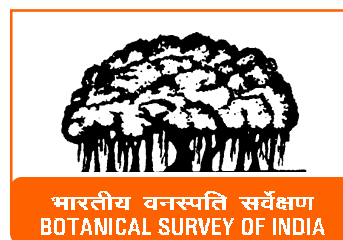


Envis

(Environmental Information System)

News Letter



भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA



Editorial

Botanical Survey of India, the premier institution engaged in the inventory of plant wealth and dissemination of knowledge on Floral Diversity of India is also the National repository of country's Floral Wealth. The ENVIS - EMCB node on Floral Diversity, Botanical Survey of India, Kolkata set up by the Ministry of Environment & Forests, Govt. of India has been assigned to prepare database on the rare and threatened plants of India, Indigenous medicinal plants, Ethnobotany, Wetland flora and Mangroves of India. This information can be accessed through web - site and e - mail.

The current issue of ENVIS Newsletter brings out some interesting articles on *Rhododendrons* from Sikkim, traditional uses of plants, potential plant species from Andamans and South India, information on plants included in CITES, the development of Herbarium Database highlighting programme of computerisation of Herbarium data of c. 3 million specimens housed in the Central National Herbarium, Botanical Survey of India etc.

Hope, this issue of ENVIS Newsletter will be useful and informative to the Botanists, foresters, Teachers, Agriculturists and all those interested in plants.

Dr. M. Sanjappa
Director, Botanical Survey of India

Mr. Harjeet Singh, Senior Advisor, Dr. (Mrs.) Indrani Chandrasekharan, Director (EI) MoEF, visiting ENVIS Centre, Botanical Survey of India, Central National Herbarium, Howrah. ▶



A NOTE ON THE DISTRIBUTION AND RARITY OF THE STATE TREE OF SIKKIM

Rhododendron niveum Hook. f. (ERICACEAE)

The genus *Rhododendron* L. is well known for its fantastic and ineffably beautiful flowers and foliage. A few species are also very much attractive for their fragrance. The name *Rhododendron* is derived from two Greek words *rhodon* means a rose and *dendron* a tree in reference to the terminal bunches of flowers that are usually red. Globally, the genus is represented by about 1000 species (Chamberlain & al., 1996) mostly concentrated in Eastern Himalayas, Western China, temperate North America and in Malaysia. They prefer to grow in acidic soils and in moist environment at an elevation ranging from 1300 to 5500 m. In India, it is represented by about 90 species, of which 36 species are found in Sikkim (Pradhan and Lachungpa, 1990). Among these, *Rhododendron niveum* Hook.f. is considered to be the most beautiful with lilac-purple flowers and dull green foliage having creamish white undersurface and was declared as the State Tree of Sikkim.

It was discovered by Sir J.D. Hooker from Sikkim Himalaya and described in his book 'The *Rhododendrons* of Sikkim Himalaya' (1849) based on fruiting material. Subsequently, it was illustrated in Botanical Magazine (1853) from the plant raised in the Royal Botanic

Gardens, Kew from the seeds collected from Sikkim Himalaya.

Chamberlain (1982) assigned the species to subsection *Arborea* Sleumer, section *Ponticum* G. Don under the subgenus *Hymenanthes* (Blume) K. Koch.

Rhododendron niveum Hook. f., *Rhododendr. Sikkim-Himalaya*: 4. 1851; *J. Hort. Soc. London* 7: 78, 93. 1852 & *Bot. Mag. 79*: t. 4730. 1853; C.B. Clarke in Hook. f., *Fl. Brit. India* 3: 466. 1882; Tagg in J. B. Stev., *Sp. Rhodod.*: 18. 1930; D.F. Chamb. in *Notes Roy. Bot. Gard. Edinburgh* 39: 332. 1982; Pradhan & Lachungpa, *Sikkim Himal. Rhodod.* 79. 1990; D.G. Long in Grierson & D. G. Long, *Fl. Bhutan* 2: 373. 1991. Type: Sikkim Himalaya, 11000 - 12000 ft., J. D. Hooker s.n. (K, Cibachrome !)

Tree, 2 - 6 m tall, branching from the base forming a bushy appearance. Stem terete, stout. Bark greyish, slightly flaking. Young shoots densely white tomentose. Leaves crowded towards the apex, downy; petiole 1 - 1.5 cm, floccose with white tomentum; lamina oblanceolate-elliptic, sometimes obovate, (8 -) 10 - 15 (-17) x (2.3 -) 3 - 5 (-5.5) cm, cuneate at base, apiculate at apex, dull green, glabrous on upper surface at maturity, densely soft, white to fawn felted

tomentose beneath, midveins depressed above, lateral nerves 12 - 16 pairs, faint. Inflorescence globular truss, sometimes conical, compact, 15 - 22 (-25)-flowered. Peduncle rusty brown tomentose, c. 2 cm long; bracts hairy, c. 1.5 x 1 cm; bracteoles hairy, c. 1 cm long; pedicel 0.5 - 1 cm long, whitish to rusty brown tomentose. Calyx c. 1 mm long, obscure, minutely 5-toothed, tomentose outside. Corolla 3 - 3.5 x c. 2 cm, tubular-campanulate, lilac-purple with dark purple nectar pouches at base, 5-lobed; lobes spreading, deeply notched with somewhat wavy margin. Stamens 10, unequal; filaments 1.5 - 2 cm, glabrous; anthers brown, c. 2 mm long. Ovary c. 6 mm long, 5 - 6-loculed, densely white to fawn tomentose; style declined, glabrous; stigma capitate. Capsule ovoid-oblong, cylindrical, 1 - 2.2 cm long, straight, blunt at apex, sparsely rusty tomentose towards base. Seeds minute, c. 1 mm long, numerous, produced at both ends.

Fl. Late April to May; Fr. November.

DISTRIBUTION: INDIA: Sikkim (East and North District); BHUTAN.

VERNACULAR NAME: Hiun-pate Gurans (Nepalese) (Pradhan & Lachungpa, 1990).

HABITAT: In exposed rocky valleys between 2900 and 3600 m; associated with *Rhododendron ciliatum* Hook.f., *R. hodgsonii* Hook.f. and *R. thomsonii* Hook.f.



SPECIMENS EXAMINED : SIKKIM: North Sikkim, Lachung to Yumthang, 23.5.1987, D.C.S.Raju 7419, Fl. (BSHC); Yumthang, 15.5.1990, R.C.Srivastava 10963 & 10970, Fl. (BSHC); on way from Lachung to Yumthang, 3100 m, 2.5.2001, D.Bhattacharyya 27752, Fl. & Fr. (CAL); East Sikkim, Kyangnosla, 8.5.1994, P.Singh & B.P.Uniyal 16228, Fl. (BSHC).

USES : Some local inhabitants use the bunches of its flowers along with other *Rhododendrons* for decoration in Lachung, North Sikkim. There is a great potential of developing this plant in horticulture.

NOTE : The field tours in Sikkim during April - May and July revealed that *R. niveum* exists only in a small scattered population along with *Abies webbiana* Lindl. and other *rhododendrons* in protected areas. This is also evident in herbaria as it is represented by few collections. Pradhan & Lachungpa (1990) reported that due to heavy rainfall in 1980 at Yakchey La, North of Lachung, North District, Sikkim, massive landslides occurred resulting in the degradation of entire population of *R. niveum*. Apart from the natural disasters, the other threats are clearing of forests for road construction and sometimes using them as fuel wood. Some of the habitats at Yakchey, between Lachung and Yumthang are fenced by the Sikkim State Forest Department and declared it as the Sanctuary. Specimens recorded from Arunachal Pradesh (housed in CAL & CDRI) were found to be *R. keysii* Nutt. (*R. S. Rao* 7908) and *R. neriiflorum* Franchet ssp. *phaedropum* (Balf. f. & Farrer) Tagg (*Rao* 7219, 7491, 7568, 7815, 7882). In an earlier publication, Ghosh & Samaddar (1989) and Mao & al. (2001) mentioned the distribution of this species in Arunachal Pradesh and Biswas (1966) recorded its occurrence in Darjeeling, West Bengal. But occurrence of this species in Arunachal Pradesh and West Bengal (Darjeeling District) is doubtful and is confined only to Sikkim and Bhutan. It is also reported to be very rare in Bhutan (Long, 1991; Pradhan, 1999).

There is a great need for conserving this species both *in situ* and *ex situ*.

Another variety, *R. niveum* Hook. f. var. *fulva* Hook.f., raised from the seeds sent by J. D. Hooker in 1848-49 from Sikkim bloomed in Royal Botanic Gardens, Kew was illustrated in *Botanical Magazine* (1885, t. 6827) is an apparently a colour variant of typical *niveum* with buff indumentum on the underside of leaves.

