a bulbous base; leaves small ovate-lanceolate to lanceolate, 2-3 × 1.0-1.5 cm, base acute to subrounded, equal-sided, sub-entire to indistinctly serrate, scattered hairy on both surfaces; calyx tube pilose; anthers with a distinct narrow beak; capsules small, 3-4 mm long, cup-shaped, indistinctly ribbed. *S. versicolor* is characterised by: erect, attaining up to 75 cm high or more, without a bulbous base; leaves ovate to broadly ovate, 5-9 × 3-4.5 cm, base distinctly unequal-sided, margin serrate, densely hairy particularly on the upper surface; calyx-tube glabrous; anthers with a distinct narrow beak; capsules large, 8-10 mm long, triangular, distinctly 3-ribbed; whereas in *S. rheedii*, plant is decumbent; leaves, ovate to broadly ovate 6-10 × 3-5 cm, base rounded, equal-sided, margin serrate, densely hairy particularly on the upper surface; calyx tube pilose; anthers broadly triangular, without a distinct narrow beak; capsules small, 3-4 mm long, cup-shaped, indistinctly ribbed.

The new species is named after its collector W. A. Talbot.

Sphyranthera airyshawii Chakrab. & Vasudeva Rao
(Euphorbiaceae) in J. Econ. Tax. Bot. 5 (4): 959-961. 1984.

Bushy shrub, ca 1 m tall, dioecious; branchlets brownish to greyish, 2-7 mm thick, terete, glabrous (the young branchlets striate and often compressed, scattered ochraceous-puberulous). Leaves alternate, variable, elliptic to narrowly oblong-elliptic or rhombate-elliptic or spatulate-obovate to spatulate-oblong-elliptic or narrowly obovate-elliptic or oblong-oblong-elliptic, 2.5-8.5 cm long, 1-3 cm broad, acute or cuneate or attenuate at base, entire at margin (the margin often curling upwards when dry), acute to obtuse or shortly acuminate to subacuminate at apex, coriaceous, glabrous or sometimes sparsely ochraceous-puberulous on midrib above, sparsely puberulous on midrib beneath (often also with a few hairs on lateral nerves), sometimes puberulous along the margin, on drying greenish-brown or brown or pale green above, pale greenish beneath, penninerved; midrib often somewhat channelled above, raised beneath; lateral nerves slender, 4-7 pairs, indistinct above, somewhat prominent or faint beneath, more or less uniformly curved, anastomosing near the margin; minor nerves indistinct above, somewhat prominent or indistinct beneath, reticulate; petiole 2-9 mm long, 1-2 mm thick, scattered ochraceous-puberulous; stipules absent. Male inflorescences and flowers: not seen. Female inflorescences: cymose, axillary, also arising from the axils of fallen leaves, subumbellate, pedunculate (the peduncle 2-15 mm long or occasionally lacking, up to 1 mm thick, scattered yellow or ochraceous-pilose), 2-4 flowered; bracts deltoid or often ovate, 0.6-1.2 mm long, 0.5-1 mm broad, puberulous. Female flowers: pedicel 2-10 mm long, 0.2-0.6 mm thick, articulate, scattered yellow or ochraceous-pilose or tomentellous; sepals 4-5, subequal, ovate or triangular or oblong or often subulate, 1-1.3 mm long, 0.3-1 mm broad, yellow-to ochraceous-tomentellous or sometimes sparsely puberulous outside, scattered adpressed-puberulous inside; disc glands 3-4, opposite to or alternating with sepals, free, deltoid or transversely oblong or suborbicular or ovate or triangular or oblong, 0.3-0.6 mm long, 0.4-0.8 mm broad, thin; ovary globose, ca 1 mm diam., 3-lobed, ochraceous or yellow-tomentellous, trilocular, locules uniovulate; styles 3, 1-1.5 mm long, free, ventrally puberulous, twice bifid.

Capsules (very immature): strongly 3 lobed, ca 4 mm long, ca 5 mm diam., ± adpressed ochraceous-pilose, intruded at apex; seeds (immature) orbicular, ca 3 mm diam.

Types : Vasudeva Rao 8951 (A: Holotype CAL; B F: Isotypes PBL).

Flowering & Fruiting : April-May.

Distribution : INDIA: Andaman-Nicobar Islands.

Herbarium specimens : INDIA: Andaman Nicobar Islands; North Andaman Island, Saddle Peak, May 10, 1982, Vasudeva Rao 8951 A (CAL); *ibid.*, Vasudeva Rao 8951 B 8951 F (PBL).

Notes : According to Chakrab. & Vasud. (*l.c.*): The hitherto monotypic genus *Sphyranthera* Hook. f., originally described in 1887, is endemic to Andaman Nicobar Islands, India. The type species, *S. lutescens* (Kurz) Pax & Hoffm., is based on *Codiaeum lutescens* Kurz which was described in 1877 from Middle Andaman Island on the basis of male plant only. The species is evidently very rare as it does not appear to have been collected again from Andaman Islands during the last one century.

Only Hore 7579, collected from great Nicobar Island in 1980, is the female plant of *S. lutescens*. T. Chakraborty again reported its occurrence from three localities on Great Nicobar Island. Both Male & Female Plants; were found growing.

A recent collection. Vasudeva Rao 8951, from Saddle Peak range on North Andaman Island, bearing female flowers and immature fruits was determined to be a *Sphyranthera*. The leaves of this material are very distinct from *S. lutescens* that even in absence of the male flowers and mature fruits, may be described as new species.

Fairly common in hill forest on redbrown soil at about 700 m altitude. The species is closely related to *S. lutescens* (Kurz) Pax & Hoffm., differing principally in the much smaller and thicker leaves with fewer lateral nerves.

Spiradiclis arunachalensis Deb & Rout (Rubiaceae) in *Candollea* 44 (1): 225-227. 1989.

Herbs 0.13-0.24 m in height, erect, more or less branching; stem stout, terete or angled, glabrous or pubescent. Leaves opposite, decussate, rarely falsely whorled above, petiolate, 1.5-7.5 × 0.3-1.3 cm, elliptic-lanceolate or oblanceolate, acute at apex, narrowed at base, subcoraceous, glabrous or scabrous above, pubescent on the nerves beneath; lateral nerves 6-11 pairs, slender, alternate or subopposite, distinct; petiole 0.2-1.0 cm, slender, pubescent; stipule persistent, interpetiolar, 4-10 × 1.0-2.5 mm, subulate pubescent. Inflorescence terminal or axillary peduncled, dichasial helicoid cyme, 4.5-14.0 cm long, pubescent; peduncle 2.0-6.0 cm long, pubescent; bracts ± 2-3 × 0.3 mm, linear-lanceolate, pubescent. Hypanthium ± 1.7 × 0.7 mm, obconic, ribbed, pubescent. Calyx tube ± 0.3 × 1.3 mm, obconic, pubescent; teeth 5-6, 0.6-0.7 × 0.5 mm, triangular, acute at apex, pubescent. Corolla tube 3.2-3.6 mm long, 1.5 mm across, campanulate, puberulous outside, pubescent within at the middle; lobes 5, 0.8-1.2 × 0.8-1.0 mm, ovate, acute at apex, pubescent outside. Stamens 5; filaments 1.0 mm, slender, glabrous, adnate above the base of the corolla tube and alternating with the lobes; anthers 1.0 mm long, linear, dorsifixed, 2-lobed, dehiscing longitudinally. Ovary 1.6 × 0.6 mm, 2-loculed, with numerous ovules on elongated axile placenta; disc 0.4 × 0.6 mm, annular; style 2.5-2.8 mm, slender, pubescent; stigma 2-lobed; lobes 0.5-0.6 × 0.3-0.4 mm, obovate, puberulous. Capsule 2.5-4 × 1.5-2 mm, obconic, ribbed, pubescent, dehiscing loculicidally and septicidally from above. Seeds numerous, 0.3 × 0.2 mm, angled; testa reticulate, embryo microscopic; albumen fleshy.

Type : A. R. K. Sastry 40721 (Holotype CAL).

Flowering & Fruiting : October-April.

Distribution : INDIA: Arunachal Pradesh, Assam, Nagaland; CHINA.

Herbarium specimens : INDIA: Arunachal Pradesh; Subansiri District, Khru River Banks, Nov. 17, 1964, A. R. K. Sastry 40721 (CAL); Abor Hills, Janakmukh, Dec. 14, 1911, I. H. Burkill 37134 (Paratype CAL); Aka Hills, N. L. Bor 1447 (Paratype CAL). Assam;

Dekho valley, 120 m, Apr. 2, 1895, *G. Watt* 10347 (Paratype CAL). Nagaland; Neechugard, Oct. 18, 1885, *C. B. Clarke* 40883 A (Paratype CAL); Nambishi, 900 m, Dec. 1907, *A. Meebold* 7413 (Paratype CAL).

Notes : According to Deb & Rout (*l. c.*): Differs from *S. caespitosa* in narrower subcoriaceous leaves attenuated at base, hypanthium and calyx pubescent, calyx-teeth broader, corolla tube puberulous outside, anthers longer, linear; style stigma and capsule pubescent, amongst others; and from *S. cylindrica* in leaves narrower, hypanthium and calyx pubescent; calyx-teeth larger, corolla tube larger and puberulous outside; filaments shorter than the corolla tube, anther larger, stigma and capsule pubescent.

"BLUME (1826) described the genus *Spiradiclis* as monotypic. HOOKER (1873) treated two species. For a long time, the genus was known to comprise 3 or 4 species (HOOKER, 1880; SCHUMANN, 1891; AIRY SHAW, 1973). The genus has been recently revised by H. S. Lo in *Act. Bot. Austro Sinica* 1: 32-36. 1983, as comprising 13 species, one variety and two forms, of which 8 species and one form are described as new; *S. cylindrica* is reduced to a form of *S. caespitosa* by Lo (*l. c.*)."

Deb & Rout while working on the genus *Spiradiclis* Bl., in India could not agree with Lo (*l. c.*) in reducing *S. cylindrica* to a synonymy and in the status of *S. caespitosa* Bl. forma *subimmersa* Lo (*l. c.*) as the distinctions are so much that they deserve to be treated as distinct species. Lo (*l. c.*), however, does not appear to have examined the specimens extant in Indian herbaria.

Lo (*l. c.*) treated *C. B. Clarke* 40883 D at K as the type of *S. caespitosa* Bl., forma *subimmersa* Lo, duplicate of which extant in CAL is treated here as a paratype of this species.

***Spiradiclis seshagirii* Deb & Rout (Rubiaceae) in *Candollea* 44 (1): 227-229. 1989.**

Shrubs 1-2.1 m in height, erect, branched; stem angled pubescent. Leaves opposite, decussate, rarely falsely whorled above,

petiolate, 6-20 × 2-7 cm, elliptic, oblong, ovate-elliptic or obovate, acute or acuminate at apex, acute or attenuated at base, membranous, glabrous above, pubescent on the nerves beneath; midrib subcanaliculate and glabrous above; lateral nerves 15-22 pairs, alternate or subopposite, slender, more prominent beneath; petiole 0.3-2.5 cm, pubescent; stipules persistent, interpetiolar, 6-12 × 2-3 mm, subulate with a broad base, pubescent outside, glabrous within. Inflorescence terminal peduncled paniculate cymes, 10.0-33.0 cm long, pubescent; peduncles 1-3, 6.5-12.5 cm long, cyme branches short, 0.5-2.5 cm; bracts 1-4 × 0.3-0.5 mm, linear, pubescent. Flowers about 80-500, sessile or subsessile, 5-merous; pedicel 0-1.2 mm, pubescent. Hypanthium 1-2 × 1.0-1.8 mm, obconic, ribbed, pubescent. Calyx-tube ± 0.2 × 1.5-1.8 mm, obovate, pubescent; teeth 5, ± 0.4 × 0.8 mm, broadly triangular, obtuse at apex, pubescent. Corolla tube 1.8-3.0 mm long; 2-2.5 mm across, pubescent on both sides, villous below the throat within; lobes 5, 1.5-1.8 × 0.6-1.0 mm, narrowly triangular, acute, pubescent. Stamens 5; filaments ± 0.6-1.0 mm, stout, glabrous, adnate above the base of corolla and alternating with the lobes; anthers 0.7-1.0 mm, dorsifixed, 2-lobed, oblong, obtuse at apex, glabrous, longitudinally dehiscent. Ovary 0.8-1.5 × 0.8-1.6 mm, 2-loculed, with numerous ovules on elongated axile placenta; disc 0.8-1.5 × 0.8-1.8 mm, conical; style 1.3-1.7 mm long, stout, pubescent; stigma 2-lobed; lobes 0.6 × 0.6 mm, pubescent. Capsules 2-3 × 1.8-2 mm across, subglobose, dehiscent loculicidally and septically. Seeds numerous, 0.3-0.4 × 0.25-0.35 mm, angled, glabrous; testa reticulate; embryo microscopic; albumen fleshy.

Types : R. S. Rao 17354 (Holotype CAL; Isotype CAL).

Flowering & Fruiting : November-December.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Siang District, Tutin, 690 m, Nov. 6, 1958, R. S. Rao 17354 (CAL); Tuting to Minguing, 900-1110 m, Nov. 14, 1958, R. S. Rao 17648 (Paratype CAL); Garsung to Eyo, 600 m, Jan. 22, 1958, R. S. Rao 17932 (Paratype CAL).

Notes : According to Deb & Rout (*l.c.*) : Differs from *S. bifida* in hypanthium and calyx pubescent; corolla larger, pubescent on both sides, villous below the throat within, corolla lobes longer, filaments shorter and stouter, anthers larger style stout, pubescent, stigma lobes longer, pubescent, disc larger, and capsule pubescent, amongst others.

The species is named after the collector, Dr. Rolla Seshagiri Rao.

Spiraea arunachalensis Panigrahi & K.M. Purohit (Rosaceae) in Bull Bot. Surv. India 26 (1-2): 83. 1984 (1985).

Shrubs 1.5-3.0 m high. Branches sub-terete, grayish brown glabrescent, young ones minutely tomentose. Buds c 2 mm long, ovoid, tomentose. Leaves alternate, lamina 1.7-3.0 × 0.8-1.5 cm, elliptic rhombic, cuneate at base, acute at apices, entire below and serrate in the upper half, pubescent on upper surface, adpressed hairy on veins beneath and pubescent on the interveinal region, primary veins 4 on each half, sub-sessile or with -petioles 1-2 mm long, pubescent. Inflorescences terminal compound corymbs, much branched, leafless, 3.5-10.0 (-15.0) cm long, 5.0-9.0 (-13.5) cm broad, hoary-pubescent, terminating on 12-24 cm long branches. Pedicels 5-6 mm long, pubescent; bracteoles not seen. Flowers not seen. Floral tubes (calyx tubes or hypanthia) campanulate, c 1 mm long, pubescent on both exterior and interior. Sepals c 1 × 1 mm, ovate-triangular, acute, pubescent outside and glabrous inside, reflexed in fruit. Petals and stamens not seen. Follicles 5, erectoparallel, body of follicles 2.0-2.5 mm long, villous, style c 1 mm subterminal; stigma swollen. Seeds 8-12 (4 large, + 8 small) or all equally developed, larger ones ± 1 mm long, smaller ones ± 0.5 mm long, linear, ellipsoid.

Types : *G. Panigrahi* 15720 (Holotype CAL; Isotypes CAL).

Fruiting : May.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Kameng District, Morsing, 1500 m, May 16, 1958, *G. Panigrahi* 15720 (CAL); Hill slopes towards the east of Nyukmadong, 2516 m, May 19, 1957, *R. S. Rao* 7590 (CAL-4 sheets without Acc. Nos.)

Notes : According to Purohit & Panigr. (*l. c.*) : It is nearer to *S. darjeelingensis* in the branching pattern of inflorescence and villous carpels but differs from it in having leaves rhombic-elliptic to obovate, blunt, pubescent on both surfaces, sessile or with 1-2 mm long petioles.

It is a high altitude plant growing at 1500-2516 m.

Spiraea chambaensis K.M. Purohit & Panigrahi (Rosaceae) in Bull. Bot. Surv. India 25 (1-4): 230-231. 1983 (1985).

Shrub; branches angled, reddish brown, glabrous with axillary buds 2.0-3.5 mm long, flat, linear, pointed, glabrous. Leaves simple, exstipulate, alternate; lamina 1.5-3.2 × 0.8-1.8 cm, ovate-elliptic to ovate-oblong, cuneate to obtuse at base, apices obtuse, rarely acutish, entire or 5-9 toothed restricted to the upper half of the lamina, both surfaces alike, glabrous but the young leaves pubescent on the veins beneath; petioles 2-3 mm long, glabrous, furrowed above. Inflorescence a simple corymb, 3.8 cm long, 4.0 cm broad, pubescent, 16 flowered; pedicels 1.5-3.3 cm long, pubescent; bracteoles leafy, entire or 2 toothed at apices, ovate-elliptic-oblong, glabrous. Flowers bisexual, 8-10 mm across, white. Floral tubes campanulate, 2.0-2.5 mm long, villous on both the outer and the inner surfaces. Sepals 5, 2.0-2.5 × ± 2 mm, ovate-triangular, acute, outer surface glabrate and inner surface villous with red woolly hairs erect to spreading. Petals 5, 3.5-4.0 × 3.0-3.5 mm, ± orbicular, sessile, glabrous. Stamens c 20, 2.5-3.5 mm long, shorter than the petals, filaments glabrous, filiform, broader towards the base, anthers dorsifixed. Nectar ring (disc) prominent, with thick conspicuous glands. Carpels 5, free, 1.5-2.0 mm long, villous; styles ± 1.5 mm long, subterminal, glabrous except at the base, stigma discoid. Ripe carpels unknown.

Types : N. C. Nair 32392 (Holotype BSD).

Flowering : July*.

Distribution : INDIA : Himachal Pradesh.

Herbarium specimens : INDIA: Himachal Pradesh; Chamba District, Satrundi, 3100 m, July 13, 1964, fl., N. C. Nair 32392 (BSD).

Notes : According to Purohit & Panigrahi (*l. c.*): The species is allied to *S. cantoniensis* Lour., of the subg. *Nothospiraea* Zabel *emend.* Dostal in having erect stems with glabrous leaves, long pedicelled flowers borne in simple corymbs on leafy branchlets, petals and carpels sessile. However, it differs from *S. cantoniensis* in having leafy bracteoles, ovate oblong leaves, the inflorescence, floral-tubes, sepals and carpels pubescent. In *S. cantoniensis* Lourn., the leaves are rhombic-lanceolate to oblong; inflorescences, floral tubes and sepals glabrous; the bracteoles minute (1.0–1.5 mm long) and the carpels glabrous except at the inner suture.

***Spiraea darjeelingensis* Panigrahi & K.M. Purohit (Rosaceae)**
in Bull. Bot. Surv. India 26 (1–2): 83–86. 1984 (1985).

Shrubs. Branches terete, greyish brown, glabrous or young part pubescent. Buds minute, pubescent. Leaves alternate, lamina 1.8–5.8 × 0.8–1.8 cm, ovate to elliptic, cuneate at base, acuminate at apices, simply serrate except at base, glabrous or pubescent on the veins beneath, young leaves tomentose, primary veins 4.5 on each half; petioles 3–5 mm long, glabrous or pubescent. Inflorescences terminal compound corymbs on the long and straight branches of the current year, branched, leafless, 6.5–15.5 cm long, 8.0–17.0 cm broad, pubescent. Pedicels 2.0–5.0 mm long, pubescent. Bracteoles not seen. Flowers not seen. Floral tubes (calyx tubes or hypanthia) in fruit shallow cupshaped, pubescent outside and glabrous inside. Sepals ± 1 × 1 mm, ovate triangular, sparsely pubescent outside and glabrous inside, reflexed in fruit. Petals and stamens not seen. Follicles 5–6, divergent, fully exposed, body of follicles 1.5–2.0 mm long, villous pubescent throughout, styles c 1 mm long, subterminal, stigma swollen. Seeds 9–10, c 1 mm long, 8 large + 1–2 small or all ± equally developed, linear-ellipsoed.

Type : J. S. Gamble 4108 C (Holotype CAL).

Fruiting : April–May.

Distribution : INDIA: West Bengal, Sikkim.

Herbarium specimens : INDIA: West Bengal; Darjeeling, 2135 m,

Apr. 3, 1877, fr., *J. S. Gamble* 4108 C (CAL). Sikkim; Lachen, 2592 m, May 1885, fr., *G. King's collector* s. n. (CAL).

Notes : According to Panigr. & Purohit. (*l.c.*): It is nearer to *S. micrantha* J. D. Hooker in its leaf-shape and inflorescence but differs from it in having leaf-lamina up to 5.8 cm long, simply serrate, petioles 3–5 mm long; inflorescence leafless. Growing in temperate climate.

Spiraea emarginata K.M. Purohit & Panigrahi (Rosaceae) in Bull. Bot. Surv. India 26 (1–2): 88. 1984 (1985).

Shrub. branches slender, flexuous, terete, dark purple, flower bearing branchlets drooping. Buds \pm 1 mm long, ovoid, pubescent, outer scales glabrous. Leaves alternate, lamina 0.8–1.5 \times 0.3–0.6 cm, ovate-elliptic to oblong, obtuse to acutish at apex, entire or crenate, on the upper half, glabrous or minutely pubescent and green above, glaucous beneath; petioles 1.0–1.5 mm long, glabrous. Inflorescences compound corymbs, hemispherical, 1.0–1.5 cm long, 1.5–2.5 cm broad, many flowered, pubescent, terminating drooping lateral branchlets of 1.5–4.0 cm long. Pedicels 4–10 mm long, slender, pubescent. Bracteoles 1.0–2.0 mm long, linear-lanceolate, pubescent. Flowers bisexual, 5–6 mm in diameter, white. Floral tubes (calyx tubes or hypanthia) obconical, \pm 1 mm long, pubescent on both exterior and interior. Sepals \pm 1 \times 1 mm, ovate-triangular, acute, pubescent on both surfaces, spreading at anthesis. Petals 2.0–2.5 \times 2.0–2.5 mm, obovate-suborbicular, always emarginate or notched, sessile, white. Stamens c. 20, 1.5–2.0 (–2.5) mm long, shorter than or equalling petals, filaments glabrous, slender and flexuous, anthers roundish oblong, dorsifixed. Nectar ring (disc) conspicuous, with thin squarish lobes. Carpels 5, sessile, glabrous except at inner suture, \pm 1 mm long, style apparently terminal, c. 1 mm long, glabrous, stigma swollen. Follicles not present.

Type : Ram Lakhan 10093 (Holotype LWG).

Flowering : May.

Distribution : INDIA : Jammu & Kashmir.

Herbarium specimen : INDIA: Jammu & Kashmir; Banihal, 1708 m, May 14, 1954, *Ram Lakhan* 10093 (LWG).

Notes : According to Purohit & Panigr. (*l. c.*): Allied to *S. gracili* Maxim & *S. vaccinifoliae* D. Don. It differs from the former by: leaves ovate-acute, pubescent on veins beneath; pedicels villous, petals emarginate; whereas it differs from later in having lamina up to 15 × 6 mm, petioles 1.0–1.5 mm long, glabrous; inflorescences 1.5–2.5 cm broad; floral tubes villous on both interior and exterior; petals always emarginate.

Dense shrubs with flowers white, growing at an altitude of 1708 m, known by the type collection only.

***Spiraea nayarii* K.M. Purohit & Panigrahi** (Rosaceae) in Bull. Bot. Surv. India 26 (1–2): 78–80. 1984 (1985).

Shrub, older branches arcuate, puberulous, younger part of the vegetative branch and the flower-bearing branchlets pubescent, striated, dioecious. Buds 2–3 mm long, ovoid with several exposed imbricate scales, minutely and sparsely pubescent. Leaves alternate, lamina 0.9–2.4 × 0.4–1.5 cm, ovate elliptic to oblong in flower-bearing branchlets, serrate-dentate except the lower third (in case of vegetative branch), the upper 1/3rd, 5–9 toothed (in flowering branchlets), rounded to cuneate at base, acute to obtuse at apices, upper surface green, minutely pubescent, lower surface pale, more pubescent, veins 3–4 on each half; subsessile or petioles 1–2 mm long, pubescent. Inflorescences compound corymb on short (1.0–2.2 cm long) leafy, slender lateral branchlets, erect and very close to the main branch, 0.7–1.2 cm long, 0.9–2.0 cm broad, tomentose, leafy, a few-flowered, pedicels 2–3 mm long, tomentose; bracteoles c 2.0–2.5 mm long, linear lanceolate, hairy. Flowers (only female flowers seen), c 3.5–4.0 mm across, red. Floral tubes (calyx tubes or hypanthia) campanulate, villous on both exterior and interior surfaces. Calyx lobes ± 1 × 1 mm, triangular, tomentose outside and glabrous inside, reflexed. Petals c 1.5 × 1.25 mm, obovate or suborbicular, red, entire, notched at apex. Stamens reduced, c 1 mm long, anthers small, empty. Disc crenate-dentate with triangular

teeth. Carpels 5, 1.5 mm long, villous; style c 1.5 mm long, basally pubescent, stigma discoid; ovules 7-8, linear-oblong, mature carpels unknown.

Type : G. King's collector, Gyalu s. n. (Holotype CAL-Acc. No. 145139).

Flowering : August.

Distribution : INDIA: Sikkim.

Herbarium specimen : INDIA: Sikkim; Tiatong above Tallum Samdong, 3660 m, Aug. 1885. fl., G. King's collector, Gyalu s.n. (CAL-Acc. No. 145139).

Notes : According to Purohit & Panigr. (*l.c.*): It is near to *S. tanguensis* in the leaf-shape of flowering branchlets and in hairy carpels but differs from it in having flower-bearing branchlets up to 2.2 cm long, slender, erect, inflorescences up to 2 cm broad, few-flowered, pedicels 2-3 mm long.

Flowers red. The plant grows at an altitude of 3660 m.

This species is named after Dr. M. P. Nayar, a renowned, internationally famous plant taxonomist and phytogeographer of India.

Spiraea panchananii Panigrabi & K.M. Purohit (Rosaceae) in Bul. Bot. Surv. India 26 (1-2): 80. 1984 (1985).

Shrub with branches angled, striated, greyish, glabrous. Buds c 2 mm long, ovoid with 7-8 imbricate scales, minutely pubescent. Leaves of flowering branches fascicled in clusters of 5-8 below the inflorescences, obovate-oblong, lamina 5-6 × 2-3 mm, entire, cuneate at base, subsessile, pubescent. Inflorescences in sessile, umbels or the lower ones sessile corymbs, simple (or sometimes compound), densely hairy, 2-12 (15)-flowered; pedicels 4-6 mm long, densely hairy, slender, erect to drooping, bracteoles 1.0-2.5 mm long, linear-lanceolate, hairy. Flowers bisexual, 5-6 mm (-7.5 mm) in diam., white. Floral tubes campanulate, 1.5-2.0 mm long, c 2 mm broad, pilose on both exterior and interior. Calyx lobes c

1.5 × 1.0 mm, ovate, triangular, pubescent outside, glabrous or scarcely pubescent inside. Petals 2.5-3.0 × 2.0-3.0 mm, sessile, obovate-cuneate, retuse, or irregularly crenate at apices, white. Stamens 15-20, 1.5-2.0 mm long, filaments glabrous, anthers dorsifixed. Disc with free notched glands. Carpels 5, free, 1.0-1.5 mm long, densely hairy on the outer side above the base and on the inner suture, styles c 1 mm long, glabrous, stigma swollen, ovules 6-8, pendulous, linear-ellipsoid.

Type : N. C. Nair 35541 (Holotype BSD).

Flowering : April.

Distribution : INDIA : Uttar Pradesh.

Herbarium specimen : INDIA: Uttar Pradesh; Pithorgarh District, Munsiri, 2400 m, Apr. 23, 1965, N. C. Nair 35541 (BSD).

Notes : According to Panigr. & Purohit (*l.c.*): It is near to *S. duthieana* in the arrangement of inflorescences on the stem but differs from it in having the lamina (below inflorescences) 5-6 × 2-3 mm, subsessile, pedicels 4-6 mm long, villous.

The plant grows at 2400 m.

The species is dedicated in honour of late Prof. Panchanan Maheshwari, F. R. S. an eminent botanist and world famous embryologist of India.

Spiraea panigrahiana K.M. Purohit (Rosaceae) in J. Econ. Tax. Bot. 6(1): 205-206. 1985.

Shrubs. Branches angled, dark brown, older parts glabrous, young branches and flowering branchlets pubescent. Buds ovoid. Leaves alternate, lamina 8-15 × 3-5 mm, obovate-spathulate, mostly entire, rarely minutely 2-3 toothed at apices, attenuate at base, obtuse at apices, glabrous or ciliate only at margins, both surfaces equally green, subsessile or with petioles 1.0-2.5 mm long, minutely pubescent. Inflorescences simple corymbs, 0.8-1.3 cm long, 1-2 cm broad, pubescent on leafy branchlets of 1.0-1.5 long, (4-) 6-10 flowered; pedicels 4-9 mm long, bracteolate. Bracteoles 2.0

5.5 mm long, linear-lanceolate to obovate, leafy, glabrous or minutely pubescent. Flowers bisexual? white. Floral tubes campanulate, 1.0-1.5 mm long, pubescent outside and glabrous within. Sepals 1.0-1.5 × ± 1 mm, ovate acute, glabrate outside and pubescent within, erect or reflexed in fruit. Petals 2.5-3.5 × 2.0-2.5 mm, obovate, cuneate at base, rounded to emarginate at apex, sessile, glabrous? white, 1 or 2 petals still attached to fruit. Stamens 15-20, ± 2 mm long, shorter than petals, filaments glabrous, anthers roundish-oblong, dorsifixed, persistent in fruit. Nectar ring (disc) conspicuous with roundish lobes. Carpels 2-5, sessile, sparsely pubescent throughout, 1.5-2.0 mm long, style subterminal, ± 1 mm long. Follicles 2-5 (1-3 or all 5 fully developed), body of follicles 2-3 mm long, sparsely pubescent throughout, gradually becoming glabrous, style 1.0-1.5 mm long, glabrous. Seeds 2-6 (3 large + 3 small or all equally developed), 1-2 mm long, linear-ellipsoid.

Type : C. M. Arora 66114 (Holotype BSD).

Fruiting : May.

Distribution : INDIA: Uttar Pradesh.

Herbarium specimen : INDIA: Uttar Pradesh; Pithoragarh District, Narayan Nagar, 1900 m, May 16, 1979; C. M. Arora 66114 (BSD).

Notes : According to Purohit (*l. c.*): This common shrubs with drooping branches, thorny stem with light brown fruits growing in slopes in oak, Rhododendron forest.

It is nearer to *S. arcuata* in its inflorescences but differs from it in having less arched ungrooved stem; leaves obovate-spathulate, mostly entire, both surfaces equally green; inflorescence branchlets drooping; petals obovate-cuneate; carpels sparsely pubescent throughout.

This species is dedicated in honour of Dr. G. Panigrahi, a well-known plant taxonomist and phytogeographer of India.

Spiraea rhamniphylla Panigrahi & K.M. Purohit (Rosaceae)
in Bull. Bot. Surv. India 26 (1-2): 76-78. 1984 (1985).

Shrubs. Branches terete, stout, redish-brown, hoary, older parts becoming glabrous. Buds 1.0 - 2.5 mm long, ovoid with imbricate scales, tomentose. Leaves alternate, lamina 1.2 - 4.5 × 0.6 - 2.8 cm, ovate to elliptic lanceolate, thick, rounded or cuneate at base, acute to obtuse at apices, crenate-serrate except at base, rarely entire, glabrous above, glaucous beneath and ± pubescent or glabrous on veins beneath, 3 - 4 primary veins on each half; petioles 2.5 - 8.0 (-10) mm long, slender, tomentose. Inflorescences terminal compound corymbs terminating the stout primary branch, 4 - 11.5 (-23.0) cm × 0.7 - 1.65 cm, flat or convex, densely flowered, tomentose; pedicels 3-5 (-8) mm long, densely tomentose, each pedicels with 1 - 2 bracteoles. Bracteoles 1 - 3 mm long, subulate or lanceolate to spatulate, tomentose. Flowers bisexual 4 - 5 mm in diam., white. Floral tubes campanulate, ± 1 mm long, tomentose outside, and glabrous inside. Sepals c 1×1 mm long, ovate-triangular, acute, tomentose outside, glabrous inside, erect in fruiting stage. Petals c 2 × 2 mm, obovate to suborbicular, apices notched or crenate, white. Stamens 15 - 20, 2 - 3 mm long, equalling or slightly exceeding petals, filaments glabrous, anthers dorsifixed. Nectar ring (Disc) conspicuous. Carpels 5, free, c 1 mm long, glabrous except at inner suture. Style 1.0 - 1.5 mm long, subterminal, stigma capitate. Follicles 5, body of follicles 2.0 - 2.5 mm long, glabrous except at inner suture, bearing style dorsally. Seeds 5 - 8, 4 large + 1 small or 6 large + 2 small or all equally developed, larger one 1 mm or more long, smaller ones less than 1 mm, linear ellipsoid, smooth.

Type : *R. Strachey* & *J. E. Winterbottom* 3 (Holotype CAL- Acc. No. 145271).

Flowering : May - July. *Fruiting*: July - September.

Distribution : INDIA: Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir.

Herbarium specimens : INDIA: Jammu & Kashmir; sine prop. loc., *H. W. Bellow* s.n. (CAL). Himachal Pradesh; Simla, Sudrvey lysium hill, 1830 m, Sept.9, 1877, fr., *J. S. Gamble* 4996 c (CAL); north Kulu, Beas valley, from Bijoura to the floor of the Rotang pass, 1220-1982 m, *Stoliczka* s.n. (CAL - Acc. No. 145270; Simla, Naldhera, 1820 m June 26, 1887, *G. Watt* s. n. (CAL - Acc. No. 145266); *ibid.*,

1830 m, June 19, 1877, fl., *J. S. Gamble* 4401c (CAL). Uttar Pradesh; Mussoorie, Charleville Road, 2000 m, Aug. 2, 1963, fr. *H. Santapau* 28553 (CAL); Mussoorie June 1898, fl., *Mackinnon* s. n. (CAL Acc. No. 145265); hills southeast of Mussoorie, 1677 m, May 1895, *R. Proudlock* s. n. (CAL -Acc. Nos. 145124 & 145125); *ibid.*, Landour, *sine lect.*, s.n. (CAL Acc. No. 145119); Mussoorie, July 1869, fl., *G. King* s. n. (CAL Acc. No. 145282); Garhwal, Birehi-Gohna, 1800 m, June 8, 1958, fl., *M. A. Rau* 10011 (CAL, BSD); Kumaon, Shalma Sarju valley, July 3, 1900, fr., *Inayat* 24400 (CAL, DD); Mussoorie 1830-2135 m, July 1899, fl., *J. F. Duthie* 22715 (CAL left hand specimen, DD); Mussoorie, July 13, 1870, fl., *G. King* 8 m (CAL left hand specimen); Mussoorie, 1830 m, Aug. 22, 1982, *K. M. Purohit* 15 (CAL); Kumaun, W. Boogur, 2135 m, May 1848, fl., *R. Strachey & J. E. Winterbottom* 3 (CAL Acc. No. 145271).

Notes : According to Panigrahi & Purohit (*l. c.*): This is near to *S. vacciniifolia* in leaf-shape and general appearance but differs from it in having branches strong and stout, petioles up to 10 mm long, inflorescences on primary branch up to 16.5 cm broad, flowers densely arranged, petals notched or crenate at apices. Growing on micaceous rocks, lime stone cliffs at an altitudinal range of 1300-2135 m.

J. D. Hooker (1878) included *S. rhamnifolia* Wall. Num. List No. 700. 1829, *nom. nud.* as a synonym of *S. vacciniifolia*. But a comparison of Lindley's t. 17 (1840) representing *S. vacciniifolia* D. Don with the microfiche of the Wall. Num. List No. 700 representing *S. rhamnifolia* brings out significant differences between them (Panigrahi & Purohit) therefore, segregate a number of the Himalayan specimens matching with Wall. Num. List No. 700, from *S. vacciniifolia* D. Don complex and identify them with *S. rhamnifolia* Wall. Num. List No. 700. 1829, *nom. nud.* Since J. D. Hooker (1878) cited *S. rhamnifolia* Wall. *nom. nud.* merely as a synonym under *S. vacciniifolia* D. Don, the description of the latter can not be utilized to validate *S. rhamnifolia* wall. *nom. nud.* [Art. 34.1 (d)]. As such, one is obliged to describe the Himalayan specimens thus segregated and matched with Wall. Num. List No 700 as a new taxon (*sp. nov.*). Since *Wallich* 700 is in K- WALL., not available for detail analysis

and there is no duplicate of this number in CAL, one regrettably abandons the more familiar epithet *rhamnifolia* in favour of a new epithet, *rhamniphylla* and the holotype is chosen from among the specimens studied in CAL.

***Spiraea subdioica* K.M. Purohit & Panigrahi (Rosaceae) in Bull. Bot. Surv. India 26 (1-2): 86-88. 1984 (1985).**

Shrub. Stem terete, brown, hoary pubescent. Buds \pm 2 mm long, ovoid, tomentose. Leaves alternate, often 2-3 leaves developing at each node, lamina 2.4-5.0 \times 0.8-2.4 cm, rhombic-elliptic, cuneate at base, acute at apices, singly serrate, sparsely pubescent above, sufficiently hairy beneath, more so on the veins, primary veins 5-6 on each half; subsessile or with petioles 1-2 mm long, densely pubescent. Inflorescence terminal compound corymb, 7.5 cm long, 11.5 cm broad, flat topped, close, tomentose, leafy, terminating a branch of 31 cm long. Pedicels 2-5 mm long, tomentose. Bracteoles 1.5-2.0 mm long, linear-subulate, ciliate. Flowers unisexual $\frac{\sigma}{\delta}$, 3-4 mm in diameter, white. Floral tubes (calyx tubes or hypanthia) spherical, less than 1 mm long, villous on exterior and glabrous on interior. Sepals 0.5-0.75 \times 0.5-0.75 mm, ovate-triangular, unicostate, tomentose outside and glabrous inside, erect or spreading or reflexed. Petals 1.0-1.5 \times 1.0-1.5 mm, obovate, sessile, apices entire or slightly retuse, white. Staminodes 15-20, c 1 mm long, anthers empty. Nectar ring (disc) prominent with incurved scales. Carpels 5, free, \pm 1 mm long, pubescent throughout, style subterminal, c 1 mm long, stigma swollen. Seeds 12-14, 4-6 large + 8 small, or all equally developed, \pm 1.0 mm long, ovate-oblong, tapering at both ends, cells of testa \pm rectangular with straight walls. Male flowers not seen.

Types : *J. Joseph* 39895 (Holotype CAL; Isotype ASSAM).

Flowering & Fruiting : September.

Distribution : INDIA: Arunachal Pradesh.

Herbarium specimen : INDIA: Arunachal Pradesh; Kameng District, Bomdila, 2780 m, Sept. 14, 1964, fl., *J. Joseph* 39895 (CAL & ASSAM).

Notes : According Purohit & Panigr. (*l. c.*) : This species is nearer to *S. robusta* in general appearance but differs from it in having leaves hairy on both surfaces, singly serrate subsessile or with petioles 1-2 mm long, flowers unisexual (female flowers seen), 3-4 mm in diam., white, floral tubes glabrous inside, carpels pubescent throughout.

It also resembles *S. micrantha* in its inflorescence and pubescent carpel but differs from it in having leaves 2.4-5.0 × 0.8-2.4 cm rhombic-elliptic, not acuminate at apices, hairy on both surfaces, somewhat sharply serrate, sessile or with short petioles (1-2 mm long).

The plant is common shrub & the flowers are in corymbs, white. It grows at the edge of the forest at an altitude of 2780 m. Known by the type collection only.

Spiraea subrotundifolia Panigrahi & K.M. Purohit (Rosaceae) in Bull. Bot. Surv. India 26 (1-2): 88-91: 1984 (1985).

Plants 22-37 cm tall. Stems erect, terete, or angled, glabrous or young ones pubescent. Buds 1.0-1.5 mm long ovoid, pubescent. Leaves alternate, lamina 1.4-3.5 × 1.2-2.5 cm, ± orbicular, rarely ovate, entire at base, singly serrate on the upper two-thirds, thick, rounded at base, apices acute to obtuse, glabrous or sparsely pubescent only on veins beneath; primary veins 5-7 on each half, subsessile or petioles 1-2 mm long, pubescent. Inflorescences terminal compound corymbs, 1-4 cm long, 2-6 cm broad, leafy, pubescent, many flowered. Pedicels 3-8 (-10) mm long, pubescent. Bracteoles c 3 mm long, lanceolate, pubescent. Flowers dioecious, 5-8 mm in diam., white (?). Floral tubes (calyx tube or hypanthia) spherical, 2.0-2.5 mm in diam., villous within and outside. Sepals c 2.0 × 1.5 mm, ovate-acute, pubescent outside and glabrous inside, spreading at anthesis. In ♂ flowers petals obovate, c 3 × 2 mm, entire; stamens 20-25, c 3 mm long, equalling or shorter than petals, bowed inwards immersing the anthers in the floral cup, filaments glabrous, anthers dorsifixed. Nectar ring (Disc) prominent with broad incurved scales, continuous. ♀ flowers smaller (c 5 mm

across), petals c 2 × 2 mm, ± orbicular, entire. Stamens reduced, shorter than petals. Carpels 5, free, 1.5 - 2.0 mm long, glabrous except at inner suture; styles c 1 mm long, subterminal, stigma swollen. Follicles 5, body of follicles 2.0 - 2.5 mm long, erecto-parallel, fully exposed, glabrous except at inner suture. Seeds 10 - 12, linear to ellipsoid, 3 larger + 7 - 9 smaller, larger ones 1 mm or more, smaller ones less than 1 mm long.

Types : King's collector s. n. (Holotype CAL ♂ + ♀ on the same sheet; Isotypes CAL- Acc. Nos. 145166 - 145168).

Flowering : July - August. *Fruiting* : September - November.

Distribution : INDIA: Sikkim.

Herbarium specimens: INDIA : Sikkim; Tiamphong, Jongri, Aug. 1887, fl., King's collector s. n. (CAL ♂ + ♀ on the same sheet; CAL Acc. Nos. 145166 - 145168).

Notes : According to Panigr. & Purohit (*l. c.*) : Allied to *S. Bellae* Sims but differs from it by plants being 22- 37 cm tall; buds pubescent; lamina up to 3.5 × 2.5 cm, ± ovate - orbicular, singly serrate, subsessile or petioles 1 - 2 mm long, sepals spreading at flowering.

Plants growing at an altitudinal range of 3050 - 4270 m.

Spiraea tanguensis K.M. Purohit & Panigrahi (Rosaceae) in Bull. Bot. Surv. India 26 (1 - 2): 80 - 83. 1984 (1985).

Shrub, older branch zigzag towards apex, glabrous, dark, branchlets pubescent, reddish brown, angled - striated, flower-bearing branchlets (1.5 -) 2.8 - 8.2 cm long, (excluding inflorescence), subdioecious. Buds ovoid with imbricate scales, c 2 mm long, shortly pubescent. Leaves alternate, lamina 1.2 - 2.5 × 0.4 - 0.8 cm, oblong - elliptic to oblanceolate, entire or 3 - 6 toothed at apices, acute at both ends or obtuse at apices, pubescent on both surfaces, more so on the veins beneath, lower surface pale, veins 3 - 4 on each half, raised; subsessile or with petioles 1-3 mm long, pubescent. Inflorescences compound corymb on leafy stout lateral branchlets, diverging away from the main stem, (2.0-) 3.2 - 5.0 cm broad (1.6)

2.4 - 3.8 cm long, tomentose, leafy, many-flowered, pedicels 2.5 - 6.0 mm long, tomentose. Bracteoles c 3 mm long, linear-lanceolate, filiform, hairy, \pm equalling the calyx. Flowers (only female flowers seen), 5 - 6 mm across. Floral tubes campanulate, villous on both outside and inside. Calyx lobes \pm 1 \times 1 mm, triangular, tomentose outside, and glabrous inside, erect or reflexed. Petals c 2 \times 2 mm, obovate to suborbicular, entire or notched at apex. Stamens reduced, filaments 1 mm or more long, shorter than petals, anthers empty. Nectar ring (disc) crenate-dentate with triangular scales. Carpels 5 - 6, free, c 2 mm long, densely hairy, half-enclosed; styles c 2.5 mm long, subterminal, basally pubescent. Ovules 12 - 15, linear ellipsoid, less than 1 mm long. Mature carpels unknown.

Type : *F. E. younghusband* s.n. (Holotype CAL - Acc. No. 145145).

Flowering : July.

Distribution : INDIA: Sikkim.

Herbarium specimens : INDIA: Sikkim; Tangu, 3965 m, July 1, 1903, fl, *F. E. younghusband* s. n. (CAL Acc. No. 145145).

Notes : According to Purohit & Panigr. (*l.c.*): Allied to *S. bellae* Sims but differs by: buds pubescent; lamina up to 2.5 \times 0.8 cm, oblong-elliptic or oblanceolate, entire or 3 - 6 toothed at apices, pubescent on both surfaces; carpels densely pilose; styles basally pubescent.

A high altitude plant growing at an elevation of 3965 m. Known by the type collection only.

Staurogyne perpusilla A.N. Henry & N.P. Balakr. (Acanthaceae) in Bull. Bot. Surv. India 3 (2): 205 - 206. 1961 (1962).

Erect herb, 2 - 11 cm, tall; stem simple, unbranched, appressed-pubescent, dark purplish-brown, terete, filiform, \pm 0.5 mm thick. Leaves 1.0 - 1.5 cm long, 0.4 - 0.8 cm wide, all opposite, ovate-oblong, obtuse or sub-obtuse, base rounded or abruptly cuneate, margins entire, thin, glabrous above, puberulous on nerves beneath; nerves 4 - 5 pairs; petiole very short, \pm 1 mm long, densely appressed-pubescent. Inflorescence terminal, in lax spiciform or condensed

racemes; peduncle angular, appressed pubescent, often short, when the inflorescence looks capitate, or sometimes elongated, when the inflorescence looks spiciform. Flowers often many, rarely 2 in each inflorescence pedicel ± 1 mm long, appressed-pubescent. Bracts ovate, obovate, oblong or spatulate, subobtuse or acute, pinnately nerved, ± 5 mm long, ± 1.5 mm, wide, glandular-hairy, as long as or longer than the calyx lobes. Bracteoles 2, linear, acute, narrowed at base, glandular-hairy, shorter than calyx lobes, ± 3 mm long, ± 0.3 mm wide. Calyx lobes 5, cleft almost to the base, subequal, 3-nerved; posticous lobe largest, ± 6 mm long, ± 1 mm wide, linear-oblong, obtuse, glandular-pubescent; anticous lobes 2, smaller, ± 5 mm long, ± 0.5 mm wide, linear-oblong, obtuse, glandular-pubescent; lateral lobes smallest, ± 4 mm long, ± 0.3 mm wide, linear, acuminate, glandular-pubescent. Corolla pale blue, ± 3 mm long. Ovary glabrous. Capsules ± 4 mm long, ± 1 mm wide ovate-oblong acute at both ends, glabrous. Seeds ± 0.1 mm in diameter, pitted-tuberculate, many in each capsule.

Types : Balakrishnan & Henry 12160 (A: Holotype MH; B-F: Isotypes MH).

Flowering & Fruiting : February.*

Distribution : INDIA : Madhya Pradesh.

Herbarium specimens : INDIA: Madhya Pradesh: Bastar District, Bedmakot, Feb. 16, 1961, Balakrishnan & Henry 12160 A F (MH).

Notes : According to Henry & Balakr. (l.c.) : *Staurogyne perpusilla* Henry & Bal., belongs to subgenus *Tetrastichum* Bremek and related to *S. polybotryae* (Nees) O. Kuntze differing in the total plant being shorter and erect, filiform, unbranched, slender, inflorescence in lax spiciform racemes with fewer flowers; leaves bracts and lobes of calyx shorter, capsules narrower.

Stixis manipurensis Deb & Rout (Capparaceae) in J. Bombay Nat. Hist. Soc. 86(1): 86-88. 1989.

Climbing shrubs c 15-20 m' in height, profusely branching above, unarmed; stem terete, lenticellate. Leaves simple, alternate,

congested on branchlets, 7.5-16.0 × 2.5-5.0 cm, elliptic-oblong, coriaceous, acute or shortly acuminate at apex, acute or obtuse at base, entire, glabrous, unicostate, reticulate; lamina profusely pustulate with bacterial nodules; lateral nerves 7-10 on either side, alternate or subopposite, arching obliquely towards the margin; midrib slightly sunken above, prominent, sometimes pustulate beneath. Flowers in axillary panicle or raceme, yellowish, sweetly scented, minutely pubescent; bracts caducous, c. 2.0 × 1.0 mm, elliptic, acute at apex, pubescent; pedicel 1.0-1.5 mm long, stout. Floral buds 4.0-4.5 × 3.0-4.0 mm, obovoid or spherical. Sepals 6 in two whorls, spreading, not reflexed at anthesis, imbricate, 3.0-3.5 × 2.5 mm, ovate, acute at apex, fulvous tomentose on both sides. Petals absent. Androgynophore c. 0.2 mm long, glabrous. Stamens more than 40; filaments c. 2 mm long, glabrous; gynophore c. 0.2 mm long, glabrous. Ovary c. 1.2 × 1.0 mm, ovoid, stellately hairy, 3-loculed, each bearing 2 ovules on axillary placenta; style c. 0.5 mm long; stigma 3-lobed. Fruit 2.5-3.1 × 1.2-1.6 cm ellipsoid, 3-angled; pericarp 2.5 mm thick, distinguished into thick pericarp, spongy mesocarp and thin endocarp. Seeds one, large, embedded in the pulp with a thin testa; cotyledons large, unequal, one enclosing the other.

Type : D. B. Deb 3549 A (Holotype CAL).

Flowering : April-August. *Fruiting* : July?

Distribution : INDIA: Manipur.

Herbarium specimens : INDIA: Manipur; Tangnopoul, 1500 m, July 30, '87, D.B. Deb 3549 (A: CAL; B: a fruiting panicle detached from the type, CAL).

Notes : According to Deb & Rout (*l.c.*): The genus *Stixis* Lour. (Capparaceae) known in the Indian Floras under the name *Roydsia* Roxb., has been recently studied by Jacob (*vide* Blumea 12 : 5-12, 1963) treating *S. suaveolens* (Roxb.) Pierre as the type. The genus is represented by seven species distributed in Nepal, Bhutan, Eastern India, South China, Burma, Vietnam, Indochina, Hainan and Western Malaysia.

Differs from *S. suaveolens* in smaller and narrower leaves, ovate sepals and much shorter androgynophore and gynophore, amongst

others; from *S. scandens* in elliptic bracts, ovate sepals, larger number of stamens and shorter glabrous gynophore; from *S. ovata* in smaller bracts, ovate sepals, shorter androgynophore and gynophore, larger number of stamens, stellately hairy ovary and shorter glabrous style.

Sundara Raghavan, R. has just published a new species from Burma (vide Bull. Bot. Surv. Ind. 28: 191, 1988), which is very different from the one described here.

***Symplocos nairii* A.N. Henry, Gopalan & Swamin.**
(Symplocaceae) in J. Bombay Nat. Hist. Soc. 81(1): 169. 1984.

Shrubs or trees up to 8 m tall; branches terete, glabrous, terminal end of young shoots often angled. Leaves up to 12 × 7 cm alternate, elliptic to oblong or ovate, glabrous, recurved and minutely glandular-dentate along margin, obtuse to acute at apex, cordate or somewhat obliquely cordate at base; midrib grooved above, prominent beneath; nerves 8-12 pairs, faintly prominent beneath; petioles 2-4 mm long, grooved above, swollen at base. Flowers axillary, solitary or clustered in racemes up to 2 cm long; axis of racemes glabrous; bracts and bracteoles up to 11 × 4 mm, persistent, ovate to cordate, appressedly hairy without, glabrous within, acute to acuminate at apex. Calyx tube 1-2 mm long, glabrous; lobes 5, each 2-4 × 1.5-2 mm, imbricate, subequal, ovate, rounded, appressedly hairy without, glabrous within. Corolla lobes 5, white, each 3-4.5 × 1-2 mm, connate at very base, glabrous. Stamens 30-35, in five alternipetalous groups; filaments 2-5 mm long, connate towards the base; anthers globose, bilocular, introrse, dehiscing longitudinally. Disc 5-glandular, glabrous, surrounding the conical sericeous style base. Ovary inferior; style 4 mm long; stigma capitate, punctiform. Drupes 8-20 × 5-6 mm, cylindrical to ellipsoid, smooth, crowned by the persistent calyx-lobes.

Types : Henry 68830 (Holotype CAL; Isotypes MH Acc. Nos. 118671-118679).

Flowering & Fruiting : March-September*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Kanniyakumari District, Muthukuzhivayal, 1400 m, Sept. 27, 1980, *Henry* 68830 (CAL & MH-Acc. Nos. 118671-118679); upper Kodayar, on way to Muthukuzhivayal, Mar. 21, 1981, *Henry* 70370 (paratypes Acc. Nos- 118680-118691 in MH).

Notes : According to *Henry et al. (l.c.)*: Allied to *S. cordifolia* Thw., but differs in: leaves smaller; flowers smaller, solitary, or clustered in racemes up to 2 cm long; axis of racemes glabrous, and stamens 30-35. In evergreen forests; rather rare.

The species is dedicated to Dr. N. C. Nair, Joint Director, Botanical Survey of India, for his significant Contributions.

Symplocos pulchra Wight Subsp. *coriacea* Gopalan & A.N. *Henry* (*Symplocaceae*) in *J. Econ. Tax. Bot.* 12 (2): 481. 1988.

Shrubs or small trees, up to 3 m tall; branchlets hirsute. Leaves 9-12 × 3-4.5 cm, elliptic to oblanceate, coriaceous, distantly serrate-mucronulate, glabrous above, minutely pilose beneath, acute to acuminate at apex, (acumen up to 7 mm long), rounded or cordate at base; nerves 5-10 pairs; petioles 2-3 (-4) mm long, hirsute. Spikes up to 2 cm long, hirsute, few flowered; bract and bracteoles 2 × 2 mm, ovate, hirsute outside, glabrous inside, caducous. Calyx-tube ca 1 mm long, hirsute; lobes 2-3 × 1-1.5 mm ovate-triangular, hirsute outside, glabrous inside sometimes unequal. Petals 4-5 × 2-3 mm, ovate, unequal, glabrous, connate at base. Stamens up to 25; filaments 2-4 mm long, adnate to petals. Disc 5-glandular, the conical style base of disc hairy. Style thick; stigma capitate, punctiform. Drupe up to 10 × 5 mm, cylindrical to ellipsoid, hairy, crowned by the persistent calyx-lobes.

