

FLORA OF
MADHYA PRADESH

V. NUDGAL, K. K. KHANNA & P. K. HAJRA

स्वतंत्रता के 50 वर्ष



*Years
of
Independence*

1997

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FLORA OF MADHYA PRADESH

VOLUME II

ANGIOSPERMS
(Primulaceae to Ceratophyllaceae)

Editors

V. Mudgal
K.K. Khanna
P.K. Hajra



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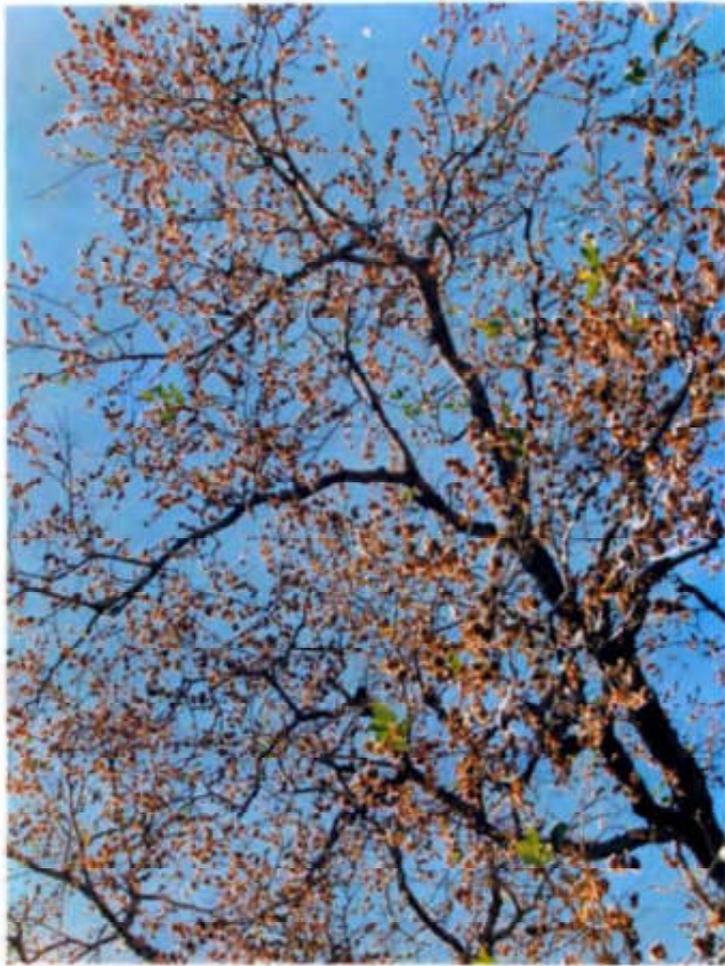


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(Courtesy: K.K. Khanna)



Plate 2. *Dry mixed deciduous forest at Sidhi* (Courtesy: S.K. Srivastava)

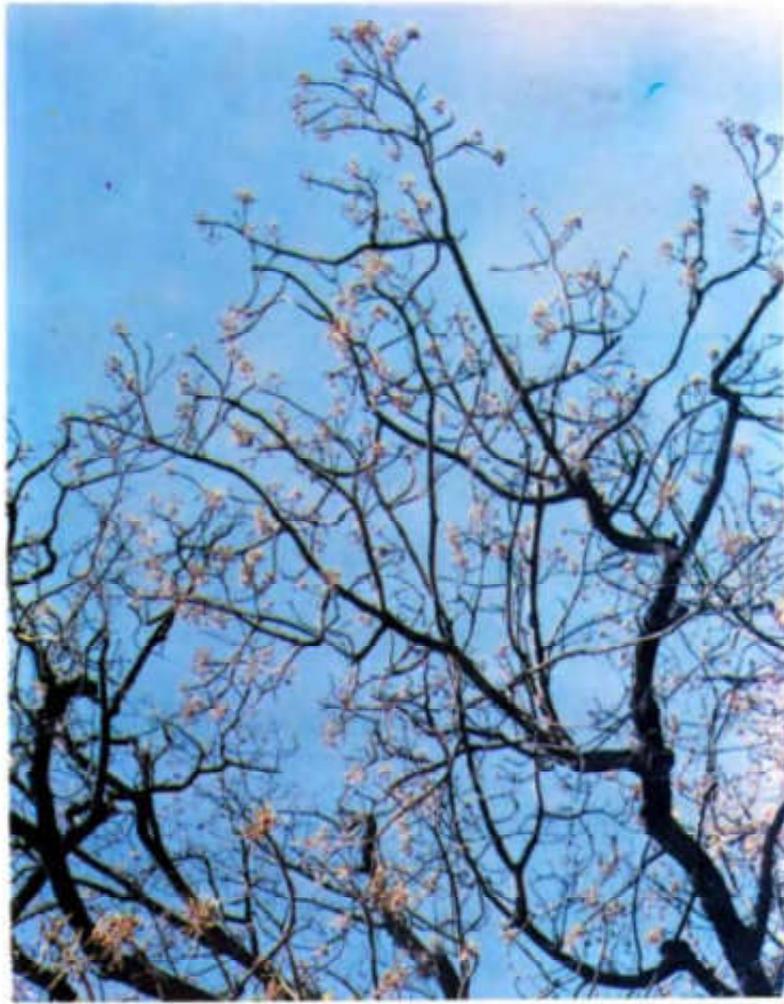


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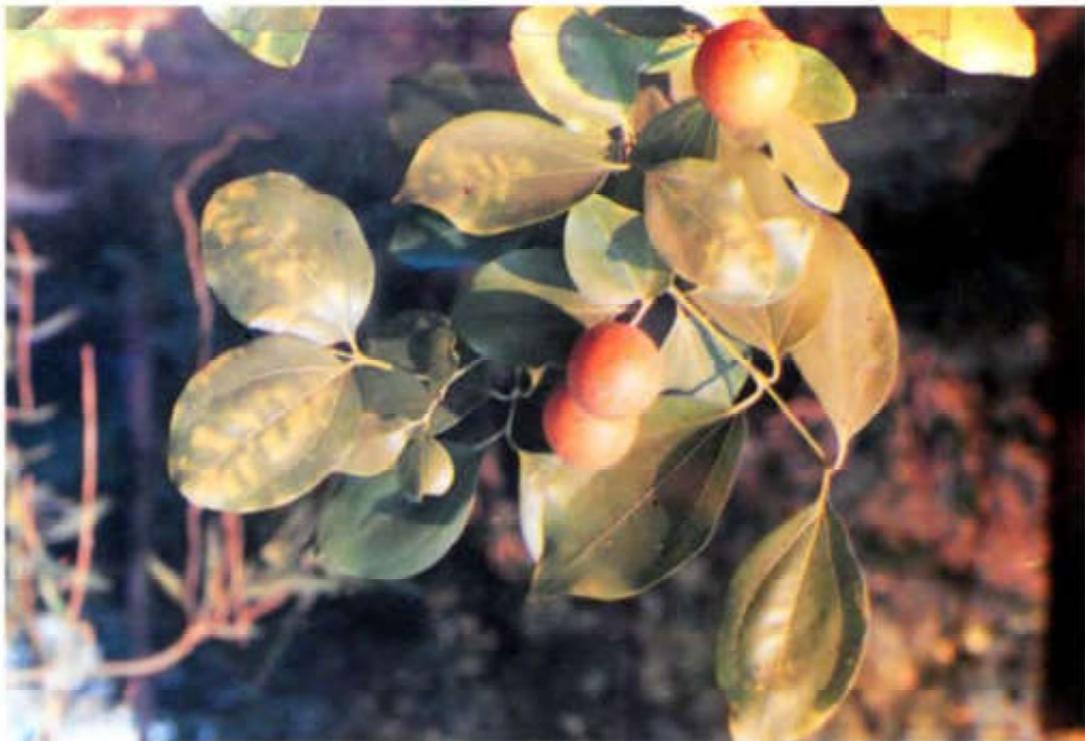


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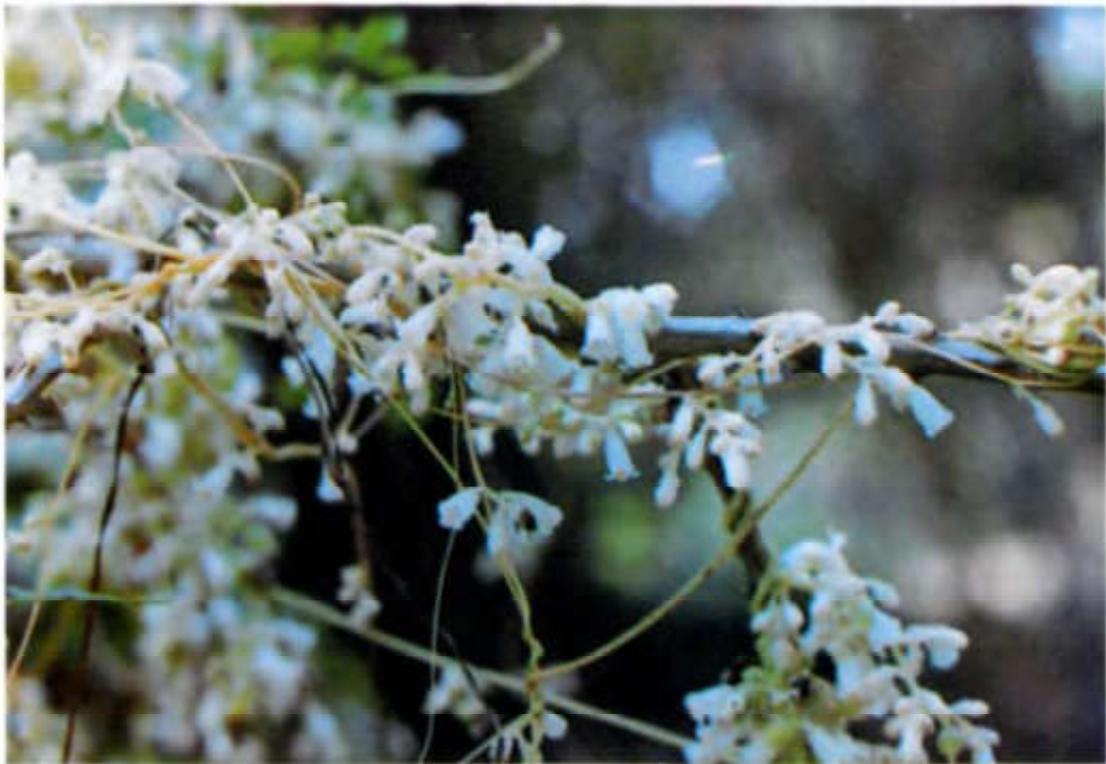


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Plate 16. *Aeginetia indica* L. (Courtesy: K.K. Khanna)

84. PRIMULACEAE

(Ramesh Kumar)

About 22 genera and 800 species; subcosmopolitan especially Northern hemisphere; 3 genera and 6 species in M.P.

- 1a. Leaves cauline; flowers solitary or in racemes; corolla-lobes contorted:
 - 2a. Filaments hairy; capsules circumscissile ...1. *Anagallis*
 - 2b. Filaments glabrous; capsules dehiscing by valves or bursting irregularly ...2. *Lysimachia*
- 1b. Leaves radical; flowers in one or more superposed whorls or umbels; corolla-lobes imbricate ...3. *Primula*

1. ANAGALLIS (Tourn.) L.

Herbs, annual or perennial, erect or prostrate; stems slender, terete or angular, glabrous. Leaves opposite or alternate, entire, sessile, exstipulate. Flowers axillary, solitary, sessile or pedicellate, ebracteate. Calyx campanulate, 5-partite. Corolla rotate to urceolate, 5-partite; lobes small or large. Stamens 5, epipetalous; filaments hairy. Ovary 1-locular; ovules many; style simple; stigma capitate. Fruit a capsule, globose or subglobose, circumscissile, many-seeded. Seeds smooth.

About 20 species; Europe, Africa and S. America; 2 in M.P.

- 1a. Leaves opposite; corolla red or blue, lobes fringed with glands ...1. *A. arvensis*
- 1b. Leaves alternate, rarely lower ones opposite; corolla white, lobes not fringed with glands ...2. *A. pumila*

1. *Anagallis arvensis* L., Sp. Pl. 148. 1753; Hook. f., Fl. Brit. India 3: 506. 1882; P. Taylor in Kew Bull. 1955: 329. 1955. Fig. 1.

Herbs, annual, erect or decumbent-ascending, up to 60 cm high; stems branched from base; branches 4-angled, narrowly winged, glabrous. Leaves opposite, ovate-lanceolate, 1.5-2 x 0.5-1.5 cm, subacute at apex, glabrous. Flowers axillary, solitary; pedicels 1-3 cm long, usually longer than leaves, recurved in fruits. Calyx-segments lanceolate, acuminate.

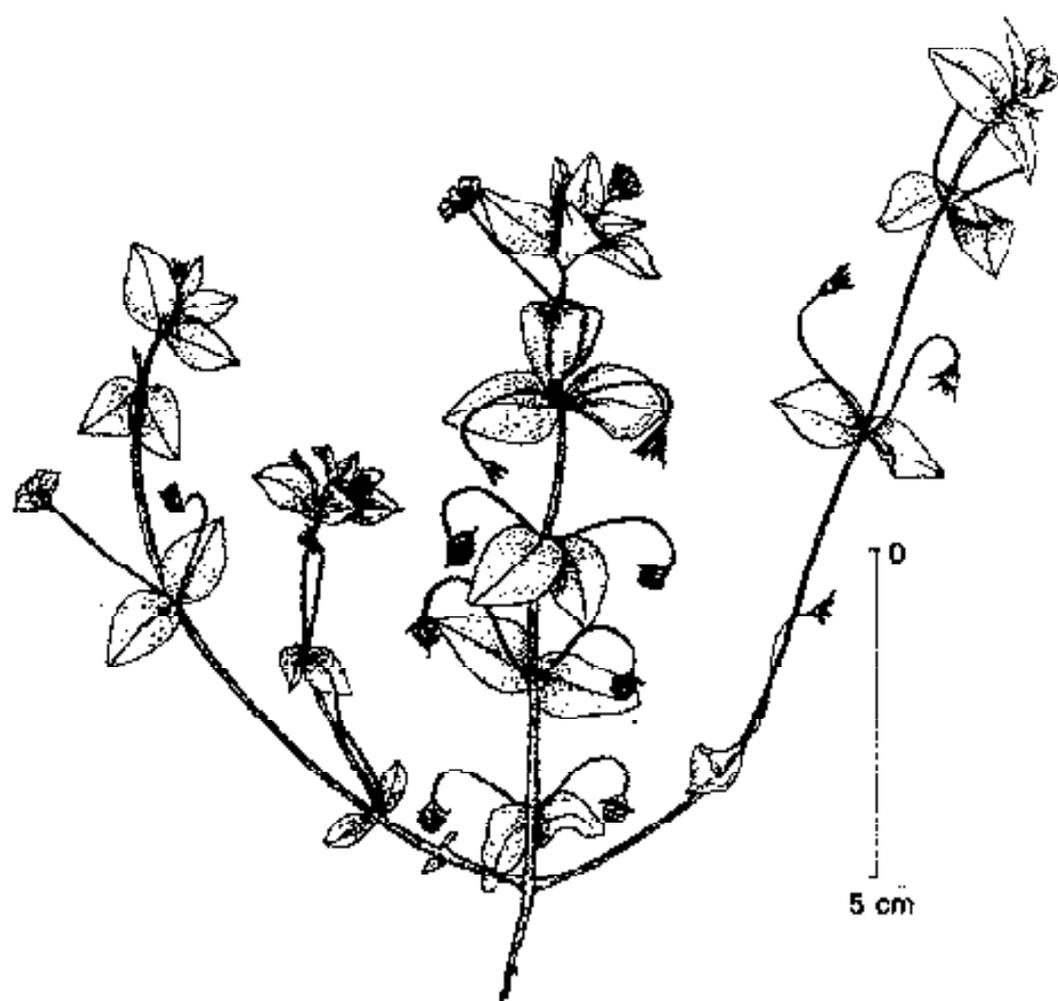


Fig. 1. *Anagallis arvensis* L.

crenulate. Corolla red or blue; lobes fringed with minute glands. Capsules globose, 4-6 mm across. Seeds flattened, somewhat 3-angled.

Common in cultivated fields and near water channels. Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Panna, Raipur, Rewa, Sagar, Satna, Sidhi, Surguja. *Fl. & Fr.*: Dec. March.

The plant has expectorant and stimulant properties and is used to treat dropsy, leprosy and hydrophobia.

2. *Anagallis pumila* Sw., Prodr. 40. 1788; P. Taylor in Kew Bull. 1955: 342. 1955. *Centunculus tenellus* Duby in DC., Prodr. 8: 72. 1844; Hook. f., Fl. Brit. India 3: 506. 1882.

Herbs, annual, erect, 5-20 cm high; stems slightly margined. Leaves alternate, rarely opposite, ovate or obovate to suborbicular, 0.5-1 x 0.4-0.5 cm, acute or obtuse at apex, cuneate at base, glabrous. Flowers axillary, solitary. Calyx-segments lanceolate-oblong, 2-3 mm long, acute or mucronate. Corolla white; lobes ovate-lanceolate, apiculate. Capsules subglobose, as long as calyx. Seeds 3-angled.

Common in moist, shady places alongwith *Styloidium tenellum* and grasses. Balaghat, Hoshangabad, Raigarh, Rajnandgaon, Sagar, Shivpuri. *Fl. & Fr.*: Sept. Feb.

2. LYSIMACHIA L.

Herbs. Leaves opposite, alternate or whorled, entire, usually minutely gland-dotted. Flowers solitary or in racemes. Calyx 5-6-lobed. Corolla white or pink, rotate or infundibuliform, 5-6-lobed. Stamens inserted at the base of corolla-lobes. Ovary subglobose; style filiform, persistent. Fruit a capsule, dehiscing by 5 valves or bursting irregularly, many-seeded. Seeds 3-angled or plano-convex.

About 150 species; temperate regions especially Europe, E. Asia and N. America; 3 in M.P.

1a. Corolla white:

2a. Corolla hardly exceeding the calyx;

stamens longer than corolla ...1. *L. candida* subsp. *obovata*

- 2b. Corolla twice as long as the calyx; stamens shorter than corolla ...2. *L. decurrens*
- 1b. Corolla pink ...3. *L. leschenaultii*

1. ***Lysimachia candida*** Lindl. subsp. ***obovata*** (Buch.-Ham. ex Hook. f.) Kunth in Engl., Pflanzenr. 22: 301. 1905. *L. obovata* Buch.-Ham. ex Hook. f., Fl. Brit. India 3: 502. 1882.

Herbs, erect, branched, more or less glaucous, up to 30 cm high. Leaves elliptic-lanceolate, 2-6 x 1-2 cm, acute or obtuse at apex, minutely gland-dotted, usually petiolate. Flowers in terminal racemes; bracts as long as the pedicels. Calyx-lobes lanceolate. Corolla white; lobes obovate. Capsules 5-valved or bursting irregularly. Seeds 3-angled.

Common in grassy fields and moist places, usually in association with *Polygonum* sp. and *Ludwigia* sp. Balaghat, Bilaspur, Mandla, Raipur, Rajnandgaon, Shahdol, Surguja. *Fl. & Fr.*: March - Dec.

2. ***Lysimachia decurrens*** G. Forster, Fl. Ins. Austr. 12. 1786. *L. javanica* Blume, Bijdr. 14: 736. 1826; Hook. f., Fl. Brit. India 3: 502. 1882. **Fig. 2.**

Herbs, erect, robust, up to 50 cm high; stems angular, provided with lenticels. Leaves usually opposite, narrowly ovate-lanceolate, 3-6 x 1-2.5 cm, subacuminate at apex, decurrent along the stem, membranous, glabrous, with glands often confined to the margin, long petiolate. Flowers in terminal, 1-5-flowered, 10-25 cm long, sometimes leafy racemes; pedicels obliquely erect or recurved, provided with stalked glands; bracts linear. Calyx-lobes lanceolate, acuminate, with longitudinal, black glands inside. Corolla white, deeply lobed; lobes oblong, rounded. Filaments with small, sessile glands. Capsules longer than calyx, bursting irregularly.

Rare. Bilaspur. *Fl. & Fr.*: March - April.

3. ***Lysimachia leschenaultii*** Duby in DC., Prodr. 8: 61. 1844; Hook. f., Fl. Brit. India 3: 501. 1882.

Herbs. Leaves alternate, lanceolate, acute at apex, smooth or crisped on the margins, glabrous, gland-dotted. Flowers in terminal, densely flowered racemes. Calyx-lobes lanceolate, acuminate. Corolla pink; lobes obovate-spathulate. Stamens exserted; filaments slender. Capsules many-seeded.



Fig. 2. *Lysimachia decurrens* G. Forster

Scarce in sandy alluvial core on gneissic rocks near water fall. Surguja (Lal and Panigrahi, 1967). *Fl. & Fr.*: April.

3. PRIMULA L.

Herbs. Leaves radical, in rosette. Flowers in superposed whorls or umbels. Calyx dentate or deeply divided. Corolla white or red, hypocrateriform or infundibuliform; mouth annulate or with folds opposite the lobes; tube short or long. Stamens inserted on the corolla-tube; filaments short; anthers included. Ovary globose or ellipsoid; style filiform; stigma capitate. Fruit a capsule, 5-valved, 2 or rarely more-seeded. Seeds angular or subglobose.

About 400 species; Northern hemisphere including Ethiopia, tropical Asia to Java and New Guinea; one in M.P.

Primula umbellata (Lour.) Bentvelzen, *Fl. Males. Ser. 1. 6:* 191. 1962. *Drosera umbellata* Lour., *Fl. Cochinch. 186.* 1790. *Androsace saxifragaefolia* Bunge, *Enum. Pl. China Bor. 53.* 1831 & in *Mém. Sav. Etr. Acad. Petersb. 2:* 127. 1835; Hook. *f.*, *Fl. Brit. India 3:* 496. 1882. *A. umbellata* (Lour.) Merr. in *Philipp. J. Sci. 15:* 237. 1919.

Herbs, annual, glandular pubescent. Leaves suborbicular, 0.75-2 cm across, cordate at base, subentire or serrate, pubescent above; petioles ca 2 cm long. Flowers in 1-several-flowered umbels; peduncles 4-6 cm long, slender; pedicels 1-3 cm long, slender, pubescent. Calyx deeply 5-lobed, enlarged in fruit; lobes spreading. Corolla white, hypocrateriform or infundibuliform; mouth yellow, annulate; tube short. Capsules globose or ovoid. Seeds deeply pitted.

In shady places. Bilaspur, Panna, Rewa, Satna, Sidhi. *Fl. & Fr.*: March April.

85. MYRSINACEAE

(U.S. Vaish)

About 39 genera and 1250 species; tropical and subtropical to temperate regions of Old World; 2 genera and 6 species in M.P.

- 1a. Flowers 10-20 mm across; corolla pink, blue or purple; anthers much longer than filaments ...1. *Ardisia*
- 1b. Flowers 4-5 mm across; corolla greenish white or greenish yellow; anthers not longer than filaments ...2. *Embelia*

1. *ARDISIA* Sw., *nom. cons.*

Shrubs or small trees. Leaves simple, alternate, spiral or subverticillate, entire, dentate, serrate or crenate, gland-dotted, herbaceous or coriaceous, sessile or shortly petiolate. Flowers in axillary panicles, corymbs or umbels, bisexual, actinomorphic, 5-merous, pedicellate. Calyx 5-lobed or 5-partite; lobes imbricate or not. Corolla pink, blue or purple, deeply 5-lobed; lobes somewhat fleshy, imbricate to right. Stamens subsessile; filaments free; anthers erect, sagittate at base. Ovary globose; style cylindrical, filiform; stigma indistinct. Fruit a drupe, subglobose or globose, fleshy, with persistent style, 1-seeded.

About 250 species; tropical and subtropical regions excluding Africa, rare in Australia; 4 in M.P.

- 1a. Leaves serrate; pedicels 0.3-0.5 cm long ...4. *A. thyrsiflora*
- 1b. Leaves entire or subcrenate; pedicels 1 cm or more long:
- 2a. Leaves lanceolate, up to 2.5 cm broad; corolla dark blue ...2. *A. quinquegona*
- 2b. Leaves obovate-oblong, elliptic-lanceolate or oblanceolate, more than 3 cm broad; corolla pink:
- 3a. Twigs and petioles rusty tomentose; leaves up to 4 cm broad; corolla spotted ...1. *A. depressa*
- 3b. Twigs and petioles glabrous; leaves 5-7 cm broad; corolla unspotted ...3. *A. solanacea*

1. *Ardisia depressa* C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 522. 1882.

Shrubs; twigs rusty tomentose. Leaves oblong-lanceolate or elliptic-lanceolate, 5-14 x 3-4 cm, acuminate at apex, cuneate at base, entire, subcoriaceous, glabrous; petioles rusty tomentose. Flowers in umbels; umbels axillary or clustered on small shoots, much branched. Calyx-lobes

ovate-lanceolate, spreading. Corolla pinkish; lobes glandular, spreading. Drupes depressed globose, black.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: March - June.

2. *Ardisia quinquegona* Blume, *Bijdr.* 13: 689. 1826. *A. pauciflora* Heyne ex Roxb., *Fl. Ind.* (Carey & Wallich ed.) 2: 279. 1824; C.B. Clarke in *Hook. f.*, *Fl. Brit. India* 3: 529. 1882.

Shrubs, ca 2.5 m high. Leaves lanceolate, up to 9.5 x 2.5 cm, acuminate at apex, acute at base, subcrenate, coriaceous; petioles up to 1 cm long. Flowers in axillary, 1-7-flowered, slender racemes, pulpy. Calyx-lobes deltoid, subacute. Corolla dark blue; lobes punctate. Drupes globose, ca 6 mm across, red.

Rare. In evergreen forests. Bastar. *Fl. & Fr.*: Dec. - Feb.

3. *Ardisia solanacca* Roxb., *Pl. Coromandel* 1: 27. t. 27. 1795. *A. humilis auct. non Vahl*, 1794; C.B. Clarke in *Hook. f.*, *Fl. Brit. India* 3: 529. 1882, *p.p. excl. syn.*

Shrubs, 2-3 m high. Leaves alternate, sometimes crowded towards the tip of branchlets, obovate-oblong or oblanceolate, 12-18 x 5-7 cm, acute-acuminate at apex, cuneate at base, coriaceous. Flowers in axillary, corymbose racemes, 1.5-2 cm across. Calyx-segments almost free up to base, coriaceous, persistent. Corolla pink, gland-dotted; lobes ovate, coriaceous. Stamens exserted, connivent around style. Drupes depressed globose, 1-1.5 cm across, green, purple-black on maturity, long stalked.

Common in evergreen forests or on hill slopes, sometimes near rocky stream. Bastar, Bilaspur, Raigarh, Raipur, Surguja. *Fl. & Fr.*: June - Oct.

4. *Ardisia thyrsiflora* D. Don, *Prodr. Fl. Nepal.* 148. 1825. *A. floribunda* Wallich in Roxb., *Fl. Ind.* (Carey & Wallich ed.) 2: 272. 1824. *A. neriifolia* A. DC. in *Trans. Linn. Soc. Bot.* 17: 118. t. 8. 1834; C.B. Clarke in *Hook. f.*, *Fl. Brit. India* 3: 522. 1882.

Shrubs. Leaves elliptic-lanceolate or oblanceolate, 10-20 x 4-7 cm, acute to acuminate at apex, cuneate at base, serrate. Flowers in axillary or terminal, minutely rusty panicles; pedicels 0.3-0.5 cm long. Calyx-lobes ovate. Corolla pale purple; lobes ovate. Drupes depressed globose, ca 5 mm across, 5-angled.

Rare. Bastar (Saxena and Khotela, 1976). *Fl. & Fr.*: May - Nov.

2. *EMBELIA* Burm. *f. nom. cons.*

Shrubs, erect, scandent or liana. Leaves simple, alternate below, opposite above, distichous or spiral, entire or dentate, often glandular, petiolate. Flowers in axillary or terminal racemes or panicles, sometimes fascicled, bisexual or unisexual, 4-6-merous; bracts minute; bracteoles absent. Calyx deeply divided; segments valvate, ciliate. Corolla-lobes free or connate at base, imbricate, ciliate, papillose inside. Stamens somewhat exserted; filaments short or long, inserted above the base of corolla-lobes; anthers obovoid. Ovary superior, abortive or reduced in male, globose-ovoid in female and bisexual flowers; style short; stigma capitate. Fruit a drupe, subglobose or globose, 1-seeded.

About 130 species; tropical and subtropical regions of Old World; 2 in M.P.

- 1a. Plants erect; leaves eglandular; racemes axillary ...1. *E. basaal*
 1b. Plants liana; leaves glandular; racemes terminal and axillary ...2. *E. ribes*

1. *Embelia basaal* (Roem. & Schult.) A. DC. in Trans. Linn. Soc. Bot. 17: 131. 1837; Panigrahi & S.M. Almeida in J. Bombay Nat. Hist. Soc. 84: 472. 1987. *Ardisia basaal* Roem. & Schult., Syst. Veg. 4: 517. 1819. *Embelia robusta auct. non* Roxb., 1820: C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 515. 1882, *p.p. quoad E. basaal in syn.* *E. isjeriam-cottam auct. non* (Roem. & Schult.) A. DC., 1834; Santapau, Fl. Khandala ed. 3: 141. 1967, *p.p. quoad syn. E. basaal. E. acutipetalum* S.M. Almeida & M.R. Almeida in J. Bombay Nat. Hist. Soc. 81: 741. 1984, *nom. superfl. illeg. - Baberung.* Fig. 3.

Shrubs or small trees, deciduous, ca 2 m high. Leaves obovate-oblong or obovate, 5-11 x 3-6 cm, acute-acuminate at apex, cuneate at base, entire or obscurely serrulate, rusty pubescent beneath. Flowers in axillary racemes, bracteate. Calyx-segments 4-5, glandular, persistent. Corolla greenish white; lobes 5, free or slightly connate at base. Drupes globose, red, with persistent style forming filiform beak.

Common in sal and mixed forests, Balaghat, Bastar, Bilaspur, Chhindwara, Hoshangabad, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Sidhi, Surguja. *Fl. & Fr.*: July - Jan.

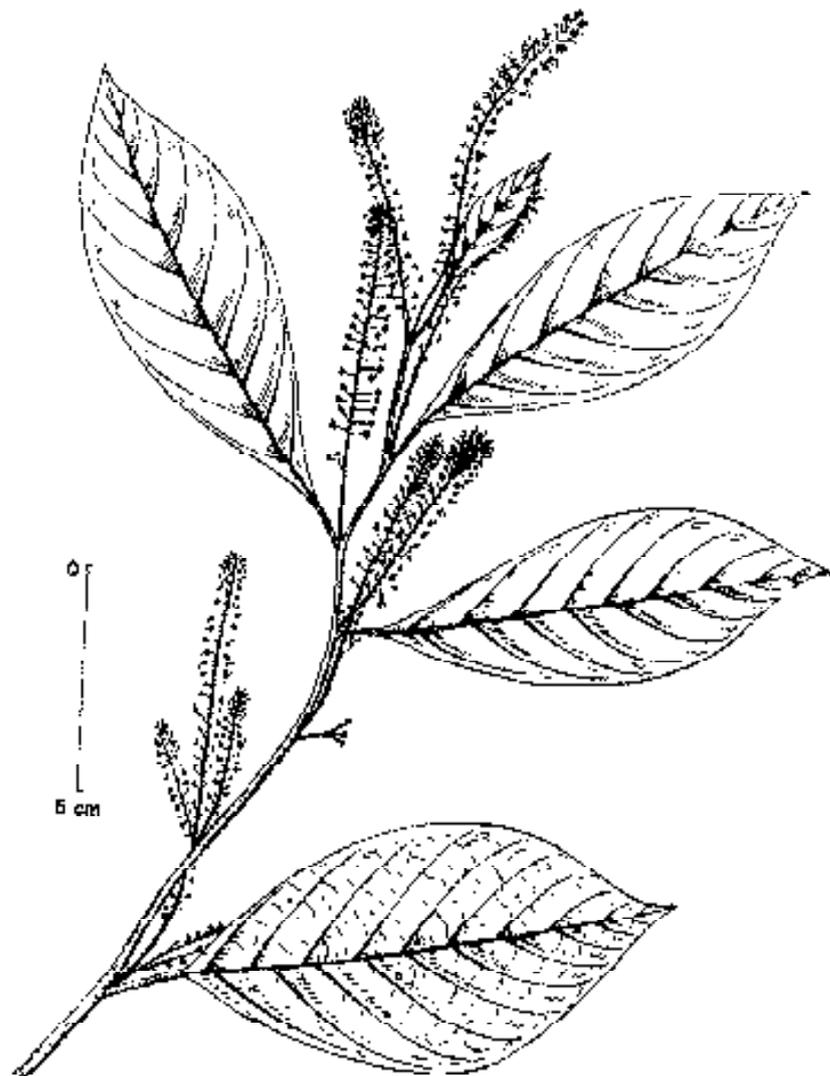


Fig. 3. *Embelia basaal* (Roem. & Schult.) A. DC.

The plant is given to expecting mothers. Leaves are applied on itches while fruits are used for blood purification and as condiments.

2. *Embelia ribes* Burm. *f.*, Fl. Ind. 62. t. 23. 1768; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 513. 1882.

Shrubs, scandent; branches slender. Leaves oblong-elliptic, ca 8.5 x 3 cm, subacuminate at apex, obtuse or cuneate at base, thinly coriaceous, dark green, gland-dotted; petioles ca 1 cm long. Flowers in terminal and axillary, paniculate racemes, 5-merous; pedicels glandular pubescent. Calyx-segments 5, ovate, ciliate. Corolla greenish yellow; lobes 5, elliptic, pubescent. Drupes globose, black when ripe.

Rare. In dense forests. Bastar. *Fl. & Fr.*: Feb. April.

85a. THEOPHRASTACEAE*

(Ajand Kumar)

About 5 genera and 90 species; tropical America; one species naturalized in M.P.

JACQUINIA L., *nom. cons.*

Shrubs or trees. Leaves opposite, alternate or somewhat whorled, entire, coriaceous. Flowers solitary or in racemes or umbels. Calyx 5-lobed; lobes ovate-orbicular. Corolla white, purple or orange, hypocrateriform, 5-lobed. Stamens 5, inserted near the base of corolla-tube; filaments subulate, usually longer than anthers. Staminodes 5, rounded, crowded at the throat and between the corolla-lobes. Ovary glabrous; stigma capitate-peltate. Fruit a berry, ellipsoid, coriaceous, few to many-seeded. Seeds ovoid, compressed.

*Possibly due to ornamental nature of the plant and restricted distribution in M.P., the family has escaped the attention and has not been included under Key to families given in Flora of M.P. Vol. I. However, for the purpose, it should be placed after lead 121b on page 110 and can be distinguished from Myrsinaceae and Primulaceae by the presence of staminodes and yellow or orange seeds.

About 30 species; Central America and Carribean; one in M.P.

Jacquinia ruscifolia Jacq., Enum. Syst. Pl. 15. 1760.

Shrubs or small trees. Leaves alternate or crowded at the tip of branches, elliptic-oblong, up to 6.5 x 1.8 cm, with 2-6 mm long apical spine, exstipulate; petioles up to 5 mm long. Flowers in terminal, up to 6 cm long racemes. Calyx-lobes orbicular, membranous. Corolla bright orange; lobes ovate, rounded. Filaments broader at base, glandular hairy. Staminodes petaloid. Ovary 1-locular; ovules many. Berries many-seeded. Seeds immersed in mucilage.

Cultivated in gardens and along the river banks, Mandla. *Fl. & Fr.*: April - June.

86. SAPOTACEAE

(Ram Lal)

About 116 genera and 1100 species; tropical to temperate regions; 4 genera and 5 species in M.P.

- 1a. Calyx-lobes 2-seriate; stamens 6 or more:
 - 2a. Calyx-lobes 4; staminodes absent ...1. *Madhuca*
 - 2b. Calyx-lobes 6 or 8; staminodes present:
 - 3a. Stamens 6; staminodes 6, glabrous ...2. *Manilkara*
 - 3b. Stamens 8; staminodes 8, hairy ...3. *Mimusops*
- 1b. Calyx-lobes 1-seriate; stamens 5 ...4. *Xantolis*

1. MADHUCA Buch.-Ham. ex J.F. Gmelin

Trees, branched; sap milky. Young leaves petaloid, clustered towards the end of branches, coriaceous, silky or tomentose beneath; stipules caducous. Flowers fascicled, crowded near the apex of branches among the leaves or from the axil of fallen leaves, pedicellate, often nodding. Calyx-lobes 4, 2-seriate; 2 outer valvate, thicker; inner imbricate, thinner. Corolla campanulate, usually 8-lobed; lobes erect, subcontorted in bud. Stamens 16 or more, in 2-3 whorls. Staminodes absent. Ovary usually pubescent, 8-more-locular; style subulate, persistent. Berries globose or ovoid, fleshy, more or less compressed.

About 85 species; Indo-Malesia especially from W. Malesia to Australia: one in M.P.

Madhuca longifolia (J. Koenig) Macbr. var. **latifolia** (Roxb.) Chevalier in Rev. Int. Bot. Appl. 23: 149. 1943; P. Royen in Blumea 10: 55. 1960. *Bassia latifolia* Roxb., Pl. Coromandel 1: 20. t. 19. 1795; C.B. Clarke in Hook. f., Fl. Brit. India 3: 544. 1882. *Madhuca latifolia* (Roxb.) Macbr. in Contr. Gray Herb. Harv. Univ. N.S. 53: 17. 1918. *M. indica* J.F. Gmelin, Syst. Nat. 799. 1791. *Bassia longifolia* J. Koenig in L., Mant. Pl. App. 563. 1771; C.B. Clarke in Hook. f., Fl. Brit. India 3: 544. 1882. *Mahua*.

Trees, deciduous, up to 18 m high; branches many, spreading. Leaves elliptic, obovate or broadly lanceolate, 7-22 x 4-11 cm, shortly acuminate at apex, rounded or acute at base; young leaves densely woolly; petioles 2.5-3 cm long; stipules subulate, densely pubescent. Flowers in dense fascicles at the end of branches; pedicels ca 3 cm long, rusty tomentose. Calyx ca 9 mm long; lobes rusty tomentose. Corolla cream-coloured, more than 1 cm long; lobes usually 8-9, ovate or lanceolate; tube ca 8 mm long, fleshy. Berries ovoid, 2.5-5 cm long, greenish, 1-4-seeded.

Common throughout the state on roadsides, near villages and in dry mixed deciduous forests. Bastar, Bilaspur, Chhatarpur, Damoh, Durg, Raigarh, Raipur, Rajnandgaon, Seoni, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: Jan. June.

Wood is used for making comb as well as for various other purposes. Bark yields tannin and employed for the treatment of scabies and rheumatism. Flowers are eaten and used for cough and distillation of liquor. At Bastar, the tribal folk use them for magical performance. Ripe fruits are eaten and used to treat asthma, burning and pthisis while seed oil for cooking, lighting and making soap. Decoction of seed cake is given as antidote to snake bite.

2. MANILKARA Adans., *nom. cons.*

Trees, evergreen. Leaves coriaceous, petiolate, exstipulate; lateral nerves parallel, raised below. Flowers solitary or few in leaf axils. Calyx-lobes 6 or 8, in 2 series of 3 or 4 each; outer valvate; inner imbricate, alternate with outer. Corolla-lobes 16 or 18, in 2 or 3 series, imbricate.

Stamens 6. Staminodes 6. Ovary globose, 6-8-locular; style columnar. Berries ellipsoid or globose, 1 or 3-seeded; epicarp thin. Seeds oblong, albuminous, shining.

About 70 species; tropical regions; 2 in M.P.

- 1a. Leaves obtuse to emarginate; berries ellipsoid, yellow when ripe; seeds reddish brown ...1. *M. hexandra*
- 1b. Leaves acute; berries globose, brown when ripe; seeds black ...2. *M. zapota*

1. *Manilkara hexandra* (Roxb.) Dubard in Ann. Mus. Col. Marseille (ser. 3) 23: 9. t. 2. 1915; P. Royen in Blumea 7: 408. 1953. *Mimusops hexandra* Roxb., Pl. Coromandel 1: 16. t. 15. 1795 & Fl. Ind. 2: 238. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 3: 549. 1882. *M. indica* A. DC. in DC., Prodr. 8: 205. 1844 - *Khirni*.

Trees, 15-18 m high; bark deeply furrowed, grey. Leaves obovate or oblong, 5-10 cm long, obtuse to emarginate at apex, cuneate at base, dark green and shining above, glabrous; petioles ca 1.2 cm long, glabrous. Flowers axillary, solitary or in fascicles; pedicels up to 1.2 cm long, pale yellow. Calyx-lobes 6, ca 0.5 cm long, reflexed, usually rusty pubescent outside, ciliate on margins. Corolla white; lobes 18, ca 0.4 cm long, 2-seriate; 12 outer lobes linear; 6 inner lobes oblanceolate; tube ca 0.6 cm long. Berries ellipsoid, 1.2-1.8 cm long, yellow when ripe, 1(-2)-seeded.

Along roadsides and near streams. Bilaspur, Chhatarpur, Damoh, Dhar, Hoshangabad, Indore, Panna, Raisen, Rewa. Sagar, Satna. *Fl. & Fr.*: Sept. Dec.

Wood is used for house building while bark as medicines. Fruits are eaten. An oil is extracted from the seeds.

2. *Manilkara zapota* (L.) P. Royen in Blumea 7: 410. 1953. *Achras zapota* L., Sp. Pl. App. 1190. 1753, *quoad typum excl. syn. Sloanei et Plukenetii*. *Manilkara achras* (Mill.) Fosberg in Taxon 13: 255. 1964. *Sapota achras* Mill., Gard. Dict. ed. 8. n. 1. 1768. *Achras sapota* L., Syst. Nat. ed. 10. 2: 988. 1759; C.B. Clarke in Hook. f., Fl. Brit. India 3: 534. 1882. *C'heekku*.

Trees, 8-15 m high. Leaves crowded at the end of branches, oblong-lanceolate or elliptic-oblong, 5-12 x 2-3 cm, acute at apex, entire, sometimes undulate, shining, glabrous. Flowers axillary, solitary; pedicels up to 2 cm long, rusty tomentose. Outer calyx-lobes ovate, ca 8 mm long, concave, thin, fleshy, pendulous. Corolla white, ca 0.7 cm across; lobes usually 16 in 2 series of 8 each, ca 4.5 mm long. Berries globose, 4-5 cm across, brown when ripe, 3-5-seeded. Seeds compressed, black.

Cultivated for edible fruits. Bhopal, Indore. *Fl. & Fr.*: Nov. March.

3. MIMUSOPS L.

Trees; sap milky. Leaves coriaceous; primary nerves numerous, spreading. Flowers axillary, solitary or in fascicles. Calyx-lobes 6-8, in 2 series; outer series valvate in bud, enclosing the inner; inner series imbricate. Corolla-lobes 18-24, in 2 or 3 series; tube short. Stamens 8, inserted at the base of corolla; filaments short; anthers with excurrent connective. Staminodes 8, alternate with stamens or connate with them at the base, entire or variously notched. Ovary pubescent, 8-locular; style elongate. Berries globose, ovoid or ellipsoid, fleshy, 1 or few-seeded. Seeds ellipsoid, compressed.

About 57 species; tropical Africa including one from Malesia to Pacific regions; one in M.P.

Mimusops elengi L., Sp. Pl. 349, 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 548, 1882. - *Maulshri*, *Molsri*.

Trees, evergreen, 12-15 m high; bark rough, dark grey. Leaves elliptic-ovate or lanceolate, 4-12 x 3.5-5.5 cm, acute to shortly acuminate at apex, acute at base, subcoriaceous, exstipulate; petioles up to 4 cm long. Flowers axillary, solitary or in fascicles of 2-6, fragrant; pedicels 1.2-1.9 cm long, rusty tomentose. Calyx-lobes 8. Corolla white, up to 1 cm across; lobes ca 24, in 3 series of 8 each, imbricate. Berries ovoid or ellipsoid, 3 x 2 cm, yellow when ripe, 1-seeded. Seeds brown, shining.

Usually planted in gardens and parks. Bhopal, Bilaspur, Chhatarpur, Damoh. *Fl. & Fr.*: Jan. Sept.

Flowers are used in perfumery while bark in native medicines. Wood is valuable and exploited for various purposes. Fruits are edible while seeds yield oil.

4. XANTOLIS Raf.

Trees, rarely shrubs. Leaves alternate, lanceolate, elliptic or obovate, coriaceous. Flowers in axillary fascicles, subsessile or shortly pedicellate; pedicels villous or tomentose. Calyx-lobes 5, rarely 6, subequal, imbricate. Corolla campanulate; lobes 5, rarely 6, shorter or longer than tube, imbricate. Stamens 5, inserted at the base of corolla-lobes; filaments short, linear; anthers ovate or lanceolate. Staminodes 5, alternate with stamens, petaloid. Ovary villous, 5-locular, rarely 2-4-locular; style short or long, cylindrical. Berries ovoid or globose, usually 1, sometimes 3-5-seeded. Seeds much compressed.

About 14 species; S.E. Asia and Philippines; one in M.P.

Xantolis tomentosa (Roxb.) Raf., *Sylva Tellur.* 35. 1838. *Sideroxylon tomentosum* Roxb., *Pl. Coromandel* 1: 28. t. 28. 1795 & *Fl. Ind.* 1: 602. 1832; C.B. Clarke in *Hook. f., Fl. Brit. India* 3: 538. 1882.

Small or medium-sized trees; bark cracked; twigs often spinous; young parts pubescent or woolly. Leaves elliptic or obovate, 5-10 x 2.5-5 cm, subacute or nearly retuse at apex, acute at base, dark green above, pale beneath; petioles ca 1.2 cm long, glabrous or pubescent. Flowers in axillary, rounded clusters; pedicels ca 0.6 cm long, drooping. Calyx-lobes 5; tube woolly. Corolla white, 0.6-0.8 cm long; lobes 5, narrowly lanceolate, nearly glabrous. Staminodes linear-lanceolate, hairy. Berries ovoid, 1.8-2.5 x 1.2-1.6 cm, yellowish green, pubescent when young, glabrous on ripening. Seeds ca 1.2 cm long, smooth.

- 1a. Spines 5-7 mm long; leaves up to 3.5 cm broad;
petioles pubescent ...1.1. var. *elengioides*
- 1b. Spines absent or very small; leaves more than
4 cm broad; petioles usually glabrous ...1.2. var. *tomentosa*

1.1. var. elengioides (Bedd.) Ram Lal in *Bull. Bot. Surv. India* 9: 267. 1967. *Achras elengioides* Bedd., *Fl. Sylv. S. India* t. 235. 1872. *Sideroxylon tomentosum* Roxb. var. *elengioides* Gamble, *Fl. Madras* 1: 534. 1919.

Rare, Bastar. *Fl. & Fr.*: Oct. - Feb.

Fruit is used as pickles and in curries.

1.2. var. tomentosa

Rare. Bastar. *Fl. & Fr.*: Oct. Feb.

87. EBENACEAE

(M.I. Hanfi)

Two genera and about 485 species; tropical and subtropical to temperate regions; one genus with 7 species in M.P.

DIOSPYROS L.

Shrubs or trees, dioecious, rarely polygamous. Leaves simple, subopposite or alternate, entire, usually coriaceous, pinnately veined, stipulate. Flowers (often female) solitary, fascicled or in cymes, usually unisexual, actinomorphic, 3-5-merous. Calyx more or less deeply lobed, persistent and accrescent in bisexual and female flowers, deciduous in male ones. Corolla tubular, campanulate, hypocrateriform or urceolate; lobes contorted. Stamens usually multiples of corolla-lobes, sometimes in clusters. Ovary superior, 2-10-locular, ovule 1, rarely 2 in each locule, axile, pendulous; styles very short, 1-5. Fruit a berry, usually globose or ovoid, 1-many-seeded.

About 475 species; tropical regions; 7 in M.P.

1a. Stamens up to 16:**2a. Anthers awnless; staminodes 7-16:****3a. Leaves always alternate; corolla of female flowers urceolate, campanulate or hypocrateriform; albumen of seeds not ruminant:****4a. Corolla urceolate or campanulate; ovary glabrous:****5a. Male calyx glabrous inside; staminodes 7-9**

...1. *D. chloroxylon*

5b. Male calyx pubescent inside; staminodes 12

...2. *D. cordifolia*

4b. Corolla hypocrateriform; ovary pubescent

...3. *D. lancifolia*

- 3b. Leaves subopposite and alternate;
corolla of female flowers tubular;
albumen of seeds ruminant ...5. *D. melanoxyton*
- 2b. Anthers awned; staminodes 4 ...6. *D. montana*
- 1b. Stamens more than 16:
- 6a. Corolla glabrous outside ...4. *D. malabarica*
- 6b. Corolla densely pilose outside ...7. *D. sylvatica*

1. **Diospyros chloroxyton** Roxb., Pl. Coromandel 1: 38. t. 49. 1795; C.H. Clarke in Hook. f., Fl. Brit. India 3: 560. 1882. *D. capitulata* Wight. Icon. Pl. Ind. Orient. 4: t. 1224. 1848 & t. 1588. 1850.

Trees; branchlets pubescent, often modified into thorns. Leaves alternate, elliptic or oblong, 2-3 x 1-2 cm, obtusely apiculate at apex, rounded at base, pubescent. Male flowers in axillary, short, 6-7-flowered clusters; female flowers solitary. Calyx cupular, 4-lobed. Corolla white, urceolate-campanulate, 4-lobed, larger in female flowers. Stamens 16, 2-seriate. Berries globose, glabrous.

Rare. Indore (Rao and Sastry, 1964). *Fl. & Fr.*: July - Dec.

2. **Diospyros cordifolia** Roxb., Pl. Coromandel 1: 38. t. 50. 1795. *D. montana auct. non Roxb.*, 1795; C.H. Clarke in Hook. f., Fl. Brit. India 3: 555. 1882, *p.p.* *D. montana* Roxb. var. *cordifolia* (Roxb.) Hieron, Monogr. Eben. in Trans. Camb. Phil. Soc. 12(1): 222. 1873. *Bis-tendu*.

Large shrubs or small trees, 3-4 m high; bark smooth. Leaves alternate, oblong, ovate-oblong or ovate-lanceolate, 2.5-9 x 1.5-3 cm, thinly coriaceous, glabrous. Male flowers in axillary, 3-flowered cymes; female flowers solitary. Calyx-lobes 4, ciliate on margins, of female flowers reflexed in fruits. Corolla creamy white, urceolate. Stamens 16, in opposite pairs, united at the base. Berries globose or ovoid, 2-2.5 cm across, yellow when ripe.

Rare. In wastelands and forests. Chhatarpur, Jabalpur, Satna, Seoni
Fl. & Fr.: June - Sept.

3. *Diospyros lancifolia* Roxb., Fl. Ind. 2: 537. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 3: 562. 1882, "*lanceaeifolia*" *D. multiflora* Wallich ex A. DC. in DC., Prodr. 8: 231. 1844.

Trees. Leaves lanceolate or oblong, acuminate at apex, subobtusate at base, glabrous. Male flowers in axillary clusters, sessile; female flowers solitary, subsessile. Calyx-lobes 4, obovate and deciduous in males, ovate with reflexed margins, persistent and densely tomentose in females. Corolla hypocrateriform, densely fulvous outside. Stamens ca 16; filaments minutely pilose. Berries subglobose or ovoid, villous.

Rare. In mixed forests. Bilaspur. *Fl. & Fr.*: March - following March.

4. *Diospyros malabarica* (Desr.) Kostel., Allg. Med.- Pharm. Fl. 3: 1099. 1834; Panigrahi & Murti in Bangladesh J. Bot. 10(1): 36. 1981. *Garcinia malabarica* Desr. in Lam., Encycl. 3: 701. 1792. *Diospyros embryopteris* Pers., Syn. Pl. 2: 624. 1807, *p.p.*; C.B. Clarke in Hook. f., Fl. Brit. India 3: 556. 1882, *p.p. excl. syn. Embryopteris peregrina* Gaertn., 1788. *D. peregrina* Guerke in Engl. & Prantl, Nat. Pflanzenfam. 4(1): 164. 1891, *p.p. majore excl. ref. Gaertn., 1788.* - *Kala-tendu, Makar-tendu.*

Fig. 4.

Trees; branches spreading; bark smooth, flaking off in large pieces. Leaves distichous, oblong or oblong-lanceolate, 10-15 x 2.5-5.5 cm, obtuse at apex. Male flowers in axillary, 2-7-flowered cymes; female flowers axillary, solitary. Calyx of female flowers dilated and subcordate at base. Stamens 24-64, in pairs; anthers with a line of hairs up to the middle. Berries globose, 8-celled, covered with rusty scurfiness, 4-8-seeded. Seeds flattened, reddish brown.

In mixed forests. Bastar, Bilaspur, Chhatarpur, Raigarh, Raipur. *Fl. & Fr.*: April - following April.

Fruits are eaten raw. Rind and bark have astringent properties and are used to treat diarrhoea. Seed oil is used for the treatment of dysentery. Wood is used for construction and boat building.

5. *Diospyros melanoxylon* Roxb., Pl. Coromandel 1: 36. t. 46. 1795; C.B. Clarke in Hook. f., Fl. Brit. India 3: 564. 1882. *Biripatta, Tendu.*

Shrubs or trees, up to 8 m high; twigs softly pubescent. Leaves ovate-elliptic, 5-18 x 4-12 cm, acute at apex, rounded or sometimes cuneate at



Fig. 4. *Diospyros malabarica* (Desr.) Kostel.

hase, pubescent beneath; venation distinct. Male flowers in axillary, simple or branched, 3-15-flowered, drooping cymes; female flowers solitary. Calyx-lobes 5, acute in males, cordate in females, broadly 2-winged. Corolla-lobes 5, densely hairy. Stamens 10. Berries globose, 2.5-3.5 cm across, glabrous with age.

Common in dry deciduous forests and on roadsides. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Jabalpur, Mandla, Morena, Panna, Raigarh, Raipur, Rajnandgaon, Satna, Seoni, Shivpuri, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: March - Aug.

Leaves are used for rolling 'Bidis' the Indian cigarette while mature fruits are eaten raw. Roasted seeds, calyx and peduncles are referred for the treatment of cough, spermatorrhoea, urinary and skin diseases. 'Gonds' tribe worship the tree.

Notes : Hole (Indian For. 30: 579, 1904) and Saxena and Khotale (J. Bombay Nat. Hist. Soc. 73: 26, 1976) have reported the occurrence of *D. exsculpta* Buch.-Ham. (*D. tomentosa* Roxb.) in Jabalpur and Bastar respectively while there is some confusion regarding the nomenclature of *D. tomentosa* Roxb. and *D. melanoxylon* Roxb. Haines (Bot. Bihar Orissa 4: 519, 1922) has treated *D. tomentosa* Roxb. as synonymous to *D. melanoxylon* Roxb. On the other hand, Gamble (Fl. Madras 2(5): 772, 1922) has treated these species separately. Ellis (Fl. Nallamalais 2: 240, 1990) has clearly stated that although *D. tomentosa* Roxb. appears to have larger leaves, the taxa requires detailed monographic study.

6. *Diospyros montana* Roxb., Pl. Coromandel I. 37. t. 48, 1795, C.B. Clarke in Hook. f. Fl. Brit. India 3: 555, 1882, p.p. *Bis-tendu*.

Shrubs or trees; twigs pubescent. Leaves ovate-elliptic, 3-10 x 2-5 cm, acute at apex, cuneate-cordate at base, pubescent beneath; veins distinct. Male flowers in axillary, short, usually 3-flowered cymes; female flowers solitary. Calyx-lobes 4, rounded. Corolla-lobes 5, ovate, acute, sparsely pubescent. Stamens 15. Berries globose, 2-2.5 cm across, glabrous.

Common in plains and sal forests. Chhatarpur, Mandla, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: March - Aug.

Wood is exploited for various purposes.

7. *Diospyros sylvatica* Roxb., Pl. Coromandel 1: 37, t. 47, 1795; C.D. Clarke in Hook. f. Fl. Brit. India 3: 559, 1882.

Small trees. Leaves narrowly elliptic or elliptic-oblong, 10-18 x 5-9 cm, acuminate at apex, sparsely pubescent beneath when young. Male flowers very small, in numerous, small, dense, pedunculate cymes, axillary and from the scars of caducous scales on new shoots, sometimes paniculate on special leafless branchlets, 3-4-merous; female flowers in distichous rows mostly below the leaves, often on special branchlets, more or less silky pubescent. Fruiting calyx-lobes 3-5, broadly oblong, ca 0.4 cm long, obtuse, coriaceous, usually reflexed; tube short, campanulate. Berries ca 1.3 cm across, 1-4-seeded; testa with crimson sap.

In semi-evergreen forests, frequently in damp places. Balaghat, Bilaspur, Raigarh, Satna, Seoni. *Fl. & Fr.*: April - March.

88. SYMPLOCACEAE

(M.L. Hanfi)

One genus with about 250 species; tropical and subtropical regions of America and E. Old World; 2 species in M.P.

SYMPLOCOS Jacq.

Shrubs or trees. Leaves alternate, entire, serrulate or dentate, often coriaceous. Flowers in axillary, simple or branched, sometimes much reduced spikes or racemes, bracteate, bracteolate. Calyx-lobes 5, small, imbricate. Corolla-lobes 5. Stamens many, adnate to corolla-tube, usually in 2 or more whorls; anthers shortly oblong. Ovary 3-4-locular, rarely 2-locular; ovules 2, pendulous; style filiform; stigma small, capitate, somewhat 3-lobed. Fruit a drupe, ellipsoid or subglobose, 1-3-seeded. Seeds oblong.

- 1a. Twigs glabrous; stamens 45-50; drupes ovoid ...1. *S. laurina*
 1b. Twigs pubescent; stamens more than 50; drupes
 narrowly ellipsoid ...2. *S. racemosa*

1. *Symplocos laurina* (Retz.) Wallich, Numer. List No. 4416, 1831; Panigrahi & Murti in Bangladesh J. Bot. 10(1): 32, 1981. *Myrtus laurinus*

Retz., *Observ. Bot.* 4: 26. 1786. *Symplocos spicata* Roxb., *Fl. Ind.* 2: 541. 1832; C.B. Clarke in *Hook. f. Fl. Brit. India* 3: 573. 1882. *S. cochinchinensis* (Lour.) S. Moore subsp. *laurina* (Retz.) Noot., *Rev. Symp.* 156. 1975.

Shrubs or trees, ca 8 m high. Leaves lanceolate, 6-15 x 2.5-6 cm, acuminate at apex, attenuate to cuneate at base, serrulate-crenate, glabrous; nerves prominent, 6-9 pairs; petioles 0.8-1.4 cm long. Flowers in 5-15 cm long, 3-partite (below) spikes, sessile; bracteoles softly hairy along the margin. Calyx-lobes ca 1 mm long. Corolla white to yellow-white; lobes 2.4-4 mm long. Stamens 45-50; filaments exceeding the length of corolla-lobes, flat. Drupes ovoid, 3.5 x 4 mm, green when young, bluish when ripe, ribbed.

Rare. Along streams. Bastar, Bilaspur. *Fl. & Fr.*: Sept. April.

2. *Symplocos racemosa* Roxb., *Fl. Ind.* 2: 539. 1832; C.B. Clarke in *Hook. f. Fl. Brit. India* 3: 576. 1882. *S. beddomet* C.B. Clarke in *Hook. f. Fl. Brit. India* 3: 582. 1882.

Shrubs or trees, 4.5-15 m high. Leaves narrowly to broadly elliptic, 9-16 x 2.5-5.5 cm, acuminate to blunt at apex, cuneate to rounded at base, entire, undulate or serrulate, sparsely pilose beneath on midrib; nerves 7-10 pairs; petioles 0.5-2 cm long. Flowers in 4-9 cm long, woolly or tomentose racemes; pedicels 1-3 mm long, hairy; bracts ovate; bracteoles nearly elliptic, appressedly hairy, caducous. Calyx-lobes 1.8-2.3 mm long, softly hairy on margin. Corolla white; lobes 2.5-5 mm long, mildly fragrant. Stamens more than 50. Style glabrescent or hairy at base. Drupes narrowly ellipsoid, 8-12 x 3-5 mm.

Common in deciduous forests. Bastar, Bilaspur, Raigarh, Satna, Sidhi, Surguja. *Fl. & Fr.*: Sept. May.

89. OLEACEAE

(K.K. Khanna and S.K. Srivastava)

About 29 genera and 900 species; subcosmopolitan especially Asia; 5 genera and 20 species in M.P.

- 1a. Corolla infundibuliform or hypocrateriform, lobes imbricate in bud, usually more than 4 in number:
- 2a. Plants usually scandent shrubs, rarely erect; fruit a berry ...2. *Jasminum*
- 2b. Plants always erect shrubs or trees; fruit a capsule:
- 3a. Leaves simple, siliceous; corolla eglandular inside, tube orange ...3. *Nyctanthes*
- 3b. Leaves imparipinnate, non-siliceous; corolla with brown glandular dots inside, tube white or green ...5. *Schrebera*
- 1b. Corolla tubular-campanulate, lobes valvate in bud, never more than 4 in number:
- 4a. Corolla-lobes free or connate in pairs; stigma clavate or 2-lobed ...1. *Chionanthus*
- 4b. Corolla-lobes all connate; stigma capitate ...4. *Olea*

1. CHIONANTHUS L.

Shrubs or trees. Leaves simple, opposite, entire, coriaceous, glabrous. Flowers in axillary or extra-axillary panicles, cymes or clusters, small, bisexual, bracteate; bracts small. Calyx small, 4-fid or 4-toothed. Corolla 4-partite; lobes free or connate in pairs, short or long, subfleshy, induplicate-valvate in bud. Stamens 2; filaments short or absent. Ovary 2-locular; ovules 2 in each locule; style short; stigma entire or 2-fid. Fruit a drupe, ellipsoid or oblong, usually 1-seeded.

About 120 species; tropical and subtropical regions; 2 in M.P.

- 1a. Petioles up to 1 cm long; panicles ca 4 cm long; calyx pubescent outside ...1. *C. mala-elengi*
- 1b. Petioles more than 1 cm long; panicles ca 10 cm long; calyx glabrous outside ...2. *C. ramiflorus*

1. *Chionanthus mala-elengi* (Dennst.) Green in Bull. Bot. Surv. India 26: 124. (1984) 1985; Srivastava and Kapoor in J. Econ. Tax. Bot. 15(1): 133. 1991. *Forsythia mala-elengi* Dennst., Schluessel Hortus Malab. 12. 21 & 31. 1818. *Chionanthus malabaricus* (Wallich ex G. Don) Bedd., Fl. Sylv.

S. India t. 239. 1872. *Linociera malabarica* Wallich ex G. Don, Gen. Hist. 4: 53. 1837-1838; C.B. Clarke in Hook. f. Fl. Brit. India 3: 607. 1882.

Trees. Leaves elliptic-oblong, 5-12 x 2-4 cm, obtuse or narrowed into a blunt acumen at apex, cuneate at base, revolute, coriaceous, glabrous; petioles up to 1 cm long. Flowers in ca 4 cm long panicles, fragrant, sessile. Calyx-lobes ovate, acute, pubescent. Corolla white, shortly tubular; lobes lanceolate, ca 6 mm long; tube ca 2 mm long. Drupes ellipsoid, ca 1 cm long, black.

Rare. Bastar. Fl. & Fr.: Feb. - April.

2. *Chionanthus ramiflorus* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 106. 1820, "*ramiflora*"; Srivastava and Kapoor in J. Econ. Tax. Bot. 15(1): 136. 1991. *Linociera ramiflora* (Roxb.) Wallich ex G. Don, Gen. Hist. 4: 54. 1837-1838. *L. macrophylla* Wallich ex G. Don, Gen. Hist. 4: 53. 1837-1838; C.B. Clarke in Hook. f. Fl. Brit. India 3: 610. 1882. *L. macrophylla* var. *attenuata* (Wallich ex G. Don) C.B. Clarke in Hook. f. Fl. Brit. India 3: 611. 1882. *Chionanthus macrophylla* Kurz var. *attenuata* (C.B. Clarke) Nair and Janardhanan in J. Bombay Nat. Hist. Soc. 78: 331. 1981.

Trees, up to 9 m high. Leaves oblong or elliptic-oblong, 7-20 x 3-5 cm, acuminate at apex, attenuate at base, entire, undulate or serrate; petioles up to 2.5 cm long. Flowers in axillary, pyramidal, ca 10 cm long panicles. Calyx 4-toothed. Corolla white to cream-coloured; lobes oblong, incurved. Drupes oblong or ellipsoid, ca 1.5 cm long, blue-purple.

Along rocky drains and on lateritic soil. Bastar, Raigarh, Raipur, Surguja. Fl. & Fr.: Feb. - April.

2. JASMINUM L.

Shrubs, erect or climbing. Leaves simple, 3-foliolate or imparipinnate, opposite, rarely alternate or 3-nately whorled; petioles articulate. Flowers solitary or in terminal or axillary cymes or panicles, small to large. Calyx small, 5-9-lobed; lobes inconspicuous to long, filiform; tube campanulate. Corolla white or yellow, often with violet tinge, infundibuliform or hypocrateriform, 5 or more-lobed. Stamens 2, inserted on corolla-tube, usually included; connectives apiculate. Ovary 2-locular; ovules 2 in each locule; style terminal; stigma oblong, 2-lobed, sometimes undivided. Fruit a berry, simple or didymous, red, black or purple-black, 2-seeded, often single by abortion.

About 450 species; tropical and temperate regions of Old World; 14 in M.P.

- 1a. Corolla bright yellow ...7. *J. humile*
- 1b. Corolla greenish white, white or white with red tinge:
 - 2a. Leaves simple:
 - 3a. Calyx-lobes shorter than calyx-tube:
 - 4a. Leaves elliptic, velvety tomentose on both the surfaces; lateral nerves distinct ...12. *J. roxburghianum*
 - 4b. Leaves broadly ovate, nearly glabrous on both the surfaces with age; lateral nerves obscure ...1. *J. arborescens*
 - 3b. Calyx-lobes longer than calyx-tube:
 - 5a. Lateral nerves 3-4 pairs:
 - 6a. Cymes terminal ...11. *J. rotlerianum*
 - 6b. Cymes axillary:
 - 7a. Branchlets nearly glabrous; berries ellipsoid ...14. *J. scandens*
 - 7b. Branchlets hairy; berries globose ...4. *J. elongatum*
 - 5b. Lateral nerves 5-6 pairs or more:
 - 8a. Calyx-lobes equal to one third of the corolla-tube:
 - 9a. Calyx glabrous, lobes not curved ...3. *J. brevipetiolatum*
 - 9b. Calyx pubescent, lobes curved:
 - 10a. Calyx 5-8 mm long; berries ellipsoid ...8. *J. malabaricum*
 - 10b. Calyx ca 10 mm long; berries globose ...13. *J. sambac*
 - 8b. Calyx-lobes equal to half of the length of corolla-tube ...9. *J. multiflorum*

2b. Leaves compound:

11a. Leaflets 3; calyx-lobes shorter than calyx-tube:

12a. Branches glabrous; corolla 3-3.5 cm long ...5. *J. flexile*

12b. Branches densely pubescent; corolla 1.5-2 cm long ...2. *J. auriculatum*

11b. Leaflets more than 3; calyx-lobes longer than calyx-tube:

13a. Midrib glabrous on both the surfaces; bracts ovate-linear; corolla with pink tinge outside ...6. *J. grandiflorum*

13b. Midrib hairy on both the surfaces; bracts linear; corolla white outside ...10. *J. officinale*

1. *Jasminum arborescens* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 94. 1820; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 594. 1882. *J. arborescens* Schult., Mant. 1: 90. 1822, *nom. illegit. J. arborescens* var. *montana* (Roth) C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 594. 1882. - *Bara kunda, Chameli, Jungli chameli, Mutabela*. **Fig. 5.**

Large shrubs, suberect, up to 3 m high; branchlets scandent, densely hairy. Leaves simple, opposite, broadly ovate or orbicular, 4-9 x 2.5-6 cm, acuminate at apex, rounded at base, softly tomentose when young, glabrous with age. Flowers in trichotomous, lax, pubescent cymes, fragrant; bracts linear. Calyx-lobes 5-6, linear, short, pubescent. Corolla white; lobes usually 9, lanceolate, as long as or longer than the tube; tube ca 1.5 cm long. Berries simple, often bent, oblong or ellipsoid, 1-1.5 cm long, black on ripening.

Common in mixed forests. Balaghat, Bhopal, Bilaspur, Damoh, Durg, Hoshangabad, Mandla, Raigarh, Raipur, Rajnandgaon, Shivpuri. *Fl. & Fr.*: March - Oct.

2. *Jasminum auriculatum* Vahl, Symb. Bot. 3: 1. 1794; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 600. 1882. *J. affine* Wight, Icon. Pl. Ind. Orient. 4(1): t. 1255. 1848. *J. ovalifolium* Wight, Icon. Pl. Ind. Orient. 4(1): t. 1256. 1848. - *Juhi*.

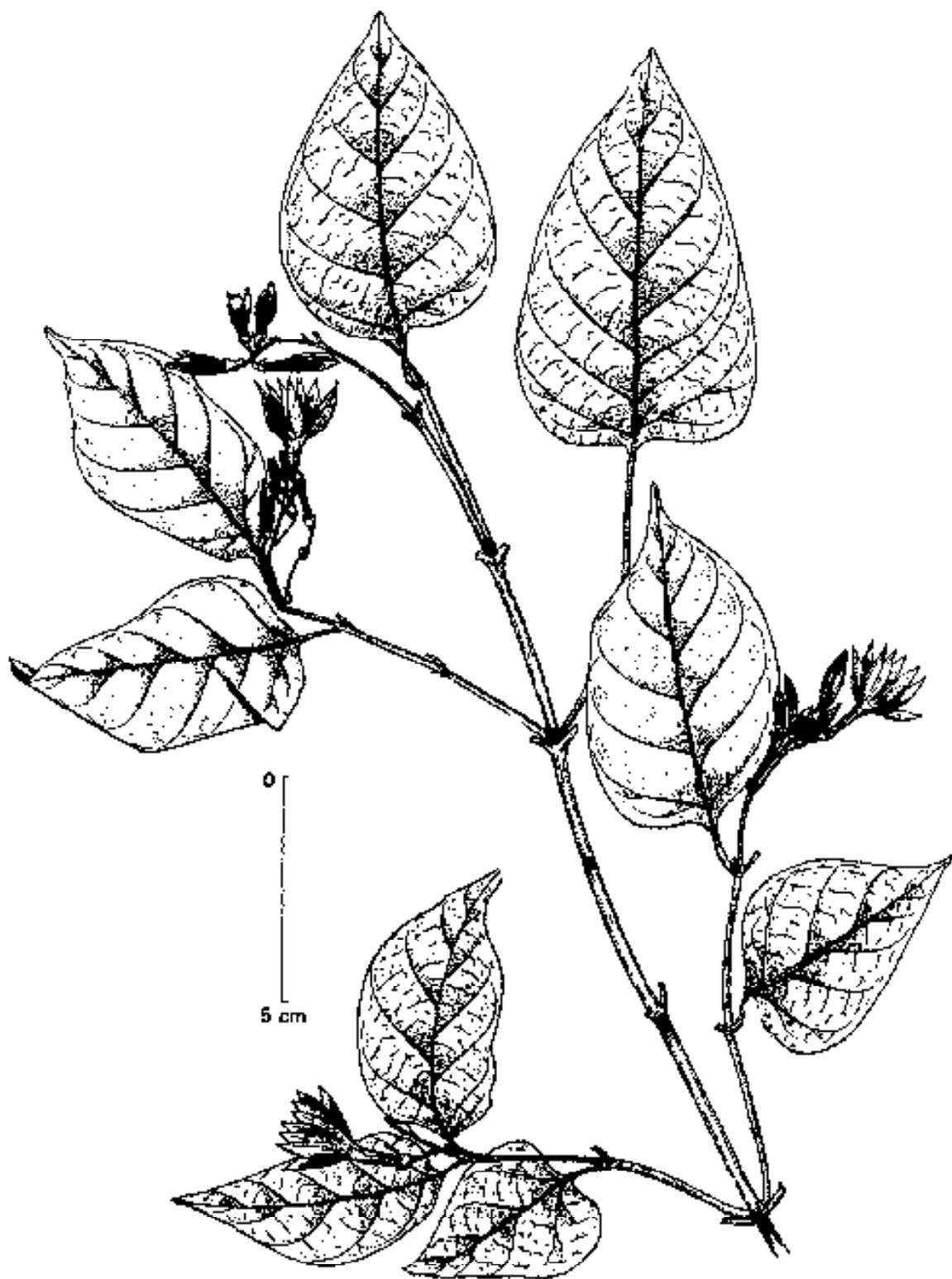


Fig. 5. *Jasminum arborescens* Roxb.

Shrubs, bushy, scandent or climbing; branches densely pubescent. Leaves opposite, 3-foliolate; leaflets ovate or deltoid, 4.5-9 x 2-3.5 cm, acute or acuminate at apex, obtuse or rounded at base, chartaceous, glabrous to pubescent; lateral leaflets reduced. Flowers in terminal or upper axillary, paniculate cymes, fragrant. Calyx 2-3 mm long, pubescent; lobes narrowly oblong, *ca* 1 mm long; tube *ca* 2 mm long. Corolla greenish white, 1.5-2 cm long, 5-7-lobed; lobes obovate, *ca* 6 mm long; tube 1-1.5 cm long. Berries globose, *ca* 1 mm across, black.

Near streams and also cultivated. Bilaspur, Rewa. *Fl. & Fr.*: July - Aug.

Flowers are exploited in perfume industry. They are also used for consumption.

3. *Jasminum brevipetiolatum* Duthie ex Brandis, Ind. Trees 450. 1906.

Large shrubs or small trees; branches glabrous. Leaves simple, elliptic-lanceolate or narrowly lanceolate, 7-12 x 1-2.5 cm, acute or acuminate at apex, cuneate at base, entire, chartaceous, glabrous; lateral nerves 5-6 pairs; petioles 4-6 mm long, glabrous. Flowers in terminal, lax, 3-6-flowered cymes; pedicels *ca* 1 cm long; bracts glabrous. Calyx 0.7-1 cm long, glabrous; lobes 6, linear, 5-6 mm long. Corolla 2.5-3 cm long; lobes 8-10, narrowly elliptic; tube *ca* 1.5 cm long. Berries ovoid-rounded, *ca* 1 cm across.

Endemic. Rare. Shahdol (Saxena, 1970). *Fl. & Fr.*: May - Sept.

4. *Jasminum elongatum* (Bergius) Willd., Sp. Pl. 1: 37. 1797; Green in Kew Bull. 42(2): 437-438. 1987. *Nyctanthes elongata* Bergius in Phil. Trans. 61: 289. t. 11. 1772 & in Phil. Trans. Abrev. (Hutton) 13: 147. t. 4. 1809. *Jasminum amplexicaule* Buch.-Ham. ex G. Don, Gen. Hist. 4: 60. 1837-1838. *J. undulatum* Ker-Gawl., Bot. Reg. 6: t. 436. 1820, *non* Willd., 1797; C.B. Clarke in Hook. f. Fl. Brit. India 3: 592. 1882.

Shrubs, erect or scandent, 1-2 m high; branchlets hairy, slender. Leaves simple, opposite, ovate-lanceolate, 3-6 x 1.5-2.5 cm, acute or acuminate at apex, rounded or subcordate at base, pubescent on the nerves beneath. Flowers in axillary few-flowered cymes, not fragrant. Calyx-lobes filiform, 7-10 mm long, pubescent. Corolla white; lobes 6, ovate, *ca* 1.2 cm long, acute. Berries simple or didymous, globose, *ca* 1 cm across, red.

Rare. Bastar. *Fl. & Fr.*: Aug. - April.

5. *Jasminum flexile* Vahl, *Symb. Bot.* 3: 1. 1794; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 3: 601. 1882. - *Malti*.

Shrubs, scandent, glabrous. Leaves opposite, 3-foliolate; leaflets ovate or deltoid-obovate, 3-6 x 2-3 cm, acuminate at apex, obtuse or truncate at base, more or less coriaceous, shining, glabrous. Flowers in axillary or terminal, dichasial cymes, fragrant; bracts linear, *ca* 2.5 mm long. Calyx 3-4 mm long; lobes 6, *ca* 1 mm long, glabrous; tube 2-3 mm long. Corolla white, 3-3.5 cm long; lobes 5, oblong, 10-15 mm long. Berries oblong, 0.8-1 cm long.

In mixed deciduous forests. Chhatarpur, Damoh, Indore, Raigarh. *Fl. & Fr.*: Oct. - Nov.

Notes: In most of the Indian Floras, Flora of West Pakistan (59: 16. 1974) and Flora of Java (2: 217. 1965) *Jasminum azoricum* L. has been given as correct name for *J. flexile* Vahl while Green (personal communication with S.K. Srivastava) has stated that *J. azoricum* is a plant of Azore and so *J. flexile* has been treated here as correct name.

6. *Jasminum grandiflorum* L., *Sp. Pl.* ed. 2. 9. 1762; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 3: 603. 1882; Sacht in *Smithsonian Contrib. Bot.* 23: 15. 1975. *J. aureum* D. Don, *Prodr. Fl. Nepal*, 106. 1825. - *Chameli*. **Fig. 6.**

Shrubs, scandent; branches glabrous, striate. Leaves opposite, imparipinnate; leaflets 7-11, ovate to elliptic, 1.8-3 x 0.6-1.6 cm, glabrous, dark green, upper pair with a broad flat base and often confluent with the terminal leaflet, terminal one slightly larger, ovate, acuminate at apex, acute at base; midrib glabrous on both the surfaces. Flowers in terminal or axillary cymes, fragrant; pedicels of lateral flowers slightly longer than the central one; bracts foliaceous, ovate-linear. Calyx 8-12 mm long; lobes 5, linear, 5-7 mm long; tube 3-4 mm long. Corolla white with pink tinge outside, 5-lobed; tube *ca* 2 cm long. Berries 6-8 mm long.

As forest undergrowth and commonly planted in gardens. Bhopal, Chhatarpur, Hoshangabad. *Fl. & Fr.*: July - Aug.

Leaves and flowers are used in native medicines while flowers are exploited in perfume industry.

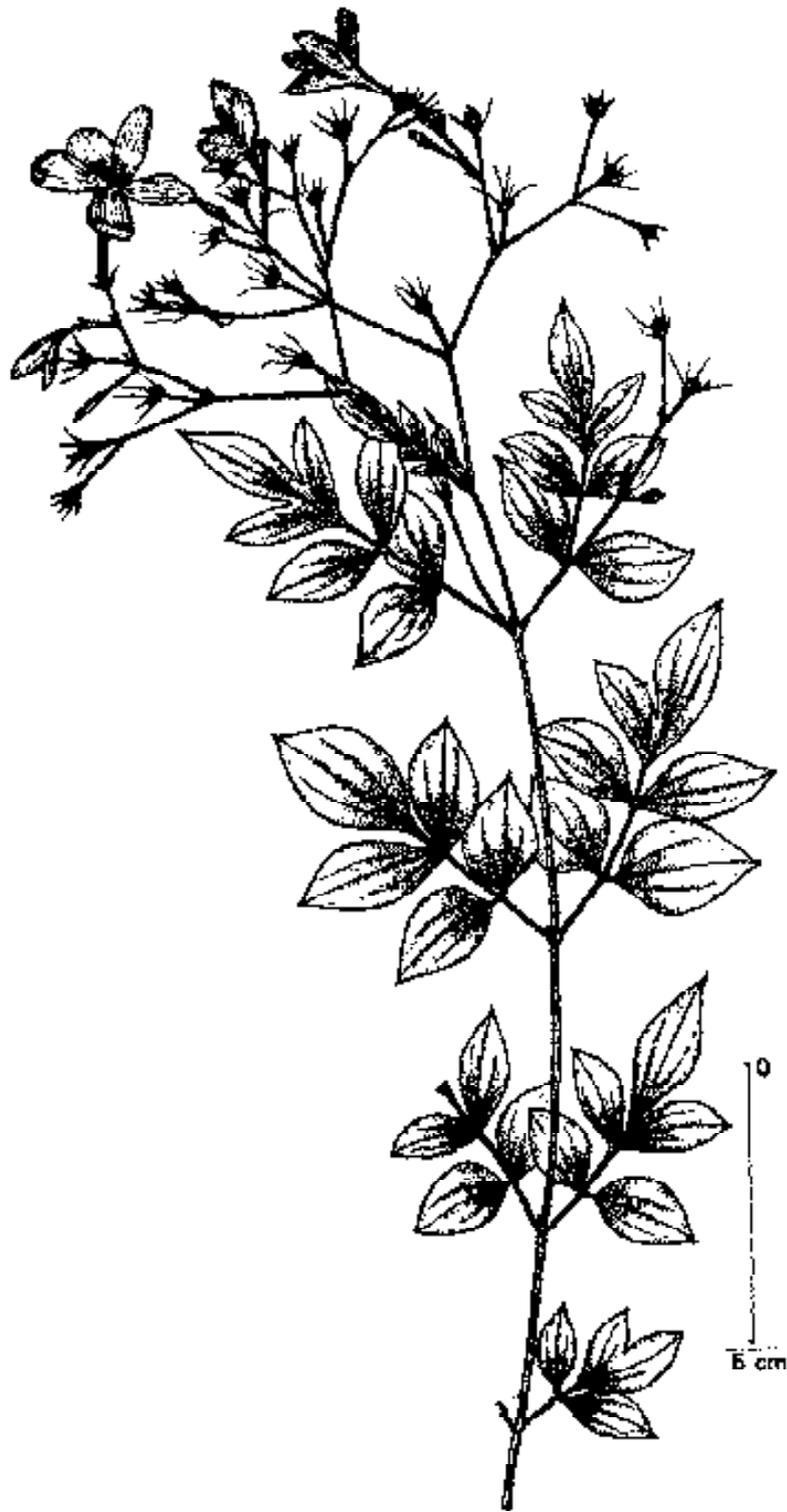


Fig. 6. *Jasminum grandiflorum* L.

7. *Jasminum humile* L., Sp. Pl. 7. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 3: 602. 1882, p.p. excl. syn. *J. bignoniaceum* Wallich ex G. Don; Green in Notes Roy. Bot. Gard. Edin. 23: 362. 1961. *J. chrysanthemum* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 98. 1820. *J. revolutum* Sims in Bot. Mag. 42. t. 1731. 1815. *J. humile* var. *revolutum* (Sims) Stokes, Bot. Comm. 1: 18. 1830. *J. wallichianum* Lindl. in Edwards, Bot. Reg. 17: t. 1409. 1831. - *Pili chameli*.

Shrubs, erect, diffuse, glabrous; branches angular. Leaves alternate, imparipinnate, variable in size, 3-7 cm long; leaflets 3-5, ovate, elliptic or lanceolate, variable in size, acute at apex, obtuse at base, coriaceous, sessile or subsessile, terminal one often larger than lateral ones. Flowers in terminal, corymbose cymes; bracts linear, minute. Calyx-lobes 5; tube ca 2 mm long. Corolla bright yellow; lobes 5, broadly ovate, reflexed in open flowers. Berries simple or didymous, ellipsoid, 4-5 mm long, black when ripe.

Bhopal (Oommachan, 1977). *Fl. & Fr.*: April - Dec.

8. *Jasminum malabaricum* Wight, Icon. Pl. Ind. Orient. 4(1): t. 1250. 1848; C.B. Clarke in Hook. f., Fl. Brit. India 3: 594. 1882. *J. malabaricum* var. *lawii* C.B. Clarke in Hook. f., Fl. Brit. India 3: 594. 1882. *Vanguli*.

Shrubs, climbing. Leaves simple, deltoid-elliptic, 6-9 x 2-3 cm, acuminate at apex, truncate or subcordate at base. Flowers in trichotomous, up to 6 cm long cymes, ca 3 cm across. Calyx 5-8 mm long; lobes 5 or 7, linear, 4-6 mm long, curved, pubescent, scabrous. Corolla white; lobes 8-10, obovate, acute or acuminate; tube ca 2 cm long. Berries ellipsoid, ca 1 cm long, turning black when dry.

Rare. Bastar. *Fl. & Fr.*: April - July.

9. *Jasminum multiflorum* (Burm. f.) Andr., Bot. Repos. 8. t. 496. 1807. *Nyctanthes multiflora* Burm. f., Fl. Ind. 5. t. 3, f. 1. 1768. *N. pubescens* Retz., Observ. Bot. 5: 9. 1788. *J. pubescens* (Retz.) Willd., Sp. Pl. 1: 37. 1797; C.B. Clarke in Hook. f., Fl. Brit. India 3: 592. 1882. *Kund phool*, *Safed chameli*.

Shrubs, scandent, densely pubescent. Leaves simple, opposite, elliptic to deltoid-ovate, 3-8 x 2-4 cm, acute or acuminate at apex, truncate at base, pubescent above, glabrous with age, tomentose or pubescent beneath.

Flowers in dense, subsessile, capituliform cymes, fragrant, sessile or subsessile. Calyx-lobes 5, linear, curved, *ca* 1 cm long, fulvous pubescent. Corolla white; lobes 5, ovate-obovate; tube slender, *ca* 2 cm long, exceeding the calyx. Berries simple or didymous, ellipsoid, *ca* 1 cm long, black when ripe.

Common along roadsides and often cultivated in gardens. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Jabalpur, Raigarh, Rajnandgaon, Sidhi, Surguja. *Fl. & Fr.*: Dec. - June.

Root decoction is considered as antidote of Cobra venom while leaves decoction in stimulating static ulcers.

10. *Jasminum officinale* L., Sp. Pl. 7. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 603. 1882. - *Chameli, Chameli jati, Motia*.

Shrubs, twining; branches long, striate, sparsely hairy when young. Leaves opposite, imparipinnate, 5-7-foliolate, 5-10 cm long; terminal leaflets ovate or lanceolate, acuminate at apex, much larger; lateral ones ovate or elliptic, up to 5 cm long, acute or apiculate at apex, acute to rounded at base, sessile or subsessile; midrib hairy on both the surfaces. Flowers in dichotomous, terminal, lax cymes, fragrant; bracts linear. Calyx 1-1.5 cm long; lobes 5, linear, subulate, 5-9 mm long; tube 2-4 mm long. Corolla white; lobes 5, ovate or elliptic, shorter than tube; tube *ca* 1 cm long. Berries ellipsoid or globose, 5-8 x 4-6 mm, black when ripe.

In dry deciduous forests. Dhar, Hoshangabad. *Fl. & Fr.*: June - Oct.

The plant is considered as aphrodisiac. Root decoction is used to treat ringworm. Flowers yield an oil.

11. *Jasminum rottlerianum* Wallich ex DC., Prodr. 8: 305. 1844; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 593. 1882. *J. rottlerianum* var. *thwaitesii* C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 593. 1882. *J. rottlerianum* var. *glabrior* C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 593. 1882.

Large shrubs, climbing; branchlets tawny villous. Leaves simple, ovate-lanceolate, 8-11 x 4-5 cm, acuminate at apex, cordate or rounded at base, entire, coriaceous, pubescent; lateral nerves 4 pairs. Flowers in fascicles arranged in terminal, dense cymes, bracteate. Calyx 0.8-1.4 cm

long; lobes 5, linear, subulate, *ca* 8 mm long, hairy; tube *ca* 3 mm long. Corolla white; lobes 6, acute. Berries rounded, ellipsoid, *ca* 1 cm across, green, black when ripe.

Rare. Indore (Rao and Sastry, 1964). *Fl. & Fr.*: Dec. - July.

12. *Jasminum roxburghianum* Wallich ex C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 3: 595. 1882. - *Chameli*, *Mutabela*.

Large shrubs, climbing; branches pubescent. Leaves simple, opposite, elliptic, up to 6 x 3.5 cm, obtuse or subacute at apex, broadly cuneate or rounded at base, velvety tomentose on both the surfaces; lateral nerves 5 pairs, distinct; petioles 0.5-1 cm long. Flowers in trichotomous, terminal, many-flowered, pubescent cymes; bracts 1-2 mm long. Calyx 3-4.5 cm long, pubescent; lobes 5-6, *ca* 2 mm long; tube 1.5-2.5 cm long. Corolla greenish white; lobes 5, ovate or lanceolate, 10-15 mm long, acute. Berries usually simple, ellipsoid, almost straight, black, smooth.

Rare. As forest undergrowth. Hoshangabad, *Fl. & Fr.*: March - April.

13. *Jasminum sambac* (L.) Aiton, *Hortus Kew.* 1: 8. 1789; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 3: 591. 1882. *Nyctanthes sambac* L., *Sp. Pl.* 6. 1753. *N. undulata* L., *Sp. Pl.* 6. 1753. *Mogorium undulatum* (L.) Lam., *Encycl.* 4: 212. 1797. *Jasminum sambac* var. *heyneana* Wallich ex C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 3: 592. 1882. *Ban mallika*, *Bela*, *Moghra*.

Shrubs, scandent or erect; branches pubescent. Leaves simple, opposite or ternate, elliptic to obovate-oblong, 4-10 x 2-5 cm, acute or obtuse at apex, rounded or truncate at base, entire, chartaceous, glabrous. Flowers in terminal, 3-flowered cymes, fragrant; bracts linear, *ca* 5 mm long. Calyx-lobes 5-7, *ca* 6 mm long, curved, pubescent. Corolla white; lobes 5-9, oblong, 1-1.4 cm long, mucronate; tube *ca* 1.8 cm long. Berries globose, *ca* 8 mm across, green, turning black, surrounded by subulate calyx-lobes.

As forest undergrowth. Bastar, Hoshangabad, Raigarh, Raipur. *Fl. & Fr.*: April - Oct.

Leaves and roots are medicinal. Flowers are used in perfume industry.

14. *Jasminum scandens* (Retz.) Vahl, Symb. Bot. 3: 2. 1794; C.B. Clarke in Hook. f., Fl. Brit. India 3: 595. 1882. *Nyctanthes scandens* Retz., Observ. Bot. 5: 9. 1788.

Shrubs, scandent, climbing by recurved petioles; branchlets nearly glabrous. Leaves simple, lanceolate-ovate, up to 12 x 5 cm, acuminate at apex, rounded at base, entire, coriaceous, glabrous above, sparsely pubescent along the nerves beneath; petioles articulate. Flowers in trichotomous, axillary, dense, paniculate or subcapituliform cymes, fragrant, subsessile; bracts linear. Calyx 6-8 mm long, pubescent; lobes 6, linear, ca 4 mm long; tube ca 2 mm long. Corolla white; lobes linear or linear-oblong; tube ca 2.5 cm long. Berries ellipsoid, 1-1.5 x 0.5-0.7 cm, black.

Rare. Bastar (Subramanyam and Henry, 1966). Fl. & Fr.: Jan. - May.

3. NYCTANTHES L.

Shrubs or small trees. Leaves opposite, entire or dentate. Flowers in axillary and terminal, pedunculate, bracteate cymes, sessile or subsessile. Calyx tubular or infundibuliform, truncate or subdentate. Corolla hypocrateriform; lobes 4-8, contorted to the left, spreading, emarginate; tube cylindrical. Stamens 2, subsessile, inserted near the apex of corolla-tube. Ovary 2-locular; ovule solitary in each locule; style filiform; stigma shortly 2-fid. Fruit a capsule, compressed parallel to the septum, flat, 2-seeded, septicidally dehiscent.

Two species; India to Java; one in M.P.

Nyctanthes arbor-tristis L., Sp. Pl. 6. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 3: 603. 1882. - *Harshringar*, *Kharsi*, *Siharu*.

Large shrubs or small trees, 2-4 m high; branches 4-angled. Leaves ovate or obovate, 7-16 x 3-8.5 cm, acute at apex, truncate at base, entire or coarsely dentate, coriaceous, covered with white stiff hairs beneath. Flowers in trichotomous cymes, fragrant, subsessile. Calyx-lobes 5, truncate. Corolla-lobes white, 5-7; tube orange, 7-10 mm long. Capsules suborbicular, ca 2 cm long.

Common in dry mixed deciduous forests and on hill slopes. Balaghat, Bilaspur, Chhatarpur, Damoh, Dhar, Indore, Jabalpur, Mandla, Narsimha-

pur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Sidhi, Surguja, West Nîmar. *Fl. & Fr.*: Sept. - Jan.

Leaves are used to treat sciatica, intestinal worms, fever and rheumatism while flowers yield a dye.

Notes : Airy Shaw (Kew Bull. 7: 271-276. 1952) at first transferred the genus to family Verbenaceae (subfamily Nyctanthoideae) and finally (Bull. Bot. Surv. India 10: 397-408. 1968) under a separate family Nyctanthaceae. However, detailed studies of Kiew and Bass (Proc. Indian Acad. Sci. 93(3): 349-358. 1984) based on floral characters, anatomy, embryology, palynology, cytology and phytochemistry strongly support its position under Oleaceae.

4. OLEA L.

Shrubs or trees. Leaves simple, opposite, entire or sometimes dentate, coriaceous. Flowers in axillary or terminal panicles, bisexual or unisexual, actinomorphic. Calyx short, 4-toothed. Corolla 4-lobed; lobes thin, valvate in bud; tube short. Stamens 2, adnate to corolla-tube. Ovary superior, conical, 2-locular; ovules 2 in each locule; style short; stigma capitate. Fruit a drupe, ellipsoid to ovoid.

About 45 species; tropical and warm temperate regions of Old World; 2 in M.P.

- 1a. Leaves eglandular; panicles axillary ...1. *O. dioica*
 1b. Leaves with glands in the axil of lateral nerves; panicles usually terminal ...2. *O. glandulifera*

1. *Olea dioica* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 105. 1820; C.B. Clarke in Hook. f., Fl. Brit. India 3: 612. 1882.

Shrubs or small trees, up to 4 m high. Leaves elliptic-obovate, 12-16 x 5-6 cm, acute at apex and base, dentate, glabrous. Flowers in panicles, pedicellate; panicles compound, in the axil of fallen leaves, up to 4 cm long. Calyx-lobes deltoid, acute. Corolla tubular-campanulate; lobes deltoid, acute, incurved; tube ca 3 mm long. Drupes ellipsoid, purple-black when ripe.

Rare. Bastar. *Fl. & Fr.*: Jan. Feb.

2. *Olea glandulifera* Wallich ex G. Don, Gen. Hist. 4: 49. 1837-1838; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 612. 1882.

Trees; branches glabrous. Leaves oblong-lanceolate or lanceolate-ovate, 8-15 x 4-6 cm, acuminate at apex, cuneate at base, entire, coriaceous, glabrous. Flowers in terminal or axillary panicles; pedicels *ca* 1 mm long. Calyx pubescent on the margin, glabrous inside. Corolla-lobes oblong-elliptic, *ca* 2 mm long. Drupes ovoid to ellipsoid, *ca* 1 cm across, black when ripe.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: March Feb.

5. SCHREBERA Roxb., *nom. cons.*

Trees. Leaves opposite, imparipinnate; leaflets opposite. Flowers in dichotomous or trichotomous, axillary or terminal, compound cymes, bracteate. Calyx tubular-campanulate, truncate or unequally 4-7-toothed. Corolla hypocrateriform; lobes 4-7, imbricate in bud, spreading; tube cylindrical. Stamens 2, adnate near the apex of corolla-tube, included or partly exerted; filaments short. Ovary 2-locular, ovules 3-4 in each locule; style cylindrical, elongate; stigma shortly 2-fid. Fruit a capsule, obovoid, 2-celled, loculicidally 2-valved, woody. Seeds winged.

About 8 species; tropical regions; one in M.P.

Schrebera swietenoides Roxb., Pl. Coromandel 2: 1. t. 101. 1799; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 604. 1882. - *Banpalas*, *Bhant*, *Maka*. Fig. 7.

Trees, 10-20 m high. Leaves 7-9-foliolate; leaflets ovate or oblong, 7-12 x 3-7 cm, acute at apex, obliquely attenuate at base, entire, coriaceous. Flowers in terminal or axillary cymes. Calyx irregularly toothed; teeth ciliate. Corolla with brown glandular dots inside; lobes undulate, obtuse; tube *ca* 1.5 cm long, pubescent inside at base. Capsules *ca* 5 x 3 cm, drooping, verrucose.

Common in mixed forests. Bastar, Bilaspur, Hoshangabad, Indore, Jabalpur, Mandla, Morena, Raigarh, Rajnandgaon, Rewa, Sagar, Seoni, Sidhi, Surguja. *Fl. & Fr.*: March - Dec.



Fig. 7. *Schrebera swietenoides* Roxb.

89a. SALVADORACEAE*

(K.K. Khanna)

Three genera and about 11 species; subtropical regions of Old World especially drier parts; one species in M.P.

SALVADORA L.

Shrubs or trees. Leaves opposite, entire, fleshy or coriaceous; stipules minute or absent. Flowers in axillary and terminal, paniculate racemes or spikes, small, bisexual or functionally unisexual; bracts minute. Calyx cupular or campanulate, 4-lobed. Corolla campanulate, 4-lobed; tube with usually 4 small teeth inside between the bases of filaments. Stamens 4, adnate at the base or middle of corolla-tube, alternate with corolla-lobes. Ovary 1-locular; ovule solitary; style absent; stigma truncate. Fruit a drupe, globose, seated on slightly accrescent calyx. Seeds globose, erect.

About 5 species; warmer regions of Africa and tropical Asia; one in M.P.

Salvadora persica L., Sp. Pl. 122. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 3: 619. 1882. **Fig. 8.**

Large shrubs or small trees, straggling, evergreen; branches drooping. Leaves opposite, decussate, elliptic-oblong or ovate, 3-6 x 2-3.5 cm, acute at apex, rounded to acute at base, somewhat fleshy or coriaceous. Flowers in lax panicles, bisexual, actinomorphic; bracts ovate, caducous. Calyx cupular; lobes rounded. Corolla greenish yellow, deeply cleft, membranous; lobes oblong. Stamens exserted. Drupes smooth, supported by persistent yellow cup of the calyx. Seeds brown.

Rare. Morena. *Fl. & Fr.*: Dec. March.

*Due to restricted distribution and rare occurrence in M.P., the family has escaped the attention and has not been given under Key to the families in Flora of M.P. Vol. I. However, for the purpose, it should be placed after lead 147a on page 112 and can be differentiated from Verbenaceae by inflorescence being paniculate raceme or spike.



Fig. 8. *Salvadora persica* L.

90. APOCYNACEAE**(Ram Lal)**

About 215 genera and 2100 species; mostly tropical regions; 15 genera and 24 species in M.P.

1a. Leaves alternate:

2a. Leaves up to 15 cm long; ovules 2 in each locule; fruit a drupe ...13. *Thevetia*

2b. Leaves more than 20 cm long; ovules more than 2 in each locule; fruit a follicle ...10. *Plumeria*

1b. Leaves opposite or whorled:**3a. Leaves whorled, rarely opposite:****4a. Fruit a follicle:**

5a. Leaves linear; anthers adherent to stigma, with terminal and basal appendages; seeds with only terminal coma ...9. *Nerium*

5b. Leaves oblanceolate or obovate; anthers free from stigma, without terminal and basal appendages; seeds with coma at both ends ...3. *Alstonia*

4b. Fruit a drupe or capsule:

6a. Plants climbers; corolla yellow, 6-9 cm across; fruit a capsule, 4-8 cm across, with numerous prickles ...2. *Allamanda*

6b. Plants erect; corolla white or pink, ca 1.2 cm across; fruit a drupe, up to 1 cm across, smooth ...11. *Rauwolfia*

3b. Leaves opposite:**7a. Seeds ecomose:**

8a. Plants armed; fruit a berry, 2-4-seeded ...5. *Carissa*

8b. Plants unarmed; fruit a follicle, more than 4-seeded:

- 9a. Herbs or undershrubs; cymes 1-4-flowered;
calyx eglandular inside ...6. *Catharanthus* *
- 9b. Shrubs or trees; cymes more than
4-flowered; calyx glandular inside ...12. *Tabernaemontana* *
- 7b. Seeds comose:
- 10a. Erect shrubs or small trees:
- 11a. Throat without corona; stamens inserted
near the base of corolla-tube; anthers
included, free from stigma; follicles
not connate ...7. *Holarrhena* *
- 11b. Throat with corona; stamens inserted
at the top of corolla-tube; anthers
exserted, adherent to stigma; follicles
connate throughout or at the tip ...15. *Wrightia*
- 10b. Scandent or climbing shrubs:
- 12a. Leaves gland-dotted; stamens inserted at
the top of corolla-tube; anthers exserted ...14. *Vallaris*
- 12b. Leaves not gland-dotted; stamens inserted
at the base or middle of corolla-tube;
anthers included:
- 13a. Calyx divided up to base; segments
linear, longer than corolla-tube ...1. *Aganosma* *
- 13b. Calyx divided only up to middle lobes
ovate, shorter than corolla-tube:
- 14a. Young branches and inflore-
scence rusty tomentose;
follicles slender ...8. *Ichnocarpus* *
- 14b. Young branches and inflore-
scence glabrous; follicles stout ...4. *Anodendron*

Notes: Mooney (1942) has reported the occurrence of *Strophanthus dichotomus* DC. (*syn. S. caudatus* Kurz) from Bastar which is a plant of Myanmar and Malaya.

1. **AGANOSMA** (Blume) G. Don

Climbers, evergreen, stout. Leaves opposite. Flowers in terminal, corymbose cymes. Calyx-segments linear, lanceolate or oblong, acuminate, with small subulate glands at the sinuses. Corolla hypocrateriform: lobes imbricate to right in bud, scarcely twisted; throat long, cylindrical, pubescent outside and with rows of bristles inside; tube very short. Stamens inserted at the base of the widened part of corolla-tube; filaments obsolete; anthers sagittate with sterile bases, connivent and adherent to stigma. Ovary hairy; stigma conical, glabrous. Fruit a follicle, sometimes cohering at the tip, straight or curved, terete. Seeds ovoid to linear-oblong, flattened, comose.

About 10 species; China and Indo-Malesia; one in M.P.

Aganosma dichotoma (Roth) K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(2): 173. 1895. *Echites dichotoma* Roth, Nov. Pl. Sp. 136. 1821. *Aganosma caryophyllata* G. Don, Gen. Hist. 4: 77. 1837-1838; Hook. f., Fl. Brit. India 3: 66^d. 1882. Fig. 9.

Large climbers, woody, pubescent; sap milky; bark brown, fissured. Leaves ovate or elliptic, 7-12 x 4-7 cm long, acute, obtuse or shortly acuminate at apex, glabrous or tomentose beneath, with 3 pairs of nerves. Flowers in lax, tomentose cymes; pedicels shorter than calyx-segments. Calyx-segments linear, spreading. Corolla white, ca 3.5 cm across; throat and tube cylindrical. Follicles 7.5-12.5 cm long, stout. Seeds ovoid or oblong, ca 1.25 cm long.

Rare. Mandla, Rewa. *Fl. & Fr.*: April-June.

2. **ALLAMANDA** L.

Shrubs, climbing, sometimes small trees. Leaves whorled, entire, with intrapetiolar glands, shortly petiolate. Flowers in terminal or axillary cymes, very large. Calyx 5-partite, without basal glands. Corolla campanulate; lobes 5 rounded, overlapping to the left; throat with a ring of white scales. Stamens 5, adnate at the throat of corolla-tube, included; anthers sagittate, mucronate. Ovary 1-locular; ovules many on 2 parietal placentae. Fruit a capsule, globose, with numerous, stout, green prickles, finally 2-valved.

About 12 species; tropical America; one in M.P.

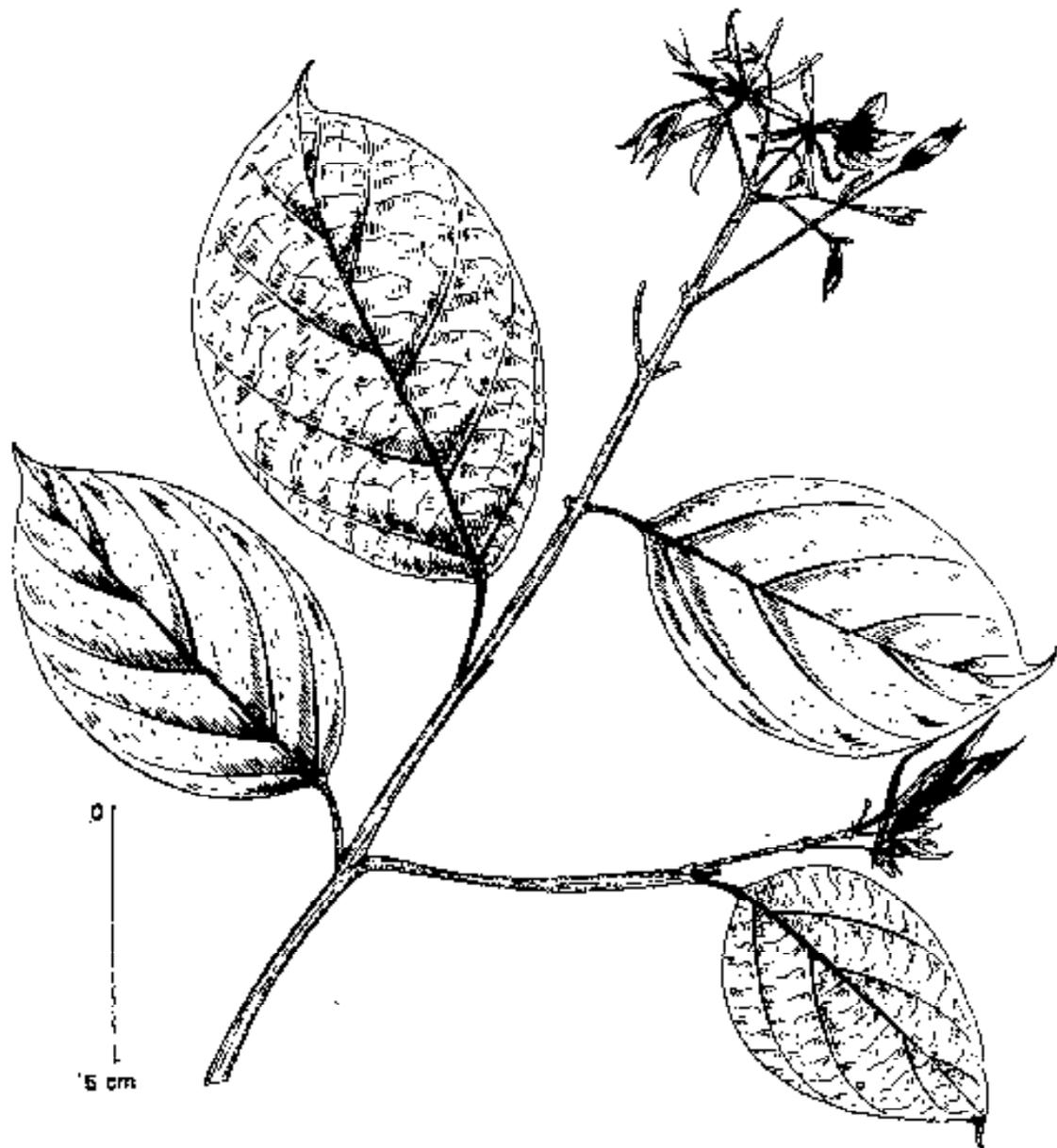


Fig. 9. *Aganosma dichotoma* (Roth) K. Schum.

Allamanda cathartica L., Mant. Pl. 214, 1771.

Shrubs, climbing. Leaves broadly oblong, 8-12 x 3-5 cm, shortly acuminate at apex, acute to attenuate at base, subcoriaceous; lateral nerves 12-14; petioles ca 0.5 cm long. Flowers in terminal, shortly pedunculate cymes, sometimes overtopped by axillary branches. Calyx-segments free, obovate, ca 2 x 0.7 cm, acute. Corolla yellow, 6-9 cm across; lobes orbicular, shorter than tube; tube ca 7 cm long, expanded from above to middle; throat densely villous near stamens. Capsules 4-8 cm across. Seeds minutely winged, without tuft of hairs.

Cultivated. Raigarh. *Fl. & Fr.*: Throughout the year.

3. ALSTONIA R. Br., *nom. cons.*

Shrubs or trees. Leaves whorled, 4-7 per node. Flowers in terminal or lateral, paniculate or umbellate cymes. Calyx eglandular, shortly 5-ribbed. lobes 5. Corolla hypocrateriform; lobes 5, obovate-oblong, imbricate to right or left; throat notched with a ring of reflexed hairs; tube cylindrical. Stamens 5, inserted near the top of the tube, included; filaments short; anthers ovate, acute, somewhat connivent but not adherent to stigma. Disk absent. Carpels 2, apocarpous; ovary hairy; ovules many; style filiform; stigma minute, sometimes 2-toothed. Fruit a follicle, paired, parallel or slightly divergent. Seeds oblong or linear, flattened, peltately attached, comose at both ends.

About 43 species; Africa, C. America, China, Indo-Malesia and West Pacific region; 2 in M.P.

- 1a. Trees; corolla greenish yellow; follicles
20-40 cm long ...1. *A. scholaris*
- 1b. Shrubs; corolla pure white; follicles up to
10 cm long ...2. *A. venenata*

1. *Alstonia scholaris* (L.) R. Br. in Mem. Werner. Soc. 1: 76. 1811; Hook. f. Fl. Brit. India 3: 642. 1882. *Echites scholaris* L., Mant. Pl. 53. 1767. - *Saptaparni*.

Trees, 6-8 m high. Leaves oblong-lanceolate or obovate, 10-15 x 3-5 cm, acute at apex, cuneate at base, entire, shining, coriaceous, glabrous.

Flowers in terminal, umbelliform cymes. Calyx tubular; lobes ovate, unequal. Corolla greenish yellow; lobes obovate, overlapping to left. Follicles 20-40 cm long, slender, pendulous.

Planted. Indore. *Fl. & Fr.*: Dec. March.

Latex, leaves and bark are medicinal. Flowers yield an essential oil. Wood is employed for various purposes.

2. ***Alstonia venenata*** R. Br. in Mem. Werner. Soc. 1: 75. 1811; Hook. *f.*, Fl. Brit. India 3: 642. 1882, "*venenatus*". **Fig. 10.**

Shrubs, *ca* 2 m high. Leaves usually oblanceolate, 9-16 x 3-4 cm, acuminate at apex, narrowed at base; young leaves softly pubescent beneath, glabrescent with age. Flowers in 2-dichotomous, terminal cymes; cymes much shorter than leaves. Calyx-lobes very small. Corolla pure white; lobes *ca* 1.5 cm long; tube very slender, *ca* 2.5 cm long. Follicles up to 10 cm long, terete, tapering at both ends.

Rare. In mixed forests. Raipur. *Fl. & Fr.*: Aug. - Oct.

Bark is medicinal.

4. ANODENDRON A. DC.

Shrubs, climbing, glabrous. Leaves opposite. Flowers in axillary and terminal, paniculate cymes; bracts small. Calyx small, 5-lobed. Corolla hypocrateriform, 5-lobed; lobes narrowly linear, almost twice as long as the tube, overlapping to right in bud; tube cylindrical. Stamens 5, inserted near the base of corolla-tube, included; anthers sagittate, adnate to stigma. Disk cupular. Carpels 2; style short; stigma conical. Fruit of follicular mericarps, diverging. Seeds ovoid-oblong, compressed, beaked, with silky coma at one end.

About 20 species; Indo-Malesia to Japan; one in M.P.

Anodendron paniculatum (Roxb.) A. DC. in DC., Prodr. 8: 444. 1844; Hook. *f.*, Fl. Brit. India 3: 668. 1882. *Echites paniculata* Roxb., Fl. Ind. 2: 17. 1832, *non* Poir., 1812.

Large climbers. Leaves opposite, decussate, broadly oblong, 8-16 x 4-6 cm, shortly acuminate at apex, rounded or truncate at base, coriaceous;



Fig. 10. *Alstonia venenata* R. Br.

petioles *ca* 2 cm long. Flowers in axillary and terminal, paniculate cymes. Calyx cupular; lobes equal. Corolla yellow; lobes slightly falcate. Mericarps paired, 10-14 cm long, tapering at apex, swollen at base.

Bastar (Mooney, 1942). *Fl. & Fr.*: March - May.

5. *CARISSA* L., *nom. cons.*

Shrubs or small trees, erect or scandent, armed, densely branched. Leaves opposite, glabrous. Flowers in trichotomous, terminal, lax, umbelliform or corymbose cymes, usually sessile. Calyx 5-lobed or partite, eglandular; lobes acute. Corolla hypocrateriform; lobes 5, overlapping to right; throat without scales, cylindrical; tube pubescent inside, dilated around the anthers. Stamens 5, inserted near the top of corolla-tube, included; anthers oblong, apiculate, free. Ovary 2-locular, glabrous; ovules 1-4 in each locule, rarely more; style filiform; stigma fusiform, apically 2-fid, pubescent. Fruit a berry, ellipsoid or globose, fleshy, 2 or 4-seeded. Seeds peltately attached to the septum, ecomose.

About 37 species; subtropical regions of Old World and Australia; 5 in M.P.

- 1a. Leaves oblong or oblong-elliptic, usually more than 5 cm long, rounded or subcordate at base ...1. *C. carandas*
- 1b. Leaves ovate, elliptic or elliptic-lanceolate, up to 5 cm long, acute, cuneate or slightly rounded at base:
 - 2a. Berries globose ...2. *C. congesta*
 - 2b. Berries subglobose or ellipsoid:
 - 3a. Calyx-lobes *ca* 1.5 mm long; berries 2-seeded:
 - 4a. Leaves usually more than 3 cm long; berries 6-8 mm long ...3. *C. opaca*
 - 4b. Leaves usually up to 3 cm long; berries *ca* 5 mm long ...4. *C. paucinervis*
 - 3b. Calyx-segments 2.5-3 mm long; berries 4-seeded ...5. *C. spinarum*

1. *Carissa carandas* L., *Mant. Pl.* 52. 1767; *Hook. f. Fl. Brit. India* 3: 630. 1882. - *Karonda*.

Shrubs, profusely branched, 2-2.5 m high; spines straight, often forked at tip, 1-2.5 cm long. Leaves usually oblong, sometimes oblong-elliptic, 3-8 x 2-4 cm, obtuse or emarginate at apex, rounded or subcordate at base, entire, glossy, coriaceous. Flowers in puberulous, corymbose cymes. Calyx-lobes *ca* 2 mm long. Corolla white or rosy; lobes 6-8 mm long; tube *ca* 1.5 cm long. Berries ellipsoid, 1.2-1.5 cm long, red, turning purple or black on ripening, 4-seeded.

In scrub forests, often cultivated. Bilaspur, Damoh, Indore. *Fl. & Fr.*: May - Oct.

Fruits are edible and made into pickles and tarts.

2. *Carissa congesta* Wight, Icon. Pl. Ind. Orient. t. 1284. 1848; Hook. f., Fl. Brit. India 3: 630. 1882. - *Karonda*.

Large shrubs or small trees, erect, sometimes scandent, evergreen, glabrous except inflorescence; spines paired, straight or slightly curved, 2.5-3 cm long. Leaves broadly ovate or elliptic, 2-5.5 x 1.5-4.5 cm, obtuse at apex, cuneate to shortly rounded at base, subcoriaceous, rather thin, dark green and shining above. Flowers in pubescent, sessile or pedunculate, corymbose cymes, faintly fragrant; pedicels short; bracts linear, pubescent. Calyx pubescent, divided more than half-way down; segments lanceolate, ciliate. Corolla white; lobes lanceolate, 5-7 mm long, acute, pubescent and ciliolate; tube 10-15 mm long. Berries globose, 0.8-1 cm across, 4-seeded, smooth, purplish on ripening.

Common along the edge of forests, also under cultivation. Bilaspur, Chhatarpur, Damoh, Jabalpur, Raigarh, Sagar. *Fl. & Fr.*: May - Oct.

Fruits are edible and made into pickles and tarts.

3. *Carissa opaca* Stapf ex Haines in Indian For. 47: 378. 1921. *C. spinarum* auct. non L., 1771; Hook. f., Fl. Brit. India 3: 631. 1882, *p.p.* *Karaunda*. Fig. 11.

Shrubs, bushy; sap milky; spines simple or forked, straight, 1-3 cm long. Leaves ovate to elliptic, 2-5 x 1.5-3 cm, acute at apex and base, entire, coriaceous, shining. Flowers in terminal or axillary, few-flowered cymes. Calyx-lobes *ca* 1.5 mm long. Corolla white. Berries subglobose or somewhat ellipsoid, 6-8 mm long, green to purple, 2-seeded.

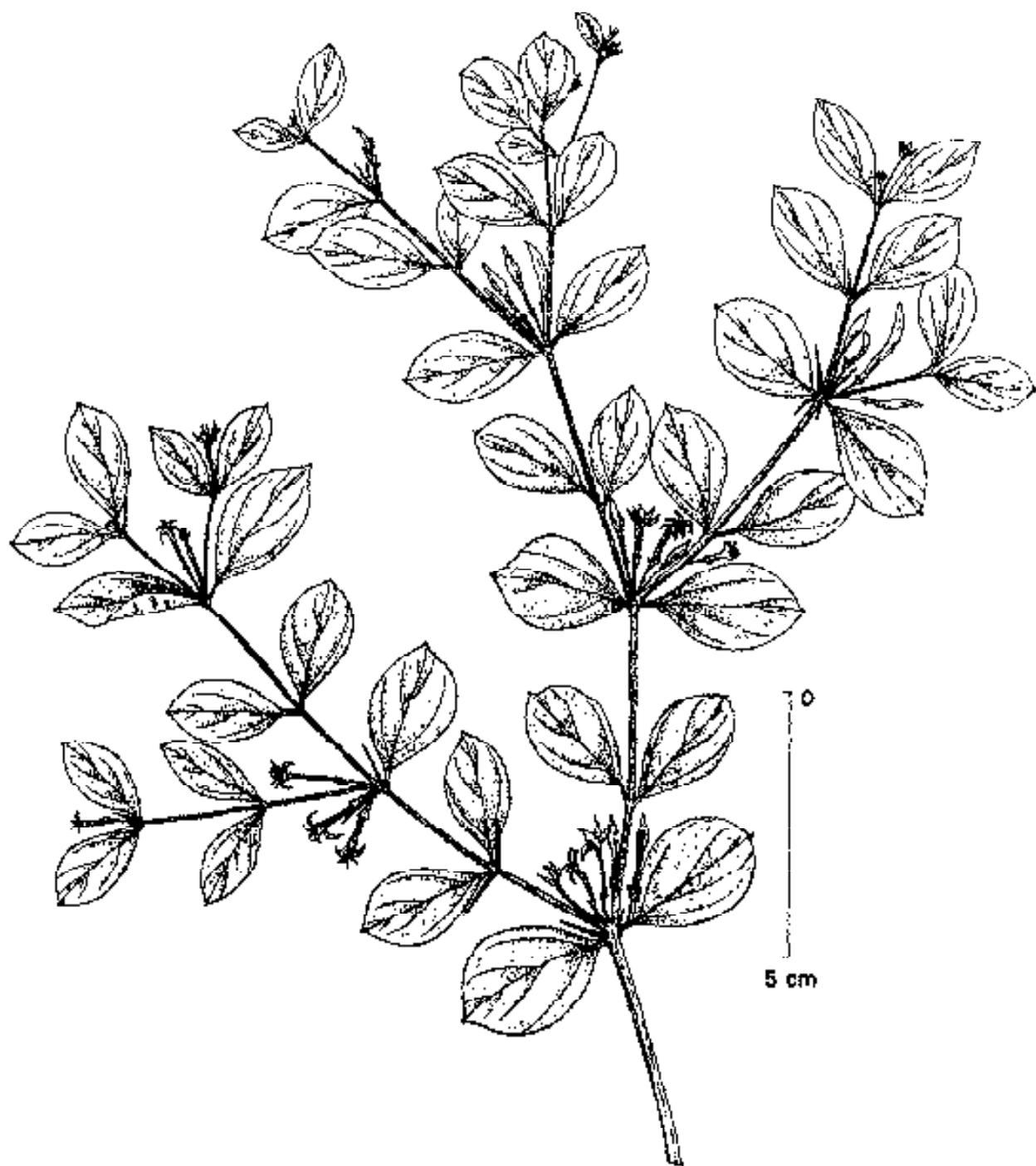


Fig. 11. *Carissa opaca* Stapf ex Haines

In mixed and scrub forests. Damoh, Chhatarpur, Indore, Rajnandgaon, Panna, Satna, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: March - Aug.

The plant is used for fencing. Roots are purgative.

4. *Carissa paucinervis* A. DC. in DC., Prodr. 8: 333. 1844; Hook. f. *Fl. Brit. India* 3: 631. 1882.

Shrubs, erect, rigid, branched; spines straight, 2.5-5 cm long. Leaves elliptic-ovate or elliptic-lanceolate, 1.5-3 cm long, mucronate at apex, acute at base; petioles up to 3 mm long. Flowers in terminal, lax, puberulous cymes, small; peduncles up to 2.5 cm long. Corolla white, sometimes with rosy tinge; lobes *ca* 4 mm long; tube *ca* 10 mm long. Berries ellipsoid or subglobose, *ca* 5 mm long, 2-seeded.

Rare. Seoni. *Fl. & Fr.*: Jan. Feb.

5. *Carissa spinarum* L., Mant. Pl. 559. 1771; Hook. f. *Fl. Brit. India* 3: 631. 1882, *p.p.* - *Jangli karonda*.

Shrubs, bushy, evergreen; branches diffuse, erect or slightly scandent; spines simple or forked, straight, 2-3.5 cm long. Leaves broadly ovate or elliptic, 1.5-4 x 1.2-2.5 cm, acute or apiculate at apex, acute or rounded at base, shining. Flowers in terminal or axillary, often branched, pubescent, sessile or shortly pedunculate cymes. Calyx divided almost up to base; segments 2.5-3 mm long. Corolla-lobes oblong or oblong-lanceolate, 0.75-1 cm long; tube 1-1.5 cm long, sparsely pubescent. Berries subglobose, 0.7-1 cm across, dark purple on ripening.

Common in open scrub forests, dry stony places and along roadsides. Balaghat, Bilaspur, Chhatarpur, Damoh, Gwalior, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Satna, Seoni, Shivpuri, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Jan. April.

Fruits are edible and made into tarts.

6. CATHARANTHUS G. Don

Herbs or undershrubs, annual or perennial, erect or procumbent. Leaves opposite, with axillary glands. Flowers axillary, solitary, paired or in 1-4-flowered cymes. Calyx eglandular, herbaceous, 5-partite. Corolla

hypocrateriform; lobes 5, overlapping to left; tube slender, cylindrical, somewhat inflated around the stamens below the constricted mouth. Stamens 5, inserted near the top of inflated tube; filaments short; anthers oblong. Disk absent. Carpels 2, apocarpous; ovary with 2 oblong glands; style filiform; stigma depressed-capitate. Fruit a follicle, cylindrical, slightly spreading. Seeds minute, ecomose.

About 8 species; tropical regions; 2 in M.P.

- 1a. Leaves lanceolate, acute or acuminate; cymes
1-2-flowered; corolla white; follicles 3.5-5 cm long ...1. *C. pusillus*
- 1b. Leaves elliptic or obovate, rounded, retuse or
mucronulate; cymes 1-4-flowered; corolla
usually rose-coloured; follicles 2-3 cm long ...2. *C. roseus*

1. *Catharanthus pusillus* (Murr.) G. Don, Gen. Hist. 4: 95. 1837-1838. *Vinca pusilla* Murr. in Comment. Soc. Regiae Sci. Gotting. 3: 66. 1773; Hook. f., Fl. Brit. India 3: 640. 1882. *Lochnera pusilla* K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(2): 145. 1895.

Herbs, annual, erect, much branched, glabrous, 10-70 cm high; stems and branches 4-angled. Leaves lanceolate, 4-7 cm long, acute or acuminate at apex, attenuate at base, minutely scabrid on margins, glabrous. Flowers in 1-2-flowered cymes; pedicels very short. Calyx ca 5 mm long; segments filiform. Corolla white; lobes obovate, ca 3 mm long; mouth pilose inside, otherwise glabrous; tube 6-9 mm long. Follicles 3.5-5 cm long, slender, striate, glabrous, straight.

Common in sandy wastelands and along roadsides. Balaghat, Betul, Bilaspur, Chhatarpur, Durg, Hoshangabad, Indore, Raigarh, Raipur, Rajnandgaon, Satna, Seoni, Sidhi, Surguja. *Fl. & Fr.*: July - Sept.

2. *Catharanthus roseus* (L.) G. Don, Gen. Hist. 4: 95. 1837-1838; Stearn in Lloydia 29: 196. 1966. *Vinca rosea* L., Syst. Nat. ed. 10: 944. 1759; Hook. f., Fl. Brit. India 3: 640. 1882. *Lochnera rosea* Rchb., Consp. Regn. Veg. 134. 1828. - *Sada-bahar*, *Sada-suhagi*.

Herbs, perennial, erect, much branched, 70-80 cm high. Leaves elliptic to obovate, 3-8 cm long, rounded, retuse or mucronulate at apex, acute at base. Flowers in 1-4-flowered cymes. Calyx-segments subulate. Corolla mostly rosy but sometimes pink or white with combination of these

colours; lobes broadly ovate, 1.5-2.5 cm long; tube 2.5-3 cm long, pubescent outside, pilose inside except at the level of anthers. Follicles 2-3 cm long, pubescent.

Cultivated in gardens, also found as escape in villages. Balaghat, Bhopal, Chhatarpur, Raigarh, Raipur, Sidhi, West Nimar. *Fl. & Fr.*: Throughout the year, mainly during Aug. - Jan.

The plant is medicinal.

7. HOLARRHENA R. Br.

Shrubs or small trees. Leaves opposite. Flowers in terminal or lateral corymbose cymes. Calyx 5-lobed, with small basal glands inside. Corolla hypocrateriform; lobes 5, imbricate to left; tube slender, cylindrical. Stamens 5, inserted near the base of corolla-tube; filaments short; anthers linear-oblong, free from stigma. Disk absent. Carpels 2, apocarpous; ovules many in each carpel; style short, filiform; stigma oblong, fusiform, entire or 2-toothed. Fruit a follicle, paired, somewhat divergent, terete. Seeds linear or oblong, compressed, concave, tipped with deciduous coma.

Four species; tropical Africa and Indo-Malesia; one in M.P.

Holarrhena pubescens (Buch.-Ham.) Wallich ex G. Don, Gen. Hist. 4: 78. 1837-1838; Panigrahi in Taxon 36: 464. 1987. *Echites pubescens* Buch.-Ham. in Trans. Linn. Soc. Bot. 13: 524. 1822. *Nerium antidysentericum* L., Sp. Pl. 209. 1753 excl. lectotype Hermann 44 (BM; vide R. Brown, 1811). *Echites antidysenterica* Roth in Roem. & Schult., Syst. Veg. 4: 394. 1819 & Nov. Pl. Sp. 138. 1821, non (L.) Roxb. ex Fleming, 1810, nec (L.) Roxb., 1814. *Holarrhena antidysenterica* Wallich, Numer. List No. 1672. 1829, non (L.) Wallich, 1829; Hook. f., Fl. Brit. India 3: 644. 1882. - *Dudhi, Khoda, Kura, Kuruchi*.

Shrubs or small trees, deciduous; bark brown. Leaves broadly ovate to elliptic-oblong, 10-20 x 6-9 cm, acuminate at apex, rounded or tapering at base, glabrous or more or less tomentose especially beneath. Flowers in terminal, many-flowered, 7.5-15 cm across cymes, fragrant. Calyx-lobes lanceolate, 2.5-3 mm long, acuminate, ciliate. Corolla white; lobes oblong, 12-14 mm long; throat without ring of hairs; tube ca 1 cm long, pubescent. Follicles 20-40 x 0.5-0.8 cm, usually marked with narrow, white specks. Seeds linear, ca 1.5 cm long; coma brown, about twice as long as the seeds.

Common in sal and mixed deciduous forests. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Gwalior, Hoshangabad, Indore, Jabalpur, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: Feb. - June.

Bark and seeds are used for the treatment of dysentery. Wood is used for making tobacco pouch and comb.

8. ICHNOCARPUS R. Br., *nom. cons.*

Shrubs, climbing. Leaves opposite, small, distant. Flowers in terminal or axillary, paniculate cymes, small. Calyx 5-fid, glandular or eglandular. Corolla hypocrateriform; lobes 5, overlapping to right, deflexed in bud; throat contracted or villous. Stamens 5, inserted near the middle of corolla-tube; filaments obsolete; anthers sagittate, connivent over stigma, spurred at base. Disk free, 5-lobed. Carpels 2, pubescent, exserted from the disk; ovules many; style short; stigma ovoid or oblong. Fruit a follicle, spreading or divaricate, slender or rigid, subterete, compressed. Seeds narrowed at tip, with deciduous coma.

About 8 species; Indo-Malesia to S. China and tropical Australia; one in M.P.

Ichnocarpus frutescens (L.) R. Br. in Mem. Werner. Soc. 1: 62. 1811 & in W.T. Aiton, Hortus Kew, ed. 2. 2: 69. 1811; Hook. f., Fl. Brit. India 3: 669. 1882. *Apocynum frutescens* L., Sp. Pl. 213. 1753. *Cherising*, *Dhimarbel*, *Kalidudhi*, *Khapribela*, *Siamlata*.

Shrubs, climbing, evergreen; young branches, inflorescence and undersurface of leaves rusty tomentose. Leaves variable, lanceolate to ovate, 4-8 x 2-4 cm, acute or subacuminate at apex, obtuse or rounded at base, pale beneath; petioles 3-4 mm long. Flowers in axillary and terminal, rusty pubescent panicles, ca 8 mm across; branches short, 3-flowered. Calyx eglandular, pubescent; lobes ovate, acute. Corolla greenish white; lobes undulate, pubescent along margin; throat villous. Disk-lobes longer than ovary. Follicles 5-15 cm long, straight or somewhat curved, pubescent when young. Seeds 1.2-1.75 cm long; coma as long as seeds.

Common in mixed forests. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: Aug. - Feb.

Roots are referred as lactagogue.

9. NERIUM L.

Shrubs, erect, glabrous. Leaves usually 3-4-nately whorled, rarely opposite, narrow; nerves very close. Flowers in terminal, corymbose cymes, large. Calyx 5-partite, glandular inside. Corolla infundibuliform; lobes overlapping to right; tube cylindrical, with 5 fringed scales. Stamens inserted near the mouth of corolla-tube; filaments short; anthers sagittate, connivent around and adherent to stigma, tipped with long, pilose appendages; each cell produced downwards into a rigid spur like appendage. Carpels 2, apocarpous; ovules many; style filiform, dilated upwards; stigma subglobose, surrounded by 5 tubercles. Fruit a follicle, cylindrical, straight. Seeds oblong, villous; coma terminal, caducous.

Two species; Mediterranean region to Japan; one in M.P.

Nerium indicum Mill., Gard. Dict. ed. 8. no.2. 1768; Santapau in Rec. Bot. Surv. India 16(1): 170. 1953. *N. odorum* Sol. in Aiton, Hortus Kew. 1: 297. 1789; Hook. f., Fl. Brit. India 3: 655. 1882. - *Kaner*.

Large shrubs, evergreen; sap milky. Leaves ternate, linear-lanceolate, 10-45 cm long, acuminate at apex, tapering into a short petiole at base, coriaceous, dark green and shining above; nerves numerous, spreading horizontally. Flowers fragrant. Calyx-segments lanceolate. Corolla red, rosy, white or yellow, ca 3.5 cm across; lobes 4-7, rounded. Follicles spreading, 10-22 cm long, rigid. Seeds ca 1.25 cm long; coma light brown.

Ornamental, cultivated in gardens. Bilaspur, Chhatarpur, Damoh, Dhar, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Shivpuri, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: April - June.

Leaves are medicinal while bark and roots are poisonous.

10. PLUMERIA L.

Large shrubs or small trees; stems thick, fleshy above, woody below; branchlets scarred with the bases of fallen petioles. Leaves alternate or whorled, large, entire; secondary nerves numerous, spreading almost at right angle to the midrib and joined with intermarginal nerves. Flowers in terminal, corymbose or umbelliform cymes, paired in the axil of large

caducous bracts, showy. Calyx eglandular. Corolla hypocrateriform or infundibuliform; lobes imbricate to left; tube pubescent inside. Stamens inserted near the base of corolla-tube; filaments obsolete; anthers oblong or ovate. Ovary glabrous; nectary absent or poorly developed; stigma 2-lobed. Fruit a follicle, paired, widely divergent, linear or lanceolate. Seeds with basal wing.

About 7 species; tropical America; 2 in M.P.

- 1a. Leaves obtuse, without marginal nerves;
inflorescence longer than leaf ...1. *P. alba*
- 1b. Leaves acute to acuminate, with conspicuous
marginal nerves; inflorescence shorter than leaf ...2. *P. rubra*

1. *Plumeria alba* L., Sp. Pl. 210. 1753.

Shrubs or small trees, dichotomously branched; sap milky. Leaves oblong, 20-30 x 8-10 cm, obtuse at apex, acute at base, entire, coriaceous, petiolate. Flowers in terminal cymes, fragrant. Calyx 5-lobed. Corolla white with yellowish tinge, 5-lobed; lobes ca 3 cm long; tube slender, ca 1.5 cm long.

Ornamental, planted in gardens. Indore. *Fl.* : March - June.

2. *Plumeria rubra* L., Sp. Pl. 209. 1753. *P. acuminata* R. Br. in W.T. Aiton, Hortus Kew. ed. 2. 2: 70. 1811. *P. acutifolia* Poir. in Lam., Encycl. Suppl. 2. 667. 1812; Hook. f., Fl. Brit. India 3: 641. 1882.

Small trees, deciduous; branches swollen and leafy towards tip; sap milky. Leaves oblong-lanceolate to obovate, 20-40 cm long, acute to acuminate at apex, acute at base, glabrous to sparsely pubescent beneath; marginal nerves conspicuous; petioles 2.5-3.7 cm long, glandular above. Flowers in umbelliform cymes. Corolla red, pink or white with yellow inside or combination of these colours; lobes broadly ovate, 2-4 cm long; tube 1-2.5 cm long. Follicles cylindrical, 9-15 cm long, rigid, drooping. Seeds with basal wing

Ornamental, planted in gardens and lawns for beautiful flowers. Bilaspur, Damoh, Raigarh. *Fl. & Fr.* : Nov. - June.

Bark and latex are medicinal.

11. RAUVOLFIA L.

Herbs, undershrubs or shrubs, erect. Leaves in whorls of 3 or 4, rarely opposite. Flowers in 2-3-dichotomous, terminal or pseudo-axillary umbelliform or corymbiform cymes, small; peduncles alternate with terminal leaves, finally turning lateral. Calyx 5-fid. Corolla tubular, infundibuliform or hypocrateriform, dilated around the anthers; lobes 5, overlapping to left; throat usually hairy inside. Stamens inserted at above or middle of corolla-tube, included; anthers acute, free from stigma. Disk large, cupular or annular, entire or slightly lobed. Carpels 2, apocarpous or syncarpous; ovules 2; style filiform; stigma capitate, 2-fid at tip. Fruit a drupe, usually 1-seeded. Seeds ovoid.

About 110 species; tropical regions; one in M.P.

Rauvolfia serpentina (L.) Benth. ex Kurz, Forest Fl. Burma 2: 171. 1877; Hook. f., Fl. Brit. India 3: 632. 1882. *Ophioxylon serpentinum* L., Sp. Pl. 1043. 1753. *Bhuin kurwa*, *Bhuin-kurai*, *Chhotachand*, *Sarpagandha*.

Herbs or undershrubs, evergreen, glabrous. Leaves ternate, elliptic, lanceolate or obovate to oblanceolate, 7-17 x 3-5 cm, acute or acuminate at apex, tapering gradually into petiole, pale beneath. Flowers in terminal or lateral, corymbose cymes; peduncles 5-12 cm long; pedicels and calyx red. Corolla white or pink, ca 1.2 cm long; lobes elliptic or oblong, obtuse, smaller than tube; tube slender, inflated above the middle. Disk membranous, slightly lobed. Drupes single or didymous, more or less concave, 0.7-1 cm across, dark purple.

Rare. In mixed and sal forests. Bastar, Raipur. *Fl. & Fr.*: Nov. - Sept.

The plant is referred as antidote to snake bite and for the treatment of high blood pressure.

12. TABERNAEMONTANA L.

Shrubs, rarely trees, usually glabrous. Leaves opposite, mostly unequal in each pair; secondary nerves 5-6; petioles glandular, stipules usually distinct. Flowers in axillary or terminal cymes, showy. Calyx 5-lobed, glandular inside, rarely eglandular. Corolla hypocrateriform; lobes overlapping to left or right. Stamens adnate at middle or below middle of

corolla-tube; filaments short; anthers linear, acute, free from stigma. Disk absent. Carpels 2, apocarpous; ovules usually numerous, many-seriate; style filiform; stigma short or long, 2-lobed. Fruit a follicle, paired, often curved. Seeds within the pulp, grooved on one face, smooth, striate or rugose, ecomose.

About 100 species; tropical regions; 2 in M.P.

- 1a. Branches slender; corolla-lobes twisted to left,
tube slender ...1. *T. divaricata*
- 1b. Branches stout; corolla-lobes twisted to
right, tube stout ? *T. heyneana*

1. *Tabernaemontana divaricata* (L.) R. Br. in Roem. & Schult., Syst. Veg. 4: 427. 1819. *Nerium divaricatum* L., Sp. Pl. 209. 1753. *N. coronarium* Jacq., Collectanea 1: 138. 1786. *Tabernaemontana coronarium* (Jacq.) Willd., Enum. Pl. 275. 1809; Hook. f., Fl. Brit. India 3: 646, 1882. *Ervatamia divaricata* (L.) Burkill in Rec. Bot. Surv. India 10: 320. 1925. - *Chandni*.

Shrubs, bushy, evergreen, dichotomously branched, glabrous. Leaves elliptic-lanceolate or oblong-lanceolate, 6-13 x 3-5 cm, acute or acuminate at apex, cuneate at base, dark green and shining above; petioles 1-1.5 cm long. Flowers in axillary, corymbose cymes, fragrant. Corolla white; lobes ovate, oblique, obtuse; tube 1.8-2.3 cm long, dilated above the anthers. Follicles spreading, 2.5-7.5 cm long, recurved, beaked or unbeaked, sessile or shortly stipitate, 3-ribbed, 3-6-seeded. Seeds ovoid or oblong, straited, fleshy.

Ornamental. Balaghat, Chhatarpur, Damoh, Dhar, Indore, Raipur, Rajnandgaon, Shahdol. *Fl. & Fr.*: May - Aug.

2. *Tabernaemontana heyneana* Wallich in Edwards, Bot. Reg. 15. t. 1273. 1829; Hook. f., Fl. Brit. India 3: 646. 1882. *Ervatamia heyneana* (Wallich) Cooke, Fl. Bombay 2: 134. 1904.

Shrubs; bark smooth, grooved when dry; branches stout. Leaves elliptic to lanceolate, 10-20 cm long, acuminate at apex, acute at base, glabrous, shining above, pale beneath; petioles up to 1.25 cm long, pulvinate at base. Flowers in many-fid cymes; bracts obsolete. Calyx

coriaceous; lobes ovate, obtuse. Corolla white; lobes falcately oblong, *ca* 1 cm long, obtuse, crisped; tube cylindrical, 1.5-3 cm long. Follicles allantoid, 2.5-3.5 cm long, slightly recurved, sessile. Seeds *ca* 1.25 cm long.

Rare. Mandla. *Fl. & Fr.*: May - Aug.

13. THEVETIA L., *nom. cons.*

Large shrubs or small trees, evergreen. Leaves alternate, usually crowded, tapering at both ends, revolute. Flowers in terminal, few-flowered cymes. Calyx 5-lobed, glandular at base inside; lobes spreading. Corolla infundibuliform; lobes overlapping to left; tube cylindrical. Stamens 5, adnate on the throat; anthers lanceolate, with branched appendages at tip. Disk absent. Carpels 2, syncarpous; ovary 2-locular; ovules 2 in each locule; style filiform; stigma disciform. Fruit a drupe, broader than long. Seeds broad, with a thin margin.

About 8 species; tropical America; one in M.P.

Thevetia peruviana (Pers.) K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(2): 159. 1895. *Cerbera peruviana* Pers., Syn. Pl. 1: 267. 1805. *Thevetia nerifolia* Juss. ex Steud., Nomencl. Bot. ed. 2. 2: 680. 1841. - *Pili kaner*.

Shrubs or small trees, glabrous, up to 6 m high; sap milky. Leaves often linear, 10-15 x 0.8 cm, glabrous, dark green and shining above. Flowers showy, fragrant. Calyx-lobes *ca* 8 mm long. Corolla crimson, white, orange or yellow; tube broadly campanulate above, cylindrical at base. Drupes 4-5 cm across, green, fleshy, bluntly 4-angled, glabrous.

Cultivated in gardens and parks. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, Indore, Panna, Raigarh, Raipur, Sidhi, Surguja. *Fl. & Fr.*: Throughout the year.

Latex and kernels are poisonous. Bark is bitter and is referred as febrifuge.

14. VALLARIS Burm. f

Shrubs, twining, rarely trees. Leaves opposite, minutely gland-dotted. Flowers in lateral or subterminal cymes or fascicles. Calyx 5-lobed,

glandular or eglandular; lobes narrow. Corolla hypocrateriform or subrotate; lobes twisted, overlapping to right; throat naked; tube short. Stamens inserted at the top of corolla-tube, exerted; filaments short, clavate; anthers connivent in a cone and adherent to stigma; cells produced into rigid basal spurs. Disk annular or cupular, with 5 lobes or scales. Carpels 2, syncarpous at first; ovules many; style filiform, pubescent; stigma thick, often 2-lobed at tip. Fruit a follicle, paired, at first jointed at length, separating with the placentae. Seeds 2-seriate, comose.

Three species; tropical Asia; one in M.P.

Vallaris solanacea (Roth) Kuntze, Revis. Gen. Pl. 417. 1891.
Peltanthera solanacea Roth, Nov. Pl. Sp. 132. 1821. *Vallaris heynei*
 Spreng., Syst. Veg. 1: 635. 1824; Hook. f., Fl. Brit. India 3: 650. 1882.
Chamari-ki-bel, *Phulkati*, *Ramsar*. Fig. 12.

Large shrubs, woody; bark ash-coloured. Leaves elliptic or oblong-lanceolate, 5-12 cm long, acuminate at apex, acute at base, shining above, glabrous or pubescent; petioles 1-2 cm long, with glands in the axils. Flowers usually in subcorymbose cymes, fragrant; peduncles slender, glabrous or pubescent; pedicels usually decurved, pubescent; bracts linear or lanceolate, acute, pubescent. Calyx-lobes ovate or lanceolate, acute, pubescent; tube short, longer than lobes. Corolla white, minutely pubescent outside; lobes obovate, obtuse; tube 2.5 cm long. Follicles oblong, 10-15 cm long. Seeds ovoid, ca 1.25 cm long, beaked; coma ca 2 cm long, silvery white.

Climbers in sal and teak forests. Hoshangabad, Mandla, Shahdol. *Fl.* & *Fr.*: Dec. - April.

Twigs are used for making basket. Plant is also cultivated in gardens for fragrant flowers.

15. WRIGHTIA R. Br.

Shrubs or trees; sap milky. Leaves opposite. Flowers in terminal or subaxillary, sessile or subsessile cymes. Calyx 5-lobed, with glands or scales inside. Corolla hypocrateriform; lobes overlapping to left; throat with corona of 5-10, usually fimbriate scales; tube cylindrical. Stamens inserted at the top of corolla-tube; filaments short, dilated; anthers exerted,



Fig. 12. *Vallaris solanacea* (Roth) Kuntze

sagittate, connivent around and adherent to stigma. Disk absent. Carpels 2, apocarpous or syncarpous; ovules many; style filiform. Fruit a follicle, connate throughout or at the tip only. Seeds linear, compressed, with deciduous coma at base.

About 24 species; tropical regions of Old World; 2 in M.P.

- 1a. Leaves tomentose on both the surfaces; coronal scales orange-coloured, cleaved into lobes but not fimbriate; follicles connate throughout . . . 1 *W. arborea*
- 1b. Leaves glabrous or puberulent; coronal scales white, fimbriate; follicles connate at the tip only . . . 2 *W. tinctoria*

1. *Wrightia arborea* (Dennst.) Mabberley in *Taxon* 26: 533, 1977
Periploca arborea Dennst., *Schlüssel Hortus Malab.* 13, 23, 25, 1818
Wrightia tomentosa Roem. & Schult., *Syst. Veg.* 4: 414, 1819; Hook. *f.*
Fl. Brit. India 3: 653, 1882. - *Daira, Dharanli, Dudhi.*

Small trees, deciduous, tomentose. Leaves elliptic-oblong, obovate or sublanccolate, 7.5-15 cm long, caudate-acuminate at apex, acute at base, reddish brown when young, tomentose; main lateral nerves 8-14 pairs, petioles ca 0.75 cm long. Flowers in subsessile, corymbose cymes, ca 2.5 cm across; bracts ovate, caducous. Calyx pubescent outside, glandular inside; lobes ca 3 mm long, obtuse. Corolla with pink tinge, white or turning pale yellow; tube twice the length of calyx. Corona scales fleshy, cleaved into unequal lobes. Follicles connate throughout, subcylindrical, 20-30 cm long, laterally compressed. Seeds 1.2-1.6 cm long.

In dry mixed deciduous forests. Hoshangabad, Raipur. *Fl & Fr*
 May - June.

Bark is referred to antidote snake bite and scorpion sting and for the treatment of diarrhoea, dysentery and piles.

2. *Wrightia tinctoria* R. Br. in *Mem. Werner. Soc.* 1, 73, 1811.
 Hook. *f.* *Fl. Brit. India* 3: 653, 1882. *Dudhu, Indrajau, Kali dudhu,*
Mitha-indrajan.

Small trees, deciduous. Leaves elliptic, oblong, obovate or oblanceolate, up to 16 x 17 cm, acuminate at apex, rounded or acute at base,

main lateral nerves 6-12 pairs. Flowers in dichotomous, terminal, lax cymes, fragrant, 1.2-1.5 cm across; bracts ovate. Calyx-lobes ovate, rounded, with membranous margin. Corolla-lobes oblong, obtuse; tube twice the length of calyx. Corona scales fimbriate. Follicles cohering at the tip only, cylindrical, 25-40 cm long, slender, curved, pendulous, glabrous. Seeds 1.2-1.5 cm long.

- 1a. Leaves puberulent throughout; inflorescence
puberulent ...2.1. subsp. *rothii*
- 1b. Leaves glabrous or puberulent only along the
midrib beneath; inflorescence glabrous ...2.2. subsp. *tinctoria*

2.1. subsp. *rothii* (G. Don) P.T. Ngan in Ann. Miss. Bot. Gard. 52: 144. 1965. *Wrightia tinctoria* R. Br. var. *rothii* (G. Don) Hook. f., Fl. Brit. India 3: 653. 1882.

Common in mixed deciduous forests. Damoh, Jabalpur, Mandla, Rajnandgaon, Rewa, Satna, Seoni, Shivpuri, West Nimar. *Fl. & Fr.*: March - Sept.

The plant is referred for dysentery.

Notes: Hook. f. (*l.c.*) and Gamble (Fl. Madras 2(5): 816. 1922) have recognised the varietal status of *rothii* while Ngan (*l.c.*) has treated as a subspecies. On the other hand, Duthie (Fl. Gangetic Plain 2: 38. 1911), Cooke (Fl. Bombay 2(1): 137. 1904) and Ellis (Fl. Nallamalais 2: 247. 1990) have merged it under *typica*. The specimens of Madhya Pradesh have, however, shown clear distinction on the indumentum nature of the plant and so Ngan's treatment at subspecies level has been followed.

2.2. subsp. *tinctoria*

Rare. Hoshangabad. *Fl. & Fr.*: March - Oct.

91. ASCLEPIADACEAE

(Ram Lal)

About 348 genera and 2900 species; tropical and subtropical regions especially Africa while few in temperate areas; 19 genera and 29 species in M.P.

- 1a. Plants erect:
- 2a. Sap milky; corolla 1-2 cm long:
- 3a. Herbs, up to 1 m high; leaves lanceolate or oblong-lanceolate, petiolate ...1. *Asclepias*
- 3b. Undershrubs or shrubs, 1-3 m high; leaves ovate-oblong, ovate or obovate, sessile ...2. *Calotropis*
- 2b. Sap watery; corolla 0.3-0.5 cm long:
- 4a. Corona double (2-seriate); pollinia erect; follicles more than 5 cm long ...11. *Leptadenia*
- 4b. Corona single (1-seriate); pollinia horizontal; follicles up to 5 cm long ...18. *Tylophora*
- 1b. Plants twining, trailing or straggling:
- 5a. Filaments usually free; pollinia granular:
- 6a. Corolla-lobes shorter than tube:
- 7a. Corolla-lobes imbricate, 10-15 mm long ...4. *Cryptolepis*
- 7b. Corolla-lobes valvate, 4-5 mm long ...8. *Hemidesmus*
- 6b. Corolla-lobes as long as or longer than tube ...5. *Cryptostegia*
- 5b. Filaments connate into a tube; pollinia waxy:
- 8a. Anthers with membranous appendages:
- 9a. Pollinia pendulous:
- 10a. Corona single (1-seriate):
- 11a. Flowers up to 1 cm when expanded; follicles slender, tapering to an acute apex ...6. *Cynanchum*
- 11b. Flowers 2-3.5 cm across when expanded; follicles stout, tapering to a blunt apex ...9. *Holostemma*
- 10b. Corona double (2-seriate):
- 12a. Corolla campanulate; follicles softly echinate ...15. *Pergularia*
- 12b. Corolla rotate or shallowly campanulate; follicles smooth:

- 13a. Plants leafless, somewhat succulent ...16. *Sarcostemma*
- 13b. Plants leafy, not succulent:
- 14a. Leaves up to 0.7 cm wide; inflorescence long pedunculate; outer corona pubescent; follicles stout ...13. *Oxystelma*
- 14b. Leaves 1.3-2 cm wide; inflorescence sessile or shortly pedunculate; outer corona glabrous; follicles slender ...14. *Pentatropis*
- 9b. Pollinia erect or horizontal, never pendulous:
- 15a. Corona adnate to staminal column:
- 16a. Plants never epiphytic; corolla-lobes imbricate:
- 17a. Corona-scales with ligular appendage ...17. *Telosma*
- 17b. Corona-scales without ligular appendage:
- 18a. Corolla campanulate or urceolate ...12. *Marsdenia*
- 18b. Corolla rotate:
- 19a. Leaves 1-8 cm long; corona-scales not stellately spreading; pollinia horizontal; follicles not ribbed ...18. *Tylophora*
- 19b. Leaves 10-14 cm long; corona-scales stellately spreading; pollinia erect; follicles ribbed ...19. *Wattakaka*
- 16b. Plants epiphytic; corolla-lobes valvate ...10. *Hoya*
- 15b. Corona adnate to corolla-tube ...7. *Gymnema*
- 8b. Anthers without membranous appendages:
- 20a. Calyx glandular; corolla narrowly tubular, inflated at base, elongate upwards, not bearded inside, lobes more or less connate at tips ...3. *Ceropegia*
- 20b. Calyx eglandular; corolla rotate or campanulate, pubescent or bearded inside, lobes free at tips ...11. *Leptadenia*

Notes: *Cryptolepis* R. Br., *Cryptostegia* R. Br., *Hemidesmus* R. Br. and *Periploca* L. are often treated under a separate family Periplocaceae.

1. ASCLEPIAS L.

Herbs or shrubs, perennial, erect; roots often tuberous. Leaves opposite, alternate or whorled. Flowers in lateral, umbelliform cymes. Calyx 5-partite, with 5-10 basal glands inside. Corolla rotate, deeply 5-lobed; lobes imbricate to right. Corona single (1-seriate) of 5 scales, arising from the staminal column and adnate to it above, concave-cucullate, sometimes with a horn like appendage protruding from inside. Stamens adnate near the base of corolla; filaments connate into a tube; anthers with membranous tip over style-apex; pollinia solitary in each anther cell, flattened, pendulous, attached by often curved caudicles to the broad corpuscula. Styles free below, connate above, columnar, truncate or depressed at apex; stigma depressed, 5-angled. Follicles inflated, beaked, smooth, covered with subulate hairs. Seeds flattened, winged, comose.

About 120 species; America, some naturalized in Old World; one in M.P.

Asclepias curassavica L., Sp. Pl. 215. 1753; Hook. f., Fl. Brit. India 4: 18.1883.

Herbs, up to 1 m high. Leaves opposite, decussate or whorled, lanceolate or oblong-lanceolate, 5-13 cm long, acute or acuminate at apex, acute at base, glabrous; petioles pubescent. Flowers in umbelliform cymes; peduncles ca 5 cm long, puberulous; pedicels ca 2 cm long, pubescent; bracts linear, ca 5 mm long. Calyx-segments lanceolate, acute, valvate, herbaceous, ciliate. Corolla bright orange-red, up to 1.5 cm across; lobes obovate, obtuse or acute, reflexed, glabrescent or not. Follicles up to 7 cm long, tapering at both ends.

Planted. Mandla. Fl. & Fr.: Throughout the year.

2. CALOTROPIS R. Br.

Undershrubs or shrubs, erect. Leaves opposite, sessile, subsessile or shortly petiolate. Flowers in lateral, umbelliform or furcate cymes. Calyx 5-partite; segments broadly ovate, glandular inside. Corolla rotate, 5-partite; lobes valvate or slightly imbricate to right in bud, glabrous. Corona

single (1-seriate) of 5, fleshy, keel-shaped lobes, adnate to gynostegium, each with a recurved spur or vesicle at base and with or without a pair of auricles at apex. Filaments connate into a tube; anthers short, broad with membranous, inflexed appendages at tip; pollinia solitary in each anther cell, pendulous, waxy, without pellucid margin. Stigma depressed, 5-lobed. Follicles ovoid-oblong, turgid, smooth. Seeds depressed, 5-angled, comose.

Six species; tropical and subtropical regions of Old World; 2 in M.P.

- 1a. Flowers 3.7-5 cm across; corolla-lobes purple to white, spreading, revolute; corona shorter than the staminal column, with 2 auricles below apex ...1. *C. gigantea*
- 1b. Flowers ca 2.5 cm across; corolla-lobes pink with purplish spot, erect; corona equal to or longer than the staminal column, without auricles ...2. *C. procera*

1. ***Calotropis gigantea*** (L.) R. Br. in W.T. Aiton, Hortus Kew. ed. 2. 2: 78. 1811; Hook. f., Fl. Brit. India 4: 17. 1883. *Asclepias gigantea* L., Sp. Pl. 214. 1753. - *Aak, Madar, Safed aak.*

Undershrubs or shrubs, stout, hoary tomentose, 2-3 m high; bark dark ash-coloured, wrinkled. Leaves elliptic, ovate to obovate, 10-20 x 8-14 cm, acute at apex, cordate or slightly arcuate, clasping at base, thick, glabrous or appressedly white floccose. Flowers in umbelliform cymes, 3.7-5 cm across, not fragrant. Calyx-segments ca 4 mm long, acute. Corolla purple to white; lobes deltoid, 8-20 mm long, spreading, revolute, subulate. Corona-lobes ca 1.2 cm long. Follicles recurved, 7-10 x 3-4 cm. Seeds broadly ovoid, ca 6 mm long, flat, minutely tomentose; coma white, silky.

Common in wastelands and along bundh of cultivated fields. Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Mandla, Raigarh, Raipur, Seoni, Surguja. *Fl. & Fr.*: March - May.

Bast fibres are obtained from the stems. The floss from seed is used for stuffing. Gun powder charcoal is prepared from wood. The plant is medicinal.

2. ***Calotropis procera*** (Aiton) R. Br. in W.T. Aiton, Hortus Kew. ed. 2. 2: 78. 1811; Hook. f., Fl. Brit. India 4: 18. 1883. *Asclepias procera* Aiton, Hortus Kew. 1: 3-5. 1789. - *Aak, Akawan, Akohwa, Madar.*

Undershrubs or shrubs, up to 1.5 m high. Leaves ovate-oblong, 12-17 x 7-11 cm, sharply acute or submucronate at apex, cordate at base, cottony beneath, glabrescent with age. Flowers in umbelliform cymes, *ca* 2.5 cm across, fragrant; peduncles often paired in axils, 2.5-6 cm long, tomentose. Calyx-segments spreading. Corolla pink with purple spots; lobes *ca* 9 mm long, erect. Corona-lobes *ca* 6 mm long. Follicles recurved, 8-10 x 4-5 cm. Seeds obovate, *ca* 6 mm long; coma white silky.

Common in wastelands, along bundh of cultivated fields and roadsides. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Jabalpur, Panna, Raipur, Rajnandgaon, Rewa, Sagar, Sarna, Seoni, Shahdol, Sidhi. *Fl. & Fr.*: March - May.

Flowers are used in religious ceremonies. Roots, barks, leaves and latex possess medicinal properties.

3. CEROPEGIA L.

Herbs, perennial, twining; roots often tuberous; sap watery. Leaves opposite, sometimes minute or absent. Flowers in lateral, subumbelliform cymes, rarely solitary, often large. Calyx 5-lobed, glandular. Corolla narrowly tubular, inflated at base, 5-lobed; lobes valvate in bud, more or less connate at tips; tube elongate, straight or curved. Corona double; outer series annular or cupular, entire or 5-10-toothed or lobed, shorter or longer than staminal column; inner series of 5, short or long, linear or subulate processes, opposite to anthers, much longer than staminal column. Anthers short, erect, without appendages; pollinia solitary in each anther cell, erect or subhorizontal, waxy, with pellucid margin, attached to corpuscula by short caudicles. Stigma included, truncate or shortly conical. Follicles usually slender, acuminate, smooth. Seeds usually oblong, margined, comose

About 160 species; tropical regions of Old World to Australia and subtropical Africa; 4 in M.P.

- 1a. Plants hispid; inner corona-lobes hooked ...3. *C. hirsuta*
- 1b. Plants glabrous or sparsely pubescent; inner corona-lobes not hooked:
 - 2a. Inner corona-lobes linear:
 - 3a. Leaves fleshy; corolla nearly straight ...1. *C. bulbosa*

- 3b. Leaves membranous; corolla distinctly curved ...4. *C. macrantha*
 2b. Inner corona-lobes spatulate ...2. *C. candelabrum*

1. ***Ceropegia bulbosa*** Roxb., Pl. Coromandel 1: 11. t. 7. 1795; Hook. f., Fl. Brit. India 4: 67. 1883; Ansari, Fasc. Fl. India 16: 10. 1984.

Herbs, twining, trailing, slender, glabrous; roots tuberous. Leaves ovate, 3-6 cm long, slightly cordate at base, fleshy, glabrous. Flowers in pedunculate, umbelliform cymes; peduncles 1.2-2.5 cm long; pedicels much shorter. Calyx-lobes lanceolate, ca 1.2 cm long, acute, ciliate on margin. Corolla pale brown outside, reddish brown inside, purple striate, ca 2.5 cm long; lobes narrow, densely brown pilose. Outer corona-lobes rounded to shortly acute, glabrous, equal to gynostegium; inner lobes straight, linear. Follicles ca 10 cm long, terete, tapering to a slender point, glabrous.

Rare. In mixed forests. Balaghat, Rajnandgaon. *Fl. & Fr.*: Oct.

2. ***Ceropegia candelabrum*** L., Sp. Pl. 211. 1753; Hook. f., Fl. Brit. India 4: 70. 1883; Ansari, Fasc. Fl. India 16: 12. 1984. *C. elliotii* Hook. f., Fl. Brit. India 4: 70. 1883.

Twining, slender; roots tuberous. Leaves ovate-lanceolate, 3-7 cm long, acuminate or mucronate at apex. Flowers in umbelliform cymes; peduncles ca 2 cm long; bracts linear. Corolla usually with brown stripes inside and long reflexed hairs in the neck; lobes purplish green, with cohering appendages, shortly beaked. Outer corona membranous; inner corona spatulate. Follicles 10-13 cm long.

Rare. In mixed forests. Rajnandgaon. *Fl. & Fr.*: Oct.