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***Agapetes affinis* (Griff.) Airy Shaw, an endemic species to Jaintia and Khasia Hills in Meghalaya has great potentialities for horticulture**



The genus *Agapetes* is known for its beautiful red, pink, yellow or greenish white flowers. It belongs to the family Ericaceae, subfamily Vaccinioideae. There are about 116 species of *Agapetes* distributed in different parts of the world of which about 101 species are in Nepal, Bhutan, India, Bangladesh, China, Myanmar, about 11 species in Malesia, 4 species in N. Australia and 1 in Thailand.

Agapetes affinis (Griff.) Airy Shaw is endemic to Jaintia and Khasia Hill districts of Meghalaya especially in Jowai, Jarain, Pynursla and Cherrapunji with brick red to red or with greenish white flowers. Plants are mostly epiphytic shrubs or shrubs on mossy bed of rock or on rock crevices with characteristic ligno-tubers which are swollen woody stems.



Agapetes affinis (Griff.) Airy Shaw: Stems terete, lenticillate, glabrous. Leaves pseudowhorled, 3-5 in each whorl, sessile; lamina ovate-lanceolate, 7.5-16.5 x 3.1-7.5 cm, obtuse to auriculate at base, entire to slightly crenate, acuminate to caudate at apex (cauda 1-2.2 cm long), coriaceous, glabrous, dark green above, pale beneath, midrib with laterals slightly raised above and prominent beneath, brochidodromous, marginal nerve prominent.

Inflorescences corymbose, axillary or cauline, 6-13-flowered, all floral parts puberulous; peduncle 2-3 cm long, cataphylls 9-13; 2-1 mm long, ovate-acuminate, medianly veined; 5-6 closely alternate, basal, 1.5-2 mm long; 6-7 cataphylls 0.7-1.5 mm long, loosely alternate, 1-3 mm apart; pedicels 1.4-2 cm, articulate at the base; bract 1, triangular boat-shaped, 0.7-1.7 mm x 0.5-1 mm, persistent to caducous; bracteoles 2, opposite to alternate, linear-triangular, 0.5-0.6 mm long, at 5-10 mm up from base. Calyx tube campanulate, 4-6.5 x 3-7 mm, 5-lobed, lobes ovate, 1.5-3.5 x 1.5-3 mm, acuminate at apex, maroon at tips. Corolla brick red to greenish white, tubular-urceolate, 1.5-2 x 0.4-0.7 cm, base 3-3.5 mm wide, angular, reticulate raised outside; midveins extend to apex in each lobe, 3-4 laterals arise from midvein at an angle

of 30° lateral veins of adjacent midveins joined at ends; 5-lobed; lobes ovate to elliptic 3-4 x 1.5-2.5 mm, acuminate to obtuse at apex, greenish. Stamens 10 in 2 whorls, 5 in each, 14-17 mm long; filaments 2.5-4 mm long, spatulate to elliptic, medially nerved, incurved,

puberulous, densely at the junction of anther and filament; anthers 1.1-1.4 cm long; anther sac 3-4.5 mm long, slightly tuberculate; tail 0.2-1 mm long, horizontal, recurved, 1-2 lobed; horns 0.8-1.1 cm long, linear, glabrous to slightly tuberculate. Ovary inferior, 5-5.5 mm in diam., 5-chambered, each incompletely 2-lobed, ovules many in each; placentation axile. Style

linear, 1 mm deeply inserted the ovary, 15-18.5 mm long, glabrous; stigma capitate, 2.5 x 1.5 mm, 5-lobed, green. Infructescences with 5-11 fruits; peduncle 1.2-2.5 cm long, 1-1.5 mm broad, puberulous; cataphylls 11-13, similar to pedicel; fruits globose-truncate, 7-8 x 6-6.5 mm with persistent crown of calyx lobes, minutely puberulous; faintly 10-ridged at truncate tip; persistent calyx lobes triangular, 2-3 x 2.5-3.5 mm. Seeds ovoid, 1.5-2 x 0.7-0.8 mm, slightly pointed at base, hyaline; seed coat canalliculate or faintly reticulate.

Distribution: India : Meghalaya (Jaintia Hills : Jowai, Jarain, Pynursla; Khasi Hills : Cherrapunji).

Flowering: October to November. Fruiting: March to April.

Vernacular name: Soh-la-mut (Khasi).

Habitat: Common in shady places in forests between 1000 - 1200m. Corolla tube brick red to dark red but greenish white in shady places.

Uses: The corolla tube tastes sour and cooked as vegetable with other vegetables or with dry fish.

The plants with its beautiful attractive flowers draw the attention of tourists in the Khasia and Jaintia hills. This plant can be explored in horticulture for its varied coloured flowers with deep green foliage.



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KNOW OUR CITES PLANTS - I Fascinating *Paphiopedilums* (CITES - Appendix I)

Orchids with their fascinating flowers perhaps represent royalty and aristocracy in floriculture. They are very much admired for their beauty and amazing diversity in structure, colour and fragrance of flowers. With their bewildering range of flowers, they have an ever demanding market of orchid fanciers and at the same time are also quite popular among professionals throughout the world. They grow under varied environmental conditions favouring high rainfall of about 1500-2500 mm/year from April to October, with relative humidity of 70-90% and temperature ranging from 10°C-25°C, but their greater diversity is found in tropical and sub-tropical

regions. Habitat is also one of the major factor effecting their growth, and hence the decline of orchid species is an indicator of ecosystem degradation.

Orchids exhibit an enormous species diversity in India due to its varied topographical, ecological and climatic conditions. Hooker (1888, 1890) reported 1600 species from erstwhile British India; Pradhan (1976, 1979) estimated about 810 species from present political boundary of India; Bose & Bhattacharjee (1980) reported 996 species under 162 genera; Chadha (1992) and Sathish Kumar & Manilal (1994) reported 1000 species from 150 genera and 1141 species under 166 genera respectively.

The *Slipper Orchids* comprises of three genera *Cypripedium* (temperate North America, Europe and Asia), *Phragmepedium* (Central and northern South America) and *Paphiopedilum* (tropical Asia) and totals about 160 species. The shape of the flower of these orchids resembles a small slipper and hence the name *Slipper Orchid*.

Paphiopedilum, a genus described by E. Pfitzer in 1886 (generic name derived

from '*pedilum*' (slipper) referring to the shape of lip) is a commercially important group of orchids, because of their long lasting elegant flowers, showing exquisite floral variations. Their distributional range extends from India eastwards across southern China to the Philippines and throughout Southeast Asia and Malay Archipelago to New Guinea and Solomon Islands.

Cribb (1987) estimated about 25 species out of 60 species of *Paphiopedilum* to be critically threatened in the wild.

There are nine species of *Paphiopedilum* reported from India (Karthikeyan, 1989; Chowdhery, 1998) of which *P. druryi* (Bedd.) Stein. is confined to Agasthya Malai, Travancore Hills, Kerala, and the rest eight are from north-east India.