Types : *Gopalan* 81443 (Holotype CAL; Isotypes MH-Acc. Nos. 144009-144016).

Flowering & Fruiting : March*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens: INDIA: Tamil Nadu; Kanniyakumari District, in 11th Forest, from Kodayar to Nalumukku, 1250 m, Mar. 25, 1984, Gopalan 81443 (CAL); *ibid.*, Gopalan 81443 -Acc. Nos. 144009 144016 MH).

Notes : According to Gopalan & Henry (*l.c.*) : Allied to *Symplocos pulchra* Wight Subsp. *Pulchra* but differs in having elliptic or oblanceolate, coriaceous, distantly serrate-mucronulate leaves. Spike up to 2 cm long, few flowered, calyx tube hairy; stamens up to 25.

In evergreen forests; rather rare.

Syzygium chandrasekharanii Chandrab. & V. Chandras. (Myrtaceae) in J. Bombay Nat. Hist. Soc. 78 (1-3): 354-356. 1981.

Trees 10-15 m high; trunk 40-70 cm in diam.; bark greyish black; branchlets tetragonous. Leaves 3-10 × 1.5-5.5 cm, sessile or subsessile, usually opposite, decussate, rarely alternate, ovate, ovate-elliptic, elliptic or elliptic-oblong, entire, recurved along margins, coriaceous, glabrous, obtuse, subacute or emarginate at apex, obtuse and subcordate at base; lateral nerves many, thin, prominently reticulate. Flowers 2-3 cm long, dull white, sessile, 20-30 in terminal or lateral corymbose cymes 8-12 cm across; peduncles up to 3 cm long; bracts ± 2.2 × 0.7 mm, spatulate, concave; bracteoles ± 2 × 1.2 mm, ovate-elliptic. Calyx 1.7-2.5 cm long, greenish pink, narrowly obconical, glabrous, rugulose without; tube 1.5-2.3 cm long, adnate with the ovary to about half its length, mouth produced beyond the ovary; lobes 4, each ± 2 × 3 mm, broadly triangular, subacute. Petals 8, each 3-5 × 3-5 mm, unequal, outer 4 larger than the inner, suborbicular, subentire, glabrous, gland-dotted, calyptrate. Stamens many, unequal, free; filaments white, slender, incurved in bud; anthers versatile. Ovary inferior, usually 2-loculed; ovules many, axile; style 1.7-2 cm long, thick, glabrous; stigma simple. Berries 2.5-2.8 × 1.7-2.5 cm, purple, obovoid, depressed at apex with persistent calyx lobes, 1-seeded; seeds ± 1.3 × 1 cm, brown, obovoid, truncate at apex, longitudinally striate, glabrous, cotyledons fused together.

Types : Chandrabose 65811 (A: Holotype CAL; B G: Isotypes MH).

Flowering & Fruiting : February April*.

Distribution : INDIA: Tamil Nadu (Madras state).

Herbarium specimens : INDIA: Tamil Nadu; Coimbatore District, Anamalai Hills, Konalar, Feb. 15, 1980, Chandrabose 65811 (A: CAL; B G: MH); *ibid.*, Apr. 12, 1980, Makali 65898 A G (Paratypes MH).

Notes : According to Chandrabose & Chandrasekaran(*l. c.*): Allied to *Syzygium lanceolatum* (Lam.) Wight & Arn., but differs in: leaves sessile or subsessile, obtuse, subacute or emerginate apex, subcordate at base; flowers in terminal or lateral corymbose cymes; calyx narrowly obconical; petals calyptrate; and berries 2.5 2.8 cm long.

Though there exists controversy in keeping *Eugenia*, *Syzygium*, *Jambosa* etc., as distinct genera, we follow R. Schmid [Amer. J. Bot. 59 (4): 423 436. 1972] in keeping *Syzygium* as a distinct genus; and our specimens fit well within the characters of *Syzygium* as given by him.

This graceful evergreen tree perhaps escaped the eyes of earlier Botanists as it occurs in sholas beyond Konalar, a remote and difficult terrain of Anamalais at an altitude of 1825 m.

This species is named in honour of Dr. N. Chandrasekharan Nair, Botanical Survey of India.

Syzygium parameswaranii M. Mohanan & A.N. Henry (Myrtaceae) in J. Bombay Nat. Hist. Soc. 84 (2): 408-409. 1987 (1988).

Trees 4 6 m tall; ultimate branchlets tetragonous. Leaves 2.5 3 × 2 3.5 cm, opposite, sessile, coriaceous, ovate, obtuse or subacute at apex, rounded at base; midrib prominent; secondary lateral veins close, conspicuous; margins recurved. Panicles c 2 × 2 cm, glabrous, subsessile, condensed, many flowered. Flowers c 8 × 2.8 mm, funnel shaped; pedicels 3 mm long, slender, glabrous. Calyx tubes c 0.3 mm; lobes 4, each c 1 × 1 mm, ovate, obtuse

at apex. Petals 4, each c 3×2.5 mm, suborbicular, obtuse at apex, gland-dotted along the main nerve. Stamens 3 mm long; filaments dilated at base. Ovary 2-loculed with many ovules in each locule; style 3 mm long; stigma simple.

Types: *M. Mohanan* 66051 (Holotype CAL; Isotypes MH Acc. Nos. 136392-93).

Flowering : January - April.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Trivandrum District, Western slopes of Agastyamalai, ± 1600 m, Mar. 5, 1980, *M. Mohanan* 66051 (CAL; MH- Acc Nos. 136392-93).

Notes: According to Mohanan & Henry (*l. c.*): The species is allied to *S. calophyllifolium* Walp., but differs by the larger, pedicelled flowers; larger ovate, conspicuous calyx lobes imbricate in bud; and larger leaves with conspicuous veins close above.

The rare tree grows along grassy Western slopes of Agastyamalai in close association with *pittosporum* sp.

This species is dedicated to Dr. M. Parameswaran Nayar, Ex Director, Botanical Survey of India.

***Tadehagi triquetrum* (L.) Ohashi subsp. *andamanicum* N.P. Balakr. & N. G. Nair (Papilionaceae) in Bull. Bot. Surv. India 24 (1-4): 29-30. 1982 (1983).**

Erect shrub, 1-2 m high; branchlets sparsely puberulous. Leaves unifoliolate, oblong-elliptic, rounded to subcordate at base, acute to mucronulate at apex, entire at margins, 2.5-7.0 cm long, 1.0-3.5 cm broad, glabrous, dark green above, pale below, sparsely puberulous and scattered long hairy on nerves beneath; sparsely hairy along margins; lateral nerves 9-11 pairs; stipules early caducous, only scars seen; petioles 7-8 mm long, pulvinate and puberulous at apex, winged all along the length; wings oblong, acute and free at apex, 6-7 mm long, 1-2 mm broad on each side, glabrous. Inflorescence terminal, slender, narrowly paniculate, seemingly simple raceme.

7-18 cm long, minutely hooked-hairy; flowers in few-flowered short condensed racemes laxly arranged on main rachis; pedicels slender, angled, 4-7 mm long, minutely hooked-hairy, yellowish purple; bracts narrow lanceolate, 1.5-2.0 mm long, scarious, early caducous, bracteoles 2, subtending calyx tube, narrow-lanceolate, acuminate, 1-2 mm long, scarious, pubescent. Calyx minutely hooked-hairy with a few long hairs, purplish; tube ca 2 mm long; lobes 4, unequal; upper lobe broadly ovate-triangular, reflexed, 1-2 mm long, 2-3 mm broad; posterior lobe narrow-lanceolate, acuminate, 2-3 mm long; lateral lobes ovate-acuminate, ca 2 mm long, ca 1 mm broad. Corolla reddish-purple, blue-tinged; standard petal 6-7 mm long, 8-10 mm broad, reflexed on a ca 2 mm long claw with a callus above the claw inside; wing petals 5-6 mm long, 2-3 mm broad with ca 2 mm long claw; keel petals 4-5 mm long, 2-3 mm broad with 2-3 mm long claw. Stamens 10, diadelphous; vexillar stamen free with 4-5 mm long slender filiform filament; staminal tube 5-6 mm long; free part of filaments short, uniformly slender, filiform; anthers subglobose, subdorsifixed, 2-celled. Ovary ca 2 mm long, orange-yellow, puberulous; stalk ca 1 mm long, enclosed in white cupular oblique mounted ca 1 mm long disc; ovules 2; style 3-4 mm long; slightly dilated at middle, pubescent at base, glabrous above; stigma capitate with a few bristly hairs. Pods stalked, 2-seeded, jointed between the seeds, 2.8-3.5 cm long, with a long curved acicular prolongation at apex; segments 1.3-1.6 cm long, 0.9-1.0 cm broad, puberulous, finely reticulate.

Types : Balakrishnan & Nair 4798 (A : Holotype CAL; B-D : Isotypes PBL; E: Isotype L).

Flowering & Fruiting : December*.

Distribution : INDIA: Andaman Island.

Herbarium specimens : INDIA: North Andamans; Saddle Peak, 650-720 m above s.l., Dec.2, 1976; Balakrishnan & Nair 4798 (A in CAL; B-D in PBL; E in L).

Notes : According to Balakr. & Nair (*l. c.*) : It differs from subsp. *alatum* (DC) Ohashi in leaves being close together, shorter, acute;

petioles thicker, shorter; wings free and acute at apex; panicles longer; pods 2-segmented; segments longer.

Grows in scrub forests on open hill slopes.

Taeniophyllum andamanicum N.P. Balakr. & N. Bhargava (Orchidaceae) in Bull. Bot. Surv. India 20 (1-4): 154-156. 1978 (1979).

Herb, epiphytic, leafless; roots 3-5 per plant, 3-8 cm long, 1-2 mm thick, subtrigonous in cross section, greyish-green. Inflorescences erect from rootstock, 1.0-3.0 cm long, glandular-punctate; peduncles 5-12 mm long, fleshy, light yellowish green, turning to light pink; spikes 5-13 mm long, papillose-punctate, light pink, persistent. Flowers 7-15 per inflorescence, non-resupinate, ± 4 mm long, light green, turning to light cream to yellowish and finally to light blood-red, persisting for 3-5 days; pedicel with ovary longitudinally ridged, ± 2 mm long, ± 0.5 mm thick, pink or light brown, sparsely glandular punctate. Sepals and petals united into a tube for more than half the length, gland-dotted; tube ± 1.5 mm long; lobes ± 1 mm long, fleshy, 1-nerved, acute, slightly spreading outwardly. Lip free, narrowly lanceolate, ± 3 mm long, ± 1 mm wide, entire, slightly undulate wavy at lateral margins towards base, saccate at base with V-shaped slit, with subulate acuminate hooked incurved apex; spur globose, ± 1 mm long, nerved, hyaline. Column fleshy, ± 1 mm long, and wide, with 2 subulate obtuse fleshy incurved arms at base, lying over the slit to the spur; operculum hyaline; pollinia 4, pyriform anterior pair smaller; caudicle very small, yellowish; stipe broad, very short, hyaline; disc very small, triangular, yellowish. Capsule oblong, ± 1 cm long, 2-3 mm thick, slightly curved, longitudinally ridged, light green turning to creamy yellow and finally to light brown with persistent bract and perianth, lasting for one month.

Types : Bhargava 5932 (A: Holotype CAL; B-C: Isotypes PBL).

Flowering & Fruiting : July-August.

Distribution : INDIA: Andaman Islands.

Herbarium specimens : INDIA: S. Andamans; Baratang Island, Nilambur, ± 25 m, July 17, 1977; *Bhargava* 5932 (A in CAL; B C in PBL); *ibid.*, July 23, 1975; *Bhargava* 2488/2 (Paratypes PBL).

Note : According to Balakr & Bhargava (*l.c.*): This species belongs to the subgenus *Codonophyllum* Schltr. and section *Sepalocodon* Schltr. And approaches near to *T. viride* Carr of Malaya but differs in being a larger plant with longer inflorescences up to 3 cm long, glandular-punctate rachis, bracts, pedicels and perianth; perianth lobes shorter, ± 1 mm long; margins of lip undulate-wavy; terminal hook of lip shorter; spur larger and disc of pollinia caudicle smaller yellowish. This is the first record of the genus from Andaman & Nicobar Islands.

There is a specimen of *Taeniophyllum* in Kew Herbarium collected from S. Andamans by Kurz without number and received at kew on 23 Sept. 1867, identified as *T. filiforme* J. H. Sm. by Dr. Lars Jonnson. However the present new species differs from *T. filiforme* fundamentally in the sepals and petals being united into a tube for half its length, while in the latter they are free to the base.

This species was growing on *Tectona grandis* in the teak plantations of Forest Department, associated with leafy liverworts, *Hayanummularia*, *Thrixspermum hystrix* and *Luisia* sp.

Tamarix kutchensis B.V. Shetty & R.P. Pandey (Tamaricaceae) in Bull. Bot. Surv. India 31 (1-4): 152. 1989 (1992).

Shrubs up to 1.5 m high. Younger parts densely papillose. Leaves 1.0 2.25 \times 0.5 3.0 mm, amplexicaul, broadly ovate, apex up-curved, acute to acuminate, younger leaves imbricate. Racemes simple or paniculate, mostly aestival (i.e. on younger branches), each 2 4 \times 0.5 0.7 cm. Rachis papillose. Bracts 1.0 1.7 \times 1.0 1.2 mm, amplexicaul, broadly triangular-ovate, acute to acyminate, margins entire or subentire. Flowers hermaphrodite. Sepals 5, subequal, almost free, 1.0 1.5 mm long, ca 1 mm broad, ovate to trullate-ovate, two outer ones more acute. Petals 5, 2.0 2.5 \times 1.0 1.5 mm, elliptic-oblong, elliptic-obovate or oblong-obovate. Stamens 6

9 (-10), filaments 1.5 - 2.0 mm long, antepetalous ones slightly shorter, epilophic i. e. base of the filaments attached to the discal lobes. Disc 6 - 9 (-10) lobbed. Ovary pyramidal, styles 3, stigmas spatulate. Capsules 5.0 - 6.5 × 1.5 - 2.0 mm. Seeds 0.5 - 0.75 mm long, coma sessile, ca 4.0 mm long.

Types : S. K. Jain 11735 (Holotype & Isotype BSI).

Flowering & Fruiting : February*.

Distribution : INDIA: Gujrat.

Herbarium specimen : INDIA: Gujrat; Kutch, Mundra-Mandvi, Feb. 2, 1957, S. K. Jain 11735 (BSI).

Notes : According to Shetty & Pandey (*l.c.*): The new species is allied to *Tamarix passerinoides* Del. ex Desv. var. *macrocarpa* Ehrenb., but can be distinguished by its upright leaves, smaller flowers with the sepals up to 1.5 × 1.25 mm, petals up to 2.5 × 1.5 mm, smaller capsules, up to 6.5 mm long and the epilophic filaments i.e. the disc is lobbed with the base of the filaments merging with the discal lobes. In *T. passerinoides* var. *macrocarpa* the leaves are deflexed, the sepals up to 2.25 × 1.5 mm, petals up to 4.5 × 2.5 mm, capsule up to 12.5 mm long and the filaments are epidiscine i. e. the disc is not lobed and the base of filaments meet almost at the centre. It also resembles *T. sarensis* Qaiser in flower size and disc character but can be distinguished from it in the plants being densely papillose with the leaves amplexicaul. In *T. sarensis* the plants are entirely glabrous and the leaves vaginate.

Known by the type collection only.

***Tarenna trichurensis* Sasidh. & Sivar. (Rubiaceae) in J. Econ. Tax. Bot. 14 (1): 243 - 245. 1990.**

Glabrous shrubs, up to 3 m tall. Leaves in unequal pairs; petiole 0.8 - 1.2 cm long; lamina 6 - 11 × 3.5 - 5.5 cm, elliptic to oblanceolate, acuminate, entire, glaucous beneath with 5 - 7 pairs of faint secondary veins, black on drying. Flowers in short, terminal pubescent, corymbose cymes. Bracts and bracteoles pubescent. Calyx 0.75 mm

above the ovary, pubescent, 5 lobed, lobes minute, subequal, obtuse. Corolla creamy white, tube 5 mm long, hairy within at mouth, lobes 5, as long as the tube, oblong-obtuse, 5 × 2.5 mm, glabrous. Stamens 5, inserted at the throat of the corolla tube, filaments 1 mm long, anthers much longer. Ovary 2 celled, each with one ovule on axile placentum. Style slender, 6 mm long, sparsely hairy. Stigma fusiform, much exserted from the corolla. Fruits subglobose, 10 × 8 mm, shortly apiculate; seeds 2, suborbicular, 6 mm across, deeply concave, smooth, shining. Endosperm horny. Embryo small, spatulate.

Types : Sasidharan 4835 (Holotype CALI; Isotypes K, MH).

Flowering : March May. *Fruiting* : November December.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Trichur, 40 m, Mar. 21, 1989, Sasidharan 4835 (CALI, K, MH); Sasidharan 5509 (Paratype, Herbarium, Kerala Forest Research Institute).

Notes : According to Sasidharan & Sivarajan (*l.c.*): This species is related to *Tarennia attenuata* and *T. alpestris* but can be distinguished by its broadly elliptic to oblanceolate, acuminate leaves with 5 - 7 pairs of lateral nerves, lax flowered tomentose cymes and corolla lobes being as long as the corolla tube.

A common undergrowth plant in the semi evergreen forests.

Terminalia sharmae M. Gangop. & Chakrab. (Combretaceae) in *J. Econ. Tax. Bot.* 16 (1): 237. 1992.

Tree, ca 20 m high; branchlets brownish, terete, 8 - 13 mm thick, glabrous, with prominent leaf-scars. Leaves alternate, crowded towards tips of branchlets, obovate to elliptic, 15 - 22 cm long, 7 - 8.5 cm broad, narrowly cuneate at base (sometimes unequal) and slightly decurrent into petioles, crenulate along margins, rounded or shortly acuminate at apex, thinly coriaceous, glabrous, brown when dry; midrib flat above, raised beneath; lateral nerves 8 - 10 pairs, evenly spaced, straight, curved upwards and branching near

margins; tertiary nerves prominent on both surfaces, reticulate; petioles 2-3 cm long, 2-2.5 mm thick, sulcate above, eglandular. Flowers: not known. Infructescences axillary, simple, spicate, ca 5 cm long; rachis grey puberulous to glabrous. Drupes ellipsoid, somewhat compressed, 2.5-3 cm long, 2-2.5 cm diam., scarcely angled, brown, glabrous, sessile.

Types : N. G. Nair 801 (Holotype CAL; Isotype CAL).

Fruiting : January*.

Distribution : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA: Andaman & Nicobar Islands; South Andaman Islands, Mount Harriet, Jan. 16, 1974, N. G. Nair 801 (CAL).

Notes : According to Gang. & Chakrab. (*l. c.*): Distinguished from the related *T. bellerica* (Gaertn.) Roxb., by the crenulate leaves with domatia in the axils of lateral nerves and the somewhat compressed, glabrous, sessile (rather than stipitate) drupes.

The obovate-elliptic leaves of the species with elongate eglandular petioles, crowded towards tips of branches indicate its alliance with *T. bellerica*. It is rare in inland hill forests at about 300 m above MSL.

The species is named in honour of Dr. B. D. Sharma, Director, Botanical Survey of India.

Terminalia vermae M. Gangop. & Chakrab. (Combretaceae) in J. Econ. Tax. Bot. 16 (1): 239-240. 1992.

Big tree (*Teste collectore*); branchlets brownish, terete, glabrous, 2-5 mm thick. Leaves subopposite to alternate, ovate-elliptic to oblong, 12-17 cm long, 5-6.5 cm broad, slightly unequal and acute to obtuse at base, entire along margins, acuminate at apex (acumen 10-15 mm long), coriaceous, glabrous, black-brown above when dry, paler beneath; midrib flat above, raised beneath; lateral nerves 8-12 pairs, prominent, evenly spaced, arcuate, vanishing near margins; tertiary nerves and nervules obscure; petioles 3-4.5 cm

long, 2-2.5 mm thick, sulcate above, glabrous, eglandular. Flowers: absent. Infructescences axillary, simple, spicate, ca 5 cm long glabrous. Drupes subglobose, ca 18 mm long, ca 15 mm diam., dark crimson, glossy, smooth, glabrous, sessile.

Type : P. Basu 7613 (Holotype CAL).

Fruiting : October.

Distribution : INDIA: Andaman & Nicobar Islands.

Herbarium specimen : INDIA: Andaman & Nicobar Islands; Baratang Islands, South Creek, Extraction area, October 30, 1979, P. Basu 7613 (CAL).

Notes: According to Gang. & Chakrab. (*l. c.*): *T. manii* sec. Basu & Premnath in Bull. Bot. Surv. India 24: 126 (1984). *non* King 1897. Allied to Malesian *T. microcarpa* Decne, differing in the glabrous, coriaceous leaves, acute to obtuse (not cuneate) at base and devoid of domatia in the axils of lateral nerves and in the glabrous, subglobose (not compressed) drupes rounded at apex.

The dark crimson, glossy, subglobose fruits are characteristic not to be found in any other species of *Terminalia* occurring in Indian subcontinent.

The plant is rare in inland moist semievergreen forest at low altitudes.

The specific epithet has been attributed after Dr. D. M. Verma, Additional Director, Botanical Survey of India.

Tetrastigma gamblei B.V. Shetty & P. Singh (Vitaceae) in Kew Bull. 42(4): 933-935. 1987.

Scandant, dioecious shrubs; branches terete, slender. Tendrils simple or 2-fid. Leaves 3-foliolate, glabrous; petioles 4-9 cm long; terminal leaflets 7-11 × 4-7.5 cm, elliptic to obovate, cuneate, obscurely serrate-dentate to subentire, acuminate, the petiolules 1-2.5 cm; lateral leaflets 5-10 × 3.5-6.5 cm, elliptic, slightly oblique at the base, margins and apex as in the terminal leaflets, petiolules 0.5-1.2 cm. Inflorescence c. 3 cm long, umbellate-cymose, pubescent;

peduncles 1-2 cm long. Flowers c 2 mm long, unisexual, 4 merous; pedicels c 2 mm long. Calyx subtruncate or minutely 4 lobed, pubescent. Petals c 1.75 × 0.8 mm, oblong ovate, slightly hooded, pubescent. Stamens c 1 mm long. Disc membranous, encircling the base of the ovary. Ovary c 1.25 mm long; stigma sessile, 4 lobed. Berries c 6 mm across, globose with thin pericarp, 1-seeded. Seeds c 6 × 5 mm, subglobose, adaxial and abaxial surfaces with longitudinal furrows, sides transversely striated.

Type : M. A. Lawson s. n. Acc. No. 10811 (Holotype MH).

Flowering & Fruiting : November - May.*

Distribution : INDIA: Karnataka, Kerala, Maharashtra.

Herbarium specimens : INDIA: Karnataka; Kodagu District, Coorg, Makut, Jan.9, 1959, *Arora* 11948 (BSI); Shimoga District, Agumbe, Nalur forest road, Feb.7, 1961, *Raghavan* 69417 (BSI); Agumbe, Minhole, Feb. 19, 1963, *Raghavan* 86347 (BSI); Uttara Kannada District (North Kanara), Ainshi, Jan. 30, 1886, *Talbot* 1380 (BSI), & Dec. 22, 1891, *Talbot* 2670 (BSI, CAL); *Talbot* 2700 (BSI); Ainshi, 300', Jan. 1921, *Bell* 7714 (BLAT); Castle Rock, 1800', Dec.25, 1917, *Sedgwick* 3403 (BLAT); Arbail ghat 2000', Dec. 1918, *Herb. L. J. Sedgwick & T.R.D. Bell* 5014 (K). Kerala; Wynaad, Vitery (Vythery), 3000', Feb. 1890, *M. A. Lawson* s. n., Acc. No. 10811 (MH); Cannanore District; Nedumpoyil, 500 m, Dec.12, 1979, *Ramachandran* 64041 (MH); Panoth, 550 m, Mar. 24, 1980, *Ramachandran* 66883 (MH). Maharashtra; Poona District, Mulshi Taluk, Ambavne, sept. 8, 1964, *Reddi* 101133 (BSI); Lonavla, Nov. 27, 1964, *Rddi* 101192 (BSI, CAL); Kandala, St. Xavier's Ravine, Dec. 28, 1948, *Santapau* 9732, 33 & 34 (BLAT); Ratnagiri District, Mangaon forest, 6 miles from Akeri, Feb. 14, 1966, *Ansari* 107747 (BSI); May 1874, *Dalzell* s.n. (K); Bombay Herb. *Dalzell* (K).

Notes : According to Shetty & Singh (*l.c.*): Gamble (Fl. Madras 1: 228.(1918) transferred *Vitis cannarensis* Dalz. (in Hooker's J. Bot. Kew Gard. Misc. 3: 123 (1851) to the genus *Tetrastigma* but, as is evident from his description and the specimen cited, erroneously applied the new combination, *Tetrastigma canarense*, to an undescribed species of *Tetrastigma*; Lawson's collection from Wynaad cited by

Gamble (*l.c.*) is, made the basis of this new species, *T. gamblei*.

Studies on the protologue of *Vitis canarensis* Dalz. and the collection 'Bombay, Dalzell' in Herb. Hooker, Kew further revealed that it is only a 3 leafleted form of *Cayratia pedata* (Lam.) Gagnep. Planchon in A. & C. DC., Monogr. Phan. 5: 620 (1887) who placed it in the section *Cayratia of cissus* (under *dubiae*) states 'C' est évidemment au groupe des *Cayratia* qu'appartient cette plante; mais je ne puis en déterminer l'espèce'. Suessenguth (in Engl. & Prantl, Nat. Pflanzenfam. ed. 2. 20d: 327 (1953) had also expressed doubts about its inclusion in the genus *Tetrastigma*. He remarks 'Zweifelhafte Arten: *T. canarense* Gamble, Fl. Madras 228 (1918) (*Vitis canarensis* Dalz.). Von Planchon mit Zweifel zu *Cissus-Cayratia* gezogen. Narbe nach der Beschreibung spitz', daher wahrscheinlich nicht zu *Tetrastigma* gehörig; Ostindien.'

Dalzell misidentified a specimen he collected in May 1874 as *Vitis canarensis* Dalz., and Gamble evidently was misled by this specimen in considering *V. canarensis* Dalz., as belonging to the genus *Tetrastigma*.

T. canarense sensu Gamble, Fl. Madras 1: 228. (1918) P. P, non *Vitis canarensis* Dalz.; Ramam in Nair & Henry, Fl. Tamil Nadu ser. 1. 1: 81 (1983). *Vitis canarensis* sensu Talbot, Forest Fl. Bombay 1: 319 (1909).

Tetrastigma gamblei is allied to *T. bracteolato* but differs in having petals spurless; berries 1 seeded, seeds subglobose, adaxial and abaxial surfaces with longitudinal furrows.

And the correct nomenclature of *Vitis canarensis* Dalz., is as follows:

Cayratia pedata (Lam.) Gagnep. in Not. Syst. 1 : 346. (1911).

Cissus pedata Lam. Encycl. 1: 31. (1783).

Vitis pedata (Lam.) Wall. ex Wight Cat. 26. 1833.

V. canarensis Dalz., in Hooker's J. Bot. Kew Gard. Misc. 3: 123 (1851) **synon. nov.**

Themeda sabarimalayana Sreek. & V. J. Nair (Poaceae)
in Bull Bot. Surv. India 29 (1-4): 127-128. 1987 (1989).

Perennials. Culms 50-200 cm high, erect, tufted; nodes glabrous. Leaves linear-lanceolate, 15-40 × 0.5-1.0 cm, acuminate, rounded at base, midrib prominent, margins serrulate. Sheaths keeled, ligules ovate, acute, membranous. Panicles 30-60 cm long, lax, drooping. Involucral spikelets 2 pairs, inserted at same level in a raceme, lanceolate or narrowly elliptic-lanceolate, 4-6 mm long, sparsely hairy or glabrous; lower glume elliptic-lanceolate 4-6 × 1 mm, acuminate, chartaceous, 9-13-nerved, sparsely hairy towards apex; upper glume lanceolate, 4-6 × 1 mm, chartaceous, 3-5-nerved, margins hyaline, ciliate in the upper half; lower floret empty, upper floret male; first lemma elliptic-lanceolate, 3.5-5 × 0.5-1.0 mm, hyaline, faintly 3-5 nerved, margins ciliolate in the upper half; epaleate; second lemma linear-lanceolate, c 2.0 × 0.2 mm, hyaline, glabrous; stamens 3, anthers 2-3 mm long. Sessile spikelet solitary, oblong-lanceolate, awned, 5-6 mm long, brownish; callus rufous-brown hairy, hairs 1-3 mm long; lower glume oblong-lanceolate, 5-6 × 1 mm, truncate and dentate at apex, coriaceous, 9-11-nerved, softly hairy; upper glume oblong-lanceolate, 5.0-5.5 × 1 mm, acute, chartaceous, 3-5-nerved, 2-keeled; first lemma elliptic-lanceolate, 3-4 × 0.5-1.0 mm, hyaline, faintly 3-5 nerved; epaleate; second lemma stipitate hyaline base of the awn, 1-2 mm long, 1-nerved; awn 15-30 mm long; palea ovate-acute, c 0.5 × 0.3 mm chartaceous; stamens 3, anthers 2-3 mm long; ovary c 0.5 mm; styles 1.0-1.5 mm long; stigmas 1-2 mm long. Pedicelled spikelets 3 or 4 in a raceme, lanceolate or narrowly elliptic lanceolate, 4-6 mm long, acuminate; pedicels 1-2 mm long; glumes and florets more or less similar to those of the sessile spikelets.

Types : P. V. Sreekumar 69433 (Holotype CAL; Isotypes K, MH).

Flowering & Fruiting : November-December.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Pathanamthitta District, on way to Sabarimala, ± 450 m, Dec. 23, 1980, P. V. Sreekumar 69433 (CAL, K & MH).

Notes : According Sreekumar & Nair (*l. c.*): Rare, along the forest margins and hill slopes.

At a glance this plant looks like *Themeda cymbaria* Hack., but the latter may be distinguished by its sheaths bearded on one margin, pairs of involueral spikelets inserted at different levels, involueral spikelets entirely glabrous, sessile spikelets c 4-5 mm long, callus hairs soft, silky white, lower and upper glumes of the sessile spikelets rounded at apex and awns short.

Eventhough, superficially this plant looks like *Themeda cymbaria* Hack., the floral characters show more similarity to *T. triandra* Forssk. But the latter is characterised by its lax, simple panicles, longer spathes and spatheoles, spikelets larger in dense capitate clusters, involueral spikelets larger and densely hairy, sessile spikelets c 8 mm long, both the glumes truncatè at apex and awns very long, up 6 cm.

Trachelospermum lucidum (D. Don) Schneid. var. ***osmastoniana*** Sas. Biswas (Apocynaceae) in Ind. J. For. 8(1): 61-62. 1985.

Woody climber. Leaves densely pubescent or brown tomentose beneath. Inflorescence tomentose. Corolla truncate.

Type : *Kanjilal* s.n. (Holotype DD).

Flowering : May-June*.

Distribution : INDIA: Tehri Garhwal (Uttar Pradesh).

Herbarium specimens : INDIA: Tehri Garhwal; Bambus, May 7, 1896, *Kanjilal* s. n. (DD). Garhwal: West Nagar Valley, June 25, 1919, A. E. Osmaston 1105/Acc. No. 23921 (Paratype DD).

Notes : According to Biswas (*l. c.*): Closely related to variety *lucidum* but differs in having its leaves densely pubescent or brown tomentose inflorescence and truncate less petals.

The taxon is named in honour of A. E. Osmaston, an ardent plant collector of Garhwal and Kumaon Himalaya.

Tribulus subramanyamii P. Singh, G.S. Giri & V. Singh (Zygophyllaceae) in Bull. Bot. Surv. India 25 (1- 4): 197- 198. 1983 (1985).

Prostrate, spreading herb, branches up to 40 cm long, solid, striate, clothed with silky white hairs, especially when young, hairs often 2 mm long, bulbous-based. Leaves usually opposite, one of each pair alternately smaller or aborting, sometimes lower ones alternate, (2.0-) 3.5- 4.5 (-6.0) cm long, paripinnate; leaflets usually 5 pairs, rarely 3, 4 or 6 pairs, terminal pair always directed upward, subsessile, ovate or ovate-oblong (6.0-) 8.0-15.0 (-17.0) × (4.0-) 6.0-9.0 (-10.0) mm, unequal sided, apex apiculate or mucronate, lateral nerves in conspicuous, brownish pubescent above, densely silky villous beneath; stipules ovate-lanceolate to linear-lanceolate, 3.0- 4.5 × 1.0- 3.0 mm, densely villous dorsally. Flowers axillary, solitary, alternating from the axils of smaller leaves, bisexual, actinomorphic, 10.0- 15.0 mm across, pedicels sericeous or strigose, 8.0- 15.0 mm long, thickened distally. Sepals 5, free, lanceolate or ovate-lanceolate, (4.5-) 5.0- 6.0 (-7.0) × (1.25) 1.5- 1.75 (-2.0) mm, apex long pointed, densely pilose without, glabrous or very sparsely hairy within towards the apex, finely veined. Petals 5, free, yellow, oblanceolate, 6.0- 8.0 × 3.5- 5.0 mm, apex undulate or emarginate, finely veined, membranous, glabrous, deciduous. Stamens usually 10, 5 opposite to each petal and attached at the base, rarely only 5, filaments filiform, 4.0- 5.0 mm long, glabrous; anthers oblong-cordate 1.0- 1.5 mm long, dorsifixed. Disc fleshy, intrastaminal glands connate, nearly triangular, ciliated at margin; extrastaminal glands oblong, shortly bilobed or emarginate at the distal end. Ovary cylindrical, densely covered with sericeous or hirsute upward spreading bulbous-based hairs, 2.0- 2.5 mm long, 5-loculed; style 1.5- 2.5 mm long, densely brownish pubescent, stigma pyramidal, 5-ridged papillose. Fruit a 5-lobed schizocarp, horizontally depressed, at maturity splitting into 5 mericarps; mericarps 5.0- 10.0 mm long, 3.5- 6.0 mm broad excluding the spines, dorsally-ridged, appressed silky hairy, rarely tubercled, greenish or greenish-yellow, divided by transverse septa inside; spines 4, tomentose with glabrate apex, lateral spines 2, conical, submedian, 3.5- 5.0 mm long, basal spines 2, sometimes reduced to tubercles, directed downward at an angle. Seeds small, 3- 5 in each mericarp.

Types : K. Subramanyam 390 (Holotype CAL; Isotypes CAL, MH).

Flowering & Fruiting : February – October.

Distribution : INDIA: Tamil Nadu, Maharashtra, Andhra Pradesh & Karnataka.

Herbarium specimens : INDIA: Tamil Nadu; Coimbatore, on the way to Varapalayam, 666 m, July 25, 1956, K. Subramanyam 390 (CAL & MH); Coimbatore, Foot of Kuridimalai, 700 m, July 10, 1956, Subramanyam 222 (CAL & MH); Salem, Malbui Dun Garden, 608 m, Sept. 14, 1948, Narayanaswami & Party 1930 (CAL) ; Coimbatore, Noyil River side, 466 m, Aug. 1, 1968, Chandrabose 30553 (MH); Coimbatore, Palamalai, 490 m, July 23, 1969, Viswanathan 32 (MH); Pudupatti, 210 m, July 19, 1956, Vajravelu 24798 (MH); Salem District, Kolli hills, Moolakuruchi, 550 m, Mar. 31, 1979, P. Perumal 22586 (RHT); Kanyakumari District, Maruthuvaralai, ± 350 m, Aug. 1, 1977, A. N. Herry 49520 (MH); Maharashtra; Poona University, Aug. 12, 1960, R. S. Raghavan 64540 (BSI); Andhra Pradesh; Anantapur District, Bukkapatnum, July 12, 1957, S. K. Wagh 6113 (BLAT); Karnataka; Mysore District, Gundlapet, 675 m, Apr. 27, 1965, B. D. Naithani 23933 (MH).

Notes : According to Singh *et al.* (*l.c.*): The species is closely allied to *T. lanuginosus* L., but differs by densely brownish pubescent style, connate and ciliated intrastaminal glands. In *T. lanuginosus*, style is glabrous, intrastaminal glands free and not ciliated at margin.

The specific epithet is in honour of late Dr. K. Subramanyam, former Director of Botanical Survey of India and Collector of this interesting species from Tamil Nadu.

Trigonella upendrae H.J. Chowdhery & R. R. Rao (Papilionaceae) in Bull. Bot. Surv. India 31 (1–4): 156–158. 1989 (1992).

Erect, sparingly branched, glabrous herbs, 40–60 cm tall. Stem 2–3 mm thick, smooth. Leaves stipulate, pinnately trifoliate, petiole shorter than the leaflets. Leaflets 2–2.5 × 5–11 mm, minutely

dentate in the upper portion of the leaflet, obovate-cuneate, glabrous. Stipules lanceolate, deeply toothed, incised, points setaceous, 8-11 mm long, auricled at the base, encircling the stem. Flowers 12 (15-30) in condensed racemes, yellow. Peduncles far exceeding the leaves, 2.5-3.5 cm long, awned at the tip. Calyx 5-7 mm long, teeth longer than the tube. Corolla twice as long as the calyx, wings equal to the keel. Stamens diadelphous. Ovary sessile, many ovuled. Fruits unknown.

Types : K. P. Janardhanan 47716 (A: Holotype CAL; B-C: Isotypes BSD).

Flowering : June.

Distribution : INDIA: Himachal Pradesh.

Herbarium specimens : INDIA: Himachal Pradesh; Kinnaur District, Pangi village near P. W. D. rest house, K. P. Janardhanan 47716 (A: CAL; B-C : BSD).

Notes : According to Chowdhery & Rao (*l.c.*): It differs from *T. corniculata* by its erect, sparingly branched; stipule deeply incised, auricled at base; petioles shorter than leaflets, leaflets minutely dentate in the terminal portion; calyx teeth longer than the tube and wings and keel equal in size. Whereas *T. corniculata* is characterised by diffuse, suberect, much branched; deeply toothed stipules, not auricled; petioles similar to leaflets in length or exceeding; leaflets faintly inciso-dentate; calyx teeth shorter than tube; wings shorter than keel.

Herbs, growing in moist places along the banks and streams.

The species is named after Dr. Upendra Chandra Bhattacharyya who has extensively botanised in this region.

Trigonostemon aurantiacus (Kurz ex Teijsm. & Binnond.) Boerl. var. **rubriflorus** N.P. Balakr. & Chakrab. (Euphorbiaceae) in *J. Econ. Tax. Bot.* 5 (1): 169-170. 1984.

Tree, 4-7 m high, monoecious; branchlets sparsely adpressed ochraceous puberulous to glabrous, 2-8 mm thick, with numerous

minute warts. Leaves elliptic obovate, narrowly obovate to cuneate-obovate or elliptic to oblong-elliptic, 9–28 cm long, 3–9 cm wide (often smaller on the flowering branchlets, 4–12 cm long, 1.5–5 cm wide), cuneate-attenuate at base, repand-serrulate to subentire at margins, caudate-acuminate (with 5–25 mm long acumen) or sometimes subacuminate at apex, firmly chartaceous to thinly coriaceous, drying blackish-grey above, glabrous on upper surface, glabrous (or often with few short adpressed hairs near base) beneath, penninerved; secondary nerves slender, 7–13 pairs (the first 2–3 pairs inconspicuous), indistinct to somewhat prominent above, faint to distinct beneath, more or less parallel or uniformly curved; tertiary nerves indistinct to faint, apparently reticulate; petioles 5–23 mm long, 1.5–2.5 mm thick, sparsely adpressed puberulous to glabrous, biglandular at apex on the upper side; the glands setiform, 1–1.3 mm long; stipules not seen. Male inflorescences cauli- or ramiflorous or axillary (in the axils of fallen leaves), fasciculate, few-flowered sub-tended by minute hairy bracts. Male flowers: pedicels slender, 6–12 mm long, glabrous; sepals 5, orbicular, 0.8–1.3 mm long, 0.8–1.3 mm wide, rounded at apex, orange, sparsely adpressed puberulous to glabrous outside, dorsally gibbous; petals 5, usually subflabellate or often spathulate-obovate, about 2 mm long, 1.3–2 mm wide, deep red or occasionally orange-red, often fimbriate at margins; disc-glands 5, free, 0.4–0.6 mm long, sometimes bilobed at apex; stamens 3, connate into a column; the column \pm 1 mm long, very shortly trifid at apex; anthers ovoid or triangular-ovoid, 0.4–0.5 mm long, initially vertical, gradually becoming subhorizontal; connectives shortly produced. Female inflorescences terminal, pseudo-racemose or narrowly thyrsoid, few-flowered, 20–24 cm long, 1–2 mm thick at base, long-peduncled, sparsely adpressed puberulous; bracts foliaceous sessile to subsessile, elliptic to oblong-elliptic or narrowly oblong, 1–7.5 cm long, 0.2–3 cm broad, the upper bracts subulate, 5–6 mm long. Female flowers: pedicels 6–9 mm long, thickened upwards (1–1.3 mm thick at apex, 0.4–0.6 mm thick at base), sparsely adpressed puberulous to glabrous; sepals 5, broadly ovate, elliptic or orbicular, 0.7–1 mm long, 0.7–1.1 mm wide, sparsely adpressed puberulous to glabrous outside, dorsally gibbous; petals 5, elliptic to obovate-spathulate, 3.5–4 mm long,

2 2.5 mm wide, deep red, deciduous; disc-glands 5, free, \pm 0.5 mm long, 0.4 0.8 mm diam.; ovary trigonous-globose, ca 1 mm diam., glabrous; styles 3, short, 0.3-0.5 mm long, thick, slightly spreading, with circular stigmatic head. Capsules unknown; fruiting pedicels 30 35 mm long.

Types : *Ansari* 1361 (A: Holotype CAL; B F: Isotypes PBL).

Flowering & Fruiting : March August.

Distribution : INDIA: Andaman-Nicobar Islands.

Herbarium specimens : INDIA: Andaman Nicobar Islands; Middle Andaman Island, Claudius Range, Apr. 6, 1916, *Parkinson* 1171 (Paratype DD). Havelock Island; without locality, \pm 25 m, May 15, 1974, *Ansari* 1361 (A in CAL; B F in PBL). South Andaman Island; Miletilak, Aug.14, 1976, *Nair* 4285 (Paratype PBL).

Notes : According to Balakrishnan & Chakraborty (*l.c.*) : Differs from var. *aurantiacus* in the obscurely penninerved leaf-base, red petals and longer fruiting pedicels; whereas in *T. aurantiacus*, the leaves are shortly and clearly trinerved at base and petals are orange-yellow.

A rare plant; occurs in inland primary forests and sandy soil up to 200 m.

Trigonostemon nicobaricus Chakrab. (Euphorbiaceae) in *J. Econ. Tax. Bot.* 5(1) : 203 204. 1984.

Tree, 5 7 m tall monoecious; branchlets brownish, terete, 2 5 mm thick, shortly yellowish-pubescent when young, becoming glabrescent. Leaves cuneate-oblongate or sometimes elliptic or oblong-obovate, 12 30 cm long, 3 7 cm wide, rounded at the extreme base, subserrulate at margin, caudate-acuminate at apex with 1 2.5 cm long acumen, thinly chartaceous, glabrous above shortly scattered pubescent on the major nerves beneath, turning dark brown or black-brown above on drying, penninerved; secondary nerves slender, 10 16 pairs, faint above, distinct beneath, more or less uniformly curved; minor nerves indistinct above, prominent beneath, reticulate; petioles (3-) 5 20 mm long, 2 3 mm thick,

channelled above, sparsely yellowish-puberulous; stipules triangular-acuminate, about 1 mm long. Inflorescences axillary, unisexual, slender pseudo-racemose 5-13 cm long, scattered yellowish puberulous; bracts linear, 2.5-7 mm long. Male flowers: pedicels 2-5 mm long, 0.4-0.7 mm thick at apex, 0.1-0.3 mm thick at base, softly scattered yellowish-puberulous; sepals 5, shortly connate, narrowly to broadly oblong or often triangular, 1-1.5 mm long, 0.7-1.2 mm wide, scattered yellowish-puberulous outside, ciliolate at margins; petals 5, spathulate-obovate about 2.5 mm long, 1.2-1.5 mm wide, blackish-crimson, sparsely pilulose to glabrous outside, minutely whitish-pilose at margins; disc-glands 5, free, ca 0.5 mm long; stamens 3, connate below into a column; the column 1-1.3 mm long, very shortly trifid at apex; anthers ellipsoid to orbicular, 0.6-0.7 mm long, initially vertical, finally horizontal. Female flowers (only slightly immature flowers seen); pedicels 3.5-4 mm long, \pm 1 mm thick at apex, \pm 0.5 mm thick at base, yellowish-tomentulous; sepals 5, unequal, ovate-lanceolate to lanceolate or ovate-elliptic, 4-6 mm long, 1.5-2 mm wide, softly scattered yellowish-puberulous outside, sub-denticulate (non-glandular) to entire at margins, acuminate at apex (?) accrescent; petals 5, oblong-elliptic, \pm 2 mm long, 1-1.2 mm wide (immature), blackish-crimson, sparsely pilosulous outside; disc-glands 5, free, \pm 0.5 mm long; ovary 3-lobed, 0.8-1 mm long, about 1 mm diam., densely yellow-puberulous; styles 3, \pm 0.8 mm long (immature), free, bifid, erect, glabrous. Capsules not known.

Types : *Dwivedi* 8521 (A: Holotype CAL; B-E: Isotypes PBL).

Flowering : April-May.

Distribution : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA: Andaman-Nicobar Islands; Great Nicobar Island, 9 km on East-West Road, May 6, 1981, *Dwivedi* 8521 (A in CAL; B-E in PBL).

Notes : According to Chakrab. (*l.c.*): Differs from *T. villosus* (Hook. f. *e. descr.*) by less pubescent; unisexual inflorescences and smaller, linear bracts. Besides the alliance with *T. villosus* of Malaya, Borneo and Sumatra, the new species is perhaps also very near to

T. serratus Bl. (*e descr.*) of Java and Bali from which, however, it differs in its relatively longer petioles and inflorescences and larger, accrescent female sepals bearing minute, non-glandular marginal teeth. The petals are also usually sparsely pilose outside. *T. nicobaricus* is probably a rare endemic. The type was collected from primary hill forest on Great Nicobar Island and remarked to be scarce, having minute purple-coloured flowers. It is the third species of *Trigonostemon* to be discovered from Andaman- Nicobar Islands and can be readily distinguished from both the previously recorded taxa, *T. laevigatus* Muell.-Arg. and *T. viridissimus* (Kurz) Airy Shaw, by its penninerved leaves and pseudo-racemose inflorescences. Further gatherings especially in fruiting condition are desirable to ascertain whether the features of the capsules have constant differences.

In the Taxonomic revision of *Trigonostemon* Bl. by N. P. Balakrishnan & T. Chakraborty (*Candolea* 46 (2): 601. 1991) *T. nicobaricus* T. Chakrab., is reduced to a variety of *T. villosus* Hook.f.

***Trigonostemon viridissimus* (Kurz) Airy Shaw var. *confertifolius* N.P. Balakr. & N. G. Nair (Euphorbiaceae) in Bull. Bot. Surv. India 24 (1-4): 36. 1982 (1983).**

Shrub ca 1 m; branches glabrous. Leaves ovate, obtuse at base, acute at apex, entire at margins, 2.5-6.5 cm long, 1.3-3.0 cm broad, glossy green, glabrous above, scattered hairy below, especially on nerves; lateral nerves 5-6 pairs, trinerved at base; petioles 2-6 mm long, ca 1 mm thick, sparsely pubescent. Racemes very short, axillary, 0.5-2.0 cm long, scattered hairy; bracts minute, ovate, glabrous to hairy; flowers yellow. Male flowers: pedicels 4-5 mm long, filiform, glabrous; sepals 5, ovate, ca 2 mm long, ca 1 mm broad, sparsely hairy; petals obovate, ca 4 mm long, ca 3 mm broad; disc cupular, 5-angled, yellow, glabrous; stamens 3, at the tip of shortly 3-branched, ca 1 mm long staminal column; anthers sessile, ca 1 mm long. Female flowers: pedicels 1.0-1.5 cm long, thickened upwards, sparsely hairy; sepals 5, ovate, ca 2 mm long, ca 1 mm broad, hairy outside; petals 5, obovate, 5-7 mm long, 3-4 mm

broad; disc cupular, irregularly 5-angled, glabrous; ovary globose, conical, ca 2 mm long, ca 1.5 mm thick, 3-loculed; locules 1-ovuled; styles 3, almost united at base, ca 2 mm long; stigma obscurely 2-lobed, subglobose.

Types : Balakrishnan & Nair 4773 (A: Holotype CAL; B D: Isotypes PBL; E: Isotype L).

Flowering : December*.

Distribution : INDIA: North Andaman Island.

Herbarium specimens : INDIA: North Andamans; Saddle Peak, 500- 700 m, Dec. 1, 1976, Balakrishnan & Nair 4773 (A in CAL, B D in PBL & E in L).

Notes : According to Balakr. & Nair (*l.c.*): It differs from var. *viridissimus* in closely arranged shorter acute leaves, shorter petioles and very few-flowered erect inflorescences.

Grows in open scrub forests.

Trigonotis caespitosa S.P. Banerjee (Boraginaceae) in Bull. Bot. Surv. India 8 (3 & 4): 322-323. 1966 (1967).

Perennial, weak, strigose herb, forming a compact rosette nearly 10 cm in diameter with a cluster of numerous long, fibrous roots. Stems many, slender, weak, cylindrical, covered with dense strigose hairs, branches 5-6 cm long, densely caespitose. Leaves simple, alternate, exstipulate, entire, obtuse, midrib only impressed, variable in shape, lamina ovate-oblong to lanceolate, 10-15 mm long, 5-7 mm broad, minutely strigose on both surfaces, lower leaves long-petiolate, petioles up to 1.5 cm long, leaf-base slightly sheathing, uppermost near the inflorescence sessile. Flowers small, ebracteae, regular, hypogynous, pedicellate, pedicels up to 2 mm long, slender, in terminal, few-flowered racemes. Calyx gamosepalous, slightly united below, sepals 5, lanceolate, entire, acute, 1.5 mm long, with long, straight, hispid hairs on both inner and outer sides, slightly enlarging in fruit, fruiting calyx up to 3 mm long. Corolla gamopetalous, tubular-rotate, 3-3.5 mm long, tube cylindrical, 1

1.5 mm long, lobes 5, ovate-obtuse, 1.5 - 2 mm long, outer face glabrate, inner side minutely hairy, throat of corolla covered with 5 obtuse scales. Stamens 5, epipetalous, included, adnate to the middle of the corolla-tube, filaments very short, anthers ovate, 0.5 mm long, bilobed, dorsifixed. Ovary superior, deeply 4 lobed; style slender, short, 1.5 mm long gynobasic, stigma capitate, receptacle flat. Nutlets 4, trigonal, narrowly winged, shining brown, stipitate, stipe straight, attachment scar basal, nutlets 1.5 mm long.

Type : *Smith & Cave* 2220 (Holotype CAL Acc. No. 308558).

Flowering & Fruiting : July August.

Distribution : INDIA: Sikkim Himalaya.

Herbarium specimen : INDIA: Sikkim; Goraphu Chu, Llonakh, 4785 m, Aug. 6, 1909, *Smith & Cave* 2220 (CAL Acc. No. 308558).

Notes : According to Ban.(l. c.): *Smith and Cave*, in *Rec. Bot. Surv. India* 4: 226 (1911), described this species as "Perhaps only a variety of the above (i. e., *T. rotundifolia*); forms a compact rosette nearly 10 cm in diameter; the inflorescences very short and with smaller flowers than the type".

T. caespitosa has little affinity with *T. rotundifolia*, differing from it by its nutlet characters and caespitose habit. The nutlets in *T. caespitosa* are stipitate, with 2 ventral and 1 broad dorsal faces, with acute edges, whereas in *T. rotundifolia* the nutlets are sessile, trigonal and 3 winged. On the other hand, *T. caespitosa* is allied to *T. multicaulis* by its nutlet characters, but differs from it by its habit, which is compact, dense and clustered, with shorter branches, leaves which are obtuse or rounded at the apices, and shorter inflorescence axes.

***Trigonotis multicaulis* (DC) Benth. ex Clarke var. *cavei* S.P. Banerjee (Boraginaceae) in *Bull. Bot. Surv. India* 8 (3 & 4): 321 322. 1966 (1967).**

Perennial weak herb, a few slender, simple branches arising from suffrutescent base, base covered with older leaf-bases, branches

slender, up to 30 cm long, sparsely hairy, internodes long. Leaves simple, alternate, exstipulate, lower radical leaves from the suffrutescent base longer, lamina 3-4 cm long, entire, narrowed at both ends, shortly acuminate, petioles 6-8 cm long, slender slightly sheathing at the base, becomes gradually smaller in the upper cauline leaves which are sessile, lanceolate, narrowed at both ends, slightly acuminate, appressed strigose, with nerves (veins) slightly impressed below. Flowers few, clustered in terminal, short, dense cymes. Calyx gamosepalous, deeply 5-partite, slightly united below, 1.5 mm long, sepals 5, lanceolate, acute, ciliate, strigose on the outer side. Corolla gamopetalous, rotate, 4-4.5 mm long, lobes 5, orbicular, throat of corolla covered with 5 obtuse scales. Stamens 5, epipetalous, adnate to just above the middle of the corolla tube, anthers bilobed, up to 1 mm long, filament very short. Style short, gynobasic receptacle flat. Nutlets 4, substipitate, trigonal.

Types : *Smith & Cave* 1607 (A: Holotype CAL; B: Isotype CAL).

Flowering & Fruiting : July.*

Distribution : INDIA: Sikkim.

Herbarium specimens : INDIA: Sikkim ; Eumtso La (Yumchhola), 4267 m, July 17, 1909, *Smith & Cave* 1607A & B (CAL).

Notes : According to Ban. (*l.c.*) : Allied to variety *T. multicaulis* Benth. & Clarke but differs by its leaves being acuminate, primary and secondary veins impressed below, shorter peduncles and larger corolla.