3. ***Ceropegia hirsuta*** Wight & Arnott in Wight, Contr. Bot. India 30. 1834; Hook. f., Fl. Brit. India 4: 71. 1883; Ansari, Fasc. Fl. India 16: 16. 1984. - *Bosia kand.*

Climbers, hispid; roots tuberous. Leaves variable, ovate, elliptic-lanceolate, up to 10 x 3 cm, acute to obtuse at apex, rounded at base, pilose. Flowers in few-flowered cymes; peduncles 1.2-2.5 cm long, stout, hispid. Corolla light green and variously striped with purple; lobes broad and folded back, upper 1/3rd light yellow, ciliate on margin and midrib. Outer corona-lobes deltoid, cleft at apex, pilose, extending above the

gynostegium; inner corona-lobes hooked at tip, 3 times the length of the outer. Follicles up to 9 cm long.

Climbers on grasses and *Flemingia* sp. in sal forests. Balaghat, Mandla, Raipur, Seoni. *Fl. & Fr.*: Oct.

The decoction of plant is given orally to antidote snake bite coupled with the external application of plant paste.

4. *Ceropegia macrantha* Wight, Contr. Bot. India 31. 1834; Hook. f., Fl. Brit. India 4: 74. 1883; Ansari, Fasc. Fl. India 16: 23. 1984. *C. raizadiana* Babu, Herb. Fl. Dehra Dun 305. 1977.

Climbers, stout, glabrous; roots with fusiform tubers. Leaves elliptic or oblong, 10-18 x 3-7.5 cm, acuminate at apex, rotundate or cuneate at base, membranous, glabrous, rarely hispid. Flowers in 4-8-flowered cymes; peduncles longer and stouter than petiole; pedicels ca 1.5 cm long; bracts many, subulate. Calyx ca 1.2 cm long; lobes linear, glabrous. Corolla-lobes lanceolate, slender, erect, glabrous; tube narrow, curved, swollen at base. Corona-lobes ovate-lanceolate, villous. Follicles 10-12 cm long.

Rare. As forest undergrowth. Hoshangabad. *Fl. & Fr.*: July - Oct.

4. CRYPTOLEPIS R. Br.

Shrubs, twining, glabrous. Leaves opposite. Flowers in dichotomous, terminal or axillary, lax, few-flowered, slender cymes, small. Calyx 5-lobed, with 5 scales inside. Corolla campanulate; lobes 5, imbricate to right, glabrous. Corona-lobes shortly linear, inserted in the middle of corolla-tube. Filaments connate by their broadened bases, free above; anthers sagittate, connivent over style-apex; pollinia cohering in pairs in each anther cell, granular; corpuscula narrow, with oblong appendage. Ovary with 2 to many ovules; stigma broadly conical. Follicles 2, divaricate, terete, smooth. Seeds ovoid or oblong, flattened, with long, white coma.

About 12 species; tropical regions of Old World; 2 in M.P.

- 1a. Leaves with more than 7 pairs of main secondary nerves; follicles lanceolate, 1.2-1.8 cm broad ...1. *C. buchananii*
- 1b. Leaves with 7 pairs of main secondary nerves; follicles linear, up to 0.8 cm broad ...2. *C. elegans*

1. **Cryptolepis buchmanii** Roem. & Schult., Syst. Veg. 4: 409. 1819; Hook. f., Fl. Brit. India 4: 5. 1883. *Dudhi. Karanta. Naghel. Nangor dudhibel.* **Fig. 13.**

Large shrubs, climbing; branches white, terete. Leaves oblong, ovate or elliptic, 8-16 x 2.5-6 cm, apiculate or acuminate at apex, usually acute at base, shining above, glaucous beneath, coriaceous; main secondary nerves more than 7 pairs, horizontal and uniting within the margin; petioles 0.6-1.2 cm long. Flowers in axillary, short, pedunculate cymes; bracts ovate or lanceolate, with scarious margin. Calyx-lobes ovate, acute. Corolla pale greenish yellow; lobes linear or linear-lanceolate, 10-14 mm long. Corona 5, clavate, fleshy. Follicles lanceolate, 5-10 x 1.2-1.8 cm, stout, straight, tapering. Seeds compressed, *ca* 6 mm long, black; coma *ca* 3 cm long.

In sal and mixed deciduous forests. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Shahdol. *Fl. & Fr.*: May - Feb

The fibres obtained from the plants are used by the tribals for cordage and for making a kind of cloth. The plant is also medicinal.

2. **Cryptolepis elegans** Wallich ex G. Don, Gen. Hist. 4: 82. 1837-1838; Hook. f., Fl. Brit. India 4: 6. 1883.

Climbers, up to 2 m high. Leaves linear or lanceolate, sometimes ovate, 4-6 cm long; main secondary nerves 7 pairs, mostly curving upwards. Corolla yellow, 3-4 cm across. Follicles paired, linear, black, tipped with a tuft of white silky hairs.

Rare. In mixed forests. Raipur. *Fl. & Fr.*: Oct.

Fibres are obtained from the plant.

5. CRYPTOSTEGIA R. Br.

Large climbers. Leaves opposite. Flowers in trichotomous, terminal cymes, large. Calyx deeply 5-partite; segments ovate-lanceolate. Corolla campanulate, with a short, basal tubular portion; lobes 5, broad, overlapping and twisted to right. Corona-scales inserted on the corolla, subulate, entire

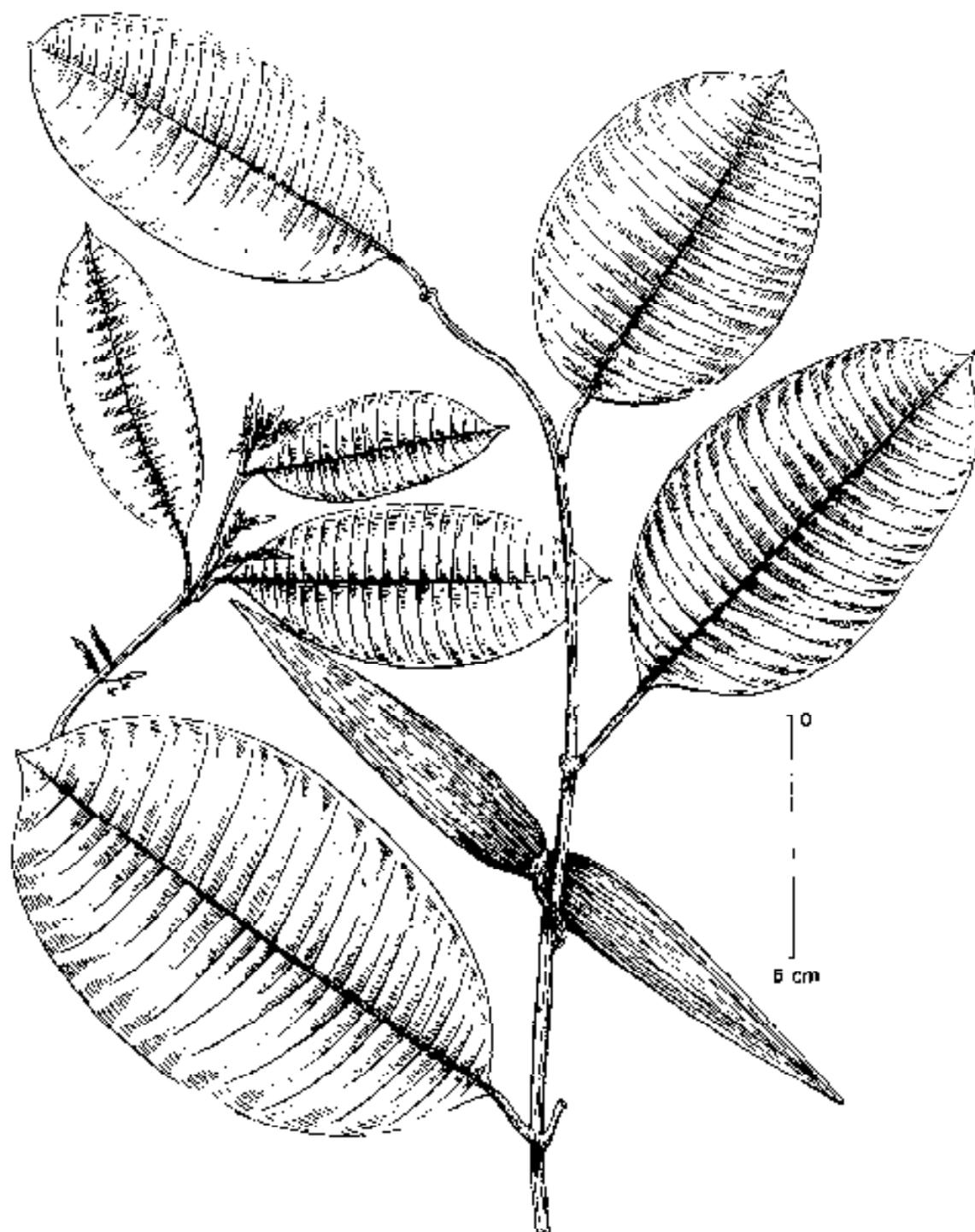


Fig. 13. *Cryptolepis buchanani* Roem. & Schult.

or 2-cleft. Filaments free, filiform; anthers acute; pollinia paired in each anther cell, granular, with subspathulate appendages. Stigma convex. Follicles divaricate, thick, hard, 3-winged. Seeds comose.

Two species; Africa and India; one in M.P.

Cryptostegia grandiflora R. Br. in Bot. Reg. 5: t. 435. 1820; Hook. f., Fl. Brit. India 4: 6. 1883.

Liana, glabrous; bark grey; sap milky. Leaves elliptic or oblong, 7-11 x 3.5-5 cm, shortly acuminate at apex, rounded or truncate at base, coriaceous, shining, glabrous; lateral nerves 8-14 pairs, closely parallel; petioles up to 1 cm long. Flowers in terminal, 3-5-flowered cymes, fragrant, showy; peduncles up to 4 cm long, stout; bracts deciduous. Calyx-segments ovate or lanceolate, ca 1.5 cm long, recurved on margin, gradually acute. Corolla light purple, up to 5 cm across; lobes broadly obovate, overlapping to right in bud. Follicles paired, ovoid-oblong, 8-12 x 2.5 cm, straight.

In mixed forests. Bastar, Damoh, East Nimar, Hoshangabad, Rewa. Fl. & Fr.: June - Sept.

Latex is medicinal.

6. CYNANCHUM L.

Herbs or shrubs, usually twining. Leaves linear-oblong, ovate or lanceolate. Flowers in pedunculate, corymbose cymes. Calyx 5-lobed; often with 5-10 basal glands inside. Corolla 5-lobed; lobes overlapping to right in bud. Corona single (1-seriate) of 5 lobes, cupular, arising from the base of corolla. Anthers with a membranous tip; pollinia solitary in each anther cell, pendulous, without pellucid margin. Stigma broadly rounded. Follicles fusiform, thick, smooth. Seeds comose.

About 100 species; tropical and temperate regions; one in M.P.

Cynanchum callialata Buch.-Ham. ex Wight, Contr. Bot. India 56. 1834; Hook. f., Fl. Brit. India 4: 24. 1883.

Undershrubs, climbing or trailing. Leaves linear-oblong, 6-8 x 3-4 cm, shortly acuminate at apex, cordate at base, glaucous beneath. Flowers

in corymbose cymes. Calyx-lobes lanceolate, acute, glabrous. Corolla white; lobes lanceolate-oblong, erect. Corona plicate; lobes obtuse. Follicles solitary or paired, lanceolate, glabrous, winged. Seeds broadly ovoid, margined.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Nov. - Jan.

7. GYMNEMA R. Br.

Shrubs, climbing; branches puberulous to tomentose. Leaves opposite. Flowers in lateral, umbelliform cymes, small. Calyx 5-lobed. Corolla campanulate; lobes valvate or slightly imbricate to right, more or less fleshy, ciliate. Corona single (1-seriate) of 5 fleshy lobes, adnate to the throat of corolla-tube, each with a decurrent base flanked by 2 rows of short, stiff hairs, with ciliate margins. Filaments shortly connate; anthers with a membranous tip; pollinia solitary in each anther cell, erect, waxy, without pellucid margin. Follicles terete, smooth, tapering at apex. Seeds comose.

About 25 species; tropical regions of Old World, Australia and S. Africa; 2 in M.P.

- | | |
|---|---------------------------|
| 1a. Leaves coriaceous; cymes subsessile; corolla
ca 6 mm across | ...1. <i>G. hirsutum</i> |
| 1b. Leaves chartaceous; cymes pedunculate; corolla
2-4 mm across | ...2. <i>G. sylvestre</i> |

1. *Gymnema hirsutum* Wight & Arnott in Wight, Contr. Bot. India 44. 1834; Hook. f., Fl. Brit. India 4: 29. 1883.

Large climbers; stems spirally twisted, young stems and inflorescence densely covered with rusty pubescence. Leaves broadly ovate, ca 7.5 cm long, acute at apex, cordate at base, coriaceous, pubescent; petioles stout, 4-6 mm long. Flowers in few or many-flowered, subsessile cymes. Calyx-lobes ovate, rounded, pubescent. Corolla yellow, ca 6 mm across; lobes thick. Follicles slender, up to 6.2 cm long, glabrous. Seeds ovoid or oblong, flat, up to 6 mm long, winged at the base; coma ca 1.7 cm long.

Rare. In mixed forests, Hoshangabad. *Fl. & Fr.*: April - July.

2. *Gymnema sylvestre* (Retz.) R. Br. ex Schult. in Roem. & Schult., Syst. Veg. 6: 57. 1820; Hook. f., Fl. Brit. India 4: 29. 1883. *Periploca sylvestris* Retz., Observ. Bot. 2: 15. 1781. *Gurmar*, *Merasingi*. Fig. 14.

Large climbers; young stems and branches terete, pubescent. Leaves broadly elliptic-obovate or oblong, 3-6 cm long, shortly acuminate at apex, rounded to cordate at base, sparsely to densely pubescent, often glabrous above; petioles 0.6-1.2 cm long. Flowers in umbelliform cymes; peduncles densely tomentose; pedicels slender, 4-8 mm long. Calyx pubescent, deeply lobed; lobes oblong, ca 2 mm long, obtuse, ciliolate. Corolla pale yellow, 2-4 mm across; lobes obtuse, recurved, thick, glabrous. Corona-lobes produced beyond the sinuses of corolla-lobes. Follicles lanceolate, 5-7.5 cm long, glabrous. Seeds nearly ovoid or oblong, flat, ca 1.2 cm long, pale brown, broadly margined.

In sal and mixed deciduous forests. Bastar, Betul, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Jabalpur, Narsimhapur, Panna, Raisen, Rewa, Satna, Shahdol. *Fl. & Fr.*: Oct. Feb.

Leaves are referred for the treatment of diabetes while leaves and roots for stomachache.

8. HEMIDESMUS R. Br.

Herbs or shrubs, prostrate or twining. Leaves opposite. Flowers in axillary, dense cymes, small. Calyx 5-lobed; lobes acuminate, glandular inside at base. Corolla rotate; lobes valvate. Corona single (1-seriate) of 5 scales, short, fleshy, inserted on corolla-throat and alternate with its lobes. Stamens inserted at the base of corolla-tube; filaments free or slightly connate at base; anthers connivent by their tips over style apex; pollinia granular. Stigma capitate, 5-angled. Follicles divaricate, slender, terete, smooth. Seeds comose.

A monotypic genus: S.E. Asia and Malesia.

Hemidesmus indicus (L.) R. Br. in W.T. Aiton, Hortus Kew. ed. 2. 2: 75. 1811; Hook. f., Fl. Brit. India 4: 5. 1883. *Periploca indica* L., Sp. Pl. 211. 1753. *Amendmal*, *Anantamul*, *Kapuri*, *Hindi-salsa*.

Herbs or shrubs, slender. Leaves variable, oblong-elliptic, elliptic, linear or linear-lanceolate, 5-10 cm long, mostly apiculate at apex, obtuse

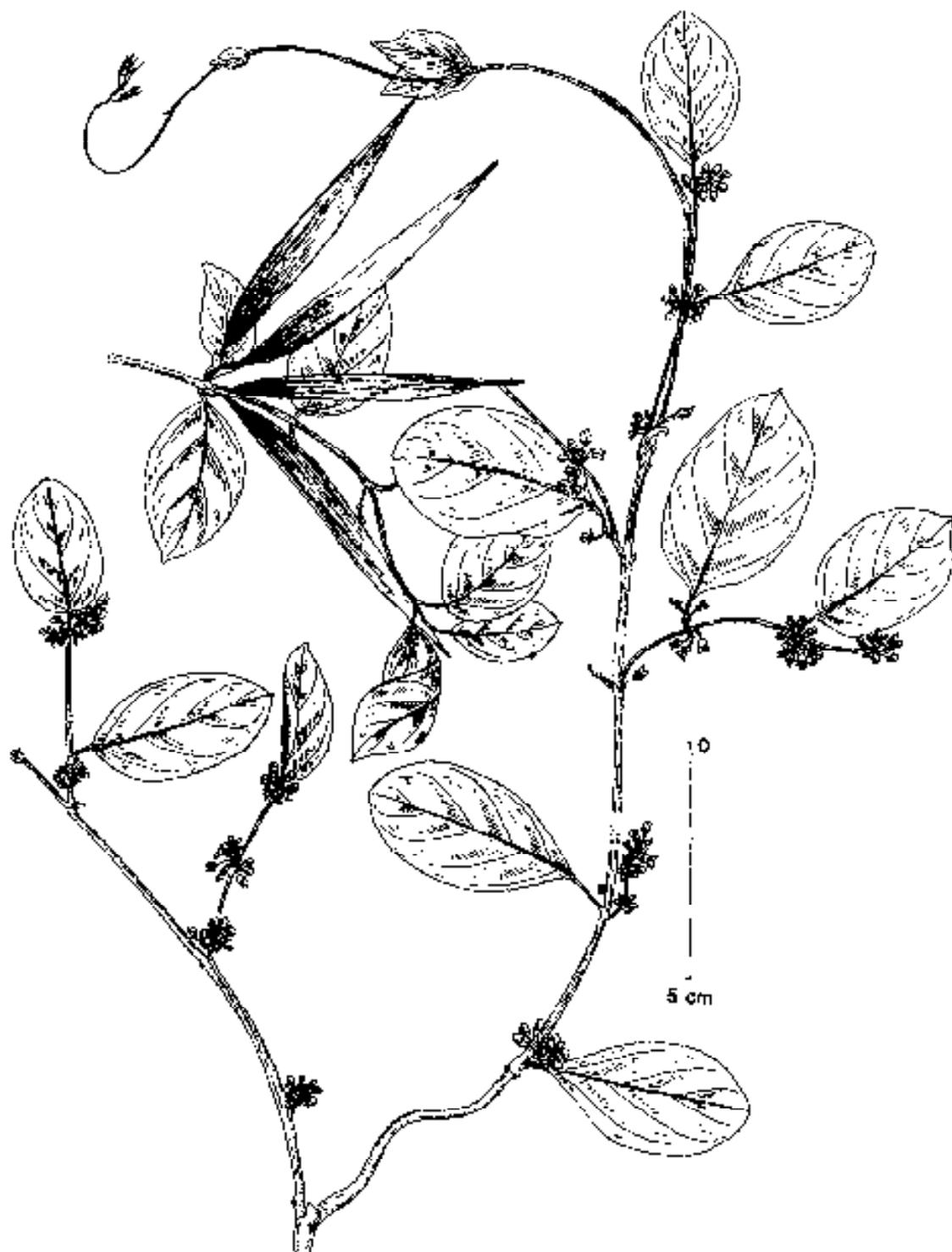


Fig. 14. *Gymnema sylvestre* (Retz.) R. Br. ex Schult.

at base. dark green with white streaks above, pale or silvery white beneath, glabrous or sometimes hoary pubescent beneath; petioles *ca* 4 mm long. Flowers in 5-15-flowered, subsessile, fasciculate cymes; pedicels with many, ovate, imbricating bracts. Calyx-lobes herbaceous, thick. Corolla-lobes yellow to nearly brown or purple inside, 4-5 mm long; tube fleshy, very short. Follicles 10-15 cm long. Seeds flattened, 0.6-1.2 cm long, black; coma *ca* 2.5 cm long.

- 1a. Leaves glabrous beneath ...1.1. var. *indicus*
 1b. Leaves pubescent beneath ...1.2. var. *pubescens*

1.1. var. *indicus*

On forest floor and twiner on a number of plants like *Anogeissus latifolia*, *Semecarpus anacardium*, *Flemingia* sp. Bastar, Betul, Bilaspur, Chhatarpur, Durg, Hoshangabad, Panna, Raigarh, Raipur, Rajnandgaon, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Aug. - Jan.

The plant is medicinal and used for the treatment of various ailments like leucoderma, psoriasis, rheumatism, urinary diseases etc.

1.2. var. *pubescens* (Wight & Arnott) Hook. *f.*, *Fl. Brit. India* 4: 5. 1883. *Hemidesmus pubescens* Wight & Arnott in Wight, *Contr. Bot. India* 63. 1834.

On forest floor and twiner on a number of plants. Balaghat, Bilaspur, Durg, Mandla, Narsimhapur, Panna, Rajnandgaon, Seoni, Sidhi. *Fl. & Fr.*: Aug. - Jan.

Medicinal uses as of var. *indicus*.

9. HOLOSTEMMA R. Br.

Shrubs, twining, glabrous. Leaves opposite. Flowers in lateral or axillary, umbelliform cymes, large; pedicels filiform. Calyx 5-lobed, usually glandular inside; lobes ovate, acute. Corolla rotate, 5-lobed: lobes imbricate to right, glabrous. Corona single (1-seriate), annular, fleshy, truncate, arising from the base of corolla. Stamens adnate to the base of corolla-tube; filaments connate to 10-winged column; anthers large, horny, shining, with membranous inflexed tips; pollinia clavate, solitary in each

anther cell, elongate, compressed, pendulous, without pellucid margin. Style slender, 5-winged at apex. Follicles lanceolate, tapering to a blunt apex. Seeds ovoid, flattened, winged, comose.

Two species; Indo-Malesia and China; one in M.P.

Holostemma ada-kodien Schult. in Roem. & Schult., Syst. Veg. 6: 95. 1820. *H. rheedei* Wallich, Pl. Asiat. Rar. 2: 51. 1831; Hook. f., Fl. Brit. India 4: 21. 1883. *H. annulare* (Roth) K. Schum. in Engl. & Prantl. Nat. Pflanzenfam. 4(2): 250. 1895. *Sarcostenma annulare* Roth, Nov. Pl. Sp. 178. 1821. *Chhirvel*.

Large climbers; stems glabrous, shining. Leaves oblong or ovate, 7.5-15.5 cm long, cuspidate at apex, cordate with deep sinus at base, glabrous above, puberulous or sparsely pubescent beneath. Flowers in umbelliform or subracemose cymes; peduncles and pedicels 2.5-5 cm long. Calyx-lobes ca 5 mm long. Corolla white or pale pink outside, crimson inside; lobes ovate or oblong, 7-15 mm long, obtuse. Follicles 10-12 cm long. Seeds ca 6 mm long, thin; coma 0.6-2.5 cm long.

In sal forest clearings. Hoshangabad, Raipur. *Fl. & Fr.*: June - Aug.

Roots are referred for the treatment of gonorrhoea, spermatorrhoea and diabetes.

10. HOYA R. Br.

Herbs or shrubs, often epiphytic, climbing or twining, pendulous, rarely erect, rooting at nodes. Leaves opposite, thick, fleshy or coriaceous. Flowers in sessile clusters or pedunculate, umbelliform cymes. Calyx small, with 5 glandular scales. Corolla rotate, fleshy or waxy, 5-lobed, often convex, spreading and reflexed, valvate in bud. Corona of 5, fleshy, membranous or horny lobes, adnate to the staminal column, horizontally spreading, inner margin produced in a spur or tooth. Staminal column short, arising from the base of corolla; anthers conniving over style apex, with a membranous appendage; pollinia solitary in each anther cell, flattened, sometimes thickened, erect, waxy. Style 5-angled at apex. Follicles slender, with thin pericarp, rarely turgid. Seeds ovoid or oblong, small, comose.

About 90 species; Indo-Malesia to pacific regions; one in M.P.

Hoya wightii Hook. *f.*, Fl. Brit. India 4: 59. 1883. *H. pendula* Wight & Arnott in Wight, Contr. Bot. India 36. 1834, *excl. syn., non* Wight, 1840-43.

Perennial, usually epiphytic, stout. Leaves elliptic-lanceolate, 5-10 cm long, acuminate at apex, acute to attenuate at base, revolute, glabrous. Flowers in lateral, many-flowered umbels, fragrant. Calyx 5-lobed. Corolla cream-coloured; lobes 7-9 mm long, pubescent inside on margin. Corona purple, truncate, stellate. Follicles solitary or paired, linear, tapering at apex. Seeds oblong; coma ca 5 cm long.

Rare. On steep hill slopes. Hoshangabad. *Fl. & Fr.*: May - Jan.

11. LEPTADENIA R. Br.

Herbs or shrubs, erect or twining, leafy or leafless; sap watery. Leaves opposite. Flowers in lateral, crowded, umbelliform cymes, small. Calyx 5-lobed. Corolla rotate to campanulate; lobes valvate, revolute at anthesis. Outer corona of 5, short, fleshy lobes, notched at apex; inner sometimes reduced to an inconspicuous fleshy ring at the base of short staminal column. Anthers inflexed over stigma, without membranous appendages; pollinia solitary in each anther cell, globose, erect, nearly sessile, pellucid at tips. Follicles ovoid-oblong or lanceolate. Seeds comose.

Four species; tropical regions of Old World; 2 in M.P.

- 1a. Plants erect, usually leafless; follicles tapering into straight beak ...1. *L. pyrotechnica*
- 1b. Plants twining, leafy; follicles tapering into curved beak ...2. *L. reticulata*

1. Leptadenia pyrotechnica (Forssk.) Decne. in Ann. Sci. Nat. ser. 2. 9: 269. 1838. *Cynanchum pyrotechnicum* Forssk., Fl. Aegypt.-Arab. 53. 1775. *Leptadenia spartium* Wight & Arnott in Wight, Contr. Bot. India 48. 1834; Hook. *f.*, Fl. Brit. India 4: 64. 1883.

Shrubs, erect, usually leafless, much branched; branches slender, rigid, terete, green, erect, straggling or drooping; young parts puberulous. Leaves usually absent, if present then only on young shoots, linear, 2.5-7.5 cm long, acute or acuminate at apex, fleshy, glabrous, sessile. Flowers in lateral, umbelliform cymes, very small; peduncles 2.5-4 mm long. Calyx

cupular, pubescent; lobes acute. Corolla greenish yellow, ca 3 mm long, deeply divided; lobes lanceolate, puberulous on both sides; tube short. Follicles solitary, lanceolate, 7.5-12.5 cm long, terete, tapering into long, slender, straight beak, glabrous. Seeds ovoid-lanceolate; coma ca 4 cm long.

Rare. In black sandy soil. Hoshangabad. *Fl. & Fr.*: Oct. - Feb.

2. *Leptadenia reticulata* (Retz.) Wight & Arnott in Wight, Contr. Bot. India 47, 1834; Hook. f., Fl. Brit. India 4: 63, 1883. *Cynanchum reticulatum* Retz., Observ. Bot. 2: 15, 1781. **Fig. 15.**

Herbs or shrubs, twining, leafy, much branched; branches hoary pubescent. Leaves ovate or lanceolate, 4-9 x 2.5-6 cm, acute or acuminate at apex, rounded to slightly cordate at base, pubescent; petioles 1.2-1.8 cm long. Flowers in lateral or subaxillary, many-flowered, umbelliform cymes; peduncles 1-7 cm long, often in pairs, puberulous. Calyx turbinate; lobes ovate-oblong. Corolla pale green or white, pubescent outside; lobes ovate or oblong, subobtuse, thick. Follicles usually solitary, 5-8.5 cm long, tapering into obtuse, curved beak, minutely white-dotted. Seeds ovoid or oblong, flat; coma ca 3 cm long.

In sal forests, mostly on red morrum or sandy soil, Bastar, Bilaspur, Hoshangabad, Raigarh, Raipur. *Fl. & Fr.*: July - April.

12. MARSDENIA R. Br.

Twining, woody. Leaves opposite. Flowers in terminal or axillary, sessile or shortly pedunculate, umbelliform or corymbose cymes. Calyx 5-lobed, usually with glands inside at the base. Corolla campanulate or urceolate; lobes overlapping to right in bud. Corona of 5, erect, fleshy lobes, adnate to the base of staminal column. Staminal column short; anthers inflexed, with membranous tip; pollinia solitary in each anther cell, erect, waxy. Style short, convex, conical or depressed at apex; stigma flat. Follicles paired, more usually solitary by abortion, tapering to a blunt, short beak. Seeds ovoid, flattened, with silky coma.

About 100 species; tropical and subtropical regions; one in M.P.

***Marsdenia tenacissima* (Roxb.) Moon**, Cat. Pl. Ceylon 21, 1824; Hook. f., Fl. Brit. India 4: 35, 1883. *Asclepias tenacissima* Roxb., Pl. Coromandel 3: 35, t. 240, 1815. - *Dudhiu-bela*.

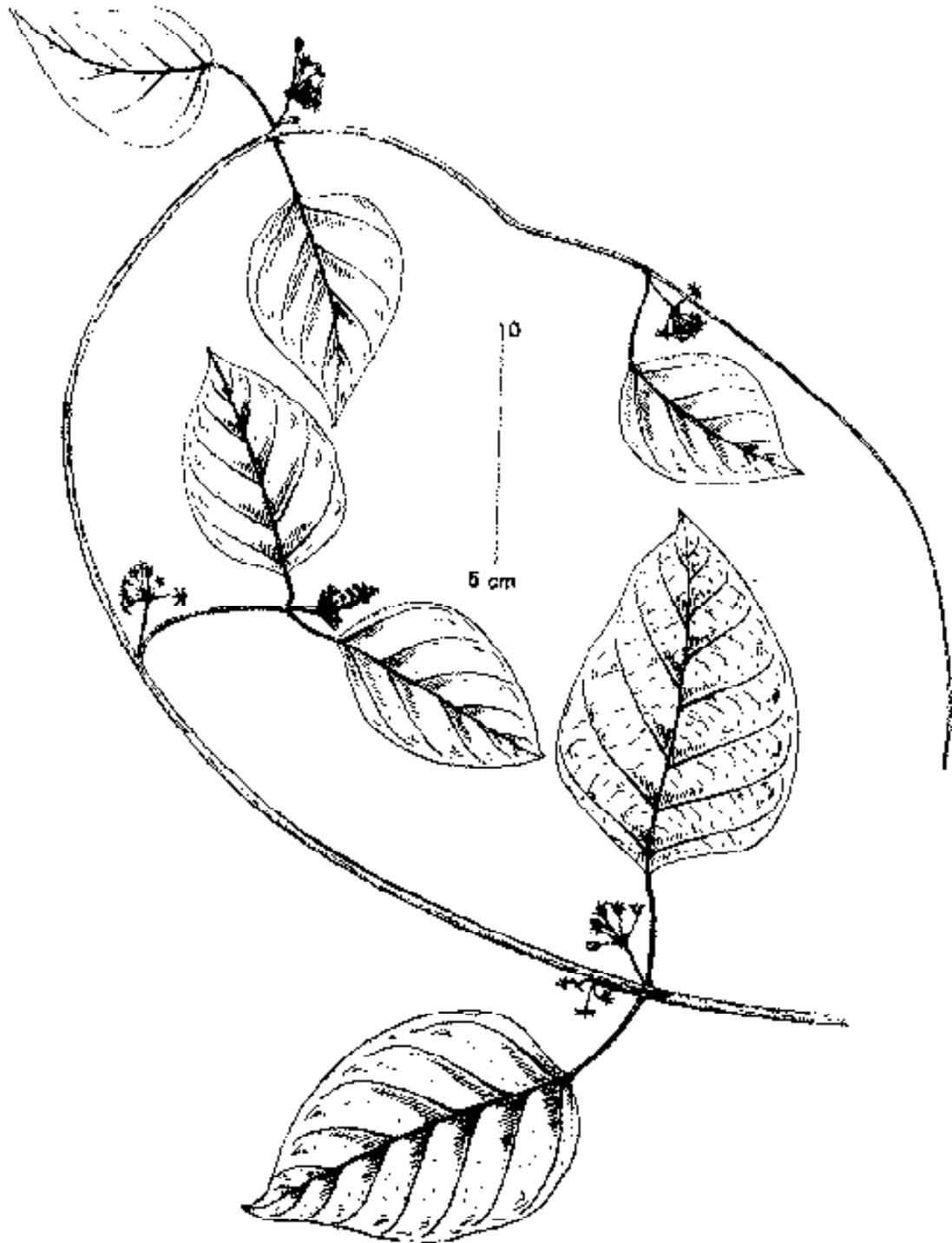


Fig. 15. *Leptadenia reticulata* (Retz.) Wight & Arnott

Twiners, stout; young parts and inflorescence densely softly pubescent; sap milky. Leaves broadly ovate to orbicular, 7.5-15 x 7.5-10 cm, abruptly acuminate at apex, cordate, truncate or rounded at base, glandular above; petioles 5-7 cm long, softly pubescent. Flowers in corymbose cymes; peduncles interpetiolar. Calyx deeply divided; lobes oblong or lanceolate, ca 3 mm long, acute. Corolla greenish yellow, ca 10 mm across, hairy outside; lobes oblong, shorter than tube, obtuse, spreading. Follicles ovoid-lanceolate, 10-15 cm long, wrinkled, horny. Seeds ovoid or oblong, ca 1.2 cm long.

In sal and mixed forests. Balaghat, Bilaspur, Chhatarpur, Raigarh, Raipur, Satna. *Fl. & Fr.*: April-June.

The plant is medicinal.

13. OXYSTEMMA R. Br.

Herbs or undershrubs, twining, glabrous. Leaves opposite, narrow. Flowers solitary or in lax, racemose or umbelliform cymes; pedicels filiform. Calyx small, 5-lobed, with a row of glands inside at the base; lobes acute. Corolla shallowly campanulate or rotate; lobes valvate below, imbricate above in bud; tube very short, with a ring of hairs inside. Corona double (2-seriate); outer of a densely pubescent annulus at the base of corolla-tube; inner of 5, erect, ovate or lanceolate scales, attached to the staminal column, 2-keeled inside. Stamens inserted at the base of corolla-tube; filaments short, connate; anthers erect, tipped with an inflexed membranous appendage; pollinia solitary in each anther cell, oblong, compressed, pendulous, waxy. Stigma depressed or subconvex, not exerted beyond the anthers. Follicles often solitary. Seeds comose.

Four species; tropical regions of Old World; one in M.P.

Oxystelma esculentum (L. f.) Smith in Rees, Cyclop. 25, No. 1, 1813; Hook. f., Fl. Brit. India 4: 17, 1883. *Periploca esculenta* L. f., Suppl. Pl. 168, 1782. *Sarcostemma esculentum* (L. f.) R. Holm in Ann. Miss. Bot. Gard. 37: 482, 1950, in *adnota*. *Oxystelma secamone auct. non* (L.) Karst., 1880-83; Santapau & Irani in Univ. Bombay Bot. Mem. 4: 67, 1960.
Dudhialata.

Twiners, slender, much branched; branches terete; sap milky. Leaves linear or lanceolate, 7-14 x 0.5-0.7 cm, acuminate at apex, rounded or

cordate at base; petioles slender, *ca* 1 cm long. Flowers in axillary, lax, racemose or umbelliform cymes; peduncles *ca* 6 cm long; bracts deciduous. Calyx cupular; lobes linear, *ca* 4 mm long, imbricate. Corolla white or pink with purple veins; lobes overlapping to right in bud, ciliate, acute, recurved. Follicles ovoid or oblong-lanceolate, 4-7 cm long. Seeds ovoid; coma silky, dull white.

Climber on roadside shrubs. Balaghat, Bilaspur, Hoshangabad, Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. Dec.

The plant is antiseptic as well as galactagogue. Fresh roots are prescribed in jaundice while leaves, flowers and fruits are eaten.

14. PENTATROPIS Wight & Arnott

Herbs or undershrubs, twining, slender. Leaves opposite, fleshy. Flowers in axillary, umbelliform cymes. Calyx 5-lobed, usually glandular inside. Corolla rotate, 5-lobed; lobes ovate-oblong, contorted in bud. Corona double (2-seriate); outer an entire annulus; inner of 5, laterally compressed scales, adnate to the back of anthers with an upcurved spur. Stamens 5; filaments connate; anthers with membranous, inflexed appendages; pollinia solitary in each anther cell, not compressed, pendulous, waxy. Style slender, 5-angled at apex, sharply cylindrical. Follicles lanceolate with narrow beak, glabrous. Seeds flattened, margined, comose.

Six species; subtropical regions of Old World and Australia; one in M.P.

Pentatropis nivalis (J.F. Gmelin) D.V. Field & J.R.I. Wood in Kew Bull. 38: 215. 1984. *Asclepias nivalis* J.F. Gmelin, Syst. Nat. ed. 13. 2(1): 444. 1791. *A. nivea* Forssk., Fl. Aegypt.-Arab. 51. 1775, *nom. illegit. non* L., 1753. *A. forskohlei* Roem. & Schult., Syst. Veg. 6: 85. 1820, *nom. illegit. superfl.* *Pentatropis spiralis* Decne. in Ann. Sci. Nat. ser. 2, 9: 327. 1838, *non Asclepias spiralis* Forssk., 1775; Hook. f. Fl. Brit. India 4: 19. 1883.

Undershrubs; roots tuberous. Leaves ovate, oblong or linear, 4.5-6.5 x 1.3-2 cm, acute or obtuse at apex, rounded or cordate at base; petioles slender, 2.5-8 mm long, puberulous when young. Flowers in 3-6-fid cymes;

pedicels 0.6-1.2 cm long, filiform. Calyx minute, deeply lobed, puberulous; lobes ovate, acuminate. Corolla greenish, divided nearly up to base; lobes 0.8-1.2 cm long, nearly acuminate, glabrous outside, puberulous inside. Follicles 5-7.5 cm long. Seeds ovoid, ca 4 mm long.

Rare. On top of the hills. Bastar. *Fl. & Fr.*: Feb.

Tubers are edible. Flowers are medicinal.

Notes: Field and Wood (*l.c.*) have clearly indicated that *A. spiralis* Forssk. is different from *P. spiralis* (Forssk.) Decne. *A. spiralis* has been described a shrub (no mention is made of the climbing habit) with obtuse leaves and solitary flowers. This description rules out the plant known as *P. spiralis* and it seems that Decaisne (1838) has mistakenly identified it with a climbing plant because of the epithet '*spiralis*'

15. PERGULARIA L.

Herbs or undershrubs, twining, pubescent. Leaves opposite. Flowers in lateral, corymbose to racemose, pedunculate cymes; pedicels slender. Calyx 5-lobed or partite, glandular. Corolla campanulate; lobes contorted in bud. Corona double (2-seriate); outer membranous, annular, 5-lobed, denticulate; inner of 5, erect, laterally compressed scales, spurred at base and produced above in long, free, often fimbriate tips, curved over style apex. Stamens 5, adnate to corolla-tube; filaments connate in the column; anther appendages membranous; pollinia solitary in each anther cell, pendulous, waxy, attached to corpuscula without caudicles. Style slender, slightly concave at tip. Follicles lanceolate, beaked, softly echinate, often recurved. Seeds comose.

About 35 species; Africa to India; one in M.P.

Pergularia daemia (Forssk.) Chiov. in Result. Sc. Miss. Stefan-Paoli, Somal. Ital. 1: 115. 1916. *Asclepias daemia* Forssk., Fl. Aegypt.-Arab. 51. 1775. *Cynanchum extensum* Jacq., Misc. Austriac. 2: 353. 1782. *Daemia extensa* (Jacq.) R. Br. in W.T. Aiton, Hortus Kew. ed. 2. 2: 76. 1811; Hook. f., Fl. Brit. India 4: 20. 1883. *Pergularia extensa* (Jacq.) N.E. Brown in Dyer, Fl. Cap. 4: 758. 1908. - *Dudhi-bel*, *Sadowani*.

Herbs, perennial, foetid; stems covered with short, stiff, spreading hairs. Leaves ovate, 5-10 cm long, acuminate at apex, deeply cordate at

base, ciliate on margin, membranous, sparsely hispid underneath; petioles 5-10 cm long. Flowers in corymbose to racemose cymes; peduncles 5-15 cm long, pubescent; pedicels 0.6-5 cm long. Calyx divided up to base, pubescent; segments ovate, ca 3 mm long, acute, ciliate. Corolla greenish white or yellowish with pink tinge at base; lobes broadly ovate, 10-14 mm long, reflexed, acute, ciliate. Corona white. Follicles reflexed, 5-7.5 cm long. Seeds ovoid, ca 6 mm long, densely pubescent.

Climber on roadside shrubs and trees. Balaghat, Bhopal, Bilaspur, Chhatarpur, Damoh, East Nimar, Indore, Mandla, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Shahdol, Shivpuri, Tikamgarh. *Fl. & Fr.*: May - July.

The plant has emetic properties.

16. SARCOSTEMMA R. Br.

Herbs or shrubs, trailing or twining; stems terete, green, jointed, fleshy, somewhat succulent. Leaves absent or very small, transparent. Flowers in terminal umbels or umbelliform cymes. Calyx small, 5-lobed, glandular or eglandular inside. Corolla rotate or campanulate, glabrous, deeply 5-lobed; lobes overlapping to right in bud. Corona double (2-seriate); outer short, annular, membranous, 5-10-lobed or crenate, adnate at the base of staminal column; inner of 5, erect, fleshy, compressed or rounded scales, adnate to the stamens above and more or less to the outer corona below, rarely absent. Stamens adnate to the base of corolla; anthers with membranous, inflexed appendages; pollinia solitary in each anther cell, slender, curved, pendulous, waxy. Style slender, 5-angled towards apex, rounded to conical or fusiform at the top. Follicles 3-angled, smooth. Seeds flat, margined, comose.

About 10 species; tropical and subtropical regions of Old World; 2 in M.P.

- 1a. Corolla-lobes 10-14 mm long; outer corona
5-lobed; follicles lanceolate ...1. *S. acidum*
- 1b. Corolla-lobes ca 6 mm long; outer corona
10-lobed; follicles oblong ...2. *S. intermedium*

1. *Sarcostemma acidum* (Roxb.) Voigt, Hort. Suburb. Calcutt. 542. [1845. *Asclepias acida* Roxb., Fl. Ind. 2: 3]. 1832. *Sarcostenma brevistigma*

Wight & Arnott in Wight, Contr. Bot. India 59. 1834; Hook. *f.*, Fl. Brit. India 4: 26. 1883. - *Somlata*.

Herbs, trailing, leafless; stems stout. Flowers in terminal, umbelliform cymes, waxy, fragrant. Corolla greenish white, campanulate; lobes 10-14 mm long, revolute. Outer corona 5-lobed; inner corona-scales with strongly inflexed apices. Follicles lanceolate, 10-12 cm long. Seeds glabrous.

Rare. Creeping on steep rocky slopes, Hoshangabad. *Fl. & Fr.*: July - Jan.

2. ***Sarcostemma intermedium*** Decne. in DC., Prodr. 8: 538. 1844; Hook. *f.*, Fl. Brit. India 4: 27. 1883. *S. viminalis* Wight & Arnott in Wight, Contr. Bot. India 59. 1834.

Shrubs, leafless. Flowers in terminal, up to 15-flowered umbels. Calyx-lobes ovate-lanceolate. Corolla greenish or yellowish white, divided nearly up to base; lobes oblong, ca 6 mm long, obtuse. Outer corona 10-lobed, waxy; inner corona-scales thin, oblong. Follicles oblong, up to 9 cm long. Seeds oblong, 4-5 mm long, winged; coma silky.

Rare. In rock crevices along river bank. Bastar (Roy and Dixit, 1987). *Fl. & Fr.*: July - Sept.

17. **TELOSMA** Coville

Undershrubs or shrubs, twining. Leaves opposite. Flowers in axillary, umbelliform cymes. Calyx 5-lobed, minutely glandular inside. Corolla hypocrateriform; lobes linear or oblong, overlapping to right in bud; tube widened at base, sometimes constricted at throat. Corona of 5 scales, adnate at the back of staminal column, erect, free above, sometimes 2-lamellate on the inner side, with a ligular appendage. Staminal column arising from near the base of corolla-tube; anthers with membranous tip; pollinia solitary in each anther cell, erect, waxy. Style short, capitate at apex. Follicles lanceolate, terete, turgid. Seeds concave, comose.

About 10 species; tropical regions of Old World; one in M.P.

Telosma pallida (Roxb.) Craib in Kew Bull. 1911: 418. 1911; Santapau & Irani in Univ. Bombay Bot. Mem. 4: 83. 1962. *Asclepias pallida* Roxb., Fl. Ind. 2: 48. 1832. *Pergularia pallida* Wight & Arnott in Wight, Contr. Bot. India 42. 1834; Hook. *f.*, Fl. Brit. India 4: 38. 1883.

Shrubs; bark of old stems corky; branches softly pubescent when young. Leaves ovate, 5-12.5 cm long, acuminate at apex, cordate at base, membranous, glabrous or pubescent when young; petioles 1.2-2 cm long, pubescent. Flowers in axillary, umbelliform cymes; peduncles interpetiolar, pubescent; pedicels ca 1.2 cm long. Calyx ca 5 mm long, pubescent; lobes oblong or lanceolate. Corolla greenish yellow; lobes glabrous; tube ca 6 mm long. Follicles 7.5-10 cm long, tapering to a blunt point, longitudinally ribbed, glabrous. Seeds ovoid, flat, pale brown, broadly margined.

Climber on *Acacia catechu* and *Ziziphus* sp. Chhatarput, Damoh, Hoshangabad, Seoni, Shivpuri. *Fl. & Fr.*: May - July.

18. TYLOPHORA R. Br.

Herbs or undershrubs, erect, creeping or twining; sap watery. Leaves opposite. Flowers in lateral or terminal, umbelliform or paniculate cymes. Calyx 5-lobed. Corolla rotate, 5-lobed; lobes broad, overlapping to right. Corona single (1-seriate) of 5, fleshy lobes, adnate wholly or in part to the staminal column. Staminal column arising from the base of corolla; anthers erect, short, with small, inflexed, membranous appendages; pollinia solitary in each anther cell, minute, usually horizontal; caudicles short, very slender. Style 5-lobed at apex, flattened or convex, rarely exserted. Follicles fusiform. Seeds ovoid, flattened, margined, comose.

About 50 species; tropical regions of Old World and S. Africa; 3 in M.P.

- 1a. Plants erect; leaves ovate or lanceolate, up to 4 cm long:
- 2a. Calyx-lobes eglandular inside; corolla-lobes lanceolate; corona-lobes rounded ...1. *T. fasciculata*
- 2b. Calyx-lobes glandular inside; corolla-lobes ovate; corona-lobes ovoid ...2. *T. macrantha*
- 1b. Plants creeping; leaves orbicular or rotundate, more than 4 cm long ...3. *T. rotundifolia*

1. *Tylophora fasciculata* Buch.-Ham. ex Wight, Contr. Bot. India 50. 1834; Hook. f., Fl. Brit. India 4: 40. 1883.

Undershrubs, erect, slender; roots thick, fascicled; upper branches often twining. Leaves ovate or lanceolate, 1-4 cm long, acute or shortly

acuminate at apex, rounded or cordate at base, coriaceous, glabrous above and puberulous on the veins beneath; petioles 6-12 mm long. Flowers in lateral, umbelliform or paniculate cymes; peduncles 2-3 mm long, pubescent; pedicels 5-10 mm long, pubescent. Calyx-lobes deltoid, ca 1.2 cm long, revolute at anthesis, sparsely pilose. Corolla purplish brown; lobes lanceolate, 2.5-3 mm long, pilose inside. Corona-lobes rounded, with a short cusp, appressed to the gynostegium. Follicles usually solitary, ovoid, 3.5-5 cm long, acute, longitudinally seriate, glabrous.

Rare. As forest undergrowth. Hoshangabad. *Fl. & Fr.*: April - May.

2. *Tylophora macrantha* Hook. f., Fl. Brit. India 4: 40. 1883.

Herbs, perennial, erect, slender: stems simple or branched, pubescent. Leaves ovate, 2-3 x 1-2 cm, acute at apex, glabrous. Flowers in simple or subcompound, pedunculate cymes. Calyx-lobes ovate or lanceolate, glandular inside. Corolla-lobes ovate, ca 2 mm long. Corona-lobes ovoid. Follicles paired, usually mucronate, smooth.

Rare. In wastelands. Raipur. *Fl. & Fr.*: May - Sept.

3. *Tylophora rotundifolia* Buch.-Ham. ex Wight, Contr. Bot. India 50. 1834; Hook. f., Fl. Brit. India 4: 43. 1883.

Herbs, perennial, creeping; stems pubescent. Leaves closely appressed to ground, rotundate or orbicular, 4-8 cm across, rounded to obtuse or sometimes mucronate at apex, rounded to slightly cordate at base, pilose on margins and veins beneath; petioles 6-12 mm long. Flowers in lateral or terminal, umbelliform or paniculate cymes; peduncles ca 1.5 cm long, pilose; pedicels filiform, 2-5 cm long, pilose. Calyx-lobes lanceolate, spreading, pilose. Corolla pale greenish purple to greenish yellow; lobes 3.5-4.5 mm long, glabrous or puberulous inside. Corona-lobes rounded, with short apical cusp. Follicles broadly ovoid, ca 5 cm long.

In sal and teak forests. Bilaspur, Hoshangabad, Raipur. *Fl. & Fr.*: May - Sept.

19. WATTAKAKA Hassk.

Shrubs, twining, glabrous or hoary tomentose; bark of old branches often lenticellate and pustular; sap watery, milky in follicles. Leaves

glabrous or hoary tomentose, petiolate. Flowers in lateral, pedunculate, umbelliform cymes. Calyx-lobes coriaceous. Corolla rotate; lobes imbricate to right, ciliate on margin. Corona single (1-seriate) of 5, fleshy, truncate lobes or scales, attached to the upper part of staminal column. Staminal column arising from near the base of corolla; anthers with membranous tip; pollinia solitary in each anther cell, erect, waxy, without pellucid margin. Follicles thick, hard, often ribbed when dry.

Three species; subtropical regions of Old World; one in M.P.

Wattakaka volubilis (L. f.) Stapf in Curtis, Bot. Mag. 148. sub. t. 8976. 1923. *Asclepias volubilis* L. f., Suppl. Pl. 170. 1782. *Hoya viridiflora* R. Br. in Mem. Werner. Soc. 1: 27. 1811. *Dregea volubilis* (L. f.) Benth. ex Hook. f., Fl. Brit. India 4: 46. 1883. *incl. var. lacuna*. *Marsdenia volubilis* (L. f.) Cooke, Fl. Bombay 2: 166. 1904. - *Nakchhikni*.

Large climbers, woody. Leaves ovate, 10-14 x 5-10 cm, acuminate at apex, rounded to cordate at base, hoary with curled pubescence. Flowers in axillary, drooping, densely flowered, umbelliform cymes; peduncles 2.5-7 cm long. Calyx-lobes ovate-lanceolate. Corolla pale green, cupular; lobes ovate, erect. Follicles usually paired, divaricate, broadly lanceolate, 7-10 cm long, reddish brown, tapering to a blunt point, longitudinally ribbed, velvety when young. Seeds broadly ovate with white margin; coma ca 3.7 cm long, white.

Climber on bushes along roads and in scrub forests. Bilaspur, Durg, Gwalior, Hoshangabad, Indore, Raigarh, Raipur, Shivpuri. *Fl. & Fr.*: March - Nov.

The plant is considered as tonic. Leaves and flowers are cooked and eaten. Stem fibres are used for ropes and fishing nets. Leaves are applied to boils and abscesses.

92. LOGANIACEAE

(R.C. Srivastava)

About 29 genera and 600 species; tropical, subtropical and temperate regions; 4 genera and 6 species in M.P.

- 1a. Herbs:
- 2a. Flowers 4-merous, solitary, fascicled or in umbels ...1. *Mitrasacme*
- 2b. Flowers 5-merous, in dichotomous or trichotomous cymes or cincinni:
- 3a. Leaves opposite; corolla urceolate; capsules 2-horned ...2. *Mitreola*
- 3b. Leaves in a (pseudo-)whorl of 4; corolla tubular or hypocrateriform; capsules not horned ...3. *Spigelia*
- 1b. Shrubs or trees ...4. *Strychnos*

1. MITRASACME Labill.

Herbs, annual. Leaves opposite or ternate; petioles joined by a membranous sheath. Flowers terminal or axillary, solitary, fascicled or in umbels, 4-merous. Calyx 4-lobed. Corolla campanulate; lobes 4, valvate. Stamens 4, free, included, inserted near the base of corolla-tube. Ovary 2-locular; ovules many in each locule; styles 2, connate at tip; stigma capitate or 2-lobed. Fruit a capsule, globose or subglobose, truncate or 2-horned at tip, many-seeded. Seeds ellipsoid or ovoid.

About 40 species; Indo-Malesia, E. Asia, Australia and New Zealand; 2 in M.P.

- 1a. Stems nearly glabrous; flowers solitary; pedicels scaberulous ...1. *M. indica*
- 1b. Stems patently glandular hairy below; flowers in umbels; pedicels glabrous ...2. *M. pygmaea* var. *malaccensis*

1. *Mitrasacme indica* Wight, Icon. Pl. Ind. Orient. t. 1601. 1850. *M. alsinoides* auct. non R. Br., 1810: C.B. Clarke in Hook. f., Fl. Brit. India 4: 80. 1883.

Herbs, ca 15 cm high; stems narrowly winged. Leaves lanceolate or ovate, 3-9 x 1-1.5 mm, 1-nerved. Flowers in upper leaf axils, solitary. Calyx-lobes lanceolate. Corolla white, bearded on mouth. Capsules subglobose, ca 2 mm across. Seeds angular-ovoid, coarsely reticulate.

In mixed forests. Balaghat, Raigarh, Rajnandgaon, Sagar. Fl. & Fr.: Sept. - Jan.

2. *Mitrasacme pygmaea* R. Br., var. *malaccensis* (Wight) Hara in J. Jap. Bot. 30: 24. 1955. *M. malaccensis* Wight, Icon. Pl. Ind. Orient. 1601. 1850. *M. polymorpha auct. non* R. Br., 1810: C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 80. 1883, *p.p.*

Herbs, hispid. Leaves ovate, 5-9 x 2-3 mm, serrulate, 1-nerved. Flowers in terminal or axillary umbels. Calyx *ca* 0.6 mm long; lobes acute. Corolla-lobes white, rounded; tube *ca* 3.5 mm long. Capsules globose, *ca* 1.5 mm across, truncate above, crowned by styles. Seeds ellipsoid, punctate.

Rare. Balaghat, Raigarh. *Fl. & Fr.*: Sept. Oct.

2. MITREOLA L.

Herbs. Leaves opposite, membranous; stipules membranous, small. Flowers in dichotomous or trichotomous, terminal or axillary, pedunculate cymes, often unilateral on ultimate cyme branches. Calyx-lobes 5, linear or lanceolate. Corolla urceolate; lobes 5, small, valvate. Stamens 5, included. Ovary 2-locular; styles 2, short; stigmas 2, hairy. Capsules obovoid, laterally compressed, truncate or 2-horned. Seeds minute, globose or ellipsoid.

About 6 species; tropical regions; one in M.P.

***Mitreola petiolata* (J.F. Gmelin) Torr. & A. Gray, Fl. N. Amer. 2: 45. 1841. *Cynoctonum petiolatum* J.F. Gmelin, Syst. Nat. 2: 443. 1791. *C. mitreola* (L.) Britton in Mem. Torrey Bot. Club 5: 258. 1894. *Ophiorrhiza mitreola* L., Sp. Pl. 150. 1753. *Mitreola oldenlandioides* Wallich ex DC., Prodr. 9: 9. 1845; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 79. 1883. *M. paniculata* Wallich ex G. Don, Gen. Hist. 4: 171. 1837-1838.**

Fig. 16.

Herbs, annual, erect, 10-40 cm high. Leaves ovate or ovate-oblong, 3-7 x 1.5-3 cm, narrowed at both ends, membranous, glabrous. Flowers in terminal and axillary, helicoid cymes, shortly pedicellate or sessile; bracts narrowly deltoid. Calyx-lobes linear, broadly membranous-margined. Corolla white, 1-2 mm long; lobes pubescent inside at base. Capsules 2-horned. Seeds ellipsoid, smooth.



Fig. 16. *Mitreola petiolata* (J.F. Gmelin) Torr. & A. Gray

Common along drains in moist shady places. Balaghat, Bhopal, Bilaspur, Hoshangabad, Panna, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. Oct.

3. SPIGELIA L.

Herbs, annual or perennial. Leaves in (pseudo-) whorls at the base of inflorescence, connected by interpetiolar stipules or sheaths at base, sessile or shortly petiolate. Flowers in terminal and/or axillary cincinni. 5-merous, sessile. Calyx deeply 5-partite. Corolla tubular or hypocrateriform; lobes 5, valvate in bud, shorter than tube. Stamens 5, included; anthers dorsifixed. Ovary superior, 2-locular; ovules many. Capsules 2-lobed, 2-celled. Seeds verrucose.

About 50 species; tropical and subtropical America including one naturalized in Old World; one in M.P.

Spigelia anthelmia L., Sp. Pl. 149. 1753; Oommachan & Shrivastava in J. Bombay Nat. Hist. Soc. 84: 730. 1987. **Fig. 17.**

Herbs, annual, erect, 50-70 cm high; stems terete, glabrous. Leaves in a (pseudo-) whorl of 4, ovate-oblong to ovate-lanceolate, 3-10 x 1-3.5 cm, acuminate at apex, cuneate and often decurrent at base, entire, scabrous above, glabrous beneath; stipules broadly deltoid. Flowers in cincinni, subsessile; cincinni in the axil of upper whorled leaves, appearing terminal; bracts lanceolate. Calyx-segments almost free up to base, ovate-lanceolate. Corolla hypocrateriform, purplish or white to red, glabrous. Capsules 4-5 x 5-6 mm, squamulate-tuberculate. Seeds ovoid or obliquely ellipsoid.

Rare. As weed in wastelands and along roadsides in forest area. Jabalpur. *Fl. & Fr.*: Aug. Sept.

Root decoction is referred as vermifuge.

4. STRYCHNOS L.

Shrubs or trees, deciduous. Leaves coriaceous or chartaceous, palmately 3-5-nerved from base. Flowers in terminal or axillary cymes; bracts lanceolate. Calyx cupular; lobes subequal, imbricate, coriaceous, acute. Corolla hypocrateriform; lobes oblong, reflexed, thin-fleshy; tube villous inside. Stamens 4 or 5, adnate to corolla-tube, subexserted; filaments short; anthers linear-oblong. Ovary conical to oblong-globose,



Fig. 17. *Spigelia anthelmia* L.

2-locular; ovules many in each locule; stigma capitate or faintly 2-lobed. Fruit a berry, globose, thick or thin-walled. Seeds embedded in fleshy pulp.

About 190 species; tropical and subtropical regions; 2 in M.P.

- 1a. Petioles more than 6 mm long; corolla greenish;
berries orange, 3-5 cm across ...1. *S. nux-vomica*
- 1b. Petioles less than 5 mm long; corolla whitish;
berries dark blue, ca 1.5 cm across ...2. *S. potatorum*

1. *Strychnos nux-vomica* L., Sp. Pl. 189, 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 90, 1883. - *Kuchla*.

Trees, up to 20 m high; branches sometimes with axillary thorns. Leaves broadly ovate or elliptic, 6-10 x 5-7 cm, acuminate at apex, attenuate at base, glabrous. Flowers in many-flowered, thinly tomentose cymes borne on short axillary branchlets. Calyx-lobes ovate, ca 2 mm long, tomentose. Corolla greenish, ca 8 mm across. Stamens 5. Ovary hairy; stigma capitate. Berries 3-5 cm across, orange, thick-shelled. Seeds lenticular, orbicular or ellipsoid.

Rare. Raipur. *Fl. & Fr.*: March - Jan.

The plant is strongly poisonous and medicinal. The drug consists of dried ripe seeds, used as tonic, stimulant and febrifuge. Bark decoction is referred to treat epilepsy while poultice of leaves for skin diseases, swelling and wounds.

2. *Strychnos potatorum* L. f., Suppl. Pl. 148, 1782; C.B. Clarke in Hook. f., Fl. Brit. India 4: 90, 1883. - *Kaya, Nirmali*.

Shrubs or small trees ca 3 m high; stems covered with black, thick, rectangular pieces of bark. Leaves elliptic or ovate, 5-13 x 3-7 cm, acute at both ends, chartaceous. Flowers in dense, glabrous cymes, fragrant. Calyx ca 1.5 mm long, puberulous. Corolla whitish, ca 4 mm across. Stamens 5. Ovary glabrous; stigma obscurely 2-lobed. Berries ca 1.5 cm across, dark blue, thin-walled. Seeds lenticular.

In mixed forests. Hoshangabad, Raipur, Seoni. *Fl. & Fr.*: April - July.

Seeds are tonic, demulcent and emetic, used in diarrhoea, diabetes and gonorrhoea. Seed paste clears the turbid water.

93. BUDDLEJACEAE

(R.C. Srivastava)

About 10 genera and 150 species; tropical and warm temperate regions; one genus with 2 species in M.P.

BUDDLEJA L.

Shrubs, erect or straggling. Leaves simple, opposite, entire, serrate, serrulate or dentate. Flowers in terminal and/or axillary, dense, thyrsoid panicles; bracts and bracteoles scaly or lanceolate. Calyx-lobes 4, valvate, densely tomentose. Corolla-lobes 4, spreading, imbricate. Stamens 4, inserted on corolla-tube, exserted. Ovary globose-oblong, pubescent or glabrous; stigma raised on a style, capitate or 2-fid. Fruit a capsule, septicidally 2-valved.

About 100 species; subtropical regions especially E. Asia; 2 in M.P.

- 1a. Leaves acuminate or cuspidate at apex; corolla white or pale violet; ovary glabrous ...1. *B. asiatica*
- 1b. Leaves obtuse or acute at apex; corolla orange; ovary pubescent ...2. *B. madagascariensis*

1. *Buddleja asiatica* Lour., Fl. Cochinch. 72. 1790; C.B. Clarke in Hook. f., Fl. Brit. India 4: 82. 1883. *B. discolor* Roth, Nov. Pl. Sp. 83. 1821. - *Neemda*. Fig. 18.

Shrubs, straggling, ca 1.5 m high; branches densely hairy when young. Leaves narrowly-oblong or ovate-lanceolate, 5-13 x 1-2 cm, acuminate or cuspidate at apex, acute at base, serrate, dentate or subentire, white tomentose beneath. Flowers in terminal or axillary, densely tomentose, spiciform panicles. Calyx campanulate. Corolla white or pale violet, ca 2 mm across; tube ca 2 mm long, stellate hairy outside. Capsules ovoid or oblong, 3 x 2 mm, brown, reflexed. Seeds ellipsoid.

Common in disturbed or secondary vegetation, near streams and rocky slopes. Bastar, Bilaspur, Chhatarpur, Hoshangabad, Raigarh, Raipur, Rewa, Satna, Shahdol, Sidhi, Surguja. Fl. & Fr.: Feb. - June.

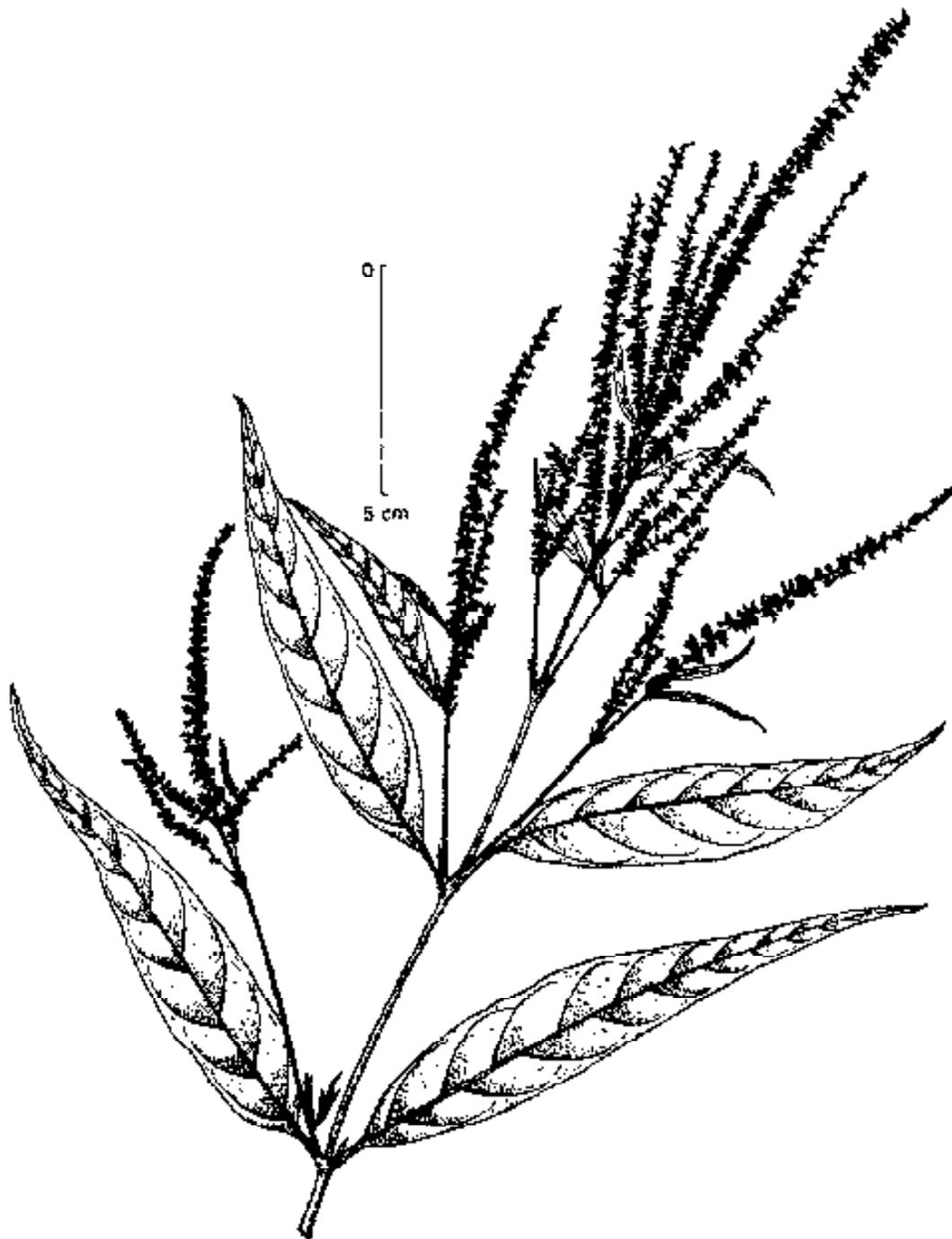


Fig. 18. *Buddleja asiatica* Lour.

Roots are used for the preparation of a fermented liquor. Flowers are eaten.

2. *Buddleja madagascariensis* Lam., Encycl. 1: 513, 1785. - *Bull tree*.

Shrubs, straggling. Leaves ovate-oblong, 6-13 x 1-3 cm, obtuse or acute at apex, entire or serrulate, glabrous above, densely white tomentose beneath. Flowers in terminal panicles, subsessile. Calyx campanulate, densely tomentose outside. Corolla orange; lobes rounded. Capsules ovoid, enclosed within the calyx, white at first, purple-blue at maturity, pubescent. Seeds ellipsoid.

In mixed forests. Hoshangabad. *Fl. & Fr.*: Jan. March.

Leaves are used to treat bronchitis, cough and asthma. Flowers yield a dye.

94. GENTIANACEAE

(R.C. Srivastava)

About 74 genera and 1200 species; cosmopolitan especially temperate and subtropical regions; 6 genera and 17 species in M.P.

1a. Flowers zygomorphic; only one stamen perfect:

2a. Calyx tubular; corolla pink or white ...1. *Canscora*

2b. Calyx campanulate; corolla greenish yellow or white ...5. *Hoppea*

1b. Flowers actinomorphic; all stamens perfect:

3a. Corolla-lobes glandular inside at base ...6. *Swertia*

3b. Corolla-lobes eglandular:

4a. Ovary 2-locular; capsules ovoid, globose or subglobose ...4. *Exacum*

4b. Ovary 1-locular; capsules linear, oblong or ellipsoid:

- 5a. Flowers pedicellate, in dichotomous
cymes; corolla pink or purple ...2. *Centaurium*
- 5b. Flowers sessile, in clusters; corolla white ...3. *Enicostema*

1. CANSCORA Lam.

Herbs. Leaves sessile or subsessile. Flowers solitary or in cymes; zygomorphic, 4-merous; bracts sometimes foliaceous. Calyx sometimes winged on back. Corolla-lobes unequal, imbricate. Filaments unequal; one produced into a clavate tip bearing the anther on a filamentella. Style simple, linear; stigma globose, 2-lobed. Capsules septicidally 2-valved or dehiscing irregularly, many-seeded.

About 30 species; tropical regions of Old World; 4 in M.P.

- 1a. Stems 4-winged:
- 2a. Flowers pedicellate:
- 3a. Pedicels winged; corolla white ...2. *C. decussata*
- 3b. Pedicels not winged; corolla pink ...1. *C. decurrens*
- 2b. Flowers sessile ...4. *C. heteroclita*
- 1b. Stems not winged but angular ...3. *C. diffusa*

1. *Canscora decurrens* Dalzell in Hook., J. Bot. Kew Gard. Misc. 2: 136. 1850; C.B. Clarke in Hook. f., Fl. Brit. India 4: 103. 1883; S. Garg, Indian Gent. 1. 1988.

Herbs, annual, erect, ca 30 cm high; stems winged. Leaves elliptic, 1-3 x 0.6-1 cm, acute at both ends, membranous, sessile; upper leaves much smaller than the lower ones. Flowers in few-flowered cymes; pedicels and calyx not winged. Calyx-teeth 4, lanceolate. Corolla pink. Capsules cylindrical, 2-valved. Seeds reticulate.

Endemic to India. In moist places along water courses. Chhatarpur, Damoh, Hoshangabad. *Fl. & Fr.*: Oct. - Nov.

2. *Canscora decussata* (Roxb.) Roem. & Schult., Syst. Veg. 1: 229. 1822; C.B. Clarke in Hook. f., Fl. Brit. India 4: 104. 1883; S. Garg, Indian

Gent. 1. 1988. *Pladera decussata* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 418. 1820 & Fl. Ind. 1: 402. 1832. - *Sankhabati, Sankhaphuli*.

Herbs, annual, erect, sparingly branched, up to 30 cm high; stems glabrous. Leaves ovate-lanceolate, 1.5-3 x 0.6-1.2 cm, acute at apex, subcordate at base, minutely ciliate, sessile. Flowers in leafy cymes, *ca* 1.5 cm long. Calyx-lobes ovate-lanceolate, *ca* 2 mm long, acute. Corolla white; lobes oblong, up to 1.2 cm long; tube *ca* 1 cm long. Capsules linear-oblong, 6-8 mm long.

Along roadsides in open forests. Bilaspur, Hoshangabad, Raigarh, Rajnandgaon. *Fl. & Fr.*: Sept. - Oct.

Plants are of medicinal use.

3. *Canscora diffusa* (Vahl) R. Br. ex Roem. & Schult., Syst. Veg. 3: 301. 1818; C.B. Clarke in Hook. f., Fl. Brit. India 4: 103. 1883; S. Garg, Indian Gent. 1. 1988. *Gentiana diffusa* Vahl, Symb. Bot. 3: 47. 1794. - *Agva, Bhuin-neem*.

Herbs, annual, erect, *ca* 20 cm high; stems 4-angled, not winged. Leaves ovate or elliptic, 1-3.5 x 0.5-1.5 cm, narrowed at both ends, sessile. Flowers in paniculate cymes; pedicels subterete or 4-angled. 15-20 mm long. Corolla pink; tube as long as calyx. One stamen longer than the other three. Capsules oblong, 10-12 mm long.

In shady places along drains and streams. Bilaspur, Chhatarpur, Damoh, Hoshangabad, Raigarh, Raipur. *Fl. & Fr.*: Oct. - May.

The plant is referred for the treatment of insanity, epilepsy and nervine debility.

4. *Canscora heteroclita* (L.) Gilg in Engl. & Prantl, Nat. Pflanzenfam. 4(2): 76. 1875; S. Garg, Indian Gent. 2. 1988. *Gentiana heteroclita* L., Mant. Pl. 560. 1771. *Canscora sessiliflora* Roem. & Schult., Syst. Veg. Mant. 3. 230. 1827; C.B. Clarke in Hook. f., Fl. Brit. India 4: 104. 1883.

Herbs, annual, profusely branched, 20-25 cm high; stems 4-winged. Leaves in rosette; lower ones broadly ovate, 0.6-1.2 x 0.5-1 cm; upper

ones linear-lanceolate, smaller, ca 0.3 x 0.1 cm. Flowers in dichasial cymes; bracts linear-lanceolate. Calyx-lobes linear-lanceolate. Corolla pinkish red. Capsules oblong, compressed, brownish. Seeds rounded or rhomboid.

In moist places. Bastar (Kumar, 1993), Jabalpur (Oommachan and Shrivastava, 1996). *Fl. & Fr.*: Oct. - March.

2. CENTAURIUM J. Hill.

Herbs, erect; stems obscurely winged. Leaves both radical and cauline; radical leaves rosulate, obtuse to subobtuse at apex; cauline ones acute to subobtuse at apex, attenuated at base. Flowers in lax or compact, dichasial cymes, actinomorphic, usually 5-merous, pedicellate. Calyx deeply partite. Corolla rotate, constricted near mouth; lobes subequal. Stamens 5, inserted in the upper half of corolla-tube; anthers twisting spirally after dehiscence. Ovary linear, 1-locular; style linear; stigma 2-lobed. Capsules 2-valved, many-seeded.

About 30 species; Northern hemisphere; one in M.P.

Centaurium meyeri (Bunge) Druce in Rep. Bot. Exch. Club Brit. Isles 1916: 613. 1919; S. Garg, Indian Gent. 3. 1988. *Erythraea meyeri* Bunge in Ledeb. Fl. Alt. 1: 220. 1829; C.B. Clarke in Hook. f., Fl. Brit. India 4: 102. 1883. *E. roxburghii* G. Don, Gen. Hist. 4: 206. 1837-1838; C.B. Clarke in Hook. f., Fl. Brit. India 4: 102. 1883. *Centaurium centauroides* (Roxb.) R.S. Rao & Hemadri in J. Bombay Nat. Hist. Soc. 67: 357. 1970. *Chironia centauroides* Roxb., Fl. Ind. 1: 584. 1832.

Herbs, erect, branched from base. Radical leaves lanceolate-oblong, obtuse at apex; upper cauline ones linear, 1-4 x 0.5-1 cm, acute or subobtuse at apex, glabrous. Flowers in dichotomous cymes. Calyx 5-6 mm long; segments linear, shorter than corolla-tube. Corolla pink or purple, ca 1 cm long; lobes lanceolate, 3-4 mm long, obtuse. Capsules linear-oblong, as long as calyx.

In harvested paddy fields. Chhatarpur, Raipur. *Fl. & Fr.*: Aug. - Sept.

3. ENICOSTEMA Blume, *nom. cons.*

Herbs; stems terete or 4-angled. Leaves opposite, subsessile to sessile. Flowers in axillary, verticillate, sessile clusters. Calyx tubular to narrowly

campanulate, 5-lobed. Corolla tubular below, narrowly infundibuliform above, nearly twice the length of calyx; lobes 5; tube cylindrical, contracted at mouth. Stamens 5, inserted in the corolla-tube below sinus; filaments filiform with double-hooded scale at base. Ovary globose, sessile, 1-locular; style slender, declinate; stigma globose. Capsules dehiscent by 2 valves.

Three species; West Indies, Central America, Africa, Madagascar, India, Indonesia and Lesser Sunda Islands; one in M.P.

Enicostema axillare (Lam.) A. Raynal in *Adansonia* 9: 75. 1969; S. Garg, *Indian Gent.* 5. 1988. *Gentiana axillaris* Lam., *Tabl. Encycl.* 1(2): 487. 1793. *G. verticillata* L., *Syst. Nat.* ed. 12. 200. 1767, *p.p.*, *non* L., 1760. *Exacum hyssopifolium* Willd., *Sp. Pl.* 1: 640. 1798. *Enicostema littorale auct. non* Blume, 1826; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 101. 1883. *E. verticillatum* (L.) Engl., *Pflanzenw. Ost-Afrikas* C. 313. 1895, *non* Baill., 1891. *E. hyssopifolium* (Willd.) Verdoorn in *Bothalia* 7: 462. 1961.

Herbs, perennial; branches erect or ascending. Leaves linear or linear-oblong, 2-6 x 0.4-1.2 cm, 3-nerved. Flowers in axillary, sessile clusters. Calyx deeply lobed; lobes narrowly oblong, obtuse, keeled. Corolla white, infundibuliform; lobes 5, elliptic, ca 2.5 mm long, spreading. Capsules ellipsoid, ca 3 mm long, glabrous. Seeds subglobose, reticulate.

Along ponds. Bilaspur, Chhatarpur, Damoh, Raipur. *Fl. & Fr.*: Aug. - Oct.

4. EXACUM L.

Herbs, annual or perennial. Leaves opposite, sessile or shortly petiolate. Flowers in dichasial cymes, rarely solitary, actinomorphic, 4-5-merous. Calyx cupular; lobes flat or winged on the back. Corolla rotate; lobes contorted, spreading; tube short. Stamens inserted on corolla-throat, exserted; filaments short; anthers dehiscent by apical pore. Ovary 2-locular; ovules many; style erect or curved; stigma subcapitate. Capsules globose or subglobose, septically 2-valved, many-seeded.

About 25 species; tropical regions of Old World; 6 in M.P.

- 1a. Plants more than 30 cm high; flowers 2-2.5 cm across:
- 2a. Leaves broadly ovate ...4. *E. perrottetii*
- 2b. Leaves elliptic-oblong or lanceolate:
- 3a. Leaves up to 2 cm broad; corolla white with dark purple tip; lobes broadly ovate ...1. *E. bicolor*
- 3b. Leaves more than 2 cm broad; corolla blue or bluish purple, rarely white; lobes lanceolate ...6. *E. tetragonum*
- 1b. Plants up to 30 cm high; flowers up to 1.3 cm across:
- 4a. Leaves ovate-elliptic, petiolate ...2. *E. carinatum*
- 4b. Leaves linear or lanceolate, sessile:
- 5a. Cymes many-flowered; pedicels stout; corolla-lobes elliptic, acute ...3. *E. pedunculatum*
- 5b. Cymes few-flowered; pedicels filiform; corolla-lobes broadly elliptic or suborbicular, obtuse ...5. *E. pumilum*

1. **Exacum bicolor** Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 413. 1820; C.B. Clarke in Hook. f., Fl. Brit. India 4: 96. 1883. - *Baracharayata*.

Herbs, erect, ca 50 cm high. Leaves elliptic-oblong, 3.5-7 x 1-2 cm, acute at apex, sessile. Flowers solitary or in densely many-flowered cymes. Calyx 4-lobed, winged on the back. Corolla white with dark purple tip, showy; lobes 4, broadly ovate-acute.

In moist places. Hoshangabad, Mandla. Fl. & Fr.: Sept. - Jan.

2. **Exacum carinatum** Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 415. 1820. *E. petiolare* Griseb. in DC., Prodr. 9: 46. 1845; C.B. Clarke in Hook. f., Fl. Brit. India 4: 98. 1883; S. Garg, Indian Gent. 7. 1988. *E. pedunculatum* L. var. *petiolare* Trimen, Handb. Fl. Ceylon 3: 182. 1893.

Herbs, erect, slender, up to 30 cm high; stems 4-angled. Leaves ovate-elliptic, 1.5-6 x 1.3-3 cm, acute at both ends, petiolate, 3-nerved. Flowers in axillary and terminal, few-flowered cymes. Calyx 4-lobed. Corolla pale blue; lobes, lanceolate. Capsules subglobose.

Along drains or on hill slopes in moist places. Balaghat, Bilaspur, Hoshangabad, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. - Oct.

3. *Exacum pedunculatum* L., Sp. Pl. 112. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 97. 1883; S. Garg, Indian Gent. 7. 1988. *E. pedunculare* Arnott in Ann. Sci. Nat. ser. 2. 11: 176. 1836. **Fig. 19.**

Herbs, erect, up to 25 cm high; stems 4-angled. Leaves lanceolate, 1.5-4.5 x 0.4-1 cm, obtuse at apex, tapering at base, usually 5-nerved, sessile. Flowers in terminal, paniculate cymes. Calyx-lobes ovate, acuminate. Corolla blue; lobes elliptic, acute. Capsules subglobose, surrounded by persistent calyx. Seeds minute, brown.

Along river bank. Chhatarpur, Durg, Indore, Narsimhapur, Raigarh, Raipur, Rewa, Sagar, Satna, Sidhi. *Fl. & Fr.*: Nov. - April.

4. *Exacum perrottetii* Griseb. in DC., Prodr. 9: 45. 1845; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 95. 1883.

Herbs; stems 4-angled, often winged. Leaves broadly ovate, acute at apex, auriculate at base, subsessile. Flowers in axillary, pedunculate cymes; bracts broadly ovate. Calyx-lobes 4, ovate, acuminate, dorsally winged. Corolla blue; lobes 4, ovate-oblong. Capsules 2-valved.

Common on slopes amidst grasses. Bastar (Arora, 1968). *Fl. & Fr.*: Feb. - March.

5. *Exacum pumilum* Griseb. in DC., Prodr. 9: 46. 1845; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 98. 1883; S. Garg, Indian Gent. 7. 1988.

Herbs, annual, erect, up to 15 cm high. Basal leaves linear; upper ones lanceolate, ca 15 x 5 mm, 3-nerved, sessile. Flowers in lax, few-flowered cymes, subsessile. Calyx 4-lobed, winged. Corolla blue; lobes 4, broadly elliptic or suborbicular, obtuse. Capsules ovoid or subglobose, ca 3 mm across.

Endemic to India. On moist soil in forests. Hoshangabad. *Fl. & Fr.*: Sept. - Oct.

6. *Exacum tetragonum* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 413. 1820; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 95. 1883; S. Garg, Indian Gent. 8. 1988. **Fig. 20.**

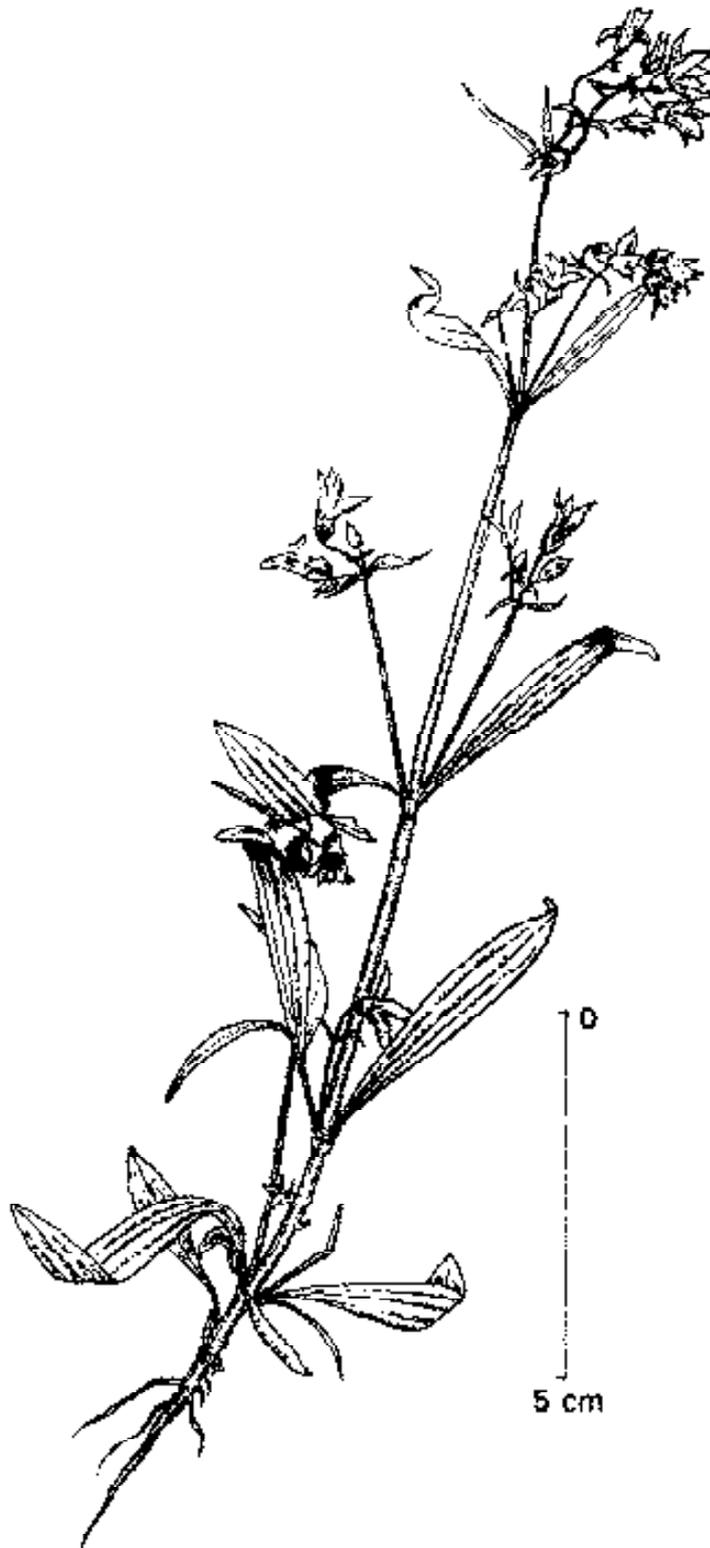


Fig. 19. *Exacum pedunculatum* L.



Fig. 20. *Exacum tetragonum* Roxb.

Herbs, erect, *ca* 50 cm high; stems 4-angled, branched in upper portion. Leaves lanceolate, 4-13 x 1-5 cm, narrowed at base or sessile. Flowers in terminal, much branched, paniculate cymes. Calyx-lobes ovate, 5-10 mm long, acuminate, winged on the back. Corolla blue or bluish purple, rarely white; lobes lanceolate, 10-20 mm long, acute. Capsules globose.

Among grasses along forest roads. Balaghat, Bastar, Raigarh, Rajnandgaon, Surguja. *Fl. & Fr.*: Sept. Feb.

5. HOPPEA Hayne *ex* Willd.

Small herbs. Leaves sessile. Flowers in dichotomous or trichotomous, axillary or terminal cymes, zygomorphic, 4-merous, sessile or shortly pedicellate. Calyx campanulate, shorter or longer than corolla, 4-lobed. Corolla tubular or urceolate; lobes 4, unequal. Stamen 1; anther globose. Staminodes rarely present. Ovary globose; style very short; stigmas 2, recurved. Capsules 2-valved, many-seeded.

Two species; S. Asia and Africa; both in M.P.

- 1a. Stems 4-angled; corolla greenish yellow ...1. *H. dichotoma*
 1b. Stems 4-winged; corolla white ...2. *H. fastigiata*

1. Hoppea dichotoma Hayne *ex* Willd. in Ges. Naturf. Fr. Neue Schriften 3: 435. 1801; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 100. 1883; S. Garg, Indian Gent. 24. 1988.

Herbs, annual, erect, up to 15 cm high; stems 4-angled. Leaves ovate-elliptic or elliptic-lanceolate, 3-6 x 1-4 mm, acute at apex, glabrous; upper ones passing into bracts. Flowers in leafy, paniculate cymes, shortly pedicellate. Calyx *ca* 3 mm long, ribbed; lobes lanceolate, acute. Corolla greenish yellow; lobes 4, deltoid, *ca* 2 mm long, acute. Capsules *ca* 2 mm long.

Along roadsides, in mixed forests and on moist slopes. Bilaspur, Chhatarpur, Durg, Hoshangabad, Raipur, Rajnandgaon. *Fl. & Fr.*: Oct. Nov.

2. Hoppea fastigiata (Griseb.) C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 100. 1883; S. Garg, Indian Gent. 24. 1988. *Cicendia fastigiata* Griseb., Gen. Sp. Gent. 158. 1839 & in DC., Prodr. 9: 62. 1845.

Herbs, 10-15 cm high; stems narrowly 4-winged. Leaves broadly ovate to rotundate, 5-8 x 5-6 mm, obtuse at apex, rounded at base. Flowers in terminal or axillary, *ca* 2 cm long cymes. Calyx-lobes lanceolate, acuminate. Corolla white; lobes oblong, *ca* 2 mm long. Capsules oblong, *ca* 3 mm long.

Rare. In moist and shady places. Jhabua (Samvatsar, 1996). *Fl. & Fr.*: Sept. Dec.

6. SWERTIA L.

Herbs, annual; stems fistular. Leaves opposite, sessile. Flowers in terminal, paniculate or corymbose cymes, actinomorphic, 4-5-merous. Calyx deeply partite; segments erect. Corolla rotate; lobes twisted to right in bud, with nectariferous glands inside at base. Ovary 1-locular; style short or absent; stigma 2-lobed. Fruit a capsule, 2-valved, many-seeded. Seeds compressed.

About 50 species; Northern hemisphere and Africa; 3 in M.P.

- 1a. Leaves narrowly lanceolate ...1. *S. angustifolia*
- 1b. Leaves ovate, spatulate-obovate or elliptic:
 - 2a. Cymes corymbose; corolla 4-lobed ...2. *S. corymbosa*
 - 2b. Cymes paniculate; corolla 5-lobed ...3. *S. minor*

1. *Swertia angustifolia* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 127. 1825; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 125. 1883; S. Garg, Indian Gent. 29. 1988.

Herbs, erect; stems trichotomously branched, 4-winged. Leaves narrowly lanceolate, 1.5-3.5 x 0.2-0.4 cm, acute. Flowers in paniculate cymes, 10-18 mm across. Calyx 4-partite; segments lanceolate or oblong, acute. Corolla white or bluish; lobes 4, oblong or ovate-lanceolate, acute. Capsules ovoid, sessile.

- 1a. Calyx-lobes 0.8-1.5 cm long, equal or longer than corolla-lobes ...1.1. var. *angustifolia*
- 1b. Calyx-lobes 0.3-0.6 cm long, always smaller than corolla-lobes ...1.2. var. *pulchella*

1.1. var. *angustifolia*

Amidst grasses in moist open places. Bilaspur. *Fl. & Fr.*: Oct. - Jan.

1.2. var. *pulchella* Burkill in J. Proc. Asiat. Soc. Bengal. 2: 375. 1906; S. Garg, Indian Gent. 29. 1988. *Swertia pulchella* Buch.-Ham. ex C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 125. 1883.

Rare. Bastar. *Fl. & Fr.*: Sept. - Nov.

2. *Swertia corymbosa* (Griseb.) C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 126. 1883; S. Garg, Indian Gent. 31. 1988. *Ophelia corymbosa* Griseb., Gen. Sp. Gent. 317. 1839.

Herbs, erect, much branched; stems 4-angled. Leaves 2-6 x 0.3-1 cm; upper leaves ovate, obtuse-mucronate; lower ones spatulate-obovate, obtuse. Flowers in terminal, corymbose cymes, 4-merous. Corolla white with blue nerves or pale blue, 4-lobed. Capsules oblong.

Endemic to India. Rare. In mixed forests. Raipur. *Fl. & Fr.*: Jan. - Feb.

3. *Swertia minor* (Griseb.) Knobl. in Bot. Centralbl. 60: 321. 1894; S. Garg, Indian Gent. 33. 1988. *Ophelia minor* Griseb. in DC., Prodr. 9: 126. 1845. *Pleurogyne minor* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 120. 1883.

Small herbs, annual; stems simple, 4-winged. Leaves ovate or elliptic, up to 1 x 0.5 cm, acute at apex, sessile. Flowers in leafy, paniculate cymes. Calyx-lobes elliptic. Corolla white or blue, 5-lobed; lobes oblong. Capsules oblong, ca 5 mm long.

On hill slopes. Hoshangabad. *Fl. & Fr.*: Oct. - Dec.

95. MENYANTHACEAE

(R.C. Srivastava)

Five genera and about 40 species; cosmopolitan; one genus with 2 species in M.P.

NYMPHOIDES J. Hill

Herbs, aquatic; stems sometimes like a petiole. Leaves simple, alternate, cordate, entire, palmately veined, exstipulate; petioles sheathing. Flowers fascicled, nodal or lateral on stem below lamina, bisexual, actinomorphic. Calyx 4-7-partite; segments slightly connate at base, imbricate, persistent. Corolla 4-7-partite; lobes connate at base, valvate. Stamens epipetalous; anthers versatile. Disk of 5 nectariferous glands alternating with stamens at the base of ovary. Ovary superior, 1-locular; style simple; stigma 2-3-fid. Fruit a capsule, indehiscent or bursting irregularly, 2-3-valved.

About 20 species; cosmopolitan; 2 in M.P.

- 1a. Corolla-lobes not fimbriate, glandular; seeds tuberculate ...1. *N. hydrophylla*
 1b. Corolla-lobes fimbriate, eglandular; seeds smooth ...2. *N. indica*

1. *Nymphoides hydrophylla* (Lour.) Kuntze, Revis. Gen. Pl. 2: 429. 1891. *Menyanthes hydrophylla* Lour., Fl. Cochinch. 1: 129. 1790. *M. cristata* Roxb., Pl. Coromandel 2: 3. t. 105. 1799. *Nymphoides cristata* (Roxb.) Kuntze, Revis. Gen. Pl. 2: 429. 1891. *Limnanthemum cristatum* (Roxb.) Griseb., Gen. Sp. Gent. 342. 1839; C.B. Clarke in Hook. f., Fl. Brit. India 4: 131. 1883.

Herbs, floating with numerous stems arising from slender rhizome. Leaves orbicular or orbicular-oblong, ca 10.5 x 8.5 cm, deeply cordate with an acute sinus, sinuate at margin, almost fleshy, smooth above, verrucose beneath; petioles very short. Flowers densely fascicled at nodes. Calyx-segments 5-7, narrowly lanceolate or oblong. Corolla white with yellow base, rotate; lobes linear-oblong. Capsules ovoid or oblong, ca 5 mm long, indehiscent, 5-10-seeded. Seeds tuberculate.

In ponds. Bilaspur, Chhatarpur, Damoh, Jabalpur, Raipur, Rajnandgaon. Fl. & Fr.: June - Sept.

2. *Nymphoides indica* (L.) Kuntze, Revis. Gen. Pl. 2: 429. 1891. *Menyanthes indica* L., Sp. Pl. 145. 1753. *Limnanthemum indicum* (L.) Griseb., Gen. Sp. Gent. 343. 1839 emend. Thwaites, Enum. Pl. Zeyl. 205. 1860; C.B. Clarke in Hook. f., Fl. Brit. India 4: 131. 1883.- *Barachuli*.

Herbs, perennial; rhizomes thick. Leaves floating, orbicular-peltate. 7-20 x 5-20 cm, deeply cordate at base, coarsely crenate, thick, petiolate. Flowers fasciated at nodes. Calyx-segments ovate-lanceolate, acute. Corolla white with yellow base; lobes ovate-lanceolate, eglandular, densely fimbriate. Capsules globose, dehiscent irregularly. Seeds globose, yellow, smooth.

In ponds. Bilaspur, Chhatarpur, Damoh, Hoshangabad, Jabalpur, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: June - Sept.

95a. POLEMONIACEAE*

(Anand Kumar)

About 20 genera and 275 species; America and Eurasia; one genus and 2 species in M.P.

PHLOX L.

Herbs, annual or perennial. Leaves mostly opposite or sometimes upper ones alternate, entire. Flowers in terminal cymes or thyrses. Calyx narrow, tubular or sometimes nearly campanulate, 5-ribbed, 5-cleft; lobes sharp-pointed, hypocrateriform; limb flat, 5-lobed; lobes obovate or broader, tube slender. Stamens 5, unequal, usually included. Ovary oblong or ovoid, 3-locular; style slender. Capsules 3-valved, 1 to many-seeded.

About 67 species; N.E. Asia and N. America; 2 in M.P.

- | | |
|--|----------------------------|
| 1a. Plants perennial; stems eglandular; leaves
all opposite | ...1. <i>P. divaricata</i> |
| 1b. Plants annual; stems glandular; upper leaves
alternate | ...2. <i>P. drummondii</i> |

*Possibly due to ornamental nature of the plants, the family has not been included under Key to the families given in Flora of M.P. Vol. I. However, for the purpose, it should be placed after lead 149a on page 112 and can be differentiated from Loganiaceae by its 3-locular ovary.

1. **Phlox divaricata** L., Sp. Pl. 152. 1753.

Herbs, perennial; stems slender, branched, up to 35 cm high. Leaves linear-oblong to ovate-lanceolate, usually acute at apex. Flowers in small cymes terminating short branches. Calyx-lobes narrowly subulate. Corolla blue or pinkish blue, up to 2.5 cm across; lobes often notched. Capsules 3-valved, many-seeded.

Cultivated in gardens. Bhopal (Oommachan, 1977). *Fl. & Fr.*: Nov. Feb.

2. **Phlox drummondii** Hook. in Curtis. Bot. Mag. 62: t. 3441. 1835.

Herbs, annual, erect, much branched, up to 30 cm high. Lower leaves opposite, upper ones alternate, broadly ovate to oblong-lanceolate, up to 5 x 2 cm, acute or mucronate at apex, narrow or clasping at base. Flowers in dense, cymose clusters. Calyx-lobes narrow, spreading or recurved in fruits. Corolla pink, red or variegated, ca 2.5 cm across; lobes broadly ovate. Capsules ovoid.

Cultivated in gardens for showy flowers. Indore. *Fl. & Fr.*: March - May.

96. HYDROPHYLLACEAE

(O.P. Mishra and B.K. Shukla)

About 22 genera and 275 species; subcosmopolitan especially dry W.N. America; one species in M.P.

HYDROLEA L., *nom. cons.*

Herbs, rarely undershrubs. Leaves alternate or spirally arranged, entire, exstipulate. Flowers in terminal racemes or cymes. Calyx 5-partite nearly up to base. Corolla rotate or campanulate, 5-lobed; lobes imbricate. Stamens 5, inserted on corolla-tube; anthers sagittate. Ovary 2-locular; ovules many in each locule; styles 2, distinct; stigma capitate. Capsules globose or ovoid, dehiscing septically by 2 valves or sometimes irregularly, many-seeded. Seeds minute, with fleshy albumen.

About 20 species; tropical regions; one in M.P.

Hydrolea zeylanica (L.) Vahl, Symb. Bot. 2: 46. 1791; C.B. Clarke in Hook. f., Fl. Brit. India 4: 133. 1883. *Nama zeylanica* L., Sp. Pl. 226. 1753. **Fig. 21.**

Herbs, annual, erect or procumbent, up to 45 cm high; stems grooved, glandular-hairy above, glabrous below, rooting at lower nodes. Leaves lanceolate, 2-5.5 x 0.3-1.5 cm, acute at apex, cuneate at base. Flowers in short racemes or cymes. Calyx-segments lanceolate, 5-6 mm long. Corolla blue, slightly shorter than calyx; lobes ovate. Capsules ovoid, ca 5 mm long, enclosed within enlarged, persistent calyx. Seeds oblong, ca 0.2 mm long, brown, wrinkled.

Common in water-logged paddy fields and along edges of ponds and lakes. Bastar, Bilaspur, Chhatarpur, Damoh, Raigarh, Raipur, Sidhi. *Fl. & Fr.*: Nov. Feb.

97. BORAGINACEAE

(K.K. Khanna)

About 156 genera and 2500 species; tropical and temperate regions especially Mediterranean; 8 genera and 30 species in M.P.

- 1a. Shrubs or trees, more than 3 m high:
 - 2a. Style 4-fid; fruits 15-20 mm across ...3. *Cordia*
 - 2b. Style 2-fid; fruits ca 5 mm across ...5. *Ehretia*
- 1b. Herbs or undershrubs, up to 1.5 m high:
 - 3a. Anthers connivent into a cone; connectives much produced ...8. *Trichodesma*
 - 3b. Anthers not connivent into a cone; connectives not produced:
 - 4a. Styles 2 ...2. *Coldenia*
 - 4b. Style 1:
 - 5a. Style gynobasic:
 - 6a. Fruits with glochidiate spines ...4. *Cynoglossum*
 - 6b. Fruits without spines ...1. *Bothriospermum*
 - 5b. Style terminal:



Fig. 21. *Hydrolea zeylanica* (L.) Vahl

- 7a. Plants never submerged;
inflorescence scorpioid at
apex; ovary 4-locular ...6. *Heliotropium*
- 7b. Plants submerged; inflorescence
not scorpioid; ovary 2-locular ...7. *Rotula*

Notes: *Coldenia*, *Cordia*, *Ehretia* and *Rotula* are often included under a separate family *Ehretiaceae*, *nom. cons.* (App. IIB, ICBN, 1994).

1. BOTHRIOSPERMUM Bunge

Herbs, annual or biennial, strigose or hirsute. Leaves simple, alternate, spirally arranged. Flowers solitary or upper ones in racemes, small, pedicellate, bracteate. Calyx deeply 5-lobed. Corolla 5-lobed; lobes spreading; throat with scales; tube short. Stamens 5, adnate to corolla-tube, included; filaments short. Ovary 4-lobed; style short, persistent, gynobasic; stigma capitate. Fruit a nutlet, granular, scabrid, with a small insertion, warty, concave on ventral side with a large areole surrounded by prominent margin.

Five species; tropical regions and N.E. Asia; one in M.P.

Bothriospermum tenellum (Hornem.) Fisch. & C.A. Mey., Index Sem. Hort. Petrop. 1: 24. 1835; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 167. 1883. *Anchusa tenella* Hornem., Hort. Bot. Hafn. 1: 176. 1813.

Fig. 22.

Herbs, annual, prostrate, much branched, *ca* 30 cm high; stems and branches appressed hairy. Leaves variable; radical leaves obovate; lower cauline leaves obovate-lanceolate to lanceolate, petiolate; upper ones lanceolate, 1-3.5 x 0.5-1.4 cm, acute at apex, undulate, appressed hairy, sessile. Flowers axillary, solitary. Calyx divided up to base; segments linear-lanceolate, hairy. Corolla white; lobes rounded; tube equalling the calyx. Nutlets 4, ellipsoid, parallel, inverted.

In moist places. Balaghat, Damoh, Sidhi. *Fl. & Fr.*: Feb. April.

2. COLDENIA L.

Herbs, prostrate or creeping, much branched. Leaves spirally arranged, small, crisped. Flowers axillary or extra-axillary, solitary, sometimes upper

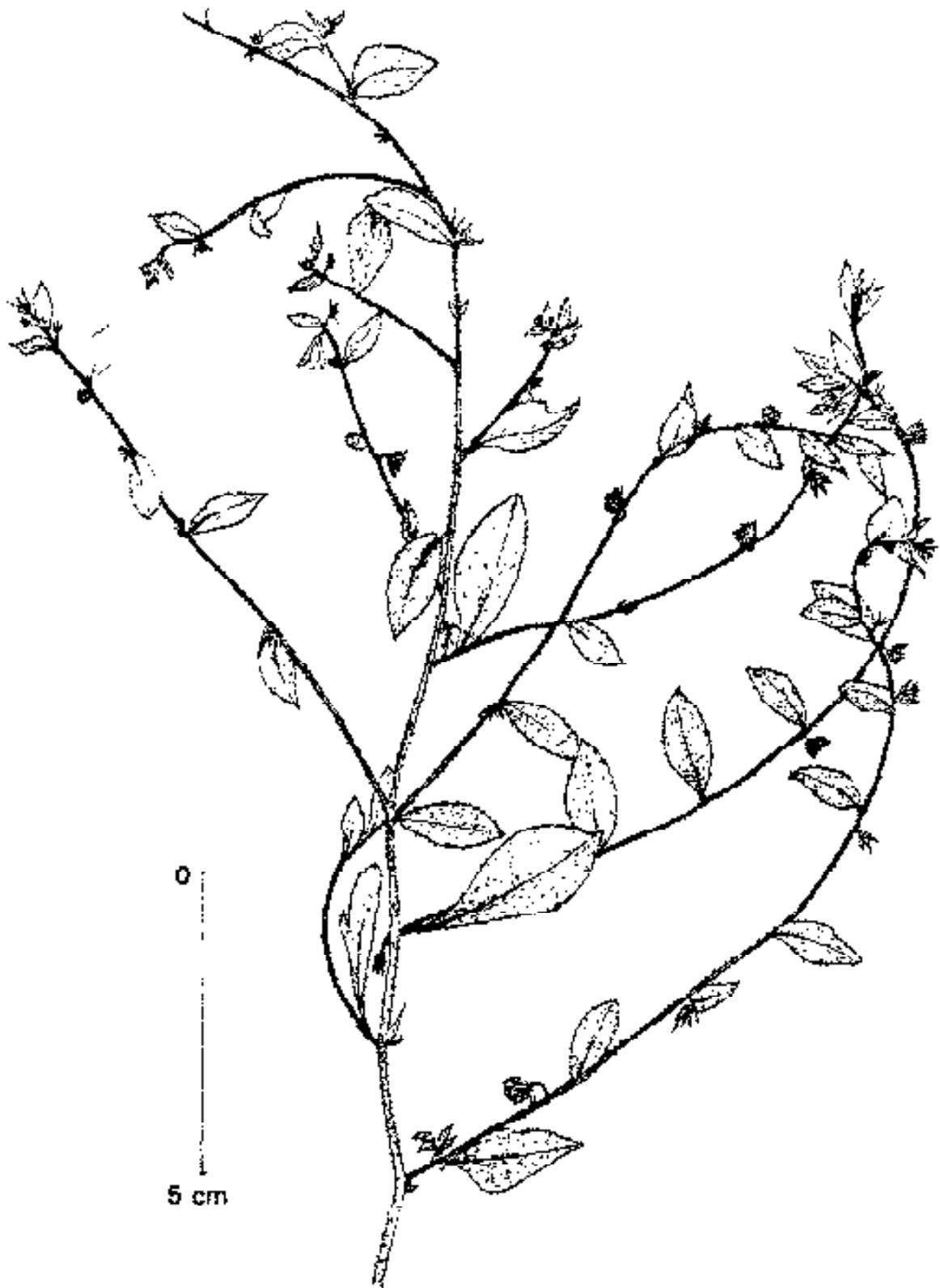


Fig. 22. *Bathriospermum tenellum* (Hornem.) Fisch. & C.A. Mey.

ones in unilateral racemes or spikes, bisexual, 4-5-merous, sessile or shortly pedicellate. Calyx 4-5-partite. Corolla small, 4-5-lobed; lobes spreading; throat without scales; tube short. Stamens 4-5, inserted on corolla-tube, included; filaments short. Ovary shallowly 4-lobed, 2-locular; ovules 2; styles 2, short, coherent in lower half, terminal; stigmas punctate. Fruit a drupe of 4 or less, 1-seeded pyrenes, dry.

A monotypic genus; tropical and subtropical regions of Old World.

Coldenia procumbens L., Sp. Pl. 125. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 144. 1883. *Ban-andi*.

Herbs, procumbent, usually appressed to the ground, covered with white silky hairs. Leaves alternate, obovate-oblong, 0.5-2.5 x 0.4-1.6 cm, asymmetrical, rounded, coarsely serrate, densely pubescent. Flowers axillary, solitary, small, subsessile. Calyx segments ovate, ciliate. Corolla yellow. Drupes 4-lobed, pyramidal, ca 3 mm long.

In moist places. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, Gwalior, Indore, Raigarh, Raipur, Rewa, Satna, Shivpuri, Sidhi. *Fl. & Fr.*: Sept. May.

Fresh leaves are applied to rheumatic swellings.

3. CORDIA L.

Shrubs or trees, sometimes climbers, softly pubescent, sometimes strigose. Leaves simple, alternate or subopposite, spirally arranged, entire or repand-serrate. Flowers in terminal or axillary, irregular, paniculate, spiciform or corymbiform cymes, bisexual or functionally unisexual, actinomorphic, more or less sessile. Calyx tubular or campanulate, 5-lobed or afterwards irregularly 2-6-lobed, enlarged in fruit. Corolla white, scarlet or orange-red, infundibuliform or hypocrateriform, 4-7-lobed; tube well developed. Stamens as many as corolla-lobes, functional or reduced, epipetalous or free from corolla-tube, inserted at the top of corolla-tube. Ovary 4-locular; style 4-fid; stigmas 4, capitate or clavate. Fruit a drupe, unlobed, 1-pyrenous, 1-4-seeded.

About 250 species; tropical regions; 7 in M.P.

1a. Corolla white:

- 2a. Leaves one and half to twice as long as broad, oblong to oblanceolate, elliptic or ovate:
- 3a. Calyx glabrous outside; corolla-tube shorter than lobes ...1. *C. dichotoma*
- 3b. Calyx pubescent outside; corolla-tube longer than lobes:
- 4a. Leaves oblong to oblanceolate; filaments hairy at base ...2. *C. gharaf*
- 4b. Leaves elliptic or ovate; filaments glabrous at base ...5. *C. monoica*
- 2b. Leaves as broad as long, obovate, broadly ovate or orbicular:
- 5a. Leaves glabrous beneath ...6. *C. obliqua*
- 5b. Leaves sparsely hairy or tomentose beneath:
- 6a. Leaves sparsely hairy beneath, never densely tomentose ...3. *C. grandis*
- 6b. Leaves densely tomentose beneath:
- 7a. Branches white pubescent; calyx densely tomentose throughout, ribbed upwards ...4. *C. macleodii*
- 7b. Branches brown tomentose when young; calyx glabrescent, not ribbed upwards ...6. *C. obliqua*
- 1b. Corolla scarlet or orange-red ...7. *C. sebestena*

1. ***Cordia dichotoma*** G. Forster, Fl. Ins. Austr. 18. 1786. *C. indica* Lam., Encycl. 7: 49. 1806. *C. myxa auct. non L.*, 1753: C.B. Clarke in Hook. f., Fl. Brit. India 4: 136. 1883. - *Lasoorā*.

Trees, polygamodioecious, 4-6 m high. Leaves elliptic or ovate, 8-12 x 4-8 cm, obtuse at apex, acute to rounded at base, entire, glabrescent or puberulent; petioles 2-4 cm long. Flowers in dichotomous, loosely branched cymes, bisexual or unisexual (only male), ebracteate; male flowers shorter than bisexual. Calyx campanulate, 5-6 mm long. Corolla 8-10 mm long; lobes recurved. Drupes globose, yellow to reddish orange, with sticky juice.

Common along roadsides, near villages and forest edges. Bastar, Chhatarpur, Damoh. *Fl. & Fr.*: March - June.

Leaves and fruits are consumed as vegetables. Leaves are used to treat ulcers while fruits are astringent, anthelmintic, expectorant, and used in infections of urinary passage, lungs and spleen. Seeds are used to treat ringworm.

2. *Cordia gharaf* (Forssk.) Ehrenb. ex Asch., Sitzungber. Ges. Naturf. Freunde 1879: 46. 1879. *Cornus gharaf* Forssk., Fl. Aegypt.-Arab. 95. 1775. *Cordia rothii* Roem. & Schult., Syst. Veg. 4: 798. 1819; C.B. Clarke in Hook. f., Fl. Brit. India 4: 138. 1883. *Gondi*.

Trees, erect or crooked, usually branching from base; bark grey-white to dull black, peeling off in longitudinal flakes. Leaves oblong to oblanceolate, 6-10 x 2-2.5 cm, rounded at apex and base. Flowers in terminal or axillary, lax cymes, small. Calyx pubescent outside, silky inside. Corolla white. Drupes ovoid, reddish brown when ripe.

Rare. On hilly tracts. Bhopal (Oommachan, 1977). *Fl. & Fr.*: April-Dec.

Bark yields gum while its extract is astringent and used as gargles for stomatitis. Fruit pulp is edible.

3. *Cordia grandis* Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 335. 1824 & Fl. Ind. 1: 593. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 137. 1883.

Trees, up to 14 m high; bark light grey. Leaves broadly ovate or orbicular, 5-18 x 4-15 cm, obtuse or acuminate at apex, cuneate or truncate at base, entire, coriaceous, glabrous, with disks above, sparsely hairy beneath. Flowers in dense, pedunculate, paniculate cymes. Calyx campanulate, not distinctly ribbed, accrescent in fruit. Corolla white. Drupes ellipsoid, ca 1.2 cm long. Seeds embedded in viscid pulp.

Rare. In evergreen forests. Bastar. *Fl. & Fr.*: Feb. March.

4. *Cordia macleodii* (Griff.) Hook. f. & Thomson in J. Linn. Soc. Bot. 2: 128. 1858; C.B. Clarke in Hook. f., Fl. Brit. India 4: 139. 1883. *Hemigymnia macleodii* Griff., Calc. J. Nat. Hist. 3: 363. 1843. - *Bohad, Daiwas*.

Trees, polygamous, 3-8 m high; branches white hairy. Leaves alternate or sometimes subopposite, broadly ovate or orbicular, 8-18 x 7-17 cm, obtuse at apex, cordate or rounded at base, sinuate, glabrous, with raised white disks above, densely grey or tawny woolly tomentose beneath; petioles stout, 3-5 cm long, tomentose. Flowers in terminal and axillary, dense, tomentose, paniculate cymes, subsessile. Calyx 6-lobed; lobes as long as or longer than tube. Corolla white. Drupes ovoid, supported by cupular, tomentose, ribbed calyx, non-edible.

In dry mixed deciduous forests. Bilaspur, Chhatarpur, Damoh, Mandla, Panna, Seoni. *Fl. & Fr.*: March - May.

5. *Cordia monoica* Roxb., *Pl. Coromandel* 1: 43. t. 58. 1796; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 137. 1883. *C. polygama* Roxb., *Fl. Ind.* (Carey & Wallich ed.) 2: 337. 1824.

Trees; branches densely brown puberulent. Leaves ovate or elliptic, 6-10 x 3-6 cm, acute or obtuse at apex, rounded at base, undulate or denticulate, scabrous above, brown pubescent beneath; petioles ca 1 cm long. Flowers in terminal, paniculate cymes, bisexual or unisexual (only male), sessile; branches densely brown puberulent. Calyx unevenly 3-4-lobed, tomentose outside. Corolla white, tubular; lobes 5, linear-spathulate, spreading. Drupes ovoid, ca 1 cm long, orange at maturity, longitudinally striated.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: July - Oct.

6. *Cordia obliqua* Willd., *Phytographia* 1(4): t. 4, f. 1. 1794 & *Sp. Pl.* 1: 1072. 1798; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 137. 1883. *Lasora*.

Trees, deciduous, polygamous, ca 8 m high; branches brown tomentose when young. Leaves obovate or orbicular, 6-13 x 5-12 cm, obtuse or more or less abruptly acuminate at apex, rounded at base, entire or slightly sinuate-dentate, glabrous or tomentose beneath. Flowers in terminal or axillary, lax, pedunculate cymes, fragrant. Calyx glabrous outside or scarcely villous on margins, persistent. Corolla white, 5-lobed; lobes as long as tube. Drupes ovoid, yellowish or pinkish when ripe, glossy, with sticky juice.

- 1a. Leaves glabrous beneath ...6.1. var. *obliqua*
 1b. Leaves densely tomentose beneath ...6.2. var. *tomentosa*

6.1. var. *obliqua*

In dry mixed deciduous forests, often cultivated. Damoh, Dhar, East Nimar, Indore, Raigarh, Raipur, Seoni. *Fl. & Fr.*: May - June.

Fruits are edible.

6.2. var. *tomentosa* (Wallich) Kazmi in J. Arnold Arb. 51: 143. 1970. *C. tomentosa* Wallich in Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 339. 1824, non Roem. & Schult., 1819. *C. obliqua* Willd. var. *wallichii* (G. Don) C.B. Clarke in Hook. f., Fl. Brit. India 4: 137. 1883. *C. wallichii* G. Don, Gen. Hist. 4: 379. 1837-1838.

Rare. In sal forests. Balaghat. *Fl. & Fr.*: April - May.

7. *Cordia sebestena* L., Sp. Pl. 190. 1753. - *Lal lasora*.

Shrubs or small trees, deciduous; bark brown; trunk short, crooked. Leaves dark green, ovate, 10-15 cm long, acute at apex, entire, rough, coarse, scabrous above, pubescent on nerves beneath. Flowers in large, paniculate cymes, showy. Calyx tubular, 3-4-lobed; lobes deltoid. Corolla scarlet or orange-red, infundibuliform, 5-6-lobed; lobes ca 1 cm long. Drupes ovoid, ca 2 cm long, white. Seeds embedded in sticky pulp.

Cultivated in gardens. Bhopal (Oominchan, 1977). *Fl. & Fr.*: Jan. July.

4. CYNOGLOSSUM L.

Herbs, annual or perennial, glabrous to coarsely pubescent. Leaves simple, alternate, entire; lower ones in a basal rosette, long petiolate; higher ones spirally arranged, subsessile or shortly petiolate. Flowers in unilateral racemes or paniculate cincinni, bisexual, actinomorphic, subsessile, ebracteate. Calyx 5-lobed; lobes more or less connate at base. Corolla hypocrateriform, infundibuliform or campanulate, 5-lobed; lobes spreading; throat with scales; tube short. Stamens 5, included; filaments very short. Ovary 4-lobed; style gynobasic, short; stigma broad, more or less capitate.

Fruit a nutlet, inserted on a pyramidal receptacle, spreading at maturity, with numerous, stout, glochidiate spines.

About 55 species; temperate and subtropical regions; 3 in M.P.

- 1a. Styles filiform, long, terete; nutlets dorsally concave, irregularly appendiculate; marginal appendages confluent at their bases ...2. *C. wallichii*
- 1b. Styles thick, short, somewhat 4-angled; nutlets dorsally convex, uniformly appendiculate; marginal appendages usually not confluent at their bases:
- 2a. Leaves covered above with hairs of unequal length arising from bulbous bases; nutlets not or obscurely margined ...1. *C. lanceolatum*
- 2b. Leaves covered above with hairs of equal length not arising from bulbous bases; nutlets strongly margined ...3. *C. zeylanicum*

1. *Cynoglossum lanceolatum* Forssk., Fl. Aegypt.-Arab. 41. 1775; C.B. Clarke in Hook. f., Fl. Brit. India 4: 156. 1883. *C. micranthum* Desf., Tabl. Ecole Bot. ed. 1. 220. 1804; C.B. Clarke in Hook. f., Fl. Brit. India 4: 156. 1883.

Herbs, erect, up to 1.5 m high; branches densely covered with white, bulbous-based hairs. Leaves variable in shape, ca 5 cm long, crispy-dentate, hispid; radical leaves lanceolate, entire, petiolate; lower cauline leaves linear-lanceolate, 3-11 x 1-4.5 cm, subsessile; upper cauline leaves elliptic-oblong to lanceolate, sessile. Flowers in axillary or terminal, up to 15 cm long, strigose, paniculate cincinni. Calyx campanulate; lobes densely hairy outside, glabrous inside. Corolla white with a bluish or purple eye; lobes suborbicular; throat nearly closed by hooded pink scales. Nutlets 4, ovoid, densely glochidiate all over.

In mixed and sal forests. Balaghat, Bastar, Bilaspur, Indore, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni, Surguja. *Fl. & Fr.*: Sept. May.

2. *Cynoglossum wallichii* G. Don, Gen. Hist. 4: 354. 1837-1838; C.B. Clarke in Hook. f., Fl. Brit. India 4: 157. 1883.

Herbs, biennial, erect; stems and branches densely covered with white hairs in the lower part. Leaves lanceolate to ovate, 1.5-5 x 0.5-2 cm, acute to obtuse at apex, densely covered with white hairs; radical leaves petiolate; lower cauline leaves longer and broader than the radical ones, acute, shortly petiolate; upper cauline leaves subsessile to sessile. Flowers in unilateral racemes. Calyx-lobes oblong. Corolla pale to deep blue, campanulate. Nutlets 4, ovoid, sparsely to densely covered with vertical appendages; dorsal longitudinal keel conspicuous or inconspicuous, rounded at apex; marginal appendages dilated, forming narrow or broad, elevated wing.

- 1a. Nutlets with prominent longitudinal keel;
marginal appendages not or slightly dilated
forming a narrow marginal wing ...2.1. var. *glochidiatum*
- 1b. Nutlets with inconspicuous longitudinal keel;
marginal appendages dilated forming broad
elevated wing ...2.2. var. *wallichii*

2.1. var. *glochidiatum* (Wallich ex Benth.) Kazmi in J. Arnold Arb. 52: 347. 1971. *Cynoglossum glochidiatum* Wallich ex Benth. in Royle, III. Bot. Himal. Mts. 1: 306. 1839; C.B. Clarke in Hook. f., Fl. Brit. India 4: 156. 1883.

Rare. Bastar, Hoshangabad. *Fl. & Fr.*: Aug. Dec.

2.2. var. *wallichii*

Fig. 23.

In open places. Balaghat, Bastar, Surguja. *Fl. & Fr.*: April Dec.

3. *Cynoglossum zeylanicum* (Vahl ex Hornem.) Thunb. ex Lehm. in Neue Schriften. Naturf. Ges. Pl. Hort. Halle 3(2): 20. 1817 & Pl. Asperif. Nucif. 116. 1818. *Anchusa zeylanica* Vahl ex Hornem., Enum. Pl. Hort. Hafn. 3. 1807. *Cynoglossum furcatum* Wallich ex Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 6. 1824; C.B. Clarke in Hook. f., Fl. Brit. India 4: 155. 1883. *C. denticulatum* A. DC. var. *zeylanica* (Vahl ex Hornem.) C.B. Clarke in Hook. f., Fl. Brit. India 4: 157. 1883. *C. meeboldii* Brand in Fedde Repert. 14: 323. 1916.

Herbs, erect, up to 1.5 m high; stems densely covered with spreading or appressed hairs. Radical leaves broadly ovate-oblong, ca 20 x 8 cm, pubescent, petiolate; lower cauline leaves shortly petiolate; upper cauline



Fig. 23. *Cynoglossum wallichii* G. Don var. *wallichii*

leaves ovate-lanceolate or ovate-oblong, gradually reduced in size, 3-8 x 1-3 cm, sessile. Flowers in axillary or terminal cincinni. Calyx-lobes ovate, covered with trichomes. Corolla pale blue, infundibuliform. Nutlets 4, ovoid, uniformly appendiculate; appendages glochidiate at apex, not confluent at bases.

Common as forest undergrowth. Bastar, Hoshangabad, Indore, Jabalpur, Mandla, Seoni, Surguja. *Fl. & Fr.*: Aug. - Dec.

5. EHRETIA P. Browne

Shrubs or trees, rarely subscandent. Leaves simple, alternate, entire or serrate, mostly petiolate. Flowers in axillary or terminal cymes, corymbs or panicles, bisexual, subsessile to pedicellate. Calyx 5-lobed; lobes free or connate at base. Corolla white or bluish white, infundibuliform, small, 5-lobed; lobes spreading; tube short or long. Stamens 5, inserted on corolla-tube, exserted; filaments filiform. Ovary 2 or 4-locular; style 2-fid near the tip; stigmas 2, capitate, discoid or clavate. Fruit a drupe, 2-4-pyrenous, globose or ellipsoid.

About 50 species; tropical and subtropical regions; 4 in M.P.

- 1a. Leaves serrate; pyrenes without cavity ...1. *E. acuminata*
- 1b. Leaves entire; pyrenes with a cavity:
 - 2a. Cymes terminal, dense, corymbose ...2. *E. aspera*
 - 2b. Cymes both axillary and terminal, lax, corymbose or of unilateral flowers:
 - 3a. Leaves symmetrical, lanceolate-oblong; corolla-lobes ovate ...3. *E. canarensis*
 - 3b. Leaves asymmetrical, ovate-elliptic, elliptic or suborbicular; corolla-lobes oblong ...4. *E. laevis*

1. *Ehretia acuminata* R. Br., Prodr. 497. 1810; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 141. 1883.

Trees, deciduous. Leaves elliptic or ovate-oblong, 8-12 x 3.5-5 cm, acute or acuminate at apex, sharply serrate, glabrous or minutely hispidulous above; petioles up to 3 cm long. Flowers fascicled, forming compound, dense, large, pubescent panicles. Calyx ciliate. Corolla white; lobes broadly oblong,

reflexed; tube short. Drupes more or less ellipsoid, *ca* 6 mm long, orange, 4-seeded.

Occasionally planted. Bhopal (Oommachan, 1977). *Fl. & Fr.*: March - July.

2. *Ehretia aspera* Willd., *Phytographia* 1(4): t. 2. f. 1. 1794. *E. laevis* Roxb. var. *aspera* (Willd.) C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 142. 1883.

Large shrubs or small trees; branches terete, downy when young. Leaves variable in shape, obovate or elliptic-oblong, 4-8 x 2-4 cm, retuse at apex, entire, coriaceous. Flowers in terminal, dense, corymbose cymes, later paniculate. Calyx pubescent outside. Corolla white or bluish white; tube longer than calyx. Drupes depressed globose, *ca* 5 mm across, green, smooth.

Rare. On rocky bank of streams. Indore (Rao and Sastry, 1964). *Fl. & Fr.*: March - May.

3. *Ehretia canarensis* (C.B. Clarke) Gamble, *Fl. Madras* 2: 891. 1922. *E. laevis* Roxb. var. *canarensis* C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 142. 1883. - *Bhojumbur, Chinor, Tamoiya.*

Small trees. Leaves symmetrical, lanceolate-oblong, up to 12 x 6 cm, acuminate at apex, cuneate to rounded at base, entire, dark brown to black when dry. Flowers in axillary, lateral or terminal, lax, unilateral cymes. Calyx campanulate; lobes small, ovate. Corolla white; lobes ovate, acute to rounded, reflexed, recurved on margins. Drupes fleshy, 4-seeded; pyrenes with a cavity.

Rare. In mixed forests. Hoshangabad (Mukherjee, 1984). *Fl. & Fr.*: April - Oct.

4. *Ehretia laevis* Roxb., *Pl. Coromandel* 1: 42. t. 56. 1796; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 141. 1883. *E. laevis* var. *floribunda* (Benth.) Brandis, *Forest Fl. N. W. India* 340. 1874; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 142. 1883. - *Chamror, Datrangi.*

Shrubs or small trees, *ca* 6 m high. Leaves variable, ovate-elliptic, elliptic or even suborbicular, 5-14 x 4-8 cm, obtuse or shortly acuminate at apex, cuneate at base, entire, glabrous or minutely pubescent beneath when

young. Flowers in loosely dichotomous, terminal and axillary, corymbose cymes, subsessile. Calyx campanulate; lobes 5, free nearly to the base. Corolla white; lobes oblong; tube short. Stigmas discoid. Drupes yellow or reddish orange, breaking into 4, 1-seeded pyrenes.

In mixed forests. Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Mandla, Raigarh, Raipur, Sagar, Seoni, Shivpuri, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: March - May.

6. HELIOTROPIUM L.

Herbs or undershrubs, rarely shrubs, erect or prostrate, glabrous to roughly pubescent. Leaves alternate or spirally arranged; lower ones often opposite, small to large. Flowers in bracteate or ebracteate spikes (cincinni), scorpioid at apex, bisexual, actinomorphic or slightly zygomorphic pedicellate or subsessile. Calyx 5-lobed or partite. Corolla mostly hypocrateriform to infundibuliform, sometimes tubular, 5-lobed; lobes spreading. Stamens 5, inserted on corolla-throat, included. Ovary 4-locular, lobed or unlobed, with a glandular ring at base; style short or long; stigma peltate or conical. Fruit a drupe, lobed or unlobed, separating into 2-4 nutlets at maturity; nutlets 1-2-seeded.

About 250 species; tropical and temperate regions; 9 in M.P.

- 1a. Corolla blue-mauve ...2. *H. indicum*
- 1b. Corolla white or dull yellow:
 - 2a. Calyx divided up to 1/4th of its length; lobes short; fruits enclosed by calyx ...8. *H. supinum*
 - 2b. Calyx divided nearly up to base; segments long; fruits not enclosed by calyx:
 - 3a. Inflorescence ebracteate:
 - 4a. Leaves lanceolate; nutlets tuberculate ...7. *H. subulatum*
 - 4b. Leaves obovate, elliptic-obovate or elliptic-oblong; nutlets otherwise:
 - 5a. Calyx-segments almost equal; corolla-tube glabrous inside, pubescent outside; nutlets finely puberulous throughout ...1. *H. ellipticum*

- 5b. Calyx-lobes unequal; corolla-tube pubescent at mouth on both the sides; nutlets appressed hairy on the back ...4. *H. ovalifolium*
- 3b. Inflorescence bracteate; bracts sometimes much reduced:
- 6a. Plants prostrate; flowers sessile, closely set on the inflorescence ...3. *H. marifolium*
- 6b. Plants usually erect; flowers subsessile to pedicellate, distantly set on the inflorescence:
- 7a. Leaves usually revolute; inflorescence bracteate throughout:
- 8a. Corolla 1.5 - 2.5 mm long; stigma subcapitate ...5. *H. rariflorum*
- 8b. Corolla 2.5 - 4 mm long; stigma conical ...9. *H. zeylanicum*
- 7b. Leaves not revolute; lower flowers of inflorescence bracteate, upper flowers ebracteate or with reduced bracts ...6. *H. strigosum*

1. *Heliotropium ellipticum* Ledeb. in Eichw., Pl. Nov. 10. t. 4. 1831. *H. eichwaldi* Steud., Nomencl. Bot. ed. 2. 1: 744. 1840; C.B. Clarke in Hook. f., Fl. Brit. India 4: 149. 1883.

Herbs, erect, branched; stems and branches covered with soft, bulbous-based hairs. Leaves obovate or elliptic-oblong, 2.5-4 x 1.5-2.5 cm, obtuse at apex, subentire, covered with hairs arising from glistening bulbous bases. Flowers in ca 4 cm long, ebracteate spikes, scorpioid at apex, usually 2-ranked. Calyx densely pubescent on both sides, divided up to base; segments ovate-lanceolate. Corolla white; lobes oblong-orbicular; tube pubescent outside. Nutlets 4, ellipsoid, minutely verrucose.

East Nimar (Maheshwari, 1960). Fl. & Fr.: Nov. - Jan.

2. *Heliotropium indicum* L., Sp. Pl. 130. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 152. 1883. *Tiaridium indicum* Lehm., Pl. Asperif. Nucif. 14. 1818. *Hathisunda*.

Herbs, perennial, strigose to woolly, up to 30 cm high. Leaves alternate or subopposite, broadly ovate or ovate-oblong, 3-9 x 2-6 cm, serrulate, rugose above, pilose beneath. Flowers in extra-axillary, up to 15 cm long.

ebracteate spikes, scorpioid at the apex. Calyx-lobes linear. Corolla blue-mauve; lobes small, rounded, crenate. Drupes deeply 2-lobed, conical or ovoid; nutlets compressed, 4-ribbed, beaked, 2-seeded.

In moist wastelands. Balaghat, Bastar, Bilaspur, Damoh, Durg, Mandla, Raipur, Rajnandgaon. *Fl. & Fr.*: Throughout the year.

Leaves are applied to boils, ulcers, wounds and as antidote to insects sting.

3. *Heliotropium marifolium* Retz., *Observ. Bot.* 2: 8. 1781; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 152. 1883. *H. scabrum* Retz., *Observ. Bot.* 2: 8. 1781; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 152. 1883.

Herbs, prostrate, 10-15 cm high; branches spreading, covered with stiff appressed hairs. Leaves alternate or fascicled, oblong or elliptic-lanceolate, 0.5-2.5 x 0.2-0.3 cm, covered with stiff straight hairs, sessile or petiolate. Flowers in 1-4 cm long, sessile, glomerate, later scorpioid spikes; bracts foliaceous, lanceolate. Calyx divided up to base; segments lanceolate, appressed hispid. Corolla white, pubescent outside. Drupes depressed, rounded or lobed; nutlets 4, equal, pubescent.

Along the river bank. Bastar, Durg, Hoshangabad, Morena, Seoni. *Fl. & Fr.*: Aug. - March.

4. *Heliotropium ovalifolium* Forssk., *Fl. Aegypt.-Arab.* 38. 1775; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 150. 1883. *H. coromandelianum* Raddi *ex DC.*, *Prodr.* 9: 533. 1845, *non* Retz., 1781.

Herbs, annual, erect or decumbent, 5-15 cm high; stems and branches covered with silky appressed hairs. Leaves elliptic-obovate, 1-1.5 x 0.5-0.8 cm, mucronate at apex, narrowed at base, rather thick, appressed hairy, petiolate. Flowers in forked, up to 1 cm long, curved, ebracteate, unilateral spikes. Calyx divided up to base; segments unequal. Corolla white, tubular, pubescent at mouth on both the sides. Drupes rounded, appressed hairy; nutlets 4, equal.

In moist places, river beds and along ponds. Bilaspur, Chhatarpur, Damoh, Durg, Gwalior, Indore, Mandla, Panna, Raipur, Raisen, Rewa, Shivpuri. *Fl. & Fr.*: Aug. - June.

5. *Heliotropium rariflorum* Stocks in Hook., Kew J. Bot. 4: 174. 1852; C.B. Clarke in Hook. f., Fl. Brit. India 4: 152. 1883.

Undershrubs, erect, stout, branched. Leaves linear or linear-lanceolate, 0.5-3 x 0.2-0.5 cm, subacute at apex, revolute, appressed hairy. Flowers in terminal or extra-axillary, 2-8 cm long, bracteate spikes. Calyx divided up to base. Corolla white. Drupes 4-lobed, ca 0.25 cm across; nutlets 4, appressed hairy.

Rare. In wastelands. Dhar (Samvatsar, 1996). *Fl. & Fr.*: Sept. - April.

6. *Heliotropium strigosum* Willd., Sp. Pl. 1: 743. 1798; C.B. Clarke in Hook. f., Fl. Brit. India 4: 151. 1883.

Herbs, erect or procumbent, much branched, 10-20 cm high; stems covered with appressed white hairs. Leaves linear-lanceolate or narrowly oblong-lanceolate, 0.5-2.5 x 0.1- 0.4 cm, acute at apex, entire, densely appressed hairy, sessile. Flowers in lax, bracteate spikes; lower flowers pedicellate; upper ones sessile. Calyx deeply divided; segments strigose outside. Corolla white, tubular or infundibuliform, strigose outside. Drupes unlobed or 4-lobed, ovoid, dark brown to black; nutlets 4, conical, glabrous or appressed hairy.

- 1a. Leaves up to 1.5 cm long; drupes unlobed
or slightly lobed, not depressed at the top ...6.1. subsp. *brevifolium*
- 1b. Leaves 1.5-2.5 cm long; drupes 4-lobed,
depressed at the top ...6.2. subsp. *strigosum*

6.1. subsp. *brevifolium* (Wallich) Kazmi in J. Arnold Arb. 51: 153. 1970. *H. brevifolium* Wallich in Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 2. 1824. *H. strigosum* Willd. var. *brevifolia* (Wallich) C.B. Clarke in Hook. f., Fl. Brit. India 4: 151. 1883. *Chitiphul*.

Along the sandy river beds. Hoshangabad. *Fl. & Fr.*: Dec. - July

6.2. subsp. *strigosum*

Common in wastelands and along ponds. Balaghat, Betul, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Narsimhapur, Raipur, Rewa, Shivpuri, Sidhi, Tikamgarh. *Fl. & Fr.*: April - Dec.

7. *Heliotropium subulatum* (Hochst. ex DC.) Vatke, Osterr. Bot. Z. 25: 166. 1875. *Tournefortia subulata* Hochst. ex DC., Prodr. 9: 528. 1845. *Heliotropium zeylanicum* auct. non Lam., 1789 : C.B. Clarke in Hook. f., Fl. Brit. India 4: 148. 1883.

Herbs, annual or perennial; stems and branches covered with trichomes arising from tuberculate bases. Leaves lanceolate, 2-4 x 0.5-1.2 cm, entire or slightly undulate, with subappressed hairs, subsessile or shortly petiolate. Flowers in terminal or axillary, simple or branched, uniseriate spikes, sessile. Calyx deeply divided; segments lanceolate, densely hairy on the margins. Corolla white to dull yellow, with minute, appressed trichomes; lobes incurved when young, later patent; tube cylindrical. Drupes ca 2 mm across; nutlets 4, brown, tuberculate, separating first in pairs, later free.

Rare. Along paddy fields, Raigarh. *Fl. & Fr.*: Throughout the year.

8. *Heliotropium supinum* L., Sp. Pl. 130. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 149. 1883. *H. malabaricum* Retz., Observ. Bot. 4: 24. 1786. *H. supinum* L. var. *malabarica* (Retz.) C.B. Clarke in Hook. f., Fl. Brit. India 4: 149. 1883. **Fig. 24.**

Herbs, annual, prostrate, branched; branches densely softly villous. Leaves ovate, obovate or ovate-elliptic, 1-2 x 0.5-1 cm, entire, appressed hairy, petiolate. Flowers in simple or forked, 2-5 cm long, uniseriate spikes. Calyx divided up to 1/4th of its length; lobes ovate, densely pubescent. Corolla white, tubular, pubescent. Drupes of usually one developed nutlet, sometimes with 1-2 or rarely 3 abortive ones; nutlets rounded, dark brown, obscurely tuberculate on the back.

In moist places. Chhatarpur, Damoh, East Nimar, Hoshangabad, Jabalpur, Raisen, Rewa, Sagar, Vidisha, West Nimar. *Fl. & Fr.*: Aug. March.

9. *Heliotropium zeylanicum* (Burm. f.) Lam., Encycl. 3: 94. 1789. *H. curassavicum* L. var. *zeylanicum* Burm. f., Fl. Ind. 41. t. 16. f. 2. 1768. *H. paniculatum* R. Br., Prodr. 494. 1810; C.B. Clarke in Hook. f., Fl. Brit. India 4: 151. 1883. *H. zeylanicum* (Burm. f.) Lam. subsp. *paniculatum* (R. Br.) Kazmi in J. Arnold Arb. 51: 156. 1970. **Fig. 25.**



Fig. 24. *Heliotropium supinum* L.

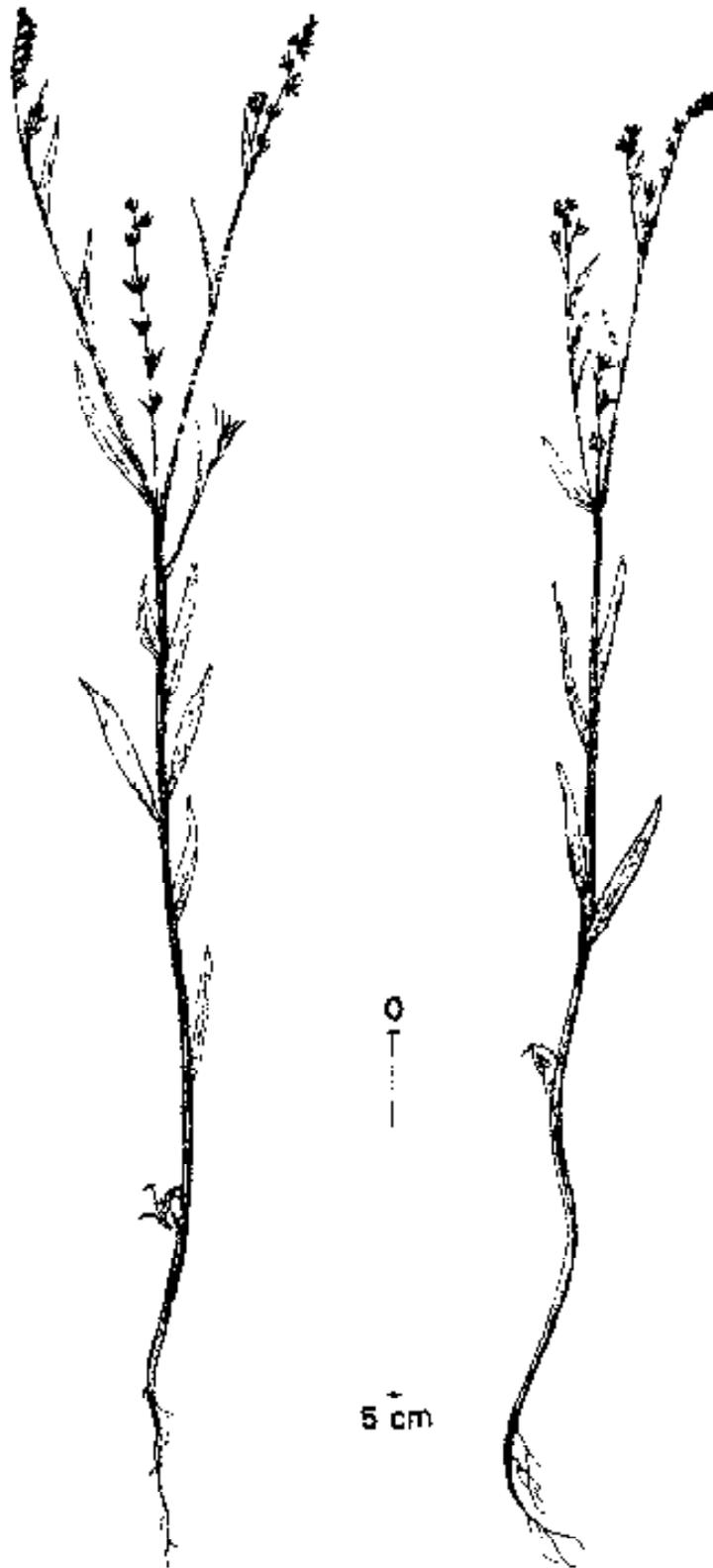


Fig. 25. *Heliotropium zeylanicum* (Burm. f.) Lam.

Herbs, annual, erect, ca 30 cm high; stems and branches loosely covered with short appressed hairs. Leaves linear-lanceolate, 1.2-2.7 x 0.1-0.3 cm, entire, usually revolute, sparsely hairy beneath, sessile. Flowers in terminal or axillary, simple or forked, bracteate, uniseriate spikes. Calyx divided up to base. Corolla white with yellow throat, sparsely hairy outside. Drupes lobed, compressed, covered with loose trichomes.

Rare. In open places. Rewa. *Fl. & Fr.*: Aug. - Sept.

7. ROTULA Lour.

Herbs or undershrubs, trailing, submerged for part of the year. Leaves alternate or fasciculate on short branches. Flowers in few-flowered cymes, bisexual. Calyx 5-partite; segments almost free, unequal in basal width. Corolla campanulate; lobes 5, large; tube shorter than lobes. Stamens 5, exserted, adnate in the lower part of corolla-tube. Ovary oblong-globose, 2-locular; style simple, terminal, elongate, persistent; stigma shallowly 2-fid, capitate. Fruit a drupe, 4-lobed, breaking into 4 nutlets; nutlets 1-seeded.

A monotypic genus; E. Brazil and tropical regions of Old World.

Rotula aquatica Lour., *Fl. Cochinch.*, 121, 1790. *Rhabdia lycioides* auct. non Mart., 1827; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 145, 1883. - *Dantratchu, Phanbidi, Sawariya*.

Herbs or undershrubs; branches creeping and rooting. Leaves oblong to spatulate, narrow, 0.7-2.5 x 0.4-0.6 cm, apiculate at apex, cuneate at base, entire, sessile. Flowers in terminal or axillary, 1-4-flowered cymes, sessile. Calyx-segments elongate-deltoid. Corolla pink to purple; lobes oblong. Drupes globose, red to orange, tipped by persistent style.

On rocky river beds and along streams. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Indore, Jabalpur, Mandla, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Seoni, Shahdol, Surguja. *Fl. & Fr.*: Oct. - Feb.

8. TRICHODESMA R. Br., *nom. cons.*

Herbs or undershrubs, hispid. Leaves opposite or alternate, entire, covered with bulbous-based, white hairs. Flowers axillary, solitary or in

terminal racemes, cymes or subcorymbose by gradual reduction of leaves. Calyx deeply 5-lobed, accrescent in fruit. Corolla campanulate, campanulate-tubular or infundibuliform, 5-lobed; lobes twisted to left; throat naked; tube short. Stamens 5, adnate to corolla-tube; filaments short; anthers connivent into a cone; connectives much produced, hairy, twisted or not. Ovary 4-lobed, 4-locular; style subterminal, slender; stigma small. Fruit of 4 nutlets, all adnate by their inner surface to central pyramidal receptacle, smooth or warty.

About 35 species; tropical and subtropical regions of Old World; 4 in M.P.

1a. Fruiting calyx-lobes cordate or hastate at base:

2a. Leaves linear, lanceolate, oblong or ovate-oblong, more than 3 x 1 cm, covered with only long, stiff bulbous-based hairs:

3a. Staminal cone exserted; tip of connectives spirally twisted ...1. *T. indicum*

3b. Staminal cone included; tip of connectives not twisted ...2. *T. sedgwickianum*

2b. Leaves oblong-elliptic, up to 2.5 x 0.8 cm, covered with long, stiff, bulbous-based hairs interspersed with short, thin, non-bulbous-based hairs ...3. *T. stocksii*

1b. Fruiting calyx-lobes ovate or rounded at base ...4. *T. zeylanicum*

1. ***Trichodesma indicum*** (L.) R. Br. ex Lehm., Pl. Asperif. Nucif. 193. 1818, "*indica*"; C.B. Clarke in Hook. f., Fl. Brit. India 4: 153. 1883; Banerjee & Pramanik in Bull. Bot. Surv. India 17: 110. (1975) 1978. *Borago indica* L., Sp. Pl. 137. 1753. *Chhota-kulpha*, *Ghammara*, *Ralmandi*, *Sal-knota*.

Herbs, annual, erect or diffuse, bristly hairy. Leaves opposite, lanceolate, linear, oblong or ovate-oblong, 3-10 x 1-1.5 cm, acute at apex, dilated at base, thinly hairy above, glabrous or densely hairy beneath with bulbous-based hairs, sessile or shortly petiolate. Flowers axillary, solitary, appearing cymose by reduction of leaves. Calyx-lobes ovate-lanceolate, produced into distinct auricle at base, hispid hairy. Corolla white to pale blue, infundibuliform; lobes abruptly narrowed to a twisted tip. Anthers

connivent in a cone, densely woolly on back. Nutlets elliptic-oblong, white, smooth and shining on the outer face, rugosely pitted on the inner face.

Notes: Kazmi (J. Arnold Arb. 52: 516. 1971) has attributed the authority for the combination to R. Brown. On the other hand, according to Ramamoorthy (Fl. Hassan 483. 1976) it should be to R. Br. ex Lehmann since R. Brown merely stated that *Borago indica* L. belonged to *Trichodesma* but did not in fact make the new combination (Art. 33.1).

- 1a. Leaves crowded, coriaceous, revolute, densely hairy beneath ...1.2. var. *indicum*
- 1b. Leaves distant, chartaceous, not revolute, glabrous beneath except on the midrib and veins:
- 2a. Leaves amplexicaul at base ...1.1. var. *amplexicaule*
- 2b. Leaves attenuated at base ...1.3. var. *subsessilis*

1.1. var. amplexicaule (Roth) Cooke, Fl. Bombay 2: 215. 1905; Sedgwick in Rec. Bot. Surv. India 6(8): 350. t. 11. 1919; Banerjee & Pramanik in Bull. Bot. Surv. India 17: 113. (1975) 1978. *T. amplexicaule* Roth, Nov. Pl. Sp. 104. 1821, *non* DC., 1846; C.B. Clarke in Hook. f., Fl. Brit. India 4: 153. 1883, *p.p.* Aundhi, Jhar.

Common in moist open places. Balaghat, Betul, Bilaspur, Dabhoh, Durg, Hoshangabad, Indore, Mandla, Raigarh, Raipur, Rajnandgaon, Rewa, Satna. *Fl. & Fr.*: July - Nov.

1.2. var. indicum

Common in wastelands, grassy fields and along roadsides. Bastar, Chhatarpur, Dhar, Indore, Raipur, Seoni. *Fl. & Fr.*: July - Nov.

Roots are used in stomach disorders while flowers as female contraceptive.

1.3. var. sessilis C.B. Clarke in Hook. f., Fl. Brit. India 4: 153. 1883; Banerjee & Pramanik in Bull. Bot. Surv. India 17: 114. (1975) 1978. *Trichodesma sessilis* Wallich, Numer. List n. 933. 1829, *nom. nud.*

Amidst boulders. Betul, Narsimhapur, Satna, Seoni, Surguja. *Fl. & Fr.*: Jan. - Aug.

2. **Trichodesma sedgwickianum** Banerjee in Bull. Bot. Soc. Bengal 16: 10. (1962) 1964; Banerjee & Pramanik in Bull. Bot. Surv. India 17: 116. (1975) 1978. *T. amplexicaule* auct. non Roth, 1821: A. DC. in DC., Prodr. 10: 172. 1846; C.B. Clarke in Hook. f., Fl. Brit. India 4: 153. 1883, p.p.; Sedgwick in Rec. Bot. Surv. India 6: 347. 1913.

Herbs, erect, annual, hirsute, ca 30 cm high. Leaves opposite, ovate-oblong, 5-9 x 1.5-3.5 cm, obtuse at apex, cordate or subamplexicaul at base, densely scabrid with white, bulbous-based, stiff hairs, sessile. Flowers axillary, solitary, sometimes in few-flowered cymes. Calyx sagittate at base; lobes strigose, never spreading. Corolla white or pinkish lilac with two brown bands at the mouth. Anthers oblong; connectives never twisted. Nutlets ovoid, smooth.

Along drains and in moist wastelands. Hoshangabad, Raipur, Rewa, Satna, Seoni. *Fl. & Fr.*: July - Oct.

3. **Trichodesma stocksii** Boiss., Diagn. Pl. Orient. II, 3(3): 140. 1856.
Fig. 26.

Herbs, perennial, ca 30 cm high; stems and branches densely covered with thin, short hairs intermixed with long, stiff, bulbous-based hairs. Leaves oblong-elliptic, 1.5-2.5 x 0.3-0.8 cm, obtuse at apex, attenuate at base, covered with long, stiff, bulbous-based hairs interspersed with short, thin, non-bulbous-based hairs; lower cauline leaves shortly petiolate; upper ones sessile. Flowers in 3-5-flowered, subcorymbs; bracts minute, linear-lanceolate. Calyx-lobes cordate at base. Corolla campanulate; lobes ovate, abruptly acuminate, recurved at apex. Anthers aristate; connectives slightly twisted. Nutlets subglobose, membranaceous on margin.

Rare. Betul. *Fl. & Fr.*: Feb. - March.

This species is being reported here as a new record for India based on a collection (Duthie 10470, CAL) of 1891.

4. **Trichodesma zeylanicum** (Burm. f.) R. Br., Prodr. 496. 1810, "zeylanica"; C.B. Clarke in Hook. f., Fl. Brit. India 4: 154. 1883; Banerjee & Pramanik in Bull. Bot. Surv. India 17: 120. (1975) 1978. *Borago zeylanica* Burm. f., Fl. Ind. 41. 1768. - *Hetenuria, Jalasirasa*.

Herbs, diffuse, bristly hairy. Leaves opposite, oblong or oblong-lanceolate, 3-8 x 1-3.5 cm, acute or obtuse at apex and base, densely



Fig. 26. *Trichodesma stocksii* Boiss.

covered beneath with soft, stiff, bulbous-based hairs; lower leaves petiolate; upper ones sessile, passing into bracts. Flowers axillary, solitary or upper ones in leafy racemes. Calyx-lobes lanceolate or ovate-lanceolate, often overtopping corolla. Corolla blue, campanulate-tubular; lobes obovate, acuminate, twisted at tip. Anthers hairy below; connectives twisted. Nutlets ovoid-oblong, finely margined.

Common in wastelands and along roadsides. Balaghat, Bastar, Betul, Bilaspur, Durg, Mandla, Panna, Raigarh, Rajnandgaon, Rewa, Satna, Seoni, Sidhi. *Fl. & Fr.*: Throughout the year.

Roots are used for the treatment of stomach diseases.

98. CONVULVACEAE

(R.C. Srivastava)

About 58 genera and 1650 species; cosmopolitan especially subtropical regions; 11 genera and 50 species in M.P.

- 1a. Plants parasitic; stems yellow or cream-coloured; leaves absent or reduced to scales ...3. *Cuscuta*
- 1b. Plants nonparasitic (autotrophic); stems green or brown; leaves well developed:
 - 2a. Leaves rotundate ...11. *Rivea*
 - 2b. Leaves otherwise:
 - 3a. Leaves coriaceous; corolla-lobes 2-fid; style absent ...4. *Erycibe*
 - 3b. Leaves not coriaceous; corolla-lobes subentire to entire; style present:
 - 4a. Prostrate herbs:
 - 5a. Styles 2; stigmas 4 ...5. *Evolvulus*
 - 5b. Style 1; stigmas 1 or 2:
 - 6a. Leaves linear-oblong, subacute to obtuse; sepals densely hairy ...2. *Convolvulus*

- 6b. Leaves reniform to broadly ovate or lanceolate to oblong, acuminate to emarginate or mucronate; sepals glabrous ...8. *Merremia*
- 4b. Erect or climbing herbs or shrubs:
- 7a. Stigma filiform ...2. *Convolvulus*
- 7b. Stigma globose:
- 8a. Sepals accrescent in fruit, falling with the fruit; seed one ...10. *Poranua*
- 8b. Sepals not or rarely accrescent in fruit; seeds 2-4:
- 9a. Stems and leaves with stellate trichomes; stigma ellipsoid to oblong ...7. *Jacquemontia*
- 9b. Stems and leaves glabrous or with simple or 2-fid trichomes; stigma globose or capitate:
- 10a. Fruits indehiscent, thick-walled ...1. *Argyreia*
- 10b. Fruits dehiscent, thin-walled:
- 11a. Stems usually winged; capsules circumscissile ...9. *Operculina*
- 11b. Stems unwinged; capsules dehiscing irregularly or by valves:
- 12a. Corolla infundibuliform or hypocrateriform, rarely campanulate; pollen echinate or spinulose, porate ...6. *Ipomoea*
- 12b. Corolla usually campanulate, rarely infundibuliform; pollen smooth, colpate ...8. *Merremia*

1. ARGYREIA Lour.

Climbers. Leaves variable in shape and size, glabrous or pubescent, petiolate. Flowers axillary, in few to many-flowered cymes, usually

bracteate. Sepals 5, often pubescent outside, slightly to much enlarged in fruit. Corolla campanulate, infundibuliform or tubular; limb entire to deeply lobed, interlobes pubescent. Stamens 5, included or exerted. Stigma globose. Fruit a berry, ellipsoid to globose, fleshy, leathery. Seeds glabrous, sometimes pilose at hilum.

About 90 species; Indo-Malesia to Australia: 8 in M.P.

- 1a. Leaves elliptic, lanceolate or oblong, obtuse at base:
- 2a. Leaves glabrous above; sepals up to 1 cm long ...2. *A. daltoni*
- 2b. Leaves sparsely hairy above; sepals
1.5-2 cm long ...4. *A. involucreta*
- 1b. Leaves ovate, cordate or truncate-cordate at base:
- 3a. Peduncles more than 20 cm long;
sepals woody ...6. *A. nervosa*
- 3b. Peduncles less than 20 cm long;
sepals herbaceous:
- 4a. Flowers in lax, corymbose cymes ...8. *A. strigosa*
- 4b. Flowers in capitate or subcapitate cymes:
- 5a. Peduncles up to 5 cm long;
sepals up to 1 cm long:
- 6a. Sepals glabrous and reddish inside ...1. *A. bella*
- 6b. Sepals sparsely hairy and
yellowish inside ...3. *A. hirsuta*
- 5b. Peduncles more than 5 cm long;
sepals more than 1 cm long:
- 7a. Sepals ovate, glabrous inside ...5. *A. kleiniana*
- 7b. Sepals elliptic-lanceolate,
sparsely hairy inside ...7. *A. sericea*

1. *Argyrea bella* (C.B. Clarke) Raizada in Indian For. 84: 472, 1958 & 93: 754, 1967. *Lettsomia bella* C.B. Clarke in Hook. f., Fl. Brit. India 4: 192, 1883. Fig. 27.

Climbers. Leaves ovate, 5-13 x 6-11 cm, acute at apex, cordate at base, softly hairy above, white tomentose beneath. Flowers in capitate

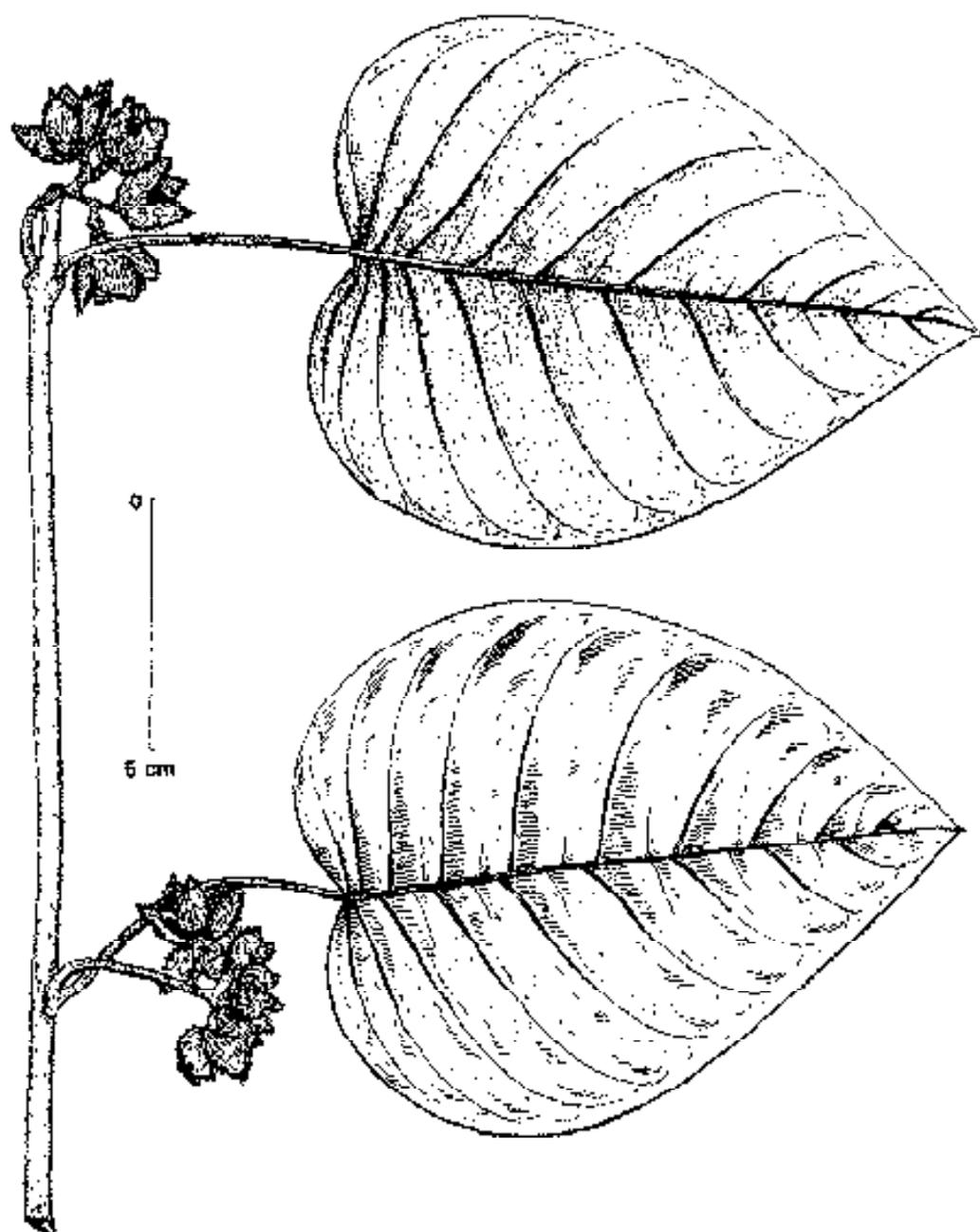


Fig. 27. *Argyreia bella* (C.B. Clarke) Raizada

cymes; peduncles terete, 2-4 cm long, shorter than leaves; bracts small, spatulate or oblong. Sepals elliptic, ca 1 cm long, glabrous and reddish inside, densely tomentose outside. Corolla tubular-campanulate, hirsute. Berries ca 5 cm across, red.

In mixed forests. Bilaspur, Raigarh. *Fl. & Fr.*: Nov. Dec.