Table - I

Taxa	Population status	Leaves	Flowers	Flowering period	Distribution
<i>Paphiopedilum charlesworthii</i> (Rolfe) Pfitz.	Believed to be extinct / critically endangered.	Upto 22 x 2.5 cm, broadly linear-lanceolate.	Solitary, 7.5 cm across, dorsal sepal deep rose, slightly hooded at tip; petals greenish brown, veins deep green; lip broad, purplish brown shaded with brown or rosy tint.	Oct.-Nov.	Lushai Hills, Mizoram; Arakan Hills, Myanmar.
<i>P. druryi</i> (Bedd.) Stein.	Critically endangered.	Upto 30 x 5 cm, strap shaped, glossy green.	Solitary, 7.5 cm across, upper sepal golden yellow with purple stripes, broadly ovate, lateral petals spreading with dark purple median stripe; lip bright yellow purple spotted.	Mar.-Apr.	Agasthya Malai, Travancore hills, Kerala. Endemic.
<i>P. fairieanum</i> (Lindl.) Stein.	Rare and endangered	Upto 20 x 3.5 cm, linear, obtuse, dark green above, pale beneath.	One rarely two, 6-8 cm across; dorsal sepal white, yellowish green at base, streaked with brownish purple; petals pale yellow, purple veined, fringed with black hairs; lip greenish violet with purple veins.	Nov.-Mar.	Eastern Himalayas, in small pockets in south Sikkim, Assam, Arunachal Pradesh; Bhutan.
<i>P. hirsutissimum</i> (Lindl. ex Hook.) Stein.	Rare	Upto 30 x 4 cm, linear-lanceolate, dark olive green.	Solitary, 12-15 cm across; dorsal sepal pale green with darker green centre and base, purple veined, distinctly keeled; petals deep purple and green; lip green flushed with dark purple.	Feb.-Apr.	Scattered in Mizoram, Nagaland, Assam, Meghalaya (Jowai Hills); Thailand, Vietnam.
<i>P. insigne</i> (Wall. ex Lindl.) Pfitz.	Threatened	Upto 2.5 cm long, strap shaped, green.	One rarely two, 12 cm across; dorsal sepal white with purple spots, base light green; petals yellowish green; lip yellowish green with brown shade.	Nov.-Feb.	Khasia Hills, Meghalaya; Bangladesh, Nepal.
<i>P. spicerianum</i> (Reichb. f.) Pfitz.	Threatened	Upto 30 x 4.5 cm, linear-oblong, leathery, dark green purple spotted beneath.	Solitary, 6 cm across; dorsal sepal white, base greenish; petals yellowish green with median line and streaks of red; lip brownish green.	Nov.-Jan	Assam; Bhutan, Myanmar.
<i>P. venustum</i> (Wall. ex Sims.) Pfitz. var. <i>venustum</i>	Threatened	Upto 15 x 4 cm, narrow oblong to elliptic, dark bluish green above, mottled with grey green, dull purple beneath.	One or two, 7.5 cm across; dorsal sepal broadly ovate, white, dark green veined; lip greenish yellow.	Feb.-Mar.	Meghalaya, Sikkim, Assam; Bangladesh.
var. <i>rubrum</i> U.C. Pradhan	Threatened	Upto 17 x 4 cm.	Dorsal sepal ovate, white, green striped; petals deep wine red.		Meghalaya.
var. <i>teestaensis</i> U.C. Pradhan	Threatened	Upto 14 x 4 cm, elliptic, light grass green, mottled olive green.	Dorsal sepal white, green veined; petals brownish pink.		Teesta Valley.
<i>P. villosum</i> (Lindl.) Stein.	Threatened	Upto 25 x 5 cm, linear, coriaceous, bright green above, pale green below, purple spotted at base.	Solitary, 15 cm across, dorsal sepal-apex white, base and centre greenish purple; petals brownish yellow; lip yellow with brownish margin.	Nov.-Feb.	Assam, Mizoram; Myanmar.
<i>P. wardii</i> Summerh.	Endangered	Upto 15 x 5.5 cm, oblong-elliptic, green or dull blue green, mottled with purple red spots beneath, glabrous.	Solitary, dorsal sepal white with parallel green nerves; petals oblong; lip green with wine red spots.	Dec.- Feb.	Lohit district of Arunachal Pradesh. Endemic.

DHAINCHA

Sesbania cannabina (Retz.) Pers.

An unarmed annual with very tall slender stems. Farmer's favourite, used as green manure crop for rice, sugarcane, cotton and coconut field. Found efficaceous in the reclamation of saline & alkaline lands. Tender stems and leaves is valued as a fodder for cattle, sheep and goats & increase meat and milk production. Fibre durable under water, used for sails, fishing net & ropes. Seeds yield gum having properties similar to those of guar gum, may be explored for industrial possibilities.

Moisture durable pith used as supporting sticks as well as wind break and shed in betel garden.

Photo: M. S. Mondal





Trade

Orchids with an ever demanding market shares about 8% of international flower market all over the world, and its value varies according to the quality of flowers and rarity of occurrence. Orchid trade is a multi million dollar business with production centres in the Netherlands, America, Japan, Thailand and Singapore.

North-east India has great potential for orchid cut flower trade, but more awareness about its commercial significance is required, so that orchid industry is more organized. But while permitting controlled legal trade in wild collected specimens, their artificial propagation should not be overlooked which represents a sustainable development alternative to the challenge of conservation.

Since *Paphiopedilums* are very much sought after due to their enchanting floral display, they have a remarkable appreciation in the market of orchid fanciers. They are also used as a progenitor for the production of hybrids.

However the major threats to the natural *Paphiopedilum* population are due to indiscriminate collection of wild plants for trade and habitat alteration or destruction. Wild population of *P. fairieanum* is affected by the military

establishment of Tenga Valley in Arunachal Pradesh and *P. druryi* has been rediscovered after a long gap from Agasthya Malai, Travancore Hills, Thiruvananthapuram district.

Sufficient laws/acts etc. has been framed by the Government of India and number of protected areas and orchid sanctuaries established to safeguard our flora. A number of endangered taxa have been multiplied and placed in their original habitat, but only reintroduction is not always a safeguard unless illegal trade is stopped.

Advantage of nurseries

Paphiopedilum can be easily propagated from seed like other orchid species and raised in nurseries, where they are much healthier. But unfortunately, since artificial propagation requires huge investment, it is difficult for well-intentioned propagators to compete with the wild collectors in the field of trade.

Paphiopedilums are cultivated in several orchidaria and botanic gardens of the world. Botanical Survey of India has brought under cultivation several species in its national orchidaria at Shillong, Barapani and Yercaud.

Legal status

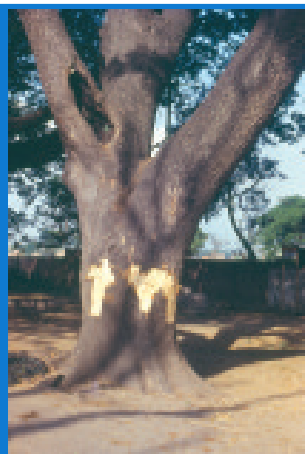
All *Paphiopedilum* species have been included in Appendix-I of CITES (Convention on International Trade of Endangered Species of Wild Flora and Fauna) which restricts its export. Eight of the nine species found in India have been included in the Red Data Book of Indian Plants, Botanical Survey of India. Some are also listed elsewhere as threatened plants in the publications of the Botanical Survey of India.

Conserving orchids and their habitats is the utmost requirement of the hour otherwise many beautiful species may vanish forever.

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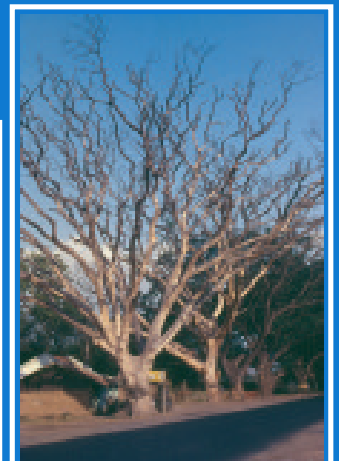
Ratna Guha & M.S. Mondal



WHO WILL TAKE CARE OF OUR EVOLUTIONARY RESPONSIBILITY ?

Owners of the unauthorized Motor garages, Dhabas & Restaurants are playing tricks for extending their roadside business in the National Highways by dashing the trucks on the big trees. First they debark the tree up to the truck's back-dashing level and as result phleom system of the plant gets damaged and ultimately the plant dies. Highway authorities/Zilla parishad cut the trees and ultimately business is extended bypassing the Environment Act.

Photo : (NH-2, Near Burdwan)
-M. S. Mondal



The quest for *Phalaenopsis* took us to Great Nicobar Island which lies south to Andamans. This Island is a real tropical paradise with luxurious evergreen forests and sandy beaches, surrounded by turquoise sea and colourful coral gardens. Having firm intentions to locate *Phalaenopsis* one of the most beautiful and rare orchid of the Andaman and Nicobar Islands, marked the start of an adventurous journey into the land of orchids. As we started to ascend to about 1500 ft on the moss laden floors of the jungle, we came across many screw pines, tree ferns, rattans, palms, orchids and many other tropical trees and shrubs. After about a week's search we collected many other interesting orchids such as jewel orchid (*Anoetochilus* sp.), many species of *Dendrobiums* and *Bulbophyllums*. As we were returning back to the base camp through a diverted route we saw a small population of *Phalaenopsis* fully bloomed in front of us, growing at an elevation of 1350 ft on the trunk of *Artocarpus lakoocha* Roxb. On nearing the plant it was found to be fully covered with ants. We counted 4 saplings, 4 plants bearing flower buds and 2 plants with full bloomed flowers. With no intentions to disturb the population we collected a small fragment of the plant with few flowers and brought it to lab. With consultation of literature we identified it as *Phalaenopsis teraspis* Reichb.f. Sweet.