Trigonotis smithii S.P. Banerjee (Boraginaceae) in Bull. Bot. Surv. India 8 (3 & 4):325-326. 1966 (1967).

Perennial weak, strigose herb, with a cluster of fibrous roots. Stems slender, weak, 6-12 cm long. Leaves simple, alternate, entire appressed-strigose, exstipulate, radical leaves very long-petioled, petioles 2-5 cm long, slender, sparsely strigose, with \pm sheathing leaf bases covering the lower portion of the stem, lamina 1-1.5 cm long, 6-8 mm broad, elliptic-oblong, obtuse or rounded at apex, base obtuse, more or less attenuate to the petiole; upper leaves

smaller, elliptic, subsessile or shortly petiolate, lamina attenuate at base, entire, obtuse, or rounded at apex, acute or sub-obtuse at base, midrib only impressed, 5–8 mm broad. Flowers in terminal, dense, ebracteate, helicoid clusters; pedicels short, 1 mm long, 2–3 mm in fruit, slender, shortly strigose. Calyx gamosepalous, deeply 5 partite, sepals 5, imbricate, densely strigose, ciliate, lanceolate or elliptic-obtuse, 1.5–2 mm long, 1 mm broad, slightly or not enlarged in fruit, ovate or lanceolate, obtuse. Corolla gamopetalous, rotate, 7–8 mm in diameter up to 7 mm long, tube 1–1.5 mm long, shorter than calyx, lobes 5, imbricate distinct, orbicular 4 mm long, 3–4 mm broad, throat of corolla closed with 5 thick, obtuse scales, scales 0.5 mm long. Stamens 5, epipetalous, filaments very short, anthers 0.5–1 mm long, bilobed, dorsifixed, adnate to the middle of the corolla tube. Ovary deeply 4-lobed; style 1 mm long, capitate, gynobasic. Nutlets 4, often one of the nutlets poorly developed, 1 mm long, shining brown, tetrahedral with 3 ventral and one dorsal faces, outer face broadest, ventral-keel prolonged into a short stipe, attached to a flat receptacle, scar small, basal.

Types : *Smith & Cave* 1811 (A: Holotype CAL-Acc. No. 308538; B D : Isotypes CAL Acc. Nos. 308553, 308554, 308557).

Flowering & Fruiting : July–August.

Distribution : INDIA : Sikkim Himalayas.

Herbarium specimens : INDIA: Sikkim; Llonok, 4419 m, July 31, 1909, *Smith & Cave* 1811 (A–D: CAL- Acc. Nos. 308538, 308553, 308554, 308557); Llonok, *Smith & Cave* 1921 (CAL); Near Nakula, Sikkim, *F. E. Younghusband* 176 (CAL).

Notes : According to Ban. (*l.c.*): *T. smithii* shows affinities with *T. multicaulis* in its cluster of stems, and with *T. rotundifolia* in the shape of its cauline leaves, but is readily distinguishable from both of them by its conspicuously larger flowers.

Smith & Cave (*Rec. Bot. Surv. India* 4: 226. 1911), however, referred their above-mentioned sheets under *T. multicaulis* with a note "not quite the type." The grounds on which these are removed and treated separately under *T. smithii* are on the characters in the leaf and flower.

Tripogon anantaswamianus Sreek., V.J. Nair & N.C. Nair (Poaceae) in Bull. Bot. Surv. India 25 (1-4): 185-187. 1983 (1985).

Densely tufted perennial herb. Culms 30-50 cm long, nodes glabrous. Leaves 25-40 cm long and 1-2 mm broad, linear, convolute, glabrous or very sparsely villous; upper surface glaucous; midrib conspicuous. Ligule a fine membrane. Sheaths smooth, glabrous. Racemes 15-20 cm long, contracted. Rachis smooth, glabrous. Spikelets 8-15 mm long, leaden grey coloured, with 7-10 florets. Callus hairy. Lower glumes 4-5 mm long, ovate-lanceolate, acuminate, shortly awned, 1-nerved, lobed on one side. Upper glumes 7-8 mm long lanceolate, notched at apex with a small awn in between. Lemma 7-8 mm long (including awns), ca 2.5 mm broad, coriaceous, 6-lobed at apex, three awned. Lobes on either side of median awn long acuminate, lateral lobes conspicuous. Awns subequal, 3-4 mm long, scabrid. Palea 3-4 × 1.0-1.4 mm, elliptic, 2-nerved, 2-keeled; keels ciliate. Lodicules 2, ca 0.5 mm long. Stamens 3, 1.5-2.0 mm long, narrow, yellow, filaments short. Ovary ca 0.6 mm long, obovate, cuneate at base. Styles 2, each 1.2 mm long, slender. Stigma ca 0.7 mm long, feathery, white. Grains not known.

Types : P. V. Sreekumar 69432 (Holotype CAL; Isotypes K, MH).

Flowering : November*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Idukki District, Eravikulam Sanctuary, 2000 m, Nov. 15, 1980, P. V. Sreekumar 69432 (CAL, K, MH).

Notes : According to Sreekumar *et al.* (*l.c.*): Allied to *T. bromoides* Roem. & Schult. and often growing along with it in the type locality. The two species appear quite distinct in the field. The differentiating features are: *T. anantaswamianus* is having the flowering stem of 50 cm height; blade length range 25-40 cm, blade width range less than 2 mm, blade margins entire, smooth, upper surface of the blade glabrous to very sparsely hairy, glaucous, lower surface of the blade glabrous; midrib conspicuous; cross section of blade at 1 cm

from collar—"V" shaped; blade exit angle 40° or less; nature of sheath glabrous, not forming fibres; ligule small, fine membrane; nature of awns in the lemmas, awns almost equal in length, scabrid; lateral lobes of the lemmas conspicuous; median lobes long, acuminate; keels of the palea ciliate; size of anthers 1.5–2 mm; nature of gynoecium ca 2.5 mm, style longer. In contrast the species *T. bromoides* Roem. & Schult., is having: 20 cm height of flowering stem; blade length range 10–20 cm; blade width range up to 3 mm; blade margins hairy; upper surface of the blade densely hairy, green and lower surface of the blade few fine hairs; midrib inconspicuous; cross section of blade at 1 cm from collar flat; blade exit angle ca 60° nature of sheath hairy, old ones breaking up into fibres; ligule absent; nature of awns in the lemmas lateral awns less than half the length of the median; glabrous; lateral lobes of the lemmas inconspicuous, which continue into arista; median lobes short, acute; keels of the palea glabrous to scabrid; size of anthers 1–1.25 mm; nature of gynoecium ca 1.5 mm.

The species is named after Dr. M. Anantaswami Rau.

***Tripogon polyanthus* Naik & Patunkar** (Poaceae) in Bull. Bot. Surv. India 15 (1 & 2): 158–159. 1973 (1976).

Densely tufted perennial, 6–8 Dm tall; stolon short, stout with long fibrous roots. Leaves 30–75 × 2–3 mm, convolute, glabrous; sheaths smooth, glabrous; ligule membranous. Raceme spiciform, 15–18 cm long; rhachis smooth. Spikelets 2–6.5 cm long, 40–50 or more flowered, dense, erect or ascending. Lower florets sessile, upper shortly pedicelled; joint of the rhachilla $1/3$ or slightly longer than the lemmas; callus hairy. Lower glume 3–3.25 mm long, one-nerved, narrowly lanceolate, caudate-acuminate, sides unequal. Upper glume 4–4.5 mm long, one-nerved, linear-lanceolate with equal sides. Lemma ovate-lanceolate, 5–5.25 mm long (including awn) and 2.25 mm broad, two-lobbed at apex; lobes acute. Awn 1–1.25 mm long, capillary from the sinus. Palea 4–4.25 × 1–1.25 mm, obovate-lanceolate, 2-keeled; keels shortly hairy.

Types : *Patunkar* 1859 (A: Holotype; B–E: Isotypes in Herbarium Marathwada University, Aurangabad).

Flowering : October*.

Distribution : INDIA: Marathwada region (Maharashtra).

Herbarium specimens : INDIA: Marathwada; Daulatabad, Oct. 18, 1973, Patunkar 1859 A E (Herbarium Marathwada University, Aurangabad).

Notes : According to Naik & Patunkar (*l.c.*): Near to *T. bromoides* Roth but differing in having much longer many flowered spikelets which are rather divaricate, more loose and straw-coloured and the lemmas 2 fid at apex.

This species is generally found growing in open situations along dry stream-banks in association with *Aristida funiculata* Trin. & Rupr., *Eragrostis sp.* and other grasses of the drier localities.

Trivalvaria kanjilalii D. Das (Annonaceae) in Bull. Bot. Surv. India 10 (3 & 4): 263 266. 1968.

A shrub, 2 3 m high; young branches brown-tomentose, glabrous with age. Leaves thinly coriaceous, lanceolate, long acuminate, both surfaces glabrous, length 12 15 cm and breadth 3.5 4 cm, main lateral nerves 8 9 pairs indistinct above; petiole 2 3 mm long, glabrous. Flowers bisexual, solitary, terminal or axillary; pedicels brown-tomentose, 3 5 mm long, with a brown-tomentose 2 3 mm long tomentose outside, puberulous within, 3 4 mm long and about 4 mm broad. Petals 6 in 2 series, brown-lanceolate acuminate bract at the middle. Sepals 3, imbricate, broadly ovate, acute, densely brown tomentose outside, puberulous within; 3 outer petals valvate, ovate, acute, 2.5 3 mm long and 2.5 mm broad, shorter than inner; 3 inner petals imbricate, shortly clawed, tip incurved, more or less rhomboid, 3-4 mm long & 2.5 3 mm broad. Stamens numerous, about 1 mm long, anther cells concealed by connective which is flat or slightly convex at the top. Carpels numerous, about 1 mm long, ovaries oblong, strigose, 1 ovuled; style curved; stigma capitate, pubescent. Ripe carpels a few, subglobose, glabrous, reddish, obtuse at both ends, with distinct transverse groove round the middle, thin walled, diameter about 1 cm, stalk 5 7 mm long. Seed 1.

Type : U. N. Kanjilal 7280 (Holotype Assam).

Flowering & Fruiting : Time not mentioned.

Distribution : INDIA: Assam (s.l.).

Herbarium specimens : INDIA: Assam (s. l.); Khasia Hills, Wah-Maw-long, 1917, U. N. Kanjilal 7280 (ASSAM); *ibid.*, Syndai, U. N. Kanjilal 2800 (ASSAM); Nongkla Khasia & Jayantia Hills, U. N. Kanjilal 6348 (ASSAM).

Notes : According to Das (l. c.): This is a distinct species differing from the other Eastern Indian species reported from Assam e. g. *T. argentea* (Hook. f. et Thoms.) Sinclair, in smaller leaves, lanceolate bract, bisexual flowers, larger sepals and petals, sepals and inner petals imbricate, outer petals valvate, ripe carpels sub-globose transversely grooved at the middle.

The species is named after its collector U. N. Kanjilal.

Utricularia khasiana J. Joseph & J. Mani (Lentibulariaceae) in Bull. Bot. Surv. India 25 (1-4): 192-194, 1983 (1985).

Stolons ca 0.2 mm thick, capillary, profusely branching, circinate at tip. Leaves 1.0-5.0 mm long, acicular, at long intervals (up to 10 mm) forked from the base, very unequal, slightly incurved, beset with spiny scales, bearing solitary traps. Traps ca 1.0 × 1.0 mm, subtended on the longer leaf-segment, pyriform, shortly stalked laterally; stalk ca 0.3 mm long; mouth oblique with obscure upper and lower lips; hairs on the rim of the mouth multicellular; lower lip with 3 diverging hairs of which the mid one is longer; upper lip with 3-8 short hairs along the rim in between the lateral antenna like hairs; antenna filiform, twice longer (ca 2 mm) than the trap, branched beyond the middle and with usually 5 (3 or 4) simple lateral secund hairs. Flowering not noticed.

Types : Joseph 76944 (A: Holotype CAL; B-C: Isotypes ASSAM; D: Isotype MH; E: Isotype, Rapinat Herbarium, Tiruchirapalli).

Flowering : Not noticed.

Distribution : INDIA: Meghalaya.

Herbarium specimens : INDIA: Meghalaya; Khasi Hills, from Shillong, Ca. 1496 m, Oct. 1, 1980, Joseph 76944 (A in CAL; B C in ASSAM; D in MH; E in Rapinat Herbarium, Tiruchirapalli); *ibid.*, Oct. 6, 1980, Joseph 76947 (Paratype ASSAM).

Notes : According to Joseph & Mani (*l.c.*) : *Utricularia khasiana* Joseph et Mani sp. nov., is a rare flowerless, rhizoidless, unobtrusive, filamentous, free floating, algae like herb in entangled masses, in shallow water along the margins of a fresh water lake, (Ward Lake, Shillong), propagating only vegetatively by fragmentation.

This is allied to *U. cymbantha* Oliver [reported from S. Africa, P. Taylor in Kew Bull. 18(1): 209-212. 1964] but distinct in vegetative characters, such as, internodes much longer (up to 10 mm), leaf always unequally forked, and the segments of the leaves beset with spiny scales instead of bare; traps subtended in the longer segment of the leaf instead of from the centre of the cleft; hairs of the trap prominently multicellular and the mid hair of the lower lip longer than the lateral ones instead of equal; presence of additional (5-8) hairs along the rim of the upper lip in between the lateral antennae instead of none main lateral antennae of the upper lip twice longer than the trap and branched beyond the middle and with more (3-5) secund lateral hairs.

This interesting species of *Utricularia* had been accidentally discovered by J. Joseph from the Ward Lake (hardly 23800 sq. m), Shillong, alt. ca 1496 m in the year 1964 February. Eversince then it had been kept under observation by him for its flowering. In all this long period it has not flowered. Notwithstanding the absence of flowers and its continued vegetative multiplication, it is clear that this is a distinct species.

P. Taylor (1964) has suggested some temperate species of *Utricularia* rely mainly on vegetative reproduction. *U. Khasiana* is a typical example of a vegetatively multiplying species. However, it is similar to *U. cymbantha*. Oliver reported from southern hemisphere (Congo to Transval and Madagascar) in the general morphology of the plant body, but distinct in many characters as given above.

The production of Turion (resting bud) also has not been noticed in this. The water in this small lake, though very cold in winter, never freezes. These plants seem to prefer the marginal still waters along with *Polygonum laccidum* Meissn. and other aquatic grasses, as also *Nelumbium* sp.

The specific epithet is after the geographical area The Khasi hills.

***Utricularia malabarica* Janarth. & A.N. Henry (Lentibulariaceae)**
in J. Bombay Nat. Hist. Soc. 86(1): 84-85. 1989.

Small herbs. Rhizoids mostly absent, if present up to 1 cm long, c 0.2 mm thick at base, terete, glandular; branches few, up to 0.8 mm long, papillose. Stolons up to 2 cm long, c 0.2 mm thick, capillary, terete, profusely branched; internodes c 2 cm long. Leaves up to 4 × 1.5 mm, solitary at base of scape and at each stolon node; petioles attenuate; lamina obovate, 3 nerved, rounded at apex. Traps up to 1.5 mm across, few, on stolons and leaves, globose; stalk short, often covered with glandular hairs; mouth basal; appendages 2, subulate, simple, glandular. Inflorescence 2-6.5 cm long, erect; peduncle c 0.6 mm thick, glabrous, angular, grooved on one side. Scales c 1.1 × 0.9 mm, 1-4 few, basifixed, ovate-deltoid. Bracts c 1.5 × 0.9 mm, ovate-deltoid, acuminate; bracteoles subulate, shorter than bract. Flowers 1-4; pedicels 3-4 mm long, winged, erect in anthesis and recurved in fruit. Calyx lobes more or less equal, c 2 × 2 mm in anthesis, c 3 × 3 mm in fruit, ovate, 10-12 nerved, outer surface and margin papillose, upper lobe acuminate, lower lobe bidentate. Corolla 7-8 mm long; upper lip c 2.5 × 1.5 mm, oblong, white with blue tinge, truncate or emarginate at apex; lower lip c 4 × 5 mm, more or less orbicular, blue; base prominently gibbous, white with blue reticulations, apex emarginate; palate hairy, spur c 4.5 mm long, slender, blue to bluish white, acute and yellow at apex. Stamens c 1 mm long; filaments strap-shaped; antherthecae distinct. Pistil c 1 mm long; ovary ovoid; style short; stigma bilabiate, lower lip oblong and hairy, upper lip short and semiorbicular. Capsules c 2.8 × 1.8 mm, ovoid-subglobose, uniformly membranous

dehiscing by a dorsal and a ventral longitudinal slit; placentum c 1 mm long, ovoid, stalked. Seeds c 0.25 mm long, ovoid; hilum prominent, subterminal; testa reticulate, smooth, cells more or less elongate.

Types : M.K. Janarthanam 82924 (Holotype CAL ; Isotypes MH Acc.Nos. 139935 139938).

Flowering & Fruiting : August*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala (Old Malabar region); Kasaragod District, Mulleriya, Aug.21, 1985, M. K. Janarthanam 82924 (CAL & MH-Acc.Nos. 139935 139938).

Notes : According to Janarth. & Henry (*l. c.*): *Utricularia malabarica* is allied to *U. lazulina* P. Taylor, but differs in: plants much smaller; calyx lobes equal and papillose; margin of upper corolla lip glabrous; lower lip of stigma hairy; fruiting pedicel recurved; seeds ovoid and testa smooth.

An annual occurs on wet laterite rocks, in association with *Eriocaulon sp.* an grasses.

***Utricularia nayarii* Janarth. & A.N. Henry (Lentibulariaceae)** in Bull. Bot. Surv. India 28 (1 4). 195 197. 1986 (1988).

Small annual herbs. Rhizoids up to 20 mm long, c 0.25 mm thick at the base, capillary, glandular; branches up to 4 mm long, simple or branched further, papillose. Stolons up to 30 mm long, c 0.2 mm thick, capillary, terete, sparsely branched. Leaves up to 50 mm long, 1.0 2.5 mm wide, solitary at the base of scape and at each stolon node; petioles attenuate; lamina linear, often forked, multinerved, rounded at apex. Traps 1.0 1.5 mm across, few, on the vegetative organs, globose; stalk short, distally thickened; mouth basal; appendages 2, subulate, simple, glandular. Inflorescence 5 - 18 cm long, solitary, erect; peduncle 0.5 0.75 mm thick, glabrous, angular, grooved on one side. Scales 1 4, similar to the bracts. Bracts up to 2.2 x 1.8 mm, basifixed, broadly ovate-deltoid, acuminate

at apex, 1 nerved; bracteoles up to 1.8 mm long, subulate. Flowers 1-5; pedicels 3-5 mm long, winged, erect at anthesis and spread in fruit. Calyx lobes unequal; upper lobe 2.5-5.0 × 3.0-4.0 mm, broadly ovate, acuminate at apex; lower lobe 2.8-6.0 × 2.2-3.3 mm, slightly longer and narrower than the upper lobe, linear-ovate, more or less elliptic in fruit, minutely bi-or tridentate at apex. Corolla 5-8 mm long, white-violet; upper lip 4.0-4.5 mm long, longer than calyx lobe, more or less constricted below the middle; upper limb slightly wider than the lower limb, rounded-emarginate at apex; lower lip 4.5-7.5 × 5.0-7.0 mm, orbicular obovate, throat yellow; base prominently gibbous, white with violet reticulations, palate hairy, rounded-wavy at apex; spur rarely exceeds calyx lobe in length, conical, slightly curved obtuse or notched with, globose glands near the apex within. Staminal filaments c 1.2 mm long, slightly curved; anther thecae distinct. Pistil c 1.3 mm long; ovary ovoid, dorsiventrally compressed; style short; stigma bilipped, lower lip truncate, upper semiorbicular. Capsules c 3 × 2 mm, ovoid, the wall uniformly membranous, dehiscing by dorsal and ventral longitudinal slits; placentum c 1.5 mm long, ovoid, stalked. Seeds c 0.5 mm across, few, subglobose, often angled; testa thick, scrobiculate, reticulate, cells more or less isodiametric.

Types : M. K. Janarthanam 82963 (Holotype CAL; Isotypes MH Acc. Nos. 136879-136882).

Flowering : October-December*.

Distribution : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Rajamallay, near Munnar in Idukki District, Dec. 12, 1985, M. K. Janarthanam 82963 (CAL) & M. K. Janarthanam 82963 (MH Acc. Nos. 136879-136882); *ibid.*, Lockhart gap near Munnar, Oct. 12, 1963, 1675 m, K. M. Sebastine 17543, 17545 (Paratypes CAL & MH).

Notes : According to Janarth. & Henry (*l.c.*): A terrestrial, on dripping rocks laden with Moss, in association with *Eriocaulon* sp., *Impatiens* sp. and grasses.

Utricularia nayarii resembles *U. graminifolia* Vahl at first sight, but is quite distinct in its flowers having shorter spur, the capsule

wall uniformly membranous and the testa scrobiculate with cells more or less isodiametric.

Dedicated this species to Dr. M. P. Nayar , Ex-Director, Botanical Survey of India.

Utricularia subramanii Janarth. & A.N. Henry (Lentibulariaceae) in *J. Bombay Nat. Hist. Soc.* 87 (3): 441. 1990 (1991).

Herbs; rhizoids up to 8 mm long, thick at base, tapering towards apex, glandular; stolons filiform. Racemes up to 15 cm long, erect, glabrous, 2-5 flowered; scales c 1.2×0.8 mm, basifixed, ovate, 3-nerved, acute to acuminate at apex; bracts c 1.5×1.2 mm, basifixed, ovate, 3-nerved, acute to acuminate at apex; bracteoles c 1 mm long, subulate to linear; flowers up to 7 mm long; pedicels up to 2.5 mm long, shorter than calyx-lobes, erect, winged. Calyx-lobes subequal, ovate, denticulate; upper lobe c 3×2.8 mm (c 4×4 mm in fruit), acute to acuminate at apex; lower lobe c 2.4×2 mm (c 4×3 mm in fruit), 2-4 dentate at apex. Corolla yellow; upper lip 3 mm long, cucullate, crested at middle on ventral side hairy along lower margin, obtuse at apex; lower lip c 3×2 mm, more or less obovate, hairy along the margin of throat, gibbous at base, rounded at apex, ligulate; ligule fimbriate along margin; spur conical, acute. Stamens c 1 mm long; filaments linear; anther thecae distinct. Pistil c 1 mm long; ovary ovoid; style thick; stigma 2-lipped. Capsules c 2.5×1.8 mm, ovoid, uniformly membranous; placenta c 1.5×1.4 mm, ovoid, compressed. Seeds c 0.3 mm long, oblongoid; hilum terminal; testa reticulate, scrobiculate.

Types: C. N. Mohanan 58342 (Holotype CAL; Isotype MH-Acc. No.134033).

Flowering & Fruiting : July*.

Distribution: INDIA: Kerala.

Herbarium specimens: INDIA: Kerala; Pathanamthitta, Quilon District, (Now Pathanamthitta District), 325 m, July 30, 1978, C. N. Mohanan 58342 (CAL & MH -Acc. No. 134033).

Notes : According to Joseph & Mani (*l.c.*): *Utricularia tayloriana* Joseph & Mani, is allied to *U. pubescens* Sm., but can be easily distinguished by the leaves being spatulate instead of peltate, and in the presence of two lamellae at the base of the upper lip within.

This new find has been located, in the moist even substratum, covered with slimy green algae ; in association with small caespitose grasses, *Utricularia bifida* L., *U. racemosa* Wall., *Burmania coelestis* D. Don, *Drosera peltata* Sm., *Murqania gigantia* (Vahl) Bruckn., *Eriocaulon* spp., etc. It is neither abundant nor common in the area of collection. Nevertheless further intensive search could locate it near Jowai area about 30 km east of the type locality.

It also resembles *Utricularia capensis* Spreng. (reported from S. Africa) in the general morphology, but can be easily distinguished being hairy instead of glabrous and in the presence of lamellae at the base of the upper lip.

The specific epithet has been given in honour of P. Taylor for his invaluable contribution on the genus *Utricularia* L. of S. Africa.

Vanda jainii A.S. Chauhan (Orchidaceae) in J. Econ. Tax. Bot. 5(4): 977-979. 1984.

Perennial, robust, epiphytic herb. Roots ca 18–23 cm long, thick, much branched, greenish. Stem ca 20–24 cm long, thick, sheathed at base with distinct nodes and internodes. Leaves ca 6.0–15.0 × 1.5–2.0 cm, alternate, distichous, narrowly oblong, keeled, sheathing and articulated at base, coriaceous, equally trilobed, mucronate at tip. Racemes ca 2.1–2.4 cm long, axillary, 2 flowered, shorter than the leaves. Flowers ca 4.0–4.5 cm across, pedicellate, bracteate, greenish-yellow, lip with brown stripes. Bracts ca 4 × 5 mm, ovate, acute, sheathing the pedicel. Dorsal sepal ca 2.7 × 0.7–0.8 cm, oblong, obtuse, yellowish, 7 parallel nerved. Lateral sepals ca 2.6 × 0.6–0.7 cm, oblong, obtuse, narrowed at base, 7 parallel nerved. Lateral petals ca 2.6 × 9.4–0.5 cm, oblong, obtuse, yellowish, 5 parallel nerved, shorter than the sepals. Lip ca 2.1–2.3 cm fleshy, adnate to column, shorter than the lateral sepals, trilobed, spurred; sidelobes ca 0.7–0.8 cm broad, erect, triangular, inner side

with two semi-circular dark brown patches, sidelobes not overlapping the apical lobes; apical lobe *ca* 1.4 cm long from the sidelobes to the tip of lip, fleshy, oblong, its apex with two erect lobules and a horn like fleshy, beak downwards, upper surface with 8-9 shallow smooth brown ridges and furrows, rest yellowish; spur *ca* 3 mm long, obtuse. Column *ca* 5-6 mm long, stout, without foot, operculate. Pollinia *ca* 1 mm broad, ovoid, attached by a broad short caudicle to a quadrate gland.

Types: Chauhan 70887 (A: Holotype CAL; B: Isotype ASSAM).

Flowering: March - August.

Distribution: INDIA: Meghalaya.

Herbarium specimens: INDIA: Meghalaya; West Khasi Hills, Sonapahar forest, from a low tree branches, Chauhan 70887A (CAL); Chauhan 70887B (ASSAM).

Notes: According to Chauhan (*l. c.*): Allied to *Vanda cristata* Lindl., but differs in leaf apex equally trilobed, mucronate; sepals and petals with parallel nerves without transverse connection; lip shorter than the lateral sepals; two semicircular dark brown patches inside the sidelobes; apical lobe with two erect lobules at apex, upper surface of lip with 8-9 shallow, smooth brown ridges and furrows; spur short, obtuse; whereas in *Vanda cristata* Lindl., leaf apex is truncate, bi or trilobed; sepals and petals with parallel venation with prominent transverse connected veins; lip longer than the lateral sepal; boldly blotched with dark brown inside the sidelobes; apical lobe with two divaricate lobules at apex; upper surface with 5-6 carunculate dark-brown ridges and furrows; spur distinct, long.

Very rare, collected from a low tree branches in moist and shady place.

This species is named in honour of Dr. S. K. Jain. Ex-Director, Botanical Survey of India, Howrah.

Vernonia anaimudica B.V. Shetty & Vivek. (Asteraceae) in Bull. Bot. Surv. India 12 (1-4): 266-268. 1970.

Erect shrubs 0.75-2.5 m high; stem woody, teret, striate,

sometimes pigmented purple, brown tomentose above, blackish brown tomentose below, base glabrescent; internodes 0.6–2.5 cm long. Leaves 3.5–12 × 1.5–5 cm, alternate in a pentastichous arrangement, usually ovate, sometimes ovate-lanceolate or elliptic lanceolate or elliptic-ovate, rounded or acute and often slightly inaequilateral at base, acuminate or mucronulate at apex, margins irregularly crenulate to serrulate, coriaceous, bullate, upper surface pilose when young, at length glabrescent with puberulus nerves and pubescent midrib, undersurface white tomentose with a tinge of pale brown or sometimes green with only the midrib and nerves pubescent; main nerves 7–12 pairs, secondary nerves many and highly reticulate; petiole 0.5–1.7 cm long, brown or blackish brown tomentose. Inflorescence corymbose, terminal and in the axils of upper leaves, 3–9 cm wide, branches brown tomentose. Capitula up to 45 per corymb, pedunculate (peduncle up to 1.6 cm long, ± 1 mm thick, brown tomentose), 0.7–1.4 cm long, ± 1 cm indiameter, flowers ± 19 per head. Involucre 5–6-seriate, ± 4 mm across the tips of phyllaries; phyllaries green, tip and margins often pigmented brown, markedly increasing in size and decreasing in pubescence towards the flower, glossy within, mucronate, spreading and turning dark brown at length; outer small, ± 2 mm long, ± 1 mm broad, ovate, tomentose; intermediate ones bigger, elliptic-oblong; inner ± 6 mm long, ± 1.1 mm broad, linear, puberulous. Flowers bisexual, fragrant. Corolla 0.75–1.05 cm long, tubular-infundibuliform, glandular, pale violet above, 2/3 of the tube below white; lobes 5, 2–3 mm long, linear-lanceolate, margins thickened, apex blunt and white. Anthers ± 2.5 mm long, dark violet, obtusely auricled at base, acute at apex; filament ± 2 mm long, white. Style 6–8.5 mm long, white, slender, slightly thickened and puberulous at the top; style branches 2, 2–3 mm long, white, arching, puberulous. Cypsela up to 3.5 mm long, ± 1 mm broad at the broadest point, brown or dark brown, 10-ribbed, glabrous, glandular between the ribs, narrowly obovoid but truncate at both ends with a basal callus ring; pappus up to 6.5 mm long, outer series shorter, buff or dingy white, setose; setae barbellate throughout their length. Receptacle small, ± 2.3 mm across, alveolate, the raised margins of the alveolae hispid.

Types: Shetty & Vivekananthan 31786 (A: Holotype CAL; B-Z: Isotypes MH).

Flowering: November February*.

Distribution: INDIA: Kerala.

Herbarium specimens: India: Kerala; Kotayam District, Rajamallay, Devicolam, Feb. 2, 1970, *Shetty & Vivekananthan* 31786 (A in CAL; B Z in MH); *ibid.*, Nov. 19, 1965, *Shetty & Vivekananthan* 26546 A E and 26550A G (Paratypes MH).

Notes: According to Shetty & Vivek. (*l. c.*): Allied to *V. Heynei* Bedd. ex Gamble, but differs inter alia in having bullate leaves with base rounded or acute, never attenuate.

In Shetty & Vivekananthan 26546 and 31786 the undersurface of leaf is white tomentose with a tinge of pale brown whereas in Shetty & Vivekananthan 26550 it is green with only the midrib and nerves pubescent.

Vernonia andamanica N.P. Balakr. & N. G. Nair (Asteraceae) in Bull. Bot. Surv. India 24 (1 4): 32 33. 1982 (1983).

Scandent shrubs, branchlets glabrous. Leaves spirally arranged, elliptic, ovate or obovate, obliquely acute at base, obtusely acute or shortly acuminate at apex, entire at margins, 4.5 10.5 cm long, 1.5 5.5 cm wide, glabrous, glossy green above, pale beneath; lateral nerves 5 7 pairs, interarching at margins; petiole 3 8 mm long, 1 - 2 mm thick, glabrous. Panicles terminal, short, few-headed; mainpeduncle 2 3 cm long glabrous or sparsely puberulous; heads subsessile, with many florets; stalk ca 1 cm long, glabrous or sparsely puberulous; involucral bracts many; outer bracts ovate, 1.5 2.5 mm long, ciliate; inner bracts ovate, oblong or lanceolate, 8 9 mm long, 2 3 mm wide, ciliate; receptacle glabrous. Corolla tube 6 7 mm long, glabrous; lobes 5, ca 3 mm long. Stamens 5, ca 4 mm long, sagittate at base, acute at apex; filaments ca 2.5 mm long. Style 7 8 mm long; stigmatic branches ca 3 mm long, curved. Achenes ca 4 mm long, 1.0 - 1.5 mm thick, obtuse, 10-ribbed, thinly pubescent; pappus hairs pale greyish, numerous, in 2 rows, pubescent; outer pappus 3 4 mm long; inner pappus 11 12 mm long.

Types: Balakrishnan & Nair 4768 (A: Holotype CAL; B-D: Isotypes PBL).

*Flowering & Fruiting: December**.

Distribution: INDIA: Andaman Islands.

Herbarium specimens: INDIA: North Andamans; Saddle Peak, 500-700 m, Dec.1, 1976, Balakrishnan & Nair 4768 (A in CAL, B-D in PBL).

Notes: According to Balakr. & Nair (l.c.): V. blanda DC., is a Burmese species and this new species differs from it in leaves being shortly acuminate; involucral bracts longer, ciliate; panicles terminal, composed of fewer heads, glabrous; pappus hairs longer, up to 12 mm long and greyish.

The new taxon is found in open scrub jungles.

Zenkeria jainii N.C. Nair, Sreek. & V.J. Nair (Poaceae) in *J. Bombay Nat. Hist. Soc.* 78 (1-3): 352. 1981.

Perennial herbs. Culms 45-60 cm long, erect from a decumbent rooting base; nodes glabrous; internodes 5-14 cm long. Leaf blades 15-50 × 0.8-1.6 cm, chartaceous, linear-lanceolate, tapering at both ends, sparsely villous on the upper surface; sheaths 8-16 cm long, chartaceous, glabrous or sparsely villous, basal ones breaking up into fibres; ligule a tuft of short hairs. Panicles 14-18 cm long, densely flowered with capillary, villous spreading branches. Spikelets 5-5.5 mm long, all alike, each 2-flowered, bisexual. Pedicels 0.2-1.5 cm long, villous; rachilla short, bearded, disarticulating above the glumes. Glumes subequal, c 3 × 1 mm ovate-lanceolate to lanceolate acute or shortly acuminate, hyaline, glabrous, 1-nerved, keeled, persistent, spreading. Lemmas c 5 × 1.2 mm, lanceolate, acuminate, 5-nerved, coriaceous, long ciliate below the middle. Paleas c 4 × 1.1 mm, ovate-lanceolate, notched at apex, 2-keeled, 2-nerved, hyaline, long ciliate along the keels except all the upper quarter. Lodicules 2, each c 0.7 × 0.4 mm, without nerves, obovate, retuse at apex. Stamens 3; anthers 2-2.5 mm long; narrow, purple, filaments 1.5-3.5 mm long, slender. Ovary c 0.8 × 0.4 mm, ovate,

glabrous; styles 2, each c 0.2 mm long, stout; stigmas c 1 cm long, feathery, white. Grains unknown.

Types: P. V. Sreekumar 68419 (Holotype CAL; Isotypes MH).

Flowering: August*.

Distribution: INDIA: Kerala.

Herbarium specimens: INDIA: Kerala; Idukki District, Eravikulam Sanctuary ± 2000 m, Aug. 20, 1980, P. V. Sreekumar 68419 (CAL & MH).

Notes: According to Nair *et al.* (*l.c.*): It has some similarity to the recently described South Indian species *Zenkeria sebastinei* Henry & Chandra., but differs in having: leaves linear lanceolate, exceeding the length of the panicles (15–50 × 0.8–1.6 cm), glabrous on lower surface, sparsely villous throughout on upper surface; ligule, a tuft of short hairs; sheaths 8–16 cm long, sparsely villous; nodes glabrous; spikelets 5–5.5 mm long; glumes subequal, lanceolate shortly acuminate (2.8–3 × 1 mm); palea 4–4.5 mm long, notched at apex; filaments more than half the length of anthers, equal to or even exceeding its length (1.5–3.5 mm); styles stout, short (c 0.2 mm); stigma large; lodicules retuse at apex, nerveless; whereas in *Zenkeria sebastinei*: leaves are narrowly elliptic, shorter than the panicle (5–18 × 1–2.2 cm); glabrous except towards tip on lower surface; ligule a rim of long hairs; sheaths 5–7 cm long, glabrous; nodes hairy; spikelets 4–4.5 mm long; glumes unequal, ovate, acute (lower c 2.5 × 1.5 mm; upper c 3.5 × 1.7 mm); palea 3–3.2 mm long, acute at apex; filaments less than half the length of anthers, at the most 1 mm long; styles slender, long (c 0.5 mm); stigma smaller; lodicules oblique and denticulate at apex; 1–2 nerved, one nerve prominent, the other faint. New species differs from *Z. elegans* by longer glumes, larger spikelets, broader hairy leaves; differs from *stapfii* by flat, broader hairy leaves, larger spikelets, and *Z. obtusiflora* is distinct from present specimens in having obtuse lemmas, smaller spikelets, broader and glabrous leaves.

Zenkeria jainii grows in clumps in the crevices of moist rocks.

The present species is named after Dr. S. K. Jain, Ex-Director, Botanical Survey of India, Howrah.

Zenkeria sebastinei A.N. Henry & Chandrab. (Poaceae) in Bull. Bot. Surv. India 15 (1 &2) : 142-144. 1973 (1976).

Perennial herbs; culms; 30 - 45 cm long, erect from a decumbent rooting base; nodes hairy; internodes 0.7 - 1.2 cm long. Leaves 5 - 17 × 1 - 2.2 cm, suberect, rigid, chartaceous, narrowly elliptic, tapering at both ends, pungent, sparsely hairy towards apex, margin thickened, scabrous; sheaths 5 - 7 cm long, chartaceous, glabrous, basal ones breaking up into fibres; ligule a fringe of hairs. Panicles up to 15 cm long, densely flowered with capillary, villous, spreading branches. Spikelets 4 - 4.5 mm long, all alike, each 2 flowered, bisexual; rachilla very short, not produced, bearded, disarticulating above the glumes. Glumes unequal, lower ca 2.5 × 1.3 mm, upper ca 3.5 × 1.7 mm, ovate to ovate-lanceolate, acute, hyaline, glabrous, 1 nerved, keeled, persistent, spreading. Lemmas ca 4.5 × 1.3 mm, lanceolate, acuminate, 5 - 6 nerved, coriaceous, hairy below the middle. Paleas ca 3.7 × 1.2 mm, 2 keeled, hyaline, long-ciliate along the keels. Lodicules 2, each ca 0.8 × 0.5 mm, obovate or obliquely obovate. Stamens 3; anthers 2 - 2.2 mm long, narrow; filaments short. Ovary ca 0.7 × 0.2 mm, oblong, glabrous; styles 2, each ca 0.5 mm long, slender; stigma ca 0.7 mm long feathery. Grains unknown.

Types: Henry 17325 (A: Holotype CAL; B-F: Isotypes MH).

Flowering: August*.

Distribution : INDIA: Tamil Nadu.

Herbarium specimens: INDIA: Tamil Nadu; Tirunelveli District, Agastyamalai, Aug. 26, 1963, Henry 17325 A: CAL; B - F: MH).

Notes: According to Henry & Chandr. (*l. c.*): This species is allied to *Zenkeria obtusiflora* (Thw.) Benth., but differs in the shorter culms and leaves, longer spikelets and acuminate lemmas.

The specific epithet is given in honour of late Dr. K. M. Sebastine, former Regional Botanist, Botanical Survey of India, Southern Circle, Coimbatore.

Abutilon hirtum (Lam.) Sweet var. ***heterotrichum*** (Hochst. ex Mattei) Cuf. (Malvaceae) in Bull. Jard.Bot.De.L'etat 29 (1) : 536. 1959 ; S. Abedin, Fl. W.Pak.130:67. 1979; T.K.Paul in Ind. J. For. 10 (4) : 311-312. 1987. *Abutilon heterotrichum* Hochst. ex Mattei, Boll. Ort. Palermo n.s. 1 (2) : 90. 1915. *Abutilon lugardii* Hochr. & Schniz in Bull. Herb. Boiss. Ser. 2.3: 825.1903.

Herb or undershrub up to 2 m high. Stems, petioles and pedicels with long patent simple hairs, minute stellate hairs and glandular hairs. Leaves 2.5-8 × 2.5-6 cm, ovate, cordate at base, acute at apex, margin coarsely, irregularly and deeply serrate, 7-9 nerved at the base, pubescent with minute stellate hairs; petiole 1.5-6.0 cm long. Stipules 0.5-1.0 × 0.1-0.3 cm, linear to lanceolate, reflexed, stellate velutinous. Flowers solitary, axillary; pedicel 1.5-4.5 cm long, articulate above the middle. Calyx 7-10 mm across, campanulate, 5-lobed, lobes free up to the middle, 5-10 × 4-6 mm, ovate to deltoid, acuminate-cuspidate, glutinous, outside densely stellate pubescent, sericeous inside. Corolla 3.0-3.5 cm across, orange-yellow with a purple centre; petals 5, ± 1.5 cm long and ca 1cm broad, broadly obovate, at base ciliate, outside stellate pubescent, inside glabrous. Staminal column 5-7 mm long, lower conical part stellate hairy, upper tubular part glabrous. Schizocarp 1-2 cm across, globular, indented at apex ; mericarps 20-25, separating early, each 10-15 mm high, broadly ovate-reniform, shortly acuminate, sometimes rounded, dorsally stellate tomentose. Seeds 3 per mericarp, ca 2.5mm across, reniform with stellate hairs sometimes more so at the hilum, brown.

Flowering & Fruiting : October. *

Distribution known so far : ETHIOPIA : PAKISTAN.

Additional reports : INDIA: Gujrat, Peninsular regions (Tamil Nadu).

Herbarium specimens : INDIA : Gujrat ; Cutch, anonymous s.n. (CAL); Peninsula Indiae Orientalis : Herb. Wight 179 (CAL). Isotype : Abyssina, Dschadscha, Oct. 1,1854; fl.fr., schimper 2306 K,P).

Notes : According to T.K. Paul (*l.c.*) : This variety differs from the typical variety of *A. hirtum* by its : Leaves ovate with coarse, irregularly and deeply serrate margin whereas in the latter taxa the leaves are orbicular-ovate with serrulate or denticulate margin.

Abutilon indicum (L.) Sweet Subsp. **albescens** (Miq.) Borss. var. **australiense** Hochr. (Malvaceae), Ann. Cons. Jard. Bot. Geneve 6:20. 1902; Nova Guinea 14:159. 1924; van Borssum Waalkes in Blumea 14(1) : 175, fig. 19 a-b. 1972. 1966; Chandrab. in Bull. Bot. Surv. India 12 (1-4) : 276. 1970. *A. indicum* sensu Span., Linnaea 15:171. 1841; ? F.v.M. , Descr. Not. Pap. P1. 4:55. 1875; Specht, Rec. Am. Austr. Sc. Exp. Arnhem Land 3 : 258. 1958. *A. graveolens* [non (Roxb.ex Hornem.) W.& A. Ex Wight] Britten, in Forbes, Nat. Wand., App. 6:500. 1885.

Unershrubs; stems terete, branched, velutinous by minute stellate hairs, also with scattered simple hairs. Leaves 2-24 × 1.5-13 cm, alternate, simple, orbicular or ovate, cordate at base, obtusely acuminate, minutely crenate to irregularly dentate, velutinous on both surfaces by minute stellate hairs, also with scattered simple hairs; petioles up to 13 cm long; stipules ± 4mm long, linear, acute, caducous. Flowers axillary, solitary. pedicels 2-8 cm long, accrescent, jointed near the apex, covered with stellate and simple hairs. Involucral bracts absent. Calyx 1.5-2 cm long, campanulate, velutinous by minute stellate hairs outside, densely tomentose within, 5-parted; segments 1-1.5 cm long, narrowly ovate, acute or acuminate; tube very short, slightly inflated. Petals ± 2 × 1.7 cm, yellow, adnate below the staminal tube, broadly obovate, truncate, obtuse or emarginate. Staminal tube ± 7 mm long, conical at base with stellate hairs; upper part tubular, glabrous; stamens many, free above, filaments ± 6 mm long, anthers monothealous. Ovary ± 4mm in diam., depressed globose, stellate hairy; carpels 15-19 ; ovules 2 or more in each cell; styles as many as carpels, free above, united to form a column to half the length at the base, stylar column ± 4 mm long; stigma capitate. Schzocarps ± 1 × 2 cm, depressed globose, indented at apex; mericarps 15-19, flat, reniform from aside, long acute at apex, dorsally tomentose by stellate hairs.

Seeds ± 2.5 × 2 mm, two or more in each mercarp, reniform, covered with stellate hairs.

Flowering : December.*

Distribution so far known : MALESIA, AUSTRALIA (Northern territory, Queensland), NEW CALEDONIA.

Additional report : INDIA: Andhra Pradesh.

Herbarium specimen : INDIA : Andhra Pradesh; Nalconda District, , Nagarjunasagar, Krishna River bank, Dec. 16, 1959, *Sebastine* 9803 (MH)

Notes : According to Chandrabose (*l.c.*) : Calyx as long as or even longer than the schizocarp; segments 1-1.5 cm long, narrowly ovate; mericarps long acute at apex are the characters in var. *australiense* ; whereas in variety *A. indicum* is characterised by: calyx much shorter than the schizocarp: segments 3-4 mm long, ovate; mericarps shortly acuminate at apex Dr. J. Van Borssum Waalkes, Holland Confirmed the identity of the specimen.

Alectra parasitica A. Rich. (Scrophulariaceae) Tent. Fl. Abyss. ii : 117. 1851; Kamble & S.G. Pradhan in Bull. Bot. Surv. India 26 (1 & 2) : 129. 1984 (1985).

An erect herb up to 25 cm in height (incl. erect rhizome which is 3.0-4.0 cm), under the shade of *Vitex negundo* Linn. and *Barleria* sp. (apparently root parasite of the above spp.). Stem 0.1-0.4 cm thick, dark purple, angular, hispidulous, turning black on drying. Rhizome 0.3-0.7 cm thick, without scales, orange red. Flowers in terminal spikes or racemes, with a very short pedicels up to 0.1 cm. Floral leaves or bracts 0.6-0.8 cm long, scale-like, sub-opposite, elliptic-ovate with acute tip, sparsely serrate, hispidulous. Bracteoles two, 0.4-0.5 cm long, linear, hispidulous. Corolla about 1.0 cm long, yellow with red to brown streaks, lobes usually five, sometimes six (two long and three short) glabrous. Calyx campanulate, persistent, with five unequal triangular lobes. Stamens four to six, filaments glabrous, anther lobes slightly unequal. Style simple; stigma elongate, inflexed, tongue shaped, hairy. Ovary glabrous, 0.3 cm across with two locules and axile placentation; ovules numerous. Capsule 0.5 cm across, subglobose, pedicelled, loculicidal, four valved, a little broader than long with persistent calyx. Seeds numerous, cuneiform ; testa lax, reticulate.

Flowering & Fruiting : August-November.

Distribution known so far : ETHIOPIA.

Additional report : INDIA: Maharashtra.

Herbarium specimen : INDIA : Maharashtra ; Kalamata in Akola District Aug. 28, 1977, S.Y. Kamble 150188 (BSI, Western Circle).

Notes : According to Kamble & Pradhan (*l.c.*) : *A. parasitica* A. Rich., which has not been so far reported from India though Hooker f. (1884) and Gamble (1957 Repr. ed.) reported two species viz. *A. thomsoni* Hook. f. and *A. sessiliflora* (Vahl) Kuntz. var. *monticola* (Engl.) Melch. (= *A. indica* Benth.) in their respective floras. This taxa can be distinguished from *A. thomsoni* Hook. f., by its glabrous filaments and from *A. parasitica* A. Rich. var. *chitrahutensis* M. A. Rau by the absence of strongly rhizomatous development of the underground parts of the stem with scales.

***Alternanthera philoxeroides* (Mart.) Griseb.** (Amaranthaceae) in Abh. Ges. Wiss. Goett. 24:36. 1879; Kuntze, Rev. Gen. P1. 2:540. 1891; Schinz in Engl. & Prantl, Nat. Pfam. 3. 1a : 115. 1893; Koorders, Exk. F1. Java 2:200. 1912; Bailey & Bailey, Hort. Sec. (rev. ed.) 44. 1941; Backer in F1. Males. Ser. I. 4 (2):93. 1949; Duke in Ann. Miss. Bot. Gdn. 48 (fasc.4:43. 1961); Maheshw. in Bull. Bot. Surv. India 6(2-4) : 313. 1964; H. B. Naithani in flowering Pl. Ind. Nep. Bhutan, p. 348. 1990. Basi, *Bucholzia philoxeroides* Mart. in Nova Acta Acad. Leop-Carol. 13(1) : 315. 1826. Syn. *Telanthera philoxeroides* Moquin-Tandon in DC. prodr. 13:362. 1849, incl. vars.; Costerus & Smith in Ann. Jard. Bot. Buitenz. 23:12. 1910. *Achyranthes philoxeroides* (Mart.) Standl. in Jour. Wash. Acad. Sci. 5:74. 1915.

Perennial aquatic or marshy herbs, 50-100 cm long, decumbent or ascending from a creeping or floating rooting base, often much-branched and forming dense masses. Stems simple or branched, fistular, longitudinally striate, with a longitudinal hairy groove on two opposite sides, otherwise glabrous. Interfascicular xylem well developed in erect stems. Leaves opposite, lanceolate, oblong to narrowly obovate, acute to rounded, submucronate, base cuneate, 4-10 × 0.5-2.5 cm, entire, thin, glabrous or glabrate, in the axils with a transverse row of white, smooth hairs; midrib prominent below; petioles 1-6 mm long. Inflorescence usually of solitary, axillary,

pedunculate, ovoid to globular-ellipsoid, white heads, also terminal and sessile, 10-18 × 10-18 mm; peduncles usually 1-5 cm long, unbranched, with a longitudinal hairy groove on the adaxial side, otherwise glabrous. Flowers perfect, dense. Bracts and bracteoles subequal, ovate, 1-nerved, nerve excurrent in apicula, glabrous, white, persistent after fall of perianth. Bracts ovate-triangular, 2-3 mm long. Bracteoles ovate, acuminate, about 2.5 mm long. Perianth almost sessile above the bracteoles, dorsally compressed, shining white, glabrous. Tepals 5, sub-equal, three to four times as long as the bracts, oblong, acute, mucronulate, 1-nerved, subchartaceous, concave, 5-7 × 1.5-2.5 mm. Stamens 5, united below into a tube; filaments 3.5-4 mm long, linear; anther linear, unilocular, 1-1.5 mm long. Pseudostaminodia distinct, lacerate and exceeding the stamens, oblong-linear, margin entire, their tips divided into three or more narrow teeth. Ovary shortly stalked, turbinate-globose, dorsally compressed, rounded at the apex; style short, cylindrical; stigma globose, capitate, glandular. Fruits not seen.

Flowering : May October.

Distribution known so far : SOUTH AMERICA (COLOMBO to BRAZIL & ARGENTINA) , UNITED STATES (Adventitive in South eastern part), JAVA (Naturalised), MALAYSIA (introduced earlier) and BURMA.

Additional reports : INDIA: W.Bengal, Bihar, Assam, Meghalaya, Madhya Pradesh, Karnataka, Jammu & Uttar Pradesh.

Herbarium specimens : INDIA: West Bengal ; Dum Dum near Calcutta, 24 Parganas, June 26, 1940, *Floyd* s.n. (CAL). Bihar. Ranchi Lake (Herb. Ranchi College). BURMA : Victoria Lake, Rangoon District, Sept. 23, 1932, *C.E.Parkinson* 15091.(CAL).

Notes : According to Maheshwari (*l.c.*) : The genus *Alternanthera* Forsk., of the family Amaranthaceae including over 100 species is best developed in the Americas. Many species are ubiquitous, of which some like *A. paronychioides* St. Hil. and *A. pungens* H.B. K. are rather obnoxious weeds with pungent tepals. Some species have been introduced into India, Burma, Australasia and Malaysia, e.g. *A. pungens* H.B.K., *A. paronychioides* St. Hil., *A. ficoidea* Roem. & Schult., and *A. brasiliana* (Linn.) Kuntze (Backer, 1948; Melville, 1958; Santapau & Shah, 1961; Maheshwari, 1962). *A. philoxeroides*

(Mart.) Griseb., a South American weed, probably Brazilian in origin, was introduced long ago in Malaysia and at present quite naturalized in West Java (Backer, 1948). In the present note, *A. philoxeroides* (Mart.) Griseb., is recorded for the first time from the lakes and water pools in the eastern parts of India, namely West Bengal and Bihar.

Standley in N.Amer. Fl. 21:142. 1917, gives the range of this species as from Colombia to Brazil and Argentina in South America; adventive in the Southeastern United States. Suessenguth in Fedde Rep. spec. nov. 39:4. 1935, reports a teratological specimen from pearl Islands in San Jose. The species was introduced long ago in the tropics of the old world. It was found there for the first time in 1875 near Java, Malaysia by Otto Kuntze. It is at present quite naturalized in West Java, although not yet recorded from elsewhere in Malaysia. In the Calcutta Herbarium there is a specimen from Victoria Lake in Rangoon district, Burma collected in 1932 by C.E. Parkinson; this is probably the first record of its occurrence on the Asiatic Mainland. Apparently the species has made further ingress in the eastern parts of India, namely West Bengal and Bihar. In the absence of earlier records before 1940, it is evident that its introduction within our gates had taken place during late years. However, it is difficult to ascertain as to how it came to be introduced into India. Like several other American weeds, it seems probable that a few viable seeds of this species might have reached India along with some packing material during the Second world war years. This is conceivable in view of the fact that this species was collected for the first time from India near an aerodrome. During recent years, a large number of neotropical weeds have been found to naturalize on Indian soil and spread like wild fire. Further in this species reproduction takes place vegetatively by means of subterranean shoots, and thus under favourable conditions it spreads rapidly forming dense masses. It would, therefore, be worthwhile to watch the spread of this weed in other parts of the country and try to eradicate it from Indian soil. Although at present it is not yet common nor troublesome, there is a possibility that like Water Hyacinth (*Eichhornia crassiper* Solms.) it may become another powerful aquatic pest in our lakes, ponds, puddles and water ways.

Teratology : In this species the stamens are very often replaced by as many sterile spurious ovaries surrounding the true ovary (Costerus and Smith in Ann. Jard. Bot. Buitenz. 23 : 12. t. 3. 1910, and Suessenguth in Fedde Rep. spec. nov. 39:4. 1935).

Anaxagorea javanica Blume (Annonaceae), Fl. Jav. Anon. 66.f. 32. et 36A. 1830; D.K. Hore in Bull. Bot. Surv. India 26 (1&2) 21. 1984 (1985).