2. *Argyreia daltoni* C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4:190, 1883.

Climbers. Leaves elliptic or oblong, 7-15.5 x 3-10 cm, acute at apex, obtuse at base, glabrous above, fulvous-strigose beneath. Flowers in cymes; peduncles 2-7 cm long, rigid, fulvous silky. Sepals up to 1 cm long, glabrous inside, hairy outside, coriaceous. Corolla purple, 7-8 cm long, densely hairy outside in buds, in alternate bands in open flowers. Berries 1.5-5 cm across.

As undergrowth in mixed forests. Bastar, Raipur. *Fl. & Fr.*: Sept. Dec.

3. *Argyreia hirsuta* Wight & Arnott in *Nova Acta Acad. Leop. Nat. Cur.* 18: 356c. 1836. *A. hirsuta* var. *coacta* C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 189, 1883.

Twiners. Leaves ovate, 7-10 x 6-8 cm, acute at apex, cordate or truncate-cordate at base, sparsely hairy above, densely hairy beneath. Flowers in several-flowered cymes, clustered in pseudo-umbels; peduncles up to 5 cm long; pedicels ca 5 mm long; bracts linear or oblong, outer often petaloid, foliaceous. Sepals ovate, ca 7 mm long, obtuse, sparsely hairy inside, densely hairy outside. Corolla lavender to purple, infundibuliform, 4-5 cm long. Berries ca 1 cm long. Seeds white, glabrous.

Rare. Along the edge of forests. Sidhi. *Fl. & Fr.*: Jan. Feb.

4. *Argyreia involucrata* C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 187, 1883. Fig. 28.

Climbers. Leaves elliptic-lanceolate or oblong, rarely ovate, 5-18 x 3-11 cm, acuminate at apex, obtuse or rounded at base, sparingly hairy or glabrescent above, densely hairy beneath. Flowers in subcapitate cymes; peduncles 5-10 cm long, shorter than leaves; bracts oblong, ca 2 cm long,

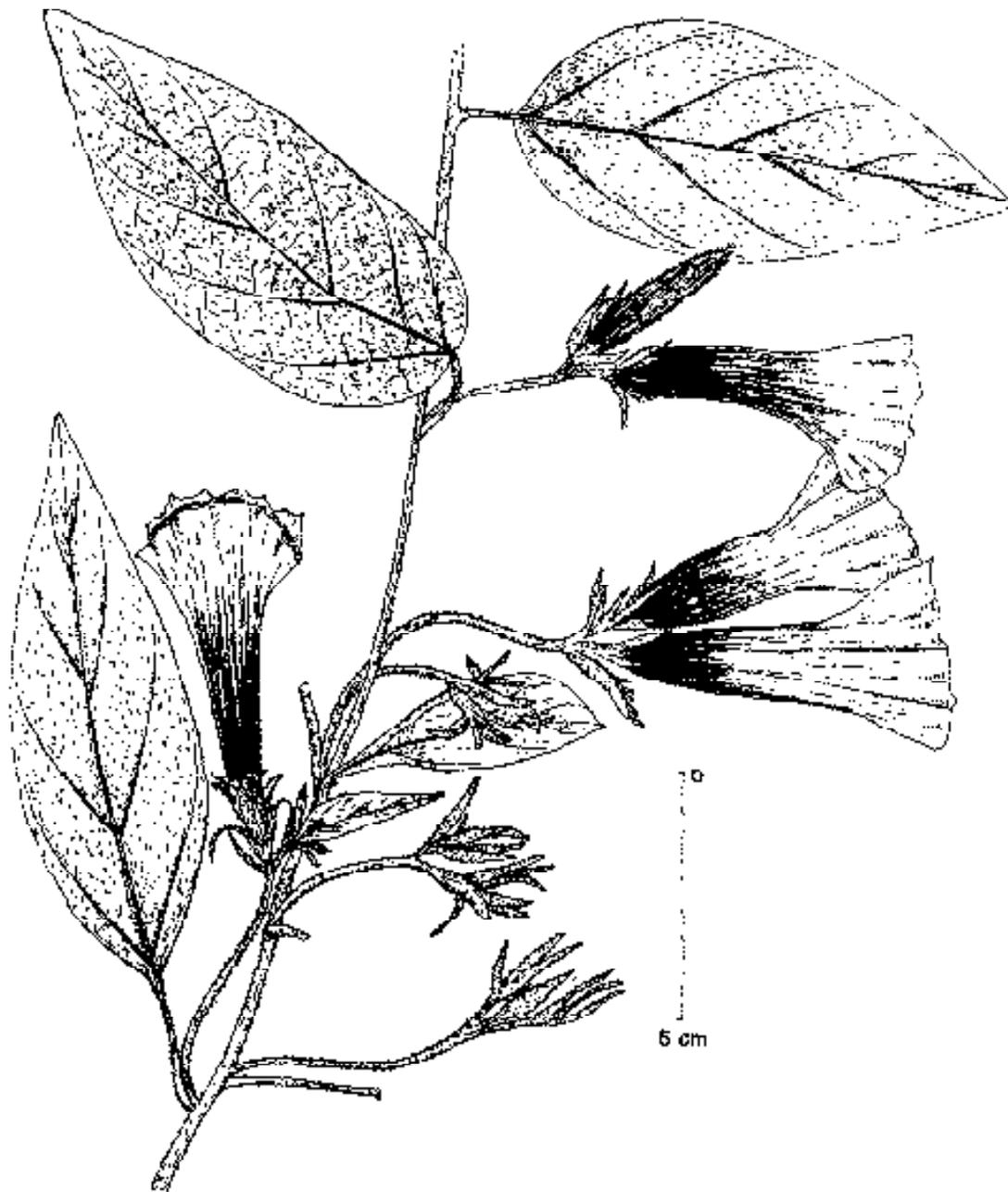


Fig. 28. *Argyreia involucrata* C.B. Clarke

stellately spreading, persistent. Sepals ovate-lanceolate, subequal or unequal, 1.5-2 cm long, acuminate, glabrous inside, hairy outside. Corolla infundibuliform. Berries oblong, ca 4 cm long, glabrous.

In mixed forests. Bastar, Raipur. *Fl. & Fr.*: Nov. Feb.

5. *Argyrea kleiniana* (Roem. & Schult.) Raizada in Indian For. 92: 302, 1966. *Ipomoea kleiniana* Roem. & Schult., Syst. Veg. 4: 789, 1819. *Argyrea bracteata* Choisy, Convolv. Orient. 39, 1834; C.B. Clarke in Hook. f., Fl. Brit. India 4: 188, 1883.

Climbers. Leaves ovate, 6.5-15 x 5-14 cm, acuminate at apex, cordate at base, sparsely hairy above, densely silky beneath; petioles 2.5-8 cm long. Flowers in subcapitate cymes; peduncles 8-10 cm long; bracts prominent, oblong or elliptic, silky villous, persistent. Sepals ovate, 10-15 mm long, subacute, glabrous inside, hairy outside. Corolla tubular-campanulate, ca 4.5 cm long. Berries ca 1.5 cm across, yellowish brown.

In scrub forests. Damoh, Hoshangabad, Jabalpur. *Fl. & Fr.*: Oct. Dec.

6. *Argyrea nervosa* (Burm. f.) Bojer, Hortus Maurit. 224, 1837. *Convolvulus nervosus* Burm. f., Fl. Ind. 48, t. 201, 1768. *Lettsomia nervosa* (Burm. f.) Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 78, 1824. *Argyrea speciosa* Sweet, Hort. Brit. ed. 2, 373, 1830; C.B. Clarke in Hook. f., Fl. Brit. India 4: 185, 1883. - *Samander-ka-pat*.

Climbers; stems densely pubescent or glabrescent when young. Leaves broadly ovate, 8-15 cm long, acute or obtuse at apex, cordate at base, glabrous above, densely silvery-white pubescent beneath. Flowers in cymes; peduncles 20-26 cm long, white tomentose. Sepals ovate, ca 2 cm long, white tomentose. Corolla lavender with darker throat, 6-7 cm long, pubescent outside on tube and interplicae. Berries dry, subglobose, 1-1.5 cm long. Seeds light or dark brown, glabrous.

Rare. Bastar, Hoshangabad. *Fl. & Fr.*: April Sept.

Leaves are used as poultice for wounds and skin diseases.

7. *Argyrea sericea* Dalzell & Gibson, Bombay Fl. 169, 1861; C.B. Clarke in Hook. f., Fl. Brit. India 4: 188, 1883.

Climbers. Leaves ovate, 4-12 x 6-11 cm, acute or acuminate at apex, cordate at base, hispid or strigose above, densely silky beneath. Flowers in capitate cymes; peduncles equal to or longer than petioles, 6-16 cm long; bracts persistent, oblong or elliptic, silky on nerves. Sepals elliptic-lanceolate, unequal, 1.5-2.5 cm long, sparsely hairy inside, densely hairy outside. Corolla *ca* 5.5 cm long, hairy outside on bands. Berries orange.

In sal forests. Balaghat, Bastar, Chhatarpur, Damoh, Hoshangabad, Indore, Mandla, Rajnandgaon, Seoni, West Nimar. *Fl. & Fr.*: Aug.-Sept.

Stems are considered to be of medicinal value by rural folk of Bastar.

8. *Argyreia strigosa* (Roth) Roberty in *Candollea* 14: 44. 1952. *Ipomoea strigosa* Roth, *Nov. Pl. Sp.* 113. 1821. *Lettsomia setosa* Roxb., *Fl. Ind.* (Carey & Wallich ed.) 2: 80. 1824; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 194. 1883. *Argyreia setosa* Arnott *ex Choisy*, *Convolv. Orient.* 43. 1834. - *Bagh-chaura*, *Baghchood*.

Large climbers. Leaves ovate, 6-14 x 4-13 cm, acute or acuminate at apex, cordate at base, glabrous above, appressed hairy beneath. Flowers in lax, corymbose cymes; peduncles 12-20 cm long; bracts ovate, obtuse, persistent, appressedly strigose. Sepals ovate to elliptic, longer than bracts, glabrous inside, densely appressed hairy outside. Corolla mauve, densely setose. Berries *ca* 5 x 7 cm.

In mixed and sal forests. Bastar, Bilaspur, Indore, Raigarh, Raipur, Seoni, Surguja, West Nimar. *Fl. & Fr.*: Oct. March.

2. CONVULVULUS L.

Herbs, annual or perennial, prostrate or twining. Leaves simple, alternate, entire, glabrous or pubescent. Flowers in terminal or axillary cymes, bracteate. Sepals 5, more or less equal. Corolla campanulate or infundibuliform. Stamens 5, included; filaments often unequal. Ovary 2-4-locular; ovules 2 in each locule; style single, filiform; stigmas 2, filiform, linear or cylindrical. Fruit a capsule, glabrous or pubescent, 2-celled, 1-4-seeded. Seeds smooth or tuberculate, glabrous or pubescent.

About 250 species; cosmopolitan especially temperate regions; 2 in M.P.

- 1a. Plants twining or climbing; leaves petiolate;
corolla 14-18 mm long ...1. *C. arvensis*
- 1b. Plants prostrate; leaves sessile;
corolla 10-12 mm long ...2. *C. prostratus*

1. *Convolvulus arvensis* L., Sp. Pl. 153. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 219. 1883.

Herbs, annual, climbing; stems glabrous to pubescent. Leaves linear-oblong, 1.5-4.5 x 0.4-3 cm, acute at apex, sagittate to hastate at base, glabrous to pubescent, petiolate. Flowers axillary, glabrous to pubescent, pedicellate, bracteate. Sepals 4-5 mm long. Corolla lilac with dark purple throat, 14-18 mm long. Capsules globose, 4-seeded. Seeds dark brown, tuberculate.

Common as weed in fields, along railway tracks and forest roads. Chhatarpur, Damoh, Indore, Raisen, Satna, Seoni, Sidhi. *Fl. & Fr.*: Dec.-Feb.

Roots are mild purgative.

2. *Convolvulus prostratus* Forssk., Fl. Aegypt.-Arab. 203. 1775. *C. microphyllus* Sieber ex Spreng., Syst. Veg. 1: 611. 1825. *C. pluricaulis* Choisy, Convolv. Orient. 95. 1834; C.B. Clarke in Hook. f., Fl. Brit. India 4: 218. 1883. *C. pluricaulis* var. *macra* C.B. Clarke in Hook. f., Fl. Brit. India 4: 218. 1883. - *Shankhpushpi*. **Fig. 29.**

Herbs, perennial, prostrate. Leaves linear to oblong, 1-3 x 0.5-0.8 cm, subacute to obtuse at apex, villous, sessile. Flowers 1-5, in axillary heads, sessile to subsessile; bracts linear to oblanceolate, acute; bracteoles filiform. Sepals ovate-lanceolate to lanceolate, 4-7 mm long, acuminate, villous; outer sepals long; inner short. Corolla 10-12 mm long. Capsules subglobose, glabrous, 4-seeded. Seeds brown-black, sparsely to densely white pubescent.

Common in open fields, sandy and rocky places. Chhatarpur, Gwalior, Indore, Mandla, Morena, Rewa, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Dec. Feb.

The plant is brain tonic and referred to improve memory.

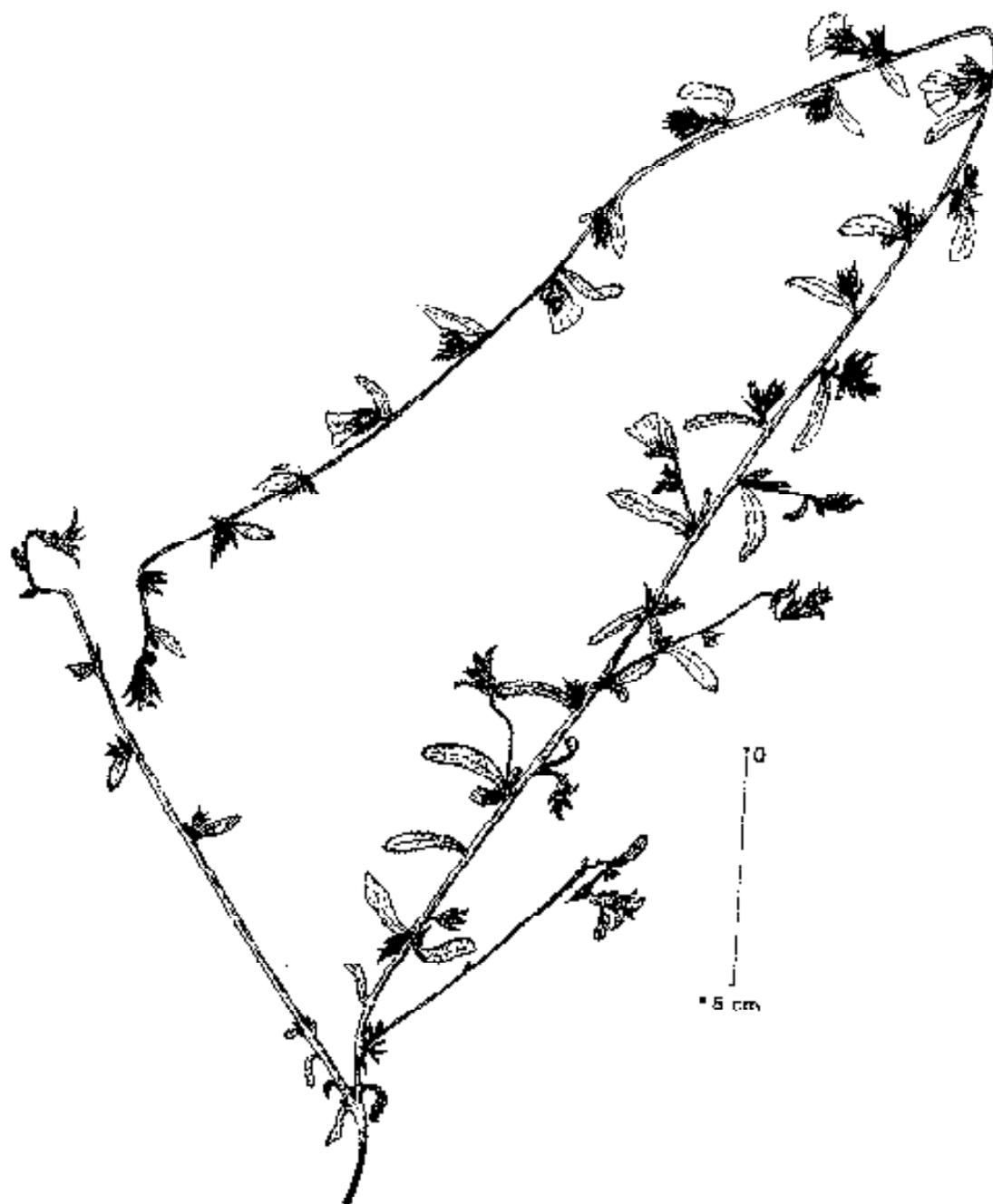


Fig. 29. *Convolvulus prostratus* Forssk.

3. CUSCUTA L.*

Parasitic, twiners, without chlorophyll; stems filiform, yellow or orange, attached to plants by haustoria; roots absent. Leaves reduced to minute scales or absent. Flowers in cymose clusters or racemes, small, whitish. Calyx gamosepalous, 5-lobed; sepals rarely free. Corolla urceolate, infundibuliform or campanulate, 5-lobed, with basal scale like appendages inside; appendages opposite the stamens, forming a corona. Ovary 2-locular; ovules 2 in each locule; styles 2, distinct or rarely united, terminal; stigma capitate to linear. Fruit a capsule, indehiscent or dehiscent, 1-4-seeded. Seeds smooth or rough.

About 145 species; cosmopolitan: 5 in M.P.

1a. Corolla white or cream-coloured:

2a. Corolla 2-3 times longer than calyx; style 1 ...5. *C. reflexa*

2b. Corolla less than twice as long as calyx; styles 2 ...2. *C. campestris*

1b. Corolla yellow:

3a. Corolla-lobes ovate-lanceolate, acute or acuminate, scales absent ...4. *C. hyalina*

3b. Corolla-lobes ovate, obtuse or shortly acute, scales present:

4a. Corolla ca 2 mm long; fruits indehiscent ...1. *C. australis*

4b. Corolla ca 3mm long; fruits dehiscent ...3. *C. chinensis*

1. *Cuscuta australis* R. Br., Prodr. 491. 1810; Yunck. in Mem. Torrey Bot. Club 18: 124. 1932.

Stems slender, leafless. Flowers in compact clusters. Calyx infundibuliform, membranous, ca 1 mm long; lobes equal or slightly longer than the united part, ovate, obtuse. Corolla yellow, infundibuliform, ca 2 mm long; lobes broadly ovate, obtuse or subacute. Stamens arising from the sinuses, ca 1.8 mm long; anthers ovate, basifixed; scales 2-fid, with few fimbriae. Capsules obpyriform, indehiscent. Seeds suborbicular, minutely foveolate, black.

*Often treated under a separate family Cuscutaceae, *nom. cons.* (App. II B, ICBN, 1994)

Rare. On *Guizotia abyssinica*. Raigarh. *Fl. & Fr.*: March.

2. *Cuscuta campestris* Yunck. in Mem. Torrey Bot. Club 18: 138. 1932.

Stems twining, leafless, filiform. Flowers in globose clusters. Calyx campanulate, ca 1.5 mm long. Corolla white, campanulate, ca 2 mm long; lobes broadly deltoid. Stamens ca 1 mm long; scales ovate, fimbriate, bridged at the base. Capsules depressed globose, indehiscent.

Common on linseed plants and *Parthenium hysterophorus*. Indore, Raipur. *Fl. & Fr.*: Sept. Feb.

3. *Cuscuta chinensis* Lam., Encycl. 2: 229. 1786; C.B. Clarke in Hook. f., Fl. Brit. India 4: 226. 1883.

Stems slender, yellow. Flowers in dense glomerules, sessile or shortly pedicellate. Calyx-lobes ovate, thickened and fleshy near the tips, forming a carina, slightly overlapping, obtuse or acute. Corolla yellow, 3-3.5 mm long. Anthers ovoid; filaments shorter, equal to or longer than anthers; scales oblong, fimbriate. Capsules depressed globose, circumscissile. Seeds ca 1.25 mm long.

- 1a. Filaments as long as or longer than anthers;
scales oblong, fimbriate at tip ...3.1. var. *chinensis*
- 1b. Filaments shorter than anthers; scales
spathulate, fimbriate from the base ...3.2. var. *ciliaris*

3.1. var. *chinensis*

Rare. Mandla. *Fl.*: Sept.

3.2. var. *ciliaris* (Hohen. ex Boiss.) Engelm. in Trans. Acad. Sci. St. Louis I: 480. 1859. *Cuscuta ciliaris* Hohen. ex Boiss., Diagn. Pl. Orient. II. 3: 129. 1856, non Kotschy ex Choisy, 1845.

Common on *Cassia tora* and *Lagascea mollis*. Indore, Sagar, Tikamgarh. *Fl. & Fr.*: Sept. Nov.

Seeds are referred as tonic, diaphoretic and demulcent.

4. *Cuscuta hyalina* Roth, Nov. Pl. Sp. 100. 1821, non Wight, 1848; C.B. Clarke in Hook. f., Fl. Brit. India 4: 226. 1883. *Amarbel, Niradhari.*

Stems closely twining, very slender, much branched, often forming a tangled mass. Flowers in fascicles or shortly pedunculate cymes or racemes; pedicels ca 0.5 mm long; bracts ca 3 mm long, lanceolate, acute. Calyx divided more than half way down, ca 3 mm long; segments 5, ovate, acute or acuminate, slightly unequal. Corolla ca 3 mm long, 5-lobed; lobes ovate-lanceolate, ca 2 mm long, acute or acuminate. Filaments 0.6-0.8 mm long; scales absent. Capsules subglobose, ca 2.5 mm across, membranous. Seeds ovoid or suborbicular, compressed, ca 1.5 mm across, crowned by the persistent styles.

Rare. Bhopal (Oommachan, 1977). *Fl. & Fr.*: July - Oct.

The plant is boiled in water and the extract is taken to relieve chest pain.

5. *Cuscuta reflexa* Roxb., Pl. Coromandel 2: 3, t. 104. 1799; C.B. Clarke in Hook. f., Fl. Brit. India 4: 225. 1883. *C. santapauli* Bancrji & Das in J. Arnold Arb. 46: 87. 1965. - *Akasbel, Amarbel.*

Stems coarse, up to 2 mm thick, yellowish green. Flowers in subglobose, small clusters or racemes. Calyx cupular; lobes orbicular, obtuse, overlapping, verrucose-carinate outside. Corolla white or cream-coloured, 6-10 mm long; lobes narrowly ovate, spreading or reflexed, shorter than tube. Filaments very short; scales ovate to oblong, fimbriate. Capsules globose-conical, circumscissile near the base. Seeds 3-3.5 mm long, black.

Common on a variety of hosts. Balaghat, Betul, Chhatarpur, Damoh, Hoshangabad, Indore, Narsimhapur, Raigarh, Raipur, Rajnandgaon, Seoni, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Nov. - March.

The plant is taken in protracted fevers, retention of wind and jaundice. Stems and seeds are used for stomach diseases while seed powder as anthelmintic and in dermatitis and itching.

4. ERYCIBE Roxb.

Woody climbers or creepers, rarely trees. Leaves simple. Flowers in terminal or axillary panicles, fragrant; bracts minute, caducous. Sepals 5, free, usually pubescent outside, glabrous inside, outer 2 different in shape.

Corolla deeply 5-lobed; each lobe with 2 lateral lobules; tube glabrous outside. Stamens 5, inserted slightly above corolla base; pollen smooth. Ovary ellipsoid, glabrous to pubescent. 1-locular; ovules 4; style absent; stigma conical, usually with 5 or 10 longitudinal, straight or slightly contracted ridges. Fruits baccate, slightly fleshy, ellipsoid or rarely obpyriform, glabrous, smooth or pubescent, usually 1-seeded.

About 67 species; Indo-Malesia to tropical Australia and Japan; one in M.P.

Erycibe paniculata Roxb., Pl. Coromandel 2: 31. t. 159. 1798; C.B. Clarke in Hook. f., Fl. Brit. India 4: 180. 1883. *E. rheede* (Schult.) Blume. Bijdr. 1047. 1827, "*rheedii*"

Large, woody climbers. Leaves oblong-ovate, ovate-obovate or elliptic, 5-10 cm long, acute-acuminate at apex, cuneate or acute at base. Flowers in terminal, many-flowered panicles. Sepals ovate to rounded, subequal, 1-2 mm long, tomentose. Corolla white, campanulate-rotate, 5-6 mm long. Fruits ovoid to ellipsoid, 10-14 mm long, slightly leathery, glabrous. Seeds glabrous.

Common in dry mixed deciduous forests, along rivers and streams. Bilaspur, Raigarh, Raipur, Rewa, Sidhi, Surguja. Fl. & Fr.: Nov. - Feb.

5. EVOLVULUS L.

Herbs, prostrate, not twining. Leaves usually small, entire. Flowers solitary or in axillary, 1-several-flowered, pedunculate dichasia, pedicellate or sessile. Sepals 5, free. Corolla rotate, campanulate, infundibuliform or hypocrateriform; limb usually entire, plicate, interplicate, pilose outside. Stamens 5, inserted within corolla-tube. Styles 2, free or basally connate, each style deeply 2-fid for at least half of its length; stigmas long, terete, filiform to subclavate. Fruit a capsule, globose to ovoid, 4-valved, 1-4-seeded. Seeds small, smooth or minutely verrucose.

About 100 species; subtropical and tropical America extending to Old World; 2 in M.P.

1a. Stems with erect, silky pubescence; leaves elliptic to linear-oblong, silky pilose; corolla shallowly lobed; capsules 2-celled

...1. *E. atsinoides*

- 1b. Stems glabrous or with appressed tomentum; leaves broadly ovate to orbicular, glabrous or slightly pubescent beneath; corolla deeply lobed; capsules 1-celled ...2. *E. nummularius*

1. ***Evolvulus alsinoides*** (L.) L., Sp. Pl. ed. 2. 392. 1762; C.B. Clarke in Hook. f., Fl. Brit. India 4: 220. 1883. *Convolvulus alsinoides* L., Sp. Pl. 157. 1753. - *Shankhaphuli*, *Shyamakranta*.

Herbs, prostrate, mostly covered with silky indumentum. Leaves elliptic to linear-oblong, 8-26 x 5-12 mm, acute to rounded at both ends, silky pilose, subsessile. Flowers 1-5 on a peduncle; peduncles 6-40 mm long. Sepals ovate-lanceolate, 4-5 mm long, acute. Corolla white or blue, campanulate to subrotate or sometimes broadly infundibuliform. Capsules globose, 3-4 mm long, glabrous, usually 4-seeded. Seeds ovoid, pale brown to black.

Common in wastelands and dry mixed deciduous forests, mostly in rocky and dry places. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Durg, Indore, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Shivpuri, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: Aug. March.

The plant is bitter, nervine tonic, febrifuge, vermifuge, antispasmodic and aphrodisiac. Leaves are referred for the treatment of asthma, insanity, epilepsy, bleeding and spermatorrhoea. Oil made with the plant is hair growth promoter.

2. ***Evolvulus nummularius*** (L.) L., Sp. Pl. ed. 2. 391. 1762. *Convolvulus nummularius* L., Sp. Pl. 157. 1753. *Volvulopsis nummularia* (L.) Roberty in Candollea 14: 28. 1952.

Herbs, perennial, prostrate, glabrous or with short tomentum, rooting at nodes. Leaves broadly ovate to orbicular, 4-15 x 7-9 mm, rounded to emarginate at apex, glabrous or slightly pubescent beneath, shortly petiolate. Flowers in leaf axils, solitary or paired; pedicels 2-6 mm long. Sepals elliptic-ovate to ovate-oblong, pubescent. Corolla white, broadly campanulate, 5-7 mm wide. Capsules globose. Seeds subglobose, brown to black, slightly muricate.

Common in wastelands and mixed forests. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Durg, Raigarh, Raipur, Rajnandgaon, Satna, Sidhi, Surguja. *Fl. & Fr.*: Aug. Feb.

Plants possess medicinal properties.

6. IPOMOEA L., *nom. cons.*

Herbs or shrubs, usually twining, sometimes prostrate or floating. Leaves variable in shape and size, entire, lobed, divided or rarely compound. Flowers mostly in axillary, 1 to many-flowered dichasia, rarely paniculate, actinomorphic or slightly zygomorphic. Sepals herbaceous to subcoriaceous, glabrous or pubescent. Corolla mostly infundibuliform or campanulate, sometimes tubular or hypocrateriform. Ovary 2 or 4-locular. Fruit a capsule, globose or ovoid, mostly 4-valved, 4 or rarely 6-seeded. Seeds glabrous to pubescent.

About 500 species; cosmopolitan; 19 in M.P.

- 1a. Leaves pinnatisect; segments filiform, linear ...14. *I. quamoclit*
- 1b. Leaves entire or palmately lobed; segments usually broad, lanceolate:
 - 2a. Leaves lobed:
 - 3a. Leaves deeply divided into 5-9 lobes; lobes cut almost up to blade bases:
 - 4a. Plants pubescent; flowers sessile or subsessile; arranged in heads ...12. *I. pes-tigridis*
 - 4b. Plants usually glabrous; flowers pedicellate, variously arranged but not in heads ...5. *I. cairica*
 - 3b. Leaves shallowly 3-5-lobed; lobes cut less than halfway to the blade bases:
 - 5a. Sepals 1.5-3 mm long; corolla hypocrateriform, red to red-yellow ...9. *I. hederifolia*
 - 5b. Sepals more than 5 mm long; corolla not as above:
 - 6a. Plants annual; stems pubescent; sepals lanceolate:
 - 7a. Sepals 1.7-2.5 cm long; corolla 3-5 cm long; capsules 8-10 mm long ...10. *I. nil*

- 7b. Sepals up to 1.7 cm long; corolla up to 2.5 cm long; capsules ca 6 mm long ...12. *I. pes-tigridis*
- 6b. Plants perennial; stems glabrous; sepals oblong or ovate-lanceolate:
- 8a. Roots tuberous; sepals acuminate; corolla-throat purple ... 4. *I. batatas*
- 8b. Roots not tuberous; sepals acute; corolla-throat white ...13. *I. purpurea*
- 2b. Leaves entire, usually not lobed:
- 9a. Leaves linear-lanceolate to narrowly oblong-lanceolate:
- 10a. Flowers solitary or in lax, pedunculate cymes; peduncles more than 1 cm long ...2. *I. aquatica*
- 10b. Flowers in dense, sessile or subsessile cymes or heads; peduncles absent or ca 3 mm long ...8. *I. eriocarpa*
- 9b. Leaves usually ovate-cordate, deltoid or broadly oblong-lanceolate:
- 11a. Leaves with white cottony indumentum beneath ...7. *I. dichroa*
- 11b. Leaves not as above:
- 12a. Sepals awned at or below the apex:
- 13a. Ovary 4-locular ...9. *I. hederifolia*
- 13b. Ovary 2-locular:
- 14a. Stems muricate or prickly:
- 15a. Stout climbers; corolla white; stamens exserted ...1. *I. alba*
- 15b. Slender climbers; corolla purple; stamens included ...19. *I. turbinata*
- 14b. Stems neither muricated nor prickly ...18. *I. tricolor*
- 12b. Sepals acute, obtuse or acuminate, not awned:

- 16a. Sepals much enlarged and accrescent in fruit ...3. *I. barlerioides*
- 16b. Sepals not or slightly enlarged, never accrescent in fruit:
- 17a. Flowers sessile or subsessile; sepals hispid ...16. *I. indica*
- 17b. Flowers pedicellate; sepals glabrous or hirsute at base:
- 18a. Plants erect ...6. *I. carnea*
- 18b. Plants twiners or climbers:
- 19a. Corolla ca 2 cm long, white or pale yellow:
- 20a. Sepals ovate or ovate-lanceolate, 3.5-7 mm long; outer ones truncate or rounded at base ...11. *I. obscura*
- 20b. Sepals lanceolate, 8-12 mm long; outer ones cordate or sagittate at base ...17. *I. sinensis*
- 19b. Corolla more than 2 cm long, blue, purple or pink, rarely white:
- 21a. Leaves pubescent; seeds glabrous ...13. *I. purpurea*
- 21b. Leaves glabrous except margin; seeds densely tomentose ...15. *I. sepiaria*

1. *Ipomoea alba* L., Sp. Pl. 161. 1753. *I. bona-nox* L., Sp. Pl. ed. 2. 228. 1762; C.B. Clarke in Hook. f. Fl. Brit. India 4: 197. 1883. *Calonyction speciosum* Choisy in Mem. Soc. Phys. Hist. Nat. Geneve 6: 441. t. 1. f. 4. 1834 (excl. var.) *C. bona-nox* (L.) Bojer, Hortus Maurit. 227. 1837.

Climbers, glabrous; stems muricate or prickly. Leaves ovate to broadly ovate, 4-12 x 4-10 cm, cordate at base. Flowers in many-flowered cymes; peduncles up to 20 cm long. Sepals subequal; outer 3 sepals shorter than the inner ones. Corolla white, hypocrateriform, ca 7 cm long. Capsules ovoid, 4-valved. Seeds glabrous.

Rare. Jabalpur (Hole, 1904). *Fl. & Fr.*: Oct. Nov.

2. *Ipomoea aquatica* Forssk., *Fl. Aegypt.-Arab.* 44. 1775; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 210. 1883. *Convolvulus repens* Vahl, *Symb. Bot.* 1: 17. 1790, *non* L., 1753. *Ipomoea repens* (Vahl) Roth, *Nov. Pl. Sp.* 110. 1821, *non* Lam., 1793. *I. reptans* Poir. in Lam., *Encycl. Suppl.* 3: 460. 1814. - *Kalmisag, Kuremua, Nari.*

Herbs, procumbent or floating; stems hollow, rooting at nodes. Leaves mostly hastate, 3-10 x 0.5-6.5 cm, acute or obtuse at apex, sometimes acuminate in cordate leaves. Flowers solitary or in few-flowered cymes; pedicels 2-7 cm long. Sepals ovate-oblong, 6-7 mm long, obtuse or subacute, glabrous. Corolla white or purple, 2-6 cm long. Capsules ovoid, 7-8 mm long. Seeds glabrous or densely soft-pilose.

In ponds. Bastar, Bilaspur, Chhatarpur, Gwalior, Indore, Panna, Raigarh, Raipur, Rewa, Sagar, Satna, Seoni, Shivpuri, Surguja, Tikamgarh. *Fl. & Fr.*: Throughout the year.

Tender shoots and leaves are eaten as vegetables. The plant is useful in nervous and general debility of women, and also for piles and to antidote opium and arsenical poisoning. The buds are applied to ringworm while the decoction of flowers to treat eye diseases. Leaves have cooling effect.

3. *Ipomoea barlerioides* (Choisy) Benth. *ex* C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 201. 1883. *Aniseia barlerioides* Choisy in *Mem. Soc. Phys. Hist. Nat. Geneve* 6: 484. 1834.

Herbs, trailing or twining; stems hispid. Leaves oblong-lanceolate or ovate-oblong, 3.5-6 x 1.6-2.5 cm, acute or shortly acuminate at apex, shallowly cordate at base, pubescent. Flowers axillary, solitary; peduncles ca 4 cm long; bracts linear. Sepals lanceolate, hairy, accrescent in fruit. Corolla pink, infundibuliform. Capsules ovoid, glabrous.

Rare. Bastar (Mooney, 1942). Surguja. *Fl. & Fr.*: Oct. Nov.

4. *Ipomoea batatas* (L.) Lam., *Tabl. Encycl.* 1: 465. 1793; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 202. 1883. *Convolvulus batatas* L., *Sp. Pl.* 154. 1753. *C. edulis* Thunb., *Fl. Jap.* 84. 1784. *Batatas edulis* (Thunb.) Choisy in *Mem. Soc. Phys. Hist. Nat. Geneve* 6: 435. 1834. - *Sakarkand, Shakarkandi.*

Climbers, perennial; roots tuberous; stems somewhat succulent, glabrous. Leaves ovate-cordate, 3-5-lobed, 7-9 x 5-8 cm, glabrous or pubescent. Flowers solitary or in few-flowered, subumbellate cymes. Sepals oblong, 10-12 mm long, acuminate, cuspidate, pubescent or ciliate. Corolla purple, 2-3 cm long; throat darker. Capsules ovoid, glabrous. Seeds rotundate, glabrous.

Usually cultivated. Bastar, Chhatarpur, Damoh, Raigarh, Satna. *Fl. & Fr.*: Oct. - Dec.

Cultivated for edible roots while green foliage is used as fodder.

5. *Ipomoea cairica* (L.) Sweet, Hort. Brit. 287. 1826. *Convolvulus cairicus* L., Syst. Nat. ed. 10. 922. 1759. *I. palmata* Forssk., Fl. Aegypt.-Arab. 43. 1775; C.B. Clarke in Hook. f., Fl. Brit. India 4: 214. 1883. *Railway creeper*.

Climbers, perennial; stems smooth or muricate, glabrous or villous at nodes. Leaves palmately divided into 5-7 lobes up to base, 4-12 cm long; segments lanceolate to ovate or elliptic. Flowers in lax, 1 to many-flowered cymes; peduncles up to 8 cm long; pedicels 1-2 cm long. Sepals ovate, subequal, 4-6 mm long, glabrous. Corolla purple or blue-purple, infundibuliform, 3-6 cm long. Capsules subglobose, 1-1.5 cm across, glabrous. Seeds subglobose to ovoid, ca 5 mm long, densely short-tomentose.

In wastelands and commonly planted as ornamental. Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: June - Dec.

The tuberous roots are consumed by villagers. Seeds are purgative.

6. *Ipomoea carnea* Jacq., Enum. Syst. Pl. 13. 1760; Verma & Srivastava in J. Econ. Tax. Bot. 4: 903-907. 1983. *I. fistulosa* Mart. ex Choisy in DC., Prodr. 9: 349. 1845. *I. carnea* Jacq. subsp. *fistulosa* (Mart. ex Choisy) Austin in Taxon 26: 237. 1977. *Batatas crassicaulis* Benth., Bot. Voy. Sulphur. 5: 134. 1845. *I. crassicaulis* (Benth.) Robinson in Proc. Amer. Acad. Sci. 51: 530. 1916. - *Behya, Besharam, Nirlajja*.

Shrubs, ca 2 m high; stems woody at base, greyish below, green above, glabrous or minutely puberulent. Leaves ovate or lanceolate, 4-21 x 3-10

cm, acuminate at apex, shallowly cordate or truncate at base. Flowers in cymose, paniculate clusters; pedicels 6-8 mm long. Sepals suborbicular. Corolla deep pink to purple, rarely white, 5-9 cm long. Capsules ovoid to subglobose, ca 1.5 cm long. Seeds covered with long comose brown trichomes.

Common on roadsides and along cultivated fields. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, Indore, Raigarh, Raipur, Rajnandgaon, Sidhi, Surguja. *Fl. & Fr.*: Throughout the year.

The plant provides green manure. It is mild purgative and also used for wounds and dog bite. It has been recorded from North Bilaspur that cattles get intoxicated on eating the leaves and sometimes even die. The plant is also used in totem.

Notes: A number of workers have followed Austin (*l. c.*) and Panigrahi and Murti (Bangladesh J. Bot. 10(1): 33, 1981) by treating *I. fistulosa* and *I. carnea* as distinct taxa at subspecific level. While on the basis of detailed herbarium, field and experimental data, Verma and Srivastava (*l. c.*) have concluded that the two taxa should be treated as conspecific since the characters hitherto used to distinguish them are not tenable as these show a continuous range of variation with changes in the habitat conditions.

7. *Ipomoea dichroa* (Roem. & Schult.) Choisy in DC., Prodr. 9: 364, 1845; Verdcourt in Kew Bull. 33: 165, 1978. *Convolvulus dichrous* Roem. & Schult., Syst. Veg. 4: 263, 1819, *nom. illegit.* *C. bicolor* auct. non Vahl, 1794; Desr. in Lam., Encycl. 3: 564, 1792. *C. pilosus* Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 55, 1824, *non* Rottl., 1803, *nom. illegit.* *Ipomoea pilosa* Sweet, Hort. Brit. ed. 1, 289, 1826 & ed. 2, 372, 1830, *non* Houtt., 1777, *nom. illegit.*; C.B. Clarke in Hook. f., Fl. Brit. India 4: 213, 1883. *I. arachnosperma* Welw., Apont. 588, 1859. **Fig. 30.**

Annual; stems prostrate or twining, covered with rigid trichomes. Leaves broadly ovate, 7-12 x 5-10 cm, acuminate at apex, cordate at base, entire, with cottony indumentum beneath. Flowers in lax or dense cymes. Sepals lanceolate, 8-10 x 1.5-2 mm, setose. Corolla pink or mauve, 1.5-2.5 cm long. Capsules ovoid, pubescent. Seeds black, white pubescent.

In wastelands. Gwalior, Indore, Raipur, Satna, Shivpuri. *Fl. & Fr.*: Aug. - Nov.

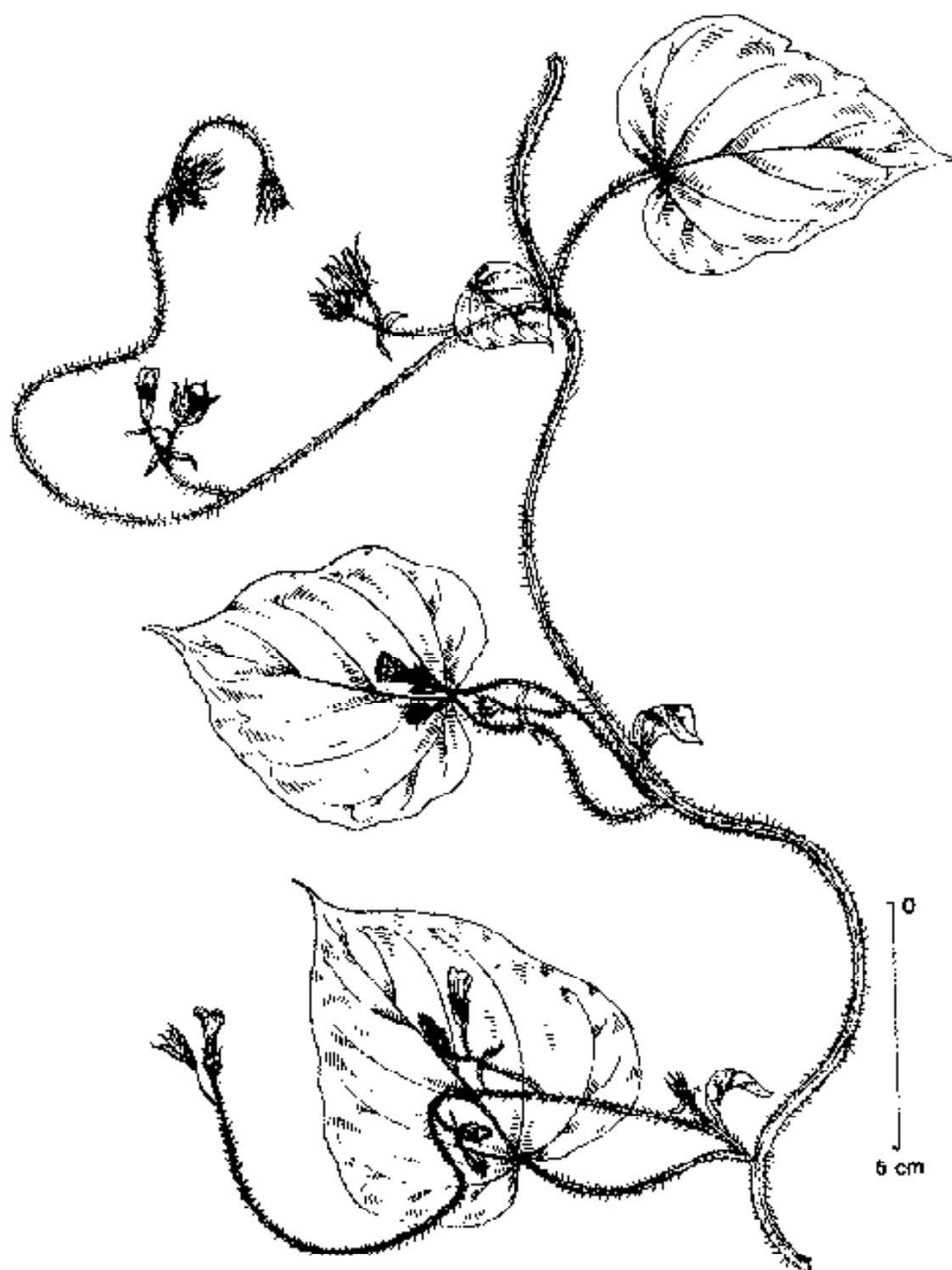


Fig. 30. *Ipomoea dichroa* (Roem. & Schult.) Choisy

8. *Ipomoea eriocarpa* R. Br., Prodr. 484. 1810; C.B. Clarke in Hook. f., Fl. Brit. India 4: 204. 1883. *Convolvulus hispidus* Vahl, Symb. Bot. 3: 29. 1794. *Ipomoea hispida* (Vahl) Roem. & Schult., Syst. Veg. 4: 238. 1819, non Zuccagni, 1806.

Herbs, twiners or prostrate, retrorsely to patently pilose. Leaves lanceolate to oblong or linear-lanceolate, 2-9 x 1-4 cm, acuminate at apex, cordate or sagittate at base, glabrous. Flowers axillary, in sessile or shortly pedunculate cymes or almost heads; pedicels ca 5 mm long. Sepals ovate, 5-7 mm long, acuminate, pilose. Corolla pink or purple, tubular, 7-9 mm long. Capsules broadly ovoid to globose, 5-6 mm across, pubescent. Seeds 2-2.5 mm across, black, glabrous.

Common in open wastelands and paddy fields. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Mandla, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Shivpuri, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Sept. - Jan.

Leaves and stems are consumed as vegetables. The plant is used to treat rheumatism, epilepsy, leprosy and ulcer. It also provides fodder.

9. *Ipomoea hederifolia* L., Syst. Nat. ed. 10. 925. 1759. *I. coccinea* auct. non L., 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 199. 1883. *I. angulata* Lam., Tabl. Encycl. 1: 464. 1793. *Quamoelit angulata* (Lam.) Bojer, Hortus Maurit. 224. 1837. *Q. coccinea* auct. non Moench, 1794; Haines, Bot. Bihar Orissa 4: 591. 1922. *Q. phoenicea* (Roxb.) Choisy in Mem. Soc. Phys. Hist. Nat. Geneve 6: 433. 1834. *Ipomoea phoenicea* Roxb., Fl. Ind. (Carcy & Wallich ed.) 2: 92. 1824.

Twiners, annual; stems glabrous or sparsely pubescent. Leaves ovate to suborbicular, 2.5-8 x 1.5-8.5 cm, acute to acuminate at apex, cordate at base, entire or 3-lobed, glabrous. Flowers solitary or in few to several-flowered cymes; pedicels 5-7 mm long. Sepals oblong to elliptic, 2-5 mm long, obtuse to truncate; outer sepals with 1.5-2 mm long, subterminal, fleshy arista, glabrous. Corolla red to reddish yellow, hypocrateriform, 3-4 cm long. Capsules subglobose, 6-8 mm long. Seeds pyriform, ca 5 mm across, dark brown, glabrous.

Common on bushes along forest roads. Balaghat, Bastar, Chhatarpur, Damoh, Hoshangabad, Indore, Mandla, Narsimhapur, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Sept. - March.

10. *Ipomoea nil* (L.) Roth, Catal. Bot. 1: 36. 1797. *Convolvulus nil* L., Sp. Pl. ed. 2. 219. 1762. *Ipomoea hederacea auct. non Jacq.*, 1787; C.B. Clarke in Hook. f., Fl. Brit. India 4: 199. 1883. - *Kaladana, Mirchai*.

Climbers, annual; stems densely to sparsely pubescent. Leaves ovate to suborbicular, 4.5-14 cm long, acute to acuminate at apex, cordate at base, 3-lobed. Flowers in 1-6-flowered cymes; pedicels 5-10 mm long. Sepals lanceolate, 17-25 mm long, with linear-lanceolate apices, densely hirsute in the basal part. Corolla purple or blue, 3-5 cm long. Capsules globose, 8-10 mm across. Seeds pyriform, glabrous or densely pubescent.

Common in mixed forests, on hedges and roadside bushes. Balaghat, Bilaspur, Chhatarpur, Damoh, Dhar, Indore, Jabalpur, Panna, Raipur, Sagar, Satna, Seoni, Surguja, Tikamgarh. *Fl. & Fr.*: Sept. - March.

Seeds are purgative.

11. *Ipomoea obscura* (L.) Ker-Gawl., Bot. Reg. 3: t. 239. 1817; C.B. Clarke in Hook. f., Fl. Brit. India 4: 207. 1883. *Convolvulus obscurus* L., Sp. Pl. ed. 2. 220. 1762.

Twining, perennial. Leaves ovate-cordate to rotundate, 2-7 x 1.5-6 cm, acute, acuminate or apiculate at apex, glabrous. Flowers axillary; pedicels 1-2 cm long. Sepals ovate or ovate-lanceolate, 3.5-7 mm long, acute, glabrous or pilose. Corolla pale yellow, campanulate, ca 2 cm long. Capsules globose, 5-10 mm across. Seeds ovoid, ca 4 mm long, brown, softly pubescent.

Common in wastelands and on hedges. Balaghat, Bilaspur, Chhatarpur, Gwalior, Hoshangabad, Indore, Raigarh, Raipur, Rajnandgaon, Shivpuri, West Nimar. *Fl. & Fr.*: July - Feb.

Leaves boiled in rectified butter (*ghee*) are used to treat aphthous affections.

12. *Ipomoea pes-tigridis* L., Sp. Pl. 162. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 204. 1883. *I. hepaticifolia* L., Sp. Pl. 161. 1753. *I. pes-tigridis* var. *hepaticifolia* (L.) C.B. Clarke in Hook. f., Fl. Brit. India 4: 204. 1883. - *Besharama, Panch-patri*.

Annuals; stems twining, prostrate or sprawling, pubescent with rigid trichomes. Leaves orbicular, shallowly divided or palmately 5-9-lobed

nearly up to base, 2.4-8 x 3.5-12 cm, wider than long, pubescent. Flowers in involucrate cymes. Sepals lanceolate, 13-17 mm long, pubescent. Corolla white, bluish white or purple, infundibuliform, 2-4 cm long. Capsules ovoid, 6-8 mm long. Seeds 3-4 mm long, blackish, sparsely pubescent.

- 1a. Leaves shallowly lobed but never up to base; corolla bluish white or purple, 2-2.5 cm long; capsules ca 6 mm long ...12.1. var. *capitellata*
- 1b. Leaves lobed nearly up to base; corolla white, 2.5-4 cm long; capsules 7-8 mm long ...12.2. var. *pes-tigridis*

12.1. var. *capitellata* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 204. 1883.

In wastelands. Balaghat, Indore, Rajnandgaon, Sagar. *Fl. & Fr.*: Sept. - Nov.

12.2. var. *pes-tigridis*

In wastelands and along cultivated fields. Balaghat, Bastar, Bilaspur, Chhatarpur, Durg, Gwalior, Hoshangabad, Mandla, Raigarh, Raipur, Rajnandgaon, Satna, Sidhi, Surguja. *Fl. & Fr.*: Aug. - Oct.

The plant is good fodder. Leaves are employed for the treatment of pimples, boils and sores. Roots are purgative; used for carbuncles and boils and to antidote snake bite and dog bite.

13. *Ipomoea purpurea* (L.) Roth, Bot. Abh. Beobacht. 27. 1787; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 200. 1883; Subramanyam & Henry in Bull. Bot. Surv. India 8: 212. 1966. *Convolvulus purpureus* L., Sp. Pl. ed. 2. 219. 1762.

Twining, annual; stems slender. Leaves broadly ovate to cordate, 4-5 cm long, entire or 3-lobed, pubescent on both the surfaces. Flowers in few-flowered cymose clusters; pedicels 8-15 mm long, recurved in fruit. Sepals ovate-lanceolate, 8-16 mm long, abruptly acute, hirsute at base. Corolla white, blue, purple, pink or striped on white background, 3-5 cm long; throat white. Capsules globose. Seeds pyriform, black, glabrous.

Rare. Bhopal. *Fl. & Fr.*: July - Oct.

14. *Ipomoea quamoclit* L., Sp. Pl. 159, 1753; C.B. Clarke in Hook. *f.* Fl. Brit. India 4: 199, 1883.

Climbers; stems slender, glabrous. Leaves ovate to elliptic, 1-5 cm long, deeply pinnatisect with 6-19 alternate or opposite pairs of linear segments, glabrous. Flowers solitary or in 2-5-flowered cymes; pedicels 9-20 mm long. Sepals oblong, 4-7 mm long, obtuse with a mucro, glabrous. Corolla red, hypocrateriform, 2-3 cm long. Capsules ovoid, 6-8 mm long. Seeds dark brown to black.

Cultivated in gardens as ornamental, sometimes found as an escape. Balaghat, Bastar, Chhatarpur, Damoh, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Sept. - Nov.

Leaves are used to treat carbuncles and bleeding piles. The plant is considered to have cooling properties.

15. *Ipomoea sepiaria* Koenig ex Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 90, 1824; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 209, 1883. *I. maxima auct. non (L. f.) G. Don ex Sweet*, 1830; Ooststroom in Blumea 3: 525, 1940.

Twining, perennial; stems slender, glabrous or covered with erect, pilose indumentum. Leaves ovate-cordate or deltoid, 3.5-7.5 x 3-7 cm, acute to acuminate at apex, with rounded lobes at base, glabrous except margin. Flowers in few to many-flowered cymes; peduncles 2.5-20 cm long. Sepals elliptic-oblong to ovate, obtuse to acute, glabrous. Corolla white, pink or pale purple, infundibuliform, 3.5-6 cm long; throat dark purple. Capsules globose. Seeds 3-4 mm long, densely tomentose.

In wastelands and along drains. Balaghat, Damoh, Mandla, Raigarh, Raipur. *Fl. & Fr.*: Aug. - Jan.

16. *Ipomoea sindica* Stapf in Kew Bull. 93: 346, 1894.

Creepers or climbers; stems hispid. Leaves deltoid-hastate or ovate-cordate, 2-8 x 1-6 cm, entire, hirsute; petioles 1-4 cm long, hispid. Flowers solitary or in few-flowered cymes; bracts hairy. Sepals lanceolate, hispid. Corolla white, infundibuliform; lobes with a tuft of hairs at the tip. Capsules globose, ca 6 mm across, glabrous. Seeds black, grey-velvety.

Rare. Bhopal (Oommachan, 1977). Shivpuri (Kaushik, 1969; Varma and Das, 1982). *Fl. & Fr.*: Aug. Nov.

17. *Ipomoea sinensis* (Desr.) Choisy in Mem. Soc. Phys. Hist. Nat. Geneve 6: 459. 1834. *Convolvulus sinensis* Desr. in Lam., Encycl. 3: 557. 1792. *C. calycinus* Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 51. 1824. *Ipomoea calycina* (Roxb.) Benth. ex C.B. Clarke in Hook. f., Fl. Brit. India 4: 201. 1883.

Twining, annual; stems villous. Leaves ovate-cordate, 3.5-6.5 x 1.5-5.5 cm, acute at apex, entire, sparsely hairy or glabrous; petioles ca 3.5 cm long. Flowers in few-flowered, pedunculate cymes. Sepals lanceolate, unequal, 8-12 mm long, acute, cordate, hastate in fruit. Corolla white, infundibuliform, narrow, ca 2 cm long. Capsules ovoid, 6-7 mm long, glabrous. Seeds villous, with long silky hairs on margin.

On hedges and bushes. Bilaspur, Chhatarpur, Morena, Sagar. *Fl. & Fr.*: Oct. Nov.

18. *Ipomoea tricolor* Cav., Icon. Fl. 3: 5. t. 208. 1795. *I. violacea* auct. non L., 1753; Ooststroom in Blumea 3: 541. 1940. *I. rubrocaerulea* Hook., Bot. Mag. t. 3297. 1834.

Twining, annual; stems glabrous. Leaves broadly ovate, 4-8 x 3-6 cm, acuminate at apex, cordate at base, entire. Flowers in dichotomous, axillary, 3-9-flowered, pedunculate cymes; pedicels thickened. Sepals ovate-lanceolate, hyaline-margined, carinate on back. Corolla blue, rarely white, infundibuliform. Capsules globose, glabrous, 4-valved, 4-seeded. Seeds black, minutely puberulent.

Cultivated in gardens. Bhopal (Oommachan, 1977). *Fl. & Fr.*: Nov. Feb.

19. *Ipomoea turbinata* Lag., Gen. Sp. Pl. 10. 1816; Gunn in Brittonia 24: 163. 1972. *Convolvulus muricatus* L., Mant. Pl. 44. 1767. *Ipomoea muricata* (L.) Jacq., Pl. Hort. Schoenbr. 3: 40. t. 323. 1798 (1803), non Cav., 1799; C.B. Clarke in Hook. f., Fl. Brit. India 4: 197. 1883. *Calonyction muricatum* (L.) G. Don, Gen. Hist. 4: 264. 1837-1838.

Climbers; stems glabrous, warty at some places. Leaves broadly ovate to orbicular, 3.5-12 cm long, acuminate at apex, cordate at base, entire.

glabrous. Peduncles usually mucronate, 1-6 cm long. Sepals ovate to oblong; outer ones 6-7 mm long; awn shorter. Corolla lavender to purplish, infundibuliform to hypocrateriform, 5-6 cm long. Capsules ovoid, 1.5-2 cm long. Seeds ovoid, brown to black, glabrous, germinating while within capsule.

In wastelands and on the edges of fields. Bastar, Chhatarpur, Hoshangabad, Indore, Mandla, Rajnandgaon, Sagar, Seoni, Sidhi, Tikamgarh, West Nimar. *Fl. & Fr.*: Aug. - Jan.

7. JACQUEMONTIA Choisy

Herbs or undershrubs, climbing, glabrous or pubescent. Leaves entire, dentate or lobed, almost cordate. Flowers axillary, solitary or in scorpioid, umbelliform or capituliform cymes. Sepals equal or unequal, mostly pubescent. Corolla blue, lilac or white, campanulate or infundibuliform, deeply lobed, dentate or entire. Style 1; stigmas 2, ellipsoid or oblong, complanate. Capsules globose to subglobose. Seeds glabrous, tuberculate, winged or pilose.

About 120 species; tropical and subtropical regions especially America; one in M.P.

Jacquemontia paniculata (Burm. f.) Hall. f. in Engl., Bot. Jahrb. Syst. 16: 541. 1893. *Ipomoea paniculata* Burm. f., Fl. Ind. 50. t. 21. f. 3. 1768, non Desr., 1792. *Convolvulus parviflorus* Vahl, Symb. Bot. 3: 29, 1794; C.B. Clarke in Hook. f., Fl. Brit. India 4: 220. 1883.

Climbers; stems pubescent with white tomentum. Leaves ovate, 4-10 x 2-4 cm, acuminate at apex, cordate at base. Flowers in axillary, few to several-flowered, cymose clusters; peduncles pubescent. Sepals ovate, 5-9 x 4-6 mm, acute. Corolla white, pink or pale blue, campanulate or broadly infundibuliform, ca 8 mm long. Capsules globose, 4-5 mm across, brown. Seeds brown to black, minutely verrucose.

On hedges. Chhatarpur, Hoshangabad, Indore. *Fl. & Fr.*: Sept. - Nov.

8. MERREMIA Dennst. ex Endl., nom. cons.

Climbers, usually herbaceous, sometimes lignescent. Leaves entire, lobed or palmately compound with 3-7 leaflets, glabrous or pubescent. Flowers axillary, solitary or in few-flowered, dichasial or subumbellate

cymes; bracts linear or lanceolate. Sepals oblong to elliptic, subequal. Corolla white, yellow or purple, campanulate or infundibuliform. Filaments almost equal, glabrous at base. Ovary glabrous, 2-3-locular, 4-5-ovuled; styles filiform; stigmas globose or biglobose, included. Fruit a capsule, 2-4-celled; pericarp thin or fragile, irregularly or longitudinally dehiscent by 4-6 valves, 4-6-seeded. Seeds glabrous or pubescent.

About 70 species; tropical regions; 6 in M.P.

- 1a. Leaves 5-7-lobed or palmately compound:
- 2a. Leaves palmately compound; corolla white ...1. *M. aegyptia*
- 2b. Leaves palmately 5-7-lobed but not compound; corolla yellow ...6. *M. vitifolia*
- 1b. Leaves entire, crenate or atmost 3-lobed:
- 3a. Flowers in umbelliform cymes; corolla pilose outside ...5. *M. umbellata*
- 3b. Flowers solitary or in lax cymes; corolla glabrous outside:
- 4a. Plants prostrate; peduncles very short or absent ...2. *M. emarginata*
- 4b. Plants twining; peduncles long:
- 5a. Leaves linear or lanceolate to oblong; inner sepals acute, attenuate-acuminate ...4. *M. tridentata*
- 5b. Leaves ovate to broadly ovate, rarely narrow; inner sepals obtuse ...3. *M. hederacea*

1. *Merremia aegyptia* (L.) Urb., Symb. Antill. 4: 505. 1910; Ooststroom in Blumea 3: 327. 1939. *Ipomoea aegyptia* L., Sp. Pl. 162. 1753. *Convolvulus pentaphyllus* L., Sp. Pl. ed. 2. 223. 1762. *I. pentaphylla* (L.) Jacq., Collectanea 2: 297. (1788) 1789; C.B. Clarke in Hook. f., Fl. Brit. India 4: 202. 1883. *Merremia pentaphylla* (L.) Hall. f. in Engl., Bot. Jahrb. Syst. 16: 552. 1893.

Climbers; stems herbaceous, with long suberect, yellowish trichomes. Leaves palmately compound; leaflets 5, elliptic, acute to acuminate at apex, entire to dentate, sparsely pubescent to glabrous. Flowers in cymes. Sepals oblong, ca 2 cm long, acute, hirsute. Corolla white, 2-3 cm long. Capsules

subglobose, 1-2 cm across, partially surrounded by the sepals. Seeds brown, glabrous.

On hedges. Bilaspur, Gwalior, Rewa, Sidhi. *Fl. & Fr.*: Sept. - Nov.

2. *Merremia emarginata* (Burm. f.) Hall. f. in Engl., Bot. Jahrb. Syst. 16: 552. 1893. *Evolvulus emarginatus* Burm. f., Fl. Ind. 77. t. 30. 1768. *Convolvulus reniformis* Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 67. 1824 & Fl. Ind. 1: 481. 1832. *Ipomoea reniformis* (Roxb.) Choisy in Mem. Soc. Phys. Hist. Nat. Geneve 6: 446. 1834; C.B. Clarke in Hook. f., Fl. Brit. India 4: 206. 1883.

Climbers, perennial; stems prostrate, rooting at nodes, glabrescent. Leaves reniform to broadly ovate, 0.5-3 cm long, obtuse to broadly rounded or somewhat emarginate at apex, cordate with a broadly rounded sinus and rounded lobes at base, coarsely crenate or entire, glabrous or sparsely pilose. Flowers axillary, solitary or in 2-3-flowered cymes; peduncles very short or absent. Sepals ovate to orbicular, pubescent on back; outer 2-3 mm long; inner 4-5 mm long, deeply emarginate. Corolla yellow, campanulate, 5-9 mm long. Capsules subglobose, 5-6 mm long, black, glabrous. Seeds 2-5 mm long, greyish brown, glabrous, dotted.

In wastelands, along edges of fields and on sandy slopes. Bastar, Chhatarpur, Damoh, Durg, Raipur, Rajnandgaon, Seoni. *Fl. & Fr.*: Dec. March.

The plants are diuretic and used for the treatment of rheumatism and cough. They are also eaten as pot-herbs.

3. *Merremia hederacea* (Burm. f.) Hall. f. in Engl., Bot. Jahrb. Syst. 18: 118. 1894. *Evolvulus hederaceus* Burm. f., Fl. Ind. 77. t. 30. f. 2. 1768. *Ipomoea chryseides* Ker-Gawl., Bot. Reg. t. 270. 1818; C.B. Clarke in Hook. f., Fl. Brit. India 4: 206. 1883.

Twining; stems smooth, glabrous. Leaves broadly ovate, 1-4 x 1-3.5 cm, obtuse at apex, broadly cordate at base, 3-lobed. Flowers solitary or in cymes. Sepals broadly obovate, ca 3 x 2 mm, notched at apex. Corolla yellow, campanulate, 7-11 mm long. Capsules broadly conical to depressed globose, 4-angled. Seeds blackish, glabrescent, 2-5 mm long.

Common in moist shady wastelands. Bastar, Bilaspur, Durg, Indore, Raigarh, Rajnandgaon. *Fl. & Fr.*: Sept. - Nov.

4. *Merremia tridentata* (L.) Hall. *f.* in Engl., Bot. Jahrb. Syst. 16: 552. 1893. *Convolvulus tridentatus* L., Sp. Pl. 157. 1753. *Ipomoea tridentata* (L.) Roth in Roem., Arch. Bot. 1(2): 38. 1798; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 205. 1883. *Xenostegia tridentata* (L.) Austin & Stapels in Brittonia 32: 533. 1980.

Twiners; stems glabrous or pubescent. Leaves linear or lanceolate to oblong, 2.5-10 cm long, truncate at base; lobes acuminate to emarginate, mucronulate, often 1 to several-dentate. Flowers axillary, solitary or in few-flowered cymes. Sepals oblong, ovate-oblong or lanceolate, 4-10 mm long. Corolla pale yellow, white, purplish or cream-coloured, campanulate, 10-20 mm long. Capsules globose, 4-9 mm across. Seeds 2-3 mm long, black, glabrous, 2-3 mm long.

- 1a. Leaves and sepals acute-mucronate ...4.1. subsp. *hastata*
 1b. Leaves and sepals obtuse-emarginate ...4.2. subsp. *tridentata*

4.1. subsp. *hastata* (Desr.) Ooststroom in Blumea 3: 317. 1939. *Convolvulus hastatus* Desr. in Lam., Encycl. 3: 542. 1792, non Forssk., 1775, Thunb., 1794 nec Sieber ex Choisy, 1845. *Merremia hastata* Hall. *f.* in Engl., Bot. Jahrb. Syst. 16: 552. 1893, nom. illeg. *Ipomoea angustifolia* Jacq., Icc. Pl. Rar. 2: 10. t. 317. 1786-93; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 205. 1883. *Xenostegia tridentata* subsp. *hastata* (Ooststroom) Panigrahi & S.K. Murti, Fl. Bilaspur. 395. 1989.

Rare. In open places and near streams. Bilaspur. *Fl. & Fr.*: July - Sept.

4.2. subsp. *tridentata*

In wastelands and river beds. Chhatarpur, Surguja. *Fl. & Fr.*: Sept. Dec.

5. *Merremia umbellata* (L.) Hall. *f.* in Engl., Bot. Jahrb. Syst. 16: 552. 1893. *Convolvulus umbellatus* L., Sp. Pl. 155. 1753. *Ipomoea cymosa* (Desr.) Roem. & Schult., Syst. Veg. 4: 241. 1819; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 211. 1883. **Fig. 31.**

Twiners or prostrate, often rooting. Leaves narrowly deltoid to ovate or oblong, 3-12 x 0.5-2.5 cm, mucronate to acuminate at apex, entire, glabrescent. Flowers in umbelliform cymes, rarely solitary; peduncles 1-3 cm long. Sepals oblong, 6-9 mm long, rounded. Corolla white,

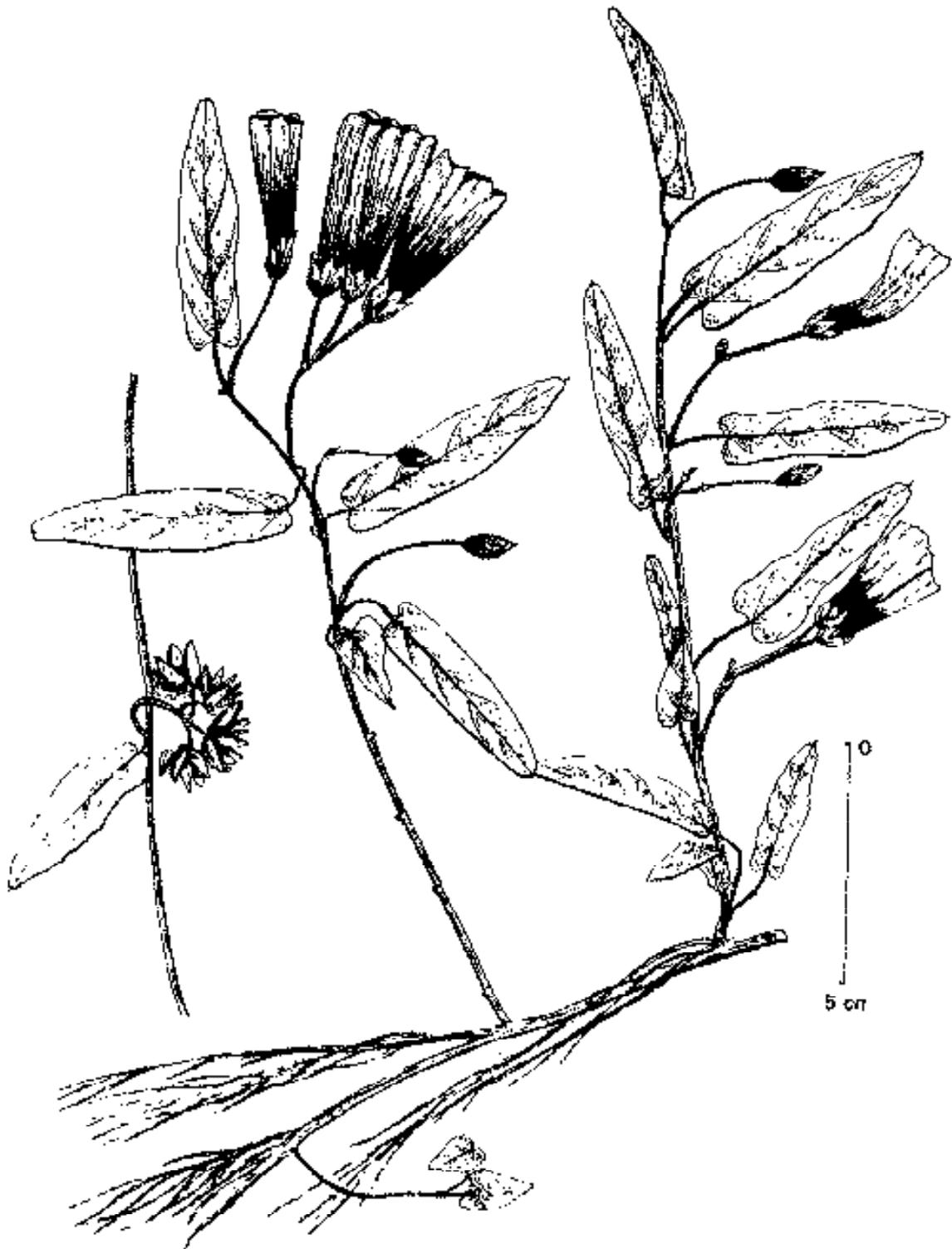


Fig. 31. *Merremia umbellata* (L.) Hall. f.

infundibuliform, 3-3.5 cm long. Capsules ovoid to conical, 10-12 mm long. Seeds dark brown, densely pubescent.

Rare. Climber on bushes and trees along the river bank. Raigarh. *Fl. & Fr.*: Feb. - April.

Young leaves are eaten as vegetables. Flowers are used to treat eye diseases.

6. *Merremia vitifolia* (Burm. f.) Hall. f. in Engl., Bot. Jahrb. Syst. 16: 552. 1893. *Convolvulus vitifolius* Burm. f., Fl. Ind. 45, t. 18, f. 1. 1768. *Ipomoea vitifolia* (Burm. f.) Blume, Bijdr. 709, 1826; C.B. Clarke in Hook. f., Fl. Brit. India 4: 213. 1883.

Twiners; stems herbaceous towards tip, woody at base. Leaves orbicular, 6-12 cm across, cordate at base, palmately 5-7-lobed, dentate or crenate. Flowers in axillary, 1-3 or many-flowered cymes; peduncles 2-3 cm long, hirsute. Sepals oblong to ovate-oblong, obtuse to acute, with glandular, pellucid trichomes. Corolla yellow, campanulate, 2.5-3 cm long. Capsules subglobose, papery, with thick, subcoriaceous, enlarged sepals. Seeds dull black to blackish brown, glabrous.

Rare. Climber on bushes. Bastar, Raigarh. *Fl. & Fr.*: Dec. - Feb.

9. OPERCULINA Manso

Herbs or shrubs, climbing; stems, petioles and pedicels often winged. Leaves usually cordate, entire or lobed. Flowers axillary, solitary or in few-flowered cymes. Sepals large, glabrous, enlarged and coriaceous in fruits. Corolla broadly campanulate, infundibuliform or hypocrateriform, white, yellow or reddish. Fruit a capsule, dehiscent at or above middle by a circumscissile epicarp. Seeds glabrous or pubescent.

About 15 species; tropical regions; 2 in M.P.

Notes: Although *Merremia* Dennst. ex Endl. is conserved against *Operculina* Manso (App. III A, ICBN, 1994) but in accordance to article 14.6 (ICBN, 1994) *Operculina* Manso has been retained.

1a. Sepals 1.5-2 cm long; corolla sulphur yellow,
4-5 cm long, densely hirsute outside

...1. *O. petaloidea*

- 1b. Sepals up to 1.5 cm long; corolla white or pale green, up to 4 cm long, glabrous outside ...2. *O. turpethum*

1. *Operculina petaloidea* (Choisy) Ooststroom in *Blumea* 3: 369. 1939. *Ipomoea petaloidea* Choisy in *Mem. Soc. Phys. Hist. Nat. Geneve* 6: 451. 1834; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 212. 1883. *Merremia crispatula* Prain, *Bengal Pl.* 2: 730. 1903.

Shrubs, climbing; stems narrowly winged. Leaves broadly ovate or oblong-lanceolate, 4-15 x 2-10 cm, acute at apex, cuneate or truncate at base, with reddish midrib. Flowers in 1 to several-flowered, elongated cymes. Sepals 1.5-2 cm long. Corolla sulphur yellow, 4-5 cm long, densely hirsute outside. Capsules ovoid, ca 1.2 cm long. Seeds minutely velvety with villous margins.

Rare. In mixed forests. Rajnandgaon. *Fl. & Fr.*: April.

2. *Operculina turpethum* (L.) Manso, *Enum. Subst. Braz.* 16: 49. 1836. *Convolvulus turpethum* L., *Sp. Pl.* 155. 1753. *Ipomoea turpethum* (L.) R. Br., *Prodr.* 485. 1810; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 212. 1883.

Climbers; stems 3-5-winged. Leaves variable, orbicular or broadly ovate-lanceolate, 4-10 x 1-6 cm. Flowers solitary or in cymose clusters. Sepals ovate, unequal, 1.2-1.5 cm long, acute or subacuminate; outer ones pubescent; inner ones glabrous. Corolla white or pale green, campanulate or broadly infundibuliform, 3-4 cm long. Capsules depressed globose, ca 1.5 cm across. Seeds black, glabrous.

On bushes and hedges. Bilaspur, Chhatarpur, Damoh, Mandla, Raigarh, Surguja. *Fl. & Fr.*: Feb. May.

Roots are purgative and used to treat jaundice, piles and bilious affections.

10. PORANA *Burm. f.*

Twiners. Leaves entire, petiolate. Flowers in racemose or paniculate clusters, rarely solitary; bracts sometimes foliaceous. Sepals 5, at least 3 outer accrescent in fruits, scarious. Corolla white, campanulate or infundibuliform, rarely hypocrateriform; limb entire or 5-lobed. Style 1,

simple or 2-fid with unequal branches; stigma globose. Fruit a capsule, dehiscent or indehiscent, 1-seeded. Seeds black, glabrous.

About 20 species; tropical Asia; 2 in M.P.

1a. Sepals densely pubescent; fruits indehiscent ...1. *P. paniculata*

1b. Sepals glabrous; fruits dehiscent ...2. *P. racemosa*

1. ***Porana paniculata*** Roxb., Pl. Coromandel 3: 31. t. 235. 1815; C.B. Clarke in Hook. f., Fl. Brit. India 4: 222. 1883. - *Safed-bel*.

Climbers. Leaves ovate, 4-9 x 2-8 cm, acuminate at apex, cordate at base, softly white tomentose. Flowers in lateral or terminal panicles. Sepals linear, ca 1 mm long, densely pubescent. Corolla white, infundibuliform, ca 4 mm long. Capsules indehiscent, ovoid-globose, 4-5 mm long, with wing like enlarged 3 sepals. Seeds ovoid, brown.

Common on bushes, often planted as ornamental. Chhatarpur, Gwalior, Mandla, Raigarh, Satna, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Nov. - March.

2. ***Porana racemosa*** Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 41. 1824. *P. malabarica* C.B. Clarke in Hook. f., Fl. Brit. India 4: 223. 1883.

Twining; stems slender. Leaves ovate or ovate-elliptic, 3-8 x 2.5-6 cm, acuminate at apex, cordate at base, appressed pilose. Flowers in axillary, paniculate cymes. Sepals glabrous, much enlarged in fruit. Corolla white. Capsules ovoid, mucronate. Seeds ovoid, yellow.

Rare. Shahdol (Saxena, 1970). *Fl. & Fr.*: Sept. - Oct.

11. RIVEA Choisy

Creepers or climbers. Leaves rotundate, silky white pubescent beneath, petiolate. Flowers axillary, solitary or in 1-3-flowered cymes; bracts shorter than sepals. Sepals ovate-oblong, equal or unequal. Corolla white, hypocrateriform. Stamens included. Ovary 4-locular; style linear-oblong; stigma 2-lobed. Fruits indehiscent, sometimes breaking irregularly, 1-4-seeded. Seeds glabrous.

Four species; Indo-Malesia; 2 in M.P.

- 1a. Sepals ovate, 8-10 mm long; seeds brown ...1. *R. hypocrateriformis*
 1b. Sepals oblong, 15-22 mm long; seeds black ...2. *R. ornata*

1. *Rivea hypocrateriformis* (Desr.) Choisy in Mem. Soc. Phys. Hist. Nat. Geneve 6: 408. 1834; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 184. 1883. *Convolvulus hypocrateriformis* Desr. in Lam. Encycl. 3: 561. 1792. - *Parh.*

Creepers or climbers; stems woody, pubescent. Leaves rotundate, 5-11 x 6-11 cm, obtuse or abruptly acuminate at apex, cordate at base, silvery white pubescent beneath. Flowers usually solitary, sometimes in subspicate cymes; bracts spatulate. Sepals unequal, ovate, 8-10 x 4-5 mm, obtuse. Corolla white, hypocrateriform, 5-8 cm long. Fruits globose or ovoid. Seeds brown.

Along roadsides and in scrub forests. Balaghat, Bastar, Betul, Chhatarpur, Dhar, Durg, Indore, Mandla, Morena, Panna, Raigarh, Ratlam, Rewa, Seoni, Shivpuri, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Aug. - Dec.

Leaves and tender shoots are eaten as vegetables. The plant is also used to antidote snake bite.

2. *Rivea ornata* Choisy in Mem. Soc. Phys. Hist. Nat. Geneve 6: 409. 1834; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 183. 1883.

Climbers. Leaves rotundate, 5-9 x 7-9 cm, obtuse or shortly acuminate at apex, glabrous above, white silky pubescent beneath. Flowers solitary on each peduncle; peduncles white pubescent. Sepals oblong, 15-22 x 4-5 mm, acute to obtuse, tomentose outside. Corolla white, hypocrateriform. Fruits globose to ellipsoid. Seeds black.

Raigarh, Satna, Surguja. *Fl. & Fr.*: Aug. - Dec.

99. SOLANACEAE

(J.N. Srivastava and R.D. Dixit)

About 90 genera and 2600 species; subcosmopolitan especially S. America; 11 genera and 27 species in M.P.

1a. Anthers dehiscing longitudinally by slit:

2a. Leaves pinnatisect; anthers coherent into a cone around style

...5. *Lycopersicon*

- 2b. Leaves and anthers not as above:
- 3a. Fruit a berry:
- 4a. Calyx accrescent, enclosing fruits:
- 5a. Flowers fascicled; corolla rotate ...1. *Withania*
- 5b. Flowers solitary; corolla campanulate or subrotate:
- 6a. Corolla white or blue; filaments pubescent at base; ovary 3-5-locular ...6. *Nicandra*
- 6b. Corolla yellow; filaments glabrous; ovary 2-locular ...9. *Physalis*
- 4b. Calyx not as above:
- 7a. Corolla rotate; berries elongate ...1. *Capsicum*
- 7b. Corolla tubular or hypocrateriform; berries globose or ovoid ...2. *Cestrum*
- 3b. Fruit a capsule:
- 8a. Flowers solitary:
- 9a. Plants viscid; calyx glandular, ca 1.2 cm long ...8. *Petunia*
- 9b. Plants not viscid; calyx eglandular, 4-5 cm long ...3. *Datura*
- 8b. Flowers in cymose panicles or lax racemes ...7. *Nicotiana*
- 1b. Anthers dehiscing by apical pore, rarely by slit:
- 10a. Flowers solitary or fascicled; calyx cupular ...4. *Lycianthes*
- 10b. Flowers in cymes or panicles; calyx campanulate or tubular ...10. *Solanum*

1. CAPSICUM L.

Herbs or undershrubs, erect. Leaves alternate, spirally arranged, entire, membranous. Flowers terminal or appearing axillary, solitary or few together. Calyx cupular or campanulate, truncate or minutely toothed. Corolla campanulate-rotate, glabrous, 5-lobed; lobes valvate; tube short. Stamens 5; filaments glabrous; anthers oblong, often bluish, dehiscing

longitudinally. Ovary glabrous, 2-4-locular: ovules many in each locule; style filiform. Disk inconspicuous. Fruit a berry, glabrous, variously shaped. Seeds discoid, glabrous.

About 10 species; tropical America; 2 in M.P.

- 1a. Flowers usually solitary; berries with pendulous pedicels ...1. *C. annuum*
 1b. Flowers usually 2-5 together, rarely solitary; berries with erect pedicels ...2. *C. frutescens*

1. ***Capsicum annuum*** L., Sp. Pl. 188. 1753; Deb in J. Econ. Tax. Bot. 1: 35. 1980. - *Lal mirch, Mirch, Mirchi*.

Herbs, annual, erect. Leaves obovate, 4-7 x 2-3.5 cm, acuminate at apex. Flowers usually solitary; pedicels 1-1.5 cm long. Calyx cupular, 2-3 mm long. Corolla white, rotate, ca 1 cm across; lobes lanceolate, spreading. Berries elongate, cylindrical, 2-8 cm long, shining, orange to red on maturity. Seeds compressed.

Cultivated throughout the state as cash crop. Bilaspur, Bhopal, Chhatarpur, Damoh, Raipur. *Fl. & Fr.*: Throughout the year.

Green fruits are eaten raw and in curries while mature ones are used as pickles and spices.

2. ***Capsicum frutescens*** L., Sp. Pl. 189. 1753; C. B. Clarke in Hook. *f.*, Fl. Brit. India 4: 239. 1883; Deb in J. Econ. Tax. Bot. 1: 35. 1980.

Herbs, annual. Leaves elliptic-ovate, 5-10 x 4-6 cm, acuminate at apex, puberulous along nerves. Flowers axillary, 2-5 together, rarely solitary; pedicels ca 1.5 cm long. Calyx cupular, 3-4 mm long, somewhat enlarged in fruits. Corolla white, subrotate, ca 1.2 cm across. Berries oblong, elongate, often curved, not pendulous, orange to red on maturity. Seeds compressed.

Cultivated throughout the state as cash crop. Bastar, Bilaspur, Hoshangabad, Ratlam, Surguja. *Fl. & Fr.*: Throughout the year.

Green fruits are used raw while mature ones as spices or pickles.

2. CESTRUM L.

Undershrubs, shrubs or small trees, usually straggling. Leaves simple, alternate, entire, petiolate or sessile. Flowers fasciated or in axillary or terminal cymes or panicles, usually fragrant. Calyx short, 5-lobed. Corolla white, greenish white or pale yellow, glabrous or pubescent, 5-lobed; lobes erect, spreading or reflexed. Stamens 5; filaments adnate to corolla-tube; anthers glabrous, short. Ovary globose or ovoid, 2-locular; ovules few; style filiform; stigma truncate or capitate. Fruit a berry, globose, oblong or ovoid, 1-seeded.

About 175 species; tropical America, now naturalized and cultivated elsewhere; 3 in M.P.

- 1a. Leaves acute at apex; corolla pure white, lobes obtuse, reflexed ...1. *C. diurnum*
- 1b. Leaves acuminate or long tapering at apex; corolla greenish white or pale yellow, lobes acute, erect or spreading:
- 2a. Leaves ovate or oblong-lanceolate, 3-4 cm broad, shortly acuminate at apex; corolla-lobes erect; berries white ...2. *C. nocturnum*
- 2b. Leaves lanceolate, up to 2 cm broad, long tapering at apex; corolla-lobes spreading; berries blackish purple ...3. *C. parqui*

1. **Cestrum diurnum** L., Sp. Pl. 191. 1753, *p.p.*; Francey in Candollea 6: 234. 1935; Deb in J. Econ. Tax. Bot. 1: 36. 1980. - *Din-ka-raja*.

Undershrubs, erect, ca 1.5 m high; branches scandent. Leaves elliptic or oblong, 6-10 x 2.5-4 cm, acute at apex, rounded at base, shining, glabrous; petioles ca 1 cm long. Flowers in axillary fascicles or long, pedunculate panicles, fragrant. Calyx-lobes obtuse. Corolla white, hypocrateriform; lobes obtuse, reflexed. Stamens included. Berries globose, 5-8 mm across, dark purple.

Cultivated in gardens. Indore. *Fl. & Fr.*: Throughout the year.

2. **Cestrum nocturnum** L., Sp. Pl. 191. 1753; Deb in J. Econ. Tax. Bot. 1: 36. 1980. - *Rat-ki-rani*.

Shrubs to small trees, up to 4 m high, branched from the base. Leaves ovate or oblong-lanceolate, 5-10 x 3-4 cm, acuminate at apex, cuneate at base, glabrous. Flowers in cymes, fragrant. Calyx *ca* 4 mm long; lobes broadly ovate, subacute. Corolla greenish white, *ca* 2 cm long; lobes acute, ciliate; tube narrow. Berries ovoid, white.

Planted in gardens and lawns throughout the state for their scented flowers which open and remain fragrant during night. Bhopal, Chhatarpur, Indore, Raipur. *Fl. & Fr.*: July - Oct.

Flowers are used in perfume industry.

3. *Cestrum parqui* L' Hér., Stirp. Nov. 73, 1788; Deb in J. Econ Tax. Bot. 1: 36, 1980. - *Rat-ki-rani*.

Shrubs, glabrous, *ca* 2 m high. Leaves lanceolate, 10-15 x 1-2 cm, long tapering at apex, petiolate. Flowers in many-flowered, umbelliform cymes, fragrant, sessile. Calyx cylindrical, *ca* 1 cm long; lobes broadly ovate, acute, ciliate. Corolla pale yellow, *ca* 2 cm long, glabrous. Berries blackish purple.

Planted in gardens and lawns. Bhopal (Oommachan, 1977), East Nimar (Maheshwari, 1958). *Fl. & Fr.*: Throughout the year.

Flowers are used in perfume industry.

3. DATURA L.

Herbs or undershrubs; branches glabrous or pubescent. Leaves alternate, large, entire, sinuate or dentate. Flowers solitary, large, pedicellate. Calyx tubular, 5-toothed. Corolla white or purple, infundibuliform or tubular, 5-10-lobed or toothed. Stamens 5, alternate with corolla-lobes; filaments inserted at the middle or towards the base of corolla-tube; anthers linear. Ovary 2-locular or 4-locular; style long; stigma small, 2-lobed. Fruit a capsule, oblong or globose, tuberculate or prickly, dehiscent irregularly or by valves, many-seeded.

About 8 species; S. & N. America but widely naturalized elsewhere; 3 in M.P.

1a. Calyx subterete; fruits globose, dehiscent irregularly:

- 2a. Leaves pubescent; fruits nodding, with pointed, 7-10 mm long prickles ...1. *D. innoxia*
- 2b. Leaves glabrescent; fruits slightly bent, with blunt, 2-5 mm long prickles or tubercles ...2. *D. metel*
- 1b. Calyx angular; fruits oblong, dehiscing by 4 valves...3. *D. stramonium*

1. ***Datura innoxia*** Mill., Gard. Dict. ed. 8. n. 5. 1768; *D. metel auct. non L.*, 1753 : C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 243. 1883; Deb in J. Econ. Tax. Bot. 1: 37. 1980. - *Dhatura*.

Undershrubs, ca 1 m high. Leaves elliptic or ovate, 10-14 x 6-9 cm, oblique at base, entire or sinuate-dentate, pubescent. Flowers axillary, solitary; pedicels 2-3 cm long, recurved in fruits. Calyx reflexed in fruits. Corolla white, ca 8 cm long; teeth 10, linear. Capsules globose, 4-5 cm across, green, covered with sharply pointed, 7-10 mm long prickles, irregularly dehiscing.

In wastelands, usually along drains. Bhopal, Chhatarpur, East Nimar, Hoshangabad, Indore, Raipur, Ratlam, Rewa, Satna, Sconi. *Fl. & Fr.*: July - Jan.

Dried leaves are used for asthma while seeds in cerebral depressions.

2. ***Datura metel*** L., Sp. Pl. 179. 1753; Deb in J. Econ. Tax. Bot. 1: 37. 1980. - *Dhatura, Sada dhatura*.

Undershrubs, 1-1.5 m high, dichotomously branched; young branches glabrous, purplish. Leaves elliptic-ovate, 7-15 x 5-9 cm, irregularly sinuate, glabrescent. Flowers axillary, solitary; pedicels slightly bent in fruits. Calyx tubular, ca 5 cm long. Corolla white with purplish tinge outside, infundibuliform, ca 7 cm long. Capsules globose, 4-5 cm across, with blunt, green, 2-5 mm long prickles or tubercles, dehiscing irregularly.

In wastelands and near drains throughout the state. Bhopal, Chhatarpur, Damoh, Indore, Raipur, Rajnandgaon. *Fl. & Fr.*: July - Sept.

The plant is used for making tattoo. Flowers and fruits are offered during worship. Leaves and roots are antispasmodic, narcotic; used in insanity, catarrhal fever, cerebral complications, diarrhoea and skin diseases. Leaves are tied to sprained parts after soaking with hot oil. Seeds are toxic.

3. *Datura stramonium* L., Sp. Pl. 179. 1753; C. B. Clarke in Hook. *f.*, Fl. Brit. India 4: 242. 1883; Deb in J. Econ. Tax. Bot. 1: 38. 1980. *D. stramonium* var. *tatula* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 242. 1883. *D. tatula* L., Sp. Pl. ed. 2. 256. 1762. - *Dhatura*. **Fig. 32.**

Herbs or undershrubs, annual or perennial, erect. Leaves deltoid or ovate-oblong, 6-15 x 4-12 cm, acuminate at apex, narrowed and oblique or rounded at base, glabrous; petioles up to 5 cm long. Flowers axillary, solitary. Calyx *ca* 4 cm long, 5-angled. Corolla white or purple, 8-10 cm long; teeth 5, linear. Capsules erect, oblong, 4-7 cm long, densely covered with 5-10 mm long prickles, dehiscent by 4 valves.

In wastelands. Indore, Jabalpur, Shahdol. *Fl. & Fr.*: Nov. March.

4. LYCIANTHES (Dunal) Hassl., *nom. cons.*

Herbs or undershrubs, erect or straggling. Leaves simple, spirally arranged, unequal, more or less entire. Flowers axillary or extra-axillary, solitary or fascicled, actinomorphic; pedicels elongate in fruits. Calyx cupular or shortly campanulate, 5-10-toothed; teeth minute or long, filiform; tube accrescent. Corolla rotate, 5-lobed; lobes ovate-lanceolate, acute. Stamens 5, inserted on throat; filaments short, equal or unequal. Ovary 2-locular; ovules 1 to many in each locule; style filiform, glabrous. Fruit a berry, globose or subglobose, glabrous. Seeds circular-reniform, finely reticulate.

About 200 species; tropical America and E. Asia; one in M. P.

Lycianthes laevis (Dunal) Bitter in Abh. Naturwiss. Ver. Bremen 24: 484. 1920; Deb in J. Econ. Tax. Bot. 1: 39. 1980. *Solanum laeve* Dunal, Solan. Syn. 22. 1816; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 231. 1883.

Undershrubs, straggling. Leaves solitary at base and in unequal pairs towards apex, elliptic-lanceolate, 10-15 x 3-5 cm, acuminate at apex, decurrent at base, membranous, scabrid above. Flowers 2-6 in extra-axillary fascicles. Berries globose, *ca* 1 cm across.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: July Dec.



Fig. 32. *Datura stramonium* L.

5. LYCOPERSICON Mill.

Herbs, annual, erect or decumbent, with spreading hairs. Leaves spirally arranged, odd-pinnate; leaflets irregularly dentate. Flowers in terminal or lateral, often 2-3-branched cincinni, 5-merous, decurved. Calyx deeply lobed nearly up to base, accrescent; segments narrow, acute. Corolla yellow; tube short. Filaments short; anthers coherent. Ovary 2 to many-locular; ovules many in each locule; style filiform; stigma entire or grooved. Fruit a berry, variable in shape and size, many-seeded. Seeds circular-reniform, flat.

About 7 species; W. S. America and Galapagos; one in M. P.

***Lycopersicon esculentum* Mill.**, Gard. Dict. ed. 8. n. 2. 1768, *nom. sp. cons.*; C.B. Clarke in Hook. f., Fl. Brit. India 4: 237. 1883; Terrell in Taxon 26: 129. 1977. *L. lycopersicum* (L.) Farewell, Ann. Rep. Comm. Park & Boul. Det. II: 84. 1900. *Solanum lycopersicum* L., Sp. Pl. 185. 1753. *Tamatar*.

Herbs, erect to decumbent, aromatic; plant parts glandular pubescent. Leaves 1-2-pinnatifid or partite; leaflets ovate-lanceolate, variable in size, acuminate at apex. Flowers in 1 to many-flowered cincinni. Calyx ca 1 cm long. Corolla yellow, ca 2 cm across, pilose outside; lobes acuminate. Berries globose to depressed globose or subglobose, 3-6 cm across, green when young, red when ripe.

Cultivated as cash crop throughout the state. Bhopal, Chhatarpur, Damoh, Indore. *Fl. & Fr.*: Throughout the year.

Fruits are edible, consumed as salad or vegetable curry, extensively used for soup and ketchup etc.

Notes: *L. esculentum* Mill. has been included under App. III B of ICBN (1994) as *nom. sp. cons.*, according to special provisions of Art 14.4.

6. NICANDRA Adans., nom. cons.

Herbs, annual, erect. Leaves alternate, spirally arranged, serrate, long petiolate. Flowers solitary, actinomorphic, pedicellate. Calyx deeply 5-lobed, accrescent, enveloping fruits. Corolla campanulate;

limb plicate, shallowly 5-lobed; tube very short. Stamens 5; filaments equal, inserted in the apical part of corolla-tube, with widened pubescent base. Ovary glabrous; ovules many; style short; stigma lobed. Fruit a berry, globose, 3-5-celled. Seeds compressed, pitted.

A monotypic genus; native of Peru but now spread throughout the warmer parts.

Nicandra physalodes (L.) Scop., *Intr. Hist. Nat.* 182. 1777; Heine, *Fl. Nouv.-Caled. et Dep.* 7: 205. 1976; Deb in *J. Econ. Tax. Bot.* 1: 42. 1980. *Atropa physalodes* L., *Sp. Pl.* 181. 1753; *Nicandra physaloides* (L.) Gaertn., *Fruct. Sem. Pl.* 2: 237. t. 131. f. 2. 1791; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 240. 1883. **Fig. 33.**

Herbs, branched. Leaves oblong or ovate-lanceolate, 5-15 x 2-7 cm, obtuse or acute at apex, oblique at base, ciliate to glabrous; petioles winged, ca 20 cm long. Flowers erect, decurved later on. Calyx 1.5-2 cm long; lobes ovate-lanceolate, up to 3 cm long in fruit, acuminate, cordate sagittate. Corolla white or bluish, 2-4 cm long, pubescent outside. Berries 10-15 mm across, glabrous.

As forest undergrowth. Balaghat, Bilaspur, Hoshangabad, Mandla, Seoni, Surguja. *Fl. & Fr.*: Jan. March.

The plant is diuretic, insecticidal, anthelmintic and used as fly poison. Seeds yield fatty oil used in varnishes.

7. NICOTIANA L.

Herbs or undershrubs, erect, viscidly pubescent. Leaves usually cauline, sometimes radical, entire or wavy, sessile or petiolate. Flowers in terminal, cymose panicles or lax racemes. Calyx campanulate, membranous, 5-lobed. Corolla tubular, hypocrateriform or infundibuliform, 5-lobed; lobes spreading. Stamens 5, didynamous, included. Ovary globose-ellipsoid, 2 or imperfectly 4-locular; style filiform; stigma capitate. Fruit a capsule, ovoid or globose, many-seeded. Seeds 3-angled.

About 67 species; Australia, S.W. Africa, N. & S. America; 3 in M.P.

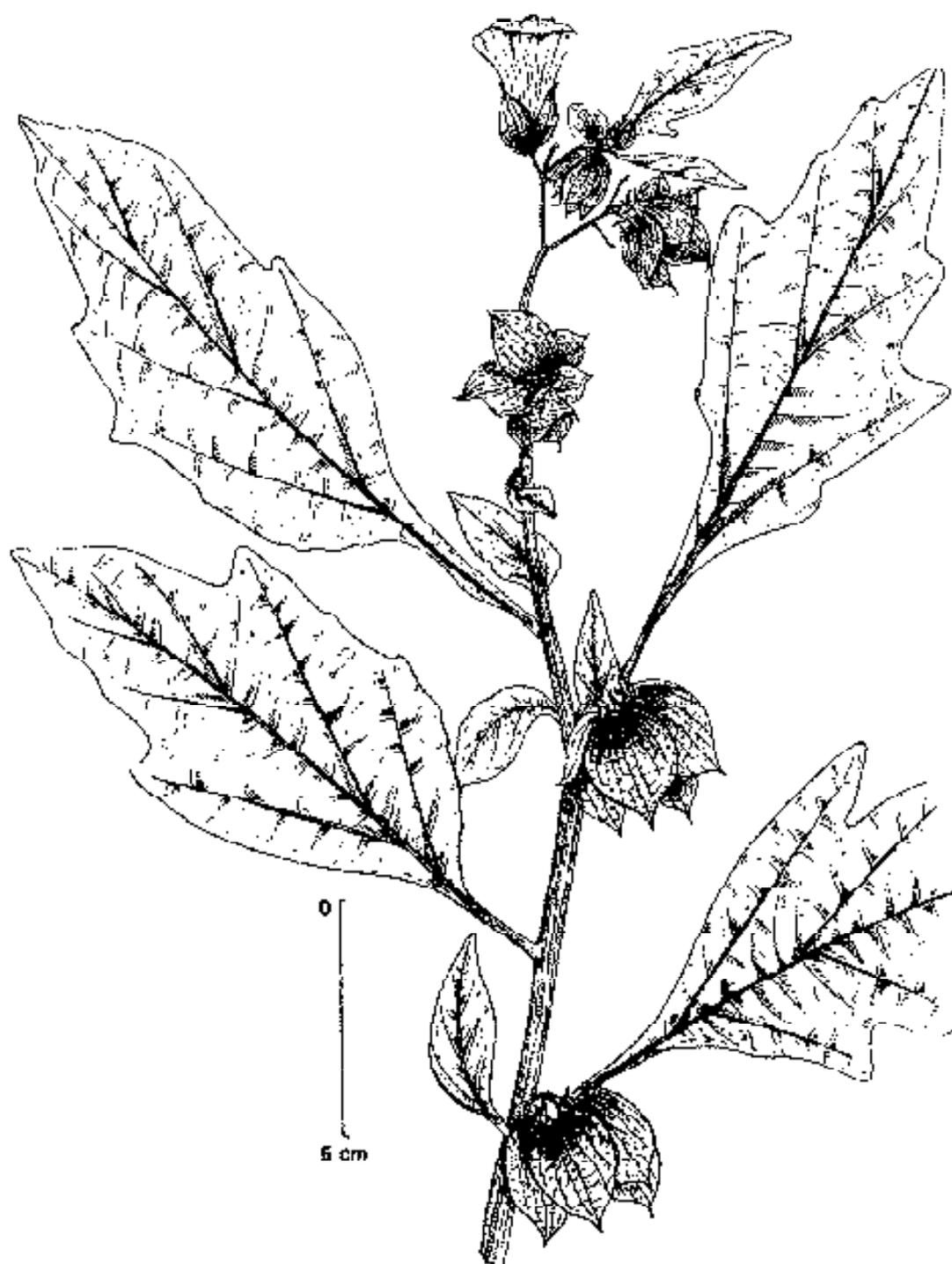


Fig. 33. *Nicandra physalodes* (L.) Scop.

- 1a. Leaves sessile or shortly petiolate; calyx-lobes acuminate; corolla hypocrateriform or infundibuliform:
- 2a. Flowers in lax racemes; stamens inserted near the top of corolla-tube ...1. *N. plumbaginifolia*
- 2b. Flowers in cymose panicles; stamens inserted near the base of corolla-tube ...3. *N. tabacum*
- 1b. Leaves petiolate; calyx-lobes obtuse to subacute; corolla narrowly campanulate or saucer-shaped ...2. *N. rustica*

1. *Nicotiana plumbaginifolia* Viv., Elench. Pl. 26. t. 5. 1802; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 246. 1883; Deb in J. Econ. Tax. Bot. 1: 42. 1980. **Fig. 34.**

Herbs. Basal leaves in a rosette, obovate, 7-12 cm long, narrowed into a short petiole; cauline leaves elliptic-obovate, 6-10 x 2.5-5 cm, obtuse or acute at apex, glandular white-dotted beneath, sessile. Flowers in terminal, lax racemes. Calyx ca 12 mm long, glandular hairy, 10-ribbed; lobes lanceolate. Corolla greenish white or pale pink, hypocrateriform, 2-3.5 cm long; tube linear. Capsules ovoid.

Along the edge of forests. Betul, Hoshangabad. *Fl. & Fr.*: Nov. March.

2. *Nicotiana rustica* L., Sp. Pl. 180. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 245. 1883; Deb in J. Econ. Tax. Bot. 1: 43. 1980. *Kalkattia tambaku*. **Fig. 35.**

Herbs; stems terete, branched from the base. Leaves ovate, 6-18 x 4-13 cm, acute at apex, obtuse or subcordate at base; petioles winged. Flowers in cymose panicles. Calyx ca 1 cm long, glandular-pubescent; lobes obtuse or subacute. Corolla greenish yellow, 2-4 cm long, pubescent outside; lobes orbicular, obtuse or subacute. Capsules subglobose, 1-1.5 cm across.

Cultivated. Panna, Satna. *Fl. & Fr.*: Nov. Feb.

Leaves are used for snuff and chewing purposes.

3. *Nicotiana tabacum* L., Sp. Pl. 180. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 245. 1883; Deb in J. Econ. Tax. Bot. 1: 43. 1980.-*Tambaku*.



Fig. 34. *Nicotiana plumbaginifolia* Viv.



Fig. 35. *Nicotiana rustica* L.

Herbs. Leaves elliptic, 14-27 x 4-12 cm, acute or obtuse at apex, cuneate at base, sessile. Flowers in cymose panicles. Calyx *ca* 1.5 cm long, glandular pubescent; lobes deltoid-lanceolate, acuminate. Corolla greenish white, *ca* 5 cm long, glandular pubescent outside; lobes ovate, acuminate. Capsules ovoid-globose, 2-2.3 cm long.

Widely cultivated throughout the state and also as wild along the drains and on abandoned hill tops. Bastar, Damoh, Hoshangabad, Mandla, Sidhi, Surguja. *Fl. & Fr.*: Dec. - April.

Leaves are bitter in taste and consumed in different forms as such or smoked. A mixture of lime and dried leaves (tobacco) is applied to wounds.

8. PETUNIA Juss.

Herbs, erect or ascending, viscidly hairy. Leaves opposite or spirally arranged, entire, sessile or shortly petiolate. Flowers axillary, solitary, actinomorphic. Calyx 5-lobed; lobes oblong-linear or lanceolate, obtuse. Corolla infundibuliform, shallowly 5-lobed; lobes somewhat unequal; tube widened upwards. Stamens 5; filaments unequal, shorter than corolla, glabrous, inserted below the middle of corolla-tube; anthers longitudinally dehiscent. Ovary 2-locular; ovules many in each locule; style filiform. Fruit a capsule, depressed-ovoid, 2-valved. Seeds small, warty.

About 35 species; tropical and subtropical America especially Brazil; one in M.P.

Petunia hybrida x Hort. ex Vilm., Fl. Pleine Terre ed. 1. 615. 1863; Deb in J. Econ. Tax. Bot. 1: 43. 1980.

Herbs, annual, erect. Leaves elliptic-lanceolate, obtuse at apex, cuneate or decurrent at base, glabrous. Flowers pedicellate; pedicels 2-4 cm long, glandular pubescent. Calyx *ca* 12 mm long, glandular pubescent; lobes lanceolate. Corolla pink-red or purple, pubescent outside; lobes rounded, obtuse or acuminate. Style glabrous.

Cultivated in gardens; sometimes as an escape in wastelands. Chhatarpur, Indore. *Fl.*: Jan. - March.

9. PHYSALIS L.

Herbs, annual or perennial. Leaves chartaceous, petiolate. Flowers axillary, solitary, pedicellate. Calyx campanulate, 5-lobed, much enlarged and inflated in fruits. Corolla subrotate, plicate, 5-angled or shortly 5-lobed. Stamens 5, inserted near the base of corolla, exserted. Ovary 2-locular. Fruit a berry, globose or ellipsoid, enveloped within bladder like calyx. Seeds compressed, smooth or rugose.

About 80 species; cosmopolitan especially America; 2 in M.P.

1a. Leaves 2-4 cm long; anthers yellow ...1. *P. minima*

1b. Leaves more than 5 cm long; anthers blue or violet ...2. *P. peruviana*

1. *Physalis minima* L., Sp. Pl. 183. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 238. 1883; Deb in J. Econ. Tax. Bot. 1: 43. 1980. *P. indica* Lam., Encycl. 2: 102. 1786. *P. minima* L. var. *indica* (Lam.) C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 238. 1883. - *Ban phutkà*, *Raspberry*.

Herbs, annual, erect, 20-35 cm high; stems pubescent. Leaves ovate, 2-4 x 1-3 cm, acute or obtuse at apex, rounded at base, dentate, sinuate or lobulate, puberulous or pubescent. Flowers nodding; pedicels 0.5-1 cm long. Calyx-lobes equalling the tube. Corolla yellow, often with small purple spots at the base. Berries globose, 7-12 mm across. Seeds rugose.

In wastelands. Balaghat, Betul, Bilaspur, Chhatarpur, Damoh, East Nimar, Hoshangabad, Indore, Mandla, Raigarh, Raipur, Rajnandgaon, Surguja, Tikamgarh. *Fl. & Fr.*: Aug. - Jan.

Notes: Hara *et al.* (Enum. Pl. Nepal 3: 110. 1982) have treated *P. minima auct. non L.*, 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 238. 1883 as a synonym of *P. divaricata* D. Don (Prodr. Fl. Nepal. 97. 1825). On the other hand, Nicolson *et al.* (Regnum Vegetabile 119: 248. 1988) have treated *P. minima* L. (1753) as a synonym of *P. angulata* L. (1753) and further stated that *P. minima* L. var. *indica* (Lam.) C.B. Clarke represents *P. parviflora* R. Br. *non* Willd. In the present work, Deb's (1980) treatment has been followed.

2. *Physalis peruviana* L., Sp. Pl. ed. 2. 1670. 1763; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 238. 1883; Deb in J. Econ. Tax. Bot. 1: 44. 1980.

Herbs, perennial, erect or rambling, glandular pubescent or villous. Leaves ovate, 5-10 x 4-6 cm, acute or acuminate at apex, cordate-cuneate at base, entire or dentate, pubescent. Flowers axillary, solitary. Calyx-lobes lanceolate, pubescent outside. Corolla yellow with purple spots inside, pubescent. Berries ellipsoid, ca 1 cm long, yellow, glabrous.

Jabalpur (Oomnathan and Shrivastava, 1996). *Fl. & Fr.* : Aug. - Nov.

10. SOLANUM L.

Herbs or shrubs, rarely small trees, erect or climbing. Leaves simple or 3-pinnatifid, alternate or in subopposite pairs. Flowers solitary or in supra-axillary, lateral or terminal cymes or panicles, bisexual or upper ones only staminate, pedicellate. Calyx campanulate or tubular. Corolla rotate or sometimes campanulate; lobes 5; tube short. Stamens 5, adnate at the throat of corolla; filaments very short; anthers connivent into a cone around style, dehiscing by apical pore or rarely by slit. Fruit a berry, variously coloured. Seeds discoid.

About 1400 species; subcosmopolitan; 9 in M.P.

- 1a. Plants climbing ...5. *S. seaforthianum*
- 1b. Plants erect, rarely prostrate, never climbing:
 - 2a. Plants armed:
 - 3a. Peduncles paired bearing solitary bisexual flower and several male flowers ...2. *S. incanum*
 - 3b. Peduncle solitary bearing only bisexual flower:
 - 4a. Corolla violet or blue:
 - 5a. Prickles hooked ...8. *S. violaceum*
 - 5b. Prickles straight:
 - 6a. Plants wild; berries up to 2.5 cm across ...9. *S. virginianum*
 - 6b. Plants cultivated; berries more than 3 cm across ...3. *S. melongena*
 - 4b. Corolla white ...6. *S. torvum*

2b. Plants unarmed:

7a. Corolla purple or violet:

8a. Plants wild; berries up to 2.5 cm across ...1. *S. dulcamara*8b. Plants cultivated; berries more than
3 cm across ...3. *S. melongena*

7b. Corolla white, rarely purple:

9a. Plants cultivated, with subterranean stem
bearing tubers; leaves imparipinnate ...7. *S. tuberosum*9b. Plants otherwise; leaves simple ...4. *S. nigrum*

1. *Solanum dulcamara* L., Sp. Pl. 185, 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 229, 1883; Deb in J. Econ. Tax. Bot. 1: 46, 1980.

Shrubs, unarmed, glabrous to glabrescent. Leaves ovate-oblong, acute at apex, cordate at base, entire, lobed or lyrate. Flowers in extra-axillary, lax, paniculate cymes. Calyx-teeth small, obtuse. Corolla purple. Berries globose. Seeds smooth.

Rare. Along the forest margins. Hoshangabad. *Fl. & Fr.*: Aug. - Jan.

2. *Solanum incanum* L., Sp. Pl. 188, 1753. *S. coagulans* Forssk., Fl. Aegypt.-Arab. 47, 1775; C.B. Clarke in Hook. f., Fl. Brit. India 4: 236, 1883. *S. melongena* L. var. *incanum* (L.) Kuntze, Revis. Gen. Pl. 454, 1891; Deb in J. Econ. Tax. Bot. 1: 49, 1980. - *Jangli bhanta*.

Undershrubs, armed, tomentose. Leaves ovate-elliptic, 4-10 x 3-6 cm, obtuse at apex, sinuately lobed, stellate pubescent, prickly on veins. Peduncles extra-axillary, paired, one bearing several male flowers in racemes, other bearing solitary, bisexual flower. Calyx stellate hairy; teeth deltoid. Corolla blue, stellate hairy outside. Berries globose, ca 2 cm across, yellow. Seeds minutely pitted.

Along the edge of forests. Bilaspur, Chhatarpur, Damoh, Hoshangabad, Rajnandgaon. *Fl. & Fr.*: Jan. - June.

Root powder is used to relieve stomachache.

3. *Solanum melongena* L., Sp. Pl. 186, 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 235, 1883; Deb in J. Econ. Tax. Bot. 1: 48, 1980. - *Baigan, Bhanta*.

Herbs or undershrubs, diffuse, much branched. Leaves ovate or ovate-oblong, 8-15 x 4-9 cm, sinuate or lobed, softly stellate pubescent, often armed along midrib. Flowers solitary or in extra-axillary racemes. Calyx densely stellate pubescent, enlarged in fruit but not inflated. Corolla violet. Berries variable in shape and size, deep purple or greenish white. Seeds spherical, flat.

Widely cultivated throughout the state as cash crop. Chhatarpur, Damoh, Indore. *Fl. & Fr.*: Throughout the year.

Fruits are consumed as vegetables.

4. *Solanum nigrum* L., Sp. Pl. 186. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 229. 1883; Deb in J. Econ. Tax. Bot. 1: 49. 1980. *S. rubrum* Mill., Gard. Dict. ed. 8. no. 4. 1768; Wight, Icon. Pl. Ind. Orient. 2 (1): 3. t. 344. 1840. - *Makoi*.

Herbs, annual, erect. Leaves ovate-oblong or oblong-lanceolate, 5-10 x 3-5 cm, entire to sinuate-dentate, almost glabrous; petioles 2-5 cm long. Flowers in extra-axillary, umbelliform cymes, small, nodding; peduncles appressed hairy, 1-5 cm long; pedicels 4-5 mm long. Calyx ca 2 mm long; lobes ovate-rounded, subobtuse. Corolla white, rarely purple; lobes oblong. Berries globose, 6-8 mm across, black, blackish purple or red.

In wastelands and moist places throughout the state. Bilaspur, Chhatarpur, Damoh, Hoshangabad, Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. - Feb.

Tender shoots and leaves are eaten as vegetables. Decoction of leaves is used for liver and skin discases. Fruits are edible and also used to treat eye diseases.

5. *Solanum seaforthianum* Andr., Bot. Repos. 8. t. 504. 1808; Deb in J. Econ. Tax. Bot. 1: 50. 1980. **Fig. 36.**

Shrubs, climbing, glabrous. Leaves ovate, 6-8 x 4.5-6 cm, deeply pinnatifid; lobes ovate-lanceolate, 3-4 x 1-2 cm, glabrous, rarely pubescent. Flowers in lateral and terminal, paniculate cymes. Calyx short, truncate. Corolla violet, ca 1 cm across. Berries globose, red. Seeds pitted.

Rare. In hilly regions. Hoshangabad. *Fl. & Fr.*: Jan. - Oct.

6. *Solanum torvum* Sw., Prodr. 47. 1788; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 234. 1883; Deb in J. Econ. Tax. Bot. 1: 51. 1980.

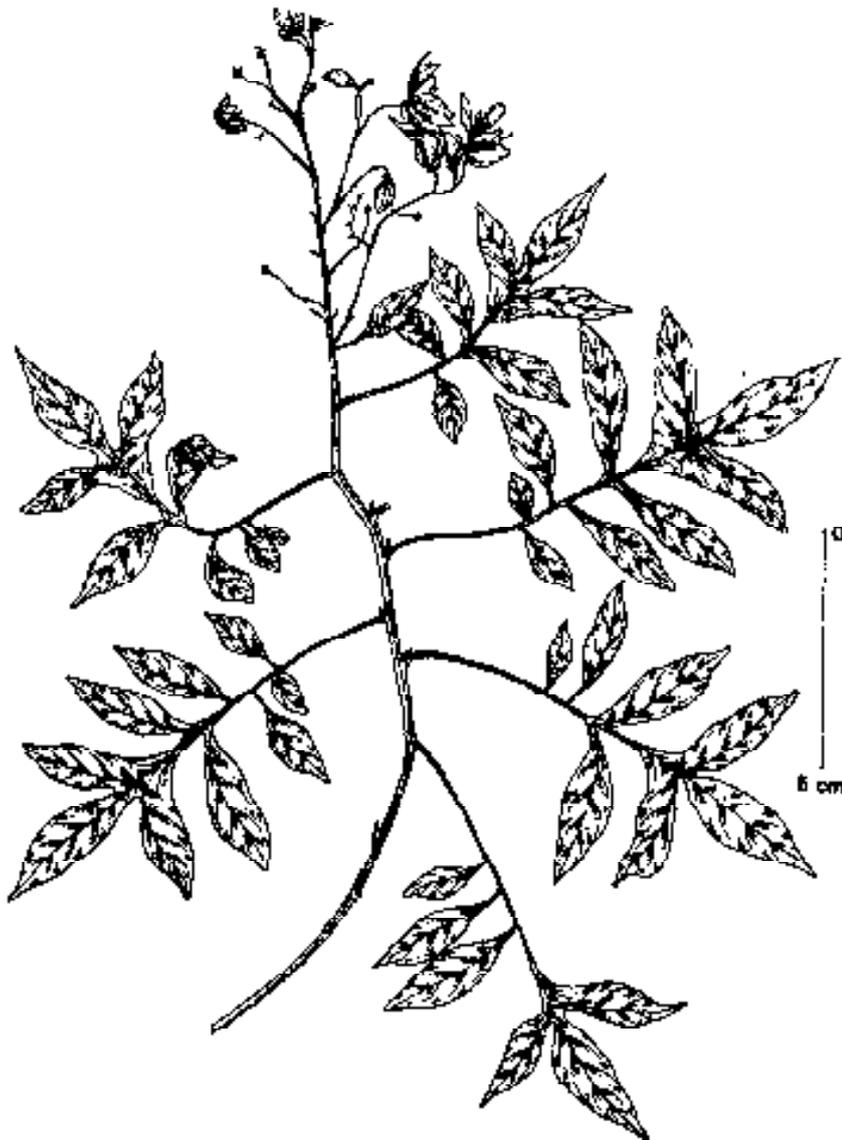


Fig. 36. *Solanum seafortianum* Andr.

Shrubs, erect, much branched; stems and petioles with scattered prickles. Leaves ovate-elliptic to oblong, 5-10 x 3-6 cm, acute or obtuse at apex, rounded or cordate at base, sinuate or pinnatifid, pubescent, sparsely prickly on midrib. Flowers in many-flowered, sessile or shortly pedunculate, corymbose cymes. Calyx cupular, ca 6 mm long, glandular pubescent; lobes oblong, acuminate. Corolla white, 7-8 mm long; lobes lanceolate, subacute. Berries globose, ca 1 cm across. Seeds globose, smooth.

On hill slopes. Bastar, Bilaspur, Hoshangabad, Raigarh. *Fl. & Fr.*: Throughout the year.

Fruits are eaten as vegetables and also given in spleen enlargement.

7. *Solanum tuberosum* L., Sp. Pl. 185, 1753; Deb in J. Econ. Tax. Bot. 1: 52, 1980. - *Aalu*.

Herbs, erect-ascending; stems subterranean bearing tubers. Leaves interruptedly imparipinnate, 12-18 cm long; leaflets ovate-obovate to elliptic, 2.5-4 x 1.5-2.5 cm, acuminate at apex, pubescent, shortly petiolate. Flowers in lateral and terminal, 7-20-flowered, corymbose cymes. Calyx 7-15 mm long, pubescent. Corolla white, 15-20 mm long.

Widely cultivated as cash crop throughout the state. Bhopal (Oommachan, 1977). *Fl.*: Dec. March.

Tubers are used in various vegetable preparations.

8. *Solanum violaceum* Ortega, Nov. Pl. Descr. Dec. 56, 1798; Nicolson *et al.* in *Regnum Vegetabile* 119: 252, 1988. *S. anguivi auct. non Lam.*, 1794; Hara *et al.*, *Enum. Pl. Nepal* 3: 111, 1982. *S. indicum auct. non L.*, 1753 (*nom. rej.* vide App. IV, ICBN, 1994); C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 234, 1883. - *Barhanta, Bhal - kateri, Birhatta*.

Undershrubs, erect, tomentose; stems armed with hooked prickles. Leaves ovate-oblong, 6-15 x 5-10 cm, subacute or obtuse at apex, subcordate or truncate at base, sinuate-pinnatifid; petioles ca 2.5 cm long. Flowers in lateral, corymbose cymes; pedicels ca 1.5 cm long. Calyx 5 mm long, stellate pubescent outside; lobes ovate, acute. Corolla violet, ca 2.5 cm across, stellate pubescent; lobes elliptic-oblong, obtuse. Berries globose. Seeds smooth.

In sal and mixed forests. Balaghat, Bilaspur, East Nimar, Hoshangabad, Raigarh, Raipur, Satna, Seoni, Surguja. *Fl. & Fr.*: Throughout the year.

The plant is used to treat cough, asthma, fever, dysuria, worms, nervous complaints, vomiting and skin diseases.

9. *Solanum virginianum* L., Sp. Pl. 187. 1753; Hepper & Jaeger in Kew Bull. 41(2): 434. 1986. *S. surattense* Burm. f., Fl. Ind. 57. 1768; Deb in J. Econ. Tax. Bot. 1: 51. 1980. *S. xanthocarpum* Schrad. & Wendl. in Schrad., Sert. Hannov. 1: 8. t. 2. 1795; C.B. Clarke in Hook. f., Fl. Brit. India 4: 236. 1883. - *Bhatkattaiya*.

Herbs, perennial, diffuse, prickly, woolly; branches zigzag, bearing strong, yellow prickles. Leaves ovate or elliptic, sinuate or subpinnatifid, 5-8 x 3-5 cm, obtuse or subacute at apex, stellate hairy, with prickles on midrib and veins. Flowers in extra-axillary, few-flowered cymes. Calyx-lobes linear or lanceolate. Corolla bluish purple to violet; lobes deltoid, pubescent outside. Berries globose, 1.5-2.5 cm across, yellow-orange. Seeds compressed, smooth.

In open wastelands throughout the state. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, East Nimar, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Dec. June.

The plant is used for nervous and respiratory disorders, cough, rheumatism, colic, asthma, sore throat and skin diseases. Decoction of roots is given in fever and spermatorrhoea. Fruit juice is given to relieve earache while the pulp is eaten as vegetables. Boiled seeds are eaten with salt.

11. WITHANIA Pauquy, *nom. cons.*

Undershrubs or shrubs, unarmed. Leaves alternate or in unequal pairs, entire, often oblique. Flowers axillary, fascicled, sessile or shortly pedicellate. Calyx campanulate, 5-6-toothed, enlarged and inflated in fruit. Corolla rotate, 3-6-lobed. Stamens inserted at the base of corolla-tube, exserted. Ovary 2-locular. Fruit a berry, globose. Seeds compressed.

About 10 species; Old World; one in M.P.

Withania somnifera (L.) Dunal in DC., Prodr. 13(1): 453. 1852; C.B. Clarke in Hook. f., Fl. Brit. India 4: 239. 1883; Deb in J. Econ. Tax. Bot. 1: 52. 1980. *Physalis somnifera* L., Sp. Pl. 182. 1753.
Ashwagandha. Fig. 37.

Undershrubs, 1-1.5 m high; branches tomentose. Leaves elliptic-ovate, 5-8 x 2-5 cm, acute at apex, truncate-acute at base, minutely stellate pubescent beneath. Flowers fascicled, pedicellate. Calyx up to 2 cm long, glabrous or pubescent; teeth linear, acute. Corolla greenish yellow, 5-lobed; lobes oblong, obtuse. Berries ca 8 mm across, orange-red on maturity, enclosed by 5-angled, membranous, inflated calyx. Seeds discoid.

In wastelands. Indore. *Fl. & Fr.*: July - Dec.

100. SCROPHULARIACEAE

(A.N. Singh)

About 222 genera and 4500 species; cosmopolitan especially temperate regions and tropical mountains; 26 genera and 69 species in M.P.

- 1a. Leaves all alternate ...25. *Verbascum*
- 1b. Lower leaves opposite or whorled, upper ones opposite, whorled or alternate:
 - 2a. Corolla-tube saccate, gibbose or spurred at base or throat:
 - 3a. Capsules loculicidal ...3. *Angelonia*
 - 3b. Capsules porous or loculicidal and porous both:
 - 4a. Plants suberect or twining; leaves sagittate or hastate at base; corolla spurred ...11. *Kickxia*
 - 4b. Plants erect; leaves obtuse or rounded at base; corolla saccate or gibbose ...4. *Antirrhinum*
 - 2b. Corolla-tube neither saccate nor gibbose nor spurred at base or throat:
 - 5a. Fertile stamens 2:
 - 6a. Anthers 2-celled; cells parallel or confluent:

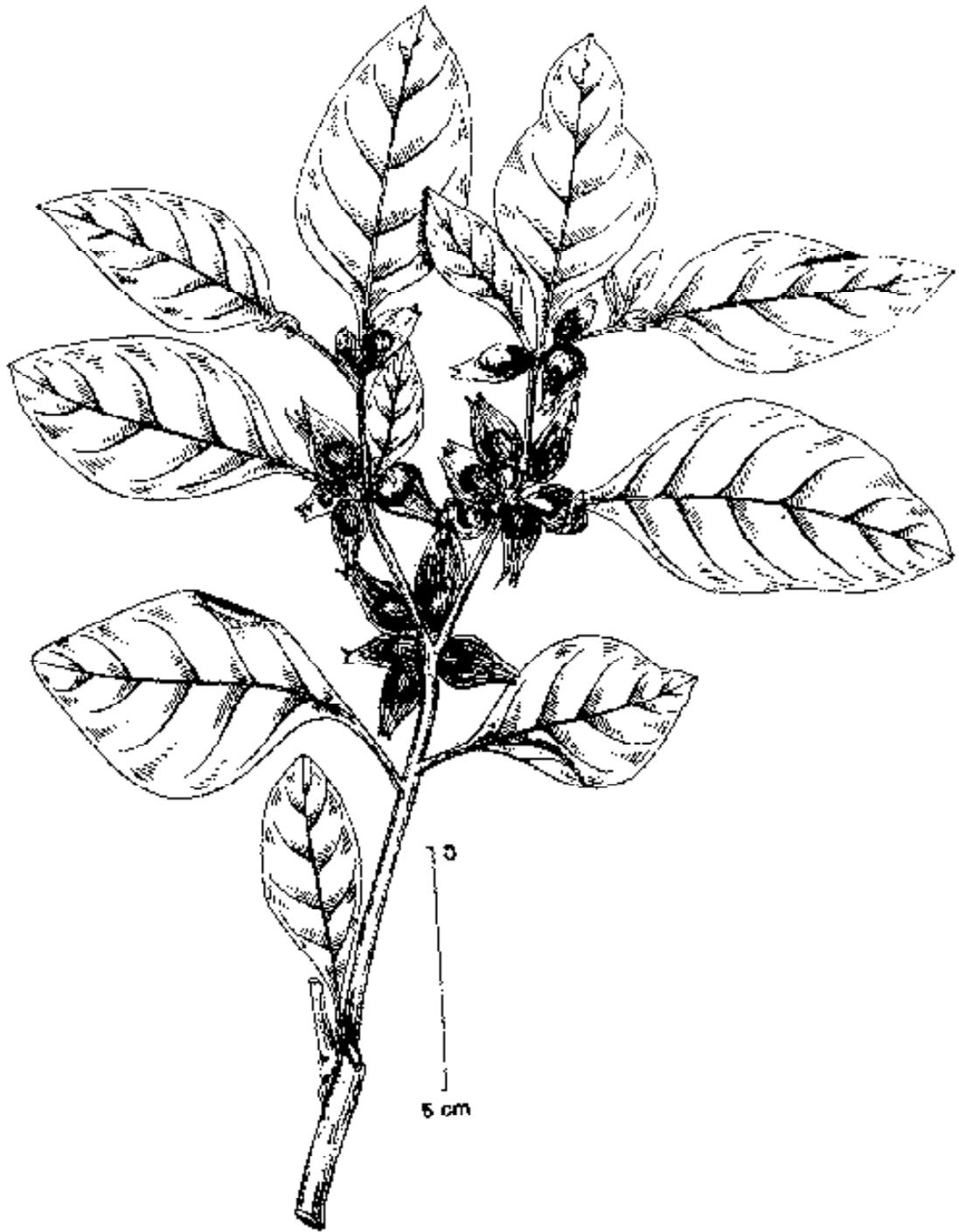


Fig. 37. *Withania somnifera* (L.) Dunal

- 7a. Upper leaves minute; corolla with upper lobes outside in bud; anther cells parallel; capsule valves placentiferous, 2-partite ...9. *Dopatrium*
- 7b. Upper leaves well developed; corolla with lateral or lower lobes outside in bud; anther cells confluent; capsule valves not placentiferous, entire ...26. *Veronica*
- 6b. Anthers 1-celled or if 2-celled, the cells divergent at least at the base:
- 8a. Calyx 3-lobed ...10. *Glossostigma*
- 8b. Calyx 5-lobed:
- 9a. Anthers 1-celled; staminodes absent; capsules loculicidal ...16. *Microcarpaea*
- 9b. Anthers 2-celled; staminodes present or absent; capsules septicidal ...14. *Lindernia*
- 5b. Fertile stamens 4:
- 10a. Flowers in cymes; corolla red; tube 1.2-1.5 cm long ...18. *Russelia*
- 10b. Flowers usually in racemes, heads or spikes, rarely solitary or in cymes; corolla of various colours but usually not red; tube up to 1 cm long:
- 11a. Anthers 1-celled, if 2-celled, one cell empty:
- 12a. Calyx-segments unequal ...1. *Adenosma*
- 12b. Calyx-lobes or segments equal:
- 13a. Corolla with lower lobes outside in bud:
- 14a. Calyx campanulate or tubular but not spathaceous:
- 15a. Corolla-tube long, slender; anther cells not stipitate:
- 16a. Corolla-tube strongly incurved; upper lip emarginate ...22. *Striga*

- 16b. Corolla-tube straight or slightly incurved; upper lip 2-lobed ...6. *Buchnera*
- 15b. Corolla-tube short, broad; empty anther cells stipitate ...20. *Sopubia*
- 14b. Calyx spathaceous, compressed and split on one side ...7. *Centranthera*
- 13b. Corolla with upper lobes outside in bud ...23. *Sutera*
- 11b. Anthers 2-celled; both cells fertile:
- 17a. Parasitic, scabrid herbs, black when dry ...2. *Alectra*
- 17b. Plants not as above:
- 18a. Plants stemless; flowers borne on scape ...8. *Craterostigma*
- 18b. Plants with well developed stems; flowers borne on the stems or branches:
- 19a. Corolla 4-lobed ...19. *Scoparia*
- 19b. Corolla 5-lobed:
- 20a. Calyx 3-5-winged ...24. *Torenia*
- 20b. Calyx not winged:
- 21a. Upper pair of stamens inserted in corolla-throat; lower pair inserted in corolla-tube, appendiculate ...14. *Lindernia*
- 21b. All the stamens inserted in corolla-tube; lower pair not appendiculate:
- 22a. Corolla campanulate, obscurely bilabiate ...5. *Bacopa*
- 22b. Corolla tubular, distinctly bilabiate:
- 23a. Anther cells separate:
- 24a. Capsules 2-valved...13. *Lindenbergia*

- 24b. Capsules 4-valved:
- 25a. Plants terrestrial; seeds terete ...21. *Stemodia*
- 25b. Plants aquatic or marshy; seeds angular ...12. *Limnophila*
- 23b. Anther cells contiguous:
- 26a. Lower leaves opposite or whorled, upper ones alternate; calyx divided halfway down, not angular ...15. *Mazus*
- 26b. All leaves opposite; calyx shortly dentate, 5-angled ...17. *Mimulus*

1. ADENOSMA R. Br.

Herbs, erect, aromatic, branched, glandular pubescent or villous. Leaves opposite, decussate, crenulate or serrate, rugose. Flowers in axillary, leafy spikes, racemes or heads, ebracteolate or bracteolate. Calyx 5-partite; segments often much enlarged in fruits. Corolla bilabiate; upper lip entire or notched; lower lip 3-lobed; tube cylindrical. Stamens 4, didynamous, included; anther cells stipitate. Style dilated at tip, winged below; stigma entire or bilamellate. Capsules ovoid, ellipsoid or lanceolate, loculicidal and septicidal, 4-valved. Seeds numerous, smooth or reticulate.

About 15 species; China, Indo-Malesia and Australia; 2 in M.P.

- 1a. Flowers in spikes or heads; capsules ovoid ...1. *A. indianum*
- 1b. Flowers solitary; capsules lanceolate ...2. *A. ovatum*

1. *Adenosma indianum* (Lour.) Merr. in Trans. Amer. Phil. Soc. n.s. 24(2): 351. 1935. *Manulea indiana* Lour., Fl. Cochinch. 386. 1790. *Adenosma capitatum* Benth. ex Hance in J. Linn. Soc. Bot. 13: 114. 1873; Hook. f., Fl. Brit. India 4: 264. 1884. *A. bilabiata* (Roxb.) Merr., Enum. Philipp. Fl. Pl. 3: 434. 1923. *Erinus bilabiatum* Roxb., Hort. Beng. 47. 1814, *nom. nud.*

Herbs, stout, 30-60 cm high. Leaves ovate or oblong, 2.5-5 cm long, subacute at apex, cuneate at base, serrate, petiolate. Flowers in axillary clusters or dense, cylindrical, villous spikes or terminal, globose or ovoid heads, surrounded by involucreal leaves; bracts linear, as long as or slightly longer than flowers. Calyx 6-7 mm long, villous; segments lanceolate, upper one largest. Corolla blue. Capsules ovoid.

In moist places along roadsides. Hoshangabad. *Fl. & Fr.*: Dec. March.

2. *Adenosma ovatum* Benth. ex Hook. *f.*, *Fl. Brit. India* 4: 263. 1884.

Herbs, erect, branched, glabrous or puberulous. Leaves ovate, 2-5 cm long, obtuse at apex, cuneate at base, crenate-serrate; petioles 5-6 mm long. Flowers axillary, solitary, sessile. Calyx bilabiate; 3 outer segments large, cordate; 2 inner segments lanceolate, smaller. Capsules lanceolate.

Rare. In moist and shady places. Dhar, Jhabua (Samvatsar, 1996). *Fl. & Fr.*: Sept. - Nov.

2. ALECTRA Thunb.

Herbs, erect, stout, usually scabrid, turning black on drying. Leaves opposite or alternate, dentate, sometimes reduced to scales. Flowers axillary, solitary or in terminal spikes or racemes, bracteate, bracteolate. Calyx campanulate, subfoliaceous, 5-toothed or 5-partite; lobes valvate. Corolla 5-lobed; lobes spreading; limb oblique; tube broad. Stamens 4, didynamous; filaments glabrous or bearded; anthers paired; cells parallel, mucronate at base. Style long, inflexed; stigma elongate, spatulate. Capsules globose or subglobose, loculicidal. Seeds minute, reticulate.

About 30 species; tropical regions of Africa, Asia and America: 3 in M.P.

1a. Leaves 0.3-0.6 cm long:

2a. Flowers sessile; filaments glabrous ...1. *A. chitrakutensis*

2b. Flowers pedicellate; filaments bearded above ...3. *A. thompsoni*

1b. Leaves 1-3 cm long ...2. *A. sessiliflora*

1. *Alectra chitrakutensis* (Rau) R. Prasad & R.D. Dixit in *Rural Reconstruction, Ecosystem & Forestry* 187. 1994. *A. parasitica* A. Rich. var. *chitrakutensis* Rau in *Bull. Bot. Surv. India* 3: 25. 1961.

Small herbs, parasitic; stems rhizomatous, underground part 2-3 cm thick, with numerous axillary buds; rhizomes orange yellow, black on drying. Leaves linear or oblong, up to 6 mm long, obtuse at apex. Flowers

in terminal racemes, sessile; bracts linear; bracteoles slender, persistent. Calyx 8-ribbed, hairy outside, glabrous inside; lobes deltoid. Corolla yellow with purple streaks. *ca* 1 cm long. Filaments glabrous. Capsules globose, *ca* 5 mm across. Seeds cuneiform.

Rare. Grows under shade and as root parasite on *Vitex negundo*. Satna. *Fl. & Fr.*: Feb. - April.

2. ***Alectra sessiliflora*** (Vahl) Kuntze, Revis. Gen. Pl. 2: 458. 1891. *Gerardia sessiliflora* Vahl, Symb. Bot. 3: 79. 1794. *Glossostylis avensis* Benth., Scroph. Ind. 49. 1835. *Alectra avensis* (Benth.) Merr. in Philipp. J. Sci. 12: 109. 1917. *A. indica* Benth. in DC., Prodr. 10: 339. 1846: Hook. f., Fl. Brit. India 4: 297. 1884. *Melasma avense* (Benth.) Hand.-Mazz., Symb. Sin. pt. 7: 343. 1931.

Herbs, erect, stout, simple or branched, scaberulous, 15-40 cm high. Leaves ovate, oblong or lanceolate, 1-3 cm long, cuneate at base, dentate, sessile or subsessile. Flowers axillary, solitary or in terminal, 7-15 cm long, leafy, pubescent, bracteate spikes, sessile or subsessile; bracteoles acicular, ciliate. Calyx 4-6 mm long, pubescent; lobes ovate-acuminate. Corolla yellow, with red or orange streaks, 6-7 mm long; lobes rounded. Filaments ciliate; anthers yellow. Capsules subglobose, 4-lobed, shorter than calyx. Seeds linear.

On hill slopes in sal forests. Bastar, Raigarh. *Fl. & Fr.*: Nov. - Feb.

3. ***Alectra thompsoni*** Hook. f., Fl. Brit. India 4: 297. 1884. *Melasma thompsoni* (Hook. f.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 91. 1891.

Herbs, annual, parasitic, erect, stiff, simple or branched, 10-40 cm high. Leaves reduced to green, brown or purple scales, 3-6 mm long, longest one oblong, obtuse at apex, minutely dentate. Flowers in lax racemes; pedicels 5-12 mm long, slender; bracts minute, alternate; bracteoles 2, linear. Calyx 5-7 mm long, hemispheric in fruit; lobes or teeth broadly ovate. Corolla yellow with red nerves, 6-8 mm long. Filaments bearded above; anthers purple. Stigma oblong-clavate, green, recurved. Capsules globose, as long as calyx. Seeds linear.

In shady places. Hoshangabad. *Fl. & Fr.*: Sept. - Nov.

3. ANGELONIA Humb. & Bonpl.

Herbs or undershrubs, erect, branched. Leaves opposite or upper ones alternate. Flowers axillary, solitary or in terminal racemes. Calyx 5-partite or 5-toothed. Corolla bilabiate; upper lip 2-lobed; lower lip 3-lobed; throat ventricose with a 2-toothed protuberance at the lower end; tube very short or absent. Stamens 4; filaments short, thick, curved. Style subulate; stigma entire or minutely dentate. Capsules globose or ellipsoid, loculicidally dehiscent, rarely indehiscent, 2-valved.

About 25 species; tropical America; one in M.P.

Angelonia salicariaefolia Humb. & Bonpl., Pl. Aequinoct. 2: 92. t. 108. 1809 (1812).

Herbs, perennial, erect, much branched, sticky or glandular pubescent, 50-60 cm high. Leaves lanceolate to linear-oblong, ca 8 cm long, serrate, subsessile. Flowers in long, leafy, bracteate racemes; pedicels slender. Calyx-lobes linear. Corolla white with violet spots, forming a cup like structure, 5-lobed; lower lobes oblong.

Cultivated in gardens. Bilaspur. Fl.: July.

Notes: Angelonia grandiflora C. Morr. is also cultivated in gardens (Oommachan, 1977; Oommachan & Shrivastava, 1996).

4. ANTIRRHINUM L.

Herbs, annual or perennial, erect. Leaves simple, opposite or upper ones alternate, entire or lobed. Flowers axillary, solitary or in terminal spikes or racemes. Calyx 5-partite; segments imbricate. Corolla bilabiate, saccate or gibbose at base, not spurred; upper lip erect or recurved on margin, 2-lobed; lower lip 3-lobed, spreading; throat closed by bearded palate. Stamens 4, didynamous, included; filaments filiform or dilated at apex; anther cells oblong, parallel. Style filiform; stigma 2-lobed. Capsules ovoid or globose, dehiscent by pores below the joint. Seeds oblong, minute, truncate, rugose or pitted.

About 42 species; W. N. America and W. Mediterranean region; 2 in M.P.

- 1a. Leaves lanceolate or oblong-lanceolate; calyx-segments ovate-elliptic; capsules globose ...1. *A. majus*
- 1b. Leaves linear; calyx-segments linear; capsules obliquely ovoid ...2. *A. orontium*

1. *Antirrhinum majus* L., Sp. Pl. 617. 1753; Hook. f. Fl. Brit. India 4: 253. 1883. - *Large snapdragon*.

Herbs, perennial (grown as annual), 30-80 cm high; stems terete, glandular pubescent towards apex. Leaves lanceolate or oblong-lanceolate, ca 8 cm long, entire. Flowers in terminal, elongated, glandular pubescent spikes or racemes. Calyx-segments ovate-elliptic, unequal, glandular pubescent. Corolla white, red or purple, 3.5-4 cm long; upper lip recurved on margin; lower lip yellow on palate, pilose inside opposite the anthers. Capsules globose.

Cultivated in gardens throughout the state. Indore. *Fl. & Fr.*: Dec. March.

2. *Antirrhinum orontium* L., Sp. Pl. 617. 1753; Hook. f. Fl. Brit. India 4: 253. 1883. - *Corn snapdragon*.

Herbs, annual or biennial, slender, branched, glabrous or glandular pubescent, 15-50 cm high. Leaves linear, 2.5-5 x 0.2-0.8 cm, acute or obtuse at apex, entire, glabrous or pubescent, sessile or subsessile. Flowers axillary, solitary or in lax racemes, sessile or shortly pedicellate. Calyx-segments linear, longer than corolla. Corolla white or pale pink. Capsules obliquely ovoid, 8-15 mm long, hairy.

As weed in open places, fields and gardens. Chhatarpur, Panna, Sidhi. *Fl. & Fr.*: Jan. - Feb.

5. *BACOPA* Aubl., *nom. cons.*

Herbs, erect, prostrate or floating, glabrous or pubescent, often punctate. Leaves opposite, narrow, entire, dentate, crenate or serrate, pinnatisect in submerged species. Flowers axillary, solitary or upper ones in racemes, bracteolate. Calyx 5-partite; segments unequal; upper often large. Corolla bilabiate; upper lip 2-lobed; lower lip 3-lobed; tube cylindrical. Stamens 4, didynamous, included; anther cells contiguous, distinct. Style

dilated towards apex, entire or 2-lobed. Capsules globose, subglobose, ovoid or cylindrical, many-seeded. Seeds minute.

About 56 species; subtropical regions especially America; 4 in M.P.

1a. Plants erect:

2a. Flowers pedicellate; corolla white
with blue tinge ...1. *B. floribunda*

2b. Flowers sessile; corolla pink
with blue tinge ...2. *B. hamiltoniana*

1b. Plants creeping or prostrate:

3a. Corolla purplish or pink ...3. *B. monnieri*

3b. Corolla lemon-yellow ...4. *B. procumbens*

1. *Bacopa floribunda* (R. Br.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 77. 1891. *Herpestis floribunda* R. Br., Prodr. 442. 1810; Hook. f., Fl. Brit. India 4: 273. 1884. *Moniera floribunda* (R. Br.) T. Cooke, Fl. Bombay 2: 286. 1905. **Fig. 38.**

Herbs, annual, erect, simple or branched, glabrous; stems angular, brownish, 10-30 cm high. Leaves linear or linear-lanceolate, 12-25 mm long, acute at apex, entire or sparsely dentate. Flowers axillary, solitary or paired; pedicels 3-5 mm long, puberulous; bracteoles 2, subulate. Upper calyx-segments orbicular or ovate, 4-6 mm long, subacute, reticulately veined; lateral segments very broad. Corolla white with blue tinge. Capsules subglobose, 2-3 mm long. Seeds oblong, brown, truncate.

In moist places along water courses. Shivpuri. Fl. & Fr.: Oct.

2. *Bacopa hamiltoniana* (Benth.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 77. 1891. *Herpestis hamiltoniana* Benth., Scroph. Ind. 30. 1835; Hook. f., Fl. Brit. India 4: 272. 1884. *Moniera hamiltoniana* (Benth.) T. Cooke, Fl. Bombay 2: 286. 1905.

Herbs, annual, erect or decumbent, simple or branched, glabrous, 15-30 cm high; branches 4-angled. Leaves linear-lanceolate, 2-3.5 cm long, acute at apex, semi-amplexicaul or narrowed into a petiole at base, entire or serrate. Flowers axillary, solitary, sessile; bracteoles setaceous. Calyx minutely pubescent; upper segments broadly ovate-cordate, acute, larger;



Fig. 38. *Bacopa floribunda* (R. Br.) Wettst.

lateral ones ovate-lanceolate; 2 inner linear-oblong, shorter. Corolla pink with blue tinge, ca 3 mm long; upper lip emarginate; lower lip 3-lobed. Capsules globose, ca 4 mm across, glabrous, 4-valved. Seeds cylindrical, truncate at both ends.

In moist and wet places. Panna, Surguja. *Fl. & Fr.*: Oct. - Nov.

3. *Bacopa monnieri* (L.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 77. 1891; Pennell in Proc. Acad. Nat. Sci. Philadelphia 98. 94. 1946. *Lysimachia monnieri* L., Cent. Pl. II: 9. 1756. *Moniera cuneifolia* Michx., Fl. Bor.-Amer. 2: 22. 1803. *Herpestis monnieri* (L.) Kunth in Humb., Bonpl. & Kunth. Nov. Gen. Sp. 2: 366. 1818 *nom. illeg.*: Benth., Scroph. Ind. 30. 1835; Hook. f., Fl. Brit. India 4: 272. 1884, "*monniera*". - *Brahmi*. Fig. 39.

Herbs, suberect, creeping or prostrate, much branched, glandular punctate; stems rooting at nodes; branches up to 30 cm long. Leaves opposite, decussate, obovate-oblong or spatulate, 4-30 mm long, obtuse or emarginate, entire or crenulate, fleshy, sessile. Flowers axillary, solitary; pedicels 4-12 mm long in flowers and up to 25 mm long in fruits; bracteoles 2, linear, ca 5 mm long, acute, entire. Calyx-segments unequal; 3 larger segments broadly ovate-oblong; 2 inner ones lanceolate, narrow, acute, entire. Corolla purplish or pink with purplish veins, campanulate, ca 1 cm long. Capsules ovoid, ca 4 mm long, acute, glabrous.

In marshy and swampy areas associated with *Dopatrium* and *Monochoria* spp. Bilaspur, Chhindwara, Damoh, Dhar, Durg, Gwalior, Mandla, Panna, Rewa, Shivpuri, Sidhi, West Nimar. *Fl. & Fr.*: July - April.

4. *Bacopa procumbens* (Mill.) Greenm., Field Columb. Mus. Bot. Ser. 2. 261. 1907. *Erinus procumbens* Mill., Gard. Dict. ed. 8. n. 6. 1768. *Lindernia dianthera* Sw., Prodr. 92. 1788. *Pagesia dianthera* (Sw.) Pennell in Acad. Nat. Sci. Philadelphia Monogr. 1 (Scroph. E. N. Amer.): 69. 1935. *Mecardonia dianthera* (Sw.) Pennell in Proc. Acad. Nat. Sci. Philadelphia 98: 87. 1946.

Herbs, annual, prostrate, glabrous; stems 4-angled, rooting at lower nodes. Leaves opposite, decussate, ovate-rounded or ovate-lanceolate, 7-16 x 6-12 mm, crenate-serrate, glandular beneath, sessile or subsessile. Flowers axillary, solitary; pedicels 2-4 cm long; bracteoles 2, linear. Calyx-segments unequal; one or both lateral segments with or without basal, bent



Fig. 39. *Bacopa monnieri* (L.) Wettst.

appendage. Corolla lemon-yellow; throat hairy. Capsules cylindrical, ca 6 mm long, 2-valved. Seeds reticulate.

In moist shady places along forests. Balaghat, Bilaspur, Jabalpur, Mandla, Raigarh, Rajnandgaon, Sconi, Shahdol, Surguja. *Fl. & Fr.*: July - Sept.

Notes: Pennell (*l. c.*) and other workers treat *Mecardonia* Ruiz & Par. as a distinct genus while few other workers treat it congeneric with *Bacopa* Aubl.

6. BUCHNERA L.

Herbs, annual, often parasitic, rigid, scabrid. Leaves simple; lower opposite, broad; upper alternate, narrow, entire or dentate. Flowers in spikes, sessile, bracteate, bracteolate. Calyx tubular, 10-nerved, sometimes 5-10-ribbed, 5-toothed. Corolla tubular, 5-lobed, straight or slightly incurved. Stamens 4, didynamous, included; anthers 1-celled. Style dilated or clavate above; stigma entire or notched. Capsules oblong-ovoid, loculicidal, many-seeded. Seeds obovoid, reticulate.

About 100 species; tropical regions; one in M.P.

Buchnera hispida Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 91. 1825; Hook. f., Fl. Brit. India 4: 298. 1884.

Herbs, erect, hispid, 15-75 cm high; branches ascending. Lower leaves in a rosette; upper opposite or alternate, obovate or oblanceolate, 2.5-6.4 cm long, dentate, sessile. Flowers in terminal spikes; bracts linear or lanceolate, glabrous or pilose; bracteoles 2, subulate to linear-lanceolate, ca 3.5 mm long. Calyx 10-ribbed, 3.5-8 mm long. Corolla white or pale purple, 10-15 mm long; lobes subequal, oblong-obovate to obovate. Capsules 5-7 mm long, enclosed by the calyx.

In moist rocky places. Bastar, Hoshangabad, East Nimar, Narsimhapur, Rajnandgaon, Sagar, Surguja. *Fl. & Fr.*: Sept. - Jan.

7. CENTRANTHERA R. Br.

Herbs, annual, rigid, glabrous or hispid. Leaves opposite or upper ones alternate, entire or dentate, scabrid, sessile. Flowers axillary, in leafy spikes

or racemes, bracteate, bracteolate. Calyx spathaceous, anteriorly cleft; lobes coherent or free. Corolla faintly bilabiate; lobes 5, broad, subequal, spreading; tube long, incurved, dilated above. Stamens 4, didynamous, included; anther cells transverse with spurred or mucronate base. Stigma dilated, acute. Capsules globose or ovoid-oblong, loculicidal. Seeds oblong, reticulate.

About 9 species; China to Australia: 3 in M.P.

- 1a. Plants hispid; calyx 7-15 mm long;
corolla brownish purple, purple or white:
- 2a. Calyx 8-15 mm long; corolla 18-30 mm long ...1. *C. indica*
- 2b. Calyx up to 8 mm long; corolla up to
15 mm long ...2. *C. nepalensis*
- 1b. Plants hispidulous or glabrous; calyx 4-5 mm
long; corolla yellow ...3. *C. tranquebarica*

1. *Centranthera indica* (L.) Gamble, Fl. Madras 2: 971. 1924. *Rhinanthus indica* L., Sp. Pl. 603. 1753. *Centranthera procumbens* Benth. in DC., Prodr. 10: 525. 1846; Hook. f., Fl. Brit. India 4:301. 1884.

Herbs, erect, hispid, 10-50 cm high. Leaves oblong-lanceolate, 1-5 x 0.2-0.5 cm, subacute at apex, subentire or shallowly serrate, ciliate on margin; upper ones smaller, passing into bracts. Flowers in terminal, spiciform racemes; bracts linear-lanceolate, ciliate on margin. Calyx 8-15 mm long, hispid. Corolla brownish purple, 18-30 mm long. Capsules oblong.

Rare. In marshy places. Dhar, Jhabua (Samvatsar, 1996). *Fl. & Fr.*: Sept. Nov.

2. *Centranthera nepalensis* D. Don, Prodr. Fl. Nepal. 88. 1825. *C. hispida* auct. non R. Br., 1810: Hook. f., Fl. Brit. India 4: 301. 1884.

Herbs, erect, simple or branched, hispid and hoary, 25-60 cm high. Leaves elliptic or linear-oblong, 1.2-4 cm long, scabrid with tubercle based hairs. Flowers axillary, solitary or in long, terminal, interrupted, subspicate racemes, almost sessile; bracts usually longer than calyx. Calyx 7-8 mm long, pubescent. Corolla white or purple, infundibuliform, 13-15 mm long, slightly curved. Capsules broadly ovoid-oblong, 5-6 mm long, grooved.

In wastelands and along the edge of cultivated fields. Balaghat, Bastar, Hoshangabad, Mandla, Panna, Rajnandgaon, Sagar. *Fl. & Fr.*: Sept. - Jan.

3. *Centranthera tranquebarica* (Spreng.) Merr. in 150th Anniv. Vol. Royal Bot. Gard. Calcutta 55. 1942. *Razunovia tranquebarica* Spreng., Mant. Prim. Fl. Hal. 45. 1807. *Centranthera humifusa* Wallich ex Benth., Scrophl. Ind. 50. 1835; Hook. f., Fl. Brit. India 4: 301. 1884.

Herbs, erect, often diffusely branched, glabrous or hispidulous, 5-15 cm high. Leaves linear, 12-18 mm long, hispidulous or glabrous. Flowers axillary, subsessile; bracts oblong. Calyx 4-5 mm long; lobes ovoid, subacute. Corolla yellow, often with purple markings, 8-13 mm long. Capsules globose, slightly shorter than calyx.

In wastelands, often semiaquatic. Balaghat, Bastar, Hoshangabad, Raigarh, Raipur. *Fl. & Fr.*: Sept. - Nov.

8. CRATEROSTIGMA Hochst.

Small herbs, perennial, acaulescent; stems sometimes elongated. Leaves entire. Flowers shorter or somewhat longer than the leaves, borne at the apex of a scape, few in the axil of opposite bracts or crowded in small, terminal, subcapitate spikes or racemes, rarely solitary. Calyx tubular; teeth 5, narrow, subequal. Corolla bilabiate; upper lip entire or emarginate; lower lip larger, 3-lobed; tube elongated above. Stamens 4, fertile, didynamous; filaments filiform, gibbose and appendiculate at the base; anthers approximate or coherent in pairs; cells divaricate, distinct. Ovules many; style filiform, dilated and shortly bilamellate at apex. Capsules ovoid or oblong, included, septicidal, many-seeded; valves entire.

About 20 species; tropical and S. Africa, Madagascar and India; one in M.P.

***Craterostigma plantagineum* Hochst.** in Flora 24: 669. 1841; Maheshwari & Singh in Bull. Bot. Surv. India 13: 11. (1971) 1973. *Torenia plantaginea* Benth. in DC., Prodr. 10: 411. 1846.

Herbs, densely pilose. Leaves radical, rosulate, 3-8 in a whorl, ovate to ovate-lanceolate, 2.8-4 x 1.5-2.2 cm, ciliate on margin, glabrous or slightly pilose above, densely pilose beneath; petioles 8-15 mm long,

winged, pilose. Scape 2.5-10 cm long, unbranched, solitary or many. Flowers usually paired, sometimes more in racemes; pedicels 2-4 mm long; bracts ovate-lanceolate, ciliate, enclosing one or more flowers. Calyx-teeth 1-2 mm long, ciliate. Corolla purple, 1.2-2 cm long. Capsules ovoid or oblong, 8-10 x 3 mm.

Ornamental. Common on exposed gravelly soils. Shivpuri. *Fl. & Fr.*: July - April.

Decoction of roots is referred for the treatment of gout and rheumatism.

9. DOPATRIUM Buch.-Ham. ex Benth.

Herbs, annual, slender, glabrous. Leaves opposite, small, close together at the stem base; upper ones remote and minute. Flowers axillary, solitary or in terminal racemes, ebracteolate; pedicels filiform or absent. Calyx 5-fid. Corolla bilabiate; upper lip 2-lobed; lower lip 3-lobed; throat broad; tube slender. Stamens 2, perfect, included; anther cells equal. Staminodes 2, minute. Style short; stigma bilamellate or subpeltate. Capsules globose, ovoid, ellipsoid or linear-oblong, loculicidal. Seeds minute, rugose or tuberculate.

About 12 species; tropical regions of Old World; 2 in M.P.

- 1a. Capsules globose or broadly ellipsoid;
fruiting pedicels erect or horizontal ...1. *D. junceum*
- 1b. Capsules linear-oblong; fruiting pedicels deflexed ...2. *D. nudicaule*

1. *Dopatrium junceum* (Roxb.) Buch.-Ham. ex Benth., Scroph. Ind. 31. 1835; Hook. f., Fl. Brit. India 4: 274. 1884. *Gratiola juncea* Roxb., Pl. Coromandel 2: 16. t. 129. 1800.

Herbs, erect, succulent, branched or unbranched, 15-30 cm high. Leaves decussate, distant, entire, sessile; lower ones oblong-obtuse, 1.5-5 cm long; upper ones ca 2 mm long or reduced. Flowers in slender racemes of distant, opposite pairs, bracteate, lower ones sessile, upper ones pedicellate. Calyx 1-2 mm long; lobes oblong, obtuse. Corolla ca 4 mm long, glandular pubescent. Capsules globose or broadly ellipsoid, 2.5-3.5 mm long. Seeds ellipsoid, tuberculate.

In marshy places along ponds and in paddy fields. Balaghat, Chhatarpur, Chhindwara, Mandla, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Surguja. *Fl. & Fr.*: Aug. - Oct.

2. *Dopatrium nudicaule* (Willd.) Benth., Scroph. Ind. 31. 1835 & in DC., Prodr. 10: 407. 1846; Hook. f., Fl. Brit. India 4: 274. 1884. *Gratiola nudicaulis* Willd. in Ges. Naturf. Fr. Neue. Schr. 4: 193. 1803.

Herbs, simple or branched, up to 25 cm high. Radical leaves absent or few at the base of stem; cauline leaves broadly oblong or ovate-oblong, 0.5-1.5 x 0.2-0.6 cm, obtuse at apex, semi-amplexicaul at base. Flowers axillary, solitary or paired. Calyx-lobes linear-lanceolate. Corolla dull blue; throat minutely hirsute. Capsules linear-oblong.

Rare. In marshy places. Jhabua (Samvatsar, 1996). *Fl. & Fr.*: Sept. Dec.

10. GLOSSOSTIGMA Wight & Arnott *ex* Arnott, *nom. cons.*

Small herbs, tufted, glabrous. Leaves opposite or fascicled, entire. Flowers axillary, solitary, minute, ebracteolate. Calyx campanulate; lobes 3-4, obtuse. Corolla 5-lobed; tube short. Stamens 2 or 4; filaments filiform; anther cells diverging, confluent at tips. Style short; stigma dilated, spatulate, recurved. Capsules included in the calyx, loculicidal. Seeds ovoid, minute.

Five species; India, Australia and New Zealand; one in M.P.

Glossostigma diandra (L.) Kuntze, Revis. Gen. Pl. 2: 461. 1891. *Limosella diandra* L., Mant. Pl. 252. 1771. *Microcarpaea spathulata* Hook., Bot. Misc. 2: 101. Suppl. t. 4. 1830. *Glossostigma spathulatum* (Hook.) Wight & Arnott *ex* Arnott, Nova Acta Acad. Leop. Nat. Cur. 18: 355. 1836; Hook. f., Fl. Brit. India 4: 288. 1884.

Herbs, creeping, rooting at nodes. Leaves opposite, linear-spathulate, 5-8 mm long, narrowed into a petiole of variable length at base. Flowers pedicellate, ebracteate. Calyx 3-lobed; lobes 1-2 mm long, obtuse. Corolla bluish or pinkish white. Stamens 2. Capsules globose, as long as or shorter than calyx.

In aquatic and swampy habitats. Damoh, Raipur, Sagar, Satna. *Fl. & Fr.*: March - Sept.

11. KICKXIA Dumort.

Herbs, suberect or twining, glabrous or villous. Leaves opposite below, alternate above, acutely lobed at base, glabrous or pubescent, petiolate. Flowers axillary, solitary or passing into racemes or spikes, ebracteolate. Calyx 5-partite; segments imbricate. Corolla purple or yellow, bilabiate, spurred; upper lip 2-lobed; lower lip 3-lobed. Stamens 4, didynamous, included; anther cells parallel. Style filiform or stout; stigma minute. Capsules globose or subglobose, many-seeded. Seeds reticulate-foveolate or spinulose.

About 25 species; Mediterranean region to W. India; 2 in M.P.