History : *Phalaenopsis speciosa* was first described by Reichenbach.f. in *Xenia Orchidacea* Vol.II p. 146 in 1874 as a variety of *Phalaenopsis speciosa* based on dried specimen which he had received from Veitch & Sons. Thomas Lobb, a collector for Veitch & Sons was the first to collect this species, based on which the description was made (Sweet, 1980). E.S. Berkley sent plants of this species from Andaman Islands to William Bull in 1880 which Bull sold to John Day of Tottenham. A water colour from one of these is found in the Day books at Kew. The illustration in Botanical magazine was made from the plant sent to Kew in 1892 from Port Blair in Andamans by Horace Man which forwarded in May 1893. E.S. Berkeley in his account states that it was truly beautiful orchid in its native home, where he saw many plants flowering at the same time and often he took parties of officers up the creek to see it. He says that it grows on boughs of mangrove trees and hangs down over waters and does not like salt air like other *Phalaenopsis*. It commences its growth up the tidal creeks where the

sweet water is strong enough to drive back the sea water. Mrs. Talbot Clifton in the "Pilgrims to the Isles of Penance, Orchid gathering in the East" says she had collected this variety from Rutland in South Andamans, in 1909 (Sweet, 1980). In the year 1992 J.A. Fowlie reported the occurrence of this species in NW Sumatra based on the collections of Liem kie wie from the coastal extreme of NW Sumatra (Fowlie, 1992). In the year 1984 the occurrence of this species was confirmed by D.K. Hore and N.P. Balakrishnan from Great Nicobar based on P. Chakraborty & D.K. Hore's collection. The last collection was by D.K. Hore in 1980 from Navy Dera (Hore & Balakrishnan, 1984). After that collection the occurrence of this species in Great Nicobar remained a great mystery. This plant species has been collected after a lapse of 23 years. As a week long survey could end up only in a very few individuals growing on a single tree, an immediate attention is needed for its conservation and propagation in ex-situ condition.

A brief description and photograph is provided to facilitate easy identification of this rare species.

Phalaenopsis tetraspis Reichb.f., *Xenia* Orch. 2 : 146. 1984. *Phalaenopsis speciosa* var. *tetraspis* Sweet in *Amer. Orch. Soc. Bull.* 37 : 1092. 1968.

In search of

PHALAENOPSIS

– J. Jayanthi, R. Sumathi, K. Karthigeyan & P.G. Diwakar

Botanical Survey of India, Andaman & Nicobar Circle
Port Blair - 744 102, India



Epiphytes. Leaves fleshy, distichous, oblanceolate, 25 × 6 cm, cuneate at base, acute at apex, sheathed at base. Inflorescence branched, up to 7 - flowered, up to 35 cm long. Bracts broadly ovate, 4 mm long. Flowers waxy white, fleshy, very fragrant, 5 cm across. Pedicel with ovary 3.5 cm long. Sepals white or with transverse magenta streaks, elliptic, 2.5 × 1 cm. Petals elliptic, 2 × 1 cm. Lip 2 cm long with transverse magenta streaks, hairy at the terminal portion, 2-lobed at base, lobes appendaged. Column 1 cm long.

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DEVELOPMENT OF HERBARIUM DATABASE IN BOTANICAL SURVEY OF INDIA

K. Sambandan & H. J. Chowdhery

Central National Herbarium, Botanical Survey of India, HOWRAH - 3

The Botanical Survey of India has recently begun a digitalization project of the herbarium plant specimens in Central National Herbarium (CNH). There are more than 1.5 million herbarium specimens excluding around 15,000 Type specimens and 2,500 wallichian collections. Herbarium data from CNH offers a unique glimpse in to the flora of the Indian subcontinent and other countries over last two centuries. This priceless botanical treasure plays a valuable role in teaching and research activity in the country in identifying botanical specimens and in the efforts of reversionary accounts of Indian plants with the help of original and authentic materials. The main objective of this database project is to obtain data and images of herbarium specimens housed in the CNH and make them available electronically. This on-line searchable herbarium will provide herbarium specimen data and digital images and labels to users via inter-net access. This database has been designed using state-of-the art computer and web-based technologies, using current standards for searching and retrieving of datasets, easily accessible to the user and scope for future expansion of enlarged datasets. The present herbarium database covers Type specimens housed in the Type herbarium of the Central National Herbarium and some families of general herbarium. However our vision is to expand this database in the near future so as to cover all the herbarium specimens housed in CNH as well as those of the regional circles of BSI.

BRAHM'S Software for the herbarium database is one such software, which is in use by some of the renowned herbaria around the world. Based on the usefulness of Brahm's software, the Botanical Survey of India chose it after suitably modifying the software for the development of herbarium database. In the database, information associated with each specimen relating to plant name, date and place, collector, collection number, determined by whom and when, ecological data, accession number, altitude, notes and digital images of the specimen were included. Information on label has been copied verbatim.

Difficulties arise during databasing of older collections about data quality. Older collections may carry little or no geospatial information and survey data

records are rarely vouchered. The conversion of old data is error-prone for various reasons. Names of localities may no longer exist, have changed their circumscription or have been applied to more than one area in a certain region or even lacking. Standardization of these data will greatly enhance their usability, but it must be done by the experts and may require further checks and research.

The herbarium database was converted into MS-Access for further Web edition and CD-ROM production. Using Active server page (ASP), server pages were prepared and presented in the form of HTML format. Digital images were made using Sony Digital Camera (MVC FD92) and were processed using Photoshop version 6.0. All the specimens were taken in their entire view, close up of floral parts



Envis officials from MoEF keenly observing CNH data base

and herbarium label. The only adjustment carried out was a reduction of the image size to make thumbnails and full screen images for the web page. All the images were saved as JPEG files. Internet pages were prepared using MS-Front page software.

The handling and presentation of sensitive data such as geographical coordinates in case of rare and endangered plants has been suppressed in this database from the users. The present database with simple software tools is highly useful for all users.

INDIAN VIRTUAL HERBARIUM- A FUTURE VISION

The Botanical Survey of India proposes to create a virtual herbarium web-based portal to access separate databases housed and maintained by various BSI regional Circles as well as Central National Herbarium. These web accessible metadata published by each BSI Circle will be converted into XML format because of its following advantages -

XML for back end metadata exchange:

-Provides robust framework for exchanging data (e.g. numerous tools available for reading and writing XML data)

-Supports format checking and validation

-Promotes interoperability as XML gains momentum on the web

-Support for XML is becoming common in the current software industry

XML for front-end reporting

-Utilize XML technology when outputting search results

- All portal queries will originate from the database as raw XML data. This raw data will be converted into browser based reports in HTML using XML publishing framework.

-Raw XML data reused and converted into other formats such as Wireless Markup Language(WML), PDF or native XML data.

Geo-referencing of herbarium data will start with the help of Indian gazetter and various related reference materials in due course. This virtual herbarium can provide geographical distribution patterns of species and population dynamics from the herbarium specimens and it can be combined with records of environmental parameters, climate data and taxon information for more complex statistics.

Most of the major herbaria and leading databases are located in developed countries. However, hitherto it is lacking in the tropics where biodiversity is very high. Development of herbarium database in countries like India with large collections needs enormous man power, money, and information technology tools. The available data with us is almost two centuries old and is partially updated. This makes it difficult to follow western databases however, the softwares like Brahm's are highly useful for developing a herbarium database. In future, herbarium will depend to a large extent on its ability to absorb new technologies that allow it to meet new demands / requirements. The herbarium of the future will be dramatically different with the advent of the virtual herbarium, which has already been introduced in Australia. Now, the Botanical Survey of India is getting ready to travel along the highway of new developments for the next revolution in herbarium management.

Since its inception in the year 1890, Botanical Survey of India is engaged in the inventourisation and documentation of the country's floral diversity. The Flora of the country is largely known through the untiring efforts of Botanical Survey of India over the last 2 centuries. The survey has so far published 15 volumes of Flora of India, a large number of State and District Floras, Flora of Protected Areas and Fragile Ecosystems, Monographs and Revisions, etc. In addition, Botanical Survey of India, the custodian of country's floral wealth also caters to the need of all most of the research institutions and universities in India and abroad, plant researchers, NGO's etc., with the help of its chain of regional herbaria spread over in different phyto-geographical regions of the country.



CNH Building

The Central national Herbarium (CAL) of Botanical Survey of India Calcutta, one of the largest herbaria of the world with about 15000 TYPE SPECIMENS, nearly 2500 Wallichian sheets, more than 3 million herbarium specimens collected from almost all the century old original Roxbarburgh's and Kind & Pantling's illustrations in water colour offers unique opportunity and unmatched facilities to Plant Taxonomists all over the world. As a result each year, a large number of Scientists from India and abroad and hundreds of research scholars and students visit various herbaria and the libraries of Botanical Survey of India for consultation. In addition, hundreds of specimens are loaned annually to many Indian and foreign herbaria and institutions for research purposes. The handling of herbarium specimens of such an enormous magnitude in a limited time period often becomes a limiting factor in completing the studies, more over frequent handling, sending of specimens on loan by POST often severely damages the delicate herbarium specimens many of which are more than 100 years old. But this priceless Botanical treasure needs more careful handling and preservation.