Small tree, ca 2.5-3 m. Bark greyish white. Leaves 12-18 × 4-7 cm, elliptic-oblong, acute to acuminate, glabrous, nerves 8-10 pairs; petiole ca 1 cm. Inflorescence axillary. Pedicel ca 1 cm long, flowers greenish outside, fragrant. Sepals glabrous to minutely puberulous, oblong, obtuse, adpressed to petals; petals 6, in two whorls, outer greenish, inner reddish; stamens many, white; stigma cone shaped, ovaries angled. Follicles red.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : BORNEO, JAVA, SINGAPORE.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimen : INDIA: Great Nicobar Island ; Lafal Forest, D.K. Hore 7547 (PBL)

Notes : According to Hore (*l.c.*) : The species differs from its closely allied species *A. luzonensis* A. Gray in having 8-15 carpels and elongated inner stamens. In inland moist forest; scarce.

Ardisia pardalina Mez (Myrsinaceae) in Engl. Pflanzenreich 9 (iv. 236) 148. 1902; G.S. Giri & M.P. Nayar in J. Bombay Nat. Hist. Soc. 78 (3) 633-635. 1981.

Shrub, glabrous, smooth. Leaves lanceolate 12-15 cm × 2.5-3.5 cm., base cuneate, apex acute or obtuse, membranous, glabrous, midrib raised beneath, lateral nerves many pairs, nerves prominent beneath, gland dotted, glands elongated, scattered, margin entire, recurved with albuminous glands; petioles ± 12 mm long, glabrous, canaliculate. Inflorescence axillary, peduncles 40-60 mm long, slender,

few flowered, paniculately umbellate. Pedicel 6-8 mm long, glabrous. Sepals 5, ovate-acute 1.5-2 mm × 1 mm large gland dotted, persistent. Fruit globose 7-8 mm diameter, redish brown, large gland dotted.

Fruiting : January.

Distribution known so far : PHILIPPINES.

Additional report : INDIA: Assam.

Herbarium specimens : INDIA : Assam; Rengging , 860 m, Jan. 25, 1912, *I.H. Burkill* 36251 (CAL). PHILIPPINES : Mayon Volcano : Albay province, Luzon, Sept. 1928, *M. Ramos* 75720; Bangui to claveria, Ilocos norte province, Luzon, Aug. 1918, *M. Ramos* 33045.

Notes : According to Giri & Nayar (*l.c.*) Carl Mez (1902) in his monograph on the family Myrsinaceae described a new species *Ardisia pardalina* from Philippines. *A. pardalina* Mez., first time is being recorded in India. It is a very interesting species among the Indian *Ardisia* so far studied as regards the glands on the leaf. Mez in his key established the subgenus *Crispardisia* based on the marginal albuminous glands on the leaves. Within the subgenus he described 2 species with the elongated glands namely *A. pardalina* and *A. sinuato-crenata*. But *A. pardalina* can be easily separated from its ally by the entire leaves whereas in *A. sinuato-crenata* the leaves are sinuate-crenate. Mez also described another species *A. oldhami* (*l.c.*) with large glands (not elongated) which was merged later on by Walker with *A. virens* Kurz. (Walker in Philippine Journal of Science 73:82, 1940). But he however did not mention the species *A. pardalina*. The specimens of *A. pardalina* Mez from Philippines are available in Herb. CAL.

Aspidopterys hirsuta (Wall.) Juss. (Malpighiaceae) in Ann. Sc. Nat. 2. ser. Bot. 13:267. 1840 et in Arch. Mus. 3:512. 1843; Hook. f.F1. Brit. Ind. 1:421. 1874. R.C. Srivast. in J.Econ.Tax.Bot 5: (1) : 127. (1984). *Hiraea hirsuta* Wall. Pl. As. Rar. 1:13. t.13. 1830 et Cat-1059.

Climbers. Stems and branches covered with long spreading flaccid hairs. Leaves broadly obovate, oblong or orbicular-obovate,

7-10 × 5-6 cm, abruptly acuminate, cordate at bases, hirsute on both the surfaces, ciliate; petioles ca 7-8 mm long, hirsute, brown. Panicles lax, branches opposite, spreading, hirsute brown, bracteate. Flowers sub-umbellate, ca 7-8 mm across, white, floral buds ca 3 × 2 mm, glabrous; pedicels 4-5 mm long, densely hirsute brown; sepals oval, 1.5-2.0 mm long, glabrous; petals obovate, 4-5 × 2.0-2.5 mm, glabrous; ovary glabrous. Samaras linear-oblong, 4.0-4.5 × 1.5-1.8 cm, apices rotundate, bases retuse, almost equally broader from base to apex, glabrous.

Flowering & Fruiting : August-November.

Distribution known so far : BURMA, THAILAND.

Additional reports : INDIA: Meghalaya, W.Bengal (Cultivated in I.B.G. & Serampore Gardens.

Herbarium specimens : INDIA: Meghalaya; Khasi Hills, Kurz s.n. (CAL). W.Bengal ; Harto Botanico Calcuttensis, *Anonymous* s.n. Cult.(DD) ; Serampur, *Anonymous* s.n. Cult. (DD) BURMA: Toong Dong et Tromi (K-Wall. 1059, Microfichs CAL).

Notes : According to Srivastava (*l.c.*) : Though the specimen was collected long back the species has not been described as yet from our country. Previously cultivated in W. Bengal in Indian Botanic Garden and Serampore Gardens.

Bulbophyllum penicillium Par. & Reichb. f. (Orchidaceae) in Trans. Linn. Soc. 30: 151. 1874; Hook.f. Fl. Brit. Ind. 5:764, 1890; S.K. Katakai & Panigrahi in Bull. Bot. Surv. India 5(3 & 4) : 243. 1963 (1964), H.B. Naithami in Flowering Pl. Ind. Nep. Bhutan P. 398.1990.

Epiphytes; rhizome stout, about 5 mm in diam., lower side covered with dense stout roots; pseudobulbs ovoid, about 2.5 cm long, stout, one-leaved; leaves linear, coraceous, acute, 16-18 × 3 cm, margin entire, petiole 3-5.5 cm long, channelled; inflorescence arising from the base of the pseudobulb, drooping, 30-35 cm long, raceme about 20 cm long, tomentose, lax-flowered; sheaths about 8 mm long; bracts lanceolate, acuminate, 5-6 mm long; pedicel with ovary about

4 mm long, slender; sepals narrow, sub-equal, 5-nerved, lanceolate, acuminate, about 1 cm long; petals small, oblong, crenate; lip sessile on the foot of the column, mobile, lanceolate, crenately hirsute with hairs, about 6 mm long.

Flowering : May to August.

Distribution known so far : MYANMAR.

Additional reports : INDIA: Assam Sikkim, Arunachal Pradesh, Meghalaya.

Herbarium specimen : INDIA: Khasia & Jaintea hills; Jorain, 16 km from Jowai, *Panigrahi*, 21926.

Notes : Rare.

Cayratia anemonifolia (Zippel ex Miq.) Susseng. (Vitaceae) in Engl. Pflanzenfam. ed. 20d: 280. 1953; Mridula Maulik in Bull. Bot. Surv. India 13(1&2) : 159. 1971 (1973). *Vitis anemonifolia* Miq. in Ann. Mus. Bot. Ludg. Batav. 1 : 80. 1864. *Cissus anemonifolia* (Zippel ex Miq.) Planch. in DC. monog. Phaner. 5: 560. 1887.

Scandent herbs. Stems and branches slender, fistular obscurely angular, pubescent, greyish green. Leaflets terminal 5.30-6.50 x 3.50 cm and other leaflets 2.50-4 x 1.50-3 cm, 5-7 pedate, ovate subrotund, lower leaflets somewhat oblique, shortly acuminate, coarsely serrate, serratures with recurved apex, lateral nerves 5-7 spreading parallelly outwardly, base obtuse. Petiole 5-6 cm long, puberulous; petiolules 1-1.50 cm long, pubescent. Stipules persistent, scarious in older branches. Tendrils leaf-opposed, forked puberulous. Inflorescences 5-6 cm long, axillary dichasial cyme lax flowered, pubescent. Flowers 3-3.50 mm long; pedicels 4-5 mm long, fleshy, pubescent. Calyx 1.5 mm across, saucer-shaped, margin very short, thin puberulous. Petals 4, 2.5 mm long, ovate-lanceolate, acute, not hooded. Stamens 4, 1.5 mm long, opposite: filaments fiat, broader near base: anthers oblong-obtuse. Disc 1 mm long, cushion-shaped, entire, concave thin. Ovary 2-locular. Style 0.5 mm simple, thin, glabrous, stigma simple.

Flowering : March-July.

Distribution known so far : TIMOR.

Additional report : INDIA: Tamil Nadu.

Herbarium specimens : INDIA : Tamil Nadu; Nilgiri District, Naduvalam, 2000 m, in flower, July 25, 1960, K. Subramaniam 10578 (MH) ; *ibid.*, 2100 m, in flower, Mar. 11, 1969, D.B. Deb 31672 (MH).

Notes : According to Maulik (*l.c.*): The specimens kept under the name *Cayratia pedata* (Laws.) Juss. at Madras Herbarium actually differs those from material of above mentioned species by its leaf-shaped. These actually represent is *Cayratia anemonifolia* (Zippel ex Miq.) Susseng.

Planchon (DC. Monog. *Phaner.* 5:560. 1887) included it under *Cissus* Planch., subgenus *Cayratia* Planch.. Sussenguth [Engl. *Pflanzenfam.* (Reprint ed. 2) 20d: 280. 1953] placed the same under the genus *Cayratia* Juss. The critical study with the protologue (Miquel, *ibid.* 1864) by Miss Mridula Maulik reveals the available specimens as *Cayratia anemonifolia* (Miq.) Susseng. This species, so far known to be endemic in Timor can not be called as such as it is found growing wild in South India. With the discovery of this species in South India, the area of its distribution becomes wide and two localities where it has been found to grow are very far from each other. It is surmised that the species may exist somewhere in East Asia but has yet to be reported.

Chenopodium truncatum Paul & G.Wilson (Chenopodiaceae) *Nuytsia* 4: 177. 1983; Ravi & N. Anilkumar in *J. Econ. Tax. Bot.* 14(1) : 109. (1990).

Annual strongly smelling, slightly fleshy procumbent herb with both simple, slender and segmented and sessile to stipitate gland tipped hairs on the stem, and leaves. Stem several, sparsely branched, radiating from a root stock, longitudinally ridged. Leaves simple, alternate, exstipulate petioled; petiole c 7 mm long; blade ovate-oblong, acute, sinuately acutely lobed on the margins, hairy on both surfaces, slightly fleshy, green when dry. Flowers polygamous, small, clustered in leaf axils. Bisexual and male flowers subsessile

to shortly stalked; perianth 4-5, distinct, c 5 mm long, lanceolate to elliptic, rostrate at apex, keeled on the back, keel slightly winged, hirsute ciliate on the scarious margins; stamen 1 or rarely 2, filament short, anther cells 2, distinct; pistil shorter than that of female. Female flowers sessile and stalked, stalk when present c 5 mm long; perianth 4-5 or rarely 6, c 5 mm long, connate to the middle, apically rostrate, vertically winged on the back, hirsute ciliate on the scarious margins; ovary round, style 1, stigmas 2, linear, fruiting perianth c 2 mm wide, more or less obtriangular, truncate at apex with radiating free ends of the perianth segments, strongly vertically winged on the back, completely enclosing the fruit. Fruit an achene c 5 mm long lenticular, brown, minutely papillate towards the apex or all over. Seed endospermous. Embryo annular.

Flowering : November.*

Distribution known so far : AUSTRALIA.

Additional report : INDIA: Karnataka.

Herbarium specimens : INDIA : Karnataka ; Bangalore, Grape garden adjacent to the Lal Bagh, Nov. 1987, *Ravi* 2336 A (CAL); *ibid.* *Ravi* 2336 B (MH); *ibid.*, *Ravi* 2336 C-J (SNCH- Sree Narayan College Herbarium Quilon).

Notes : According to Ravi & Anil Kumar (*l.c.*): The specimens were identified by Dr. Paul G. Wilson himself of the Western Australian Herbarium, Perth.

Cleisostoma paniculatum (Ker-Gawl.) Garay (Orchidaceae) Bot. Mus. Leafl. Harv. Univ. 23, 4:173. 1972; N.C. Deori & C.L. Malhotra in Bull. Bot. Surv. India 15 (3-4) : 274. 1973; H.B. Naithani in Flowering Pl. Ind. Nep. Bhutan P. 401.1990. *Aerides paniculatum* Ker-Gawl. in Bot. Reg. 3. T. 220. 1817.

Epiphytes. Stem elongated, clothed with leaf-sheaths; leaves 11-23 × 1.5-2 cm, spreading, coriaceous, apex unequally bifid. Inflorescence simple panicle, axillary, horizontal or erect, much longer than the leaves; scape stout with 2-3 tubular sheaths. Floral bracts minute, ovate-acute. Flowers 1.3 cm across, greenish, inner surfaces of sepals

golden yellow except the purple blotches along the middle; dorsal sepal 4×2 mm, ovate, cucullate, 5-nerved, crenate at apex; laterals 5×2.5 mm, spreading, oblong, 5-nerved; petals 3.5×1.5 mm, linear-oblong, 3-nerved; lip yellow, 3-lobed side lobes obtuse, midlobe uncinately acuminate at apex with 2-subulate processes; callus at the mouth of the spur 2-lobed hairy; spur 5 mm long, sub-cylindrical, not septate; column purple, very short; anther whitish, depressed, obovate, cordate at base; pollinia 2, each 2-lobed stipes broad, acuminate, glands large, forked, exposed; pedicel 8-10 mm long including ovary; capsule 20×5 mm, prominently 6-ridged.

Flowering : June-September. *Fruiting* : November- February.

Distribution known so far : CHINA, TAWAIN to THAILAND.

Additional reports : INDIA: Arunachal Pradesh, Assam, Meghalaya Mizoram, Nagaland & Tripura.

Herbarium specimens : INDIA : Arunachal Pradesh ; Hayuliang, Lohit District, Aug. & Sept. 1973, *Joseph* 51768, 51772. Meghalaya; Pongtung, K. & J. Hills, Dec. 1930, *Deka* Acc. Nos. 36161, 36193. Mizoram ; Aizol, Feb. 1953, *Deka* 41047. Assam; Dulong Reserve Forest, N.Lakhimpur, Nov. 1957, *Panigrahi* 11339. Nagaland; Tseminyu, Nov. 1973, *Hynniewta* 56254. All the specimens are in the herbarium of the Botanical Survey of India, Eastern Circle, Shillong (ASSAM).

Notes : According to Deori & Malhotra (*l.c.*): Dr. Gunnar Seidenfaden, Denmark confirmed the identity of the specimen. The plant is a new orchid record for India.

Clitoria arborescens R. Br. (Papilionaceae) in Ait. Hort. Kew. 2, 4:302. 1812; Hooker in Curtis Bot. Mag. n.s. 6.t. 3165. 1832; DC. Prodr. 2:235. 1825; G.H. Bhaumik & G.C. Das in J. Econ.Tax. Bot. 4 (2) : 607-608 (1983). *C. poitaei* DC. Prodr. 2:234. 1825.

Shrub, c 3 m or more high. stem erect, very woody; branches spreading and ascending or somewhat twinning. Leaves large, long stalked, 3-foliolate, upper ones similar but gradually smaller upwards, leaflets $12-18$ cm \times $5-8.5$ cm, broadly elliptic, ovate-elliptic or elliptic-

oblong, shortly acuminate, mucronate, upper surface glabrous or with short uncinata pubescens and occasional scattered hairs conspicuous on main nerves, strigose to sparsely strigose hairy below; veins weakly impressed above, conspicuously raised below. Petioles 6-13 cm long, weakly striate. Inflorescence an axillary few flowered panicle. Bracts 5-6 mm long, linear-lanceolate, striate, puberulous; bracteoles 8mm long, same as the bracts, inserted 1-2 mm below the calyx; peduncles 3-5 mm long. Calyx tube 1.8-2 cm long, 2 mm wide near the base, 6-9 mm near the mouth, persistent, strigose hairy, striate, the lobes 4 mm long, broadly ovate, abruptly narrowed into a long acumen. Petals 3-4 cm long, standard light violet, densely strigose hairy outside and very small uncinata pubescens on the inner surface near the base. Ovary stipitate (stipe 2-3 mm long), 7mm long, tomentose, pod 3.5-6.5 cm long, valves convex, ecostate, uncinata pubescence to glabrate. Seeds orbicular, c 6 mm in diam., dark brown, smooth.

Flowering & Fruiting : September.

Distribution known so far : NORTHERN SOUTH AMERICA, native of Island of Trinidad and St. Vincent to French Guiana.

Additional report : INDIA: Meghalaya.

Herbarium specimens : Tropical, Sona Pahar, 5 km point towards Hahim, Khasi Hills District, Aug. 27, 1976, *Bhawmik* 60481 (ASSAM, CAL).

Notes : According to Bhaumik & Das (*l.c.*): Growing on hill slope at the edges of semideciduous forest. The *Clitoria arborescens* R. Br., which is previously not known from India.

A native of the island of Trinidad and distributed from St. Vincent island to French Guiana, the species is so far known from Northern South America (Bentham, 1858; Fantz. 1979). Bentham's report of its distribution in Panama appears to be due to wrong identity of his cited specimens e.g. *Cumming* 1142 and *Sinclair* s.n. which have been later identified as *Clitoria javitensis* (H.B.K.) Benth. var. *portobellensis* (Beurling) Fantz. (Fantz., 1980). Thus, its occurrence in Khasi Hills is reported here as a new record for India, as well as its second locality of distribution on the globe. The discontinuous

distribution of the species growing wild in different parts of the globe is extremely significant from the point of view of phytogeography.

Connarus planchonianus Schellenb. (Connaraceae) in Kew. Bull. 375.1927; D.K. Hore in Bull. Bot. Surv. India 26 (1&2) : 21-22. 1984 (1985). *C. grandis* (non Jack) Hook. f. in Fl. Brit. India 2: 53. 1876.

Large twining liana. Leaves 1-2 jugate, usually 5-foliolate, imparipinnate, leaflets oblong to lanceolate, base cuneate or rounded, apex obtuse-acuminate. Inflorescence terminal or axillary, in panicle. Fruit in follicles, 4-6 × 2-2.2 cm, little compressed, ellipsoid to obovoid, beak inconspicuous, pendulous; young fruits green but yellowish-orange when ripe and ultimately brownish when dry.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : BURMA; SUMATRA ; MALAY PENINSULA & SINGAPORE.

Additional report. : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island; Campbell Bay, Balakrishnan 2790 (PBL, CAL) ; Alexandra river bank forest, D.K.Hore 7965 (PBL) ; 36.5 km, East-West Road, D.K.Hore 8270 (PBL).

Notes : According to Hore (*l.c.*) : Leenhouts in Fl. Males. Ser. 1. 5 (4) : 528.1958. *C. planchonianus* Schellenb. (*C. grandis* non Jack), *C. semidecandrus* Jack, *C. gibbosus* Wall. ex Hook. f. are three distinct species.

In beach forest, road side rocky hill slopes, sandy loam; not frequent.

Croton hirtus L'Her. (Euphorbiaceae), Strip. Nov. 1: 17, t. 9. 1785; Amaratunga in Ceylon J.Sci. 12: 189. 1977; Veldkamp in Fl. Males. Bull. 9/4 (40) : 415. 1987. V.S.Ramach. K. Ravikumar and Balasubramaniam in Ind. J.For. 15 (2) : 183-185. 1992. *Croton glandulosus* L., Syst. ed. 10, 2: 1275. 1795 var. *hirtus* (L'Herit.) Mull.-Arg. in DC. prodr. 15(2) : 684. 1866.

Erect, suffruticose herb up to 50 cm high; stem woody, terete, dichotomously branched; branchlets with white to pale yellow strigose stellate hairs. Leaves alternate, ovate to ovate-oblong, 2.2-6 × 1.3-4.2 cm, truncate to obtuse or oblique at base, irregularly serrate along margin, acute at apex, with stellate white hairs on both sides; nerves 3-5, obscure above, distinct below with 2 distinct glandular hairs at base of lamina; petioles terete, 0.4-2.8 cm long, longer in lower branches, shorter in upper branches, stellate hairy; stipules ca 2mm long, linear, stellate hairy, persistent when young, caducous when mature. Inflorescence terminal, rarely axillary, up to 4 cm long with numerous multibranched glandular hairs with globose tips, female flowers below, male flowers above; axillary inflorescence usually without flowers, rarely with 1-2 female flowers; bracts linear, ca 2 mm long with glandular hairs. Male flowers white, globose in bud; pedicels ca 1 mm long, stellate hairy; sepals 5, lobes equal, obovate, ca 1.5 × 1 mm, entire along margin, obtuse at apex, glabrous inside, stellate hairy outside; petals 5, lobes equal, oblanceolate, ca 2 × 0.75 mm, serrate along margin, acute at apex, glabrous inside, stellate hairy outside, hairs longer below, shorter above, distinctly 1-veined; stamens 11; filaments ca 1.5 mm long, glabrous, terete anthers oblongoid, ca 0.25 mm long, pale brown. Female flowers green; sepals 5, lobes unequal; longer ones 3, linear oblong ca 3 × 1 mm, dentate along margin, acute at apex, glabrous inside, hairy outside; the other 2 lobes ca 2 × 0.5 mm and ca 1 × 0.25 mm petals ca 0.25 mm long, green; ovary ovoid, ca 1.5 mm across, stellate hairy; styles 3, each divided into two, ca 2 mm long, terete, slender with numerous stellate hairs; capsules ca 5 mm across, stellate hairy throughout with persistent sepals and remnants of styler branches; seeds 1 in each locule, trigonous, ca 3 × 1 mm, glabrous, shiny, brown with black patches; caruncle pale yellow.

Flowering & Fruiting : May - October*.

Distribution known so far : WEST INDIES, CENTRAL & SOUTH AMERICA, TROPICAL ASIA, AFRICA, THAILAND and SRI LANKA.

Additional report : INDIA : Tamil Nadu (introduced probably).

Herbarium specimens : INDIA : Tamil Nadu State ; Thirunelveli District, Mundanthurai Wild Life Sanctuary, Karaiyar Dam Tunnel,

V.S. Ramachandran 4301 on Oct. 12, 1989 at an altitude of \pm 550 m: Agastiar Nagar Tribal Pockets, K. Ravikumar 92638 on May 2, 1990, at an altitude of \pm of 400 m.

Notes : According to Ramchandran *et al* (*l.c.*) : The genus *Croton* Linn., has about 750 species chiefly in the tropical and subtropical regions of the world (Airy Shaw, 1973) Hooker (1887) reported 27 species from erstwhile British India and out of these 14 are believed to occur in South India (Cooke, 1958; Gamble, 1957). Recently Chakrabarty (1987) reported 29 species from the Indian subcontinent. Chakrabarty (*l.c.*) stated that this species is native to West Indies and Central & South America which has become an aggressive weed in Tropical Asia and Africa. Amaratunga (1977) enumerated its occurrence in Sri Lanka. Veldkamp (1987) reported it as a new record for Thailand.

Locally abundant in a restricted area near a stream of dry deciduous forest. They grow on sandy soil and are associated with *Acalypha indica*, *Cassia occidentalis* and *Cleome aspera*. Since this species is found in Sri Lanka, there is every possibility of its introduction to India by all means.

Crypsis aculeata (L.) Ait., (Poaceae) in Hort. Kew, ed : 1 : 48, 1789 ; F1 Egypt, 1 : 349 , 1941 ; Bor in Rech. F. F1. Lowland Iraq : 100, 1964 ; D. C. Pal in Bull. Bot. Surv. India 32 (1-4) : 165 1990 *Schoenus aculeatus* L. , Sp. Pl. ed. 1 : 42 : 1753.

An annual prostrate herb with many stems. Stems up to 20 cm long, smooth or glabrous. Leaf blades flat, ca 5 cm \times 4 mm, hairy on both the surfaces. Inflorescence capitulum (raceme) supported by two uppermost inflated leaf-sheaths, bearing short pungent blades. Spikelets 3-4 mm long. Lemma longer than glumes, + 4mm. Anthers -2. Palea newed.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : AFGANISTAN, IRAN.

Additional report : INDIA: Rajasthan.

Herbarium specimen : INDIA : Rajasthan ; Barmer G. L. Tiwari 1140 (CAL).

Notes : According to Pal (*l.c.*) : *Crypsis* is distributed in India in the arid region from Pakistan, Sind, N.W. India-Punjab , Kashmir to Madhya Pradesh, Bundelkhand. So far specimens from Rajasthan desert have been assigned to the species, namely, *C. schoenoides* Lam.

The Examination of some specimens from Barmer , N. W. Rajasthan, which is an extension of the Sind desert, turned out to be *C. aculeata* (L.) Ait., a hitherto unknown species in India. The specimen due to its shorter and broader raceme , two upper most leaf-sheaths, longer lemma than glumes is referable to *C. aculeata* (L.) Ait., whereas ellipsoidal inflorescence in *C. schoenoides* and longer than broad; lemma equal or shorter than glumes, spikelets 2-3.5 mm long.

Rozhevits & Shiskkim (1934) observed that this grass is relished by livestock. According to Bor (1968) this grass was first introduced in South Africa during the world war in 1914-1918 as a fodder grass.

The name of the genus *Crypsis* has been derived from Greek word Kryptos which means hidden or concealed, an illusion to the inflorescence which is enclosed in upper most leaf sheaths.

***Cryptocarya griffithiana* Wight (Lauraceae), Ic. 5: t. 1830, 1852; Hook. f. Fl. Brit. India 5:177. 1886; N.C. Nair & Bhargavan in Ind. J. For. 4(2) : 157. 1981.**

Evergreen trees up to 5 m; leaves oblong, caudate-acuminate, coriaceous, with 8-10 pairs of conspicuous nerves; leaves, young parts and inflorescence rusty villous.

Flowering : July.

Distribution known so far : MALAYSIA (Malacca; Perak; Malay Peninsula).

Additional report : INDIA: Tamil Nadu.

Herbarium specimens : MALACCA : *Griffith* s.n. (MH-Acc.Nos. 70492, 70493. *Perak* ; *Rev. Fr. Scortechini* s.n. (MH-Acc. No. 90062);

400-600 ft. Jan. 1884, *Kings collector*, 10173 (MH-Acc. No. 90063) ; 500-800 ft., July 1883, *Kings Collector* 4670 (MH-Acc. No. 90061). *Malaya Peninsula* ; s.l., s.n., MH-Acc. Nos. 70490, 70491). INDIA : Tamil Nadu ; Tirunelveli District, valayar R.F., Eastern slope, 1000 m, July 12, 1976, *P. Bhargavan* 4746 (MH-Nos. 92539, 92540).

Notes: According Nair & Bhargavan (*l.c.*) : The descriptions given above of the plant, a new record for India, are the significant characters to identify the species in the field. The specimen, *King Collector's* 10173 (Acc. No. 90063) is actually a tree of 50-70 ft; stem 10-15" in diam, fruits dark green 3/3" in long by 3/8" diam; yong; in dense mixed forest.

The specimens from Malaya Peninsula, s.l., s.n. (Acc. Nos. 70490, 70491) presented by Kew and sheets bear initials of Hooker.f.

Curcuma aurantiaca Zipp. (Zingiberaceae) valetton in Bull. Jard. Bot Buitnz. (ser. 2) 27:17. 1918; V.A. Amalraj *et al.* in Ind. J. For. 15(1) : 88-89. 1992; Holttum in Gard. Bull. Singapore 13:66. 1950; Backer & Bakh. f., Fl. Java 3:207. 1968.

Rootstock ovoid, up to 5 × 2 cm, dirty pale yellow inside with a typical camphor flavour ; root tubers white inside. Leaves bifarious, oblong-lanceolate, 20-35 × 8-16 cm, sparsely hairy on dorsal side and finely pubescent beneath, broadly cordate and unequal at base, caudately acuminate at apex; petiole up to 19 cm long, glabrous. Inflorescence central, up to 30 cm long; peduncle up to 17 cm long, pubescent, most part covered by leaf sheaths; bracts pubescent, fleshy, paler towards base, connate part of fertile bracts longer than the free part; lower ones broadly obovate with rounded upper margin, upper ones acute or acuminate. Fertile bracts up to 4.5 × 3.4 cm, varying in colour from pale green to greenish pink; coma bracts up to 5.6 × 2.5 cm, white with green tinge, with or without pink base to pink striped with white margin. Flower showy, yellow-orange, up to 5 cm, longer than bracts. Calyx ca 1.5 cm long, hairy with unequal teeth, split on one side. Corolla shorter than staminode, pale orange, glabrous within, posterior lobe widest and pubescent outside; staminodes yellow orange, sparsely hairy on margins, lip larger than

lobes, with a darker centre, widest in the middle but abruptly narrowed into a slightly emarginate ultimate apex. Anther not spurred, ca 5 mm long, versatile, obliquely truncate-obtuse at base, pale orange with darker apex; connective sparsely hairy, apically crested. Style filiform, stigma bilabiate, ciliate with a pair of epigynous glands; ovary three celled with many ovules. Fruit obovoid, hairy with persistent calyx; seeds light brown, shiny, covered by white lacinate aril.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : JAVA.

Additional report : INDIA: Kerala.

Herbarium specimens : INDIA : Kerala; Pathanapuram, Muralidharan M 13B ; Vellanikkara, Amalraj & Velayudhan AV 33, AV 429 to 432; Acc.No. 364 (MH) and AV 432 (National Herbarium, NBPGR, New Delhi).

Notes : According to V.A. Amalraj *et al.* (*l.c.*): Fischer (1928) Recorded eight species of *Curcuma* from the erstwhile Madras Presidency, while Baker (1894) reported 29 species from British India. This additional species *C. aurantiaca* Van Zijp reported as a new record for India.

C. aurantiaca closely resembles *C. parviflora* Wall., and *C. ecalcarata* Sivarajan & Indu, both coming under the sub-genus *Hitcheniopsis* (Bak.) K.Schumm.

In the relationship of the three species, while inflorescence found Central and anther thecae pubescent, ecalcarate in all the 3 species; in species *C. aurantiaca* peduncle is concealed; petal pale orange; staminode colour orange; leaf base cordate, unequal; epigynous gland present, whereas in species *C. parviflora* peduncle is concealed; petal colour white; staminode colour white (lip violet) ; leaf base rounded; epigynous gland unknown, and in the last species *C. ecalcarata* peduncle is unconcealed; petal white; staminode colour bright yellow; leaf base cordate unequal; epigynous gland absent.

C. aurantiaca is distributed throughout Kerala in sandy coastal plains to upper midlands and also at the foot hills of Western Ghats.

The plants occur in swarms. The colour of bracts is highly variable. It flowers and fruits in Java, from November to end of March (valeton *l.c.* p. 77).

Curcuma oligantha Trimen (Zingiberaceae) in *J. Bot.* 23:245. 1885; Trimen, *Handb. Fl. Ceylon* 4:242, t 92. 1898; Baker in Hook. *f. Fl. Brit. Ind.* 6:215. 1890; Burt. & Smith in Dassa. & Fosb., *Fl. Ceylon* 4:504. 1983. K. G. Bhat in *Ind. J. For.* 10 (1) : 66-68. 1987. *C. kannanorensis* R. Ansari *et al.*, in *Curr. Sci.* 51 (6) : 293, fig. 1-8, 1982, *syn. nov.*

A perennial herb. Rootstock small, white inside; root-fibres terminating in subglobose or oblong-ellipsoid tubers, white inside. A fully developed leaf tuft up to 15 cm high. Leaves 2-7 in a tuft; lamina up to 20 × 8 cm, ovate-elliptic, acuminate, glabrous; petioles shorter than lamina. Inflorescence arising before or with the developing leaves from the base of a new leaf shoot, up to 12 cm long, few to many-flowered. Coma absent. Bracts ascending, up to 3 × 1.5 cm, lanceolate, obtuse, recurved at apex, adnate at base, green or with a pinkish tinge. Bracteoles ca 1.5 × 0.6 cm, lanceolate, inner bracteoles smaller. Cincinni few-flowered. Calyx ca 2 cm long, tubular, unilaterally split, obscurely 3-lobed. Corolla-tube up to 3 cm long, white, pubescent; lobes subequal, white or with a pinkish tinge; dorsal lobe ca 2 × 1 cm, ovate, apiculate; lateral lobes smaller, rounded at apex. Lateral staminodes white, ca 2.5 × 1.2 cm, ovate, subacute. Labellum ca 2 × 2 cm, emarginate, white with a yellow spot at the throat. Filament ca 6 mm long; anthers ca 4 mm long, spurred at base. Ovary puberulous, ca 3 × 2 mm. Capsule subglobose; seeds arillate.

Flowering : May July.

Distribution known so far : SRI LANKA.

Additional reports : INDIA: Karnataka, Western Ghats, Kerala.

Herbarium specimen : INDIA : Karnataka; Coastal belt; Western Ghats, frequent in moist shady places.

Notes : According to K.G. Bhat (*l.c.*) : *C. oligantha* Trimen which

was hitherto believed to be endemic to Sri Lanka; is closely allied to *C. albiflora* Thw., a species confined to Sri Lanka. However, *C. oligantha* can be distinguished from the latter by its lower ascending bracts. From other Indian species of *Curcuma*, it differs in the absence of sterile coma bracts of the inflorescence. Recently, Ansari *et al.* (1982) have published a new species of *Curcuma* - *C. kannanorensis* from Kerala with two varieties, viz., var. *kannanorensis* and var. *lutea* to cover white-flowered and yellow-flowered plants respectively. Their new species is hardly distinguished from *C. oligantha* and it is treated here as a synonym of *C. oligantha*, but it would be quite reasonable to keep the yellow-flowered ones under var. *lutea*.

C. oligantha var. *lutea* (R. Ansari *et al.*) K.G. Bhat, *comb. nov.*
C. kannanorensis var. *lutea* R. Ansari *et al.* in *Curr. Sci.* 51 (6) : 294, 1982; differs from the typical variety by the yellow colour of the flowers. The two species of the genus *curcuma* came across by Bhat (author) which are frequent in moist shady places along Western Ghats and Coastal belt of Karnataka one with : Flowers white with yellow spot at the throat of the labellum. While the other has pure yellow flowers. Both these taxa were found to be *C. oligantha*. Trimen by the author and Miss R. M. Smith of R. B. Garden, Edinburgh.

Cypholophus moluccanus (Blume.) Miq (Urticaceae) in *Ann. Mus. Bot. Lugd.-Bat.* 4: 303. 1869; D.K. Hore in *Bull. Bot. Surv. India* 26 (1&2) : 22. 1984 (1985). *Urtica moluccana* Bl., *Bijdr.* 491. 1825.

Undershrub, ca 1 m, erect, branches hairy. Leaves opposite, 12-23 × 6-8.5 cm, ovate to ovate-oblong, base oblique on one side, rounded or subcordate on the other side, crenate-serrate, scabrous, densely hirsute on both surfaces, interstitial spaces very prominent especially when dry, nerves 3, diverging from base, stipulate. Petiole 1-6 cm. Flowers monoecious, clustered (in verticillasters) around axis leaving certain gaps, white. Fruits unknown.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : SUMATRA, JAVA, TAIWAN, PHILIPPINES to MICRONESIA & HAWAII.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimen : INDIA : Great Nicobar Island; humid forest of Laful, D.K. Hore 7588 (PBL).

Notes : According to Hore (*l.c.*) : The genus is recorded from India for the first time.

In evergreen damp forested ravines at low altitude; rare.

Daphne composita (L.f.) Gilg (Thymelaeaceae) in Engler & Prantl., Pfl. Fam. 3 (6a) : 238. 1894; Gamble in J. Asiat. Soc. Bengal 75 (2) : 258. 1912; Hochr. in Candollea 2:443. 1925; Ding Hou in Fl. Malesiana 6(1) : 37. 1960; Back. & Bakh. f. Fl. Java 1:259. 1963; D. Basu in Bull. Bot. Surv. India 31 (1-4) : 132. 1989. *Scopalia composita* L.f. Suppl. 409. 1781; Meissn. in DC. Prodr. 14: 540. 1857; *Eriosolena montana* Bl. Bijdr. 651. 1826. *E.pendula* Bl. ex Lace in Not. Syst. 3: 101. 1914. *E. composita* van Tiegr. in Ann. Sc. Nat. Bot. 7: 196. 1893. *Daphne montana* Meissn. in Bot. Ges. Regensb. 3:284. 1814. *D. pendula* Bl. ex Lecomte, Not. Syst. 3:101. 1914 p.p.

Shrubs or small trees up to 10 m tall. Leaves chartaceous to sub-coriaceous, usually with brown hairs above and glaucous beneath, 10-16 cm × 3-5 cm, elliptic, oblong to lanceolate, acute, acuminate, nerves 9-14 pairs, distinct or faint, base attenuate; petiole 0.3-0.5 cm long. Inflorescence axillary, solitary or 2 in one point, 10-12 flowers. Involucral bracts 2, deciduous, ovate, oblong, 1-2 cm long, pubescent. Peduncle 2.5-6.5 cm long, thin. Flowers light yellow, fragrant, brown hairy. Perianth tube 3-6 mm long; lobes convolute, 2 longer, 2 shorter, ovate-oblong, 0.2 cm × 0.05 cm or 0.4 cm × 0.1 cm. Stamens 8, sessile or filament 1 mm; anther linear, 1-2 mm long. Ovary ellipsoid, 1-2 mm long, densely appressed hairy; style 2 mm long; stigma globose. Disc lobed. Fruits ellipsoid or ovoid, 10-15 mm × 5 mm, black or deep red.

Flowering : January-March.

Distribution known so far : BORNEO, MYANMAR, INDO-CHINA, MALAYSIA, INDONESIA (Sumatra, W. Java).

Additional report : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA: Arunachal Pradesh; Egar & Serpo 1700 m, Jan. 23, 1912. *Burkill* 36218 (CAL); Rungling Camp, 1400 m, Jan. 26, 1912, *Burkill* 36281 (CAL).

Notes : According to D. Basu (*l.c.*) : The species is new additions to Indian Flora. In rain forests. The leaves are used as cordage and durable hemp.

Dendrobium infundibulum Lindl. (Orchidaceae) in Jour. Linn. Soc. 3:16, 1859; Gard. Chron. 1194, 1862; Hook. f. Fl. Brit. Ind. 5. 721, 1890; S.K. Katakai & Panigrahi in Bull. Bot. Surv. India 5 (3 &4) : 243. 1963 (1964) ; H.B. Naithani in flowering P1. Ind Nep. Bhutan P.407. 1990.

Epiphytes; stem 20-30 cm long, internodes about 3-3.5 cm long, ribbed, sheaths covered with black deciduous hairs; leaves oblong, sessile, 8-10 × 2-2.3 cm; lower surface covered with scattered deciduous black hairs, base amplexicaul, tip notched; flowers very large in terminal or lateral racemes, white with golden or yellowish stripes on disc, about 8 cm in diam.; bracts about 1.3 cm long, upper-surface covered with black hairs; pedicels with ovary about 4 cm long, stout; sepals oblong-lanceolate, shortly acuminate, 5-7 -nerved, 4.7 -5 × 1.5 cm; petals broadly elliptic or orbicular, acute, 7-9-nerved, about 4.6 × 3 cm; mentum as long as the dorsal sepal, funnel-shaped, incurved; lip obovate-oblong, toothed, about 5 cm long and 3.6 cm, broad along the side-lobes, side-lobes rounded, incurved, midlobe quadrate, apiculate, shortly 2-lobed, white with golden stripes on disc; column short and stout; pollinia 4 free, oblong.

Flowering : April. *Fruiting* : September onwards.

Distribution known so far : MYANMAR.

Additional reports : INDIA: Assam, Mizoram, Nagaland, Lushai Hills.

Herbarium specimens : INDIA: Lushai Hills; *Mustafi* s.n.

Notes : New record for India.

Dendrobium parishii Reichb. f. (Orchidaceae) in Bot. Zeit. 21:237. 1863 et Xen. orchids 2. 140. t. 152. 1867. N.C. Deori & G.C. Das in Bull. Bot. Surv. India 18 (1-4) : 233. 1976 (1979); H.B. Naithani in Flowering Pl. Ind. Nep. Bhutan P. 407. 1990.

Stem stout, short, erect with scarious sheaths on old stem. Leaves generally 3, oblong-lanceolate, notched at apex. Flowers 1-3-nate on a short peduncle from leafless stem, rose-purple, 4-5 cm across; sepals unequal, dorsal sepal 2.5×1 cm apiculate 5 nerved; laterals acuminate, 5-nerved, 2.5×0.9 cm; petals broadly elliptic, acuminate, 2.3×1.1 cm, 7-nerved, 3-nerves prominent at base; lip 2.2×1.2 cm, shortly clawed with two maroon blotches, tomentose with purple veins, acute, apex recurved; column white, short; anther purple with appressed hairs, rostrate, 2-celled; pollinia 4, yellow, 2-each, bifid.

Flowering : Time not mentioned.

Distribution known so far : UPPER MYANMAR, TENASSERIM; MALAY; CHINA, Yunnan; THAILAND, LAOS, COMBODIA, ANNAM.

Additional reports : INDIA: Mizoram, Manipur, Nagaland.

Herbarium specimen : INDIA : Mizoram; Seling, Sukla 62855 (ASSAM).

Notes : According to Deori & Das (*l.c.*) Under cultivation in National Orchidarium, Shillong. The species is a new record for India.

Dendrobium plicatile Lindl. (Orchidaceae) Bot. Reg. Misc. 10. 1840; Seidenf. & Smitin. Orch. Thailand 186, f. 151, t. VI, 575. 1959; Holtt. Rev. Fl. Malaya, Orch. ed. 3:267. 1964; N.P. Balakr. & Chakr. in Bull. Bot. Surv. India 20 (1-4) : 83. 1978. *D. flabellatum* Reichb. f. Bonpl. 5:56. 1857; Holtt. Rev. Fl. Malaya, Orch. ed. 1:264. 1958.

Epiphytes; stems much branched, polynodal, creeping, ascending, 4-6 mm thick, rooting at nodes; pseudobulb terminal, stout, slightly flattened, 5.0-7.5 cm long, 0.8-1.5 cm thick, yellow-green. Leaves solitary on pseudobulb, broadly oblong-lanceolate to oblong-ovate, 9-18 cm long, 2.0-4.5 cm broad, thinly coriaceous. Flowers solitary in

the leaf axil at apex of pseudobulb, \pm 2.2 cm long, \pm 3 cm across, white to light creamy yellow; bracts 5-6, surrounding the pedicel, oblong, obtusely acuminate, \pm 1 cm long, \pm 4 mm wide; pedicels with ovary 1.0-1.5 cm long. Dorsal sepal free, oblong-lanceolate, acute, 1.5-2.0 cm long, 4-5 mm wide; lateral sepals obliquely oblong-lanceolate, acute, decurrent along foot forming a narrow conical mentum, \pm 2 cm long, \pm 5 mm wide. Petals narrow-lanceolate, 1.3-1.6 cm long, 3-4 mm wide, light cream-coloured. Lip 3-lobed, 2.0-2.4 cm long, creamy white with brownish red spots on short triangular side lobes; midlobe broadly obovate, plicate with much folded sides, widened gradually from base to broad apex, 2-fid at apex, 1.0-1.5 cm across; keels on the lip 3; lateral keels thick, undulate, wavy; median keel short straight. Column 0.8-1.0 cm long, 3-4 mm broad, 3-lobed at apex; foot \pm 6 mm long, \pm 2 mm wide, longitudinally grooved; operculum \pm 1.5 mm across; pollinia 4, \pm 1 mm long.

Flowering : March-July. *Fruiting* : July.

Distribution known so far : THAILAND, MALAYASIA, BORNEO, CELEBES and JAVA.

Additional report : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA : N. Andamans; Lamia Bay to Kalipur, Sea Level, Mar. 30, 1977, in Flower, *Balakrishnan* 5372 (PBL & CAL). Katchal Island; East Bay, May 4, 1975, in Flower, *Chakraborty* 2517 (PBL & CAL). Great Nicobar Island; Kopenheat, Sea Level, July 21, 1976, in Flower & Fruit *Balakrishnan* 3904 (PBL & CAL).

Note : New Record for India.

Dendrobium podagraria Hook. f. (Orchidaceae) in Fl. Brit. Ind. 5:728. 1890; S.K. Katakai & Panigrahi in Bull Bot. Surv. India 5 (3 & 4) : 243. 1963 (1964).

Epiphytes; roots fibrous; stem pseudobulbous in the lower part which is about 1.5 cm long, spindle-shaped, continuing upwards as a thin branched stem, 25-45 cm long, internodes 20-30 \times 2 mm.,

branched, terete; leaves elliptic-lanceolate, sessile, flat, apex rounded, glabrous, 9-11-nerved, about 45 × 5 mm, sheathed; sheaths covering the stem, about 2.2-4 cm long, persistent or deciduous, glabrous, strongly striated, slightly longer than the internodes, drying to ash-grey; flowers arising from a tubercle at the nodes of the leafless branches, 1-2 together, white, erect, about 1.5 cm in diam. ; bracts 2, ovate-lanceolate, about 3-4 mm long, concave, membranous, 4-6-nerved; pedicel about 1 cm long, straight; dorsal sepal lanceolate, about 5 × 1.5 mm with slightly wavy margin, 3-nerved, lateral sepals about 8 × 5 mm, broadest at the base with acute free ends, 6-nerved (7-nerved according to Hooker); petals narrow, 3-nerved; mentum about 8 mm long, straight or curved; lip as long as the lateral sepals or slightly shorter, obcordate, lateral lobes rounded, slightly emarginate, 5-6-nerved, mid-lobe shorter than lateral lobes, rounded, with a plate and an outgrowth in the sinus; column short; anther 2-celled with 4-free ovate-oblong pollinia; capsule not seen.

Flowering : August.

Distribution known so far : MYANMAR, Tenasserim.

Additional report : INDIA: Assam.

Herbarium specimen : INDIA: Assam; Kachar, D.F.O. , 22879.

Notes : The orchid is a new record for India.

Desmodium cephalotoides Craib (Papilionaceae) in Kew Bull. 1912: 150, 1912 & Fl. Siam. Enum. 1:405. 1928; R.M. Dutta & Babu in Bull. Bot. Surv. India 10 (3-4) : 270. 1968; H. B. Naithani in Flowering Pl. Ind. Nep. Bhutan P.115.1990. *Dendrolobium cephalotoides* (Craib) Schindl. Fedde repert. 20:279. 1924.

Erect, perennial, fruticose herbs or under-shrubs. Branches triquetrous, densely villous-pubescent with appressed, grey-silky hairs, slightly flexuous when young. Leaves alternate, stipulate, pinnately 3-foliolate, 8-15 (18) cm long; stipules, dry brown, caducous, lanceolate, sharply acute or acuminate, silky-hairy on the back, 1-1.2 cm long; petiole 3-quetrous, slightly grooved above, silky-pubescent, 2-3.5 (-4) cm long; leaflets shortly petioluled with 0.3-

0.5 cm long petiolules, stipellate; stipels persistent, linear, subulate, silky-hairy, 0.5-0.7 (-0.8) cm long; lamina elliptic-ovate to lanceolate-oblong, cuneate to acute or subrotundate at the base, slightly oblique at the base of lateral ones, sharply acuminate or subacute, mucronate at the apex, entire or undulate, chartaceous, glabrous at maturity on both surfaces except appressed-pilose nerves beneath and midrib above; nerves depressed above and raised beneath, lateral nerves subparallel to the midrib, 10-17 (-18) pairs, connected beneath by transverse nervules, 5-12 (-15) \times 2-5(-6) cm. Inflorescence axillary, solitary, peduncled, silky-villous or pubescent umbels, which often form terminal leaf less racemes or rarely panicles by the reduction of uppermost leaves; peduncles 3-quetrous, villous or pubescent with silky hairs, (0.5) 1-3.5 cm long. Flowers whitish, 1.2-1.3 cm long; pedicels unequal, slender, silky-pubescent, 0.4-5 (-0.6) cm long, bracts dry-brown, striated, deciduous, concave or not, ovate or oblong, abruptly acute or subacuminate, silky-hairy in the upper half on the back along the midrib and margins, 0.3-0.4 \times 0.1-0.12 (-0.15) cm; bracteoles elliptic-oblong, abruptly acute or sharply acute, concave, silky-hairy in the upper half on the back, 0.3-0.4 (-0.45) \times 0.18-0.2 cm; calyx campanulate, 0.55 (-0.06) cm long (incl. 0.25-0.03cm long tube), glabrous within and appressed-silky without, cleft to the middle, upper 2-teeth connate into ovate-triangular, abruptly acute, 0.25-0.3 cm long lobe, hairy on the back, lower middle lobe the longest, lanceolate acuminate, hairy (-0.45) cm long, lateral ones ovate-triangular, acute, 0.25-0.3 cm long; corolla white, 1.1-1.2 (-1.3) cm long; standard clawed, rounded to suborbicular, emarginate at the apex, wings clawed, oblanceolate to oblong, closely adhering to the Keels and as long as the Keels, Keels hatch-shaped, obtuse; stamens monodelphous, 1.2-1.3 cm long; anthers linear 0.08-0.1 cm long; ovary sessile, pilose especially along the sutures, 0.5-0.3 cm long, style linear, incurved at the apex, glabrous, 1.2-1.25 cm long, stigma capitate. Young pods 4-5 jointed, densely appressed-silky pubescent.

Flowering : June-July. *Fruiting* : August-October.

Distribution known so far : THAILAND, MYANMAR.

Additional reports : INDIA: Assam (S.) , Mizoram.

Herbarium specimens : INDIA : Mizoram ; Aizol, Lushai hills, Godfrey 509 CAL; Pardy 16 (CAL) ; Thalthlang to South Vanlaiphai, Dutta 34021 (ASSAM). MYANMAR : upper Burma : Shan, King's collector 645 (CAL); Abdul Huk s.n. (CAL); upper Chindwing District , J.H. Lace 4178 (CAL).

Notes : According to Dutta & Babu (*l.c.*) : *D. cephalotoides* Craib, a species hitherto known only from Thailand. *D. cephalotoides* Craib is closely allied to *D. triangulare* (Retz.) Merr., but readily distinguishable from the latter by the larger flowers, broader bracts and bracteoles and in the acuminate middle calyx teeth of the lower lip.

Specimens from Assam have much longer peduncles than those of Burma. The bracts and bracteoles in Burmese specimens are much longer and sharply acute than in Assam specimens. The longer peduncles of the umbels, racemose or paniculate inflorescences and shorter bracts and bracteoles in Assam specimens may prove to be good to recognise an infraspecific taxon, but there are several intermediates connecting these two forms of specimens. Further, the presence of solitary 4-foliolate leaf and paniculate inflorescence formed by the production of secondary umbels from the main peduncles in one of the specimens from Assam (Dutta 34021) may perhaps due to monstrosity rather than characters of the genotypic nature.

Some specimens of *Desmodium triangulare* (Retz.) Merr., from China (Yunnan, Sunnao Mts. , Henry 12107, 12107 A) have bracts very similar to those of *D. cephalotoides* Craib, but differ from the latter in having linear bracteoles. As such the differences between the two species further narrow down and the only reliable character appears to be the nature of bracteoles. Therefore, it seems that the *D. cephalotoides* Craib may well be recognised as a variety of *D. triangulare* (Retz.) Merr.

Desmodium ospriostreblum Choiv. (Papilionaceae) in Ann. Ist Bot. Roma 8: 428, 1908; Gillett *et al.* in Milne-Redhead *et* Polhill, Fl. Trop. E. Africa 475, 1971; B.M. Sharma in Ind. J. For. 13(3) ;

260.1990. *D. terminale* sensu Guill. et Perr. in Fl. Seneg, Tent. 1: 207, 1832 (non DC. 1825). *D. spirale* sensu Bak. in Fl. Trop. Africa 2 : 160. 1871 *pro parte* (non DC. 1825). *D. tortuosum* sensu Hepper in Fl. W.Trop. Africa, ed. 2, 1:585. 1958 *pro parte* (non DC. 1825).

Erect or ascending, 30-75 cm tall, weak annual herb; stem striate, uncinulate-pubescent; branches more or less angled, rather densely pubescent. Leaves pinnately 3-foliolate; petiole slender, uncinulate-puberulent and pubescent, 0.5-4 cm long; stipules lanceolate-attenuate, 2-6 mm long, rather dilated on the outer side at the base, uncinulate puberulent externally and beset on the margins with stiff, pointed hairs; stipules setaceous. Leaflets membranous, the terminal ovate to near rhombic from a cuneate-obtuse-rounded base, 2-7 × 1-3.5 cm, acute or obtuse, the laterals slightly oblique and similar to elliptic or almost orbiculate, 1.2-3.5 × 0.5-2.5 cm, all with both surfaces moderately uncinulate-puberulent and scattered with an inter-mixture of straight, tapering hairs; margins beset with long, tapering, rather stiff, pointed hairs; petiolules of the terminal leaflets uncinulate-puberulent, 0.4-1.5 cm long, of the laterals 0.5-2 mm long and densely long-haired. Flowers bluish or blue-yellow, 3-3.5 mm long, on 0.4-1.3 cm long, pedicels in racemose to racemose-paniculate, terminal and axillary, uncinulate-puberulent inflorescences. Calyx puberulent and hairy; upper two teeth connate to slightly short of their apices, the lowermost longest, slender and long attenuate. Standard obovate, retuse; winged short clawed and remotely auricled; keel-petals slightly exceeding the rest in length. Pods shortly stipitate, reticulate, uncinulate-pubescent, 10-30 × 3-5 mm, with both margins about equally indented; segments nearly rhombic, alternately revolute on the margins and progressively shorter downwards. Seed reniform, 2.5-3.25 × 1.5-2 mm, brown, smooth.

Flowering & Fruiting : August October.

Distribution known so far : CAPE VERDE IS. SENEGAL, SIERRA LEONE, GHANA, NIGERIA, ZAMBIA, ANNOBEN, ETHIOPIA, MALAWAI, RHODESIA.

Additional report : INDIA: Jammu.

Herbarium specimens : INDIA: Jammu; Ramnagar, C. 325 m,

B.M. Sharma 705: Panj Pir, C 325 m, *B.M. Sharma* 50230; 2 km short of Nāgrota, C-325 m, *B.M. Sharma* 50231. All vouchers specimens are deposited in the Regional Research Laboratory, Jammu.