- 1a. Plants hirsute or villous; corolla pubescent, with purplish upper lip and purple spotted palate, spur straight or slightly curved forward ...1. *K. incana*
- 1b. Plants glabrous; corolla glabrous, yellow throughout, spur strongly curved forward ...2. *K. ramosissima*

1. *Kickxia incana* (Wallich) Pennell in Acad. Nat. Sci. Philadelphia Monogr. 5 (Scroph. W. Himal.): 59. 1943. *Linaria incana* Wallich, Pl. Asiat. Rar. 2: 43. 1831; Hook. f., Fl. Brit. India 4: 252. 1883. *L. cabulica* Benth. in DC., Prodr. 10: 270. 1846; Hook. f., Fl. Brit. India 4: 251. 1883. *L. ramosissima* Wallich var. *pubescens* Stocks ex Hook. f., Fl. Brit. India 4: 251. 1883.

Herbs, perennial, prostrate, hirsute or villous. Leaves variable; lower leaves ovate or subhastate, lobed; upper ones lanceolate, sagittate. Flowers axillary, solitary; pedicels rigid, often longer than leaves. Calyx-segments lanceolate. Corolla ca 7 mm long; upper lip purplish; palate purple spotted; spur straight or slightly curved forward, much shorter than corolla-tube. Capsules subglobose, rupturing irregularly. Seeds pitted.

On hilly slopes amidst rock boulders. East Nimar, Hoshangabad, Mandla, Rewa, Sagar. *Fl. & Fr.*: Sept. - Dec.

2. *Kickxia ramosissima* (Wallich) Janchen in Oesterr., Bot. Zeitschr. 82: 152. 1933. *Linaria ramosissima* Wallich, Pl. Asiat. Rar. 2: 43. t. 153. 1831; Hook. f., Fl. Brit. India 4: 251. 1883.

Herbs, perennial, twining or trailing, glabrous often much branched from the base; branches slender, prostrate, 15-30 cm long. Leaves variable, glabrous; lower ones deltoid, 3-7-lobed, hastate at base; upper ones usually lanceolate, apiculate at apex, sagittate at base. Flowers axillary, solitary; pedicels filiform, 1-3.5 cm long. Calyx-segments linear-lanceolate. Corolla yellow, 5-9 mm long; spur strongly curved forward. Capsules subglobose, 2.5-4 mm long, opening on one side by a valve and other side by a subapical pore. Seeds spinulose.

On hill slopes as undergrowth of mixed forests and in between granitic boulders over dilapidated wall. Darnoh, Gwalior, Hoshangabad, Indore, Mandla, Rewa, Sagar. *Fl. & Fr.*: Sept. - April.

12. LIMNOPHILA R. Br., *nom. cons.*

Herbs, annual or perennial, aquatic or marshy, often aromatic, glabrous or pubescent; stems erect, prostrate or creeping, simple or branched, rooting at nodes. Leaves both submerged and aerial; submerged leaves whorled, lacinate, divided into capillary, glabrous segments; aerial leaves opposite or whorled, entire, serrate or pinnately divided, if undivided, pinnately or parallel-nerved, sessile or petiolate. Flowers axillary, solitary or in terminal or axillary, lax or compact spikes, racemes, cymes or panicles, sessile or pedicellate; bracts foliaceous; bracteoles present or absent. Calyx tubular, 5-lobed; lobes subequal. Corolla infundibuliform, 5-lobed, bilabiate; upper lip entire or 2-lobed; lower lip 3-lobed. Stamens 4, included, didynamous; filaments filiform; anther cells stipitate. Style filiform, deflexed at tip; stigma bilamellate. Capsules ellipsoid to globose, both septicial and loculicial. Seeds striate, reticulate.

About 36 species; tropical regions of Old World; 8 in M.P.

- 1a. Leaves opposite, neither pinnatisect nor multifid, pinnately nerved:
 - 2a. Flowers mostly in heads ...7. *L. rugosa*
 - 2b. Flowers solitary or in spikes or cymes:
 - 3a. Leaves with only one primary nerve ...6. *L. repens*
 - 3b. Leaves with 3-7 primary nerves ...3. *L. connata*
- 1b. Leaves whorled and/or opposite, often pinnatisect or multifid, never pinnately nerved:

- 4a. Leaves 1-nerved; fruiting calyx striate:
- 5a. Flowers in racemes ...1. *L. aromatica*
- 5b. Flowers solitary or in cymose panicles ...2. *L. chinensis*
- 4b. Leaves 3-5-nerved; fruiting calyx not striate:
- 6a. Flowers distinctly pedicellate ...5. *L. indica*
- 6b. Flowers sessile or subsessile:
- 7a. Stems subglabrous or hirsute;
leaves whorled; flowers solitary ...8. *L. sessiliflora*
- 7b. Stems glabrous; leaves opposite and whorled;
flowers solitary or in lax spikes ...4. *L. heterophylla*

1. *Limnophila aromatica* (Lam.) Merr., *Interpr. Herb. Amboin.* 466. 1917; Philcox in *Kew Bull.* 24: 145. 1970. *Ambulia aromatica* Lam., *Encycl.* 1: 128. 1783. *Limnophila gratissima* Blume, *Bijdr.* 749. 1826; Hook. *f.*, *Fl. Brit. India* 4: 268. 1884. - *Kutra*.

Herbs, annual or perennial, erect, simple or much branched, glabrous to minutely glandular, up to 50 cm high. Leaves opposite or ternate, linear-oblong to ovate-lanceolate, 1-5.5 x 0.3-1.5 cm, subacute at apex, crenate to serrate-dentate, glabrous to densely and minutely glandular punctate. Flowers axillary, solitary or in axillary or terminal, simple or paniculately branched, few to many-flowered, 10-30 cm long racemes; pedicels 0.5-2 cm long, glandular; bracteoles linear-lanceolate, 1-2 mm long. Calyx 4-8 mm long, glandular; lobes 2-5 mm long, acuminate. Corolla pale blue to bluish violet, 10-13 mm long, glandular. Capsules oblong or ellipsoid, compressed, 5-6 mm long.

In moist habitats particularly in cultivated fields. Balaghat, Bastar, Bilaspur, Damoh, Hoshangabad, Raigarh, Raipur. *Fl. & Fr.*: Nov. - Feb.

2. *Limnophila chinensis* (Osbeck) Merr. in *Amer. J. Bot.* 3: 581. 1916; Philcox in *Kew Bull.* 24: 151. 1970. *Columnnea chinensis* Osbeck, *Dagb. Ostind. Resa* 230. 1757. *Stemodia hirsuta* Heyne ex Benth. in Lindl., *Bot. Reg.* 17, sub. t. 1470. sp. 15. 1832; Benth., *Scroph. Ind.* 24. 1835. *Limnophila hirsuta* (Heyne ex Benth.) Benth. in DC., *Prodr.* 10: 388. 1846; Hook. *f.*, *Fl. Brit. India* 4: 268. 1884.

Herbs, annual, erect, glabrous to hirsute, purplish, 15-50 cm high; stems hollow, creeping below, rooting at nodes. Leaves opposite or 3-4-

nately whorled, broadly elliptic or linear-oblong, occasionally subs-patulate, 2-3 cm long, semi-amplexicaul at base, serrulate, gland-dotted, sessile or narrowed into a short petiole. Flowers axillary, solitary or in paniculate cymes at the end of branches; pedicels 6-13 mm long, hirsute; bracteoles filiform, 1.5-2.5 mm long. Calyx 6-9 mm long, glandular or hirsute; lobes lanceolate, acuminate, striate in fruits. Corolla 10-15 mm long; lobes violet, pubescent outside, villous inside; tube reddish. Capsules ellipsoid, ca 5 mm long.

- 1a. Plants hirsute; leaves linear-oblong ...2.1. var. *chinensis*
 1b. Plants glabrous; leaves broadly elliptic ...2.2. var. *clarkii*

2.1. var. *chinensis*

In moist habitats. Balaghat, Bastar, Bilaspur. *Fl. & Fr.*: Aug. Dec.

2.2. var. *clarkii* (Haines) Murti in Bangladesh J. Bot. 10 (1): 34. 1981. *Limnophila hirsuta* var. *clarkii* Haines, Bot. Bihar Orissa 4: 628. 1922. *L. hirsuta* (Heyne ex Benth.) Benth. in DC., Prodr. 10: 388. 1846; Hook. f., Fl. Brit. India 4: 268. 1884, *p.p.* **Fig. 40.**

In moist habitats. Bilaspur. *Fl. & Fr.*: Nov.

3. *Limnophila connata* (Buch.-Ham. ex D. Don) Hand.-Mazz., Symb. Sin. 7: 837. 1936; Philcox in Kew Bull. 24: 133. 1970. *Cybbanthera connata* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 87. 1825. *Stemodia hypericifolia* Benth. in Lindl., Bot. Reg. 17, sub.t. 1470, 6. 1832 & Scroph. Ind. 23. 1835. *Limnophila hypericifolia* (Benth.) Benth. in DC., Prodr. 10: 386. 1846; Hook. f., Fl. Brit. India 4: 269. 1884.

Herbs, annual, erect, stout, glabrous, 15-60 cm high. Leaves all opposite, elliptic or ovate-oblong, 1.5 x 0.6 cm, obtuse at apex, semi-amplexicaul at base, crenulate, punctate beneath. Flowers solitary in the axil of opposite or alternate bracts or in terminal and axillary, glandular, sessile or pedunculate spikes, sessile or subsessile; bracts subcordate, 10-12 mm long, glandular; bracteoles linear, subulate, ca 5 mm long. Calyx 5-7 mm long, ribbed with stipitate glands; lobes ovate, 4-5 mm long, acuminate. Corolla blue-violet, 12-15 mm long, hirsute outside, densely glandular inside. Capsules broadly ellipsoid, 3-4 x 2 mm, blackish brown.

Along the streams. Bilaspur, Hoshangabad. *Fl. & Fr.*: Sept. Nov



Fig. 40. *Limnophila chinensis* (Osborn) Merr. var. *clarkii* (Haines) Murti

4. *Limnophila heterophylla* (Roxb.) Benth., Scroph. Ind. 25. 1835; Hook. f., Fl. Brit. India 4: 270. 1884; Philcox in Kew Bull. 24: 124. 1970. *Columnea heterophylla* Roxb., Fl. Ind. 3: 97. 1832. *Limnophila reflexa* Benth., Scroph. Ind. 25. 1835. *L. heterophylla* var. *reflexa* (Benth.) Hook. f., Fl. Brit. India 4: 270. 1884.

Herbs, perennial, aquatic, slender, glabrous, up to 50 cm high. Leaves on aerial stems opposite or whorled (uppermost often alternate), oblong-lanceolate, up to 20 x 3.5 mm, semi-amplexicaul at base, subcrenate, with 3-5 parallel nerves; those below the uppermost in whorls of 4-6, pinnatisect, glabrous; submerged leaves multifid with capillary segments up to 5.5 cm long. Flowers axillary, solitary or in terminal, lax, leafy spikes, sessile or subsessile, ebracteolate. Calyx glandular; lobes ovate, shortly acuminate; fruiting ones hemispheric, membranous, not striate. Corolla pale pink, glabrous. Capsules globose, compressed.

In marshy and swampy habitats. Sagar. *Fl. & Fr.*: Sept. Oct.

5. *Limnophila indica* (L.) Druce in Rep. Bot. Exch. Club Brit. Isles 1913(3): 420. 1914; Philcox in Kew Bull. 24: 115. 1970. *Hottonia indica* L., Syst. Nat. ed. 10. 919. 1759. *Limnophila gratioloides* R. Br., Prodr. 442. 1810; Hook. f., Fl. Brit. India 4: 271. 1884, incl. vars. *elongata* and *intermedia*. *L. racemosa* Benth., Scroph. Ind. 26. 1835. - *Kuttra*.

Herbs, perennial, amphibious, much branched; stems 2.5-14 cm long, striate and glandular in upper parts, rooting at lower nodes. Aerial leaves whorled, variously dissected, those towards the apex sometimes opposite in 2-3 pairs, undissected, crenate-serrate to lacerate; submerged leaves in whorls of 6-12, pinnatisect; lobes flattened or capillary. Flowers axillary, solitary or in terminal racemes; pedicels glandular; bracteoles 2, linear-subulate, 3-4 mm long. Calyx 3.5-7 mm long; lobes linear, 2-3 mm long, acute or acuminate, glabrous or pubescent. Corolla white, purple or bluish, 9-13 mm long. Capsules broadly ellipsoid or globose, 3.5-5 mm long. Seeds truncate or rounded.

Common in marshy and aquatic habitats. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Indore, Jabalpur, Mandla, Morena, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Shahdol, Shivpuri, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Almost throughout the year.

6. *Limnophila repens* (Benth.) Benth. in DC., Prodr. 10: 387. 1846; Philcox in Kew Bull. 24: 154. 1970. *Stemodia repens* Benth. in Lindl., Bot. Reg. 17. sub. t. 1470. sp. 11. 1832 & Scroph. Ind. 24. 1835. *Limnophila conferta* Benth. in DC., Prodr. 10: 387. 1846; Hook. f., Fl. Brit. India 4: 266. 1884. *L. sessilis* (Benth.) Fischer in Kew Bull. 1932: 62. 1932.

Herbs, erect or procumbent, diffusely branched, glabrous, 10-50 cm high. Leaves opposite, oblong, elliptic-oblong or elliptic-lanceolate, 2-4 cm long, obtuse at apex, narrowed or semi-amplexicaul at base, crenate-serrate, punctate beneath, pinnately nerved. Flowers axillary, solitary or in axillary, short, leafy spikes or cymes; rachis pubescent; bracts opposite or alternate; bracteoles linear, 1.5-3 mm long, hispid. Calyx 3-5.5 mm long, deeply divided: lobes linear, acuminate, glandular pubescent, striate in fruits. Corolla 7.5-11 mm long; throat yellowish; tube inflated below, pubescent inside. Capsules ellipsoid, 3-4 mm long, brown. Seeds oblong, angular.

In moist sandy soil. Bastar, Bilaspur, Raigarh. *Fl. & Fr.*: Nov. - Dec.

7. *Limnophila rugosa* (Roth) Merr., Interpr. Herb. Amboin. 466. 1917; Philcox in Kew Bull. 24: 135. 1970. *Herpestis rugosa* Roth, Nov. Pl. Sp. 290. 1821. *L. roxburghii auct. non* G. Don, 1837-1838; Hook. f., Fl. Brit. India 4: 265. 1884.

Herbs, annual, erect, glabrous or pubescent, up to 50 cm high; stems much branched from the base, rooting at lower nodes. Leaves opposite, elliptic to ovate, 1.5-9 x 5-7 cm, acute or obtuse at apex, crenate-serrate, glabrous or scabrid above, hirsute to scabrid on nerves beneath, petiolate. Flowers in axillary clusters or axillary, pedunculate heads, sessile; bracts oblong, 11-15 x 3-5 mm, amplexicaul, 5-8-nerved; bracteoles absent. Calyx-lobes unequal, acuminate, pubescent. Corolla blue-purple with yellow mouth, 9-16 mm long, pubescent outside. Capsules oblong, compressed, ca 6 mm long, grooved. Seeds oblong, angular, truncate, minutely dotted.

In moist and swampy habitats. Bastar, Bilaspur, Raigarh, Rajnandgaon, Sidhi, Surguja. *Fl. & Fr.*: July - Dec.

8. *Limnophila sessiliflora* (Vahl) Blume, Bijdr. 750. 1826; Hook. f., Fl. Brit. India 4: 270. 1884; Philcox in Kew Bull. 24: 112. 1970. *Hottentia sessiliflora* Vahl, Symb. Bot. 2: 36. 1791.

Herbs, annual or perennial, floating or partly submerged, simple or branched, hirsute to subglabrous. Leaves whorled, submerged ones divided into capillary, glabrous segments, 5-30 mm long; those on aerial stems elliptic-lanceolate, 4-12 x 3 mm, crenate-serrate to lacerate and pinnatisect, punctate. Flowers axillary, solitary, sessile or subsessile; bracts linear; bracteoles absent. Calyx 4-7 mm long, sparingly hirsute; lobes 2-3.5 mm long, acuminate, glandular. Corolla light purple or pink, 7-12 mm long; tube cylindrical, often with yellow tinge. Capsules 3.5-5.5 mm long. Seeds truncate at both ends.

In marshy places. Raipur, Rajnandgaon, Sagar. *Fl. & Fr.*: Oct. - Nov.

13. LINDENBERGIA Lehm.

Herbs, annual or perennial, woody at base; branches erect, straggling or ascending. Leaves simple, opposite or upper ones alternate. Flowers axillary, in spikes or racemes, bracteate, ebracteolate. Calyx campanulate, 5-partite. Corolla bilabiate; upper lip 2-lobed; lower lip 3-lobed; tube cylindrical. Stamens 4, didynamous; filaments filiform; anther cells stipitate. Style filiform, subacute at apex. Capsules oblong or ovoid, 2-valved, many-seeded. Seeds minute.

About 15 species; tropical regions of Old World; one in M.P.

Lindenbergia indica (L.) Vatke in Osterr. Bot. Z. 25: 10. 1875. *Dodartia indica* L., Sp. Pl. 633. 1753. *Lindenbergia urticaefolia* Lehm. in Link & Otto, Ind. Sem. Hort. Berol. 5. 1829; Hook. f., Fl. Brit. India 4: 262. 1884. *L. polyantha* Royle ex Benth., Scroph. Ind. 22. 1835; Hook. f., Fl. Brit. India 4: 262. 1884. *L. abyssinica* Hochst. ex Benth. in DC., Prodr. 10: 377. 1846; Hook. f., Fl. Brit. India 4: 262. 1884.

Herbs, annual, erect, often tufted, glandular hairy, 10-30 cm high. Leaves opposite, ovate or elliptic, 1.5-5 cm long, acute or subobtuse at apex, crenate-serrate, glandular hairy; lower leaves petiolate while upper ones sessile. Flowers in axillary or terminal, 1-many, leafy racemes. Calyx 3-6 mm long, glandular hairy; segments oblong, obtuse or subacute, ciliate. Corolla yellow, slightly glandular hairy; upper lip slightly hooded, reflexed at tip; palate gibbose. One anther cell higher than other. Capsules ovoid, laterally compressed, beaked, pubescent. Seeds ellipsoid.

On old walls and in sandy soil between rock crevices. Balaghat, Chhatarpur, Damoh, Gwalior, Hoshangabad, Indore, Panna, Raigarh, Sagar, Satna. *Fl. & Fr.*: Oct. - March.

The plant is grazed.

14. LINDERNIA All.

Herbs, annual or perennial, erect, prostrate or creeping, simple or branched, glabrous or pubescent. Leaves opposite, entire or dentate, penninerved or parallel nerved. Flowers axillary, solitary or in terminal racemes, bracteolate, sessile or pedicellate. Calyx 5-partite or 5-toothed; lobes linear. Corolla bilabiate; upper lip emarginate or 2-lobed; lower lip 3-lobed; tube cylindrical. Stamens 4, all perfect or the posterior or anterior pair reduced to staminodes, each pair of stamens with a tooth like or subulate appendage at base; filaments filiform; anther cells divaricate, often confluent at apex. Style slender; stigma bilamellate. Capsules globose, ovoid or oblong to linear, septicidal. Seeds foveolate, rugose.

About 50 species; subtropical regions especially of Old World; 16 in M.P.

1a. Capsules about equalling the calyx or shorter:

2a. Leaves penninerved:

3a. Calyx divided up to middle:

4a. Calyx up to 4 mm long, glabrous ...5. *L. crustacea*

4b. Calyx 6-13 mm long, hispid ...6. *L. hookeri*

3b. Calyx divided up to base or nearly so:

5a. Corolla 3-4 mm long ...9. *L. multiflora*

5b. Corolla 8-18 mm long:

6a. Plants villous; corolla up to 12 mm long:

7a. Leaves up to 1.6 cm long;
calyx ca 3 mm long ...3. *L. caespitosa*

7b. Leaves 2.5-4 cm long; calyx
more than 3 mm long ...8. *L. montana*

6b. Plants sparsely pubescent; corolla
more than 15 mm long ...16. *L. viscosa*

2b. Leaves parallel nerved ...13. *L. procumbens*

1b. Capsules about twice as long as the calyx or longer:

- 8a. Perfect stamens 4:
- 9a. Flowering calyx divided up to middle:
- 10a. Flowers pedicellate ...10. *L. nummularifolia*
- 10b. Flowers sessile or subsessile ...14. *L. sessiliflora*
- 9b. Flowering calyx divided up to base ...1. *L. anagallis*
- 8b. Perfect stamens 2:
- 11a. Leaves parallel nerved:
- 12a. Corolla more than 8 mm long ...7. *L. hyssopioides*
- 12b. Corolla up to 6 mm long ...12. *L. parviflora*
- 11b. Leaves penninerved:
- 13a. Corolla white, pink or red ...A. *L. ciliata*
- 13b. Corolla blue or violet:
- 14a. Leaves linear, more or less entire ...15. *L. tenuifolia*
- 14b. Leaves oblong-lanceolate,
 serrulate or serrate:
- 15a. Plants prostrate; staminodes
 hooked ...2. *L. antipoda*
- 15b. Plants erect; staminodes
 straight ...11. *L. oppositifolia*

1. *Lindernia anagallis* (Burm. f.) Pennell in J. Arnold Arb. 24: 252. 1943; Mukerjee in J. Indian Bot. Soc. 24: 133. 1945. *Ruellia anagallis* Burm. f., Fl. Ind. 135. 1768. *Gratiola cordifolia* Colsm., Prodr. Descr. Gratiol. 15. 1793. *Lindernia cordifolia* (Colsm.) Merr., Enum. Philipp. Fl. Pl. 3: 437. 1923. *Vandellia pedunculata* Benth., Scroph. Ind. 37. 1835; Hook. f., Fl. Brit. India 4: 282. 1884. *V. angustifolia* Benth., Scroph. Ind. 37. 1835; Hook. f., Fl. Brit. India 4: 282. 1884. *V. cordifolia* (Colsm.) G. Don, Gen. Hist. 4: 549. 1837-1838.

Herbs, annual or perennial, prostrate or creeping, glabrous, rooting at nodes; stems and branches 4-angled, striate. Leaves somewhat variable in shape, oblong, elliptic, ovate or obovate-lanceolate, up to 4 x 1.3 cm, truncate-cordate at base, obscurely serrate, sessile or shortly petiolate; petioles 3-5 mm long. Flowers axillary, solitary or in terminal racemes; pedicels 2-3 cm long. Calyx divided almost up to base; segments lanceo-

late, ca 4 mm long, acuminate. Corolla pink, blue or violet, 10-12 mm long. Stamens 4, didynamous; anterior filaments appendiculate; anthers tailed at base. Capsules linear, cylindrical, 12-17 mm long. Seeds ellipsoid.

In moist gravelly soil near streams. Balaghat, Bastar, Bilaspur, Mandla, Raigarh, Raipur, Sidhi, Surguja. *Fl. & Fr.*: Jan. Nov.

2. *Lindernia antipoda* (L.) Alston in Trimen, Handb. Fl. Ceylon suppl. 6. 214. 1931. *Ruellia antipoda* L., Sp. Pl. 635. 1753. *Gratiola veronicifolia* Retz., Observ. Bot. 4: 8. 1786. *G. verbenifolia* Colsm., Prodr. Descr. Gratiol. 9. 1793. *Bonnaya veronicifolia* (Retz.) Spreng., Syst. Veg. 1: 41. 1824; Hook. f., Fl. Brit. India 4: 285. 1884. *B. verbenifolia* (Colsm.) Spreng., Syst. Veg. 1: 42. 1824. *Lindernia veronicifolia* (Retz.) F.v. Muell., Fragm. 6: 101. 1867. *L. verbenifolia* (Colsm.) Pennell in Acad. Nat. Sci. Philadelphia Monogr. 5 (Scroph. W. Himal.): 131. 1943; Mukerjee in J. Indian Bot. Soc. 24: 133. 1945. *Bonnaya veronicifolia* (Retz.) Spreng. var. *verbenifolia* (Colsm.) Hook. f., Fl. Brit. India 4: 285. 1884.

Herbs, annual or perennial, prostrate, glabrous; branches ascending, 4-angled, up to 20 cm long. Leaves linear-oblong or oblanceolate, 1-5 x 0.3-0.6 cm, acute or obtuse at apex, subentire or serrulate, sessile or subsessile. Flowers axillary, solitary or in terminal or axillary, leafy racemes; pedicels 5-12 mm long; bracts setaceous. Calyx ca 5 mm long, deeply divided; segments linear-lanceolate, acute, serrate in the upper part. Corolla blue-violet or purple, ca 8 mm long. Stamens 2. Staminodes 2, clavate, yellow. Capsules linear, 10-13 mm long, striate.

In sandy soil along streams. Balaghat, Bilaspur, Durg, Jabalpur, Mandla, Raigarh, Raipur, Rajnandgaon, Satna, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Almost throughout the year.

3. *Lindernia caespitosa* (Blume) Panigrahi in Taxon 33: 320. 1984. *Diceros caespitosus* Blume, Bijdr. 753. 1826. *Vandellia scabra* Benth., Scroph. Ind. 36. 1835; Hook. f., Fl. Brit. India 4: 281. 1884. *Lindernia pusilla* (Thunb.) Merr., Philipp. J. Sci. Bot. 11: 312. 1916.

Herbs, erect or often prostrate, slender, diffusely branched, 5-10 cm high, covered with long, white, spreading hairs. Leaves broadly ovate or ovate-cordate, often orbicular, 8-16 mm long, acute or obtuse at apex, obscurely crenate-serrate or entire, subsessile. Flowers axillary or terminal, solitary; pedicels 1.2-4 cm long, capillary. Calyx ca 3 mm long, divided

nearly up to base; segments lanceolate, hirsute. Corolla pale violet. *ca* 8 mm long; throat yellow. Stamens 4; filaments of anterior pair appendaged at base. Capsules *ca* 2.5 mm long, glabrous.

In marshy habitats associated with *Drasera*, *Wahlenbergia*, *Hypericum* and *Cyperus* spp. Bastar, Mandla. *Fl. & Fr.*: March - April.

4. *Lindernia ciliata* (Colsm.) Pennell in Brittonia 2: 182. 1936; Mukerjee in J. Indian Bot. Soc. 24: 133. 1945. *Gratiola ciliata* Colsm., Prodr. Descr. Gratiol. 14. 1793. *G. serrata* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 139. 1820. *Bonnaya brachiata* Link & Otto, Icon. Pl. Select. 2: 25. t. 11. 1820; Hook. f., Fl. Brit. India 4: 284. 1884. *Vandellia brachiata* (Link & Otto) Haines, Bot. Bihar Orissa 4: 632. 1922.

Herbs, annual, erect, much branched, glabrous, 2-15 cm high; stems 4-angled; lower branches decumbent. Leaves broadly oblong or obovate, 8-40 mm long, obtuse or subacute at apex, serrate, sessile, penninerved. Flowers in terminal, lax racemes; pedicels slender, 3-4 mm long; bracts linear, subulate, 4-5 mm long. Calyx *ca* 5 mm long, divided almost up to base; segments linear, subulate, ciliate, aristate. Corolla white, pink or red, *ca* 8 mm long. Stamens 2. Capsules linear or oblong, 10-13 mm long, acute. Seeds truncate at both ends.

In moist shady places. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Durg, Hoshangabad, Indore, Mandla, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna. *Fl. & Fr.*: Aug. - Feb.

5. *Lindernia crustacea* (L.) F. v. Muell., Syst. Census Austral. Pl. 97. 1882; Mukerjee in J. Indian Bot. Soc. 24: 130. 1945. *Capraria crustacea* L., Mant. Pl. 87. 1767. *Vandellia crustacea* (L.) Benth., Scrophl. Ind. 35. 1835; Hook. f., Fl. Brit. India 4: 279. 1884.

Herbs, annual, erect or decumbent, often diffusely branched, somewhat glabrous; stems 4-angled, pubescent on the angles. Leaves ovate, 8-20 x 5-15 mm, obtuse at apex, rounded or cordate at base, entire or serrate, penninerved; petioles 2-8 mm long. Flowers axillary, solitary and in subracemes; pedicels 5-20 mm long. Calyx 3.5-4 mm long, lobed only up to 1/4th of its length; teeth deltoid or lanceolate, acute. Corolla purple or blue-violet, yellow-red in throat, 8-14 mm long. Stamens 4; anterior pair appendaged. Capsules oblong-ovoid, 2-3 mm long, truncate. Seeds ovoid, pale yellow, with minute tail at one end, granulate.

In moist shady places. Balaghat, Bastar, Bilaspur, Chhatarpur, Durg, Hoshangabad, Mandla, Morena, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Surguja, Tikamgarh. *Fl. & Fr.*: July - Nov.

6. *Lindernia hookeri* (C.B. Clarke ex Hook. f.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 80. 1891; Mukerjee in J. Indian Bot. Soc. 24: 130. 1945. *Vandellia hookeri* C.B. Clarke ex Hook. f., Fl. Brit. India 4: 280. 1884.

Herbs, annual, erect, diffusely branched, pubescent, 10-20 cm high; stems 4-angled. Leaves ovate-lanceolate, 15-25 mm long, acute or obtuse at apex, rounded-subcordate at base, entire in lower part, crenate-serrate in the upper part, pubescent, sessile or petiolate. Flowers axillary, solitary or in subumbels at the end of branches. Calyx 6-13 mm long; lobes unequal, hispid. Corolla bluish purple. Stamens 4; filaments of anterior pair appendaged at base. Capsules oblong, shorter than calyx, acute. Seeds rugulose.

In marshy places or near streams on hill slopes. Hoshangabad, Seoni. *Fl. & Fr.*: Sept. - March.

7. *Lindernia hyssopioides* (L.) Haines, Bot. Bihar Orissa 4: 635. 1922; Mukerjee in J. Indian Bot. Soc. 24: 132. 1945. *Gratiola hyssopioides* L., Mant. Pl. 174. 1771. *Ilysanthes hyssopioides* (L.) Benth. in DC., Prodr. 10: 419. 1846; Hook. f., Fl. Brit. India 4: 283. 1884.

Herbs, erect or straggling, slender, simple or diffusely branched, 10-45 cm high. Leaves oblong or oblong-lanceolate, 6-25 x 3-10 mm or upper ones linear-lanceolate, smaller, entire, 1-3-nerved, sessile. Flowers axillary, solitary; pedicels 1-4 cm long, filiform. Calyx ca 3 mm long, divided up to base; segments narrowly lanceolate, glabrous. Corolla white with pink or blue-purple tinge, 8-13 mm long. Stamens 2. Staminodes 2, clavate, glandular. Capsules ovoid-oblong, ca 5 mm long, acute, glabrous.

In moist and aquatic habitats. Balaghat, Bastar, Bilaspur, Mandla, Raigarh, Sidhi, Surguja. *Fl. & Fr.*: Nov. - May.

8. *Lindernia montana* (Blume) Koord., Exkurs.-Fl. Java 3: 178. 1912. *Diceros montanus* Blume, Bijdr. 752. 1826. *Vandellia mollis* Benth., Scroph. Ind. 37. 1835; Hook. f., Fl. Brit. India 4: 281. 1884. *Lindernia mollis* (Benth.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 80. 1891; Mukerjee in J. Indian Bot. Soc. 24: 131. 1945.

Herbs, procumbent or often creeping, villous, 10-50 cm high. Leaves ovate or ovate-oblong, 2.5-4 cm long, crenate-serrate, villous, sessile or shortly petiolate; petioles *ca* 4 mm long. Flowers axillary, solitary or in axillary and terminal racemes; pedicels 6-18 mm long, slender. Calyx up to 13 mm long, hirsute, divided nearly up to base; segments subulate. Corolla brown-yellow. Stamens 4; filaments pubescent, of anterior pair appendaged at base. Capsules oblong, shorter than calyx. Seeds rugose.

Central India, without exact locality. There is a single collection by G. King (CAL).

9. *Lindernia multiflora* (Roxb.) Mukerjee in J. Indian Bot. Soc. 24: 131. 1945. *Torenia multiflora* Roxb., Fl. Ind. 3: 96. 1832. *Vandellia multiflora* (Roxb.) G. Don, Gen. Hist. 4: 549. 1837-1838; Hook. f., Fl. Brit. India 4: 280. 1884. **Fig. 41.**

Herbs, annual, erect, flaccid, branched, 4-20 cm high; stems 4-angled, ciliate-ribbed, rooting at lower nodes. Leaves ovate or oblong, 15-30 x 8-15 mm, obtuse at apex, entire or sub serrate, sessile or shortly petiolate. Flowers in terminal, glandular pubescent racemes; pedicels 5-15 mm long; bracts minute, subulate. Calyx *ca* 1.5 mm long, divided nearly up to base; segments lanceolate. Corolla white, bluish white or pale purple, 3-4 mm long. Stamens 4; filaments of anterior pair appendaged at base. Capsules suborbicular, 3-4 mm long. Seeds reticulate.

In moist places along roadside ditches. Ratlam, Rewa. *Fl. & Fr.*: July - Oct.

10. *Lindernia nummulariifolia* (D. Don) Wettst. in Engl. & Prantl. Nat. Pflanzenfam. IV. 3b: 79. 1891. "*nummularifolia*"; Mukerjee in J. Indian Bot. Soc. 24: 132. 1945. *Vandellia nummulariifolia* D. Don, Prodr. Fl. Nepal. 86. 1825, "*nummularifolia*"; Hook. f., Fl. Brit. India 4: 282. 1884.

Herbs, erect or decumbent to ascending, simple or branched, glabrous, 15-30 cm high. Leaves broadly ovate, orbicular or obovate, 10-18 mm long and broad, obtuse at apex, crenate-serrate, 5-nerved, sessile or subsessile. Flowers axillary, solitary or in few-flowered, subumbellate racemes; pedicels 3-16 mm long, slender. Calyx *ca* 3 mm long, divided up to middle; lobes lanceolate, acute. Corolla white with purple tinge; upper lip brown; lower lip white with a purple centre. Stamens 4; filaments

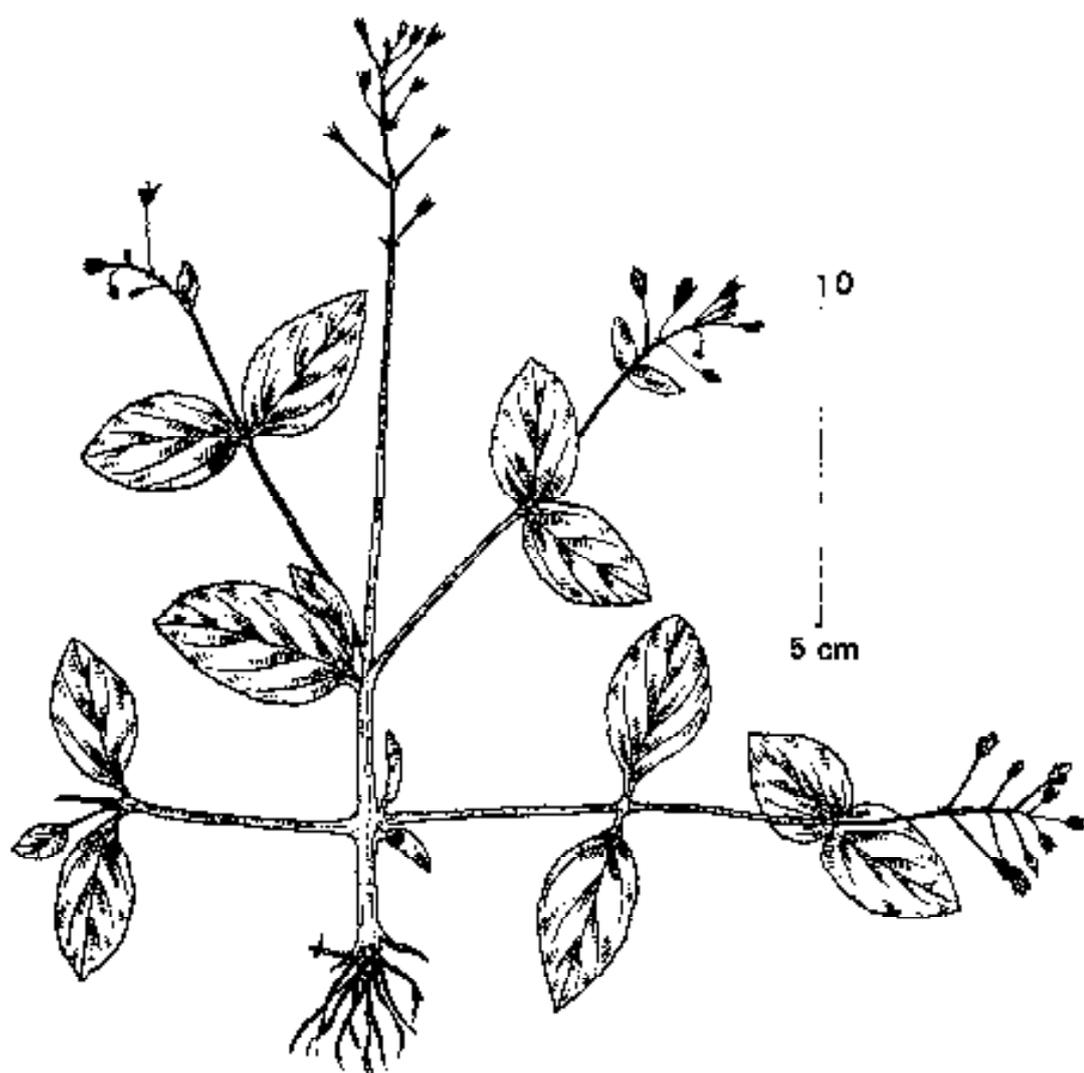


Fig. 41. *Lindernia multiflora* (Roxb.) Mukerjee

of anterior pair appendiculate. Capsules ovoid-oblong or ellipsoid, ca 6 mm long, apiculate, glabrous.

In moist sandy alluvium on hill slopes. Balaghat, Chhindwara, Hoshangabad, Raigarh, Seoni. *Fl. & Fr.*: July - Oct.

11. *Lindernia oppositifolia* (Retz.) Mukerjee in J. Indian Bot. Soc. 24: 134. 1945. *Gratiola oppositifolia* Retz., *Observ. Bot.* 4: 8. 1786. *Bonnaya oppositifolia* Spreng., *Syst. Veg.* 1: 41. 1825; Hook. *f.*, *Fl. Brit. India* 4: 286. 1884.

Herbs, erect, 10-20 cm high; branches 4-angled. Leaves oblong-lanceolate, 1.5-2 x 0.2-0.5 cm, obtuse at apex, cuneate at base, serrulate, glabrous, penninerved. Flowers axillary, solitary or in terminal racemes; bracts linear. Calyx-segments linear-lanceolate, ca 3 mm long. Corolla blue-white with violet lip. Stamens 2. Capsules linear or lanceolate, ca 7 mm long, brown.

Rare. Gregarious in moist places. Shahdol (Saxena, 1970). *Fl. & Fr.*: Aug. - Sept.

12. *Lindernia parviflora* (Roxb.) Haines, *Bot. Bihar Orissa* 4: 635. 1922; Mukerjee in J. Indian Bot. Soc. 24: 132. 1945. *Gratiola parviflora* Roxb., *Pl. Coromandel* 3: 3. t. 203. 1811. *Hysanthes parviflora* (Roxb.) Benth. in DC., *Prodr.* 10: 419. 1846; Hook. *f.*, *Fl. Brit. India* 4: 283. 1884.

Herbs, annual, erect or decumbent, simple or diffusely branched, glabrous, 10-20 cm high; stems 4-angled, rooting at lower nodes. Leaves ovate-lanceolate, 0.5-1.8 x 0.2-0.8 cm, entire, 3-5-nerved, sessile. Flowers axillary, solitary or in terminal racemes; pedicels 6-18 mm long. Calyx ca 3 mm long, deeply divided; segments linear-lanceolate, 1-nerved. Corolla white, pink or pale violet, 5-6 mm long. Stamens 2. Staminodes 2, lobed or dentate. Capsules ellipsoid, 3-5 mm long, striate. Seeds rugose.

In moist places along streams. Balaghat, Bilaspur, Hoshangabad, Indore, Jabalpur, Mandla, Morena, Narsimhapur, Raigarh, Rewa, Satna, Seoni, Shivpuri, Surguja, West Nimar. *Fl. & Fr.*: Aug. - Dec.

13. *Lindernia procumbens* (Krock.) Borbas, *Bekesm. Fl.* 80. 1881. *Anagalloides procumbens* Krock., *Fl. Siles.* 2(1): 398. t. 26. 1790. *Lindernia pyxidaria* L., *Mant. Pl.* 252. 1771, *p.p.* (quoad. spec. excl. syn.)

nom. illeg.; Mukerjee in J. Indian Bot. Soc. 24: 131. 1945. *Vandellia erecta* Benth., Scroph. Ind. 36. 1835, *pro maj. parte*; Hook. f., Fl. Brit. India 4: 281. 1884. *V. pyxidaria* (L.) Maxim. in Bull. Acad. Sci. St. Petersb. 20: 449. 1875.

Herbs, annual, erect, glabrous, 10-20 cm high; stems angular, branched from the base. Leaves elliptic or oblong, 10-25 mm long, obtuse at apex, tapering at base, entire or crenulate, 3-5-nerved, sessile. Flowers axillary, solitary; pedicels 12-16 mm long, slender. Calyx deeply divided; segments linear or lanceolate, ca 2 mm long, 3-nerved. Corolla white, pinkish white or pale purple, 5-8 mm long. Stamens 4. Capsules broadly ellipsoid. Seeds rugose.

In moist and swampy habitats. Bastar, Bilaspur, Damoh, East Nimar, Hoshangabad, Jabalpur, Mandla, Raipur, Rajnandgaon. *Fl. & Fr.*: Oct. June.

14. *Lindernia sessiliflora* (Benth.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 79. 1891; Mukerjee in J. Indian Bot. Soc. 24: 132. 1945. *Vandellia sessiliflora* Benth., Scroph. Ind. 37. 1835; Hook. f., Fl. Brit. India 4: 282. 1884.

Herbs, erect or decumbent to ascending, dichotomously or trichotomously branched, glabrous or puberulous, 5-15 cm high; stems 4-angled, pubescent on angles, often rooting below. Leaves suborbicular or broadly ovate, 8-18 mm long and broad, rounded or cordate at base, crenate-serrate, glabrous except on nerves beneath, sessile. Flowers in terminal, 1-4-flowered clusters, sessile or subsessile. Calyx 2-3 mm long, divided up to middle; lobes linear-lanceolate. Corolla purplish, ca 6 mm long. Capsules ellipsoid, 5-7 mm long, acute-acuminate. Seeds granulate.

In moist sandy alluvial soil. Chhindwara. *Fl. & Fr.*: July.

15. *Lindernia tenuifolia* (Colsm.) Alston in Trimen, Handb. Fl. Ceylon suppl. 6. 214. 1931; Mukerjee in J. Indian Bot. Soc. 24: 134. 1945. *Gratiola tenuifolia* Colsm., Prodr. Descr. Gratiol. 8. 1793. *Bonnaya tenuifolia* (Colsm.) Spreng., Syst. Veg. 1: 42. 1824; Hook. f., Fl. Brit. India 4: 286. 1884.

Herbs, erect, tufted, succulent, diffusely branched; branches filiform, interlaced. Leaves linear, 2.5-4 x 0.2-0.5 cm, more or less entire. Flowers

axillary, solitary or upper ones in racemes. Calyx 2-3 mm long, divided nearly up to base. Corolla pale blue, 2-3 mm long. Stamens 2; filaments filiform. Staminodes 2, glandular, obtuse. Capsules 6-12 mm long, slender, septicidal. Seeds rugose.

In marshy places. Satna. *Fl. & Fr.*: Sept. Oct.

16. *Lindernia viscosa* (Hornem.) Boldingh, *Zakfl. Java* 165. 1916. *Gratiola viscosa* Hornem., *Enum. Pl. Hort. Hafn.* (Rev. ed.) 19. 1807. *Vandellia hirsuta* Benth., *Scroph. Ind.* 36. 1835; Hook. *f.*, *Fl. Brit. India* 4: 280. 1884. *Lindernia hirsuta* (Benth.) Wettst. in Engl. & Prantl, *Nat. Pflanzenfam.* IV. 3b: 79. 1891; Mukerjee in *J. Indian Bot. Soc.* 24: 131. 1945. **Fig. 42.**

Herbs, erect to ascending, simple or branched, sparsely pubescent, 4-15 cm high; stems 4-angled. Leaves ovate or oblong, 8-25 mm long, obtuse at apex, entire or sinuate, sessile or shortly petiolate. Flowers axillary, solitary or in axillary and terminal racemes; pedicels 0.4-1 cm long. Calyx divided nearly up to base; segments lanceolate or linear-lanceolate, pubescent. Corolla bluish white or bluish violet, 15-18 mm long. Stamens 4. Capsules globose or orbicular, 4-6 mm long, shorter than calyx. Seeds rugose.

Rare. On hill slopes and shady places. Hoshangabad. *Fl. & Fr.*: Sept. Nov.

15. MAZUS Lour.

Herbs, small, often with runners. Lower leaves opposite or in rosette; upper alternate, dentate or incised. Flowers in terminal, subsecund racemes, bracteate; bracteoles absent or minute. Calyx campanulate, 5-lobed. Corolla bilabiate; upper lip 2-lobed; lower lip 3-lobed, with 2 ridges in the throat; tube short. Stamens 4, didynamous. Stigma 2-lobed. Capsules globose, subglobose or compressed, loculicidal, many-seeded. Seeds ovoid.

About 30 species; Asia to Australia; one in M.P.

Mazus pumilus (Burm. *f.*) Steenis in *Nova Guinea* (n.s.) 9: 31. 1958. *Lobelia pumila* Burm. *f.*, *Fl. Ind.* 186. t. 60. f. 3. 1768. *Lindernia japonica* Thunb., *Fl. Jap.* 253. 1784. *Mazus japonicus* (Thunb.) Kuntze, *Revis. Gen.*

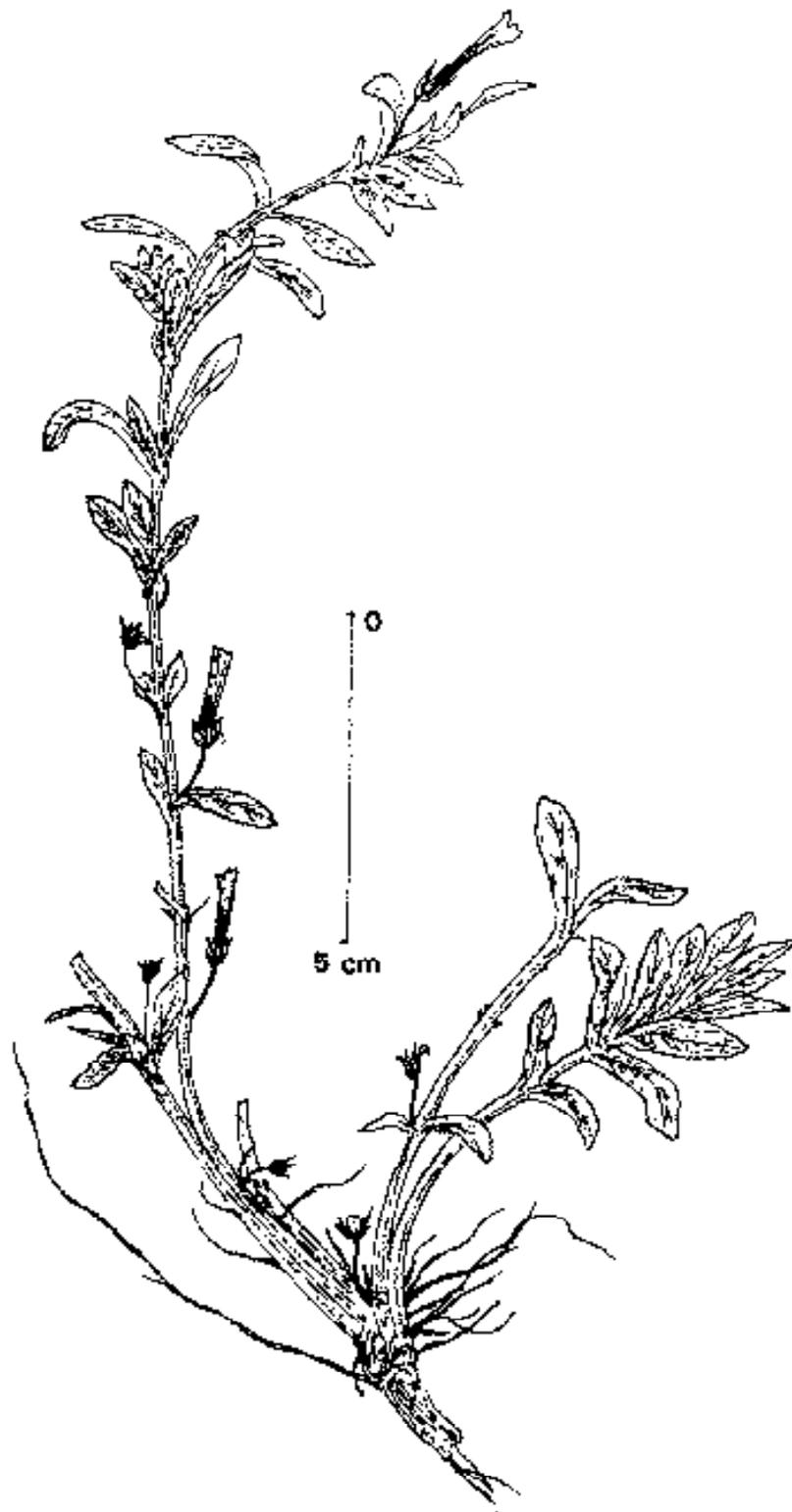


Fig. 42. *Lindernia viscosa* (Hornem.) Boldingl.

Pl. 462. 1891. *M. rugosus* Lour., Fl. Cochinch. 385. 1790; Hook. f. Fl. Brit. India 4: 259. 1884. - *Nakh-chinkni*.

Herbs, annual, erect or trailing, glabrous or sparsely hairy, non-stoloniferous. Radical leaves in rosette, oblanceolate or obovate to spatulate, 2-7.5 cm long, crenate or dentate, shortly petiolate. Flowers in 2.5-25 cm long, leafless or leafy, pubescent, scapiform racemes. Calyx-lobes ovate-lanceolate, subulate, ca 4 mm long. Corolla white or light blue, 6-13 mm long; ridges of lower lip brown spotted and bearded with club-shaped hairs. Capsules subglobose, 3-4 mm long, included in the persistent calyx. Seeds minute, pale yellow.

In moist shady places particularly along drains and water channels. Bilaspur, Hoshangabad, Mandla, Raigarh, Surguja. Fl. & Fr.: Nov. - April.

Notes: Saxena (1970) has reported *M. delavayi* Bonati from Shahdol but this is a chinese plant.

16. MICROCARPAEA R. Br.

Herbs, very small, nearly glabrous; stems slender, diffusely branched. Leaves opposite, entire, sessile. Flowers very small, axillary, solitary, ebracteate, sessile. Calyx tubular, 5-angled or 5-ribbed, 5-fid. Corolla 5-lobed, sublabiate; tube short. Stamens 2, perfect, included; filaments filiform; anthers connivent, 1-celled. Style filiform, bent, thickened at base; stigma capitate, recurved. Capsules ovoid to ellipsoid, loculicidally 2-valved. Seeds ovoid.

A monotypic genus; Java, China, India and Australia.

Microcarpaea minima (J. Koenig ex Retz.) Merr. in Philipp. J. Sci. 7: 100. 1912. *Paederota minima* J. Koenig ex Retz., Observ. Bot. 5: 10. 1788. *Microcarpaea muscosa* R. Br., Prodr. 436. 1810; Hook. f., Fl. Brit. India 4: 287. 1884.

Herbs, diffuse or creeping, striate, glabrous; stems prostrate, tufted, interlaced, 5-10 cm long, rooting at nodes. Leaves oblong, 2.7-8 x 0.75 mm, obtuse. Flowers minute. Calyx 5-angled, ca 1.5 mm long; lobes ovate, ciliate on margins. Corolla pinkish red, 2-3 mm long; upper lip 2-lobed; lower lip 3-lobed; lobes ciliate on margins; tube 1-1.5 mm long. Style glabrous. Capsules ellipsoid, 1.5-2 mm long, glabrous.

In moist places as soft, pale green mats. Balaghat, Bastar, Sugar, Shivpuri. *Fl. & Fr.*: Nov. April.

17. MIMULUS L.

Herbs, rarely shrubs, erect or decumbent, glabrous or pilose, often viscid or glandular pubescent. Leaves opposite, entire or dentate. Flowers axillary, solitary or in terminal racemes, showy, ebracteate. Calyx tubular, 5-angled, 5-toothed. Corolla bilabiate; upper lip 2-lobed; lower lip 3-lobed, spreading; tube cylindrical. Stamens 4, didynamous, included; filaments filiform. Ovary glabrous; style filiform; stigma 2-lobed. Capsules oblong, obovoid or linear, loculicidal, many-seeded. Seeds oblong.

About 150 species: S. Africa, Asia and America; one in M.P.

Mimulus strictus Benth., Scroph. Ind. 28. 1835. *M. gracilis auct.* 17011 R. Br., 1810: Hook. f., Fl. Brit. India 4: 259. 1884.

Herbs, perennial, erect, branched, 25-60 cm high; stems 4-angled, striate. Leaves radical and cauline, oblong, 2.5-8 x 0.5-2.5 cm, obtuse or acute at apex, narrowed at base, dentate, glabrous, gland-dotted beneath, sessile. Flowers axillary, solitary; pedicels stout, 1-4 cm long. Calyx 5-6 mm long; lobes acute. Corolla white, pink or pale blue, 12-13 mm long; lobes rounded; tube dilated. Capsules oblong or obovoid, ca 6.5 mm long. Seeds smooth.

As forest undergrowth and amidst rock boulders along running streams, often associated with *Nepeta*, *Sphaeranthus*, *Cynoglossum*, *Ammania* and *Canscora* spp. Balaghat, Betul, Bilaspur, Jabalpur, Mandla, Raigarh, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Aug. May.

18. RUSSELIA Jacq.

Shrubs or undershrubs; branches angular, often with pendulous branchlets. Leaves opposite or whorled, well developed or reduced to scales. Flowers in dichotomous, many-flowered cymes or sometimes solitary, bracteate. Calyx 5-partite. Corolla somewhat bilabiate, 5-lobed; lobes rounded; tube cylindrical. Stamens 4, included; anther cells divaricate at length. Capsules subglobose, septically dehiscent. Seeds ovoid.

About 52 species: Cuba and Mexico to Columbia; 2 cultivated in M.P.

- 1a. Leaves broadly ovate, well developed; peduncles more than 3-flowered ...1. *R. coccinea*
- 1b. Leaves linear, lanceolate or ovate, often upper ones reduced to scales; peduncles 1-3-flowered ...2. *R. equisetiformis*

1. *Russelia coccinea* Wettst. in Engl. & Prantl. Nat. Pflanzenfam. IV. 3b: 63. 1891. *R. sarmentosa* Jacq., Enum. Syst. Pl. 25. 1760.

Shrubs. Leaves opposite or in whorls of 4 at each node, broadly ovate, serrate. Flowers in dichotomous, congested, many-flowered, shortly pedunculate cymes. Corolla red; tube cylindrical.

Cultivated in gardens. Bhopal (Oommachan, 1977), Jabalpur (Oommachan and Shrivastava, 1996). *Fl.*: Most part of the year.

2. *Russelia equisetiformis* Schlechtend. & Cham. in Linnaea 6: 377. 1831. *R. juncea* Zucc. in Flora 15(2): Beibl. 99. 1832. *R. floribunda* Woodrow in J. Bombay Nat. Hist. Soc. 12: 174. 1898, non Humb., Bonpl. & Kunth, 1818. *Fountain plant*.

Undershrubs, much branched, glabrous, 1-1.5 m high; stems striate; branches slender, nodding or pendulous at top. Leaves ovate or linear-lanceolate, 3-8 mm long, mostly reduced to minute scales on the branches and branchlets. Flowers in 1-3-flowered cymes; peduncles elongate. Corolla scarlet, hypocrateriform; tube 12-15 mm long.

Cultivated in gardens and parks throughout the state. *Fl.*: Almost throughout the year.

19. SCOPARIA L.

Herbs or undershrubs, erect, much branched, glabrous or pubescent. Leaves opposite or whorled, entire, serrate or dentate, glandular punctate. Flowers small, axillary, solitary, paired or in whorls, ebracteolate. Calyx 4-5-partite; segments ovate, oblong or lanceolate, imbricate. Corolla rotate, 4-lobed, densely bearded on throat; lobes subequal, obtuse. Stamens 4, subequal; filaments filiform; anthers subsagittate; cells parallel or divergent. Style slightly clavate towards apex; stigma truncate or notched. Capsules globose or ovoid, septicidal. Seeds ovoid or obovoid, angular, scrobiculate.

About 20 species; tropical America; one in M.P.

Scoparia dulcis L., Sp. Pl. 116. 1753; Hook. f., Fl. Brit. India 4: 289. 1884. - *Banmirach*, *Ghodatulsi*, *Mithi-patti*.

Herbs, erect, 0.3-1 m high; stems and branches 4-6-angled, glabrous or nearly so. Leaves opposite or ternate, rhomboid or elliptic, 1.2-3.5 x 0.6-1.4 cm, subacute or obtuse at apex, narrowed into a petiole at base, serrate. Flowers 3-6 in axillary whorls; pedicels 8-12 mm long. Calyx-segments 4, oblong, acute or subacute, entire, 3-5-nerved. Corolla white, ca 4 mm across, pilose. Capsules subglobose, 2-3 mm across. Seeds ovoid or obovoid.

In open wastelands and as weed of cultivated fields. Bastar, Chhatarpur, Damoh, Durg, Hoshangabad, Jabalpur, Mandla, Narsimbapur, Panna, Raigarh, Raipur, Rajnandgaon, Seoni, Sidhi. *Fl. & Fr.*: Throughout the year.

Whole plant is used to treat dropsy and diabetes. The leaves are used as tonic especially for weakness of semen while seeds for cold drinks.

20. SOPUBIA Buch.-Ham. ex D. Don

Herbs, erect, branched. Leaves whorled or lower leaves opposite and upper ones alternate, entire or pinnatifid. Flowers axillary, in racemes or spikes, bracteolate. Calyx campanulate, 5-toothed or 5-lobed. Corolla infundibuliform or subrotate, 5-lobed; lobes unequal; tube short, dilated above. Stamens 4, didynamous; anthers of upper or both pairs connivent in pairs; one cell of each stamens perfect, ovoid, the other empty, stipitate. Stigma thickened, subclavate, obtuse. Capsules ovoid or oblong, loculicidal, many-seeded. Seeds reticulate.

About 60 species; tropical regions of Old World to S. Africa; 3 in M.P.

1a. Plants more than 40 cm high; leaves pinnatisect ...1. *S. delphinifolia*

1b. Plants up to 30 cm high; leaves entire, dentate or 3-fid:

2a. Calyx-lobes lanceolate, shorter than tube;

corolla campanulate

...2. *S. stricta*

2b. Calyx-lobes ovate, more or less equal to tube;

corolla subrotate

...3. *S. trifida*

1. *Sopubia delphinifolia* (L.) G. Don, Gen. Hist. 4: 560. 1837-1838, "*delphinifolia*"; Hook. f., Fl. Brit. India 4: 302. 1884. *Gerardia delphinifolia* L., Cent. Pl. II. 21. 1756.

Herbs, annual, erect, much branched. 0.4-0.9 m high; stems 4-angled, glabrous or hispidulous, often spotted with purple. Leaves pinnatisect, 2.5-5 cm long, scabrid; segments filiform, distant, often again divided. Flowers in racemes or spikes; pedicels 3-6 mm long; bracteoles 1-1.5 mm long, filiform. Calyx 10-nerved, *ca* 9 mm long; teeth linear-subulate. Corolla purple or red, ventricose, up to 3.8 cm long. Capsules oblong, 5-8 mm long. Seeds oblong, striate.

In roadside ditches and moist places. Balaghat, Bastar, Bilaspur, Durg, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Surguja. *Fl. & Fr.*: Sept. Dec.

2. *Sopubia stricta* G. Don, Gen. Hist. 4: 559. 1837-1838; Hook. *f.*, Fl. Brit. India 4: 302. 1884.

Herbs, erect, rigid, pubescent, *ca* 30 cm high. Leaves linear-lanceolate, entire or dentate. Flowers in racemes, subsessile or pedicellate; pedicels *ca* 5 mm long. Calyx-lobes lanceolate, much shorter than tube, acute, pubescent. Corolla pale purple, campanulate, puberulous outside. Capsules subglobose, compressed at the top, 4-valved.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Oct. Dec.

3. *Sopubia trifida* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 88. 1825; Hook. *f.*, Fl. Brit. India 4: 302. 1884.

Herbs, erect, *ca* 30 cm high. Leaves linear-filiform, 15-20 cm long, upper ones entire, lower ones 3-fid; segments linear or filiform. Flowers axillary, solitary; pedicels *ca* 1 cm long. Calyx-lobes ovate, more or less equal to tube, pubescent inside. Corolla yellow with purple centre, subrotate, *ca* 1 cm across. Capsules ovoid-oblong, *ca* 5 mm long, emarginate. Seeds spirally reticulate.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Oct. Nov.

21. STEMODIA L., *nom. cons.*

Herbs, aromatic, glandular pubescent or villous. Leaves opposite or sometimes whorled. Flowers axillary, solitary or upper ones crowded in leafy racemes, bracteolate. Calyx 5-partite; segments linear or lanceolate, acute, imbricate, equal or unequal. Corolla tubular, bilabiate; upper lip

emarginate; lower lip 3-lobed. Stamens 4, didynamous, included; filaments filiform; anther cells polleniferous. Style dilated towards apex, usually 2-lobed. Capsules globose or ovoid, acuminate, loculicidal or septicidal, many-seeded. Seeds striate, usually reticulate.

About 35 species; tropical America; one in M.P.

Stemodia viscosa Roxb., Pl. Coromandel 2: 33, t. 163, 1802 & Fl. Ind. 3: 94, 1832; Hook. f., Fl. Brit. India 4: 265, 1884.

Herbs, perennial, simple or branched, 15-50 cm high; branches ascending, pubescent or villous, viscid. Leaves oblong to ovate-oblong, 3-6.2 x 1.3-2.5 cm, subacuminate at apex, amplexicaul at base, scabrid above and strigose along the nerves beneath, sessile. Flowers axillary, solitary or in few-flowered racemes; pedicels 6-9 mm long, glandular-strigose; bracteoles 2, linear, subulate, ca 3 mm long. Calyx-segments 3-5 mm long, minutely glandular pubescent and ciliate. Corolla dull violet-blue, ca 10 mm long; upper lip broadly orbicular, emarginate; lower lip ca 7 mm across; throat pilose. Capsules ovoid-oblong, 4-6 x 2 mm, 4-valved, enclosed in the calyx. Seeds oblong-cuneiform, truncate at the ends.

In moist lowland and marshy places associated with *Ageratum*, *Blumea* and *Gnaphalium* spp. Bilaspur, Durg, East Nimar, Gwalior, Indore, Mandla, Raigarh, Raipur, Rajnandgaon, Ratlam, Rewa, Seoni. Fl. & Fr.: Nov. - April.

22. STRIGA Lour.

Herbs, often parasitic, erect, scabrid, black when dry. Leaves opposite below, alternate above, entire or dentate, sometimes reduced to scales. Flowers axillary or upper ones in bracteate spikes; bracteoles usually 2. Calyx tubular, strongly 4-15-ribbed, 5-toothed or emarginate. Corolla bilabiate; upper lip notched or 2-lobed; lower lip 3-lobed; tube abruptly incurved, pubescent or glabrous. Stamens 4, didynamous, included; anthers 1-celled, vertical or dorsifixed; connectives sometimes mucronate. Style thickened or clavate above; stigma simple. Capsules subglobose, ovoid, oblong, obovoid or ellipsoid, loculicidal, many-seeded. Seeds obovoid or oblong, reticulate.

About 40 species; tropical regions of Old World to S. Africa; 4 in M.P.

- 1a. Calyx-tube 10-15-ribbed:
- 2a. Three calyx-ribs terminating at the tip of each lobe; capsules ca 7 mm long ...1. *S. angustifolia*
- 2b. Only one calyx-rib terminating at the tip of each lobe; capsules 1-4 mm long ...2. *S. asiatica*
- 1b. Calyx-tube 4-5-ribbed:
- 3a. Plants root parasites; leaves scaly, 0.3-0.6 cm long; corolla purple ...4. *S. gesnerioides*
- 3b. Plants not root parasites; leaves not scaly, 1-4 cm long; corolla white ...3. *S. densiflora*

1. ***Striga angustifolia*** (D. Don) Saldanha in Bull. Bot. Surv. India 5: 70. 1963. *Buchnera angustifolia* D. Don, Prodr. Fl. Nepal. 91. 1825. *B. euphrasioides* Benth., Scroph. Ind. 41. 1835, non Vahl, 1794; *Striga euphrasioides* Benth. in Hook., Comp. Bot. Mag. 1. 364. 1836 excl. basionym *Buchnera euphrasioides* Vahl; Hook. f., Fl. Brit. India 4: 299. 1884.

Herbs, annual, erect, simple or branched, 10-40 cm high. Leaves mostly alternate, linear or linear-lanceolate, 1-5 x 0.1-0.4 cm, entire or 1-2-dentate, sessile. Flowers axillary, solitary, often forming terminal spikes; upper bracts linear to subulate, pubescent; lower bracts foliaceous; bracteoles linear, 3-6 mm long. Calyx 6-9 mm long, hispid, 15-ribbed; each lobe with 3 ribs terminating at its apex. Corolla white with pale pink at throat, 10-18 mm long, pilose, abruptly incurved at or above the middle. Capsules ovoid, ca 7 mm long, apiculate.

In wastelands and paddy fields. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Chhindwara, Damoh, Dhar, Durg, Gwalior, Hoshangabad, Indore, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Aug. Feb.

2. ***Striga asiatica*** (L.) Kuntze. Revis. Gen. Pl. 2: 466. 1891. *Buchnera asiatica* L., Sp. Pl. 630. 1753. *Striga lutea* Lour., Fl. Cochinch. 22. 1790; Hook. f., Fl. Brit. India 4: 299. 1884.

Herbs, parasitic, erect, branched, 10-40 cm high. Leaves linear, 1-3 x 0.1-0.2 cm, subacute at apex, hispid or strigose, sessile. Flowers axillary.

solitary or in terminal, lax, elongated, leafy spikes; bracteoles linear. Calyx 5-6 mm long, strigose, 10-15-ribbed; one rib reaching the apex of each lobe, others ending in sinus. Corolla yellow or white, 10-12 mm long; tube hispid. Capsules oblong, 1-4 mm long, dark brown, grooved.

On rocky hill slopes and in sal forest floor along ditches. East Nimar, Gwalior, Hoshangabad, Indore, Mandla, Rajnandgaon, Surguja. *Fl. & Fr.*: Sept. - Dec.

3. ***Striga densiflora*** (Benth.) Benth. in Hook., *Comp. Bot. Mag.* 1: 363. 1836; Hook. *f.*, *Fl. Brit. India* 4: 299. 1884. *Buchnera densiflora* Benth., *Scroph. Ind.* 41. 1835.

Herbs, erect, simple or branched, 10-40 cm high. Leaves linear, 1-4 cm long, acute at apex, scabrid, passing into bracts. Flowers in terminal, lax, elongated, bracteate spikes; bracteoles linear, acute, ciliate. Calyx 4-6 mm long, scabrid, 5-ribbed; teeth lanceolate, subulate, ciliate. Corolla white, 10-15 mm long; throat hairy; tube *ca* 7 mm long, incurved above the middle. Capsules obovoid-oblong, *ca* 4 mm long.

Rare. Amidst grasses. Mandla. *Fl. & Fr.*: Aug.

4. ***Striga gesnerioides*** (Willd.) Vatke, *Oesterr. Bot.* 25: 11. 1875. *Buchnera gesnerioides* Willd., *Sp. Pl.* 3: 338. 1800. *B. orobanchoides* R. Br. ex Endl. in *Flora* 15: 388. t. 2. 1832. *Striga orobanchoides* (R. Br. ex Endl.) Benth. in Hook., *Comp. Bot. Mag.* 1: 361. t. 19. 1836; Hook. *f.*, *Fl. Brit. India* 4: 299. 1884.

Herbs, parasitic, erect, simple or branched, stout, glabrous or pubescent, 10-25 cm high; rootstock woody, tuberous; stems angular, with purple tinge. Leaves scaly, ovate-lanceolate, 3-6 mm long, acute, purple, higher ones passing into bracts. Flowers in terminal, lax or dense spikes, sessile; bracts lanceolate, acute or acuminate; bracteoles linear. Calyx 2-3 mm long, hispid, 4-5-ribbed; lobes lanceolate, ciliate. Corolla purple; tube incurved above the middle, hairy outside and in the throat. Capsules ovoid-globose, *ca* 5 mm across.

Amidst grasses on hill slopes; parasitic on the roots of *Lepidogathis* sp. and other plants. Dhar, Gwalior, Hoshangabad, Rewa, Satna. *Fl. & Fr.*: Aug. - Oct.

23. SUTERA Roth

Herbs, annual or perennial, glabrous or viscid pubescent. Leaves pinnatisect; lower leaves opposite, upper ones alternate. Flowers axillary and in terminal racemes or spikes, ebracteolate; bracts foliaceous. Calyx 5-partite or 5-lobed; segments narrow, imbricate. Corolla 5-lobed; lobes unequal, obtuse; tube slender. Stamens 4, didynamous, included or not; filaments filiform; anthers 1-celled, reniform. Style filiform, short; stigma obtuse or notched. Capsules ovoid-oblong or ellipsoid-oblong, many-seeded. Seeds pitted.

About 130 species; tropical and S. Africa; one in M.P.

Sutera dissecta (Delile) Walp., Repert. Bot. Syst. 3: 271. 1844. *Capraria dissecta* Delile, Deser. Egypte, Hist. Nat. (Fl. Egypte) 239. t. 32. f. 2. 1812. *Sutera glandulosa* Roth, Nov. Pl. Sp. 291. 1821; Hook. f. Fl. Brit. India 4: 258. 1884.

Herbs, annual, erect or spreading, glandular viscid; branches 10-30 cm high. Leaves ovate, 2-3 cm long, pinnatisect; segments dentate. Flowers axillary, solitary or upper ones in racemes, sessile or subsessile. Calyx 3-4 mm long; segments linear-oblong, gland-dotted. Corolla purple-yellow or white, tubular. Capsules ellipsoid-oblong, ca 4 mm long.

In wastelands preferably moist gravelly soil. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Gwalior, Hoshangabad, Indore, Mandla, Narsimhapur, Raipur, Rewa, Sagar, Seoni, West Nimar. *Fl. & Fr.*: Dec. April.

24. TORENIA L.

Herbs, glabrous or pubescent. Leaves opposite, entire, crenate or serrate. Flowers axillary, solitary, in fascicles, pseudumbels or terminal racemes, bracteolate. Calyx tubular, bilabiate or 3-5-toothed, 3-5-winged, keeled or plaited. Corolla bilabiate; upper lip erect, entire, notched or 2-lobed; lower lip spreading, 3-lobed; tube cylindrical, dilated above. Stamens 4, perfect, didynamous, 2 upper included, 2 lower conniving under the upper lip and appendaged at base; anthers cohering in pairs, cells often confluent. Stigma 2-lamellate. Capsules linear, oblong or ellipsoid, septicial, many-seeded. Seeds rugose, pitted.

About 40 species; tropical regions of Old World; 4 in M.P.

- 1a. Flowers solitary or in racemes:
- 2a. Calyx broadly winged; mid lobe of lower lip of corolla with a yellow spot at base ...1. *T. fournieri*
- 2b. Calyx narrowly winged; mid lobe of lower lip of corolla without yellow spot at base ...4. *T. travancoricu*
- 1b. Flowers fascicled or in subumbels:
- 3a. Calyx broadly winged, wings cordate at base; fruiting calyx not ribbed ...2. *T. indica*
- 3b. Calyx narrowly winged, wings not cordate at base; fruiting calyx ribbed ...3. *T. thouarsii*

1. *Torenia fournieri* Linden ex Fourn. in *Illustr. Hort.* 23: 129. t. 249. 1876.

Herbs, perennial, erect, much branched, glabrous, up to 30 cm high; stems 4-angled. Leaves ovate or ovate-cordate, 3.5-5 cm long, entire or serrate, petiolate. Flowers axillary, solitary or in terminal racemes; pedicels stout. Calyx rather inflated, broadly 5-winged, faintly ciliate. Corolla showy; upper lip pale blue, obscurely 2-lobed; lower lip purple or violet, 3-lobed; mid lobe with a yellow spot at base; tube pale violet, yellow on back.

Widely cultivated in gardens for beautiful flowers, occurs as an escape too. Bastar. *Fl.*: Aug.

2. *Torenia indica* Saldanha in *Bull. Bot. Surv. India* 8(2): 126. 1966. *T. cordifolia* auct. non Roxb., 1802: Hook. f. *Fl. Brit. India* 4: 276. 1884, *p.p.*

Herbs, annual, erect, simple or trichotomously branched, 10-30 cm high; stems 4-angled, glabrous or pubescent at angles, often rooting at lower nodes. Leaves ovate-lanceolate, 2-4 cm long, penninerved, pubescent on nerves; petioles ca 16 mm long, pubescent. Flowers axillary, usually whorled or subumbellate at the tip of branches; pedicels 1-2 cm long; deflexed. Calyx 8-12 mm long; upper lip 3-toothed; lower lip 2-toothed; wings ciliate, cordate at base. Corolla purple-violet, ca 15 mm long; tube equalling the calyx, curved. Capsules oblong-ellipsoid.

In moist places of the forests. Balaghat, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. Oct.

3. *Torenia thouarsii* (Cham. & Schlechtend.) Kuntze, Revis. Gen. Pl. 2: 468. 1891. *Nortenia thouarsii* Cham. & Schlechtend. in Linnæa 3: 18. 1828. *Torenia parviflora* Buch.-Ham. ex Benth., Scroph. Ind. 39. 1835 & in DC., Prodr. 10: 410. 1846; Hook. f., Fl. Brit. India 4: 278. 1884.

Herbs. annual, erect or procumbent, glabrous, 8-20 cm high; stems 4-angled, winged at angles, branching from base, rooting at lower nodes. Leaves ovate or ovate-lanceolate, 1.2-3 cm long, acute at apex, serrate, puberulous, petiolate. Flowers axillary, usually fascicled; pedicels 5-10 mm long. Calyx obliquely bilabiate, ca 5 mm long; upper lip 2-lobed; lower lip 3-lobed; dorsal ridge of each lobe narrowly winged, ciliate in flower, ribbed in fruit. Corolla purplish or pink, ca 10 mm long; upper lip deltoid, entire; lower lip 3-lobed. Capsules oblong.

In moist shady places. Balaghat. *Fl. & Fr.*: Sept.

4. *Torenia travancorica* Gamble, Fl. Madras 2: 957. 1923. *T. asiatica* auct. non L., 1753; Hook. f., Fl. Brit. India 4: 277. 1884, p.p. *T. leucosiphon* Alston in Trimen, Handb. Fl. Ceylon 6: 212. 1931.

Herbs. annual, diffusely branched, glabrous; stems 4-angled. Leaves ovate-lanceolate, up to 5 x 3 cm, acute at apex, subcordate at base, serrate, scabrous. Flowers axillary, solitary. Calyx-lobes lanceolate, acuminate. Corolla showy; upper lip purple, oblong-orbicular; lower lip bluish purple; throat pale white. Capsules linear, ca 1 cm long, glabrous.

Rare. Bhopal (Oommachan, 1977). Jabalpur (Oommachan and Shrivastava, 1996). *Fl. & Fr.*: Throughout the year.

25. VERBASCUM L.

Herbs, biennial or perennial, glandular or eglandular pubescent. Leaves alternate, entire, crenate or dentate, sometimes pinnatifid. Flowers in terminal, simple or branched racemes or spikes, actinomorphic, bracteate. Calyx 5-lobed or 5-partite; lobes imbricate. Corolla rotate or subrotate, 5-lobed. Stamens 4 or 5, didynamous or not; filaments all or the upper 3 bearded or densely hairy; anthers transverse or oblique, 1-celled. Style

dilated at apex; stigma simple. Capsules globose, oblong or ovoid, septicidal. Seeds ovoid or oblong, rugose.

About 360 species: Eurasia: 2 in M.P.

- 1a. Plants glandular; radical leaves up to 9 cm long;
stamens 4 ...1. *V. chinense*
- 1b. Plants eglandular; radical leaves 12-35 cm long;
stamens 5 ...2. *V. thapsus*

1. *Verbascum chinense* (L.) Santapau. Fl. Purandhar 90. 1958 & in Rec. Bot. Surv. India 16: 177. 1967. *Scrophularia chinensis* L., Mant. Pl. 250. 1771. *Celsia coromandeliana* Vahl, Symb. Bot. 3: 79. 1794; Hook. f., Fl. Brit. India 4: 251. 1883. *Verbascum celsioides* Benth. in DC., Prodr. 10: 229. 1846. *V. coromandelianum* (Vahl) Kuntze, Revis. Gen. Pl. 2: 468. 1891. - *Akhpooti, Gadur-tambaku, Kokhima.*

Herbs, erect, glandular pubescent, 0.2-1 m high. Radical leaves in rosette, oblong, 5-9 x 3-3.5 cm, obtuse at apex, serrate, dentate, lyrate-pinnatifid, petiolate; upper ones ovate or oblong, smaller, acute at apex, dentate-serrate, sessile. Flowers in lax, simple or branched, 15-25 cm long, glandular pubescent racemes. Calyx-lobes oblong or ovate, acute, pubescent. Corolla yellow, 12-13 mm across; lobes unequal. Capsules subglobose or ovoid, 5-8 mm across, glandular.

In wastelands and river beds. Balaghat, Betul, Bilaspur, Chhatarpur, Damoh, Gwalior, Hoshangabad, Indore, Jabalpur, Mandla, Raigarh, Raipur, Rewa, Sagar, Seoni, Shahdol, Shivpuri, Sidhi, Vidisha, West Nimar. *Fl. & Fr.*: Dec. - June.

The plant is used as fish poison.

2. *Verbascum thapsus* L., Sp. Pl. 177. 1753; Hook. f., Fl. Brit. India 4: 250. 1883.

Herbs, erect, up to 1 m high. Radical and lower cauline leaves obovate-lanceolate, 12-35 x 3-6 cm, obtuse at apex, decurrent at base, crenate or subentire, densely stellate tomentose, petiolate; upper cauline leaves oblong, smaller, acute-acuminate at apex, sessile. Flowers in dense, 15-25 cm long, tomentose, spicate racemes. Calyx tomentose. Corolla yellow, subrotate, 1.5-2 cm across. Capsules ovoid, 6-7 mm long, tomentose.

Rare. In neglected fields. Chhatarpur. *Fl. & Fr.*: Dec. March.

26. VERONICA L.

Herbs or shrubs, rarely trees. Leaves opposite, rarely upper ones alternate. Flowers axillary, solitary or in terminal or axillary racemes, bracteate, ebracteolate. Calyx 4-5-partite. Corolla white, blue, pink or purple, rotate, 4-5-lobed; tube short or absent. Stamens 2, exserted; anther cells divergent or parallel, confluent. Style simple; stigma subcapitate. Capsules compressed or turgid, 2-grooved, dehiscent in various ways. Seeds plano-concave or boat-shaped, smooth or rugose, sometimes winged.

About 250 species; N. temperate regions to tropical mountains; one in M.P.

Veronica anagallis-aquatica L., Sp. Pl. 12, 1753; Hook. f. Fl. Brit. India 4: 293. 1884. Fig. 43.

Herbs, perennial, erect or decumbent, simple or branched, 15-50 cm high; stems creeping and rooting at nodes below, glandular pubescent above. Leaves oblong-lanceolate or ovate-lanceolate, 2.5-15 x 0.7-2.5 cm, obtuse at apex, semi-amplexicaul at base, entire or serrate, sessile or shortly petiolate. Flowers in axillary, lax, 7.5-15 cm long racemes; pedicels filiform, 8-10 mm long; bracts linear-lanceolate. Calyx-segments oblong-lanceolate, 2-3 mm long, subacute. Corolla white or pink, ca 4 mm across, 4-lobed. Capsules orbicular or orbicular-oblong, 2-3 x 3-4 mm. Seeds ovoid or oblong.

Common in aquatic and marshy places associated with *Cyathocline* sp., *Rumex* sp. and *Sphaeranthus* sp. Balaghat, Bhopal, Bilaspur, Chhatarpur, Damoh, Indore, Jabalpur, Mandla, Morena, Panna, Raigarh, Rewa, Sagar, Satna, Seoni, Shahdol, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: Nov. April.

101. OROBANCHACEAE

(A.N. Singh)

About 17 genera and 230 species; Northern hemisphere especially temperate and subtropical regions; 2 genera and 3 species in M.P.



Fig. 43. *Veronica anagallis-aquatica* L.

- 1a. Scapes one-flowered; calyx spathaceous; anther cells unequal ...1. *Aeginetia*
- 1b. Scapes many-flowered; calyx not spathaceous; anther cells equal ...2. *Orobanche*

1. AEGINETIA L.

Herbs, erect, fleshy, leafless, unbranched; roots fibrous. Scapes simple, crimson, purple-brown or violet. Flowers solitary on curved scapes. Calyx spathaceous, valvate, swollen at base, split on anterior side; mouth oblique. Corolla bilabiate, 5-lobed; lobes twisted; tube broad, incurved. Stamens 2, included; filaments erect or curved; anthers 1-lobed, spurred. Ovary 1-locular; style short; stigma peltate. Capsules faintly 2-valved, dehiscent. Seeds brown, pitted.

About 3 species; Indo-Malesia, E. Asia and Japan; one in M.P.

Aeginetia indica L., Sp. Pl. 632. 1753; Hook. f., Fl. Brit. India 4: 320. 1884.

Herbs, perennial, erect, 10-30 cm high; stolons subterranean, giving out succulent, fibrous roots terminating in haustoria. Scapes purple-brown or violet, slender, embraced by short scales at base. Calyx mauve to purple, 1.5-3 cm long, posteriorly ending in a beak. Corolla dark purple, tubular, curved, 2-4 cm long, obscurely bilabiate; lobes unequal, ca 0.6 cm long, obtuse, entire to finally crenate. Capsules ovoid-globose, 1.5-2 x 1 cm. Seeds reticulate.

In moist shady places of Bamboo mixed forests. Balaghat, Bastar, Bilaspur, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni. *Fl. & Fr.*: Sept. Feb.

2. OROBANCHE L.

Herbs, parasitic, scapigerous, slender or stout, simple or branched. Scapes covered with acute or acuminate scales. Flowers in dense, lax or interrupted spikes or racemes, bracteate, bracteolate or ebracteolate. Calyx campanulate, 4 or 5-lobed. Corolla tubular or infundibuliform, bilabiate, dilated, often with villous folds at throat. Stamens 4, didynamous, included; anther cells equal, spurred. Ovary 1-locular; ovules many; style long; stigma peltate, 2-lobed. Capsules 2-valved, many-seeded. Seeds globose.

About 150 species; temperate and subtropical regions especially northern: 2 in M.P.

- a. Bracts ovate, 5-7 mm long; bracteoles present; filaments hairy at base ...1. *O. aegyptiaca*
- 1b. Bracts lanceolate, 10-15 mm long; bracteoles absent; filaments glabrous ...2. *O. cernua*

1. **Orobanche aegyptiaca** Pers., Syn. Pl. 2: 181. 1806. *O. indica* Buch.-Ham. ex Roxb., Fl. Ind. 3: 27. 1832. *non* Spreng., 1825; Hook. f., Fl. Brit. India 4: 326. 1884. *O. ramosa auct. non* L., 1753; Hook. f., Fl. Brit. India 4: 326. 1884.

Herbs, annual, erect, often branched, brownish pubescent, 10-30 cm high. Scapes thickened at base; scales lanceolate, sparsely hairy. Flowers in lax, cylindrical spikes; bracts ovate, 5-7 mm long, acute, pubescent; bracteoles 2, filiform, up to 5 mm long, constricted in the middle. Calyx 6-8 mm long, split behind; lobes acuminate. Corolla blue, bluish white, bluish violet or mauve, infundibuliform, 18-25 mm long, pubescent; lobes ciliate. Filaments hairy at base. Capsules oblong, 4-5 mm long.

Parasites on the roots of members belonging to families Brassicaceae, Apiaceae and Solanaceae. Damoh, Sidhi. *Fl. & Fr.*: Jan. March.

2. **Orobanche cernua** Loefl., Iter Hispan. 152. 1758. *O. nicotianae* Wight, Ill. Ind. Bot. 2: 179, t. 158. 1850; Hook. f., Fl. Brit. India 4: 326. 1884.

Herbs, erect, simple or branched, glabrous or puberulous, pale brown or bluish, 10-30 cm high. Scales ovate, acute or acuminate. Flowers in terminal, dense, cylindrical, short spikes; bracts lanceolate, 10-15 mm long; bracteoles absent. Calyx 10-12 mm long; lobes 2-fid up to middle, lanceolate. Corolla white with purple tinge, 12-18 mm long; lobes ovate, glabrous or puberulous above. Filaments glabrous. Capsules ellipsoid, 8-12 mm long.

Parasites on the roots of members belonging to families Brassicaceae and Solanaceae. Rewa. *Fl. & Fr.*: Feb. March.

102. LENTIBULARIACEAE

(R.C. Srivastava)

Four genera and about 245 species; cosmopolitan; one genus and 14 species in M.P.

UTRICULARIA L.

Herbs, annual or perennial, aquatic, terrestrial or epiphytic, scapigerous; stems modified to act as rhizoids, stolons or foliar organs. Leaves (foliar organs) in basal rosette and/or cauline, occasionally partly or wholly reduced, modified into bladder like traps for capturing and digesting small, aquatic organisms. Flowers in racemes; scapes erect or twining, with or without scales; bracts variable, basifixed, medifixed or variously produced below the point of attachment; bracteoles 2, almost always at the base of the pedicels, usually free, rarely connate with bracts. Calyx 2-lobed, usually accrescent; lobes usually free. Corolla bilabiate; upper lip entire or 2 to more-lobed; lower lip entire or 2-5-lobed, spurred, sometimes saccate. Stamens included, inserted at the base of upper lip; filaments short, linear, often curved, often flattened and dilated above; anthers elliptic, dorsifixed. Ovary globose or ovoid. Fruit a capsule, dehiscing by longitudinal slits, dorsiventral or rarely by lateral valves, pores or circumscissile or indehiscent, many-seeded. Seeds variously shaped and sculptured.

About 180 species; cosmopolitan especially tropical regions; 14 in M.P.

1a. Plants aquatic or semi-aquatic:

2a. Scapes without scales:

3a. Scapes with a whorl of spongy floats;
wings of seeds 1-2 cell layers thick ...12. *U. stellaris*

3b. Scapes without spongy floats; wings of
seeds 3-4 cell layers thick ...2. *U. aurea*

2b. Scapes with scales:

4a. Scapes slender: scale usually 1, near
the middle of the scape ...7. *U. exoleta*

4b. Scapes relatively stout: scales 2-3,
always in the upper half of the scape ...3. *U. australis*

1b. Plants terrestrial or epiphytic:

5a. Bracts medifixed:

6a. Leaves linear-spathulate; calyx-lobes
more or less equal; seeds not glochidiate ...6. *U. caerulea*

6b. Leaves orbicular-reniform; calyx-
lobes unequal; seeds glochidiate ...13. *U. striatula*

5b. Bracts basifixed:

7a. Corolla white or yellow:

8a. Scapes, pedicels and calyx hairy;
corolla white ...8. *U. hirta*

8b. Scapes, pedicels and calyx glabrous;
corolla yellow:

9a. Scapes erect, not twining; pedicels
recurved in fruit ...5. *U. bifida*

9b. Scapes twining; pedicels
suberect in fruit ...11. *U. scandens*

7b. Corolla pink, mauve, bluish purple,
purple or blue:

10a. Leaves covered with many
glandular hairs on abaxial
surface ...10. *U. pubescens*

10b. Leaves eglandular:

11a. Corolla purple; seeds conical,
truncate ...1. *U. arenaria*

11b. Corolla blue; seeds otherwise:

12a. Scapes twining:

13a. Leaves 1-nerved;
scales and bracts
ovate ...4. *U. huouleiensis*

13b. Leaves 3-nerved;
scales and bracts
lanceolate ...6. *U. caerulea*

12b. Scapes erect:

- 14a. Pedicels recurved in fruits; seed testa
longitudinally reticulate ...9. *U. polygaloides*
- 14b. Pedicels not recurved in fruits; seed testa with
subhexagonal, scrobiculate areoles ...14. *U. uliginosa*

Notes: P. Taylor (in Matthew, Fl. Tamilnadu 3(2): 1120, 1983) while describing *U. praeterita* P. Taylor from Tamilnadu mentioned its distribution in Madhya Pradesh too.

1. *Utricularia arenaria* A. DC. in DC., Prodr. 8: 20, 1844; Saxena in Indian For. 92: 493-494, 1966. *U. tribracteata* Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 18, 1850. *U. exilis* Oliver in J. Linn. Soc. Bot. 9: 154, 1867. *U. krikii* Stapf in Dyer, Fl. Cap. 4(2): 428, 1904.

Herbs, terrestrial; rhizoids short, capillary, simple, few to many fascicled at or just above scape base; stolon filiform. Leaves usually numerous at anthesis, 1-3 from near the scape base, others scattered on stolons, obovate-oblongate, entire, 1-nerved. Traps numerous, ovate, up to 1 mm long, stalked; mouth terminal. Scapes erect, 2-16 cm long, 1-5-flowered; scales few; bracts basifixed, 5-nerved. Calyx-lobes 1-2 mm long. Corolla purple. Seeds conical, truncate.

Rare. In boggy places. Hoshangabad. *Fl. & Fr.*: Sept. - Oct.

2. *Utricularia aurea* Lour., Fl. Cochinch. 26, 1790. *U. flexuosa* Vahl. Enum. Pl. 1: 198, 1804; C.B. Clarke in Hook. f., Fl. Brit. India 4: 329, 1884, p.p. *U. fasciculata* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 143, 1820.

Herbs, aquatic; stolons terete, much branched. Leaves numerous, multifid; ultimate segments capillary. Traps orbicular, either lateral or at the point of bifurcation. Scapes erect, long, without any floating vesicles; scales always absent; pedicels sharply reflexed in fruit; bracts basifixed, orbicular, rounded or subacute at apex; bracteoles absent. Calyx-lobes subequal, ovate. Corolla yellow. Capsules globose. Seeds lenticular-prismatic, 5-angled, minutely winged, reticulate.

Common in shallow water and swampy paddy fields. Bastar, Bilaspur, Chhatarpur, Damoh, Durg, Mandla, Panna, Raipur, Rajnandgaon, Sagar, Seoni, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Oct. - March.

3. *Utricularia australis* R. Br., Prodr. 430. 1810. *U. flexuosa* auct. non Vahl, 1804; C.B. Clarke in Hook. f., Fl. Brit. India 4: 329. 1884, p.p. et quoad syn. *U. australis* R. Br.

Herbs, aquatic; stolons filiform, branched. Leaves many, ovate to lanceolate. Traps numerous, lateral on leaf segments just above the bifurcation point, obliquely ovoid, ca 2 mm long, shortly stalked; mouth lateral. Scapes erect, straight, up to 15 cm long; scales 2-3 in upper half of the scape; bracts basifixed, orbicular, rounded; bracteoles absent. Calyx-lobes ovate or ovate-oblong, ca 3 mm long. Corolla yellow, ca 12 mm long, obscurely 3-lobed. Seeds angular, narrowly winged.

Rare. In shallow waters. Indore. *Fl. & Fr.*: March - April.

4. *Utricularia haouleensis* A. Chev. in Bull. Soc. Bot. Fr. Mem. 8. 1912. *U. scandens* auct. non Benj., 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 332. 1884.

Herbs, terrestrial; rhizoids few from the base of scape, capillary, up to 8 mm long. Leaves linear, acute to rounded, membranous, 1-nerved, not conspicuous at anthesis. Traps few, scattered on foliar organs and stolon branches, globose, ca 1 mm across, twining, shortly stalked; mouth basal. Scapes up to 20 cm long, 2-5-flowered, glabrous; scales few, distant. Calyx-lobes ovate, ca 2 mm long, obtuse or subacute. Corolla blue. Seeds ovoid or ellipsoid, corky, distinctly reticulate.

Rare. Along ponds and in paddy fields. Raipur. *Fl. & Fr.*: Sept. - Oct.

5. *Utricularia bifida* L., Sp. Pl. 18. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 332. 1884. *U. ramosa* Vahl, Enum. Pl. 1: 204. 1804; C.B. Clarke in Hook. f., Fl. Brit. India 4: 335. 1884.

Herbs, terrestrial; rhizoids filiform. Leaves linear, rounded at apex, membranous, 1-nerved. Traps reniform, scattered on rhizoids; mouth basal. Scapes erect, filiform, 2-5-flowered, glabrous; scales lanceolate; bracts basifixed, broadly ovate-oblong, obtuse; bracteoles linear. Calyx-lobes unequal, broadly ovate. Corolla yellow. Capsules broadly ellipsoid. Seeds ovoid, rugose.

In marshy places. Balaghat, Bilaspur, Durg, Raigarh, Surguja. *Fl. & Fr.*: Aug. - April.

6. *Utricularia caerulea* L. *emend.* Burm. *f.*, Fl. Ind. 11. 1768. *U. racemosa* Wallich *ex* Walp. in Meyen, *Observ. Bot.* 19: 401. 1843; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 333. 1884 *incl. var. filicaulis* C.B. Clarke. *U. roseo-purpurea* Stapf *ex* Gamble, Fl. Madras 2: 983. 1924.

Herbs, terrestrial. Leaves linear-spathulate, 3-nerved. Traps ovoid-obovoid; mouth basal. Scapes erect or twining, 5-7-flowered, filiform, glabrous; scales many, medifixed; pedicels recurved in fruit; bracts variable, medifixed or basifixed; bracteoles smaller. Calyx-lobes subequal, ovate, obtuse. Corolla pink, mauve, purple or blue. Capsules globose with persistent calyx. Seeds ovoid or oblong-ellipsoid, smooth or papillose, reticulate.

- 1a. Scapes erect; bracts medifixed; seeds oblong-ellipsoid ...6.1. var. *caerulea*
 1b. Scapes twining; bracts basifixed; seeds ovoid ...6.2. var. *graminifolia*

6.1. var. *caerulea*

In mud, Balaghat, Bilaspur, Raigarh, Rajnandgaon, Surguja. *Fl. & Fr.*: Sept. - April.

6.2. var. *graminifolia* (Vahl) Bhattacharyya in Bull. Bot. Soc. Bengal 30: 73-87. 1976. *U. graminifolia* Vahl, Enum. Pl. 1: 195. 1804.

Along stream, Bastar, Hoshangabad, Surguja. *Fl. & Fr.*: Sept. - April.

7. *Utricularia exoleta* R. Br., Prodr. 430. 1810; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 329. 1884. *U. gibba* subsp. *exoleta* (R. Br.) Taylor in Mitt. Bot. Staat. Munch. 4: 101. 1961 & in Kew Bull. 18: 204. 1964.

Herbs, aquatic, free-floating; stolons terete, much branched. Leaves numerous, alternate on stolons, capillary, forked; ultimate segments few, glabrous or very sparsely setulose. Traps ovate to reniform; mouth lateral; upper lip with 2, branched appendages. Scapes erect; filiform, 2-3-flowered; scale 1, near the middle of the scape; bracts basifixed; bracteoles absent. Flowers pedicellate. Calyx-lobes subequal. Corolla yellow. Capsules globose. Seeds lenticular, winged, smooth.

Common in shallow stagnant water and water logged fields. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Indore, Mandla, Raipur, Rajnandgaon, Shahdol, Shivpuri, Tikamgarh. *Fl. & Fr.*: Sept. - April.

8. *Utricularia hirta* Klein ex Link in Jahrb. 1. 3: 55. 1820; C.B. Clarke in Hook. *f.* Fl. Brit. India 4: 332. 1884.

Herbs, terrestrial; rhizoids sparsely branched. Leaves obovate-spathulate, flat, obtuse, 1-nerved. Traps reniform, stalked; mouth lateral, with few gland-tipped hairs. Scapes erect, 1-5-flowered, hairy; scales many, lanceolate; pedicels hairy; bracts basifixed; bracteoles linear-lanceolate. Calyx-lobes ovate, subequal, hairy. Corolla white. Capsules globose. Seeds globose, reticulate.

Rare. In marshy places. Surguja. *Fl. & Fr.*: Dec. - Jan.

9. *Utricularia polygaloides* Edgew. in Proc. Linn. Soc. 1: 351. 1847; Basak in *Taxon* 25: 189. 1976. *U. reticulata* Sm. var. *uliginosa* C.B. Clarke in Hook. *f.* Fl. Brit. India 4: 331. 1884. *U. stricticaulis* Stapf ex Gamble, Fl. Madras 2: 981. 1924.

Herbs, terrestrial; rhizoids filiform. Leaves linear, very narrow, 1-nerved. Traps rotundate, borne on foliar organs and stolons. Scapes rather stout, 3-10-flowered; scales ovate; pedicels winged; bracts basifixed, ovate; bracteoles linear. Calyx-lobes subequal, acute, persistent in fruit. Corolla blue; lower lip suborbicular, ca 6 mm across, acute; spur conical. Capsules ovoid. Seeds obovoid, longitudinally reticulate.

Rare. In marshy places. Durg. *Fl. & Fr.*: Dec. - April.

10. *Utricularia pubescens* Sm. in Rees, Cycl. 37. n. 53. 1818.

Herbs, terrestrial; rhizoids few from near the base of scape and petioles, simple, capillary. Leaves many, one arising from scape base, rest scattered on stolon, orbicular, peltate, horizontal, fleshy, many-nerved, with many glandular hairs on abaxial surface. Traps numerous, scattered on rhizoids, stolons and petioles, almost globose, up to 0.8 mm across, stalked. Scapes erect, filiform, up to 30 cm high; bracts basifixed. Calyx-lobes ovate, 1.5-2.5 mm long, setulose, papillose or glabrous. Corolla bluish purple. Seeds orbiculate.

Rare. Among grasses and sedges in boggy open ground near sal forests. Hoshangabad. *Fl. & Fr.*: Sept. - Oct.

11. *Utricularia scandens* Benj. in *Linnaea* 20: 309. 1847. *U. wallichiana* auct. non Benj., 1845; Wight, *Icon. Pl. Ind. Orient.* 4: t. 1572. 1850; C.B. Clarke in Hook. *f.* *Fl. Brit. India* 4: 332. 1884.

Herbs, terrestrial; rhizoids numerous from base and often fasciculate from several additional points shortly above the base, capillary. Leaves linear, spatulate, membranous. Traps scattered on stolons and leaves, globose, ca 0.6 mm across; mouth basal. Scapes twining, 3-35 cm high; pedicels suberect in fruit; scales and bracts broadly ovate, basifixed; bracteoles linear-lanceolate. Calyx-lobes ovate, 2.5-3 mm long. Corolla yellow, 5-9 mm long. Seeds broadly ellipsoid, reticulate.

Common in boggy areas near stream in sal forests. Bhopal, Hoshangabad, Raigarh, Raipur, Shahdol, Surguja. *Fl. & Fr.*: Dec. - March.

12. *Utricularia stellaris* L. *f.*, *Suppl. Pl.* 86. 1782, non Benth., 1869; C.B. Clarke in Hook. *f.* *Fl. Brit. India* 4: 328. 1884.

Herbs, aquatic, free-floating; all parts submerged, except the inflorescence; stolons terete, filiform. Leaves whorled, multifid; ultimate segments capillary. Traps suborbicular or obliquely ovoid; mouth lateral; upper lip with 2 appendages. Scapes erect, slender, 4-12-flowered, with a whorl of ellipsoid, white, spongy floats above the middle; floats with filiform, external pinnules at their apices; pedicels deflexed in fruit; scales and bracteoles absent; bracts basifixed. Calyx-lobes unequal, accrescent. Corolla yellow. Capsules globose. Seeds prismatic, narrowly winged.

Occasional in shallow ponds, ditches and stagnant water tanks. Bhopal, Dhar, Durg, Raipur, Rewa, Seoni. *Fl. & Fr.*: Dec. - March.

13. *Utricularia striatula* Sm. in Rees, *Cycl.* 37. n. 17. 1819. *U. orbiculata* Wallich ex A. DC. in DC., *Prodr.* 8: 18. 1844; C.B. Clarke in Hook. *f.* *Fl. Brit. India* 4: 334. 1884.

Herbs, epiphytic or terrestrial; rhizoids few, filiform; stolons capillary, branched. Leaves orbicular-reniform, membranous. Traps borne on stolons, obliquely globose or ovoid, stalked; mouth lateral; upper lip with 2, divergent, glandular appendages. Scapes erect, filiform, glabrous; scales similar to bracts; bracts medifixed; pedicels reflexed in fruit. Calyx-lobes unequal, obtuse. Corolla pale blue with white and orange spots; spur curved under the lower lip. Capsules more or less globose. Seeds ovoid, glochidiate.

Rare. On moist mossy bark and hill slopes. Hoshangabad. *Fl. & Fr.*: June - Oct.

14. *Utricularia uliginosa* Vahl, Enum. Pl. 1: 203. 1804. *U. affinis* Wight in Hook., J. Bot. Kew Gard. Misc. 1: 373. 1849 & Icon. Pl. Ind. Orient. t. 1580. f. 1. 1850; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 330. 1884. *U. griffithii* Wight, Icon. Pl. Ind. Orient. t. 1576. 1850. *U. affinis* var. *griffithii* (Wight) Oliver in J. Linn. Soc. Bot. 3: 179. 1859; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 331. 1884.

Herbs, terrestrial; rhizoids few, filiform; stolons capillary, branched. Leaves spatulate, 1-3-nerved, inconspicuous at anthesis. Traps on stolons and foliar organs, globose; mouth basal; upper lip with 2, simple appendages. Scapes simple or branched, 3-6-flowered, glabrous, terete; pedicels winged; scales, bracts and bracteoles basifixed. Calyx-lobes subequal, broadly ovate to orbicular, minutely denticulate; lower lobe shortly 2-fid. Corolla pale blue; spur slightly deflexed. Capsules depressed globose. Seeds subglobose, reticulate.

Among grasses at moist places in sal forests. Bastar, Hoshangabad. *Fl. & Fr.*: Sept. - March.

103. GESNERIACEAE

(A.N. Singh)

About 146 genera and 2400 species; tropical regions especially of Old World; 4 genera and 4 species in M.P.

- 1a. Flowers solitary or in axillary or terminal, simple, subumbellate or subcapitate cymes:
 - 2a. Flowers solitary or in subumbellate or simple cymes; capsules linear, much exceeding the calyx, loculicidal:
 - 3a. Leaves densely villous; anthers with a tuft of hairs on back; capsules sessile ...1. *Chirita*
 - 3b. Leaves sparsely pubescent; anthers without a tuft of hairs on back; capsules stalked ...2. *Didymocarpus*

- 2b. Flowers in congested, subcapitate cymes;
capsules globose, hardly exceeding the
calyx, circumscissile ...3. *Epithema*
- 1b. Flowers in terminal racemes ...4. *Rhynchoglossum*

1. CHIRITA Buch.-Ham. ex D. Don

Herbs or undershrubs; stems short or long, unbranched or branched. Leaves 2, opposite, sometimes alternate or whorled, orbicular, elliptic or ovate, unequal, villous, sessile. Flowers solitary or in axillary, few to many-flowered cymes; bracts 2, minute. Calyx small, 5-lobed; lobes acute. Corolla tubular or infundibuliform, bilabiate, 5-lobed; lobes rounded. Perfect stamens 2; filaments flattened, geniculate; anthers 2-celled, divaricate. Staminodes 2-3. Ovary linear; style short or long; stigma peltate, oblique. Fruit a capsule, linear, elongate, sessile, 2-valved; valves 2-partite. Seeds ellipsoid, smooth.

About 77 species; Indo-Malesia; one in M.P.

Chirita bifolia D. Don, Prodr. Fl. Nepal. 90. 1825; C.B. Clarke in Hook. f., Fl. Brit. India 4: 357. 1884.

Herbs, erect, 5-15 cm high; rhizomes elongated or tuberous, hairy; stems with 1-2 small, bract like leaves in the middle. Leaves orbicular; larger leaf 3-5 cm long; smaller leaf 1-3.5 cm long, sometimes suppressed, cordate at base, serrate, densely villous. Peduncles 1-2 between the leaves, 2-fid, *ca* 2.5 cm long; bracts 6-7 mm long, villous. Flowers solitary; pedicels 8-12 mm long, pubescent. Calyx 10-13 mm long, subcorollaceous; lobes lanceolate, 8-9 mm broad. Corolla purple-blue above, yellowish below, 3.5-5 cm long, ventricose above the calyx. Capsules sessile.

Amidst grasses on hill slopes. Hoshangabad. *Fl. & Fr.*: Aug. Sept.

2. DIDYMOCARPUS Wallich, *nom. cons.*

Herbs, erect or creeping, caulescent or acaulescent; stems rhizomatous. Leaves opposite, alternate or crowded at base or solitary. Flowers in axillary, pedunculate, subumbellate or subracemose cymes, small or large; bracts inconspicuous. Calyx small, 5-lobed. Corolla campanulate or tubular, asymmetrical at mouth, bilabiate, 5-lobed; lobes unequal, rounded. Perfect stamens 2; filaments curved; anthers coherent, 2-celled. Staminodes 2-3.

Ovary 1-locular; ovules indefinite; style slender; stigma capitate or peltate, emarginate. Fruit a capsule, linear, dehiscent loculicidally, 2-valved. Seeds ellipsoid, minutely reticulate.

About 150 species; Madagascar, Indo-Malesia and from S.E. Asia to tropical Australia; one in M.P.:-

Didymocarpus pygmaea C.B. Clarke in A. DC., Monogr. Phan. 5: 82. 1883 & in Hook. f., Fl. Brit. India 4: 345. 1884. Fig. 44.

Herbs, annual, small, pubescent; stems straight or curved, 3-8 cm long. Leaves usually solitary, elliptic or oblong, 2-8 x 1.2-6.5 cm, cordate at base, crenate, membranous, sessile; secondary nerves 6-9; sometimes a short stem above the single leaf bearing 1-2 subopposite or alternate, unequal leaves. Flowers 1-9, in subumbellate cymes; pedicels 0.8-1.5 cm long. Calyx-lobes linear, 2-5 mm long. Corolla white, tubular, 2-5 mm long. Capsules 1-1.8 cm long, acuminate. Seeds ellipsoid.

In mixed forests on hill slopes and in rock crevices. Balaghat, Chhatarpur, Hoshangabad, Panna, Rajnandgaon, Rewa. *Fl. & Fr.*: Aug. Oct.

3. EPITHEMA Blume

Herbs, succulent, pubescent. Leaves opposite or alternate, variable. Flowers in congested, dense, subcapitate cincinni; bracts present, solitary, large. Calyx campanulate, 5-lobed; lobes acute. Corolla bilabiate; upper lip 2-lobed or emarginate; lower lip 3-lobed; tube terete, short. Stamens exerted, adnate above the middle of corolla-tube, 2 posterior ones fertile. Staminodes 2. Disk glabrous, 2-lobed, enclosing the ovary. Ovary hairy, 1-locular; style glabrous; stigma capitate. Fruit a capsule, globose, circumscissile. Seeds ellipsoid, spirally reticulate.

About 10 species; tropical regions of Old World; one in M.P.

Epithema carnosum (G. Don) Benth., Scroph. Ind. 57. 1835; C.B. Clarke in Hook. f., Fl. Brit. India 4: 369. 1884. *Aikinia carnosa* G. Don. Gen. Hist. 4: 665. 1837-1838.

Herbs, erect; stems pubescent. Leaves variable in shape and size; lower ones ovate-cordate, 8-12 cm long, acute or obtuse at apex, cordate or

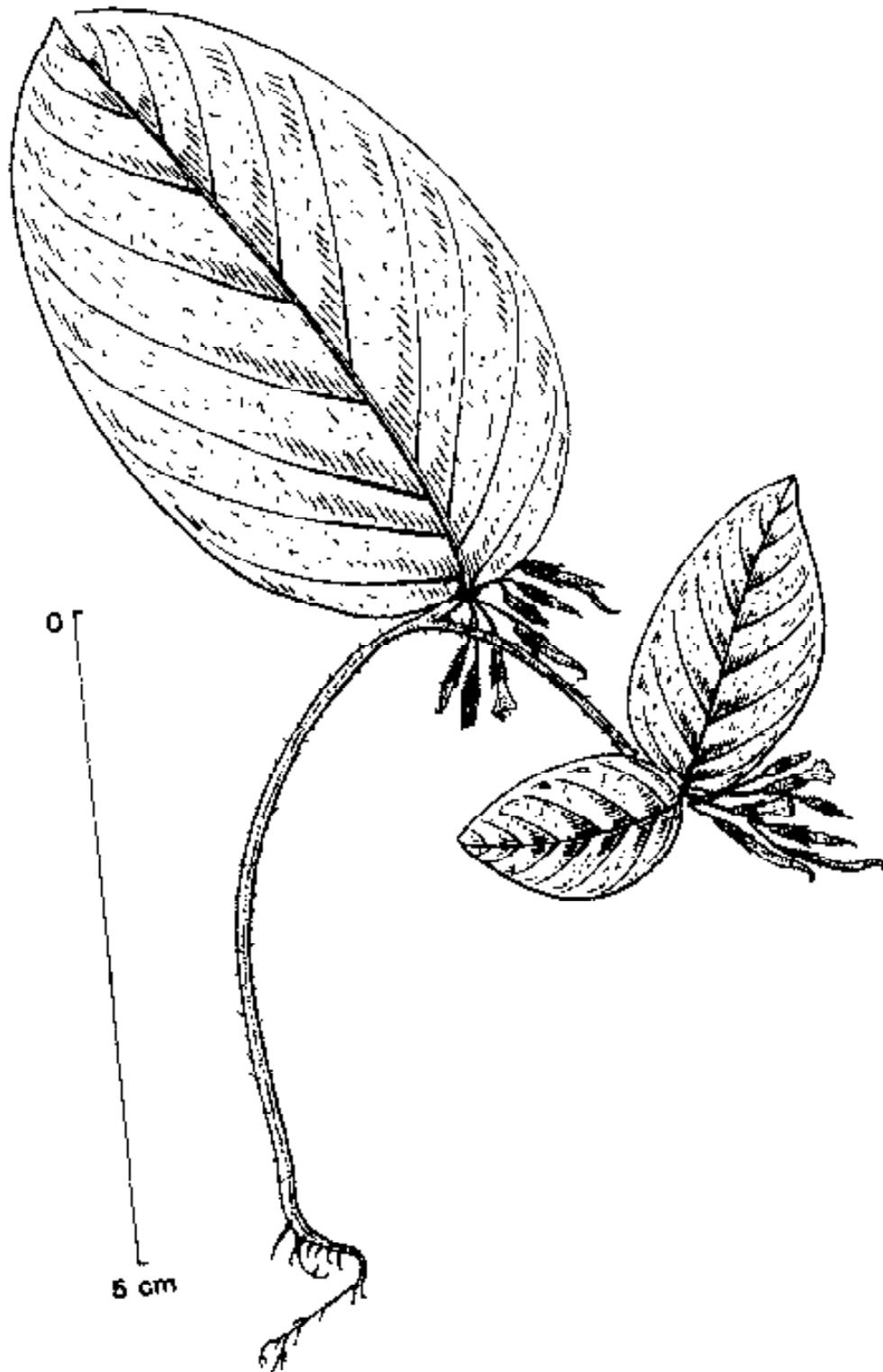


Fig. 44. *Didymocarpus pygmaea* C. B. Clarke

truncate at base, serrate; upper ones much smaller. Flowers in terminal, congested, subcapitate, scorpioid cymes; bracts broadly ovate, serrate-dentate. Calyx-lobes lanceolate, scabrous. Corolla blue; lobes glabrous; tube white. Capsules enclosed within calyx.

Bastar (Subramanyam and Henry, 1966), Chhindwara (Saxena and Shukla, 1970). *Fl. & Fr.*: Aug. - Dec.

4. RHYNCHOGLOSSUM Blume

Herbs, erect. Leaves alternate, unequal in size; larger ones persistent; smaller ones subulate, fugacious. Flowers in terminal racemes, ebracteate or with minute, linear bracts. Calyx campanulate, 5-lobed. Corolla tubular, bilabiate, 5-lobed; upper lip short, 2-lobed; lower lip much longer, shallowly 3-lobed; tube contracted at the mouth. Perfect stamens 2, adnate near the middle of corolla-tube, included; filaments glabrous. Staminodes 2-3. Disk-glabrous, annular or cupular. Ovary and style glabrous; stigma capitate. Fruit a capsule, oblong or ovoid, 2-valved. Seeds minutely reticulate or smooth.

About 13 species; S.E. Asia and S. America; one in M.P.

Rhynchoglossum obliquum Blume, Bijdr. 741. 1826; C.B. Clarke in Hook. f., Fl. Brit. India 4: 367, 1884.

Herbs, succulent. Leaves elliptic-oblong, acuminate at apex, unequal at base, cordate on one side, membranous, glabrous. Flowers in terminal racemes; rachis glabrous; bracts subulate. Calyx-lobes deltoid, acute, not winged. Corolla blue, tubular; upper lip emarginate, short; lower lip larger, 3-lobed. Capsules ovoid. Seeds ellipsoid, smooth.

Shahdol (Saxena, 1970). *Fl. & Fr.*: Aug. - Oct.

104. BIGNONIACEAE

(K.K. Khanna & Ram Saran)

About 112 genera and 725 species; tropical regions especially S. America: 17 genera and 18 species in M.P.

- 1a. Liana, climbing shrubs or vines:
- 2a. Leaves pinnately compound ...16. *Tecomaria*
- 2b. Leaves 2-foliolate:
- 3a. Tendrils simple; corolla purple or red ...2. *Cydista*
- 3b. Tendrils 3-fid; corolla yellow or orange:
- 4a. Leaves 4-6 cm long; panicles terminal; corolla orange ...10. *Pyrostegia*
- 4b. Leaves more than 6 cm long; panicles axillary; corolla yellow ...7. *Macfadyena*
- 1b. Erect shrubs or trees:
- 5a. Shrubs or small trees:
- 6a. Flowers cauliflorous, borne on larger branches or trunk; fruit a berry, globose; seeds wingless ...1. *Crescentia*
- 6b. Flowers acauliflorous; fruit a capsule, linear or linear-oblong; seeds winged:
- 7a. Leaves simple, entire; capsules 20-30 cm long ...17. *Tecomella*
- 7b. Leaves pinnately compound; leaflets serrate; capsules up to 16 cm long:
- 8a. Corolla orange-red, infundibuliform, 4-lobed ...16. *Tecomaria*
- 8b. Corolla bright yellow, campanulate, 5-lobed ...15. *Tecoma*
- 5b. Large trees:
- 9a. Leaves palmately 5-foliolate; corolla rosy-pink ...14. *Tabebuia*
- 9b. Leaves pinnately compound; corolla otherwise:
- 10a. Corolla blue-violet; capsules ovate-orbicular, ca 7 cm long ...5. *Jacaranda*
- 10b. Corolla never blue; capsules oblong or linear, more than 15 cm long:

- 11a. Leaves 1-pinnate:
- 12a. Calyx spathaceous:
- 13a. Corolla white; capsules linear;
seeds corky-winged ...3. *Dolichandrone*
- 13b. Corolla red; capsules oblong-lanceolate;
seeds membranous-winged ...12. *Spathodea*
- 12b. Calyx not spathaceous:
- 14a. Inflorescence often drooping; corolla
pale yellow, dull purple or red, bilabiate:
- 15a. Corolla pale yellow or dull
purple; capsules curved, 0.5-2 cm
broad; seeds winged ...13. *Stereospermum*
- 15b. Corolla red; capsules
straight, more than 2 cm
broad; seeds wingless ...6. *Kigelia*
- 14b. Inflorescence erect; corolla
cream-coloured, not bilabiate ...4. *Heterophragma*
- 11b. Leaves 2-3-pinnate:
- 16a. Calyx woody in fruit; corolla maroon;
stamens 5 ...9. *Oroxylum*
- 16b. Calyx not woody in fruit; corolla white
to yellow; stamens 4:
- 17a. Leaflets sinuate-dentate;
inflorescence glabrous; capsules up
to 30 cm long ...8. *Millingtonia*
- 17b. Leaflets entire or coarsely
serrate; inflorescence tomentose;
capsules 50-100 cm long ...11. *Radermachera*

Notes: *Bignonia magnifica* Bull. is sometimes cultivated in gardens (Khanna *et al.*, 1991).

1. CRESCENTIA L.

Small trees. Leaves simple or 3-foliolate, borne in alternate fascicles on thick branches. Flowers cauliflorous, borne on the trunk and older

branches. Calyx large, bilabiate, not spathaceous. Corolla of variable colour, usually with a transverse fold in throat; lobes acuminate. Stamens 4, subexserted. Ovary 1-locular; ovules multiseriate on 4 parietal placentae. Fruit a berry, more or less globose, large, with hard woody shell. Seeds small, flat, wingless, embedded in pulp.

Six species; tropical America, often cultivated elsewhere; one in M.P.

Crescentia cujete L., Sp. Pl. 626. 1753.

Small trees, ca 4 m high. Leaves simple as well as 3-foliolate, fascicled, obovate, of variable size, 5-20 x 2-7 cm, acute at apex, attenuate at base, chartaceous, glabrous above, pubescent beneath along midrib. Calyx bilabiate up to base, glabrous. Corolla with combination of green, purple, red and yellow with dull purple lines, tubular, fleshy; lobes deltoid. Disk annular-pulvinate. Berries globose. Seeds thin.

Cultivated. Bhopal (Oomnathan, 1977). *Fl. & Fr.*: March - July.

2. CYDISTA Miers

Liana; branchlets terete or 4-angled. Leaves simple or 2-foliolate, obtuse or shortly acuminate at apex, rounded to broadly cuneate at base, sometimes with a simple tendril; pseudostipules foliaceous or absent. Flowers in terminal or axillary racemes, sometimes in few-flowered panicles. Calyx cupular, irregularly bilabiate, truncate, subhirsute, not spathaceous. Corolla tubular to infundibuliform. Stamens 4, didynamous. Ovary narrowly cylindrical; ovules 2-seriate. Disk absent. Fruit a capsule, linear, compressed, not echinate. Seeds flat, with thin wings; wings undifferentiated from the seed body.

Four species; tropical America; one in M.P.

Cydista aequinoctialis (L.) Miers, Proc. Roy. Hort. Soc. 3: 191. 1863.
Bignonia aequinoctialis L., Sp. Pl. 623. 1753.

Shrubs, climbing. Leaves 2-foliolate; leaflets ovate to elliptic-lanceolate, 6-15 x 4-8 cm, shining green, membranaceous to chartaceous, pubescent with simple hairs; tendrils simple; pseudostipules absent or inconspicuous. Flowers in terminal or axillary panicles, fragrant. Calyx truncate or shallowly 5-lobed. Corolla purple or red with maroon lines.

glabrous. Capsules flattened, round-tipped. Seeds with brown, membranaceous wings.

Cultivated. Bhopal (Oommachan, 1977), Jabalpur (Oommachan and Shrivastava, 1996). *Fl. & Fr.*: Nov. - March.

3. DOLICHANDRONE (Fenzl) Seem., *nom. cons.*

Trees. Leaves 1-pinnate, opposite; leaflets entire. Flowers in terminal, few-flowered racemes or panicles, large, nocturnal, fragrant. Calyx spathaceous, containing watery fluid, curved, caducous. Corolla more or less hypocrateriform, with a widened, campanulate upper portion and a narrow, long tube; lobes 5, subequal, rounded, crisped. Stamens 4, didynamous, equally inserted at the base of swollen portion of tube; anthers glabrous, very large, 2-celled. Staminodes small. Disk annular, cushion like. Ovary linear-oblong, 2 locular with 2, false septa, appearing 4-locular; ovules inserted on 2 placentae in each locule; style slender; stigma 2-lipped. Fruit a capsule, linear, subcylindrical to compressed, curved, many-seeded. Seeds corky, winged.

About 9 species; E. Africa to New Caledonia; one in M.P.

Dolichandrone falcata (Wallich ex DC.) Seem. in J. Bot. 8: 381. 1870; C.B. Clarke in Hook. f., Fl. Brit. India 4: 380. 1884, *excl. syn. Bignonia atrovirens* Heyne ex Roth. *Spathodea falcata* Wallich ex DC., Prodr. 9: 206. 1845; *Dolichandrone lawii* Seem. in J. Bot. 8: 380. 1870; C.B. Clarke in Hook. f., Fl. Brit. India 4: 380. 1884. *D. falcata* var. *lawii* Haines, Bot. Bihar Orissa 4: 658. 1922.

Trees, deciduous, 6-8 m high; young parts pubescent or shortly villous. Leaflets 5-7, opposite, obovate or suborbicular, 2-5 x 1.5 cm, rounded or shortly acute at apex, cuneate or rounded at base, glabrous or pubescent. Flowers in racemes; pedicels ca 1 cm long. Calyx stellately pubescent. Corolla white, ca 2.5 cm long; lobes obovate-oblong, with undulate-crisped margin; tube narrow at base, gradually enlarging upwards. Capsules flat, falcately curved, 30-40 cm long, acuminate, glabrescent, green, turning black on ripening.

In dry places, sometimes in black soil. Chhatarpur, East Nimar, Hoshangabad, Indore, Raigarh, Shivpuri, West Nimar. *Fl. & Fr.*: March - June.

The plant is considered as abortifacient. Bark is used as fish poison.

4. HETEROPHRAGMA DC.

Trees. Leaves large, 1-pinnate. Flowers in terminal, woolly panicles, large. Calyx campanulate, irregularly 3-5-lobed. Corolla tubular-ventricose; lobes 5, rounded, subequal. Stamens 4, didynamous, included; filaments hairy at base. Disk cushion-shaped. Ovary sessile; ovules numerous, many-seriate on each placenta; style long; stigma 2-lobed. Fruit a capsule, elongate, cylindrical or more or less compressed, falcate or twisted, loculicidally 2-valved. Seeds compressed, with a membranous wing at each end.

Two species; S.E. Asia; one in M.P.

Heterophragma quadriloculare (Roxb.) K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 243. 1895. *Bignonia quadrilocularis* Roxb., Pl. Coromandel 2: 24, t. 145. 1800. *Heterophragma roxburghii* DC., Prodr. 9: 210. 1845; C.B. Clarke in Hook. f., Fl. Brit. India 4: 381. 1884.

Trees, ca 10 m high; young parts pubescent. Leaves 20-30 cm long; leaflets 7-11, elliptic-oblong, 8-10 x 3-4 cm, obtuse at apex, entire or serrulate, pubescent when young, glabrous with age. Flowers in many-flowered panicles, fragrant. Calyx ca 1.5 cm long, densely tomentose outside, not spathaceous. Corolla cream-coloured, ca 5 cm long, hairy at throat. Capsules linear, ca 30 cm long, pointed, straight.

Extremely rare. Bastar. Fl. & Fr.: Jan. - June.

5. JACARANDA Juss.

Trees, deciduous. Leaves 2-pinnate, opposite; leaflets numerous, serrate. Flowers in terminal or axillary panicles, sometimes in defoliated leaf axils, showy. Calyx shortly 5-toothed. Corolla campanulate or infundibuliform, blue; upper lip 2-lobed; lower lip 3-lobed; lobes spreading; tube constricted above the base or not, widened upwards, curved. Stamens 4, didynamous, included. Staminodes present, long. Disk present. Ovary oblong; stigma oblong. Fruit a capsule, compressed, dehiscing by 2 valves. Seeds flat, winged.

About 30 species; tropical America; one in M.P.

Jacaranda mimosaeifolia D. Don in Bot. Reg. 8. t. 631. 1822. *J. ovalifolia* R. Br. in Curtis, Bot. Mag, 49. t. 2327. 1822. - Nilgulmohar.

Trees, 6-8 m high. Leaves 18-30 cm long; rhachis grooved; pinnae ca 20 pairs, opposite; leaflets 12-26 pairs, with an odd one, oblong to rhomboid; terminal one linear-lanceolate, 10-11 x 2-3 mm, cuspidate. Flowers in lax, terminal panicles. Calyx 5-toothed. Corolla blue-violet, infundibuliform, densely hairy; lobes more or less equal; tube curved below. Capsules ovoid-orbicular, ca 7 cm long, flat, woody.

Commonly planted in gardens and along roads as avenue tree. Balaghat, Bilaspur, Chhatarpur, Indore, Rajnandgaon, Surguja. *Fl. & Fr.*: March - June.

6. KIGELIA DC.

Trees, evergreen. Leaves imparipinnate, opposite or ternate. Flowers in terminal, large, pendulous panicles. Calyx campanulate, coriaceous, at first entirely closed, afterwards more or less irregularly splitting, containing a watery fluid, 2-5-lobed. Corolla infundibuliform above the narrow base, bilabiate; upper lip 2-lobed; lower lip 3-lobed. Stamens 4. Staminodes rather large. Disk present. Fruits oblong, sausage-shaped, very large, pendulous, oblong, hard walled, indehiscent. Seeds obovoid, wingless, embedded within pulp.

A monotypic genus; native of tropical Africa, cultivated elsewhere.

Kigelia africana (Lam.) Benth. in Hook. f., Niger Fl. 463. 1849. *Bignonia africana* Lam., Encycl. 1: 424. 1785. *Crescentia pinnata* Jacq., Collectanea 3: 203. t. 18. 1789. *Tecoma africana* G. Don, Gen. Hist. 4: 224. 1837-1838. *Kigelia pinnata* (Jacq.) DC., Prodr. 9: 247. 1845. *K. aethiopica* (Fenzl) Decne. in Deless., Icon. Sel. Pl. 5: 39. t. 93. 1846. *Jharfanoos*

Trees, much branched, 10-15 m high. Leaves decussate or ternate, 20-50 cm long; leaflets 5-9, ovate-oblong to elliptic-ovate, 4-12 x 2-6 cm, acute or mucronate at apex, often oblique at base, entire, coriaceous, scabrid, glabrous or pubescent on nerves. Flowers in lax panicles; nocturnal. Calyx greenish, glabrous. Corolla dark wine-red, 5-10 cm long; throat wide; basal tube as long as the calyx. Fruits 25-40 cm long.

Often cultivated in gardens. Bilaspur, Indore, Raipur, Seoni. *Fl. & Fr.*: March - Dec.

7. MACFADYENA A. DC.

Liana with adventitious roots from the nodes; roots with swollen tubers. Leaves 2-foliolate, opposite, often with a 3-fid, uncate tendril; pseudostipules small, lanceolate to ovate. Flowers solitary or in axillary, contracted cymes or panicles. Calyx campanulate, membranaceous, irregularly lobed; apicule incurved or absent. Corolla yellow, puberulous, bilabiate, 5-lobed. Stamens 4, didynamous. Ovary linear-oblong, glabrous or subpuberulous; ovules 2-4-seriate on axile placentae in each locule. Disk annular-pulvinate. Fruit a capsule, linear, compressed. Seeds thin, winged; wings not sharply demarcated from seed body.

About 4 species; tropical America; one in M.P.

Macfadyena unguis-cati (L.) A.H. Gentry in *Brittonia* 25: 236. 1973 & *Ann. Miss. Bot. Gard.* 60: 874. 1973. *Bignonia unguis-cati* L., *Sp. Pl.* 623. 1753. *B. gracilis* Lodd., *Bot. Cab.* 18(1): t. 1705. 1831.

Shrubs, climbing; branchlets terete, glabrous to puberulous. Leaflets ovate or oblong, 6.5-15 x 1.5-6 cm, acute to acuminate or mucronate at apex, rounded at base, glaucous; pseudostipules ovate, longitudinally striate. Flowers in axillary panicles. Calyx cupular, membranaceous. Corolla bright yellow with orange lines in throat, tubular-campanulate. Capsules narrowly linear, flattened, with leathery valves. Seeds with membranaceous wings.

Cultivated in gardens. Bhopal (Oommachan, 1977), Jabalpur (Oommachan and Shrivastava, 1996). *Fl. & Fr.*: Oct. - May.

8. MILLINGTONIA L. f.

Trees, evergreen or deciduous; bark corky. Leaves imperfectly 2-3-pinnate, opposite. Flowers in terminal, lax, many-flowered panicles, fragrant, nocturnal. Calyx small, cupular, persistent, shortly 5-lobed. Corolla hypocrateriform, glabrous, 5-lobed; tube long, thin, widening towards the limb. Stamens 4, didynamous, shortly exserted; anthers with one fertile cell, other rudimentary. Staminodes small or absent. Disk cupular, crenate. Ovary linear-oblong; style filiform; stigma 2-lobed. Fruit

a capsule, linear, compressed parallel to the septum, dehiscing septicidally by 2 valves; valves flat. Seeds flat, thinly discoid, winged.

A monotypic genus: S.E. Asia and Malesia.

Millingtonia hortensis L. *f.*, *Suppl. Pl.* 291. 1782; C.B. Clarke in *Hook. f.*, *Fl. Brit. India* 4: 377. 1884. - *Akash neem*, *Neem chameli*.

Trees, 8-10 m high; bark rough, cracking; young shoots pubescent. Leaves 40-50 cm long; leaflets 5-7, ovate-elliptic, 3.5-7 x 2-4.5 cm, acuminate at apex, cuneate-truncate at base, sinuate-dentate, glabrous. Flowers in widely branched, erect panicles. Calyx truncate; lobes short. Corolla bright white; lobes ovate, unequal; tube cylindrical, slender. Capsules up to 30 cm long.

Planted on roadsides and in gardens. Chhatarpur, Dhar, Gwalior, Indore, Raigarh. *Fl. & Fr.*: Dec. May.

The bark is considered as antipyretic and also used to relieve bodyache.

9. OROXYLUM Venten.

Trees. Leaves large, 2-3-pinnate, opposite; leaflets entire or dentate-serrate. Flowers in terminal, large, long pedunculate racemes, bracteate. Calyx campanulate, persistent, not articulated, coriaceous, truncate or shallowly lobed. Corolla infundibuliform, thick, fleshy, 5-lobed; lobes crisped, subequal. Stamens 5, subequal, inserted above the middle of corolla, not or only slightly exerted from the throat; filaments in 2, unequal pairs, 5th shorter; anthers glabrous, 2-celled. Disk large, not surrounding the base of ovary. Ovary linear-oblong, 2-locular; stigma 2-lipped. Fruit a capsule, large, broadly linear, sword-shaped, flatly compressed parallel to the septum, many-seeded. Seeds discoid, with membranous wings.

A monotypic genus; Indo-Malesia.

Oroxylum indicum (L.) Venten., *Dec. Gen.* Nov. 8. 1808; C.B. Clarke in *Hook. f.*, *Fl. Brit. India* 4: 378. 1884. *Bignonia indica* L., *Sp. Pl.* 625. 1753. *B. pentandra* Lour., *Fl. Cochinch.* 2: 379. 1790. *Spathodea indica* Pers., *Syn. Pl.* 2: 173. 1806. *Calosanthes indica* Blume, *Bijdr.* 760. 1826. - *Arlu*, *Saona*, *Ullu*.

Trees, 10-15 m high, irregularly branched. Leaves usually tufted towards twig end, long petiolate; leaflets ovate-elliptic, 7-13 x 4-9 cm, acuminate at apex, entire or coarsely serrate-dentate, shining, dark green above. Flowers solitary on a tubercle, arranged in erect racemes; peduncles ca 40 cm long. Calyx dirty violet, campanulate, 3-5 cm long, turning woody in fruit. Corolla deep maroon, 5-7 cm long, glandular inside; lobes obovate, sparsely toothed. Disk shallowly 5-lobed. Capsules flat, pendent, 50-75 x 6-9 cm, tapering at both ends.

In mixed forests. Bastar, Chhatarpur, Raipur, Seoni. *Fl. & Fr.*: June - March.

Seeds are sometimes eaten.

10. PYROSTEGIA K. Presl

Liana. Leaves 2-foliolate, opposite, with a simple or 3-fid tendril; leaflets entire, petiolulate; pseudostipules small, inconspicuous. Flowers in terminal or axillary panicles. Calyx obconical or campanulate-cupular, truncate or 5-denticulate. Corolla tubular to infundibuliform; lobes 5; tube long, narrow. Stamens 4, exserted, 2 posterior ones shorter. Staminodes small. Ovary linear, 4-angled. Disk annular-pulvinate. Fruit a capsule, linear, acute, compressed parallel to the septum; valves smooth, coriaceous. Seeds ellipsoid, thin, with brown membranous wings.

About 4 species; tropical S. America; one in M.P.

Pyrostegia venusta (Ker-Gawl.) Miers in Proc. Roy. Hort. Soc. 3: 188. 1863; A.H. Gentry in Ann. Miss. Bot. Gard. 60: 918. 1973. *Bignonia venusta* Ker-Gawl., Bot. Reg. 3: t. 249. 1818. *B. ignea* Vell., Fl. Flumin. 244. 1825 & 4: t. 15. 1827. *Pyrostegia ignea* (Vell.) K. Presl, Bot. Bemerk. 93. 1844.

Shrubs, climbing, evergreen; branchlets angular. Leaflets ovate, 4-6 x 2.5-4 cm, acuminate at apex, rounded at base, entire; petiolules 1-1.5 cm long; petioles 1.5-2.5 cm long; tendrils 3-fid, long coiled, terminated by a minute claw. Flowers in terminal panicles. Calyx cupular, truncate with a 5-toothed rim. Corolla bright orange, tubular; lobes narrow, oblong-linear, ca 1 cm long, recurved; tube 4-5 cm long.

Often cultivated in gardens. Bhopal (Oommachan, 1977). *Fl.*: Jan. March.

11. RADERMACHERA Zoll. & Moritzi

Trees; twigs and floral rachis distinctly lenticellate. Leaves 2-3-pinnate; petioles and leaflets articulate; leaflets minutely glandular dotted beneath. Flowers in terminal thyrses, rarely in paniculate racemes; bracts and bracteoles inconspicuous. Calyx closed in bud, splitting spathaceously, truncate or irregularly lobed. Corolla hypocrateriform, infundibuliform or basal tube suddenly widened into an upper tube; lobes unequal. Stamens 4, didynamous; filaments inserted at the apex of basal tube, hairy at base; anther cells V-shaped, divergent. Staminode 1. Ovary elongate, glabrous or tuberculate, 2-locular; style filiform; stigma 2-lamellate. Disk slightly ridged. Fruit a capsule, linear, subcylindrical; septum terete, spongy. Seeds flat, small, with hyaline wings at both ends.

About 16 species; S.E. Asia and Malesia; one in M.P.

Radermachera xylocarpa (Roxb.) K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3b: 243. 1895; Steenis in Blumea 23: 131. 1976. *Bignonia xylocarpa* Roxb., Fl. Ind. 3: 108. 1832. *Stereospermum xylocarpum* Wight, Icon. Pl. Ind. Orient. t. 1335-36. 1848; C.B. Clarke in Hook. f. Fl. Brit. India 4: 383. 1884. - *Jaimangal, Katori, Paral*.

Large trees, deciduous, 15-20 m high. Leaves 2-pinnate, 50-80 cm long; leaflets 2-4 pairs with an odd one, elliptic to oblong, 5-10 x 3-5 cm, acute or acuminate at apex, entire or coarsely serrate, glabrous. Flowers in ovoid, erect, tomentose panicles, large, fragrant. Calyx campanulate, ca 1 cm long, pubescent outside; lobes 3-5, irregular. Corolla white with yellow tinge, ca 3 cm long, glabrous; lobes rounded, crisped; tube narrow, short. Disk cupular, fleshy. Capsules ca 1 m long, woody, slightly curved, tuberculate.

On rocky hill slopes and in mixed forests. Bilaspur, Hoshangabad, Mandla, Raigarh. *Fl. & Fr.*: April - Feb.

12. SPATHODEA P. Beauv.

Trees. Leaves 1-pinnate, opposite or ternate. Flowers in terminal, densely-flowered racemes, large, showy. Calyx spathaceous, large, recur

ved. splitting on the anterior side. Corolla zygomorphic; basal portion cylindrical, short, enclosed within calyx; upper portion abruptly much widened, obliquely campanulate, erect; lobes 5, crisped, subequal, erect. Stamens 4, subequal, not exserted, unequally inserted near the base of swollen portion of tube; filaments glabrous; anthers large, 2-celled. Staminodes small. Disk annular, shallowly lobed. Ovary ovate-oblong, pubescent, papillose, 2-locular; style glabrous; stigma 2-lamellate. Fruit a capsule, oblong-lanceolate, erect, flattened parallel to the septum, loculicidally 2-valved; valves boat-shaped, woody. Seeds winged.

A monotypic genus; tropical Africa; one in M.P.

Spathodea campanulata P. Beauv., Fl. Oware 1: 47, t. 27-28, 1805.

Trees, 8-10 m high, widely branching at the top. Leaves odd-pinnate, 15-45 cm long; leaflets 9-13, elliptic-oblong, 5-10 x 3-5 cm, acute to acuminate at apex, rounded at base, entire, puberulous beneath along veins, shortly petiolate. Flowers in erect racemes, borne on stout peduncles; pedicels 3-4 cm long, articulate at base. Calyx golden-brown, velutinous, glabrous inside; fissures not reaching up to apex in open flower. Corolla bright red or reddish orange, campanulate; lobes orange inside, deltoid, 3-4 cm broad; tube 7-8 cm long, yellowish orange inside, glandular; inflated portion 6-7 cm long. Capsules 15-20 x 3-5 cm, brownish black.

Planted as ornamental in gardens, parks and as an avenue tree. Indore, Mandla, Raipur. *Fl. & Fr.*: July-Dec.

13. STEREOSPERMUM Cham.

Large trees. Leaves 1-pinnate, opposite, sometimes ternate; leaflets few pairs, diminishing in size downwards. Flowers in terminal or defoliated axillary, lax, many-flowered panicles, sometimes fragrant. Calyx small, campanulate, 3-5-lobed. Corolla tubular-campanulate, curved, bilabiate; upper lip 2-lobed; lower lip 3-lobed; lobes crisped, subequal, toothed or lacinate. Stamens 4, didynamous, adnate near the base of corolla, included; filaments glabrous or with a dense hairy tuft at base; anthers 2-celled. Staminodes small. Disk present, cupular. Ovary linear-oblong, 2-locular; style slender; stigma 2-lipped. Fruit a capsule, linear, twisted and curved, terete or angular, loculicidally 2-valved; septum thick, corky, spongy. Seeds wedge-shaped, 3-angled, embedded in notches of septum, winged.

About 15 species; tropical regions of Old World; 2 in M.P.

- 1a. Leaves and inflorescences viscid pubescent with capitate-glandular hairs; corolla dull purple with yellow streaks inside; capsules obscurely 3-ribbed ...1. *S. chelonoides*
- 1b. Leaves and inflorescences glabrous or puberulous, never viscid pubescent; corolla pale yellow, with red streaks inside; capsules 4-ribbed ...2. *S. colais*

1. ***Stereospermum chelonoides*** (L. f.) DC. in Bibl. Univ. Geneve II, 17: 124. 1838, *p.p. excl. ref.* Rheede t. 26 & DC., Prodr. 9: 210. 1845; Santisuk in Kew Bull. 28: 176. 1973. *Bignonia chelonoides* L. f., Suppl. Pl. 282. 1782, *p.p. excl. ref.* Rheede, 1786. *Bignonia suaveolens* Roxb., Fl. Ind. 3: 104. 1832. *Tecoma suaveolens* (Roxb.) G. Don, Gen. Hist. 4: 224. 1837-1838. *Stereospermum suaveolens* (Roxb.) DC., Prodr. 9: 211. 1845; C.B. Clarke in Hook. f., Fl. Brit. India 4: 382. 1884. - *Padar*, *Pendara*.

Trees, deciduous, 10-20 m high. Leaves opposite, rarely ternate, 30-50 cm long; leaflets 3-4 pairs, obovate-oblong, 5-16 x 3-7 cm, acute to shortly acuminate at apex, cuneate at base, entire, viscid pubescent with capitate-glandular hairs. Flowers in *ca* 25 cm across, viscid pubescent panicles, fragrant. Calyx shortly 5-lobed. Corolla dull purple, with yellow streaks inside, 2-3 cm long; lobes subentire; tube pink. Capsules 15-30 cm long, smooth or obscurely 3-ribbed. Seeds *ca* 3.5 cm long.

Common along forest roads. Balaghat, Bastar, Bilaspur, Durg, Jabalpur, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni, Surguja. *Fl. & Fr.*: April - Jan.

Root bark is diuretic, tonic and used to treat asthma and stomach diseases.

2. ***Stereospermum colais*** (Dillwyn) Mabberley in Taxon 27: 553. 1978. *Bignonia colais* Dillwyn, Rev. Hortus Malab. 28. 1839. *Dipterosperma personatum* Hassk. in Flora 25 (2) Beibl. 1: 28. 1842. *Stereospermum chelonoides* DC., Bibl. Univ. Geneve II, 17: 124. 1838, *p.p. quoad ref.* Rheede, t. 26 & DC., Prodr. 9: 210. 1845; C.B. Clarke in Hook. f., Fl. Brit. India 4: 382. 1884. *S. personatum* Chatterjee in Bull. Bot. Soc. Bengal 2: 70. 1948. *S. tetragonum* DC., Prodr. 9: 210. 1845. - *Chhota padar*.

Trees, deciduous, 10-20 m high; bark greyish black. Leaves 20-50 cm long; leaflets 3-6 pairs, oblong, elliptic-oblong or lanceolate-oblong, 4-12 x 2-5 cm, caudate-acuminate at apex, cuneate at base, entire, glabrous. Flowers in *ca* 40 cm long, drooping panicles; peduncles 1-7 cm long. Calyx purple, 6-8 mm long, glabrous or pubescent. Corolla pale yellow with red streaks; lobes crisped; tube 4-6 mm long. Capsules up to 50 cm long, 4-angled, curved or spirally twisted. Seeds *ca* 2 cm long.

- 1a. Leaflets oblong or lanceolate-oblong;
calyx pubescent; filaments glabrous or
with few hairs at base ...2.1. var. *angustifolium*
- 1b. Leaflets elliptic-oblong; calyx glabrous;
filaments with a dense hairy tuft at base ...2.2. var. *colais*

2.1. var. *angustifolium* (Haines) Bennet & Raizada in Indian J. For. 4: 67. 1981. *Stereospermum chelonoides* var. *angustifolium* Haines, Descr. List Trees South Circle C.P. 169. 1916. *S. angustifolium* (Haines) Haines in Kew Bull. 1922: 121. 1922 & Bot. Bihar Orissa 4: 656. 1922. *S. personatum* var. *angustifolium* (Haines) Santisuk in Kew Bull. 28: 181. 1973.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: April - Dec.

2.2. var. *colais*

Fig. 45.

In mixed forests or hill slopes. Raipur, Seoni. *Fl. & Fr.*: May - Aug.

14. **TABEBUIA** Gomes *ex* DC.

Trees. Leaves 1-foliolate or digitately 3-7-foliolate, opposite. Flowers in terminal racemes or panicles, borne on defoliated or leafy branchlets. Calyx cupular, campanulate or tubular, coriaceous, truncate, bilabiate or shallowly 5-lobed. Corolla yellow, white, red, lavender or magenta, tubular-infundibuliform or campanulate; lobes 5; tube long. Stamens 4. Staminodes small. Ovary linear-oblong; ovules 2 to multiseriate in each locule. Fruit a capsule, elongate, smooth or wavy muricate, glabrous or pubescent, dehiscing perpendicularly to the septum. Seeds thin, with membranaceous wings, sometimes thick, corky and without wings.

About 100 species; mainly tropical America; one in M.P.

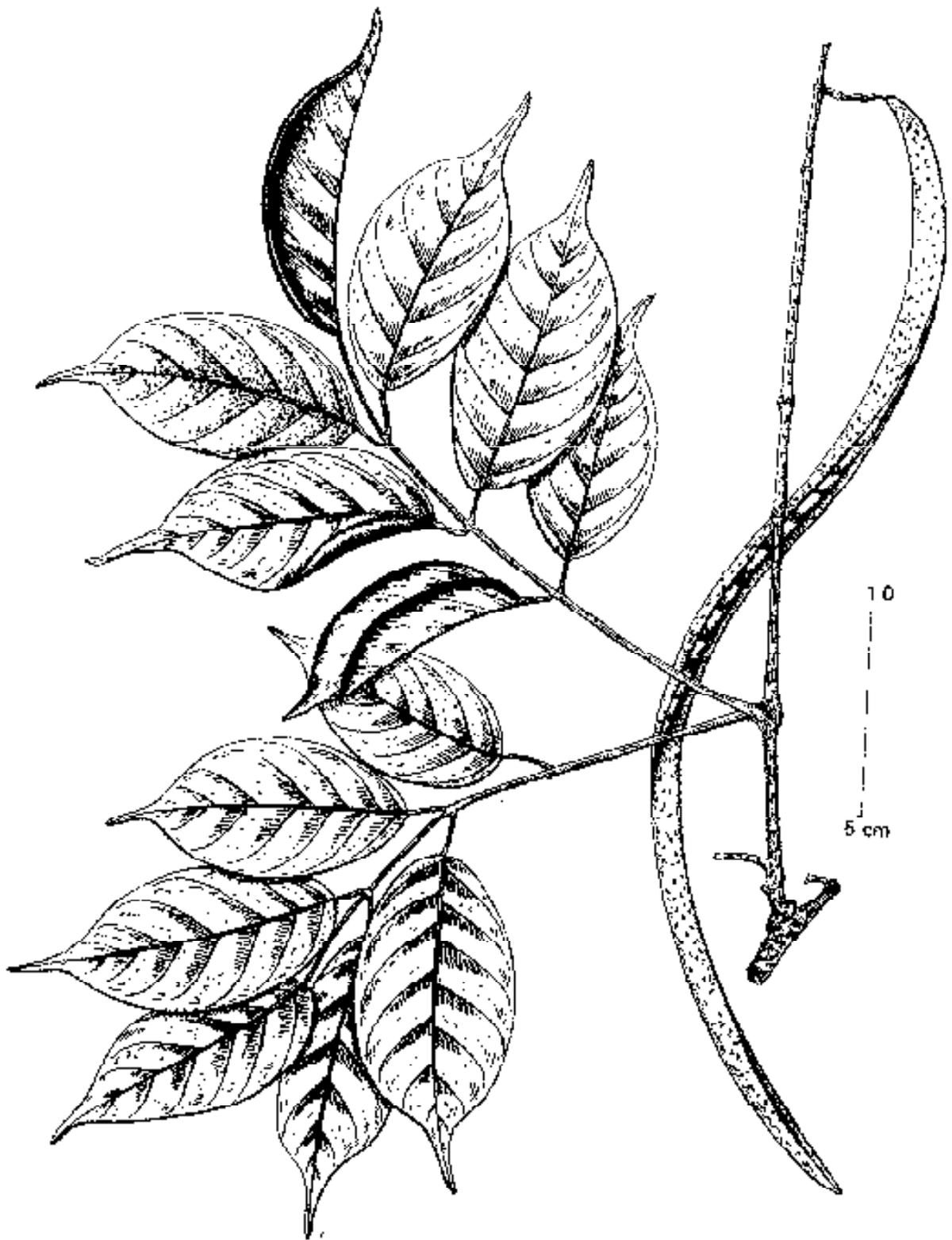


Fig. 45. *Stereospermum colais* (Dillwyn) Mabberley var. *colais*

Tabebuia rosea (Bertol.) DC., Prodr. 9: 215. 1845. *Tecoma rosea* Bertol., Fl. Guatimal. 25. 1840. *Tabebuia pentaphylla* (L.) Hemsl., Biol. Cent.-Amer., Bot. 2: 495. 1882.

Trees. Leaves palmately 5-foliolate; leaflets elliptic-oblong or ovate-oblong, terminal leaflet 10-30 x 5-15 cm, intermediate pair 8-30 x 5-15 cm, lateral pair 5-20 x 3-10 cm, acute to acuminate at apex, entire, subcoriaceous to chartaceous. Flowers in terminal panicles, slightly fragrant. Calyx bilabiate. Corolla rosy pink or lavender, tubular-infundibuliform; throat yellow, turning white.

Cultivated. Bhopal (Oommachan, 1977). Fl.: Dec. March

15. TECOMA Juss.

Shrubs or small trees, erect or scrambling. Leaves imparipinnate, rarely simple, opposite; leaflets incised or serrate, densely glandular punctate beneath. Flowers in racemes or panicles. Calyx tubular-campanulate, 5-dentate, subcoriaceous; glands scattered. Corolla yellow, orange or scarlet, campanulate; lobes 5, equal or unequal, minutely ciliate. Stamens 4, didynamous, inserted at the top of the narrow part of tube, exerted or included, hairy at the insertion point; anthers 2-celled. Staminodes small. Disk shallowly cupular. Ovary oblong or narrowly cylindrical, compressed; ovules 2-4-seriate in each locule. Fruit a capsule, linear, somewhat compressed; valves smooth. Seeds flat, hyaline-winged.

About 12 species; tropical America; one in M.P.

Tecoma stans (L.) Juss. ex Kunth in Humb., Bonpl. & Kunth, Nov. Gen. Sp. 3: 144. 1819. *Bignonia stans* L., Sp. Pl. ed. 2. 871. 1762.

Shrubs, glabrous, 1.5-2.5 m high. Leaves imparipinnate; leaflets 3-7, elliptic-ovate or lanceolate, 5-10 x 2-4 cm, acuminate at apex, serrate, glabrous, sessile. Flowers in glabrous racemes or panicles, fragrant. Calyx-lobes deltoid, acuminate. Corolla bright yellow; lobes subequal; tube ca 3 cm long, abruptly contracted at the base. Disk fleshy, 5-lobed. Capsules 10-16 cm long, erect, often lenticellate. Seeds orbicular-compressed.

Commonly cultivated in gardens and as hedges in villages. Chhatarpur. Hoshangabad. Indore. Fl. & Fr.: Often throughout the year.

16. **TECOMARIA** (Endl.) Spach

Shrubs, decumbent or straggling, flaccid; tendrils absent. Leaves imparipinnate, 5-11-foliolate, opposite; leaflets crenate-serrate. Flowers in terminal racemes or panicles. Calyx campanulate or cupular, 5-toothed. Corolla orange to scarlet, narrowly infundibuliform, slightly curved. Stamens 4, inserted above the middle of the tube, exserted. Staminodes small. Ovary oblong. Fruit a capsule, linear, compressed, dehiscing perpendicularly to the septum. Seeds small, flat, membranaceous-winged.

A monotypic genus; E. & S. Africa, cultivated elsewhere.

Tecomaria capensis (Thunb.) Spach, Hist. Nat. Vég. 9: 137. 1838. *Bignonia capensis* Thunb., Prodr. Pl. Cap. 105. 1800. *Tecoma capensis* (Thunb.) Lindl., Bot. Reg. 13: t. 1117. 1827.

Shrubs, somewhat climbing or nearly erect, glabrous. Leaflets 5-9, ovate or elliptic-rhomboid, acute at apex, serrate. Flowers in racemes. Calyx cupular. Corolla orange-red, infundibuliform. Disk cupular-pulvinate. Capsules linear, ca 7 cm long.

Cultivated. Bhopal (Oommachan, 1977), Shivpuri (Kaushik, 1969). *Fl. & Fr.*: July - Sept.

17. **TECOMELLA** Seem.

Shrubs or small trees. Leaves simple, opposite, entire. Flowers in racemes or panicles. Calyx campanulate-tubular, 5-lobed. Corolla campanulate-tubular or infundibuliform, 5-lobed; lobes subequal, rounded; throat wide. Stamens 4, exserted. Disk cupular. Ovary oblong; ovules many in each locule. Fruit a capsule, linear-oblong, slightly compressed at right angle to the septum, dehiscing loculicidally. Seeds discoid, with a broad transverse hyaline wing.

A monotypic genus; Arabia to India.

Tecomella undulata (Sm.) Seem. in Ann. Mag. Nat. Hist. ser. 3, 10: 30. 1862 & in J. Bot. 1: 18. 1863. *Bignonia undulata* Sm., Exot. Bot. 1: 35. t. 19. 1804. *Tecoma undulata* (Sm.) G. Don, Gen. Hist. 4: 233. 1837-1838; C.B. Clarke in Hook. f., Fl. Brit. India 4: 378. 1884.

Small trees. Leaves elliptic-oblong to elliptic-lanceolate, 4-9 x 1-2 cm, entire, undulate. Flowers in condensed, 2-7-flowered racemes, large; bracts linear, stellately pubescent. Calyx campanulate, unequally 5-lobed. Corolla infundibuliform; lobes suborbicular; tube dilated at base. Disk cupular-compressed, 5-lobed. Capsules 20-30 cm long, laterally compressed.

Shivpuri (Kaushik, 1969). *Fl. & Fr.*: April onwards.

105. PEDALIACEAE

(K.K. Khanna)

About 18 genera and 95 species; tropical and subtropical regions especially coastal and arid zones; 2 genera and 2 species in M.P.

- 1a: Leaves large, broadly ovate; flowers in terminal racemes; fruits with two apical claw like hooks ...1. *Martynia*
- 1b. Leaves comparatively smaller, elliptic or lanceolate; flowers axillary, solitary; fruits without hooks ...2. *Sesamum*

1. MARTYNIA L.*

Herbs, erect, covered with glandular-viscid hairs. Leaves usually opposite, membranous, long petiolate, palmatinerved. Flowers in short racemes, bisexual, zygomorphic, pedicellate; bracteoles 2, persistent, membranous. Calyx 5-partite up to base; segments unequal. Corolla obliquely campanulate, ventricose; lobes unequal, broad. Fertile stamens 2, epipetalous; anthers cohering. Staminodes 2-3. Disk fleshy. Ovary superior, 1-locular, divided into 4 locules by intrusion of 2, opposite, parietal, T-shaped placentae in each locule, pendulous; style erect; stigma 2-lamellate. Fruit a drupe, woody, crowned by 2 strong, claw like, sharp hooks. Seeds oblong.

A monotypic genus; native of Mexico but naturalised in tropical and subtropical regions.

**Martynia* L. is often treated under a separate family Martyniaceae, *nom. cons.* (App. II B, ICBN, 1994).

Martynia annua L., Sp. Pl. 618. 1753. *M. diandra* Gloxin, Observ. Bot. 14. t. 1. 1785; C.B. Clarke in Hook. f., Fl. Brit. India 4: 386. 1884. *Bicchu*, *Ulat-kanta*.

Herbs, perennial, erect, much branched, glandular pubescent, up to 2 m high; stems subterete, fistular. Leaves broadly ovate-orbicular, 20-40 cm across, sinuately dentate, sticky; petioles 20-30 cm long. Flowers in lax racemes, borne in the bifurcation of upper branches, drooping. Calyx and corolla glandular pubescent. Corolla mauve or pinkish white with deep purple blotches on the inner side of lobe, bilabiate. Drupes ovoid, green, black on drying, hooked at the tip, deflexed.

In wastelands. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, Hoshangabad, Indore, Mandla, Panna, Raipur, Rajnandgaon, Rewa, Satna, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Aug. - Nov.

2. SESAMUM L.

Herbs, erect or decumbent, covered with short, white hairs. Leaves opposite or alternate, glaucous beneath; smaller ones simple, entire or serrate-dentate; larger ones deeply divided. Flowers axillary, solitary, forming a lax, leafy raceme at the apices of branchlets; bracts lanceolate. Calyx 5-lobed, small; lobes unequal. Corolla 5-lobed, villous at the throat inside; tube decurved, gradually widened upwards. Stamens 4, didynamous; anthers free. Disk annular. Ovary hispid, 2-locular, becoming 4-locular by radial false septum; ovules many in each locule; stigma 2-lamellate. Fruit a capsule, oblong, unarmed, 2-valved. Seeds ovoid, compressed, 2-seriate in each cell.

About 15 species; tropical regions of Old World and S. Africa; one in M.P.

Sesamum indicum L., Sp. Pl. 634. 1753; Nicolson *et al.* in *Regnum Vegetab.* 119: 207. 1988. *S. orientale* L., Sp. Pl. 634. 1753; Backer & Bakh. f., *Fl. Java* 2: 544. 1965. *S. malayamum* Nair in *Bull. Bot. Surv. India* 5: 252-253. 1963. *S. indicum* var. *subindivisum* DC., *Pl. Rar. Jard. Genev.* 18. 1825. *Til*.

Herbs, annual, erect, glandular pubescent, ca 1 m high; stems obtusely 4-angled. Leaves elliptic-lanceolate; lower ones opposite, 3-foliate or palmatisect, serrate; upper ones oblong or ovate-lanceolate, 5-15 x 0.5-

4.5 cm, entire. Flowers axillary, solitary, with 2, yellow glands at the base of pedicels. Calyx-lobes oblong, pubescent. Corolla bilabiate; lobes pubescent outside. Capsules 1.5-3 cm long, 4-angled, apiculate, deeply 4-grooved. Seeds white, brown or black, smooth or rugose.

Often cultivated for oil yielding seeds. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Indore, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Sept. Oct.

Seed oil is used for cooking, in soap industries and as hair oil. Seeds are edible and various preparations are made by mixing them with sugar or jaggery.

Notes: As per article 11.5 of ICBN (1994) the choice of first author in uniting two taxa bearing names of equal priority should be followed. Backer and Bakh. *f. (l.c.)* stated that the first author to unite these two Linnean specific epithets was Graham (Cat. Pl. Bombay 126, 1839) who adopted *S. orientale* but Nicolson *et al. (l.c.)* pointed out that it was De Candolle (Pl. Rar. Jard. Genev. 18, 1825 & Prodr. 9: 250, 1845) who had first accepted *S. indicum* L. as the correct name after combining the two taxa and hence this has been adopted here.

106. ACANTHACEAE

(K.K. Khanna, A.K. Tripathi and V. Mudgal)

About 357 genera and 4350 species; tropical regions but also in Mediterranean region, United States and Australia; 38 genera and 103 species in M.P.