General Herbarium

The recent development of Electronic Herbarium Database or the Virtual Herbarium has proved to be a boon as it offers complete Online Herbarium Information /Data along with images to a researcher sitting in one corner of the world through internet. Now we can have the access to a large number of intentionally renowned herbaria which are now available online. In an effort to cope up with the present demanding situations and need, Botanical Survey of India too has recently undertaken the digitalization program of its herbarium specimens at Central National Herbarium (CAL), Howrah, India as well as in some of its regional Circles. Once this Database is standardized, all the regional Circles of Botanical Survey of India will participate in this endeavor to form a National Database of country's floral wealth.



Herbarium Abstract

The main objective of this information system is to develop virtual databases for general as well as for Type Specimens. Virtual Herbarium Database for the family Dilleniaceae is one of the pilot projects in the field of biological informatics from Central national Herbarium, Botanical Survey of India, Calcutta. The purpose of this project is to digitalize data contained in the herbarium sheet's label and images of these specimens (selected ones) issued in the Central National Herbarium and to make them available electronically in the form of a Compact Disc. This on-line searchable herbarium will provide desired data and digital images of a herbarium specimen and its label. This herbarium database has been designed using state-of-art computer and web-based technologies, using current standards for the searching and retrieving of datasets easily by the users.



Roxburgh's Illustration

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Detail about the table information

Family: Dilleniaceae
 Plant Name: Dillenia indica
 No. of records: 81

Genus	Species	Country	Major Area	Collector	Collection Date	ID	Image
Dillenia	indica			?		541	Yes
Dillenia	indica	Australia		Baron Ferdinand von Mueller		520	No
Dillenia	indica	Bangladesh	Chittagong	G.B. Clarke	2 February 1873	811	No
Dillenia	indica	Burma		Lieut. Siches Toph. P.A.		404	No
Dillenia	indica	Burma		Falconer	8 February 1940	405	No
Dillenia	indica	India	Andhra Pradesh	G.V. Subba Rao	27 December 1969	799	No
Dillenia	indica	India	Andhra Pradesh, Chittoor District	G.V. Subba Rao	17 November 1969	798	Yes
Dillenia	indica	India	Andhra Pradesh	R.P. Srinivasan		797	Yes
Dillenia	indica	India	Tripura	P.M. Debbarman	26 December 1914	796	Yes
Dillenia	indica	India	Kerala, Cannanore District	V.S. Ramchandran	22 February 1979	795	No
Dillenia	indica	Malayan Archipelago	Malaysia	Yehudok		545	No
Dillenia	indica	Malayan Archipelago	Sumatra	H.D. Forbes	13 August 1880	544	No
Dillenia	indica	Malayan Peninsula	Perak	H.N. Ridley	1891	553	No
Dillenia	indica	Malayan Peninsula	Pulau Tekong	H.N. Ridley	9 July 1891	554	No
Dillenia	indica	Singapore	Batu Tapah	H.N. Ridley	1899	555	No

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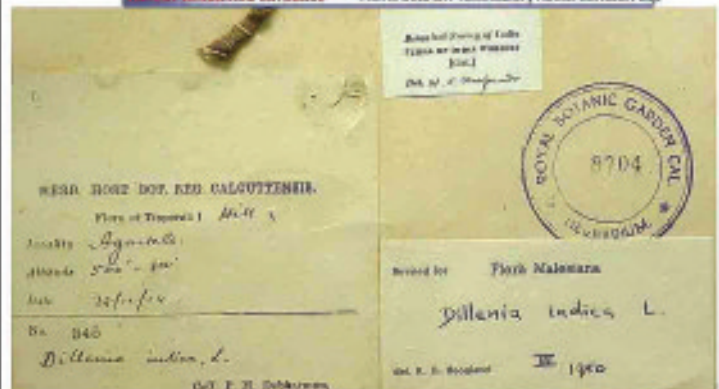


Family	Dilleniaceae
Genus	Dillenia
Species	indica
Author [L.
Collector	P.M. Debbarman
Collection_No	345
Collection_Date	26 December 1914
Determined by	R.D. Hoogland
Determination_Date	March 1990
Country	India
Majorarea	Tripura
Minorarea	Agartala
Occurrence	Wild
Altitude_(Min)	800F
Accession_No	8704
Name_by_Collector	Dillenia indica L.
Flowering	No
Fruiting	No
Habit	Tree
Image	True



label Floral Parts

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Iris lactea Pall., locally known as *Krishm* (Kashmiri) is a perennial tufted herb with long creeping stout rhizomes covered with fibrous remnants of leaf bases, tough and wiry roots, distichously arranged linear leaves more or less equalling the scape, 20 - 50 cm long simple scape bearing 1-2 cauline leaves, 2-3-flowered spathe, narrowly lanceolate spathe valves, 4- 6 cm across funnel-shaped flowers with nearly obsolete perianth-tube, oblanceolate smooth tepals, 3 stamens, narrowly fusiform ovary and 3-4 cm long linear and petaloid style branches, 4 -7 x 0.8 - 1.2 cm capsule with beak and equally-spaced 6 longitudinal ribs and subglobose seeds with 4-5 mm in diameter. It flowers during April - June and fruits during July - August.

It is a widely distributed Asiatic species. In India it grows from subtropical to cold deserts of Jammu & Kashmir and northern part of Himachal Pradesh in varied habitats viz., riverbanks, the bunds of cultivated fields, marshy places, sandy lake margins, abandoned fields and pastures as well as in complete dry conditions at altitudes from 1500 to 3700 m. This is a salt-resistant species and can withstand long period of drought (Dykes, 1913; Mathew, 1989; & Zhao, 1992) and in areas of very low rainfall it barely reaches 10 cm in height (Waddick, 1992). The plants of this species have multifarious uses.

USES:

Almost all parts of the plants of this species are useful. Its leaves are used as fodder in winter; bedding for cattle, for thatching houses; mat and basket works (Watt, 1890), in making chords and footwear locally called the "Pulhor" (Karihaloo et al., 1984); for making paper (Zhao, 1992). Its tough leaf fibres are utilised to make string or rough cloth (Mathew, 1989). The tough roots are used to make brushes (Zhao, 1992). The rhizomes are used as an ingredient of compositions for purifying blood, for venereal diseases and also in liver complaints and dropsy (Chopra et al., 1956; Wealth of India, 1959). Its fresh flowers contain 0.05 - 0.1 % of an anthocyanin pigment called ensatin chloride, which on hydrolysis yields glucose, malvidin chloride and p-hydroxy cinnamic acid (Wealth of India, 1959). Han (1988, 1995) has reported an anticancer drug, irisquinone from *I. lactea*. Its flowers and seeds are used medicinally

IRIS LACTEA PALL. (IRIDACEAE)

A versatile potential plant of Asia

—D. D. Bahali, Botanical Survey of India, Howrah 711103 (CAL)

and its seeds can be used in the preparation of an herbal contraceptive (Zhao, 1992). The species flourish under adverse conditions where other shallow rooting plants fail to grow and serve as an excellent soil binder because of its extensive and intertwining root system (Karihaloo et al., 1984). In gardens it flowers quite freely in open positions and reasonably well-drained



soil. The species being salt and drought resistant, its germplasm may be useful in breeding resistant varieties of Irises.

The only abuse of the species lies with its great vitality and invasion of pastureland, where the livestock seldom graze it except in winter. Once the plant is established it is very difficult to eradicate them and their abundance may be considered as a sign of pastureland degeneration (Zhao, 1982).

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Plant a tree on every birthday, it will embrace and anchor our mother earth and protect it.

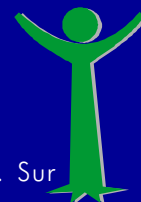


Photo : P. R. Sur

"Chaulmoogra oil" - a potential drug for leprosy and other dermal ailments

- Debasmita Pramanik & M.S. Mondal

Hydnocarpus pentandra (Buch.-Ham.) Oken. - an endemic plant from western Ghats, commonly known as "Chaulmoogra tree" belong to the family Flacourtiaceae. The genus Hydnocarpus Gaertn. comprises of about 40 species growing usually in south and southeast Asia, chiefly in Indo-Malayan region. In India, this genus is represented by only 4 species of which Hydnocarpus pentandra (Buch.-ham.) Oken. is an important source of oils of "chaulmoogra" group.

The plant is variously known in different linguistic provinces (Table -1).