Notes : According to Sharma (*l.c.*) : The leguminous genus *Desmodium* Desv., is reported to include 450 species in all (Airy Shaw, 1973) , out of which, according to Santapau & Henry (1973) 42 species are known to occur in India. Raizada (1976) has, however, since reported the introduced American species *D. tortuosum* (SW.) DC., as a new record for India while Bennet & Chandra (1982) have added *D. likabali* sp. nov. from Arunachal Pradesh. Although the species has not been reported from Pakistan (*c. f.* Ali, 1977) it is presumed (*D. ospriostreblum*) that it might well have escaped the attention of plant explorers in that country, as has also apparently been the case here. How and when it came to be introduced is hard to ascertain, but its uncinulate-haired fruits sticking readily to the skin and clothing of the passers by may explain its import through human agency.

D. ospriostreblum Choiv., is a much a component of the roadside forest flora about Jammu as any other common place herb and also involved considerable phytogeographical interest.

Dichapetalum platyphyllum Merr. (Dichapetalaceae) in Philipp. J. Sci. 30:401. 1926; Leenh. in Reinwardtia 4:81. 1956 & in Van Steenis, Fl. Males. 1, 5:310. 1957. Lakhmin & S. K. Srivast. in Ind. J. For. 15 (1) : 83-84. 1992.

A liana; branches terete, early glabrescent, dark brown, faintly ribbed, gland-dotted. Leaves simple, rather large, 9-17.5 × 2.4-9.2 cm, elliptic to broadly elliptic or oblong-elliptic, coriaceous, greyish green, glabrous, with scattered glands beneath, especially on the nerves and midrib, acuminate at apex with up to 1.2 cm long acumen, cuneate or slightly oblique at base, entire at margins; lateral nerves 5-7 pairs, curved, distinctly interarching at ca 0.5 cm behind the margins; petioles 0.1-0.5 cm long, minutely pubescent. Inflorescence distinctly stalked. Fruit solitary, 3-lobed, 2.5-3.0 × 2.8-3.0 cm, globose

with a distinct suture on each lobe, velvety-tomentose; stones rugose; stalk up to 1.2 cm long with persistent calyx. Seeds 3, one per locule, 1.5 × 0.8 cm, pear-shaped, violet-brown when dry.

Fruiting : September*.

Distribution known so far : MALAYSIA, PHILIPPINES.

Additional report : INDIA: Nicobar Islands.

Herbarium specimens : INDIA : South Nicobars; Great Nicobar, near Alexandra river bank, Sept. 21, 1980, *D.K. Hore* 7959 (PBL).

Notes : According to Lakhminarasimhan & Srivastava (*l.c.*): It occurs in inland forests and is closely related to *D. gelonioides* (Roxb.) Engl., from which it differs however, by its 3-merous fruits. *Dichapetalum* Thou., is represented by about 200 species in the world, of which most of them are local endemics to Africa. 3 taxa have so far been reported for India (Leenhouts in Van Steenis, 1957), of which 2 taxa, viz., *Dichapetalum gelonioides* (Roxb.) Engl. ssp. *andamanicum* (King) Leenh. and *D. timoriense* (DC.) Boerl., are known to occur in Andaman and Nicobar Islands (Vasudeva Rao, 1986).

Diodia teres Walter *sensu lato* (Rubiaceae) Steyermark in Mem. New York Bot. Garden 23:799 (1972); Ravi *et al.* in J. Bombay Nat. Hist. Soc. 86 (2) : 277-278.1989.

Annual erect to diffuse herb. Stem 4-angled, to 30 cm long, hirsute-hairy. Leaves sessile, linear-elliptic to lanceolate, up to 3.5 cm long and 1 cm broad with recurved scabrous margins, acute to acuminate apex ending in a stiff arista, broadly cuneate to round base, midrib prominently impressed above and raised below, veins 4-5, obscure above, slightly raised below, puberulous above and below, prominently so on the raised veins below with strigose hairs added on both sides and broad leaf base; stipular sheath more or less truncate at apex, strigose outside with 8 to 9 linear slender teeth up to 1 cm long, shortly hairy at the base, glabrous otherwise, interspersed with more or less club-shaped glandular hairs. Flowers 1 to 4 per axil, sessile. Sepals 4, short, subequal, triangular-acute,

scabrous on the margins, persistent. Corolla mauve, funnel-form, tube 4 to 5 mm long with a ring of short hairs at the base, glabrous otherwise on the inside, lobes 4, triangular-ovate, acute-apiculate at apex, 2 to 3 mm long, as broad as long or slightly less, puberulous on the outside with a few bristly hairs towards the tip. Stamens 4, inserted at the mouth of the tube, anthers short, 2-celled, filament as long as or shorter than the anther. Ovary 2 mm long, half as broad as long, shortly hairy towards the apex and glabrous towards the base, 2 celled, each cell with a single basal axile ovule; disc small and annular; style slender, about 4.5 mm long, bluntly tuberculate towards the apex; stigma capitate, 2-lobed, papillate. Fruit obovate to spherical with the persistent calyx teeth, 3.5 to 4 mm long, shortly hairy towards the apex, glabrous towards the base, splitting into 2 indehiscent cocci and falling at maturity from the leaf axil, seeds flattened-obovate, smooth, pale brown, concave on the ventral face with a longitudinal ridge, apically incurved.

Flowering & Fruiting : July*.

Distribution known so far : NEW WORLD, ANGOLA, SENEGAL and JAPAN.

Additional report : INDIA: Kerala.

Herbarium specimens : INDIA : Kerala; Quilon District, near the costal town of Quilon, Chathanoor, July 6, 1988, *Ravi* 2429 (A in K; B in CAL; C in MH; D in Sree Narayan College Herbarium, Quilon).

Notes : According to Ravi *et al.* (*l.c.*) : Detailed study of the vegetative and floral characters of the above plant revealed its distinctness from all the known Indian Rubiaceae genera. This plant was identified as *Diodia teres* Walter by the Royal Botanic Gardens, Kew. As none of the Indian Floras, past or present, deal with any species of *Diodia* L., the plant is a new record for the genus in India. According to Kew, *D. teres* is a New World species, so far reported outside the New World only from Angola, Senegal and Japan.

Diodia L. is closely allied to *Spermacoce* L. (in the broad sense) and *Richardia* L., in the general vegetative and floral characters, but is distinct from both in the mode of dehiscence of the fruit. While

the fruit is a schizocarp in both *Diodia* and *Richardia* splitting into 2 cocci the former and into more than 2 cocci in the latter the fruit is a variously dehiscent septicidal capsule in *Spermacoce*. The description made on the basis of study of fresh specimens. Recently T. U. A. Kunju, P. Mathew and S. D. Biju in Indian J. Forestry 13 (4) : 351 1990, mentioned the above plant with description and its occurrence in the district Ernakulam Kerala, TUA 2082 (CALI) [Samaddar].

Dioscorea laurifolia Wall. (Cat. 5111, 1830, nom. nud.) ex Hook. f. (Dioscoreaceae) Fl. Brit. Ind. 6: 293. 1892; Prain & Burk. in J. Asiat. Soc. Beng. II., 10: 39. 1914; Ridl. Fl. Mal. Pen. 4:319. 1924; Prain & Burk. in Ann. R. bot. Gdn. Calc. 14:222, t. 88, 1938; Burk. in Fl. Malesiana I. 4(3) : 323. 1951; Deb et S.K. Katakai in Bull. Bot. Surv. India 5(2) : 163. 1963. *D. oppositifolia* (non Linn.) Curtis in J. Str. Br. R. Asiat. Soc. 25: 149. 1894.

A climber twining to the right, branching; stem wiry, slightly ridged, sparsely prickly; prickles small, thickened at the base, bent downwards. Leaves opposite, petiolate, petiole up to 3.2 cm long, channelled dilated at both ends; lamina lanceolate to ovate-lanceolate about 7.6-10.5 × 2.9-3.6 cm, glabrous; apex acuminate, slightly bent, base slightly cuneate, 5-nerved with one pair submarginal, reticulate. Spikes about 3-4 cm long, 1 or 2 together in the leaf axils or at the ends of branches. Flowers about 1.5 mm in diam., sessile, buds slightly longer than globose; bracts deltoid acute, about 1.2 mm long. Tepals 6, in two whorls of 3 each, the outer ones larger, about 2 × 2 mm, incurved, mid-vein prominent, apex rounded, margin entire; the inner ones narrower about 1.5 mm long, incurved, apex blunt, margin entire. Stamens 6 attached to the prolonged torus; anthers 2-celled, basifixed, oblong, slightly longer than the filament, introrse; female flowers and fruits unknown.

*Flowering (Male) : July**

Distribution known so far : SINGAPORE, MALACCA, W. region of MALAY PENINSULA (excepting Kelantan, Pahang and Trengganu) and MYANMAR.

Additional reports: EASTERN INDIA : Arunachal Pradesh (NEFA), Naga hills (Probably).

Herbarium specimen : INDIA: Arunachal Pradesh (NEFA, Tirap Frontier Divison); Pungchow, 27°30' N & 96°E, July 7, 1961, (the above position is a tripartite junction of NEFA, Naga Hills and tuensang Agency and Burma) *Deb* 26589.

Notes : According to Deb & Katakai (*l.c.*): *Dioscorea laurifolia* Wall. ex Hook. f. Plate 1 is hitherto known to be a Malay Peninsular plant. It was originally named by Wallich on the basis of a specimen collected from Penang (Wall. Cat. 5111) and subsequently described by Hooker (F1. Brit. Ind. 6:293, 1892). The plant has since been recorded from Singapore, Malacca and other parts of the western region of Malay Peninsula. According to Prain and Burkill (Ann.R. bot. Gdn. Calc. 14:222 , 1938) the most northern locality definitely known is at 5°31' N. They, however, believed that the northern limits of this plant are not established. Now it proves the authenticity of prediction on the distribution of the species by the great authorities on the genus.

The specimen was collected from the plant growing at the slope of the hill in the outskirts of a patch of evergreen forest. It was found at two places at a short distance of about 1 km. According to Prain and Burkill, *Dioscorea laurifolia* Wall. ex Hook. f., in the Malay Peninsula is itself sometimes difficult to distinguish. They consider that it forms hybrids with associated species of the section *Enantiophyllum* and that the plants which present difficulties to the systematic botanists are hybrids of this kind. Probably, this accounts for the presence of short prickles on the branches.

It is likely to occur in Naga Hills, Tuensang Division and Burma.

Diospyros cauliflora Blume (Ebenaceae) in Bijdr. 668. 1825; Hiern in Trans. Camb. Phil. Soc. 12:234. 1873; Bakh. in Bull. Jard. Bot. Btzg. Ser. 3, 15:134. 1937; Backer & Bakh. f. F1. Java 2:187. 1965; Ng in Mal. Forest. 40:215. 1977 et Tree F1. Malaya 3:64, f. 2. 1978; Phengkklai in Thai For. Bull. 11:50; f. 25. 1978; Vasudeva Rao in J. Econ. Tax. Bot. 7 (3) : 629. (1985). *D. caliginosa* Ridley in Trans. Linn. Soc. Ser. 2,3:318. 1893 et F1.Mal. Pen. 2:295. 1925.

D. trunciflora Ridley in Jour. Str. Br. Roy. As. Soc. 57:67. 1910 et Fl. Mal. Pen. 2:295. 1923.

Small trees 3-7 m tall, \pm 70 cm girth b.h.; main trunk blackish grey and knotty, bark cracked, branches thin, terete, sparsely lenticellate, glabrescent. Leaves alternate, elliptic, lanceolate or obovate, rarely oblong, base attenuate or acute, apex, gradually acuminate, 12-40 cm long, 5-12 cm broad, thinly coriaceous, glabrous on maturity, blackish above, brown below; midrib sunken above, prominent and raised below, lateral nerves 12-18 on either side, inconspicuous above, prominent and well-raised below, distinctly arcuately anastomosing near margins; secondary veins scalariform, tertiary laxly reticulate, prominent especially below; petiole half-terete, flat or channelled above, appressed pubescent-glabrescent \pm 1 cm long. Fruits fasciculate on tubercles of trunk and old branches, borne on short, thick, bracteate pedicels; ovoid, ellipsoid or globose, apiculate or gradually narrowed to a beak apex, green and densely brown or red tomentose especially at apex when young, turning black, glabrescent, rugulose on drying, \pm 2 cm diam., \pm 2.5 cm long; fruiting calyx 4-lobed, \pm 1 cm wide, lobes strongly reflexed densely woolly tomentose, ovate, \pm 4 mm long. Seeds 4, ovate-oblong, flattened on two sides, convex on one side, \pm 1.5 cm long, \pm 1 cm broad; testa smooth, white; endosperm equal, radiately striate.

Fruiting : July-October*.

Distribution known so far : VIETNAM, THAILAND, MALAY PENINSULA, SUMATRA, JAVA, BALI, LAMBEK, BORNEO, PHILIPPINES, CELEBES, MOLUCCAS and NEW GUINEA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island; Jhau nallah, Oct. 30, 1984, Vasudeva Rao & T. Chakraborty 10261 (PBL) ; Cambell Bay Chengappa Bay, July 27, 1976, N.P. Balakrishnan 4042 (PBL); Galathea river bank, Oct. 17, 1979, D.K. Hore 7223 (PBL).

Notes : According to Vasudeva Rao (*l.c.*) : These specimens, including the recent one of the author with T. Chakraborty are in fruiting condition only, there is no difficulty in ascribing them to the correct species. The possession of apiculate, green (turning black

on maturity) fruits fasciculate on the (knotty) tubercles of trunks and old branches (cauliflorous) is characteristic to the species. This feature of the fruits with non-endospermous seeds and the other vegetative characters clearly establish the true identity of the species.

There is no earlier record of this species for the Andaman and Nicobar Islands. While treating this species for Thailand, Phengklai (1978, *op. cit. infra*) mentions India under the distribution of this species; the basis of this inclusion of India is not clear since this species is not recorded for India as far as it could be seen from the available literature.

Scattered in the inland forests, mostly near stream (Moist areas).

The fruits are reported to be eaten by the Shompen tribes in the Great Nicobar Island.

Vern. name : 'Kendu' (Ranchi).

Edgeworthia longipes Lace (Thymeliaceae) in Kew Bull. 380. 1914; D. Basu in Bull. Bot. Surv. India 31 (1-4): 132-135. 1989

Shrub or small tree ca 2-3 m high. Branches spreading, narrow, cylindrical, appressed hairy when young, provided with glabrous cortex, reddish-brown. Leaves 10-20 cm × 3-5 cm, alternate, sub-opposite, oblanceolate, membranous, pale green, acute or acuminate at apex, attenuated at base, petiole short, margin frequently recurved, 10-13 lateral nerves on both sides or upper conspicuous, lower slightly raised. Inflorescence multiflowered, densely crowded in a head, ca 4 cm in diam., bracts solitary, linear or in 2 bracteoles, deciduous. Flowers white, hairy, peduncle 6-10 cm long, curved, stout. Perianth tube 1.5-2 cm long, cylindrical, outer sericeous, golden yellow, linear inner glabrous; lobes 4, acute, acuminate, 5-6 mm long, stamens 8, biseriate; anthers 3-5 mm long, upper series partly exerted; ovary 1-celled, superior, sessile, apex dense hairy; style 1 mm long, glabrous; stigma linear.

Flowering : December-March.

Distribution known so far : MYANMAR.

Additional reports : INDIA: Mizoram, Arunachal Pradesh.

Herbarium specimens : INDIA: Mizoram; Mizo hills, Jan. 21, 1963, Deb 31087 (CAL). Arunachal Pradesh ; Lahit Camp, Jan. 4, 1970, Krishna 48798 (CAL). BURMA : Magok to Berrardamys, 1600 m, Oct, 25, 1912, Lace 6005 (Holotype CAL).

Notes : According to Basu (*l.c.*) : *E. longipes* can be distinguished from *E. gardeneri* by : branches red; peduncle 6-10 cm long, curved, bracts solitary, deciduous; flowers silvery-white, hairy outside, not fragrant; perianth tube linear, lobes twisted; ovary densely hairy at the apex. In contrast, *E. gardeneri* with branches yellow-brown; peduncle 1.5-5 cm long, bracts many; flowers golden yellow hairy outside, fragrant, perianth tube broad, lobes spreading, ovary densely hairy throughout. Disc present.

Elaeagnus griffithii Servett. (Elaeagnaceae) in Bull. de 1, Herb. Boissier (Ser.2) 8:385. 1908; *et* in Beihe. Bot. Centralb. (Abt.2) 25:69. 1909; D. Basu in J. Econ Tax. Bot. 7(3) : 655. (1985).

Evergreen straggling shrubs, branches slender, flexible, rusty, non spinous. Leaves 80-135 × 30-54 mm, membranous, elliptic, base roundish, apex long acuminate, not symmetrical, upperside glabrous, silvery or rusty beneath, 6-7 nerved, petioles 8-9 mm long, rusty, grooved. Flowers solitary in the axils of young leaves, appearing during autumn, campanulate, perigynous, silvery, rusty, pedicel 5 mm long, perianth tube 3 mm, lobes 5 × 6 mm, triangular densely scaly. Stamens 4, filaments 2 mm long, not curved. Styles erect, glabrous, filiform, disc gradually curved forming a saucer shaped structure. Fruits ellipsoid, rusty, pedicels increasing 18 mm.

Flowering : July-September. *Fruiting* : November- December.

Distribution known so far : BANGLADESH. (INDIA not described or mentioned though Collected).

Additional report : INDIA: Meghalaya.

Herbarium specimen : INDIA : Meghalaya ; Khasia hills, Griffith s.n. (DD). Presented by Dr. G. King in the year 1882.

Notes : According to D. Basu (*l.c.*) : Two sheets collected by

Griffith during his voyage to East Bengal, Assam in 1835-38 but remained unidentified in DD herbarium. These have been identified as *Elaeagnus griffithii* Serv., with the help of literature and matching with the type sheet. Though this taxon was collected 150 years ago from Assam, Khasia but has not so far been described or mentioned in any of the Indian Flora,

Type : 4383/1 (A&B) *Griffith* (K,DD).; endemic.

Elaeagnus kanaii Momiy. (Elaeagnaceae) in Momiyama & Hara in J.Jap. Bot. 48 (9) : 257-267. 1973; D. Basu & Malhotra in Bull. Bot. Surv India 26 (1&2) : 125-126. 1984 (1985).

Shrubs, branched, angular, 2mm diam., covered with silvery or dark brown scales when mature. Leaves 5.1 cm × 2.5 cm to 6.9 cm × 3.5 cm, large, evergreen, elliptic, ovate-elliptic, rarely obovate-elliptic, acuminate, base obtuse or acute, papery-membranous, dull yellow upper side, silvery beneath; petioles 8-16 mm, pale yellow, silvery, midrib elevated. Flowers in axillary clusters 1-3 in fascicle, green yellow, silvery glabrous, slightly drooping, calyx tube 3.5-4.5 mm long, 4-lobed, angular, 1.5 mm, hairy. Anthers 1.8 mm long, linear-oblong, serrated, apiculate, filament 0.5 mm long, erect, styles ca 8.5 mm long copious stellate hairy, stigma curved, ovary ellipsoid. Fruits 1.1-1.4 cm × 0.5-0.8 cm, ellipsoid, oblong or ovate, covered with silvery scales, yellow, pointed beaked. Nut oblong or ovate-oblong, tapering at both ends, yellow or brown, 8 ribbed, pedicels 1.2-2.2 cm long, slender, silvery.

Flowering & Fruiting : January-June*

Distribution known so far : NEPAL.

Additional report : INDIA: Uttar Pradesh.

Herbarium specimens : INDIA : Uttar Pradesh; Kumaon, Jipti, 2500 m., June 11, 1960; T.A. Rao 11779 (BSD) ; Blume Range, 1500 m, Jan. 11, 1915, Sambhunath & Joshi 10699 (DD).

Notes : According to D. Basu & Malhotra (l.c.): Two herbarium sheets (Nos. DD 10699 and BSD 11779) kept under *E. umbellata* Thunb. and *E. latifolia* Linn. , respectively. Both the specimens were

found exactly tally with the protologue and illustration, Fig. 4 of *E. kanaii* Momiyama (1973). This taxon is reported here for the first time from India.

It is distinguished from allied species — *E. umbellata* and *E. latifolia* by : not spinescent, flowers 1-3, fruit apiculate whereas both the later species are: spinescent; flowers 3-9; fruit not apiculate.

Both the specimens cited here are from Uttar Pradesh, Kumaon possibly bordering Nepal and there is every possibility of this species migrating from Nepal to India or vice-versa.

Elatostema longicaudatum Grierson & Long (Urticaceae) in Notes Roy. Bot. Gdn. Edinb. 40(1) : 131-133. 1892, with figures et F1. Bhutan 1 (1) : 118 1983; S.S. Jain & R. C. Gaur in Indian Forester 111 (9) : 742-744. 1985.

Erect glabrous undershrub, monoecious or dioecious, up to 1.5 m in height. Leaves alternate, distichous, assymetrical, elliptic, (9-) 14-25 × (2.5-) 4-8 cm, caudate-acuminate, acumens 2-5 cm long, remotely serrulate, leaf margin faintly and remotely serrulate in distal half on both sides, triple nerved at base, main nerves pinnately nerved, cystoliths visible on the under-surface as minute white dots and lines petiole 3-8 mm long; stipules deciduous, membranaceous, opposite at each node, oblong-lanceolate, 13-16 × 2-4 mm, subacute, or emarginate; rudimentary leaves small deciduous, ovate, acute or apiculate, 1-3.5 × 1 mm facing normal leaves at each node. Flowers sessile in dichotomously branched axillary inflorescence; male cymes up to 3 cm in diameter bracts elliptic-lanceolate ca 2 mm long, tepals 5, obovate-obtuse, 2-2.5 × 1.5 mm, stamens 5; female cymes 1.5-2.5 cm in diameter, bracts lanceolate ca 1.5 mm, perianth lobes 5, elliptic-ovate or obtuse 1 × 0.7 mm, midvein produced a little beyond apex, ovary ellipsoid, compressed. Fruit and ellipsoid achene ca 1 × 0.7 mm.

Flowering & Fruiting : April July*.

Distribution known so far : BHUTAN.

Additional reports : INDIA: Arunachal Pradesh; MYANMAR.

Herbarium specimens : INDIA : Arunachal Pradesh; Subansiri District, New Itanagar, Apr. 16, 1979, R. C. Gaur & S.S. Jain Ser. II, 291. (2 sheets) MYANMAR : Upper Chindwin District, Chindwin River above Hkanti, July 14, 1916, C.G. Rogers 1072.

Notes : According to Jain & Gaur (l.c.) : The genus *Elatostema* contains ca 200 species which are distributed in the tropics of the old world. India alone accounts for 32 species - mostly herbs, confined between 1320 and 4000 m of altitude in the Himalayas and also occurring in Khasi Hills extending southwards to Western Ghats.

E. longicaudatum Grierson & Long belongs to subgenus *Pellionia* of *Elatostema*. It comes closer to *E. heyneanum* (Wedd.) Hall. f. and *E. latifolium* (Bl.) Schroter but differs in having distally serrate leaf margin and deciduous stipules. It is, however, related up to some extent to *E. griffithianum* (Wedd.) Hall. f., but can easily be distinguished from it in having glabrous leaves with serrate margin, its markedly different nervation and almost sessile cymes.

Elytranthe albida (Blume) Blume (Loranthaceae) in Schult.Syst. veg., 7(2) : 1611. 1830; Danser in Blumea 2(2) : 43. 1936 et in Bull. Jard. Bot., Buitenzorg, ser. 3, 16 (1) : 15. 1938; Backer & Bakh. f. Fl. Java 2:70. 1965; K.M. Vaid & H. B. Naithani in Ind. J. For. 3(4) : 365-366. 1980; H.B.Naithani, in Flowering Pl. Ind. Nep. Bhutan p.370 1990. *Loranthus albidus* Bl. in Verh. Bat. Genootsch. 9:184. 1823; Hooker Fl. Brit. Ind. 5:222. 1886; King in J. As. Soc. Beng. 66(2): 98. 1897. *L. leucosiphon* Griff. Not. Pl. As. 4:623. 1854 et Ic. Pl. As. t.619-1, 621, 622, 623. 1854.

A shrub, widely branched, glabrous, stems sometimes 12 cm thick. Leaves orbicular-ovate to lanceolate, base cuneate-rounded, tip acuminate or obtuse, 6-14 × 2.5-8 cm; petiole up to 3 cm long. Spikes sometimes in the axils of the older leaves, mostly 1 or more on defoliated nodes, peduncled; flowers-pairs 1-3. Calyx tube 1-1.5 mm, limb campanulate, entire, 1.5-3.5 mm high. Corolla in adult buds 4-6.5 cm, upwards obscurely 6-keeled, yellowish white, usually marked with bluish dots; segments at first green, afterwards violet, at last red. Fruit broadly ellipsoid, about 3 mm long.

Flowering : November*.

Distribution known so far : MYANMAR, CHINA, MALAYA, INDONESIA, LAOS and THAILAND.

Additional reports : INDIA: Mizoram, Arunachal Pradesh.

Herbarium specimens : INDIA : Mizoram ; Champhai School, 1200 m, Nov.21, 1976, K.M. Vaid & H. B. Naithani, Ser. II. No. 301 (DD.)

Notes : According to Vaid & Naithani (*l.c.*): The plant parasitising on *Quercus griffithii* tree grows at Champhai, a picturesque township close to the India-Burma border.

It has been described by Hooker under Sect. VIII, Elytranthe in the Flora of British India as *Loranthus albidus* Bl., from Tenasserim, Malacca, Java, Sumatra and Borneo.

The dispersal of seeds of Loranthaceae is mainly effected through the agency of birds. Champhai being within the flight range of birds from across the neighbouring country of Burma, there is every possibility of range of distribution of *E. albida* having been thus extended westward into eastern India.

Eragrostis subsecunda (Lam.) Fourn. (Poaceae) Mexican Plants 2:118. 1886., Sreek. in J. Econ. Tax. Bot 14(3) :626.(1990).*Poa subsecunda* Lam. Tabl. Encycl. 1:184. 1791.

Perennials. Culms willowy, 20-80 cm long; nodes glabrous. Leaves lanceate or linear-lanceate, 1-15 × 0.1-0.3 cm, rounded at base. Sheaths slightly keeled. Ligules obscure. Panicles 3-25 cm long, lax, loosely spiculate, subsecound. Spikelets oblong-lanceate, 10-16 or more flowered, purplish-green. Lower glume lanceate, 1-2 × 0.5 mm, chartaceous, 1-nerved. Upper glume ovate-lanceate, 2-2.5 × 0.5-1 mm, chartaceous, 1-nerved. Lemmas broadly ovate, 2-2.5 × 1-1.5 mm, acute, chartaceous, 3-nerved. Paleas elliptic-lanceate or oblong lanceate, 1.5-2 × 1 mm, 2 keeled ciliate. Lodicules 2, obovate, c 0.1 mm long, wavy at apex, faintly 3-nerved. Stamens 3, anthers 0.25-0.5 mm long, violet. Ovary oblong, 0.25-0.5 mm long; styles c 0.5 mm long, white Grains ovate, 0.5-1 mm long.

Flowering & Fruiting : March- September.

Distribution known so far : CHINA, SRI LANKA, BANGLADESH.

Additional report : INDIA: Kerala.

Herbarium specimens : INDIA: Kerala; Alappuzha, Kumarakodi, Sept. 21, 1981, P.V. Sreekumar 70574, 70582; Pallana, June 25, 1980, P.V. Sreekumar 6646, Kollam, Neendakara, June 19, 1980, P.V.Sreekumar 67613.

Notes : According to Sreekumar (*l.c.*): The Genus *Eragrostis* Wolf comprises over 300 species (Willis, 1897) distributed all over the world, mainly in the tropical and subtropical regions, of which about 35 species occur in India including 25 in South India (Hooker 1896, Fischer 1934).

This species of the genus *Eragrostis* Wolf found along the banks of intruded backwaters and canals of Alappuzha and Kollam.

According to T.A. Cope and M. Lazarides (Pers. Comm.) this rare species was missed by N. L. Bor when he wrote his 'Grasses of Burma, Ceylon,' *India and Pakistan*. There are a few collections of this species from Sylhet, Mauflong, Chittagong and Sri Lanka deposited at Kew Herbarium. M. Lazarides (Pers. Comm.) says that the type specimen of this species is a collection from East China by Sonnerat, of which the holotype is in Herbarium Lamarck, at Paris and a photo is kept in Kew. Occurrence of this very rare grass in Kerala is of great phytogeographic interest.

Eriocaulon echinulatum Mart. (Eriocaulaceae) in Wall.P1. As. Rar. 3:29. 1832; Hook. f. Fl. Brit. Ind. 6:579. 1893; Fyson in Journ. Ind. Bot. Soc. 2:317. t. 47. 1921; Myrthong *et al.* in J. Bombay Nat. Hist. Soc. 80(3) : 667 - 668. Bhutan 1983 (1984); H.B.Naithani, Flowering Pl. Ind. Nep. & Bhutan P. 459. 1990.

Roots fibrous, tufted. Scapes 5-10 cm high, stout, striate, twisted, glabrous, hairy only below the head. Leaves radical, 2-3 × 0.2-0.4 cm, subulate, acute, with distinct cross nervules. Sheaths as long as leaves. Heads 4-6 mm across, straw-coloured, with distinct,

stellately radiating bracts. Receptacle villous. Involucral bracts lanceolate, ending in long aristate, glistening apex; floral bract longer than flowers, narrowed at base, abruptly narrowed to an elongate apex. Male flower : sepal 1, rounded or crenate; petals reduced to hairs or deformed; staminal column as long as sepals, slightly narrower towards villous base; stamens 6, at the top of the staminal column; anthers 2-celled, elliptic, black. Female flowers : sepals 2, falcately lanceolate, clawed, winged at the back, with serrate margin; petals 0 or reduced to hairs, partly concealing the ovary; ovary 3-celled, straw-coloured; style stout, 3-fid. Capsule triangular, truncate, membranous; seed elongate, with 5, pectinate, longitudinal ribs, and a black apical gland.

Flowering & Fruiting : August October.

Distribution known so far : MYANMAR, SOUTHERN CHINA and THAILAND.

Additional reports : INDIA: Meghalaya, Orissa.

Herbarium specimens : INDIA : Meghalaya; Balphakram wild life Sanctuary (Garo Hills), 150-200 m, Y. Kumar 5737 (NEHU-Shillong).

Notes : According to Myrthong *et al.* (*l.c.*) This is quite distinct from other species of the genus in having long, stellately aristate, glistening bracts, giving the head, a spiny appearance. Rare, in marshy, open grassland associated with *Eriocaulon alpestre*, *E.nepalense*, *Utricularia* spp., and grasses.

Hooker reported this species based on a collection of Wallich (Wall Cat. No. 6082) from Kalaben, Burma.

***Erycibe griffithii* Clarke (Convolvulaceae)** in Hook. f. Fl. Brit. Ind. 4:182. 1883; Ridl. Fl. Mal. Pen.2:447 1923 *pro parte*; Hoogland in Fl. Males. I. 4: 411. 1953; N.C. Nair in Bull. Bot. Surv. India 18 (1-4) : 232.1976 (1979).

Scandent shrub, branches greyish with small lenticels; leaves ovate to elliptic-obovate, rounded to oblique at base, shortly acuminate at apex, margins entire, 5-12 cm long, 3-7 cm broad, glabrous; lateral

nerves 6-8 pairs, interarching towards the margins; petioles strong, 1-2 cm long, \pm 2 mm thick, glabrous; flowers axillary, solitary or in 2-5 flowered, 1-2 cm long, thickly brown-hairy cymes; pedicels 2-5 mm long, \pm 1 mm thick with 1-2 short, ovate, pubescent bracts and with 2 ovate-triangular, \pm 2 mm across, hairy bracts just beneath the sepals; sepals 5, outer two orbicular, 2-3 mm across, pubescent outside, inner three orbicular-rhomboidal, \pm 3 mm long, \pm 4 mm broad, thickened and pubescent at middle outside, ciliate at margins; corolla tube short, \pm 2 mm long; lobes 5, clockwise twisted, obovate, 7-9 mm long, 5-6 mm broad; midpetaline bands ovate-triangular, 4-5 mm long, 3-4 mm broad, brown hairy; lobules 4-5 mm long, 2-3 mm broad, folded in the young flowers, the upper one thicker and concave, pale brownish yellow, glabrous; anthers 5, placed about 1 mm above the abase of corolla tube, retuse at apex, subretuse at base, \pm 1 mm across; ovary ovoid globose, glabrous, 1-2 mm across; stigma discoid, truncate at apex, more or less 5-ridged, 1-celled with 4 basal ovules; young fruits ellipsoid-globose, 2.0-2.5 cm long, 1.5 - 2.0 cm thick, greyish brown, scurfy.

Flowering : February-March. *Fruiting* : April.

Distribution known so far : LOWER MYANMAR, THAILAND, MALAY PENINSULA and VIETNAM.

Additional reports : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA : South Andaman Island ; Dhanikari, Mar. 27, 1976, in flower, *N. G. Nair* 3642 (PBL) ; Car Nicobar Island ; Arong, Feb. 27, 1976, in flower, *N.G. Nair* 3562 (PBL); *ibid.*, Apr. 25, 1976, in fruits, *N. G. Nair* 3718 (PBL).

Notes : According to Nair (*l.c.*): At low altitude, away from Sea in mixed forests of South Andaman and Car Nicobar Island.

Euphorbia agowensis Hochst. ex Boiss. (Euphorbiaceae) in DC. Prodr. 15 (2) : 70. 1862; Kumari & Subba Rao in Bull. Bot. Surv. India 15(1-2) : 126. 1973; H. B. Naithani, flowering Pl. Ind. Nep. Bhutan P. 376. 1990.

A perennial herb up to 143 cm high, base fruticose, twisted (old branches erect and rigid), grooved, dichotomous or trichotomous branching, internodes long. Leaves 2-8, $5 \times 0.6-2.5$ cm, puberulous when young, at length glabrous, lower leaves alternate, upper leaves opposite or ternate, oblong, lanceolate or obovate, acute, obtuse or emarginate, mucronate, entire or denticulate, base cuneate, shortly petioled; stipules glanduliformis. Cyathia terminal, turbinate, velvety externally and at throat, subsessile, subtended by 2 or 3 ovate or rotund leaves; glands 4 or 5, free, transversally oblong, subsessile, situated in between the cucullate and ciliate involucre lobes. Male flowers bracteolate; bracteoles lacerate, hairy; filaments hairy, thick, erect, jointed above the middle; anthers yellow, two celled, opening longitudinally. Female flowers pedicellate, stalk hairy; ovary hairy, trigonous; styles 3, hairy, free, bifid. Capsules trigonous separating into one seeded cocci from a persistent axis. Seeds 4 mm long, oblong, compressed, longitudinally 5 ridged, wrinkled, caruncle transversely oblong.

Flowering & Fruiting : July-November*.

Distribution known so far : ABYSSINIA, AGOW, 4000-5000 ft.; near Sea shore of Dhalac Island in Indian Ocean.

Additional reports : INDIA: Tamil Nadu, Andhra Pradesh.

Herbarium specimens : INDIA : Tamil Nadu ; Nilgiri District , on way from Anaikatty to Kutrapatii (850 m alt.) Nov. 24, 1970, Subbarao & Kumari 27800 (MH); Anaikatty to Kutrapatti (650 m alt.) , July 20, 1972, Subbarao 40591 (MH).

Notes : According to Kumari & Rao (l.c.): The plant is nearer to *Euphorbia geniculata* Ort., but can be differentiated by perennials, more than a metre high; leaves smaller, variable in shape, petioles short; cyathia velvety; glands 4-5 , transversely oblong, situated in between involucre lobes; seeds compressed, pale yellow wrinkled, in *E. geniculata*: Annuals, less than mt; leaves larger, obovate acute, petioles long, cyathia glabrous, gland one, seeds 3 mm long, ovate back, granulate.

Euphorbia leucocephala Lotsy (Euphorbiaceae) in Coult Bot. Gaz. 20:350. t.24. 1895; M.S. Binojkumar & N.P Balakr. in Ind. J. For. 15 (2) : 181-182. 1992.

Shrubs or small trees, up to 5 m high; stems branched, upper ones dichotomously branched, sub-terete, greyish in colour. Leaves opposite, elliptic to elliptic-oblong, entire, cuneate at base, acute to acute-apiculate at apex, 2.6-7 × 0.7-2 cm, pinnately veined; veins 14-16, covered with extremely few hairs on both sides, rather more along the midrib; older leaves turning red; petioles ca 2 cm long, hirsute; stipules small, triangular, deciduous; floral leaves white, showy, smaller in size, 1-2 × 0.5-1 cm. Cyathia terminal, solitary or in dichasial cymes; peduncles ca 3 mm long, hairy; involucre turbinate, ca 1.5 cm diameter, appressed with long white hairs; lobes triangular, laciniate; glands 5, broadly oblong, cup shaped, ca 1mm diam., limbs of glands oblong, oblong-lanceolate, obtuse, 3-3.5 mm long, ca 1 mm wide. Male florets : in 5 fascicles with 8-10 flowers in each ; pedicles ca 1 mm long, anthers subglobose, transversely dehiscent; bracteoles filiform, ca 1.5 mm long, peripheral ones laciniate, hairy. Female florets: gynophores ca 1.5 mm long, sparsely hairy, ovary subglobose, ca 1.5 mm diameter, obtusely keeled; styles 3, ca 1 mm long, each bifid from middle; stigmas simple. Capsules obtusely keeled, ca 5 mm diam., glabrous. Seeds quadrangular ca 5 mm long, ca 2 mm wide; coarsely bluntly tuberculate, pale black, with hyaline papilla.

Flowering & Fruiting : December-February.

Distribution known so far : Native of GUATEMALA.

Additional reports : INDIA (introduced) : Uttar Pradesh, West Bengal, Tamil Nadu.

Herbarium specimens : INDIA : Uttar Pradesh ; Dehra Dun, Balbir avenue, Dec. 20, 1972, 650 m, *Som Deva* 7193 (DD). West Bengal; Howrah, Indian Botanic Garden, Nov. 19, 1973, Ghosh & Murmu 481 (CAL) ; *ibid.* Nov. 24, 1973, *Ghosh & Murmu* 482 (CAL). Tamil Nadu; Ooty, Nov. 3, 1954, *Torne* s.n. (BSI) ; Coimbatore, Chidambaram Park, Dec. 2, 1989, *Binojkumar* 85088 (MH); Coimbatore Agricultural University Campus, Feb. 4, 1990, *Binojkumar* 85096 (MH).

Notes : According to Binojkumar & Balakrishnan (*l.c.*) : *Euphorbia systyla* Edgew reported by Gosh & Murmu (in *Geobios* 4:276. 1977) seems to be based on wrong identification. An examination of the material (Ghosh & Murmu 481 & 482) in CAL Herbarium confirmed that their specimens also belong to *E. leucocephala* Lotsy. This plant is seen to be one of the costly garden plants in southern India, propagation of this plant is rather difficult and is through stem cutting or root cuttings only. Inflorescence is remarkable for its numerous white bracts, which suggested the specific name *Leucocephala*. Other important features are that only a very few of the cyathia have female flowers and dried styles are persistent on top of the Capsule.

Mr. A. Radcliffe-Smith, Roy. Bot. Gard. Kew confirmed the identity & send the above protologue.

***Fagopyrum sagittatum* Gilib.** (Polygonaceae) *Exerc. Phyt.* 2:435 (1792); A. Loss. in *F1. USSR* 5:702 (1936); Munshi in *J. Econ. Tax. Bot.* 4(3) : 959. (1983). *F. fagopyrum* Karsten. *Deutsch. F1.* 522(1883). *Polygonum fagopyrum* L. *Sp. Pl.* 364(1753).

Annual, erect, simple, branched herbs, 30-40 cms long; stem angular, sulcate, pubescent; internodes long. Leaves petiolate; petiole 1-2 cms long; grooved, angles much pubescent; lamina triangular-cordate, acute or acuminate, more or less reniform, eciliate, pubescent on nerves, 1-2 cms long and 0.8-1.8 cms broad; ochrea tubular, slightly partite, along on sides pubescent at base, 0.4-0.5 cms long dark brown, nerved. Flowers mostly in axillary cymes; each flower 0.5-0.8 mm across, bracteate, pedicellate; bracte, ovate, acuminate, ciliate, 0.2 cm long and 1.5 mm broad; perianth segments more or less in whorls, segments elliptic, acute, 0.5-0.6 mm long and 0.3-0.4 mm broad, unequal, white; stamens 8, filaments short, equal or unequal; ovary 3-gonous, styles 3, long slightly connate below; stigma rounded or rarely capitate. Nut trigonous, much long exerted, rough dull, edges rounded, dark brown or black, 3.5-5 mm long and 0.2-0.3 cms broad. Pedicels 0.1-0.15 cm long.

Flowering & Fruiting : July-August*.

Distribution known so far : Central belt & Southern region of EUROPE, cultivated in NEW WORLD, described from ASIA.

Additional report : Throughout Northern Himalayas.

Herbarium specimens : INDIA : Northern Himalayas; Dras(Ladakh); A.H. Munshi 1741, 1742(KASH); Sumbal (Sindh Valley, Kashmir), A.H. Munshi 1646, 1647 (KASH); Zanskar (Ladakh) A.H. Munshi 2763 and 2763 (KASH).

Notes : According to A.H. Munshi (*l.c.*): This species can be distinguished from *F. esculentum* in having greenish white flowers, not abortive; nut dark brown, rough, edges not sharp and dull; whereas in *F. esculentum*, flowers are whitish pink, mostly abortive; nut light brown with zebra lines, smooth and with sharp edges. Cultivated crop, growing with *F. esculentum* Moerch.

Flowering, fruiting and distributional report are provided here from F1. USSR 5: 702 (1936) (Samaddar).

Farsetia heliophila Bunge ex Coss.(Brassicaceae), Comp. F1. Atl. 2:227. 1887;Bornm in Beih. Bot. Centrbl. 28. 104. 1911; Rechinger, F1.Iranica 57 : 136. 1968; Jafri in Nasir & Ali, F1. Pakistan 55 : llc, f. 12 C& D. 1973. Parmar in Bull. Bot. Surv. India 26. (1&2): 120. 1984.

Suffruticose, perennial undershrubs without woody base; branches strict, erect, rigid and wiry. Leaves linear to linear-lanceolate, usually not more than 20 × 2 mm, attenuated at the base, rotundate or obtuse at the apex. Racemes few-flowered, lax. Sepals 6-9 mm long. Petals 10-12 mm long, pale purple. Siliquae 25-30 × 2-2.8 mm, linear, compressed. Seeds uniseriate, nearly orbicular, 2-2.5 mm in diam. (including the wings).

Flowering & Fruiting : October-January.

Distribution known so far : IRAN, PAKISTAN.

Additional Report : INDIA: Rajasthan.

Herbarium specimen : INDIA : Rajasthan; Rai Singh Nagar, Ganga nagar, Roy 3886(BSJO).

Notes : According to Parmar (*l.c.*): Jafri (1957), in his studies on the genus *Farsetia* Turr., in Pakistan, India and Afghanistan merged *F. heliophila* Bunge ex. Coss., under *F. jacquemontii* Hook. f. & Thoms., but later (Jafri, 1973) in the Flora of West Pakistan (Brassicaceae) considered *F. heliophila* as a distinct species. Rechinger (1968) also treated it as a separate species. Rare, in sandy moist soil.

Ficus magnoliaefolia Blume (Moraceae) Bijdr. 448. 1825; D.K. Hore in Bull. Bot. Surv. India 26 (1&2) : 22. 1984 (1985).

Large tree; stem with milky juice. Leaves ovate-oblong or oblong-obovate, base rounded, acuminate, nerves 3 Figs. globose, 1-2 cm across.

Fruiting : March.*

Distribution known so far : JAVA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimen : INDIA : Great Nicobar Island; Valdora bay, Mar. 4, 1952, B.S. Chengappa 22946 (DD).

Notes : According to Hore (*l.c.*): Very near to *F.nervosa* Heyne. In evergreen forest; rare.

Gentiana argentea (D.Don) Royle ex Griseb. var. ***albescens*** Franch. ex Forbes et Hemsley (Gentianaceae) in J. Linn. Soc. Bot. 26(174) :124. 1890; S. Agrawal & U.C. Bhattach. in Bull. Bot. Surv. India 26(1-2) : 100. 1984. *Gentiana albescens* Franch. ex Kusn. in Acta Horti Petrop. 15(3) : 409.1904, *nom illegit.*, non Favre (1875). *Gentiana sorocula* sensu Nair in Bull. Bot. Surv. India 6(2-4); 151. 1964, non Burkill.

Annual erect, depressed, dense caespitose 0.1-7.5 cm tall herbs, usually greenish-silvery, often with purplish tinge. *Leaves* radical ovate or ovate-lanceolate, aristate, 0.8-2.2 cm long, 4-6 mm broad; cauline ovate or obovate, suberect-erect, 0.5-0.9 cm long, 3-6 mm

broad; margins cartilaginous, serrulate, upper ones involute. Flowers 5-merous blue, 0.6-1.2 cm long, terminal clustered or solitary-subsolitary, infundibuli form or subcampanulate. Calyx shorter or slightly longer than corolla; lobes lanceolate or ovate-oblong, aristate, erect, 4-6 mm long, 1-2 mm broad, cartilaginous, serrulate. Corolla lobes ovate, acute, 2-3 mm long, ca 2 mm broad. Capsule obovoid, spatulate, subsessile, crestate at apex, 4-5 mm long, 3-4 mm broad. Seeds brownish, numerous, oblong-trigonus, ca 1 mm in length.

Flowering & Fruiting : February- June; often September-October in Himachal Pradesh.

Distribution known so far : CHINA, AFGANISTHAN, TIBET.

Additional report : INDIA: Himachal Pradesh, Uttar Pradesh.

Herbarium specimens : INDIA : Himachal Pradesh ; Lahul Koksar, Sissoo, 3400 m, June 26, 1958, *Rau* 5909 (BSD); Spiti, Kunjum area, 3975 m, Sept. 7, 1961, *Nair* 16713 A (BSD); Kinnaur, Kalpa, Chini, 2775 m, June 3, 1962, *Nair* 22369 (BSD) ; Chini, 3450 m, June 4, 1962, *Nair* 22424B (BSD); Purbani slope below F.R.H., 2500 m, Oct. 7, 1971, *Janardhanan* 46522A (BSD); Baspa Valley, Chitkul hill slope, 4200 m, May 23, 1972, *Janardhanan* 47420 (BSD); Chitkul hill slope, above the village, 4200 m, May 23, 1972, *Janardhanan* 47406 (BSD); Rakcham near P.W.D., Rest House, May 20, 1972, *Janardhanan* 47342 (BSD); Uttar Pradesh, Chamoli Valley of Flowers, June 16, 1979, *Bhattacharyya* 66399 (BSD); Badrinath, 2500 m, June 20, 1979, *Bhattacharyya* 66462 (BSD); on way to Valley of Flowers, 3500 m, June 16, 1979, *Bhattacharyya* 66381 (BSD); Tehri Panwali, 3100 m, June 4, 1972, *Naithani* 48159 (BSD).

Notes: According to Agrawal & Bhattacharyy(l.c.): On dry rocky or grassy slopes; along water courses or on glacial moraines; 2500-4200 m altitude.

An interesting variety, hitherto unrecorded from India, small in alpine pastures these plants grow in patches, singly or 2-3 at a place, showing great variation in their habit. The plants are quite distinct from var. *argentea* proper due to their ovate-lanceolate, obovate or ovateoblong, erect, acuminate leaves and calyx lobes. Kusnezow (1904) described the taxon as a separate species *Gentiana albescens* Franch., ex Kusn., which happens to be a later homonym.

Sunita Agrawal et U.C. Bhattacharyya observed it to be a variety of *Gentiana argentea* (D. Don) Royle ex Griseb., as described by Forbes et Hemsley.

Forbes & Hemsley (1890) mentioned the distribution of the variety in China and Afghanistan eastward. But no specimen has been found in major Indian herbaria and from Jammu & Kashmir (India) which is in the east of Afghanistan. It is therefore, expected to occur in this state.

Named on the silvery shine of the foliage (but it is not a constant character).

Geranium carolinianum L. (Geraniaceae.) Sp.P1. 682.1753; Deam, Fl. Indiana 625. 1910 (repr. ed. 1970); Gleason, New Britton and Brown, 111. Fl. Northeast United States 2:458. 1968; Wiggins, Fl. Baja California 639. 1980; Martin & Hutchins, Fl. New Mexico 1: 1119. 1980; Sharma, Singhal & Kaur in J. Bombay Nat. Hist. Soc. 85 (1) : 247. 1988.

An annual herb with a slender tap root. Stems several from the base, 15-45 cm long, suberect at the base with spreading or ascending branches, densely patent or retrose-hispid or hirsute as are also the petioles, peduncles and pedicels, glandular on the upper parts especially in the inflorescence region. Radical leaves short-lived; cauline leaves numerous, petioles 1.2-10 cm long; blades 2-6 cm wide, reniform or orbicular-reniform in outline, thin, appressed hispid-hairy on both sides, divided three fourths to almost to the base into usually 5 (rarely 3 or 7), nearly equal cuneate lobes, lobes deeply divided and toothed at the apex with linear-oblong, subobtuse or obtuse segments; stipules 4-7 mm long, lanceolate, acuminate, thinly pubescent with ciliate margins. Peduncles 1-3 cm long, slender, 2-flowered, solitary axillary or loosely aggregated in terminal, 4-12-flowered, umbel-like clusters. Pedicels 0.5-1 cm long. Sepals 4-5 × 3-4.5 mm (excluding ± 1 mm long awn), enlarged and reddish-tipped in fruit, ovate or elliptic-ovate, 3-nerved, hirsute on the veins and margins without, glabrous within, petals ± 4.5 × 2 mm, cuneate with a small claw and three prominent veins, light pink

to whitish. Filament \pm 3.5 mm long, broadened in the lower half. Fruits 1.3-1.7 cm long (including 1-2 mm long stylar beak), densely gland-hispid. Mature carpel body 3-3.5 \times \pm 2 mm, ovoid, black, villous with ascending hairs. Seeds \pm 1.5 long, ellipsoid, dark brown, shallowly reticulate with elongate and irregular areoles.

Flowering & Fruiting : February- April.

Distribution known so far : NORTH AMERICA (Native).

Additional report : INDIA: Punjab.

Herbarium specimens ; INDIA : Punjab; Patiala, Modi Mandir, Baradari Gardens, M. Sharma 9689 & 14309, 12497 (PUN); Patiala, Ranjit Bagh, V.K. Singhal 12951 (PUN).

Notes : According to Sharma *et al.* (*l.c.*) : In general characteristics this species is close to another annual of the genus *Geranium* found in Punjab, namely *G. rotundifolium* Linn. However, in the latter taxon the fruiting pedicels are deflexed and petals distinctly exceed the sepals. On the other hand, in the present species fruiting pedicels are erect and petals are smaller than or hardly as long as sepals. In general appearance *G. carolinianum* is relatively more robust and has larger leaves in comparison to *G. rotundifolium*.

The species has not been reported earlier from India by Edgeworth & Hooker (1874) or in the subsequent compilatory lists of new records to Indian flora (Calder *et al.* 1926, Razi 1959, Nayar & Ramamurthy 1973, Ghosh & Dutta 1976, Ghosh 1977, 1979 and Nayar & Karthikeyan 1981). Apparently *G. carolinianum* Linn., is a new addition to the Indian flora

The plant appears to be an accidental introduction. The plants seem to have a preference for shade and grow in garden beds or along irrigation channels in the gardens.

Globba cernua Baker (Zingiberaceae) in Hook. f. Fl. Brit. India 6:205.1890; Ridl. J.S.B.R.A.S.32:99. 1891; Flora 4:240; Schum. in Pflanzenr. Zing. 4:46. 149. 1904; Holttum, Gard. Bull. 13:32. 1950; M. Sabu & Mangaly in J. Econ. Tax. Bot. 12 (2) : 478. (1988)

G. brachycarpa Baker, in Hook. f. Fl. Brit. India 6:205. 1890; Ridl. Flora 4:240. *G. macranthera* Ridl., Jour. F.M.S. Mus. 4:76. 1909; Flora 4.240.

Plants 30-60 cm tall, rhizome conical, small, 1x0.5 cm, light yellowish to grey inside, with many white, fusiform root tubers 4 x 0.5 cm, in size. Roots many, thick, fleshy. Stem slender, fleshy, slightly swollen near the rhizome; lower vegetative bracts purple, lower one third fused and upper two third open; solitary bulbils at each node, opposite to the attachment of the leaves. Leaves 6-8, upper surface glabrous, lower surface minutely pubescent; upper leaves larger, green, 15-20 x 4-5 cm, oblong lanceolate, tip acuminate, shortly petioled, 0.4 cm, ligulate, ligule short, membranous 0.2 cm, tripartite, minutely pubescent. Lower leaves smaller, ovate, 3 x 2 cm, upper surface green, lower surface purple. Inflorescence terminal, 8-10 cm, decurved, peduncle slender, green, short, bracts many, lax, spreading, persistent, glabrous; lower bracts green, large, c 1 x 0.8 cm, broadly ovate, smaller towards the apex, each subtending one or more spherical bulbils. Upper bracts fertile, smaller, c 0.6 x 0.6 cm; ovate, light orange, turning to light green when mature. Each bract subtends a cincinni of 4-5 flowers of small stalk, the lower ones 1 cm long to the first flower, bearing a succession of 4-5 flowers in two ranks on very short pedicels, altogether 3-4 cm long. Secondary bracts 0.3-0.6 x 0.2-0.4 cm, orange. Calyx truncate, 0.4-0.6 cm, shortly 3 lobed, lobes unequal, orange yellow glabrous. Corolla tube longer than the calyx, 1.5 cm long, hairy, recurved, orange. Corolla lobes ovate, cup shaped, 0.4 cm, glabrous. Staminodes longer than the corolla lobes, 1.2 x 0.3 cm, tip slightly curved upwards, orange, glabrous. Labellum 1.0-1.4 cm, triangular glabrous, with divergent lobes, which hardly reach the attachment of the petals, orange, with a reddish patch at the centre. Filament 2.5 cm long, up curved, anther small, the pollen sacs parallel bearing two spreading and somewhat divergent, narrowly triangular appendages on each side. Style long filiform, stigma cup shaped, slightly exerted from the anther lobes. Ovary 0.2 cm, rugose, unilocular with 3 parietal placentae, several ovules on each placenta. Epigynous gland one, linear 0.3 cm long. Fruit rare, rugose.