- 1a. Plants climbers (except *Thunbergia erecta*);
leaves palmately-nerved; calyx many-toothed ...38. *Thunbergia*
- 1b. Plants erect or prostrate; leaves pinnately-nerved;
calyx 4-5-partite or lobed:
 - 2a. Calyx 4-partite or lobed:
 - 3a. Stamens 2; staminodes 1-2 or absent:
 - 4a. Flowers more than 2 cm long ...5. *Barleria* *
 - 4b. Flowers up to 1 cm long:

- 5a. Capsules 4-seeded; seeds borne on retinacula ...22. *Justicia*
- 5b. Capsules many-seeded; seeds not borne on retinacula:
- 6a. Bracts rigid, acuminate; peduncles of spikes covered with alternate scales ...14. *Elytraria*
- 6b. Bracts herbaceous, obtuse; peduncles if present, then without scales ...24. *Nelsonia*
- 3b. Stamens 4; staminodes absent:
- 7a. Corolla with subobsolete or obsolete upper lip, tube cartilaginous; anthers 1-celled ...7. *Blepharis*
- 7b. Corolla with well developed upper lip, tube thin-fleshy or membranous; anthers 2-celled:
- 8a. Stamens exserted; stigma linear ...20. *Hygrophila*
- 8b. Stamens included; stigma capitate ...23. *Lepidagathis*
- 2b. Calyx 5-partite or lobed:
- 9a. Stamens 2:
- 10a. Corolla-lobes twisted in bud:
- 11a. Leaves entire or obscurely crenulate; corolla-tube long, linear, slender ...15. *Eranthemum*
- 11b. Leaves distinctly crenulate to serrate; corolla-tube narrow below, usually infundibuliform upwards:
- 12a. Corolla resupinate; anthers muticous ...37. *Strobilanthes*
- 12b. Corolla not resupinate; anthers not muticous:
- 13a. Calyx bilabiate ...31. *Phlebophyllum*
- 13b. Calyx not bilabiate ...25. *Nilgirianthus*
- 10b. Corolla-lobes imbricate in bud:
- 14a. Ovules 3 to many in each locule; capsules 6 or more-seeded:

- 15a. Flowers in pseudowhorls, subtended
by cladodes ...18. *Haplantodes*
- 15b. Flowers in unilateral racemes or
panicles, without cladodes:
- 16a. Panicles both axillary and terminal;
capsules linear-oblong ...3. *Andrographis*
- 16b. Panicles exclusively axillary;
capsules ellipsoid-lanceolate ...21. *Indoneesiella*
- 14b. Ovules 1 to 2 in each locule; capsules 2-4-seeded:
- 17a. Herbs:
- 18a. Seeds covered with long hairs ...32. *Rhaphidospora*
- 18b. Seeds glabrous:
- 19a. Flowers in unilateral spikes ...35. *Rungia*
- 19b. Flowers in clusters or
paniculate cymes:
- 20a. Flowers in dense clusters ...10. *Dicliptera*
- 20b. Flowers in paniculate cymes ...28. *Peristrophe*
- 17b. Undershrubs or shrubs:
- 21a. Anther cells not spurred:
- 22a. Flowers in dense, terminal spikes;
bracts large; capsules ovoid ...13. *Ecbohium*
- 22b. Flowers solitary or in cymes
on the branches of
divaricate panicle; bracts
small; capsules clavate ...33. *Rhinacanthus*
- 21b. Anther cells spurred:
- 23a. Flowers ca 25 mm long ...1. *Adhatoda*
- 23b. Flowers up to 20 mm long:
- 24a. Bracts purple, pubescent ...6. *Beloperone*
- 24b. Bracts green, glabrous:
- 25a. Calyx-segments subequal;
both anther cells spurred;
capsules clavate ...17. *Gendarussa*

- 25b. Calyx-segments equal; only one anther cell spurred; capsules ovoid or ellipsoid ...22. *Justicia*
- 9b. Stamens 4:
- 26a. Corolla-lobes imbricate in bud:
- 27a. Corolla orange or yellow; anthers 1-celled ...9. *Crossandra*
- 27b. Corolla never orange or yellow; anthers 2-celled:
- 28a. Ovary with many ovules in each locule; seeds not laterally compressed ...36. *Staurogyne*
- 28b. Ovary with 1 or 2 ovules in each locule; seeds laterally compressed:
- 29a. Flowers in heads; bracts exceeding the calyx; seeds hairy ...23. *Lepidagathis*
- 29b. Flowers in spikes or compound racemes; bracts not exceeding the calyx; seeds glabrous ...4. *Asystasia*
- 26b. Corolla-lobes twisted in bud:
- 30a. Ovules 2 in each locule; capsules 1-4-seeded:
- 31a. Flowers ca 5 mm across; corolla white, tube very slender, scarcely widening above ...30. *Phaulopsis*
- 31b. Flowers more than 10 mm across; corolla blue, purple or white, tube widened, tubular-ventricose:
- 32a. Flowers in clusters or contracted cymes or racemes; anther cells mucronate or spurred at base:
- 33a. Bracteoles small, subulate; stigma simple, linear ...12. *Dyschoriste*
- 33b. Bracteoles large, ovate; stigma unequally 2-lobed ...29. *Petalidium*
- 32b. Flowers in spikes; anther cells not spurred:

- 34a. Leaves sessile, amplexicaul at base ...27. *Perilepta*
- 34b. Leaves petiolate not amplexicaul at base:
- 35a. Leaves scabrid above with bristles ...8. *Carvia*
- 35b. Leaves not scabrid:
- 36a. Corolla resupinate; anthers
muticous ...37. *Strobilanthes*
- 36b. Corolla not resupinate;
anthers not muticous ...25. *Nilgirianthus*
- 30b. Ovules more than 2 in each locule;
capsules 6 or more-seeded:
- 37a. Corolla bilabiate:
- 38a. Flowers in cymes, often cincinnus;
bracts and bracteoles minute ...26. *Nomophila*
- 38b. Flowers in terminal heads or axillary
whorls around nodes; bracts and
bracteoles well developed, foliaceous ...20. *Hygrophila*
- 37b. Corolla not bilabiate:
- 39a. Bracts cartilaginous ...16. *Gantelbua*
- 39b. Bracts not cartilaginous:
- 40a. Bracts present; bracteoles small,
not exceeding the calyx:
- 41a. Flowers in clusters, arranged
in panicles; bracts linear; anther
cells mucronate or awned ...2. *Aechmanthera*
- 41b. Flowers in capitate spikes,
not paniculate; bracts elliptic-
oblong; anther cells muticous...19. *Hemigraphis*
- 40b. Bracts absent; bracteoles large,
exceeding the calyx:
- 42a. Bracteoles foliaceous, broad;
capsules clavate, with a
solid base, bearing seeds
only in the upper part ...11. *Dipteracanthus*
- 42b. Bracteoles not foliaceous,
narrow; capsules linear,
without a solid base, bearing
seeds throughout ...34. *Ruellia*

1. ADHATODA P. Miller

Shrubs, erect. Leaves simple, entire, subentire or crenulate-undulate. Flowers in axillary and terminal, dense, often thyriform spikes at the end of branches or fascicled in upper axils, subsessile; bracts herbaceous, elliptic or oblong, imbricate, exceeding the calyx; bracteoles similar but usually narrower. Calyx shortly campanulate, 5-lobed; lobes lanceolate, imbricate, the two lowest often subconnate. Corolla bilabiate; upper lip galeate, 2-lobed, subentire; lower lip 3-lobed, spreading, recurved; tube short. Stamens 2, adnate near the top of corolla-tube, exserted; anthers 2-celled; cells minutely apiculate at base. Staminodes absent. Disk cupular. Ovary 2-locular, usually hairy; ovules 2 in each locule; style filiform; stigma entire. Fruit a capsule, oblong or clavate, contracted in a long, solid stipe. Seeds suborbicular, compressed, rugose.

About 20 species; tropical Africa and Asia; one in M.P.

Adhatoda zeylanica Medik. in Hist. Comment. Acad. Theod.-Palat. 6: 393. 1790; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 22. 1994. *Justicia adhatoda* L., Sp. Pl. 15. 1753. *Adhatoda vasica* Nees in Wallich, Pl. Asiat. Rar. 3: 103. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 540. 1885. *Adusa*, *Arusha*.

Shrubs, perennial, evergreen, 1-1.5 m high. Leaves elliptic-lanceolate or ovate-lanceolate, 6-18 x 2-7 cm, acuminate or acute at apex, cuneate or decurrent at base, subentire or crenulate-undulate, glabrous when mature. Flowers in leafy spikes; bracts foliaceous, elliptic-obovate to ovate, apiculate, ciliate. Corolla white or cream-coloured; upper lip curved, notched at apex; lower lip white with rose-purple lines and dots in the throat; throat villous. Capsules clavate, 2-3 cm long, dark brown, 4-seeded.

Common in fields and wastelands. Bilaspur, Bastar, Chhatarpur, Damoh, Hoshangabad, Indore, Raigarh, Raipur, Rewa, Sagar, Satna, Seoni. *Fl. & Fr.*: Dec. - March.

Roots, leaves and flowers are referred for the treatment of cough and asthma while only leaves are considered as antipyretic.

2. AECHMANTHERA Nees

Undershrubs or shrubs; stems pubescent. Leaves opposite, often viscid. Flowers in sessile clusters arranged in trichotomous or secund panicles; bracts linear, as long as the calyx; bracteoles similar to bracts but smaller. Calyx somewhat 5-partite; lobes pinkish or pale blue or violet, linear, subequal. Corolla 5-lobed; lobes subequal, rounded, twisted to left in bud; tube cylindrical at base, suddenly widened near the middle, with 2 hairy lines on the palate inside. Stamens 4, didynamous, included; longer filaments hairy, shorter ones glabrous; anthers awned or mucronate. Ovary densely hairy at the apex; ovules 4-6 in each locule; style sparsely hairy; stigma simple, large, linear-lanceolate. Fruit a capsule, oblong or linear, 6-8-seeded; retinacula hooked. Seeds compressed, glabrous or hairy.

Three species; endemic to Himalaya and neighbouring mountains; one in M.P.

Aechmanthera gossypina (Nees) Nees in Wallich, Pl. Asiat. Rar. 3: 87, 1832; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 23, 1994. *Ruellia gossypina* Nees in Wallich, Pl. Asiat. Rar. 1: 38, t. 42, 1830. *Aechmanthera tomentosa* Nees in Wallich, Pl. Asiat. Rar. 3: 87, 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 428, 1884. *A. tomentosa* var. *wallichii* (Nees) C.B. Clarke in Hook. f., Fl. Brit. India 4: 428, 1884. *A. wallichii* Nees in DC., Prodr. 11: 170, 1847. Fig. 46.

Undershrubs, erect, up to 1.5 m high; stems tomentose-woolly. Leaves lanceolate or elliptic, 8-18 x 5-10 cm, acute at apex, rounded at base, crenate, densely white tomentose, rugose, with 12-16 pairs of deeply impressed, lateral nerves. Flowers in 3-8-flowered clusters arranged on the spreading branches of terminal, leafy panicles; bracts and bracteoles glandular pubescent. Calyx glandular. Corolla pale blue or violet, 2-3 cm long; tube ventricose. Capsules linear, ca 1 cm long, pubescent.

Rare. In rocky places. Raigarh. Fl. & Fr.: Nov. March.

3. ANDROGRAPHIS Wallich *ex* Nees

Herbs, annual, erect or procumbent; stems and branches 4-angled. Leaves simple, opposite, entire. Flowers in terminal and axillary, lax, often paniculate or dense and subcapitate racemes or spikes, sometimes solitary, often unilateral; bracts small; bracteoles minute or absent. Calyx 5-partite:



Fig. 46. *Aechmanthera gossypina* (Nees) Nees

segments narrow. Corolla white, pink or purplish, tubular, small, pubescent, bilabiate; upper lip subentire or 2-lobed; lower lip 3-lobed, deflexed. Stamens 2; filaments broad, ciliate or setulose, rarely glabrous; anthers 2-celled, exserted. Ovary 2-locular, sparsely hairy; ovules 3-6 in each locule; style slender; stigma minutely 2-fid. Capsules linear-oblong or elliptic, compressed at right angles to the septum, 6-12-seeded. Seeds oblong or subquadrate, glabrous, rugosely pitted.

About 20 species; tropical Asia; 2 in M.P.

- 1a. Branchlets glandular pubescent; corolla pink ...1. *A. ovata*
 1b. Branchlets glabrous; corolla white or purplish ...2. *A. paniculata*

1. ***Andrographis ovata*** (T. Anderson ex Bedd.) Benth. ex C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 502. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 25. 1994. *Gymnostachyum ovatum* T. Anderson ex Bedd., Icon. Pl. Ind. Or. t. 250. 1874.

Herbs, erect, stout, branched; branchlets glandular-pubescent. Leaves broadly ovate, 4-7 x 2-4 cm, acute or shortly acuminate at apex, hirsute; petioles up to 3 cm long. Flowers in axillary and terminal, up to 30 cm long, often paniculate spikes, subsessile; bracteoles 2. Calyx-segments subacute, glandular pubescent. Corolla pink, ca 1.5 cm across; lobes subacute. Capsules pubescent, 8-10-seeded. Seeds subquadrate, rugose.

Rare. In wastelands and as undergrowth in mixed forests. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: Oct. June.

2. ***Andrographis paniculata*** (Burm. *f.*) Wallich ex Nees in Wallich, Pl. Asiat. Rar. 3: 116. 1832; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 501. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 25. 1994. *Justicia paniculata* Burm. *f.*, Fl. Ind. 9. 1768. *Andrographis subspathulata* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 502. 1884. - *Kalmegh, Kiryat*.

Herbs, erect, much branched, glabrous, 40-90 cm high. Leaves linear-obovate or lanceolate, 5-8 x 1-2 cm, acute at apex, tapering at base, glabrous, shortly petiolate. Flowers in terminal and axillary, paniculate racemes, rarely axillary, solitary; bracts opposite, lanceolate; bracteoles 2, small or absent. Calyx-lobes pubescent. Corolla white or purplish, glandular pubescent; lower lip with deep pink or purple markings inside

at base. Capsules linear-oblong, *ca* 1.5 cm long, sparsely pubescent. Seeds subquadrate, brown or yellow, rugose.

Common in wastelands. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Narsimhapur, Raigarh, Raipur, Rajnandgaon, Sidhi, Surguja. *Fl. & Fr.*: Sept. April.

The plant is bitter tonic and used for the treatment of malaria, hepatic disorders, itches and as antidote to snake bite.

4. ASYSTASIA Blume

Herbs or undershrubs; stems thickened above the nodes. Leaves opposite, entire, rarely dentate, usually lineolate, connected by transverse ridges. Flowers in lax or dense, usually unilateral, simple or compound racemes or spikes; bracts and bracteoles small. Calyx deeply 5-partite; segments narrow, subequal. Corolla 5-lobed; lobes subequal, imbricate in bud; tube cylindrical below, inflated above, infundibuliform. Stamens 4, didynamous, perfect, inserted in the widened part of corolla-tube, included or 2 anterior ones slightly exerted; filaments basally connate in pairs; anthers 2-celled, minutely spurred at base or mucicous. Ovary 2-locular; ovules 2 in each locule; style linear; stigma subcapitate or 2-fid. Capsules clavate, with a solid stalk like basal part. Seeds orbicular or angular, compressed, glabrous, rugose or tuberculate.

About 70 species; tropical regions of Old World; 2 in M.P.

- 1a. Flowers in racemes; capsules *ca* 1 cm long ...1. *A. gangetica*
 1b. Flowers in spikes; capsules 1.5-2 cm long ...2. *A. mysurensis*

1. ***Asystasia gangetica*** (L.) T. Anderson in Thwaites, Enum. Pl. Zeyl. 235. 1860. *Justicia gangetica* L., Cent. Pl. II: 3. 1756 & Amoen. Acad. 4: 299. 1759. *Asystasia coromandeliana* Nees in Wallich, Pl. Asiat. Rar. 3: 89. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 493. 1884.

Herbs or undershrubs, erect or straggling, suffruticose; branches puberulous. Leaves elliptic-ovate, 3-5 x 2-3 cm, acute to acuminate at apex, truncate or rounded at base, entire or dentate. Flowers in terminal or axillary, lax racemes; bracts lanceolate, 2-4 mm long, smaller than calyx, pubescent; bracteoles lanceolate, small. Calyx divided up to base; segments linear-lanceolate, pubescent. Corolla white with purplish streaks; lobes

orbicular, pubescent outside; tube constricted above. Capsules ca 1 cm long. Seeds tuberculate.

Rare. Gwalior. *Fl. & Fr.*: March April.

2. *Asystasia mysurensis* (Roth) T. Anderson in J. Linn. Soc. Bot. 9: 524. 1867; Santapau in Kew Bull. 1948: 276. 1948. *Ruellia mysurensis* Roth, Nov. Pl. Sp. 303. 1821. *Asystasia lawiana* Dalzell in Kew J. Bot. 4: 344. 1852; C.B. Clarke in Hook. f., Fl. Brit. India 4: 496. 1884.

Herbs, 30-40 cm high; stems 4-angled, grooved. Leaves elliptic-oblong, 4-10 x 3-5 cm, acute at apex, pubescent beneath. Flowers in terminal spikes; bracts lanceolate, pubescent; bracteoles lanceolate, small. Corolla white. Capsules 1.5-2 cm long, glandular pubescent. Seeds tuberculate.

In moist and shady places of forests as well as fields. Dhar, Jhabua (Samvatsar, 1996). *Fl. & Fr.*: Sept. Nov.

5. BARLERIA L.

Herbs, undershrubs or shrubs, armed or unarmed. Leaves opposite, entire. Flowers solitary or in dense or rather lax spikes, showy, sessile; bracts 2, one fertile, another sterile, sometimes reduced to spines; bracteoles absent. Calyx deeply 4-partite; segments in opposite pairs; outer pair larger. Corolla infundibuliform; lobes 5, subequal, imbricate in bud; tube elongate. Stamens 2 fertile and 2 rudimentary; anthers oblong, 2-celled. Disk large, cupular, half embracing the ovary. Ovary 2-locular; ovules 2 in each locule; style long; stigma 2-fid or subentire. Capsules ovoid, oblong, ellipsoid or obovoid, 2 or 4-seeded below the middle. Seeds compressed, glabrous or with silky appressed hairs.

About 250 species; tropical regions; 9 in M.P.

1a. Plants armed; corolla yellow; capsules 2-seeded:

2a. Spines 2 per axil; leaves linear-lanceolate;
bracts broadly obovate

...5. *B. lupulina*

2b. Spines 3-5 per axill; leaves elliptic or
obovate; bracts lanceolate

...8. *B. prionitis*

1b. Plants unarmed; corolla white, purple or blue;
capsules 4-seeded:

3a. Seeds glabrous:

4a. Stems stout, straggling; leaves coriaceous ...3. *B. gibsoni*4b. Stems slender, erect; leaves chartaceous ...7. *B. prattensis*

3b. Seeds hairy:

5a. Outer calyx-segments large, spiny on margin ...2. *B. cristata*

5b. Outer calyx-segments comparatively smaller, not spinous on margin:

6a. Corolla pure white, 6-9 cm long ...4. *B. lawii*

6b. Corolla blue or purple, up to 5 cm long:

7a. Flowers in unilateral spikes; outer calyx-segments denticulate ...9. *B. strigosa*

7b. Flowers solitary or in spikes but not unilateral; outer calyx-segments entire:

8a. Flowers in spikes; calyx-segments glandular pubescent outside; staminodes present ...1. *B. courtallica*8b. Flowers solitary; calyx-segments nearly glabrous; staminodes absent ...6. *B. montana*

1. ***Barleria courtallica*** Nees in DC., Prodr. 11: 226. 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 489. 1884.

Undershrubs or shrubs, erect. Leaves elliptic-obovate, 6-11 x 3-5 cm, acuminate at apex, cuneate at base, puberulous; petioles ca 2 cm long. Flowers in terminal spikes; bracts linear-lanceolate, glandular pubescent outside. Calyx-segments glandular pubescent outside, sericeous inside. Corolla blue; lobes sparsely pubescent; tube yellow. Capsules oblong, 4-seeded.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Dec. March.

2. ***Barleria cristata*** L., Sp. Pl. 636. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 488. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 30. 1994. *Tadralu*.

Herbs or undershrubs, perennial, erect, ca 1 m high; stems 4-angled, appressed pubescent. Leaves elliptic or oblong-lanceolate, 4-14 x 1-3 cm,

acute-acuminate at apex, tomentose. Flowers in terminal and axillary, short, capituliform spikes; bracts 10-15 mm long, acute, membranous. Calyx divided nearly up to base; two outer segments white, large, ovate-oblong, membranous, bristle-tipped on margin; two inner narrower, lanceolate, ciliate. Corolla deep purple or pinkish purple, pubescent outside; lobes ovate-oblong, ca 8 mm long. Capsules ellipsoid, up to 2 cm long, glabrous, 4-seeded. Seeds brown, silky hairy.

Common along roadsides and forest clearings. Balaghat, Bastar, Betul, Bhopal, Bilaspur, Chhatarpur, Durg, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Throughout the year.

3. *Barleria gibsoni* Dalzell in Hook., J. Bot. Kew Gard. Misc. 2: 339. 1850; C.B. Clarke in Hook. f., Fl. Brit. India 4: 487. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 30. 1994.

Undershrubs, straggling, ca 1.5 m high. Leaves ovate-oblong, 2-7 x 1-3.5 cm, entire. Flowers axillary, solitary or paired, passing in terminal spikes; bracts linear-lanceolate or oblong, glabrous. Calyx-segments unequal; outer pair ovate-oblong; inner pair linear or lanceolate. Corolla light blue; lobes obovate, hirsute outside; tube white with blue base. Capsules oblong, 4-seeded. Seeds ellipsoid, black, glabrous.

Rare. Along stream. Indore. *Fl. & Fr.*: Sept. - Oct.

4. *Barleria lawii* T. Anderson in J. Linn. Soc. Bot. 9: 492. 1867; C.B. Clarke in Hook. f., Fl. Brit. India 4: 486. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 30. 1994. *B. beddomei* T. Anderson ex Bedd., Icon. Pl. Ind. Or. 62. t. 258. 1874.

Herbs or undershrubs, perennial, erect, up to 1.2 m high; branches terete, appressed pubescent. Leaves elliptic or elliptic-lanceolate, up to 10 x 5 cm, acuminate at apex, narrowed at base, subsessile or shortly petiolate. Flowers in axillary and terminal, leafy spikes; bracts linear-oblong, up to 1 cm long, glandular. Outer calyx-segments elliptic-ovate, acute, usually sparsely greyish strigose; inner ones lanceolate. Corolla white, narrowly infundibuliform, 6-9 cm long, pubescent. Capsules obovoid, compressed, ca 2 cm long, glabrous. Seeds obtuse, silky hairy.

Rare. In mixed forests. Indore (Rao & Sastry, 1964). *Fl. & Fr.*: Oct. Nov.

5. **Barleria lupulina** Lindl. in Edwards, Bot. Reg. 18: t. 1483. 1832-1833; C.B. Clarke in Hook. f., Fl. Brit. India 4: 482. 1884. **Fig. 47.**

Herbs or undershrubs. Leaves linear-lanceolate, 5-10 x 0.5-1.5 cm, rigidly coriaceous, glabrous to subglabrous, dark green with red midrib above, pale beneath, shortly petiolate, with 2 spines per axil. Flowers in 5-8 cm long, erect or nodding spikes; bracts broadly obovate, erect, imbricate, green with a purple upper half, shortly pubescent, with many, small, cupular glands on the back of the lower half. Calyx 1-1.5 cm long, pubescent, segments shortly aristate. Corolla yellow. Capsules *ca* 1.5 cm long.

Rare. Jabalpur. *Fl. & Fr.*: March - April.

6. **Barleria montana** Nees in Wallich, Pl. Asiat. Rar. 3: 92. 1832 C.B. Clarke in Hook. f., Fl. Brit. India 4: 487. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 33. 1994.

Herbs or undershrubs, perennial, erect, up to 1 m high. Leaves narrowly obovate to ovate-lanceolate, 5-10 x 3-5 cm, acuminate at apex, narrowed at base, thinly chartaceous, glabrous or minutely puberulous above. Flowers axillary or terminal, solitary; bracts obovate, shorter than calyx, acute. Outer calyx-segments ovate, sometimes slightly 2-fid, nearly glabrous; inner ones linear to linear-lanceolate. Corolla blue or purple; lobes orbicular-obovate, obtuse. Capsules *ca* 2 cm long, beaked above, 4-seeded. Seeds orbicular or suborbicular, with silky yellowish hairs.

Rare. In hilly forest area, Chhindwara (Saxena & Shukla, 1970). *Fl. & Fr.*: Nov. - Jan.

7. **Barleria prattensis** Santapau in Kew Bull. 1948: 487. 1949 & in Univ. Bombay Bot. Mem. 2: 62. 1951; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 33. 1994. **Fig. 48.**

Herbs or undershrubs, erect, unarmed, 0.5-1 m high; stems and branches glabrous. Leaves elliptic-oblong or ovate, 4-12 x 1-5 cm, entire, glabrous. Flowers in axillary or terminal spikes; bracts lanceolate-elliptic, spinous-toothed. Calyx-segments bristle-tipped; outer pair ovate; inner pair linear, minutely hairy on the margin. Corolla white or purple, up to 8 cm long, glabrous; lobes obovate, subequal. Capsules ellipsoid, up to 4 cm long, 4-seeded. Seeds orbicular, glabrous.

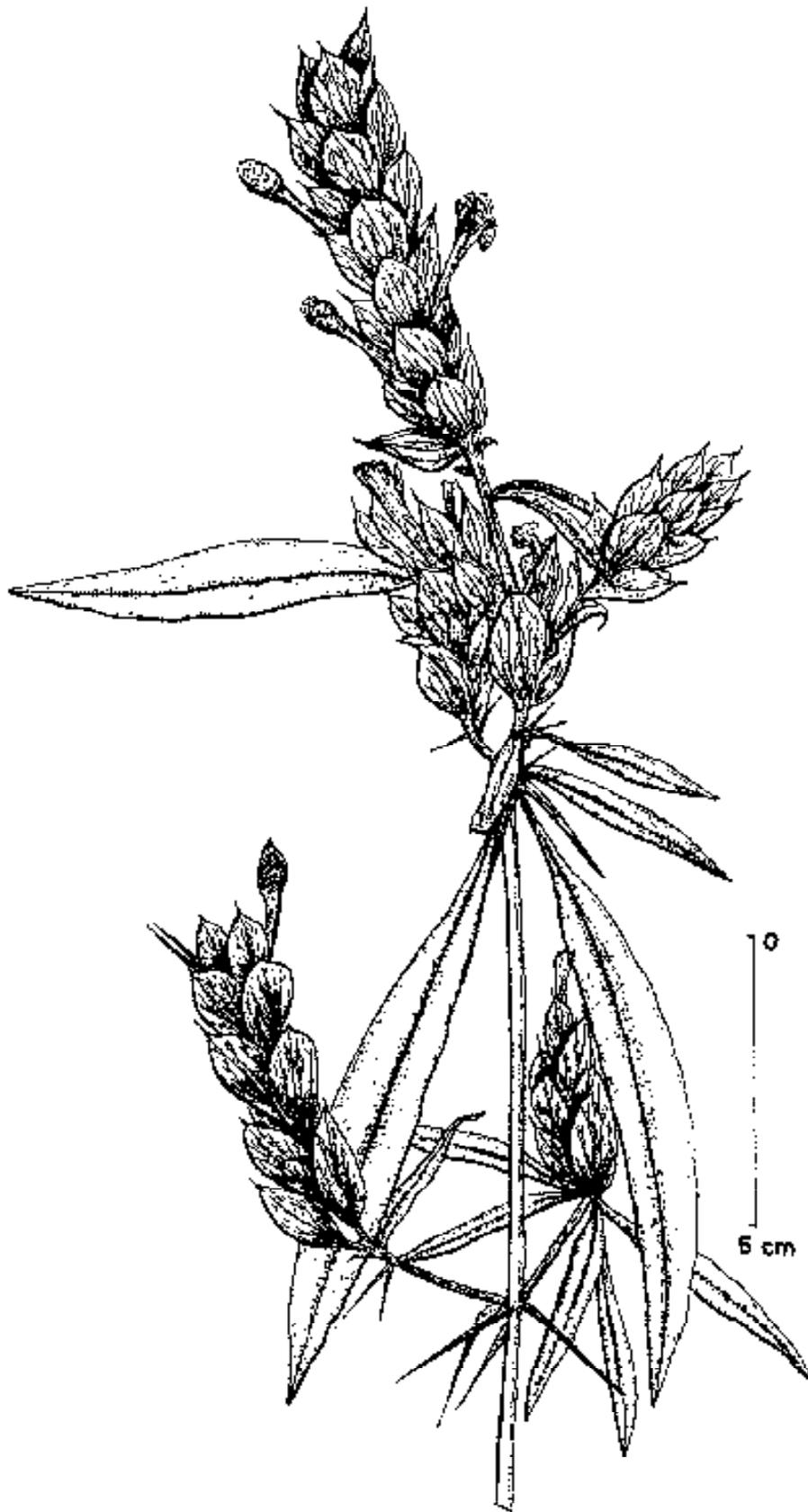


Fig. 47. *Barleria lupulina* Lindl.



Fig. 48. *Barleria prattensis* Santapau

Rare. In shady places of mixed forests. Balaghat, Hoshangabad, Morena. *Fl. & Fr.*: Sept. Feb.

8. *Barleria prionitis* L., Sp. Pl. 636. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 482. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 37. 1994. - *Jhinti, Katsareya*. **Fig. 49.**

Undershrubs, perennial, armed, ca 1 m high; young branches pubescent. Leaves elliptic or obovate, 6-11 x 2-5 cm, acute or obtuse at apex, tapering at base, sparsely pubescent underneath, shortly petiolate. Flowers solitary or in terminal, spicate clusters; bracts lanceolate, 1-2 cm long, spine-tipped; bracteoles bristle-tipped. Calyx-segments broadly lanceolate, acuminate; outer pair spine-tipped. Corolla yellow, slightly bilabiate, glabrous or puberulous. Capsules ovoid, ca 1 cm long, beaked, 2-seeded. Seeds hairy.

Common as undergrowth in mixed forests. Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Gwalior, Hoshangabad, Indore, Jabalpur, Morena, Panna, Raigarh, Raipur, Raisen, Rewa, Sagar, Seoni, Shivpuri, Sidhi, Tikamgarh. *Fl. & Fr.*: Sept. April.

The plant is used to treat whooping cough, tuberculosis, abscess and glandular swellings. Further, it is locally worshipped while the flowers are used in rituals.

9. *Barleria strigosa* Willd., Sp. Pl. 3: 379. 1800; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 489. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 37. 1994. *B. caerulea* Roxb., Fl. Ind. 3: 39. 1832. **Fig. 50.**

Herbs or undershrubs, perennial, up to 1 m high; stems and branches terete, fulvous-strigose. Leaves broadly ovate, 8-20 x 4-10 cm, acuminate at apex, abruptly attenuate at base, entire, membranous, sparsely ciliolate; petioles ca 4 cm long. Flowers in axillary and terminal, dense, unilateral, strigose spikes; bracts brown, ovate or lanceolate, ca 3 cm long, pubescent, denticulate. Outer calyx-segments ovate, denticulate, ciliate on margin; densely strigose; inner ones linear. Corolla blue or pale violet, 3.5-5 cm long. Capsules oblong-ellipsoid, ca 2 cm long, apiculate, glabrous, 4-seeded. Seeds flattened, silky hairy.

In sal and mixed forests. Bastar, Bilaspur, Raigarh, Raipur. *Fl. & Fr.*: Oct. - June.



Fig. 49. *Barleria prionitis* L

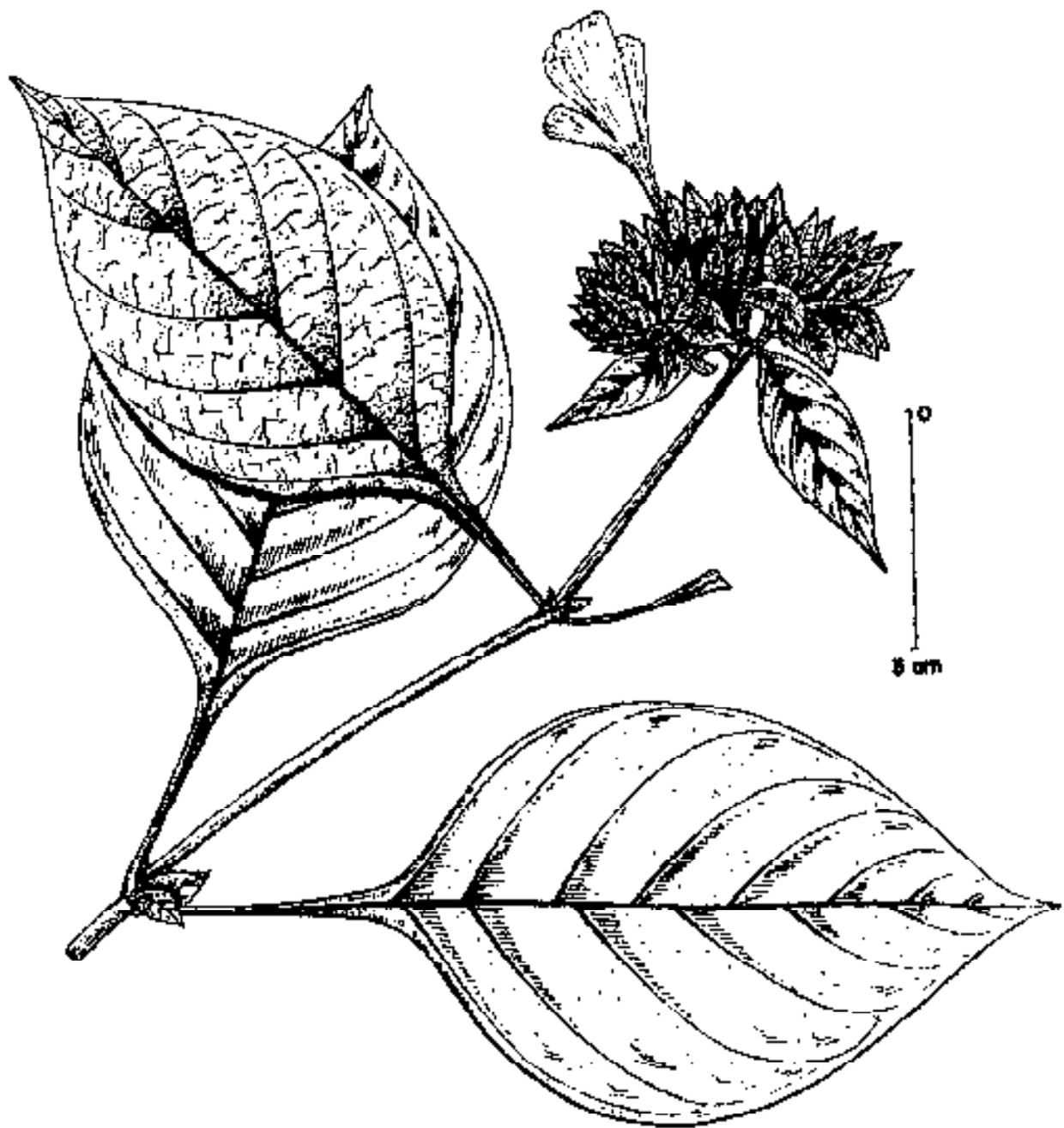


Fig. 50. Barleria strigosa Willd.

6. BELOPERONE Nees

Undershrubs; stems thickened above the nodes. Leaves opposite, entire, connected by transverse ridges. Flowers in terminal and axillary spikes; bracts brightly coloured, linear; bracteoles linear, smaller than bracts. Calyx 5-partite; segments acute. Corolla bilabiate; upper lip ovate-oblong, forming a prolongation of the tube, shallowly 2-lobed, convex; lower lip spatulate, shortly 3-lobed, slightly recurved; lobes imbricate; tube narrow. Stamens 2, inserted in the upper half of corolla-tube; anther cells shortly spurred at base. Ovary with 2 ovules in each locule; style filiform, entire or slightly 2-lobed. Capsules with a stipiform solid base and well developed retinacula, 4-seeded. Seeds compressed, smooth.

About 30 species; tropical America; one in M.P.

Beloperone guttata T.S. Brandegee in Univ. Calif. Publ. Bot. 4: 278. 1912; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 40. 1994.

Undershrubs; stems 4-angled, patently villous. Leaves oblong-lanceolate, 3-7.5 x 2-4 cm, obtuse at apex, cuneate or shortly contracted at base, thinly pubescent above, moderately to densely pubescent beneath. Flowers in shortly pedunculate spikes; rachis pubescent; bracts pale to purple, ciliate, rather densely pubescent; bracteoles pale, pubescent. Calyx pale green, 6-7 mm long, finely pubescent. Corolla rosy purple; margin of upper lip purple; palate speckled with purple; tube 1.8-2 cm long. Capsules apiculate, densely pubescent. Seeds shining.

Planted in gardens and parks. Bhopal (Oommachan, 1977). *Fl. & Fr.*: July - Dec.

7. BLEPHARIS Juss.

Herbs or undershrubs, often spinous; internodes elongate. Leaves simple, opposite or whorled, subentire, dentate or spinous, glaucous beneath. Flowers solitary, in axillary clusters or terminal spikes, 4-merous; bracts in 3 or 4 opposite pairs, dentate on margin, with stiff hairs; bracteoles lanceolate or spatulate. Calyx 4-partite nearly up to base; segments unequal, in opposite pairs; inner smaller. Corolla bilabiate; upper lip subobsolete or obsolete; lower lip 3-lobed, obovate or oblong, deflexed, puberulous; tube cartilaginous, shorter than lobes. Stamens 4, didynamous, adnate at the throat, exerted; filaments rigid, flattened; anthers 1-celled;

sterile cells bearded. Disk annular. Ovary 2-locular; ovules 2 in each locule; style linear; stigma 2-fid. Capsules ellipsoid, oblong or ovoid. Seeds compressed, echinate-papillose, on rigid retinacula.

About 80 species; tropical regions of Old World; 3 in M.P.

1a. Leaves opposite; bracts 3 pairs; capsules oblong ...1. *B. asperrima*

1b. Leaves whorled; bracts 4-5 pairs; capsules ellipsoid:

2a. Leaves petiolate, acute; flowers in clusters ...2. *B. maderaspatensis*

2b. Leaves sessile, obtuse; flowers solitary ...3. *B. repens*

1. *Blepharis asperrima* Nees in DC., Prodr. 11: 267. 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 478. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 41. 1994.

Small herbs, annual or perennial, erect or prostrate; stems shining, pubescent. Leaves opposite, ovate or ovate-lanceolate, 3-7 x 2-3 cm, acute to acuminate at apex, entire or spinous-dentate, glabrous or with scattered bulbous-based hairs. Flowers solitary in upper axils or in terminal, short spikes; bracts in 3 opposite pairs. Calyx-segments oblong-spathulate. Corolla bright blue or white with darker veins; upper lip absent; tube white, ca 2.5 cm long. Capsules oblong, compressed, ca 1 cm long, 2 or 4-seeded. Seeds ovoid, echinate.

Rare. In moist shady places. Bhopal (Oommachan, 1977). Fl. & Fr.: Oct. Jan.

2. *Blepharis maderaspatensis* (L.) Heyne ex Roth, Nov. Pl. Sp. 320. 1821; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 42. 1994. *Acanthus maderaspatensis* L., Sp. Pl. 639. 1753. *Blepharis boerhaviaefolia* Pers., Syn. Pl. 2: 180. 1806, non Roth, 1821; C.B. Clarke in Hook. f., Fl. Brit. India 4: 478. 1884. - *Dudhiya choti*.

Herbs, perennial, diffuse or prostrate, pubescent; stems divaricately branched, wiry. Leaves in whorls of 4, 2 smaller and 2 larger at each node, elliptic, ovate-lanceolate or oblanceolate, 3-9 x 1.5-3.5 cm, acute at apex, cuneate at base, subentire, ciliate on margin, appressed pubescent. Flowers axillary, in 2-3-flowered clusters, often combined into leafy spikes; bracts

8, in 4 opposite pairs, obovate-spathulate, upper with bristles on margin. Calyx-segments oblong, ciliate. Corolla pale blue or pink with a yellow spot inside the lower lip. Capsules ellipsoid, ca 7 mm long, brown, 2-seeded. Seeds densely papillose.

Common as undergrowth in mixed forests and in wastelands. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Gwalior, Hoshangabad, Jabalpur, Mandla, Panna, Raigarh, Rajnandgaon, Rewa, Sagar, Satna, Sidhi. *Fl. & Fr.*: Sept. - April.

3. *Blepharis repens* (Vahl) Roth, Nov. Pl. Sp. 321. 1821; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 42. 1994. *Acanthus repens* Vahl, *Symb. Bot.* 2: 76. 1791. *Blepharis molluginifolia* Pers., *Syn. Pl.* 2: 180. 1806. C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 479. 1884.

Herbs, annual, prostrate, pubescent; stems diffuse, wiry. Leaves in whorls of 4, oblong or obovate, 1-3 x 0.5-0.6 cm, mucronate at apex, entire, slightly succulent. Flowers axillary, solitary; bracts 8-10, in opposite pairs, spinous. Calyx-segments linear-lanceolate, ca 8 mm long; outer one 2-fid at tip; inner linear. Corolla blue or violet; tube ca 3 mm long. Capsules ellipsoid, compressed, ca 6 mm long, glabrous, completely enclosed within accrescent calyx, 2-seeded. Seeds broadly ellipsoid, hairy.

Common in wastelands. Bhopal, Bilaspur, Indore, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. - Jan.

8. *CARVIA* Bremek.

Shrubs. Leaves densely ciliate on margin, scabrid above with bristles. Flowers in short spikes, solitary in the axil of bract; bracts persistent, longer than calyx; bracteoles absent. Calyx 5-partite; segments obtuse, imbricate. Corolla bilabiate, not resupinate; lobes subequal, twisted to left in bud; throat campanulate, terete. Stamens 4, didynamous, included; longer filaments hairy at base; shorter ones glabrous; anthers erect, not spurred. Ovary with 2 ovules in each locule. Capsules glabrous, 2-seeded.

A monotypic genus; endemic to India.

Carvia callosa (Nees) Bremek. in *Verh. Acad. Wet. Afd. Natuurk. sect. 2.* 41 (1): 187. 1944; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 45. 1994. *Strobilanthes callosa* Nees in Wallich, *Pl. Asiat. Rar.* 3: 85. 1832.

C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 451. 1884. *S. grahamianus* Wight, Icon. Pl. Ind. Orient. 4(4): t. 1520. 1850. *Maruadana*.

Undershrubs or shrubs, perennial, erect, up to 3 m high; stems faintly 4-angled, swollen at nodes. Leaves in unequal pairs, oblanceolate or elliptic-lanceolate, 8-20 x 5-10 cm, acuminate at apex, cuneate at base, crenate-serrate or dentate, scabrous above, pubescent beneath. Flowers in axillary, simple or branched spikes, enclosed in bracts; bracts violet to whitish green, boat-shaped, obtuse, glabrous or white hispid. Calyx divided nearly up to base, pubescent, persistent; segments elliptic-lanceolate, coriaceous. Corolla bright blue, ca 3.5 cm long; lobes orbicular, large; tube pale or white, cylindrical. Capsules obovoid or ellipsoid, compressed, green. Seeds densely appressed hairy.

- 1a. Bracts glabrous ...1.1. var. *callosa*
 1b. Bracts white hispid ...1.2. var. *hispida*

1.1. var. *callosa*

In dry mixed deciduous forests. Bastar, Bhopal, Hoshangabad, Indore. *Fl. & Fr.*: Sept. - April.

1.2. var. *hispida* (C.B. Clarke) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect.2. 41(1). 187. 1944. *Strobilanthes callosa* Nees var. *hispida* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 451. 1884.

Rare. Near patches of evergreen forests. Bastar (Arora, 1968). *Fl. & Fr.*: Sept. - Dec.

9. CROSSANDRA Salisb.

Undershrubs. Leaves opposite or whorled, entire or undulate, sometimes slightly dentate. Flowers in linear-oblong spikes, sessile; bracts foliaceous, imbricate, rather large; bracteoles linear or lanceolate, as long as the calyx. Calyx 5 partite; 2 lower segments oblong, sometimes connate; 2 innermost lanceolate, smaller. Corolla hypocrateriform, 5-lobed; lobes elliptic, subequal, imbricate in bud; tube incurved. Stamens 4, didynamous, included in corolla-tube; anthers 1-celled; connectives mucronate. Ovary 2-locular; ovules 2 in each locule; style linear; stigma 2-lobed. Capsules oblong, acute, 4-seeded. Seeds compressed, covered with appressed fringed scales formed of many connate hairs.

About 50 species; tropical Africa, Arabia and Madagascar; one in M.P.

Crossandra infundibuliformis (L.) Nees in Wallich, Pl. Asiat. Rar. 3: 98. 1832; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 46. 1994. *Justicia infundibuliformis* L., Syst. Nat. ed. 10. 850. 1759. *Crossandra undulaefolia* Salisb. in W. Hook., Parad. Lond. t. 12. 1805; C.B. Clarke in Hook. f., Fl. Brit. India 4: 492. 1884. *C. axillaris* Nees in Wallich, Pl. Asiat. Rar. 3: 98. 1832. - *Priya-darsa*.

Large herbs or undershrubs, perennial, up to 1.5 m high. Leaves in whorls of 4, crowded near the inflorescence, elliptic or lanceolate, 5-12 x 2-5 cm, acute at apex, tapering at base, entire, glabrous. Flowers in terminal and axillary, dense spikes; bracts lanceolate, glandular pubescent; bracteoles linear, subulate, pubescent, ciliate. Calyx-segments lanceolate, unequal, 7-9 mm long, glandular pubescent. Corolla orange-yellow; lobes connate near middle; tube ca 2.5 cm long, narrow. Capsules glabrous. Seeds orbicular.

Ornamental, cultivated in gardens. Bhopal, Indore. *Fl. & Fr.*: Aug. March.

10. DICLIPTERA Juss., *nom. cons.*

Herbs, erect or diffuse. Leaves simple, opposite, entire or obscurely undulate, lineolate. Flowers in axillary or terminal clusters or cymes, one or more flowers often reduced to a rudimentary calyx and bracteoles, sessile or subsessile; bracts opposite, unequal, larger than calyx; bracteoles linear or linear-lanceolate, more or less equal to calyx. Calyx deeply 5-partite; segments linear-lanceolate, equal, more or less pubescent; tube short. Corolla white, pink or red with purple spots, bilabiate; upper lip narrow, entire or emarginate; lower lip 3-lobed, recurved; tube slender. Stamens 2; anthers 2-celled; cells superposed, mucicous. Ovary 2-locular; ovules 2 in each locule; style filiform; stigma 2-fid. Capsules clavate or ellipsoid, with a solid stipe; placentae separating elastically from base. Seeds ovoid or suborbicular, verrucose, echinulate, tuberculate or papillose.

About 150 species; tropical and subtropical regions; 5 in M.P.

- 1a. Plants densely pubescent ...2. *D. hupleuroides*
 1b. Plants usually glabrous, sometimes sparsely pubescent:

- 2a. Flowers in panicles:
- 3a. Leaves more than 6 cm long; panicles lax; bracts not cuneate ...1. *D. beddomei*
- 3b. Leaves up to 6 cm long; panicles not lax; bracts cuneate ...3. *D. cuneata*
- 2b. Flowers in capitate cymes or clusters:
- 4a. Corolla 15-20 mm long; capsules ca 15 mm long ...4. *D. roxburghiana*
- 4b. Corolla 3-6 mm long; capsules ca 3 mm long ...5. *D. verticillata*

1. *Dicliptera beddomei* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 551, 1885.

Herbs, erect or diffuse; stems striate, glabrous except the tips. Leaves ovate, ca 12 x 7 cm, acuminate at apex, minutely pubescent; petioles up to 5 cm long. Flowers in lax panicles, often white-pubescent; bracts linear-oblong, ca 8 mm long, abruptly mucronate, ciliate; bracteoles linear-lanceolate. Corolla minutely pubescent. Capsules clavate, ca 8 mm long, pubescent. Seeds verrucose.

Rare. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: Dec. - March.

2. *Dicliptera bupleuroides* Nees in Wallich, Pl. Asiat. Rar. 3: 111, 1832. *D. roxburghiana* Nees var. *bupleuroides* (Nees) C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 554, 1885.

Herbs or undershrubs, densely pubescent. Leaves ovate or elliptic, acute or acuminate at apex, glabrous or sometimes pubescent. Flowers in terminal and axillary, dense clusters, sessile; bracts linear or linear-oblong, nearly parallel-sided, acuminate-cuspidate; bracteoles pubescent. Calyx-segments unequal, subulate-setaceous. Corolla rosy purple; lobes subequal, pubescent. Capsules pubescent.

Rare. Mandla (Joseph & Vajravelu, 1967). *Fl. & Fr.*: Feb. - April.

3. *Dicliptera cuneata* Nees in Wallich, Pl. Asiat. Rar. 3: 111, 1832 & in DC., Prodr. 11: 481, 1847; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 552, 1885.

Herbs, erect, ca 50 cm high; branches glabrous, grooved. Leaves ovate, ca 6 x 3 cm, acuminate at apex, rounded at base, glabrous to sparsely puberulous. Flowers in axillary and terminal, paniculate cymes, pedicellate; bracts ovate-oblong, cuneate; bracteoles linear, pubescent. Calyx-segments almost free up to base, linear, puberulous. Corolla-lobes ca 7 mm long. Capsules ellipsoid, compressed, ca 6 mm long. Seeds compressed, tuberculate.

Rare. Bastar. *Fl. & Fr.*: Feb. - March.

4. *Dicliptera roxburghiana* Nees in Wallich, *Pl. Asiat. Rar.* 3: 111. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 553. 1885; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 47. 1994.

Herbs, perennial, 0.5-1 m high; stems sparsely pubescent. Leaves elliptic or ovate, 3-12 x 1.5-6 cm, acute at apex, cuneate at base, puberulous; petioles up to 12 mm long. Flowers in axillary and terminal, 2-4-flowered, pedunculate, capitate cymes; bracts obovate or oblanceolate, ca 1 cm long, ciliate on margin, pubescent; bracteoles linear, glandular pubescent. Calyx 5-6 mm long, glandular pubescent; segments linear. Corolla rosy purple, 1.5-2 cm long. Capsules clavate, ca 1.5 cm long, glabrescent. Seeds verrucose.

Common in rock crevices and wastelands. Bastar. Hoshangabad. Raigarh, Raipur. *Fl. & Fr.*: Feb. - June.

5. *Dicliptera verticillata* (Forssk.) C. Christensen in *Dansk. Bot. Arkiv.* 4(3): 11. 1922; Wood *et al.* in *Kew Bull.* 38: 450. 1983; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 48. 1994. *Dianthera verticillata* Forssk., *Fl. Aegypt.-Arab.* 9. 1775. *Dicliptera micranthes* Nees in Wallich, *Pl. Asiat. Rar.* 3: 112. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 553. 1885.

Herbs, annual, ascending, branched, up to 50 cm high; stems 6-angled, glabrous or pubescent. Leaves elliptic or ovate, 4-8 x 2-4 cm, acute or acuminate at apex, glabrous or slightly pubescent; petioles 2-3 cm long. Flowers in axillary, dense, globose, sessile clusters; bracts 2, foliaceous, obovate-lanceolate, spine-tipped; bracteoles linear, pubescent. Calyx-segments ca 3 mm long, acute or spinescent. Corolla with dark purple spots at throat, 3-6 mm long, pubescent outside. Capsules ellipsoid, compressed, ca 3 mm long, pubescent at tip. Seeds echinulate.

Common in wastelands. Bilaspur, Chhatarpur, Durg, Gwalior, Indore, Morena, Raigarh. *Fl. & Fr.*: Oct. - April.

11. DIPTERACANTHUS Nees

Herbs, erect or prostrate. Leaves opposite or alternate, entire or subentire, petiolate. Flowers terminal or axillary, solitary or in clusters or racemes, sessile or subsessile; bracts absent; bracteoles large, foliaceous, usually exceeding the calyx. Calyx 5-lobed; lobes valvate, subequal, shortly decurrent. Corolla infundibuliform, caducous, 5-lobed; lobes ovate, subequal, obtuse or fimbriate, twisted to left in bud, equally spreading. Stamens 4, didynamous, included; filaments shortly connate at base and forming a sheath, glabrous or sometimes hairy at base; anther cells oblong, equal, mucous. Ovary oblong-cylindrical, 2-locular; ovules 6 or more in each locule; style linear, hairy; stigma 1 or 2-lamellate. Capsules oblong or clavate, with a solid stipe, 12 or more-seeded. Seeds orbicular, flattened, hygroscopically hairy.

About 10 species; tropical E. Africa, Asia and Australia; 5 in M.P.

- 1a. Plants prostrate or decumbent ...4. *D. prostratus*
- 1b. Plants erect:
 - 2a. Leaves alternate; corolla white with pink or purple markings ...2. *D. cernuus*
 - 2b. Leaves opposite; corolla of uniform colour:
 - 3a. Corolla white; lobes glabrous ...5. *D. suffruticosus*
 - 3b. Corolla lilac-red or pale purple; lobes pubescent:
 - 4a. Leaves elliptic or lanceolate, long acuminate, 10-15 cm long; bracteoles ca 2.5 cm long ...1. *D. beddomei*
 - 4b. Leaves ovate or ovate-elliptic, obtuse, up to 6 cm long; bracteoles ca 1 cm long ...3. *D. patulus*

1. *Dipteracanthus beddomei* (C.B. Clarke) Santapau in Indian For. 79: 322. 1953; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 49. 1994. *Ruellia beddomei* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 413. 1884. **Fig. 51.**



Fig. 51. *Dipteracanthus beddomei* (C.B. Clarke) Santapau

Herbs, perennial, erect. 30-70 cm high; stems 4-angled, glabrous or sometimes sparsely pubescent. Leaves elliptic to lanceolate, 10-15 x 3.5-5 cm, mostly long acuminate at apex, suddenly narrowed at base, subentire-undulate, ciliate. Flowers subsessile; bracteoles elliptic or ovate, sometimes lanceolate, *ca* 2.5 cm long. Calyx-lobes linear-lanceolate, 7-8 mm long, ciliate. Corolla pale purple, 7-8 cm long; lobes oblong-orbicular, pubescent outside. Capsules clavate, *ca* 2.5 cm long, glabrous.

Rare. In sal forests and on hill slopes. Balaghat, Seoni, Shahdol. *Fl. & Fr.*: Aug. - Dec.

2. *Dipteracanthus cernuus* (Roxb.) Santapau in Indian For. 79: 322. 1953; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 50. 1994. *Ruellia cernua* Roxb., *Fl. Ind.* 3: 45. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 413. 1884.

Herbs, annual, erect, *ca* 70 cm high; stems pubescent towards apex; branches opposite, glabrous. Leaves alternate, drooping, ovate-lanceolate, 5-10 x 2.5-3 cm, acuminate at apex, glabrous or puberulous. Flowers axillary, subsessile; bracteoles lanceolate or elliptic, *ca* 2.5 cm long, acute. Calyx-lobes linear, *ca* 1.5 cm long, pubescent. Corolla white with pink or purple markings, 2.5-3 cm long; tube as long as the ventricose part. Capsules *ca* 2 cm long, pubescent.

Rare. In mixed forests. Hoshangabad. *Fl. & Fr.*: Aug. - Dec.

3. *Dipteracanthus patulus* (Jacq.) Nees in Wallich, *Pl. Asiat. Rar.* 3: 82. 1832; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 50. 1994. *Ruellia patula* Jacq., *Misc. Austriac.* 2: 358. 1781; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 412. 1884. **Fig. 52.**

Herbs, erect, branched, hoary pubescent, up to 70 cm high; stems somewhat 4-angled. Leaves opposite, ovate or ovate-elliptic, 2-6 x 1.5-3 cm, obtuse at apex, entire, hirsute. Flowers axillary, solitary or in clusters, subsessile; bracteoles lanceolate, *ca* 1 cm long, ciliate on margin, pubescent. Calyx-lobes linear, acute, pubescent. Corolla lilac-red to pale purple, 2.5-4 cm long; lobes pubescent outside; tube as long as the ventricose part. Capsules oblong, *ca* 2 cm long, brown, glabrous, *ca* 12-seeded. Seeds suborbicular, flat, glabrous.

Rare. In river beds. Bhopal, Hoshangabad. *Fl. & Fr.*: June - Nov.

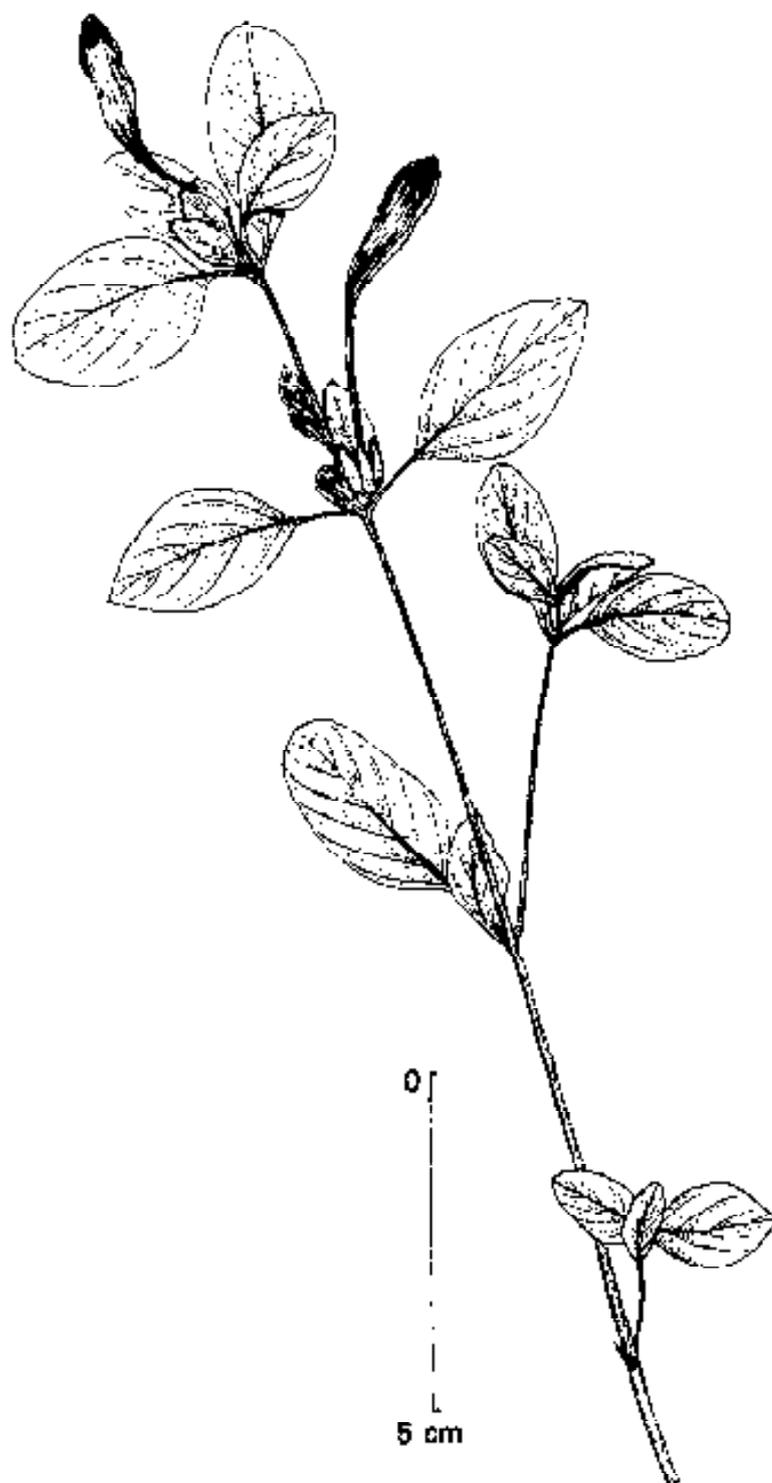


Fig. 52. *Dipteracanthus patulus* (Jacq.) Nees

The plant is referred for the treatment of rheumatic diseases.

4. *Dipteracanthus prostratus* (Poir.) Nees in Wallich, Pl. Asiat. Rar. 3: 81. 1832; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 53. 1994. *Ruellia prostrata* Poir. in Lam., Encycl. 6: 349. 1804; C.B. Clarke in Hook. f., Fl. Brit. India 4: 411. 1884, *incl. var. dejecta* C.B. Clarke in Hook. f., Fl. Brit. India 4: 412. 1884. *Dipteracanthus dejectus* Nees in Wallich, Pl. Asiat. Rar. 3: 82. 1832.

Herbs, perennial, prostrate or decumbent, up to 50 cm high; stems much branched, terete at internodes. Leaves ovate-elliptic, 2-8 x 0.5-3 cm, acute to acuminate at apex, entire, ciliate on margin, sparsely pubescent. Flowers axillary, usually solitary, sessile; bracteoles elliptic-oblong, 1-3 cm long, ciliate on margin, pubescent. Calyx-lobes linear, 8-18 mm long, puberulous, ciliate. Corolla pale mauve-violet, caducous, pubescent outside; ventricose part 2-3 cm long, twice the length of tube. Capsules clavate, ca 2 cm long, brown, pubescent.

Common in wastelands and sandy river beds. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, Indore, Mandla, Panna, Raipur, Rewa, Seoni, Shivpuri, Sidhi, Tikamgarh. *Fl. & Fr.*: April - June.

5. *Dipteracanthus suffruticosus* (Roxb.) Voigt, Hort. Suburb. Calcutt. 483. 1845; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 53. 1994. *Ruellia suffruticosa* Roxb., Fl. Ind. 3: 53. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 413. 1884.

Herbs, perennial, erect, 30-60 cm high; stems pubescent; roots tuberous with fusiform swellings. Leaves oblong or broadly elliptic, ca 10 x 4 cm, rounded or obtuse at apex, pubescent. Flowers terminal, solitary, subsessile; bracteoles elliptic, ca 2 cm long, acute. Calyx-lobes linear, ca 6 mm long, glabrous or puberulous. Corolla white, ca 4 cm long; lobes rounded, glabrous. Capsules oblong, ca 3.5 cm long, 12-14-seeded. Seeds discoid.

Common in mixed forests. Bilaspur, Hoshangabad, Raipur, Sidhi. *Fl. & Fr.*: Aug. - June.

12. DYSCHORISTE Nees

Herbs or undershrubs, perennial, prostrate or decumbent. Leaves simple, opposite or appearing whorled, entire or serrulate, shortly petiolate.

Flowers solitary or in axillary clusters or contracted cymes, subsessile; bracts and bracteoles small, narrow. Calyx tubular, 5-lobed or partite; lobes or segments subequal. Corolla tubular, bilabiate; lobes 5, subequal, obtuse, twisted to left in bud, spreading in flower. Stamens 4, didynamous, adnate near the middle of corolla-tube, exserted; filaments glabrous or pubescent; anthers 2-celled; cells oblong, shortly mucronate at base. Disk annular or lobed. Ovary oblong, glabrous, 2-locular; ovules 2 in each locule; style filiform, hairy; stigma simple, linear, recurved. Capsules oblong, with solid base. Seeds orbicular, compressed, hygroscopically hairy, on strong retinacula.

About 65 species; tropical and subtropical regions; 2 in M.P.

- 1a. Calyx 6-8 mm long; corolla 8-10 mm long ...1. *D. nagchana*
 1b. Calyx 12-15 mm long; corolla 18-25 mm long ...2. *D. vagans*

1. *Dyschoriste nagchana* (Nees) Bennet in Indian For. 109: 220. 1983. *Dipteracanthus nagchana* Nees in Wallich, Pl. Asiat. Rar. 3: 82. 1832. *Dyschoriste depressa* Nees in Wallich, Pl. Asiat. Rar. 3: 81. 1832; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 56. 1994. *D. cernua* Nees in Wallich, Pl. Asiat. Rar. 3: 81. 1832. *D. erecta* (Burm. f.) Kuntze, Revis. Gen. Pl. 485. 1891 *excl. type*. *Calophanes nagchana* (Nees) Nees in DC., Prodr. 11: 109. 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 410. 1884.

Herbs, perennial; branches usually prostrate, rooting at nodes. Leaves broadly elliptic or obovate, 2-5 x 0.5-1.5 cm, entire or dentate, glabrous. Flowers axillary, solitary or in clusters; bracts absent; bracteoles linear. Calyx 6-8 mm long, divided almost up to base, pubescent; segments linear-lanceolate. Corolla pale pink, 8-10 mm long; lobes oblong. Capsules ca 1 cm long, glabrous, 4-seeded.

Common in wastelands. Bastar, Bilaspur, Durg, Indore, Jabalpur, Mandla. *Fl. & Fr.*: Dec. Feb.

2. *Dyschoriste vagans* (Wight) Kuntze, Revis. Gen. Pl. 486. 1891; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 57. 1994. *Calophanes vagans* Wight, Icon. Pl. Ind. Orient. 4: t. 1526. 1850; C.B. Clarke in Hook. f., Fl. Brit. India 4: 411. 1884.

Herbs or undershrubs, decumbent, up to 1 m high; stems angular; branches strigulose. Leaves ovate, lanceolate or elliptic-ovate, 3.5-6.5 x

2-3 cm, acuminate at apex, acute at base, hispidulous above, pale beneath; petioles *ca* 1 cm long. Flowers in glandular pubescent cymes or axillary clusters; bracts and bracteoles linear. Calyx 12-15 mm long; lobes linear, acuminate, with subequal, filiform-tipped teeth and stalked glands. Corolla purple, abruptly expanded above, 18-25 mm long, pubescent outside. Capsules *ca* 1 cm long, 4-seeded.

In moist places. Bastar, Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. - Feb.

13. ECBOLIUM Kurz

Undershrubs or shrubs, nearly glabrous. Leaves entire, rather coriaceous. Flowers in axillary and terminal, dense, many-flowered spikes; bracts large, foliaceous, imbricate, sometimes dentate; bracteoles 2, linear or lanceolate, small. Calyx 5-partite; segments linear, narrow, equal or unequal, connate below. Corolla bilabiate; upper lip narrow, shortly 2-lobed; lower lip 3-lobed, pendent; lobes imbricate in bud; tube long, slender. Stamens 2, adnate near the apex of corolla-tube; anthers 2-celled, oblong, mucicous. Ovary glabrous or hairy, 2-locular; ovules 2 in each locule; style filiform; stigma shortly 2-fid. Capsules ovoid, narrowed into a solid stipe, 2-4-seeded. Seeds large, compressed, tuberculate, scabrous.

About 19 species; tropical and S. Africa, Madagascar, Socotra and India; one in M.P.

Ecboium viride (Forssk.) Alston in Trimen, *Handb. Fl. Ceylon* 6 (suppl.): 229. 1931. *Justicia viridis* Forssk., *Fl. Aegypt.-Arab.* 5. 1775. *Ecboium linneanum* Kurz in *J. Asiat. Soc. Bengal* 2: 75. 1871; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 544. 1885.

Undershrubs. Leaves obovate or elliptic-ovate, up to 10 x 6 cm, acute at apex, attenuate at base. Flowers in axillary and terminal, leafy spikes; bracts obtuse or slightly acute; bracteoles narrow. Calyx-segments subequal, acuminate. Corolla bluish green; lower lip with 2 wing like lateral lobes. Capsules compressed, *ca* 1.5 cm long, beaked, 2-seeded. Seeds orbicular.

Rare. Chhindwara (Rao & Narayanaswamy, 1960). *Fl. & Fr.*: Throughout the year.

14. ELYTRARIA Michx., *nom. cons.*

Herbs; stems short or absent. Leaves alternate, crowded, radical or subradical. Flowers in simple or branched, rigid spikes. small, closely arranged; scapes covered with spirally arranged, imbricate bracts; bracteoles small. Calyx more or less 4-partite; lobes unequal, the largest sometimes 2-fid. Corolla small, bilabiate; upper lip obtuse; lower lip forked, acute; lobes 5, imbricate in bud; tube linear. Stamens 2, fertile, adnate to throat, included or slightly exerted; anther cells 2, parallel, with or without a minute spur at base. Disk small. Ovary 2-locular; ovules 6-10 in each locule; style short, slender; stigma shortly 2-lobed. Capsules ovoid or ellipsoid. Seeds ovoid, minute, reticulate, minutely papillose, not on retinacula.

About 7 species; tropical and subtropical regions; one in M.P.

Elytraria acaulis (L. f.) Lindau in Engl. & Prantl, Nat. Pflanzenfam. Nachtr. 1, 304. 1897; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 59. 1994. *Justicia acaulis* L. f., Suppl. Pl. 84. 1782. *Tubiflora acaulis* (L. f.) Kuntze, Revis. Gen. Pl. 1: 500. 1891. *Elytraria crenata* Vahl, Enum. Pl. 1: 106. 1804; C.B. Clarke in Hook. f., Fl. Brit. India 4: 394. 1884.

Herbs, 10-20 cm high. Leaves radical, in a rosette, oblong to obovate or spatulate, 6-20 x 3-8 cm, rounded or obtuse at apex, cuneate at base, crenate-dentate, glabrous, shortly petiolate. Flowers in simple or branched spikes borne on scapes; scapes ca 20 cm long; bracts ovate, acuminate, aristate, lower ones sterile, upper ones fertile; bracteoles 2, linear, pubescent. Calyx-lobes lanceolate, scarious and ciliate on margin. Corolla white or bluish white or pinkish; lobes ovate. Capsules ovoid, brown, glabrous. Seeds flattened.

Common in shady places. Betul, Chhatarpur, Gwalior, Panna, Rewa, Satna, Shivpuri. *Fl. & Fr.*: April - Nov.

Roots are considered effective for the treatment of breast tumour, abscess, pneumonia and infantile diarrhoea while leaves as antipyretic.

15. ERANTHEMUM L.

Herbs or shrubs, perennial, glabrous. Leaves opposite, entire or crenulate, lineolate. Flowers in terminal, simple or branched spikes, heads

or corymbs, subsessile; bracts large; bracteoles smaller. Calyx 5-lobed; lobes narrow, short, unequal or subequal, scarious. Corolla 5-lobed; lobes subequal, spreading, twisted to left; tube long, slender, widened at the top or sometimes at the middle. Stamens 2, fertile, glabrous; anthers 2-celled. Staminodes 2, small. Disk annular or shortly cupular. Ovary 2-locular; ovules 2 in each locule; style filiform, hairy; stigma entire or minutely 2-lobed. Capsules oblong or clavate, with solid base, 4-seeded. Seeds discoid, compressed, smooth or rugose, on retinacula.

About 30 species; tropical Asia; 3 in M.P.

- 1a. Bracts green ...2. *E. purpurascens*
 1b. Bracts white:
 2a. Leaves 12-20 cm long; bracts ovate or elliptic, glabrous; calyx 9-10 mm long ...1. *E. nervosum*
 2b. Leaves up to 12 cm long; bracts obovate, glandular strigose; calyx ca 5 mm long ...3. *E. roseum*

1. ***Eranthemum nervosum*** (Vahl) R. Br., Prodr. 477. 1810; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 61. 1994. *Justicia nervosa* Vahl, Enum. Pl. 1: 164. 1804. *Eranthemum pulchellum* Andr., Bot. Repos. t. 88. 1800, non Roxb., 1832. *Daedalacanthus nervosus* T. Anderson in J. Linn. Soc. Bot. 9: 487. 1867; C.B. Clarke in Hook. f., Fl. Brit. India 4: 418. 1884.

Herbs or undershrubs, perennial, up to 1 m high; stems 4-angled. Leaves ovate-elliptic, 12-20 x 6-9 cm, acuminate at apex, attenuate at base, entire or crenulate. Flowers in terminal, closed, panicles composed of short, uninterrupted spikes; bracts foliaceous, white with dark green nerves, ovate or elliptic, abruptly acute or acuminate, glabrous, lineolate; bracteoles lanceolate, 5-6 mm long, ciliate. Calyx 9-10 mm long, densely pubescent; lobes lanceolate, unequal. Corolla 2.5-3 cm long; lobes 7-8 mm long, rounded. Capsules ca 1.5 cm long, glabrous. Seeds hairy.

In moist places. Bastar, Chhatarpur, Damoh, Raigarh, Surguja. Fl. & Fr.: Feb. - April.

2. ***Eranthemum purpurascens*** Wight ex Nees in Wallich, Pl. Asiat. Rar. 3: 106. 1832; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 62. 1994. *E. pulchellum* Roxb., Fl. Ind. 1: 111. 1832, non Andr., 1800. *Justicia pulchella* Roxb., Pl. Coromandel 2: 41. t. 177. 1805. *Daedalacanthus*

purpurascens (Wight ex Nees) T. Anderson in *J. Linn. Soc. Bot.* 9: 488. 1867; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 420. 1884. *Eranthemum pulchellum* Andr. var. *purpurascens* Kuntze in Kanjilal *et al.*, *Fl. Assam* 3: 439. 1939.

Herbs or undershrubs, erect, stout, up to 1 m high; branches 4-angled, puberulous. Leaves ovate or ovate-elliptic, 13-18 x 6-8 cm, acuminate at apex, cuneate at base. Flowers in terminal or axillary, dense, 3-8 cm long spikes; bracts ovate-lanceolate, ca 2.5 cm long, glandular pubescent; bracteoles linear-lanceolate, glandular pubescent, ciliate. Calyx white, 6-9 mm long, pubescent; lobes lanceolate. Corolla lilac or bluish purple, 3-5 cm long; lobes ovate to obovate, pubescent outside. Capsules ca 1.5 cm long, glabrous.

Common in mixed forests. Balaghat, Bastar, Bilaspur, Chhatarpur, Durg, Hoshangabad, Indore, Jabalpur, Mandla, Morena, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa. Sagar, Satna, Seoni, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Oct. - April.

3. *Eranthemum roseum* (Vahl) R. Br., Prodr. 477. 1810; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 62. 1994. *Justicia rosea* Vahl, *Enum. Pl.* 1: 165. 1804. *Daedalacanthus roseus* (Vahl) T. Anderson in *J. Linn. Soc. Bot.* 9: 487. 1867; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 419. 1884.

Herbs or undershrubs, erect, up to 1.5 m high. Leaves elliptic or ovate-lanceolate, 6-12 x 3-5 cm, acuminate at apex, subentire, glabrous. Flowers in terminal and axillary, linear, 7-15 cm long spikes; bracts white with green hairs, obovate, ca 1.5 cm long, mucronate or shortly apiculate, glandular strigose; bracteoles linear, pubescent, ciliate. Calyx white, ca 5 mm long, pubescent; lobes lanceolate. Corolla violet-blue, 2-4 cm long; lobes oblong-obovate; tube slender. Capsules up to 1.5 cm long, glabrous, 4-seeded. Seeds brown.

Rare. In rock crevices. Indore, Mandla. *Fl. & Fr.*: Nov. - Dec.

16. GANTELBUA Bremek.

Herbs, annual, procumbent or diffuse, strigose. Leaves subentire, strigose, tapering into petiole at base. Flowers in clustered spikes; bracts 4, large, cartilaginous, setose on margins, each lower bract subtending a flower and superposed contracted secondary spikes, each upper bract

supporting one or two superposed flowers, bracts of secondary spikes narrower. Calyx 5-partite. Corolla 5-lobed. Stamens 4; anthers mucicous. Capsules linear-oblong. Seeds covered with hairs.

A monotypic genus; endemic to India.

Gantelbua urens (Heyne ex Roth) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 147. 1944; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 65. 1994. *Ruellia urens* Heyne ex Roth, Nov. Pl. Sp. 302. 1821. *R. dura* Nees in Hook., Comp. Bot. Mag. 2: 311. 1837. *Hemigraphis dura* (Nees) T. Anderson in J. Linn. Soc. Bot. 9: 461. 1867, *excl. syn. Ruellia crispa* Nees, *non* L., 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 422. 1884.

Herbs, up to 60 cm high; stems somewhat 4-angled, covered with stout, white hairs. Leaves oblong-lanceolate, 1.5-4 x 0.9-2 cm, obtuse at apex, shortly petiolate. Flowers in terminal, many-flowered spikes, densely covered with white and yellowish brown hairs; bracts spatulate or ovate-oblong, 2-3 cm long, densely pubescent. Calyx-segments linear, ca 1.2 cm long, densely pubescent, ciliate. Corolla blue or violet, ca 1.5 cm long; lobes subequal; tube slender. Capsules ca 1.4 cm long, glabrous, 6-8-seeded. Seeds broadly ellipsoid or suborbicular, yellowish brown.

Common on gravelly soil. Bhopal, East Nimar, Indore, Narsimhapur, Raipur, Seoni, *Fl. & Fr.*: Dec. Feb.

17. GENDARUSSA Nees

Undershrubs or shrubs, erect. Leaves opposite, connected by transverse ridges, with cystolith. Flowers in terminal and axillary spikes or narrow panicles; bracts narrow. lower bracts 3 or more-flowered, upper ones 1-flowered. Calyx 5-partite; segments narrow, subequal. Corolla bilabiate; upper lip deltoid; lower lip with a palate, 3-lobed; lobes imbricate in bud; tube narrow, widened in the upper part. Stamens 2, inserted at base of the widened part of corolla-tube, exserted; anther cells 2; upper cell with a short while lower cell with a larger basal spur. Staminodes absent. Ovary with 2 ovules in each locule; style filiform; stigma subentire. Capsules clavate, glabrous, 4-seeded.

Two species; Indo-Malesia; one in M.P.

Gendarussa vulgaris Nees in Wallich, Pl. Asiat. Rar. 3: 104. 1832; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 67. 1994. *Justicia gendarussa* Burm. f., Fl. Ind. 10. 1768; C.B. Clarke in Hook. f., Fl. Brit. India 4: 532. 1885. - *Nili-nargandi*.

Undershrubs, erect, much branched. ca 1 m high; stems often rooting from the lower nodes. Leaves lanceolate or linear-lanceolate, 5-12 x 1-3 cm, bluntly acuminate at apex, cuneate at base, crenate or undulate, subcoriaceous, glabrous. Flowers in terminal, glabrous or puberulous, often paniculate spikes; bracts linear, small. Calyx ca 5 mm long. Corolla white with purple veins and spots inside, 1.5-2 cm long. Capsules ca 1.2 cm long.

Commonly planted as hedge in gardens, also found as escape in wastelands. Bastar, Bhopal, Bilaspur, Chhatarpur, Mandla, Raipur. *Fl. & Fr.*: Jan. - Feb.

18. HAPLANTHODES Kuntze

Herbs, erect. Leaves entire, petiolate. Flowers axillary, in pseudo-whorls, surrounded by numerous, abortive branchlets reduced to spine like cladodes terminated by 2-3 minute spinous or subspinous points; bracts and bracteoles small. Calyx 5-partite; segments subequal. Corolla small, tubular, bilabiate; upper lip 2-lobed; lower lip obtusely 3-lobed; tube slightly enlarged above. Stamens 2, shorter than corolla, adnate below the throat; filaments flattened; anthers 2-celled, connivent; cells unequal, mucicous, one cell usually bearded on the back. Disk thick, prominent. Ovary 2-locular; ovules 3-8 in each locule; style slender; stigma linear. Capsules linear-oblong, compressed at right angles to the septum, 6-16-seeded. Seeds ellipsoid, densely hygroscopically hairy.

Three species; Indo-Malesia; 2 in M.P.

- 1a. Cladodes up to 2.5 cm long; bracteoles shorter than calyx; capsules hairy ...1. *H. tentaculatus*
 1b. Cladodes more than 2.5 cm long; bracteoles longer than calyx; capsules glabrous ...2. *H. verticillatus*

1. *Haplantodes tentaculatus* (Nees) Majumdar in Bull. Bot. Soc. Bengal 25: 76. 1971. *Haplantus tentaculatus* Nees in DC., Prodr. 11: 513. 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 506. 1884.

Herbs, slender; stems 4-angled in the upper part, glandular pubescent. Leaves ovate, 4-12 x 2-7 cm, acuminate at apex, pubescent; axillary cladodes (spines) slender, 2-2.5 cm long, densely covered with short and long hairs, with 2 or 3, villous teeth at apex. Flowers in between the cladodes, sessile; bracteoles subulate, shorter than calyx. Calyx-segments linear-subulate, pubescent. Corolla blue or lilac. Capsules oblong, *ca* 1 cm long, hairy.

As forest undergrowth. Dhar (Duthie, 1903-1929; Samvatsar, 1996), Jhabua (Samvatsar, 1996). *Fl. & Fr.*: Dec. - Jan.

2. *Haplanthodes verticillatus* (Roxb.) Majumdar in Bull. Bot. Soc. Bengal 25: 76. 1971; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 68. 1994. *Justicia verticillata* Roxb., Fl. Ind. 1: 135. 1832. *Haplanthus verticillaris* Nees in DC., Prodr. 11: 513. 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 506. 1884. *Bremekampia verticillata* (Roxb.) Sreemadh. in Bull. Bot. Surv. India 6: 323. 1965. - *Kastula*.

Herbs, annual, erect, up to 1 m high. Leaves ovate-oblong or elliptic-oblong, 5-10 x 3-5 cm, acute or acuminate at apex, pubescent; axillary cladodes (spines) 4-angled, 10-16 at each node, up to 4 cm long, with 2 spinous teeth at the apex. Flowers in between the cladodes, sessile; bracteoles pointed, longer than calyx. Calyx-segments lanceolate, *ca* 4 mm long, pointed, glandular pubescent. Corolla *ca* 1.5 cm long; lobes violet; tube white. Capsules oblong, *ca* 1.5 cm long, green, with 2-3, white horns, grooved, glabrous.

In mixed deciduous forests. Damoh, Hoshangabad, Indore, Mandla, Sagar. *Fl. & Fr.*: Nov. - March.

19. HEMIGRAPHIS Nees

Herbs, undershrubs or shrubs. Leaves opposite, subentire or dentate. Flowers solitary or in terminal or pseudo-axillary heads or spikes, rarely paniculate, sessile; bracts large, imbricate, each 1-flowered; bracteoles narrow, small or absent. Calyx 5-partite; segments linear or lanceolate, unequal. Corolla tubular-ventricose or infundibuliform; lobes 5, subequal, twisted to left in bud; tube long. Stamens 4, didynamous, included or scarcely exerted; anthers oblong, 2-celled, mucicous. Ovary 2-locular; ovules 3-8 in each locule; style linear, long; stigma 2-lobed; one lobe linear, other short. Capsules linear or linear-oblong, bearing seeds from the base. Seeds discoid, compressed, hygroscopically hairy.

About 90 species; tropical Asia; 4 in M.P.

- 1a. Corolla tubular-ventricose; capsules *ca* 10 mm long, 12-seeded:
- 2a. Hairs soft; leaves up to 2 cm long; calyx-segments linear, *ca* 8 mm long ...1. *H. hirta*
- 2b. Hairs scabrous; leaves 2-5 cm long; calyx-segments lanceolate, *ca* 5 mm long ...4. *H. venosa*
- 1b. Corolla tubular-infundibuliform; capsules 5-6 mm long, 6-seeded:
- 3a. Hairs less viscid; spikes lax; corolla 1.5-2 cm long ...2. *H. latebrosa*
- 3b. Hairs more viscid; spikes dense; corolla *ca* 1 cm long. ...3. *H. rupestris*

1. **Hemigraphis hirta** (Vahl) T. Anderson in J. Linn. Soc. Bot. 9: 462. 1867; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 422. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 69. 1994. *Ruellia hirta* Vahl, Symb. Bot. 3: 84. t. 67. 1794.

Herbs, annual, prostrate, much branched, hirsute-villous. Leaves broadly ovate or elliptic, 1-2 x 0.5-1.3 cm, acute or obtuse at apex, crenate. Flowers in condensed, 2-6-flowered heads; bracts elliptic, 10-15 mm long, woolly; bracteoles absent. Calyx-segments linear, *ca* 8 mm long. Corolla violet with deep violet throat, 10-15 mm long, glabrous, fugacious. Capsules linear-cylindrical, *ca* 1 cm long, glabrous, *ca* 12-seeded. Seeds brownish.

Common in wastelands. Mandla, Rajnandgaon, Rewa, Satna. *Fl. & Fr.*: April - July.

2. **Hemigraphis latebrosa** (Heyne ex Roth) Nees in DC., Prodr. 11: 723. 1847; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 423. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 70. 1994. *Ruellia latebrosa* Heyne ex Roth, Nov. Pl. Sp. 307. 1821. *Hemigraphis latebrosa* (Heyne ex Roth) Nees var. *heyneana* Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 40(1): 139. 1944. - *Bhangra*.

Herbs, annual, diffuse, viscidly pubescent, up to 60 cm high. Leaves dimorphic, ovate-oblong, 2-11 x 3-6 cm, acuminate at apex, cuneate or truncate at base, sparsely pubescent; leaves of side branches elliptic, smaller. Flowers in heads, usually borne on small, axillary branches; bracts ovate or elliptic, of outer flowers much longer, ciliate on margin, glandular pubescent. Calyx 6-8 mm long, pubescent. Corolla 1.5-2 cm long; lobes blue-violet, rounded, bearded inside; tube sometimes yellow. Capsules ca 6 mm long, brown, pubescent. Seeds covered with white hairs.

Common in moist places. Balaghat, Bastar, Bilaspur, Damoh, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rewa, Sagar, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Sept. - April.

3. *Hemigraphis rupestris* Heyne ex T. Anderson in J. Linn. Soc. Bot. 9: 462. 1867; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 70. 1994. *H. latebrosa* (Heyne ex Roth) Nees var. *rupestris* (Heyne ex T. Anderson) C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 424. 1884.

Herbs, perennial, erect or decumbent-ascending, aromatic, glandular pubescent or villous; stems 4-angled. Leaves ovate-elliptic or lanceolate, 2-10 x 1-6 cm, acute to acuminate at apex, rounded or cuneate at base, serrate-dentate, ciliate, pubescent. Flowers in terminal and axillary spikes, sessile; bracts foliaceous, ovate-lanceolate, 5-15 mm long, imbricate. Calyx ca 5 mm long, glandular pubescent; segments ciliate. Corolla blue, ca 10 mm long; lobes ovate, hairy; tube suffused with yellow. Capsules ca 5 mm long, beaked, 6-seeded.

Common in moist shady places. Bastar, Bilaspur, Mandla, Raigarh, Sidhi, Surguja. *Fl. & Fr.*: Nov. - April.

4. *Hemigraphis venosa* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 423. 1884.

Herbs, scabrous; stems creeping. Leaves ovate, 2-5 cm long, crenate, lineolate, petiolate. Flowers in axillary and terminal, many-flowered heads; bracts obovate; bracteoles absent. Calyx-segments lanceolate, ca 5 mm long, acuminate. Corolla white with purple tinge inside. Ovary glabrous. Capsules ca 1 cm long.

Rare. Bastar. *Fl. & Fr.*: Feb. - April.

20. HYGROPHILA R. Br.

Herbs, occasionally armed; branchlets 4-angled. Leaves opposite, entire, crenate or serrulate, subsessile or petiolate. Flowers in terminal heads, spikes or axillary whorls around the nodes, subsessile; bracts and bracteoles sometimes foliaceous, linear, lanceolate or elliptic-ovate; bracteoles as long as or shorter than calyx. Calyx tubular, 4 or 5-partite; segments linear or lanceolate. Corolla bilabiate; upper lip erect, 2-lobed; lower lip deflexed, 3-lobed, crested; lobes twisted to left in bud; tube swollen above. Stamens 4, didynamous, adnate at the throat, exserted; posterior pair sometimes smaller or rudimentary; filaments glabrous; anther cells oblong, mucous. Ovary 2-locular; ovules 4 to many in each locule; style filiform, hairy; stigma simple, linear. Capsules linear or linear-oblong, bearing seeds throughout. Seeds ovoid, compressed, white hairy when wet.

About 100 species; tropical regions; 8 in M.P.

- 1a. Plants armed; calyx 4-partite ...1. *H. auriculata*
- 1b. Plants unarmed; calyx 5-partite:
- 2a. Flowers in axillary whorls:
- 3a. Leaves elliptic or obovate, obtuse at apex ...3. *H. erecta*
- 3b. Leaves linear, linear-oblong or linear-lanceolate, acute at apex:
- 4a. Plants ca 5 cm high; bracts lanceolate ...2. *H. balsamica*
- 4b. Plants 30-90 cm high;
bracts ovate or elliptic:
- 5a. Leaves 6-8 cm long, glabrous ...7. *H. salicifolia*
- 5b. Leaves more than 8 cm long,
pubescent ...5. *H. phlomoides*
- 2b. Flowers in terminal spikes:
- 6a. Plants succulent; bracts cordate;
retinacula soft, straight ...4. *H. heinei*
- 6b. Plants not succulent; bracts not cordate;
retinacula hard, curved:

- 7a. Fertile stamens 2; capsules pubescent,
20 or more-seeded ...6. *H. polysperma*
- 7b. Fertile stamens 4; capsules glabrous,
8-10-seeded ...8. *H. serpyllum*

1. ***Hygrophila auriculata*** (Schumach.) Heine in Kew Bull. 16: 172. 1962; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 74. 1994. *Barleria auriculata* Schumach. in Schumach. & Thonn., Beskr. Guin. Pl. 285. 1827. *B. longifolia* L., Cent. Pl. II: 22. 1756. *Asteracantha longifolia* (L.) Nees in Wallich, Pl. Asiat. Rar. 3: 90. 1832. *Hygrophila spinosa* T. Anderson in Thwaites, Enum. Pl. Zeyl. 225. 1860; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 408. 1884. *H. longifolia* (L.) Kurz in J. Asiat. Soc. Bengal 39: 78. 1870, *non* Nees, 1847. - *Oont-katela*.

Herbs, annual or perennial, erect, up to 1 m high; stems stout, with thickened nodes and axillary whorls of 1.5-3 cm long, hispid, yellow spines. Leaves in whorl of 6 at a node, oblong or linear-lanceolate, 4-18 x 1-2.5 cm, subsessile. Flowers in dense clusters at leaf axils, usually 8 in each whorl, showy; bracts 2-seriate, linear-lanceolate, up to 3 cm long, ciliate; bracteoles linear-lanceolate, narrow, smaller. Calyx 4-partite; segments linear-lanceolate, hairy. Corolla blue-purple, glabrous; tube *ca* 1.2 cm long, abruptly widening. Capsules linear-oblong, *ca* 8 mm long, pointed, glabrous, 4-8-seeded.

Common along ponds and ditches. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Dhar, Durg, East Nimar, Hoshangabad, Indore, Jabalpur, Mandla, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Shivpuri, Sidhi, Tikamgarh, West Nimar. *Fl. & Fr.*: Sept. June.

The plant is referred for the treatment of jaundice, dropsy and urinogenital diseases. Roots are diuretic.

2. ***Hygrophila balsamica*** (L. *f.*) Raf., Fl. Tellur. 4: 66. 1838. *Ruellia balsamica* L. *f.*, Suppl. Pl. 289. 1782. *Cardanthera balsamica* (L. *f.*) Benth. *ex* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 404. 1884. *C. verticillata* (Nees) Benth. *ex* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 404. 1884. *Adenosma verticillata* Nees in Wallich, Pl. Asiat. Rar. 3: 79. 1832.

Small herbs, *ca* 5 cm high. Leaves lanceolate, sometimes lower ones pinnatifid, acute at apex, cuneate at base, serrulate. Flowers in axillary

whorls; bracts lanceolate; bracteoles linear. Calyx 5-partite; segments, linear-lanceolate, unequal; outer segments larger, ciliate. Corolla pale violet; upper lip glabrescent, ciliate. Capsules pubescent. Seeds on minute, straight retinacula.

Rare. Bastar. *Fl. & Fr.*: Feb.

3. *Hygrophila erecta* (Burm. *f.*) Hochr. in *Candollea* 5: 230. 1934; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 74. 1994. *Ruellia erecta* Burm. *f.*, *Fl. Ind.* 135. 1768. *Hygrophila quadrivalvis* (Buch.-Ham.) Nees in Wallich, *Pl. Asiat. Rar.* 3: 80. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 408. 1884. *Ruellia quadrivalvis* Buch.-Ham. in *Trans. Linn. Soc. Bot.* 14: 291. 1824.

Herbs, annual, erect, up to 50 cm high; stems somewhat 4-angled, rooting at lower nodes. Leaves elliptic or obovate, 3-6 x 2-3 cm, obtuse at apex, rounded at base, entire to somewhat crenate, glabrous. Flowers in axillary whorls; bracts foliaceous, ca 8 mm long; bracteoles oblong, obtuse, strigose. Calyx 5-partite; segments equal, long acuminate, hispid-ciliate. Corolla purple-blue; lobes equal; tube ca 8 mm long. Capsules linear, ca 2 cm long, erect, in clusters.

In sandy soil and moist places. Satna, Surguja. *Fl. & Fr.*: Dec. - March.

4. *Hygrophila heinei* Sreemadh. in *Bull. Bot. Surv. India* 10: 223. 1969; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 75. 1994. *Ruellia uliginosa* L. *f.*, *Suppl. Pl.* 290. 1782. *Adenosma uliginosa* (L. *f.*) Nees in *R. Br., Verm. Bot. Schr.* 3: 298. 1827 & in Wallich, *Pl. Asiat. Rar.* 3: 79. 1832. *Cardanthera uliginosa* (L. *f.*) Benth. *ex* C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 403. 1884. Fig. 53.

Herbs, annual, erect or decumbent, succulent, 30-50 cm high. Leaves oblong-obovate or spatulate, 2-4 cm long, entire or crenate. Flowers in terminal spikes; bracts foliaceous, elliptic-ovate, ca 6 mm long, cordate, imbricate, closely packed. Calyx-segments linear, pubescent. Corolla blue, ca 8 mm long. Capsules ca 5 mm long.

Rare. In cultivated fields. Raipur. *Fl. & Fr.*: Jan. - March.

5. *Hygrophila phlomoides* Nees in Wallich, *Pl. Asiat. Rar.* 3: 80. 1832 & in DC., *Prodr.* 11: 90. 1847; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 408. 1884.

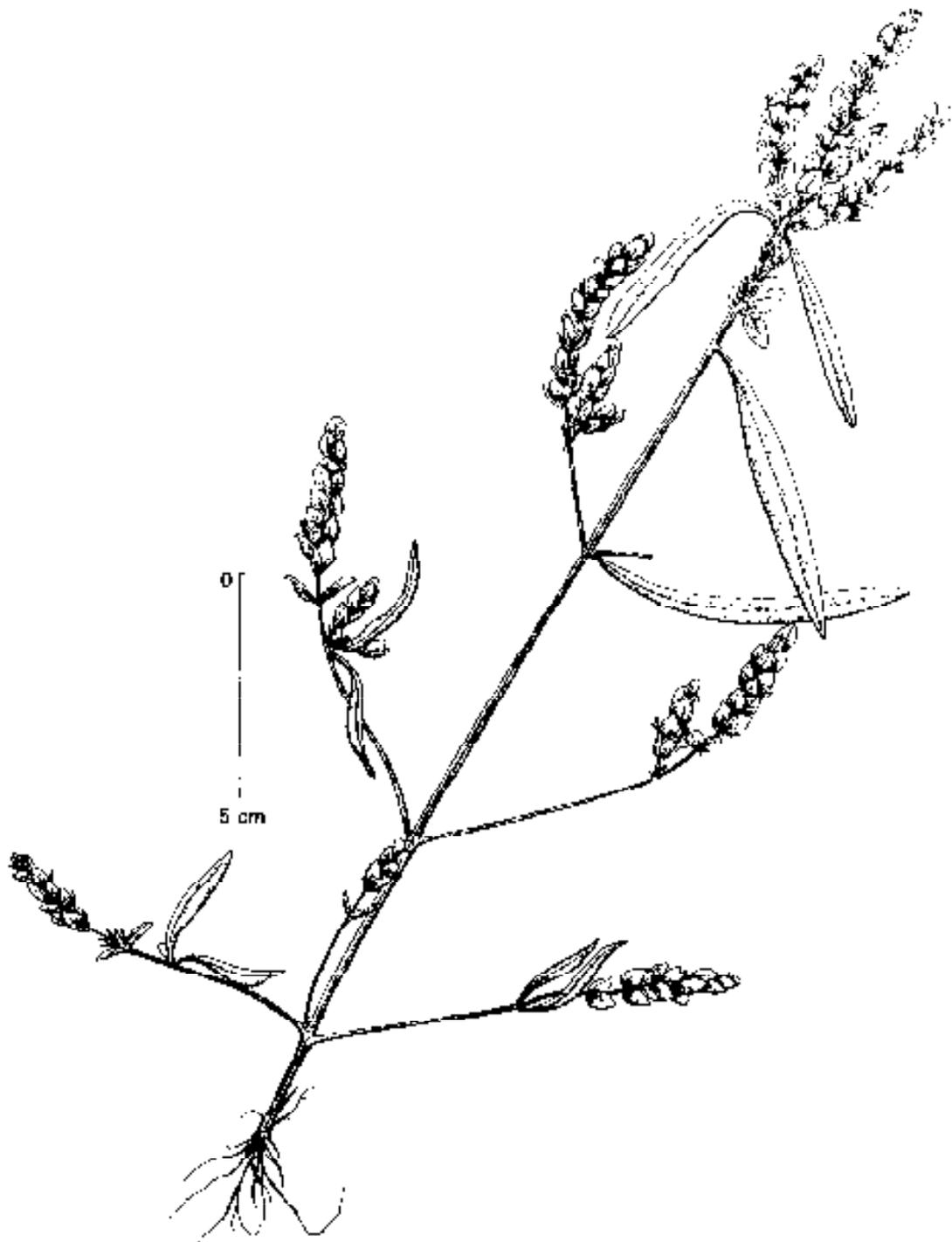


Fig. 53. *Hygrophila heinei* Sreemadh.

Herbs, erect, stout. Leaves linear-oblong, 8-15 cm long, pubescent, sessile. Flowers in dense, villous whorls. Calyx ca 12 mm long, brown hairy; one segment larger than others in fruits. Corolla purple, ca 12 mm long. Capsules linear, slightly compressed, ca 12 mm long, 10-12-seeded.

In marshy wastelands. Dhar (Samvatsar, 1996). *Fl. & Fr.*: Oct. - Dec.

6. *Hygrophila polysperma* (Roxb.) T. Anderson in J. Linn. Soc. Bot. 9: 456. 1867; C.B. Clarke in Hook. f., *Fl. Brit. India* 4: 406. 1884; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 75. 1994. *Justicia polysperma* Roxb., *Fl. Ind.* 1: 119. 1832. *Hemiadelphis polysperma* (Roxb.) Nees in Wallich, *Pl. Asiat. Rar.* 3: 80. 1832. *H. polysperma* (Roxb.) Nees var. *joshianus* Rao & Biswas in *Indian For.* 94: 657. 1968. *Ruellia polysperma* Heyne ex Roth, *Nov. Pl. Sp.* 305. 1821.

Herbs, suberect or procumbent, pubescent; stems often rooting at lower nodes. Leaves ovate or elliptic-oblong, 0.5-2.5 x 0.3-1.5 cm, acute or obtuse at apex, tapering at base, entire, subsessile. Flowers in terminal, dense spikes; bracts foliaceous, elliptic-lanceolate, hairy; bracteoles linear, ciliate on margin. Calyx 5-partite; segments linear-lanceolate, scarious and ciliate on margin. Corolla white, pink or bluish purple, ca 7 mm long, hairy. Capsules linear-oblong, ca 7 mm long, brown, pubescent.

Common in moist places along drains Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Durg, Gwalior, Jashangabad, Indore, Jabalpur, Mandla, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Shivpuri, Sidhi, Surguja, Tikamgarh, *Fl. & Fr.*: Oct. - April.

7. *Hygrophila salicifolia* (Vahl) Nees in Wallich, *Pl. Asiat. Rar.* 3: 81. 1832; C.B. Clarke in Hook. f., *Fl. Brit. India* 4: 407. 1884; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 78. 1994. *Ruellia salicifolia* Vahl, *Symb. Bot.* 3: 84. 1794. *Hygrophila angustifolia* auct. non R. Br., 1810; Gamble, *Fl. Madras* 2: 1016. 1924.

Herbs; annual, erect or ascending, stiff, 30-90 cm high. Leaves linear-lanceolate, 6-8 x 0.8-1.5 cm, acute at apex, narrowed at base, glabrous, subsessile. Flowers in axillary whorls; bracts ovate or elliptic, 6-8 mm long; bracteoles linear or lanceolate, as long as calyx. Calyx 5-partite, divided up to base in fruit, 8-12 mm long, hispid, ciliate. Corolla pale purple, 12-16 mm long; tube shorter than calyx. Capsules linear, 12-16 mm long, many-seeded.

Common along ditches and ponds. Balaghat, Bastar, Raipur, Sidhi. Surguja. *Fl. & Fr.*: Sept. - Jan.

8. *Hygrophila serpyllum* (Nees) T. Anderson in J. Linn. Soc. Bot. 9: 456. 1867; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 406. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 78. 1994. *Physichilus serpyllum* Nees in Hook., Comp. Bot. Mag. 2: 311. 1837. *Hygrophila serpyllum* (Nees) T. Anderson var. *hookeriana* C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 407. 1884.

Herbs, annual, procumbent, pubescent; stems often rooting at lower nodes. Leaves elliptic-lanceolate, up to 2.5 x 1.5 cm, acute at apex, entire, pubescent, subsessile. Flowers in terminal, dense, leafy spikes; bracts and bracteoles elliptic-lanceolate, 5-8 mm long, acute, pubescent. Calyx 5-partite; segments linear, densely ciliate. Corolla purple or blue-violet; throat white, bearded. Capsules linear-oblong, 5-8 mm long, pointed, glabrous, many-seeded.

Common in rock crevices and dried river beds. Bhopal, Damoh, Hoshangabad, Indore, Mandla, Sagar, West Nimar. *Fl. & Fr.*: Dec. - April.

21. **INDONEESIELLA** Sreemadh.

Herbs, erect; stems and branchlets 4-angled, hispid. Leaves simple, pubescent, sessile or subsessile. Flowers in unilateral, simple or paniculate racemes; bracts pubescent; bracteoles smaller. Calyx 5-partite; segments shortly connate, linear-lanceolate, subequal, valvate, glandular pubescent. Corolla tubular, slightly ventricose above, bilabiate; upper lip erect, shortly 2-lobed; lower lip deflexed, 3-lobed; lobes unequal. Stamens 2, adnate at the throat, exserted; filaments flattened; anther cells unequal, one cell bearded below. Ovary puberulous, 4-ovuled; style hairy; stigma linear or unequally 2-fid, curved. Capsules pubescent, 6 or more-seeded. Seeds ovoid.

Two species; endemic to India; one in M.P.

***Indoneesiella echioides* (L.) Sreemadh.** in Phytologia 16: 466. 1968; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 81. 1994. *Justicia echioides* L., Sp. Pl. 16. 1753. *Andrographis echioides* (L.) Nees in Wallich, Pl. Asiat. Rar. 3: 117. 1832; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 505. 1884. *Neesiella echioides* (L.) Sreemadh. in Phytologia 15: 271. 1967, *nom. illeg.*

Herbs, annual, erect, white pubescent, up to 50 cm high; stems grooved. Leaves oblong-elliptic or oblanceolate, 2-8 x 1-3 cm, obtuse at apex, rounded or cuneate at base, subentire, sparsely pubescent, sessile. Flowers in simple or branched, subsecund racemes; bracts linear, ca 2 mm long; bracteoles subulate, pubescent. Calyx-segments linear, 4-6 mm long. Corolla white with purple streaks, 10-15 mm long; upper lip with a purple blotch; lower lip dark purple; lobes glandular pubescent. Capsules ellipsoid-lanceolate, ca 10 mm long, with persistent calyx. Seeds brown, rugose.

Common in wastelands, usually in shady places. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Durg, Gwalior, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Shahdol, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Aug. - Feb.

The plant is bitter tonic and referred to treat fever and jaundice.

22. JUSTICIA L.

Herbs, undershrubs or shrubs. Leaves entire or subentire. Flowers in spikes, rarely solitary, sessile or subsessile; bracts large or small; bracteoles narrow or absent. Calyx 4 or 5-partite; segments narrow. Corolla bilabiate; upper lip entire or 2-lobed; lower lip 3-lobed; lobes imbricate in bud; tube as long as or shorter than the limb. Stamens 2; filaments often dilated, glabrous or hairy near the base; anthers 2-celled; lower cell with a white basal appendage. Ovary 2-locular; ovules 2 in each locule; style filiform; stigma minutely 2-fid. Capsules 4-seeded, sometimes bearing seeds from the base or sometimes contracted below into a cylindrical, solid stipe and bearing seeds towards apex. Seeds ovoid or suborbicular, more or less compressed, tuberculate, lepidote or glochidiate.

About 420 species; tropical and subtropical regions as well as temperate N. America; 10 in M.P.

1a. Calyx 5-partite:

- | | |
|---|--------------------------|
| 2a. Undershrubs, ca 1 m high; bracts white,
ovate; capsules pubescent | ...1. <i>J. betonica</i> |
| 2b. Herbs, up to 60 cm high; bracts green,
oblong-orbicular; capsules glabrous | ...3. <i>J. glauca</i> |

1b. Calyx 4-partite:

- 3a. Bracts and bracteoles as long as or longer than calyx-segments:
- 4a. Bracts and calyx-segments linear, obtuse, glabrous ...8. *J. quinqueangularis*
- 4b. Bracts and calyx-segments elliptic-ovate, linear-lanceolate or elliptic-lanceolate, acute, pubescent or scabrous:
- 5a. Bracts, bracteoles and corolla-lobes 8-12 mm long; capsules glabrous ...4. *J. latispica*
- 5b. Bracts, bracteoles and corolla-lobes up to 6 mm long; capsules pubescent all over or at least at the apex:
- 6a. Calyx-segments scarious, aristate ...5. *J. neesii*
- 6b. Calyx-segments neither scarious nor aristate:
- 7a. Bracts elliptic-ovate, covered with glistening, jointed hairs ...9. *J. simplex*
- 7b. Bracts linear-lanceolate, covered with non-glistening, unjointed hairs ...6. *J. procumbens*
- 3b. Bracts and bracteoles shorter than calyx-segments:
- 8a. Bracts, bracteoles and calyx-segments obtuse at apex; calyx-segments slightly longer than bracts ...8. *J. quinqueangularis*
- 8b. Bracts, bracteoles and calyx-segments acute at apex; calyx-segments always much longer than bracts:
- 9a. Bracts and bracteoles ca 2.5 mm long:
- 10a. Prostrate herbs; leaves smaller, up to 2 cm long ...7. *J. prostrata*
- 10b. Erect herbs; leaves comparatively longer, 3-8 cm long ...10. *J. vahlii*
- 9b. Bracts and bracteoles up to 1.5 mm long ...2. *J. diffusa*

1. *Justicia betonica* L., Sp. Pl. 15. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 525. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 86. 1994. *J. ramosissima* Roxb., Fl. Ind. 1: 129. 1832. *Adhatoda betonica* (L.) Nees in Wallich, Pl. Asiat. Rar. 3: 103. 1832. *Justicia betonica* L. var. *ramosissima* (Roxb.) C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 525. 1885. - *Mokandar*.

Undershrubs, erect or scandent, ca 1 m high; branches pubescent, swollen above the nodes. Leaves ovate-lanceolate, 4-10 x 2-4 cm, acuminate at apex, tapering at base, entire or crenate, glabrous. Flowers in terminal, simple or branched spikes; bracts foliaceous, white with green nerves, up to 1.5 cm long, acuminate, imbricate; bracteoles more or less similar. Calyx 5-partite; segments linear-lanceolate, subequal, puberulous. Corolla white with red-purple dots, ca 1.5 cm long. Capsules clavate, ca 1.5 cm long, beaked, pubescent.

Common in mixed forests and wastelands. Balaghat, Bastar, Bilaspur, Chhindwara, Damoh, Hoshangabad, Raigarh, Raipur, Seoni, Shahdol, Surguja. *Fl. & Fr.*: Aug. April.

2. *Justicia diffusa* Willd., Sp. Pl. 1: 87. 1797; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 538. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 86. 1994. *Rostellaria diffusa* (Willd.) Nees in Wallich, Pl. Asiat. Rar. 3: 100. 1832. *Rostellularia diffusa* (Willd.) Nees in DC., Prodr. 11: 371. 1847.

Herbs or undershrubs, erect or diffuse, profusely branched, strigose; stems 4-angled. Leaves ovate-orbicular or elliptic-lanceolate, 2-9 x 0.5-3 cm, acute or acuminate at apex, rounded or cuneate at base, pubescent beneath. Flowers in axillary or terminal, 2-8 cm long, erect spikes; bracts linear-lanceolate, shorter than calyx; bracteoles similar to bracts but slightly narrow. Calyx 4-partite, divided almost up to base; segments lanceolate, ca 3 mm long, scarious on margin. Corolla pink or pale purple, infundibuliform, ca 6 mm long; upper lip broadly ovate, notched; tube as long as the limb. Capsules oblong or ellipsoid, ca 4 mm long, glabrous.

1a. Herbs; leaves elliptic-lanceolate:

2a. Leaves up to 5 cm long; spikes 3-8 cm long ...2.1. var. *diffusa*

2b. Leaves 8-9 cm long; spikes up to 2 cm long ...2.2. var. *hedyoridifolia*

1b. Undershrubs; leaves ovate-orbicular ...2.3. var. *orbiculata*

2.1. var. diffusa

Common in wastelands and mixed forests. Balaghat, Bhopal, Chhindwara, Damoh, Hoshangabad, Jabalpur, Mandla, Raigarh, Raipur, Rajnandgaon, Rewa, Seoni, Shivpuri, Surguja. *Fl. & Fr.*: Sept. March.

2.2. var. hedyotidifolia (Nees) C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 538. 1885. *Rostellaria hedyotidifolia* Nees in Wallich, *Pl. Asiat. Rar.* 3: 100. 1832.

In open rocky places. Hoshangabad (Saxena. 1972). *Fl. & Fr.*: Aug. Oct.

2.3. var. orbiculata C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 538. 1885; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 87. 1994. *Justicia orbiculata* Wallich, *Numer. List n.* 2489. 1830, *non* T. Anderson, 1867.

On rocky slopes. Damoh, Hoshangabad. Sidhi. *Fl. & Fr.*: Aug. Dec.

3. Justicia glauca Rottler in *Ges. Naturf. Fr. Neue Schr.* 4: 219. 1802; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 529. 1885; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 87. 1994. *Adhatoda orixensis* (Koenig ex Roxb.) Nees in DC., *Prodr.* 11: 400. 1847. *Gendarussa orixensis* (Koenig ex Roxb.) Nees in Wallich, *Pl. Asiat. Rar.* 3: 104. 1832. *Justicia orixensis* Koenig ex Roxb., *Fl. Ind.* (Carey & Wallich ed.) 1: 133. 1820 & *Fl. Ind.* 1: 132. 1832. *Gendarussa tranquebariensis* Wight, *Icon. Pl. Ind. Orient.* 2: t. 462. 1843, *non* Nees, 1832.

Herbs, erect or somewhat diffuse, 30-60 cm high; stems terete, grooved, puberulous; branches purple, with bulbous-based hairs. Leaves ovate-elliptic, up to 8 x 3 cm, obtuse at apex and base, petiolate. Flowers solitary, often scattered in distant, lower axils or in terminal, lax spikes; bracts oblong-orbicular, ca 1 cm long, pubescent along the margin. Calyx 5-partite; segments linear, ca 4 mm long, scarious, sparsely puberulous or glabrous. Corolla pink or pinkish white; lobes ca 8 mm long; tube glabrous. Capsules obovate, ca 1 cm long, glabrous. Seeds tuberculate.

Common in fields. Balaghat, Raigarh, Raipur. *Fl. & Fr.*: Aug. Oct.

4. Justicia latispica Gamble, *Fl. Madras* 2: 1080. 1924; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 89. 1994. *J. procumbens* L. var. *latispica*

C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 539. 1885. *Rostellularia procumbens* Wight, Icon. Pl. Ind. Orient. 4: t. 1539. 1850. *R. latispica* (C.B. Clarke) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 45(2): 69. 1948.

Herbs or undershrubs, diffuse, branched; stems covered with stiff, strigose, scattered hairs. Leaves elliptic or ovate, 4-5 x 2-2.5 cm, with 4 pairs of main nerves. Flowers in terminal and axillary, cylindrical spikes; bracts elliptic-ovate or lanceolate, 8-12 mm long, broader than bracteoles and calyx-segments; bracteoles similar to bracts but narrower. Calyx 4-partite. Corolla pale lilac with white spots, 8-12 mm long. Capsules ca 3 cm long, glabrous, papery.

Along the water streams. Hoshangabad, Sidhi, Surguja. *Fl. & Fr.*: Jan.-Feb.

5. *Justicia neesii* Ramam. in Saldanha & Nicolson, Fl. Hassan 551. 1976. *J. micrantha* auct. non Pohl ex Nees, 1847: Wallich ex C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 536. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 89. 1994. *Rostellaria crenata* Nees in Wallich, Pl. Asiat. Rar. 3: 101. 1832.

Herbs, annual, erect, ca 25 cm high; stems and branches grooved, glabrous or pubescent. Leaves ovate-elliptic, 2-4 x 1.5-2 cm, acute at apex, attenuate at base, entire, scabrid-pubescent. Flowers in axillary and terminal spikes; bracts and bracteoles linear-spathulate, with bulbous-based, white hairs on margin. Calyx 4-partite; segments lanceolate, 4-5 mm long, aristate, distantly ciliate towards apex, scarious on margin at base. Corolla pink; upper lip deltoid-oblong, entire. Capsules oblong, ca 4 mm long, stalked. Seeds tuberculate.

Rare. As weed in cultivated fields. Bastar, Chhindwara, Sidhi. *Fl. & Fr.*: Feb. March.

6. *Justicia procumbens* L., Sp. Pl. 15. 1753; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 539. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 93. 1994. *Rostellaria procumbens* (L.) Nees in Wallich, Pl. Asiat. Rar. 3: 101. 1832. *Rostellularia procumbens* (L.) Nees in DC., Prodr. 11: 371. 1847.

Herbs, annual, suberect or diffuse; stems often rooting at lower nodes, with zigzag branches. Leaves variable, elliptic, ovate or lanceolate, 1.5-4

x 0.6-1.5 cm, obtuse or acute at apex and base, glabrous or pubescent, petiolate. Flowers in terminal, cylindrical, 2-6 cm long spikes; bracts and bracteoles linear-lanceolate, pubescent, scarious on margin. Calyx 4-partite; segments linear-lanceolate, ciliate on margin, hirsute. Corolla pink or pale violet, pubescent outside; upper lip broadly ovate, notched above; lower lip shortly 3-lobed; tube as long as the limb. Capsules oblong, ca 5 mm long, beaked, stalked, pubescent.

Common on rocky hill slopes. Balaghat, Bilaspur, Hoshangabad, Indore, Raigarh, Rajnandgaon, Surguja. *Fl. & Fr.*: Sept. - Dec.

7. ***Justicia prostrata*** (C.B. Clarke) Gamble, *Fl. Madras* 2: 1081. 1924; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 93. 1994. *J. diffusa* Willd. var. *prostrata* C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 538. 1885. *Rostellularia prostrata* (C.B. Clarke) Majumdar in *Bull. Bot. Soc. Bengal* 25: 75. 1971.

Herbs, annual, prostrate, slender; branches spreading. Leaves ovate-elliptic or suborbicular, 1-2 x 0.5-1 cm, obtuse at apex, rounded at base, entire, sparsely pubescent. Flowers in axillary and terminal, up to 6 cm long spikes; bracts and bracteoles lanceolate, shorter than calyx, pubescent. Calyx 4-partite; segments lanceolate, scarious, ciliate along midrib and margin. Corolla white or pink with purple spots, ca 7 mm long. Capsules oblong-ellipsoid, ca 3 mm long, beaked, grooved. Seeds black, tuberculate.

Common in wastelands. Bastar, Durg, Hoshangabad, Jabalpur, Panna, Raigarh, Seoni, Shahdol. *Fl. & Fr.*: July - April.

8. ***Justicia quinqueangularis*** Koenig ex Roxb., *Fl. Ind.* 1: 133. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 536. 1885; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 96. 1994. *Rostellularia quinqueangularis* (Koenig ex Roxb.) Nees in Wallich, *Pl. Asiat. Rar.* 3: 101. 1832. *Rostellularia quinqueangularis* (Koenig ex Roxb.) Nees in DC., *Prodr.* 11: 375. 1847.

Herbs, annual, erect or ascending, glabrous, up to 50 cm high; stems 4-5-angled. Leaves in distant pairs, ovate-oblong, linear or linear-lanceolate, 2-8 cm long, obtuse or subacute at apex, entire or subentire, glabrous. Flowers in terminal, lax, elongated or short spikes; bracts and bracteoles linear, 3-4 mm long, glabrous. Calyx 4-partite nearly up to base; segments linear, 4-5 mm long, equal, glabrous. Corolla white with purplish blotch, ca 9 mm long. Capsules ellipsoid or oblong, ca 8 mm long, pointed, stalked.

- 1a. Leaves ovate-oblong, subentire; spikes short, broad; capsules ellipsoid ...8.1. var. *peploides*
- 1b. Leaves linear-lanceolate, entire; spikes elongated, slender; capsules oblong ...8.2. var. *quinqueangularis*

8.1. var. *peploides* (Nees) C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 537. 1885. *Rostellaria peploides* Nees in Wallich, Pl. Asiat. Rar. 3: 101. 1832. *Rostellularia peploides* (Nees) Nees in DC., Prodr. 11: 375. 1847. *Justicia peploides* (Nees) T. Anderson in J. Linn. Soc. Bot. 9: 511. 1867; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 91, 1994.

Common in grassy fields. Balaghat, Bastar, Betul, Bhopal, Chhatarpur, Gwalior, Hoshangabad, Indore, Mandla, Panna, Raipur, Rewa, Sagar, Satna, Seoni, Sidhi. *Fl. & Fr.*: Aug. - Nov.

8.2. var. *quinqueangularis*

Common in moist shady places. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Chhindwara, Durg, Indore, Mandla, Morena, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Shahdol, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: Aug. - April.

9. *Justicia simplex* D. Don, Prodr. Fl. Nepal, 118. 1825; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 539. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 96. 1994. *Rostellaria mollissima* Nees in Wallich, Pl. Asiat. Rar. 3: 101. 1832. *Rostellularia mollissima* (Nees) Nees in DC., Prodr. 11: 373. 1847. *R. japonica* (Thunb.) Ellis in Bull. Bot. Surv. India 22: 196. 1980 (1982). *Justicia japonica* Thunb., Fl. Jap. 20. 1784.

Herbs, erect or prostrate, up to 30 cm high; branches 4-angled, grooved, pubescent, swollen above the nodes. Leaves variable in shape, ovate, ovate-lanceolate or elliptic-oblong, 2-5 x 0.5-2 cm, acute or obtuse at apex, subentire, glabrous or pubescent. Flowers in terminal or axillary, dense, cylindrical spikes; bracts and bracteoles elliptic-ovate, slightly longer than calyx, membranous-margined. Calyx 4-partite, 3-5 mm long; segments unequal, ciliate. Corolla pale purple or whitish, 5-6 mm long; throat mottled inside. Capsules ellipsoid, pubescent at tip. Seeds rugose.

Common in fields and wastelands. Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Chhindwara, Damoh, Durg, East Nimar, Gwalior, Hoshangabad, Mandla, Narsimhapur, Satna, Shahdol, Shivpuri, Surguja, Tikamgarh. *Fl. & Fr.*: Aug. - April.

10. *Justicia vahlii* Roth, Nov. Pl. Sp. 14. 1821; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 97. 1994. *Rostellaria vahlii* (Roth) Nees in Wallich, Pl. Asiat. Rar. 3: 102. 1832. *Justicia diffusa* Willd. var. *vahlii* (Roth) C.B. Clarke in Hook. f., Fl. Brit. India 4: 538. 1885. **Fig. 54.**

Herbs, annual, erect or decumbent, ca 40 cm high. Leaves ovate-lanceolate, elliptic or linear, 3-8 x 0.5-2 cm, acute-acuminate at apex, narrowed at base, entire. Flowers in axillary and terminal spikes; bracts and bracteoles lanceolate, ca 2 mm long, shorter than calyx, scarious and ciliate on margin. Calyx 4-partite; segments linear, ca 3 mm long, scarious, ciliate. Corolla pink, ca 5 mm long, puberulous outside; throat with dark pink markings. Capsules oblong-ellipsoid, 3-4 mm long, beaked, pubescent. Seeds slightly flattened, tuberculate.

In moist shady places. Gwalior, Mandla, Raigarh, Surguja. *Fl. & Fr.*: Sept. - March.

23. LEPIDAGATHIS Willd.

Herbs or undershrubs, often pubescent. Leaves entire or crenate-serrate. Flowers in terminal or axillary spikes or heads; bracts exceeding the calyx, rarely small; bracteoles smaller. Calyx 4 or 5-partite; segments unequal; upper segment larger; the two lower segments opposite and connate; the two inner smaller and narrower. Corolla tubular, bilabiate; upper lip erect, 2-lobed; lower lip spreading, 3-lobed, sometimes spotted; tube slender below, swollen in the middle. Stamens 4, didynamous, adnate at the base of throat, included; anthers 2-celled; cells mucicous. Disk annular. Ovary 2-locular; ovules 1 or 2 in each locule; style slender, recurved; stigma capitate, entire or 2-lobed. Capsules conical, ovoid or oblong, 2 or 4-seeded. Seeds compressed, hairy.

About 100 species; tropical and subtropical regions; 7 in M.P.

1a. Capsules 4-seeded:

2a. Erect herbs or undershrubs;
bracteoles spine-tipped ...2. *L. cuspidata*

2b. Diffuse or suberect herbs;
bracteoles not spine-tipped:

3a. Corolla pale purple ...6. *L. purpuricaulis*

3b. Corolla white:



Fig. 54. *Justicia vahlii* Roth

- 4a. Diffuse herbs; bracts elliptic-ovate ...3. *L. fasciculata*
 4b. Prostrate herbs; bracts lanceolate ...5. *L. incurva*
- 1b. Capsules 2-seeded:
- 5a. Calyx 5-partite ...7. *L. trinervis*
- 5b. Calyx 4-partite:
- 6a. Bracts ovate ...1. *L. cristata*
 6b. Bracts lanceolate ...4. *L. hamiltoniana*

1. *Lepidagathis cristata* Willd., Sp. Pl. 3: 400. 1800; C.B. Clarke in Hook. *f.* Fl. Brit. India 4: 516. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 99. 1994.

Herbs, procumbent, 15-45 cm high; branches spreading, 4-angled, almost winged. Leaves linear-oblong, 6-8 x 0.6-1 cm, lineolate, spinous-serrulate, sessile. Flowers in globose, subradical heads, borne in the lower part of leafy branch; bracts ovate, spine-tipped, pubescent; bracteoles membranous, spine-tipped. Calyx 4-partite; segments unequal, spine-tipped; lower ones connate up to half way. Corolla white with brown or purple spots, ca 12 mm long, densely hairy in bud. Capsules ovoid, ca 5 mm long, grooved, glabrous. Seeds densely covered with hygroscopic hairs.

Common in mixed forests and in wastelands. Bastar, Bhopal, Bilaspur, Chhatarpur, Gwalior, Hoshangabad, Indore, Narsimhapur, Raipur, Rajnandgaon, Rewa, Seoni, Tikamgarh. *Fl. & Fr.*: Sept. March.

The plant is antipyretic and used for the treatment of itches and sores.

2. *Lepidagathis cuspidata* Nees in Wallich, Pl. Asiat. Rar. 3: 97. 1832; C.B. Clarke in Hook. *f.* Fl. Brit. India 4: 519. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 99. 1994 Fig. 55.

Herbs or undershrubs, erect, up to 1 m high; stems 4-angled, densely puberulous. Leaves oblong-lanceolate, 4-14 x 2-4 cm, acuminate or mucronate at apex, acute at base, entire, glabrescent; those of branches smaller, sessile. Flowers in axillary and terminal, paniculate spikes; bracts foliaceous, ovate-mucronate, pubescent; bracteoles linear, smaller, spine-tipped. Calyx ca 1 cm long, glandular hairy; lobes lanceolate, unequal. Corolla white with purplish spots, hairy outside, with dark coloured, transverse markings in throat. Capsules oblong, 6-8 mm long, brown, glabrous.

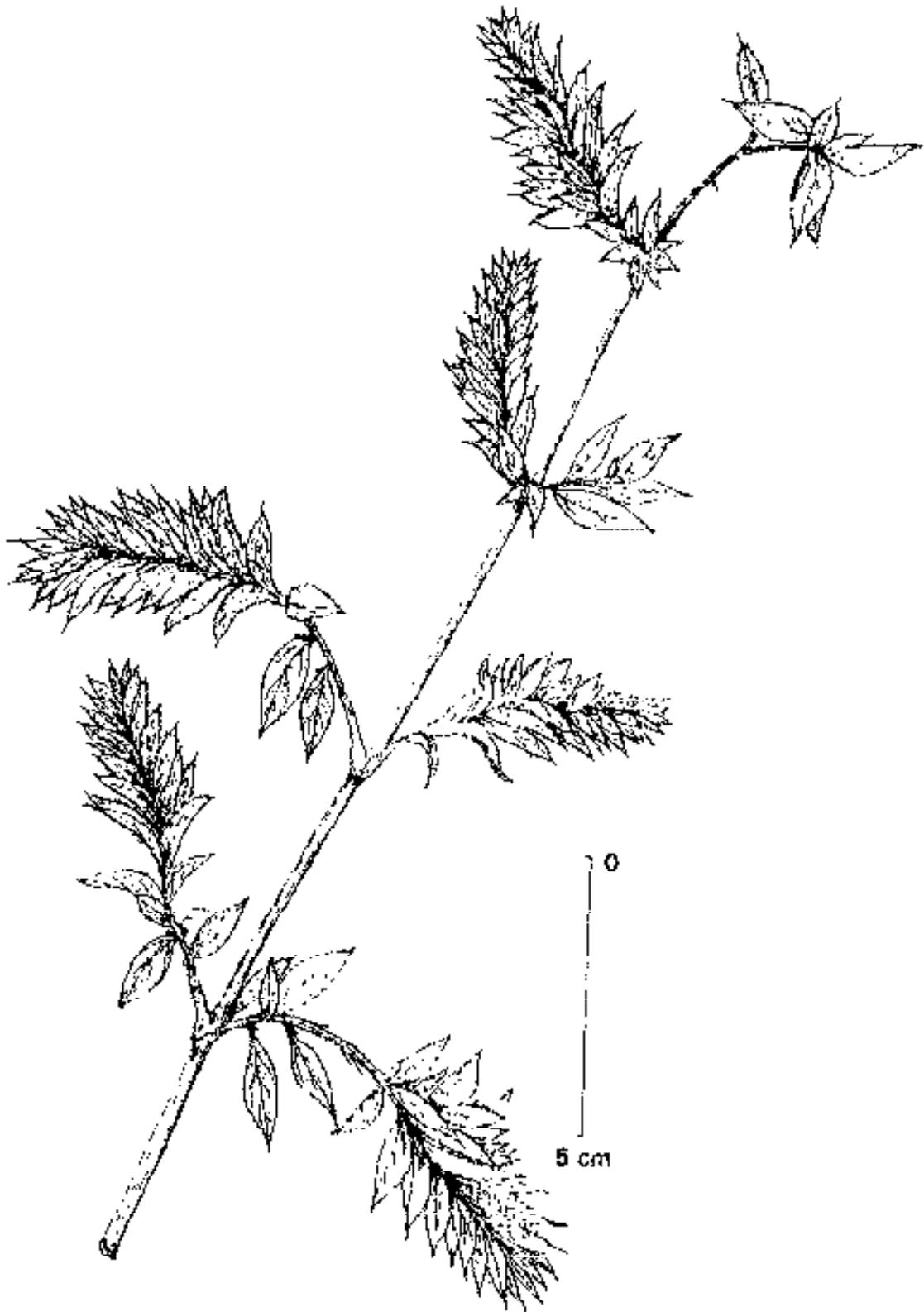


Fig. 55. *Lepidagathis cuspidata* Nees

Rare. As undergrowth in forests. Bastar, Hoshangabad. *Fl. & Fr.*: Dec. Feb.

3. *Lepidagathis fasciculata* (Retz.) Nees in Wallich, *Pl. Asiat. Rar.* 3: 95. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 522. 1885; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 100. 1994. *Ruellia fasciculata* Retz., *Observ. Bot.* 4: 28. 1786-87.

Herbs, diffuse, up to 30 cm high; stems slender, 4-angled, pubescent. Leaves elliptic to obovate, 2.5-5 x 1.5-2 cm, acuminate at apex, irregularly crenate or dentate, pubescent; petioles up to 2.5 cm long. Flowers in terminal and axillary, condensed, flattened, softly sericeous spikes; bracts elliptic-ovate, 3-nerved, glandular pubescent; bracteoles ovate-lanceolate, 1-nerved, glandular pubescent. Calyx 5-partite; outer segments ovate-lanceolate; median 2 segments lanceolate, shortly connate; inner 2 segments linear. Corolla white, pubescent outside; lower lip slightly longer. Capsules oblong. Seeds suborbicular.

In sal forests. Balaghat, Bastar, Bilaspur, Hoshangabad, Mandla, Raigarh, Sidhi, Surguja. *Fl. & Fr.*: Nov. April.

4. *Lepidagathis hamiltoniana* Wallich ex Nees in Wallich, *Pl. Asiat. Rar.* 3: 96. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 516. 1885; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 100. 1994. - *Agachiya*.

Herbs, perennial, erect or diffuse. Leaves linear or narrowly oblong, up to 15 x 1 cm, entire, more or less glabrous. Flowers in spikes aggregated in globose heads at the base of stem; bracts lanceolate, up to 1.25 cm long, spine-tipped, with white hairs on the margin. Calyx-segments lanceolate, reddish when young, membranous, spine-tipped; lower ones usually broader and 2-fid. Corolla blue-mauve or white with brown spots, mottled inside, with appressed, straight, white hairs. Capsules conical, 2-seeded. Seeds covered with hygroscopic hairs.

Common in wastelands and mixed forests. Mandla, Raigarh, Raipur, Surguja. *Fl. & Fr.*: Nov. Feb.

5. *Lepidagathis incurva* Buch.-Ham. ex D. Don, *Prodr. Fl. Nepal.* 119. 1825; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 102. 1994. *L. mucronata* Nees in Wallich, *Pl. Asiat. Rar.* 3: 95. 1832. *L. hyalina* Nees in Wallich, *Pl. Asiat. Rar.* 3: 95. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit.*

India 4: 521. 1885. *L. riparia* Nees in DC., Prodr. 11: 253. 1847. - *Patharchatti*.

Herbs, prostrate, much branched, 30-60 cm high; stems 2-4-ribbed. Leaves variable in shape; lower ovate; upper oblong, narrower, 4-13 x 1-3 cm, entire or undulate, glabrous above, slightly pubescent on the nerves beneath, petiolate. Flowers in terminal and axillary, dense spikes; bracts lanceolate, ca 12 mm long, imbricate, acuminate-mucronate; bracteoles narrower. Calyx-segments linear-lanceolate, mucronate; outer segment oblong, longest, ciliate on margin. Corolla white with brown spots, ca 6 mm long. Capsules oblong, ca 7 mm long, with a short beak, 4-seeded.

Common in mixed forests and in forest clearings. Balaghat, Bastar, Bilaspur, Mandla, Raigarh, Raipur, Rajnandgaon, Sidhi, Surguja. *Fl. & Fr.*: Nov. June.

6. *Lepidagathis purpuricaulis* Nees in Wallich, Pl. Asiat. Rar. 3: 96. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 519. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 102. 1994.

Herbs, perennial, suberect or decumbent-ascending; stems 4-angled, often with purple tinge, branched from the base. Leaves ovate-lanceolate or oblanceolate-obovate, unequal, 3-13 x 1-3.5 cm, acute or acuminate at apex, narrowed at base, glabrous. Flowers in axillary, clustered spikes; bracts lanceolate, ca 6 mm long, acuminate with an apical mucro, glandular pubescent; bracteoles ca 1 cm long. Calyx-segments 5, linear-lanceolate, unequal, glandular ciliate. Corolla pale purple, 10-15 mm long. Capsules oblong-lanceolate, glabrous, 4-seeded.

In moist places. Bilaspur, Raigarh, Rewa, Surguja. *Fl. & Fr.*: Jan. April.

7. *Lepidagathis trinervis* Wallich ex Nees in Wallich, Pl. Asiat. Rar. 3: 96. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 517. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 103. 1994.

Herbs, perennial, pubescent, up to 25 cm high; branches slender, 4-angled. Leaves linear or linear-lanceolate, 2.5-6 x 0.4-1 cm, acute at apex, tapering at base, entire, scabrid on margin, sessile. Flowers in axillary spikes; spikes solitary or many aggregated in ovoid-globose heads; bracts ovate-elliptic, spinous-cuspidate; bracteoles oblong-lanceolate, aristate.

Calyx-segments spinous-tipped, glabrous outside, densely pubescent inside. Corolla pink, violet or pale purple; throat with transverse streaks and mottled with yellow, brown and purple, 6-9 mm long, densely white hairy. Capsules compressed, beaked, glabrous. Seeds covered with long, silky white hairs.

In scrub forests usually in rock crevices. Bastar, Bhopal, Bilaspur, Dhar, Indore, Panna, Satna, Sidhi, Tikamgarh, West Nimar. *Fl. & Fr.*: Nov. April.

24. NELSONIA R. Br.

Herbs, erect or diffuse, pubescent. Leaves opposite, subequal, entire. Flowers in ovoid or cylindrical spikes, small; bracts closely imbricate, alternate or spirally arranged, glandular villous; bracteoles absent or much reduced. Calyx small, 4-partite; segments lanceolate, unequal; the larger often 2-fid. Corolla small, bilabiate; lobes 5, spreading, obtuse; tube slender. Stamens 2, adnate above the middle of corolla-tube, subincluded; anthers 2-celled, somewhat divergent, mucicous or minutely spurred. Ovary 2-locular; ovules 8-10 in each locule; style slender; stigma shortly 2-lobed. Capsules with seeds in the basal half, barren above. Seeds granular, not supported on retinacula.

Two species; tropical regions of Old World; one in M.P.

Nelsonia canescens (Lam.) Spreng., *Syst. Veg.* 1: 42. 1825; Tripathi *et al.* *Fl. Elem. Madhya Pradesh* 104. 1994. *Justicia canescens* Lam., *Tabl. Encycl.* 1: 41. 1791. *Nelsonia campestris* R. Br., *Prodr.* 481. 1810; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 394. 1884. *Chhotu-aandhi. Kharabhaji.*

Herbs, perennial, erect or diffuse, up to 60 cm high; young parts villous; roots fleshy, tuberous. Leaves elliptic-oblong to obovate, 5-20 x 1-3 cm, obtuse or subacute at apex; basal leaves petiolate; upper ones sessile. Flowers in axillary and terminal, 1-5 cm long, grey woolly spikes; bracts ovate-obovate, 4-6 mm long; bracteoles represented by two opposite tuft of hairs. Calyx-segments 5-6 mm long, glandular ciliate. Corolla white, pink or blue, 7-8 mm long. Capsules ovoid-conical, ca 6 mm long, glabrous, 8-12-seeded. Seeds ovoid, brown.

Common in wastelands and dried river beds. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Mandla, Raigarh, Raipur, Rajnandgaon, Rewa, Seoni, Sidhi, Surguja. *Fl. & Fr.*: April-June.

25. NILGIRIANTHUS Bremek.

Herbs, undershrubs or shrubs. Leaves long petiolate. Flowers in axillary and terminal, often drooping spikes; bracts longer than calyx, persistent; bracteoles present or absent, narrowly linear, shorter than calyx, persistent. Calyx not bilabiate, 5-partite; segments acute or obtuse. Corolla usually blue, rarely white, not resupinate, 5-lobed; lobes ovate, subacute, rounded or emarginate, twisted in bud; tube terete, widening into a throat; throat campanulate, shorter or longer than tube. Stamens usually 4, sometimes 2, subequal or didynamous, included or exerted; filaments filiform, hairy either along the whole length or only at the base, sometimes glabrous; anthers erect, not mucicous. Staminodes small or absent, alternating with stamens. Ovary hairy, rarely glabrous; ovules 2 in each locule; style glabrous or somewhat hairy. Capsules fusiform usually 2-4-seeded. Seeds glabrous or hairy on margin, shining, whitish.

About 20 species; endemic to India; 5 in M.P.

1a. Stamens 4:

2a. Bracts glabrous:

3a. Plants up to 25 cm high; leaves up to 4 cm long, with 4-5 pairs of ill-defined nerves ...1. *N. campanulatus*

3b. Plants more than 50 cm high; leaves 6-15 cm long, with 6-8 pairs of raised nerves ...2. *N. heyneanus*

2b. Bracts strigose or glandular pubescent:

4a. Spikes strobilate, often cymose; bracteoles absent ...3. *N. lupulinus*

4b. Spikes capitate; bracteoles present ...4. *N. neilgherrensis*

1b. Stamens 2 ...5. *N. reticulatus*

1. *Nilgirianthus campanulatus* (Wight) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41 (1): 172. 1944; Tripathi *et al.*, Fl. Elem. Madhya

Pradesh 106. 1994. *Strobilanthes campanulatus* Wight, Icon. Pl. Ind. Orient. 4 (4): t. 1562. 1850. *S. heyneanus* Nees var. *campanulatus* (Wight) C.B. Clarke in Hook. f., Fl. Brit. India 4: 444. 1884. "*campanulata*".

Small herbs, up to 25 cm high. Leaves ovate, up to 4 x 2.5 cm, subacute at apex, obtuse or subcordate at base, softly villous; main nerves not prominent. Flowers in subglobose, solitary or few-clustered spikes; spikes 1.5-2.5 cm across; bracts elliptic-obovate, deflexed, glabrous; bracteoles absent. Corolla campanulate or subcampanulate; lobes small, scarcely up to 1.5 cm long. Stamens 4. Capsules up to 1 cm long. Seeds glabrous.

Rare. Along forest roads and on hill slopes. Hoshangabad. *Fl. & Fr.*: July - Dec.

2. Nilgirianthus heyneanus (Nees) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 173. 1944; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 106. 1994. *Strobilanthes heyneana* Nees in Wallich, Pl. Asiat. Rar. 3: 85. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 443. 1884. *S. rugosus* Wight, Icon. Pl. Ind. Orient. 4(4): t. 1619. 1850.

Herbs or undershrubs, erect, 0.5-1.5 m high; stems hirsute upwards. Leaves ovate, elliptic or lanceolate, 6-15 x 3-6 cm, unequal below, acuminate at apex, cuneate at base, serrate, silky pubescent. Flowers in capitate spikes; bracts pink, solitary, orbicular, concave, glabrous; bracteoles absent. Calyx-segments linear-oblong, 6-7 mm long, 3-nerved. Corolla blue, 15-18 mm long; lobes acute; throat purple. Stamens 4. Capsules oblong-ovoid, 6-8 mm long, 4-seeded. Seeds ovoid, hairy on margin.

Rare. In mixed forests. Chhindwara, Hoshangabad. *Fl. & Fr.*: July Oct.

Notes: Joseph (Bull. Bot. Surv. India 5: 281-299. 1963) has reported *N. heyneanus* (Nees) Bremek. var. *neesii* Bremek. from Hoshangabad but in fact Bremekamp (*l.c.*) has described this variety with a question mark (?).

3. Nilgirianthus lupulinus (Nees) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 173. 1944. *Strobilanthes lupulina* Nees in Wallich, Pl. Asiat. Rar. 3: 85. 1832 & in DC., Prodr. 11: 184. 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 443. 1884.

Undershrubs, erect. Leaves ovate-elliptic, acuminate at apex, decurrent at base, serrate, rugose. Flowers in strobilate spikes; bracts elliptic-obovate, glandular pubescent, reticulate; bracteoles absent. Calyx-segments oblong, obtuse or emarginate, scarious. Corolla campanulate; lobes ovate. Stamens 4. Seeds glabrous.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Aug. Sep.

4. *Nilgirianthus neilgherrensis* (Bedd.) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 173. 1944. *Strobilanthes neilgherrensis* Bedd., Icon. Pl. Ind. Or. 1: 45. t. 196. 1874; C.B. Clarke in Hook. f., Fl. Brit. India 4: 438. 1884.

Shrubs; young parts hirsute. Leaves ovate, 9-12 x 5-7 cm, acuminate at apex, rounded at base, shallowly serrate, chartaceous, strigose; petioles ca 4 cm long. Flowers in axillary, densely strigose, capitate spikes; bracts oblong, cuspidate, strigose; bracteoles lanceolate. Calyx-segments linear, unequal. Corolla bluish or white; lobes puberulous outside; tube cylindrical. Stamens 4. Capsules ca 1 cm long.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Dec. - Jan.

5. *Nilgirianthus reticulatus* (Stapf) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 173. 1944; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 106. 1994. *Strobilanthes reticulatus* Stapf in Kew Bull. 1894: 347. 1894.

Undershrubs, up to 1.5 m high; young stems angular. Leaves ovate-lanceolate, 4-8 x 2.5-3.5 cm, acute at apex, rounded or cordate at base, crenate, pubescent. Flowers in terminal or axillary spikes; bracts pink-purple, broadly ovate. Calyx-segments linear-oblong, 6-8 mm long. Corolla blue, 2-2.5 cm long; lobes rounded; tube narrowed at base, broader in upper part. Stamens 2. Capsules oblong, ca 1 cm long, pale yellow, glandular hairy at apex. Seeds suborbicular.

Rare. In rock crevices. Bastar. *Fl. & Fr.*: Feb. May.

26. NOMAPHILA Blume

Herbs, erect; nodes thickened. Leaves entire, petiolate, connected by transverse ridges, with cystolith. Flowers in axillary cymes, shortly or

moderately pedicellate; ultimate branches often cincinnus; bracts linear, minute; bracteoles small or absent. Calyx 5-partite; segments linear; posterior segment longest. Corolla tubular, bilabiate; upper lip shortly 2-lobed; lower lip 3-lobed, with a villous palate; lobes twisted in bud; tube pale, widened apically. Stamens 4, didynamous, inserted below the middle of corolla-tube; filaments basally connate in pairs by a membrane. Ovary oblong; ovules many in each locule; style linear, hairy; stigma simple, linear. Capsules linear. Seeds ellipsoid, reticulate, covered with long, mucilaginous hairs.

About 12 species; palaeotropical regions; one in M.P.

Nomaphila parishii T. Anderson in J. Linn. Soc. Bot. 9: 455. 1867; C.B. Clarke in Hook. f., Fl. Brit. India 4: 409. 1884.

Herbs, 30-50 cm high; stems pubescent upwards, glabrous below. Leaves lanceolate, ca 6 x 2 cm, acute at apex and base, entire; young leaves minutely pubescent; mature ones linear above, sparsely pubescent or glabrate beneath. Flowers in axillary cymes; bracts opposite, linear. Calyx-segments linear, ca 6 mm long, acute, glandular pubescent. Corolla lilac, more or less glabrous. Capsules ca 12 mm long, many-seeded.

Rare. Balaghat. *Fl. & Fr.*: Jan. Feb.

27. PERILEPTA Bremek.

Herbs or undershrubs. Leaves in unequal pairs, amplexicaul at base, connected by transverse ridges, sessile. Flowers in axillary and terminal, subsessile spikes; bracts persistent, more or less as long as the calyx; bracteoles small or absent. Calyx bilabiate; upper one 3-partite; lower one 2-partite. Corolla resupinate; lobes 5, twisted in bud; tube slightly recurved above the short, narrow base, with 2 rows of hairs inside on the posterior side. Stamens 4, didynamous, included; filaments basally connected by a membrane. Ovary 2-locular; ovules 2 in each locule. Capsules fusiform, 4-seeded; retinacula well developed. Seeds with mucilaginous hairs.

About 8 species; India to S.E. Asia; one in M.P.

Perilepta auriculata (Nees) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 194. 1944; Tripathi *et al.*, Fl. Elem. Madhya

Pradesh III. 1994; Wood in Edinb. J. Bot. 51(2): 220. 1994. *Strobilanthes auriculata* Nees in Wallich, Pl. Asiat. Rar. 3: 86. t. 195. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 453. 1884, incl. var. *edgeworthiana* (Nees) C.B. Clarke in Hook. f., Fl. Brit. India 4: 453. 1884. *S. edgeworthianus* Nees in DC., Prodr. 11: 190. 1847. *Perilepta edgeworthiana* (Nees) Bremek., Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 195. 1944; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 112. 1994.

Herbs or undershrubs, perennial, erect, ca 1 m high; branches 4-angled, divaricate. Leaves elliptic-oblong to ovate-lanceolate, 5-20 x 3-8 cm, acuminate at apex, auriculate at base, serrulate. Flowers in axillary and terminal, compact, strobiliform, 10-15 cm long spikes; bracts obovate, imbricate, glandular pubescent, ciliate on margin; bracteoles linear. Calyx-segments lanceolate-spathulate, subequal, glandular pubescent. Corolla blue or whitish violet, campanulate or tubular-ventricose, 2-3 cm long; lobes retuse. Capsules ca 7 mm long, glabrous.

Common in mixed forests usually in moist, black, humus soil. Bastar, Bilaspur, Hoshangabad, Raigarh, Raipur, Seoni, Sidhi, Surguja. Fl. & Fr.: Dec. Feb.

28. PERISTROPHE Nees

Herbs, erect. Leaves entire, lineolate. Flowers solitary or in axillary and terminal cymes often arranged in spreading, lax panicles; bracts linear or elliptic, 1-4 together, decussate, longer than calyx; bracteoles linear or lanceolate, shorter than bracts. Calyx 5-partite; segments linear-lanceolate, subequal. Corolla bilabiate; upper lip subentire; lower lip shortly 3-lobed; tube slender. Stamens 2; filaments hairy below; anthers 2-celled, mucicous. Ovary 2-locular; ovules 2 in each locule; style filiform; stigma minutely 2-lobed. Capsules, stalked, usually 4-seeded, more or less pubescent. Seeds ovoid, compressed, glabrous or minutely glandular papillose.

About 15 species; tropical regions of Old World; 2 in M.P.

- 1a. Leaves elliptic, 10-20 cm long; bracts elliptic;
corolla 4-6 cm long ...1. *P. montana*
- 1b. Leaves ovate or ovate-lanceolate, up to 8 cm
long; bracts linear; corolla up to 1.5 cm long ...2. *P. paniculata*

1. *Peristrophe montana* Nees in Wallich, Pl. Asiat. Rar. 3: 113. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 556. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 114. 1994.

Herbs, erect, up to 75 cm high; branches almost terete, glabrous. Leaves elliptic, 10-20 x 4-8 cm, long acuminate at apex, glabrous; petioles up to 2.5 cm long. Flowers in axillary and terminal, branched cymes; bracts 2, conspicuous, elliptic, ca 2.5 cm long, obtuse or minutely apiculate, glabrous. Corolla pink, 4-6 cm long. Capsules ellipsoid, minute. Seeds discoid.

Rare. In mixed forests. Mandla. *Fl. & Fr.*: March - Nov.

2. *Peristrophe paniculata* (Forssk.) Brummitt in Kew Bull. 38: 451. 1983; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 113. 1994. *Dianthera paniculata* Forssk., Fl. Aegypt.-Arab. 7. 1775. *D. bicalyculata* Retz. in Vet. Acad. Handl. 297. t. 9. 1775. *Justicia bicalyculata* (Retz.) Vahl, Symb. Bot. 2: 13. 1791. *Peristrophe bicalyculata* (Retz.) Nees in Wallich, Pl. Asiat. Rar. 3: 113. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 554. 1885. - *Atrilal*.

Herbs, annual, erect, much branched, hispid, up to 1 m high; stems and branches 6-angled. Leaves ovate or ovate-lanceolate, 4-8 x 2-3.5 cm, acute to acuminate at apex, rounded at base, subentire or crenulate, ciliate on margin, pilose; petioles 6-12 mm long. Flowers in axillary and terminal, lax, divaricate, paniculate cymes; bracts 2, linear, unequal; bracteoles 4, subequal. Calyx-segments 3-4 mm long. Corolla rosy or rosy-pink, 1.4-1.5 cm long, hairy outside; throat hairy. Capsules oblong, ca 1 cm long, covered with glandular and simple hairs throughout except stalk. Seeds orbicular.

Common in wastelands, Balaghat, Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Gwalior, Hoshangabad, Indore, Jabalpur, Mandla, Raigarh, Raipur, Rewa, Sagar, Satna, Shahdol, Shivpuri, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Sept. - April.

The plant is medicinal and used as antidote to snake bite.

29. PETALIDIUM Nees

Undershrubs or shrubs. Leaves opposite, entire, crenate or serrate. Flowers solitary or in contracted, axillary cymes or racemes, often crowded

on short, lateral branchlets, sessile or shortly pedicellate; bracts narrow, small or absent; bracteoles large, reticulate, ultimately scarious. Calyx 5-partite; segments unequal. Corolla tubular-ventricose, straight or curved, 5-lobed; lobes subequal, twisted to left in bud; tube dilated in the upper half. Stamens 4, didynamous; anthers 2-celled, shortly spurred or mucicous at base. Ovary 2-locular; ovules 2 in each locule; style linear, long; stigma unequally 2-lobed. Capsules clavate, compressed. Seeds discoid, hygroscopically hairy.

About 35 species; tropical regions, S. Africa and India; one in M.P.

Petalidium barlerioides (Roth) Nees in Wallich, Pl. Asiat. Rar. 3: 82. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 416. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 117. 1994. *Ruellia barlerioides* Roth, Nov. Pl. Sp. 310. 1821.

Undershrubs, erect or straggling, up to 1.5 m high; twigs straw-coloured. Leaves broadly ovate, 5-10 x 3-7 cm, comparatively larger on stem and smaller on flower-bearing branches, acuminate at apex, rounded at base, crenate-serrate. Flowers solitary or crowded on lateral branches; bracts absent; bracteoles foliaceous, ovate-elliptic, up to 2.5 cm long. Calyx-segments lanceolate-subulate, glandular pubescent. Corolla yellowish white, pale blue or white; lobes obovate-suborbicular, up to 3.5 cm long, crenulate. Capsules ca 1.2 cm long, glabrous. Seeds compressed.

In mixed and teak forests. Bastar, Bilaspur, Damoh, Hoshangabad, Jabalpur, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Jan. May.

30. PHAULOPSIS Willd., *nom. et orth. cons.*

Herbs, perennial, prostrate. Leaves simple, opposite, entire or obscurely crenate, membranous, petiolate. Flowers in terminal, dense, unilateral spikes, small; bracts orbicular, closely imbricate; bracteoles absent. Calyx 5-partite; one segment ovate, large; others linear, narrow, smaller. Corolla 5-lobed; lobes slightly unequal, rounded, twisted in bud; tube slender, cylindrical. Stamens 4, didynamous; anthers 2-celled, minutely mucronate at base. Ovary 2-locular; ovules 2 in each locule; style long, hairy; stigma simple, linear. Capsules clavate, compressed parallel to the septum, 4-seeded. Seeds discoid, hygroscopically hairy.

About 20 species; tropical Africa, Mascarenes Islands and India; one in M.P.

Phaulopsis dorsiflora (Retz.) Santapau in Kew Bull. 1948: 276. 1948. *Ruellia dorsiflora* Retz., Observ. Bot. 6: 31. 1791. *R. imbricata* Forssk., Fl. Aegypt.-Arab. 113. 1775. *Micranthus oppositifolius* J.C. Wendl., Bot. Beob. 39. 1798. *Phaulopsis parviflora* Willd., Sp. Pl. 3: 342. 1800. "*Phaylopsis*"; C.B. Clarke in Hook. f., Fl. Brit. India 4: 417. 1884. *Aetheilema reniforme* Nees in Wallich, Pl. Asiat. Rar. 3: 94. 1832. *Phaulopsis imbricata* Cordem., Fl. Reum. 496. 1895, *non* Sweet, 1826. *P. oppositifolia* Lindau in Engl. & Prantl. Nat. Pflanzenfam. Nachtr. 1: 305. 1897. *Micranthus dorsiflorus* Fischer in Kew Bull. 1932: 63. 1932.

Herbs. diffuse, much branched, viscid. up to 80 cm high. Leaves in unequal pairs, ovate-oblong, 3-10 x 1.5-3.5 cm, acuminate at apex, entire, hirsute; petioles 0.5-3 cm long. Flowers in terminal, hispid spikes, sometimes clustered in lower axils; bracts foliaceous, pubescent. Calyx-segments ciliate and glandular hairy. Corolla white, small. Capsules flat, 5-6 mm long.

Rare. In mixed forests. Bastar, Raipur. *Fl. & Fr.*: Jan. Feb.

31. PHLEBOPHYLLUM Nees

Undershrubs or shrubs. Leaves opposite, entire to crenate-serrate, petiolate. Flowers in spikes, often paniculate; bracts concealing calyx; bracteoles narrower than bracts, both persistent. Calyx bilabiate, 5-lobed; lobes subequal, usually acute. Corolla ventricose from near the base, not resupinate, 5-lobed; tube less than 2 cm long; palate hairy. Stamens 2, included; filaments generally hairy; anther cells parallel. Staminodes absent. Ovary usually glabrous; ovules 2 in each locule. Capsules clavate.

About 8 species; endemic to India; 2 in M.P.

- 1a. Petioles more than 2 cm long; bracts lanceolate ...1. *P. jeyporensis*
 1b. Petioles up to 2 cm long; bracts ovate ...2. *P. versicolor*

1. *Phlebophyllum jeyporensis* (Bedd.) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 169. 1944. *Strobilanthes jeyporensis* Bedd., Icon. Pl. Ind. Or. t. 214. 1874; C.B. Clarke in Hook. f., Fl. Brit. India 4: 436. 1884.

Shrubs; branches glabrous, angular. Leaves ovate or elliptic-ovate, 7-14 cm long, acuminate at apex, rounded at base, abruptly decurrent on petiole, crenate or crenulate-dentate, more or less membranous; young leaves glabrous above, pubescent beneath; mature ones pubescent and lineolate above, pubescent on the nerves beneath. Flowers in often trichotomous, 3-5 cm long, paniculate spikes; bracts lanceolate; bracteoles linear-lanceolate, glandular pubescent outside. Calyx-lobes linear, glandular pubescent outside. Corolla white; lobes unequal, spreading; ventricose part ca 1 cm long. Capsules up to 1.5 cm long, beaked.

Rare. Bastar. *Fl. & Fr.*: Feb. - April.

Notes: The plant is endangered and has been included in Red Data Book of India (Nayar and Sastry, 1987).

2. *Phlebophyllum versicolor* (Wight) Bremek. in Verh. Acad. Wet. Afd. Natuurk. sect. 2. 41(1): 169. 1944. *Endopogon versicolor* Wight, Icon. Pl. Ind. Orient. t. 1497. 1849 & Ill. Ind. Bot. t. 164. 1850. *Strobilanthes cuspidatus* (Benth.) T. Anderson in J. Linn. Soc. Bot. 9: 465. 1867; C.B. Clarke in Hook. f., Fl. Brit. India 4: 435. 1884. *Endopogon cuspidatus* Benth. in Linnaea 24: 646. 1851.

Shrubs. Leaves ovate or obovate, cuspidate-acuminate at apex, rounded to attenuate at base, entire to crenulate, subcoriaceous, glabrous above, pilose beneath; petioles ca 2 cm long. Flowers in usually leafless, paniculate spikes; bracts ovate, acuminate; bracteoles lanceolate, glandular-ciliate. Calyx-lobes sericeous. Corolla pink. Capsules ca 1 cm long.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Dec. - April.

32. RHAPHIDOSPORA Nees

Herbs, erect or decumbent; stems articulate above the nodes. Leaves simple, opposite, connected by transverse ridges, with cystolith. Flowers in axillary or terminal, few-flowered corymbs or paniculate cymes; bracts and bracteoles small. Calyx 5-partite; segments narrow, acute. Corolla white or greenish white, small, bilabiate; upper lip erect, emarginate; lower lip deflexed, 3-lobed; lobes imbricate in bud; tube widened at apex, with 2 intrusions below the palate. Stamens 2, glabrous; anthers 2-celled; lower cell basally spurred. Staminodes absent. Ovary 2-locular; ovules 2 in each

locule; stigma faintly 2-lobed. Capsules with a stipiform solid base, 4-seeded. Seeds covered with long hairs.

About 12 species; tropical Africa and W. Malesia; one in M.P.

Rhaphidospora glabra (Koenig ex Roxb.) Nees in Wallich, Pl. Asiat. Rar. 3: 115. 1832. & in DC., Prodr. 11: 499. 1847. *Justicia glabra* Koenig ex Roxb., Fl. Ind. (Carey & Wallich. ed.) 1: 132. 1820; C.B. Clarke in Hook. f., Fl. Brit. India 4: 535. 1885.

Herbs, erect or decumbent, ca 60 cm high; stems grooved. Leaves broadly ovate, 3-6 x 1.5-3 cm, acuminate at apex, obtuse at base, entire, glabrous. Flowers in axillary and terminal, paniculate cymes; bracts linear, small; bracteoles paired, similar to bracts. Calyx-segments linear, acute, puberulous. Corolla tubular, glabrous. Capsules oblong, pubescent. Seeds discoid, densely brown villous.

Rare. Bastar. Fl. & Fr.: Nov. - Jan.

33. RHINACANTHUS Nees

Undershrubs or shrubs, erect, sometimes subscaudent or decumbent. Leaves entire. Flowers solitary or in small cymes on the branches of dense or divaricate panicles; bracts and bracteoles similar, linear-lanceolate, small, shorter than calyx. Calyx deeply 5-partite; segments narrow. Corolla bilabiate; upper lip linear-oblong, entire or shortly 2-lobed, twisted or recurved; lower lip broad, 3-lobed; tube cylindrical, narrow, long, scarcely enlarged above. Stamens 2, adnate near the top of corolla-tube; anthers 2-celled; cells superposed, mucicous. Disk cupular. Ovary 2-locular; ovules 2 in each locule; style filiform; stigma minutely 2-lobed. Capsules with long, solid stipe, 4-seeded. Seeds ovoid or orbicular, compressed, glabrous, obscurely rugose or tuberculate.

About 15 species; tropical regions of Old World; one in M.P.

Rhinacanthus nasuta (L.) Kurz in J. Asiat. Soc. Bengal 39: 79. 1870; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 121. 1994. *Justicia nasuta* L., Sp. Pl. 16. 1753. *Rhinacanthus communis* Nees in Wallich, Pl. Asiat. Rar. 3: 109. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 541. 1885.

Undershrubs, erect or decumbent, up to 1.5 m high; stems terete, pubescent when young. Leaves elliptic or elliptic-lanceolate, 5-10 x 2-4 cm,

acuminate at apex, acute at base, undulate, glabrescent, lineolate; petioles up to 1.5 cm long. Flowers in axillary and terminal, divaricate, pubescent panicles, sessile or subsessile; bracts foliaceous. Calyx-segments ovate-lanceolate, ca 3 mm long, puberulous. Corolla white with bluish tinge; upper lip shortly 2-lobed. Capsules clavate, ca 2 cm long, pubescent. Seeds orbicular, tuberculate.

As undergrowth in mixed forests and on hill slopes. Bastar, Raigarh, Raipur. *Fl. & Fr.*: Nov. - Feb.

34. RUELIJA L.

Herbs, annual or perennial. Leaves opposite, rarely whorled, entire or subentire. Flowers solitary or in cymes, sessile or subsessile; bracts absent; bracteoles narrow, large, usually exceeding the calyx. Calyx 5-partite or 5-fid; segments narrow, subequal, acute. Corolla tubular-ventricose, oblique; lobes subequal, rounded, twisted to left in bud; tube ventricose. Stamens 4, didynamous; filaments glabrous or sometimes hairy at base; anthers 2-celled, subequal; cells oblong, mucous. Ovary 2-locular; ovules 3-10 in each locule; style linear; stigma simple. Capsules cylindrical, seed-bearing throughout. Seeds thin, hygroscopically hairy, on strong hooked retinacula.

Five species; tropical and subtropical America; one in M.P.

***Ruellia tuberosa* L.** Sp. Pl. 635. 1753; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 122. 1994.

Herbs, erect, up to 50 cm high; roots tuberous; stems grooved, 4-angled. Leaves elliptic or elliptic-obovate, 5-12 x 4-5 cm, obtuse or rounded at apex, decurrent at base, subentire, shortly petiolate. Flowers in axillary and terminal, pedunculate cymes; bracteoles linear-subulate, 3-5 mm long. Calyx-segments linear, 1.5-2 cm long, glandular, ciliate. Corolla blue-violet, occasionally white, 5-5.5 cm long, hairy outside; lobes irregularly sinuate-dentate. Capsules linear-fusiform, ca 2 cm long, pointed, grooved, 20 or more-seeded. Seeds orbicular.

In wastelands and sometimes planted in gardens. Durg, Rewa, West Nimar. *Fl. & Fr.*: July - Sept.

35. RUNGIA Nees

Herbs, erect or diffuse. Leaves entire or serrulate, usually lineolate. Flowers in terminal or axillary, unilateral spikes; bracts in 2 or 4 rows; 2 of the rows usually without flowers; flowering bracts scarious on margin; bracteoles narrower than flowering bracts. Calyx small, 5-partite; segments linear-lanceolate or linear-subulate. Corolla small, bilabiate; upper lip emarginate; lower lip longer, 3-lobed. Stamens 2; anthers 2-celled; cells subequal, usually superposed; lower cell with a white, basal appendage. Disk annular or shortly cupular. Ovary 2-locular; ovules 2 in each locule; style filiform; stigma minutely 2-fid. Capsules ovoid, obovoid or oblong, shortly stipitate, 4-seeded. Seeds compressed, glabrous, minutely or strongly concentrically verrucose.

About 50 species; tropical regions of Old World; 3 in M.P.

- 1a. Spikes distinctly unilateral; bracts dimorphic ...2. *R. pectinata*
 1b. Spikes imperfectly unilateral; bracts similar:
 2a. Plants erect; stems densely pubescent;
 capsules obovoid ...1. *R. elegans*
 2b. Plants diffuse or decumbent; stems glabrous
 or puberulous; capsules ovoid-oblong ...3. *R. repens*

1. *Rungia elegans* Dalzell in Dalzell & Gibson, Bombay Fl. 196. 1861; C.B. Clarke in Hook. f., Fl. Brit. India 4: 549. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 124. 1994.