Scientific Name of the Plant	Linguistic Provinces	Vernacular Names
<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken. (Flacourtiaceae)	Telegu	Adi-badam, Niradi
	Tamil	Maravattai, Maravetti, Niradi-mattu
	Sanskrit	Garudaphala, Tuvrak
	Marathi	Kadu-kavata, Kentel, Kowti
	Malayalam	Kodi, Koti, Vetti, Nirvetti, Niralam
	Kanara	Chaulmoogra.

Table - 1

The plant is an evergreen dioecious tree, 5-25 m tall; bark rough, brownish. Leaves variable, ovate-elliptic-oblong or oblanceolate, subserrate. Stipules caducous. Plants dioecious. Male flowers greenish, in racemose fascicles; sepals unequal; petals ovate to suborbicular, concave, ciliate along margins, smaller than sepals; stamens 5 with reniform anthers. Ovary rudimentary. Female flowers solitary or binate on a common peduncle; staminodes 5; ovary obscurely 5-ribbed, beaked, yellowish; stigmas 5 lobed. Berries globose; pericarp reddish brown, tomentose. Seeds 15-20, embedded in pulp. Fl. & Fr.: February - June (Sept.)

Distribution: Moist deciduous and semi-evergreen forests of Western Ghats upto 850 m, often near water courses. Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala. Endemic.

Status: Threatened to some extent due to large scale commercial exploitation, deforestation and population explosion. However, the plant is not still covered by laws.

Chemistry: The seed of *Hydnocarpus pentandra* is major source of fatty oils which are commonly known as "Chaulmoogra group of oils". Among chaulmoogra group, there are 3 oils - Chaulmoogra oil, *Hydnocarpus* oil and Lukrabo oil. *H. pentandra* yields *Hydnocarpus* oil specifically.

The oils of chaulmoogra group are characterised by the presence of unsaturated cyclic fatty acids, mainly chaulmoogric acid, *Hydnocarpic* acid, gorlic, oleic and palmitic acids as well as small quantities of lower homologous of *hydnocarpic* acids. The acids contain a cyclopentene ring at the end of the carbon chain and an asymmetric carbon dextrorotatory. Fatty acid composition of *hydnocarpus* oil is given in table 2.

Table - 2

Name of the component	Amount present
Chaulmoogric acid	27.0
<i>Hydnocarpic</i> acid	48.7
Gorlic acid	12.2
Lower homologous of chaulmoogric (alepric, aleprylic, aleprestic, aleprolic and unidentified acid)	3.4
Oleic acid	6.5
Palmitic acid	1.8

Uses: *Hydnocarpus* oil is mainly used in the treatment of lepromatous leprosy and is effective in early stage, in decreasing the size of the nodules, anaesthetic patches and skin lesions.

Ethyl *hydnocarpate* (containing mostly ethyl esters of chaulmoogric and *hydnocarpic* acids) possesses

therapeutic properties of the oil and useful in leprosy.

In culture medium, it has been shown that various *hydnocarpates* have a strong action in checking the growth of acid fast *Mycobacterium leprae*, *M. tuberculosis*.

This oil is administered internally to prevent gastric irritation. Intra-muscular injections give better results.

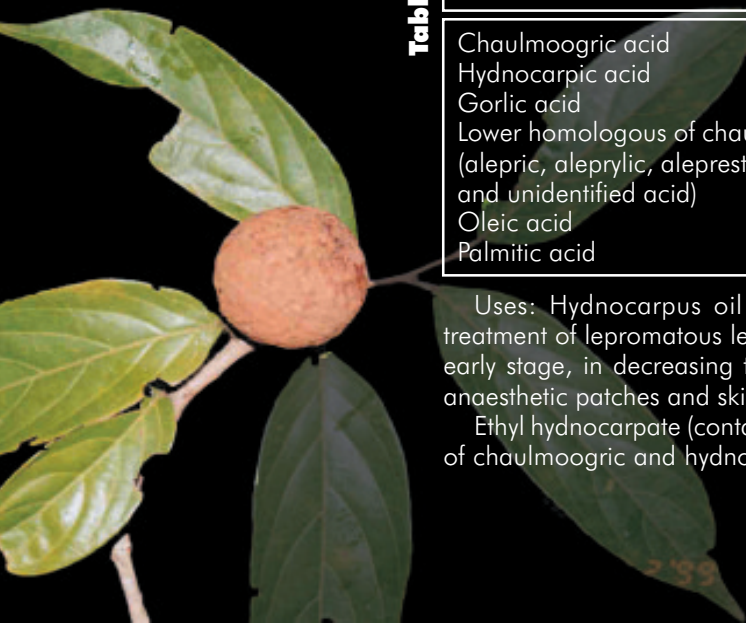
The press cake obtained after the expression of oil from the seed is used as manure.

The natives of South India use *Hydnocarpus* seeds as a remedy for leprosy, chronic skin diseases, ophthalmia as a dressing for wounds and ulcers. They use seed oil as a local application in rheumatism, sprains and bruises, sciatica, chest pain and burning.

Conservation: Uncontrolled commercial exploitation, loss of habitat and some other anthropogenic activities has made *Hydnocarpus pentandra* - a threatened endemic to Western Ghats. Though a portion of its locality is under Nilgiri biosphere Reserve, established in 1984, proper monitoring is essential to save the plant from further destruction. Minimum legal protection should be provided to against large-scale depletion though yet not covered by any laws. Cultivation of the plant by the local people with the help of modern technology should be encouraged.

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THE LION SEAR [*Leonotis nepetaefolia* (L.) Aiton]

- A LITTLE KNOWN MEDICINAL PLANT

Subhasis Panda & Ram Kumar Bhakat*

Botanical Survey of India Howrah - 711103

The genus *Leonotis* (Pers.) R. Br., Lamiaceae, is represented globally by ca. 40 species and ca. 2 spp. in India (Santapau & Henry, 1973; Willis Dictionary, 1973). It is distributed in the tropical countries. In India the genus is naturalized throughout the hotter parts i.e., almost in all states. This genus includes the traditional medicinal plants not reputed yet. But only *Leonotis nepetaefolia* (L.) Aiton is well known for its curing skin diseases among tribals like Lodha, Munda and Santal (D.C. Pal & S.K. Jain, 1998).

Leonotis nepetaefolia (L.) Aiton a stout and tall annual shrub, 5-7 ft high; stem 4-angled and hairy. Leaves 10 cm-20 cm x 5 cm-10 cm wide, membranous, long petioled (3 cm-7 cm long), broadly ovate, acute, coarsely crenate-serrate, hairy on both sides. Inflorescence verticillaster. Flowers numerous, densely crowded in globose axillary heads, 4 cm-7 cm in diam.; floral leaves - deflexed and lanceolate; bracts linear, deflexed and spine tipped; calyx 2 cm - 3 cm long, ribbed and reticulate, hairy, tubular, incurved, teeth spinescent and throat glabrous; corolla orange-red, 2-3 cm long, tube slender, exerted, upper lip villous, lower lip glabrous and minute. Fruits nutlets, ca 4 mm long, linear-oblong, obliquely truncate (S.K. Mukherjee, 1940).

The plant prefers waste places of warmer regions, especially lateritic soil (in the lateritic belt of west Midnapore, West Bengal and Chotanagpur areas, Jharkhand, the plant grows luxuriantly and it can be propagated through seeds and cuttings.

Distribution

INDIA (throughout hotter parts); TROPICAL ASIA; TROPICAL AMERICA and TROPICAL AFRICA.

Flowering: September to November (peaking in October). Fruiting: December to February

Vernacular Name: Hindi & Bengali: Hejurchei; Marathi: Dipmal; Gujrati: Matijer, Matisul; Telegu: Ranabheri, Mundari: Agia janum; Santal: Dare dhompo, Janum dhompo; Lodha: Sidho, Agi-janum (D.C. Pal & S.K. Jain, 1998); Oriya: Tonka-agia.

Common Name: Lions sear.

Chemistry

Seeds contain fatty oil (28%), protein (23.6%), crude fibres (14.3%), nitrogen free extracts (19.3%) and ash (5.9%). Glucose, fructose, a phytin-like substance containing inositol, phosphorus and calcium have been identified. Steam-distillation of seeds yields 2% of a volatile oil. The fatty oil extracted from the seeds is similar to olive oil. The composition of fatty acids of the oil is: linoleic acid (11.9%), oleic acid (64.6%), myristic acid (1.3%), palmitic acid (12%) and stearic acid (1.2%). (Chem. Abstr. 43: 3491.1949). The seeds contain feeble anti-malarial activity (Wealth of India, 1962).

The leaves contain a bitter fatty oil (1%), a resin, resinic acid and ash (7%). Calyx and flowers contain similar substances.