Flowering : August onward.

Distribution known so far : MALAYA PENINSULA.

Additional report : S. INDIA: Malabar.

Herbarium specimens : S. INDIA : Kerala; Palghat District, Chulliparamala, Aug. 5, 1972, *Sworupanandan* 214 (CALI) ; Calicut University Botanical Garden (Transplanted from Vagamon, Palai, Idukki District), Aug. 10, 1986, *Jose K. Mangaly* CU 37364 (CALI); Malappuram District, Nilambur, Oct. 28, 1986, *Lakshmana* K.301 (CALI).

Notes : According to Sabu & Mangaly (*l.c.*) : *Globba cernua* from Malaya Peninsula and *G.brachycarpa* from Perak were described by Baker (1890), and *G. macranthera* was described by Ridley (1909). Halttum (1950) included both *G.brachycarpa* Baker and *G. macranthera* Ridl., under *G.cernua* Baker and he described its distribution as "common on the Taiping Hills and the Main Range at c 2000-4000 feet and has also been collected in the lowlands of perak. Its southern limit appears to be G. Angsi and its northern limit Taiping". *Globba marantina* Linn., was also described from Malaya. Baker (1890) included *G. marantina* Wall. Cat. 6532 and *G. marantinoides* Wight Ic. Sub. t. 201 under *G. bulbifera* Roxb., and its distribution is described as "Eastern Himalaya and Tropical India, Malabar, the Malaya Peninsula and Ceylon." Burt and Smith (1983) included *G. bulbifera* Roxb., under *G. marantina* Linn. This species and *G.ophioglossa* Wt., is very common on the Western Ghats (Malabar) of South India. The inflorescence of *G. marantina* is c 10 cm long, bracts closely imbricating, 2-3 cm long, broadly ovate, those at the base of the spike subtending ovoid bulbils and remainder subtending few flowered cincinni.

Another species of *Globba* from Vagamon in Idukki District and Nilambur in Palghat District and it agrees with the description of *G. cernua* Linn.

Glochidion sumatranum Miq. (Euphorbiaceae) Fl.Ned. Indie, Suppl. 1, prodr. Florae sumatranae : 180,450.1861; Airy Shaw in

Kew Bull. 36:308.1981. *G. perakense* Hook.f. Fl. Brit. India 5:317; 1887. N.P. Balakr. & Chakrab. in Proc. Indian Acad. Sci. (Pl. Sci.) 92 (4) : 361-362. 1983.

Almost glabrous shrubs or trees up to 6 m tall; leaves glossy, ovate-oblong to ovate-lanceolate or elliptic to elliptic-lanceolate or elliptic-oblong or lanceolate, 6-11.5 (-17) cm long, 2-5 (-7.5) cm wide, acute to obtuse at base, entire at margins, acuminate to subacuminate at apex, firmly chartaceous; inflorescences shortly peduncled, supra-axillary; anthers 5-8, connate in an oblong to ellipsoid mass; ovary densely puberulous, capsules depressed-globose, not or scarcely lobed, puberulous, under 1 cm in diam., bearing the short persistent columnar style, with slender irregular ridges or lamellae on the surface, turning black on drying.

Flowering & Fruiting : February November.

Distribution known so far : S.E. ASIA, (through Malesia to N.Australia).

Additional report : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA: Andaman & Nicobar Island; Car Nicobar Island, Mus, June 8, 1974, *Nair* 1542, 1544 (PBL); Mus, Nov. 14, 1975, *Nair* 2879 (PBL); Passa, Mar.2, 1974, *Nair* 939, 946 (PBL) ; Sawai, June 4, 1975, *Nair* 2679 (PBL).

Notes : According to Balakrishnan & T. Chakrab. (*l.c.*) : Airy Shaw , 1976,1980: *G. sumatranum* is a highly polymorphic complex and is one of the most difficult groups in *Glochidion*. This plant is closely allied to *G. brunneum* and the Car Nicobar populations differ from the spp. *brunneum* (*e descr.*) in the depressed-globose capsules which tend to become more flattened; from ssp. *andamanicum* it differs in the relatively smaller leaves, acute to obtuse at base, supra-axillary, peduncled inflorescences, puberulous ovary and capsules and in the absence of the cup-chaped crown of the stylar column. The leaf margins of this plant curl upwards when dry, not as in the Siamese examples of *G. sumatranum* where the characteristic curling in the opposite direction (downwards) has been noted (Airy Shaw 1972). The styles (0.6-1.2 mm long) on the ovary may initially remain free at base with erect to somewhat connivent apical lobes

but ultimately the inconspicuous column gradually elongates, at least slightly and as a result the style assumes and perfect columnar shape, 1.2-1.5 mm in length, as evidenced in the fruiting stage when a basal connate portion can always be noted. *G. sumatranum* is fairly common on Car Nicobar Island in shrub or inland forests on sandy, rocky or clayey loam at sea level. It may eventually be found also on Great Nicobar Island.

***Goodyera macrantha* Maxim.** (Orchidaceae) in Fl. des. Serres. Ser. II 7:113. 1867-68; Ohwi, J.Fl. Japan 340. 1965 (English Ed.); A.S.Rao & Hajra in Indian Forester 102(3) : 197. 1976.

Terrestrial low, procumbent herbs 6.0-8.0 cm high, purplishgreen. Roots 3-4, short, slender; leaves 4-6 per plant, 2.0-4.0 × 1.5-3.0 cm, ovate acute, base rounded, pinkish-green beneath; white veined and deep green above; petioles 1.0-1.5 cm long, sheathing at base; inflorescence 2-3 flowered (rarely 5-flowered) pubescent, 3.0-5.0 cm long; bracts 1.0-2.0 cm long; broadly linear, pubescent. Flowers subsecund, 2.0-2.5 cm long, pinkish or pinkish-white, tubular, 1.8 cm across at mouth; sepals 2.0-2.5 cm long, 4 mm broad, 3-nerved, pinkish, ovate-acute to oblong-lanceolate, pubescent outside. Petals 2.0-2.5 cm long, 0.3-0.5 cm broad, 3-nerved, pinkish-white, ovate-lanceolate, falcate; lip 1.0-2.0 cm long; 0.5-0.6 cm broad at base, 0.3 cm at apex, sub-saccate at base; sac pubescent within, the limb elongate, lanceolate, sub-acute, tip recurved; column ca 1.0 cm long; pollinia obovate ca 0.5 cm long, narrow, lanceolate; ovary ca 1.2 cm long, purplish.

Flowering : June-July.

Distribution known so far : JAPAN.

Additional report : INDIA: Arunachal Pradesh.

Herbarium specimen : INDIA : Arunachal Pradesh ; Kameng, 2 km from Bomdila, an way to Selari, May 13, 1974, Hajra 54975 (ASSAM).

Notes : According to Rao & Hajra (*l.c.*) : The plant was in deep shade and heavy humus; out of 50 species of *Goodyera* 14 species

are reported from India and 2 from Sikkim Himalaya. The species is very near to *Goodyera hemsleyana* but differs from it in number and size of flowers in the spike and in the absence of a sharp tooth at each side of the mouth of lip. However it agrees with *G. macrantha* Maxim.

Gymnadenia camtschatica (Cham.) Miyabe & Kudo (Orchidaceae) in Ohwi Fl. Japan 322, 1965; Arora & Malhotra in Ind. J. For. 2(4) : 311-312, 1979. *Platanthera camtschatica* (Cham. & Schlechtend) Makino, Ill. Fl. Japan 702, 1948. *Orchis camtschatica* Cham., in Linnaea 3:27, 1828. *Habenaria tipuloides* Benth., in Journ. Linn. Soc. 18:35, 1881. *Platanthera tipuloides* Lindl. Gen. et. Sp. Orch. 285, 1835. *Orchis tipuloides* Linn. f. Suppl. 401, 1781.

Terrestrial orchids. Roots tuberous, slightly thickened at the base. Stems 20-50 cm long. Radical leaves single, obtuse, narrow at the base; cauline leaves 7-15 cm long, alternate elliptic to narrowly oblong, rounded at the apex or acute; the upper ones (1 or 2 leaves) small, broadly lanceolate, acuminate. Spikes 5-15 cm long, usually many flowered. Bracts lanceolate, acuminate, usually twice as long as the flowers. Flowers pink or pale rose. Sepals 5 mm long, 3-nerved, narrowly ovate, rather obtuse, subequal, fleshy. Lip broadly cuneate-ovate, slightly longer than the sepals, 3-lobed at the apex; laterals narrowly ovate, obtuse; apical rather short. Spur 2-5 mm long, much shorter than the ovary, narrow towards the obtuse apex. Rostellum narrowly grooved between the locules.

Flowering : August.

Distribution known so far : JAPAN (Kamtschatika); AMERICA (Attu Island).

Additional report : INDIA : (N.W. Himalaya).

Herbarium specimens : INDIA : N. W. Himalaya; Dafia Dhura forest, 2600 m, Aug. 28, 1973, C.M. Arora 50066; M. 24197; M. 24203 and M. 24204 (the last 3 specimens are deposited in DD).

Notes : According to Arora & Malhotra (*l.c.*) : In Pithoragarh District of E. Kumaon, this interesting, terrestrial orchid, in

decomposed humus, on grassy slope in shady places was collected. The critical study revealed it to be *Gymnadenia camtschatica* (Cham.) Miyabe & Kudo. The identity was further confirmed by studying the material from Japan and deposited in the Herbarium of the Forest Research Institute, Dehra Dun (DD). The present collection so far from its known localities of occurrence (Attu Island America and Kamtschatika Japan) is interesting and as far as known is not recorded from India. The specimens are deposited in the Herbarium of BSI, Dehra Dun, BSD.

There is an illustration of this species in Makino's Fl. Japan (*l.c.*) differing in foliage of the specimen discovered, but after consultation of recent literature it has been found to be within the range of foliar variability observed in this particular species.

A synonym of *Satyrum nepalense* Don. (Naithani, Flu. Pl. Ind. Nep. Bhutan P. 413).

Habenaria dentata (Sw.) Schltr. (Orchidaceae) in Fedde, Repert. Beih. IV. 125. 1919; Seidenfaden et (Tem) Smitinard in Orchids Thailand 1:39. t. 28, 29. 1959. Arora in Bull. Bot. Surv. India 14(1-4) : 155.1972 (1975). *Orchis dentata* Swartz in Act. Holm. 207. 1800. *Platanthera dentata* Lindl. Gen. et Sp. Orch. 296. 1836.

Terrestrial orchid. erect, 30-40 cm high, unbranched; root tuberous. Stem minutely grooved, glabrous. Leaves with sheathing petiole, elliptic lanceolate, many nerved, glabrous. Flowers terminal, milk-white, bracteate, 2-4 flowers on each plant, odourless; sepals subequal; petals much smaller than sepals, triangular. Lip with a long spur swollen at base, three lobed; side lobes rounded, margin dentate with open dichotomous venation; midlobe linear, slightly shorter than the side lobes, free nearly to the base. Anther adnate to the column. Pollinia pyriform.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : CHINA.

Additional report : INDIA : Western Himalaya (U.P.)

Herbarium specimen: INDIA : Western Himalaya : Kumaon, Bageshwar and Thal, Almorah District, 1150 m, Arora s.n.

Notes : According to Arora (l.c.) : *Habenaria dentata*-(Sw.) Schltr., a terrestrial orchid is being recorded for the first time from India. The orchid was found growing in a few small patches on the half decomposed humus in gullies and on grassy slopes under the partial shade of *Pinus roxburghii* Sarg.

A unique feature in this species is the venation of the lip where it is dichotomously branched and free at tips in the side lobes. A similar condition is also noticed in the sepals.

This species is said to be highly variable and according to Dr. G. Seidenfaden (personal communication) this name is used for quite a variable group of plants, and some day a specialist may be able to single out several different units. The plant differs in some respects from the more usual forms viz., its spur does not seem to be geniculate, and the upper part of the stem usually has a part with leaves reduced to sheaths. It has also been noticed by Dr. Summerhayes (according to Dr. M.P. Nayar, Keeper, Central National Herbarium, Calcutta) that a number of specimens in Kew Herbarium are abnormal.

Halodule uninervis (Forsk.) Aschers. (Zanthelliaceae) in Boiss., Fl. Orient. 5 : 24. 1882; D.K. Hore in Bull. Bot. Surv. India 26 (1 & 2) : 25. 1984 (1985). *Zostera uninervis* Forsk., Fl. Aegypt. Arab. 120 : 157. 1775.

Semiaquatic herb. Rhizome creeping through sand or coral reefs. Roots 1-6. Short, erect stem from each node. Leaves distichous, 2-3 leaves together from each node, 13-14 cm long and 4-6 mm wide, leaf blade linear, flat, gradually narrowed at base, tips tridentate, median tooth obtusely rounded, nerves inconspicuous; leaf sheath ca 3-4 cm long, flowers or fruits unknown.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : KUWAIT, SRI LANKA, THAILAND, INDONESIA, MALAY PENINSULA, VIETNAM, PHILIPPINES, JAPAN, WEST AUSTRALIA and NEW CALEDONIA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island ; Koshindon, Balakrishnan 4034 (PBL, CAL); Kopenheat submerged seashore, D.K. Hore 8215 (PBL).

Notes : According to Hore (*l.c.*) : Den Hartog (1970) though reported the species on the basis of the specimens *Prain's collector s.n.* (CAL) from Andaman in March 1899, it is untraceable in CAL.

Intertidal zone, rocky submerged sea shore or coral reefs, mud-banks or in shallow water; abundant.

Hedychium gomezianum Wall. (Zingiberaceae) in Kew Jour. Bot. 5:368. 1853; Baker in Hook. f. Fl. Brit. Ind. 6:228. 1892; Schum. in Engler Pflanzenr. Heft 20:55. 1904; S.C. Srivast. in Ind. J. For. 9 (1) : 85-86. 1986.

Herbs, terrestrial, ca 65 cm tall; stem ca 1.6 cm thick. Leaves subsessile or petiolate; petiole 0.2-0.4 cm long; ligules 0.8-1.1 cm long, ca 0.4 cm broad, ovate, obtuse, glabrous; lamina 20-30 cm long, 4-5 cm broad, elliptic, long acuminate, glabrous. Inflorescence ca 7.5 cm long, moderately dense spike, recurved; peduncle pubescent; bracts 1.0-1.5 cm long, ca 0.7 cm broad, lanceolate, acuminate, membranous, glabrous, convolute, 1-flowered; bracteoles ca 0.7 cm long, ca 0.5 cm broad, oblong, 1-tridentate apically, pubescent, connate at the base. Flowers 3.5-4.2 cm long, white; calyx ca 0.6 cm longer than the bracts, tridentate, pubescent at the apex only; corolla-tube ca 0.3-0.5 cm longer than the calyx, pubescent; corolla lobes 3, 1.0-1.2 cm long, ca 0.15 cm broad, linear, acute; staminodes 2, 0.6-0.8 cm long, ca 0.15 cm broad, linear, acute; lip ca 1.2 cm long, ca 0.5 cm broad, narrowly spatulate, cuneate, bipartite at apex; lobes elliptic, acuminate; sinus 0.3-0.5 cm deep; claw ca 0.2 cm long; stamen 1.3-1.5 cm long; anther ca 0.8 cm long, linear; ovary ca 0.3 cm long, ellipsoid, pubescent; style 3.3-4.1 cm long; stigma funnel shaped, villous.

Flowering : September.*

Distribution known so far : BURMA, Tavoy.

Additional report : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh; Bomdila, Tenga Valley, 1500 m, Sept. 14, 1964, *J. Joseph* 39929 (ASSAM); BURMA : Tavoy, *W.G. Gomez* Wall. Cat. No. 6543 (K, Photo CAL).

Notes : According to *Srivastava (l.c.)* : The species is closely allied to *H. griffithianum* Wall., but differs in its elliptic leaves, recurved inflorescence and 3.5-4.2 cm long and pure white flowers. Corolla tube 0.3-0.5 cm longer than the calyx, staminodes linear and lip bipartite.

Specimen deposited in ASSAM herbarium was found to be wrongly identified as *H. gracile* Roxb. The correct identity of the specimen significantly influenced its known distribution. So far the species was considered endemic to Burma but the present specimen, from Arunachal Pradesh, India, establishes its occurrence in India too.

The specific epithet "*gomezianum*" is derived after the name of collector *W. G. Gomez*.

Hetaeria oblongifolia (Blume) Blume (Orchidaceae) Coll. Orch. t. 32. 1858; Backer & Bakh.f. Fl. Java 3:271. 1968; Seidenf. in Dansk Bot. Ark. 32:96. f. 60. 1978; N.P. Balakr. & Chakr. in Bull. Bot. Surv. India 20 (1-4) : 83. 1978 (1979). *Etaeria oblongifolia* Bl. Bijdr. 410, t. 14. 1825. *H. helferi* Hook. f. Fl. Brit. Ind. 6:115. 1890.

Terrestrial herbs, 30-50 cm high; stem dark reddish-green, succulent, prostrate at base, ascending-erect above, 4-5 mm thick; internodes 2-3 cm long. Leaves spirally arranged, 7-9, patent, obliquely ovate-elliptic to ovate-lanceolate, obliquely acute at base, acute to short acuminate at apex, 6-10 cm long, 2.5-4.5 cm wide, shining, reddish-green, many-nerved; petiole sheathing at base, slender above, 2.5-3.0 cm long; sheathing base 1.2-1.5 cm long, reddish green, distinctly hyaline at oblique margins; slender upper portions 1.3-1.5 cm long. Inflorescence terminal, 20-30 cm long; scape 15-20 cm long; sterile bracts 3-4 on scape, linear-lanceolate, sheathing at base, acuminate at apex, 1.8-2.5 cm long, scarious; rachis 5-10

cm long, beset with more or less dense gland-tipped patent hairs; floral bracts linear-lanceolate, long-acuminate, ± 1 cm long, ± 2 mm wide, 1-nerved, sparsely glandular hairy outside, curved at base, erect above, reflexed at middle in old ones, persistent. Flowers many, omnilaterally arranged, opening acropetally, ± 5 mm long, ± 5 mm across, not opening fully, not resupinate; ovary with pedicel linear-ellipsoid, ± 7 mm long, ± 1.5 mm thick, erect, faintly grooved, beset with many patent gland-tipped hairs. Sepals greenish-yellow outside, pale yellow inside; dorsal sepal elliptic-obovate, subacute, 3-nerved, ± 5 mm long, ± 3.5 mm wide, sparsely gland-tipped hairy outside; lateral sepals obliquely elliptic sub-acute, 3-nerved, ± 6 mm long, ± 3 mm wide, beset with gland-tipped hairs outside; petals elliptic-obovate, obtuse, narrow at base, wavy at margin, ± 5 mm long, ± 3 mm wide, 3-nerved, whitish-yellow. Lip boat-shaped, shallowly saccate with incurved margins, with a longitudinal furrow at basal portion outside, narrowed to a subulate flat cusp at apex, ± 5 mm long, ± 3 mm wide in natural position, ± 5 mm wide when flattened out, inside with a prominent median ridge and 2 very narrow slender lateral ridges on either side, each lateral ridge at base with 2 or 3 fleshy slender terete simple or bifid soft appendages. Column ± 3 mm long, ± 2 mm wide, in front with 2 parallel obtusely protruding keels, in back with a pair of slender subulate processes; operculum double boat-shaped, broad and obtuse at base, narrow and blunt at apex, ± 2 mm long, ± 1.5 mm wide; pollinia 2, clavate, 2-fid, ± 1 mm long, divided into numerous lobules on a short narrow stipe ending in a small viscidium. Fruit ovoid-ellipsoid, ± 1 cm long, ± 7 mm thick.

Flowering : April.

Distribution known so far : THAILAND, MALAYA, JAVA, CELEBES; PHILIPPINES, NEW GUINEA and AUSTRALIA.

Additional report : INDIA: Nicobar Island.

Herbarium specimens ; INDIA : Katchal Island : Mildera, Apr. 30, 1977, Chakraborty 5572 (PBL,CAL).

Notes : New record for India. Plant (5572) is with flower.

Hiptage candicans Hook. f. (Malpighiaceae) in F1. Brit. Ind. 1:419. 1874; R.C.Srivast. in J.Econ. Tax. Bot. 4 (3) : 939. (1983).

Small trees; branches densely flavid-tomentose. Leaves lanceolate-ovate, elliptic-lanceolate or ovate-oblong, 6-9.5 × 1.5-5 cm, bases acute or obtuse, apices acute or shortly acuminate, coriaceous, young ones densely flavid-tomentose on both the surfaces, adult ones glabrous above; petioles tomentose, ca 5 mm long, racemes 9-14 cm long; pedicels 14-17 mm long; bracts lanceolate-ovate, 3-4 mm long; bracteoles lanceolate, 2-2.5 mm long. Flowers white, 2-3 cm across; floral buds sub-globose-ovoid, 0.75-1 × 0.6-0.8 cm; sepals ovate, 5-6 mm long and ca 2 mm wide; glands ovoid, ca 3 × 0.25 mm, decurrent on pedicels; petals flavate, fimbriate, ca 1 cm in diam; filaments ca 11 mm long, anthers ovoid, 1-2 mm; styles circinate, 1.5 cm long. Samaras pilose, median wings lanceolate or oblanceolate-oblong, 2.5-4 × 6-14 mm, lateral wings ovate, 6-14 × 5-11 mm.

Flowering & Fruiting : March-May.

Distribution known so far : BURMA.

Additional report : INDIA : Nagaland.

Herbarium specimens ; INDIA: Nagaland; Shugnu, Jagormani 476 (DD). BURMA : Bank below Yenagheem, Wallich 9020 (K-Wall.) (Microfiche CAL!).

Notes : According to Srivastava (*l.c.*): Specimens in FRI herbarium, Dehra Dun (DD), identified as *Hiptage cadicans* Hook. f., a perusal of the relevant literature (Hooker 1874, Calder *et al.* 1926, Niedenzu 1928, Blatter 1930, Razi 1959, Nayar and Ramamurthy 1973, Nayar and Karthikeyan 1981) has revealed that this species has not been reported so far from India.

Homalomena nutans Hook. f. (Araceae) in F1. Brit. India 6: 535. 1893; D.K.Hore in Bull. Bot. Surv. India 26 (1&2) : 22. 1984 (1985).

Terrestrial herb, ca 30 cm. Rhizome as small as a little finger, elongated rooting. Lamina 12-15 × 6-7 cm, elliptic, acuminate, nerves inconspicuous, glossy green. Petiole arises from base, ca 15-16 cm long, little slender. Spathe plae pinkish.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : MALAYSIA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island ; Galathea river bank forest. *D.K.Hore* 6787 (PBL) ; 36 km, North South Road, *N.G.Nair* 7150 (PBL).

Notes : According to *Hore (l.c.)* : Dense Humid forest along the stream course; uncommon.

Hyptis capitata Jacq.(Lamiaceae) Icon. Pl. Rar. 1:11.t.114. 1781-86; Benth. In DC Prod. 12:106. 1848; Mukerjee, Rec. Bot. Surv. India 14:63. 1940; Senaratna, Ceylon Jour. Sci. Sect. A. 12:163. 1945; Back. and Bakh. f. Fl. Java 2:634. 1965; Keng. Fl. Males. 1.8: 369. 1978; Cramer, Rev. Handb. Fl. Ceyl. 3: 156.1981; Sivar. *et al.* in J. Econ. Tax. Bot. 7 (1) : 224 (1985).

Perennial undershrubs; about 2 m tall; profusely branched, stem 4-angled, shallowly furrowed on the sides, puberulous with a hollow pith; leaves up to 15 × 8 cm, upper ones smaller, ovate or elliptic, narrowed and decurrent on the petiole, acute at apex, crenate-serrate, hairy on both surfaces, more profusely when young, petiole to 5 cm long, heads globose in the upper axils 1.5-2 cm in diameter, long-peduncled, peduncle 4-5 cm long, each head subtended by a whorl of 4-6 , oblong, acute, scaberulous bracts long ciliate on margins at base; calyx tubular, tube 1-1.5 mm long, 10-nerved and prominently reticulate in fruits, hirsute at apex, teeth small; corolla white, 4.5 mm long, tube infundibular, sparsely villous outside towards the mouth; limb two lipped, resupinate, upper lip 2-lobed, lower of 3, saccate, the middle lobe deflexed; stamens 4, didynamous, slightly exerted, anther cells confluent; style glabrous, stigma shortly bifid; nutlets 4, ovoid-oblong, 1 × 0.8 mm, subtrigonal, reddish brown, shining, areola on the basal side white.

Flowering & Fruiting : December-March.

Distribution known so far : Native of TROPICAL AMERICA, naturalised in various parts of TROPICS, JAVA, CEYLON, MALAYSIA.

Additional report : INDIA: Kerala.

Herbarium specimen : INDIA : Kerala ; Malappuram District Calicut Univ. Campus, Sivarajan 38344 (CALI).

Notes : According to Sivarajan *et al.* (*l.c.*) : This bushy shrub with long-peduncled capitate inflorescence and minute flowers from waste places near Calicut University Campus in Malappuram district. This species was subsequently seen growing along roadsides and waste places, in Ernakulam city and suburbs also. This species is hitherto not recorded from India and its rare occurrence probably suggests that it is of very recent introduction to this part of the world and possible from Ceylon.

A decoction of the leaves is said to be used for cleansing wounds and against amenorrhoea by the people of Malesia. The dried heads and peduncles are used for interior decoration (Keng, *l.c.*). Seen in growing along roadsides and waste places.

Illicium cambodianum Hance (Illiciaceae) in Journ. Bot. 14:240. 1876; Smith in *Sergentia* 7 (1) : 45. 1947; Subba Rao & Kumari in Bull. Bot. Surv. India 6(1) : 105. 1964 (1965).

Tree, young branchlets rugose, subterete, or slightly angled. Leaves pseudovercillate in clusters of 3-5 at distal nodes, petioles about 5-12 mm long, leaf blades subcoriaceous, olivaceous to brown and slightly paler beneath when dry, obovate-elliptic, 8-12.5 × 3-4.5 cm cuspidate, acuminate, margins entire and slightly recurved, costa lightly impressed above, prominent beneath, secondary nerves 6-10 per side, elevated above, anastomosing near margin, elevated to faintly prominulous beneath. Flowers pink, axillary of subterminal, solitary apparently bracteate, bracts caducous, pedicels 5-10 mm, stouter than petioles, rugulose, ebracteolate; perianth segments 7, outer ones obscurely ciliolate, larger and thin coriaceous, broadly ovate and rounded at apex, inner ones carnose, smaller obovate, eciliate. Stamens 15, uniseriate, 2-3 mm long; filaments carnose, ligulate, broad at base, anthers oblong, almost equal in length to filaments, the connective truncate, the thecae subprotuberant, dehiscing lengthwise; carpels 12-13, free, in a single whorl, 5 mm long, erect, narrowed into a rather slender style, stigmatic on the ventral side, ovule one. Fruits follicular, mature ones 12-13, free,

gradually attenuate in to an apex, aromatic (even dry ones), dehiscence ventral.

Flowering & Fruiting : June.*

Distribution known so far : Southern INDO-CHINA, Southern BURMA.

Additional report : INDIA : Arunachal Pradesh (NEFA).

Herbarium specimen : INDIA : Arunachal Pradesh; Ziro to Begi, Subansiri Frontier Division, June 11, 1961, *Subbarao* 24988.

Notes : According to Rao & Kumari (*l.c.*). The number of floral parts given here in the description though vary in some cases from those of Smith (1947) they are in order when the observations made by Smith (*l.c.*) at the end of the description for *Illicium cambodianum* Hance and the characters given by Hutchinson (1959) for the family Illiciaceae are taken into consideration. Smith (*l.c.*) writes that, "these differences in number of parts are normal for species of *Illicium*".

The is a common plant in Subansiri Frontier Division. It is distributed in Southern Indo-China and Southern Burma where altitudes of 900 m and 1050 m are recorded for this plant.

Impatiens aganantha Hook.f.(Balsaminaceae) in *Rec. Bot. Surv. India* 5:16, 21.1905; L.K.Ghora & Ghora in *Bull. Bot. Surv. India* 27(1-4) : 239. 1985 (1987).

Erect herbs : branches slender, glabrous. Leaves 2-3.5 x 0.8-1 cm, ovate, cuneate, acuminate, margin crenate with bristles in the notch, glabrous on both surfaces, pale beneath, exstipulate, veins 4-5 pairs; petiole 1-2 mm long, slender. inflorescence a raceme, 5 cm long, very slender, usually terminal, glabrous : pedicels 8 mm long, filiform, glabrous. Flowers 6-8 mm long, bracteate. Bracts 1 or 2, each 2 x 1 mm, lanceolate, glabrous. Sepals 3, lateral sepals 2.2 x 1 mm, oblong, aristate; lower sepal obliquely navicular, 3-4 mm long, 3-4 mm deep, constricted into a narrow curved spur 3-4 mm long. Petals 5, reddish-white, dorsal petal 3 x 2.5 mm, obovate; lateral united petals 6-7 mm long with a short narrow

appendage. Stamens 5, filaments 2 mm long, petaloid, glabrous. Carpel 2 mm long; ovary glabrous. Fruit a capsule, 8-10 mm long, clavate, glabrous, seeds many.

Flowering & Fruiting : July-August.

Distribution known so far : TIBET, Chumbi.

Additional report : INDIA: Sikkim.

Herbarium specimens : TIBET: Chumbi, Lingmoo Tongo, July 31, 1884, *Dr. King's Collector* 145 (CAL-Acc. No.72162, photo CAL). INDIA: Sikkim; Gnatong, 3648-3952 m, Aug. 16, 1910, *W.W. Smith* 4320 (CAL) ; Yeumthang, Sept. 6, 1911, *Ribu & Rhomoo* 5423 (K in the Kew neg. Card no. 1159-CAL).

Notes : According to L.K. Ghora & C. Ghora (*l.c.*) J.D. Hooker (1874) recorded 96 species of the genus *Impatiens* L. (Balsaminaceae) from the Indian region in his *Flora of British India*. He treated many new Eastern Himalayan species in a short descriptive key in his epitome (1905) of the British Indian species of *Impatiens* L. One of them is *I. aganantha* Hook. f., based on a collection from Tibet, Chumbi valley at Lingmoo Tongo by King's Collector in 1884. Subsequently, another collection of W.W. Smith from Gnatong, Sikkim deposited in CAL was also identified to be the same species showing its extension of distribution to India. Hooker treated the plant only in a brief Key.

Impatiens scitula Hook. f. (Balsaminaceae) in *Rec. Bot. Surv. India* 4:14. 18.1905 ; L.K. Ghora & Maiti in *Bull. Bot. Surv. India* 22(1-4) : 191. 1980 (1982).

Herb, succulent, somewhat swollen at the nodes, glabrous. Leaves elliptic to ovate lanceolate, 2-3 × 1.0-1.5 cm, acute, crenate, with bristles in the notches; secondary veins 3-4 pairs with faint reticulations, whitish beneath; petiole slender, 2-9 mm long. Inflorescence a raceme; peduncles both axillary and subterminal, slender, 1.0-1.7 cm long, simple or 2-pedicelled; pedicels filiform, 0.8-1.5 cm long, bracteate; bracts 1 or 2, ca 2.0-1.5 mm. Flowers 3.0-3.5 cm long. Sepals 4, the outer sepals ovate to ovate-lanceolate, 4-5 × 2-3 mm, acuminate, entire with a slightly cordate base, the

posterior one saccate, suddenly narrowed into the incurved spur. Petals 5; standard ovate, 5-8 × ca 5 mm, acute, entire; base cordate; wings with broad lateral lobes, 2.5-3.0 cm long, distal lobe loriform with caudate base. Stamens 5; filaments dilated, 4-5 mm long. Carpels 5; ovary linear-oblong, on a cup-like disc at the base; style absent; stigma 5-lobed. Capsule (immature) linear, 1.0-1.7 cm long. Seeds many.

Flowering & Fruiting : September-October.

Distribution known so far : TIBET (Chumbi).

Additional report : INDIA: West Bengal.

Herbarium specimens : TIBET : Tibet, 1882, King's collector s.n. (3 gatherings). INDIA : West Bengal ; Darjeeling, Tongloo 3300 m, Oct. 11, 1876, G. King 3076; Tongloo North, 3071 m, Sept. 11, 1962, B. Safui 1604 (2 gatherings) [CAL].

Note : According to Ghora & Maiti (*l.c.*) : Hooker (1905) in his epitome of the British Indian species of *Impatiens* L., treated several new Eastern Himalayan species with only a key to them. One of these is *I. scitula* Hook. f., based on a collection from Tibet, Chumbi valley gathered by King's Collector in 1882. Subsequently, other collections of G. King and B. Safui from Tongloo, Darjeeling, West Bengal are identifiable to this species showing its extension of distribution to India—A new record for India.

Indorouchera griffithiana (Planch.) Hall. f. (Linaceae) in Beih. Bot. Centralbl. 39 (2) : 50. 1923 ; D.K. Hore in Bull. Bot. Surv. India 26 (1&2) : 21. 1984 (1985). *Roucheria griffithiana* Planch. in Hook. Lond. J. Bot. 6 : 143. 1847 et 7 : 527. 1848; Hook. f. Fl. Brit. Ind. 1 : 414. 1874.

Subscandent large shrub to woody lianas, spreading over the canopy of the trees on which it climbs. Branches alternate with woody, revolute hook like tendrils at base of the side branches, perfectly glabrous. Leaves alternate, lanceolate, caudate, acuminate, glossy green. Flowers axillary fascicled, condensed, yellow, fragrant, pentamerous. Petals caducous. Young fruits greenish-white but become orange-red when mature.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : JAVA , MALAYSIA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island ; 6 km, East West Road, Balakrishnan 2963 (PBL, CAL); Galathea river bank, N.G. Nair 7142 (PBL); Laful Forest, D.K. Hore 7770 (PBL).

Notes: According to Hore (*l.c.*) : An ornamental liana with beautiful dazzling yellow, fragrant flowers. A plant suitable for introduction into gardens.

In mixed or dense inland hilly forest, rocky loam; few or scarce.

Ischaemum lacii Stapf ex Bor (Poaceae) in Kew Bull. 1950 : 187 (1950) ; Sur in J. Bombay Nat. Hist. Soc. 82 (1):242-243. 1985.

Perennial grass, culms up to 120 cm long, erect. Leaves usually 7-17 cm long, 15 cm wide, elliptical, multi-nerved, middle nerve prominent, pubescent at both sides, more in lower surface; ligule 5 mm long, oblong. Racemes 2, 7 cm long. Sessile and pedicelled spikelet jointed, rhachis fragile. Sessile spikelet 8 mm long; lower involucral glume 7-8 mm long, ovate-lanceolate apex marginate, middle part densely pilose multi-nerved. Upper involucral glume 3-10.5 mm long, lanceolate acute, 3 nerved, minute awned, awn 2.5 mm long. Lower floret male; lemma up to 7 mm long elliptical, hyaline, 3 nerved, acute; stamens 3, anther 2 mm long; palea 5.5 mm long otherwise same as lemma, 2 nerved. Upper floret hermaphrodite; lemma up to 6.5 mm long, bidentate, 3-nerved, awned, awn up to 3 cm long, column 11 mm long; stamens 3, anther 3-3.5 mm long; palea 4.5 mm long, linear lanceolate 2-nerved. Pedicelled spikelet-lower involucral glume 8 mm long, dorsal part pilose, awned. Upper involucral glume 7.5 mm long, upper lemma similar to sessile spikelet, awned, awn 11 mm long.

Flowering : November February.

Distribution known so far : BURMA.

Additional report : INDIA: Meghalaya.

Herbarium specimens: INDIA : Meghalaya ; Shillong, Khasia, 4000 ft., *J.D. Hooker & T. Thomson* (CAL) ; Shillong, Barapani, *M.P.Guha* 43 (CAL).

Notes : According to *Sur (l.c.)* : *Ischaemum lacci* Stapf ex Bor belong to subfamily Panicoideae, tribe Andropogoneae and subtribe Ischaemineae. This species was described by Bor in *Kew Bull.* 1950, 187 (1950). This grass has not so far been reported from India. Bor (1960), has mentioned its distribution in Burma, where it seems to be endemic.

Katherinea navicularis N.P. Balakr. & S. Chowdhury (Orchidaceae) in *Bull. Bot. Surv. India* 8 (1-4) : 316. 1966; N.C.Deori & G.C.Das in *Bull. Bot. Surv. India* 18 (1-4) : 235. 1976 (1979).

Epiphyte. Rhizome 3-4 mm thick, much branched, covered with many imbricate scarious tubular sheaths. Sheaths dull yellowish green to pale brown, drying to greyish-brown. Pseudobulbs uninodal, diphyllous, 2.0-6.5 cm apart, narrowly ellipsoid-oblong, terete, smooth, glossy, pale yellowish-green, 3.5-4.0 cm long, 1.0-1.5 cm thick; covered with 3-4 tightly imbricating, scarious bracts. Bracts greenish-yellow to brownish-yellow, often plicate, the uppermost reaching the apex of the pseudobulb, rarely to the base of leaf-blade. Leaves, opposite, at the apex of pseudobulb, persistent, elliptic-oblong, narrowed at base, subobtuse, emarginate at apex with subequal obtuse lobes, thinly coriaceous, 1-nerved, 3.5-8.5 cm long, 1.5-2.5 cm broad; petiole 5-7 mm long, grooved, pale yellowish-green. Raceme solitary, terminal, arising from the apex of pseudobulb; peduncle \pm 1 cm long. Bract elliptic-ovate, subacute, scarious, pale greenish-yellow, many-nerved, shortly tubular at base, \pm 2.2 cm long, \pm 1 cm broad. Pedicel with ovary \pm 2.7 cm long, pale yellowish-green. Floral bract linear-lanceate, acuminate, pale green, \pm 9 mm long, \pm 2 mm broad, scarious, 1 nerved. Flower solitary, dull purplish-brown, \pm 4 cm long, \pm 4.5 cm in diam. Dorsal sepal ovate-lanceate, acuminate, \pm 2.8 cm long, \pm 1 cm broad, upcurved, dull purplish-

brown outside, pale greenish-brown inside, 5-nerved. Lateral sepals attached to the foot of column, falcate-lanceate, acuminate, broader at base, ± 2.7 cm long, ± 1 cm broad at base, dull purplish-brown outside, pale greenish-brown inside, faintly 9-nerved, apex decurved, spreading. Petals linear-lanceate, subulate, acuminate, spreading, ± 2.9 cm long, ± 2 mm broad, dull yellowish-brown outside, pale yellowish-green inside, faintly 3-nerved. Lip ovate-acute in outline, distinctly trilobed, broadest at the lateral lobes, ± 1.8 cm long, ± 1.7 cm broad; side lobes incurved with overlapping upper margins touching each other forming a tube enclosing the column, ± 1 cm long, ± 6 mm broad, pale yellowish-white with dark purplish-brown at anterior margins; midlobe ovate, acuminate, narrowed at base, ± 1.3 cm long, ± 1 cm broad, dark purplish-brown; disc with 3 contiguous longitudinal parallel ridges running from base of lip to the base of midlobe, white, dark purplish brown in grooves; mentum ± 1 cm long, obtuse, rounded, white. Column ± 1.8 cm long, ± 3 mm broad, broadly winged with a short foot and a short mucronate apex; margins upturned, erect, ± 2 mm broad, forming a shallow concave boat-shaped cavity, continuous and broadest at the foot, with 2 deep yellow spots at the middle and a broad yellow spot at the apex of foot inside. Operculum broader than long, greenish-yellow, ± 2 mm long, ± 3 mm broad. Pollinia 4, oblong-pyriform, in pairs without any appendages.

Flowering : September October.

Distribution known so far : BHUTAN.

Additional report : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh : Kameng District, A.S. Rao 50643 (ASSAM). BHUTAN : Balakrishnan 43014 (A:Holotype CAL; B-G : Isotypes ASSAM).

Notes : According to Balakr., Chowdhury, Deori & Das (*l.c.*) : Under cultivation in National Orchidarium, Shillong, this is a new record for Indian flora. Scape solitary terminal.

The type specimen collected from near Narfong, on the road to Tashigang ($91^{\circ} 26' E$ & $27^{\circ} 7' N$), 1560 m, March 29, 1965, collected

in vegetative condition, flowered under cultivation at Shillong on Sept. 24, 1965, *Balakrishnan* 43014 (A : Holotype in CAL; B-G: Isotypes ASSAM); National Orchidarium Plant No. BHT. 2513.

Lepidium divaricatum Solander (Brassicaceae) in Aiton, Hort. Kew. 2:441. 1789; Thellung, Die gattung *Lepidium* (L.) R. Br. Eine Monographische studie Zurich : 146. 1906; Flora Europaea 1:330. 1964; U.C.Bhattach. & Majumdar in Bull. Bot. Surv. India 18 (1-4): 214. 1976 (1979).

Annual herb. Stem papillose. Basal leaves subpinnate. Upper leaves oblong-lanceolate, acute, dentate. Racemes terminal and axillary. Sepals 0.5-0.75 mm, petals 0.25-0.50 mm, style very short. Pedicels 2-4 mm in fruit. Fruiting racemes elongate. Silicula narrowly elliptic to narrowly ovate, 2-3 × 1.5-2 mm, apical notch shallow and narrow; septum lanceolate or oblanceolate, valvules boat-shaped. Seed ovoid, slightly compressed, about 1.25 × 0.7 mm, yellowish-brown.

Fruiting : August.*

Distribution known so far : SOUTH AFRICA, WESTERN EUROPE.

Additional report : INDIA: Western Himalaya.

Herbarium specimens : INDIA : Western Himalaya ; Lahul, Jispa, 3200 m, Aug. 14, 1970, *U.C. Bhattacharyya* 40793; *ibid.*, Koksar, 3100 m, Aug. 7, 1970, *U.C. Bhattacharyya* 40674.

Notes : : According to *Bhattacharyya & Majumdar (l.c.)* : The plant is apparently indistinguishable from *L. ruderale* L., but can be recognised under microscope by the papillose nature of the stem. Frequency and preponderance of the species in wild state indicates its complete naturalisation in Lahul, and this appears to be the first record of this species from the Himalayan region.

Introduced and naturalised in Western Europe.

Leucas zeylanica (L.) R.Br. var. *walkeri* (Benth.) Hook. f., (Lamiaceae) Fl. Brit. Ind. 4:689.1885; Trimen, Handb. Fl. Ceylon 3:387. 1895; Cramer in Revised Handb. Fl. Ceylon 3:184. 1981 ;

Kamble & M.S. Dawre in J. Econ. Tax. Bot. vol. 4(1): 317. (1983).
Leucas walkeri Benth. in DC. Prod. 12:531. 1848.

Annual; stem erect, 12-30 cm high, much branched, slender, branches diffuse, acutely 4-angular, hispidulous; internodes up to 6.5 cm long, densely villous-hirsute or with appressed, retrose hairs. Leaves suberect, linear to linear-lanceolate, 1.5-6.2 × 0.2-0.6 cm, tapering to base, sub-acute, entire or shallowly and distantly serrate, scabrid and with impressed nerves above, densely hirsutulous and glandular-punctate beneath; petioles 1-3 mm long; verticils rather dense; pedicels 0.5 mm long. Calyx tube 6-7 mm long, slightly curved, 10-11 nerved, mouth oblique, villous-annulate within, hairs exerted, white; teeth 10, sometimes 11, subulate, moderately long spinescent. Nutlets narrowly turbinate, trigonous, 2-2.5 × 1.5 mm, glabrous.

Flowering & Fruiting : September-December.*

Distribution : CEYLON.

Additional report : INDIA: Maharashtra.

Herbarium specimens : INDIA : Maharashtra; Tambe near Junnar, Pune District, Oct. 1965, *Hemadri* 106880 (BSI); Ghatang, Bhullari, Amaravati District, Sept., 1963, *R.S. Rao* 91951 (BSI); Sherewadi near Arhat, Pune District, Dec., 1960, *Janardhanan* 700020 (BSI).

Notes : According to Kamble & Dawre (*l.c.*) : Bentham (1848) in DC. Prodrumus described *Leucas walkeri* as a new species on the basis of Mrs. Walkers collections from Ceylon. Later Hook. f.(1885) described the same species as a variety *walkeri* Hook. f. of *Leucas zeylanica* (L.) R.Br., but without adequate description or illustration. In Flora of Ceylon, Cramer L.H.(1981) recorded this variety from other localities and described it as an endemic to Ceylon.

var. *walkeri* differs from var. *zeylanica* by : calyx teeth 10; mouth villous- annulate within; leaves up to 6 mm broad ; whereas in var. *zeylanica* calyx teeth are 7-8 ; mouth glabrous within ; leaves more than 6 mm broad.

Macroptilium atropurpureum (DC.) Urb. (Papilionaceae) Symb. Antill 9:452. 1982. Verdc. in Kew Bull. 24:517,1970 (in foot notes);

Subba Rao & Gopalan in J. Bombay Nat. Hist. Soc. 77 (2) :357. 1980; H.B.Naithani, Flowering Pl. Ind. Nep. Bhutan P. 122. 1990. *Phaseolus atropurpureus* DC. Prodr. 2 :395. 1825.

Slender creeping herbs; stem terete, obscurely striate, grey tomentose. Leaves alternate, trifoliate; petioles 1-5.2 cm long, tomentose; stipules 2-5 mm long, reflexed, narrowly deltoid, acute, tomentose, more so without. Leaflets ovate, terminal ones sometimes rhomboidal, 1.3-3.5 × 0.7-2.9 cm, lateral leaflets as long as terminal ones and broader, acute, apiculate, obscurely lobed, round or truncate at base, nerves prominent beneath, grey tomentose above and more so beneath; petiolules 2-5 mm long, tomentose; stipels minute, subulate, tomentose. Flowers in axillary racemes; peduncles 10.5-20.5 cm long, tomentose; bracts and bracteoles minute, tomentose, caducous. Calyx green tomentose, tube nearly as long as lobes; upper 3 lobes shorter than lower 2, narrowly deltoid acuminate. Corolla purple, up to 1.5 cm long; wing petals deeply coloured, longer than vexillum and keel; vexillum reflexed, keel incurved. Stamens 9+1, vexillary stamen free; style incurved at right angle, bearded on the adaxial side below the capitate stigma. Fruits nearly terete, beaked, up to 7 cm long, grey tomentose, valves twisting after dehiscence. Seeds dark brown, up to 3 mm long, more than 1 mm broad.

Flowering & Fruiting : August.

Distribution known so far : TROPICAL AMERICA; Cultivated in parts of AFRICA (KENYA, MALAWI, ZAMBIA, SOUTH AFRICA and ZIMBABWE) ; ASIA (HONGKONG) ; AUSTRALIA (QUEENSLAND, NEW S.WALES).

Additional reports : INDIA: Tamil Nadu; Maharashtra & Goa.

Herbarium specimen : INDIA : Tamil Nadu ; Coimbatore, Farm of Tamil Nadu Agricultural University, 487 m, Aug. 20, 1974, Marudan 39285.

Notes : According to Subba Rao & Gopalan (*l.c.*) : It was found growing in the fodder grass plot of Tamil Nadu Agricultural University, Coimbatore and probably came as an impurity with some other seeds. An allied species, *M. bracteatum* (Nees & Mart.) Verdc. is also found near Waltair in Andhra Pradesh.

The typical characters of the genus *Macroptilium* (Benth.) Urb. are squarish hooked style; wings rounded and longer than vexillum and keel; stipules not produced below the base.

Mallotus penangensis Mull. -Arg.(Euphorbiaceae) in *Linnaea* 34:186. 1865 & in DC. *Prodr.* 15 (2) :961. 1866; Hook. f. *F1. Brit. Ind.* 5:440. 1887; Pax & Hoffm. in *Engl. Pflanzenr.* IV. 147.VII : 201.1914; Ridley, *F1. Malay Penins.* 3: 293.1924; Whitmore, *Tree F1. Malaya* 2:116. 1973; Airy Shaw in *Kew Bull.Add.Ser.IV*:164.1975 & in *Kew Bull.* 36:328. 1981; Chakrab. in *J.Econ.Tax.Bot.* 5 (1) :217. (1984).

Tree up to 20 m high (once noted as scandent); branchlets glabrous; leaves opposite (exceedingly unequal, one of each pair being of normal size and shape, the other stipuliform and subtending as inflorescence), oblong to narrowly oblong or often elliptic-oblong, 5.5-26 cm long, 1.5-8 cm broad, acute, obtuse to rounded at base, entire at margins, acuminate to caudate-acuminate at apex, coriaceous, glabrous, dark brown when dry; secondary nerves 5-9 pairs; petioles 0.5-4 cm long; stipules narrow, acutely subulate, up to 10 mm long; male inflorescences many-flowered, 3-7 cm long, rachis puberulous; bracts deltoid, \pm 1 mm long; pedicels 2-3 mm long, puberulous; sepals 3, recurved, elliptic to broadly ovate-elliptic, 3-4.5 mm long, 1.7-3 mm broad, minutely adpressed pubescent outside; stamens 75-95; female inflorescences few-flowered, 4-11 cm long, rachis tomentellous and shortly scattered hirsute; bracts deltoid, \pm 1.5 mm long, acuminate; pedicels 3-7 mm long, tomentellous, sparsely setulose near apex; sepals 6, unequal, oblong to lanceolate, 2-4 mm long, 0.5-1.5 mm broad, coriaceous, ciliolate at margins, puberulous outside; ovary 4-5 mm diam., fulvous tomentellous, densely echinate; the processes narrow, \pm conical, with 3-6 apical and subapical setae; styles 3, shortly connate at base, 5-10 mm long, adpressed puberulous beneath, plumose-papillose above; capsules somewhat depressed, strongly 3-lobed, 14-15 mm diam., fulvous tomentellous, densely echinate and setose.

Flowering & Fruiting : January December.

Distribution known so far : MALAYA, BORNEO, SUMATRA, MOLUCAS, PHILIPPINES.

Additional report : INDIA: Andaman & Nicobar Islands.

Herbarium specimens : INDIA : Andaman Nicobar Island; Great Nicobar Island, 17 km on east-west road, Dec.2, 1975, P. Chakraborty 3234 (PBL); ± 30 km on east-west road, Dec.7, 1978, Nair 7198, 7200 (PBL) ; 35 km on east-west road, July 22, 1976 , Balakrishnan 3953 (PBL); 38 km on east-west road, Feb. 13, 1980, Dwivedi 7876 (PBL); Laful forest, May 6, 1980, Hore 7768 (PBL); way back from Laful Nov. 4, 1979, Hore 7744 (PBL).

Notes: According to Chakrab. (*l.c.*) : Fairly Common in inland forest on dense moist hill forest or dense mixed forest on clayey loam up to 175 m altitude.

Medinilla fuchsioides Gardn. (Melastomataceae) in Calc. J. Bombay Nat. Hist. Soc. 8 : 12. 1847; Thw. Enum. Pl.Zeyl. 106. 1859; C.B.Cl. in Hook. f. Fl.Brit. Ind. 2 : 548. 1879; Cogn. in DC. Monogr. Phan. 7 : 580. 1891; B.V.Shetty & Karth. in Bull. Bot. Surv. India 18 (1-4) : 215. 1976, (1979).

Shrubby; upper surface of leaves dark green, lower surface pale green, elliptic or elliptic lanceolate, sessile or subsessile, recurved at apex, usually 5-nerved, 3 nerves arising from base, 2-nerves a little above ; peduncle, pedicel and calyx red; 1-3 flowered, flowers 4-merous, corolla pinkish red; filaments yellow, anthers yellowish without, whitish within, style creamish.

Flowering : December*.

Distribution known so far : CEYLON (endemic).

Additional report : INDIA: Tamil Nadu.

Herbarium specimens : INDIA: Tamil Nadu; Kanyakumari District, Grassy slopes, beyond Kandakki Estate, Panagudi, 1210 m, Dec. 8, 1969, B.V. Shetty 33084.

Notes : According to Shetty & Karthikeyan (*l.c.*) : In Mahendragiri Hills and adjoining regions, Kanyakumari District, Tamil Nadu (77°29' 77° 31' East longitude and 8° 23'-8° 26' North latitude), this species of *Medinilla* in bloom was come across. On critical

examination it was found to be different from the other two species of the genus reported by Gamble in his *Flora of the Presidency of Madras viz.*, *M. beddomei* C.B.Cl. and *M. malabarica* Bedd. The material was, therefore, sent to the Central National Herbarium, Calcutta where it was identified as *M. fuchsoides* Gardn. This species has hitherto been regarded as endemic to Ceylon (C.B. Clarke in Hook. f. Fl. Brit. Ind. 2 : 548. 1879), and the present report is, thus, a new record for India. Description are taken mainly from field notes and differences from other species.

It is different from two other species of *M. malabarica* Bedd. & *M. beddomei* C.B.Cl. In *M. malabarica* Bedd., leaves are petiolate, 3-5 nerved, nerves almost from the base and in *M. beddomei* C. B. Clarke leaves are orbicular, 3 nerved, side nerves indistinct.

Growing from the crevices of rocks in humus soil and found clinging to the rocks.

Melochia nodiflora Swartz, (Sterculiaceae) Prodr. Veg. Ind. Occ. 97. 1768; C.A. Backer & R.C. Bakh. Fl. Java 1:405-406. 1963; Sreek. & N.C. Nair in J. Bombay Nat. Hist. Soc. 78 (2) : 424-425. 1981; H.B. Naithani, Flowering Pl. Ind. Nep. Bhutan p.67.1990.

Shrubs or undershrubs, 0.50-2.50 m tall. Stems woody, terete, much branched. Branches drooping, older ones with reddish tinge, stellately pubescent. Leaves broadly ovate or ovate-lanceolate, acuminate, cordate at base, margins sharply serrate. Petioles 0.2-3.5 cm long. Lamina 1-13 × 0.75-7 cm, sparsely pubescent on both surfaces, main nerves about 7-10 pairs. Stipules 5-6 × 2 mm, lanceolate, acuminate, ciliate. Flowers subsessile, indense 3-15 flowered axillary clusters. Bracts foliaceous, 6-9 × 3-4 mm, ovate-lanceolate, acuminate, hirsute. Calyx united + halfway, lobes imbricate in bud, equal, 2-3 × 1-1.5 mm, ovate-lanceolate, acuminate, sparsely pubescent, margins reddish. petals spatulate, macrescent, 3-4 × 1.5-2 mm, white with purple veins, veins prominent on, innerside, base conical, cream coloured and without veins, margins hyaline. Stamens 5. Filaments united almost up to the apex, ± 2.5 mm long, glabrous. Anthers 1 mm long, basifixed, extorse. Carpels 5, 3.5-4 mm. Ovary

sessile, hispid. Styles 5, free or slightly connate at base. Capsules sub-globose, 4 mm in diam., hispid, reddish when young, longitudinally 5-grooved, septicidally dehiscent. Seeds $\pm 2.5 \times 1.5$ mm, ovate, angular or 3 faced, brown with a white spot at the tip. Testa smooth, minutely reticulate.