Herbs, annual, erect, up to 40 cm high; stems covered with soft, white hairs. Leaves elliptic-lanceolate, 5-10 x 2-3.5 cm, acute to acuminate at apex, narrowed at base, entire, pubescent. Flowers in imperfectly unilateral spikes; bracts broadly elliptic, scarious and ciliate on margin; bracteoles linear-lanceolate. Calyx-segments linear-subulate, pubescent. Corolla pink or pale purple, pubescent outside; throat pink mottled. Capsules obovoid, mucronate, pubescent on the margin. Seeds broadly oblong, pale yellowish brown.

Rare. In sandy wastelands. Bhopal, Jhabua. *Fl. & Fr.*: Aug. - Sept.

2. *Rungia pectinata* (L.) Nees in DC., Prodr. 11: 470. 1847; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 126. 1994. *Justicia pectinata* L., Cent.

Pl. II: 3. 1756 & Amoen. Acad. 4: 299. 1759. *Rungia parviflora* (Retz.) Nees var. *pectinata* (L.) C.B. Clarke in Hook. f., Fl. Brit. India 4: 550. 1885. *R. parviflora* (Retz.) Nees var. *muralis* C.B. Clarke in Hook. f., Fl. Brit. India 4: 550. 1885.

Herbs, annual, procumbent, much branched. Leaves elliptic or lanceolate, 3-8 x 1-5 cm, acuminate at apex, serrulate, sessile or petiolate. Flowers in terminal and axillary, dense, distinctly unilateral spikes; sterile and fertile bracts dissimilar; sterile bracts oblong-lanceolate, narrowly scarious-margined; fertile ones obovate-orbicular, broadly scarious-margined; bracteoles oblong, scarious-margined. Calyx-segments linear-lanceolate, ciliate on margin. Corolla light blue with two rows of darker patches in the lower lip. Capsules ovoid, ca 2.5 mm long.

Common in wastelands and in mixed forests. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Indore, Jabalpur, Mandla, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Shahdol, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: Jan. - April.

3. *Rungia repens* (L.) Nees in Wallich, Pl. Asiat. Rar. 3: 110. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 549. 1885; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 126. 1994. *Justicia repens* L., Sp. Pl. 15. 1753. *Kharmor*.

Herbs, annual, diffuse or procumbent; branches 4-angled. Leaves oblong or elliptic-lanceolate, 2-8 x 1-2 cm, acute or obtuse at apex, tapering at base, subentire, subsessile. Flowers in terminal, 1-3 cm long, erect, pubescent spikes; bracts foliaceous, ovate-orbicular, pubescent, scarious-margined; bracteoles lanceolate, ciliate. Calyx-segments lanceolate, ca 4 mm long, pubescent. Corolla rosy or pink with deep red or purple spots in the throat of lower lip. Capsules ovoid-oblong, compressed, 4-5 mm long, pubescent. Seeds ovoid.

Common along the roadside ditches. Balaghat, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Jabalpur, Mandla, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Shivpuri, West Nimar. *Fl. & Fr.*: Nov. - Jan.

36. STAUROGYNE Wallich

Herbs or undershrubs. Leaves opposite, rarely alternate, entire or subentire. Flowers small, solitary or in terminal or pseudo-axillary, simple

or compound, lax or dense racemes or spikes; bracts usually foliaceous, small or large; bracteoles 2, small. Calyx deeply 5-partite nearly up to base: segments oblong or linear, subequal or one larger than the others. Corolla shallowly bilabiate; lobes 5, short, imbricate in bud; tube cylindrical or slightly infundibuliform, long or short. Stamens 4, didynamous, usually included; filaments hairy; anther cells 2, mucicous. Disk small. Ovary 2-locular: ovules many in each locule; style linear; stigma 2-lobed; one lobe often again 2-lobed. Capsules oblong or ovate-oblong, small, seed bearing throughout, many-seeded. Seeds globose, small, smooth or pitted, without retinacula.

About 80 species; tropical regions especially W. Malesia; 4 in M.P.

- 1a. Plants diffuse or prostrate; flowers usually solitary, rarely in 1-1.5 cm long spikes; corolla 10-12 mm long ...2. *S. glutinosa*
- 1b. Plants erect; flowers in 2-5 cm long spikes; corolla 3-8 mm long:
 - 2a. Stems viscous; leaves spatulate ...1. *S. glauca*
 - 2b. Stems not viscous; leaves elliptic or ovate-oblong:
 - 3a. Plants usually unbranched; corolla ca 3 mm long ...3. *S. perpusilla*
 - 3b. Plants often branched from the base; corolla ca 6 mm long ...4. *S. polybotrya*

1. *Staurogyne glauca* (Nees) Kuntze, Revis. Gen. Pl. 497. 1891. *Ebermaiera glauca* Nees in Hook., Comp. Bot. Mag. 2: 310. 1837; C.B. Clarke in Hook. f. Fl. Brit. India 4: 395. 1884.

Herbs, erect; stems viscous pubescent above. Leaves often alternate towards apex and opposite towards base, spatulate, up to 5 x 1.5 cm, obtuse at apex, attenuate at base, glabrous or slightly viscous pubescent. Flowers in ca 5 cm long spikes; bracts glandular pubescent; bracteoles linear-oblong, pubescent. Calyx-segments linear-oblong, glandular pubescent. Corolla 5-8 mm long; lobes rounded; tube cylindrical. Capsules oblong, ca 5 mm long, membranous, glabrous, apiculate.

Rare. Bastar. Fl. & Fr.: Oct. Dec.

2. *Staurogyne glutinosa* (Wallich ex C.B. Clarke) Kuntze, Revis. Gen. Pl. 499. 1891; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 130. 1994. *Ebermaiera glutinosa* Wallich ex C.B. Clarke in Hook. f., Fl. Brit. India 4: 396. 1884. Fig. 56.

Herbs, annual, diffuse or prostrate. Leaves opposite, oblong or elliptic, 1-3 x 0.5-1 cm, obtuse at apex, tapering at base, entire, glabrous or subglabrous. Flowers pseudo-axillary, solitary, rarely in 1-1.5 cm long spikes; bracts 2, oblong, glandular pubescent. Calyx-segments unequal, largest one oblong, obtuse; smaller ones linear, subobtuse. Corolla pink-purple with dark brown streaks, campanulate, shallowly 5-lobed; lobes 10-12 mm long, pubescent outside. Capsules oblong, ca 5 mm long, glabrous.

Rare. In moist places. Rewa, Satna. *Fl. & Fr.*: Dec. Feb.

3. *Staurogyne perpusilla* Henry & Balakrishnan in Bull. Bot. Surv. India 3: 205. 1961; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 130. 1994.

Small herbs, erect, up to 10 cm high; stems terete, unbranched, appressed pubescent. Leaves opposite, ovate-oblong, 1-1.5 x 0.5-0.8 cm, obtuse at apex, rounded at base, entire, glabrous above, puberulous on nerves beneath. Flowers in terminal, lax, usually many-flowered, spiciform or condensed racemes; bracts ovate, obovate or oblong, glandular pubescent; bracteoles linear. Calyx-segments subequal, 4-6 mm long. Corolla pale blue, ca 3 mm long. Capsules ovate-oblong, ca 4 mm long, glabrous. Seeds pitted-tuberculate.

Rare. Bastar (Henry & Balakrishnan, 1961). *Fl. & Fr.*: Feb. March.

4. *Staurogyne polybotrya* (Nees) Kuntze, Revis. Gen. Pl. 497. 1891; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 132. 1994. *Ebermaiera polybotrya* Nees in DC., Prodr. 11: 74. 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 396. 1884. Fig. 57.

Small herbs, erect, up to 20 cm high; stems appressed grey pubescent. Leaves elliptic, subobtuse at apex and base, subentire, glabrous or minutely pubescent on the nerves, sessile or shortly petiolate. Flowers in dense, uninterrupted, cylindrical, 2-3 cm long spikes; bracts narrowly oblong, scarcely exceeding the calyx; bracteoles linear, shorter than calyx. Calyx-segments subequal, narrowly linear; largest one oblong, much broader.



Fig. 56. *Staurogyne glutinosa* (Wallich ex C.B. Clarke) Kuntze

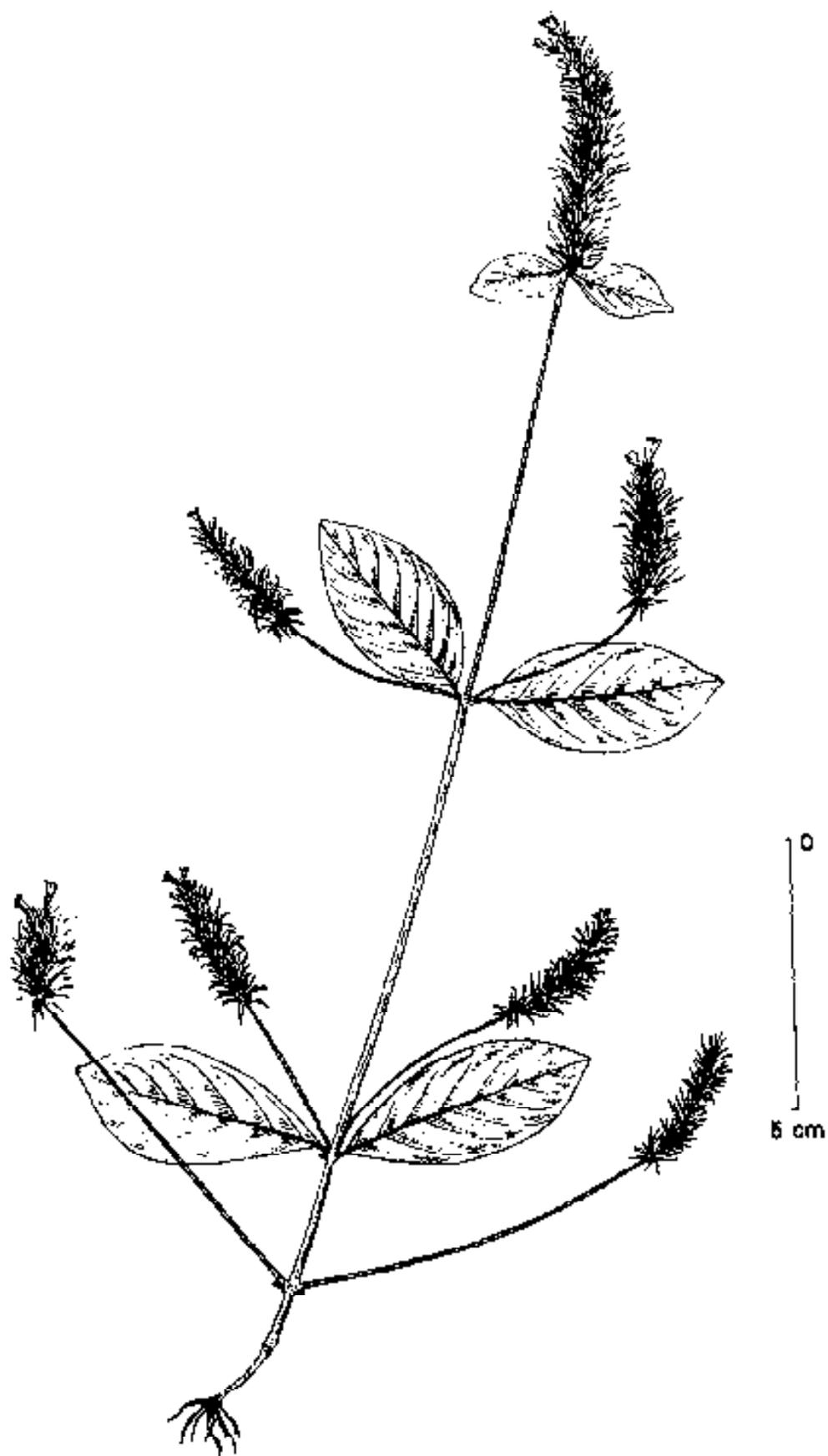


Fig. 57. *Staurogyne polybotrya* (Nees) Kuntze

Corolla blue with rose or yellow stripes. *ca* 6 mm long. Capsules *ca* 5 mm long.

Rare. In moist sandy soil. Raigarh. *Fl. & Fr.*: Dec. March.

37. STROBILANTHES Blume

Herbs, undershrubs or shrubs; young parts 4-angled. Leaves opposite, often unequal, crenate to serrate, thick chartaceous to coriaceous, petiolate, with cystolith. Flowers in axillary and/or terminal, lax or condensed spikes or panicles, sessile, sometimes pedicellate; bract 1; bracteoles 2, narrow, small or absent. Calyx not bilabiate, usually 5-partite; segments narrow, equal or subequal, free or basally connate. Corolla tubular-ventricose, resupinate; lobes 5, subequal, ovate or rounded, twisted to left in bud, spreading or reflexed. Stamens 2 or 4, didynamous, included or exerted, monadelphous; anthers 2-celled, mucicous. Disk small or prominent. Ovary 2-locular; ovules 2 in each locule; style filiform; stigma of one, linear branch, other branch obsolete. Capsules oblong, 2 or 4-seeded. Seeds much compressed, glabrous, on curved retinacula.

About 250 species; tropical Asia; 2 in M.P.

- 1a. Bracteoles absent; corolla pale blue ...1. *S. asperrimus*
 1b. Bracteoles present; corolla pink ...2. *S. walkeri*

Notes: Mooney (1942) has reported *S. falconeri* T. Anderson and *S. rufescens* T. Anderson from Bastar which are plants of Myanmar and Sri Lanka respectively.

1. *Strobilanthes asperrimus* Nees in DC., Prodr. 11: 183. 1847; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 443. 1884. *S. lupulinus* T. Anderson in J. Linn. Soc. Bot. 9: 469. 1867, *non* Nees, 1832.

Shrubs; branches scabrous, glandular pubescent. Leaves broadly elliptic, up to 12 x 6 cm, coriaceous, scabrous with bulbous-based hairs above, white strigose beneath. Flowers in strobilate spikes; bracts white or pink, elliptic or orbicular, obtuse or emarginate, not glandular pubescent; bracteoles absent. Calyx-segments emarginate, subscarious. Corolla pale blue. Capsules 4-seeded.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Oct. Dec.

2. *Strobilanthes walkeri* Arnott ex Nees in Hook., Comp. Bot. Mag. 2: 312. 1837 & in DC., Prodr. 11: 181. 1847; C.B. Clarke in Hook. f. Fl. Brit. India 4: 440. 1884.

Undershrubs. Leaves ovate to obovate, 5-8 x 2-4 cm, acute to acuminate at apex, attenuate at base, crenate-serrate, thinly scabrous. Flowers in axillary, condensed spikes, sessile; bracts more or less equal to bract of head, crenate-serrate; bracteoles lanceolate, ciliate. Calyx-segments equal, strigose inside. Corolla pink; lobes 2 + 3, reflexed. Capsules oblong.

Rare. Along forest roads. Hoshangabad (Rao & Narayanaswamy, 1960; Mukherjee, 1984). *Fl. & Fr.*: Dec. - Jan.

38. THUNBERGIA Retz., *nom. cons.*

Undershrubs or shrubs, climbers, sometimes erect. Leaves simple, opposite, 3-5-nerved from base, entire or serrate, petiolate. Flowers axillary, solitary, paired or in terminal racemes; bracts 2, at the base of pedicel, foliaceous, sometimes not foliaceous; bracteoles large, spathaceous, enclosing calyx. Calyx small, annular, usually 10-16-toothed. Corolla infundibuliform; lobes 5, subequal, imbricate; tube swollen, curved. Stamens 4, didynamous, inserted near the base of corolla-tube, included; filaments usually hairy; anthers 2-celled; cells unequal, shortly spurred or rounded. Disk annular or cushion-shaped. Ovary 2-locular; ovules 2 in each locule; style long; stigma entire, 2-fid or fringed. Capsules globose or conical, with a sword-shaped beak, 4-seeded. Seeds ovoid, globose or hemispherical, glabrous.

About 100 species; tropical regions of Old World; 5 in M.P.

- 1a. Plants erect ...2. *T. erecta*
- 1b. Plants climbers:
 - 2a. Flowers in racemes; calyx entire or crenulate; corolla blue or bluish purple ...4. *T. grandiflora*
 - 2b. Flowers solitary or paired; calyx 10-16-toothed; corolla white or orange:
 - 3a. Corolla orange with a reddish brown spot ...1. *T. alata*
 - 3b. Corolla white:

- 4a. Bracts foliaceous; seeds hemispherical ...5. *T. laevis*
 4b. Bracts not foliaceous; seeds globose ...3. *T. fragrans*

1. ***Thunbergia alata*** Bojer ex Sims in Curtis, Bot. Mag. t. 2591. 1825; C.B. Clarke in Hook. f., Fl. Brit. India 4: 391. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 135. 1994. **Fig. 58.**

Herbs, climbing. Leaves broadly ovate, 4-9 x 3-7 cm, acute or mucronate at apex, cordate or hastate at base, entire, pubescent; petioles winged. Flowers axillary, solitary or paired, long pedicellate; bracts hastate, glabrous, folded in the middle like a wing; bracteoles broadly ovate. Calyx-teeth 10-16, linear or subulate, unequal, ciliate. Corolla orange with a reddish brown spot; lobes spreading; tube *ca* 1.5 cm long. Capsules depressed globose, *ca* 1 cm across, pubescent. Seeds wrinkled.

Rare. As weed in cultivated fields. Dhar, Hoshangabad. *Fl. & Fr.*: Sept. Feb.

2. ***Thunbergia erecta*** (Benth.) T. Anderson in J. Linn. Soc. Bot. 7: 18. 1864; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 136. 1994. *Meyenia erecta* Benth. in Hook., Niger Fl. 476. 1849.

Herbs or undershrubs, perennial, erect. *ca* 1 m high; branches glabrous. Leaves variable in shape, elliptic or obovate to ovate-lanceolate, 2-8 x 2-4 cm, acute or acuminate at apex, rounded at base, entire, glabrous. Flowers axillary, usually solitary, sometimes paired; bracts ovate; bracteoles caducous. Calyx-teeth 12-15, subulate, glandular-pubescent, hidden by foliaceous bracts. Corolla yellowish violet to violet or purple-blue. Capsules 1.5-2 cm long.

Planted in gardens. Chhatarpur, Indore. *Fl. & Fr.*: Sept. Feb.

3. ***Thunbergia fragrans*** Roxb., Pl. Coromandel 1: 47. t. 67. 1796; C.B. Clarke in Hook. f., Fl. Brit. India 4: 390. 1884; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 136. 1994. *T. volubilis* Pers., Syn. Pl. 2: 179. 1806. **Fig. 59.**

Climbers; stems striate, slender, glabrous or hirsute. Leaves oblong or deltoid-ovate, 4-10 x 3-5 cm, rounded at apex, cordate or hastate at base, entire or with a few basal, angular, apiculate lobes, coriaceous, scabrous, puberulous; petioles *ca* 2 cm long. Flowers axillary, solitary or

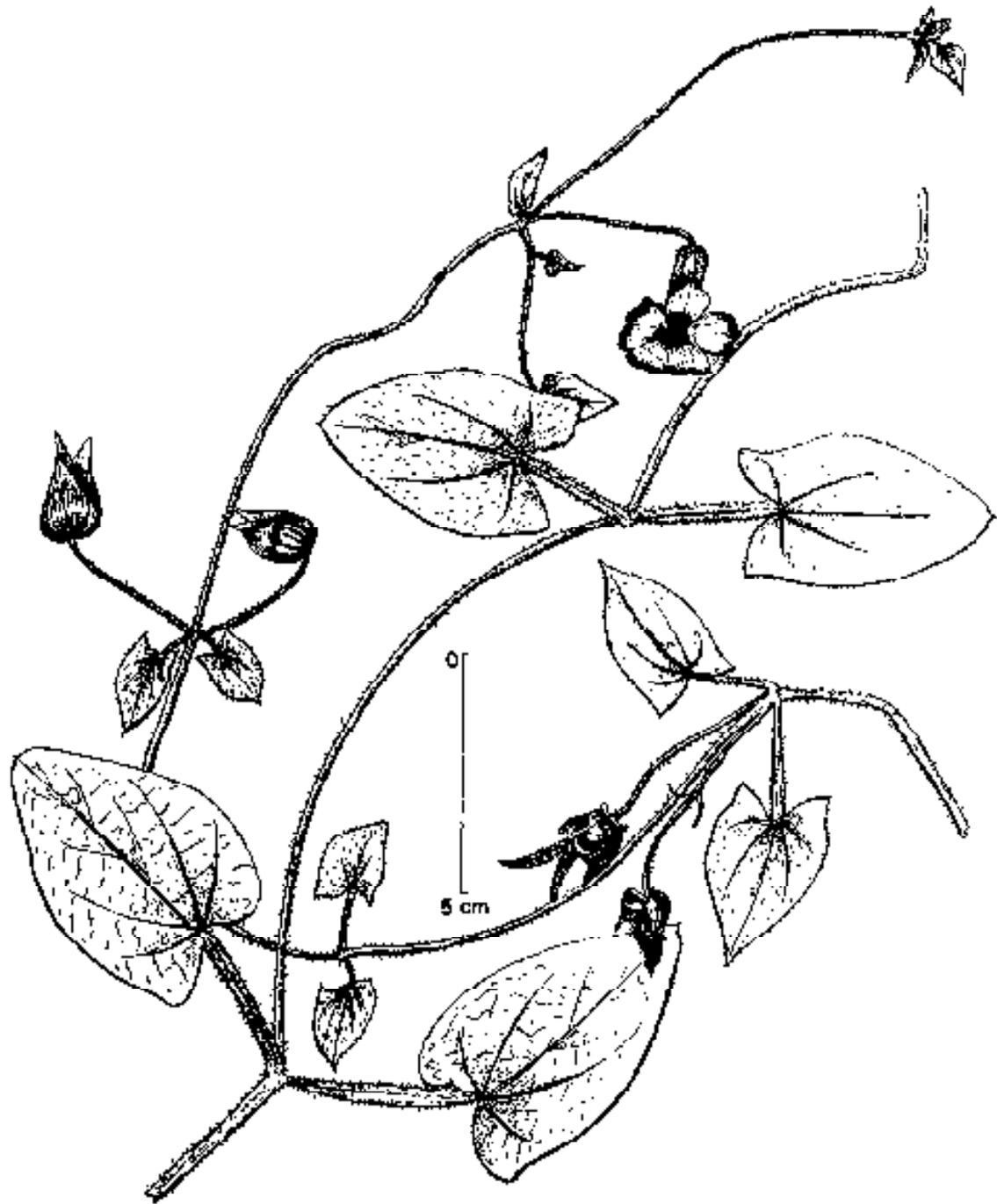


Fig. 58. *Thunbergia alata* Bojer ex Sims

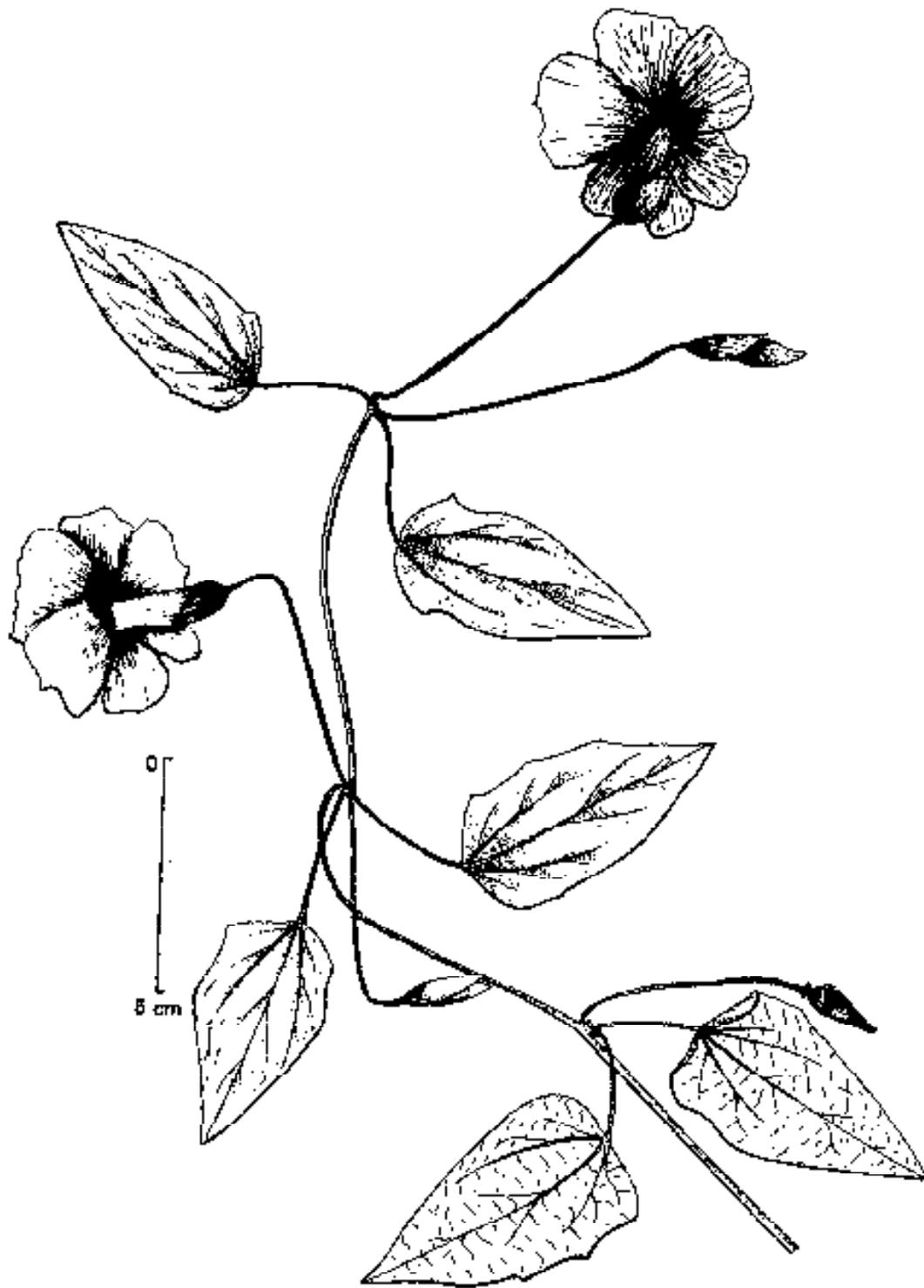


Fig. 59. *Thunbergia fragrans* Roxb.

paired; bracts small, not foliaceous; bracteoles ovate, acuminate. Calyx many-toothed, pubescent. Corolla white; lobes orbicular, ca 4 cm long; tube cylindrical. Capsules conical, 18-25 mm long. Seeds globose, rugose.

In mixed and sal forests. Bastar, Bilaspur, Dhar, Raipur, Rajnandgaon. *Fl. & Fr.*: Nov. Feb.

4. *Thunbergia grandiflora* (Roxb. ex Rottl.) Roxb. in Lodd. Bot. Cab. t. 324. 1819 & in *Fl. Ind.* 3: 34. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 392. 1884. *Flemingia grandiflora* Roxb. ex Rottl. in Ges. Naturf. Fr. Neue Schr. 4: 202. 1803.

Woody climbers; branches pendant. Leaves ovate-lanceolate or deltoid-ovate, 5-8 x 3-4.5 cm, acute-acuminate at apex, obtuse-subcordate at base, crenate, serrate; uppermost often passing into bracts. Flowers in terminal racemes, showy; bracts large. Calyx entire or crenulate ring. Corolla light or dark blue or bluish purple. Capsules brown, glabrous.

Cultivated. Bhopal (Oommachan, 1977). *Fl. & Fr.*: Sept. - Dec.

5. *Thunbergia laevis* Nees in Wallich, *Pl. Asiat. Rar.* 3: 77. 1832. *T. fragrans* Roxb. var. *laevis* (Nees) C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 391. 1884.

Climbers; stems dilated at nodes. Leaves deltoid-ovate to ovate-lanceolate, 3-5 x 1-3 cm, acute at apex, rounded or cordate-hastate at base, entire or undulate. Flowers axillary, solitary or paired, pedicellate; bracts foliaceous; bracteoles oblong-lanceolate, acute. Calyx-teeth 12-15. Corolla white. Capsules up to 2.5 cm long, grey puberulous. Seeds hemispherical, rugose.

Bastar, Bilaspur, Dhar. *Fl. & Fr.*: Nov. March.

107. VERBENACEAE

(R.C. Srivastava)

About 91 genera and 1900 species; tropical to temperate regions; 18 genera and 35 species in M.P.

1a. Inflorescence subtended by an involucre
of foliaceous bracts

...15. *Symphorema*

1b. Inflorescence without involucrel bracts:

2a. Inflorescence a spike or raceme,
indeterminate and centripetal:3a. Flowers in spikes, subcapitate during
anthesis and elongating in fruits,
sessile or subsessile:4a. Fruits composed of four 1-seeded
schizocarps ...17. *Verbena*

4b. Fruits composed of two pyrenes:

5a. Perfect stamens 4:

6a. Calyx truncate, entire, sinuate
or shallowly toothed; drupes fleshy ...8. *Lantana*

6b. Calyx 2-lobed; drupes dry:

7a. Shrubs or undershrubs;
leaves not fleshy, more
than 5 cm long ...9. *Lippia*7b. Herbs; leaves usually
fleshy, up to 3 cm long ...11. *Phyla*5b. Perfect stamens 2 ...14. *Stachytarpheta*

3b. Flowers in elongated racemes, pedicellate:

8a. Plants liana; epicalyx present; mature
fruits conspicuously 5-winged ...10. *Petrea*8b. Plants erect, rarely climbers; epicalyx
absent; mature fruits unwinged:9a. Shrubs; ovary 8-locular; drupes
composed of 4 pyrenes ...5. *Duranta*9b. Trees; ovary 4-locular; drupes
composed of 2 pyrenes ...3. *Citharexylum*2b. Inflorescence cymose, determinate and
centrifugal; cymes often congested into
panicles, false umbels, umbelloid panicles,
thyrses or heads:10a. Fruit a capsule ...2. *Caryopteris*

10b. Fruit usually a drupe:

- 11a. Flowers actinomorphic:
- 12a. Corolla white, 5-7-lobed; fruiting calyx inflated ...16. *Tectona*
- 12b. Corolla lilac-purple, 4-lobed; fruiting calyx not inflated ...1. *Callicarpa*
- 11b. Flowers more or less zygomorphic:
- 13a. Drupes composed of one 4-loculate and two 2-loculate pyrenes:
- 14a. Corolla-tube large, infundibuliform and ampliate above ...6. *Gmelina*
- 14b. Corolla-tube short, cylindrical:
- 15a. Leaves 3-7-foliolate; corolla 5-lobed, curved ...18. *Vitex*
- 15b. Leaves simple; corolla 4-lobed, straight:
- 16a. Dwarf herbs, ca 25 cm high; stems subterranean ...13. *Pygmaeopremna*
- 16b. Shrubs, trees or woody vines, more than 0.5 m high; stems aerial ...12. *Premna*
- 13b. Drupes composed of four or many 1-loculate pyrenes:
- 17a. Calyx cupuliform or rotate; drupes completely enclosed by persistent calyx ...7. *Holmskioldia*
- 17b. Calyx campanulate; drupes not enclosed by persistent calyx ...4. *Clerodendrum*

1. CALLICARPA L.

Shrubs or trees. Leaves simple, mostly opposite, decussate, exstipulate. Flowers in axillary or supra-axillary cymes, actinomorphic. Calyx tubular or campanulate to cyathiform, 4-toothed to 4-fid, sometimes entire, rarely 5-toothed. Corolla infundibuliform or hypocrateriform; limb 4-partite, rarely 5-partite; lobes linguulate, isomorphic, spreading; tube straight, broadly cylindrical, ampliate above. Stamens 4, rarely 5, equal, inserted at or near the base of corolla-tube, alternate with corolla-lobes; filaments

filiform, glabrous; anthers oblong or elliptic, 2-celled. Ovary hypogynous, 4-locular; style capillary, glabrous; stigma depressed-capitate or peltate. Fruit a drupe, almost globose, with fleshy exocarp and hard endocarp.

About 140 species; tropical and subtropical regions; 2 in M.P.

- 1a. Trees; leaves entire; drupes purple ...1. *C. arborea*
 1b. Shrubs; leaves crenate-dentate; drupes white ...2. *C. macrophylla*

1. **Callicarpa arborea** Roxb., Fl. Ind. 1: 390. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 567. 1885.

Trees, up to 8 m high. Leaves elliptic or ovate-oblong, 16-30 x 7-15 cm, subacuminate at apex, cuneate at base, entire, glabrous above, tomentose beneath. Flowers in dichotomous cymes. Corolla lilac-purple. Drupes globose, 2-3 mm across, purple. Seeds more or less oblong, pale yellow.

In mixed forests. Raigarh, Rajnandgaon, Surguja. *Fl. & Fr.*: May-Nov.

2. **Callicarpa macrophylla** Vahl, Symb. Bot. 3: 13. t. 53. 1794; C.B. Clarke in Hook. f., Fl. Brit. India 4: 568. 1885. - *Daya*.

Shrubs. Leaves elliptic-oblong to lanceolate, 12-25 x 5-11 cm, acuminate at apex, acute or cuneate at base, glabrescent, crenate-dentate; teeth gland-tipped; petioles 4-12 mm long. Flowers in axillary, solitary or often numerous cymes; pedicels ca 2 mm long. Calyx campanulate, ca 1.5 x 1.2 mm, 4-toothed. Corolla lilac or purple, ca 3 cm long; lobes 4, ovate, subacute. Drupes globose, ca 2 cm across, white.

In mixed forests. Bastar, Raigarh. *Fl. & Fr.*: Oct. - Jan.

Plants are used as fodder. Paste of leaves is used to treat mouth ulcers while heated leaves are applied to rheumatic joints.

2. CARYOPTERIS Bunge

Shrubs or small trees. Leaves opposite, decussate or ternate, entire or dentate, often glandular-punctate, more or less pubescent beneath. Flowers

in axillary, subcapitate cymes or sometimes terminal corymbs, panicles or thyrses with opposite branches, zygomorphic. Calyx campanulate, deeply 5-partite; segments deltoid or lanceolate. Corolla hypocrateriform or tubular, bilabiate; limb spreading, 5-lobed; tube cylindrical. Stamens 4, didynamous, inserted below throat, exserted; filaments filiform. Ovary imperfectly 4-locular; style filiform; stigma shortly and unequally 2-fid. Fruit a capsule, small, enclosed by persistent calyx. Seeds oblong, erect.

Six species; E. Asia; one in M.P.

Caryopteris bicolor (Hardw.) Mabberley in Bot. Hist. Hort. Malab. 83. 1980. *Volkameria bicolor* Hardw. in Asiat. Res. 6: 366. 1799. *Caryopteris odorata* (D. Don) B.L. Robinson in Proc. Amer. Acad. Arts Sci. 40: 531. 1916. *C. wallichiana* Schauer in DC., Prodr. 11: 625. 1847, *nom. illeg.*; C.B. Clarke in Hook. f., Fl. Brit. India 4: 597. 1885. **Fig. 60.**

Large shrubs. Leaves elliptic or oblong-lanceolate to lanceolate, 5-9 x 1-3 cm, acuminate at apex, cuneate at base, shortly petiolate; petioles 6-12 mm long. Flowers in axillary cymes. Calyx 2-4 mm long, densely pubescent outside, persistent. Corolla blue or purple; upper lobes oblong, ca 5 mm long; lower lobes ca 7 mm long. Capsules globose, ca 5 mm across, dark blue or bluish, pubescent, almost 4-lobed.

Rare. In sal and mixed forests. Surguja. *Fl. & Fr.*: Dec. - Feb.

Wood is used for making sticks and canes.

3. CITHAREXYLUM L.

Shrubs or trees, rarely climbers. Leaves decussate, ternate or verticillate, entire or dentate, with a pair of glands at the base of blade. Flowers in axillary and terminal racemes or spikes, small, each subtended by a tiny and inconspicuous bractlet. Calyx tubular or cyathiform, actinomorphic or somewhat zygomorphic, thin, accrescent. Corolla infundibuliform or hypocrateriform; limb spreading, 5-partite; tube narrow, cylindrical. Stamens 4, didynamous, inserted at or above the middle of corolla-tube, included; anthers ovate or sagittate, introrse. Ovary 4-locular; ovule solitary in each locule. Fruit a drupe; fruiting calyx conspicuously enlarged, indurated, cupuliform or patelliform, shorter than fruit.

About 70 species; tropical America to Argentina; one in M.P.

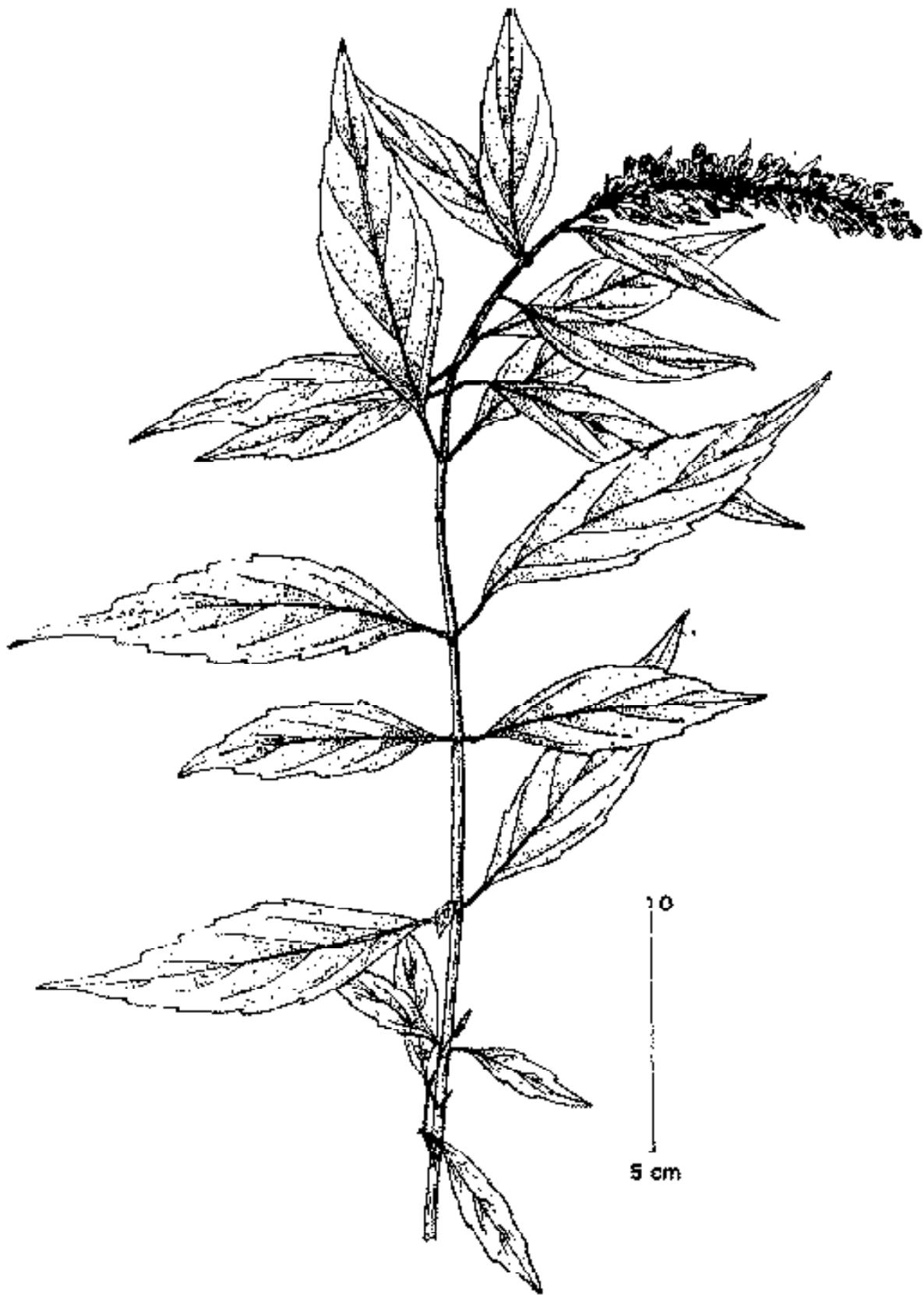


Fig. 60. *Caryopteris bicolor* (Hardw.) Mabberley

Citharexylum spinosum L., Sp. Pl. 625. 1753. *C. subserratum* auct. non Sw., 1768: Mukherjee, Fl. Pachmarhi & Bori Res. 240. 1984. Fig. 61.

Small trees, glabrous. Leaves ovate-elliptic or obovate, 7-16 x 4-6.5 cm, shining above, remotely shallowly serrate towards the apex, petiolate. Flowers in long, drooping racemes, fragrant. Calyx shortly 5-lobed. Corolla white. Drupes succulent.

Rare. In sal forests. Hoshangabad, Indore. Fl. & Fr.: July - Oct.

4. CLERODENDRUM L.

Herbs, shrubs or trees, perennial, sometimes scandent, glabrous or variously pubescent. Leaves simple, opposite, decussate or whorled, entire or variously dentate, exstipulate. Flowers in lax cymes, paniculate at the apex of branchlets or densely aggregate in terminal corymbs or heads or rarely solitary, zygomorphic, showy. Calyx red, white or green, campanulate, truncate to 5-toothed, 5-fid or 5-partite, often accrescent. Corolla white, blue, violet or red, hypocrateriform; limb spreading or reflexed in anthesis, 5-partite; lobes subequal; tube cylindrical, straight or incurved. Stamens 4 or 5, exserted, alternate with corolla-lobes, didynamous, inserted in the corolla-tube. Ovary imperfectly 4-locular; ovule solitary in each locule. Fruit a drupe, globose or obovoid, somewhat 4-lobed, separating into 4 pyrenes. Seeds oblong.

About 400 species; tropical and subtropical regions; 9 in M.P.

- | | |
|---|---------------------------|
| 1a. Plants armed | ...1. <i>C. aculeatum</i> |
| 1b. Plants unarmed: | |
| 2a. Corolla-tube curved, swollen; drupes not splitting into 4 pyrenes at maturity | ...7. <i>C. serratum</i> |
| 2b. Corolla-tube almost straight, slender; drupes splitting into 4 pyrenes at maturity: | |
| 3a. Leaves mostly whorled | ...2. <i>C. indicum</i> |
| 3b. Leaves opposite, decussate: | |
| 4a. Plants usually scandent | ...8. <i>C. splendens</i> |
| 4b. Plants usually erect: | |

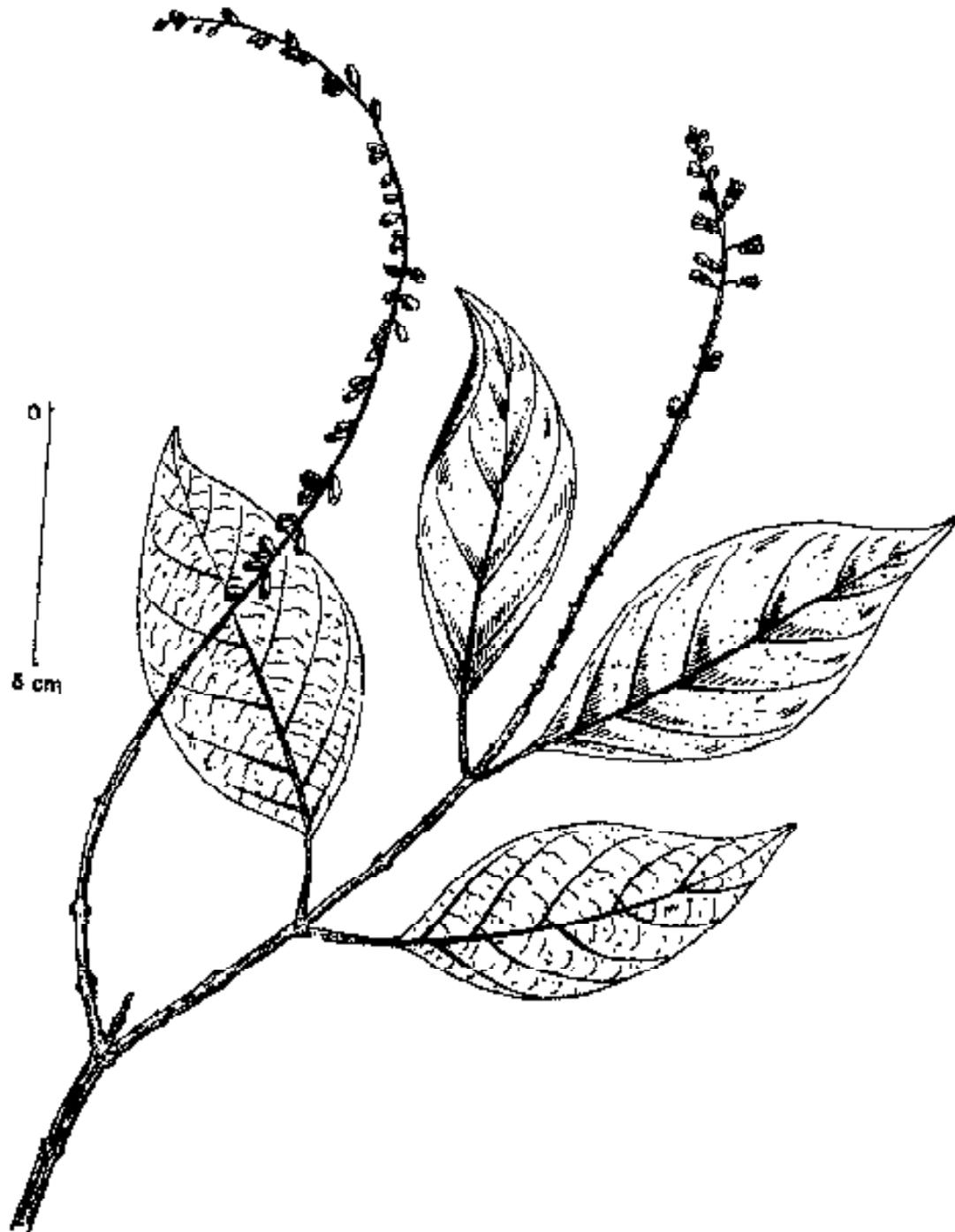


Fig. 61. *Citharexylum spinosum* L.

5a. Leaves glabrous beneath:

6a. Leaves elliptic or lanceolate, up to
5 cm long; corolla white to purple ...3. *C. inerme*

6b. Leaves ovate, 12-18 cm long; corolla scarlet ...4. *C. japonicum*

5b. Leaves pubescent beneath:

7a. Leaves up to 6 cm long and 4 cm broad;
calyx up to 10 mm long ...5. *C. multiflorum*

7b. Leaves more than 9 cm long and 4 cm broad;
calyx 10-15 mm long:

8a. Calyx purple or red; corolla pink ...6. *C. philippinum*

8b. Calyx green; corolla white ...9. *C. viscosum*

1. *Clerodendrum aculeatum* (L.) Griseb., Fl. Brit. W. I. 500. 1862; C.B. Clarke in Hook. f., Fl. Brit. India 4: 589. 1885. *Volkameria aculeata* L., Sp. Pl. 637. 1753.

Shrubs, trailing, armed; spines short, axillary. Leaves elliptic or elliptic-lanceolate, 1-5 x 1-2 cm, acute at apex, entire, glabrous, petiolate. Flowers in lax, few-flowered cymes, fragrant. Corolla white; lobes ca 1.5 cm long. Drupes obovoid, ca 1 cm long, green.

In mixed deciduous forests. Narsimhapur. Fl. & Fr.: Jan. - March.

2. *Clerodendrum indicum* (L.) Kuntze, Revis. Gen. Pl. 2: 586. 1891. *Siphonanthus indica* L., Sp. Pl. 109. 1753. *Clerodendrum siphonanthus* R. Br. in W.T. Aiton, Hortus Kew. ed. 2. 4: 65. 1812; C.B. Clarke in Hook. f., Fl. Brit. India 4: 595. 1885. - *Bharangi*.

Woody herbs, erect. Leaves lanceolate to oblong, 6-19 x 2-4 cm, acute or subacuminate at apex, acute at base. Flowers in axillary, 3-7-flowered cymes; pedicels ca 2 cm long. Calyx 5-fid, ca 1.5 cm long, glandular-punctate; lobes ovate-deltoid, apiculate. Corolla white; lobes oblong, obtuse, ca 2 cm long. Drupes 4-lobed, green, turning reddish black; fruiting calyx accrescent, red, fleshy.

On sandy soil and river beds. Balaghat, Bhopal, Chhatarpur, Raipur, Surguja. Fl. & Fr.: Sept. - Oct.

Plants are sometimes used as substitute for opium and also smoked with tobacco. Resin is used to treat syphilitic rheumatism. Plant extract is used with rectified butter (*ghee*) for skin diseases while pounded root for asthma.

3. *Clerodendrum inerme* (L.) Gaertn., Fruct. Sem. Pl. 1: 271. t. 57. 1788; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 589. 1885. *Volkameria inermis* L., Sp. Pl. 637. 1753.- *Lanjai, Vilayati - mehdhi.*

Shrubs. Leaves elliptic or narrowly lanceolate, 3-5 x 1.5-2.5 cm, obtuse at apex, acute at base, glabrous. Flowers in axillary, 3-7-flowered, up to 9 cm long cymes. Calyx campanulate, ca 4 mm long, 5-toothed; teeth acute. Corolla white or slightly purple, hypocrateriform; lobes obovate; tube slender, 2-3 cm long. Drupes obovate, ca 12 x 8 mm, green when young, black or brown on maturity.

Bhopal, Bilaspur, Chhatarpur, Indore. *Fl. & Fr.*: July - Jan.

The plant is grown as hedge. Leaf decoction is applied for the treatment of intermittent fever.

4. *Clerodendrum japonicum* (Thunb.) Sweet, Hort. Brit. (ed. 1). 322. 1826. *Volkameria japonica* Thunb. in Nov. Act. Reg. Soc. Sci. Upsat 3: 208. 1780. *Clerodendrum squamatum* Vahl, Symb. Bot. 2: 74. 1791; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 593. 1885.

Undershrubs, ca 1.5 m high. Leaves ovate, 12-18 x 10-14 cm, acuminate at apex, cordate at base, denticulate, membranous, scaberulous above, gland-dotted beneath. Flowers in terminal, large, erect, thyrsoid panicles. Calyx divided up to base; segments coriaceous, accrescent in fruit. Corolla scarlet; tube ca 2.5 cm long. Drupes ca 1 cm across, blue-black.

Cultivated. Shahdol (Saxena, 1970). *Fl. & Fr.*: Sept. Dec.

5. *Clerodendrum multiflorum* (Burm. *f.*) Kuntze, Revis. Gen. Pl. 3: 526. 1891. *Volkameria multiflorum* Burm. *f.*, Fl. Ind. 137. t. 45. f.1. 1768. *C. phlomidis* L. *f.*, Suppl. Pl. 292. 1782; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 590. 1885.

Shrubs or small trees; branches pubescent. Leaves ovate-rhomboid, 3-6 x 2.5-4 cm, acute or shortly acuminate at apex, acute or subcordate at

base, subentire or crenate-serrate. Flowers in axillary and terminal cymes; bracts foliaceous. Calyx 9-10 mm long; lobes ovate, subacuminate. Corolla white or yellowish white, hypocrateriform, ca 2 cm long, puberulent outside; lobes subequal. Drupes broadly obovoid, ca 10 mm long, wrinkled, depressed at apex.

In wastelands. Chhatarpur, Gwalior, Indore, Panna, Raipur, Rewa, Sagar, Satna, Shivpuri, West Nimar. *Fl. & Fr.*: Oct. - Feb.

The plant is given to cattles to cure diarrhoea, swollen stomach and as anthelmintic. Leaf decoction is given to cure syphilis.

6. *Clerodendrum philippinum* Schauer in DC., Prodr. 11: 667. 1847; Howard & Powell in Taxon 17: 54. 1968. *C. fragrans* Willd., Enum. Pl. 659. 1809, *nom. illeg.*; C.B. Clarke in Hook. f., Fl. Brit. India 4: 589. 1885. *C. japonicum* (Thunb.) Sweet var. *pleniflorum* (Schauer) Maheshwari in Taxon 15: 43. 1966.

Shrubs. Leaves broadly ovate, 9-17 x 6-15 cm, acute at apex, cordate at base, irregularly dentate. Flowers in terminal, densely many-flowered, ca 5 cm long, subsessile or shortly pedunculate cymes; bracts foliaceous. Calyx purple or red, campanulate, ca 1.5 cm long, glabrous. Corolla pink, hypocrateriform.

Bilaspur, Raigarh, Surguja. *Fl. & Fr.*: March - April.

7. *Clerodendrum serratum* (L.) Moon, Cat. Pl. Ceylon 1: 46. 1824; C.B. Clarke in Hook. f., Fl. Brit. India 4: 592. 1885. *Volkameria serrata* L., Mant. Pl. 90. 1767. - *Bharangi*, Duma. **Fig. 62.**

Shrubs, 1-3 m high; stems 4-angled. Leaves opposite or ternate, ovate or elliptic, 11-22 x 6-13 cm, subsessile. Flowers in terminal, pyramidal, ca 30 cm long panicles. Calyx campanulate. Corolla bluish or purplish, 7-9 mm long; limb bilabiate, unequally 5-lobed. Drupes subglobose or broadly obovoid, 2-4-lobed, ca 7 mm long, dark purple or black at maturity; fruiting calyx cupuliform, somewhat accrescent.

In sal forests. Balaghat, Bastar, Bilaspur, Damoh, Dhar, Durg, Hoshangabad, Indore, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni, Surguja. *Fl. & Fr.*: Aug. - Oct.

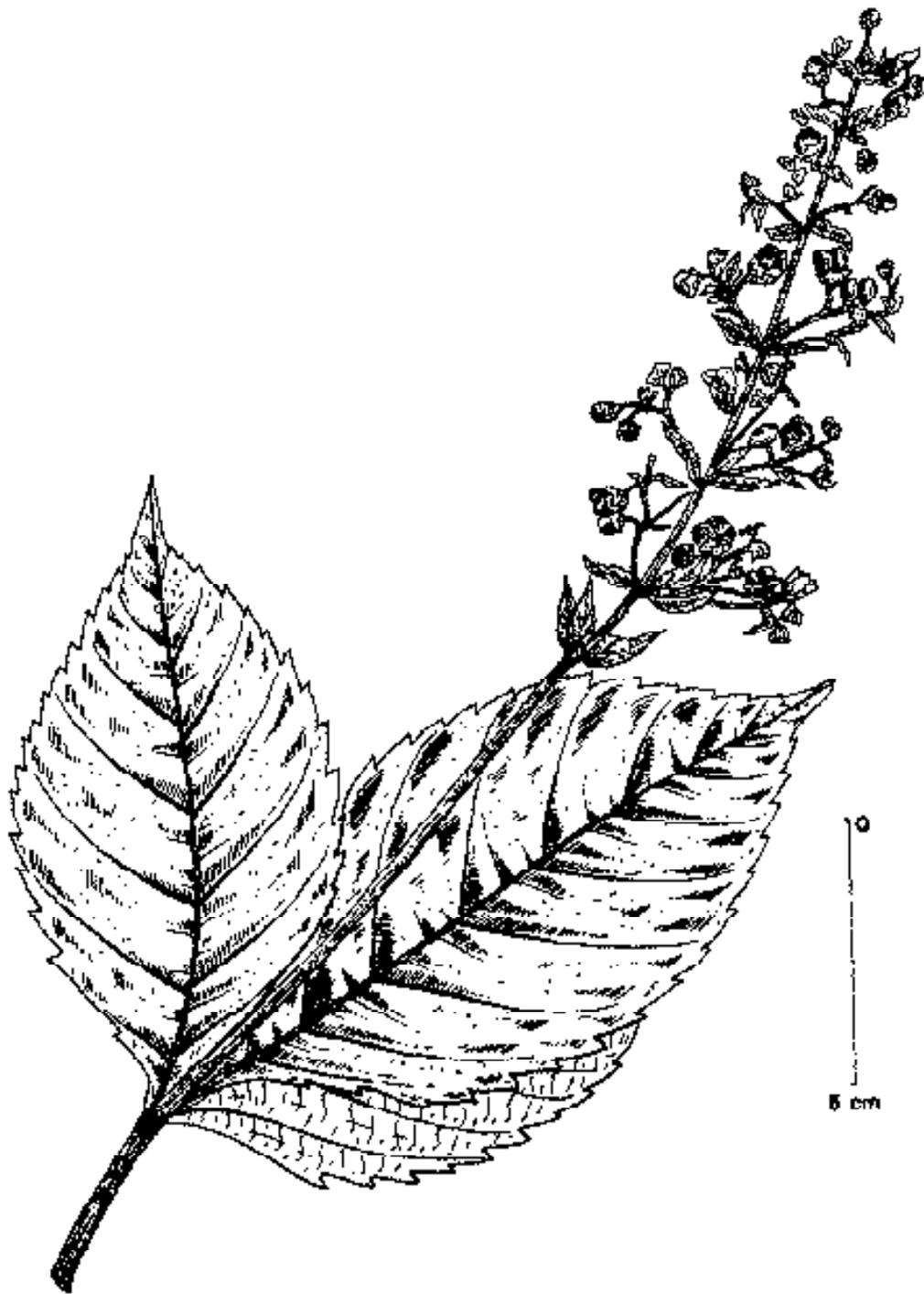


Fig. 62. *Clerodendrum serratum* (L.) Moon

D-manitol is obtained from the root bark. Roots are used for the treatment of febrile, bronchial and catarrhal affections. It is also given in nausea after boiling in water with ginger and coriander. Seeds are laxative.

8. *Clerodendrum splendens* G. Don ex James, Edinburgh New Philos. J. 11: 349. 1824.

Shrubs, scandent. Leaves variable, elliptic, elliptic-ovate to ovate, oblong-orbicular, suborbicular or even narrowly lanceolate, 6-12 x 4-8 cm, acuminate at apex, cordate at base, glabrous. Flowers in supra-axillary and terminal, corymbose cymes. Calyx campanulate, ca 1 cm long, glabrous. Corolla deep red to crimson, hypocrateriform, showy; lobes rounded; tube slender, ca 2 cm long. Drupes black, shining.

Bhopal, Indore. *Fl. & Fr.*: Jan. - March.

Leaves are applied on bruises, wounds and blisters.

9. *Clerodendrum viscosum* Venten., Jard. Malmaison 1: t. 25. 1803; Santapau in Bull. Bot. Surv. India 3: 14. 1961. *C. infortunatum auct. non* L., 1753, *nec* Gaertn., 1788; C.B. Clarke in Hook. f., Fl. Brit. India 4: 594. 1885. - *Rhant*.

Shrubs; up to 2 m high. Leaves elliptic to ovate, 9-23 x 4-17 cm, acute or subacuminate at apex, acute, obtuse or cordate at base, denticulate or serrate, sparsely pubescent; petioles slender, villous. Flowers in terminal, of several, opposite, few-flowered ascending or divaricate, pedunculate cymes; bracts foliaceous, villous. Calyx green, 10-15 mm long. Corolla white, pubescent; tube ca 2 cm long. Drupes globose, green, turning to bluish and black with maturity, fleshy, enclosed in accrescent fruiting calyx.

Common along roadsides. Bilaspur, Bastar, Damoh, Hoshangabad, Rewa, Surguja. *Fl. & Fr.*: March - June.

Roots, bark and flowers are used in local medicine to cure skin diseases. Flowers are also used for worship.

5. DURANTA L.

Shrubs. Leaves simple, decussate or whorled, entire or dentate. Flowers in mostly terminal, rarely axillary, elongate racemes, often showy.

mostly pedicellate, each borne in the axil of a small bractlet. Calyx tubular or subcampanulate, 5-costate, each rib terminating in a short subulate tooth. Corolla hypocrateriform: limb spreading, 5-partite, pubescent at the mouth: tube cylindrical. Stamens 4, didynamous, inserted at or above the middle of corolla-tube, included: filaments very short; anthers sagittate, dorsifixed. Ovary 8-locular; ovule solitary in each locule; style terminal; stigma obliquely subcapitate, 4-lobed. Fruit a drupe, completely included within accrescent calyx.

About 30 species; Carribean to S. America: one in M.P.

Duranta repens L., Sp. Pl. 637. 1753; Moldenke in Ann. Missouri Bot. Gard. 60: 90. 1973. *D. erecta* L., Sp. Pl. 637. 1753. *D. plumieri* Jacq., Select. Stirp. Amer. Hist. 186. t. 176. 1763.

Shrubs, armed or unarmed. Leaves ovate-elliptic or ovate to obovate, 1-5 x 1-3 cm, acute or obtuse at apex, sometimes apiculate, entire or coarsely serrate, glabrous. Flowers in racemes, fragrant: racemes mostly concentrated at the tips of branches, erect or recurved; pedicels 1-5 mm long. Calyx tubular, 3-4 mm long. Corolla white, blue, lilac, violet, purplish or mauve. Drupes globose, 4-5 mm across, orange-yellow; fruiting calyx yellowish, glabrous, prolonged into a curved beak beyond the fruit. Seeds oblong.

- 1a. Plants unarmed; leaves serrate throughout;
flowers white ...1.1. var. *alba*
- 1b. Plants armed: leaves serrate towards apex only;
flowers blue or violet ...1.2. var. *repens*

1.1. var. **alba** C.B. Clarke in Hook. f., Fl. Brit. India 4: 560, 1885.

Planted. Bhopal (Oommachan, 1977). Fl.: Aug. Sept.

1.2. var. **repens**

On bundh of cultivated fields, usually planted as hedge. Bilaspur, Chhatarpur, Hoshangabad, Indore, Mandla, Raigarh, Raipur, Surguja. Fl. & Fr.: May - Dec.

Fruit-juice diluted with water (1:100) is known to kill the mosquito larvae in ponds and swamps.

6. GMELINA L.

Shrubs or trees. Leaves opposite, decussate, entire, dentate or lobed, often with few, sunken, nectariferous glands near or at the base beneath. Flowers in axillary and terminal, paniculate cymes, zygomorphic. Calyx campanulate or obconic, 4-5-toothed, persistent, often with glands. Corolla obliquely campanulate or infundibuliform, more or less bilabiate; limb oblique, spreading, 4-5-lobed. Stamens 4, didynamous, inserted on corolla-tube, 2 longer filaments glanduliferous, decurved; anthers oblong, medi-fixed. Ovary 4-locular; ovule solitary in each locule. Fruit a drupe, more or less succulent, borne on scarcely enlarged fruiting calyx. Seeds oblong.

About 35 species: E. Asia, Indo-Malesia, Australia, tropical Africa and Mascarenes; 2 in M.P.

- 1a. Unarmed, erect trees; leaves ovate or obovate; bracts not petaloid ...1. *G. arborea*
- 1b. Armed, straggling shrubs; leaves elliptic; bracts petaloid ...2. *G. philippensis*

1. *Gmelina arborea* Roxb., Pl. Coromandel 3: 41-42. t. 246. 1815 & Fl. Ind. 3: 84. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 581. 1885. *Premna tomentosa* Miq. apud C.B. Clarke in Hook. f., Fl. Brit. India 4: 581. 1885. - Kamhar, Khamer, Kumber, Sewan.

Trees, 10-15 m high. Leaves ovate, 6-19 x 5-15 cm, acuminate at apex, densely tomentose above when young, glabrescent with age, fulvous tomentose beneath. Flowers in axillary or terminal panicles. Calyx broadly campanulate, ca 5 mm long, 5-toothed, fulvous tomentose outside. Corolla yellow, tubular below, obliquely infundibuliform at the throat, ca 4 cm long, pubescent outside; upper lip 2-lobed; lower lip 3-lobed; middle lobe much longer and broader. Drupes ovoid or obovoid-pyriform, ca 2 cm long, orange-yellow.

In sal forests. Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni, Shivpuri, Surguja. Fl. & Fr.: March - June.

Wood is valuable and employed for making various articles. Roots are used as tonic, stomachic, laxative, anthelmintic and anodyne; widely employed for the treatment of liver diseases, indigestion, burning sensation and even hallucination. Fruits are edible.

2. *Gmelina philippensis* Cham. in *Linnaea* 7: 109. 1832. *G. hystrix* Schult. ex Kurz in *J. Asiat. Soc. Beng.* 39: 81. 1870; C. B. Clarke in *Hook. f.*, *Fl. Brit. India* 4: 582. 1885.

Shrubs, straggling, armed; branches lenticellate; branchlets spinescent. Leaves elliptic, cuneate at base, entire or distantly dentate, smooth, glaucous beneath with scattered glands. Flowers in panicles; bracts large, petaloid, brightly coloured. Corolla yellow; tube inflated above.

Planted in gardens as hedge. Bhopal (Oommachan, 1977). *Fl. & Fr.*: April - Aug.

7. HOLMSKIOLDIA Retz.

Shrubs or trees. Leaves opposite, decussate, entire or dentate. Flowers in axillary or terminal, shortly pedunculate cymes, usually crowded at the apex of branchlets, zygomorphic. Calyx cupuliform or rotate; tube very short. Corolla-limb oblique, spreading, 5-partite; tube cylindrical, incurved. Stamens 4, didynamous, inserted on corolla-tube; anthers ovate. Ovary obscurely 4-lobed, 4-locular; ovule solitary in each locule; style 2-fid. Fruit a drupe, truncate or shortly 4-lobed at apex, more or less enclosed in urceolate base of persistent calyx-tube; fruiting calyx much enlarged, patelliform or rotate. Seeds oblong.

About 10 species; tropical Africa to India; one in M.P.

Holmskioldia sanguinea Retz., *Observ. Bot.* 6: 31. 1791; C.B. Clarke in *Hook. f.*, *Fl. Brit. India* 4: 596. 1885. - *Kapni*. Fig. 63.

Shrubs or small trees, straggling; branches drooping, angular. Leaves ovate, 4-10 x 2-5 cm, acuminate at apex, crenate serrate or subentire. Flowers in axillary or terminal cymes. Calyx red. Corolla brick-red, tubular, ca 2.5 cm long, oblique, bilabiate. Drupes globose, brown.

Rare. Hoshangabad. *Fl. & Fr.*: Nov. - March.

8. LANTANA L.

Herbs or shrubs, erect, sometimes subscandent or prostrate; stems sometimes armed with thorns or prickles. Leaves opposite, decussate, dentate or serrate, often rugose. Flowers in axillary, dense, cylindrical

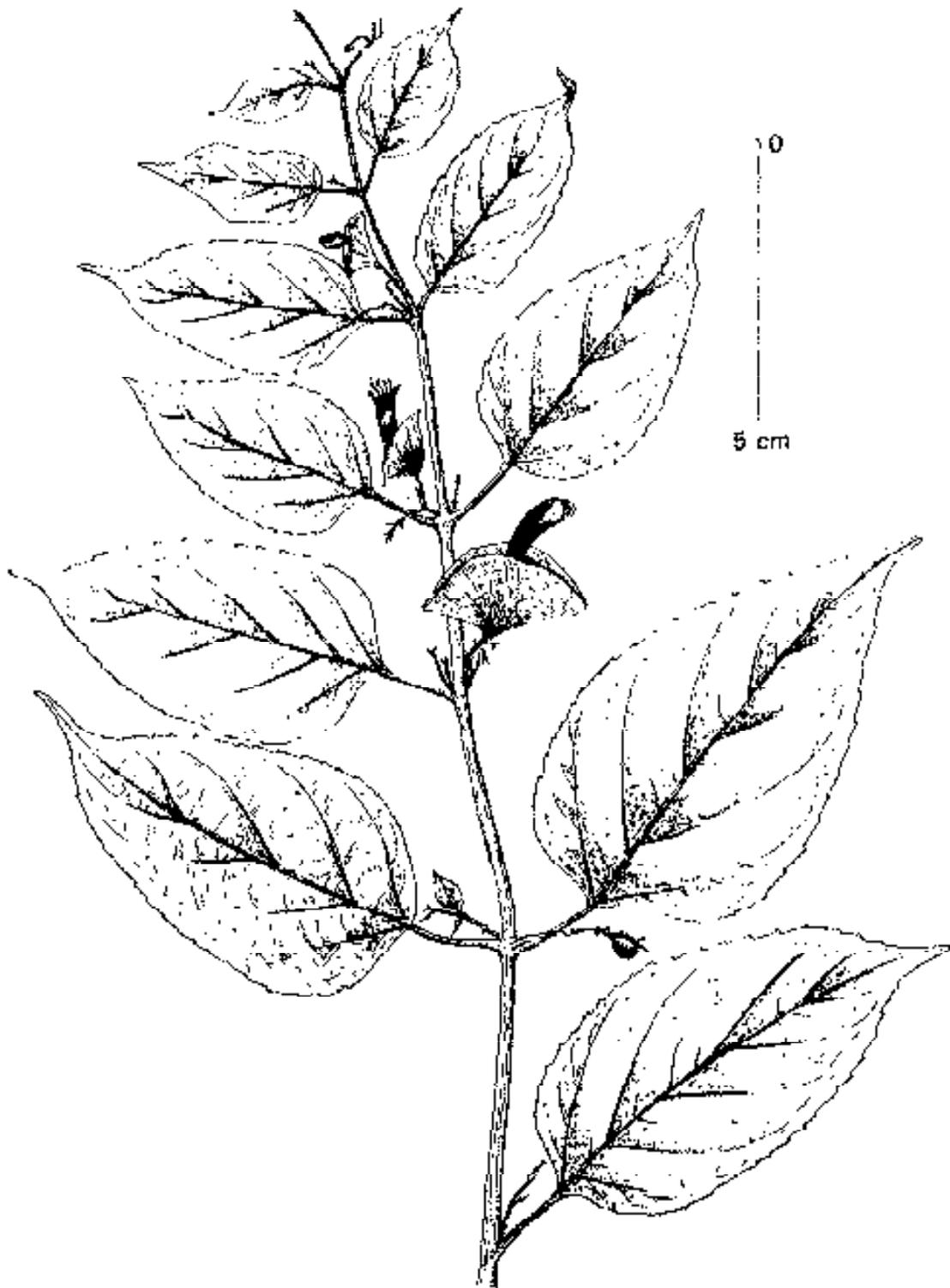


Fig. 63. *Holmskioldia sanguinea* Retz.

spikes or contracted heads. Calyx small, truncate, entire or sinuate-dentate, membranous. Corolla red, yellow, pink, purple, blue or white, hypocrateriform, bilabiate, 4-5-lobed; tube narrowly cylindrical. Stamens 4, didynamous, inserted at about the middle of corolla-tube, included; anthers ovate. Ovary 2-locular; ovule solitary in each locule; style short; stigma thick, oblique or sublateral. Fruit a drupe. Seeds without endosperm.

About 150 species; tropical America and tropical and S. Africa; 2 in M.P.

- 1a. Outer bracts mostly equal to the rest,
narrowly lanceolate, 1-2 mm wide,
never conspicuously involucrate ...1. *L. camara* var. *aculeata*
- 1b. Outer bracts much larger than the rest,
broadly ovate, ca 5 mm wide, very
conspicuously involucrate ...2. *L. indica*

1. *Lantana camara* L. var. *aculeata* (L.) Moldenke in *Torreyia* 34: 9, 1934; Santapau in *Bull. Bot. Surv. India* 3:18, 1961. *L. aculeata* L., *Sp. Pl.* 627, 1753. *L. camara* *auct. non* L., 1753; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 562, 1885. - *Baramasi, Raimuniya*.

Shrubs, up to 3 m high. Leaves ovate, 2-9 x 2-6 cm, acute or shortly acuminate at apex, cuneate, rounded or cordate at base, crenate-serrate, scabrous above. Flowers in pedunculate, capitate spikes; bracts inconspicuous, about as long as the corolla-tube. Calyx small, inconspicuous, ca 3 mm long. Corolla pink, orange; mouth turning yellow or orange after fertilization; limb 6-8 mm wide; tube ca 10 mm long. Drupes globose, 2-3 mm across, black.

On roadsides and forest margins. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, Hoshangabad, Indore, Narsimhapur, Panna, Raigarh, Raipur, Satna, Shivpuri, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: April - June.

Powdered roots with milk are given to children suffering from colic pain and stomachache; infusion of whole plant is used for the treatment of catarrh and bronchitis. Leaf decoction is used in treating constipation.

2. *Lantana indica* Roxb., *Fl. Ind.* 3: 89, 1832; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 562, 1885.

Shrubs, ca 2 m high. Leaves ovate or lanceolate, 3-10 x 2-6 cm, mostly unequal, acute at apex, crenate-serrate, softly hairy above. Flowers in ovoid, spicate heads, sessile; peduncles 3-5 cm long; bracts ovate or elliptic to lanceolate, 6-8 mm long; outer (lower) ones involucrate; inner ones smaller. Calyx ca 1.7 mm long, pubescent outside. Corolla pink or pink-purple to dull purple, ca 8 mm long, hairy outside; limb ca 6 mm wide; tube yellowish. Drupes 3-8 mm across, purple; fruiting calyx thin.

Rare. In scrub forests. Indore, Morena. *Fl. & Fr.*: Sept. Dec.

Plants are sometimes used as antidote to snake bite.

9. LIPPIA L.

Undershrubs or shrubs, rarely herbs. Leaves simple, opposite or whorled, entire, crenate, serrate or lobed. Flowers in elongated or dense, capitate spikes; bracts small; bracteoles absent. Calyx small, campanulate, 2-lobed, membranous. Corolla hypocrateriform, bilabiate; upper lip emarginate or 2-fid; lower lip 3-lobed; tube cylindrical, straight or curved. Stamens 4, didynamous, included. Ovary 2-locular; ovule solitary in each locule; style short; stigma subcapitate. Fruit a drupe, small, separating into two 1-seeded pyrenes.

About 200 species; tropical Africa and America; one in M.P.

Lippia javanica (Burm. f.) Spreng., *Syst. Veg.* 2: 752. 1825; Meeuse in *Blumea* 5: 68. 1942. *Verbena javanica* Burm. f., *Fl. Ind.* 12. t. 6. f. 2. 1768. *Lippia alba* (Mill.) N.E. Brown ex Britton & Wilson in *Sc. Surv. Porto Rico* 6: 141. 1925. *Lantana alba* Mill., *Gard. Dict.* ed. 8. 8. 1768. *Lippia geminata* Humb., *Bonpl. & Kunth, Nov. Gen. Sp.* 2: 266. 1818; C.B. Clarke in *Hook. f., Fl. Brit. India* 4: 563. 1885.

Shrubs, erect. Leaves ternately whorled, elliptic-oblong, 5-8 x 2-3.5 cm, acute at apex, rounded at base, crenate-serrate, pubescent beneath; petioles up to 1 cm long. Flowers in axillary spikes; bracts ovate-lanceolate, ca 3 mm long, pubescent. Calyx-lobes lanceolate. Corolla pink, 5-6 mm long. Drupes subglobose.

Rare. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: July - Jan.

10. PETREA L.

Shrubs, trees or liana. Leaves opposite or whorled, pinnately-veined, exstipulate. Flowers in axillary or terminal, many-flowered, mostly elongate racemes, hypogynous. Calyx-lobes 5, blue, violet to purple or white, longer than tube, alternate with corolla-lobes, with a calicina crest on the ventral surface; tube cylindrical or campanulate. Corolla dark blue, purple or white; limb 5-lobed; anterior lobe largest; tube cylindrical, urceolate or infundibuliform; upper portion abruptly and widely amplified. Stamens 4, didynamous, inserted near the middle of corolla-tube, included; filaments very short; anthers oblong or ovate. Ovary subglobose or oblong, 2-locular; ovule solitary in each locule; style terminal; stigma capitate, oblique, 2-lobed. Disk conspicuous. Fruit a drupe, completely enclosed by accrescent, incrassate calyx, acting as wings. Seeds without endosperm.

About 30 species; tropical America; one in M.P.

Petrea volubilis L., Sp. Pl. 626. 1753.

Large woody climbers; stems ash-coloured, lenticellate. Leaves variable, ovate to elliptic or lanceolate, 10-14 x 4-7 cm, acute at both ends, entire, undulate, very scabrous. Flowers in lax, many-flowered racemes, blue or pale violet. Calyx-lobes oblong, membranous; tube ca 3 mm long. Corolla-lobes broadly elliptic, puberulent; tube 6-8 mm long. Fruiting calyx tough, caducous.

Cultivated in gardens. Bhopal, Indore. *Fl. & Fr.* Oct. April.

11. PHYLA Lour.

Herbs, perennial, procumbent or creeping. Leaves opposite, decussate, often fleshy. Flowers in axillary, densely many-flowered, pedunculate heads or spikes, zygomorphic, sessile, bracteate; spikes usually capituliform at first, later elongate. Calyx campanulate or cupular, 2-carinate or winged, membranous. Corolla white or lavender to purple, hypocrateriform; limb oblique, spreading, almost bilabiate, 4-partite; tube straight or incurved. Stamens 4, didynamous, included or slightly exerted; anthers unappendaged. Ovary 2-locular; ovule solitary in each locule; stigma incrassate, oblique or recurved. Fruit a drupe, small, enclosed by calyx, dividing into 2 pyrenes at maturity.

About 15 species; tropical and subtropical regions: one in M.P.

Phyla nodiflora (L.) E. Greene, *Pittonia* 4: 46, 1899. *Verbena nodiflora* L., *Sp. Pl.* 20, 1753. *Lippia nodiflora* (L.) Rich. in Michx., *Fl. Bor.-Amer.* 2: 15, 1803; C.B. Clarke in Hook. *f.* *Fl. Brit. India* 4: 563, 1885.

Herbs, prostrate. Leaves obovate-spathulate, 1-2.5 x 0.5-1 cm, obtuse at apex, cuneate at base, decurrent into petiole, serrate above the middle, entire towards base, glabrescent. Flowers in condensed or elongated, pedunculate spikes; bracts broadly ovate, concave, apiculate, sparsely ciliate; bracteoles absent. Calyx cupular; lobes 2, lanceolate, acute. Corolla purplish white, 2-2.5 mm across; tube ca 1.5 mm long. Drupes globose, ca 1 mm across.

Common in moist wastelands. Bastar, Bilaspur, Chhatarpur, Dantoli, Durg, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Shivpuri, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Throughout the year.

12. PREMNA L., *nom. cons.*

Shrubs or trees. Leaves simple, opposite, decussate, entire or dentate, often glandular. Flowers in determinate, centrifugal cymes or corymbs, hypogynous. Calyx campanulate or cupuliform, truncate to sinuately 3-5-toothed, persistent. Corolla more or less hypocrateriform: throat often villous; tube short, narrowly infundibuliform or subcylindrical. Stamens 4, didynamous, inserted in the upper half of tube or at its mouth; filaments short, filiform; anthers ovoid or subglobose. Ovary 2-locular; ovules 2 in each locule; style filiform or subulate; stigma shortly 2-fid. Fruit a drupe, small, globose or obovoid; fruiting calyx patelliform. Seeds oblong.

About 200 species; tropical and subtropical regions of Old World: 3 in M.P.

- 1a. Leaves dentate; calyx 4-toothed ...1. *P. barbata*
- 1b. Leaves entire or minutely dentate;
calyx 5-toothed or lobed:
 - 2a. Evergreen trees; leaves up to 5 cm broad,
other than fulvous-tomentose beneath ...2. *P. latifolia*
 - 2b. Semi evergreen trees; leaves 5-11 cm
broad, fulvous-tomentose beneath ...3. *P. tomentosa*

1. *Premna barbata* Wallich ex Schauer in DC., Prodr. 11: 636. 1847; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 579. 1885.

Shrubs, up to 1.5 m high, branched from the base. Leaves oblong or ovate, 7-18 x 5-7 cm, acuminate at apex, obtuse or subcordate or cuneate at base, dentate, glabrous above. Flowers in terminal, 1.5-4 cm across, more or less densely villous corymbs; bracts linear, caducous. Calyx 4-toothed; teeth oblong, obtuse. Corolla ca 2.5 mm long, bilabiate. Drupes globose or obovoid, ca 2 mm across, green turning brown, obscurely verrucose.

On hill slopes and between rock boulders. Bilaspur, Hoshangabad, Satna, Sidhi. *Fl.* & *Fr.*: July - Aug.

2. *Premna latifolia* Roxb., Fl. Ind. 3: 76. 1832; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 577. 1885. *Varan.*

Small trees. Leaves broadly elliptic, ovate to oblong-elliptic or lanceolate, 7-12 x 4-5 cm, abruptly acute or shortly acuminate at apex, rounded to subtruncate or cordate at base, entire, pubescent. Flowers in axillary and terminal corymbs. Calyx obscurely bilabiate. Corolla white. Drupes subglobose, 4-5 mm across, fleshy, hardly verrucose; fruiting calyx ca 2.5 x 6 mm, appressed pubescent outside.

1a. Leaves cordate at base; corymbs simply villous ...2.1. var. *latifolia*

1b. Leaves cuneate at base; corymbs rusty tomentose ...2.2. var. *mucronata*

2.1. var. *latifolia*

Rare. Bastar. *Fl.* & *Fr.*: Nov. - March.

Leaves are diuretic and used in dropsy. Latex is applied to boils. Decoction of bark is given to cattles for stomach diseases.

2.2. var. *mucronata* (Roxb.) C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 578. 1885. *P. mucronata* Roxb., Fl. Ind. 3: 80. 1832.

Rare. Jabalpur (Hole, 1904). *Fl.* & *Fr.*: March - June.

3. *Premna tomentosa* Willd., Sp. Pl. 3: 314. 1800; C.B. Clarke in Hook. *f.*, Fl. Brit. India 4: 576. 1885.

Fig. 64.

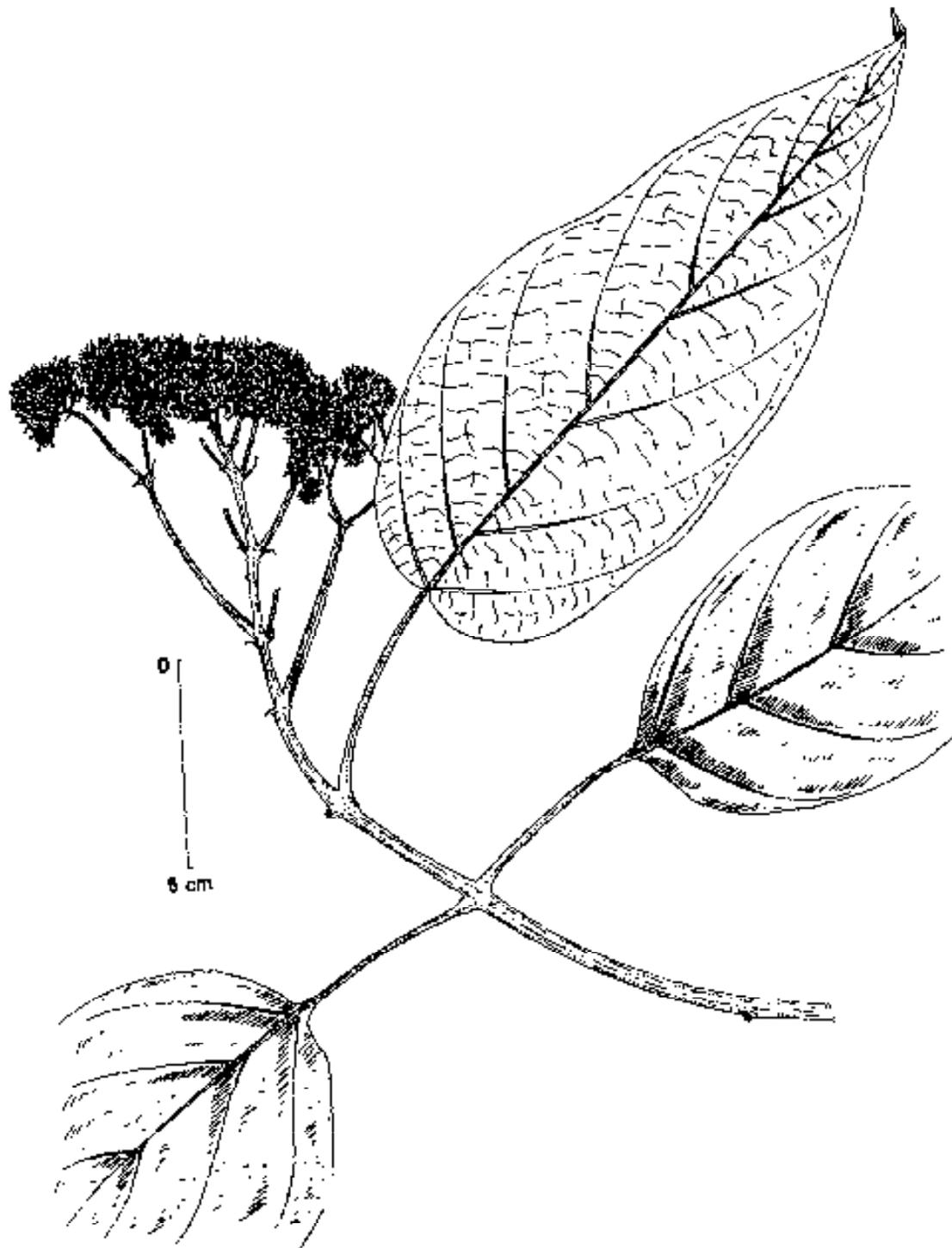


Fig. 64. *Premna tomentosa* Willd.

Shrubs or small trees, *ca* 3 m high. Leaves broadly ovate, 8-19 x 5-11 cm, acuminate at apex, rounded to truncate at base, entire or minutely dentate, thick chartaceous, tomentose along the nerves above, densely tomentose beneath. Flowers in terminal and axillary, *ca* 7 cm long, corymbose cymes. Calyx campanulate, *ca* 4 mm across. Corolla white; lobes 5, suborbicular, *ca* 2 mm long, obtuse; tube *ca* 3 mm long, villous along the throat. Drupes *ca* 5 mm across.

Rare. In deciduous forests and river embankments. Seoni, Surguja. *Fl. & Fr.*: Aug. - Oct.

13. PYGMAEOPREMNA Merr.

Dwarf herbs; rhizomes subterranean, elongate. Leaves mostly in 2 or 3 opposite, decussate pairs or apparently verticillate, entire or irregularly dentate. Flowers in trichotomous, terminal, dense, short, corymbose cymes, small, somewhat zygomorphic. Calyx cupuliform, 5-toothed. Corolla hypocrateriform; limb obscurely bilabiate, 4-5-lobed; tube very short, pilose in throat. Stamens 4, didynamous, included; filaments very short, filiform; anthers almost cordate. Ovary 2-locular; ovule solitary in each locule. Fruit a drupe, globose.

Three species; India, Philippines and Yunnan; one in M.P.

Pygmaeopremna herbacea (Roxb.) Moldenke, *Phytologia* 2: 54. 1941. *Premna herbacea* Roxb., *Fl. Ind.* 3: 80. 1832; C.B. Clarke in Hook. *f.*, *Fl. Brit. India* 4: 581. 1885. - *Bharangi*.

Dwarf herbs, perennial, aromatic, with a stout woody base, *ca* 25 cm high. Leaves opposite, decussate, appressed to the ground, obovate-rounded to elliptic, 3-22 x 2-14 cm, obtuse or rounded at apex, acute or cuneate at base, glabrous or sparsely hairy, sessile. Flowers in pedunculate, corymbose panicles. Calyx *ca* 15 mm long, glandular hairy; teeth ovate-rounded, ciliate. Corolla greenish yellow or cream-coloured, *ca* 4 mm long. Drupes green, black on drying, glabrous.

Common in sal forests often along with *Combretum nanum* and *Justicia* sp. Balaghat, Bastar, Bilaspur, Mandia, Raipur, Rajnandgaon, Sidhi, Surguja. *Fl. & Fr.*: July - Oct.

The roots or rhizomatous stems are referred for the treatment of dropsy, cough, phlegm, asthma, fever and rheumatism.

14. STACHYTARPHETA Vahl, *nom. cons.*

Herbs or undershrubs, annual or perennial. Leaves opposite or alternate, dentate, rugose. Flowers in terminal, elongated spikes, sessile or semi-immersed in furrows of the rachis, bracteate. Calyx narrowly tubular, 4-lobed or toothed. Corolla white, blue, purple or red, hypocrateriform; limb spreading, 5-partite; tube cylindrical. Perfect stamens 2, inserted above the middle of corolla-tube, included; filaments short. Staminodes 2, posterior. Ovary 2-locular; ovule solitary in each locule; style elongated, filiform; stigma terminal, capitate or subcapitate. Fruit of two 1-seeded pyrenes, cylindrical, enclosed by the fruiting calyx. Seeds linear, erect.

About 65 species; tropical and subtropical regions of America and tropical regions of Old World; one in M.P.

Stachytarpheta jamaicensis (L.) Vahl, Enum. Pl. 1: 206. 1804. *Verbena jamaicensis* L., Sp. Pl. 19. 1753. *Stachytarpheta indica auct. non* Vahl, 1804; C.B. Clarke in Hook. f., Fl. Brit. India 4: 564. 1885, *p.p.*

Herbs or undershrubs, climbing; stems somewhat 4-angled, dichotomously branched. Leaves opposite, ovate or obovate, 3-7 x 1.5-4 cm, obtuse or acute at apex, cuneate and long decurrent at base, serrate, glabrous; petioles slender, winged. Flowers in 8-12 cm long spikes. Calyx ca 4 mm long, 4-toothed, glabrous. Corolla-lobes ca 5 mm long; tube slightly curved, hairy. Fruits oblong or pyriform.

In mixed forests. Bastar, Chhatarpur, Rajnandgaon, *Fl. & Fr.*: Feb. June.

15. SYMPHOREMA Roxb.

Shrubs, scandent. Leaves opposite, entire or sinuate-dentate. Flowers in involucrate, pedunculate, capitate cymes, actinomorphic, sessile; heads 7-flowered, with 3 central and 4 lateral flowers, paniculate at the end of branches, often with a small bract at the base of peduncle; involucre bracts 6, oblong, foliaceous. Calyx obovoid or turbinate. Corolla 6-16-lobed; tube cylindrical, widened above. Stamens 6-16, inserted at the apex of corolla-tube and alternating with lobes; anthers ovate, exserted. Ovary 2-locular or imperfectly 4-locular at base, 1-locular at apex; style filiform; stigma shortly 2-fid. Fruits obovoid or subglobose, included in the calyx.

Three species; Indo-Malesia; one in M.P.

Symphorema polyandrum Wight, Icon. Pl. Ind. Orient. 2: t. 363. 1840; C.B. Clarke in Hook. f., Fl. Brit. India 4: 599. 1885. *Kapri*.

Shrubs, climbing, ca 2 m high. Leaves ovate, 4-15 x 3-9 cm, dentate, stellately hairy, sessile. Flowers in capitate cymes; involucre bracts foliaceous, tomentose, dentate towards apex. Calyx ca 4 mm long, velvety. Corolla 12-lobed. Fruits ca 4 mm long, glabrous.

In mixed forests. Bastar, Bilaspur, Durg, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: April - June.

16. TECTONA L. f., *nom. cons.*

Large trees. Leaves opposite, decussate or ternate, large, entire or denticulate. Flowers in many-flowered cymes, borne in massive, terminal panicles, actinomorphic. Calyx campanulate, shortly 5-7-lobed, persistent and enlarged in fruit. Corolla hypocrateriform; limb 5-7-partite; tube cylindrical. Stamens 5 or 6, inserted in corolla-tube; anthers ovate or elliptic-oblong, 2-celled. Ovary 4-locular; ovule solitary in each locule; style terminal, capillary; stigma shortly 2-fid. Fruit a drupe, enveloped by enlarged fruiting calyx.

Four species; S.E. Asia to Malesia; one in M.P.

Tectona grandis L. f., Suppl. Pl. 151. 1782; C.B. Clarke in Hook. f., Fl. Brit. India 4: 570. 1885. - *Sagon, Sagwain, Teak*.

Trees, up to 20 m high; young parts tomentose; branches and branchlets stout, 4-angled. Leaves opposite, ovate-elliptic, 12-50 x 6-30 cm, drooping, entire or repand-denticulate, stellately tomentose beneath. Flowers in dichotomously branched, 20-40 cm long, tomentose panicles. Calyx light green, ca 4 mm long; teeth often reflexed, obtuse. Corolla white; lobes obovate-elliptic, erect or reflexed; tube broadly cylindrical, ca 2 mm long. Drupes enclosed in 4-angled, inflated calyx.

Balaghat, Bastar, Bilaspur, Chhatarpur, Dhar, Durg, Hoshangabad, Indore, Panna, Raigarh, Raipur, Rewa, Rajnandgaon, Seoni, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Aug. - Dec.

Wood is highly valuable and used for making various articles while its oil is used to treat eczema, ringworm and itches.

17. VERBENA L.

Herbs. Leaves opposite, decussate, rarely whorled, dentate. Flowers in terminal, usually densely many-flowered spikes or heads. Calyx tubular, 5-angled, 5-ribbed, 5-lobed or 5-toothed. Corolla hypocrateriform or infundibuliform; limb flat, spreading or oblique; lobes 5; tube cylindrical, straight or curved, usually villous at the point of stamen insertion, barbate at mouth. Stamens 4, didynamous, inserted in the upper half of corolla-tube; anthers ovate. Ovary superior, entire or 4-lobed, 4-locular; ovule solitary in each locule; style shortly 2-fid towards apex. Fruit schizocarpous, enclosed by the mature calyx. Seeds oblong, erect.

About 250 species; tropical and temperate America, few in Old World; 2 in M.P.

- 1a. Leaves dissected into linear segments; flowers
in dense heads; corolla lilac-purple ...1. *V. bipinnatifida*
- 1b. Leaves pinnatifidly lobed; flowers
in spikes; corolla pale pink ...2. *V. officinalis*

1. *Verbena bipinnatifida* Schauer in DC., Prodr. 11: 553. 1847.

Herbs, perennial, hirsute, up to 60 cm high. Leaves dissected, long petiolate. Flowers in dense heads, elongating in fruits; bracts equal to calyx-lobes in length. Calyx-lobes setaceous. Corolla lilac-purple. Fruits dry, enclosed by the calyx.

Planted in gardens and parks. Chhatarpur, Indore, Seoni. *Fl. & Fr.*: Oct. - Feb.

2. *Verbena officinalis* L., Sp. Pl. 20. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 565. 1885.

Herbs, erect or decumbent; young branches with minute, sparse prickles. Leaves variously lobed, scabrous; lower pinnatifid or coarsely dentate; upper usually deeply dentate or 3-partite, 4-7 x 1.5-3 cm. Flowers in dense, bracteate spikes. Corolla pale pink. Fruits dry, subcylindrical.

Bhopal (Oommachan, 1977). *Fl. & Fr.*: April - Oct.

18. VITEX L.

Shrubs or trees. Leaves usually opposite, decussate or ternate, palmately 3-4-foliolate. Flowers in cymes, zygomorphic; cymes densely or loosely divaricate, in leaf-axils or aggregated in terminal, sessile or pedunculate, racemiform, thyrsoïd or laxly diffuse panicles. Calyx campanulate, cyathiform or rarely tubular-infundibuliform, 5-toothed or 5-fid, rarely 3 or 6-fid; teeth slightly unequal. Corolla variously coloured, long tubular or cylindrical to hypocrateriform; limb oblique, more or less bilabiate; upper lip 2-fid; lower lip 3-fid. Stamens 4, didynamous, inserted in corolla-tube; anthers 2-celled. Ovary 4-locular at anthesis; ovule solitary in each locule; style terminal, filiform, shortly 2-fid. Fruit a drupe, fleshy. Seeds obovate or oblong.

About 250 species; tropical to temperate regions: 4 in M.P.

- 1a. Shrubs; leaves grey pubescent beneath ...3. *V. negundo*
- 1b. Trees; leaves otherwise:
- 2a. Leaves 3-7-foliolate; petioles never winged; calyx pubescent:
- 3a. Leaflets entire; drupes globose, ca 5 mm across ...1. *V. heterophylla*
- 3b. Leaflets entire to dentate; drupes ellipsoid-oblong, ca 1.5 cm long ...2. *V. leucoxylon*
- 2b. Leaves 3-foliolate; petioles often winged in young plants; calyx glabrous ...4. *V. peduncularis*

1. *Vitex heterophylla* Roxb., Fl. Ind. 3: 75. 1832; C.B. Clarke in Hook. f., Fl. Brit. India 4: 585. 1885.

Trees. Leaves 5-foliolate; leaflets elliptic-oblong, acuminate at apex, entire, membranous, glabrous, gland-dotted on both the surfaces. Flowers in large, terminal, paniculate cymes. Calyx glandular pubescent, accrescent in fruit. Corolla yellow; lower lip blue. Drupes globose, ca 5 mm across.

Rare. Bastar (Mooney, 1942). Fl. & Fr.: March - July.

2. *Vitex leucoxylon* L. f., Suppl. Pl. 293. 1782; C.B. Clarke in Hook. f., Fl. Brit. India 4: 587. 1885.

Trees, up to 10 m high. Leaves 3-7-foliolate; leaflets obovate-oblong, 7-15 x 2-4 cm, acute at apex and base, entire to dentate. Flowers in axillary, ca 10 cm long, corymbose cymes. Calyx ca 3 mm long, 5-toothed, appressed pubescent. Corolla cream-coloured, purplish inside, ca 1.5 cm across, 5-lobed; tube ca 5 mm long. Drupes ellipsoid-oblong, ca 1.5 x 0.8 cm.

In dried river beds, rocky slopes and along river bank. Bastar, Bilaspur, Raigarh, Raipur. *Fl. & Fr.*: April - June.

The leaves are used to treat anaemia.

3. *Vitex negundo* L., Sp. Pl. 638. 1753; C.B. Clarke in Hook. f., Fl. Brit. India 4: 583. 1885. - *Negur, Sambhatu, Shivari.*

Shrubs, 1.5-2.5 m high. Leaves 3-5-foliolate; leaflets oblanceolate, 7-12 x 2-3 cm, acuminate at apex, acute at base, chartaceous, glabrous above, grey pubescent beneath. Flowers in terminal and upper axillary, ca 20 cm long panicles. Calyx white-spotted, ca 3 mm long, 5-toothed. Corolla purple to violet; tube ca 5 mm long. Drupes globose, ca 4 mm across, black.

Common along roadsides, river bank and cultivated fields. Balaghat, Bastar, Betul, Bilaspur, Chhatarpur, Damoh, Jabalpur, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Shivpuri, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: June - Dec.

Leaves are of medicinal importance.

4. *Vitex peduncularis* Wallich ex Schauer in DC., Prodr. 11: 687. 1847; C.B. Clarke in Hook. f., Fl. Brit. India 4: 587. 1885.

Trees, up to 10 m high. Leaves 3-foliolate; leaflets oblanceolate, 9-15 x 2.5-4 cm, shortly acuminate at apex, thinly coriaceous. Flowers in lax, dichasial cymes, arranged in axillary, up to 25 cm long, racemose panicles. Calyx yellow-spotted, ca 4 mm long, 5-toothed. Corolla cream-coloured with blue tinge; tube ca 2 mm long. Drupes obovoid, ca 0.7 cm across.

In mixed forests and along river bank. Bilaspur, Raigarh, Raipur. *Fl. & Fr.*: April - June.

108. LAMIACEAE Lindl.**(A.K. Mukherjee)**

About 224 genera and 5600 species; cosmopolitan especially from Mediterranean region to C. Asia; 20 genera and 62 species in M.P.

1a. Stamens declinate:

**2a. Lower lip of corolla entire; basal scar of
nutlets not oblique:**

3a. Lower lip of corolla flat or nearly so:

**4a. Calyx deflexed in fruit, upper lobe
recurved, margins decurrent on the tube:**

**5a. Corolla-tube not exceeding the
calyx; stigma 2-fid** ...16. *Ocimum*

**5b. Corolla-tube exceeding the calyx;
stigma entire or slightly notched** ...17. *Orthosiphon*

**4b. Calyx suberect or declinate in fruit,
upper lobe not recurved, margins
not decurrent** ...1. *Acrocephalus*

**3b. Lower lip of corolla conspicuously
concave or boat-shaped:**

**6a. Corolla distinctly bilabiate, lower
lip longer than the upper:**

**7a. Upper lip of calyx rounded, deflexed
or calyx subequally 5-toothed:**

8a. Stamens free ...18. *Plectranthus*

8b. Stamens connate below ...6. *Coleus*

**7b. Upper lip of calyx beaked or truncate,
curved downwards to close the mouth
or the calyx without upper lip** ...3. *Anisochilus*

**6b. Corolla subbilabiate, lowest lobe shorter
or equalling the other lobes** ...7. *Hyptis*

**2b. Lower lip of corolla 3-lobed; basal scar
of nutlets oblique** ...9. *Lavandula*

1b. Stamens straight or descending:

9a. Nutlets with very large, lateral,
oblique scar or areola ...2. *Ajuga*

9b. Nutlets with small, basal, not oblique scar or areola:

10a. Perfect stamens 2 or 4; anther
cells at length not diverging:

11a. Anthers 1 or 2-celled, not separated;
connective not filiform:

12a. Anthers 1-celled:

13a. Calyx 5-partite,
segments feathery,
longer than the tube ...5. *Cotenrookea*

13b. Calyx 5-toothed, teeth
neither feathery nor
longer than the tube ...19. *Pogostemon*

12b. Anthers 2-celled ...13. *Mentha*

11b. Anthers 1-celled or separated by a
filiform connective ...20. *Salvia*

10b. Perfect stamens 4; anther
cells at length diverging:

14a. Calyx 10-15-nerved:

15a. Calyx equally dentate or lobed;
anterior (lower) pair of
stamens longer ...14. *Micromeria*

15b. Calyx unequally dentate
or lobed; posterior (upper)
pair of stamens longer ...15. *Nepeta*

14b. Calyx 5-10-nerved:

16a. Upper lip of corolla flat,
not hooded ...4. *Anisomeles*

16b. Upper lip of corolla hooded:

17a. Anther cells hairy ...8. *Lanium*

17b. Anther cells glabrous:

- 18a. Leaves deeply lobed; calyx 5-toothed ...11. *Leonurus*
 18b. Leaves not lobed; calyx 8-10-toothed:
 19a. Upper lip of corolla shorter than the lower ...12. *Leucas*
 19b. Upper lip of corolla longer than the lower ...10. *Leonotis*

1. ACROCEPHALUS Benth.

Herbs, annual. Leaves usually petiolate, sometimes sessile or subsessile. Verticillasters in terminal or axillary, dense heads or spikes. Flowers very small, sessile; bracts imbricate. Calyx ovoid in flower, tubular in fruit, gibbose at base, bilabiate; upper lip larger, flat, entire or serrate; lower lip entire, 4-fid or 4-dentate; throat naked. Corolla subequally 4-lobed; tube very short. Stamens 4, declinate; filaments free, included; anthers scarcely exerted. Disk small, gibbose. Ovary 4-partite; style shortly 2-fid. Nutlets smooth or minutely tuberculate; basal scar small.

About 130 species; tropical regions of Old World; 2 in M.P.

- 1a. Leaves glabrous or nearly so; bracts
 acuminate, ca 2 mm broad ...1. *A. hispidus*
 1b. Leaves scabrid; bracts mucronate.
 ca 7 mm broad ...2. *A. verbenifolius*

1. *Acrocephalus hispidus* (L.) Nicolson & Sivadasan in Taxon 29: 324. 1980. *Gomphrena hispida* L., Sp. Pl. ed. 2, 1: 326. 1762. *Brunella indica* Burm. f., Fl. Ind. 130. 1768, "*Prunella*" *Acrocephalus indicus* (Burm. f.) Kuntze, Revis. Gen. Pl. 2: 511. 1891. *Ocimum capitatum* Roth. Nov. Pl. Sp. 276. 1821. *Acrocephalus capitatus* (Roth) Benth. in Edwards, Bot. Reg. 15: sub t. 1300. 1830; Hook. f., Fl. Brit. India 4: 611. 1885.

Herbs, slender; stems simple or branched, 15-30 cm high, obtusely 4-angled, glabrous or nearly so; branches ascending or descending. Leaves ovate or lanceolate, 2-4 cm long, subacute at apex, coarsely serrate, glabrous, decurrent into a short petiole. Verticillasters in terminal, globose or cylindrical heads; heads 6-18 mm across; bracts shortly acuminate, cuneate. Calyx 2-6 mm long, pubescent outside; upper lip entire, rounded; lower lip with 4, lanceolate teeth. Corolla pale purple, suberect, ca 3 mm long. Nutlets minute, oblong-ellipsoid, compressed, smooth, brownish black.

In wastelands, along river banks, on hill slopes and foot hills. Balaghat, Bastar, Bilaspur, Chhatarpur, Hoshangabad, Raigarh, Raipur, Rajnandgaon, Sidhi, Surguja. *Fl. & Fr.*: Sept. - Dec.

2. *Acrocephalus verbenifolius* Watt ex Mukherjee in Notes Bot. Gard. Edinb. 19: 303. 1938 & Rec. Bot. Surv. India 14(1): 30. 1940. **Fig. 65.**

Herbs, erect, 50-70 cm high; stems 4-angled, grooved, scabrid. Leaves linear or narrowly lanceolate, 3-8 x 0.2-0.5 cm, acute or acuminate at apex, serrate, scabrid and with glandular pits. Verticillasters in terminal, 1-10 cm long, densely villous spikes; bracts broadly ovate, glandular pubescent, membranous, each subtending 5-9 flowers. Calyx campanulate, ca 2 mm long, gland-dotted, densely villous outside; upper lip serrate; lower lip with 4, acuminate, erect, subequal teeth, ciliate. Corolla white or pale yellow, ca 2.5 mm long; upper lip subequally 4-lobed; lower lip entire; tube slightly exerted. Nutlets ovoid, 0.7-0.8 mm long, dark brown, minutely tuberculate.

Rare. Among forest fringes. Balaghat. *Fl. & Fr.*: Sept. - Dec.

2. AJUGA L.

Herbs, annual or perennial, often stoloniferous. Leaves usually crenate. Verticillasters in axillary or terminal, 2 or many-flowered spikes, bracteate. Calyx campanulate, 10-nerved; teeth 5, equal. Corolla bilabiate; upper lip very short; lower lip longer, 3-lobed, deflexed; tube included or exerted. Stamens 4, didynamous, arcuate, usually protruding beyond the upper lip; lower pair longest; anther cells divergent, finally confluent. Disk equal or oblique. Ovary shortly 4-lobed; style subequally forked. Nutlets reticulate, obliquely attached.

About 50 species; Old World especially temperate regions but also in lowland Malesia; 2 in M.P.

- 1a. Corolla-tube not inflated, straight ...1. *A. bracteosa*
 1b. Corolla-tube inflated at base, geniculate
 above the swelling ...2. *A. macrosperma*

1. *Ajuga bracteosa* Wallich ex Benth. in Wallich, Pl. Asiat. Rar. 1: 59. 1830; Hook. f., Fl. Brit. India 4: 702. 1885. **Fig. 66.**



Fig. 65. *Acrocephalus verbenifolius* Watt ex Mukherjee

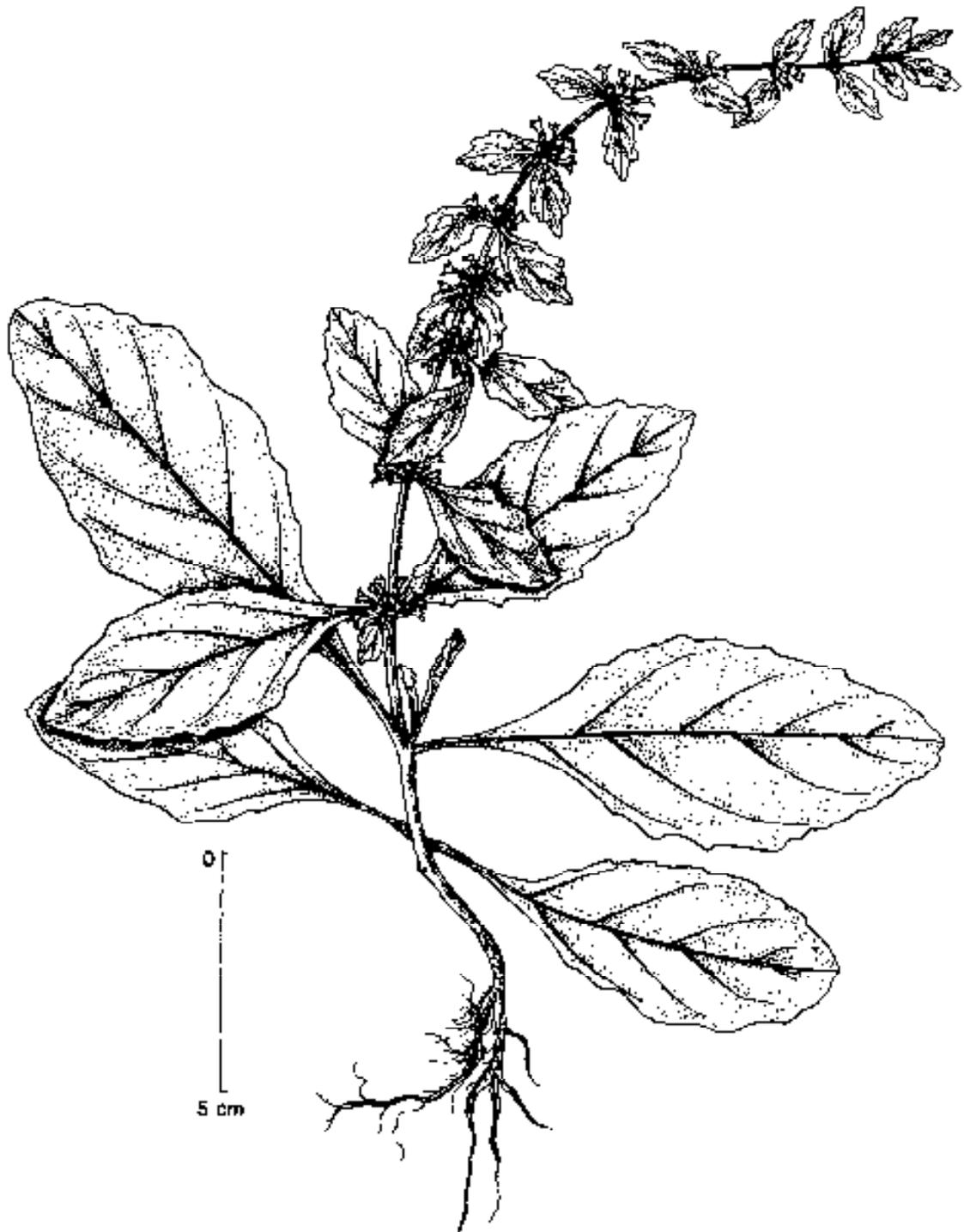


Fig. 66. *Ajuga bracteosa* Wallich ex Benth.

Herbs, dwarf, tufted, pinkish, *ca* 30 cm high; stems numerous, decumbent and ascending, obtusely 4-sided, with dense, spreading pubescence. Leaves elliptic-oblong, 2-5 cm long, rounded at apex, somewhat tapering at base, repandly or sinuately dentate, lobulate or subentire, sparsely hairy above, pubescent beneath especially on the nerves; petioles 2-5 mm long. Verticillasters in 3-8 cm long spikes, at first very dense; lower verticillasters finally discrete; bracts foliaceous. Flowers *ca* 5 mm long. Calyx pink, *ca* 4 mm long, hairy. Corolla sparsely hairy outside; upper lip short, erect, 2-lobed or subentire. Stamens exserted. Nutlets globose-oblong, smooth and shining when fresh, rugose and pitted when dry.

Along stream banks and on meadows. Balaghat, Mandla. *Fl. & Fr.*: Jan. March.

2. *Ajuga macrosperma* Wallich ex Benth. in Wallich, *Pl. Asiat. Rar.* 1: 58, 1830; Hook. *f.*, *Fl. Brit. India* 4: 704, 1885. **Fig. 67.**

Herbs, procumbent, much variable; stems 15-60 cm long, terete, hairy below, usually villous near the inflorescence. Leaves ovate-oblong or obovate, variable in size, 4-15 cm long, obtuse at apex, sinuate-crenate, petiolate; petioles 1-5 cm long. Verticillasters in 3-20 cm long spikes, continuous or interrupted; lower bracts foliaceous, upper ones ovate, shorter than the calyx. Calyx-teeth minute, obtuse. Corolla blue, usually glabrous; upper lip erect, 2-lobed; lobes of lower lip subequal or the middle one broader; tube twice as long as the calyx, inflated at base, geniculate above the swelling. Stamens exserted. Nutlets *ca* 1.5 mm across, deeply rugosely pitted.

Rare. On hill slopes and along the banks of drains. Bilaspur, Surguja. *Fl. & Fr.*: Jan. March.

3. *ANISOCHILUS* Wallich ex Benth.

Herbs or shrubs, annual or perennial. Leaves usually fleshy, with excavations on lower surface in between nerve reticulations. Verticillasters densely imbricate, in somewhat 4-angled or cylindrical spikes, usually arranged in panicles; bracts shorter or longer than flowers, caducous. Flowers small. Calyx suberect, inflated above middle, bilabiate; upper lip entire, longer than lower, deflexed over mouth of tube after anthesis; lower lip truncate, toothed or absent. Corolla-tube slender, exserted beyond calyx, incurved, broadened at throat. Stamens exserted or not, declinate; anther



Fig. 67. *Ajuga macrosperma* Wallich ex Benth.

cells confluent. Disk lobed; anterior lobe slightly prolonged. Style shortly 2-fid above. Nutlets smooth.

About 20 species; tropical regions of Old World; 2 in M.P.

- 1a. Calyx glabrous or pubescent with minute hairs ...1. *A. carnosus*
 1b. Calyx villous with long white hairs ...2. *A. eriocephalus*

1. *Anisochilus carnosus* (L. f.) Wallich ex Benth. in Wallich, Pl. Asiat. Rar. 2: 18. 1830; Hook. f., Fl. Brit. India 4: 627. 1885. *Lavandula carnosus* L. f., Suppl. Pl. 273. 1782.

Herbs, annual, erect, ca 60 cm high; stems obtusely 4-angled, fleshy, dull pinkish red. Leaves broadly ovate, 2-6 x 1-6 cm, subacute or obtuse at apex, rounded or subcordate at base, crenate-serrate, glabrous above, densely scabrid beneath, rather fleshy; petioles 0.6-6.6 cm long, puberulous. Panicles diffusely branched; spikes subglobose to oblong-ovoid, 1.5-5 cm long; bracts broadly ovate, truncate at base. Calyx tubular, upper lip deltoid-lanceolate, up to 2.5 x 2 mm, acute; lower lip slightly truncate; tube up to 2 mm long. Corolla pinkish purple, up to 1.5 cm long; upper lip up to 4 mm long; lower lip broadly ovate, up to 3 mm long; lobes shallowly orbicular; tube 4-9 mm long. Nutlets ovoid to suborbicular, compressed, dark brown, shining.

In moist soil near drains and on hill slopes. Bilaspur, Bastar, Chhatrapur, Hoshangabad, Raigarh, Raipur, Sagar, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Jan. - Dec.

2. *Anisochilus eriocephalus* Benth. in DC., Prodr. 12: 81. 1848; Hook. f., Fl. Brit. India 4: 627. 1885.

Herbs, annual, slender, glabrous or puberulous, 30-60 cm high. Leaves orbicular-ovate, ca 5 cm across, cordate at base, with shallow crenations, thick, puberulous, glandular beneath, petiolate. Verticillasters in very dense, cylindrical spikes; peduncles slender. Calyx glandular-villous or woolly with long white hairs; upper lip broadly ovate, acuminate, deflexed in fruits, concealing mouth and the truncate lower lip; tube inflated in the middle and curved. Corolla pinkish.

In moist soil. Hoshangabad. *Fl. & Fr.*: Oct. - Dec.

4. ANISOMELES R. Br.

Herbs, perennial; stems erect, villous or lanate. Leaves serrate-crenate to dentate, petiolate. Verticillasters axillary or in terminal, interrupted spikes, many-flowered. Flowers sessile or subsessile. Calyx campanulate, slightly enlarged in fruit; limb equally 5-lobed; tube 10-nerved. Corolla bilabiate; upper lip erect, subhooded, villous, entire; lower lip spreading, 3-lobed; middle lobe larger, emarginate or 2-fid; tube subequalling calyx, pilose-annulate inside. Stamens 4, didynamous, included under the upper lip; filaments pubescent at middle; posterior anthers longer, 1-celled, anterior ones dimidiate. Disk equal-sided. Style 2-fid. Nutlets ovoid or oblong, smooth.

About 6 species; tropical regions of Old World; one in M.P.

Anisomeles indica (L.) Kuntze, Revis. Gen. Pl. 2: 512. 1891. *Nepeta indica* L., Sp. Pl. 571. 1753. *Anisomeles ovata* R. Br. in W.T. Aiton, Hortus Kew. ed. 2. 3: 364. 1811; Hook. f., Fl. Brit. India 4: 672. 1885. *Ballota disticha* L., Mant. Pl. 83. 1767.

Herbs, perennial; stems erect, acutely 4-angled, densely villous, divaricately branched. Leaves broadly ovate, 3-10 x 3-8 cm, acute at apex, truncate, rounded, or subcordate at base, rarely cuneate, slightly thick, softly pubescent; petioles 1-7 cm long, densely hairy. Verticillasters axillary, interrupted below, dense and spicate above; bracts linear, 4-5 mm long, pubescent. Calyx ca 6 mm long, hirsute; teeth lanceolate, as long as the tube, acute, ciliate. Corolla bluish purple, sometimes yellow, ca 2 cm long; upper lip ciliate. Nutlets ca 2.5 mm long, black, smooth and shining.

As forest undergrowth, on hill slopes and along roadsides. Balaghat, Bilaspur, Chhatarpur, Damoh, Gwalior, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Sconi, Sidhi, Surguja. *Fl. & Fr.*: Aug. - March.

5. COLEBROOKEA Sm.

Shrubs, woolly or densely hoary. Leaves opposite or ternate, petiolate. Verticillasters in paniculate spikes, densely flowered; bracts connate. Flowers functionally unisexual (dioecious). Calyx campanulate; teeth subulate, much elongated in fruit, capillary and feathery; tube very short. Corolla small; lobes 4, subequal or the upper larger; tube short. Stamens

4, exerted in male, included in female flowers; filaments glabrous; anther cells confluent. Disk uniform. Ovary 4-partite; style 2-fid, subulate. Nutlets dry, ovoid, hairy at tip; basal scar small.

A monotypic genus; endemic to India.

Colebrookea oppositifolia Sm., Exot. Bot. 2: 111. t. 115. 1805; Hook. f., Fl. Brit. India 4: 642. 1885. - *Binda*.

Shrubs, spreading, 2-3 m high; branches stout, grooved, softly white tomentose. Leaves oblong-lanceolate, 12-24 x 4-8 cm, acute or acuminate at apex, acute at base, crenate or serrulate, softly pubescent; petioles 2-4 cm long. Verticillasters in terminal or axillary, paniculate spikes; spikes slender, 5-10 cm long; bracts minute, linear, pubescent; sometimes a whorl of bracteoles present at the base of spike. Calyx ca 3 mm long, 5-toothed; teeth deeply grooved, subulate, plumose with hairs elongating in fruit up to 6 mm long. Corolla white, very small; upper lobe emarginate. Nutlets often solitary.

Along drains, foot hills, in roadside thickets, on hill slopes and in teak-bamboo forest floor. Bastar, Bilaspur, Damoh, Hoshangabad, Mandla, Raigarh, Raipur, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Nov. - April.

6. COLEUS Lour.

Herbs or undershrubs, often fleshy, usually aromatic. Leaves crenate-serrate. Flowers in lax or dense, paniculate or racemose, 6-8-fid cymes; floral leaves and bracts caducous. Calyx subcampanulate, declinate or reflexed in fruit; upper lip with ovate teeth; lower lip with 4 acuminate teeth or the lateral teeth obtuse. Corolla bilabiate; upper lip short, broad, slightly 4-lobed, recurved; lower lip much longer, entire, boat-shaped, stipitate or narrowed at base; tube exerted, decurved in the middle, often obliquely swollen at the throat. Stamens 4, didynamous, connate below in a sheath round the style; anther cells confluent. Disk enlarged in front. Ovary 4-partite; style slender, 2-fid. Fruits of 4 orbicular or ovoid, smooth, dry nutlets; basal scar small.

About 60 species; tropical regions of Old World; 3 in M.P.

- 1a. Leaves thick, fleshy; petioles 2-4 mm long ...), *C. amboinicus*
 1b. Leaves not so thick, less fleshy; petioles
 more than 5 mm long:

- 2a. Calyx-throat villous inside ...2. *C. barbatus*
 2b. Calyx-throat glabrous inside ...3. *C. scutellarioides*

1. *Coleus amboinicus* Lour., Fl. Cochinch. 2: 372. 1790; Cramer in Kew Bull. 32: 555. 1978. *C. aromaticus* Benth. in Wallich, Pl. Asiat. Rar. 2: 16. 1830; Hook. f., Fl. Brit. India 4: 625. 1885. - *Ajwain patti*. *Patherchor*.

Herbs, perennial, strongly aromatic, fleshy; stems somewhat 4-angled to subterete. Leaves opposite, fleshy, fragile, broadly ovate, 2-5 x 1.5-3.5 cm, crenate, tomentose, shortly petiolate. Verticillasters distantly arranged in terminal spikes. Corolla pale purple; upper lip broad; lower lip long projecting.

Planted in gardens. Indore. *Fl. & Fr.*: Feb. - March.

Leaves are aromatic, edible and used for flavouring dishes. They are also used to treat urinary diseases. Decoction of leaves is given in chronic cough and asthma.

2. *Coleus barbatus* (Andr.) Benth. in Wallich, Pl. Asiat. Rar. 2: 15. 1830; Hook. f., Fl. Brit. India 4: 625. 1885. *excl. syn. Germanea forskohlei* Poir., 1788 & *Plectranthus forskohlaei* Willd., 1800, *non* Vahl. 1790; Cramer in Kew Bull. 32: 555. 1978. *Plectranthus barbatus* Andr., Bot. Repos. 10: t. 594. 1810. *Coleus forskohlii* Briq. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3a: 359. 1897.

Herbs, perennial; stems generally decumbent, subsucculent, densely hirsute, dotted with reddish orange oil globules in between hairs. Leaves ovate-oblong, 2-8 x 1.5-4.5 cm, obtuse at apex, narrowed at base, crenate, densely pubescent; petioles 0.5-2.5 cm long. Verticillasters in 15-30 cm long, 6-10-fid, *ca* 3 cm apart, spiciform racemes; rachis stout, densely hairy and glandular; bracts *ca* 2.5 cm long, caducous. Fruiting calyx *ca* 0.8 cm long, hairy and glandular outside and with a ring of hairs inside; upper lip slightly longer than the lower; lower lip with 4 teeth. Corolla bluish, *ca* 2 cm long, with red glands outside; upper lip short, 4-lobed; lower lip boat-shaped; tube geniculate. Nutlets dark brown, smooth.

On meadows. Bastar, Indore. *Fl. & Fr.*: Nov. - Feb.

3. *Coleus scutellarioides* (L.) Benth. in Wallich, Pl. Asiat. Rar. 2: 16. 1830; Hook. f., Fl. Brit. India 4: 626. 1885. *Ocimum scutellarioides* L.,

Sp. Pl. ed. 2. 833. 1763. *Coleus blumei* Benth., Labiat. Gen. Spec. 56. 1832.

Herbs, perennial, 0.6-1 m high, finely tomentose. Leaves purplish, ovate-deltoid or broadly ovate, 5-14 x 3-9 cm, acute at apex, coarsely crenate. Verticillasters distantly arranged in puberulous racemes. Calyx gland-dotted, glabrous; upper lip ovate; lower lip with 2 lateral, obtuse and 2 middle, acute teeth; fruiting calyx ca 3 mm long. Corolla white with blue lower lip, infundibuliform, ca 15 mm long; tube up to 5 mm long.

Cultivated in gardens. In several districts. *Fl. & Fr.*: Nov. - Feb.

7. HYPTIS Jacq., *nom. cons.*

Herbs or shrubs, often aromatic. Leaves opposite, unequally serrate, petiolate. Flowers in various, often spicate or occasionally few-flowered, cymose racemes; floral leaves sometimes present; bracts subulate. Calyx tubular or campanulate, 10-nerved; limb subequally 5-lobed; lobes subulate or toothed. Corolla subbilabiate, 5-lobed; lobes spreading; lowest lobe shorter or equalling the other lobes, abruptly deflexed, saccate, contracted at base. Stamens 4, declinate, slightly exserted; filaments pubescent; anthers 2-celled; cells confluent. Disk symmetrical. Style shortly 2-fid. Nutlets ovoid or oblong, smooth or punctate-rugose.

About 400 species; subtropical and tropical regions; one in M.P.

Hyptis suaveolens (L.) Poit. in Ann. Mus. Hist. Nat. 7: 472. t. 29. f. 2. 1806; Hook. f., Fl. Brit. India 4: 630. 1885. *Ballota suaveolens* L., Syst. Nat. ed. 10. 1100. 1759. - *Dona, Vilayati tulsi*.

Herbs, annual, sweet-smelling, rigid, 0.6-1 m high; stems and branches obtusely 4-angled, patently hirsute. Leaves broadly ovate or suborbicular, 3-7 x 2-5 cm, obtusely acute at apex, shallowly crenate-serrulate; petioles 1.5-4 cm long. Flowers axillary or terminal, secund in short umbels, sometimes in panicles or flowers even solitary; bracts minute, setaceous. Calyx glandular and hispid outside, villous at the mouth, striate; teeth erect, subulate. Corolla small, blue. Nutlets usually 2, ovoid, flat, blackish brown, notched at the apex and with a white mark on either side of the pointed base.

Common as weed in wastelands, along bank of drains, roadsides, in forest clearings, on hill slopes and among boulders. Bilaspur, Chhatarpur,

Chhindwara, Damoh, Durg, Hoshangabad, Mandla, Raigarh, Raipur, Rewa, Sidhi, Surguja. *Fl. & Fr.*: Throughout the year.

8. LAMIUM L.

Herbs, annual or perennial, erect or procumbent. Leaves usually crowded. Verticillasters densely many-flowered, either axillary or in leafy heads; bracteoles subulate or absent. Calyx tubular or campanulate, 5-nerved, 5-toothed; mouth equal or oblique. Corolla-tube usually exerted, annulate or not, dilate at the throat; upper lip arched, entire, retuse or 2-fid; lower lip spreading, 3-lobed; lateral lobes truncate or angled, sometimes appendaged; median lobe somewhat stipitate, entire or 2-lobed. Stamens 4, parallel, ascending under the upper lip; lower longer; anthers conniving; cells divergent. Disk equal or slightly produced in front. Style equally 2-fid; lobes subulate. Nutlets acutely triquetrous, truncate at tip.

About 40 species; N. Africa and Eurasia; one in M.P.

Lamium amplexicaule L., Sp. Pl. 579. 1753; Hook. f., Fl. Brit. India 4: 679. 1885.

Herbs, decumbent, 15-30 cm high, branching from the base, hairy or glabrescent; stems and branches slender. Leaves orbicular, 1-2 cm across, rounded or cordate at base, inciso-crenate; lower almost lobulate, minutely hairy, long petiolate below, subsessile to sessile above; petioles very slender, ca 3 cm long below, much shorter upwards. Flowers many or few in distant, axillary whorls. Calyx ca 5 mm long, villous; teeth as long as or shorter than the tube, narrow, acuminate, converging in fruit. Corolla purple, ca 2 cm long; lip short; tube short. Nutlets ca 2 mm long, brown with prominent scaly marks.

Rare. As weed. Hoshangabad. *Fl. & Fr.*: Sept. - March.

9. LAVANDULA L.

Herbs or undershrubs, perennial, aromatic. Leaves uni- or bipinnate, entire or dentate. Verticillasters in terminal spikes; bracts persistent, membranous or not, often coloured. Calyx sessile or shortly pedicellate, cylindrical or urceolate, often enlarged in fruit, 5-toothed; posterior tooth often enlarged and appendaged. Corolla uniform or bilabiate; lobes 5;

posterior lip 2-lobed, usually large, upright; anterior lip 3-lobed, often reflexed; tube more or less exceeding the calyx, slightly dilated at the throat. Stamens 4, included: anterior pair longer; anthers reniform. Disk equally 4-lobed; lobes corresponding to the lobes of ovary. Ovary 4-partite; style shortly 2-fid, with flattened lobes. Nutlets smooth or slightly rough; basal scar slightly oblique.

About 20 species; Atlantic Islands and from Mediterranean region to Somalia and India; one in M.P.

Lavandula bipinnata (Roth) Kuntze, Revis. Gen. Pl. 521. 1891. *Bysteropogon bipinnatus* Roth, Nov. Pl. Sp. 255. 1821. *Lavandula burmanni* Benth., Labiat. Gen. Spec. 157. 1833; Hook. f., Fl. Brit. India 4: 631. 1885.

Herbs, erect, stout or slender, 0.4-1 m high; stems simple or branched, 4-angled, pubescent. Leaves 2-10 cm long, sessile or almost so, pinnatipartite or very deeply pinnatisect; segments linear, entire or dentate, glabrous or pubescent, pale beneath. Verticillasters in simple or branched, subumbellate spikes; bracts ovate, glandular pubescent, persistent, each subtending one flower. Calyx tubular, 4-6 mm long, slightly curved, finely hoary pubescent, glandular; teeth equal, lanceolate, acute with penicillate tips. Corolla blue or white, ca 12 mm long, pubescent outside; tube slender below, slightly dilated above. Nutlets minute, oblong, ellipsoid, black, smooth, with a large, white areola on the dorsal side, very mucilaginous when wet.

Along drains, on hill slopes, in and around bamboo thickets and forest clearings. Balaghat, Bilaspur, Damoh, Hoshangabad, Indore, Jabalpur, Mandla, Narsimhapur, Rajnandgaon, Surguja. *Fl. & Fr.*: Oct. - Feb.

10. LEONOTIS (Pers.) R. Br.

Tall herbs, annual or perennial. Leaves ovate, crenate-serrate, petiolate. Flowers in very dense, axillary heads. Calyx infundibuliform; teeth 8-10, more or less unequal, upper largest; throat oblique; tube arcuate, 8-10-ribbed. Corolla bilabiate; upper lip elongated, concave, hairy outside; lower lip short, deflexed, with 3, subequal lobes; tube as long as the calyx. Stamens 4, didynamous, arcuate; lower pair longest; anthers 2-celled; cells divaricate,

subconfluent. Disk equal. Style shortly 2-fid. Nutlets ovoid-triquetrous, obtuse or truncate, glabrous.

About 15 species; tropical Africa while one extending to America and Asia; one in M.P.

Leonotis nepetifolia (L.) R. Br., *Prodr.* 504, 1810 & in W.T. Aiton, *Hortus Kew.* ed. 2, 3: 409, 1811; Hook. *f.*, *Fl. Brit. India* 4: 691, 1885. *Phlomis nepetifolia* L., *Sp. Pl.* 586, 1753, "*nepetaefolia*" *Badbhodra*, *Bhimalgutta*, *Gathora sankh*, *Hejurchei*.

Herbs, erect, 1.5-2 m high; stems stout, 4-angled, puberulous. Leaves broadly ovate, up to 20 cm long, acute at apex, cuneate at base, coarsely crenate-serrate, membranous, puberulous, long petiolate. Flowers in axillary, globose, 3-7 cm across heads; floral leaves deflexed, lanceolate; pedicels up to 2 mm long; bracts linear, deflexed, spine-tipped. Calyx 2-3 cm long; teeth unequal, spine-tipped; upper one ovate, *ca* 8 mm long, acuminate; lower one deltoid, smaller; mouth oblique; throat glabrous; tube incurved, ribbed, puberulous below, densely hispid above with long hairs. Corolla orange-red, *ca* 2-3 cm long, glabrous below, densely villous above as well as on the long upper lip; tube hairy inside, with 3, parallel rings of white hairs. Nutlets linear-oblong, *ca* 4 mm long, obliquely truncate.

On hill slopes, along roadsides, in wastelands and near villages. Balaghat, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Jabalpur, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Shivpuri, Sidli, Surguja. *Fl. & Fr.*: Oct. - March.

The flowers are used for the treatment of ringworm.

11. LEONURUS L.

Herbs, erect, stout. Leaves opposite, deeply lobed; lobes irregularly incised. Verticillasters axillary, dense, many-flowered; floral leaves narrower, lobed or coarsely dentate; bracteoles subulate, dentate. Calyx tubular, 5-toothed; teeth equal. Corolla bilabiate; upper lip entire, erect; lower lip 3-lobed; tube cylindrical, naked or annulate inside. Stamens 4, didynamous, ascending under the upper lip; anthers 2-celled. Disk symmetrical. Ovary 4-partite; style 2-fid. Nutlets triquetrous, smooth, truncate.

About 8 species; temperate Europe and Asia; one in M.P.

Leonurus sibiricus L., Sp. Pl. 584. 1753; Hook. f., Fl. Brit. India 4: 678. 1885.

Herbs, annual, 60-70 cm high; stems 4-angled, grooved, densely pubescent. Leaves deeply lobed, palmatisect, acute or acuminate at apex, truncate at base, membranous; lobes 2-6 x 0.5-1 cm, irregularly serrate; upper leaves narrower, less divided; petioles up to 5 cm long. Verticillasters dense; bracteoles linear, spinescent. Calyx up to 5 mm long; teeth spinescent. Corolla pink, ca 1 cm long, puberulous.

Rare. As weed in wastelands. Indore. *Fl. & Fr.*: Jan. - March.

12. LEUCAS R. Br.

Herbs or undershrubs, perennial, villous or lanate. Leaves entire, serrate or dentate. Verticillasters few to many-flowered, distant. Flowers usually sessile. Calyx tubular or tubular-campanulate, 8-10-nerved, 8-10-toothed; teeth usually unequal; mouth equal or oblique. Corolla usually white, bilabiate; upper lip short, erect, hooded, entire, rarely emarginate, hirsute outside; lower lip longer, spreading, 3-lobed; middle lobe largest; tube straight, slender, annulate inside or not. Stamens 4, didynamous, included in the upper lip of corolla; filaments glabrous; anthers 2-celled, connivent. Disk symmetrical. Style 2-fid; posterior branch very short. Nutlets ovoid, triquetrous.

About 150 species; Africa and Arabia to Indo-Malesia; 16 in M.P.

1a. Calyx-tube bent:

2a. Calyx-mouth produced on the lower (anterior) side ...15. *L. urticaefolia*

2b. Calyx-mouth produced on the upper (posterior) side:

3a. Calyx-mouth glabrous inside or minutely pubescent:

4a. Calyx-mouth wide, teeth equal ...5. *L. hyssopifolia*

4b. Calyx-mouth contracted, uppermost tooth longest:

- 5a. Bracts equalling the calyx, with long marginal bristles ...1. *L. aspera*
- 5b. Bracts smaller than calyx, without bristles ...7. *L. lavandulifolia*
- 3b. Calyx-mouth hairy inside:
- 6a. Bracts 1.5-2.5 cm long, imbricating and forming an involucre, covering the floral heads ...3. *L. cephalotes*
- 6b. Bracts ca 1 cm long, neither imbricating nor forming an involucre:
- 7a. Stems finely pubescent; bracts linear, spinous; calyx-teeth unequal ...9. *L. martinicensis*
- 7b. Stems densely tawny hispid; bracts lanceolate, not spinous; calyx-teeth equal ...12. *L. nutans*
- 1b. Calyx-tube straight:
- 8a. Leaves entire:
- 9a. Verticillasters axillary ...8. *L. longifolia*
- 9b. Verticillasters terminal:
- 10a. Calyx-teeth ca 2.5 mm long, very unequal:
- 11a. Stems patently hirsute ...14. *L. stricta*
- 11b. Stems appressed pubescent ...4. *L. clarkei*
- 10b. Calyx-teeth ca 1 mm long, almost subequal ...16. *L. zeylanica*
- 8b. Leaves crenate or serrate:
- 12a. Hairs on stem and branches erect or spreading ...6. *L. lanuta*
- 12b. Hairs on stem and branches reflexed:
- 13a. Leaves membranous, never densely tomentose beneath; calyx hispid on the ribs but not hoary:
- 14a. Calyx ca 6 mm long ...13. *L. pilosa*
- 14b. Calyx 7-9 mm long ...2. *L. biflora*

13b. Leaves chartaceous, densely white or grey tomentose beneath; calyx hoary or hispid:

15a. Leaves obtuse at apex, rounded at base; petioles ca 4 mm long

...11. *L. montana*

15b. Leaves acute at apex, cuneate at base; petioles more than 1 cm long

...10. *L. mollissima*

1. *Leucas aspera* (Willd.) Link, Enum. Hort. Berol. Alt. 2: 113. 1822; Hook. f., Fl. Brit. India 4: 690. 1885. *Phlomis aspera* Willd., Enum. Pl. Hort. Berol. 2: 621. 1809. - *Bhodaki*.

Herbs, annual, erect or diffuse; stems 30-60 cm high, much branched, hispid or scabrid. Leaves linear or narrowly oblong-lanceolate, 3-8 x 0.5-1 cm, obtuse at apex, narrowed at base, entire or minutely crenate, more or less pubescent, shortly petiolate or sessile. Verticillasters terminal or axillary, very dense, many-flowered; bracts linear, ciliate, subspinulose, almost equalling the calyx. Calyx tubular, 8-12 mm long, curved, usually smooth and glabrous below, ribbed and scabrid or hispid above; teeth short, deltoid, spinulose, ciliate, upper one largest; mouth small, very oblique, produced on the upper side. Corolla white, ca 10 mm long. Nutlets ca 2.5 mm long, smooth, brown.

In fallow lands, wastelands, along streams, roadsides and as forest undergrowth. In almost all the districts. *Fl. & Fr.*: Aug. - April.

The plant is medicinal. Roots are used for asthma while the flowers for treating fever in children.

2. *Leucas biflora* (Vahl) R. Br., Prodr. 504. 1810; Hook. f., Fl. Brit. India 4: 683. 1885, *excl. syn. L. procumbens* Thwaites. *Phlomis biflora* Vahl, Symb. Bot. 3: 77. 1794. *Nepeta indica* Burm. f., Fl. Ind. 126. 1768. *non* L., 1753.

Herbs, procumbent, slender; branches up to 75 cm long from a woody rootstock, often ascending or climbing, glabrous or pubescent with deflexed hairs. Leaves ovate, elliptic or oblong, 1.5-5 x 0.5-2 cm, obtuse at apex, rounded at base, coarsely serrate or crenate, pubescent; petioles 0.6-1 cm long. Verticillasters 1-4-flowered, axillary; bracts setaceous, minute. Calyx campanulate, 7-9 mm long, ribbed, hispid outside, sparsely hairy inside except below the middle; teeth deltoid-subulate, subequal, ca 3 mm long.

ciliate. Corolla white; tube annulate inside. Nutlets *ca* 1.5 mm long, brown, truncate at apex, irregularly prominently tuberculate.

- 1a. Plants softly pubescent; calyx-teeth one-half to one-fourth the length of the tube ...2.1. var. *biflora*
 1b. Plants glabrous; calyx-teeth comparatively smaller, less than one-fourth the length of the tube ...2.2. var. *procumbens*

2.1. var. *biflora*

As forest undergrowth, along river bank, roadsides, cultivated fields and in wastelands. Balaghat, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Mandla, Rajnandgaon, Rewa, Sagar, Sidhi, Surguja. *Fl. & Fr.*: Oct. - March.

2.2. var. *procumbens* (Desf.) Gamble, *Fl. Madras* 2: 1151. 1924. *Leucas procumbens* Desf. in *Mem. Mus. Hist. Nat. Paris* 11: 7, t. 3, f. 2. 1824; Hook. *f.*, *Fl. Brit. India* 4: 683. 1885.

Indore, Sagar, Sidhi, Surguja. *Fl. & Fr.*: Sept. - Feb.

3. *Leucas cephalotes* (Koenig *ex* Roth) Spreng., *Syst. Veg.* 2: 743. 1825; Hook. *f.*, *Fl. Brit. India* 4: 689. 1885. *Phlomis cephalotes* Koenig *ex* Roth. *Nov. Pl. Sp.* 262. 1821. *Leucus capitata* Desf. in *Mem. Mus. Hist. Nat. Paris* 11: 8, t. 4. 1824. *Dhurpi sag.*

Herbs, annual, erect, stout, 0.3-1 m high, scaberulous or pubescent with spreading hairs. Leaves narrowly ovate or ovate-lanceolate, cuneate at base, crenate-serrate, softly pubescent, glandular-punctate beneath, shortly petiolate. Verticillasters usually terminal, densely many-flowered, globose, *ca* 3.5 cm across; bracts lanceolate, 1.5-2.5 cm long, acute, awned, rigidly ciliate, numerous, imbricating, involucrate, covering the floral heads. Calyx tubular, *ca* 2 cm long, curved, glabrous below, pubescent above; teeth short, subulate; mouth oblique, produced on the upper side. Corolla white, *ca* 2.5 cm long; lower lip slightly longer than the upper. Nutlets *ca* 3 mm long, brown, smooth.

Amidst grasses in forest clearings and in cultivated fields. Balaghat, Betul, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar,

Satna, Seoni, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Aug. April.

Flowers are used for the treatment of cold and cough while seed oil to relieve headache.

4. *Leucas clarkei* Hook. *f.*, *Fl. Brit. India* 4: 688. 1885; Mukherjee in *Rec. Bot. Surv. India* 14(1): 170. 1940.

Herbs, annual, slender, 5-50 cm high; branches ascending, sparsely and appressedly hairy with deflexed hairs. Leaves linear or linear-lanceolate, 3-6 x 0.3-0.8 cm, obtuse at apex, narrowed at base, entire, appressedly hispid above, scabrid, hirsute beneath, sessile or subsessile. Verticillasters terminal, subglobose; bracts as long as the calyx-tube, very slender, ciliate. Calyx *ca* 6 mm long, pubescent; teeth slender, uppermost 3 much longer, scabrid, acicular; mouth wide, slightly oblique, densely villous inside. Corolla white; upper lip short, club-shaped, villous with silky hairs; lower lip *ca* 10 mm long; tube included. Nutlets *ca* 2 mm long, rounded at apex, smooth.

On foot-hills, in cultivated fields, along roadsides, on sandy flats and among boulders. Balaghat, Bastar, Bilaspur, Chhatarpur, Durg, Mandla, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Satna, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Sept. March.

5. *Leucas hyssopifolia* Wallich *ex* Benth. in Wallich, *Pl. Asiat. Rar.* 1: 60. 1830; Hook. *f.*, *Fl. Brit. India* 4: 690. 1885. *Ghumi*.

Herbs, perennial, suffruticose, hispid; stems and branches many from woody rootstock. Leaves linear, 3-7 cm long, obtuse at apex, entire, usually recurved on margin, pubescent with stiff hairs, subsessile. Verticillasters small, terminal and axillary; bracts slender and subulate, spinulose, almost equalling the calyx. Calyx obconic, *ca* 6 mm long, glabrous; teeth erect, minute; mouth wide, truncate, glabrous inside. Corolla white; tube slender, scarcely longer than calyx, pubescent above. Nutlets *ca* 3 mm long, greyish brown, glandular-punctate, truncate at the top.

As forest undergrowth. Mandla (Maheshwari, 1963). *Fl. & Fr.*: May - Aug.

6. *Leucas lanata* Wallich *ex* Benth. in Wallich, *Pl. Asiat. Rar.* 1: 61. 1830; Hook. *f.*, *Fl. Brit. India* 4: 681. 1885. Fig. 68.

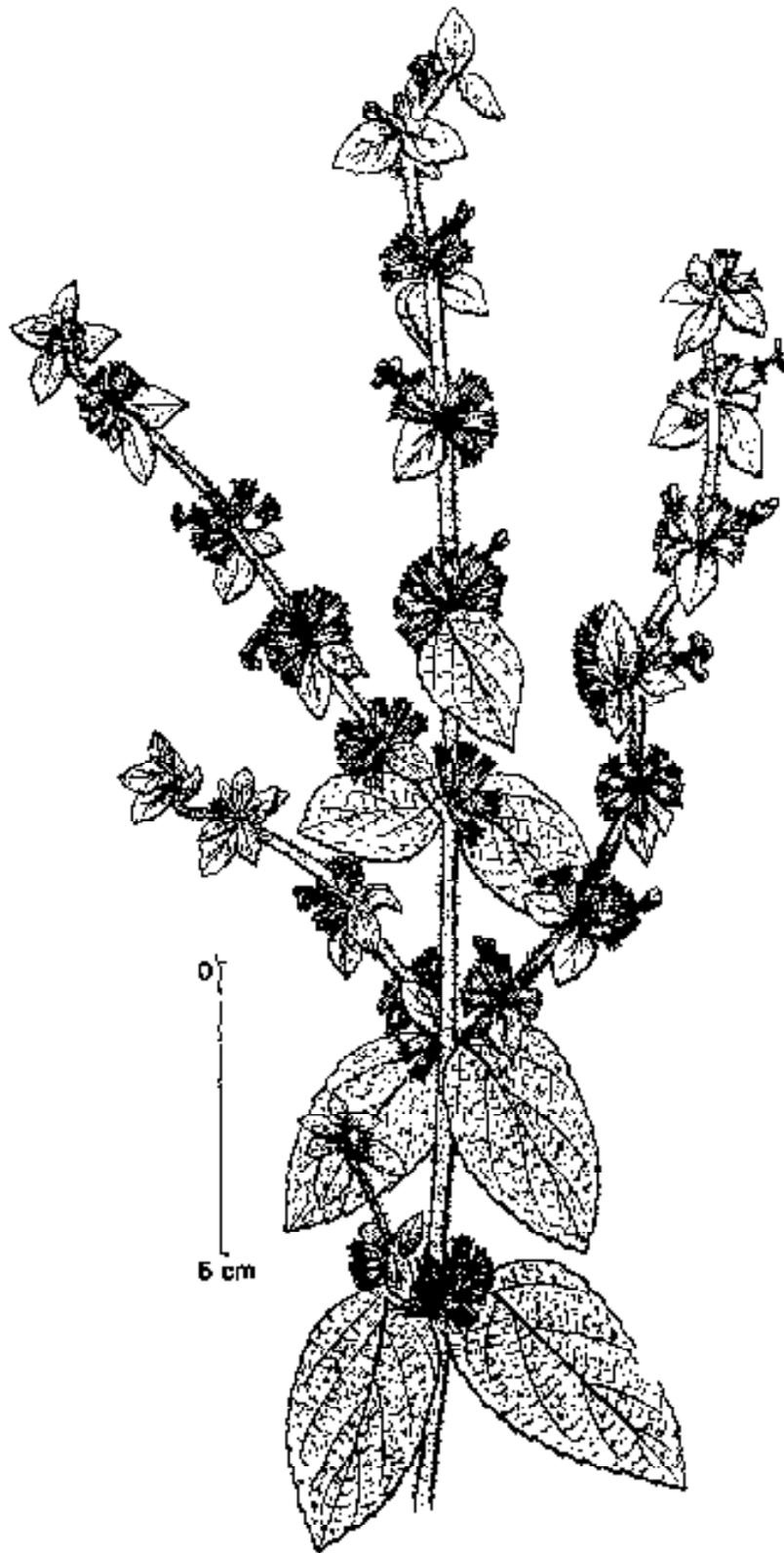


Fig. 68. *Leucas lanata* Wallich ex Benth.

Herbs, perennial, erect, 0.2-1 m high, much branched from a stout rootstock, softly woolly or subsilky with erect and spreading hairs. Leaves ovate, 2-6 x 1-3 cm, obtuse or acute at apex, rounded or cuneate at base, crenate-serrate, thick, softly tomentose or silky, subsessile below, gradually becoming sessile upwards. Verticillasters axillary, densely many-flowered; bracts setaceous, densely hairy, much shorter than calyx. Calyx tubular-campanulate, ca 8 mm long, straight, densely silky villous outside, pubescent inside in the upper part; teeth minute, alternately shorter, deltoid-subulate; mouth truncate. Corolla white; tube annulate inside. Nutlets oblong-ovoid, ca 1.5 mm long, obliquely truncate.

As forest undergrowth on hill slopes, near streams and along roadsides. Bastar, Chhindwara, Hoshangabad. *Fl. & Fr.*: Oct. - Dec.

The plant grows only at high elevations. The woolly and silky nature is more prominent at higher altitudes.

7. ***Leucas lavandulifolia*** Sm. in Rees, Cycl. 20. n. 2. 1812. *Phlomis linifolia* Roth, Nov. Pl. Sp. 260. 1821. *Leucas linifolia* (Roth) Spreng., Syst. Veg. 2: 743. 1825; Hook. f., Fl. Brit. India 4: 690. 1885.

Herbs, erect, slender, usually branched, 30-60 cm high; stems and branches 4-angled, finely appressed-puberulous. Leaves linear or linear-lanceolate, 5-8 x 0.3-1 cm, subacute at apex, tapering at base, entire or remotely crenate-serrate, finely puberulous; petioles usually very short or obsolete. Verticillasters axillary and terminal, leafy, always towards the apex of stems and branches. Flowers subsessile or shortly pedicellate; bracts narrowly linear, subspinescent, finely puberulous. Calyx ca 9 mm long, sparingly puberulous or glabrous; mouth pubescent inside, contracted, very oblique, rounded below, forming a large acute lobe above; tube curved. Corolla white, ca 12 mm long; upper lip oblong, white woolly; lower lip patent; mid lobe large, obovate, rounded; lateral lobes small; tube ca 7 mm long. Nutlets oblong, ca 2 mm long, dull pale brown, rounded.

On hill slopes and sandy river beds. Bastar, Indore, Raipur. *Fl. & Fr.*: Aug. - April.

8. ***Leucas longifolia*** Benth., Labiat. Gen. Spec. 744. 1835; Hook. f., Fl. Brit. India 4: 684. 1885.

Herbs, annual, erect, rigid, 20-50 cm high, branching in the upper part of stem, glabrous below, scaberulous or sparsely hairy above with erect or spreading hairs. Leaves narrowly linear, 3-6 cm long, obtuse at apex, narrowed at base, entire, puberulous, sessile. Verticillasters axillary, few-flowered; bracts minute, subulate, pubescent. Calyx *ca* 6 mm long, hispid; teeth 10, very small; mouth truncate, wide, villous inside. Corolla *ca* 16 mm long; upper lip very short; lower lip much longer and very wide, 3-lobed; tube slender, exserted, annulate inside. Nutlets *ca* 2.5 mm long, rounded at the top.

Rare. In wastelands. Indore, West Nimar. *Fl. & Fr.*: Aug. - Nov.

9. *Leucas martinicensis* (Jacq.) R. Br., *Prodr.* 504. 1810; Hook. *f.*, *Fl. Brit. India* 4: 688. 1885. *Clinopodium martinicense* Jacq., *Enum. Syst. Pl.* 25. 1760. *Phlomis martinicensis* (Jacq.) Sw., *Prodr.* 88. 1788.

Herbs, annual, stout, branched, 0.4-1.2 m high; stems and branches 4-angled and 4-grooved, hirsute. Leaves opposite, ovate, oblong or broadly lanceolate, 3-8 x 1.5-4 cm, obtuse at apex, cuneate at base, widely and deeply crenate; petioles 10-15 mm long, hirsute. Verticillasters numerous, axillary, distant, many-flowered, globose, 2-3 cm across; floral leaves decreasing upwards; bracts green, linear, 6-9 mm long, spinescent at their tips with slender awns. Calyx tubular, sigmoid, *ca* 10 mm long, longer in fruits, pubescent outside; teeth 10, lanceolate, ciliate, with spinescent tips, uppermost largest, *ca* 5 mm long; tube glabrous inside; mouth oblique. Corolla white, *ca* 10 mm long; upper lip erect, white, villous; lower lip spreading; lateral lobes oblong, rounded; mid lobe 2-fid. Nutlets obovoid-oblong, *ca* 2.5 mm long, dark brown, obliquely truncate at apex, shining.

In valley, open fields and as weed near habitations. Balaghat, Bilaspur, Chhindwara, Hoshangabad, Indore, Raigarh, Satna. *Fl. & Fr.*: Oct. - Dec.

10. *Leucas mollissima* Wallich *ex* Benth. in Wallich, *Pl. Asiat. Rar.* 1: 62. 1830; Hook. *f.*, *Fl. Brit. India* 4: 682. 1885.

Herbs, slender, 0.25-1 m high; branches straggling, pubescent or hoary-tomentose with appressed hairs. Leaves ovate or ovate-lanceolate, 2-8 x 1-4 cm, acute at apex, cuneate at base, serrate, somewhat strigosely villous above, white tomentose beneath; petioles up to 2 cm long. Verticillasters distant, many-flowered; bracts minute, linear, villous. Calyx tubular, 6-8 mm long, straight, softly silky villous or pubescent outside, pubescent inside

in the upper part; teeth minute, deltoid-subulate, subequal or alternately longer. Corolla white; tube annulate inside. Nutlets *ca* 2 mm long, brown, obliquely truncate at the top.

On hill slopes, bank of streams and also as forest undergrowth. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, Gwalior, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rewa, Sagar, Seoni, Sidhi, Surguja. *Fl. & Fr.*: July - May.

11. *Leucas montana* (Roth) Spreng., *Syst. Veg.* 2: 742. 1825; Hook. *f.*, *Fl. Brit. India* 4: 682. 1885. *Phlomis montana* Roth, *Nov. Pl. Sp.* 263. 1821. *Leucas hamiltoniana* Wallich *ex* Benth. in Wallich, *Pl. Asiat. Rar.* 1: 62. 1830.

Undershrubs; branches straggling with densely softly woolly hairs or tomentose with deflexed hairs. Leaves ovate or slightly orbicular, 2.5-5 x 1.5-3 cm, obtuse at apex, rounded at base, crenate, thick, silky above or often almost glabrescent; petioles *ca* 4 mm long. Verticillasters axillary, few or many-flowered; bracts minute, linear, densely villous. Calyx tubular-campanulate, 5-8 mm long, straight, subsessile, silky villous outside, finely pubescent inside in the upper half; teeth minute. Corolla white; tube annulate inside.

On hill slopes, in wastelands, among boulders and in mixed forests. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Seoni, Shahdol. *Fl. & Fr.*: Aug. - March.

12. *Leucas nutans* (Roth) Spreng., *Syst. Veg.* 2: 743. 1825; Hook. *f.*, *Fl. Brit. India* 4: 688. 1885. *Phlomis nutans* Roth, *Nov. Pl. Sp.* 263. 1821.

Herbs, annual, 10-12 cm high; branches often straggling, diffuse, laxly hairy. Leaves oblong or oblong-lanceolate, 1.5-5 x 0.5-1.5 cm, obtuse at apex, closely serrate or subserrate, pubescent on both the surfaces, usually with long hairs on the nerves beneath, shortly petiolate or often sessile. Verticillasters terminal or subterminal, many-flowered; bracts lanceolate, foliaceous, ciliate, almost equalling the calyx or shorter. Calyx 8-10 mm long, membranous, falcately decurved in the middle, strongly ribbed above, hispid outside and pubescent inside; teeth subequal, lanceolate, ciliate, longer than the hairs of the mouth; mouth oblique. Corolla white, *ca* 12 mm long; lower lip longer than the upper; tube slender, annulate near the base. Nutlets narrowly oblong-ellipsoid, *ca* 3 mm long, brown, smooth.

On hill slopes, amidst grasses and along roadsides. Chhatarpur, Gwalior, Panna, Sidhi. *Fl. & Fr.*: July - Nov.

13. *Leucas pilosa* Wallich ex Benth. in Wallich, *Pl. Asiat. Rar.* 1: 62. 1830; Hook. *f.*, *Fl. Brit. India* 4: 683. 1885.

Herbs, perennial; rootstock stout; branches long, slender, ascending, pubescent with appressed and deflexed hairs mixed with scattered, long spreading hairs. Leaves ovate, 2-5 x 1.5-3 cm, acuminate or acute at apex, rounded at base, coarsely serrate, membranous, sparsely hispid or glabrous; petioles 1-3 cm long, shorter upwards. Verticillasters axillary, few-flowered, many; bracts usually much shorter than the calyx, densely hispid. Calyx campanulate, ca 6 mm long, straight, densely hispid outside, glabrous inside; teeth short, acicular, alternately shorter. Corolla white, small; lips very short, subequal; tube exserted. Nutlets ca 1.5 mm long, truncate at the top, slightly covered with brownish down.

Rare. Along streams. Jabalpur. *Fl. & Fr.*: Nov. Feb.

14. *Leucas stricta* Heyne ex Benth. in Wallich, *Pl. Asiat. Rar.* 1: 61. 1830; Hook. *f.*, *Fl. Brit. India* 4: 688. 1885.

Herbs, annual, erect, slender, hispid hairy, 15-35 cm high; branches often diffuse. Leaves linear or linear-oblong, obtuse at apex, narrowed at base, usually entire, hispid, glandular beneath, sessile or subsessile. Verticillasters usually terminal and solitary on the branches or sometimes two in tiers with several leaves close to the inflorescence; bracts filiform, rigid, ciliate. Calyx ca 10 mm long; teeth sometimes as long as the tube, slender, ciliate; mouth oblique, densely villous inside; tube narrowly infundibuliform, erect, nearly straight, shortly and closely pubescent or somewhat glabrescent. Corolla white; lower lip large, obtuse, much longer than the upper lip; tube included. Nutlets ca 3 mm long, rounded at the top, brown, smooth.

In wastelands and cultivated fields, Hoshangabad, Indore. *Fl. & Fr.*: Aug. - Nov.

15. *Leucas urticaefolia* (Vahl) R. Br., *Prodr.* 504. 1810; Hook. *f.*, *Fl. Brit. India* 4: 680. 1885. *Phlomis urticaefolia* Vahl, *Symb. Bot.* 3: 76. 1794

Herbs, annual, erect, hairy, 0.15-1 m high; stems 4-angled. Leaves ovate or often lanceolate, 3-5 cm long, cuneate at base, coarsely serrate, softly pubescent or hoary or often glabrous; petioles 5-15 mm long. Verticillasters usually axillary, dense, many-flowered, globose; bracts almost equalling the calyx, ciliate. Calyx cylindrical, 8-12 mm long, membranous, reticulate, pubescent or villous outside, sparsely hairy inside; teeth minute, spinulose; mouth oblique, split above, produced on the anterior side. Corolla white; tube slender, not annulate. Nutlets ca 1.5 mm long, truncate and glandular at the top.

Rare. Along roadsides, Indore. *Fl. & Fr.*: Dec. - March.

16. *Leucas zeylanica* (L.) R. Br., Prodr. 504. 1810; Hook. f., *Fl. Brit. India* 4: 689. 1885. *Phlomis zeylanica* L., Sp. Pl. 586. 1753.

Herbs, annual, erect, 15-60 cm high; branches acutely 4-angled, diffuse, hispidulous. Leaves linear-lanceolate to lanceolate, 3-6 x 0.5-1.3 cm, subacute at apex, tapering at base, entire, scabrid above, densely hirtellous and glandular punctate beneath; petioles 1-4 mm long. Verticillasters 2-3, usually combined into a terminal head, occasionally axillary; floral leaves linear, subulate, 4-7 x 0.5-1 mm, long-ciliate. Calyx 7-8-toothed; mouth oblique, glabrous inside; tube up to 5 mm long, slightly curved, 10-11-nerved, hirtellous. Corolla white, up to 12 mm long; upper lip up to 4 mm long; lower lip broadly spatulate, up to 11 x 8 mm; tube 5-6 mm long, glabrous, annulate inside near the middle. Nutlets oblong-cuneate, ca 3 mm long, truncate at the top, 3-angled, black, shining, with a white boss at base.

Rare. Along roadsides and in wastelands. Hoshangabad. *Fl. & Fr.*: Oct. - Dec.

13. MENTHA L.

Herbs, perennial, erect or prostrate, aromatic; rootstock creeping. Leaves opposite, glandular punctate. Verticillasters axillary, many-flowered, in terminal, dense, cylindrical spikes; floral leaves linear. Flowers small; bracteoles small or absent. Calyx tubular or campanulate, 10-nerved; limb subequally 5-lobed or subbilabiate; throat glabrous or villous. Corolla tubular; limb 4-lobed, somewhat irregular; posterior lobe larger, entire or emarginate. Stamens 4, equal, erect, included or exserted; filaments glabrous; anthers 2-celled; cells divaricate. Disk symmetrical. Style exserted, 2-fid. Nutlets ovoid, smooth.

About 25 species; temperate regions of Old World; one in M.P.