Tribal use

Ashes of flowers are applied to scalds and burns (common practices among tribals of Chotanagpur areas).

Lodha women used to apply root paste with paste of long peppers (3:2) as cure for Tunka (swelling of breasts) - when a mother's breast swell and milk does not pass through the nipples, the crushed root is rubbed on the breast (Encyclopaedia Mundarica).

Tribals of Maharashtra used to mix the ashes of the flower-heads with curds and applied to ringworm and other itchy diseases of the skin (Kirtikar & Basu, 2003).

The whorl, in flower or in seed, is pounded and fried in Koranj oil and this mixture is rubbed on itch, also on head sores of small children.

Lodhas prescribe infusion of flowers 10 ml against intestinal worms like tapeworm and apply ash (made by burning inflorescence) with mustard oil (3:1) as cure for Kha-sua (a kind of skin diseases). They put seeds in eyes for bringing out foreign particles from eyes.

Mundas apply ash (made by burning whole plant) with mustard oil (3:2) for treatment of Eczema (D.C. Pal & S.K. Jain, 1998).

Lodhas use dried seed powder and dried leaf powder as narcotic like tobacco.

In Madagascar, the plant is considered emmenagogue, febrifuge, depurative, narcotic, laxative and used



in skin diseases, amenorrhoea and fever.

The leaves are used in Brazil in the treatment of rheumatic affections.

Conservation: Being an annual shrub, naturalized throughout the hotter parts of India i.e., almost in all the states, yet the plant needs proper conservation practices otherwise the plant would be placed in the Red Data Book in near future because of rising urbanization following habitat degradation. Giving one instance, in West Midnapore where approx. 50% plants are destroyed only due to this reason. The plant survives only through seeds throughout whole summer. Therefore, proper conservation remedies are essential to preserve its seed bank but rising habitat degradation causing a great menace to its survival.

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Rheum nobile Hook. f. & Thoms. (Polygonaceae)

THE 'HIMALAYAN MONK'

– Needs Care to Conserve

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R*heum nobile* Hook. f. & Thoms. (Polygonaceae) is quite different in appearance from the rest of the species having its large pyramidal inflorescence concealed by yellowish, larger, reflexed bracts, looks like 'Himalayan Monk', spread sparse in the alpine meadows drawing attraction, prefer to shelter itself in the crevices of barren rocks, with contrast colourfull foliage and bracts. It is thus attracted by its promising habitat and appearance and easily captured for harvesting to the local people.

Moreover, it is considered as one of the major vegetables in the daily dishes to the persons stayed for a period of June to September, take temporary shelter for the grazing of Yaks in the alpine meadows. So, subsequently it has become rare and threatened due to over exploitation.

Taxonomy:

Rheum nobile Hook. f. & Thoms. in Hook. f., Ill. Himal. Pl. t. 19.1855; Hook. f. in Hook. f., Fl. Brit. India 5: 57.1886; Grierson and Long, Fl. Bhutan 1(1): 172. 1984.

Nepali: Keju; Bhutia: Chhucha, Tsuka.

Robust herb, to 1.5 m tall; rootstock perennial, stout; stem hollow; leaves basal, rosulate, suborbicular, to 30 cm across, base rounded to shallowly cordate, leathery, fleshy, with the reticulation of prominent networks of raised veins; stipules pinkish; inflorescence a large congested terminal panicle, concealed by dropping leafy yellowish to cream-yellow bracts; flowers in clusters, numerous, 3-merous, green; nutlets broadly ovoid, 2-4-winged [Plate 1].

Distribution:

INDIA: Himalaya: Sikkim; NEPAL; BHUTAN; TIBET. Grown in alpine meadows and in rocky crevices in between 3600-4900 m altitudes (Polunin and Stainton, 1984).

Ecology :

This species is with the adaptation of the particular climatic condition as well as topographical situation. Whenever, there is the loss of topographical situation, the distribution or its occurrence usually fallen down. This species commonly grows on stiff slopes, rocky, dry places, almost on barren ground, and most probably one of the pioneer element regarding the plant succession and interesting to look at. Landslide prone areas are also one of the favourite growing places of this species. Naturally, associated plants are very less in respect to other alpine species. The common associated plants are *Veronica lanuginosa*, *Ranunculus* sp., *Primula sikkimensis*, *Eriophyton wallichii*, *Meconopsis simplicifolia*, *Allium wallichii*, *Carex* sp. etc. in slopes. While growing in rocky crevices it is almost solitary having the smallest cushion forming patches of lichens, mosses and some Caryophyllaceous, Saxifragas and Gentianians taxa. It is also firmly attached by its perennial



rootstock penetrating to almost every space to hold up its weighty upright mass [Plate 2].

It is pertinent to report that none of the grazing animals consume it probably due to its acidic sour taste which is the self defense of this species in nature.

Uses:

a) Food:

The rosulate, spreading 15-20 ovate, fleshy green leaves and along with the lower fleshy stem portion are commonly harvested, which are very popular to the local people, especially to porters and tourists. These are crushed together to prepare a "Chatney" with the ingredients of ginger, garlic, chilies and salt to their required amount. "Chatney" is sour in taste and causes appetite and makes a relief to the travelers in breaking monotony while moving.

B) Medicine:

Rhizome/root portion is said to use by the local people (Lepcha, Nepalese, Bhutias etc.) to cure rheumatic arthritis, heart complaints and used as stimulant tonic. It is also used by the women after delivery to relieve from pain and also recover the general condition using this as tonic (Maity et al., 2003).

The rhizomes and roots are prepared in three ways: decoction, infusion and powder. The decoction and infusion are the general uses in rheumatic joint-pain and heart diseases to take as prescribed by the local medicine man according to the condition of disease symptom and the patient. The powder is taken with water as stimulant tonic, commonly 2-3 times in a days and continued for a few days or till recovery (Maity et al., 2003).

c) Industrial (Cottage) :

Rhizomes, leaves, the bracts are considered as the chief source of natural yellow dye, used in carpet industry by the

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local people followed after their indigenous technology and practices (Maity and Chauhan, 2002). The decoction of almost whole of the plant is taken for obtaining the dye. However, it is too much costly now due to non-availability of sufficient plant materials in an area and thus the synthetic dye is mostly used now-a-days. Of course, the practice is still continuing in a limited locality in lower scale.

Threats:

The threat to this species in the Sikkim Himalayas is observed in three ways.

Firstly, the juvenile plant with fresh leaves along with stem are harvested for vegetable without giving chance to grow the plant to its flowering stage. Thus loss of vegetation and the cease of flowering and fruiting is observed for its regeneration, furthermore, in nature.

Secondly, the leaves, almost all (15-20) of the plants are harvested causing the damage to the plants and to face the little survivability of the plant in nature for its full maturing and fruit setting.

Thirdly, the plants are uprooted for medicinal uses and the local uses for the preparation of yellow dye which are leading to the over exploitation and causing threat to this species. All these factors lead to this species under the category of threat as "Endanger" in nature.

Conservation:

Though the major part of the population of this species under Kanchenjunga Biosphere Reserve, Sikkim, in Sikkim Himalaya, the conservation is needed, particularly outside the reserve forests. As its habitat is mainly at the altitudes ranging from 3600-4900 m - a zone considered as a seasonal grazing ground (June-September) of the animals of local communities the local communities are with well practice to use this plant as vegetable, medicine and in yielding the dye. Thus, firstly the awareness among local people is necessary. Planned eco-tourism may give a better result. Finally strict rules should be initiated by the State Forest Department to stop its further exploitation in natural habitat.

There is no doubt to say that not a single step has been initiated so far to regenerate this species in nature or in artificial culture. So, State Forest Department may initiate its ex-situ conservation through nursery or tissue culture laboratory. Otherwise, the "endanger" species will rise to the rank of "critically endangered" of IUCN very soon.

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CROTALARIA SHEVAROYENSIS GAMBLE – AN ENDEMIC & ORNAMENTAL SPECIES

—A.A. Ansari, Botanical Survey of India

Introduction

Crotalaria L. (Leguminosae) with above 600 species world over is distributed mostly in the tropics and subtropics of Africa and America representing about 500 species and the rest about 100 are distributed in India and other Asian regions. In India, the genus is represented by 94 species, 1 subspecies, 10 varieties and 2 formae.

Crotalaria shevaroyensis was first described by J.S. Gamble in 1917 based on a collection by A. G. Bourne in 1897 from Yercaud, Shevaroy hills of Salem district.