Flowering & Fruiting : November- January*

Distribution known so far : TROPICAL AMERICA (native).

Additional reports : INDIA: Tamil Nadu, Kerala, W. Bengal & Bihar.

Herbarium specimens : INDIA : Kerala ; Trivandrum, Kariavattom, Nov. 8, 1979, along the streams, P. V. Sreekumar s.n. (MH). Tamil Nadu ; Coimbatore, on way to the millet breeding Station, Dec. 15, 1979, P.V.Sreekumar 58038 (MH) ; Coimbatore, near the Railway Station, Jan. 23, 1980, P.V. Sreekumar 58039 (MH).

Notes : According to Sreekumar & Nair (Lc) : The plant is a native of Tropical America. This may be a new introduction here and is rapidly spreading. It shows luxuriant growth near the margins of open drains, canals, pools and ditches where human disturbance is very minimum. The plant has also been located in open drier areas where the population is very sparse, and the plants are stunted. This species can easily be distinguished from the other two species of the genus represented in India namely *M. corchorifolia* L., and *M. umbellata* Stapf.

The species *M. nodiflora* Swartz is a shrub; flowers in axillary clusters; filaments united almost up to the tip; capsules subglobose; whereas *M. corchorifolia* L., is a herb; flowers in terminal clusters; filaments united half way or more, never to tip., capsule globose and *M. umbellata* Stapf being small trees; flowers are in umbellate corymbs; filaments united at the base and capsules oblong, the differences from each other become obvious.

Memecylon hookeri Thwaites (Melastomataceae) Enum. 113, 1859; Clarke in Hook. f.F1. Brit. Ind. 2 : 554. 1879; Cogniaux in DC. Mon. Phan. 7:1137. 1891; Trimen, Handb. F1. Ceylon 1:212.

1893; A.N. Henry & Subr. in Bull. Bot. Surv. India 13(12) : 165. 1971(1973).

Erect shrubs, 2-4 m tall, sparingly branched; bark grey, flaking off into small pieces; branchlets stout, strongly 4-angled with narrow wings on the angles. Leaves 20-40 × 6.5-14 cm, opposite, sessile or subsessile, lanceate, coriaceous, glabrous, acuminate at apex, cordate at base, penninerved, veins prominent beneath, lateral veins numerous, joining an intramarginal vein. Flowers 6-7 mm across, bluish-violet, clustered in axillary (also in axils of fallen leaves on old wood) branched cymes; peduncles 6-10 cm long, 4-angled with narrow wings on angles; pedicels 6-9 mm long, slender. Berries 9-10 mm across, globose, crowned by calyx-limb, blackish-purple when ripe.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : CEYLON.

Additional report : INDIA: S. India.

Herbarium specimen : INDIA : Tamil Nadu ; Tirunelveli District, Kannikatti, Henry 17365, E8407 (MH).

Notes : According to Henry & Subramanyam (*l.c.*) : Hitherto *M. hookeri* was regarded as endemic to Ceylon. The occurrence of this species at the southern end of the Western Ghats in India forms and extension of its distribution in India.

A remarkable species easily distinguishable from other *Memecylons* in having larger leaves and long pedunculate cymes. In the Ceylon specimens of this species represented in CAL and MH, the peduncles are very short or almost absent. Thwaites *loc. cit.* states "pedunculis brevibus vel subnullis" and Clarke *loc. cit.* reports "peduncle 0". Hence South Indian plant exhibiting the characteristic elongated peduncles may represent a new variety of *Memecylon hookeri* Thw. However, more studies should be made in order to check the constancy of this character in relation to differences in habitat and distribution.

Nertera sinensis Hemsl. (Rubiaceae) in Journ. Linn. Soc. 23:391. t. 10, 1888; Sastry & H. Deka in Bull. Bot. Surv. India 9 (1-4) : 285-286. 1967 (1968).

Small herbs in gregarious patches on wet rocks in stream, with erect leafy shoots and creeping stems rooting at nodes. Leaves shortly petiolate, 5-12 × 3-4 mm, oblong-lanceolate or elliptic-lanceolate, apex acute, base cuneate, the surfaces minutely lepidote. Flowers terminal, solitary, sessile, very small, ± 2 mm long and equally broad. Calyx a mere rim. Corolla rotate, 4-lobed; tube short, glabrous; lobes thick, obtuse, reflexed. Stamens 4, far exerted, filaments attached at the base of the tube. Styler lobes 4, divided nearly to the base, slender, minutely hispidulous, reflexed over the corolla lobes. Fruit an indehiscent globose berry ± 3 mm in diam., black on ripening; pyrenes 4, plano-convex, cartilagenous; embryo dark brown, plumule ovate, radicle spindle-shaped.

Flowering : May. *Fruiting* : November.

Distribution known so far : CHINA.

Additional report : INDIA: Arunachal Pradesh.

Herbarium specimens : INDIA : Arunachal Pradesh ; Subansiri District, Amjee, Nov. 13, 1964, A.R.K.Sastry 40568 (Fruit) and May 21, 1966, A.R.K. Sastry 45490 (Flower); Tirap District, Raho to Vokanoska Aug. 26, 1958, G. Panigrahi 16855 (Veg.) (ASSAM).

Notes : According to Sastry & Deka (*l.c.*) ; *Nertera* Banks et Sol. ex Gaertn., is a rubiaceous genus with known distribution limited to Australia, New Zealand and Formosa. Hemsley (1888) in describing his new species, *N. sinensis* was naturally surprised to record this genus in China and has remarked "This is an interesting addition to the chinese Flora, and an extension of the area of a genus of remarkable distribution."

The present discovery of this in Subansiri district, is an addition to the Indian Flora and extends the distribution of the genus and species further west, in the Eastern Himalayas, far from its type locality, Mt. Omei in Szechuen, China. This offers an example of an unusual link in the phytogeographical relationships of these regions. Rare locally.

Nervilia punctata (Blume) Makino (Orchidaceae) in Bot. Mag. Tokyo 16:199. 1902, *nom. tantum*; Schltr. in Engl. Bot. Jahrb. 45:402. 1911; Seidenf. & Smitin. Orch. Thailand 67, 1959; Holtt. Rev. Fl. Malaya, Orch. ed. 3:106. 1964; Backer & Bakh. f. Fl. Java. 3:261. 1968; Seidenf. in Dansk. Bot. Ark. 32: 151, f. 93. 1978; N.P. Balakr. & Chakr. in Bull Bot. Surv. India 20(1-4) : 84. 1978 (1979) *Pogonia punctata* Bl. Mus.Bot. Lugd. -Bat. 1:32. 1849 et Coll. Orch. Arch. Ind. 150, t. 48, 54. 1858. *Aplostellis punctata* (Bl.) Ridl. Fl. Mal.Pen. 4:204. 1924.

Terrestrial tuberous herbs, leaves and flowers rarely together, usually hysteroanthous. Leaves young, just appearing, arising from 2 sheaths, solitary, suborbicular, cordate at base, 7-plicate, 7-angled at nerve-endings, 4-5 cm long, 5-6 cm wide, 7-nerved, glabrous, green; lower sheath ovate, lanceolate, \pm 1.5 cm long; upper sheath lanceolate, bilobed at apex with acuminate lobes, \pm 3.5 cm long, light brown; petiole 2-3 cm long, terete, grooved on one side towards apex. Inflorescence 15-18 cm long, 1-flowered; peduncle slender, translucent whitish, 2-noded; sheath on lower node ovate-oblong, acuminate, \pm 1 cm long; sheath on upper node larger, linear-lanceolate, acuminate, 3-4 cm long, 5-nerved. Flowers terminal, solitary, subtended by a bract, pointing at about right angles to the scape or nodding when old; bracts oblong, acute, 6-8 mm long, 2-3 mm wide; pedicel \pm 1 mm long; ovary oblong-ovoid, 5-6 mm long, 2-3 mm thick, dull yellow. Sepals and petals spreading, slightly concave, pale yellowish green with a few scattered purplish spots inside, 3-nerved; sepals lanceolate, acuminate, \pm 2 cm long, \pm 4 mm wide; petals lanceolate, caudate acuminate at apex, \pm 1.5 cm long, \pm 4 mm wide. Lip horizontal, 3-lobed, embracing the column at base, the side lobes covering the sides of operculum, longitudinally keeled inside and on either side with 2 long minutely hairy ridges, 1.6-1.8 cm long, 6-7 mm wide at midlobe; lateral lobes ovate, acute, \pm 2 mm long, \pm 1.5 mm wide at base, slightly incurved and pointing towards tip of lip; midlobe horizontal, slightly curved at tip, oblong, subobtuse at apex, \pm 1 cm long, 6-7 mm wide, somewhat wavy at margin, white with light pink tinge and purple spots inside. Column clavate, thickened to top, \pm 6 mm long, obtuse; pollinia 2, furrowed, granulate, powdery, ecaudiculate.

Flowering : May.

Distribution known so far : THAILAND, MALAYSIA, JAVA, BORNEO and SUMATRA.

Additional report : INDIA: Nicobar Island.

Herbarium specimens : INDIA : Katchal Island; Mildera, May 4, 1977, *Chakraborty* 5601 (PBL & CAL).

Notes : New record for India. The plant *Chakraborty* 5601 is with flower.

Ochthocharis bornensis Blume (Melastomataceae) in Mus. Bot. Lugduno-Batavorum 1:40. 1849; Hansen & Wickens in Kew Bull. 36:16. 1981; Vasudeva Rao & Chakrab. in J. Econ. Tax. Bot. 6(2): 419. 1985.

Shrub \pm 1 m tall, young branchlets densely rusty pubescent, glabrescent. Leaves lamina ovate-lanceolate 9.5-13 \times 3-4.5 cm, rounded or occasionally subacute at base, serrulate, shortly acuminate at apex, membranaceous, glabrous above except for tuft of hairs at base, sparsely pubescent on the nerves beneath, trinerved; petiole 1.5-4 cm long. Inflorescences fasciculate, in the axils of fallen leaves, peduncle obscure. Flowers pentamerous, hypanthium campanulate, calyx rim-like with 5 minute projections on the outer side, petals ovate, acute, pinkish; stamens 8 or 10, equal, anthers oblong, connective ending in a small dorsal spur. Capsule subglobose, 5-6 mm diam., crowned by adpressed rim, brownish when dry, obscurely 5-lobed.

Flowering & Fruiting : November*

Distribution known so far : MALAY PENINSULA, COMBODIA, S. VIETNAM, SUMATRA, BORNEO; MOLUCCAS, NEW GUINEA, SOLOMON IS. (*testibus* Hansen & Wickens *l.c.*)

Additional report : INDIA: Great Nicobar Island.

Herbarium specimen : INDIA : Great Nicobar Island : Galathea river mouth, Nov. 28, 1978, *N.G. Nair* 7127 (PBL).

Notes : According to Rao & Chakrab. (*l.c.*). The genus is known to be represented by seven species, of which only *O. javanica* Bl. is recorded for India from the Andaman Islands (Hansen & Wickens.

1981). The present report of a second species of *Ochthocharis*, viz. *O. bornensis* Bl., from Great Nicobar Island is an addition to the Indian flora. The two species, *O. javanica* and *O. bornensis* differ in that the leaves are 3-plinerved and the transverse veins are hardly visible on lower surface in the former whereas in the latter the leaves are trinerved right from the base and the transverse veins are prominent beneath.

Hansen & Wickens *l.c.* being referred for detailed descriptions and figures in addition to above description of the plant.

Palaquium sukoei Fischer (Sapotaceae) in Bull. Misc. Inf. Kew 1933:365. 1933; van Royen in Blumea 10:574.1960; Ng in Tree Fl. Malaya 1:427. 1972; Chakrab. & Vasudeva Rao in J.Econ. Tax. Bot. 6(2) : 418. 1985.

Tree 15-30 m high; branchlets glabrous. Leaves crowded at the tips of branchlets, obovate to elliptic-obovate, 7-16 cm long, 2-6 cm wide, more or less cuneate-attenuate at base, entire (the margins tending to curl upwards when dry), rounded to obtuse or occasionally emarginate at apex, stiffly coriaceous, glabrous, black above and reddish brown beneath when dry; midrib flat above; lateral nerves 9-15 pairs, inconspicuous above; petiole 1.5-3.5 cm long, blackish. Flowers solitary, axillary; pedicels 10-15 mm long; sepals 3+3, the outer broadly ovate-oblong to triangular, 5-6 mm long, the inner wide oblong-elliptic, 4.5-5 mm long, brown-tomentose outside, rufous-pubescent inside; corolla ca 6 mm long, petals 6 oblong, glabrous except for a ring of ferruginous hairs near the base of stamens; stamens 12; ovary conoid, ferruginous-sericeous, 6-locular. Fruits ellipsoid, 3.5-4.5 cm long, 2-2.5 cm diam., brown, with lepidote flakes on surface, 1-seeded; pedicel 1.5-2.5 cm long, very thick.

Flowering & Fruiting : September February*.

Distribution known so far : BURMA, MALAYA.

Additional report : INDIA: Great Nicobar Islands.

Herbarium specimens : INDIA : Great Nicobar Is. ; 37.5 km on eastwest road, Oct. 1,1980, Hore 8253 (PBL) ; 38 km on east-west road, Feb.22, 1980, Dwivedi 7896 (PBL).

Notes : According to Chakrab. & Rao (*l.c.*) : Rare in inland hill forest at low altitude. Bark brown-white, milky latex present, flowers white and fragrant.

***Papaver hybridum* L.** (Papaveraceae) Sp. Pl. 506, 1753; Hook. f., Fl. Brit. Ind. 1:117. 1872; Butcher in New Illus. Brit. Fl. 246, 1961; H.S. Kirn & B.K. Kapahi in Ind. J. For. 6(3) : 233. 1983.

An annual, sparingly branched, 19-40 cm tall, hispid herb; hairs on branches and stems adpressed and with bulbous base, caducous with age; radical leaves long petioled, 3-30 cm long, cauline, alternate, sessile-subsessile, 3-5.5 cm long, 2-3 times pinnate fid-pinnate sect., ultimately segments linear-lanceolate, awned; flower 2.5-4 cm in diam., scarlet with a blackish blotch; pedicel 8-13 cm long; sepals 2, caducous, obtuse, sparingly hispid; petals 4, overlapping and crumpled in bud, obovate, 1-1.3 cm long, scarlet with a black blotch at the base; stamens numerous, filaments dilated upwards; capsule 0.8-1.3 cm long, subglobose, bristly-hispid; stigma convex, stigmatic rays 4-8, reaching or exceeding the edge of the disc.

Flowering & Fruiting : March-April.

Distribution known so far : PAKISTAN, AFGANISTAN, W. ASIA, N. AFRICA and EUROPE.

Additional report : INDIA: Jammu & Kashmir.

Herbarium specimens : INDIA: Jammu & Kashmir : Apr. 19, 1974, H.S. Kirn 789; Mar. 14, 1983, H.S. Kirn 2323 (Herb. Dept. of Bio-Sciences University of Jammu & R.R.L.) ; Apr. 3, 1983, No. 13806 (R.R.L., Jammu).

Notes : According to Kirn & Kapahi (*l.c.*) : Some interesting specimens of *Papaver* were collected by H. S. Kirn from Mankote and Poonch city. This *papaver* is naturalised as a weed in wheat fields and waste lands along with *P. dubium* L.

This species was also collected from the wheat fields on way to village Brar near Sunderbani in district Rajouri by BKK. *P. hybridum* L., figures in Hooker's Flora of British India but from

areas in Pakistan. It can be distinguished from *P. dubium* L., by the narrow, linear, awned ultimate segments of leaves and sub-globose, hispid-setose capsules having 4-8 stigmatic rays. The present report of its occurrence in Jammu and Kashmir state thus extends the phytogeographic range of the species further east to India.

***Phaleria macrocarpa* (Scheff.) Boerl. (Thymelaeaceae) in Handl. 3 : 111. 1900; D.K.Hore in Bull. Bot. Surv. India 26 (1 &2) : 22. 1984 (1985) *Drimyspermum macrocarpum* Scheff., in Ann. Bot. Gard. Btzg. 1. 46. 1876.**

Small tree, ca 5-8 m. Leaves simple, opposite, elliptic-oblong lanceolate, 17-20 x 5.5-7.5 cm, apex acute to acuminate, base cuneate to rounded, dark green above, pale below. Inflorescence cauliflorous or on old wood, 1-5-flowered, shortly peduncled. Flowers 2-3 cm long, white; calyx lobes reflexed; corolla lobes 4; stamens exerted beyond corolla tube; ovary glabrous, style longer than the corolla tube. Fruits 1.5-1.8 x 1.4 1.5 cm, globose, obovoid, narrowed towards base, green but purplish or reddish when mature.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : JAVA, MALAYSIA & NEW GUINEA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island; Galathea river mouth, N.G. Nair 7128 (PBL) ; Navy Dera, D.K. Hore 7286 (PBL).

Notes : According to Hore (*l.c.*) : This is the first generic record from India, although Beddome (1873), Hooker (1886) have described its related species *P. cauliflora* Bedd., from Sri Lanka which is a synonym of *P. capitata* Jack (Ding Hou in Fl. Males. Ser. 1.6 :22. 1960).

In marshy or damp inland forest areas ; rare.

***Plocoglottis javanica* Blume (Orchidaceae) Bijdr. 380. 1825 et Tab. Javan. Orch. t. 21, 1825; Seidenf. & Smitin. Orch. Thailand 348. 1961; Holtt. Rev. Fl. Malaya, Orch. ed. 3:159. f. 269. 1964;**

Backer & Bakh. f. F1. Java 3 : 325. 1968; N.P. Balakr. & Chakr. in Bull. Bot. Surv. India 20 (1-4) : 85. 1978 (1979).

Terrestrial herbs; stems pseudobulbous at base, 2-5 cm long, narrowed towards apex. Leaves solitary on the pseudobulb, broadly elliptic, decurrent at base, shortly acuminate at apex, 17-30 cm long, 5-9 cm broad, glabrous; main nerves 5-7; petiole 7-17 cm long, 2-4 mm thick. Inflorescence arising from the base of pseudobulbs; peduncle 40-70 cm long, puberulous, reddish green; sheaths tubular at base, oblique at mouth, 2-3 cm long; bracts ovate-acuminate, 6-8 mm long, 4-6 mm broad, pubescent on both surfaces; ovary with pedicel 8-11 mm long, 1-2 mm thick, ridged, pubescent. Sepals pale yellow with purplish pink spots and blotches; dorsal sepal elongate-ovate, 10-13 mm long, 4-5 mm broad, pubescent outside; lateral sepals obliquely ovate, 11-12 mm long, 4-6 mm broad, pubescent outside. Petals falcately linear-lanceolate, incurved, 10-12 mm long, 2-3 mm broad, glabrous, pale yellow with purplish-pink blotches. Lip jointed to the short column-foot forming a short spur, 6-8 mm long, 6-7 mm wide with 2 short side lobes at base completely united to the midlobe, acuminate, recurved at tip. Column 4-6 mm long, 3.0-3.5 mm broad; foot \pm 2 mm long; operculum \pm 2 mm across, pollinia 4, subglobose to subreniform, \pm 1 mm thick; caudicle \pm 2 mm long; turned towards tip of anther.

Flowering : July.

Distribution known so far : THAILAND, MALAYSIA, SUMATRA, and JAVA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island ; 35 km on East West Road, \pm 100 m, July 23, 1976, in flower, *Balakrishnan* 3989 (PBL & CAL).

Notes : According to Balakr. & Chakrab. (*l.c.*) : Genus itself is new to India. The present Collections are intermediate between *P. javanica* & *P. lowii*, an endemic from Malaysia differing from former in sort petioles and puberulous subpubescent inflorescences, from the latter in sepals & petals being spotted and blotched purplish

pink, instead of uniformly yellow in *P. lowii*. Probably, both these belong to one species, but more materials to be studied.

Podochilus microphyllus Lindl. (Orchidaceae) Gen. Sp. Orch. 234. 1835; Hook. f. Fl. Brit. Ind. 6:81. 1890; Grant, Orch. Burma 320. 1895; Ridl. Fl. Mal. Pen. 4:193. 1943; Seidenf. & Smitin. Orch. Thailand 322, f. 244. 1960; Holtt. Rev. Fl. Mal. Orch. ed. 3:500, f. 143. 1964; N.P. Balakr. & Chakr. in Bull. Bot. Surv. India 20 (1-4) : 86-87. 1978 (1979).

Epiphytic, sometimes petrophilous; stems many, closely crowded together, often creeping, simple or often branched, slender, flexuous, wiry, 12-22 cm long, ± 1 mm thick. Leaves 2-ranked, closely arranged, spreading, duplicative, narrowly elliptic, jointed and twisted at base, awned at apex, 7-9 mm long, ± 2 mm wide. Inflorescence terminal or rarely lateral, few-flowered, up to 1.8 cm long; bracts ovate, 1-2 mm long. Flowers resupinate, slightly opened, never fully opening, 3-4 mm long, white with median purple lines one on each sepal and purple patch on centre of petals and sometimes on each side of lip. Dorsal sepal broadly ovate, hooded, ± 1.6 mm long, 1-nerved. Lateral sepals decurrent along column-foot, forming a saccate mentum, obliquely ovate, acute, ± 2.4 mm long, 3-nerved. Petals oblong, subacute, ± 1.6 mm long, ± 8 mm wide, 1-nerved. Lip oblong-ovate, curved at middle, cordate at base, 3-nerved, attached to the tip of column-foot, divided at base into 2 lobes, one on each side of the narrow claw, widened upwards, bluntly pointed at apex, curved at middle, on the inner side at base with two erect linear appendages, ± 2 mm long, ± 0.8 mm wide. Column erect, with 2 arms, ± 0.5 mm long; foot ± 1.2 mm long; rostellum triangular-lanceolate, shortly bifid. Anther lanceolate, acute, erect; pollinia 4, elongate-pyriform; stipe slender; disc ovate, red. Capsule ellipsoid, ± 3 mm long.

Flowering & Fruiting : July.

Distribution known so far : BURMA, THAILAND, MALAYA, BORNEO and SUMATRA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island ; 35 km on East West Road, \pm 200 m, July 20, 1976, in flower and fruit, Balakrishnan 3892 (PBL & CAL).

Notes : According to Balakr. & Chakrab. (l.c.) : In dense inland forest.

Potamogeton filiformis Pers. (Potamogetonaceae). in Synops. I : 152 (1805) ; Ascherson et Graeb. in Das P. flanzentr. 51 : 126 (1959) ; Stewart, Fl. W. Pak & Kash. 29 (1972); Majeed Kak & Javeid in Indian Forester 108 (11) : 719-721. 1982. *P. pectinatus* ssp. *filiformis* Hook. Steud. Fl. Brit. Isles ed. 2:397 (1878).

Submerged perennial herbs, rhizomes extensively creeping with horizontal stolens bearing white tubers. Stems cylindrical, simple or branched, 29-35 cm tall, olive green or greenish yellow; lower internodes much shorter. Leaves setaceous, 5-14 cm \times 0.5-1.8 mm, obtuse never mucronate, 1-3 nerved, translucent; yellowish green; stipules adnate to the leaf and sheathing stems, lanceolate, 1-1.3 cm long, half clasping, blunt scarious. Spikes cylindrical 9-15 cm long. Flowers 4-5 mm diam., arranged on interrupted spikes in 2-5 whorls 1-1.5 cm apart; perianth reddish green or olive green; stamens 0-5.1 mm long. Carpels 4, style inconspicuous; stigma broad and sessile. Fruiting spikes dense without interruptions; achenes obovoid, slightly compressed, 2-3 mm long 2 mm broad, pale olive; beak very short, almost central, apex truncate, inconspicuously reticulately veined.

Flowering & Fruiting : July-August.

Distribution known so far : BRITISH ISLES (native) , NORTH AMERICA, AFRICA and ASIA.

Additional report : INDIA: Kashmir (N.W. Himalayas).

Herbarium specimens : INDIA: Ladakh ; Drass, in permanent water reservoirs, Aug. 2, 1974, A.M.Kak 3704; Menamarg, in swift flowing shallow. Streams, July 29, 1974, A.M. Kak 3684; Thungboo to Panikar (Zanskar), in small but swift flowing cannels, Aug. 10, 1974, A.M. Kak 936; Parkhacheck (Zanskar) in irrigating channels, Aug. 11, 1974, A.M.Kak 3614.

Notes : According to A.M. Kak & Javeid (*l.c.*): The species differs from *P. pectinatus* in being unbranched, when branched usually near the base, leaves blunt submucronate, 1-3 nerved; stigma disc shaped sessile or short stalked. Nutlets 2-3 mm long, beak short subcentnal with truncate apex. In contrast the species *P. pectinatus* is having apical portion much branched forming thick mats. Leaves narrowly acute usually 1-nerved; stigma not dicoid, nutlets 2.5-4 mm long; beak facial usually recurved 0.6 mm, towards the basal end or slightly above.

Common at altitude 3,000-4,000 m in still or slow flowing streams.

Potamogeton polygonifolius Pourr. (Potamogetonaceae) in Mem. Acad. Toulouse III. 325 (1788); Ascherson et Graebner, Synops. Mitteleurope. Fl. 1:305 (1797) ; et Pflanzenr. 31: 66 (1907) ; Majeed Kak & Javeid in Indian Forester 108 (11) : 719. 1982. *P. gramineus* L. Sp. Pl. 127 (1753).

Perennial herb, rootstocks creeping with short internodes. Stems terete, 20-30 cm tall, lower internodes much longer. Leaves petioled upper ones coriaceous, floating, suborbicular to lanceolate, cordate or abruptly narrowed at the base, 3-6 × 1.8-2 cm broad with prominent veins beneath; lower leaves submerged, narrowly linear lanceolate, 5-8 × 1.5-2.3 cm., membraneous, dark green; petioles much longer than the petioles of upper leaves. In terrestrial forms lamina ovate, cordate, acute or slightly mucronate, shortly petiolate, smooth, reddish green; stipules subpetiolar, equalling internodes, 3-3.5 cm long, obtuse, subpersistent. Spikes erect, cylindrical, lax, 1.5-3 cm long; peduncles cylindrical, much longer than spikes, 3-4 mm across. Flowers 2.5 mm across, loosely arranged when young. Fruits 1.7-2.1 × 1-1.5 mm, keeled, somewhat convex dorsally; base small, subterminal, dull olive green, often reddish brown.

Flowering & Fruiting : May July*.

Distribution known so far : BRITISH ISLES; EUROPE; AFRICA; NORTH AMERICA and ASIA.

Additional report : INDIA: Kashmir valley.

Herbarium specimens : INDIA : Kashmir valley ; Hokhar Sar, in deep waters, June 2, 1975, A.M. Kak 3675; Hajratbal, shallow waters, May 25, 1975, A.M. Kak 2028; Nageen lake, in deep waters, June 1, 1975, A.M. Kak 3367; Verinag in the irrigating channels, July 2, 1975, A.M. Kak 3139. The voucher specimens have been deposited in the Herbaria of the University of Alabama (USA) and University of Kashmir, Srinagar.

Notes : According to A.M. Kak & Javeid (*l.c.*): *Potamogeton* L. (Potamogetonaceae S. Str.) is an aquatic cosmopolitan genus with 100 species (Airy Shaw, 1966). The genus is represented by about 14 species in the valley of Kashmir (Kak, 1977). Hook. f. (1893) reported 9 species from the Indian subcontinent, whereas Subramanyam (1962) has included only 4 species in his treatise of Indian aquatic angiosperms. He has merged *P. indicus* Roxb., with *P. nodosus* Poir and *P. javanicus* Hassk., with *P. octandrus* Poir; he does not mention *P. natans* L., *P. lucens* L., *P. zizi* Mert., *P. alpinus* Balb., *P. crispus* L., *P. fluitans* Roth and *P. pusillus* L., which are common in our lakes and ponds. Stewart (1972) has listed 11 species and does not record *P. tepperi* A. Benn, which was reported by Ascherson and Graebner (1907) based on Clarke's plate 29142 deposited in Kew Herbarium collected by Clarke (1876) from Kashmir.

The species, *P. polygonifolius* Pourr., so far is unknown from the Indian subcontinent. The populations of *P. polygonifolius* Pourr., were collected from the valley between 1500-1800 m

The species *P. natans* having the characters of submerged leaves reduced to phyllodes, sometimes exceeding the upper floating leaves, differs from the species *P. polygonifolius* & *P. nodosus* which have characters of submerged leaves linear obovate, usually tapering to tip and base, phyllodes absent; but again differs both from each other by stipules are subpersistent, 2-4 cm long, obtuse not keeled nor channeled on the back; nutlets obovate, 1.5-3 mm long, obscurely keeled, beak slightly curved in case of species *Polygonifolius* whereas stipules decaying shortly, linear acute or obtuse, 3-9 cm long those of upper leaves more or less 2 keeled, nutlets obovoid, 2.5-3.5 cm long, acutely keeled, beak short but stout in species *P. nodosus*.

It is highly variable species and susceptible to the influence of altitudinal and other conditions.

Przewalskia tangutica Maxim. (Solanaceae) in Bull. Acad. Imp. Sci. St. Petersb. 27:507. 1882 ; Forbes & Hemsley in J. Linn. Soc. 26:177. 1889; Lu & Zhang in D' Arcy, Solan. Biol. Syst. 66. 1986; Sanjappa & Raju in Bull. Bot. Surv. India 31 (1-4) : 175-177. 1989 (1992).

Erect, succulent herb, 20-35 cm tall, simple or branched, glandular pubescent; root-stock thick, somewhat tuberous; stem poorly developed, mostly embedded in soil except for 6-10 cm long leaf-bearing portion. Leaves scale-like at base, gradually transforming into distinct leaves above, simple, alternate, distantly placed in flowering, crowded on stem in fruiting giving head-like appearance; petioles 3-5 cm long, fleshy, glandular pubescent; lamina 10-12 × 1.8-2.3 cm, obovate-oblong, cuneate at base, undulate, distinctly ciliate, obtuse to rounded at apex, glandular pubescent on both surfaces, densely towards apex and margin; midrib 2.5-3.0 mm broad at base, gradually narrowing towards tip, lateral veins many, slender, forming distinct reticulation. Flowers yellow, solitary, axillary, 4.5-5.0 cm long; pedicels 2.2-2.5 cm long, sparsely glandular pubescent. Calyx membranous, green, tubular, 1.2-1.5 cm long, 3-5 mm across, reticulately veined, glandular pubescent without, glabrous within; lobes 2.5-3.0 × 2.0 mm, narrowly triangular, margin crenate, acute; fruiting calyx 6.0-6.5 cm long, 3.5-4.0 cm across in the middle, elliptic, inflated, prominently reticulate-veined, persistent, indurated, enclosing a small capsule. Corolla infundibuliform, 5-lobed, glandular puberulous without, glabrous within; tube 1.6-2.0 cm long; lobes imbricate in bud, 3.0 × 1.5 mm, triangular, irregularly crenate, plicate inside, 3-veined, distinctly reticulate within. Stamens 5, epipetalous, inserted below the throat; filaments 1 mm long, glabrous; anthers 1.5 mm long, oblong, dorsifixed, longitudinally dehiscent. Disc very thin, annular. Carpels 2, syncarpous, 2.0-2.4 cm long, glabrous; ovary 2.5 mm long, ovoid to subglobose, bilocular, ovules subanatropous, many on axile placenta; style 2.0-2.2 cm long, slender, filiform, stigma 1 mm long, bilobed capitate. Capsules 1.5

cm long, 1.2 cm diam., globose to subglobose, glabrous, circumscissile in the upper half, pericarp membranous, veined. Seeds brown, 2.5 × 2.3 mm, obliquely sphaeroidal, reticulate, with curved ridges, micropyle surrounded by 10-12 raised, thick cells; embryo curved, cotyledons linear; albumen copious, fleshy.

Flowering : June-July. *Fruiting* : July-September.

Distribution known so far : W. CHINA: (Ginghai Xiziang Plateau).

Additional report : INDIA: N. Sikkim.

Herbarium specimens : INDIA : Sikkim ; between Tista river and foot-hill of Dorji la alt. 5200 m, Aug. 1, 1987, M. Sanjappa 18507 (CAL); Raju & Singh 8006 (SHC); Satish Kumar 6135 (TBGT*) ; between Tista river and Kerang, near Yak huts, alt. 5400 m, Aug. 2, 1987, M. Sanjappa 18543 (CAL).

Notes : According to Sanjappa & Raju (*l.c.*) : *Przewalskia* Maxim., a monotypic genus represented by *P. tangutica* Maxim., has been collected for the first time from Sikkim Himalaya. It is included in the subtribe *Hyoscyaminae* (Lu & Zang, 1986), essentially Asiatic in distribution, characterised by curved embryo, imbricate corolla lobes, greatly enlarged fruiting calyx which is reticulate veined, indurated and enclosing a capsule with circumscissile dehiscence. This species considered to be endemic to China is a rich source of tropane group of alkaloids and is known by the name 'Ma Niao Peo' in Chinese traditional medicine. It is reported to have analgesic, antitoxic, anti inflammatory and antispasmodic properties. According to Hsiao (1981) the species contains tropane alkaloid compounds like hyoscyamine, scopolamine, anisodamine and anisodine and also non-tropane alkaloid bellardine.

The genus *Przewalskia* was described by Maximowicz (1882) based on the collections of *Przewalski* from Tangut in China. The present record from higher alpine zone of Sikkim adjoining Tibetan plateau indicates that it will be worthwhile to explore the possibility of using the plant as a potential source of tropane alkaloids in our country. However, care should be taken not to overexploit the wild

source endangering the very existence of the species as it is so far known only from 2 populations in N. Sikkim.

Although the species is known only from the above indicated localities in Sikkim, a large number (ca 300-400) of plants were seen growing at the foothill of Dorji la especially near Yak huts, while in the adjoining Kerang area very few (ca 4-5) plants were noticed. However, a number of skeletons of the inflated calyx were seen scattered in most of the pools, puddles and even along the margins of smaller lakes.

It is not known whether Yaks and other wild animals feed on the plant. It will be interesting to note if the Tail-les Rats, inhabiting the alpine zone of Sikkim, feed on the fruits of this species.

Among the 6 flowers dissected, 4 showed normal 5 stamens, while one flower showed 6 stamens (4 distinct and 2 together).

This is a new generic record for India. T.B.G.T. stands for Tropical Botanic Gardens & Research Institute Palode, Trivandrum, Kerala.

Sandy micaceous soils in cold arid areas between 5200 and 5400 m altitude.

Psidium guineense Swartz, (Myrtaceae) Fl. Ind. Occ. 2:881, 1791; DC. Prod. 3:235. 1828; Deb in Bull. Bot. Surv. India 3 (1): 87-89. 1961; H.B. Naithani, Flowering Pl. Ind. Nep. Bhutan p. 165. 1990.

Habit mostly an under-shrub, sometimes a shrub and rarely a small tree, evergreen terete, pubescent-villous. Bark not exfoliating in thin flakes as in *Psidium guajava* Linn. Leaves petiolate with petiole up to 1 cm long, opposite, decussate, 6-15 × 4-8 cm, ovate, oblong or elliptic-oblong, entire or distantly serrulate, slightly recurved, obtuse or acute, glabrous above and ferruginous-tomentose below, pinnate reticulate; lateral nerves 6-10 on each side, alternate. Peduncles 1-3 flowered, axillary, about 2 cm long. Flowers regular, polypetalous, pentamerous, epigynous, with a pair of opposite bracteoles. Calyx entire in bud, irregularly 5-lobed in flower, lower

portion adnate to the ovary. Corolla of free petals, 5 or more with modification of some of the stamens to petals, white, broad, imbricate, alternating with sepals. Stamens free, 120-130 in number; filaments up to 1.25 cm long, flattened; anthers adnate, introrse, 4-loculed, dehiscing longitudinally; sometimes some of the stamens undergo modification to petals with one anther lobe or with only traces of anther lobes; the phenomenon of transition from stamens to petals in wild plants is probably the first record for this family. Ovary inferior, two or more-celled, with many ovules in each cell; stigma dumbbell-shaped; style one. Fruit a berry, pyriform, about 2 cm in diam., containing numerous seeds with hard testa. Embryo curved.

Flowering & Fruiting : Almost throughout the year.

Distribution known so far : NEW GUINEA (Native).

Additional reports : INDIA: Tripura, Assam

Herbarium specimens : INDIA : Tripura : Agartala, Deb 9, 548, 594, 814, (ASSAM, Dept. Botany, M.B.B. College, Agartala, Tripura).

Notes : According to Deb (*l.c.*) : The genus *Psidium* Linn., contains about 100 species (Lawrence, 1951) most of which are native in tropical and subtropical America. Duthie in Hooker's Flora of British India (1875) described only one species, *Psidium guajava* Linn., of this genus as occurring in India as a cultivated or exotic plant.

Deb Burman 308, preserved in the Hebarium of Indian Botanic Garden, Sibpur, West Bengal which is the same as *Psidium guajava* Linn. It escaped the notice of Dr. K. Biswas (1958) who visited Tripura in 1943. Originally a native of New Guinea, it has been growing wild at Agartala for a long time and has been naturalised there.

In Tripura, this plant is localised in the Sadar Sub-Division at Agartala (College tillah, Jhaguria mura, Kunjaban etc.), Jogendra nagar, Ananda nagar, Bishal ghar, Konaban, Ranir Bazar, East Noabadi, Jirania and Tirbrubari. It grows in sandy gravelly and ferruginous soil forming societies, pure or in association with coppice shoots of *Microcos paniculata* Linn., *Holarrhena antidysenterica* Wall.,

Careya arborea Roxb., *Glycosmis arborea* (Roxb.) Corr., *Clerodendrum infortunatum* Gaertn., *Melastoma malabathricum* L. *Cassia tora* Linn., *Croton bonplandianum* Bail., *Scoparia dulcis* L. *Jatropha gossypifolia* Linn., and others.

Natural regeneration is very common, but the plant does not seem to be spreading. Due to the influence of different biotic factors, the plant usually does not attain the normal size of a small tree.

Ranunculus trilobus Desf. (Ranunculaceae) Fl. Atl. 1:437. 1798; Tutin in Fl. Europ. 1:230. 1964; Som Deva & H.B. Naithani in Ind. J. For. 7 (4) : 337-338. 1984.

Annual herb, 5-25 cm high. Roots fibrous to slightly thick, not tuberous. Stem erect, not creeping, rooted at the nodes, slightly hairy to almost glabrous. Leaves mostly crowded at the base, lowest simple, the next 3-partite; segments simple, cuneate-obovate, dentate, upper with more numerous linear-oblong lobes. Flowers yellow, 10-15 mm in diameter. Sepals 5-7 mm, obovate. Petals yellow as long as the sepals, nectary at base covered by a flap which is more or less free laterally. Receptacle pubescent. Achenes about 2 mm, strongly compressed, with numerous small tubercles, beak short triangular.

Flowering & Fruiting : June*

Distribution known so far : ALBANIA, FRANCE, GREECE, ITALY, MALTA, PORTUGAL, SPAIN.

Additional report : INDIA: Uttar Pradesh (Kumaun).

Herbarium specimen : INDIA : Uttar Pradesh : Almora District, Baijnath, 1125 m, Kumaun, June 1, 1982, Som Deva 10582 (DD).

Notes : According to Deva & Naithani (*l.c.*): The species *R. trilobus* Desf., a new record for India was identified by P.H. Davis of the Royal Botanic Garden, Edinburgh and was known so far from S.W. Europe.

Rhus tomentosus L. (Anacardiaceae) Sp. Pl. 1:266. 1758; Thunb. Fl. Cap. 2:266. 1818; DC. Prodr. 2:73. 1825; G. Don. Gen.

Syst. 2:74. 1832; Engl. in DC. Mon. Phan. 4:407. 1883; Sonder, Fl. Cap. 1:508. 1894; D. Chandra & R. B. Ghosh in Ind. J. For. 2(3): 264-265. 1969.

A shrub or small tree. Branches glabrous. Bark brownish with many circular lenticels. Leaves palmately trifoliate, alternate, 4.5-6 cm; petiole glabrous, 1.5-2 cm, slender. Leaflets elliptic, 2.5-5 × 1-2.5 cm, both ends acute, upper surface glabrous, ventral surface whitish tomentose, margin entire or coarsely serrated from the middle to the apex, 9-10 vein-pairs, sunken above, raised below, slightly arched upwards; petiolule short. Panicles usually terminal, sometimes axillary, up to 4 cm, tomentose. Flowers small, unisexual, bracteate, pedicelled; pedicel 1-1.5 mm long, slender, pubescent. Male flower 1.5 × 2 mm, pubescent. Sepals 5-lobed, lobes almost free, imbricate, ovate 0.5 × 0.2 mm, obtusely acute, pubescent. Petals 5, free, imbricate, linearly oblong, 1 × 0.3 mm, obtuse, pubescent. Disc. distinctly 5-lobed, 0.8 mm in diameter. Stamens 5, 1 mm long, inserted at the base of the disc; filament filiform, dorsifixed; anther lobed, almost globose.

Flowering & Fruiting : October - December.

Distribution known so far : TROPICAL AFRICA.

Additional report : INDIA: Tamil Nadu.

Herbarium specimens : INDIA : Tamil Nadu ; Ootakamund, Oct. 1921, Major General F.J. Jenekin s.n. (CAL Acc. Nos. 98294 and 98295).

Notes : According to D. Chandra & Ghosh (*l.c.*) : *Rhus tomentosus* L., belonging to the family Anacardiaceae, is a native of tropical Africa.

This plant was first collected from Ootakamund in 1921 by Major General, F.J. Jenekin., but its occurrence in India was not validly recorded.

Ruellia ciliatiflora Hook. (Acanthaceae) in Bot. Mag. 66, t. 3718. 1840; H.B. Naithani in Ind. J. For. 4 (3) : 235. 1981.

Herb up to 1.5 m high. Stem angular, hairy. Leaves simple,

opposite, 4-11 × 3-7 cm, hairy, ovate, margin entire or serrate, base rounded, apex acute or sub-acute, petiole 1-3 cm long. Bracteoles 2, leaf like, hairy. Flowers purple in axillary cymes, 4 cm. Calyx 5-partite, ca 1 cm long, linear, hairy, persistent. Corolla purple, tubular and ventricose, hairy, lobes unequal. Stamens 4. Style long; stigma capitate. Capsule ellipsoid, 1-3 cm long, hairy. Seeds discoid scabrous.

Flowering & Fruiting : August.*

Distribution known so far : SOUTH AMERICA (Native).

Additional report : INDIA: Uttar Pradesh.

Herbarium specimen : INDIA : Uttar Pradesh ; Dehra Dun, New Forest, 650 m, Aug. 15, 1969, H.B. Naithani 7172 (DD).

Notes : According to Naithani (l.c.): It is presumed that this species may have come to new Forest, Dehra Dun along with the Forestry seeds imported from South America.

Rumex conglomeratus Murray (Polygonaceae), Prodr. Des. Strip. Gott. 52. 1770; Meisn. ap. DC. Prodr. 14:59, 1856; Boiss. Fl. Orient. 4:1010. 1879; Losina-Losin in Fl. URSS 5:470. 1936; Rech. F. in Candollea 12:96. 1949; Rechinger in Fl. Europea 1:87. 1964; Cullen in Fl. Turkey 2:289. 1966; Munshi & Javeid in Bull. Bot. Surv. India 15 (3&4) 278. 1973. *R. nemolapathum* Ehrh. Beitr. 1:181. 1787. *R. glomeratus* Schreb., Spicil. Fl. Lips. Index 155, no. 300. 1771. *R. paludosus* Withering Bot. Arr. Brit. Pl. ed. 2:354. 1796. *R. acutus* SM. Fl. Brit. 1:391. 1800; SM. Engl. Bot. 11:724. 1800. *Lapathum glomeratus* Exer. Phytol. II. 444. 1792.

Erect, branched perennial herb, 50-120 cm tall. Stem slender, sulcate, glabrous, slightly flexuous, usually dark green, leafy; internodes shorter than leaves. Leaves simple, alternate, undulate, acute; basal leaves petiolate, oblong-lanceolate, 12 mm- 22 cm with sub-cordate base. Stem leaves sub-sessile, lanceolate, 8 mm-11 cm with rounded or slightly cuneate base; floral leaves elliptic-lanceolate, sessile or sub-sessile, 5 mm-4 cm with cuneate base; veins forming 30-60^o to with mid-vein. Ocrea brown, 2-5 mm, truncate, with

prominent nerves. Flowers 2-3 mm across, in distant crowded whorls forming much branched inflorescence, each whorl is subtended by a leaf, and has 10-15 flowers. Perianth 6, valves lingulate, sub-acute 3-3.5 × 0.9-1 mm, all tuberculate; tubercle often covering the valves. Stamens 6; filaments short. Ovary trigonous, 0.7-1 mm; styles 3, stigma fimbriate. Nut 1.9-2 mm × 1.3-5 mm, globose trigonous, brown, shining. Pedicels 1-2 mm long, thick, articulated near the base, persistent.

Flowering : June August.

Distribution known so far : EUROPE, AFRICA and S.W. ASIA.

Additional report : INDIA: Kashmir.

Herbarium specimens : INDIA : Kashmir ; Srinagar, Banks (Water reservoir), Bemina, A.H.Munshi 1221; Nishat, A.H.Munshi 1235; Shivpora, A.H. Munshi 1241.

Notes : According to Munshi & Javeid (*l.c.*) : The genus *Rumex* L. (Polygonaceae) with about 200 species is widely distributed throughout the world; nearly 18 species are represented in India mainly confined to the Himalayan region.

Rambles through the valley of Kashmir enabled the authors, Munshi & Javeid to collect certain specimens, which on critical scrutiny were identified as *R. conglomeratus* Murr., a taxon well represented in Europe, Africa, S.W. Asia, but not recorded hitherto from Indian sub-continent. The taxon was 'matched' and identified from available Herbarium specimens at Central National Herbarium, Calcutta and described for reference. The Herbarium specimens except (A.H. Munshi 1235) which is deposited in the Herbarium of Botany Department, Kashmir University, Srinagar-6.

The taxon is closely allied to *R. sanguineus* L., but can be distinguished by Pedicles about as long as the valves or only slightly longer; all valves with tubercles; all whorls of flowers subtended by leaves, whereas in *R. sanguineus*, pedicels are always distinctly longer than valves; only one valve with a tubercle, only the lower whorls of flowers subtended by leaves.

Found in waste places along ditches.

Rumex crispus L. (Polygonaceae) Sp.Pl. 335. 1753; K.C.Kanodia in Bull. Bot. Surv. India 5 (3-4) : 377-379. (1963); H. B. Naithani, Flowering Pl. Ind. Nep. Bhutan p. 355. 1990.

Perennial, erect, glabrous herb, 0.5-1 m tall; stem cylindrical, ridged, hollow, at the base about 1 cm in diam., angulate above, narrower, much branched, enlarged at the nodes; internodes 4-8 cm long; stipules ochreate, membranous; foliage graded, larger at the base, becoming smaller above; leaves petiolate, alternate, simple; petiole up to 5 cm long, flat, grooved; lamina lanceolate, 4-20 cm long, 0.3-4.5 cm broad, crumpled, strongly wavy, the margins obscurely crenulate, the base tapering to the petiole, the apex acute, the two surfaces glabrous; midrib flat on the adaxial but prominent on the abaxial surface; inflorescence a compound raceme with branches bearing whorls of pendulous flowers, leafless above; flowers polygamous, pedicellate, sepaloid, trimerous, actinomorphic; pedicels slender, about 6 mm long with tumid joints below the middle; perianth segments 6, biseriate, free, persistent, dark green, the outer three glaucous, smaller, 2-3 mm by 1 mm, ovate-lanceolate, entire, obtuse, the inner three (valves) membranous, enlarging in fruit, entire, cordate, 4 by 4 mm, tuberculate near the base; tubercle ellipsoid, 1-2 mm long; stamens 6, in two whorls of 3 each, the outer introrse, the inner extrorse; filaments filiform, about 1 mm long; anthers basifixed, about 1 mm long in bisexual flowers, 1.5 mm long in male flowers; ovary trigonous, hypogynous, on a minute glandular disc, syncarpous, 2-3 mm long, 1.0-1.5 mm broad, unilocular, style slender, 1.0 mm long; stigma fimbriate; ovule single, on a basal placenta; fruits sharply triangular, glossy, reddish-brown, up to 3 by 2 mm.

Flowering & Fruiting : April.*

Distribution known so far : EUROPE (Native) ; AMERICA (Common in U.S.A. & parts of CANADA) AUSTRALIA & NEWZEALAND (Naturalised).

Additional reports : INDIA: Rajasthan, Kashmir, Uttar Pradesh & Tamil Nadu.

Herbarium specimens : INDIA : Rajasthan ; Mount Abu, Dirty water nala near the road, Kanodia 62196; Jain 62092.

Notes : According to Kanodia (*l.c.*) : *Rumex crispus* Linn., is a highly polymorphic group of plants as indicated recently by Rechinger, it would be of great interest to observe its variability in the Indian habitat and to record its future as a new entrant into the flora of our country.

This species can easily be distinguished from *Rumex orientalis* Brehn., to which it is very closely related, by the presence of its plumpy tubercles and in its pedicels being longer than the fruiting tepals. It can also be separated from *R. patens* Linn., which is its next closely related species, by the presence of a tubercle on each of the tepals, while in the latter (*R. patens* L.) only one of the tepals bears a tubercle. From the remaining Indian species of *Rumex*, it can be differentiated by the presence of bisexual flowers in addition to the unisexual ones.

In India, however, its presence has not been reported till now. At Mount Abu the plants observed showed every sign of being quite at home, healthy and profusely flowering and fruiting. Its presence at Mt. Abu is not very unusual considering that this place is a well known hill resort and attracts tourists from different parts of the world, including Europeans and Americans. In all probability, this has been introduced by chance through such visitors. Similarly it is possible that the plant has been introduced in other hill resorts of the country, but unnoticed. This may be due to the unavailability of an adequate description. Accordingly to facilitate the identification and study of the plant, a detailed description with analytical drawings, is now being provided.

Unlike certain other exotics this species is not a troublesome weed but somewhat useful. Bailey has mentioned that the leaves are used as greens.

It has been recorded by Muenscher, Bailey, Fernald, Kraemer and Rydberg as a common weed.

Rungia muralis Nees (Acanthaceae) in DC. Prod. XI : 470. 1847; G.M. Oza in Indian Forester 103 (2) : 157. 1977.

Plants with low-growing many branched woody stem which is digitate or semi-digitate from the base, branches pressed together; bracts rough, minutely dotted, mucronate conspicuously veined, fertile ones oval ciliate with membranous margin, sterile ones lanceolate to oblong with naked to very narrowly membranous margin. Bracteoles with membranous margin to emarginate, mucronate. Leaves subspherical to spatulate.

Flowering & Fruiting : April.

Distribution known so far : Confined to INDIA (not recorded in local Floras).

Additional report : INDIA: Gujrat.

Herbarium specimens : INDIA : Gujrat : Baroda District, Por, 1972.

Notes : According to G.M. Oza (*l.c.*) : C.B. Clarke in Hook. f. F1. Brit. Ind. 4:550. 1885, reduced *Rungia muralis* Nees (1847) to a var. of *Rungia parviflora* Nees and Th. Cooke in his F1. Pres. Bombay 400, 1905, followed Clarke, whereas H. Santapau in "The Acanthaceae of Bombay" , 77, 1952 and in J. Bombay Nat. Hist. Soc. 51:365.1953, considered it conspecific with *Rungia pectinata* (Linn.) Nees. Wealth of India IX (Rh So) : 93, 1972, follows Santapau.

The observations of G.M.Oza in the ravines and waste places of Por. District Baroda, Gujarat State, laboratory and herbarium reveal that *Rungia muralis*, does differ in so many points of *Rungia parviflora* and *Rungia pectinata*, that it seems better to return to the standpoint taken in by Nees. The taxon, with clear established identity, has not been recorded in any of our popular local floras. It is therefore, a new recorded for India.

The species which seems to be confined to India is described here on the basis of the original description found in De Candolle's Prodrumus XI : 470, 1847.

The opinion of prof. Dr. C.E.B. Bremekamp of Netherlands which formed the basis of the present note.

Salix lindleyana Wall. ex Anders. (Salicaceae) in Kunal. Svensk. Vet. Akad. Handl. 1850 : 499. 1851. var. **microphylla**

Anders. *l.c.* : 500 ; in DC. Prodr. 16 (2) : 296.1868 ; Kimura in Fl. E. Himalaya 3 : 16. 1975; Malhotra & Balodi in Bull. Bot. Surv. India 26 (1 &2) : 132. 1984 (1985).

Small shrubs. Stems prostrate, creeping, rooting, bark rough, brownish, young shoots glabrous, leaves 8 mm long and 3 mm broad, alternate, oblong or oblong-lanceolate, entire, revolute, glabrous on both surfaces, petiolate, petioles 1.5 mm long. Flowers arranged in catkins, male catkins 1.2 cm long, rachis glabrous, bracts 3 mm long, oblong-elliptic, acute, glabrous, stipes stout. Fruiting catkins 1.5 cm long, capsules 5 mm long, glabrous.

Flowering & Fruiting : May-September.

Distribution known so far : NEPAL.

Additional report : INDIA: Kumaon Himalaya.

Herbarium specimen : INDIA : Kumaon Himalaya ; Martoli bugyals, 4500-6000 m, June 1958, BSD 6894.

Notes : According to Malhotra & Balodi (*l.c.*) : This variety is different from the var. *lindleyana* in certain leaf characters : leaves 8 mm long and 3 mm broad, oblong or oblong-lanceolate, entire, margins revolute, whereas in var. *lindleyana*, the leaves are serrulate or crenulate, glaucous on lower surface. Growing on alpine meadows.

Saurauia bracteosa DC. (Saurauiaceae) in Mem. Soc. Phys. Hist. Nat. Geneve 1 : 423. t. 6A. 1822; D.K. Hore in Bull. Bot. Surv. India 26 (1 & 2) : 21. 1984 (1985).