Mentha spicata L., Sp. Pl. 576. 1753. - *Podina*, *Pudina*

Herbs, perennial, prostrate or creeping, aromatic. Leaves opposite, ovate, ovate-elliptic or elliptic-oblong, 1.5-2 x 0.5-1 cm, serrate, glabrous, sessile. Verticillasters arranged in interrupted, 5-7 cm long spikes. Flowers purplish.

Cultivated throughout the state as field crop. *Fl. & Fr.*: June - July.

The paste of leaves is used against heat stroke.

14. MICROMERIA Benth., *nom. cons.*

Herbs or undershrubs. Leaves small, entire or dentate. Verticillasters axillary, sometimes spicate or paniculate. Flowers small. Calyx 10-13-nerved, 5-toothed or bilabiate. Corolla bilabiate; upper lip erect, entire or notched; lower lip spreading, 3-lobed. Stamens 4, slightly exerted or included; anterior (lower) pair longer, ascending, incurved with diverging tips; anther cells distinct, parallel, diverging at length; connectives usually thickened. Disk equal or reduced to an articular gland. Style-lobes equal or upper very short, lower recurved, flattened. Nutlets elliptic-oblong.

About 70 species; Canaries and Mediterranean region to S.W. China; 2 in M.P.

- 1a. Leaves up to 6 mm long, margin thick; verticillasters 2-few-flowered; flowers 8-10 mm long ... 1. *M. biflora*
- 1b. Leaves 10-30 mm long, margin not thick; verticillasters many-flowered; flowers 3-4 mm long ... 2. *M. capitellata*

1. *Micromeria biflora* (Buch.-Ham. ex D. Don) Benth., *Labiatae*, Gen. Spec. 378. 1834; Hook. f., *Fl. Brit. India* 4: 650. 1885. *Thymus biflorus* Buch.-Ham. ex D. Don, *Prodr. Fl. Nepal*, 112. 1825.

Herbs, perennial, up to 40 cm high; branches tufted from a stout, woody rootstock, glabrous or hairy. Leaves ovate or oblong, up to 6 mm long, subacute, entire, thickened, revolute, subsessile. Verticillasters axillary,

2-4-flowered or often flowers solitary, pedicellate. Calyx hirsute; teeth setaceous, subulate; tube strongly nerved. Corolla white or pink; upper lip notched or 2-lobed; lower lip spreading, 3-lobed.

On open meadows, along channels, on hill slopes and as forest undergrowth. Bastar, Bilaspur, Hoshangabad, Raigarh, Sidhi, Surguja. *Fl. & Fr.*: Nov. - April.

2. *Micromeria capitellata* Benth. in DC., Prodr. 12: 218. 1848; Hook. f., Fl. Brit. India 4: 649. 1885.

Herbs, strongly aromatic, slender; rootstock woody; stems erect, 4-angled, pubescent, sometimes with purple tinge. 30-70 cm high. Leaves ovate or ovate-oblong, 10-30 mm long, obtuse at apex, rounded or cuneate at base, entire or crenate-serrate, pubescent above and on the nerves beneath, subsessile. Verticillasters in the axils of floral leaves, distant, forming a spicate raceme; lower verticillasters pedunculate, upper sessile; floral leaves smaller upwards; bracteoles linear-lanceolate, hairy. Calyx small, villous; teeth as long as the tube, erect-subulate; throat with ring of hairs. Corolla violet, 3-4 mm long, hairy outside; tube as long as the calyx or little longer. Nutlets minute, elliptic-oblong, brown, smooth.

On hill slopes and bank of streams. Balaghat, Bilaspur, Raigarh, Surguja. *Fl. & Fr.*: March - April.

15. NEPETA L.

Herbs, erect or ascending. Leaves opposite, sessile or petiolate. Flowers in continuous, terminal spikes, heads or in distinct clusters, either axillary or forming interrupted spikes or panicles. Calyx tubular, 15-nerved; teeth 5, equal or not. Corolla bilabiate; upper lip erect, concave, emarginate or 2-fid; lower lip 3-fid; mid lobe largest, entire or crenulate, narrow at base; lateral lobes small, usually reflexed; tube not annulate inside, inflated at the throat. Stamens 4, ascending under the upper lip, rarely exserted, posterior (upper) pair longer; anther cells diverging. Disk entire or faintly 4-lobed, produced in front or not. Style-lobes subulate. Nutlets 4, obovoid, smooth or granulate.

About 250 species; temperate Eurasia, North Africa and tropical mountains; 2 in M.P.

- 1a. Verticillasters few-flowered, in loose panicles;
corolla lilac or rosy ...1. *N. graciliflora*
- 1b. Verticillasters densely many-flowered, in
slender panicles or interrupted spikes;
corolla blue-purple or white ...2. *N. hindostana*

1. *Nepeta graciliflora* Benth. in Wallich, Pl. Asiat. Rar. 1: 65. 1830; Hook. f., Fl. Brit. India 4: 663. 1885.

Herbs, erect or ascending, slender; stems long, branching from the base, pubescent or nearly glabrous. Leaves deltoid-ovate or oblong-ovate, 1-7 cm long, acute at apex, cordate or truncate at base, coarsely serrate or crenate, pubescent or glabrescent; petioles as long as the lamina. Verticillasters axillary and terminal, few-flowered, forming loose, drooping panicles, long pedunculate; bracts setaceous, minute, hairy. Calyx ca 4 mm long, pubescent or glabrous; teeth aristate, shorter than tube; upper lip slightly longer than lower; mouth slightly oblique. Corolla lilac or rosy, 6-8 mm long. Nutlets ca 1 mm long, chocolate-coloured, granulate.

In moist habitat along the bank of channels. Hoshangabad, Mandla, Rewa, Sidhi, Surguja. Fl. & Fr.: Jan. - March.

2. *Nepeta hindostana* (Heyne ex Roth) Haines, Bot. Bihar Orissa 4: 744. 1922. *Glechoma hindostana* Heyne ex Roth, Nov. Pl. Sp. 258. 1821. *Nepeta ruderalis* Buch.-Ham. ex Benth. in Wallich, Pl. Asiat. Rar. 1: 64. 1830; Hook. f., Fl. Brit. India 4: 661. 1885.

Herbs, annual, erect or ascending, 10-60 cm high; stems robust or slender, obtusely angled, grooved, branching from the base or not, finely pubescent or hoary. Leaves broadly ovate or orbicular, 1-4 cm long, obtuse at apex, cordate at base, crenate, pubescent; petioles 1-2 cm long. Verticillasters dense, 1-1.5 cm across, usually in long pedunculate, slender panicle or interrupted spike; bracts setaceous. Calyx ca 4 mm long, villous, oblique at the mouth; 3 upper teeth deltoid, aristate; 2 lower filiform, smaller. Corolla blue-purple or white, ca 6 mm long; upper lip flat, oblong, 2-fid, hairy; lower lip with 2-fid lateral lobes and a large, emarginate and slightly obtusely crenate mid lobe; tube slightly exserted. Stamens slightly exceeding the upper lip of corolla. Nutlets broadly oblong, ca 1 mm long, brown with white dots.

On river bank and roadsides. Bilaspur, Chhatarpur, Hoshangabad, Jabalpur, Mandla, Rajnandgaon, Rewa, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Jan. - April.

16. OCIMUM L.

Herbs or undershrubs, strongly aromatic; stems often much branched. Leaves opposite, petiolate. Verticillasters 6-10-flowered, in simple or branched racemes. Flowers small; pedicels recurved under the calyx; bracts minute, caducous. Calyx ovoid or campanulate (deflexed in fruit), 10-nerved, bilabiate; upper lip large, broad, flat (strongly reflexed in fruit), often decurrent on the tube; lower lip usually with 4, narrow, pointed teeth. Corolla campanulate, not annulate inside, bilabiate; upper lip truncate, subequally 4-fid; lower lip longer, declinate, flat, entire. Stamens 4, declinate, paired, exserted; filaments free or the lower pair connate below, naked or the upper pair toothed or hairy below; anther cells confluent. Disk entire or 2-4-lobed, equal-sided. Stigma 2-fid; branches subrugose. Nutlets obovoid to subglobose, often finely warty.

About 150 species; tropical and warm temperate regions especially Africa; 5 in M.P.

1a. Calyx pubescent or villous inside:

2a. Fruiting calyx *ca* 6 mm long; corolla
10-12 mm long ...1. *O. basilicum*

2b. Fruiting calyx *ca* 3 mm long;
corolla *ca* 6 mm long:

3a. Leave glabrous ...2. *O. canum*

3b. Leaves pubescent ...4. *O. kilimandschuricum*

1b. Calyx glabrous inside:

4a. Pedicels as long as calyx ...5. *O. tenuiflorum*

4b. Pedicels smaller than calyx ...3. *O. gratissimum*

1. *Ocimum basilicum* L., Sp. Pl. 597. 1753; Hook. *f.*, Fl. Brit. India 4: 608. 1885. *O. americanum* L., Cent. Pl. 1: 15. 1755. *O. thyrsoiflorum* L., Mant. Pl. 84. 1767. *O. basilicum* L. var. *thyrsoiflorum* (L.) Benth. in Wallich, Pl. Asiat. Rar. 2: 13. 1830. *Babui tulsi*, *Ban tulsi*, *Marmari*, *Ram tulsi*.

Herbs, erect, much branched, 0.5-1 m high. Leaves ovate-lanceolate, 3-5 x 1-2 cm, acuminate at apex, cuneate or tapering at base, entire or dentate, glabrous; petioles 1-2 cm long, ciliate. Verticillasters in simple or much branched, often thyrsoïd racemes. Calyx 2-4 mm long, ca 6 mm in fruit, villous inside; upper calyx-lobe becoming horizontal in fruit; 2 middle teeth of the lower lip awned, longer than the upper lobe; lateral teeth shorter than the lower ones. Corolla white, 10-12 mm long. Nutlets pitted.

In wastelands, forest floor and nearby habitations. Balaghat, Betul, Bilaspur, Chhatarpur, Durg, Gwalior, Indore, Jabalpur, Rewa, Satna, Seoni, Sidhi, Tikamgarh. *Fl. & Fr.*: July - April.

The plant is used for the treatment of skin and eye diseases.

2. *Ocimum canum* Sims, Bot. Mag. 51. t. 2452. 1824; Hook. f., Fl. Brit. India 4: 607. 1885. *O. americanum auct. plur. non L.*, 1755. *Ban talsa*, *Ban talsi*.

Herbs, erect, much branched, 25-60 cm high; stems somewhat 4-angled, striate. Leaves elliptic-lanceolate, 2-3.5 cm long, narrowed at both ends, entire or faintly dentate, almost glabrous; petioles 1-2.5 cm long. Verticillasters densely flowered, in 7-20 cm long, spiciform racemes. Flowers subsessile; pedicels short, erect, often closely appressed to the rachis; bracts awned, ciliate with long, white hairs, smaller than the calyx. Calyx ca 3 mm long, villous inside, slightly pubescent outside; upper calyx-tooth broad and rounded, awned, ciliate; other 4 teeth lanceolate, subulate. Corolla white, 5-6 mm long. Nutlets narrowly ellipsoid, black, punctulate.

In wastelands, forest floor and nearby habitations. Bastar, Chhatarpur, Indore, Mandla, Narsimhapur, Raipur, Rajnandgaon, Rewa, Satna, Seoni. *Fl. & Fr.*: Aug. - March.

The leaves are used for the treatment of cold and cough.

3. *Ocimum gratissimum* L., Sp. Pl. 1197. 1753; Hook. f., Fl. Brit. India 4: 608. 1885.

Shrubs, perennial, up to 2.5 m high. Leaves ovate, 2.5-10 x 3-7 cm, acute at apex, cuneate at base, coarsely crenate-serrate; petioles as long as the lamina. Verticillasters moderately close, in short, simple or branched,

woolly racemes; bracts sessile, longer than calyx. Calyx ca 2.5 mm long, twice enlarged in fruit, pubescent; upper calyx-tooth rounded, longer than the lower ones, curved upwards in fruit closing the mouth of the calyx. Corolla ca 5 mm long, pubescent outside; upper lip with 4 teeth; lower lip longer. Nutlets subglobose, brown, with a glandular depression.

In wastelands and along roadsides. Balaghat, Bastar, Damoh, Dhar, Indore, Jabalpur, Raipur, Seoni, Surguja. *Fl. & Fr.*: Sept. March.

The tribals of Bastar prepare cold drinks from the plant.

4. *Ocimum kilimandscharicum* Guerke in Engl., Pflanzenw. Ost-Afrikas C. 349. 1895. *Kapur tulsi*.

Herbs, 50-80 cm high; branches pubescent. Leaves ovate or oblong, 2.5-4 x 0.7-1 cm, entire, pubescent, petiolate. Verticillasters in 8-12 cm long racemes. Calyx pubescent. Corolla white or light purple, 6-8 mm long. Nutlets ovoid, black to brown.

Indore. *Fl. & Fr.*: Aug. - Dec.

The plants possess insecticidal and mosquito repellent properties. The leaves and flowers yield camphor used in cosmetics and medicines.

5. *Ocimum tenuiflorum* L., Sp. Pl. 597. 1753; Keng in Steenis, Fl. Malesiana ser. 1. 8: 378. 1978. *O. sanctum* L., Mant. Pl. 85. 1767; Hook. f., Fl. Brit. India 4: 609. 1885. *O. inodorum* Burm. f., Fl. Ind. 130. 1768. - *Tulsa, Tulsi*.

Herbs, perennial, erect, softly hairy, much branched, 0.3-1 m high; stems and branches purplish or green, woody below on maturity. Leaves elliptic-oblong, 2-6 cm long, acute or obtuse at apex, entire or serrate, pubescent; petioles 1-2.5 cm long. Verticillasters close, in 10-20 cm long racemes; pedicels as long as fruiting calyx, slender, pubescent. Calyx broadly campanulate, slightly enlarged in fruit; uppermost calyx-tooth broadly obovate, much reflexed and shortly apiculate. Corolla purplish, ca 5 mm long; upper lip pubescent on the back. Nutlets subglobose or broadly ellipsoid, slightly compressed, pale brown or reddish, nearly smooth, with small black markings.

In wastelands and under cultivation throughout the state. Bastar, Chhatarpur, Damoh, Indore, Panna, Raigarh, Raipur, Rewa, Sidhi, Tikamgarh. *Fl. & Fr.*: Almost throughout the year.

The plant is worshipped. Decoction of leaves is given for the treatment of common cold and cough and skin diseases.

17. ORTHOSIPHON Benth.

Herbs or undershrubs. Leaves opposite. Verticillasters of 6 or less flowers, usually in terminal, simple racemes; bracts usually small and reflexed, rarely large and coloured. Calyx ovoid, campanulate or tubular, deflexed in fruit, 5-toothed: upper tooth very broad, ovate, membranous, recurved with margins decurrent on the tube; 4 lower teeth subulate or awned, slightly connate or not. Corolla bilabiate; upper lip 3-4-fid; lower lip declinate, entire, concave; tube usually longer than calyx, often slender, straight or incurved. Stamens 4, declinate, usually exerted; filaments free, without any basal appendage; anther cells confluent. Disk usually gibbose. Style slender; stigma minute, capitate or clavate, entire or slightly notched. Nutlets 4, dry, ovoid or orbicular, usually smooth; basal scar small.

About 40 species; tropical regions of Old World; 3 in M.P.

- 1a. Corolla-tube as long as the calyx ...1. *O. pallidus*
 1b. Corolla-tube much longer than the calyx:
 2a. Leaves cuneate at base, coarsely
 dentate, sessile or subsessile ...2. *O. rubicundus*
 2b. Leaves truncate at base, entire
 or serrate, petiolate ...3. *O. thymiflorus*

1. *Orthosiphon pallidus* Royle ex Benth. in Hook., Bot. Misc. 3: 370. 1833 & Labiat. Gen. Spec. 708. 1835; Hook. f., Fl. Brit. India 4: 613. 1885.

Herbs, perennial, diffusely branched, scarcely woody, 10-40 cm high; branches numerous from the woody rootstock, 4-angled, glabrous. Leaves ovate, 2-8 x 1-4 cm, obtuse or often acute at apex, shortly cuneate at base, coarsely dentate or crenate, usually entire at base, glabrous, gland-dotted, petiolate. Verticillasters distant, 6-flowered, in short racemes; pedicels as long as the flowering calyx, pubescent. Calyx ca 3 mm long; 2 lowest teeth

with long, upcurved awns; throat naked. Corolla white or pale lilac; upper lip shorter than the suborbiculate, concave lower lip; tube as long as calyx. Nutlets subglobose, compressed, yellowish brown, nearly smooth.

In wastelands, open meadows and among gravels and grasses. Balaghat, Betul, Bilaspur, Damoh, Indore, Jabalpur, Mandla, Morcha, Raipur, Satna, Shivpuri, Sidhi. *Fl. & Fr.*: July - Nov.

Leaves are used to treat urinary diseases.

2. *Orthosiphon rubicundus* (D. Don) Benth. in Wallich, Pl. Asiat. Rar. 2: 141. 1831; Hook. f., Fl. Brit. India 4: 614. 1885. *Plectranthus rubicundus* D. Don, Prodr. Fl. Nepal. 116. 1825, "*rubicunda*"

Herbs, perennial, erect, glabrous or pubescent, 15-40 cm high; rootstock stout, woody; roots tuberous. Leaves ovate or ovate-lanceolate, 3-16 x 1-6 cm, acute at apex, cuneate at base, coarsely dentate, sessile or subsessile. Verticillasters distant, in long, slender racemes; bracts minute. Calyx 4-6 mm long; throat naked; lower teeth subulate. Corolla white or pinkish, twice as long as the calyx or less, pubescent. Nutlets suborbicular, compressed, punctulate, nearly smooth.

On hill slopes, in sal forests and along roadsides. Balaghat, Bilaspur, Hoshangabad, Raipur, Seoni, Sidhi. *Fl. & Fr.*: April - Aug.

Powdered roots are used to treat wounds of catties.

3. *Orthosiphon thymiflorus* (Roth) V.D. Sleerson in Reinwardtia 5: 42. 1959. *Ocimum thymiflorum* Roth, Nov. Pl. Sp. 269. 1821. *Orthosiphon glabratus* Benth. in Wallich, Pl. Asiat. Rar. 2: 14. 1830. *O. tomentosus* Benth. in Wallich, Pl. Asiat. Rar. 2: 14. 1830; Hook. f., Fl. Brit. India 4: 613. 1885, *incl. vars. except var. rubiginosa* C.B. Clarke ex Hook. f., Fl. Brit. India 4: 614. 1885.

Herbs, erect, glabrous, ca 30 cm high. Leaves broadly ovate, 3-8 cm long, acute at apex, truncate at base, entire or serrate, glabrous. Verticillasters 5-6-flowered, in terminal racemes; bracts ovate. Corolla white; upper lip suborbicular; lower lip broad. Nutlets subglobose or ellipsoid, compressed, brown, minutely tuberculate, enclosed in persistent calyx.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Aug. - Oct.

18. PLECTRANTHUS L'Herit., *nom. cons.*

Herbs or undershrubs. Leaves usually opposite, petiolate, subsessile or sessile. Flowers in cymes or racemes, usually in spreading panicles, rarely simple. Calyx equally or subequally 5-toothed or distinctly bilabiate; upper lip 3-toothed and lower lip 2-toothed or upper lip entire and lower lip 4-toothed. Corolla bilabiate; upper lip usually broad, 2-4-fid, recurved; lower lip entire, boat-shaped, usually narrow, stipitate, much longer than upper lip; tube exerted, straight or decurved, equal or gibbose or often obtusely spurred at base. Stamens 4, didynamous, declinate; filaments free, not toothed, usually glabrous; anther cells usually confluent. Disk produced in front. Ovary 4-partite; style slender, subequally 2-fid. Nutlets 4, dry, orbicular, ovoid or oblong, smooth, granulate or punctate.

About 300 species; tropical and subtropical regions of Old World; 4 in M.P.

- 1a. Calyx bilabiate; fruiting calyx ca 10 mm long ...2. *P. mollis*
 1b. Calyx subequally 5-toothed or very shortly bilabiate;
 fruiting calyx less than 4 mm long:
 2a. Corolla pale violet ...1. *P. japonicus*
 2b. Corolla white with pink or purple spots:
 3a. Leaves ovate or elliptic;
 fruiting calyx decurved ...3. *P. rugosus*
 3b. Leaves lanceolate; fruiting calyx erect ...4. *P. ternifolius*

1. *Plectranthus japonicus* (Burm. f.) Koidz. in Bot. Mag. Tokyo 43: 386. 1929; Santapau & Wagh in Bull. Bot. Surv. India 5: 107. 1964. *Scutellaria japonica* Burm. f., Fl. Ind. 130. 1768. *Plectranthus coetsa* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 117. 1825; Hook. f., Fl. Brit. India 4: 619. 1885. *P. menthoides* Benth. in Wallich, Pl. Asiat. Rar. 2: 17. 1830; Hook. f., Fl. Brit. India 4: 620. 1885. **Fig. 69.**

Undershrubs, erect, strongly aromatic, usually much branched, pubescent, 1-2.5 m high. Leaves ovate, 3-10 x 1.5-4.5 cm, cuneate at base, serrate, pubescent, often hoary beneath; petioles about one fourth of the length of leaves, slightly winged. Flowers in cymes arranged in axillary and terminal panicles; pedicels slender, deflexed, pubescent. Calyx ca 2 mm long in flower, slightly enlarged in fruit, hoary pubescent, 10-nerved;



Fig. 69. *Plectranthus japonicus* (Burm. f.) Koidz.

lips indistinct, 5-toothed; teeth subequal, acute; tube cylindrical, curved above the middle. Corolla pale violet, ca 5 mm long, pubescent outside; upper lip very short, erect, broad with shallow lobes; tube deflexed, much shorter than lower lip. Nutlets oblong or subglobose.

Rare. In forest clearings and embankments. Raigarh, Surguja. *Fl. & Fr.*: Oct. - Dec.

2. *Plectranthus mollis* (Aiton) Spreng., Syst. Veg. 2: 690. 1825. *Ocimum molle* Aiton, Hortus Kew. 2: 322. 1789. *Plectranthus incanus* Link, Enum. Hort. Berol. ait. 2: 120. 1822; Hook. f., Fl. Brit. India 4: 621. 1885.

Herbs, erect, robust, 0.4-1 m high; stems pubescent, fleshy below. Leaves ovate-cordate, 3-11 x 2-6 cm, acute or acuminate at apex, crenate; petioles 3-10 cm long. Flowers in lax cymes arranged in slender, 10-25 cm long racemes, paniculately branched below; pedicels 3-4 mm long in flower, 6-8 mm long in fruit; bracts small, ovate, cuneate. Calyx broadly campanulate, 10-12 mm long in fruit, erect, bilabiate; upper lip short, rounded, entire, reflexed; lower lip with 4, acutely pointed teeth, longer than the upper lip, middle teeth longer than the lateral ones. Corolla pale lilac or light blue, 10-12 mm long; lower lip short, hemispherical, boat-shaped; tube slightly recurved, not gibbose at base, white pubescent, longer than lower lip. Nutlets subglobose, ca 2 mm across, smooth, pale brown, dotted with dark spots.

Along roadsides, channels, in forest clearings and as undergrowth in mixed forests. Balaghat, Bilaspur, Hoshangabad, Indore, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni, Sidhi, Surguja. *Fl. & Fr.*: Aug. - March.

3. *Plectranthus rugosus* Benth. in Wallich, Pl. Asiat. Rar. 2: 17. 1830; Hook. f., Fl. Brit. India 4: 620. 1885. Fig. 70.

Undershrubs, erect, 1-1.5 m high; branches slender, hoary with stellate hairs. Leaves ovate or elliptic, 2-4 x 1-2 cm, obtuse at apex, subcordate at base, crenate, slightly thick, coriaceous, rugose, finely reticulate above, densely white tomentose beneath, shortly petiolate. Flowers in axillary, lax-flowered cymes; cymes paniced in leafy racemes; peduncles and pedicels slender. Calyx 4-5 mm long in fruit, decurved, pubescent, subequally 5-toothed or very shortly bilabiate; teeth subequal, acute or obtuse. Corolla white with pink or purple spots, ca 4 mm long; lips large; lower longer; tube very short, declinate or abruptly decurved, usually gibbose at base. Nutlets oblong.

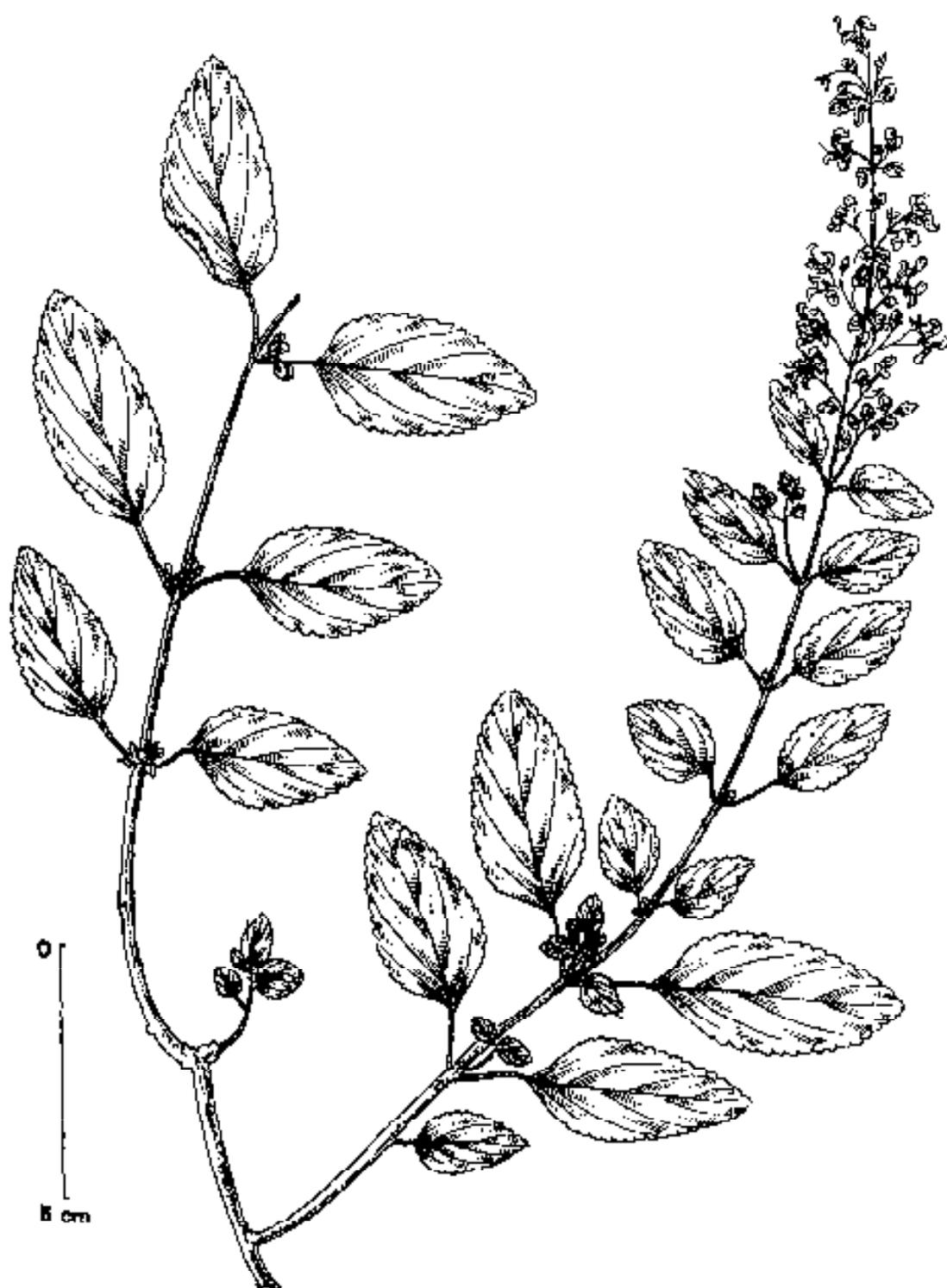


Fig. 70. *Plectranthus rugosus* Benth.

Rare. On hill slopes. Hoshangabad. *Fl. & Fr.*: Aug. - Nov.

4. ***Plectranthus ternifolius*** D. Don, Prodr. Fl. Nepal. 117. 1825; Hook. *f.*, Fl. Brit. India 4: 621. 1885.

Undershrubs; branches densely white tomentose. Leaves opposite or ternate, lanceolate, acuminate at apex, acute at base, serrate, hairy above, white tomentose beneath, subsessile. Flowers in erect, villous cymes arranged in racemes forming terminal panicle. Calyx campanulate, tomentose; teeth subequal. Corolla white with pink spots; tube longer than calyx.

Bhopal (Oommachan, 1977), Jabalpur (Oommachan and Shrivastava, 1996). *Fl.*: Nov. - Jan.

19. POGOSTEMON Desf.

Herbs or undershrubs, annual or perennial. Leaves opposite or 3-12 in a whorl, entire or serrate. Verticillasters in axillary or terminal spikes, occasionally subcapitate, more often paniculate or racemose; flowers small; floral leaves ovate or linear. Calyx tubular or ovoid-campanulate, shortly 4-5-lobed; throat glabrous. Corolla tubular; limb 4-lobed; tube included or exserted. Stamens 4, exserted, declinate; filaments usually bearded at middle; anthers 2-celled; cells confluent. Disk subentire or unequal. Style 2-fid. Nutlets ovoid or oblong, smooth or granulate.

About 71 species; Indo-Malesia: 8 in M.P.

Notes: Panigrahi (Bull. Brit. Mus. Nat. Hist. Bot. Ser. 10(1): 1-89, 1982) has reduced *Dysophylla* Bl. and *Eusteralis* Rafin. as congeneric synonyms of *Pogostemon* Desf.

1a. Stems and leaves densely hirsute or tomentose:

2a. Leaves revolute on margin ...2. *P. cruciata*

2b. Leaves flat on margin ...7. *P. quadrifolius*

1b. Stems and leaves glabrous or pubescent:

3a. Leaves whorled:

4a. Calyx glabrous ...3. *P. linearis*

4b. Calyx densely villous ...8. *P. stellatus*

3b. Leaves opposite:

5a. Bracts ovate, imbricating and more or less concealing the calyx:

6a. Leaves more or less coarsely incised; flower-clusters rounded

...4. *P. paniculatus*

6b. Leaves more or less regularly serrate; flower-clusters elongated:

7a. Stems and leaves hoary puberulous below

...1. *P. benghalense*

7b. Stems and leaves nearly glabrous

...5. *P. pubescens*

5b. Bracts neither imbricating nor concealing the calyx

...6. *P. purpurascens*

1. *Pogostemon benghalense* (Burm. f.) Kuntze, Revis. Gen. Pl. 2: 529. 1891. *Origanum benghalense* Burm. f., Fl. Ind. 128. t. 38. f. 3. 1768. *Pogostemon plectranthoides* Desf. in Ann. Mus. Nat. Hist. Paris 2: 155. t. 6. 1803; Hook. f., Fl. Brit. India 4: 632. 1885.

Bushy shrubs, aromatic, 1-2 m high; branches often dark purple; young parts hoary pubescent or villous. Leaves opposite, ovate, 5-15 x 4-8 cm, acute at apex, doubly serrate, glabrous or pubescent, sometimes velvety beneath. Verticillasters close, many-flowered, in axillary or terminal, stout, villous or hoary, paniculate spikes; bracts ovate, ca 8 mm long, acute, softly pubescent, imbricating, each bract subtending a fascicle of sessile flowers. Calyx often with purple tinge in the upper part, ca 5 mm long; teeth lanceolate; tube slender, subcylindrical. Corolla pink; tube slender. Nutlets 4, broadly ellipsoid, smooth, brownish.

On hill slopes and as forest undergrowth. Bastar, Betul, Bilaspur, Chhatarpur, Chhindwara, Damoh, Hoshangabad, Jabalpur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Seoni, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Nov. - March.

2. *Pogostemon cruciata* (Benth.) Kuntze, Revis. Gen. Pl. 2: 530. 1891; Panigrahi in J. Orissa Bot. Soc. 6(1): 51. 1984. *Dysophylla cruciata* Benth. in Wallich, Pl. Asiat. Rar. 1: 30. 1830; Hook. f., Fl. Brit. India 4: 639. 1885. *Eusteralis cruciata* (Benth.) Panigrahi in Phytologia 32(6): 478. 1976.

Fig. 71.

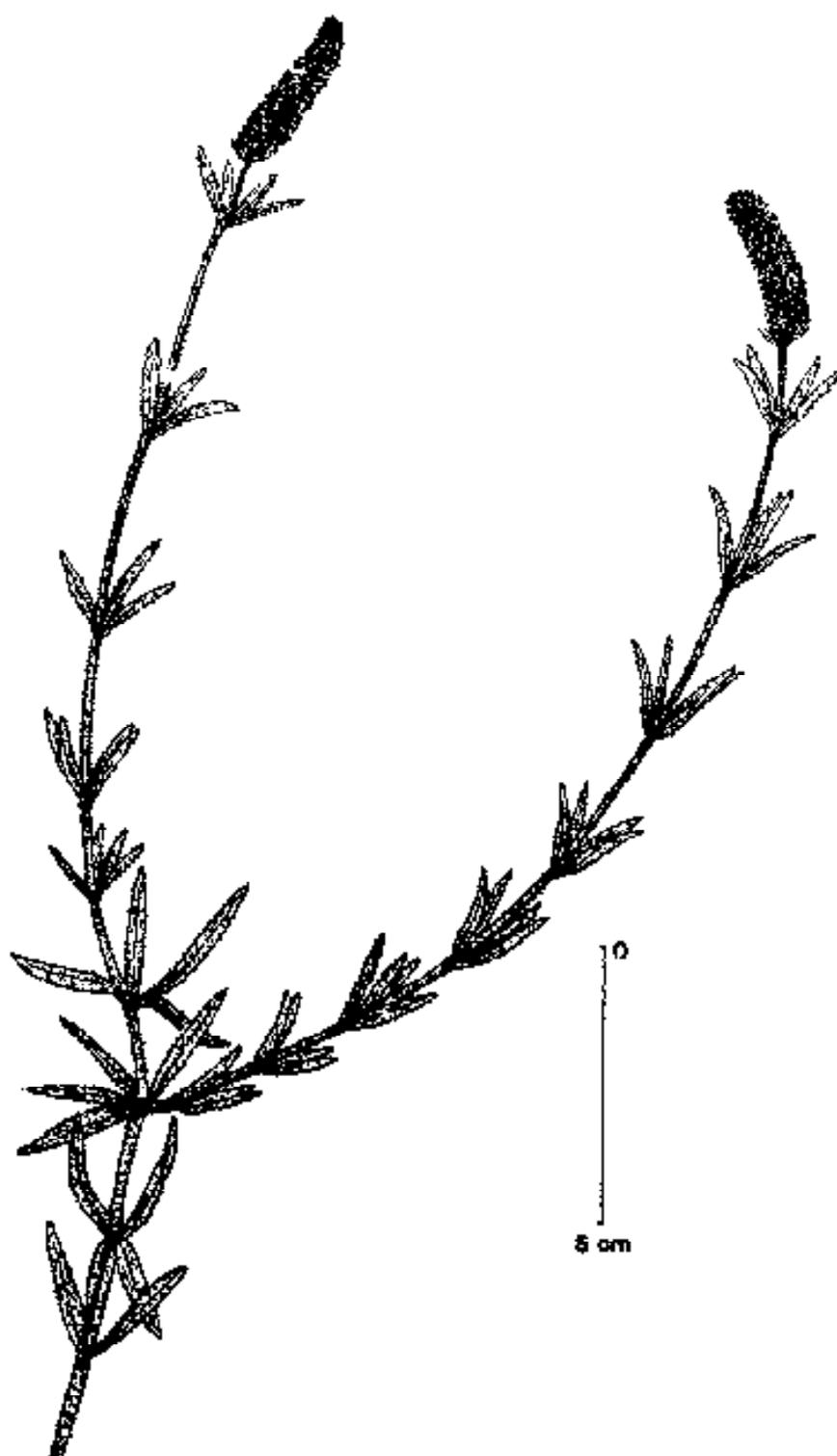


Fig. 71. *Pogostemon cruciata* (Benth.) Kuntze

Herbs, stout, 25-60 cm high; stems and branches densely hirsute. Leaves usually 4 in a whorl or 3 in the upper portion, erect, linear, 2-2.5 cm long, obtuse at apex, revolute, densely hirsute, sessile. Verticillasters confluent in 2.5-5 cm long, villous spikes. Calyx minutely villous. Corolla lilac or pale purple; lobes glabrous; tube scarcely exserted. Nutlets minute, elliptic-oblong, black, smooth.

In moist soil near streams, Raigarh, Sidhi. *Fl. & Fr.*: Oct. - March.

3. *Pogostemon linearis* (Benth.) Kuntze, Revis. Gen. Pl. 2: 530. 1891; Panigrahi in J. Orissa Bot. Soc. 6(1): 53. 1984. *Dysophylla linearis* Benth. in DC., Prodr. 12: 157. 1848; Hook. f., Fl. Brit. India 4: 639. 1885. *Eusteralis linearis* (Benth.) Panigrahi in Phytologia 32(6): 476. 1976.

Herbs, annual, erect, sparsely hairy or glabrous, 0.5-1 m high. Leaves linear-lanceolate, 3-7 cm long, obtuse at apex, revolute, sparingly dentate, glabrous. Verticillasters in 6-10 x 0.5-1.5 cm spikes; bracts oblong-lanceolate, more or less equalling the calyx. Calyx glabrous; teeth erect in fruits. Corolla ca 4 mm long; tube exserted. Nutlets small, elliptic-oblong.

Rare. In moist situations or aquatic conditions. Morena. *Fl. & Fr.*: Oct. - Dec.

4. *Pogostemon paniculatus* (Willd.) Benth. in Wallich, Pl. Asiat. Rar. 1: 30. 1830; Hook. f., Fl. Brit. India 4: 631. 1885. *Elsholtzia paniculata* Willd., Sp. Pl. 3: 59. 1800.

Undershrubs, erect, villous, 1-2 m high. Leaves usually in unequal pairs, ovate, 7-11 x 5-8 cm, acuminate at apex, cuneate at base, irregularly inciso-serrate, membranous, pubescent; petioles 1-3 cm long. Verticillasters in axillary and terminal, 5-10 cm long, slender, laxly paniculate spikes; cluster of flowers somewhat rounded; bracts imbricating, membranous, pubescent, ciliate, about as long as the calyx. Calyx narrowly tubular, ca 5 mm long, pubescent; teeth lanceolate, ciliate. Corolla white, as long as the calyx. Nutlets minute, broadly ovoid, brownish black, smooth, shining.

Rare. On hill slopes and moist forest floor, Hoshangabad. *Fl. & Fr.*: Nov. - Feb.

5. *Pogostemon pubescens* Benth. in DC., Prodr. 12: 152. 1848. *P. parviflorus* Benth. in Wallich, Pl. Asiat. Rar. 1: 31. 1830, *p.p.*; Hook. f., Fl. Brit. India 4: 632. 1885, *p.p.*

Herbs, erect, 1-1.5 m high. Leaves ovate or ovate-lanceolate, 3-7 x 1.5-3.5 cm, acuminate at apex, slightly cuneate at base, singly or doubly crenate, serrate, chartaceous, glabrous; petioles variable in length. Verticillasters densely packed, globose, confluent, subsecund, pubescent, in large, paniculate spikes; bracts imbricating, longer than calyx; bracteoles shorter. Calyx *ca* 4 mm long; teeth short, lanceolate; tube 5-angled, pubescent outside. Corolla pink.

On roadsides. Bastar, Betul, Hoshangabad, Sidhi. *Fl. & Fr.*: Feb. - May.

6. *Pogostemon purpurascens* Dalzell in Hook., J. Bot. Kew Gard. Misc. 2: 337. 1850; Hook. f., Fl. Brit. India 4: 632. 1885.

Herbs, erect, pubescent; stems furrowed. Leaves ovate, 3-7 x 2-3.5 cm, incisedly serrate, membranous, softly hairy; petioles 1.5-4 cm long. Verticillasters globose, close in the upper part of spike, distant below, in 6-16 cm long, long-pedunculate, paniculate spikes; bracts ovate, *ca* 5 mm long, acute, ciliate, slightly falcate. Calyx *ca* 5 mm long, pubescent; teeth lanceolate, as long as the tube, acute, ciliate; tube 5-angled. Corolla white with purple upper lip. Nutlets ovoid, compressed, smooth, shining black when ripe.

On forest floor. Bastar, Hoshangabad. *Fl. & Fr.*: Feb. - May.

7. *Pogostemon quadrifolius* (Benth.) Kuntze, Revis. Gen. Pl. 2: 530. 1891; Panigrahi in J. Orissa Bot. Soc. 6(1): 54. 1984. *Dysophylla quadrifolia* Benth. in Wallich, Pl. Asiat. Rar. 1: 30. 1830; Hook. f., Fl. Brit. India 4: 639. 1885. *Eusteralis quadrifolia* (Benth.) Panigrahi in Phytologia 32(6): 478. 1976.

Undershrubs, erect stout, tomentose, 30-75 cm high; rootstock woody. Leaves 4 in a whorl, linear-oblong or linear-lanceolate, 3-10 cm long, acute or obtuse at apex, narrowed at base, usually serrate or subentire, softly pubescent, shortly petiolate. Verticillasters close, in 6-16 cm long, long-pedunculate, paniculate spikes; bracts minute, linear, spatulate. Calyx short, obconic, pubescent; teeth half as long as the tube, 3-angled, ciliate. Corolla pink, *ca* 3 mm long; lobes oblong, obtuse. Nutlets very minute, subglobose.

Rare. In rock crevices on hill top. Bastar. *Fl. & Fr.*: Nov. - Feb.

8. *Pogostemon stellatus* (Lour.) Kuntze, Revis. Gen. Pl. 2: 530. 1891, *p.p. excl. syn. Dysophylla crassicaulis* Benth.; Panigrahi in J. Orissa Bot. Soc. 6(1): 55. 1984. *Mentha stellata* Lour., Fl. Cochinch. 2: 361. 1790, *non* Buch.-Ham. *ex* Roxb., 1832. *Dysophylla verticillata* Benth. in Wallich, Pl. Asiat. Rar. 1: 30. 1830; Hook. f., Fl. Brit. India 4: 639. 1885. *Mentha verticillata* Roxb., Fl. Ind. 3: 5. 1832, *non* L., 1759, *nec* D. Don, 1825. *Dysophylla stellata* (Lour.) Benth. in Wallich, Pl. Asiat. Rar. 1: 30. 1830, *p.p.*: Hook. f., Fl. Brit. India 4: 640. 1885. *Eusteralis stellata* (Lour.) Panigrahi in Phytologia 32(6): 477. 1976.

Herbs, annual, erect, 10-60 cm high, very variable in habit; stems hollow; internodes very close in the lower portion. Leaves 4-10 in a whorl, spreading, deflexed, linear or linear-lanceolate, 1.5-8 cm long, entire or obscurely crenate-serrate, glabrous, sessile. Verticillasters close and crowded, in 1-7 cm long, slender, densely villous spikes; bracts as long as the flowers, persistent even after the falling of fruits. Calyx minute, densely villous. Corolla pink, *ca* 2 mm long. Nutlets pale brown.

In moist soil. Balaghat, Bastar, Bilaspur, Damoh, Rajnandgaon. *Fl. & Fr.*: Sept. - Feb.

20. SALVIA L.

Herbs, undershrubs or shrubs. Leaves usually simple, rarely compound, opposite, often whorled below, petiolate or subsessile. Verticillasters usually in terminal, paniculate spikes or racemes; bracts small or large, sometimes coloured. Calyx campanulate or tubular, bilabiate; upper lip entire or 3-toothed; lower lip 2-fid; mouth naked. Corolla bilabiate; upper lip erect, usually hooded; lower lip 3-lobed; central lobe usually larger, entire or emarginate; tube annulate inside or naked. Perfect stamens 2, inferior; upper pair represented by small staminodes or obsolete; filaments short, articulating with a slender connective and sometimes produced beyond the joint; connective linear, transverse, with an upper ascending arm bearing a linear, fertile anther cell and a lower straight or deflexed arm without any or with an abortive or fertile anther cell. Disk usually enlarged in fruit. Style shortly 2-fid; lobes usually subulate, equal or the lower longer, sometimes flattened. Nutlets 4, dry, ovoid, somewhat triquetrous, smooth.

About 900 species; tropical to temperate regions especially America and S.W. Asia; 5 in M.P.

- 1a. Erect herbs:
- 2a. Leaves lanceolate or oblong-lanceolate:
- 3a. Leaves serrulate; verticillasters 6-8-flowered; calyx purple ...3. *S. leucantha*
- 3b. Leaves irregularly crenate; verticillasters 4-6-flowered; calyx green ...4. *S. plebeia*
- 2b. Leaves ovate ...2. *S. coccinea*
- 1b. Straggling herbs or undershrubs:
- 4a. Calyx glandular hairy; corolla white ...1. *S. aegyptiaca*
- 4b. Calyx eglandular hairy; corolla purple-blue ...5. *S. santolinaefolia*

Notes: *Salvia officinalis* L. is also cultivated in gardens and parks (Oommachan, 1977; Oommachan and Shrivastava, 1996).

1. *Salvia aegyptiaca* L., Sp. Pl. 23. 1753; Hook. f., Fl. Brit. India 4: 656 1885.

Undershrubs, straggling; branches rigid, 4-angled, divaricate, hairy. Leaves usually linear-lanceolate, 0.5-3 x 0.2-0.8 cm, acute at apex, crenate, wrinkled, subsessile. Verticillasters 2-6-flowered, in erect or ascending racemes. Calyx glandular hairy. Corolla white. Nutlets oblong-ellipsoid, bluish black, smooth.

Cultivated in gardens. Bhopal (Oommachan, 1977). *Fl. & Fr.*: Dec. Feb.

2. *Salvia coccinea* Buchoz ex Etilinger, *Salvia* 23. 1777.

Herbs, annual, erect, 20-90 cm high. Leaves ovate, 3-6 x 3-4 cm, obtuse at apex, serrate, sparsely hairy above, densely pubescent beneath. Verticillasters 4-5-flowered, in interrupted racemes. Calyx green, 7-9 cm long, minutely hairy, 13-14-nerved. Corolla 3-4 cm long, hairy outside. Nutlets ovoid-oblong, ca 3 mm long, glabrous.

Rare. On hilly and rocky places. Damoh. *Fl. & Fr.*: Sept. Dec.

3. *Salvia leucantha* Cav., Icon. 1: 16. t. 24. 1791.

Herbs, erect, ca 50 cm high; stems diffusely branched; young parts dull purple, tomentose. Leaves lanceolate, 4-7 x 1-2 cm, acute-acuminate at apex, rounded at base, serrulate, glaucous, pubescent beneath. Verticillasters 6-8-flowered, in ca 20 cm long, leafy racemes; peduncles villous. Calyx purple, tubular-campanulate, 9-nerved, villous outside. Corolla white, 1.5-2 cm long. Nutlets ovoid.

Rare. In wastelands. Indore. *Fl. & Fr.*: Sept. - Dec.

4. *Salvia plebeia* R. Br., Prodr. 501. 1810; Hook. f. Fl. Brit. India 4: 655. 1885.

Herbs, annual, erect, 20-75 cm high; stems branched, obtusely 4-angled and grooved. Leaves oblong-lanceolate, 4-14 x 1.5-4 cm, narrowed at base, irregularly crenate. Verticillasters in panicles of 6-30 cm long, slender, spicate racemes; bracts small, narrow. Fruiting calyx ca 3 mm long; upper lip shorter than the lower, obtuse, entire, reflexed; lower lip obtusely 3-toothed. Corolla white or lilac, ca 5 mm long; upper lip oblong-obtuse; lower lip 3-lobed; middle lobe much larger; tube exserted, annulate inside. Nutlets minute, ovoid, brown, mucilaginous when wet.

Along roadsides, river banks and sides of channels. Bilaspur, Chhatarpur, Damoh, Durg, Jabalpur, Mandla, Panna, Raigarh, Rewa, Sagar, Satna, Sidhi, Surguja. *Fl. & Fr.*: Sept. - April.

5. *Salvia santolinaefolia* Boiss., Diagn. Pl. Orient. ser. 1. 5: 13. 1844 & Fl. Orient. 4: 632. 1879; Hook. f. Fl. Brit. India 4: 656. 1885. *S. pumila* Benth., Labiat. Gen. Spec. 726. 1835, p.p. & in DC., Prodr. 12: 356. 1848, p.p. *S. aegyptiaca*, L. var. *pumila* (Benth.) Hook. f., Fl. Brit. India 4: 656. 1885, p.p. *Gulab-kosh*.

Herbs or undershrubs, scabrid or villous. Leaves linear-lanceolate, 1-2 x 0.2-0.5 cm, obtuse at apex, decurrent into petiole at base, rugose, rigid, appressed hairy. Verticillasters in slender racemes. Calyx villous with long hairs. Corolla purple-blue. Nutlets ovoid, brown, smooth.

On gravelly soil and in rock crevices. Bhopal (Oommachan, 1977). *Fl. & Fr.*: Nov. - Feb.

The plant extract is used for gonorrhoeal disorders.

109. PLANTAGINACEAE

(A.K. Mukherjee)

Three genera and about 255 species: cosmopolitan; one genus with 2 species in M.P.

PLANTAGO L.

Herbs, annual or perennial, terrestrial, erect or suffruticose, caulescent or acaulescent. Leaves usually radical but sometimes cauline in caulescent plants. Flowers in heads or cylindrical spikes, bisexual, 4-merous. Sepals equal or 2 of them larger. Corolla-lobes 4, equal; tube equalling the calyx or slightly longer. Stamens 4, inserted in the corolla-tube. Ovary 2-4-locular; ovules 1-many in each locule. Capsules circumscissile. Seeds 1-many in each cell, usually boat-shaped, with ventral hilum; albumen fleshy.

About 250 species; cosmopolitan; 2 in M.P.

- 1a. Leaves ovate or ovate-lanceolate, 10-16 cm long; spikes elongate, 15-25(-50) cm long ...1. *P. asiatica*
- 1b. Leaves filiform, 2-4 cm long; spikes ovoid, 1-1.4 cm long ...2. *P. exigua*

1. *Plantago asiatica* L., Sp. Pl. 113, 1753. *P. major auct. non L.*, 1753 : Hook. f., Fl. Brit. India 4: 705, 1885, p.p. - *Isabgol*. Fig. 72.

Herbs, erect. Leaves ovate or ovate-lanceolate, 10-16 x 4-8 cm, obtuse at apex, subentire; nerves 5 or 7, much prominent; petioles very narrow. Flowers in elongate, 15-25 cm long, rarely up to 50 cm long spikes; peduncles grooved, 20-40 cm long; bracts broadly deltoid, ca 2 mm long. Calyx shortly stipitate; sepals 2-2.5 mm long; anterior sepal narrowly ovate-elliptic, often a little incurved at apex, with adjacent furrows equally broad to the lateral lamina; posterior sepal elliptic, little narrowed at apex. Corolla-lobes lanceolate, 1-2 mm long. Capsules ellipsoid, rounded or a little conical at apex, 5-8-seeded.

Rare. On embankments of streams. Surguja. Fl. & Fr.: Jan. March.

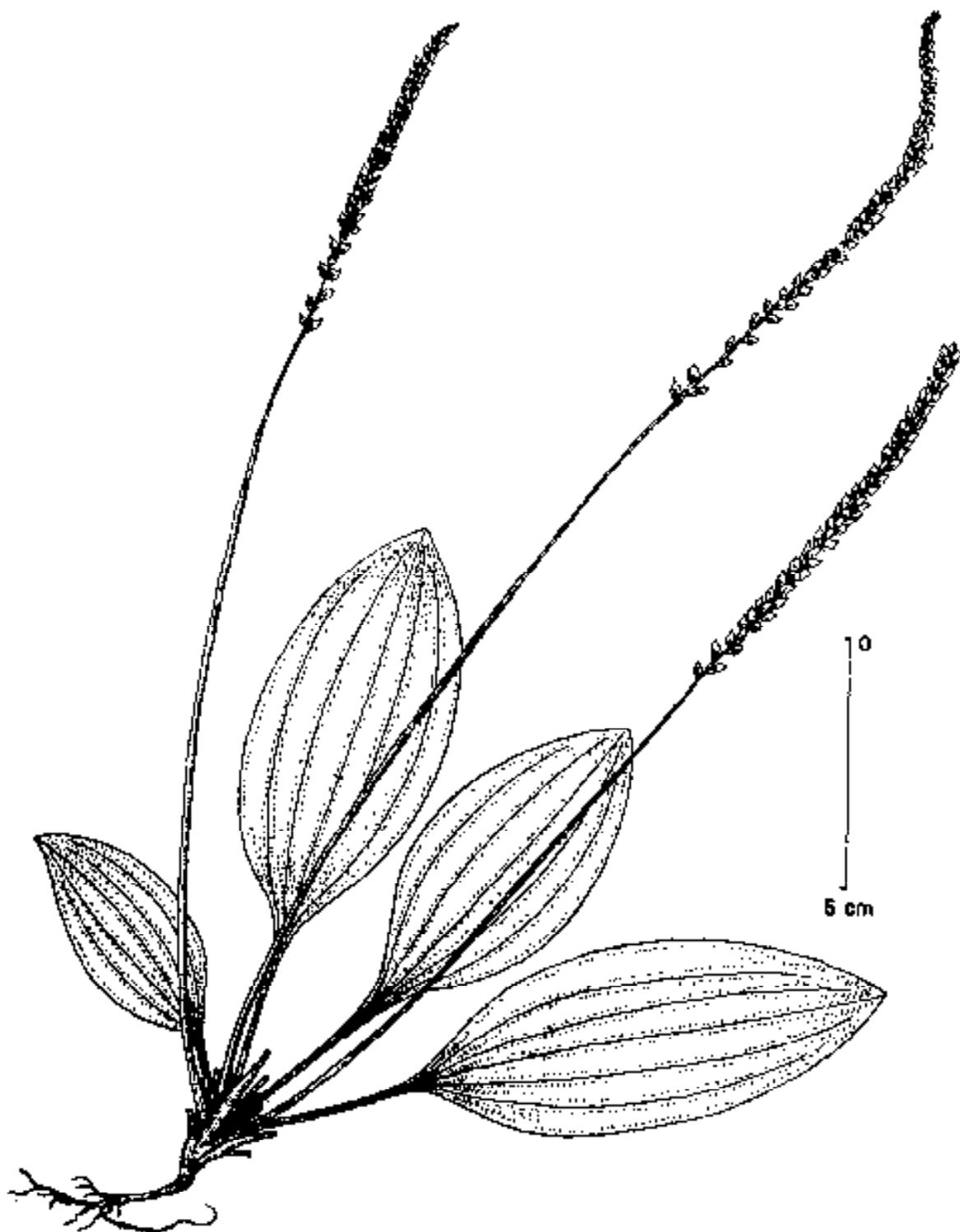


Fig. 72. *Plantago asiatica* L.

2. *Plantago exigua* Juss. ex Murray in Comm. Soc. Reg. Sci. Gotting. 1. 1778: 94. t. 5. 1779. Panigrahi in Kew Bull. 30: 671. 1975. *P. pumila* L. f., Suppl. Pl. 125. 1782; Hook. f., Fl. Brit. India 4: 707. 1885.

Herbs, annual, delicately branched, 15-45 cm high; branches opposite, decussate, erect, more crowded upwards. Leaves opposite, subopposite or in whorls of 3 or 4 upwards, filiform, 20-40 x 0.5 mm, reflexed at apex, entire, revolute, somewhat fleshy. Flowers in many-flowered, ovoid, 1-1.4 cm long spikes; peduncles filiform, solitary, terminal or axillary, 2-5 cm long. Flowers minute, yellowish white; bracts 2-2.5 mm long. Sepals lanceolate. Corolla-lobes ovate-lanceolate, 1.7-2.2 mm long; tube swollen at base. Capsules ellipsoid or ovoid, 3.5-4 mm long, 2-celled; cells 1-seeded. Seeds brown.

Rare. As weed in cultivated fields and wastelands. Bilaspur. *Fl. & Fr.*: Feb. March.

Seeds are medicinally used.

110. NYCTAGINACEAE

(A.K. Mukherjee)

About 34 genera and 350 species; tropical and subtropical regions especially America, few in temperate zones; 4 genera and 7 species in M.P.

- 1a. Bracts conspicuous, large, brightly coloured ...2. *Bougainvillea*
- 1b. Bracts inconspicuous, small,
not brightly coloured:
 - 2a. Flowers showy; perianth-tube 2-3 cm long ...4. *Mirabilis*
 - 2b. Flowers not showy; perianth-tube up to 1 cm long:
 - 3a. Anthocarps 10-ribbed,
with wart-like glands ...3. *Commicarpus*
 - 3b. Anthocarps 5-ribbed, without
wart-like glands ...1. *Boerhavia*

1. BOERHAVIA L.

Herbs, often glandular. Leaves opposite. Flowers capitate or paniculate, small, sessile or with jointed pedicels, bracteate. Perianth infundibuliform or campanulate, 5-lobed. Stamens 1-5, exserted; filaments connate at base. Ovary oblique, stipitate; stigma peltate or capitate. Anthocarps clavate, turbinate, fusiform or obovoid, usually 5-ribbed, often glandular.

About 40 species; subtropical regions; 3 in M.P.

- 1a. Flowers in diffuse, terminal panicles, much exceeding the foliage:
- 2a. Anthocarps fusiform ...1. *B. diffusa*
- 2b. Anthocarps turbinate to broadly clavate ...2. *B. procumbens*
- 1b. Flowers in strict, axillary cymes, rarely exceeding the foliage ...3. *B. repens*

1. *Boerhavia diffusa* L., Sp. Pl. 3. 1753; Mukherjee in J. Econ. Tax. Bot. 5: 582. 1984. *B. repens* L. var. *diffusa* (L.) Hook. f., Fl. Brit. India 4: 709. 1885. *Chatwa bhaji*, *Patharchatta*, *Punarnava*.

Herbs, perennial, diffuse, straggling; stems woody below; branches usually pinkish. Leaves ovate-oblong, unequal, 1-4 x 0.3-3.5 cm, sinuate to repand, puberulous, whitish beneath. Flowers in terminal, diffuse panicles, much exceeding the foliage, ca 3 mm long, pinkish mauve, sessile; bracts and bracteoles ovate, 1.5-2 mm long, acuminate, puberulous. Anthocarps fusiform, ca 3 mm long.

Common along roadsides, river banks and in wastelands. Bastar, Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Indore, Raigarh, Raipur, Rajnandgaon, Seoni, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Oct. April.

A medicinal plant, source of "*Punarnavin*".

Roots are diuretic, laxative and referred for the treatment of urinary, liver, kidney and heart diseases. Leaves are used for the treatment of skin diseases and as antidote of snake bite. Sometimes the leaves are eaten.

2. *Boerhavia procumbens* Banks ex Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 146. 1820. *B. repens* L. var. *procumbens* (Banks ex Roxb.) Hook. f.,

Fl. Brit. India 4: 709. 1885. *B. coccinea* *Swet. non* Mill., 1768: R.R. Stewart, Ann. Cat. Vas. Pl. W. Pakistan & Kashmir 233. 1972. - *Swet punarnava*.

Herbs, perennial, diffuse, straggling, puberulous; stems woody below; branches green. Leaves ovate or oblong to subcordate, unequal, 1.5 x 0.3-3.8 cm, cuspidate or obtuse, sinuate to repand, puberulous. Flowers in terminal, diffuse panicles, much exceeding the foliage, ca 3 mm long; bracts and bracteoles ovate, 1.5-2 mm long, acuminate. Perianth pinkish or white, campanulate. Anthocarps turbinate to broadly clavate, ca 3 mm long, glandular, papillose.

Common on roadsides, forest floor and in rock crevices. Balaghat, Bastar, Hoshangabad, Seoni, Sidhi. *Fl. & Fr.*: Sept. - June.

A medicinal plant, source of "*Punarnavin*"

3. *Boerhavia repens* L., Sp. Pl. 3. 1753; Hook. *f.*, Fl. Brit. India 4: 709. 1885, *excl. var. diffusa & procumbens*; Mukherjee in J. Econ. Tax. Bot. 5: 583. 1984.

Herbs, perennial, diffuse, straggling; stems woody below; branches pinkish. Leaves in asymmetrical pairs, broadly ovate; larger ones ca 5 x 4 cm, sinuate to repand, whitish beneath. Flowers in axillary cymes, rarely exceeding foliage; peduncles solitary, slender. Perianth campanulate; lobes emarginate, pinkish; tube constricted above the ovary, glandular. Anthocarps turbinate to narrowly clavate, glandular, papillose.

Common on roadsides, in rock crevices and forest clearings. Balaghat, Bastar, Bilaspur, Durg, Jabalpur, Mandla, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: Throughout the year.

A medicinal plant, source of "*Punarnavin*"

2. BOUGAINVILLEA Commerson *ex* Juss., *nom. cons.*

Large shrubs, scandent, armed. Leaves alternate. Flowers usually in clusters of three, somewhat coloured, small, enclosed by an involucre of 3, usually brightly coloured, large bracts; bracts persistent, acting as a wing to the fruit; midrib of bract adnate to the pedicel. Perianth tubular with a spreading, small, 5-lobed limb; upper part spirally rolled; basal part somewhat wider, hardening into the leathery wall of the anthocarp. Stamens 5-

10, unequal, scarcely exerted. Ovary striptate; style lateral; stigma linear. Anthocarps fusiform, glabrous or pubescent, 5-ribbed.

About 14 species; C. and tropical S. America; 2 in M.P.

- 1a) Branches and leaves glabrous ...1. *B. glabra*
 1b) Branches and leaves pubescent ...2. *B. spectabilis*

1. Bougainvillea glabra Choisy in DC., Prodr. 13(2): 437. 1849.

Shrubs, climbing; branches glabrous. Leaves broadly ovate, 4-8 x 2-5 cm, acuminate at apex, obtuse at base, entire or undulate, glabrous, shortly petiolate. Flowers in cymes, usually in clusters of 3; bracts showy, large, variously red coloured. Perianth-base adnate to bracts.

Cultivated for ornamental value. Damoh, Chhatarpur, Indore. *Fl.*: Throughout the year.

2. Bougainvillea spectabilis Willd., Sp. Pl. 2: 348. 1799. - *Bougambel*.

Climbers, evergreen; branches pubescent. Leaves orbicular-ovate, acuminate at apex. Spines 2-3 cm long. Flowers and bracts obtuse, ternate at the ends of every branchlet and forming immense panicles of a deep magenta colour. Perianth greenish yellow.

Cultivated in gardens. Damoh, Chhatarpur, Indore. *Fl. & Fr.*: Usually during hot season.

3. COMMICARPUS Standl.

Herbs or shrubs, perennial, suffruticose or scrambling. Leaves opposite, entire, often sinuate-repand. Flowers in terminal or axillary umbels, bisexual; involucrel bracts present. Perianth campanulate or infundibuliform, 5-lobed. Stamens 2-5; filaments unequal, connate at base. Style filiform; stigma peltate. Anthocarps clavate, 10-ribbed, viscid, with large, wart like glands.

About 16 species; tropical and subtropical regions; one in M.P.

Notes: A number of authors have treated this genus under *Boerhavia* L. from which it differs in the larger flowers and the anthocarps being 10-ribbed and with conspicuous glands.

Commicarpus chinensis (L.) Heimerl in Engl. & Prantl, Nat. Pflanzenfam. ed. 2. 16C: 117. 1934. *Valeriana chinensis* L., Sp. Pl. 33. 1753. *Boerhavia repanda* Willd., Sp. Pl. 1: 22. 1797; Hook. f., Fl. Brit. India 4: 709. 1885. *B. chinensis* (L.) Aschers & Schweinf., Beitr. Fl. Aethiop. 1: 167. 1867. Fig. 73.

Shrubs, diffuse, scandent, glabrous. Leaves ovate, 2.5-6 x 1-4.5 cm, acute or acuminate at apex, truncate or cordate at base, lobed or sinuate. Flowers in axillary, long pedunculate umbels, mostly from one axil of the pair only, pink, 7-10 mm across; pedicels slender, 7-12 mm long. Perianth infundibuliform. Anthocarps uniformly covered with wart like glands.

In wastelands on dry soils. Dhar, Gwalior, Indore, Rewa. *Fl. & Fr.*: April - Dec.

Leaves are used as vegetables.

4. MIRABILIS L.

Herbs, perennial; roots often tuberous. Leaves opposite. Flowers in axillary cymes; involucrel bracts 5. Perianth brightly coloured, infundibuliform, constricted above the ovary; limb 5-lobed, caducous. Stamens 5-6, exserted. Style 1; stigma capitate. Anthocarps coriaceous, ribbed. Nuts ribbed.

About 45 species; subtropical America; one in M.P.

Mirabilis jalapa L., Sp. Pl. 177. 1753; Mukherjee in J. Econ. Tax. Bot. 5: 587. 1984. *Gulabbas*.

Herbs; roots thick, tuberous; stems dichotomous, glabrous, swollen at nodes. Leaves ovate, 5-12 x 2-6 cm, acuminate at apex, slightly oblique at base, puberulous. Flowers in clusters of 4-5, subsessile; involucrel bracts ovate, ca 9 mm long, sepaloïd, puberulous, nervose, connate at base; pedicels ca 2 mm long. Perianth-tube 2-3 cm long. Anthocarps ovoid, ca 9 mm long, 5-ribbed, black, tuberculate.

Cultivated in gardens and also as an escape in wastelands. Bilaspur, Chhatarpur, Indore, Mandla, Raigarh, Raipur, Tikamgarh. *Fl. & Fr.*: Throughout the year.

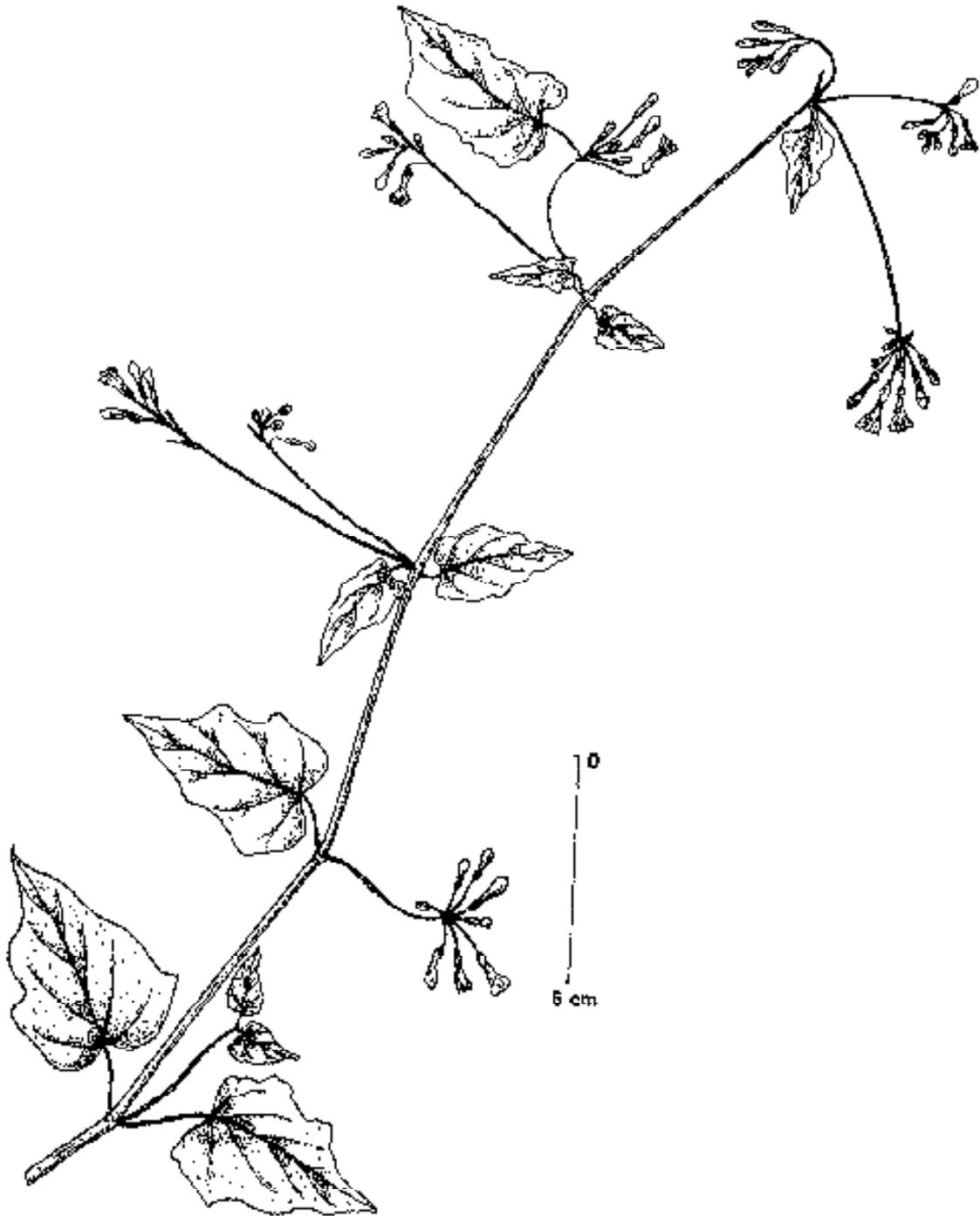


Fig. 73. *Commicarpus chinensis* (L.) Heimerl

III. AMARANTHACEAE**(A.K. Mukherjee)**

About 71 genera and 800 species; tropical and subtropical to temperate regions; 13 genera and 27 species in M.P.

- 1a. Leaves alternate, rarely opposite:
- 2a. Each fertile flower subtended by 2 lateral, sterile, modified flowers ...8. *Digera*
- 2b. Fertile flowers not subtended by modified, sterile flowers:
- 3a. Ovary few to many-ovuled:
- 4a. Herbs; fruit a capsule ...6. *Celosia*
- 4b. Undershrubs or shrubs; fruit a berry ...7. *Deeringia*
- 3b. Ovary 1-ovuled:
- 5a. Pseudostaminodes present ...2. *Aerva*
- 5b. Pseudostaminodes absent:
- 6a. Tepals villous; stamens 1-2 ...10. *Nothosaerva*
- 6b. Tepals not villous; stamens 3-5:
- 7a. Flowers bisexual; seeds with a conspicuous, membranous, cupular aril ...3. *Allmania*
- 7b. Flowers unisexual; seeds without aril ...5. *Amaranthus*
- 1b. Leaves opposite or whorled:
- 8a. Fertile flowers subtended by several, lateral, sterile flowers modified into hooked or glochidiate spines ...12. *Pupalia*
- 8b. Fertile flowers not subtended by such modified sterile flowers:
- 9a. Bracteoles with dorsal crest; filaments monadelphous almost to the top ...9. *Gomphrena*
- 9b. Bracteoles without dorsal crest; filaments monadelphous only at the base or free:

- 10a. Pseudostaminodes absent ...11. *Psilotrichum*
- 10b. Pseudostaminodes present:
- 11a. Leaves linear-filiform; capsules
circumscissile, longitudinally split
at maturity ...13. *Trichuriella*
- 11b. Leaves not linear-filiform; capsules
indehiscent or rupturing irregularly:
- 12a. Inflorescence axillary, dense, sessile
heads; anthers 1-celled ...4. *Alternanthera*
- 12b. Inflorescence terminal, elongate,
pedunculate spikes with flowers
increasingly distant below in fruit;
anthers 2-celled ...1. *Achyranthes*

1. ACHYRANTHES L.

Herbs. Leaves opposite, entire, petiolate. Flowers in terminal, more or less slender spikes, at first congested, more or less patent, finally laxer and deflexed, bisexual, solitary in a bract; bracts lanceolate, deltoid or ovate, with midrib excurrent in a spine; bracteoles 2, spinous; spine with short and free or long and adnate membranous wings at base. Tepals 4-5, narrowly lanceolate, acuminate, aristate, indurate in fruit especially at base. Stamens 2-5; filaments filiform, monadelphous, alternate with pseudostaminodes; anthers 2-celled. Ovary with solitary, pendulous ovule; style slender; stigma truncate-capitate. Fruit an utricle, indehiscent, 1-seeded, falling off with bracteoles and tepals. Seeds cylindrical.

About 6 species; tropical and subtropical regions especially of Old World; 2 in M.P.

- 1a. Wings on each side of the base of the bracteoles
almost entirely adnate to the spine; pseudo-
staminodes with a narrow, entire or undulate
ventral scale and a long, fimbriate dorsal scale ...1. *A. aspera*
- 1b. Wings on each side of the base of the bracteoles
free, somewhat divergent; pseudostaminodes
without scales ...2. *A. bidentata*

1. *Achyranthes aspera* L., Sp. Pl. 204. 1753; Hook. f., Fl. Brit. India 4: 730. 1885. *Chichdi, Chirchira, Latjira.*

Herbs, perennial, erect or subscandent; stems simple or branched; nodes more or less shrunken on drying. Leaves elliptic, oblong or ovate, 3-12 x 1.5-6 cm, acute, acuminate or obtuse at apex, narrowed at base, glabrous or variously pubescent. Flowers in initially dense, finally elongating, 8-30 cm long spikes; peduncles 1-6 cm long; bracts lanceolate, 1.5-5 mm long, membranous, glabrous; bracteoles 1.5-4 mm long; basal wings 1/3-1/4th of the length of spine and adnate to it. Tepals whitish, pale green to red or purple, 5, 3-6 mm long. Stamens 5; filaments 1.5-4 mm long, Pseudostaminodes subquadrate. Style 1-4 mm long. Utricles 1-3 mm long. Seeds smooth, filling the utricles.

The plant is medicinal.

- 1a. Plants tomentose; leaves thick, villous to silky pubescent:
- 2a. Leaves elliptic-ovate, silvery silky beneath ...1.1. var. *argentea*
- 2b. Leaves ovate to almost rounded, never silvery silky beneath ...1.2. var. *aspera*
- 1b. Plants subglabrous; leaves membranous, more or less glabrous ...1.3. var. *porphyristachya*

1.1. var. *argentea* (Thwaites) Hook. f., Fl. Brit. India 4: 730. 1885. *Achyranthes argentea* Thwaites, Enum. Pl. Zeyl. 249. 1861.

Common in wastelands, Balaghat, Bastar, Hoshangabad, Indore, Raigarh, Ratlam, Satna, Tikamgarh. *Fl. & Fr.*: Throughout the year.

1.2. var. *aspera*

Common in wastelands, Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Jabalpur, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Sidhi, Tikamgarh. *Fl. & Fr.*: Aug. - Feb.

1.3. var. *porphyristachya* (Wallich ex Moq.) Hook. f., Fl. Brit. India 4: 730. 1885. *Achyranthes porphyristachya* Wallich ex Moq. in DC., Prodr. 13(2): 316. 1849. Fig. 74.

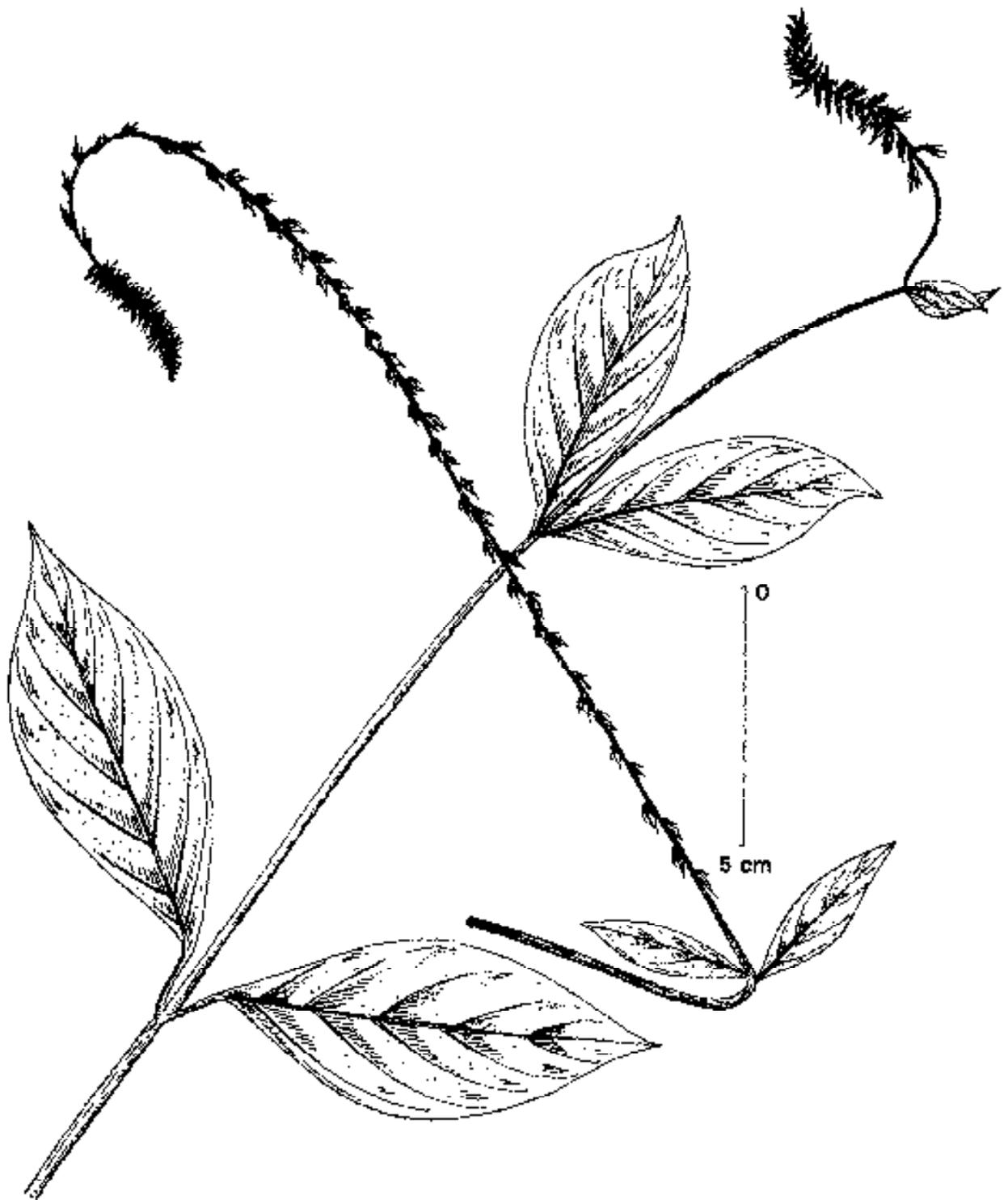


Fig. 74. *Achyranthes aspera* L. var. *porphyristachya*
(Wallich ex Moq.) Hook. f.

In wastelands. Balaghat, Bastar, Bilaspur, Hoshangabad, Mandla, Surguja. *Fl. & Fr.*: Aug. Feb.

2. *Achyranthes bidentata* Blume, Bijdr. 545. 1826; Hook. f., Fl. Brit. India 4: 730. 1885.

Herbs, perennial, erect or straggling; stems much branched; nodes frequently much shrunken on drying. Leaves elliptic-oblong to broadly ovate, rarely narrowly lanceolate, 9-22 x 2.5-8.5 cm, acuminate at apex, narrowed at base, usually pubescent; petioles 3-20 mm long. Flowers in initially dense, finally elongating, up to 20 cm long spikes; peduncles 1-4 cm long; bracts narrowly lanceolate, 3-5 mm long, membranous, glabrous; bracteoles 3.5-5.5 mm long; basal wings 0.5-1.5 mm long, almost free from the spine. Tepals 5, 4-7 mm long. Stamens 5; filaments 2-3 mm long. Pseudostaminodes subquadrate, simple, rarely crested. Style 1-2 mm long. Utricles 2-3 mm long. Seeds smooth, filling the utricles.

Rare. On hill tops. Hoshangabad. *Fl. & Fr.*: Oct. Jan.

2. **AERVA** Forssk., *nom. cons.*

Herbs or undershrubs, perennial, erect or scandent; branches usually alternate. Leaves alternate, rarely opposite, entire. Flowers in axillary and terminal, sessile or pedunculate spikes, unisexual, bisexual or both mixed, bracteate, solitary in the axil of each bract; bracteoles 2, persistent. Tepals 5, ovate, lanceolate-oblong or obovate-spathulate, membranous margined, with a thin to wider, green centre, deciduous with the fruit. Stamens 5, shortly monadelphous at base, alternate with pseudostaminodes; anthers 2-celled. Ovary with solitary, pendulous ovule; style short, slender, distinct; stigmas 2, short to long, filiform. Fruit an utricle, thin-walled, bursting irregularly. Seeds rounded or reniform, compressed, brown or black.

About 10 species; tropical and subtropical regions of Old World; 3 in M.P.

1a. Flowers unisexual: seeds rounded ...i. *A. javanica*

1b. Flowers bisexual or bisexual and female
both; seeds reniform:

- 2a. Leaves 1-5 cm long; spikes axillary, not paniculate ...2. *A. lanata*
 2b. Leaves more than 5 cm long; spikes
 axillary and terminal, often paniculate ...3. *A. sanguinolenta*

1. *Aerva javanica* (Burm. f.) Juss. ex Schult., Syst. Veg. 5: 565. 1819; Hook. f., Fl. Brit. India 4: 727. 1885. *Iresine javanica* Burm. f., Fl. Ind. 212. t. 65. f. 2. 1768. *I. persica* Burm. f., Fl. Ind. 212. t. 65. f. 1. 1768. *Aerva tomentosa* Forssk., Fl. Aegypt.-Arab. 122, 170. 1775.

Herbs or undershrubs, erect or scandent, hoary tomentose. Leaves alternate, ovate-lanceolate or linear-oblong, greenish white tomentose. Flowers in terminal, cylindrical, woolly, paniculate spikes, unisexual, greenish white. Outer tepals ovate in male flowers, obovate-spathulate in female ones; inner tepals smaller. Utricles ovoid-orbicular, compressed. Seeds rounded, brown or black, shining.

Chambal (Agarkar, 1969). *Fl. & Fr.*: Aug. - Oct.

2. *Aerva lanata* (L.) Juss. ex Schult., Syst. Veg. 5: 564. 1819; Hook. f., Fl. Brit. India 4: 728. 1885. *Achyranthes lanata* L., Sp. Pl. 204. 1753. *Illecebrum lanatum* (L.) L., Mant. Pl. 344. 1771.

Herbs, erect, prostrate or straggling, sometimes woody, stiff or weak, 30-50 cm high; stems and branches more or less lanate with whitish hairs. Leaves alternate, suborbicular to obovate, 1-5 x 0.5-3 cm, apiculate to acute at apex, cuneate at base, densely lanate beneath. Flowers in solitary or axillary, clustered, white, cylindrical, 4-15 mm long, sessile spikes, bisexual; bracts 0.7-1 mm long. Tepals densely lanate dorsally; outer 2 hyaline, ovate-oblong, 0.7-1.2 mm long; inner 3 slightly shorter. Style and stigma subequal to the ovary at anthesis. Utricles rotundate, ca 1 mm across, compressed. Seeds reniform, ca 0.8 mm long, black, shining.

Common as weed in wastelands, along river banks and roadsides. Balaghat, Bastar, Betul, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, East Nimar, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Ratlam, Rewa, Satna, Seoni, Sidhi, Tikamgarh, West Nimar. *Fl. & Fr.*: July - April.

Roots are medicinal.

3. *Aerva sanguinolenta* (L.) Blume. Bijdr. 547. 1826. *Achyranthes sanguinolenta* L., Sp. Pl. ed. 2. 294. 1762. *A. scandens* Roxb., Fl. Ind.

(Carey & Wallich ed.) 2: 503. 1824. *Aerva scandens* (Roxb.) Wallich ex Moq. in DC., Prodr. 13 (2): 302. 1849; Hook. f., Fl. Brit. India 4: 727. 1885.

Herbs or undershrubs, straggling, scarcely scandent, ca 1 m high. Leaves mostly alternate, rarely opposite, elliptic, elliptic-lanceolate or lanceolate, up to 15 x 5 cm, usually tapering at both ends, membranous. Flowers in axillary and terminal, often paniculate spikes; panicles 1-5 cm long or terminal ones up to 10 cm long. Tepals ca 2 mm long, densely white-villous; outer tepals white; inner ones with green centre. Pseudostaminodes shorter than stamens. Style slender, about as long as the ovary. Utricles thin, rupturing irregularly, more or less transversely.

On forest floor, hill slopes, amidst boulders and along roads. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Sidhi, Surguja. *Fl. & Fr.*: July - April.

3. ALLMANIA R. Br. ex Wight

Herbs, annual. Leaves alternate, entire. Flowers in terminal or leaf-opposed, 3-flowered, capituliform cymes, bisexual; central one sessile or subsessile, subtended by a single bract; lateral ones pedicellate, subtended by a bract and 2 bracteoles; bracteoles subequal to perianth. Tepals 5, persistent. Stamens 5, shortly monadelphous at base; anthers 2-celled. Pseudostaminodes absent. Ovary with solitary, erect ovule; style long, slender; stigmas 2, divergent. Fruit an utricle, thin-walled, circumscissile. Seeds erect, compressed, with a membranous, 2-lobed, cupular aril.

One to two species; tropical Asia; one in M.P.

Allmania nodiflora (L.) R. Br. ex Wight in Hook., J. Bot. 1: 226. t. 128. 1834; Hook. f., Fl. Brit. India 4: 716. 1885. *Celosta nodiflora* L., Sp. Pl. 205. 1753. *Allmania albida* R. Br. ex Hook. f., Fl. Brit. India 4: 717. 1885.

Herbs, annual, spreading, prostrate or ascending, much branched, 0.1-1 m high; branches and stems more or less angular, sulcate or striate. Leaves variable in shape and size, linear to elliptic, oblong, obovate or spatulate, 2-12 x 0.2-2 cm, rounded to apiculate or shortly acuminate at apex, cuneate to attenuate at base; petioles indistinctly demarcated, up to 1.5 cm long. Flowers in terminal and leaf opposed, reddish, globose to

ovoid, 0.7-2 cm across, subsessile to long pedunculate cymes; bracts membranous; bracteoles narrower, 4-5 mm long. Tepals narrowly elliptic-lanceolate, 4-5 mm long, with a single, reddish or greenish midrib. Filaments 3-3.5 mm long, subulate. Utricles ovoid, 3-4 mm long. Seeds lenticular, 2.5-3 mm long, black.

On forest floor, hill slopes, in wastelands, rock boulders and along roadsides. Bilaspur, Durg, Hoshangabad, Mandla, Raigarh, Raipur, Rewa, Seoni, Shahdol, Surguja. *Fl. & Fr.*: July - Jan.

4. ALTERNANTHERA Forssk.

Herbs, annual or perennial, erect, prostrate or scrambling, sometimes aquatic, floating. Leaves opposite, entire. Flowers in axillary or terminal, solitary or clustered, sessile or pedunculate heads or short spikes, bisexual, solitary in the axil of a bract; bracts persistent; bracteoles 2, persistent or not. Tepals 5, free, equal or unequal, glabrous or with smooth or denticulate hairs. Stamens 2-5, some occasionally without anthers; filaments distinctly monadelphous at base into a cup or tube, alternate with pseudostaminodes; anthers 1-celled. Pseudostaminodes large or small, dentate or lacinate. Ovary with solitary, pendulous ovule; style short; stigma capitate. Fruit an utricle, indehiscent, thin-walled or sometimes corky. Seeds more or less lenticular.

About 80 species; tropical and subtropical regions; 5 in M.P.

- 1a. Heads pedunculate except the terminal ones ...3. *A. philoxeroides*
- 1b. Heads sessile, sometimes on pseudo-peduncles:
- 2a. Bracts and tepals spinescent;
tepals dissimilar ...4. *A. pungens*
- 2b. Bracts and tepals not spinescent;
tepals similar:
- 3a. Tepals 1-nerved throughout; anthers 3 ...5. *A. sessilis*
- 3b. Tepals 3-nerved in the lower half; anthers 5:
- 4a. Plants erect; pseudostaminodes
as long as stamens ...1. *A. betzickiana*
- 4b. Plants prostrate; pseudostaminodes
much shorter than stamens ...2. *A. paronychioides*

1. *Alternanthera bettzickiana* (Regel) Nicholson, Ill. Dict. Gard. ed. 1. 59. 1884, "*betzichiana*" *Telanthera bettzickiana* Regel, Gartenflora 11: 178. 1862. *Gomphrena ficoidea* L., Sp. Pl. 225. 1753. *Alternanthera ficoidea* (L.) R. Br. ex Roem. & Schult., Syst. Veg. 5: 555. 1819, non P. Beauv., 1818.

Herbs, perennial, erect; stems with purple tinge on nodes. Leaves in subequal pairs, oblong-obovate or spatulate, 2-6 x 0.5-2 cm, subfleshy, pubescent. Flowers in axillary, solitary, white, ovoid to globose, sessile heads. Tepals mucronate. Utricles enclosed within persistent tepals.

Rare. On newly placed soil heaps. Bhopal (Oommachan, 1977). *Fl. & Fr.*: Dec. - Feb.

2. *Alternanthera paronychioides* St. Hill., Voy. Distr. Diam. 2: 439. 1833; Mears & Gills in J. Arnold Arb. 58: 62. 1977.

Herbs, perennial, prostrate, mat-forming; rootstocks stout; branches rooting at nodes. Leaves elliptic, ovate or obovate, 8-30 x 2-10 mm, white villous when young, sparsely hairy beneath, petiolate. Flowers in axillary, solitary or 2-3 together, globose or ovoid, 4-8 mm across, sessile heads; bracts *ca* 2.75 mm long, white, membranous; bracteoles *ca* 2.5 mm long. Tepals white, oblong-lanceolate, subequal; outer 2 longer. Stamens 5, all fertile. Utricles orbicular-obcordate, compressed, 1.5-2 mm across. Seeds discoid, *ca* 1.25 mm across, brownish, shining.

Along roadsides and bank of ponds. Balaghat, Bhopal, Chhatarpur, Damoh, Durg, Raipur, Rajnandgaon. *Fl. & Fr.*: Throughout the year.

3. *Alternanthera philoxeroides* (Mart.) Griseb. in Abh. Koen. Ges. Wiss. Goett. Phys. Cl. 24: 36. 1879. *Bucholzia philoxeroides* Mart., Beitr. Amarantac. 107. 1825 & in Nova Acta Leop. 13: 315. 1826.

Herbs, perennial, floating; stems *ca* 1.5 cm thick, rooting at nodes; internodes *ca* 10 cm long. Leaves variable, obovate-spathulate or linear-lanceolate to oblong, up to 10 x 2 cm, acute at apex, narrowed at base. Flowers in axillary, solitary, globose, *ca* 2 cm across, pedunculate heads, ultimate apical head sessile, smaller; peduncles 2-5 cm long; bracts scarious, white, deltoid-ovate, 4-6 mm long; bracteoles 5-6 mm long, persistent. Tepals white, elliptic, equal, 6-7 mm long, acuminate. Stamens 5. Utricles obcordate, 3-3.5 mm long, with thick margin. Seeds discoid, 1.5-2 mm across, brown.

Rare. In ponds. Raipur. *Fl. & Fr.*: Aug. - Oct.

4. *Alternanthera pungens* Kunth in Humb., Bonpl. & Kunth, Nov. Gen. Sp. 2: 206. 1818. *Achyranthes repens* L., Sp. Pl. 205. 1753. *Illecebrum achyrantha* L., Sp. Pl. ed. 2. 299. 1762. *Alternanthera repens* (L.) Link, Enum. Hort. Berol. alt. 1: 154. 1821, non J. F. Gmelin, 1791.

Herbs, perennial, prostrate, mat-forming; rootstocks stout, vertical; branches terete, striate, villous with long, white hairs when young. Leaves broadly rhomboid-ovate to obovate, 1.5-4.5 x 0.3-2.7 cm, rounded at apex with a mucro, narrowed at base; petioles up to 1 cm long. Flowers in axillary, solitary or 2-3 together, globose to cylindrical, 0.5-1.5 cm long, sessile heads; bracts and bracteoles similar, 3-5 mm long. Tepals dissimilar; abaxial, adaxial and laterals ca 5 mm, 3 mm and 2 mm long respectively, adaxial and abaxial tepals with tuft of barbellate, whitish bristles. Stamens 5, all fertile. Utricles ca 2 mm long. Seeds discoid, ca 1.25 mm across, brown.

In moist wastelands and on hill slopes. Betul, Bhopal, Bilaspur, Chhatarpur, Indore, Satna, Shahdol. *Fl. & Fr.*: Throughout the year.

5. *Alternanthera sessilis* (L.) R. Br. ex DC., Cat. Pl. Horti. Monsp. 4: 77. 1813; Hook. f., Fl. Brit. India 4: 731. 1885. *Gomphrena sessilis* L., Sp. Pl. 225. 1753. *Alternanthera nodiflora* R. Br., Prodr. 417. 1810; Hook. f., Fl. Brit. India 4: 732. 1885. *Guroo*.

Herbs, perennial, more or less branched; stems 2-5 mm thick, rooting at nodes; internodes ca 10 cm long, decreasing upwards. Leaves variable, linear-lanceolate to oblong, ovate or obovate-spathulate, 1-9 x 0.2-2 cm, obtuse to shortly acuminate at apex, cuneate to attenuate at base; petioles obsolete to ca 5 mm long. Flowers in axillary, solitary or 2-5 together, subglobose, ca 5 mm across, sessile heads; bracts deltoid-ovate, 0.75-1 mm long; bracteoles 1-1.5 mm long, persistent. Tepals ovate-elliptic, equal, 1.5-2.5 mm long, white. Stamens 5, (2 filaments without anthers). Utricles obcordate, 2-2.5 mm long, with thick margin. Seeds discoid, 0.75-1 mm across, brown.

Common in aquatic and semiaquatic situations. Balaghat, Bastar, Betul, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, East Nimar, Gwalior, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Shivpuri, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Throughout the year.

The plants are used as vegetables.

5. AMARANTHUS L.

Herbs, annual, rarely perennial, monoecious or dioecious, glabrous or hairy. Leaves simple, alternate, entire or sinuate, long petiolate. Flowers in dense cymes or lax, axillary clusters or the upper clusters leafless and more or less in lax or dense spikes or panicles, bracteate, bracteolate. Tepals 2-5, free or connate at base, membranous; of female flowers sometimes slightly accrescent in fruit. Stamens free, usually as many as the tepals; anthers 2-celled. Ovary ovoid; ovule solitary, erect; stigmas 2-3, erect, flexuose or recurved. Fruit a capsule or utricle, dry, indehiscent, rupturing irregularly or circumscissile. Seeds usually black and shining; testa thin.

About 60 species; chiefly tropical and temperate regions; 7 in M.P.

- 1a. Leaves with axillary, paired spines ...4. *A. spinosus*
- 1b. Leaves without axillary, paired spines:
 - 2a. Upper flower clusters in terminal, leafless, spikes or panicles:
 - 3a. Fruits dehiscent, circumscissile:
 - 4a. Tepals 3 ...6. *A. tricolor*
 - 4b. Tepals 5:
 - 5a. Terminal spikes pendulous; tepals of female flowers broadly obovate or spatulate, imbricate ...1. *A. caudatus*
 - 5b. Terminal spikes scarcely pendulous; tepals of female flowers lanceolate or oblong, not imbricate ...2. *A. hybridus*
 - 3b. Fruits indehiscent or rupturing irregularly:
 - 6a. Fruits scarcely exceeding tepals, not compressed; seeds with shallow, scurfy verrucae ...7. *A. viridis*

- 6b. Fruits distinctly exceeding the tepals,
compressed; seeds without shallow verrucae ...3. *A. lividus*
- 2b. Upper flower clusters axillary, leafy, never in
spikes or panicles:
- 7a. Tepals 2; capsules hyaline with
longitudinal ribs ...5. *A. tenuifolius*
- 7b. Tepals 3; capsules neither hyaline nor ribbed ...6. *A. tricolor*

1. *Amaranthus caudatus* L., Sp. Pl. 990. 1753; Hook. f., Fl. Brit. India 4: 719. 1885. - *Chaulai*, *Ramdana*.

Herbs, annual, erect, up to 1.5 m high; stems stout, sparingly branched or unbranched. Leaves broadly ovate to rhomboid-ovate or ovate-elliptic, 2.5-14 x 1-7 cm, obtuse to subacute at apex, shortly cuneate at base, glabrous or pilose beneath on nerves; petioles ca 8 cm long. Flowers in axillary and terminal, red or green, ca 30 x 1.5 cm spikes; male and female flowers intermixed; bracts and bracteoles deltoid-ovate. Tepals 5; in male flowers 2.5-3.5 mm long, acute, aristate; in female flowers broadly obovate or spatulate, 1.75-2.5 mm long, mucronate. Capsules ovoid-globose, 2-2.5 mm across, circumscissile. Seeds compressed, 0.75-1.25 mm across, black, shining.

Cultivated and also as an escape in wastelands. Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, East Nimar, West Nimar. *Fl. & Fr.*: Aug. Oct.

2. *Amaranthus hybridus* L. subsp. *incurvatus* (Gren. & Godr.) Brenan var. *paniculatus* (L.) Mansf. in *Die Kulturpfl. Beih* 2: 54. 1959. *A. paniculatus* L., Sp. Pl. ed. 2: 1406. 1763; Hook. f., Fl. Brit. India 4: 718. 1885. - *Chaulai*, *Lal rojju*, *Ramdana*.

Herbs, annual, erect or ascending, ca 2 m high; stems stout, branched, angular. Leaves broadly lanceolate to rhomboid or ovate, 3-19 x 1.5-8 cm, mucronulate at apex, attenuate at base; petioles up to 15 cm long. Flowers in axillary and terminal spikes; terminal spikes simple or in much branched panicle, up to 45 x 25 cm; male and female flowers intermixed; bracts and bracteoles deltoid-ovate to deltoid-lanceolate, subequal or longer than tepals. Tepals 5, lanceolate or oblong, 1.5-3.5 mm long. Capsules subglobose to ovoid, 2-3 mm long, circumscissile; lid smooth. Seeds compressed, 0.75-1.25 mm across, black.

As weed in cultivated fields and wastelands. Chhatarpur, Chhindwara, Damoh, Raigarh, Raipur, Satna, Shahdol, Sidhi. *Fl. & Fr.*: Aug. - Oct.

3. *Amaranthus lividus* L., Sp. Pl. 990. 1753. *A. blitum* L., Sp. Pl. 990. 1753, *nom. conf.*; Hook. f., *Fl. Brit. India* 4: 721. 1885, *excl. var. sylvestris*. *A. oleraceus* L., Sp. Pl. ed. 2. 1403. 1763.

Herbs, annual, erect, ascending or prostrate, 6-60 cm high; stems slender to stout, simple or branched. Leaves ovate to rhomboid-ovate, 1-8 x 0.6-6 cm, mucronulate at apex, shortly cuneate at base, glabrous; petioles up to 10 cm long. Flowers in terminal and axillary, slender to stout spikes or panicles, green; terminal spikes 0.6-11 x 0.3-2 cm; male and female flowers intermixed; bracts and bracteoles deltoid-ovate to lanceolate. Tepals 3, membranous on margin. Capsules subrotund, compressed, exceeding the tepals, 1.25-2.5 mm long. Seeds rounded, compressed, 1-1.75 mm across, black.

1a. Plants erect or ascending; leaves 4-8 cm long;
fruits 2-2.5 mm long ...3.1. subsp. *lividus*

1b. Plants prostrate to decumbent; leaves up to
4 cm long; fruits up to 1.75 mm long ...3.2. subsp. *polygonoides*

3.1. subsp. *lividus*

Rare. Bastar. *Fl. & Fr.*: Feb.

3.2. subsp. *polygonoides* (Moq.) Probst, Wolladventivflmitteleur. 74. 1949. *Eucolus viridis* (L.) Moq. var. *polygonoides* Moq. in DC., Prodr. 13(2): 274. 1849. *Amaranthus lividus* L. var. *polygonoides* (Moq.) Thell. in Rep. Bot. Soc. & Exch. Club 5: 574. 1920.

As weed in wastelands. Bilaspur, Indore, Satna, Sidhi. *Fl. & Fr.*: Aug. - Oct.

4. *Amaranthus spinosus* L., Sp. Pl. 991. 1753; Hook. f., *Fl. Brit. India* 4: 718. 1885. - *Kanta khutna*, *Kantewali chaulai*, *Kateli chaulai*.

Herbs, annual, erect, branched, up to 1 m high. Leaves ovate to rhomboid-ovate, elliptic, lanceolate-oblong or lanceolate, 1.5-12 x 0.8-6 cm, mucronate at apex, cuneate or attenuate at base, glabrous; petioles up to 9 cm long, sometimes longer than lamina; each leaf-axil bearing a pair of

ca 2.5 cm long spines. Flowers in axillary clusters or in terminal, up to 15 x 1 cm spikes, green; lower clusters and lower part of spikes bearing only female flowers; upper part of spikes with male flowers; bracts and bracteoles deltoid-ovate, awned; bracteoles shorter than bracts. Tepals 5. Capsules ovoid-urceolate, ca 1.5 mm long. Seeds compressed, 0.75-1 mm across, black.

Extremely common in wastelands and disturbed areas along roadsides. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Shahdol, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Throughout the year.

5. *Amaranthus tenuifolius* Willd., Sp. Pl. 4: 381. 1805; Hook. f., Fl. Brit. India 4: 722. 1885.

Herbs, annual, prostrate, usually branched from the base, glabrous. Leaves oblong or oblong-linear, 0.5-2 x 0.2-0.5 cm, obtuse to emarginate at apex, attenuate at base, entire, glabrous. Flowers in axillary, cymose clusters; bracts present, hyaline on margin. Tepals 2. Capsules ellipsoid, compressed, hyaline, with longitudinal ribs.

Chhatarpur, Indore. *Fl. & Fr.*: March - June.

6. *Amaranthus tricolor* L., Sp. Pl. 989. 1753. *A. tristis* L., Sp. Pl. 989. 1753. *A. mangostanus* L., Cent. Pl. I. 32. 1755; Hook. f., Fl. Brit. India 4: 720. 1885. *A. polygamus* L., Cent. Pl. I. 32. 1755; Hook. f., Fl. Brit. India 4: 721. 1885. *A. gangeticus* L., Syst. Nat. ed. 10. 2: 1268. 1759; Hook. f., Fl. Brit. India 4: 719. 1885.

Herbs, annual, erect or ascending, usually much branched, ca 1 m high. Leaves variable, broadly ovate, rhomboid-ovate or broadly elliptic to lanceolate-oblong, 1-8 x 1-3 cm, emarginate, obtuse or acute at apex, shortly cuneate to attenuate at base; petioles up to 8 cm long. Flowers in more or less globose, 4-25 mm across clusters; clusters axillary or sometimes only lower axillary, upper often in terminal spikes; male and female flowers intermixed; bracts and bracteoles deltoid-ovate; bracteoles awned at apex, broadest near the base. Tepals 3, 3-5 mm long, awned. Capsules ovoid-urceolate, 2.25-2.75 mm long, circumscissile. Seeds lenticular, 1-1.5 mm long, black or brown, shining.

Common as weed in wastelands and cultivated fields; also cultivated. Balaghat, Bastar, Chhatarpur, Damoh, Gwalior, Mandla, Raipur,

Rajnandgaon, Satna, Shahdol, Sidhi, Surguja, Tikamgarh, West Nimar.
Fl. & Fr.: Aug. - Oct.

7. *Amaranthus viridis* L., Sp. Pl. ed. 2. 1405. 1763; Hook. f., Fl. Brit. India 4: 720. 1885. *A. gracilis* Desf., Tabl. Ecole Bot. 43. 1804.
Chaulai.

Herbs, annual, erect or ascending, slender, 10-75 cm high. Leaves deltoid-ovate to rhomboid-oblong, 2-7 x 1.5-5.5 cm, shortly mucronate at apex, cuneate to subtruncate at base, glabrous; petioles up to 10 cm long. Flowers in axillary or terminal, 2.5-12 x 0.2-0.5 cm, slender, often paniculate spikes; male and female flowers intermixed but female more numerous; bracts and bracteoles deltoid-ovate to lanceolate-ovate; bracteoles shorter than tepals. Tepals 3, rarely 4, 1.25-1.75 mm long. Capsules subglobose, 1.25-1.5 mm long, indehiscent or rupturing irregularly, strongly rugose. Seeds rounded, 1-1.25 mm across, dark brown to black, reticulate.

Common as weed in wastelands, cultivated fields, gardens and along roadsides. Betul, Bilaspur, Chhatarpur, Damoh, Dhar, East Nimar, Indore, Mandla, Raigarh, Raipur, Rewa, Satna, Shivpuri, Sidhi, West Nimar. *Fl. & Fr.*: Throughout the year.

Leaves are used as vegetables.

6. CELOSIA L.

Herbs, sometimes rather woody at base, annual or perennial, occasionally scandent. Leaves simple, alternate, entire or somewhat lobed. Flowers in axillary and terminal, dense to lax spikes or thyrses, bisexual, bracteate, 2-bracteolate; lateral cymes lax to dense, forming sessile clusters. Tepals 5, free, equal. Stamens 5; filaments connate at base into a short sheath, free portions deltoid below and filiform above, more or less swollen or with teeth projecting on either side of the anther; anthers 2-celled. Ovary with few to many ovules; style elongate to almost obsolete; stigmas usually 2-3. Fruit a capsule, sometimes thickened above, circumscissile. Seeds rounded, usually strongly compressed, black, shining, reticulate, grooved or tuberculate.

About 50 species; subtropical regions of America and Africa; one in M.P.

Celosia argentea L., Sp. Pl. 205. 1753; Hook. f., Fl. Brit. India 4: 714. 1885. *C. cristata* L., Sp. Pl. 205. 1753; Hook. f., Fl. Brit. India 4: 715. 1885. *C. coccinea* L., Sp. Pl. ed. 2. 297. 1762. - *Safed murgha*, *Silver*.

Herbs, annual, erect, 0.4-2 m high; stems and branches strongly ridged, glabrous. Leaves lanceolate-oblong to narrowly linear, 2-15 x 0.2-3.2 cm, acute to obtuse at apex, tapering at base into a slender petiole, glabrous. Flowers in terminal, dense, many-flowered, silvery to pink, conical at first but later cylindrical, 2.5-20 x 1.5-2.2 cm spikes; peduncles up to 20 cm long; bracts and bracteoles lanceolate or the lower deltoid, 3-5 mm long, persistent. Tepals narrowly elliptic-oblong, 6-10 mm long, acute or obtuse. Filaments very delicate; sinuses rounded; anthers and filaments magenta to cream-coloured. Capsules ovoid to globose, 3-4 mm across. Seeds lenticular, 1.25-1.5 mm long, reticulate.

Common as weed in cultivated fields, wastelands, along roadsides and in dried up river beds. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Gwalior, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Shivpuri, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Aug. Dec.

Young leaves are used as vegetables. Seeds are aphrodisiac and used for the treatment of diarrhoea, blood and eye diseases.

7. DEERINGIA R. Br.

Undershrubs or shrubs, scandent or subscandent, sometimes polygamodioecious. Leaves alternate, petiolate. Flowers in simple or paniculate racemes or spikes, bisexual and unisexual or mixed; bracts and bracteoles scarious. Tepals 5, equal, free, spreading in fruit. Stamens 4 or 5; filaments connate at base into a cup; anthers 2-celled. Ovary ovoid, sessile or stipitate; ovules few or many; styles 2 or 4, connate at base, papillose. Fruit a berry, small. Seeds few to many, reniform, compressed.

About 7 species; tropical regions of Old World; one in M.P.

Deeringia amaranthoides (Lam.) Merr., Bur. Sci. Publ. Manila 9: 247. 1917. *Achyranthes amaranthoides* Lam., Encycl. 1: 548. 1785. *Deeringia celosioides* R. Br., Prodr. 413. 1810; Hook. f., Fl. Brit. India 4: 714. 1885.

Subscandent shrubs; branches pendulous, glabrous. Leaves ovate or oblong-lanceolate, 5-10 x 3-4 cm, acuminate at apex, rounded at base, entire or undulate. Flowers in terminal and axillary racemes, usually paniculate. Tepals elliptic-oblong, membranous. Berries globose, 4-7 mm across.

Rare. Bastar (Saxena & Khotela, 1976). *Fl. & Fr.*: Sept. - Dec.

8. DIGERA Forssk.

Herbs, annual; branches alternate. Leaves alternate, entire. Flowers in axillary, long pedunculate, bracteate, spiciform racemes; each bract subtending a shortly pedunculate, partial inflorescence consisting of a central fertile flower and 2 highly modified, sterile, 1-bracteolate, lateral flowers. Tepals 4-5; outer pair opposite, sheathing the remaining floral parts; inner ones more delicate, hyaline. Stamens 4-5, without intermediate staminode like teeth; filaments free, filiform; anthers 2-celled. Ovary 1-locular; ovule solitary; style filiform; stigmas 2, divergent. Fruit a nutlet, hard, indehiscent, enclosed by persistent perianth and falling together with sterile flowers and bractcoles; endosperm copious.

A monotypic genus; tropical regions of Old World.

Digera muricata (L.) Mart., Beitr. Amarantac. 77. n. 2. 1825 & in Nova Acta Leop. 13(1): 285. 1826. *Achyranthes muricata* L., Sp. Pl. ed. 2. 295. 1762. *A. alternifolia* L., Mant. Pl. 50. 1767. *Digera arvensis* Forssk., Fl. Aegypt.-Arab. 65. 1775; Hook. f., Fl. Brit. India 4: 717. 1885. *Latmahuria*, *Lesua*.

Herbs, erect or straggling, usually glabrous, 20-80 cm high. Leaves broadly ovate, 1.5-7 x 0.8-3 cm, acute or acuminate at apex, narrowed at base, glabrous; petioles slender, up to 3.5 cm long. Flowers in axillary, 15-30 cm long racemes, white, often with pink, carmine or red tinge; peduncles slender, up to 14 cm long; bracts persistent, 1-2.75 mm long. Outer tepals 3-4.5 mm long; inner tepals shorter. Fruits subglobose, 2-2.5 mm long, bluntly keeled, with persistent style.

In dry sandy places, along roadsides and as garden weed. Chhatarpur, Damoh, Dhar, Durg, Hoshangabad, Indore, Raigarh, Raipur, Rajnandgaon, Satna. *Fl. & Fr.*: July - April.

Leaves are sometimes used as vegetables.

9. GOMPHRENA L.

Herbs, annual or perennial. Leaves opposite, entire. Flowers in terminal or axillary, solitary or glomerate spikes or heads, bisexual, each solitary in the axil of a bract; spikes often subtended by a pair of sessile leaves; bracteoles 2, laterally compressed, carinate, often more or less winged or cristate along the dorsal surface or midrib, deciduous with the fruit. Tepals 5, erect, free, more or less lanate dorsally; inner 2 more or less indurate at base in fruit. Stamens 5, monadelphous; tube shortly 5-toothed with entire to very deeply 2-lobed teeth, with or without alternating pseudostaminodes. Ovary with solitary, pendulous ovule; style short or long; stigmas 2, suberect or more or less divergent. Fruit an utricle, thin-walled, rupturing irregularly, with persistent bracts. Seeds ovoid, compressed.

About 100 species; tropical America, S.E. Asia and Australia; 2 in M.P.

- 1a. Inflorescence white; bracteoles 5-6 mm long,
with a small dorsal crest ...1. *G. celosioides*
- 1b. Inflorescence pinkish to deep red; bracteoles
8-12 mm long, with a large, dorsal crest ...2. *G. globosa*

1. *Gomphrena celosioides* Mart., Beitr. Amarantac. 93. 1825 & in Nova Acta Leop. 13(1): 301. 1826. *G. decumbens* auct. non Jacq., 1804; Gamble, Fl. Madras 2: 1179. 1925.

Herbs, annual, erect or prostrate, hairy, glabrescent with age. Leaves narrowly oblong to oblong-elliptic or oblanceolate, 1.5-4.5 x 0.5-1.3 cm, obtuse to subacute at apex, narrowed to a poorly demarcated petiole at base, with long, white hairs on margins and beneath. Flowers in spikes; spikes above the uppermost pair of leaf, initially subglobose, finally elongate and cylindrical, 2-7 cm long, sessile; bracts deltoid-ovate, 2.5-4 mm long; bracteoles 5-6 mm long, mucronate. Tepals narrowly lanceolate, 4-5 mm long; outer 3 more or less flat; inner 2 sigmoid, slightly longer than the outer. Pseudostaminodes absent. Style and stigmas together ca 1 mm long. Utricles pyriform, ca 1.75 mm long. Seeds ca 1.5 mm long, brown, shining.

In wastelands, along roadsides and as weed of cultivated fields. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Indore, Raigarh, Raipur, Rajnandgaon, Satna, Seoni, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: July - April.

Roots are referred for the treatment of eye diseases.

2. *Gomphrena globosa* L. Sp. Pl. 224. 1753; Hook. *f.*, Fl. Brit. India 4: 732. 1885.

Herbs, annual, erect or decumbent, branched, densely white hairy, 15-60 cm high. Leaves broadly lanceolate to oblong or elliptic-oblong, 2.5-12 x 2-4 cm, narrowed to ill-defined petiole at base. Flowers in spikes; spikes above the uppermost pair of leaves, usually solitary, pinkish to deep red, globose or depressed globose, ca 2 cm across, sessile; bracts deltoid-ovate, 3-5 mm long; bracteoles 8-12 mm long, with irregularly dentate crest. Tepals 6-6.5 mm long; outer ones more lanate; inner less indurate at base. Pseudostaminodes absent. Style and stigmas together ca 2.5 mm long. Utricles oblong-ovoid, compressed, ca 2.5 mm long. Seeds ca 2 mm long, brown, shining.

Commonly cultivated as ornamental and occasionally found as escape by roadsides and in wastelands. Chhatarpur, Indore, Raipur. *Fl. & Fr.*: July - April.

10. NOTHOSAERVA Wight

Herbs, annual. Leaves opposite or alternate, entire. Flowers in dense, solitary or clustered spikes, small, bisexual, sessile, solitary in the axil of scarious bract. Tepals 3-4, hyaline, subtended by 2, very small bracteoles. Stamens 1 or 2; filaments filiform, without intermediate teeth; anthers 2-celled. Ovary with solitary, pendulous ovule; style short; stigma capitate. Fruit a capsule, delicate, rupturing irregularly, falling with persistent perianth, bracts and bracteoles. Seeds rounded, laterally compressed; endosperm copious.

A monotypic genus; tropical Africa to tropical Asia.

***Nothosaerva brachiata* (L.) Wight**, Icon. Pl. Ind. Orient. 6: 1. 1853; Hook. *f.*, Fl. Brit. India 4: 726. 1885. *Achyranthes brachiata* L., Mant. Pl. 50. 1767. *Illecebrum brachiatum* (L.) L., Mant. Pl. 213. 1771. *Pseudanthus brachiatus* (L.) Wight, Icon. Pl. Ind. Orient. 5(2): 3. t. 1776. bis. 1852.

Fig. 75.

Herbs, erect, 8-30 cm high; branches many, opposite, spreading from about the base upwards. Leaves narrowly or broadly elliptic, elliptic-

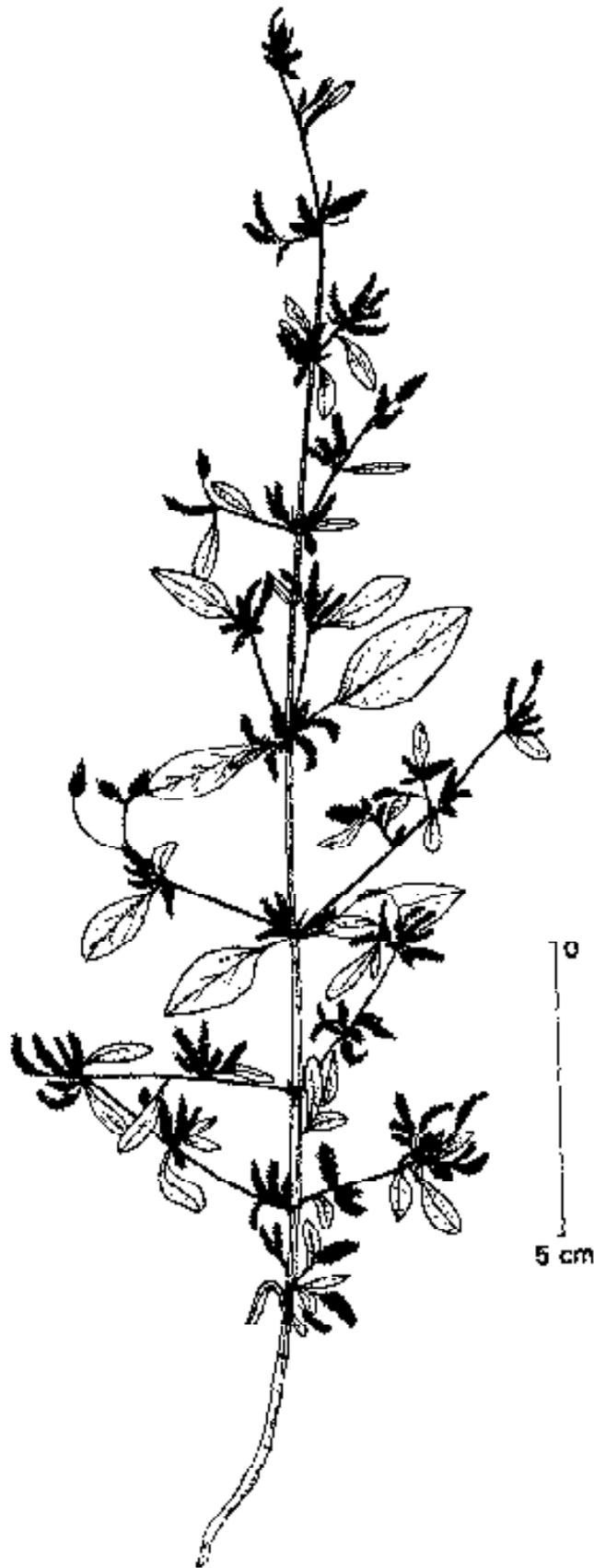


Fig. 75. *Nothosaerva brachiata* (L.) Wight

oblong, 5-20 x 2-10 mm, obtuse to subacute at apex, abruptly narrowed to a petiole. Flowers in spikes; spikes white, clustered in leaf axils or on axillary shoots, 2-10 x 1-2 mm, sessile or shortly pedunculate; peduncles pilose; bracts concave, *ca* 0.5 mm long, hyaline, minutely erose, nerveless; bracteoles minute, hyaline. Tepals broadly ovate, 1-1.25 mm long, villous outside. Capsules *ca* 0.75 mm long, falling with persistent perianth. Seeds chestnut-brown, smooth, shining.

Along roadsides and in moist, sandy areas. Panna, Sama. *Fl. & Fr.*: Oct. - March.

11. PSILOTRICHUM Blume

Herbs or undershrubs, annual or perennial, prostrate to scandent. Leaves opposite, entire. Flowers in axillary and terminal heads or spikes, bisexual, solitary in the axil of each bract, 2-bracteolate; bracts persistent, finally spreading or deflexed; bracteoles falling with the fruiting tepals. Tepals 5, free, strongly to faintly nerved; outer 2 more or less indurate at base. Stamens 5, connate at base, without or rarely with alternating pseudostaminodes; anthers 2-celled. Ovary with solitary, pendulous ovule; style slender but short; stigma capitate. Fruit an utricle, thin-walled, bursting irregularly. Seeds ovoid or lenticular, compressed, brownish.

About 15 species; tropical regions of Old World especially Africa; one in M.P.

Psilotrichum ferrugineum* (Roxb.) Moq. in DC., Prodr. 13(2): 279. 1849; Hook. f., Fl. Brit. India 4: 725. 1885. *Achyranthes ferruginea* Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 502. 1824. **Fig. 76.*

Herbs, annual, glabrous, 5-20 cm high; branches prostrate. Leaves linear or obovate-oblong, 2-3 cm long. Flowers in spikes, white; spikes terminal or in the fork of branches, densely flowered. *ca* 1.25 cm long; bracts subulate-lanceolate. Outer tepals boat-shaped, *ca* 2 mm long, obtuse, ribbed, deeply grooved, glabrous. Pseudostaminodes absent. Utricles globose or compressed, indehiscent. Seeds lenticular, inverse.

In moist places of the forests. Balaghat, Mandla, Raigarh. *Fl. & Fr.*: July - Nov.



Fig. 76. *Psilotrichum ferrugineum* (Roxb.) Moq.

12. PUPALIA Juss., *nom. cons.*

Herbs or undershrubs, annual or perennial. Leaves opposite, entire. Flowers in terminal, spiciform thyrses; bracts persistent, deflexed, entire, each subtending a single, central, bisexual flower and several, lateral, sterile ones modified into stellately spreading hooked or glochidiate spines. Spines first very small, finally disposed in 3 or more clusters of 5-20. Tepals 5. Stamens 5; filaments connate at base into a fleshy, lobed, disk like cup; anthers 2-celled. Pseudostaminodes absent. Ovary with solitary, pendulous ovule; style slender; stigma capitate. Fruit an utricle, thin-walled, rupturing irregularly. Seeds oblong-ovoid or ovoid, slightly compressed; endosperm copious.

Four species; tropical regions of Old World; one in M.P.

Pupalia lappacea (L.) Juss., Ann. Mus. Hist. Nat. 2: 132. 1803; Hook. f., Fl. Brit. India 4: 724. 1885. *Achyranthes lappacea* L., Sp. Pl. 204. 1753. *A. atropurpurea* Lam., Encycl. 1: 546. 1785. *Pupalia atropurpurea* (Lam.) Moq. in DC., Prodr. 13(2): 331. 1849; Hook. f., Fl. Brit. India 4: 723. 1885. - *Chitchita*.

Herbs, annual or perennial, 0.3-1 m high; stems much branched, swollen at nodes, 4-angled; branches opposite, pilose to tomentose. Leaves ovate-elliptic to oblong or orbicular, 2-10 x 1-5 cm, acuminate at apex, cuneate at base; petioles 2-2.5 cm long. Flowers in spikes; spikes dense when young, up to 50 cm long; peduncles 1-10 cm long; bracts lanceolate, 1.5-2.5 mm long; partial inflorescence of one solitary, bisexual flower subtended by a triad of one and two modified flowers, falling intact as burr; bracteoles of sterile flowers ovate-lanceolate. Tepals oblong-ovate to lanceolate-ovate; outer two 3-5 mm long; inner three terminating in 5-18 setae; setae 3-7 mm long. Utricles ovoid, 2-2.5 mm long. Seeds ca 2 mm long, dark brown, shining.

In wastelands and along roadsides. Bastar, Chhatarpur, Damoh, Gwalior, Hoshangabad, Indore, Raipur, Rewa, Sagar, Satna, Seoni, Shahdol, Shivpuri, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Aug. March.

13. TRICHURIELLA Bennet

Herbs, perennial, erect; branches opposite or whorled. Leaves opposite or whorled, entire. Flowers in axillary and terminal, dense spikes, bisexual,

bracteate, 2-bracteolate; bracts and bracteoles small, membranous, persistent, each bract subtending a single flower. Tepals 4, lanceolate-subulate, persistent. Stamens 4, shortly connate at base, alternate with pseudostaminodes; anthers 2-celled. Pseudostaminodes 3 angled to subquadrate. Ovary with solitary, pendulous ovule; style very short; stigmas 2, very short, divergent. Fruit an utricle, thin-walled, circumscissile. Seeds ovoid, with a thin-walled area of shallow depression.

A monotypic genus; S.E. Asia (India, Ceylon and Thailand).

Trichuriella monsoniae (L. f.) Bennet in Indian J. For. 8: 86. 1985. *Illecebrum monsoniae* L. f., Suppl. Pl. 161. 1782. *Celosia monsonia* Retz., Observ. Bot. 2: 13. 1781. *Aerva monsonia* (Retz.) Mart., Beitr. Amarantac. 83. 1825 & in Nova Acta Leop. 13(1): 291. 1826; Hook. f., Fl. Brit. India 4: 728. 1885. *Trichurus monsoniae* (L. f.) C. Townsend in Kew Bull. 29(3): 466. 1974. **Fig. 77.**

Herbs, up to 40 cm high; stems slender, simple or branched, with pale, raised ridges. Leaves crowded on lower internodes, mostly opposite or whorled in the upper part, linear-filiform, up to 2.5 cm long. Flowers in terminal, up to 4 cm long spikes; bracts lanceolate, ca 2 mm long, lanate, hyaline; bracteoles smaller. Tepals ca 2.5 mm long, hyaline, dorsally lanate, curving towards the apex of spike. Utricles ca 1 mm long, circumscissile; lid often longitudinally split. Seeds ovoid, ca 0.6 mm long, reddish brown, shining.

On dried river beds, hill slopes, among boulders, in wastelands and along roadsides. Bastar, Bhopal, Bilaspur, Hoshangabad, Raigarh, Raipur, Seoni, Surguja. *Fl. & Fr.*: Aug. May.

112. CHENOPODIACEAE

(A.K. Mukherjee)

About 120 genera and 1300 species; cosmopolitan especially in desert and semidesert areas; one genus and 3 species wild in M.P. (*Atriplex hortensis* L., *Beta vulgaris* L., *Kochia scoparia* Schrad., *K. trichophylla* Voss. and *Spinacia oleracea* L. are cultivated).

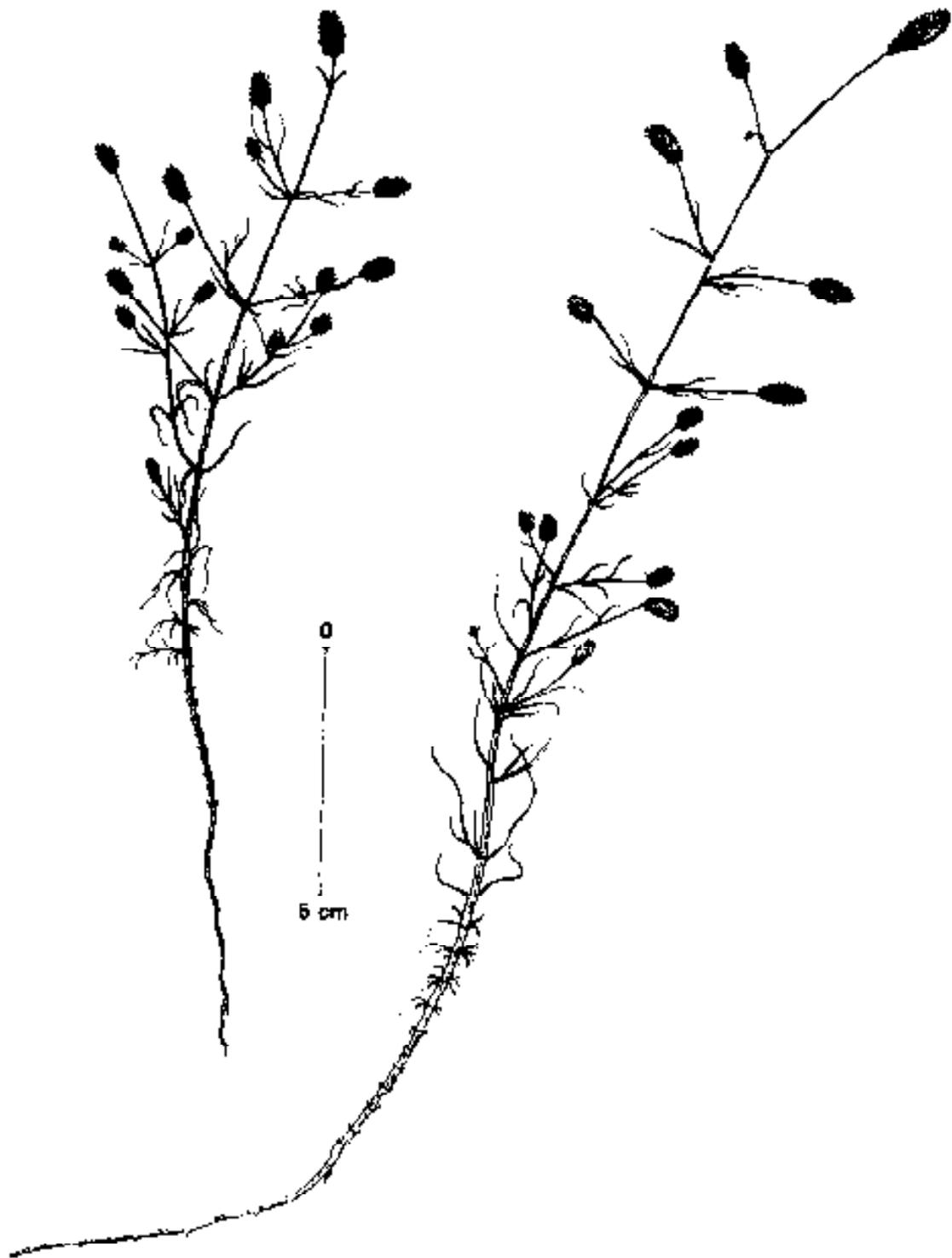


Fig. 77. *Trichuriella monsuniae* (L. f.) Bennet

CHENOPODIUM L.

Herbs, annual or perennial, erect or ascending, sometimes strongly aromatic; stems angular. Leaves alternate, entire, lobed or dentate. Flowers in axillary clusters, spikes or cymes, very small, bisexual, ebracteate, ebracteolate. Tepals 3-5. Stamens 1-5, hypogynous or subperigynous, free or connate at base; anthers 2-celled. Disk absent. Ovary depressed globose or compressed; style short; stigmas 2-5. Fruit an utricle, membranous, included in tepals. Seeds horizontal or vertical, rounded or denticulate; testa crustaceous or coriaceous.

About 150 species; temperate regions; 3 in M.P.

- 1a. Plants strongly aromatic, glandular; stigmas 3-5...2. *C. ambrosioides*
- 1b. Plants not strongly aromatic, eglandular; stigmas 2:
- 2a. Secondary nerves not very prominent; terminal panicle much larger than the axillary ones; seeds smooth, blackish brown, shining ...1. *C. album*
- 2b. Secondary nerves very prominent; terminal panicle not much larger than the axillary ones; seeds rugose, dull black ...3. *C. murale*

1. *Chenopodium album* L., Sp. Pl. 219. 1753; Hook. f., Fl. Brit. India 5: 3. 1886. - *Bathua*, *Bethu sag*.

Herbs, annual, erect, 0.15-1 m high; young parts covered with white powdery vesicles; stems ribbed, with longitudinal, dark green or red streaks. Lower leaves ovate-rhomboid, irregularly and rather coarsely dentate-serrate-laciniate, long petiolate; upper ones elliptic-oblong-lanceolate, 1.5-15 x 0.5-13 cm, acute or obtuse at apex, acute or rounded at base, less deeply incised or entire, shortly petiolate; secondary nerves not prominent. Flowers in terminal, leafy, paniculate clusters, 5-merous. Tepals ovate, 1.5-2.25 mm long, obtuse. Stigmas 2, short. Utricles depressed globose, finely papillate, enclosed by incurved tepals. Seeds horizontal, lenticular, 1.25-1.75 mm across, surrounded by an obtuse keel, blackish brown, shining.

Common in cultivated fields, along river banks and in wastelands. Bilaspur, Chhatarpur, Damoh, Hoshangabad, Jabalpur, Mandla, Panna, Raigarh, Raipur, Sagar, Satna, Sidhi, Surguja. Fl. & Fr.: Sept. March.

The plant is laxative, anthelmintic and consumed as vegetables.

2. *Chenopodium ambrosioides* L., Sp. Pl. 219. 1753; Hook. *f.*, Fl. Brit. India 5: 4. 1886.

Herbs or undershrubs, annual, erect, strongly aromatic; stems sparsely pubescent. Leaves oblong or lanceolate, 5-10 x 3-5 cm, obtuse at apex, attenuate at base; lower leaves subentire to shallowly serrate-dentate; upper entire. Flowers in dense glomerules or paniculate, interrupted spikes, sessile. Tepals green, 4-5, connate at base, ovate-deltoid, *ca* 1 mm long, hairy outside. Stigmas 3-5. Utricles enclosed by tepals. Seeds horizontal or vertical, orbicular, *ca* 1 mm across, reddish brown, smooth.

Rare. On river bank. Bastar. *Fl. & Fr.*: Feb. April.

3. *Chenopodium murale* L., Sp. Pl. 219. 1753; Hook. *f.*, Fl. Brit. India 5: 4. 1886. - *Bajhua*.

Herbs, annual, erect, 15-80 cm high. Leaves ovate-rhomboid-deltoid, 2-7 x 1.5-5 cm, acute at apex, cuneate at base, irregularly coarsely dentate-serrate; secondary nerves prominent; petioles of lower leaves 3-5 cm long. Flowers in axillary and terminal, 1-4 cm long panicles; terminal panicle not longer than axillary ones. Tepals distinctly connate at base, ovate, 1.5-2 mm long. Stigmas 2, short. Utricles depressed globose, 1.25-1.5 mm across. Seeds horizontal, encircled by sharp keel; testa dull black, very finely papillate.

In wastelands and cultivated fields. Chhatarpur, Raipur, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: Dec. - March.

113. BASELLACEAE

(A.K. Mukherjee)

Four genera and about 15 species; tropical and subtropical regions especially America; one species in M.P.

BASELLA L.

Twiners, much branched, fleshy. Leaves alternate, entire, petiolate, exstipulate. Flowers in axillary and/or terminal spikes, small, bisexual,

5-merous, sessile; bract 1, small, green, caducous; bracteoles 2, fleshy, adnate to perianth. Perianth 5-fid, petaloid, fleshy; tepals short, incurved, imbricate. Stamens 5, perigynous, included, opposite to tepals; anthers 2-celled, versatile. Ovary 1-locular; ovule solitary; stigmas 3. Fruit an utricle, globose or ovoid, adhering to seed, included in fleshy perianth. Seeds erect, globose or subglobose; testa crustaceous; albumen scanty.

Six species; 2 in tropical Africa, 3 in Madagascar and 1 pantropical; one in M.P.

Basella alba L., Sp. Pl. 272. 1753. *B. rubra* L., Sp. Pl. 272. 1753; Hook. f., Fl. Brit. India 5: 20. 1886. *B. cordifolia* Lam., Encycl. 1: 382. 1785. - *Poi*, *Poibhaji*, *Poye*.

Herbs, perennial, climbing; branches terete. Leaves ovate-elliptic to oblanceolate, 4-10 x 3-6 cm, gradually acute at apex, rounded at base; petioles 1.5-2.5 cm long. Flowers in 7-10 cm long, slender spikes bearing crowded flower buds in the upper half; mature flowers farther apart; bracts ovate, ca 1.3 mm long, acute; bracteoles ovate, concave, ca 1 mm long, acute, partly adnate to perianth-tube. Perianth suburceolate, ca 3 mm across, pinkish green; lobes equal or outer 2 slightly larger, ovate, ca 1.5 mm long, acute; tube ca 2.5 mm long. Utricles ovoid, ca 6 mm across, black on ripening, with deep purple juice. Seeds globose.

Climbers on bushes and hedges, often cultivated. Damoh, Indore, Raigarh, Raipur, Sidhi and possibly in other districts too. *Fl. & Fr.*: March - Dec.

It is said that the mucilage of this plant especially of the petiole and midrib accumulates radioactive strontium. The cultivated plants are sold as leafy vegetables. The petioles and the midrib are thrown away before cooking.

114. PHYTOLACCACEAE

(R. Prasad)

About 18 genera and 65 species; tropical and subtropical regions especially America; one species in M.P.

RIVINA L.

Herbs, erect; stems woody. Leaves alternate, petiolate; stipules small, caducous. Flowers in axillary, rarely terminal, erect racemes, bisexual; pedicels slender; bracts small, subulate; bracteoles 2, caducous. Tepals 4. Stamens 4, hypogynous, alternate with tepals; filaments filiform; anthers oblong, erect. Ovary subglobose, 1-locular; ovule solitary; style short; stigma capitellate. Fruit a berry, subglobose. Seeds erect, lenticular.

A monotypic genus; S. United States to tropical America.

Rivina humilis L., Sp. Pl. 121. 1753. *R. laevis* L., Mant. Pl. 41. 1767; Hook. f., Fl. Brit. India 5: 21. 1886. *R. orientalis* Moq. in DC., Prodr. 13(2): 12. 1849.

Herbs, perennial, erect, repeatedly branched, 0.4-1 m high; stems in the upper part patently pubescent. Leaves ovate-oblong or ovate-lanceolate, 4-12 x 1.5-4 cm, long acuminate or acute at apex, obtuse, rounded or subcordate at base, glabrous above, sparsely pubescent on the midrib beneath; petioles 1-3.5 cm long, patently pubescent. Flowers in 4-10 cm long, sparsely hairy racemes; pedicels 2-4 mm long. Tepals cream-coloured, obovate-oblong, 2-3 mm long, obtuse, persistent. Berries 3-3.5 mm across, crimson red on maturity, 1-seeded.

Usually cultivated in gardens and often in wild as escape. Indore, Jabalpur (Dommachan, and Shrivastava, 1996). *Fl. & Fr.*: Aug. - Nov.

115. POLYGONACEAE

(S.K. Srivastava and O.P. Mishra)

About 5 genera and 1050 species; more or less cosmopolitan but especially in N. temperate regions; 4 genera and 18 species in M.P.

- 1a. Plants climbers; tendrils present ...1. *Antigonon*
- 1b. Plants erect or prostrate; tendrils absent:
 - 2a. Undershrubs or shrubs; branches flattened; perianth fleshy in fruits ...2. *Muehlenbeckia*
 - 2b. Herbs; branches never flattened; perianth not fleshy in fruits:

- 3a. Perianth-lobes 3-5, 1-seriate, not much enlarged in fruits: stigmas capitate ...3. *Polygonum*
- 3b. Perianth-lobes 6, 2-seriate, inner whorl much enlarged in fruits: stigmas fimbriate ...4. *Rumex*

1. ANTIGONON Endl.

Climbers; branchlets and rachis of the inflorescence often terminating in tendrils. Leaves amplexicaul at base, petiolate, stipulate; stipules small or often reduced to stipulary line. Flowers in small fascicles; pedicels articulate. Perianth 5-6-merous, pink or red, cyclic or acyclic; 3 outer tepals in fruit dry, accrescent, forming wings. Stamens 7-9, connate at base into a ring, with short teeth between the filaments. Ovary 3-angled; ovules on long funicle, at first pendulous, subsequently erect; styles 2-3, free; stigmas capitate, papillose. Fruit a nut, 3-angled.

About 3 species; C. America; one in M.P.

Antigonon leptopus Hook. & Arnott, Bot. Beechey Voy. 308. t. 69. 1838.

Shrubs, tendril climbing, slender. Leaves ovate-deltoid or deltoid, 5-10 cm long, undulate, pubescent on the nerves beneath. Flowers in fascicles arranged in axillary racemes; rachis of racemes frequently terminated by branched tendrils. Tepals 5, pink-red. Stamens 8. Styles 2; stigmas 2. Nuts ovoid-conical. Seeds deeply grooved.

Common along roadside bushes and hedges, often cultivated. Chhatarpur, Damoh, Dhar, Indore, Raipur, Satna. *Fl. & Fr.*: July - Nov.

2. MUEHLENBECKIA Meisn., *nom. cons.*

Undershrubs or shrubs; branches leafless, green, with stipulary line at nodes. Leaves small, fleshy, caducous. Flowers in axillary clusters or short, lateral spikes. Perianth deeply 5-fid, more or less fleshy in fruit. Stamens 8-9, reduced to staminodes or absent in females. Ovary 3-angled; styles 3, often very short; stigmas broadly lobed or fimbriate.

About 15 species; Australia, New Zealand and S. America; one in M.P.

Muehlenbeckia platyclada (F.v. Muell. ex Hook.) Meisn. in Bot. Zeit. 22: 313. 1865. *Coccoloba platyclada* F.v. Muell. ex Hook. in Curtis, Bot. Mag. t. 5382. 1863.

Shrubs, glabrous; branches modified into phylloclades. Leaves rhomboid, hastate, appearing during rainy season. Flowers in axillary clusters at nodes. Perianth greenish white, campanulate. Fruits baccate, with fleshy perianth.

Planted on sandy alluvial soil in parks and gardens. Bhopal, Bilaspur, Hoshangabad. *Fl. & Fr.*: June - Sept.

3. POLYGONUM L., *nom. cons.*

Herbs, rarely shrubs, usually erect. Leaves alternate, entire, rarely lobed; stipules membranous, ocreate. Flowers in sessile clusters arranged in spiciform (pseudo-spikes), capituliform or paniculate racemes, bisexual, small or minute; pedicels short, usually jointed under the perianth; bracts and bracteoles membranous, ocreate. Disk glandular or absent. Perianth 4-5-lobed, rarely 3-lobed. Stamens 5-8, rarely 1-4, perigynous; filaments filiform, dilated at base; anthers 2-celled; cells distinct, jointed by a small connective. Ovary compressed or 3-angled; ovule solitary, usually stipitate; styles 2 or 3, free or slightly connate at base; stigmas capitate. Fruit a nutlet, compressed or 3-angled, with obtuse or acute angles, covered by the persistent perianth; pericarp usually hard, shining or dull. Seeds albuminous.

About 150 species; cosmopolitan especially N. temperate regions; 13 in M.P.

- 1a. Flowers axillary, solitary or 2-3 in a cluster ...10. *P. plebeium*
- 1b. Flowers in terminal pseudo-spikes, spurious heads, panicles or racemes:
 - 2a. Flowers in cymosely disposed spurious heads:
 - 3a. Heads subtended at the base by a leafy involucre ...9. *P. nepalense*
 - 3b. Heads without a leafy involucre:
 - 4a. Undershrubs; stems without prickles on nodes; styles 3; nutlets 3-angled ...1. *P. auriculatum*

- 4b. Herbs; stems with recurved prickles
on nodes; styles 2; nutlets biconvex ...3. *P. dichotomum*
- 2b. Flowers in pseudo-spikes, racemes or panicles:
- 5a. Nutlets 3-angled:
- 6a. Bracts distant; perianth glandular ...5. *P. hydropiper* subsp.
microcarpum var. *triquetrum*
- 6b. Bracts closely set; perianth eglandular:
- 7a. Stems and peduncles with
recurved prickles ...13. *P. strigosum*
- 7b. Stems and peduncles
without prickles:
- 8a. Leaves acute at base; ocreae
with cilia longer than tube ...2. *P. barbatum*
- 8b. Leaves rounded at base; ocreae
with cilia shorter than tube ...12. *P. serrulatum*
- 5b. Nutlets biconvex:
- 9a. Ocreae with a spreading or
reflexed limb at base ...7. *P. limbatum*
- 9b. Ocreae without limb:
- 10a. Ocreae and bracts glabrous ...4. *P. glabrum*
- 10b. Ocreae and/or bracts
variously hairy or ciliate:
- 11a. Leaves up to 5 cm long and
1 cm broad, glabrous;
racemes simple ...8. *P. minus*
- 11b. Leaves more than 5 cm long
and 1 cm broad, silky tomentose
beneath; racemes paniculate:
- 12a. Bracts densely white-
woolly; perianth
2-2.5 mm long ...6. *P. lapathifolium* var.
lanatum
- 12b. Bracts hispid; perianth
4-5 mm long ...11. *P. pulchrum*

1. *Polygonum auriculatum* Meisn., Monogr. Polyg. 59. t. 6. 1826; Steenis in Blumea 16: 357. 1968. *P. chinense* var. *ovalifolium* Meisn. in Wallich, Pl. Asiat. Rar. 3: 60. 1832; Hook. f., Fl. Brit. India 5: 45. 1886. *Persicaria auriculata* (Meisn.) S.K. Dixit, B. Datt & G.P. Roy in J. Econ. Tax. Bot. 15(2): 312. 1991. *P. chinensis* (L.) H. Gross, var. *ovalifolia* (Meisn.) Hara, Fl. East. Himal. 1: 71. 1966. **Fig. 78.**

Undershrubs, rambling, semi-scandent; stems cylindrical, glabrous. Leaves ovate or oblong, 4-12 x 2-7 cm, shortly acuminate at apex, entire or crenulate, glabrous; petioles 0.7-1.3 cm long, with auricles at base; ocreae membranous, obliquely truncate. Flowers in cymosely paniculate heads, slightly fragrant, sessile; peduncles glandular hairy; bracts ovate, acute. Perianth white, 4-5 mm long, 5-lobed; tepals ovate-oblong. Ovary 3-angled; styles 3, connate at base. Nutlets 3-angled, black.

Rare. Usually near drains on slopes. Bastar. *Fl. & Fr.*: Oct. - April.

2. *Polygonum barbatum* L., Sp. Pl. 362. 1753; Hook. f., Fl. Brit. India 5: 37. 1886. *P. stagninum* Buch.-Ham. ex Meisn. in Wallich, Pl. Asiat. Rar. 3: 56. 1832; Hook. f., Fl. Brit. India 5: 37. 1886. *Persicaria barbata* (L.) Hara, Fl. East. Himal. 1: 70. 1966. - *Aesa*.

Herbs, perennial, prostrate or erect, 0.6-1.5 m high; stems glabrous or appressed hairy. Leaves linear-lanceolate, 5-20 cm long, acuminate at apex, acute, rounded or subcordate at base, subsessile, minutely hairy; ocreae with long cilia. Pseudo-spikes in panicles; peduncles glabrous or hairy; bracts ciliate on margin. Perianth white or pinkish. Nutlets ovoid-ellipsoid, 3-angled, ca 2 mm long, enclosed within persistent perianth.

- 1a. Stems appressed hairy; leaves acute at base ...2.1. subsp. *barbatum*
 1b. Stems glabrous; leaves rounded or subcordate
 at base ...2.2. subsp. *gracile*

2.1. subsp. *barbatum*

Common along streams and paddy fields associated with *Nepeta* and *Cyperus* spp. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, East Nimar, Hoshangabad, Indore, Mandla, Morena, Panna, Raigarh, Raipur, Rajnandgaon, Sagar, Satna, Seoni, Shivpuri, Sidhi, Tikamgarh, West Nimar. *Fl. & Fr.*: March - Oct.

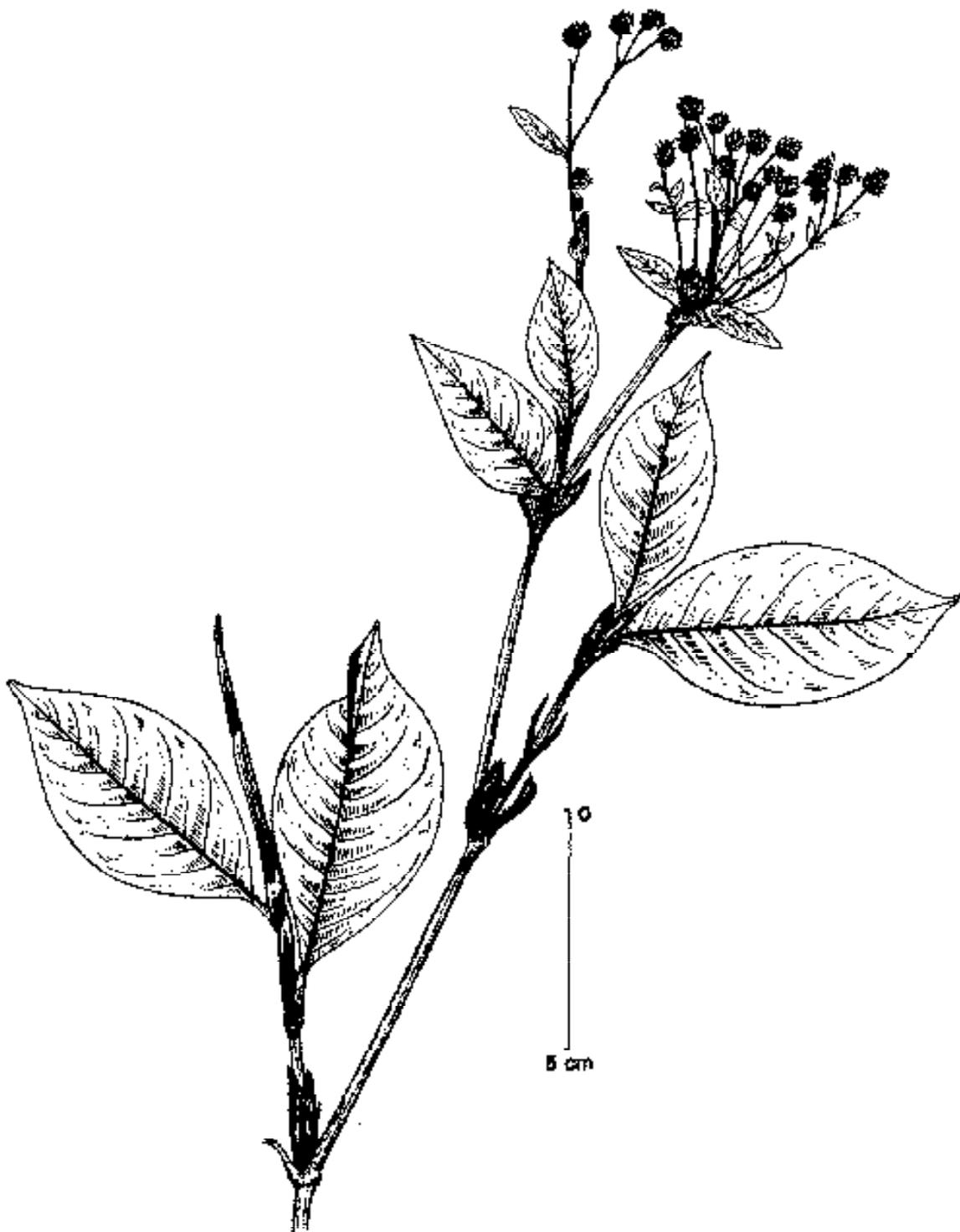


Fig. 78. *Polygonum auriculatum* Meisn.

Seeds are referred to relieve stomachache.

2.2. subsp. gracile Danser in Bull. Jard. Bot. Buit. ser. 3. 8: 146. f. 2. 1927. *Polygonum barbatum* L. var. *gracile* (Danser) Steward, Contr. Gray Herb. 5(88): 55. 1930. *P. flaccidum* Roxb., Fl. Ind. 2: 291. 1832, non Meisn., 1856. *P. serrulatum auct. non* Lag., 1816: Hook. f., Fl. Brit. India 5: 38. 1886, excl. var. *donii*.

In marshy places along the streams. Balaghat, Mandla, Surguja. *Fl. & Fr.*: July - Nov.

Notes: *Polygonum stagninum* Buch.-Ham. ex Meisn. has been treated as a variety of *P. barbatum* by Steward in Contr. Gray Herb. 5(88): 55. 1930 (Lauener and Ferguson in Notes Royal Bot. Gard. Edinb. 40: 195. 1982) while Saldanha (Fl. Karnataka 1: 181. 1984) has retained it as a distinct species. Dixit *et al.* (J. Econ. Tax. Bot. 15(2): 312. 1991) while revising the genera *Persicaria* and *Polygonum* in Madhya Pradesh have treated it under *Persicaria* as *Persicaria barbata* (L.) Hara var. *stagnina* (Buch.-Ham. ex Meisn.) S.K. Dixit, B. Datt & G.P. Roy.

3. *Polygonum dichotomum* Blume, Bijdr. 529 & 535. 1826. *P. pedunculare* Meisn. in Wallich, Pl. Asiat. Rar. 3: 58. 1832; Hook. f., Fl. Brit. India 5: 48. 1886. *P. strigosum* R. Br. var. *pedunculare* (Meisn.) Steward in Contr. Gray Herb. 5(88): 91. 1930. *Persicaria dichotoma* (Blume) S.K. Dixit, B. Datt & G.P. Roy in J. Econ. Tax. Bot. 15(2): 313. 1991.

Herbs, trailing, glabrous, up to 50 cm high; stems ascending, with recurved prickles on nodes. Leaves elliptic-oblong or linear-oblong, 2.5-8 x 0.5-1 cm, acuminate at apex, narrowed at base, softly ciliate, prickly on margins; ocreae ca 1.5 cm long, glabrous, obliquely truncate. Flowers in oblong or globose heads; peduncles glandular hairy; bracts pubescent. Perianth white, with pink tinge. Nutlets orbicular, biconvex, included within perianth-tube.

Along streams. Bastar, Hoshangabad, Rajnandgaon, Surguja. *Fl. & Fr.*: July - Nov.

4. *Polygonum glabrum* Willd., Sp. Pl. 2: 447. 1799; Hook. f., Fl. Brit. India 5: 34. 1886. *Persicaria glabra* Gomez in Ann. Inst. Segunda Enset. Habana 2: 278. 1896.

Herbs, perennial, creeping at base, 1-2.5 m high; stems stout, simple or branched, reddish below. Leaves elliptic-ovate or lanceolate, 10-20 cm long, acuminate at apex, tapering at base, glabrous, gland-dotted, dark brown, shining when dry; ocreae membranous, eciliate, closely sheathing the stems. Flowers in terminal, 5-10 cm long, slender, paniculate racemes; bracts oblong, truncate. Perianth pink-red or white; tepals oblong, obtuse. Nutlets broadly ovoid or suborbicular, glistening dark brown.

Common along ponds and drains. Balaghat, Bastar, Bilaspur, Chhatarpur, Dhar, Durg, Indore, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Oct. - April.

Plant is febrifuge. Decoction of leaves is given to treat colic pain.

5. *Polygonum hydropiper* L. subsp. *microcarpum* Danser var. *triquetrum* Danser in Bull. Jard. Bot. Buit. ser. 3. 8: 189. 1927. *P. hydropiper* L. var. *flaccidum* (Meisn.) Steward in Contr. Gray Herb. 5(88): 59. 1930. *P. flaccidum* Meisn. in DC., Prodr. 14(1): 107. 1856; Hook. f., Fl. Brit. India 5: 39. 1886, non Roxb., 1832.

Undershrubs, suberect, shortly creeping; stems rather stout, leafy, glabrous; branches glandular punctate. Leaves ovate-lanceolate or oblong, 5-12 cm long, acute or acuminate at apex, glabrous; ocreae glabrous or shortly ciliate. Flowers in filiform, decurved racemes; pseudo-spikes glandular-punctate; bracts glandular, ciliate on the upper margin. Perianth pink, glandular. Nutlets 2-3 mm long, 3-angled, brown.

On sandy alluvial soil near streams. Balaghat, Bastar, Bilaspur, Mandla, Raigarh, Rajnandgaon, Seoni, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Feb. - Sept.

The leaves are stimulant, diuretic and used for urinary disorders and as fish poison. Roots are stimulant and bitter tonic.

6. *Polygonum lapathifolium* L. var. *lanatum* (Roxb.) Steward in Contr. Gray Herb. 5(88): 46. 1930. *P. lanatum* Roxb., Fl. Ind. 2: 285. 1832. *P. lanigerum auct. non R. Br.*, 1810; Hook. f., Fl. Brit. India 5: 35. 1886. *Persicaria lapathifolia* (L.) S.F. Gray var. *lanatu* (Roxb.) Hara in Hara et al., Enum. Pl. Nepal. 3: 176. 1982.

Herbs, annual, erect or procumbent, white-woolly, 0.5-1 m high; stems with red tinge. Leaves ovate-lanceolate, 7-15 x 1-2 cm, acuminate at apex, cuneate at base, entire, glabrous above, silky tomentose beneath; ocreae ca 1.2 cm long, ciliate on margin. Flowers in axillary or terminal, paniculate racemes; bracts densely white-woolly. Perianth greenish white or pink, 2-2.5 mm long. Nutlets ovoid, compressed, 1-2 mm long, brown-black, smooth.

Rare. Along the river bank and perennial streams. Shahdol (Saxena, 1970; Dixit *et al.*, 1991). *Fl. & Fr.*: Nov. April.

The plant extract has been shown to possess antimicrobial activity.

7. ***Polygonum limbatum*** Meisn. in DC., Prodr. 14(1): 123. 1856; Hook. *f.*, Fl. Brit. India 5: 30. 1886. *Persicaria limbata* (Meisn.) Hara, Fl. East. Himal. 1: 71. 1966. - *Nandi bhaji*.

Herbs, annual, erect or decumbent; stems simple, stout, glabrous or pubescent. Leaves lanceolate, 10-20 cm long, acuminate at apex, tapering at base, entire, scaberulous; petioles short; ocreae cylindrical, strigose. Flowers in short, erect, paniculate racemes; peduncles short, strigose; pedicels short; bracts crowded, hispid. Perianth white. Nutlets orbicular, biconvex, black, smooth.

In puddles. Balaghat, Bastar, Betul, Rajnandgaon. *Fl. & Fr.*: May Nov.

8. ***Polygonum minus*** Huds., Fl. Angl. ed. I. 148. 1762; Hook. *f.*, Fl. Brit. India 5: 36. 1886, *p.p.* *P. tenellum* Blume, Bijdr. 530. 1825 *non* Roxb., 1832. *Persicaria tenella* (Blume) Hara in J. Jap. Bot. 44: 375. 1969.

Fig. 79.

Herbs, prostrate; stems slender, glabrous, angular, creeping at base and then ascending. Leaves linear or lanceolate, 2.5-5 cm long, subacute at apex, narrowed at base, glabrous; ocreae sparsely strigose, truncate, fringed with short bristles. Flowers in 1.5-2.5 cm long, erect, filiform racemes, minute; bracts tubular, short, fringed with bristles. Perianth pink or red, 5-lobed. Nutlets orbicular, rounded, biconvex, smooth, shining.

On wet sandy soil near streams. Raigarh. *Fl. & Fr.*: Nov. - Feb.

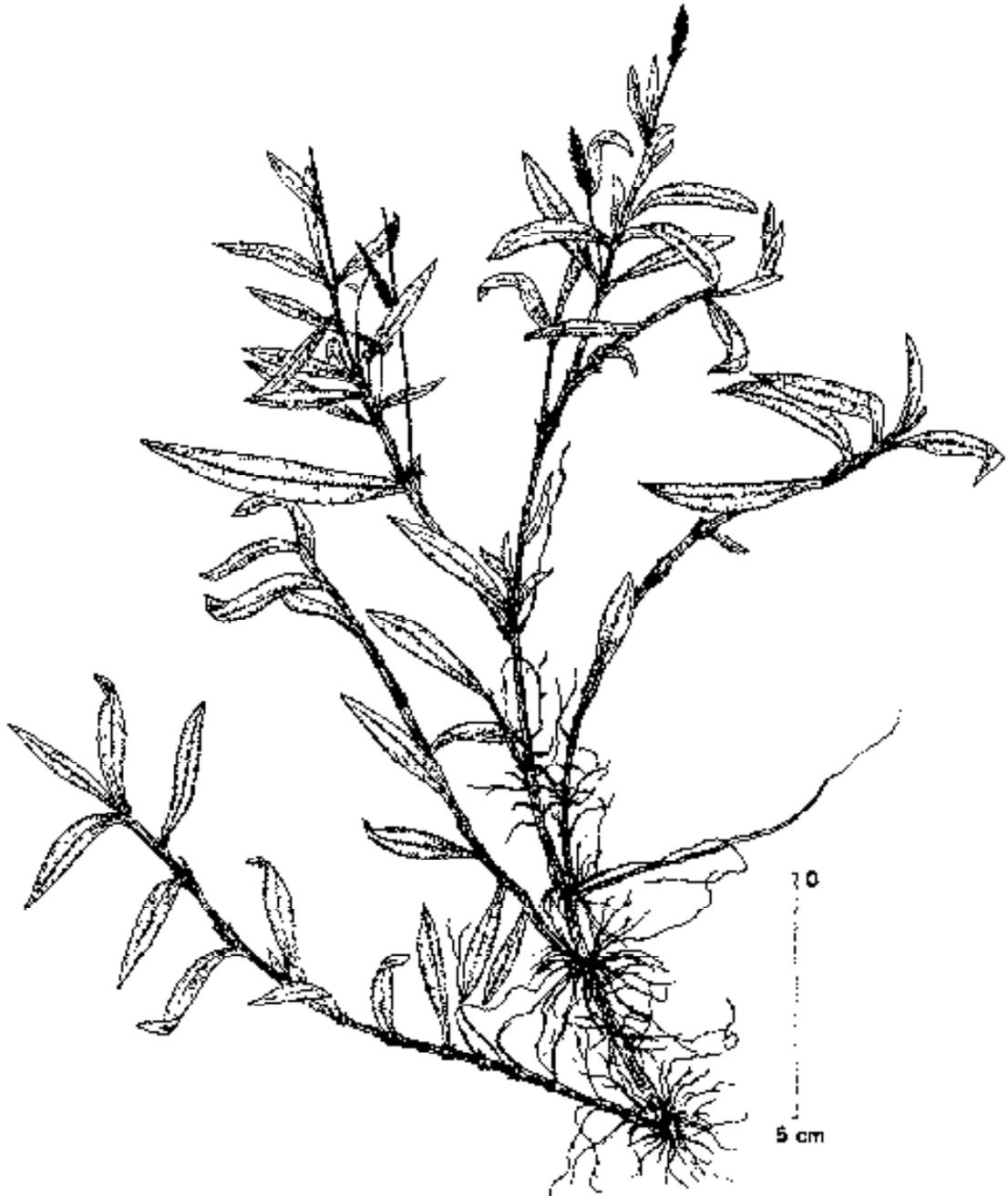


Fig. 79. *Polygonum minus* Huds.