Description: Elegant, paniculately branched, ferruginous-villous shrub up to 3 m high. Leaves simple, chartaceous, subsessile, 4-8 x 2.5-3.5 cm, obovate-oblong, attenuate at base, obtuse-acute and apiculate at apex, veins about 7, conspicuous beneath, sericeo-villous on both the surfaces; stipule absent. Inflorescence terminal, much branched pyramidal panicles up to 15 cm long; branches 6-8 cm long with 3-5 flowers. Flowers ca 3 cm across; pedicels 1-1.5 cm long, alternate; bracts 0.7-1 cm long, ovate-cordate, acuminate, blackish, glabrous and shining above, margin revolute, reflexed, persistent; bracteoles 6-7 mm away from calyx, 6-7 mm long, ovate-cordate, acuminate, margin revolute, reflexed, blackish, glabrous

and shining above. Calyx 1.1-1.2 cm long, tube ca 4 mm long; lobes with revolute margins, upper 2 lanceolate, lower 3 linear. Corolla yellow, twice as long as the calyx; vexillum c. 2.5 x 2 cm, suborbicular or broad ovate, obtuse-acute at apex, dorsally pubescent, wing petals c. 2 x 0.8 cm, oblong, slightly falcate, keel petals c. 2 x 1 cm, falcate, beak untwisted, glabrous except the ciliate margins. Staminal sheath c. 8 mm; filaments 0.5-1 cm long; oblong anthers c. 3.5 mm; ovoid anthers c. 1 mm. Ovary c. 6 mm, stipitate, glabrous; ovules numerous; style c. 2 cm long, geniculate, densely pubescent on both the sides. Pods 3.5-4 x c. 1.5 cm, oblong-terete, apex attenuate, stalk 1-1.5 cm long, glabrous or minutely puberulous. Seeds 12-16, ovoid-reniform, c. 3.5 mm.

Local name : Tamil "KAATTUTHUVARA"

Ecology: Grows on grassy slopes along forest margins above 1500 m.

Flowering and Fruiting: September-December.

Distribution: India: Endemic to Tamil Nadu: Salem (Shevaroy hills), Madurai and Dharampuri district.

Possible uses: It can be used as green manure, as a shade plant in tea and coffee plantations and as an ornamental.

Possible threats: Though there is no immediate threat but the habitat in Shevaroy hills is depleting due to cutting of forests

and clearing of slopes for coffee plantation in Shevaroy hills, which is the type locality of the species. The occurrence of this species in Madurai and Dharampuri is scarce.

Conservation: Cultivated in National Orchidarium & Experimental Garden, Botanical Survey of India, Southern Circle, Yercaud as an ornamental.

Propagation: Through seeds.

Reference

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Gila - the longest fruit bearing plant

'Gila' - a popular Hindi and Bengali name of *Entada rheedii* Spreng (syn. *E. phaseoloides* (Linn.) Merrill) under the family Leguminosae and subfamily Mimosaceae is commonly known as elephant creeper probably for its gigantic nature and tender shoot and leaves used by the elephants as favourite food. The fruit is said to be longest fruit (up to 1.5 m) in plant world. The plant is considered to be destructive to forest trees and is often cut down by foresters. It rarely dies as a result of frequent cutting.

Distribution

The plant occurs throughout the sub-Himalayan tract from Nepal eastwards ascending to 1300 m in Sikkim, Assam, Bihar, Orissa and in the monsoon forests of Western and Eastern ghats. It is abundant in Andaman Islands.

Description

A gigantic climber with twisted and angled stem and brownish bark often rough at the base. A potable watery fluid exudes from the fresh stem when cut. Leaf bipinnate, long stalked, ending in a woody, bifid tendril. Flowers small and yellow in colour in spikes. Pod jointed, woody 80-150 cm long and 7.5-10 cm in wide containing 5-30 seeds. Seeds flat, orbicular, 5 cm across, with shining, dark brown or purple testa, which is tough and horny.

Propagation

It is propagated either from seeds or by layering.



Uses

The seeds are considered tonic, emetic, antiperiodic and anthelmintic. Two amorphous saponins have been isolated from the seeds, which have strong hemolytic action on human red blood cells and have a depressant effect on the respiratory system and inhibit the movements of unstriated muscles of the intestine and uterus. A sharp fall in blood pressure was observed in experimental animals. Besides saponins the seed contains a fixed oil. The oil is used in illuminating the lamps. The white kernels of the seeds are eaten by the poor after soaking in water and roasting. Roasted pods and seeds are used as coffee substitute in South Africa. They are occasionally used as substitute for calabar bean. Tribal use: The seed, stems and bark are used as substitute for soap. The stem is cut into short lengths, beaten into flat strips and sun-dried, when soaked in water and rubbed, the material produce lather with good cleaning properties. Half-ripe seeds are made into paste with water and used as hair wash. The seeds and fruit pulps are also used as fish poison in some parts of India. The seed paste is applied locally for inflammatory glandular swellings and as a plaster to join the fractured bones. Juice of the wood and bark is used as an external application for ulcers. The bark fibre, which is coarse but durable, is used for cordage and nets. The hard and smooth shelled seeds are used for burnishing pottery, polishing hand-made paper and crimpling linen. The seeds are hollowed out and employed in making trinkets and small receptacles like snuff and tinder-boxes.

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century old tree. Forest Department can invite FRI, Dehradun or BSIP, Lucknow for determination of correct age of the tree. Archeological Survey of India also can take initiative for further study and truth.

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A CENTURY OLD TREE MAY BE A PROOF FOR INDIA'S FIRST(?) POST OFFICE

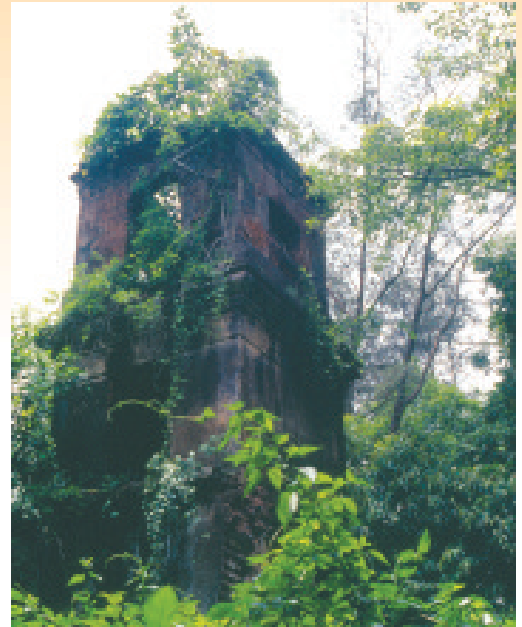


Photo : M. S. Mondal

An old Monument supposed to be the first post office of India at Khejuri (Kedegree), Purba Midnapore and an old tree - *Adansonia digitata* (Kalpabriksha), planted there can be correlated towards evidence of the India's first Imperial Post Office, Mr. Butcher was the Post master.

Adansonia digitata Linn. (Baobab tree, Kalpabriksha) planted near the old monument attains 20 feet diameter girth at chest height. A team of scientists from BSI visited the site with local MLA. It is presumed that the tree (Tropical African origin) was planted by the Portuguese estimated as early as c.300 years back. During British colonization Khejuri was a big port and it was quite natural that for sending mails through ship this place was selected. It is also important to note that during imperial period this plant of foreign origin was planted in India at different places of royal choice. Care should be taken by the state forest department to protect the

Some information about ENVIS Centre

Established : April, 1994.
Subject Area : Floral Diversity.
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Mr. Harjeet Singh, Senior Advisor, Dr. (Mrs.) Indrani Chandrasekharan, Director (EI) MoEF, keen to see the Website of ENVIS Centre during their visit to ENVIS Centre, BSI, Central National Herbarium, Howrah.

Activities of the Centre : The centre has enormous data on many areas and wants to create database and publish the following information.
 i) Dry & wet coastal ecosystem in India : Indian Coastal topography, geology & geomorphology, climate, vegetation pattern, floristic component their values in work of Assessment of Floristic Diversity of Angiosperm in regard to different ecozones in India
 ii) Data base on medicinal value of aquatic plants in Eastern India.
 iii) User service will continue.

Future plan : Thrust area of the ENVIS Centre, BSI is the task of disseminating information on Floral Diversity from different eco-regions of India. Entry of data and scanning of photographs and illustrations of the plants included in the BSI Data Book of Indian Plants will be continued. Economic and medicinal plants and those included in red list categories will be given special emphasis. An identification manual of CITES plants will be prepared and published from the ENVIS centre.

List of Publications broughtout so far : Books published :
 1. Mangroves, Associates and Salt Marshes of the Godavari and Krishna Delta.
 2. Diversity of Coastal Plant Communities.
 3. Red List of Threatened Vascular Plant Species in India.
 Newsletter published : Up to vol. 9. Vol.10 (in press)