Small tree, 2-4 m; apical leaf bud reddish. Leaves alternate, 30-45 x 12-14 cm, elliptic-oblong-obovate, acuminate, cordate at base, densely clothed with brown tomentum, rough. Petiole 4-8 cm, densely brownish hairy. Cymes densely pubescent and scaly, stalk ca 4 cm; calyx green, densely pubescent; corolla connate at base, white, fragrant; stamens yellow. Fruits unknown.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : JAVA.

Additional report : INDIA: Great Nicobar Island.

Herbarium specimens : INDIA : Great Nicobar Island; 31 km, East-West Road, D.K. Hore 7213 (PBL) ; Laful Forest, D.K. Hore 7773 (PBL).

Notes : According to Hore (*l.c.*): Dense evergreen Wet forest, edges; rare or a few.

Schizophragma integrifolia Oliver (Hydrangeaceae) in Hooker's *Icones* 20 : t. 1934, 1890; Rehder in Wilson P1. Wilson 1:41, 1911; Curtis Bot. Mag. t. 8991, 1924; Bean in Gard. Chron., Ser. 3, 84:394, 1928; Bailey St. Cycl. Hort. 3: 3113, 1950; H.B. Naithani & Bennet in Ind. J. For. 2 (2) 138-140. 1979. *Schizophragma hydrangeoides* Sieb. & Zucc. var. *integrifolium* Franchet in Nouv. Arch. Mus. Paris Ser. II. 8: 266. 1885.

Climber to a height of *ca* 4.5 m, deciduous. Leaves 13.5-26.5 × 10-16.5 cm, ovate or broadly ovate, apex acute or acuminate, base truncate or subrounded, margins entire, denticulate or dentate, upper surface dark green and glabrous, lower surface pale and densely pubescent; primary veins 7-10 pairs; petiole 4.5-10.5 cm long, pubescent. Inflorescence a terminal corymbose panicle, 18-25 cm in diam. Foliaceous bract of the sterile flowers white, *ca* 4 cm long, elliptic or elliptic oblong. Fruit *ca* 4 mm long, turbinate, strongly 10-ribbed; opening between the ribs for dispersal of seeds. Seeds numerous, minute *ca* 0.75 mm long, linear or linear oblong.

Fruiting : October.

Distribution known so far : CHINA.

Additional report : INDIA: Arunachal Pradesh.

Herbarium specimen : INDIA : Arunachal Pradesh ; near Perila, Kameng District, Oct. 15, 1977, Bennet & Naithani 3037 (DD).

Notes : According to Naithani & Bennet (*l.c.*) : *Schizophragma integrifolia* Oliver has been collected for the first time from Kameng district, Arunachal Pradesh. This is the first report of the genus *Schizophragma* Sieb. & Zucc., from India.

This climber ca 4.5 m high on a tree in fruiting stage was found near Perila, Kameng district. From a distance it resembled a *Mussaenda* species.

The genus *Schizophragma* Sieb. & Zucc. comprises of 4 species (Hutchinson, 1968) and is distributed in China, Korea, Taiwan and Japan. While Santapau & Henry (1973) followed Stapf (1932) in the merger of *Pileostegia* Hooker f. & Thoms., with *Schizophragma* Naithani & Bennet follow Hutchinson in Keeping them distinct as these two genera can be satisfactorily demarcated by the characters (after Hutchinson): leaves evergreen; petals cohering into a cap; no sterile flowers present...*Pileostegia* and leaves deciduous; petals valvate; sterile flowers with one enlarged ovate white bract *Schizophragma*.

Pileostegia is represented in India by only one species, i.e. *P. viburnoides* Hooker f. & Thoms. *Schizophragma* has not yet been reported from India. It is now being reported for the first time from Arunachal Pradesh.

Schizophragma integrifolia Oliv., is a polymorphic species. The size of the leaves and the enlarged bract of the sterile flowers varies much; margin of the leaves entire, denticulate or dentate; lower surface of the leaves glabrous to pubescent or villous and base of the leaves subcordate to rounded or truncate. Taking various characters into account apart from the typical variety, Rehder has described the Chinese material of this species into four new varieties.

Owing to the dentate or denticulate margin, the plant collected from Perila comes near var. *denticulatum* Rehder, but due to the large size of the leaves, it comes near the typical variety. Biosystematic studies may solve the taxonomic problems of this polymorphic species. Oliver described *Schizophragma integrifolia* based on Dr. Henry's collection from China and suggested that *Schizophragma hydrangeoides* Sieb. and Zucc. var. *integrifolium* Franchet, based on David's collection must be the same taxon. Many other taxonomists supported the view of Oliver.

This species is grown as an ornamental in China. In India also it may be introduced as an ornamental climber in areas with high

rainfall and altitude of 1000-2500 m. It thrives well in partial shade and may be planted for covering walls and trunks of trees.

Scleranthus annuus L. (Caryophyllaceae) Sp. Pl. 1:406. 1753; Hutchinson. J., Fam. Fl. Pl. 1:433.t. 277 (ed.2) 1959; Muenscher, Weeds, 208. t. 32 K-M. (ed.2) 1955; Clapham *et al.* Ecr. Fl. Br. Isles 115 (ed.2) 1968; Fl. Eur. 1:149. 1964; Subba Rao & Kumari in Bull. Bot. Surv. India 13 (3 & 4) : 347. 1971 (1974).

Annual or biennial herb 2.5-25 cm high. Tap root slender. Stems ascending or decumbent, glabrous or shortly hairy, much branched. Leaves exstipulate, 5-15 (-20) mm, simple, opposite, connate at the base by their narrow scarious margins, subulate, acute, usually ciliate on the lower margins. Flowers bracteate, bracts longer than the flowers, subsessile, solitary in the forks of the stem and in terminal and axillary clusters, ca 4 mm, small, green; sepals 5, triangular, acute, glabrous, margins narrowly scarious, suberect or slightly incurved in fruit; petals 0. Stamens 10 or fewer, distichous, situated on the calyx, much shorter than the sepals. Ovary 1 celled, styles 2, long filiform, stigma capitate. Fruit indehiscent, hard \pm 4 mm long, enclosed by the glabrous 10 furrowed and very hard perigynous tube.

Flowering & Fruiting : November.*

Distribution so far known : EUROPE (Native), N.AFRICA, ASIA and introduced in U.S.A. & CANADA.

Additional report : INDIA: Tamil Nadu.

Herbarium specimen : INDIA : Tamil Nadu ; Niligiri District, on the slope, Kukal Betta Hill, 1925 m, Nov. 29, 1970, *Subba Rao & Kumari* 37399 (MH).

Notes : According to Subba Rao & Kumari (*l.c.*) : This new record for India is common on the hill slope and near fields on brown soil associated with *Wahlenbergia gracilis* Schrad. and *Senecio lessingianus* Clarke.

Scleria africana Benth. (Cyperaceae) in Benth. & Hook. f. Gen. Pl. 3: 1071, 1883; S.K. Jain & R. S. Raghawan in Bull. Bot. Surv. India 9 (1-4) : 301. 1967; H.B.Naithani, flowering Pl. Ind. Nep. Bhutan p.474. 1990. *Diplacrum africanum* (Benth.) Clarke in Durand & Schinj, Consp. Fl. Afr. 5 :668. 1895. *D. caricinum* Fischer in Gamble's Fl. Madras 3:1164, repr. ed. 1957 pro parte.

Annual, slender, glabrous herb. Stems tufted, few to about 12 cm high, leafy their whole length. Leaves 1.5-4 cm long, 2-4 mm broad, linear, acuminate. Inflorescence of small axillary or terminal clusters of spikelets, often continued nearly to the base of the stem; in very- short-stemmed forms (as specimens) many spikelets crowded in lower axils, peduncles very short; 3-4 male spikelets at the base of the inflorescence, glumes 3-4, membranous or hyaline; the female spikelet terminal, 1 flowered, glumes 2, ovate lanceolate, 3-nerved, entire at tip, with small, hyaline, obtuse lobes at about the middle of their margins, concave at base. Nut minute, about 1 mm long, subglobose or oblong, with 10-14 longitudinal ribs from summit to base, ribs not anastomosing.

Flowering & Fruiting : October-November.

Distribution known so far : AFRICA.

Additional reports : INDIA: Karnataka (Mysore), Maharashtra, Orissa & Goa.

Herbarium specimens : INDIA : Karnataka (Mysore) : Aglatti, 3500 ft., Nov. 1908, A. Mebold 9496 (CAL). Maharashtra ; Shimoga District, Tirthahalli, Slender annual, 2-3" tall, 600-700 m, Oct. 19, 1964, S. Raghawan 97483A (Poona BSI).

Notes : According to Jain & Raghawan (*l. c.*) : This sedge closely resembles *Scleria caricina* Benth. (*Diplacrum caricinum* R.Br.) but differs in being the plants very slender and small; the glumes are entire at tip, they merely have small, hyaline obtuse lobes towards the lower half of their margins; the ribs on the nut do not anastomose. In *S. caricina*, plant is robust, tall; the glumes of female spikelet are 3 cuspidate, lobes are acuminate; ribs on nut are anastomosing.

The earliest collection of this sedge in the Calcutta herbarium (CAL) is *A. Meebold* 9496, Nov. 1908, Aglatti, 3500 ft, Mysore. It was misidentified by Fischer as *S. caricina*; the description given by Fischer (loc. cit.) for *Diplacrum caricinum*, therefore, includes both *S. caricina* and *S. africana*.

It should be useful to examine the material of *S. caricina* (or *Diplacrum caricinum*) in other herbaria of India and segregate the specimens of *S. africana*, if any.

Along rocky slopes, rare.

Solanum blumei Nees ex Blume (Solanaceae) Bijdr. 696, 1826; Prain, J. Asiat. Soc. Beng. 74:330. 1906; Ridley, Fl. Malaya Peninsula 2:466. 1923; Subba Rao & T. R. Kumari in Bull. Bot. Surv. India 5 (3 &4) : 241. (1964). *S. violaceum* B1. Catal. Gew. Buitenz. 55, 1823, non R. Br.

Terrestrial, suffruticose, glabrous herb. Leaves towards top geminate, comprising of one large and one small leaf at each node, membranous, entire, acute, base unequal, secondary nerves 3-6 pairs forming more or less an intra marginal nerve, larger leaves 8-13 × 5-7 cm with petioles up to 2 cm long, smaller leaves 1.5 × 1.6-3.5 cm with petioles up to 1.2 cm. long. Flowers axillary, solitary or in clusters, pedicels slender, 5-15 mm long, deflexed. Calyx glabrous, subtruncate, tube 4 mm long, teeth 10 subulate, 5 longer, 1 mm, alternating with 5 shorter, 0.5 mm. Corolla glabrous, violet, about 8 mm long and 8 mm across, lobes ovate, about 9 × 3 mm. Stamens 5, epipetalous, alternating with corolla lobes, filaments broad and flat, about 1 mm, long, anthers basifixed, oblong, narrowed at the top, about 4 mm long, dehiscing by apical pores. Ovary glabrous; style glabrous about 6 mm long; stigma capitate, about 0.25 mm in diam. Fruit not known.

Flowering : June*.

Distribution known so far : SUMATRA, JAVA, BORNEO.

Additional report : INDIA: Arunachal Pradesh.

Herbarium specimen : INDIA : Arunachal Pradesh (NEFA) ; Subansiri Frontier Division, Begi to Amji, June 6, 1961, *Subba Rao* 24807.

Notes : Rare.

Solanum rostratum Dunal (Solanaceae) Hist. Sol. 234, 1813; DC. Prodr. 13 (1) : 329. 1852; Som Deva in Indian Forester 102 (2) : 138. 1976.

Stem branched from the base, spiny and stellate pubescent. Leaves ovate or oblong pinnately lobed, stellate pubescent on both sides, with spines on principal veins. Calyx 5- partite, tube spiny, later enlarging and completely enclosing the berry. Corolla 2-3 cm in diameter, yellow. Anthers yellow one of them much longer than the other four. Ovary & Styles glabrous. Berry globose 1.5-2 cm in diameter prickly.

Flowering & Fruiting : June.*

Distribution known so far : NORTH AMERICA , MEXICO, Adjacent states of USA.

Additional report : INDIA: Uttar Pradesh (Western Himalaya).

Herbarium specimen : INDIA : Uttar Pradesh; Uttar Kashi District, Naitwar, 1300 m, Tons valley, June 19, 1968, *Som Deva* 3558 (Forest Research Institute Herbarium, Dehradun).

Notes : According to Som Deva (*l.c.*) : Occasional in waste places near human habitation as a weed. In U.S.A. where locally known as Buffalobur, Texas thistle etc., it is reported to cause poisoning when animals feed upon herbage or berries (Muenschar, 1945). Its presence in himalaya may be due to seeds coming with the pines imported from Mexico by Forest department for plantation.

Soliva anthemifolia (Juss.) R.Br. (Asteraceae) in Trans. Linn. Soc. 12:102 (1817) ; U.C. Bhattach. in Bull. Bot. Surv. India 5 (3 &4) : 375. (1964); H. B. Naithani, Flowering Pl. Ind. Nep.

Bhutan p. 239. 1990. *Gymnostylis anthemifolia* A. Juss. in Ann. Mus. Par. 4:262 (1804).

Flat, diffuse, annual herb. Stem much shorter than the leaves, forming dense tufted growths; plant body increasing radially by rigid stolons, rooting below the point of insertion of the sessile heads; roots fibrous, tough, Leaves radical, petiolate, simple, oblong to oblong lanceolate, 3-10 cm long, finely dissected into minute linear, 1-multifid segments simulating a decomposed condition; ultimate segments 1-3 mm long and 5-8 mm broad, covered with long strigose simple hairs or sometimes glabrous; base sheathing, almost white, scarious, broadly ovate to nearly cordate, over-lapping and aggregating below the heads. Heads sessile, several together, greyish green, enclosed within leaf bases; extremely villous hairy, 2-3 mm in diameter; fruiting heads much enlarged, becoming almost spherical, 8-1 cm in diameter; involucre bracts several 2 mm long, ovate to ovate lanceolate, nearly equal, in two rows, covered with long simple strigose hairs; margins scarious, white. Receptacle flat, without any scales, extremely villous within; florets in the circumference in several rows, female, apetalous; ovary oblong to elliptic, truncated at the tip, white, with hairs at this region; ovule elliptic; style filiform, fairly rigid with white papillate outgrowths, much longer than the ovary, straight, terminal slightly notched at the end. Disc florets mostly male or sterile, tubular, pale yellow, 2-3 toothed at apex, gradually tapering towards the base. Sterile florets with prominent pistillode, with or without anthers and mixed up with the fertile males; anthers as many as petals, obtuse at base; pollen worted. Achenes in mature spherical heads compactly arranged, 1.5-2 mm long, dark brown, lenticular, bordered by a thick, transversely rugose pale brown wing, devoid of pappus; style rigid, persistent, with hooked tip; mature achenes.

Flowering & Fruiting : February-April.

Distribution known so far : AUSTRALIA (Queensland), NEW SOUTH WALES and SOUTH AMERICA (BENTHAM, 1866), NEPAL & BHUTAN.

Additional reports : INDIA: Uttar Pradesh, Rajasthan.

Herbarium specimens : INDIA : Uttar Pradesh : Near Ramnagar,

in Flowers and mostly in Fruits, Apr. 19, 1962, *U.C. Bhattacharyya* 20348 (BSD; Bahraich, Naipalgunge Road, mostly in flowers, few in fruits, Feb. 17, 1963, *C.L. Malhotra* 26667 (B.S.D).

Notes : According to Bhattacharyya (*l.c.*) : *Soliva anthemifolia* R. Br., is a species of tropical Australia (Queensland) and New South Wales where it is considered a good fodder. It is also found in South America (Bentham, 1866). The species has so far not been recorded from India and its recent discovery from two localities in northern districts of U.P. is of considerable interest. These collections are from wild populations. The possibility of their introduction into the area in the past cannot, however, be ruled out. Even if there has been introduction of the species, accidental or otherwise, the plant appears to have undergone perfect naturalization considering the conditions and habitat in which the present collections were made. It would be of interest to look for this plant in other parts of the country as it may give a clue to its distribution. There are no specimens from India in either the FRI Herbarium or the Calcutta Herbarium. In fact the only specimens in Indian Herbaria are from Rev. Scortechini's collection from Queensland (Australia). Found on sandy moist stream bank and on exposed soil near water.

***Spergularia diandra* (Guss.) Helder. & Sart. (Caryophyllaceae)** in Herb. Graec. Norm. 492:1124. 1855; Monnier and Ratter in Tutin *et al.* Fl. Europ. 1:155. 1964; Ratter in Davis, Fl. Turk. 2:292. 1966; Stewart, Ann.Cat. Vas. Pl. W. Pak. 253. 1972; Bhopal and Chaudhri in Pakistan Systematics 1 (1) : 97. 1977; H.B. Niethani & Dayal in Ind. J.For. 4 (3) : 242. 1981. *Arenaria diandra* Guss. Prodr. Sic. 1:515. 1827.

Annual with slender tap root. Stem spreading, much branched from the base, 3-30 cm. Leaves filiform, slightly fasciculate, mucronate, stipulate with short triangular-lanceolate, silvery stipules. Inflorescence ebracteate above, much-branched, slender. Flowers in leafless cymes, lilac or white, peduncle longer, glandular. Sepals 2-3 mm, margin scarious, as long as the capsule. Petals lilac or white, narrowly elliptic, equalling the sepals. Stamens 2-3. Style 3. Fruit

a capsule, 1.5-3 mm, subglobose, valve purple black at maturity. Seeds c 0.7 mm wingless, triangular-obovate, rugulose, bristling with rigid papillae, dark brown to black.

Flowering & Fruiting : March.*

Distribution known so far : EUROPE, SYRIA, USSR; IRAQ, IRAN; TURKEY; NORTH AFRICA & PAKISTAN.

Additional report : INDIA: Uttar Pradesh.

Herbarium specimen : INDIA : Uttar Pradesh : Farrukhabad District, Mahmoodpur Sinauda (Tilia Garho), Mar. 4, 1968, *Ram Dayal* 1968T (DD).

Notes : According to Naithani & Ram Dayal (*l.c.*) : In sandy and waste places. *S. diandra* (Guss) Helder. & Sart. is closely related to *S. rubra* (L) J. & C. Presl but differs in having, stipules ± broadly triangular; leaves slightly fasciated; inflorescence ebracteate above; petals narrowly elliptic; stamens 2-3 in contrast, stipules lanceolate-acuminate; leaves strongly fasciculate; inflorescence bracteate; petals ovate; stamens 5-10 are the characters of *S. rubra*.

Spigelia anthelmia L. (Spigeliaceae) Sp.Pl.1 (1753) 149; Fl. Malesiana 6 (1962) : 376-378; M. Oommachan & J.L. Shrivast. in J. Bombay Nat. Hist. Soc. 84 (3) : 730. 1987.

Annual herb, 50-70 cm high, unbranched or with few pairs of branches arising near the base; stem erect, terete, cylindrical, green, glabrous, with a few remote pairs of small leaves and an apical pseudowhorl of four larger leaves. Leaves with interpetiolar, broadly triangular, blunt, glabrous stipules; petioles 0-0.5 cm; lamina ovate-oblong to ovate-lanceolate, 3-10 by 1-3 cm, herbaceous, scabrous above, glabrous beneath, cuneate and often decurrent at the base, attenuate at the apex; nerves 4-6 pairs, strongly ascending. Inflorescences terminal in the axils of the whorled upper leaves, up to 15 cm long, peduncle very short, glabrous; bracts lanceolate, 1.4-2 mm long. Flowers spaced, sub-sessile. Sepals 5, free, slightly unequal in length, ovate-linear-lanceolate, 2-3 mm, acute, glabrous to sparsely puberulous outside, pale green. Corolla salver-shaped,

5-lobed, glabrous, white to red or purplish; tube 6-10 mm, triangular. Stamens 5, inserted slightly below the middle of the tube, filaments filiform, 1 mm, anthers attached slightly above the base, lanceolate, 1-1.5 mm, obtuse. Ovary glabrous, subglobose, 0.5-0.75 mm, style cylindrical, 0.75 mm; stigma ovate-lanceolate, 1.5-2 mm, pubescent near the tip, caducous. Capsule 4-5 by 5-6 mm, squamulate-tuberculate. Seeds obliquely ellipsoid or ovoid, 1.5-2 mm, dull-brown, tuberculate.

Flowering & Fruiting : Time not mentioned.

Distribution known so far : SOUTH AMERICA (Native) ; TROPICAL WEST AFRICA and MALAYASIA (Naturalised).

Additional report : INDIA: Madhya Pradesh.

Herbarium specimens : INDIA : Madhya Pradesh ; around Jabalpur, COD; *ibid.*, water works areas, *M. Oommachan & J.L. Shrivastava* s.n.

Notes : According to Oomachan & Shrivastava (*l.c.*) : A rare weed of roadsides, waste places in forest area in sandy soils during rainy season. A self-pollinating plant; flowers open only for a very short period in the after-noon.

A poisonous plant, the decoction of the roots is said to be used as an effective vermifuge locally.

Identification of the specimen was made at Kew Herbarium.

Stachytarpheta dichotoma Vahl (Verbenaceae) Enum. Pl. 1:207. 1805; R.R. Rao *et al.* in J. Bombay Nat. Hist. Soc. 79 (1): 233. 1982.

Much branched undershrubs; branches dichotomous, purplish or sometimes green, faintly quadrangular, sparsely hairy; leaves 5-10 x 2-4.5 cm, ovate-elliptic, dentate, base decurrent along the petiole; flowers sessile, immersed in long, slender decurved spikes, bracteate; bracts lanceolate-subulate, 4-4.5 mm long; spikes 10-30 cm long; calyx tubular, 5-ribbed, 5 mm long; corolla salver-shaped, light blue turning to white; limb 3-4 mm across, oblique, 5-lobed; tube curved,

5 mm long, hairy within; stamens 2, filaments slender, included; ovary 2 locular, ovule 1 in each locule; style long, filiform, persistent; stigma capitate; drupe firmly enclosed in the calyx tube, breaking up into two 1 seeded pyrenes.

Flowering & Fruiting : Major part of the year.

Distribution known so far : TROPICAL AMERICA (Native).

Additional report : INDIA: Meghalaya.

Herbarium specimens : INDIA : Meghalaya ; Garo Hills-Tasek, B. Neogi 3569; K. Haridasan 4110, Darugiri 4125 (NEHU-Herbarium North Eastern Hill University).

Notes : According to Rao *et al.* (*l.c.*): The genus *Stachytarpheta* Vahl is represented by 2 species in India *S. indica* Vahl (*S. jamaicensis* Vahl) and *S. mutabilis* Vahl. The present report from Meghalaya forms a new record for India. The taxon is allied to *S. indica* but differs in having branches purple or green, spikes decurved or drooping; corolla light blue turning white; limb 3-4 mm across; tube 4-5 mm long. In contrast, in *S. indica* branches are green, spikes erect, corolla deep blue; limb 6-8 mm across, tube 6-8 mm long.

Fairly naturalized in Meghalaya specially in Garo Hills.

Strobilanthes walkeri Arn. ex Nees (Acanthaceae) in Hook. Comp. Bot. Mag. 2: 312. 1836 & in DC. Prodr. 11:181. 1847; T. Anders. in Thwaites Enum. 227. 1860 & in Journ. Linn. Soc. 9:470. 1867; Bedd. Ic. Pl. Ind. Or. t. 222. 1874; Clarke in Hook. f. Fl. Brit. Ind. 4: 440. 1884; Trimen, Handb. Fl. Ceylon 3:305. 1895; Vajr. & S.R. Sriniv. in Bull. Bot. Surv. India 15 (3-4) : 280. 1973 (1976).

Shrubs or undershrub of about 1.5 m high, having very variable leaves in size. Leaves are opposite, unequal, elliptic to ovate, densely lineolate above and scarious on both sides with bluntly serrate margins. Inflorescence in axillary and in terminal capitate cymes of 1-5, peduncles villous and thickened upwards. Flowers pink, 1-4 per head. Capsule ellipsoid and glabrous. Seeds 2, ovate and covered with adpressed silky hairs.

Flowering & Fruiting : November.*

Distribution known so far : CEYLON.

Additional report : INDIA : Tamil Nadu.

Herbarium specimens ; INDIA : Tamil Nadu ; Niligiri District, towards Jakkanery, Kunjapanai R.F., 1100 m, Nov. 25, 1970, Vajravelu 37053. CEYLON : "4000 to 7000 ft." Beddome s.n., Acc. No. 61526; C.P. 3517; *Herb. Wight*. Acc. Nos. 61523 & 61527 (All in MH).

Notes : According to Vajravelu & Srinivasan (*l.c.*) : So far *Strobilanthes walkeri* Arn. ex Nees has not been reported from India, though R.H. Beddome (1874) and J.D. Hooker (1884) have dealt with this species in their floras, based on the collections from Ceylon. Further it was regarded as endemic to Ceylon. The occurrence of this species in the Nilgiri Hills extends its distribution to S. India, suggesting phylogeographic affinities of these areas.

For detailed description and figures of this species, Beddome (1874), Clarke (1884) and Trimen (1895) (*loc. cit.*) may be referred. This species is allied to *S. thwaitesii* T. Anders. and *S. Caudatus* T. Anders., but differs in having shorter corolla tube (up to only 1 cm long), while in the other two species corolla tube is always longer than 1.5 cm.

According to C.E.B. Bremekamp [Verh. Nederl. Akad. Wet. II 41 (1): 1-306. 1944] the genus *Strobilanthes* B1. *emend.* Breme., does not occur in India; its distribution is restricted only to "Sumatra and Java". The numerous species treated under *Strobilanthes* B1. (*sensu lato*) in Indian floras fall under many smaller genera which are recognised by Bremekamp. He, however, was not able to place "*Strobilanthes walkeri* Arn. ex Nees" in any of the described genera, as is evident from his remark (*loc. cit.* p. 287) "*genus adhuc incertum*".

***Struchium sparganophorum* (L.) Kuntze. (Asteraceae) Rev. Gen. P1. 1:366 (1891). R. Vasudevan in Bull. Bot. Surv. India 8 (1-4):202. 1966 (1967). H.B. Naithani, Flowering P1. Ind. Nep. Bhutan p.240. 1990. *Ethulia sparganophora* L. (1763). C.D. Adams in Fl. W. Trop.**

Afr. 2:269. 1963.

Semi-aquatic, erect herb, up to 60 cm tall, rooted from basal nodes. Stem cylindrical, greenish, hard at base, with lower internodes 4-5 cm long and 5-8 mm thick, upper shorter, narrower, sparsely puberulous. Leaves simple, alternate, exstipulate, about $15 \times 4-5$ cm; petioles 2-2.5 cm long, base amplexicaul with minutely hairy margin; lamina elliptic, narrowing at both ends, acute, inconspicuously serrulate, minutely puberulous when young; pinnately reticulate; ribs raised, sparsely puberulous on dorsal side. Inflorescence axillary, of 4-5 subsessile, clustered, globose, homogamous capitula, hairy when young. Mature head about 5 mm diam., involucre of 4-5 series of ascending, progressively larger bracts which are triangular to oblanceolate, acuminate, greenish at middle, scarious near hairy margin. Receptacle convex, pitted. Florets all tubular, without paleae, 4-5 mm long, epigynous, actinomorphic, hermaphrodite, trimerous. Calyx of three, white, spongy, acute scales united in varying degree, often lightly, unequally lobed at apex, valvate, persistent, about 0.5 mm long. Corolla about 2 mm long, white, with narrow tube 1 mm long; and campanulate limb divided into three, acute, spreading lobes, valvate, with glands on surface. Androecium of three epipetalous stamens; filaments short, filiform, white; anthers sagittate, with sterile apex and tails, syngenesious, slightly exerted into a cone. Pollen white, spherical, exine regularly reticulate; reticulations minutely warty, meshes corrugated, germ-pores appearing as transparent circles in meshes. Ovary about 1.5 mm long, with three or more vertical ridges and glands on surface. Ovule solitary, basal, anatropous, slightly flattened. Style filiform, white, with a minute disc-like joint at base. Stigma bifid, subulate, purple, outer surface shortly hairy, receptive surface papillose. Fruits about 1.5 mm long, blackish, with three prominent vertical ridges, often with 1-3 extra secondary ridges, and glands dried up on the surface as white dots; persisting calyx as thick, spongy crown; wall thin, leathery. Seed about 1 mm long, obovate-lenticular; testa membranous, straw-coloured, or blackish; inconspicuous raphe as a line along one margin, rarely raphe dark. Embryo conical, radicle obtuse, cotyledons fleshy.

Flowering & Fruiting : February.*

Distribution known so far : TROPICAL AMERICA, AFRICA, MALESIA.

Additional reports : INDIA : Kerala, Nicobor Island.

Herbarium specimen : INDIA : Kerala; from the margin of fresh water pond in side the Zoo at Trivandrum, Feb. 1965, R. Vasudevan s. n., (identified at Kew Herbarium. Ref. H. 1518/65).

Notes : According to Vasudevan (*l.c.*); This plant was first collected from Trivandrum, in 1959, by Prof. N.A. Erady, and identified with reference to Kew Herbarium, but its occurrence in India, was not validly recorded. In Kew Herbarium, there is no other record of this plant from India.

The plants forming the subject of this note, were collected by R. Basudevan in February 1965, and identified at kew Herbarium (Ref. H. 1518/65). Descriptions are based on fresh specimens.

Plants were collected from the margin of a fresh water pond inside the Zoo at Trivandrum, Kerala. Probably the plant got introduced to this place, through the agency of foreign, wading birds brought into the Zoo. Distribution of the plant is restricted to low lying wet areas in the neighbourhood. The fruits with their spongy calyx, are buoyant and adapted for aquatic dispersal. Now it is spreading in wet localities.

A point of special interest is the presence of two unequal ovules, in some central florets in all the heads examined. But two-seeded fruits have not been noted.

Taraxacum luridum G. Hagl. (Asteraceae) in Botaniska Notiser 1938 : 307-309. 1938; Wadhwa & Malhotra in Ind. J. For 9 (4) : 354. 1986.

Tufted, spreading, annual-perennial, 5-20 cm tall herbs. Leaves suberect, procumbent, outer tongue shaped, entire or sparsely dentate or sinuate lobed, obtuse, intermediate and inner \pm linear, short, acute, interlobe entire 2-0.5 mm broad, terminal lobe elongate, tongue shaped, entire, shortly acute, petioles short, sheathing winged. Heads 2.3 cm across, radiate, solitary on radical stalks

(scapes), scapes sheathing-winged, erect with shorter or longer leaves. Involucre bracts 1.1 cm long, equally broad, more than one-seriate brightly green, ray florets 10.3 cm long, longer than the involucre bracts, disc-florets 8 mm long, pappus of plumose hairs, achenes 4 mm long and 1 mm broad, ribbed, sparsely prickly, glabrous, beaked, beaks 2 mm long.

Flowering & Fruiting : July-August.

Distribution known so far : EAST TURKISTAN (Kashgar, Bostan-terek) ca 3000 m, Jarkend, Tash-Korghan, Pamir, Jerzil (2800m).

Additional report : INDIA : Ladakh.

Herbarium specimens : INDIA : Ladakh : Pilung Chho, (Mulbekh road, 2500 m), July 20, 1976, B.M. Wadhwa 58830 (BSD); Namiskala, 3720-3950 m, July 20, 1976, B.M. Wadhwa 5882 (BSD).

Notes : According to Wadhwa & Malhotra (*l.c.*) : Found on sandy, rocky slopes and rare.

T. luridum G. Hagl., is reported to have been collected from Chitral (Kerstan 1557 of Stewart "Cat. Vas. Pl. W. Pak. & Kash." 1972) but there is no herbarium sheet in Kew/BM herbaria.

***Thespesia lampas* (Cav.) Dalzell & Gibson var. *longisepala* Borss. (Malvaceae) in Blumea 14:118. f. 14C. 1966., Anand Kumar in J. Econ. Tax. Bot. 7 (3) : 665. (1985); H.B. Naithani, flowering Pl. Ind. Nep. Bhutan p. 66. 1990.**

Undershrubs to shrubs. 1.5 -3 m high. Branches cylindrical, densely tomentose by stellate hairs, glabrescent with age. Petiole 1-7.5 cm, densely stellate hairy. Upper leaves entire or sinuate, 4-9.5 × 2-7.8 cm, ovate, acute or sub-acuminate at the apex rounded at the base. Lower leaves usually 3-lobed, 5-13.5 × 3.5-12.5 cm, 5-7 nerved at the base; lobes ovate or deltoid with acute or sub-acuminate apex; leaf base cordate. Leaves sparsely stellate and simple hairy above, densely stellate tomentose beneath; midrib with a linear nectary on undersurface near the base of lamina. Flowers solitary, axillary or by the reduction of upper leaves in axillary, often

seemingly sympodial, long stalked racemes of few (1-5) flowers. Pedicels 4-10 mm long, slightly accrescent; in 1-flowered inflorescence, pedicel jointed above the middle. Epicalyx segments 4-6, linear or subulate, 5-9 mm long, stellate-hairy, caducous. Calyx cupular, accrescent; segments 7-10 mm long, triangular or sub-linear, apex acute or acuminate; sinuses rotundate; densely stellate hairy, glabrescent with age. Corolla yellow with a deep purple centre, infundibuliform, petals up to 8.5 × 6 cm. Staminal column 1.5-2 cm, almost antheriferous throughout. Ovary conical, acuminate, 5-celled. Capsules black, woody, ovoid, beaked, 5-angled, 2.2-2.6 × 1.5-1.8 cm, minutely stellate hairy, glabrescent. Seeds black, ovoid, angular, turgid, 4-5 mm long; sparse appressed, simple hairy, glabrescent.

Flowering & Fruiting : August-December.

Distribution known so far : JAVA, BORNEO.

Additional reports : INDIA: Uttar Pradesh, Madhya Pradesh, Assam, Orissa and Meghalaya.

Herbarium specimens: INDIA : Uttar Pradesh ; Mirzapur District, Pipri Rihand Dam site, Oct. 24, 1964 *Panigrahi* 2022; Mirzapur District, Ghoghra Dam, Silhat Sector, Oct. 11, 1969, *Panigrahi* 12434. Madhya Pradesh; N. Bilaspur, Kunkun, Dec. 31, 1964, *C.M.Arora* 7339; Ambikapur District., Jamdoarighat Hasdo, Aug. 23, 1974, *G.Sengupta* 20577.

Notes : According to Anand Kumar (*l.c.*) : This variety can be easily distinguished from var. *lampas* by its longer calyx segments and rotundate sinuses of the calyx. In mixed Forest usually on Slopes.

Triumfetta repens (B1.) Mer & Rolfe (Tiliaceae) in Philipp. J. Sci. 3(Bot.) :111. 1908; Merr. Enum. Philipp. Fl. Pl. 3:31. 1923; Backer & Bakh. f. Fl. Java 1: 395. 1963; H.S.Dagar & Chakrab. in Ind. J.For. 10 (1) : 68-69. 1987. *Porpa repens* B1. Bijdr. : 117. 1825; Miq. Fl. Ind. Bat.1 (2) : 198. 1859.

Woody creeper; white or yellow stellate-strigose or tomentellous. Leaves elliptic to orbicular, shallowly to deeply 3-5 -lobed or

sometimes without lobes, up to 3×2 cm, rounded or subcordate or acute at base, shallowly dentate-serrate at margins, obtuse to acute or often retuse at apex, chartaceous-coriaceous, blackish-green when dry, palmi-nerved; petiole 2-13 mm long. Inflorescences borne on short and erect branches, cymose, leaf-opposed, (2-) 3-flowered, ca 2 cm long, pedunculate (5-10 mm long). Flowers shortly pedicellate; sepals 5-6, linear, $8-10 \times 0.8-2$ mm, recurved; petals 5-6, spathulate-oblongate or unguiculate-oblongate, $6-7 \times 1.2-3$ mm, yellow, bearded near base; outer disc glands 5-6, transversely oblong; inner disc shortly cupular, thin, puberulous at apex; stamens 28-36; ovary 1.2-2 mm in diam.; style filiform, ca 7 mm long, shortly 3-4-fid at apex. Fruits globose, 13-15 mm in diameter, densely echinate, glabrous, 3-4-loculed, green, turning black or dark brown when dry.

Flowering & Fruiting : April-May; October-November (perhaps throughout the year).

Distribution known so far : INDO-CHINA to JAVA, BORNEO, PHILIPPINES; KEELING ISLANDS, MADAGASCAR and the small islands of the coast of QUEENS LAND (*testibus Merrill, l.c.*).

Additional report : INDIA: Car Nicobar Island, Great Nicobar Island.

Herbarium specimens : INDIA : Car Nicobar Island : Mus, Nov. 12, 1983, Dagar 9833 (PBL). Great Nicobar Island : Kopenheat, Apr. 29, 1984, Chakraborty 10208 (PBL).

Notes : According to Dagar & T. Chakrab.(*l.c.*) : Rare strandline plant growing on sandy beaches. It is the third species of *Triumfetta* to be discovered on the Andaman & Nicobar Islands and can be readily distinguished from the earlier known species, *T. anua* L. and *T. rhomboidea* Jacq., by its prostrate habit.

Utricularia stanfieldii P.Taylor (Lentibulariaceae) in Taxon 12:294. 1963 & Kew Bull. 18 (1) : 88-91. t. 28 & 29. 1964; J. Joseph & J. Mani in Bull. Bot. Surv. India 24 (1-4) : 109.1982 (1983).

Ephemeral erect terrestrial insectivorous Plants. Rhizoids 5-6, from the base of the scape with many traps. Stolons similar to

rhizoids, branched. Leaves a few, at the base of the scape and also along the stolon, ca 5 mm long, uninerved. Traps a few, along the leaf margins more on the rhizoids, long stalked, ca 1 mm long (with stalk), ovoid; mouth oblique. Scape erect, 2-4 cm tall, simple, capillary, finely papillose towards the base and smooth above. Scale ca 1 mm long, 2-5 on the scape, elliptic, both scales and bracts closely adpressed to the axis, attached about the middle, persistent, the portion above the attachment about two and a half times longer than the lower part, acute to acuminate at apex; lower portion obtuse at tip. Bracts similar to scales but slightly larger and oblong. Flowers long pedicellate, solitary, rarely two, golden yellow, bracteate, ebracteolate, with trilobulate lower lip, pedicels 3-5 mm long, slender, erect. Calyx bilobed; lobes subequal, cupular, slightly accrescent and closely enveloping the fruit, prominently 6-nerved; nerves converging and united at the apex. Corolla yellow, bilobed with a conspicuous raised bigibbous palate; upper lip orbicular, ca 3x3 mm, two and a half times longer than the calyx lobe; lower lip very conspicuous and larger than the upper, deflexed, unequally 3-lobulate, shortly clawed at the base, ca 5 mm long and ca 6 mm broad across the side lobes; midlobe slightly larger than the side ones. Spur arising from a conical base, shortly acuminate, as long as the lower lip or slightly shorter, held closely below and concealed by the lip. Capsules globose, ca 1 mm in diameter, with an accrescent calyx. Seeds ovoid, faintly longitudinally striated.

Southern Nigeria ondo Province Standfield 121 (k).

Flowering & Fruiting : August-September.

Distribution known so far : WEST AFRICA- SURIA, LIBERIA, NIGERIA.

Additional report : INDIA: Meghalaya.

Herbarium specimens : INDIA : Meghalaya; Jaintia hills, near Jarain, 1450m, Joseph 50993, (ASSAM).

Notes: According to Joseph & Mani (*l.c.*) : In open moist sandy soil overlying rocks and stones along with *Drosera peltata* Sm and *D. burmanii* Vahl. It differs from the species of Taylor *l.c.* having long stalked traps; 1 (-2) F1. instead of 2-7 (alternating steric bracts) and the spur as long as or with shorter than the lower lip at the

corolla instead of being longer. The species of *Stanfield* 121 (k) from S. Nigeria.

Vicia monantha Retz. (Papilionaceae) Obs. Bot. 3:39. 1783; Post & Dinsmore, Fl. Syria Palest. and Sinai 1:423-424. 1932; Burt & Lewis in Kew Bull. 1949:497-515. 1950; Tutin *et al.* in Fl. Europea 2:133. 1968; Plitmann in Davis, Fl. Turkey 3:296. 1970; Zohary, Fl. Palaest. 2:199.f. 284. 1972; Townsend & Guest, Fl. Iraq 3:521. 1974; G.P.Roy & V.Singh in J. Bombay. Nat. Hist. Soc. 77 (3) : 532 1981. *V.gracilis* Banks & Sol. ex Russ. Nat. Hist. Aleppo ed. 2. 2:259. 1794. *V. cinerea* M.Bieb. Fl. Taur. -Cauc. 3:470. 1819. *V. calcarata* Desf. var. *cinerea* (M.Bieb.) Boiss. Fl. Orient. 2:590. 1872. *V. griffithii* Baker in Hook. f. Fl. Brit. Ind. 2:178. 1876. *V. monantha* Retz. var. *cinerea* (M.Bieb.) Dinsm. Fl. Pal. ed. 2. 1:424. 1932. *V. monantha* Retz. subsp. *cinerea* (M.Bieb.) Maire in Bull. Soc. Hist. Nat. Afr. Nord 31:17. 1940 (Papilionaceae).

Annual climbing herbs, clothed with short, appressed and spreading silky hairs. Stem terete. Leaves alternate, 5-12 cm long, pinnate; rachis ending into 2 to 3-fid tendrils; leaflets 12-18, scattered and paired, linear-oblong, 8-25 × 1-2 mm, obtuse, distinctly veined beneath; petiolules ± 1 mm long. Stipules deltoid, deeply palmately lacinate. Racemes peduncled, not exceeding the leaves, laxly 2 to 4-flowered. Calyx-tube campanulate; upper teeth deltoid, lower ones linear. Corolla lilac, ± 1.3 cm long. Style finely downy all round the tip. Pods flat, oblong, 2-3.5 × 0.6-1 cm., glabrous, 5 to 7-seeded. Seeds oblong-suborbicular, smooth.

Flowering & Fruiting : January March.

Distribution known so far : W. and S. EUROPE, CYPRUS, SYRIA, LEBANON, PALESTINE, JORDAN, EGYPT, ARABIA, KUWAIT, BAHRAIN, TURKEY, CAUCASUS, IRAN, PAKISTAN, AFGANISTAN, CENTRAL ASIA (TURKMENIA to PAMIR-ALAI), MOCARONESIA and N.AFRICA (MOROCCO to LIBYA).

Additional report : INDIA : Rajasthan.

Herbarium specimens : INDIA : W. Rajasthan; Churu, Sujangarh, Mar. 18, 1976, Roy 2492 B (BSJO, CAL).

Notes: According to Roy & Singh (*l.c.*) : *Vicia monantha* Retz. (syn. *V. griffithii* Baker) had been included in J.D. Hooker's

Flora of British India 2:178. 1876 on the basis of specimens collected from Punjab and Baluchistan (Rawal Pindae and Futteyjung : *Griffith* 1114, *Clarke* 105 (CAL).

This species has not been recorded in Indian floras but is likely to be found in other regions.

Semidesertic, common weed in wheat and barley crops and fallow fields, Churu, Sujangarh.

***Vicia narbonensis* L.** (Papilionaceae) Sp. Pl. 737. 1753; Hook f. Fl. Brit. Ind. 2:179. 1876; Bailey in Man. Cult. Pl. 552, 1924; Ali in Bot. Notiser 120:50. 1967; U.Plitmann in Davis Fl. Turk. 3:321. 1970; H.S.Kirn in J.Econ. Tax. Bot. 4 (3) : 979 (1983).

A stout, suberect, 25-80 cm tall annual herb; branches hirsute; stipules large, 1-1.5 cm long, semi-hastate, toothed; teeth 3-8; leaves pinnate lower with 2 and upper with 4 leaflets; rachis ending in a simple or branched tendril; leaflets subsessile, 0.7-4.2 cm long, 0.6-2.5 cm broad, obovate-broadly lanceolate, entire, mucronate, pilose at the margin; flowers 1-4 in axillary shortly peduncled racemes, peduncle 0.1-0.3 cm long; pedicel 0.1-0.2 cm long; calyx 0.8-1.4 cm long, mouth slightly oblique, teeth unequal, lower lanceolate, as long as the calyx tube, upper deltoid and smaller, tube 0.4-0.6 cm long; corolla purple, more than twice the length of calyx, vexillum 1.6-2.6 cm long, wings 1.4-2.5 cm long and keel 1.5-2.4 cm long; stamens 9+1, tube oblique at the apex; ovary flat, pilose; style curved, on the lower side of the tip; pod oblong linear, 4-4.8 cm long with recurved beak, pilose, tubercled, 4-7 seeded; seeds globular, dark-grey in colour and 0.3-0.6 cm India.

***Flowering & Fruiting* :** March-May.

***Distribution known so far* :** PAKISTAN, U.S.S.R. , S. EUROPE, NORTH AFRICA, CENTRAL ASIA (some parts).

***Additional report* :** INDIA: Jammu & Kashmir.

***Herbarium specimens* :** INDIA : Jammu & Kashmir, Poonch District, Mankote, near Chote Shah Shrine in Tehsil Mendhar, H.S.Kirn 1381, 2317, 2322 (Herb. Dept. of Biosciences Jammu Univ.)

Notes : According to Kirn (*l.c.*) : In Hooker's *Flora of British India* Baker reported existence of *Vicia narbonensis* Linn., near Peshawur, now in Pakistan. Ever since, it has not been reported from anywhere else in the country. It grows as a common (naturalised) weed in wheat fields and wastelands.

Vitex agnus-castus L. (Verbenaceae) Sp. Pl. 638. 1753; Jafri & Ghafoor in Nasir & Ali, F1. Pakistan 77:25. 1974; Naomi Feinbrun-Dostan, F1. Palaestina 3:95, p1. 154. 1978; Townsend in Davis, F1. Turkey 7 : 35. 1982; Parmar in J.Econ. Tax. Bot. 4 (3) : 1039. (1983).

Shrubs up to 2 m tall; branches grey tomentose. Leaves palmately 5-7 foliolate; leaflets subsessile to petiolulate, 5-10 × 0.8-1.5 cm, lanceolate, acuminate, usually entire. Inflorescences 10-20 cm long, sub-cylindric, interrupted; cymes forming verticillaster, compact, sessile or subsessile. Flowers pale violet. Calyx c 0.3 cm long; teeth much shorter than the tube; veins on the inside of the calyx tube reticulate in the upper third. Corolla about three times as long as the calyx, lower lip glabrous inside. Filament densely bearded below. Drupes globose, slightly longer than the calyx.

Flowering & Fruiting : August- December.

Distribution known so far : A MEDITERRANEAN, IRAN, PAKISTAN, (Sindh).

Additional report : INDIA: Rajasthan.

Herbarium specimens : INDIA : Rajasthan : Ganganagar, Rai Singh Nagar, Roy 3861 & 4947 (BSJO).

Notes : According to Parmar (*l.c.*) : Of the 14 species of *Vitex* L., reported from India so far, only one species is distributed in Rajasthan (Moldenke, 1980). The species can be distinguished from *V. negundo* L., in having leaflets 5-7, cymes sessile or subsessile, forming a sub-cylindrical, narrow inflorescence, whereas in species *V. negundo*, leaflets are 3-5 cymes often somewhat lax and paniced, forming a pyramidate inflorescence.

Rare, in moist sandy loam soil, probably introduced.

Voacanga grandifolia (Miq.) Rolfe (Apocynaceae) in J.Bot. 21:202. 1883; Backer and Bakh. f. F1. Java 2:229. 1965; K.C.Sahani & Bahadur in Ind. J. For. 2(1) : 33. 1979. *Orchipeda grandifolia* Miq. Ann. Mus. Bot. Lugd. Bat. 1: 316. 1864.

A small tree or large shrub 2-6 m high. Leaves often crowded at the tops of the branchlets, oblong, with a gradually narrowed or acuminate apex, chartaceous, patently pubescent on both surfaces of glabrous above, 15-43 × 6-15 cm. Flowers 5-merous, in terminal, widely patent or drooping cymes; peduncles 5-20 cm, 2-3 times branched; pedicels 1-1.5 cm. Calyx 1.5-2 cm, much shorter than the corolla-tube, broad, with a rounded-obtuse base, finely pubescent. Corolla-tube strongly twisted to the left, widened near the top; limb 5-5.5 cm diam. ; lobes 2-2.5 cm wide. Disc consisting of 5 basal lobes. Style thickened above the base. Fruit reflexed, ellipsoid follicles, 5-6 × 4-5 cm; pulp orange. Seeds black.

Flowering : October - December. *Fruiting* : January-March.

Distribution known so far : JAVA (Indonesia).

Additional reports : INDIA: Goa, also introduced in gardens in India.

Herbarium specimens : INDIA : N. Goa ; Valpoy, Sept. 26, 1972, Sahani 3427, (Tree 5 m, Sterile); Indian Botanic Garden, Calcutta, Feb. 18, 1949, Raizada 21559 (In fruit, cult.)

Note : According to Sahani & Bahadur (l.c): *Voacanga* Thou., is a genus of laticiferous small trees or erect shrubs with about 25 species distributed in tropical Africa, Madagascar and Malaysia. Two species have been introduced into Indian gardens. *Voacanga* Thou., is a small tree or robust erect shrubs with white milky juice. Leaves opposite, sessile or subsessile, amplexicaul, leaving a large scar. Flowers in terminal (Later on seemingly infra-apical) binate, very distinctly peduncled cymes, 5-merous. Calyx tubular or campanulate, lobed, on the inside with many basal glands. Corolla salver-shaped, large, white or light yellow; tube widened at the base and in or above the middle; throat with a fleshy ring, not scaly; lobes in bud overlapping to the left. Stamens inserted in the upper widening of the corolla-tube, included, loosely cohering with the

stigma, sagittate; cells tailed. Disc annular or composed of 5 lobes. Ovaries 2, free, many-ovuled; style glabrous; stigma cylindric, 2-lobed, with a basal collar. Fruit of paired follicles, pendulous, thick, oblique, orange. Seeds many, embedded in pulp., ecomose.

V. grandifolia (Miq.) Rolfe is a small tree or tall shrub, bearing large, creamy-white flowers in drooping clusters at the end of the branches, introduced into the Indian Botanic Garden, Calcutta. All parts of the plant contain alkaloids which vary seasonally. The bark from trunks contain as high as 2.72% of alkaloids on dry weight basis in November. The leaves contain a mixture of alkaloids (yield up to 1.23% on dry weight basis) viz., vobtusine, vobtusine-lactone and deoxyvobtusine (Wealth of India 10:559. 1976).

Voacanga grandifolia (Miq.) Rolfe a tree of the family Apocynaceae, native of Java (Indonesia), has been found to be growing wild in Valpoy forests of Goa in Western Ghats. This is the first record of the genus as well as of the species from India from the wild. As Goa (W.Ghats) has several Malaysian elements in its flora, the occurrence of this taxon here is understandable. Since the leaves in the Goa plant are glabrous, its correct identity is *V. grandifolia* var. *glabrifolia* Bakh. f. (Blumea 6:386. 1950).

Xanthium spinosum L. (Asteraceae) Sp.P1. 987. 1753; Dar, Naqushi & Showkat Ara in J. Bombay. Nat. Hist. Soc. 87 (2) : 329-331. 1990; H.B. Naithani, Flowering P1. Ind. Nep. Bhutan p. 251. 1990.

Erect, annual, usually densely branched, coarse herbs. Stem tomentose, with strong, yellowish, trifid (-4-fid), spines on 2-4 mm long stalk, up to 3 cm long. Leaves with 2 mm-1 cm long, tomentose petioles; blade narrowly lanceolate, up to 8 cm long, 2.5 cm broad below the middle, lobed or not, base cuneate, apex gradually narrowed into an acute-acuminate tip, upper surface canescent, more so on veins, lower densely canescent, silvery. Flowers unisexual, monoecious, in axillary and terminal heads, male above and female below. Male heads spherical, c 6 mm across, comprising numerous, crowded florets, each with tubular, 5-toothed, green corolla; anthers 5,

free, oblong, c 1×0.36 mm, basifixed, tips mucronate, inflexed; filaments monadelphous, 1.2 mm long. Female heads ovoid, c 6 mm long, each comprising 2 florets within a prickly envelope formed by involucre bracts and terminating in two short beaks; styles thread-like, dark brown, protruding through the beaks. Fruit elliptic, 12 x 4-5 mm, densely covered with hooked bristles. Seeds 4-6 mm long, oblong, glabrous.

Flowering & Fruiting : Mid August-October.

Distribution known so far : COSMOP, EUROPE.

Additional reports : INDIA: Kashmir Himalaya, Rajasthan, West Bengal.

Herbarium specimens : INDIA : Kashmir Himalaya ; Ganderbal (Rangil) 1, 750 m, in Soil Conservation Farm, above water treatment plant, June 14, 1981, G.H.Dar 2056 (KASH); Sind valley (Pranshur), 3,350 m (an alpine meadow at one days journey on foot from Sonamarg) , on heaps of sheep dung, Aug. 22, 1983, G.H. Dar 7934-35 (KASH); Srinagar (Hazratbal), 10 km north of Srinagar), 1,625 m, near electric substation, on waste places, in association with *X. strumarium* L. and *Cannabis sativa* L. Sept. 1, 1983, A.R.Naqshi 8148-8149 (KASH); Srinagar (Chatterhama), 18 km north of Srinagar, 1,700 m, along the lower bank of Bijili Canal, Sept. 2, 1983, G.H. Dar 8357, 8358 and 8359 (KASH); Srinagar around the graveyards, very common July 1988, A.R. Naqshi s.n. (KASH)

Notes : According to Dar *et al.* (*l.c.*) : *Xanthium spinosum* L. has not so far been reported from the Indian subcontinent. Growing on wasteland, roadsides and sheep dung at some places in the Kashmir valley.

Xanthium spinosum L., a recent introduction to India, differs from *X. strumarium* L., which is also an exotic, by leaves attenuate to both ends, usually with trifid (4-fid) spines at base; fruiting bur blunt or with 2 inconspicuous beaks; whereas in *X. strumarium* leaves conduplicate, rounded or sub-deltoid, unnamed in the axils; fruiting bur with usually 2 strong, porrect beaks.

It is probable that the species, due to the presence of 'Bur' , has come to India through the improved sheep breed brought from different European countries. This is strengthened by our collection of its specimens on the heaps of sheep dung in an alpine meadow of Sind valley.

The specimens of the taxon showed vigorous growth and seemed to have adapted fully to the environmental conditions of their localities. This coupled, with the spiny nature of the plant (which affords protection against grazing, lopping and trampling), is indicative of its becoming a troublesome weed in the near future.

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