9. *Polygonum nepalense* Meisn., Monogr. Polyg. 84. t. 7. f. 2. 1826. *P. punctatum* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 72. 1825, non Elliott, 1817, nec Raf., 1820. *P. alatum* Buch.-Ham. ex D. Don var. *nepalense* (Meisn.) Hook. f., Fl. Brit. India 5: 42. 1886. *Persicaria nepalensis* (Meisn.) H. Gross in Engl., Bot. Jahrb. 49: 277. 1913. **Fig. 80.**

Herbs, annual, erect to ascending; stems numerous, usually prostrate, creeping or decumbent below with many ascending branches, rooting at lower nodes. Leaves deltoid-ovate, 2-4 cm long, acute or subobtuse at apex, subcordate at base, entire, minutely punctate; petioles winged, amplexicaul at base; ocreae membranous, obliquely truncate. Flowers in pedunculate heads; peduncles glandular hairy towards apex; bracts glabrous, eciliate. Perianth red-purple. Stamens 6-8, included. Styles 2-3. Nutlets lenticular or 3-angled, pitted, red-brown, with a prominent rib on the lateral faces.

Rare. In shady and moist places of forests. Hoshangabad. *Fl. & Fr.*: Sept. March.

10. *Polygonum plebeium* R. Br., Prodr. 420. 1810, "*plebejum*"; Hook. f., Fl. Brit. India 5: 27. 1886. - *Chati-bhaji*, *Machichi*.

Small herbs, annual, tufted; stems purplish green, white hairy. Leaves elliptic-oblong, oblong, linear, obovate or orbicular, 0.3-3 cm long, acuminate, apiculate or obtuse at apex, narrowed at base, sessile or shortly petiolate; ocreae hyaline, shortly lacerate to the middle, fimbriate. Flowers axillary, solitary or 2-3 in clusters; pedicels short. Perianth pink, ca 2 mm long, divided nearly to the base; tepals broad or narrow. Stamens 7-8. Styles 3. Nutlets 3-angled, smooth, shining.

The leafy stems are used as vegetables.

1a. Leaves longer than stipules:

2a. Flowers pedicellate ...10.2. var. *effusa*

2b. Flowers sessile or subsessile:

3a. Leaves linear-lanceolate or oblong,
more than 1 cm long:

4a. Leaves acute or acuminate at apex,
flat on margins; tepals narrow ...10.3. var. *elegans*



Fig. 80. *Polygonum nepalense* Meisn.

- 4b. Leaves obtuse at apex, recurved on margins; tepals broad ...10.6. var. *plebeium*
- 3b. Leaves obovate or obovate-oblong, up to 1 cm long:
- 5a. Flowers concealed by stipules; tepals narrow ...10.1. var. *brevifolia*
- 5b. Flowers not concealed by stipules; tepals broad ...10.5. var. *indica*
- 1b. Leaves shorter than stipules:
- 6a. Leaves elliptic-oblong, apiculate at apex, flat on margins ...10.7. var. *scindica*
- 6b. Leaves orbicular or broadly obovate, obtuse at apex, recurved on margins ...10.4. var. *griffithii*

10.1. var. *brevifolia* Hook. *f.*, Fl. Brit. India 5: 28. 1886.

On alluvial soil in dried drains. Bilaspur, Mandla. *Fl. & Fr.*: Aug. Nov.

10.2. var. *effusa* (Meisn.) Hook. *f.*, Fl. Brit. India 5: 28. 1886. *Polygonum effusum* Meisn. in DC., Prodr. 14(1): 93. 1856.

Common in wet and marshy places near river. Indore, Rewa, Shivpuri, Sidhi. *Fl. & Fr.*: Oct. April.

10.3. var. *elegans* (Roxb.) Hook. *f.*, Fl. Brit. India 5: 29. 1886. *Polygonum elegans* Roxb., Fl. Ind. 2: 291. 1832.

In moist rock crevices near river bank. Bilaspur, Sagar, Shahdol. *Fl. & Fr.*: July - Nov.

10.4. var. *griffithii* Hook. *f.*, Fl. Brit. India 5: 29. 1886.

Occasional in dried drains and river beds. Damoh, Jabalpur, Sagar, Seoni. *Fl. & Fr.*: Aug. - Dec.

10.5. var. *indica* (Heyne ex Roth) Hook. *f.*, Fl. Brit. India 5: 28. 1886. *Polygonum indicum* Heyne ex Roth, Nov. Pl. Sp. 208. 1821.

In moist places, Mandla. *Fl. & Fr.*: Sept. - March.

10.6. var. plebeium

Common in wastelands and dried silted drains, Balaghat, Bastar, Betul, Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Gwalior, Hoshangabad, Jabalpur, Mandla, Morena, Raigarh, Raipur, Rewa, Satna, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Dec. - April.

10.7. var. scindica Hook. *f.*, *Fl. Brit. India* 5: 29. 1886; Blatt. & Hallberg in *J. Bombay Nat. Hist. Soc.* 26(4): 969. 1920.

On alluvial soil in dried drains. Bilaspur, Jabalpur, Sidhi. *Fl. & Fr.*: Sept. - Dec.

11. Polygonum pulchrum Blume, *Bijdr.* 530. 1826; Santapau and Wagh in *Bull. Bot. Surv. India* 5: 108. 1964. *P. tomentosum* Willd., *Sp. Pl.* 2: 447. 1799, non Shrank, 1789; Hook. *f.*, *Fl. Brit. India* 5: 30. 1886. *Persicaria pulchra* (Blume) Sojak in *Preslia* 46(2): 154. 1974.

Herbs, annual, erect, up to 1 m high. Leaves elliptic-ovate to lanceolate, 10-12 x 2.5-3 cm, acuminate at apex, silky tomentose beneath; ocreae 1.2-2.5 cm long, ciliate at mouth. Flowers in paniculate racemes; peduncles strigose; bracts orbicular, ca 3 mm long, hispid. Perianth white, 4-5 mm long. Styles 2. Nutlets orbicular, biconvex, ca 3 mm across.

Rare. Along the stream bank. Bastar (Saxena and Khotele, 1976). *Fl. & Fr.*: Oct. - March.

The leaves are used as salad.

12. Polygonum serrulatum Lag., *Gen. Sp. Pl.* 14. 1816. *P. barbatum* Woodr. in *J. Bombay Nat. Hist. Soc.* 12: 214. 1899, non L., 1753. *Persicaria salicifolia* (Brouss. ex Willd.) Munshi & Javeid in *J. Econ. Tax. Bot. addl. ser.* 2: 73. 1986.

Herbs, annual, branched; stems prostrate, slender, glabrous, rooting at lower nodes. Leaves linear or elliptic-oblong, 8-12.5 cm long, acute at apex, rounded at base, glabrous or sometimes with few scattered hairs on the upper surface and midrib, subsessile; ocreae strigose, truncate, ciliate

with long stiff bristles. Flowers in terminal, up to 5 cm long, erect, slender, paniculate racemes; peduncles glabrous; pedicels short; bracts membranous. Perianth white, eglandular; lobes ovate. Stamens 5-8. Styles 3, connate at base. Nutlets *ca* 2 mm long, 3-angled, smooth, shining.

Along river banks associated with *Cyathocline purpurea* and *Sphaeranthus* sp. Mandla, Sagar. *Fl. & Fr.*: April - Nov.

13. *Polygonum strigosum* R. Br., Prodr. 420. 1810; Hook. f., Fl. Brit. India 5: 47. 1886. *Persicaria strigosa* (R. Br.) Nakai in Rigakkai 24: 299. 1926.

Herbs, annual, creeping; stems 30-80 cm long, prickly, angular. Leaves linear-oblong, 3-10 x 0.6-2.5 cm, acute to acuminate at apex, truncate or cordate at base, softly pubescent, strigose on margin; ocreae *ca* 2 cm long, ciliate. Flowers in paniculate racemes; peduncles glandular-hispid, prickly; bracts ovate, strigose. Perianth pink, 2-2.5 mm long. Stamens 6-8. Nutlets black.

Rare. Creeping over rocks. Shahdol (Saxena, 1970). *Fl. & Fr.*: July - Nov.

4. RUMEX L.

Herbs, annual or perennial. Leaves radical or cauline, alternate; stipules hyaline, ocreate, caducous at maturity. Flowers in axillary clusters or whorls arranged in simple or paniculate racemes, bisexual or unisexual; pedicels jointed; bracts ocreate; bracteoles absent. Tepals 6, rarely 4; inner accrescent, entire or toothed. Stamens 6; filaments short; anthers oblong. Ovary 3-angled; ovule solitary; styles 3; stigmas fimbriate. Fruit a nutlet, small, enclosed within the usually enlarged inner tepals. Seeds erect.

About 200 species; cosmopolitan especially N. temperate regions; 3 in M.P.

1a. Plants more than 30 cm high; leaves rounded or cordate at base:

2a. Teeth of the inner fruiting tepals erect; nutlets *ca* 2 mm long

...1. *R. dentatus* subsp.
klotzschianus

- 2b. Teeth of the inner fruiting tepals
hooked; nutlets 3-4 mm long ...2. *R. nepalensis*
- 1b. Plants up to 30 cm high; leaves hastate at base ...3. *R. vesicarius*

1. **Rumex dentatus** L. subsp. **klotzschianus** (Meisn.) Rehb. f., Beih. Bot. Centralb. 49: 19. 1932 & in Candollea 12: 119. 1949. *Rumex klotzschianus* Meisn. in DC., Prodr. 14(1): 57. 1856. *R. dentatus auct. non* L., 1771: Hook. f., Fl. Brit. India 5: 59. 1886. - *Ambavah, Lalbibi.*

Herbs, annual, erect; stems grooved, glabrous. Leaves oblong, 7.5-10 cm long; basal much larger than the cauline ones, obtuse, glabrous; petioles equal to or shorter than the lamina. Flowers in leafy or leafless whorls, pedicellate. Tepals 2-3 mm long; inner tepals broadly ovate, much enlarged in fruit, reticulately veined. Nutlets 3-angled, ca 2 mm long, brown.

In moist places. Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rewa, Satna, Shahdol, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Jan. - April.

2. **Rumex nepalensis** Spreng., Syst. Veg. 2: 159. 1825; Hook. f., Fl. Brit. India 5: 60. 1886.

Herbs, annual or perennial, erect; stems glabrous or with scattered glandular hairs. Leaves 7-14 cm long; basal leaves oblong-ovate, cordate at base, long petiolate; upper ones lanceolate, nearly sessile; petioles usually winged. Flowers in whorls combined into leafy racemes, bisexual; bracts ovate-lanceolate, acute, glabrous. Nutlets lenticular, 3-4 mm long, dark brown.

In wastelands. Sagar. *Fl. & Fr.*: March - April.

3. **Rumex vesicarius** L., Sp. Pl. 336. 1753; Hook. f., Fl. Brit. India 5: 61. 1886.

Herbs, annual, monoecious, glabrous, pale green, branched from the base. Leaves elliptic-ovate, 2.5-7.5 cm long, acute at apex, hastate at base, long petiolate. Flowers arranged in axillary, long pedunculate racemes, pink; pedicels slender, jointed in the middle. Nutlets white or pink.

Cultivated as vegetable, fodder crop and for its medicinal properties. Rewa. *Fl. & Fr.*: Feb. - March.

116. **PODOSTEMACEAE**

(S.K. Srivastava and O.P. Mishra)

About 50 genera and 275 species; tropical regions especially of America and Asia, few in temperate zone; 3 genera and 3 species in M.P.

- 1a. Flowers actinomorphic; spathe absent; stamens 3 ...1. *Dalzellia*
- 1b. Flowers zygomorphic; spathe present;
stamens 1 or 2:
- 2a. Thallus closely attached to the rocks;
flowering bracts absent; fruits unequally
lobed, oblique ...2. *Podostemum*
- 2b. Thallus floating from an attached base;
flowering bracts present; fruits equally
lobed, not oblique ...3. *Polypleurum*

1. DALZELLIA Wight

Herbs in rapid streams and waterfalls. Thallus frondose, suborbicular or stellate, attached to substratum by root hairs. Leaves numerous, simple, either on the upper surface or edges of thallus, green or red. Flowers terminal, solitary, actinomorphic, pedicellate. Perianth 3-fid. Stamens 3, alternate with tepals; anthers 2-celled, dehiscing longitudinally. Fruit a capsule, ellipsoid or obovoid, 3-celled; valves incurved after dehiscence.

A monotypic genus; endemic to India.

Dalzellia zeylanica (Gardner) Wight, Icon. Pl. Ind. Orient. 5(2): 34. 1852; Nagendran & Arekal in Bull. Bot. Surv. India 23: 229. 1981. *Tristicha zeylanica* Gardner in Calc. J. Nat. Hist. 7: 177. 1846. *Terntola zeylanica* (Gardner) Tul. in Arch. Mus. Hist. Nat. Paris 6: 190-192. t. 13, f. 3. 1852; Hook. f., Fl. Brit. India 5: 62. 1886; Subramanyam, Aquatic Angiosp. 45. 1962. *Lawia zeylanica* Tul. in Ann. Sci. Nat. Bot. ser. 3. 11: 112. 1849 *emend.* Willis in Ann. Roy. Bot. Gardens, Paradeniya 1(3): 213. 1902.

Herbs, perennial, aquatic; roots attached to rocks. Leaves linear, 2-5 mm long, acute, entire. Flowers solitary; pedicels emerging from terminal,

axial leaf cupules, 2-5 mm long. Perianth 3-lobed, *ca* 1 mm long. Capsules obovoid, *ca* 1 mm long, 9-ribbed. Seeds small, *ca* 0.5 mm long.

Rare. On smooth rocky substratum of running water in streams and rivers. Bastar (Roy & Dixit, 1987). *Fl. & Fr.*: Aug. - Feb.

2. **PODOSTEMUM** Michx.

Herbs, annual or perennial, submerged. Thallus ribbon or thread like; secondary shoots ascending. Leaves subulate, long. Flowers zygomorphic, naked, terminal, with a tubular or infundibuliform spathe. Stamens 1 or 2, with a staminode on each side of the common axis. Ovary ellipsoid, 2-locular; style short; stigmas 2, subulate, with small papillae. Fruit a capsule, unequally lobed, 8-ribbed.

About 18 species; tropical to N. America; one in M.P.

Podostemum barberi Willis in Ann. Roy. Bot. Gard. Peradeniya 1 (3): 230. 1902; Subramanyam, Aquatic Angiosp. 51. 1962.

Thallus broad, closely attached to the rocks. Flowers cleistogamous. Spathe very long. Stamen 1. Ovary with 6, broad wings. Capsules dehiscing by valves; one valve persistent with 3 decurrent ribs; others deciduous; stipes *ca* 2 cm long.

Rare. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: Not recorded.

3. **POLYPLEURUM** (Tul.) Warm.

Herbs, thalloid, submerged. Thallus variable, usually free floating from an attached base, exogenously branched; secondary shoots marginal, ultimately 1-flowered. Leaves subulate. Flowers zygomorphic, enclosed in spathe, subtended by 2-8, scaly or fleshy bracts. Stamens 1 or 2, with staminodes on either side of the common axis. Ovary smooth. Fruit a capsule, equally lobed, 8-ribbed, many-seeded.

Five species; tropical W. Africa, India and Sri Lanka; one in M.P.

Polypleurum stylosum (Wight) J.B. Hall in Kew Bull. 26: 131. 1971; Nagendran & Arekal in Bull. Bot. Surv. India 23: 232. 1981; Verma &

Lal in *J. Econ. Tax. Bot.* 3: 645-647. 1982. *Dicraea stylosa* Wight, *Icon. Pl. Ind. Orient.* t. 1917. f. 2. 1852; Subramanyam, *Aquatic Angiosp.* 47. 1962. *Podostemon stylosus* Benth. ex Hook. *f. Fl. Brit. India* 5: 64. 1886.

Herbs, perennial, submerged. Thallus dichotomously branched, up to 16 cm long, reddish brown; branches 4-5 mm broad, obtuse, with a distinct midrib. Flowers on both the margins of branches, 4-5 mm long, subsessile, bracteate; bracts 2 pairs, distichous, imbricate; outer *ca* 5.5 mm long; inner *ca* 11.5 mm long. Spathe oblong, 4-5 mm long, membranous, fully enclosing the bud. Tepals 2, linear, up to 2 mm long. Stamens 2; filaments flattened, *ca* 1.5 mm long, monadelphous. Ovary ellipsoid, substipitate; ovules many; styles 2, linear. Capsules ellipsoid, *ca* 2.5 x 1.3 mm, stipitate, dehiscent by 2 valves; valves 3-ribbed. Seeds ovoid, yellow.

Rare. In slow flowing stream on rocks and boulders. Raipur. *Fl. & Fr.*: Oct.

117. ARISTOLOCHIACEAE

(R.D. Dixit)

Seven genera and about 410 species; tropical and subtropical regions especially America; one genus and 3 species in M.P.

ARISTOLOCHIA L.

Herbs or shrubs, perennial, usually twining. Leaves simple, alternate, entire or lobed; petioles dilated at base. Flowers solitary or in short racemes, bisexual, zygomorphic, pedicellate, bracteate. Perianth tubular; limb broadened, obliquely 1-2-lipped; tube inflated at the base, narrowed above. Stamens 6, adnate to style; anthers 4-celled, extrorse. Ovary 6-locular; ovules numerous; style columnar; stigma 6-lobed. Fruit a capsule, 6-valved. Seeds flat, winged all round.

About 300 species; tropical and subtropical regions especially America; 3 in M.P.

1a. Leaves broadly ovate or reniform, cordate at base; flowers solitary:

- 2a. Plants prostrate; capsules 1-2 cm long ...1. *A. bracteolata*
 2b. Plants climbers; capsules 4-5 cm long ...3. *A. littoralis*
 1b. Leaves elliptic-ovate, obovate or panduriform,
 cuneate, subtruncate or subcordate at base;
 flowers in racemes ...2. *A. indica*

1. ***Aristolochia bracteolata*** Lam., Encycl. 1: 258. 1783. *A. bracteata* Retz., Observ. Bot. 5: 29. 1788; Hook. f., Fl. Brit. India 5: 75. 1886.
Kidamar.

Herbs, perennial, prostrate, slender, glabrous; stems and branches angular, striate; branches spreading, decumbent. Leaves reniform or broadly ovate, 3-8 cm across, obtuse to subacute at apex, cordate at base, glaucous beneath. Flowers solitary; pedicels 1-2 cm long; bracts large, orbicular or subreniform. Perianth dark purple; limb entire, 1-lipped; tube cylindrical, with trumpet-shaped mouth. Capsules oblong-ellipsoid, 1-2 cm long, 12-ribbed, glabrous. Seeds deltoid, with cordate base.

In wastelands. Bhopal (Oommachan, 1977), Shivpuri (Kaushik, 1969).
Fl. & Fr.: Sept. - March.

The plant is purgative and anthelmintic. Dried root powder is referred as abortifacient. Leaves pounded with castor oil are used for the cure of eczema and snake bite. Seeds yield non drying fatty oil.

2. ***Aristolochia indica*** L., Sp. Pl. 960. 1753; Hook. f., Fl. Brit. India 5: 75. 1886. *A. lanceolata* Wight, Icon. Pl. Ind. Orient. 5. t. 1858. 1852.
Ishari mul. Fig. 81.

Herbs, perennial, twining, glabrous; stems woody below, slender above, stems and branches grooved. Leaves variable, elliptic-ovate, obovate or panduriform, 4-12 x 2.5-7 cm, obtuse or acuminate at apex, cuneate, subtruncate or subcordate at base, entire or wavy-margined, punctate. Flowers in axillary racemes. Perianth greenish white, 2.5-3.5 cm long; limb purple or brown; tube cylindrical, inflated at base. Capsules oblong-subglobose, 3-3.5 cm long. Seeds 3-angled.

In mixed forests. Chhatarpur, Damoh, Raipur, Rajnandgaon. *Fl. & Fr.*:
 July - Feb.

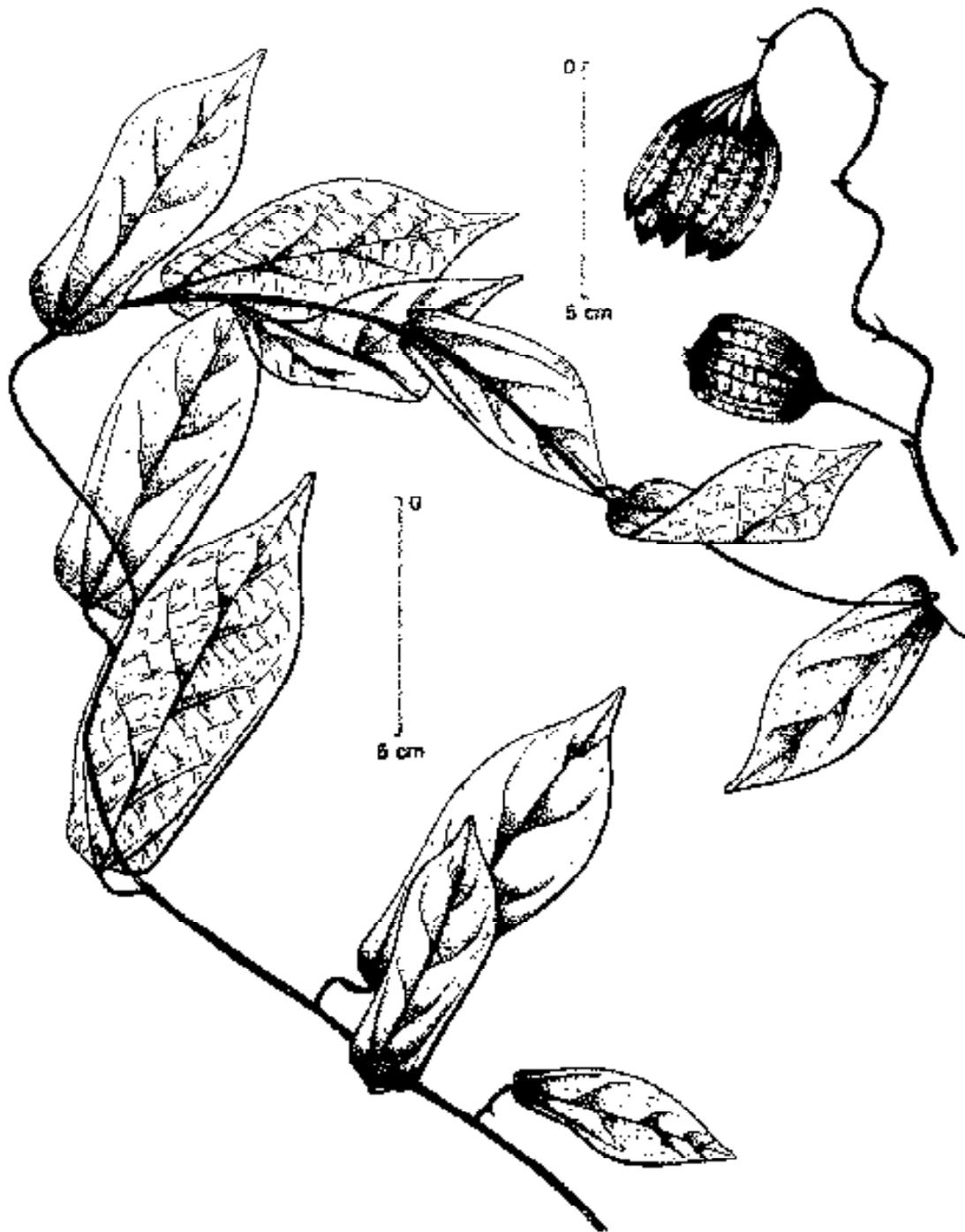


Fig. 81. *Aristolochia indica* L.

Roots are used for the treatment of snake bite, fever and minor ailments of children; decoction of leaves for cough while seeds for inflammation and biliousness.

3. *Aristolochia littoralis* D. Parodi in Anal. Soc. Ci. Argentina 5: 155. 1878. *A. elegans* Mast. in Gard. Chron. 2: 301. 1885.

Herbs, climbing, slender, glabrous. Leaves broadly ovate to reniform, 4-8 cm across, obtuse or rounded at apex, cordate at base, entire-repand. Flowers axillary, solitary; pedicels 4-6 cm long. Perianth-limb dark purple, broadly ovate-cordate, rounded or emarginate, vaulted; neck recurved; ventricose part greenish white, ellipsoid. Capsules 4-5 cm long (excl. beak).

Cultivated. Bhopal (Oommachan, 1977), Indore. *Fl. & Fr.*: Dec. - Feb.

118. PIPERACEAE

(M.I. Hanfi)

About 15 genera and 2000 species; tropical and subtropical regions; 2 genera and 3 species in M.P.

- 1a. Leaves with obscure or faintly visible nerves;
flowers bisexual; stigma penicillate ...1. *Peperomia*
- 1b. Leaves with prominent nerves; flowers
unisexual, rarely bisexual; stigma not penicillate ...2. *Piper*

1. PEPEROMIA Ruiz & Pav.*

Herbs, annual or perennial, generally succulent. Leaves opposite or whorled, sometimes alternate, entire, pellucid-punctate, exstipulate. Flowers in terminal or leaf-opposed whorls, rarely axillary, solitary or in fasciculate spikes, minute, bisexual, sessile or sunken in the rhachis; bracts sessile, sometimes peltately attached. Perianth absent. Stamens 2; filaments very short; anther cells confluent. Ovary 1-locular; ovule solitary, erect; stigma lateral or terminal, usually penicillate. Fruit a berry or nutlet, minute, indehiscent, almost dry; pericarp thin. Seeds minute.

* Often treated under a separate family Peperomiaceae

About 1000 species; tropical and subtropical regions especially America; 2 in M.P.

- 1a. Leaves alternate, more than 1.5 cm long ...1. *P. pellucida*
 1b. Leaves whorled, up to 1 cm long ...2. *P. tetraphylla*

1. *Peperomia pellucida* (L.) Kunth in Humb., Bonpl. & Kunth, Nov. Gen. Sp. 1: 64. 1816. *Piper pellucidum* L., Sp. Pl. 30. 1753.

Herbs, erect or diffuse, rarely rooting at lower nodes; stems glabrous, pellucid. Leaves alternate, deltoid-ovate, 1.5-3 x 1.5-2.5 cm, subtruncate or cordate at base, 5-nerved. Flowers in axillary, terminal or leaf-opposed, 2.5 cm long spikes. Fruits globose, brown-black, sulcately striate, pointed at apex.

In cultivated fields and in shady habitats in the gardens. Dhar, Indore, Rajnandgaon. *Fl. & Fr.*: Sept. - Dec.

The plant is sometimes used as vegetables.

2. *Peperomia tetraphylla* (G. Forster) Hook. & Arnott, Bot. Beechey Voy. 97. 1832; Yuncker in Brittonia 14: 188. 1962. *Piper tetraphylla* G. Forster, Fl. Ins. Austr. 5. 1786. *Peperomia reflexa* A. Dietr., Sp. Pl. ed. 6. 180. 1831, non Kunth, 1815; Hook. f., Fl. Brit. India 5: 99. 1886.

Small herbs, succulent, branched. Leaves in whorls of 4, ovate-rhomboid or orbicular, ca 1 x 0.8 cm, subacute at apex, cuneate at base, coriaceous, glabrous; petioles ca 3 mm long. Flowers in terminal, ca 4 cm long, pubescent spikes; bracts orbicular, peltate. Berries obovoid, glabrous.

Bastar (Mooney, 1942; Subramanyam and Henry, 1966). *Fl. & Fr.*: Nov. - April.

2. PIPER L.

Shrubs, rarely herbs, erect or scandent, often glandular or aromatic; branches with swollen nodes. Leaves often oblique, entire; stipules various. Flowers in spikes, unisexual, rarely bisexual, minute, each in the axil of a bract, with or without 2, lateral bracteoles; bracts peltate or cupular, adnate

to rachis, sometimes decurrent, with or without raised margins; bracteoles when present forming low ridges on each side of the flower or connate, semi-lunar. Perianth absent. Stamens 2-4, rarely 5 or more; filaments short; anthers 2-celled; cells parallel, distinct. Ovary 1-locular; ovule solitary, erect; style short, conical, beaked; stigmas 2-5. Fruit a berry, ovoid or globose, small, 1-seeded. Seeds usually globose.

About 1000 species; tropical regions; one in M.P.

Piper longum L., Sp. Pl. 29. 1753; Hook. f., Fl. Brit. India 5: 83. 1886.
Pipram. Fig. 82.

Herbs, trailing or climbing, dioecious. Leaves ovate, 2.5-10 x 1-6 cm, acuminate at apex, cordate at base, membranous, glabrous, 5-7-nerved; petioles 0.5-2.2 cm long. Male spikes slender, yellow; bracts peltate, stalked. Ovary sunken. Fruiting spikes 1.8-2.5 cm long, fleshy.

Rare. In moist shady places of mixed forests. Dhar, Sidhi. *Fl. & Fr.*: July - Oct.

Fruit is used as condiment and to treat cough and cold.

Notes: *Piper helle* L. is often cultivated.

119. LAURACEAE

(M.I. Hanfi)

About 45 genera and 2200 species; tropical and subtropical regions especially S.E. Asia and Brazil; 5 genera and 7 species in M.P.

- 1a. Plants leafless, filiform, parasitic twiners ...1. *Cassytha*
- 1b. Plants otherwise:
 - 2a. Leaves 3-nerved at or above base:
 - 3a. Flowers in panicles, bisexual and unisexual; perianth-lobes 6 ...2. *Cinnamomum*
 - 3b. Flowers in umbels or heads, unisexual; perianth-lobes 4 or 5 ...4. *Neolitsea*
 - 2b. Leaves penninerved:

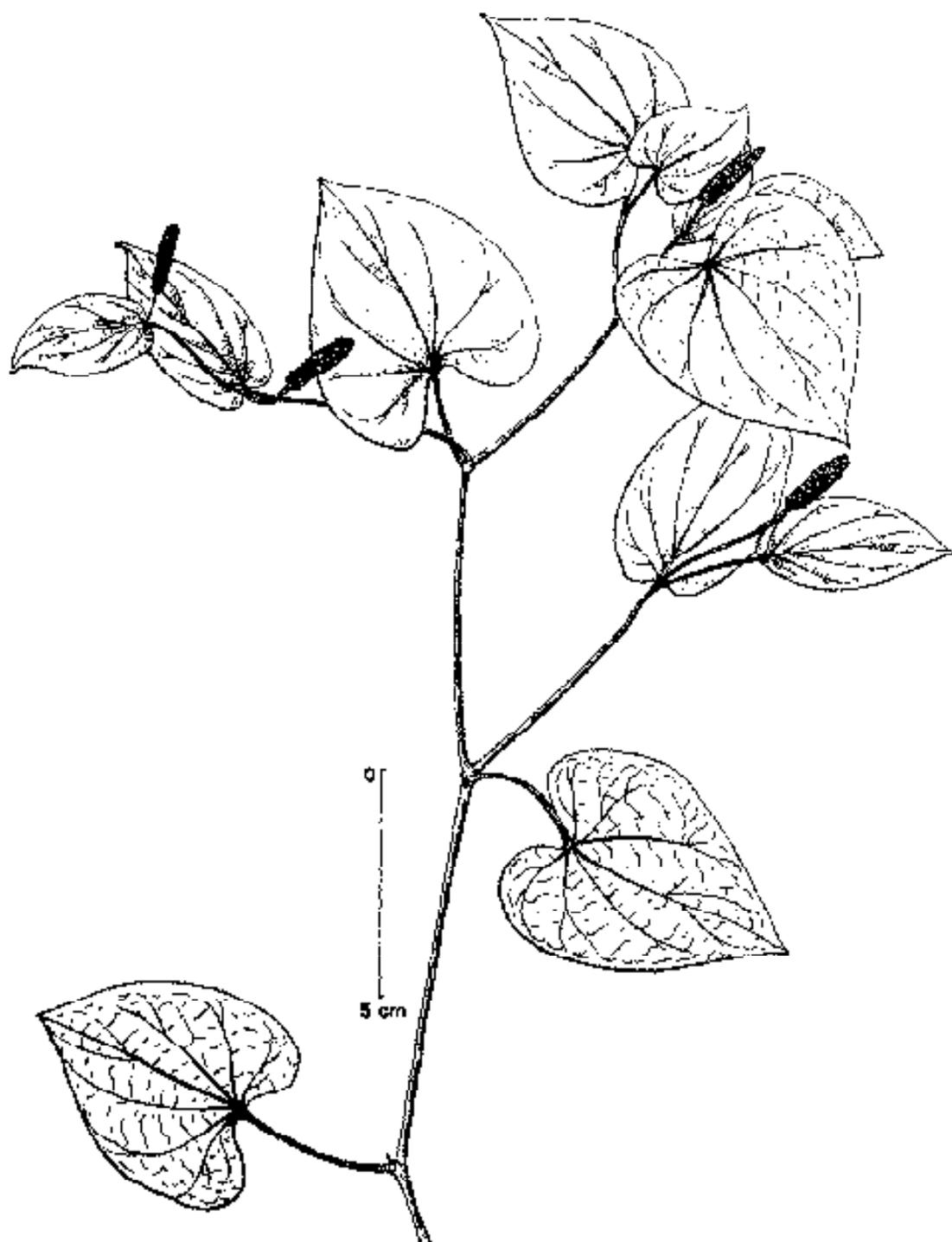


Fig. 82. Piper longum L.

- 4a. Flowers in fascicles or umbels ...3. *Litsea*
 4b. Flowers in panicles ...5. *Persea*

1. CASSYTHA L.

Parasitic twiners, yellowish green, filiform, adhering to the host by haustoria. Leaves reduced to minute scales or absent. Flowers in spikes, heads or racemes, small, bisexual, sometimes dimorphic; bracteoles 3. Perianth 6-lobed; outer 3 smaller, tube short. Stamens 9, in 3 whorls; outer 2 whorls eglandular, introrse; 3rd inner whorl glandular, extrorse. Staminodes in 4th whorl, sessile or stipitate. Ovary globose; stigma small or capitate. Fruit a small drupe, enclosed in the succulent perianth-tube and crowned by the perianth-limb. Seeds with thin testa.

About 16 species: Old World; one in M.P.

Cassutha filiformis L., Sp. Pl. 35. 1753; Hook. f. Fl. Brit. India 5: 188. 1886. - *Amarbel*.

Herbs, parasitic, forming web over bushes; stems puberulous. Leaves of minute scales or absent. Flowers in lateral, lax, divaricate spikes, sessile; bracteoles small, rounded, ciliate. Perianth twice as long as the bracteoles; lobes 6, in 2 rows; outer 3 lobes rounded, ciliate; inner ones oblong, acute, concave; tube short. Drupes globose, white, smooth.

Rare. In wastelands and open forests. Bilaspur, Chhatarpur, Raigarh. *Fl. & Fr.*: Almost throughout the year.

The plant is tonic and used to treat chronic dysentery, arthritis and inflamed eyes.

2. CINNAMOMUM Schaeff., *nom. cons.*

Shrubs or trees, evergreen, often polygamous. Leaves usually opposite, rarely alternate, usually 3-nerved. Flowers in axillary and subterminal panicles, small, bisexual and unisexual; female flowers usually larger; bracts caducous. Perianth infundibuliform; lobes 6, subequal; tube short. Stamens 9, perfect or by abortion 6, in 3 whorls; 2 outer whorls eglandular, introrse; 3rd inner whorl glandular, extrorse; anthers 4-celled, rarely 2-

celled. Staminodes in 4th whorl, cordate, stipitate. Ovary sessile, free from the perianth; style short or long; stigma discoid or obscurely 3-lobed. Fruit a berry, surrounded by enlarged, cupular perianth. Seeds with thin testa.

About 250 species; S.E. Asia to Australia; one in M.P.

Cinnamomum tamala T. Nees in T. Nees & Eberm., Handb. Med.-Pharm. Bot. 2: 426. 1831; Hook. f., Fl. Brit. India 5: 128. 1886. *Tejpat*.

Trees, moderate-sized. Leaves variable, lanceolate or ovate-lanceolate, 10-15 x 3-6 cm, shortly or bluntly acuminate at apex, shining above. Flowers in 5-10 cm long panicles; peduncles ca 1.25 cm long. Perianth ca 0.7 cm across; lobes truncate. Berries 1-1.25 cm long, born on enlarged, cupular perianth.

Planted in gardens. Hoshangabad, Raigarh, Surguja. *Fl. & Fr.*: July - Oct.

Leaves are used as condiment.

3. LITSEA Lam., *nom. cons.*

Shrubs or trees, evergreen, rarely deciduous, dioecious. Leaves alternate, rarely opposite or subopposite, penninerved, rarely 3-nerved; leaf-buds naked or scaly. Flowers in fascicles or umbels, unisexual, rarely bisexual; umbels 4-6-flowered, simple, compound or clustered, sessile or shortly pedunculate; involucre bracts 4-6, rarely more, concave, coriaceous or membranous. Perianth campanulate; lobes 4 or 6, equal or unequal, sometimes small or absent; tube short. Stamens 6, 9 or 12, rarely more or fewer, in 3-4 whorls; filaments of 1st and 2nd whorl usually eglandular, of 3rd whorl with 2 glands; anthers introrse, 4-celled. Ovary enclosed by perianth-tube or not; style thick; stigma peltate or 2-lobed. Fruit a drupe or berry, seated on often enlarged, cupular perianth-tube.

About 400 species; subtropical and tropical regions especially Asia and Australia; 2 in M.P.

- 1a. Leaves ovate or ovate-lanceolate; perianth-lobes absent; fruits globose ...1. *L. glutinosa*
- 1b. Leaves broadly elliptic; perianth-lobes present; fruits subglobose ...2. *L. monopetala*

1. *Litsea glutinosa* (Lour.) Robinson in Philipp. J. Sci. Bot. 6: 321. 1911. *Sebifera glutinosa* Lour., Fl. Cochinch. 2: 638. 1790. *Litsea sebifera* Pers., Syn. Pl. 2: 4. 1806; Hook. f., Fl. Brit. India 5: 157. 1886. *Maida lakri*.

Trees, up to 15 m high; branches white pubescent. Leaves ovate-lanceolate or ovate, 12-20 x 4-9 cm, acute at apex, rounded or cuneate at base, glabrous or pubescent beneath; lateral veins 7-10 pairs, not very prominent beneath; petioles slender, 2-3.5 cm long. Flowers in large, compound umbels, usually in subumbellate clusters at the apex of slender stalks, white pubescent; peduncles 8-15 mm long; pedicels 3-5 mm long. Fruits globose, 8-9 mm across, on small, thickened perianth-tube.

- 1a. Leaves ovate, densely tomentose beneath ...1.1. var. *glabraria*
 1b. Leaves ovate-lanceolate, sparsely
 pubescent beneath ...1.2. var. *glutinosa*

1.1. var. *glabraria* (Juss.) Mudgal et Khanna, *comb. nov.* *Litsea glabraria* Juss. in Ann. Mus. Par. 6: 212. 1805. *L. sebifera* Pers. var. *glabraria* Hook. f., Fl. Brit. India 5: 158. 1886.

Rare. Jabalpur (Hole, 1904). *Fl. & Fr.*: Aug. - Nov.

1.2. var. *glutinosa*

Common in mixed forests, along streams and on hill slopes. Bilaspur, Hoshangabad, Raigarh, Raipur, Rewa, Seoni, Shivpuri. *Fl. & Fr.*: June - Nov.

The bark is astringent, aphrodisiac and used for the treatment of sprains, bruises, diarrhoea and dysentery. Gum of the bark is used in *agarbatti* (incensed sticks) industry. The leaves are considered as antiseptic and used as poultice for bruises and wounds.

2. *Litsea monopetala* (Roxb.) Pers., Syn. Pl. 2: 4. 1806. *Tetranthera monopetala* Roxb., Pl. Coromandel 2: 26. t. 148. 1800. *Litsea polyantha* Juss. in Ann. Mus. Hist. Nat. 6: 211. 1805; Hook. f., Fl. Brit. India 6: 162. 1886. - *Meda*.

Trees, up to 12 m high; branchlets brownish tomentose. Leaves broadly elliptic, 9-24 x 5-11 cm, obtuse or apiculate at apex, rounded at base, softly

tomentose and distinctly reticulate beneath; lateral veins 7-12 pairs; petioles 1-2.5 cm long. Flowers in umbels; umbels pubescent, in dense clusters; peduncles 3-10 mm long, tomentose; pedicels 2-4 mm long. Fruits subglobose, ca 7 x 6 mm, apiculate, borne on cupular perianth.

In mixed forests and by the sides of rocky drains. Bastar, Bilaspur, Raipur, Surguja. *Fl. & Fr.*: March - June.

The wood is used for agricultural implements while the powdered bark and roots are used to treat bruises and pain.

4. NEOLITSEA Merr.

Large shrubs or trees, dioecious. Leaves alternate, opposite or whorled, 3-nerved from base. Flowers in axillary umbels or heads, unisexual; umbellules clustered or in panicles; peduncles short; involueral bracts 4; pedicels short, pilose. Perianth 4-5-lobed. Stamens 6, in 3 whorls; 2 inner ones bearing glands; anthers 4-celled, introrse. Pistillodes present or absent in male flowers. Staminodes present in female flowers, 6, clavate. Ovary ovoid; style distinct; stigma capitate. Fruit a berry.

About 60 species; Indo-Malesia to E. Asia; one in M.P.

Neolitsea cassia (L.) Kosterm. in J. Sci. Res. Indones. 1: 85. 1952. *Laurus cassia* L., Sp. Pl. 369. 1753. *Litsea zeylanica* Nees, Amoen. Bot. Bonn. fasc. 1: 58. t. 5. 1823; Hook. f., Fl. Brit. India 5: 178, 1886. *Neolitsea zeylanica* (Nees) Merr. in Philipp. J. Sci. suppl. 57. 1906.

Trees; young parts silky pubescent. Leaves oblong-ovate or elliptic-lanceolate, 6-12 x 3-5 cm, acuminate at apex, acute at base, subcoriaceous, glabrous above, glaucous beneath. Flowers in 4-5-flowered umbels arranged in sessile clusters. Perianth 4-5-lobed, silky. Berries ovoid-oblong, ca 1.2 cm long.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Jan. - April.

5. PERSEA Mill., *nom. cons.*

Shrubs or trees, evergreen. Leaves simple, alternate, appearing clustered at the end of branchlets, penninerved. Flowers in subterminal

panicles, bisexual, pedicellate; bracts caducous. Perianth-lobes 6; tube short. Stamens 9; outer 2 whorls introrse; inner whorl shortly extrorse; anthers 4-celled. Staminodes in 4th whorl, cordate, stipitate. Ovary ovoid; ovule solitary; style filiform; stigma discoid. Fruit a berry, seated on slightly enlarged perianth; fruiting perianth-lobes reflexed.

About 150 species; tropical regions; 2 in M.P.

1a. Shrubs or small trees; berries *ca* 5 cm across ...1. *P. americana*

1b. Large trees; berries *ca* 2 cm across ...2. *P. macrantha*

1. *Persea americana* Mill., Gard. Dict. ed. 8. 1768. - *Avocado*.

Shrubs or small trees, 2-3 m high; branches pubescent. Leaves crowded at stem apices, ovate-elliptic, 9-12 x 4-6 cm, entire, coriaceous, reddish when young; petioles 2-4 cm long. Flowers in crowded, densely many-flowered panicles, terminating stem apices, small. Perianth greenish yellow. Berries globose or pyriform, *ca* 5 cm across, yellow to green or reddish purple, with thick epicarp.

Cultivated. Indore. *Fl. & Fr.*: Sept. - Jan.

Fruits are eaten.

2. *Persea macrantha* (Nees) Kosterm. in Reinwardtia 6: 193. 1962. *Machilus macrantha* Nees in Wallich, Pl. Asiat. Rar. 2: 70. 1831; Hook. f., Fl. Brit. India 5: 140. 1886. *M. glaucescens* Wight, Icon. Pl. Ind. Orient. t. 1825. 1852. **Fig. 83.**

Trees, *ca* 10 m high. Leaves elliptic-oblong, 9-16 x 3.5-6 cm, obtuse or acute at apex, rounded at base, pale green, subcoriaceous, glabrous; nerves 7-10 pairs; petioles 3-4 cm long. Flowers in terminal panicles; peduncles up to 18 cm long, sparsely pubescent; pedicels *ca* 4 mm long. Perianth greenish yellow, pubescent. Berries globose, *ca* 2 cm across, smooth.

Rare. In mixed and sal forests and near streams. Bastar, Surguja. *Fl. & Fr.*: Jan. - March.

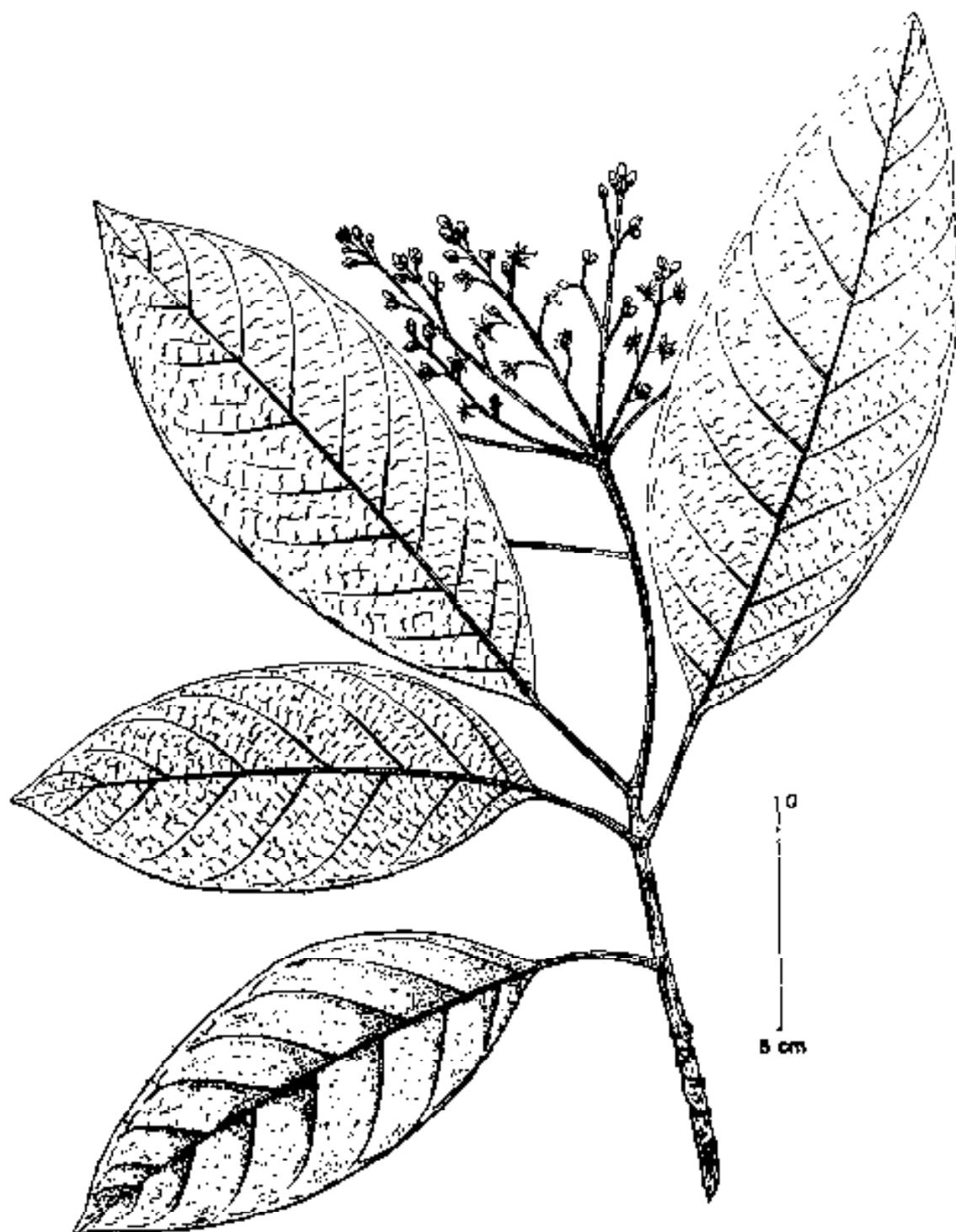


Fig. 83. *Persea macrantha* (Nees) Kosterm.

120. PROTEACEAE**(M. Prasad)**

About 75 genera and 1350 species; tropical and subtropical regions especially Southern hemisphere; one species in M.P.

GREVILLEA R. Br. ex J. Knight, *nom. cons.*

Shrubs or trees. Leaves alternate, spirally arranged, variable, simple or pinnatifid or bipinnatifid. Flowers in terminal and/or axillary, solitary or paniculate, spiciform racemes, bracteate or ebracteate; pedicels solitary or 2-3 together, free. Perianth mostly recurved below the limb, sometimes straight; segments of limb connate for long. Anthers sessile. Hypogynal glands or scales united into a basal annulus. Ovary stipitate or subsessile; ovules 2; style slender, clavate at the tip; stigma punctiform. Fruit a follicle, firm to lignescent, dehiscent along the adaxial suture, rarely along both sutures. Seeds flat, usually with a membranous wing.

About 250 species; Sulawesi, New Guinea, New Caledonia, Vanuatu and Australia; one in M.P.

Grevillea robusta A. Cunn. ex R. Br., *Suppl. Prodr. Fl. Nov. Holl.* 24. 1830.

Trees, up to 20 m high; bark greyish brown, furrowed. Leaves deltoid-ovate to oblong-ovate, 13-24 cm long, pinnate; pinnae mostly 5-11 pairs, opposite or subopposite, deeply pinnatifid into lobes; lobes lanceolate or linear-oblong, 10-40 x 3-7 mm, acute at apex, entire or incised, glabrous above, densely brown tomentose beneath; petioles 2-6 cm long. Flowers in secund, many-flowered, pedunculate racemes, orange to golden-brown or golden-yellow. Perianth 9-12 mm long; lobes narrowly spatulate; tube not expanded at base. Disk annular. Follicles ovoid, compressed, ca 1.7 x 1 cm, blackish purple, glabrous, with hardened and persistent style at apex. Seeds elliptic, ca 16 x 8 mm.

Planted in gardens, parks and roadsides. Bilaspur, Raigarh, Mandla, Rajnandgaon, Shivpuri. *Fl. & Fr.*: March - April

The wood is exploited for various purposes.

120a. ELAEAGNACEAE*

(Anand Kumar)

Three genera and 45 species; temperate and subtropical regions of Northern hemisphere; one species in M.P.

ELAEAGNUS L.

Shrubs or trees, often with silvery lepidote or stellate tomentum. Leaves alternate or opposite, entire, exstipulate. Flowers axillary, solitary or 2-3-nate, or sometimes in fascicles on short leafless or leafy branchlets, bisexual, shortly pedicellate. Perianth tubular; upper part campanulate, urceolate or infundibuliform, valvately 4-fid at apex, caducous; lower part oblong or globose, persistent. Stamens 4; filaments short. Ovary 1-locular; style linear, included, slightly dilated above; stigma lateral. Fruit a drupe, enclosed within persistent, thickened perianth base; pericarp membranous.

About 40 species; Europe, Asia and N. America; one in M.P.

Elaeagnus conferta Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 460. 1820 & 1: 440. 1832; Kumar in J. Econ. Tax. Bot. 19: 739. 1995. *E. latifolia* auct. non L., 1753; Hook. f., Fl. Brit. India 5: 202. 1886, p.p.

Shrubs, scandent, armed, much branched. Leaves elliptic or elliptic-oblong to obovate, up to 15 x 7 cm, acute or acuminate at apex, covered with glistening, silvery-white scales beneath; midrib on upper surface slightly immersed. Flowers in 1-5-flowered fascicles. Perianth covered with silvery scales; lobes ovate; tube urceolate. Drupes elliptic-oblong, up to 2.5 cm long, red, 8-ribbed. Seeds with hard shining testa.

Rare. On hill tops in dense forests. Bastar (Mooney, 1942). *Fl. & Fr.*: Dec. - March.

*Possibly because of rare occurrence and restricted distribution in M.P., the family has somehow escaped the attention and has not been included under Key to families given in Flora of M.P. Vol. I. However, for the purpose, it should be placed after lead 182b on page 115 and can be differentiated from Opiliaceae by vegetative parts covered with silvery brownish or golden-coloured lepidote or stellate hairs.

121. LORANTHACEAE**(R.C. Srivastava)**

About 70 genera and 940 species; tropical and temperate regions; 3 genera and 7 species in M.P.

- 1a. Leaves well developed and with a midrib;
flowers bisexual; style long:
 - 2a. Flowers actinomorphic; corolla 5-lobed,
tube not split on one side ...1. *Dendrophthoe*
 - 2b. Flowers zygomorphic; corolla 4-lobed,
tube split on one side ...2. *Loranthus*
- 1b. Leaves absent, if present then without a
midrib; flowers unisexual; style short or absent ...3. *Viscum*

1. DENDROPTHOE Mart.

Herbs or subshrubs, parasitic, forming massive clumps on stems and branches of host trees; branchlets terete or 3-angled; nodes dilated. Leaves alternate, penninerved, petiolate. Flowers aggregated in axillary or extra-axillary racemes, actinomorphic, pedicellate; bracts cupular, oblique, enclosing calyx-base. Calyx tubular or flask-shaped, truncate. Corolla cylindrical, inflated above or not; lobes 5, spreading or reflexed, acute. Stamens 5, usually adnate to corolla-tube. Ovary oblong-cylindrical; stigma capitate. Fruit a drupe.

About 30 species; tropical regions of Old World; one in M.P.

Dendrophthoe falcata (L. f.) Etting. in Denkschr. Akad. Wissensch. Math. Nat. 32: 52. 1872. *Loranthus falcatus* L. f., Suppl. Pl. 211. 1782. *L. longiflorus* Desr. in Lam., Encycl. 3: 598. 1792; Hook. f., Fl. Brit. India 5: 214. 1886, incl. var. *falcata* (L. f.) Kurz & var. *amplexifolia* (DC.) Thwaites. - *Banda*.

Perennial, parasitic, dichotomously branched; branches woody. Leaves elliptic-oblong, obovate or ovate-lanceolate, 5-15 x 2.5-8 cm, obtuse or acute at apex, cordate to cuneate at base, coriaceous, sessile or shortly petiolate. Flowers in 5-10 cm long racemes, often clustered in leaf axils; pedicels 2.5-4 cm long; bracts small. Calyx ca 0.5 cm long, entire or

obscurely toothed. Corolla bright red; lobes reflexed; tube 3-5 cm long. Drupes ovoid-oblong, 6-7 mm long, bright red, crowned by persistent calyx-base.

Common parasite on a variety of hosts viz., *Madhuca*, *Acacia*, *Terminalia*, *Grewia*, *Shorea*, *Bauhinia*, *Albizia*, *Mitragyna* and *Nyctanthes* spp. Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, East Nimar, Hoshangabad, Indore, Mandla, Narsimhapur, Raigarh, Raipur, Raisen, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Shivpuri, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Nov. - May.

The plant is medicinal. The bark is astringent and used to treat wounds and menstrual disorders.

2. LORANTHUS Jacq., *nom. cons.*

Herbs, undershrubs or shrubs, semiparasitic. Leaves opposite or alternate, usually broad, coriaceous. Flowers in racemes, bisexual, bracteate; bracteoles 2, free or connate with bract or absent. Calyx truncate or 4-6-toothed; tube adnate to ovary. Corolla 4-lobed; lobes reflexed or spreading. Stamens 4, epipetalous; anthers versatile or cells adnate, parallel. Disk absent. Style columnar; stigma obovoid or capitate. Fruits 1-seeded.

About 100 species; tropical and subtropical regions of Old World, few in temperate Europe and Australia; 3 in M.P.

- | | |
|--|------------------------------|
| 1a. Leaves orbicular or broadly ovate | ...2. <i>L. cordifolius</i> |
| 1b. Leaves ovate-oblong or elliptic-oblong: | |
| 2a. Leaves cuneate at base; bracts ovate;
corolla greenish yellow | ...1. <i>L. budleioides</i> |
| 2b. Leaves rounded or subcordate at base;
bracts elliptic-lanceolate; corolla whitish | ...3. <i>L. philippensis</i> |

1. *Loranthus budleioides* Desr. in Lam., *Encycl.* 3: 600. 1792. *L. parasiticus* (L.) Merr. in *Phil. J. Sci.* 15. 232. 1919, *non* Druce, 1914. *Scurrula parasitica* L., *Sp. Pl.* 110. 1753. *Loranthus scurrula* L., *Sp. Pl.* ed. 2. 472. 1762 (*nom. illeg.*); Hook. *f.*, *Fl. Brit. India* 5: 208. 1886, *p.p.*

Fig. 84.

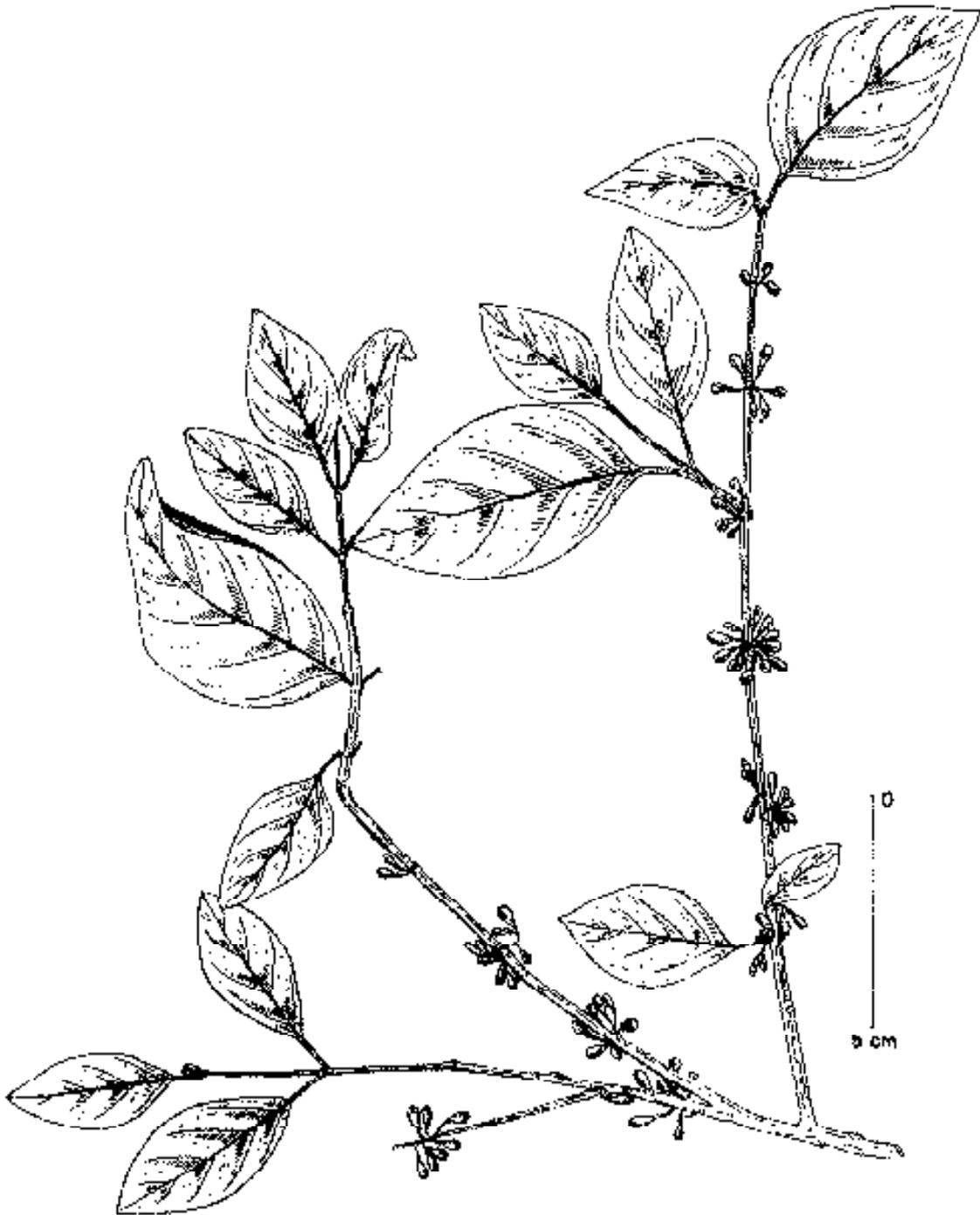


Fig. 84. *Loranthus budleioides* Desr.

Undershrubs; branches terete. Leaves opposite, ovate-oblong or elliptic, 5-10 x 2-5 cm, obtuse or subacute at apex, cuneate at base, glabrous when mature; petioles *ca* 1 cm long. Flowers in axillary racemes, tomentose, pedicellate; bracts ovate, minute. Calyx-tube attenuated at base. Corolla-lobes greenish yellow, linear, 1-2 mm long; tube curved, inflated, *ca* 1 cm long. Fruits clavate, *ca* 6 mm long, tomentose.

Common parasite on trees. Bilaspur, Hoshangabad, Raigarh, Raipur. *Fl. & Fr.*: Oct. - March.

2. *Loranthus cordifolius* Wallich in Roxb., *Fl. Ind.* (Carey & Wallich ed.) 2: 222. 1824; Hook. *f.*, *Fl. Brit. India* 5: 209. 1886. *Scurrula cordifolia* (Wallich) G. Don, *Gen. Hist.* 3: 421. 1834.

Herbs or undershrubs; young parts densely covered with rusty or white, scurfy tomentum. Leaves orbicular or broadly ovate, 3-7 x 2-5 cm, obtuse or subacute at apex, subcordate at base, white pubescent beneath. Flowers in racemes, mostly in the axil of fallen leaves, densely tomentose; pedicels *ca* 2 mm long; bracts ovate, obtuse. Corolla brown. Fruits clavate, rusty tomentose.

Bastar, Hoshangabad. *Fl. & Fr.*: Oct. - March.

3. *Loranthus philippensis* Cham. & Schlechtend. in *Linnaea* 3: 204. 1828. *Scurrula philippensis* (Cham. & Schlechtend.) G. Don, *Gen. Hist.* 3: 422. 1834.

Branchlets tomentose. Leaves ovate-elliptic, 4-11 x 3-6 cm, obtuse to subacute at apex, rounded or subcordate at base, white pubescent beneath; petioles *ca* 1.8 cm long. Flowers in axillary, 3-6-flowered racemes; bracts elliptic-lanceolate. Calyx entire or obtusely 4-toothed. Corolla 1.5-2 cm long, whitish. Fruits clavate, tomentose.

Common parasite on various hosts *viz.*, *Butea monosperma*, *Ficus semicordata*, *Diospyros* sp., *Xeromphis* sp., *Woodfordia fruticosa*, *Zanthoxylum alatum*. Balaghat, Betul, Bilaspur, Hoshangabad, Jabalpur, Mandla, Raigarh, Rajnandgaon, Seoni, Surguja. *Fl. & Fr.*: July - Feb.

3. VISCUM L.*

Undershrubs or shrubs, semiparasitic. Leaves opposite, flat, sometimes reduced to scales or absent. Flowers in fascicles, rarely axillary, solitary, unisexual, actinomorphic; bracts small; bracteoles 2, free or connate. Perianth 4-lobed; tepals ovate-deltoid; tube short, solid in male, adnate to ovary in female. Stamens 4; anthers sessile, adnate to tepals. Ovary inferior, 1-locular; ovule solitary; stigma sessile, conical or pulvinate. Fruit a berry, succulent, globose, subglobose or oblong.

About 100 species; tropical regions of Old World to temperate regions; 3 in M.P.

- 1a. Leaves absent or reduced to scales ...1. *V. articulatum*
- 1b. Leaves well developed:
- 2a. Leaves obliquely ovate-lanceolate, acuminate ...2. *V. monoicum*
- 2b. Leaves equally elliptic or elliptic-lanceolate, obtuse ...3. *V. orientale*

1. *Viscum articulatum* Burm. f., Fl. Ind. 311. 1768; Hook. f., Fl. Brit. India 5: 226. 1886. *Viscum nepalense* Spreng., Syst. Veg. 4: Cur. Post. 47. 1827. - *Badu, Madang*.

Shrubs, pendulous, dichotomously branched; stems jointed, flattened, readily disarticulating, green; internodes 2.5-5 cm long. Leaves absent or minute scale like. Flowers minute, 1-6 together in fascicles at the nodes; central flowers female; lateral flowers usually male; bracts cupular. Tepals reflexed in male flowers and erect in female. Berries globose or subglobose, 3-4 mm across, yellowish green, smooth.

Common parasite on *Diospyros melanoxylon*, *Terminalia* sp. and *Ziziphus* sp. in mixed forests. Bastar, Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Indore, Jabalpur, Mandla, Raigarh, Raipur, Satna, Seoni, Shahdol, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: Oct. - Feb.

The plant is bitter, acrid, cooling, sweetish, aphrodisiac, alterative; useful in *Kapha & Vata* diseases of blood, ulcers, epilepsy and biliousness.

* Sometimes treated under a separate family Viscaceae.

Sometimes it is given to treat fever with aching limbs. Dried and pounded fruits are used as nutritious food for milk cattle.

2. *Viscum monoicum* Roxb. ex DC., Prodr. 4: 278. 1830; Hook. f., Fl. Brit. India 5: 224. 1886.

Shrubs, pendulous; stems terete, green. Leaves obliquely ovate-lanceolate, 3-7 x 1-3 cm, sometimes falcately curved, acuminate at apex, tapering into petiole at base; basal nerves 4-5, fairly prominent. Flowers in axillary, 3-flowered, sessile or shortly pedunculate fascicles, minute, greenish; bracts truncate, apiculate. Berries oblong, green, smooth.

On *Dendrophthoe* sp. (double parasitism), *Gardenia* sp., *Holarrhena pubescens*, *Madhuca longifolia*, *Nyctanthes* sp., *Shorea robusta* and *Wendlandia* sp. Bastar, Bilaspur, Raigarh, Surguja. Fl. & Fr.: May - Dec.

3. *Viscum orientale* Willd., Sp. Pl. 4: 737. 1806; Hook. f., Fl. Brit. India 5: 224. 1886. Fig. 85.

Stems much branched; branches terete or angular, grooved, thickened at nodes. Leaves elliptic or elliptic-lanceolate, 2.5-5 x 1-2.5 cm, obtuse at apex, tapering into petiole at base, entire or undulate, coriaceous. Flowers in axillary, sessile or shortly pedunculate clusters. Berries ovoid or sub-globose.

On *Haldinia cordifolia*, *Toona ciliata*, *Cleistanthus* sp., *Madhuca longifolia* and *Zanthoxylum alatum*. Bastar, Bilaspur, Raigarh, Raipur. Fl. & Fr.: Nov. May.

122. SANTALACEAE

(R.C. Srivastava)

About 36 genera and 500 species; almost cosmopolitan especially tropical and subtropical regions; 2 genera and 2 species in M.P.

- 1a. Leaves alternate; flowers both bisexual and unisexual; perianth-lobes usually 3 ...1. *Osyris*
- 1b. Leaves usually opposite; flowers bisexual; perianth-lobes usually 5 ...2. *Santalum*



Fig. 85. *Viscum orientale* Willd.

1. OSYRIS L.

Shrubs, polygamous, glabrous; branches angular. Leaves alternate, entire, exstipulate. Flowers solitary or fascicled, pedicellate. Perianth 3-4-lobed; lobes ovate, shorter than tube, with a tuft of hairs inside; tube adnate to ovary in bisexual flowers. Stamens 3 or 4, inserted at the base of perianth-lobes. Disk shallow, angular. Ovary within the perianth-tube; ovules 2-4; style short; stigma 3-4-lobed. Fruit a drupe, globose or ovoid. Seeds globose.

About 7 species; Mediterranean region and Africa to India; one in M.P.

Osyris quadripartita Salzm. ex Decne. in Ann. Sci. Nat. Bot. ser. 2. 6: 65. 1836. *O. wightiana* Wallich ex Wight, Icon. Pl. Ind. Orient. t. 1853. 1852. *O. arborea* Wallich ex A. DC. in DC., Prodr. 14: 633. 1857; Hook. f., Fl. Brit. India 5: 232. 1886. **Fig. 86.**

Shrubs, erect, evergreen, bushy; branchlets 3-angled. Leaves elliptic-oblong, 1.5-4 x 1-2 cm, mucronate at apex, cuneate at base, glaucous. Flowers axillary; male flowers in fascicles; bisexual ones usually solitary, pendulous. Perianth pale green or yellow, 3-lobed. Disk 3-lobed. Drupes subglobose, ca 8 mm across, yellow-orange.

In dry mixed deciduous forests, often in association with *Gardenia* sp. Bastar, Hoshangabad. *Fl. & Fr.*: July - Jan.

Leaf infusion is a powerful emetic.

Notes: Tehhs (in Hara *et al.*, Enum. Fl. Pl. Nepal 3: 192. 1982) has treated *O. quadripartita* and *O. wightiana* as distinct species.

2. SANTALUM L.

Shrubs or trees. Leaves opposite, rarely alternate, glabrous. Flowers in axillary or terminal panicles or racemes, bisexual. Perianth-lobes 4 or 5, valvate, slightly longer than tube, with a tuft of hairs inside; tube adnate to the base of ovary. Stamens 4 or 5, adnate to the base of perianth-lobes; filaments short. Disk cupular, 4 or 5-lobed; lobes alternating with stamens. Ovary initially free, later adnate to perianth at base; ovules 2-3; stigma shortly 2-3-lobed. Fruit a drupe, globose or subglobose. Seeds subglobose.



Fig. 86. *Osyris quadripartita* Salzm. ex Deone.

About 9 species; Indo-Malesia to Australia and Hawaii; one in M.P.

Santalum album L., Sp. Pl. 349. 1753; Hook. f., Fl. Brit. India 5: 231. 1886. *Chandan*.

Trees, evergreen, 8-10 m high semiparasitic on roots. Leaves lanceolate or elliptic, 3-7 x 1.5-3 cm, acute at apex, rounded at base, entire, subcoriaceous; petioles 1-1.5 cm long. Flowers in trichotomous panicles, small, 5-merous; panicles shorter than leaves. Perianth purplish brown inside; lobes obovate, minutely ciliate; tube campanulate. Disk of 5, fleshy, ovoid scales. Drupes globose, ca 1 cm across, black, annulate above.

On hill slopes, usually cultivated. Dhar, Gwalior, Indore, Narsimhapur, Raigarh, Raipur, Ratlam, Rewa, Surguja. *Fl. & Fr.*: Aug. Dec.

Heartwood is strongly scented and is of commercial value. It is used for carving and making different articles. It is also used in religious ceremonies of Hindu community.

123. EUPHORBIACEAE

(B.K. Shukla)

About 326 genera and 7750 species; cosmopolitan excluding Arctic region; 29 genera and 96 species in M. P.

1a. Flowers arranged in cyathia:

2a. Cyathia subactinomorphic;
involucres 4-5-lobed; glands not inside
nectary but alternate with involucral-lobes ...14. *Euphorbia*

2b. Cyathia conspicuously zygomorphic;
involucres 5-lobed; glands inside nectary ...22. *Pedilanthus*

1b. Flowers not arranged in cyathia:

3a. Leaves often with yellow,
red or brown spots:

4a. Male tepals 4, female tepals
3-6; stamens 8 ...1. *Acalypha*

4b. Male tepals 5-6, female tepals
absent; stamens 15-35 ...11. *Codiaeum*

- 3h. Leaves unspotted:
- 5a. Leaves lobed or 3- foliolate:
- 6a. Leaves 3-foliolate; stamens 5 ...6. *Bischofia*
- 6b. Leaves palmately lobed; stamens 8 or more:
- 7a. Male perianth 2-seriate; tepals 10 ...18. *Jatropha*
- 7b. Male perianth 1-seriate; tepals 4-5:
- 8a. Petioles eglandular; stamens 10 ...21. *Manihot*
- 8b. Petioles glandular; stamens more than 10 ...24. *Ricinus*
- 5b. Leaves neither lobed nor 3-foliolate:
- 9a. Male flowers solitary or in axillary fascicles:
- 10a. Male inner tepals 5 or 6:
- 11a. Herbs; male outer tepals 5-6, imbricate ...3. *Andrachne*
- 11b. Shrubs or trees; male outer tepals 5, valvate:
- 12a. Ovary 2-locular; styles 2; fruit a drupe ...8. *Bridelia*
- 12b. Ovary 3-locular; styles 3; fruit a capsule ...10. *Cleistanthus*
- 10b. Male inner tepals absent, if present then only 3:
- 13a. Disk absent:
- 14a. Ovary with solitary ovule in each locule:
- 15a. Leaves usually peltate; anthers 4-celled ...19. *Macaranga*
- 15b. Leaves otherwise; anthers 2-celled:
- 16a. Male tepals 4 ...2. *Alchornea*
- 16b. Male tepals 3 ...15. *Excoecaria*

- 14b. Ovary with 2 ovules in each locule:
- 17a. Herbs or undershrubs,
up to 60 cm high ...25. *Sauropus*
- 17b. Shrubs or trees, more than 1 m high:
- 18a. Leaves up to 3 cm long ...7. *Breynia*
- 18b. Leaves more than 4 cm long:
- 19a. Ovary 1 or 3-locular; stigmas
recurved; fruit a drupe ...13. *Drypetes*
- 19b. Ovary 3-15-locular; stigmas
erect; fruit a capsule ...16. *Glochidion*
- 13b. Disk present:
- 20a. Plants dioecious; pistillodes
present ...27. *Securinega*
- 20b. Plants monoecious; pistillodes
absent ...23. *Phyllanthus*
- 9b. Male flowers in axillary spikes, racemes,
corymbose cymes or panicles:
- 21a. Plants twining, hispid with stinging hairs ...28. *Tragia*
- 21b. Plants not as above:
- 22a. Male perianth 2-seriate; inner tepals 5:
- 23a. Flowers in corymbose cymes,
the main branch bearing a female
flower while others terminating
into male ones ...18. *Jatropha*
- 23b. Flowers in racemes bearing female
flowers at base and male flowers
above:
- 24a. Inflorescence terminal or in
bifurcations of the stems;
stamens incurved in bud ...12. *Croton*
- 24b. Inflorescence axillary;
stamens erect in bud ...9. *Chrozophora*
- 22b. Male perianth 1-seriate; inner
tepals absent:

- 25a. Male tepals imbricate ...5. *Baliospermum*
- 25b. Male tepals valvate:
- 26a. Filaments connate ...17. *Homonoia*
- 26b. Filaments free:
- 27a. Ovary 1-locular; ovules 2 ...4. *Antidesma*
- 27b. Ovary 2-4-locular; ovule solitary
in each locule:
- 28a. Plants monoecious; stamens 2-8:
- 29a. Male tepals 4; stamens 8 ...1. *Acalypha*
- 29b. Male tepals 5; stamens 2-4 ...26. *Sebastiania*
- 28b. Plants dioecious; stamens
more than 8:
- 30a. Plants evergreen; ovary
3-4-lobed, glandular; fruit a
capsule, covered with red
granules ...20. *Mallotus*
- 30b. Plants deciduous; ovary not
lobed, eglandular; fruit a
drupe, without red granules ...29. *Trewia*

1. ACALYPHA L.

Herbs, undershrubs or shrubs, monoecious or dioecious; branchlets smooth or striate. Leaves dentate, crenate or serrate, petiolate; stipules minute, caducous, rarely persistent. Flowers in terminal or axillary spikes; male flowers above and female flowers below, usually on the same spike (except *A. hispida*). Male bracts and bracteoles minute or absent. Tepals 4, equal, valvate. Stamens 8 or more, on a convex receptacle, exserted. Female bracts generally larger than ovary; bracteoles minute. Tepals 3-6, equal, imbricate. Ovary 3-lobed, 3-locular; ovules 3, axile; style filiform, lacinate or fimbriate. Fruit a capsule of 3, minute, 2-valved cocci. Seeds globose or ovoid.

About 430 species; tropical and subtropical regions; 6 in M.P.

- 1a. Plants cultivated; leaves dentate; style
branches more than 12, pale red:

- 2a. Plants dioecious; leaves uniformly green;
female spikes pendulous ...2. *A. hispida*
- 2b. Plants monoecious; leaves variegated;
female spikes erect ...6. *A. wilkesiana*
- 1b. Plants wild; leaves crenate or serrate;
style branches 1-12, green:
- 3a. Bracts concealing the capsules:
- 4a. Bracts almost pectinate, with subulate,
hispid teeth; capsules glabrous ...1. *A. ciliata*
- 4b. Bracts dentate or crenate;
capsules hispid ...3. *A. indica*
- 3b. Bracts not concealing the capsules:
- 5a. Female flowers sessile; bracts large,
with gland-tipped hairs on teeth ...4. *A. malabarica*
- 5b. Female flowers pedicellate; bracts
minute, without gland-tipped hairs
on teeth ...5. *A. racemosa*

1. *Acalypha ciliata* Forssk., Fl. Aegypt.-Arab. 162. 1775; Hook. f., Fl. Brit. India 5: 417. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 145. 1994.

Herbs, annual, erect, 25-50 cm high. Leaves ovate-elliptic, 4-8 x 2-4.5 cm, caudate or acuminate at apex, rounded at base, serrate; petioles 2.5-8 cm long. Flowers in axillary, 1-1.8 cm long spikes, pale green. Male flowers ebracteate, sessile. Tepals minute. Stamens 8. Female flowers many, crowded in lower part of the spike; bracts 2-3 mm across. Tepals 3, ovate, minute, ciliate. Styles 3, filiform, lacinate. Capsules ca 2 mm long, whitish, enclosed in persistent bracts. Seeds ca 1.5 mm across, smooth.

Common in shady wastelands along the foot-paths and edges of the fields and gardens. Balaghat, Chhatarpur, Damoh, Indore, Mandia, Rajnandgaon, Satna, Seoni, Sidhi. *Fl. & Fr.*: Aug. Dec.

2. *Acalypha hispida* Burm. f., Fl. Ind. 303. t. 61. f. 1. 1768; Hook. f., Fl. Brit. India 5: 417. 1887.

Undershrubs, dioecious, 1-1.5 m high. Leaves broadly ovate or suborbicular, 8-16 x 6-13 cm, acuminate at apex, cordate or subcordate at base, dentate, pubescent, uniformly green, palmatinerved at base; petioles 3-7 cm long. Female flowers in bright red, up to 25 cm long, pendulous spikes.

Cultivated in gardens. Bhopal (Oomnathan, 1977). *Fl.*: April - June.

3. *Acalypha indica* L., Sp. Pl. 1003. 1753; Hook. f., Fl. Brit. India 5: 416. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 146. 1994. - *Kuppi*.

Herbs, annual, erect, 30-75 cm high; stems angular, pubescent. Leaves rhomboid-ovate, 3-6.5 x 2-4.2 cm, subacute-obtuse at apex, truncate-cuneate at base, serrate in upper half. Flowers in axillary spikes; spikes nearly as long as petiole. Male flowers ebracteate. Tepals minute, connate. Stamens 8, curved. Female flowers 3-5 together in the axil of bracts in lower parts of spike; bracts 5-7 mm long. Tepals 3, ovate, minute, imbricate, ciliate. Styles 3, lacinate. Capsules *ca* 2 mm across, enclosed in bracts. Seeds ovoid, *ca* 1 mm long, smooth, pale brown.

Common as weed in gardens, fields, old buildings and vacant plots near villages. Chhatarpur, Dhar, Indore, Raipur, Rajnandgaon. *Fl. & Fr.*: July - Nov.

The plant decoction is referred for cough while roots, leaves and tender shoots are used to treat stomachache and diarrhoea. Leaves are used as vegetables.

4. *Acalypha malabarica* Muell. Arg. in Linnæa 34: 42. 1865-66; Hook. f., Fl. Brit. India 5: 416. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 146. 1994.

Herbs, annual, erect, rigid, 10-20 cm high; stems pubescent. Leaves elliptic-lanceolate, 1.2-3 x 1-1.5 cm, subacute at apex, acute-rounded at base, shallowly serrate, pubescent. Flowers in axillary spikes; male flowers above the female. Male flowers ebracteate. Tepals minute. Stamens 8. Female flowers bracteate; bracts 3-4 mm across, folded, toothed. Tepals 3, ovate, minute. Capsules 2-3 mm long, glabrous. Seeds ovoid, *ca* 1.5 mm long, brown, smooth.

Rare. In moist, sandy wastelands. Balaghat, Chhatarpur, Damoh, Durg, Gwalior. *Fl. & Fr.*: Aug. Nov.

5. *Acalypha racemosa* Wallich ex Benth., *Etud. Gen. Euphorb.* 443. 1858; Santapau & Wagh in *Bull. Bot. Surv. India* 5: 105. 1964. *A. paniculata* Miq., *Fl. Ned. Ind.* 1(2): 406. 1859; Hook. f., *Fl. Brit. India* 5: 415. 1887; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 149. 1994.

Herbs, annual or perennial, 60-80 cm high; branchlets striate, sparsely pubescent. Leaves ovate or lanceolate, 2-5 x 1.5-2.5 cm, acuminate at apex, truncate to rounded at base, serrate; petioles as long as or longer than lamina. Male flowers in axillary, elongate, 4-10 cm long, slender spikes. Anthers vermiculiform. Female flowers in terminal panicles; bracts minute, acute, each subtending 3 female flowers. Tepals 5. Ovary *ca* 1 mm across, glandular-ciliate; style 3-7-partite, up to 1.5 mm long. Capsules *ca* 2 mm across, 3-lobed, glandular. Seeds reticulate, pitted.

Rare. In moist, sandy soil. Bilaspur. *Fl. & Fr.*: Aug. Nov.

6. *Acalypha wilkesiana* Muell. Arg. in DC., *Prodr.* 15 (2.2): 817. 1866; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 149. 1994.

Shrubs, monoecious, 1-3 m high. Leaves ovate or ovate-rhomboid, 4-22 x 2-15 cm, acuminate at apex, shortly cordate or obtuse at base, dentate, sparsely pubescent, usually variegated with red or brown spots and with pink or pale yellow margin. Flowers in spikes; spikes mostly shorter than leaves; bracts 5-13-dentate or lobed, 1-flowered.

Cultivated in gardens and parks. Bhopal (Oommachan, 1977), East Nimar (Maheshwari, 1958). *Fl. & Fr.*: Throughout the year.

Notes: A number of varieties are under cultivation.

2. ALCHORNEA Sw.

Shrubs or trees, dioecious, rarely monoecious. Leaves simple, alternate, entire, dentate or serrate, ribbed, usually stipellate at base, glandular. Flowers solitary, clustered or in simple or paniculate racemes or spikes. Male flowers clustered. Female flowers solitary. Tepals usually 4. Disk absent. Ovary 2-3-locular; ovule solitary in each locule; style usually long, linear. Fruit a capsule of 2-3, crustaceous cocci. Seeds subglobose.

About 70 species; tropical regions; 2 in M.P.

- 1a. Leaves broadly ovate or orbicular;
capsules obscurely 3-lobed ...1. *A. mollis*
- 1b. Leaves ovate or ovate-rhomboid;
capsules deeply 3-lobed ...2. *A. tiliifolia*

1. *Alchornea mollis* Muell. Arg. in *Linnaea* 34: 168. 1865; Hook. *f.*, *Fl. Brit. India* 5: 420. 1887.

Small trees; young parts tomentose. Leaves broadly ovate or orbicular, 10-15 cm across, cuspidate at apex, rounded or cordate at base, dentate or serrate, pellucid-punctate; petioles 10-15 cm long; stipules small, subulate. Tepals lanceolate, membranous, pubescent. Ovary tomentose. Capsules globose, obscurely 3-lobed, pubescent. Seeds rugose.

Bastar (Mooney, 1942). *Fl. & Fr.*: April - Oct.

2. *Alchornea tiliifolia* (Benth.) Muell. Arg. in *Linnaea* 34: 168. 1865; Hook. *f.*, *Fl. Brit. India* 5: 421. 1887, "*tiliaefolia*" *Stipellaria tiliaefolia* Benth. in Hook., *J. Bot. Kew Misc.* 6: 4. 1854.

Large shrubs or small trees. Leaves ovate or ovate-rhomboid, 8-20 x 4-14 cm, acute to shortly acuminate at apex, rounded or subcordate at base, dentate, glandular on margins, pubescent on nerves beneath; petioles 8-10 cm long. Flowers in racemes or panicles. Capsules flattened, ca 1 cm long, green, minutely tuberculate, finely pubescent.

Bastar (Mooney, 1942). *Fl. & Fr.*: April - Oct.

3. ANDRACHNE L.

Herbs, monoecious. Leaves alternate, usually small, entire, membranous, petiolate. Flowers small, pedicellate. Male flowers clustered in the axils. Perianth usually 2-seriate; outer tepals sepaloid, 5-6; inner tepals petaloid, 5-6, small or absent. Disk glands as many or twice as many as the tepals. Stamens 5-6, alternate with inner tepals; anthers erect; cells parallel. Pistillodes small. Female flowers solitary. Perianth as in male flowers; outer tepals usually larger than in male flowers; inner tepals minute or absent. Ovary 3-locular; ovules 2 in each locule; styles short, 2-fid or 2-partite. Fruit a capsule of 3, 2-valved cocci. Seeds curved, rugose, estrophiolate; albumen fleshy.

About 20 species; tropical America, N. Africa, Mediterranean region; one in M.P.

Andrachne telephioides L., Sp. Pl. 1014. 1753; Hook. f., Fl. Brit. India 5: 284. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 152. 1994.

Herbs, prostrate; stems 15-20 cm long. Leaves elliptic or obovate, 3-4 mm long, subacute at apex, sessile; nerves obscure. Flowers green, ca 2 mm across. Male outer tepals free, rounded or rhombic; inner tepals lanceolate, small. Disk glands membranous, 2-lobed. Female outer tepals larger than male; inner tepals minute. Capsules depressed globose, ca 3 mm across.

Rare. On slopy places. Rewa. Fl. & Fr.: Jan. March.

4. ANTIDESMA L.

Small trees, dioecious. Leaves petiolate; lateral nerves arching; stipules caducous. Flowers in axillary or terminal, slender, elongated, usually catkin like spikes, rarely panicles or racemes, sessile or pedicellate; bracts and bracteoles present. Tepals 3-7, free or connate, valvate. Stamens 2-5, opposite the tepals, exserted. Pistillodes present or absent. Ovary 1-locular; ovules 2, pendulous; styles 2-4, notably shorter than ovary, recurved, stigmatose, persistent. Fruit a drupe, ovoid or compressed, hardly enlarged. Seeds small.

About 160 species; tropical and subtropical regions of Old World especially Asia; 5 in M.P.

- 1a. Stamens 2; pistillodes absent ...1. *A. acidum*
- 1b. Stamens 3-5; pistillodes present:
 - 2a. Leaves obtuse or rounded at apex; tepals 5-7 ...4. *A. ghaesembilla*
 - 2b. Leaves acute, acuminate or mucronate at apex; tepals 3-4:
 - 3a. Male flowers sessile ...3. *A. bunius*
 - 3b. Male flowers pedicellate:
 - 4a. Stamens 3-4 ...2. *A. acuminatum*
 - 4b. Stamens 5 ...5. *A. menasu*

Notes: Willis (1982) has treated the genus under a separate family Stilaginaceae.

1. *Antidesma acidum* Retz., *Observ. Bot.* 5: 30. 1788; Airy Shaw in *Kew Bull.* 26: 352. 1972; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 154. 1994. *A. diandrum* (Roxb.) Heyne *ex* Roth, *Nov. Pl. Sp.* 369. 1821; Hook. *f.*, *Fl. Brit. India* 5: 361. 1887, *p.p.* *Stilago diandra* Roxb., *Pl. Coromandel* 2: 35. t. 166. 1802. *Antidesma ghaesembilla auct. non* Gaertn., 1788; Hook. *f.*, *Fl. Brit. India* 5: 357. 1887, *p.p. quoad syn. A. acidum* Retz. - *Amoori, Amta, Khatua.* **Fig. 87.**

Small trees, deciduous, 4-8 m high. Leaves obovate-elliptic to oblong, 4-12 x 3-7 cm, acute or acuminate at apex, rounded or cuneate at base, glabrous, hairy on nerves beneath. Flowers in spikes terminating the branchlets, up to 8 cm long; bracts ovate, acute. Male flowers *ca* 0.7 mm across, pedicellate. Tepals 5, ovate, *ca* 1.5 mm long, acute, basally connate. Stamens 2. Pistillodes absent. Female flowers *ca* 0.7 mm across. Ovary obovoid, glabrous. Drupes ovoid or subglobose, 4-5 mm across, red.

Common in dry mixed deciduous forests. Balaghat, Bilaspur, Damoh, Durg, Hoshangabad, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Seoni, Sidhi, Surguja. *Fl. & Fr.*: July - Oct.

Leaves are consumed as vegetables while fruits are edible. Seed oil is used as cooking medium.

2. *Antidesma acuminatum* Wight, *Icon. Pl. Ind. Orient.* 6. t. 1991. 1853; Hook. *f.*, *Fl. Brit. India* 5: 363. 1887, *p.p.*

Small trees; branchlets tomentose. Leaves oblong or elliptic-lanceolate, 10-20 x 3-8 cm, acuminate at apex, obtuse and unequal at base, entire; stipules linear, silky pubescent. Male flowers in panicles, shortly pedicellate; rachis pubescent. Tepals 3-4, glabrous. Stamens 3-4. Pistillodes present. Female flowers in larger panicles. Tepals pubescent. Drupes ellipsoid, red, turning black.

Bastar (Mooney, 1942). *Fl. & Fr.*: May - Aug.

3. *Antidesma bunius* (L.) Spreng., *Syst. Veg.* 1: 826. 1825; Hook. *f.*, *Fl. Brit. India* 5: 358. 1887. *Stilago bunius* L., *Mant. Pl.* 122. 1767.

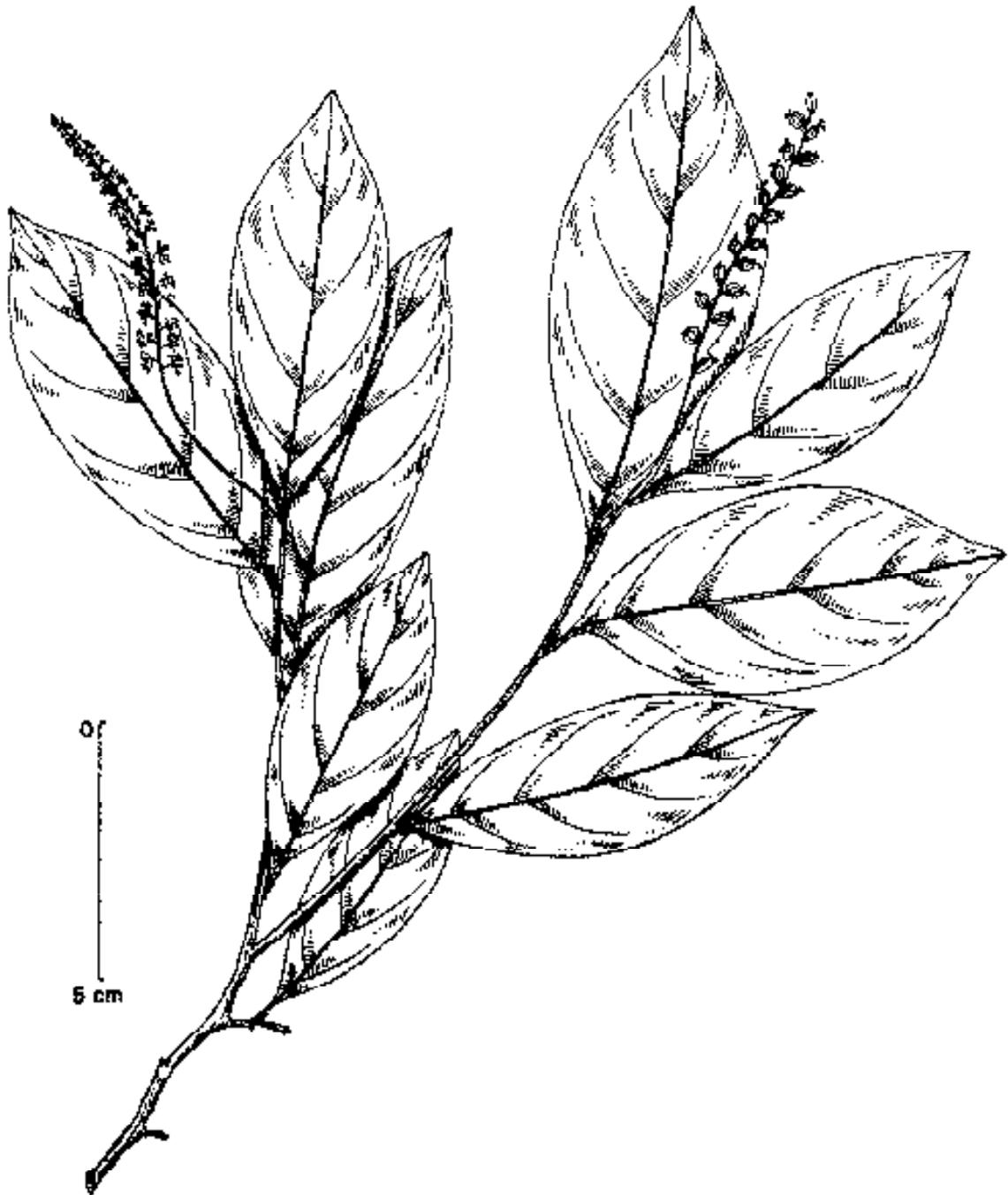


Fig. 87. *Antidesma acidum* Retz.

Small trees; young twigs fulvous hairy. Leaves elliptic-oblong or oblanceolate, 10-18 x 4-8 cm, acute or acuminate at apex, acute or subcordate at base, entire, coriaceous, glabrescent. Male flowers in spikes, sessile; rachis rusty pubescent. Perianth cupular, shortly 4-lobed, pubescent. Stamens 3. Pistillodes dilated at apex. Female flowers in racemes. Disk cupular, glabrous. Drupes ellipsoid, red turning black, with persistent tepals.

Bastar (Mooney, 1942). *Fl. & Fr.*: April - Aug.

4. *Antidesma ghaesembilla* Gaertn., *Fruct. Sem. Pl.* 1: 189, t. 39. 1788; Hook. *f.*, *Fl. Brit. India* 5: 357. 1887, *p.p.*; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 154. 1994. - *Amthi*.

Small trees, 4-10 m high; branchlets rusty or brown tomentose. Leaves ovate, oblong, broadly oblong or suborbicular, 3-7.5 x 2.9-5.7 cm, rounded or obtuse at apex and base, pubescent above, brown tomentose beneath. Flowers in slender, paniculate spikes, greenish yellow, sessile. Male flowers terminal, *ca* 2 mm across. Tepals 5-7, ovate-lanceolate, 1-5 mm long, connate at base. Stamens 4. Pistillodes linear. Female flowers subsessile. Ovary globose, *ca* 2 mm across. Drupes subglobose, 4-5 mm across, red or black on ripening. Seeds ovoid, 3-4 mm long, brown.

Common in dry mixed deciduous and sal forests. Balaghat, Bilaspur, Damoh, Durg, Hoshangabad, Raigarh, Raipur, Sconi, Sidhi. *Fl. & Fr.*: July - Sept.

Fruits are edible.

5. *Antidesma menasu* Miq. *ex Tul.* in *Ann. Sci. Nat. Bot. Ser.* III. 15: 215. 1851; Hook. *f.*, *Fl. Brit. India* 5: 364. 1887; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 155. 1994.

Trees, 6-12 m high; young parts puberulous. Leaves elliptic-oblong, 10-15 x 2.3-7 cm, acuminate or mucronate at apex, truncate at base, shining on both the surfaces; stipules linear, acute. Flowers axillary and terminal, solitary or in paniculate racemes. Male flowers *ca* 3 mm across. Tepals 3, free. Stamens 5, inserted in the hollows of disk. Pistillodes present. Female flowers *ca* 1.5 mm across. Ovary obovoid, *ca* 0.7 mm across; glabrous; stigmas 3-5. Drupes ovoid, 5-8 mm long.

Rare. In mixed forests and along streams. Hoshangabad, Rajnandgaon.
Fl. & Fr.: Sept. Oct.

5. BALIOSPERMUM Blume

Undershrubs or shrubs. Leaves spirally arranged, glandular-sinuoussdentate, pinnately nerved, 3-nerved at base, petiolate; petioles bearing 2 glands at apex; stipules gland like. Flowers in axillary racemes or panicles. Male tepals 5, imbricate. Disk of 5 glands, free or subcoherent, often 2-partite to the base, lobed, crenate. Stamens 18-25, free, crowded; anthers basifixed; cells 2, divergent at base. Female disk cupular, entire or crenate. Staminodes absent. Ovary 3-locular; ovule solitary in each locule; styles more or less coherent at base, 2-lobed; stigmas widened into a wing, recurved at apex. Fruit a capsule of 3, 2-valved, crustaceous cocci. Seeds ovoid, carunculate, grey black.

Six species; India to Sumbawa; one in M.P.

Baliospermum montanum (Willd.) Muell. Arg. in DC., Prodr. 15(2.2): 1125. 1866; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 158. 1994. *Jatropha montana* Willd., Sp. Pl. 4: 563. 1805. *Baliospermum axillare* Blume, Bijdr. 604. 1826; Hook. f., Fl. Brit. India 5: 461. 1887. *B. polyandrum* Wight, Icon. Pl. Ind. Orient. 5(2): t. 1885. 1852.

Undershrubs, perennial, erect, 1-1.5 m high; young parts hairy. Leaves ovate-oblong or elliptic-lanceolate, 5-22 x 3-18 cm, acute or acuminate at apex, rounded, subcordate or cuneate at base, sinuate, dentate, often the lower ones 3-fid; stipular glands 2 at base. Flowers in axillary or terminal panicles. Male flowers terminal. Tepals 2.5-3 mm long, green, glabrous or hairy; lobes rounded, orbicular. Stamens 20-25. Female flowers at the base. Disk entire. Ovary hairy. Capsules subglobose-obovoid, 1-1.2 cm across, hairy, 3-lobed. Seeds ellipsoid, 6-7 mm long, smooth, mottled.

Common in shady places and along the bank of drains in mixed forests. Damoh, East Nimar, Hoshangabad, Indore, Mandla, Narsimhapur, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Satna, Seoni, Sidhi, Surguja.
Fl. & Fr.: Feb. - April.

Seeds are used as purgative and as fish poison.

6. BISCHOFIA Blume

Trees, deciduous, dioecious. Leaves 3-foliolate; leaflets often crenate. Flowers minute, in axillary or lateral, paniculate racemes. Male flowers scattered or clustered, shortly pedicellate. Tepals imbricate, cucullate, retuse. Stamens 5, free. Pistillodes present. Female flowers pedicellate. Tepals 5. Staminodes small. Ovary exserted, 3-4-locular; ovules 2 in each locule; styles 3, long. Fruit a berry, indehiscent, hardy, 3-6-seeded. Seeds oblong, 3-angled.

A monotypic genus; Indo-Malesia and China.

Notes: Willis (1982) has treated the genus under a separate family Bischofiaceae.

Bischofia javanica Blume, Bijdr. 1168. 1827; Hook. *f.*, Fl. Brit. India 5: 345. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 159. 1994.

Fig. 88.

Trees, 15-20 m high; bark dark-coloured. Leaves alternate; leaflets broadly ovate-elliptic, 8-15 x 4-9 cm, acuminate at apex, cuneate at base, often oblique. Flowers in pedunculate racemes. Male tepals obovate, concave, ca 1 mm long. Stamens opposite the tepals; anthers globular. Pistillodes broad, peltate. Female tepals ovate, ca 2 mm long, subobtuse. Berries 5-8 mm across, green, smooth, 3 or 4-seeded. Seeds smooth, shining brown.

Rare. Along the bank of drains and streams, Raigarh, Surguja. *Fl. & Fr.*: Feb. - April.

7. BREYNIA J.R. Forster & G. Forster, *nom. cons.*

Shrubs or small trees, monoecious. Leaves simple, distichous, elliptic, shortly petiolate; stipules minute, acuminate. Flowers axillary. Male flowers in fascicles, pendulous, more than female. Tepals 6, connate into a turbinate tube. Stamens 3, included; anthers connate by their connectives, extrorse; connectives hardly produced. Female flowers mostly solitary. Tepals 6, shortly connate, spreading or campanulate. Ovary half inferior, globose, truncate or cupular, 3-locular; ovules 6, axile. Disk absent. Fruit a capsule, indehiscent, with accrescent tepals. Seeds 3-angled.

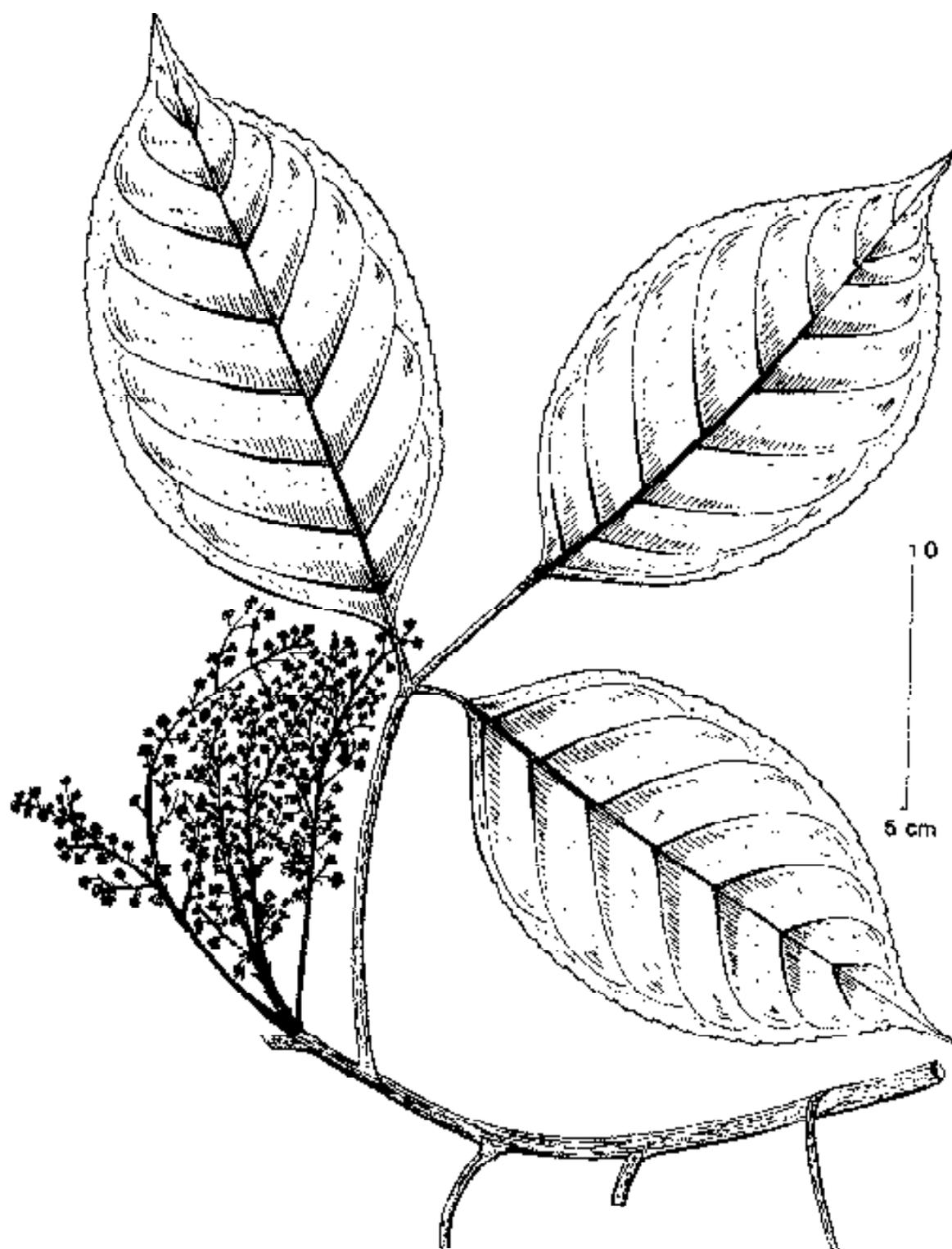


Fig. 88. *Bischofia javanica* Blume

About 25 species; China to New Caledonia and Australia; 2 in M.P.

- 1a. Fruiting perianth notably enlarged; capsules depressed; seeds arillate ...1. *B. retusa*
- 1b. Fruiting perianth hardly enlarged; capsules not depressed; seeds exarillate ...2. *B. vitis-idaea*

1. ***Breynia retusa*** (Dennst.) Alston in Ann. Roy. Bot. Gard. 11: 204. 1929; Airy shaw in Kew Bull. 26: 227. 1972; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 161. 1994. *Phyllanthus retusus* Dennst., Schlüssel Hortus Malab. 31. 1818. *Breynia patens* (Roxb.) Rolfe in J. Bot. 20: 359. 1882; Hook. *f.*, Fl. Brit. India 5: 329. 1887.

Shrubs or small trees, 2-4 m high. Leaves elliptic-oblong, 1.5-2.5 x 1-1.5 cm, obtuse at apex, rounded to acute at base. Flowers axillary, on filiform pedicels. Male perianth-tube ca 4 mm long. Staminal column ca 7 mm long, basally narrowed. Stamens 3; anthers oblong. Female tepals thick-fleshy, wavy. Ovary cupular, obscurely 6-lobed; style ca 0.7 mm long, exserted, 3-fid above. Capsules depressed globose, ca 8 mm across; fruiting perianth enlarged, spreading.

Rare. In mixed deciduous forests. Seoni. *Fl. & Fr.*: March - April.

2. ***Breynia vitis-idaea*** (Burm. *f.*) C. Fischer in Kew Bull. 1932: 65. 1932; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 163. 1994. *Rhamnus vitis-idaea* Burm. *f.*, Fl. Ind. 61. 1768. *Phyllanthus rhamnoides* Retz., Observ. Bot. 5: 30. 1788. *Melanthesa rhamnoides* (Retz.) Blume, Bijdr. 591. 1826. *Breynia rhamnoides* (Retz.) Muell. Arg. in DC., Prodr. 15 (2.2): 440. 1866; Hook. *f.*, Fl. Brit. India 5: 330. 1887.

Large shrubs, 2-3 m high. Leaves elliptic-ovate, 2-3 x 1-1.6 cm, subacute at apex, rounded at base; stipules 1-2 mm long, subulate, from a triangular base. Flowers minute. Male perianth-tube 2-5 mm long. Staminal column ca 6 mm long, uniformly thick. Female flowers campanulate. Tepals shortly connate, ca 2 mm long, acute. Ovary truncate, obscurely 3 or 6-lobed. Capsules globose, ca 6 mm across, obscurely 3-6-lobed; fruiting perianth hardly enlarged.

Common in sal and mixed forests. Balaghat, Bastar, Durg, Hoshangabad, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: April - Nov.

B. BRIDELIA Willd.

Shrubs or trees. Leaves often with parallel main veins. Flowers in axillary clusters, sometimes combined into a pseudo-spike or pseudo-panicle. Male tepals 10, 2-seriate, outer 5, valvate, inner 5, free, usually clawed, cucullate and dentate. Disk cupular. Stamens 5, inserted on a stalk like gynandrophore bearing a pistillode at tip. Female tepals 10; inner tepals oblong or spatulate, persistent. Ovary 2-locular, ovules 2 in each locule; styles 2; stigmas deeply 2-fid. Fruit a drupe, usually globose, enclosing 1-2 usually 1-seeded pyrenes.

About 60 species, tropical regions of Old World, 5 in M.P.

- 1a. Plants straggling 1 *B. hamiltoniana*
- 1b. Plants erect:
- 2a. Leaves obovate, elliptic-obovate or oblanceolate, secondary nerves 6-12 pairs, looping
- 3a. Tepals pale greenish yellow, glabrous, drupes globose, ca 4 mm across 2 *B. montana*
- 3b. Tepals white, pubescent, drupes oblong or ellipsoid, ca 1 cm long 3 *B. pubescens*
- 2b. Leaves elliptic-oblong, secondary nerves 15-20 pairs, straight, parallel, never looping
- 4a. Flowers in long spikes, drupes purple-black 4 *B. retusa*
- 4b. Flowers solitary or in short spikes, drupes yellowish 5 *B. squamata*

1. *Bridelia hamiltoniana* Wallich ex Muell. Arg. in *Linnaea* 34: 77, 1865-66; Hook. f. *Fl. Brit. India* 5: 271, 1887; Tripathi *et al.* *Fl. Elem. Madhya Pradesh* 165, 1994.

Shrubs, straggling, up to 3 m high. Leaves elliptic, obovate-elliptic or rhomboid, 4-8 x 2-4 cm, obtuse at apex, entire or slightly crenulate; stipules lanceolate-subulate, 1-2 mm long. Flowers in axillary, small, sessile, spicate clusters. Male: outer tepals ovate, 1-1.5 mm long, acute, connate at base; inner tepals orbicular-rhomboid, 0.7-0.8 mm long. Female: tepals ovate, acute. Styles distinct, stigmas 2-fid. Drupes globose, 5-6 mm across, black.

Rare. In mixed forests. Raigarh, Raipur. *Fl. & Fr.*: Aug. Dec.

2. ***Bridelia montana*** Willd., Sp. Pl. 4: 978. 1806; Hook. *f.*, Fl. Brit. India 5: 269. 1887. *p.p.*

Shrubs, monoecious, ca 2 m high; branches brown, glabrous. Leaves obovate, suborbicular or oblanceolate, ca 7 x 4 cm, acute at apex, cuneate at base, glabrous or puberulous beneath; secondary nerves 6-10 pairs; stipules linear-lanceolate. Flowers few in axillary clusters, sessile; bracts lanceolate, glabrous. Tepals pale greenish yellow, glabrous. Drupes globose, ca 4 mm across, green with white speckle.

Bastar (Saxena & Khotale, 1976). *Fl. & Fr.*: Oct. Dec.

Ripe fruits are edible.

3. ***Bridelia pubescens*** Kurz in J. Asiat. Soc. Bengal 42: 241. 1873 & Forest Fl. Burma 2: 367. 1877; Hook. *f.*, Fl. Brit. India 5: 270. 1887.

Trees, monoecious; branches pubescent. Leaves elliptic-obovate, 8-16 x 3-8 cm, acuminate at apex, cuneate at base, pilose beneath; secondary nerves 7-12 pairs; petioles short; stipules linear-lanceolate. Flowers in axillary clusters or spikes, densely pubescent. Tepals white, pubescent. Drupes oblong or ellipsoid, ca 1 cm long, purple-red, with persistent tepals.

Bastar (Mooney, 1942). *Fl. & Fr.*: April - Feb.

4. ***Bridelia retusa*** (L.) Spreng., Syst. Veg. 3: 48. 1826; Hook. *f.*, Fl. Brit. India 5: 268. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 167. 1994. *Cluytia retusa* L., Sp. Pl. 1042. 1753. - *Ekdania*. Khaja, Khasoi.

Trees, deciduous, 4-7 m high, spinous when young; bark grey. Leaves elliptic-oblong, 6-15 x 3-6 cm, obtuse at apex, usually rounded at base, glabrous and bright green above, glaucous and finely tomentose beneath; secondary nerves 15-20 pairs. Flowers in axillary clusters or long, axillary or terminal spikes with male and female flowers intermixed, greenish yellow, sessile or shortly pedicellate. Male outer tepals deltoid-ovate, 2-3 mm long, fleshy; inner tepals greenish white, obovate, short. Stamens connate below. Female tepals spatulate. Drupes ca 8 mm across, purple-black, supported by persistent calyx.

Common in mixed forests and along roadsides. Balaghat, Bastar, Bilaspur, Bhopal, Chhatarpur, Damoh, Dhar, Durg, Hoshangabad, Indore, Mandla, Panna, Raigarh, Raipur, Satna, Seoni, Shahdol, Surguja. *Fl. & Fr.*: July - Feb.

Wood is used as timber for rafters, posts and agricultural implements. Leaves are used as fodder. Mature fruits are sweet and edible.

5. *Bridelia squamosa* (Lam.) Gehrm. in Engl., Bot. Jahrb. 41, Beibl. 95: 30. 1908; Santapau in J. Bombay Nat. Hist. Soc. 50: 308. 1951; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 167. 1994. *Cluytia squamosa* Lam., Encycl. 5: 54. 1790. *Bridelia retusa* var. *squamosa* Muell. Arg. in DC., Prodr. 15(2.2): 493. 1866; Hook. f., Fl. Brit. India 5: 268. 1887. - *Kasai*.

Small trees, up to 4 m high; bark greyish, flaking. Leaves elliptic-oblong, sometimes a few obovate-rounded, 10-20 x 5-9 cm, glaucous beneath, strongly 15-20-nerved. Flowers axillary, solitary or in short, tomentose spikes. Male outer tepals ovate, 3-4 mm long, acute; inner tepals orbicular, 4-5 mm long. Stamens 5. Female tepals subspathulate. Drupes globose, 6-8 mm across, yellowish.

In sal and mixed forests. Durg, Raipur, Rajnandgaon, Satna. *Fl. & Fr.*: Aug. - Jan.

9. CHROZOPHORA ADr. Juss., *nom. et orth. cons.*

Herbs or undershrubs, diffuse, densely hispid or stellately tomentose. Leaves alternate, sinuate-dentate or lobed, wavy or plicate, glandular or eglandular at base. Flowers in axillary racemes bearing female flowers at the base and male flowers towards apex. Male tepals 10, 2-seriate; outer 5, deeply lobed; inner 5, short. Disk obscure. Stamens 5-15, connate at the base, 1-3-seriate. Pistillodes absent. Female tepals 10; outer 5, narrow; inner 5, very narrow, sometimes setaceous or obsolete. Disk of 5, short, broad glands, alternating with inner tepals. Ovary 3-locular; ovule solitary in each locule; style erect or spreading, 2-fid. Fruit a capsule of 3, hispid, tomentose or lepidote, 2-valved, almost fleshy cocci. Seeds estrophiolate; testa shining.

About 12 species; Mediterranean region and from tropical Africa to India; 2 in M.P.

- 1a. Leaves up to 3.5 cm long; stellate hairs stipitate;
capsules greyish black ...1. *C. prostrata*
- 1b. Leaves 4-8 cm long; stellate hairs sessile;
capsules purple ...2. *C. rotleri*

1. *Chrozophora prostrata* Dalzell in Dalzell & Gibson, Bombay Fl. 233. 1861; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 168. 1994. *C. plicata* Adr. Juss. in Euphorb. Gen. 28. 1824; Hook. f., Fl. Brit. India 5: 409. 1887.

Herbs, annual, erect or procumbent to prostrate, stellately hairy, up to 25 cm long. Leaves both radical and cauline, broadly ovate-suborbicular, 1.2-3.5 x 1-2.8 cm, obtuse at apex, truncate-cordate at base, undulate-crenate, pubescent above, stellately woolly beneath. Flowers in axillary, short, few-flowered racemes. Male outer tepals ovate, up to 3 mm long; inner tepals reddish, elliptic-lanceolate, up to 2.5 mm long. Stamens 15, 2-seriate. Female outer tepals linear, up to 2.5 mm long; inner tepals smaller than outer. Styles 3, 2-fid. Capsules subglobose, ca 6 mm across, greyish black, stellately woolly. Seeds globose, ca 2 mm across, dark grey.

- 1a. Plants erect; leaves longer than broad, subacute,
often with 2 glands at base ...1.1. var. *parviflora*
- 1b. Plants prostrate; leaves about as
long as broad, obtuse, eglandular ...1.2. var. *prostrata*

1.1. var. *parviflora* (Klotzsch ex Schweinf.) Duthie, Fl. Gangetic Plain 3: 106. 1915. *Chrozophora parviflora* Klotzsch ex Schweinf. Pl. Quaed. Nilot. 11. 1862. *C. plicata* Adr. Juss. in Euphorb. Gen. 28. 1824; forma 2, Hook. f., Fl. Brit. India 5: 410. 1887.

In dried ponds and puddles on clay or black soil, usually associated with *Heliotropium supinum* and *Coldenia procumbens*. Bhopal (Oomma-
chan, 1977). *Fl. & Fr.*: May - June, also during winter.

1.2. var. *prostrata*

Common in dried ditches and puddles along roadsides. Bastar, Bhopal, Bilaspur, Chhatarpur, Damoh, Rajnandgaon, Satna, Seoni, Sidhi, West Nimar. *Fl. & Fr.*: March - June.

2. *Chrozophora rottleri* (Geiseler) Adr. Juss. ex Spreng., Syst. Veg. 3: 850. 1826; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 169. 1994. *Croton rottleri* Geiseler, Croton. Monogr. 54. 1807. *Chrozophora tinctoria auct. non* Adr. Juss., 1824; Hook. f., Fl. Brit. India 5: 409. 1887, *p.p.*

Herbs, annual, stellately tomentose, up to 60 cm high. Leaves alternate, broadly ovate or suborbicular, 4-8 x 3-7 cm, obtuse-rounded at apex, truncate-cuneate at base, entire or 3-lobed, undulate-crenate, stellately hairy. Flowers in axillary or terminal racemes; bracts linear, *ca* 3 mm long, caducous. Male outer tepals ovate, 2.5-3 mm long, stellately hairy; inner tepals yellow, ovate-lanceolate, 2.2-5 mm long. Stamens 5-15; filaments connate at base, 1-3-seriate. Female outer tepals deltoid, *ca* 2 mm long, acute, hairy; inner tepals yellow, shorter, setaceous. Styles 3, 2-fid. Capsules subglobose, *ca* 8 mm across, purplish, stellately tomentose. Seeds globose, *ca* 3 mm across, ash-coloured.

Common in wastelands, dried ditches, roadsides, river beds and along the railway track. Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Mandla, Rajnandgaon, Rewa. *Fl. & Fr.*: March - May.

The ash of roots is used for the treatment of cough. Seeds are used as purgative.

10. **CLEISTANTHUS** Hook. f. ex Planch.

Shrubs or small trees, monoecious. Leaves alternate, entire. Flowers small, in axillary clusters or spikes, all sessile or female shortly pedicellate. Male tepals 10, 2-seriate; outer 5, valvate or subimbricate at apex; inner 5, minute, spathulate or cuneate, dentate at apex. Stamens 5; filaments connate at base. Female perianth less deeply lobed than male. Ovary 3 (rarely 4)-lobed, 3-locular; ovules 2 in each locule; styles more or less cohering at base, 2-lobed or 2-fid. Fruit a capsule of 3, 2-valved cocci, subglobose or depressed, sessile or stipitate. Seeds arillate or exarillate; albumen copious or scanty.

About 130 species; tropical regions of Old World; 2 in M.P.

- 1a. Leaves orbicular, obovate or elliptic, shortly acute
or apex; ovary glabrous; capsules *ca* 2 cm across ...1. *C. collinus*
- 1b. Leaves ovate to elliptic-lanceolate, acuminate at
apex; ovary villous; capsules *ca* 0.7 cm across ...2. *C. patulus*

1. *Cleistanthus collinus* (Roxb.) Benth. ex Hook. f., Fl. Brit. India 5: 274. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 170. 1994. *Cluytia collina* Roxb., Pl. Coromandel 2: 37. t. 169. 1802. *Gurari*, Karra.

Shrubs or small trees, up to 8 m high. Leaves distichous, orbicular, obovate or elliptic, 2-10 x 2-7 cm, shortly acute at apex, sometimes emarginate, rounded at base, glaucous beneath. Flowers in axillary clusters, *ca* 1 cm across. Male outer tepals lanceolate, thick, basally connate; inner tepals linear. Stamens monadelphous. Female perianth deeply lobed. Ovary globose; ovules laterally pendulous; styles 3, shortly 2-fid. Disk annular with an inner, fimbriate corona, enclosing ovary. Capsules globose, *ca* 2 cm across, dark brown. Seeds globose; testa reddish brown, smooth, shining.

Common in dry mixed deciduous forests. Balaghat, Bastar, Bhopal, Bilaspur, Durg, Raigarh, Raipur, Rajnandgaon, Seoni. *Fl. & Fr.*: June Nov.

The wood is used for posts and poles. Roots, leaves, bark and fruits are used as fish poison.

2. *Cleistanthus patulus* (Roxb.) Muell. Arg. in DC., Prodr. 15(2.2): 505. 1866; Hook. f., Fl. Brit. India 5: 279. 1887. *Cluytia patula* Roxb., Pl. Coromandel 2: 37. t. 170. 1802. *Lebidiera patula* (Roxb.) Muell. Arg. in Linnaea 32: 21. 1864-65. *Amanoa indica* Wight, Icon. Pl. Ind. Orient. 5: 1911. 1852.

Small trees; branches glabrous. Leaves ovate to elliptic-lanceolate, *ca* 9 x 3.5 cm, acuminate at apex, rounded at base, coriaceous, glabrous, shortly petiolate. Flowers in axillary, *ca* 2 cm long spikes. Male tepals ovate or obovate, acute, crenulate. Female tepals subentire. Disk flat, shallowly crenate. Ovary villous; styles 3, 2-fid. Capsules globose, *ca* 7 mm across, 3-lobed, glabrous to pilose.

Rare. Bastar (Saxena, 1973; Saxena and Khotele, 1976). *Fl. & Fr.*: Feb. May.

11. CODIAEUM Adr. Juss., *nom. cons.*

Herbs, shrubs or small trees, erect. Leaves simple, spirally arranged, entire, coriaceous, exstipulate, petiolate. Flowers in unisexual racemes; racemes in upper leaf-axils, solitary or paired. Male tepals 5-6, minute.

Disk glands 5-6, alternate with tepals. Stamens 15-35, on slightly vaulted receptacle, free. Female tepals absent. Disk cupular, almost entire. Ovary 3-locular; style entire. Fruits globose, 3-lobed, breaking up into 2-valved cocci.

Six species; Malesia to Pacific region; one in M.P.

Codiaeum variegatum (L.) Blume, Bijdr. 606. 1826; Hook. f., Fl. Brit. India 5: 399. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 171. 1994. *Croton variegatum* L., Sp. Pl. 1199. 1753. *C. pictus* Lodd., Bot. Cab. t. 870. 1824.

Shrubs or small trees, evergreen, 1.5-3 m high. Leaves variable in shape, oblong-ovate, obovate-oblong, ovate, spatulate or linear, 5-30 x 1-5 cm, often waved on margin, shining, with pale, red or yellow spots. Flowers in 10-25 cm long racemes; male and female racemes often in one axil. Male tepals up to 3 mm long. Stamens 15-20. Female flowers without tepals. Ovary glabrous; styles connate at base, recurved, elongated, filiform. Fruits globose, ca 7 mm long, pale. Seeds ca 5 mm long, brown, variegated.

Commonly cultivated in gardens. Bhopal, Indore, Jabalpur. *Fl. & Fr.*: Oct. - Feb.

12. CROTON L.

Herbs, shrubs or trees. Leaves alternate, with 2 glands at base; stipules linear, caducous. Flowers in terminal racemes; female flowers in lower and male flowers in upper part. Male tepals 10, 2-seriate, shortly connate at base, valvate. Stamens 20, free, incurved in bud, exerted later. Disk glands 5, opposite. Female tepals 10, 2-seriate, valvate or imbricate. Ovary globose, 3-locular; ovules 3, pendulous; styles 3, once or twice forked; stigmas acute. Disk glands 5, hypogynous. Fruit a capsule of 3, 2-valved cocci, subglobose. Seeds carunculate; testa crustaceous.

About 750 species; tropical and subtropical regions; 2 in M.P.

- 1a. Herbs; leaves up to 7 cm long; capsules
ca 6 mm across ...1. *C. bonplandianus*
- 1b. Small trees; leaves 7-25 cm long;
capsules ca 10 mm across ...2. *C. roxburghii*

1. *Croton bonplandianus* Baill. in *Adansonia* 4: 339. 1863-1864; Croizat in *J. Bombay Nat. Hist. Soc.* 41: 573. 1940, "*bonplandianum*"; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 172. 1994. *C. sparsiflorus* Morong in *Ann. N.Y. Acad. Sci.* 7: 221. 1893.

Herbs, perennial, erect, much branched, up to 60 cm high. Leaves ovate-lanceolate, 2.5-7 x 1-3 cm, acute at apex, obtuse-subtruncate at base, serrate. Flowers in 5-8 cm long racemes, greenish; male flowers above, female flowers fascicled in the axil of minute bracts. Male outer tepals obovate, minute; inner tepals linear-oblong. Stamens 10-15. Female tepals lanceolate. Ovary densely stellate-hairy; stigmas 2-fid. Capsules 5-6 mm long, 3-angled, stellate-hairy. Seeds oblong, ca 4 mm long, shining, with white caruncle.

Common in wastelands, harvested fields, along the railway tracks and in open lands but not in shady places. Bilaspur, Chhatarpur, Damoh, Durg, Mandla, Raigarh, Raipur, Rajnandgaon, Rewa, Shahdol. *Fl. & Fr.*: March-April.

2. *Croton roxburghii* Balakrishnan in *Bull. Bot. Surv. India* 3: 39. 1961; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 173. 1994. *C. oblongifolius* Roxb., *Fl. Ind.* 3: 685. 1832, *non* Delile, 1814, *nec* Spreng., 1826; Hook. *f.*, *Fl. Brit. India* 5: 386. 1887, "*oblongifolium*" **Fig. 89.**

Trees, 5-13 m high. Leaves crowded towards the end of branchlets, oblong-lanceolate, 7-25 x 3-10 cm, acuminate at apex, subacute at base; stipules linear, 4-6 mm long. Flowers solitary or fascicled in terminal or axillary racemes. Male outer tepals ovate, 4-6 mm long, obtuse; inner tepals elliptic-lanceolate, 2-3 mm long, obtuse, woolly. Stamens 12, inflexed in bud. Female outer tepals acute, with densely ciliate margins; inner tepals obovate, 2-3 mm long, with densely woolly margins. Styles 3, each again 2-fid. Capsules subglobose, 9-10 mm across, 3-lobed. Seeds ellipsoid, 4-5 mm long.

In mixed forests and on hill slopes. Bilaspur, Raigarh. *Fl. & Fr.*: March - Jan.

13. DRYPETES Vahl

Trees, evergreen. Leaves alternate, distichous, entire or serrulate, coriaceous, petiolate. Flowers axillary, in fascicles, pedicellate. Male

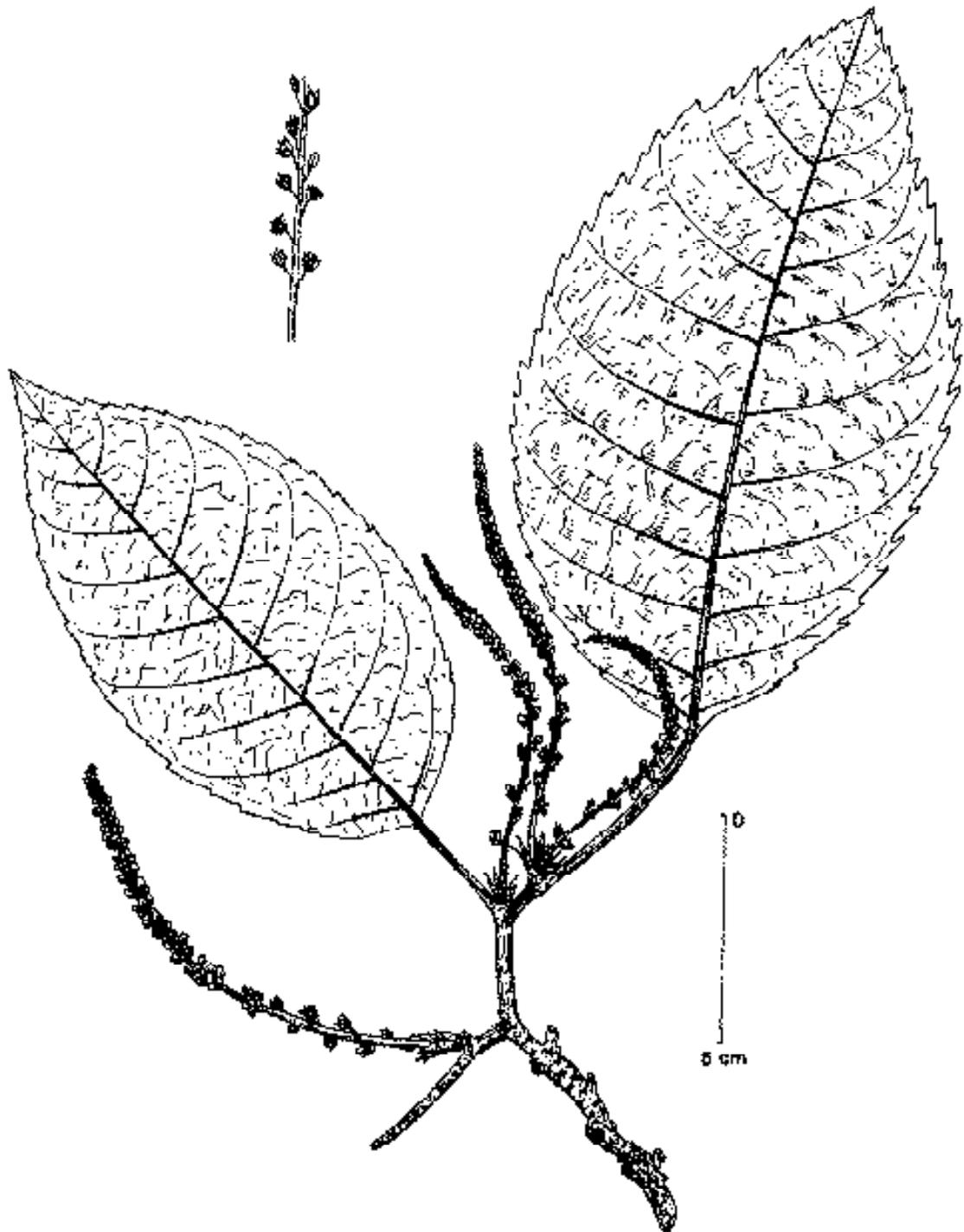


Fig. 89. *Croton roxburghii* Balakrishnan

tepals 4 or 5, unequal. Stamens 3-8, free or connate at base, exserted; anther cells parallel. Female tepals as in male. Ovary 1 or 3-locular; ovules 2 in each locule, pendulous; style 1 or 3; stigmas cupular, fleshy, dilated. Disk annular or absent. Fruit a drupe, ellipsoid or globose, usually 1-seeded. Seeds ovoid.

About 200 species; tropical regions of S. Africa and E. Asia; one in M.P.

Drypetes roxburghii (Wallich) Hurusawa, J. Fac. Sci. Univ. Tokyo Sect. 3, Bot. 6(6): 337. 1954; Airy Shaw in Kew Bull. 26: 257. 1972; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 174. 1994. *Putranjiva roxburghii* Wallich, Tent. Fl. Nepal. 61. 1826; Hook. *f.*, Fl. Brit. India 5: 336. 1887.

Trees, up to 8 m high; branches drooping. Leaves ovate-oblong, 4-10 x 2-3 cm, acute to shortly acuminate at apex, obliquely obtuse or rounded at base, serrulate, shining above. Male flowers in axillary, capituliform clusters, yellowish, shortly pedicellate. Tepals 5, oblong, ca 2 mm long, obtuse, ciliate. Disk absent. Stamens 3, connate at base. Female flowers 1-3 in an axil, greenish. Tepals 5, oblong, up to 2 mm long. Ovary 3-locular, finely silky; stigmas 3, recurved. Drupes ellipsoid, ca 1.5 cm long, pointed at apex, white tomentose; stone hard, rugose. Seeds crustaceous.

Commonly planted as avenue tree, sometimes in wastelands. Chhatarpur, Damoh, Indore, Rewa, Seoni. *Fl. & Fr.*: March - Feb.

14. EUPHORBIA L.

Herbs, shrubs or small trees; sap milky; stems slender or thick and fleshy. Leaves opposite or alternate, sometimes caducous; stipules small or absent. Flowers in cyathia, solitary or combined into cymes, umbels or corymbs. Involucre often 4-5-lobed at tip and bearing 1-5 glands alternating with the lobes; glands often with a petaloid limb; bracteoles present. Male flowers naked, pedicellate. Stamens without floral envelope. Female flowers naked or with 3, minute perianth-lobes. Ovary 3-locular, exserted on a pedicel in the centre of the involucre; styles 3, free or connate, entire or 2-lobed. Fruit a capsule of 3, 2-valved cocci separating elastically from a persistent axis. Seeds laterally attached at or above the middle of the locule, with or without aril or thickening at the hilum, carunculate.

About 1600 species; cosmopolitan especially subtropical regions; 25 in M.P.

1a. Shrubs or small trees; stems fleshy:

2a. Unarmed:

3a. Leaves 7-15 cm long; bracts foliaceous, bright red or light yellow ...19. *E. pulcherrima*

3b. Leaves 1-1.3 cm long; bracts neither foliaceous nor coloured ...25. *E. tirucalli*

2b. Armed:

4a. Each stigma 2-fid:

5a. Main stem practically none; spines spiral and in pairs; leaves up to 1.2 cm long ...3. *E. caducifolia*

5b. Main stem present; spines neither spiral nor in pairs; leaves 2-6 cm long ...14. *E. milit*

4b. Each stigma undivided:

6a. Branches prominently 3-7-angled or winged:

7a. Branches 3 to 5-winged; wings lobulate; styles connate up to half of length:

8a. Leaves ca 1 cm long; spine-shields persistent; filaments red ...1. *E. antiquorum*

8b. Leaves more than 1 cm long; spine-shields caducous; filaments greenish yellow ...2. *E. barnhartii*

7b. Branches angular, neither winged nor lobulate; styles nearly free up to base ...22. *E. royleana*

6b. Branches terete or angular (not prominently):

- 9a. Branches angular; stipular spines on prominent tubercles; tubercles sub-confluent, in 5 rows; leaves acute at apex ...15. *E. neriifolia*
- 9b. Branches terete; stipular spines on short tubercles; tubercles spirally disposed; leaves obtuse at apex ...16. *E. nivulia*
- 1b. Herbs; stems not fleshy:
- 10a. Leaves more than 1 cm long:
- 11a. Leaves alternate below, opposite above or all alternate except the upper most floral leaves, exstipulate:
- 12a. Involucre with a single large gland on one side ...9. *E. heterophylla*
- 12b. Involucre with 4 to 5 well developed glands along the upper margin:
- 13a. Floral leaves very broad and short, almost orbicular, very different from the lower leaves:
- 14a. Bracts free; capsules hairy; seeds oblong, bluish grey ...13. *E. laeta*
- 14b. Bracts connate at base; capsules glabrous; seeds subglobose, yellowish brown ...17. *E. perbracteata*
- 13b. Floral leaves slightly broader than lower ones, otherwise both type of leaves similar:
- 15a. Rootstock usually proliferous; seeds globose, smooth ...18. *E. prolifera*
- 15b. Rootstock not proliferous; seeds ellipsoid, with leprous, tuberculate testa ...6. *E. dracunculoides*

- 11b. Leaves all opposite, stipulate or if stipules absent then opposite pairs of leaves joined by interpetiolar line:
- 16a. Floral leaves distichously imbricating, secund, concealing the involucre:
- 17a. Capsules glabrous ...20. *E. pycnostegia*
- 17b. Capsules hairy:
- 18a. Limbs of glands pectinately laciniate ...5. *E. cristata*
- 18b. Limbs of glands entire or sinuate but not laciniate ...7. *E. elegans*
- 16b. Floral leaves neither distichously imbricating nor concealing the involucre:
- 19a. Plants nearly glabrous; cymes not capituliform; glands with distinct limbs ...12. *E. hypericifolia*
- 19b. Plants hispid; cymes capituliform; glands with obsolete limbs ...11. *E. hirta*
- 10b. Leaves less than 1 cm long:
- 20a. Glands of involucre with conspicuous petaloid limbs ...21. *E. rosea*
- 20b. Glands of involucre without petaloid limb:
- 21a. Leaves subquadrate or obliquely ovate, retuse at apex ...23. *E. serpens*
- 21b. Leaves ovate-oblong, elliptic-oblong or obliquely oblong, obtuse or rounded at apex:
- 22a. Stems glabrous or nearly so; capsules glabrous all over ...10. *E. heyneana*
- 22b. Stems puberulous or pubescent; capsules pubescent either partly or completely:
- 23a. Capsules pubescent at the angles of the cocci, glabrous elsewhere ...4. *E. chamaesyce*

23b. Capsules pubescent or hirsute all over:

24a. Leaves crenulate; capsules pubescent;
seeds furrowed ... 24. *E. thymifolia*

24b. Leaves entire; capsules hirsute;
seeds pitted ... 8. *E. granulata*

1. *Euphorbia antiquorum* L., Sp. Pl. 450. 1753; Hook. f., Fl. Brit. India 5: 255. 1887. *Tredhara*.

Small trees, much branched; branches jointed; branchlets 3 to 5-winged. Leaves spatulate or obovate-oblong, ca 1 cm long, fleshy; stipular spines on a small tubercle, dark brown, ca 5 mm long. Cyathia in branched cymes. Involucre cupular; bracts 2, ovate. Perianth-lobes 5, fleshy. Stamens red. Ovary 3-locular; ovule solitary in each locule. Capsules compressed.

Rare. In rock crevices. Hoshangabad. *Fl. & Fr.*: Nov. - Jan.

2. *Euphorbia barnhartii* Croizat, Euphorb. Art. 52, t. 25. 1934; Santapau in Bull. Bot. Surv. India 3:16. 1961; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 178. 1994. *E. trigona auct. non* Haw., 1812; Hook. f., Fl. Brit. India 5: 256. 1887.

Shrubs or small trees; stems fleshy, thick, 1.5-2 m high, terete at base, 4-5-winged upwards; branches 3-alate; sinus acute or lobulate, with one or two pairs of stout, stipular spines on the lobes. Leaves oblong-obovate, 1.2-6 x 0.5-2 cm, rounded, with a recurved mucro. Involucres in dichasial cymes of 3; central one with female flowers; laterals usually male; lobes cuneiform, fimbriate; glands 1.5-2 mm long, shining, yellow. Capsules not seen.

In drier regions. Damoh. *Fl.*: Sept. - Nov.

3. *Euphorbia caducifolia* Haines in Indian For. 40: 154. 1914 & Bot. Bihar Orissa 2: 143. 1921; Santapau in Bull. Bot. Soc. Bengal 8: 6. 1955; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 178. 1994. *E. neriifolia auct. plur. non* L., 1753, *nec* Roxb., 1832.

Shrubs, fleshy, extensively branched from the base; branches terete, tuberculate, smooth, green; tubercles spirally arranged at the apex, each

provided with broadly elliptic and black areoles bearing paired spines. Leaves at the apex of the areoles, solitary, suborbicular, 8-12 mm long, acute at apex, thick, fleshy, glabrous. Cyathia in triads, in the axils of fallen leaves towards the apex of branches; bracts 2, pink, rounded-ovate, mucronulate. Involucral-lobes broadly cuneate, fimbriate; glands tumid, transversely oblong, glabrous. Capsules acutely 3-angled, ca 8 mm across, plano-convex. Seeds ovoid, ca 3 mm across, deep brown, smooth.

Rare. In hilly regions. Bastar. *Fl. & Fr.*: Nov. - Dec.

4. *Euphorbia chamaesyce* L., Sp. Pl. 455. 1753; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 178. 1994. *E. prostrata* Aiton, Hortus. Kew. 2: 139. 1789; Hook. *f.*, Fl. Brit. India 5: 266. 1887. *Chamaesyce prostrata* (Aiton) Small, Fl. S. E. U. S. 713. 1903.

Herbs, annual, prostrate; stems 20-30 cm long, several, spreading, slightly flattened from base, puberulous with minute curved hairs on upper side, glabrous below. Leaves ovate-oblong, slightly oblique, 2-6 x 1.5-4 mm, obtuse or rounded at apex, cordate-rounded at base. Involucres axillary, solitary, hairy outside; lobes lanceolate, ciliate; glands red, suborbicular. Capsules subglobose, ca 1.5 mm across. Seeds narrowly ovoid, ca 1 mm long, 4-angled, obtuse at apex, truncate at base, transversely rugose.

Usually on hill slopes and in rock crevices. Chhatarpur, Damoh, Durg, Hoshangabad, Indore, Mandla, Raigarh, Raipur, Seoni, Sidhi. *Fl. & Fr.*: Aug. - Sept.

The plant is used as lactagogue and vegetable.

5. *Euphorbia cristata* Heyne ex Roth, Nov. Pl. Sp. 226. 1821; Hook. *f.*, Fl. Brit. India 5: 247. 1887, *p.p.*; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 180. 1994. *Chamaesyce cristata* (Heyne ex Roth) Webster in J. Arnold Arb. 48: 424. 1967.

Herbs, annual, prostrate or ascending, slender; stems 10-25 cm long, covered with long, flexuous hairs. Leaves opposite, obliquely ovate-cordate, 1.5-2 x 0.8-1.2 cm, obtuse at apex, serrulate, hairy. Involucres sessile, hairy, in the axils of uppermost, distichously imbricate leaves; lobes linear-lanceolate; glands with pectinate and fimbriate limbs. Capsules ovoid, ca 2 mm across, white, transversely furrowed.

Rare. On rocky hill slopes. Panna, Surguja. *Fl. & Fr.*: Oct. - Jan.

6. *Euphorbia dracunculoides* Lam., *Encycl.* 2: 428. 1788; Hook. *f.*, *Fl. Brit. India* 5: 262. 1887; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 180. 1994. *E. angustifolia* Buch.-Ham. *ex* D. Don, *Prodr. Fl. Nepal.* 62. 1825; Hook. *f.*, *Fl. Brit. India* 5: 265. 1887. - *Chagulpututi*. **Fig. 90.**

Herbs, annual, much branched, glabrous, 20-35 cm high. Leaves linear or linear-lanceolate, 1-2.5 x 0.2-0.5 cm, acute at apex, sessile. Involucres solitary, campanulate, glabrous outside, hairy inside, subsessile; lobes ovate, ciliolate; glands semilunate. Capsules 3-4 mm long, pale yellow. Seeds ellipsoid, 2-2.5 mm long; testa white, leprous, tuberculate.

As weed in cultivated fields and low hilly tracks. Bilaspur, Raipur, Surguja. *Fl. & Fr.*: Jan. - April.

7. *Euphorbia elegans* Spreng., *Syst. Veg.* 3: 794. 1826; Hook. *f.*, *Fl. Brit. India* 5: 246. 1887; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 183. 1994.

Herbs, annual, dichotomously branched, hairy. Leaves ovate or orbicular, 1-2 x 0.8-1.3 cm, obtuse at apex, finely serrate. Floral leaves (bracts) broadly elliptic or obovate, obtuse, softly hairy inside, much imbricating, forming short spikes at the ends of the branches, subsessile. Involucres turbinate, hairy; lobes rosy, obovate, cuneate, sinuate at apex. Capsules subglobose, 3-4 mm across. Seeds *ca* 2 mm long, 4-angled, bluntly pointed, parallel-grooved, glabrous.

Rare. On rocky and slopy lands. Bastar, West Nimar. *Fl. & Fr.*: Sept.-March.

The plant is used as vegetable.

8. *Euphorbia granulata* Forssk., *Fl. Aegypt.-Arab.* 94. 1775; Hook. *f.*, *Fl. Brit. India* 5: 252. 1887; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 183. 1994.

Herbs, annual, prostrate, hispidly villous. Leaves opposite, obliquely oblong or obovate-oblong, 2.5-5 x 1-1.3 mm, obtuse or rounded at apex, villous. Involucres minute, axillary and on short, leafy, raceme like branchlets; lobes obtuse-ciliate; glands usually without limb. Capsules *ca*

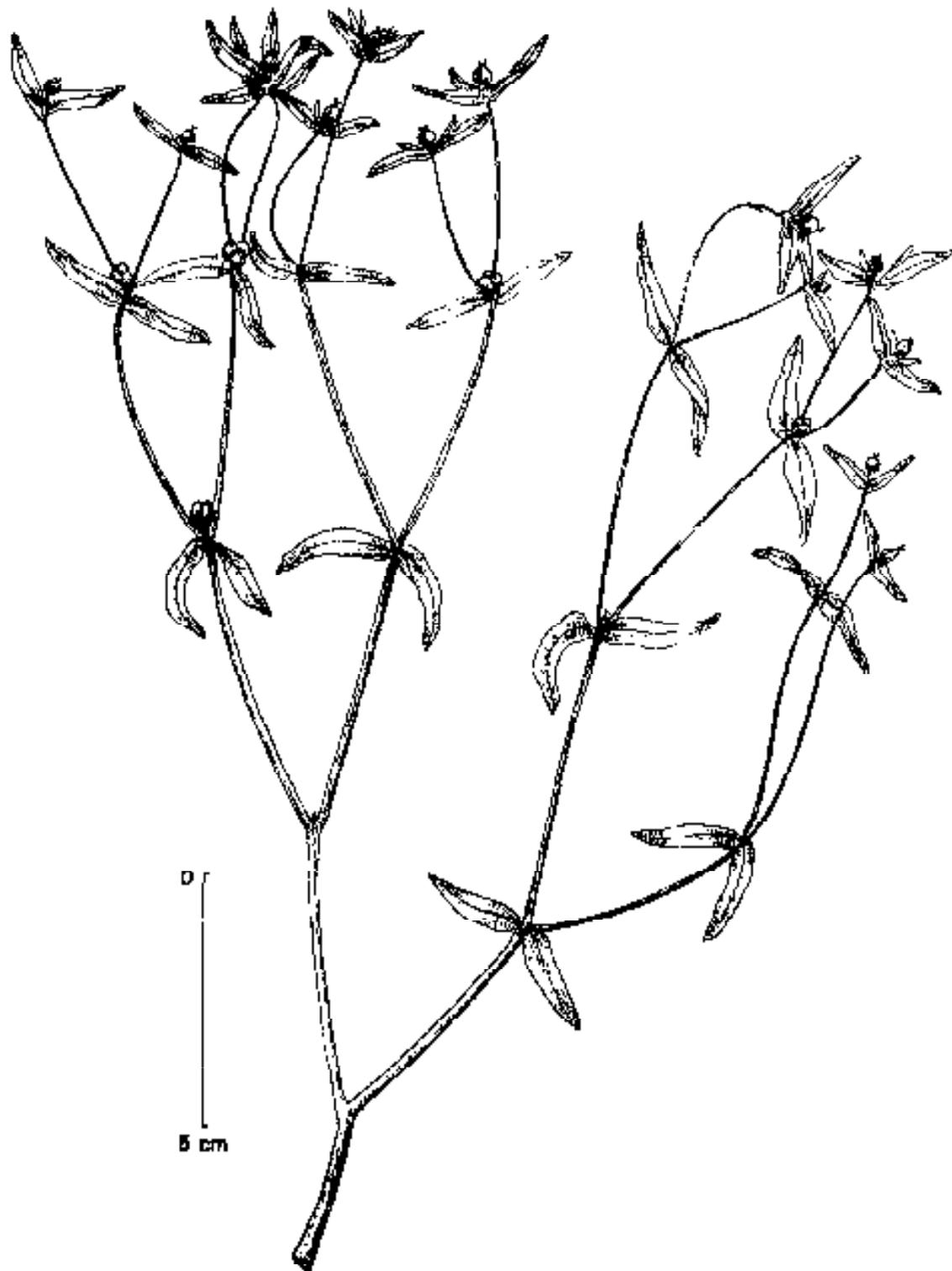


Fig. 90. *Euphorbia dracunculoides* Lam.

1 mm across, hirsute. Seeds *ca* 0.7 mm long, 4-angled, bluntly pointed, faintly pitted.

Rare. On sandy gravelly soil. Bilaspur. *Fl. & Fr.*: Oct. - Nov.

9. *Euphorbia heterophylla* L., Sp. Pl. 453. 1753; A.R. Smith in Kew Bull. 26: 264. 1972; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 183. 1994. *E. geniculata* Ort., Nov. Pl. Desr. Dec. 18. 1797. *E. prunifolia* Jacq., Pl. Hort. Schoenbr. 3: 15. 1798; Hook. f., Fl. Brit. India 5: 266. 1887.

Herbs, annual, erect, 30-60 cm high; stems fistular, glabrous, green, branched in the upper part. Leaves variable, linear-lanceolate, oblong, ovate or elliptic to obovate, rounded, obtuse or acute at apex, narrowed at base, subentire, dentate to serrate, glabrous above, hairy and whitish beneath. Involucres in cymes, densely corymbose; lobes 5, ovate, fimbriate. Capsules globose, *ca* 5 mm across, glabrous. Seeds ovoid-subglobose, *ca* 4 mm long, ash-coloured, tuberculate.

Common as weed in cultivated fields, wastelands and along the irrigation channel. Balaghat, Bastar, Bilaspur, Damoh, Durg, Indore, Panna, Raipur, Rajnandgaon, Seoni, Shivpurí, Tikamgarh, West Nimar. *Fl. & Fr.*: Sept. - Oct.

The plant is a good fodder as it is known to increase milk production in cattles.

10. *Euphorbia heyneana* Spreng., Syst. Veg. 3: 791. 1826; Panigrahi in Kew Bull. 29: 695. 1974; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 186. 1994. *E. microphylla* Heyne ex Roth, Nov. Pl. Sp. 229. 1821, *non* Lam., 1788; Hook. f., Fl. Brit. India 5: 252. 1887. *E. orbiculara* Miq., Fl. Ind. Bat. 1(2): 421. 1859, *non* Humb., Bonpl. & Kunté, 1817. *E. bombaiensis* Santapau in Bull. Bot. Soc. Bengal 8: 17. 1955, *excl. syn*

Herbs, annual, prostrate, dichotomously branched, glaucous or green; stems 10-15 cm long; internodes ribbed. Leaves obliquely oblong, 2-8 x 1.5-5 mm, rounded at apex, entire at base, serrate above, glabrous. Involucres axillary, broadly campanulate, stalked, glabrous; lobes deltoid, acute; glands shortly stipitate. Capsules *ca* 1.75 mm across, obtusely keeled. Seeds *ca* 1 mm long, obtusely 4-angled, concave on sides, smooth, brown.

Common on roadsides, slopes and in paddy fields. Bastar, Chhatarpur, Damoh, Durg, Gwalior, Hoshangabad, Mandla, Morena, Rajnandgaon. *Fl. & Fr.*: Sept. - Oct.

11. *Euphorbia hirta* L., Sp. Pl. 454. 1753; Airy Shaw in Kew Bull. 26: 264. 1972; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 186. 1994. *E. pilulifera* L., Sp. Pl. 454. 1753; Hook. f.: Fl. Brit. India 5: 250. 1887. *Chamaesyce hirta* (L.) Millsp. in Field Mus. Bot. 2: 303. 1909. - *Dudhi*, *Dudhiya*.

Herbs, annual, erect-decumbent, 20-35 cm high, often branched from the base. Leaves ovate-oblong to elliptic, 1.5-2.5 x 0.5-1.5 cm, subobtuse at apex, oblique, rounded or cuneate at base, serrulate; stipules subulate. Cyathia in axillary, capituliform cymes. Involucres campanulate; lobes acute, hairy; glands orbicular, truncate at apex, with an obsolete appendage. Capsules depressed globose, ca 1 mm across, 3-lobed, appressed pubescent. Seeds globose, ca 9 mm across, 4-angled, slightly transversely rugose, reddish.

Common along roadsides and waste moist places. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, Hoshangabad, Indore, Jabalpur, Raipur, Satna, Tikamgarh. *Fl. & Fr.*: Aug. - Oct.

12. *Euphorbia hypericifolia* L., Sp. Pl. 454. 1753; Hook. f., Fl. Brit. India 5: 249. 1887, *p.p.*; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 187. 1994. *E. parviflora* L., Syst. Nat. ed. 10. 2: 1047. 1759. - *Hakshardana*.

Herbs, annual, erect or ascending, slender, 30-40 cm high. Leaves broadly oblong, 1-2.5 x 0.5-1.3 cm, obtuse or rounded at apex, oblique at base, minutely serrulate, glabrous above, puberulent beneath. Cymes axillary, minute, pedunculate. Involucres cupular, puberulent; lobes deltoid, subulate, ciliate; glands white, orbicular, rounded at apex. Capsules subglobose, ca 2 mm across, pubescent. Seeds ellipsoid, ca 1 mm long, 4-angled, slightly transversely rugose.

Common in sal forests, on open rocky slopes and in wastelands. Balaghat, Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Indore, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: Sept. - Nov.

13. *Euphorbia laeta* auct. non, Aiton, 1789; Heyne ex Roth, Nov. Pl. Sp. 230. 1821; Rau in Bull. Bot. Surv. India 19: 71. 1969; Tripathi

et al., Fl. Elem. Madhya Pradesh 187. 1994. *E. rothiana* Spreng., Syst. Veg. 3: 796. 1826; Hook. f., Fl. Brit. India 5: 263. 1887.

Herbs, annual or perennial, erect, glaucous; upper branchlets umbellate. Leaves alternate on stem, 4-whorled beneath the whorled crown of branches, linear-oblong, lanceolate, 4-8 x 0.5-1.5 cm, acute or mucronate at apex, glabrous. Floral leaves (bracts) opposite beneath the dichotomous forks, broadly ovate or orbicular, acute, mucronate at apex, rounded at base. Involucres axillary in the upper axils and terminal, solitary; lobes subquadrate, ciliate; glands semilunate, 2-horned. Capsules 5-6 mm across, hairy. Seeds oblong, 2-3 mm long, semicylindrical, bluish grey, grooved down on one side, smooth.

Rare. On hilly and rocky places. Betul. Fl. & Fr.: Oct. - Nov.

14. *Euphorbia milii* Desmoul. in Bull. Hist. Nat. Soc. Linn. Bordeaux 1: 27-30. Pl. 1. 1826; Croizat in J. Arnold Arb. 21: 506. 1940; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 190. 1994. *E. splendens* Bojer *ex* Hook. in Curtis, Bot. Mag. 56. t. 2902. 1829.

Undershrubs, much branched, 0.6-1 m high. Spines needle like, 1.2-2.5 cm long, widened at base. Leaves obovate to oblong, spatulate, 2-6 x 1.7-2.7 cm, mucronate at apex. Cyathia in long pedunculate, dichotomous cymes; bracts 2, broadly ovate, apiculate, bright red or crimson. Involucral lobes fimbriate; glands ovoid or rounded, red.

Common in hilly or dried regions, often cultivated in gardens and parks. Balaghat, Bastar, Bilaspur, Chhatarpur, Raigarh. Fl.: Throughout the year.

15. *Euphorbia nerifolia* L., Sp. Pl. 451. 1753; Hook. f., Fl. Brit. India 5: 255. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 190. 1994. *E. ligularia* Roxb., Fl. Ind. 2: 465. 1832. - *Pattonkisend*.

Shrubs or small trees, erect, branched, 2-3 m high; young branches 5-angled, with short, stipular, sharp spines arising from thick tubercles, arranged in 5, irregular rows. Leaves alternate, crowded towards the apex of branches, obovate-oblong, 15-25 x 5-8 cm. Involucres yellowish; lateral ones shortly pedicellate, bisexual; central ones male, sessile; lobes large, erect, cordate, fimbriate; glands transversely oblong, yellow. Capsules ca 1 cm across. Seeds ca 5 mm across, smooth.

Usually in drier or rocky regions, wastelands and often planted as hedge around the villages and cultivated fields. Bilaspur, Damoh, East Nimar, Hoshangabad, Panna, Raipur, Seoni, Sidhi, Tikamgarh. *Fl. & Fr.*: Nov. Dec.

Latex is purgative and also applied in scabies and skin diseases.

16. *Euphorbia nivulia* Buch.-Ham. in Trans. Linn. Soc. Bot. 14: 286. 1825; Hook. *f.*, *Fl. Brit. India* 5: 255. 1887; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 190. 1994. *E. nerifolia* Roxb., *Fl. Ind* 2: 467. 1832, non L., 1753. - *Katathohar*.

Shrubs or small trees, erect, succulent, 1-6 m high; stems thick, glabrous, rounded; branches terete, with pairs of spines on tubercles. Leaves obovate, 10-15 x 5-6 cm, retuse, fleshy. Involucres in crowded cymes at the end of branches, yellowish green; lobes large, erect, ovate, fimbriate; glands oblong. Capsules globose, ca 6 mm across, glabrous. Seeds globose, ca 2 mm across, greenish black, smooth, dorsally grooved.

Common on slopes and foot-hills. Chhatarpur, Damoh, Mandla, Raigarh, Rewa, Satna, Seoni, Surguja, West Nimar. *Fl. & Fr.*: March May.

Latex is used to treat eye diseases.

17. *Euphorbia perbracteata* Gage in Kew Bull. 1914: 238. 1914; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 191. 1994.

Herbs, annual, erect, glabrous, 20-40 cm high. Leaves linear or linear-lanceolate, 1.4-5.5 x 0.3-0.5 cm, obtuse or apiculate at apex, oblique at base, glabrous. Cyathia umbellate; bracts foliaceous, broadly ovate, often connate at base, 0.6-2.2 cm long. Involucres campanulate, glabrous outside, sparsely pubescent inside; lobes 5, oblong or subdeltoid, sparsely ciliate; glands 4, broadly oblong, truncate. Capsules 4-5 mm long, subpyramidally 3-lobed, sulcate, glabrous. Seeds ovoid, 2-3 mm long, pale yellowish brown, smooth.

Common in dry lands, frequently in fallow fields. Bilaspur, Damoh, Raipur, Rajnandgaon. *Fl. & Fr.*: Jan. April.

18. *Euphorbia prolifera* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 62, 1825; Hook. f., Fl. Brit. India 5: 264, 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 191, 1994.

Herbs, erect, glaucescent, multicauline, branched, woody at base. Leaves linear, lanceolate to oblong, 2-5 x 0.3-1 cm, obtuse, retuse or mucronate at apex, rounded or subcordate at base, somewhat fleshy, glabrous. Inflorescence subumbellate; bracts foliaceous. Involucral-lobes 5, deltoid, fimbriate, ciliate; glands 2-horned, yellowish. Capsules ca 5 mm across, glabrous. Seeds globose, ca 3 mm across, red-brown, smooth.

Common in red-yellow soil, sometimes along the drains. Bilaspur, Raigarh, Surguja. Fl. & Fr.: March - Jan.

19. *Euphorbia pulcherrima* Willd. ex Klotzsch in Otto & A. Dietr., Allg. Gartenz. 2: 27, 1834; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 193, 1994. *Poinsettia pulcherrima* R. Graham in Edinb. New Phil. J. 20: 412, 1836; Hook. f., Fl. Brit. India 5: 239, 1886. - *Christmas flower*.

Shrubs, 0.5-3 m high; branches cylindrical, green. Leaves alternate, ovate or elliptic to lanceolate, 7-15 x 4-10 cm, acuminate at apex, cuneate or rounded at base, entire or sinuately lobed; petioles 4-6 cm long. Cyathia in terminal, dichotomous, lax cymes; bracts oblanceolate, 5-10 x 2-4 cm, acuminate, bright red or occasionally light yellow. Involucral-lobes fimbriate, ciliate; glands ca 8 mm across, orange.

Commonly planted in gardens and parks, often found as an escape. Bhopal, Chhatarpur, Indore. Fl. & Fr.: Nov. - March.

20. *Euphorbia pycnostegia* Boiss., Cent. Euphorb. 9, 1860; Hook. f., Fl. Brit. India 5: 246, 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 193, 1994.

Herbs, annual, erect, glabrous, dichotomously branched, 30-60 cm high. Leaves oblong, 1.5-2 x 1-1.3 cm, obtuse or subacute at apex, entire or finely serrulate. Involucres stalked, turbinate, glabrous outside, hairy inside; lobes suborbicular, rounded at apex, fimbriate; glands oblong. Capsules ca 2 mm across, glabrous; cocci obtusely keeled. Seeds oblong, ca 1.5 mm long, greenish, obtusely 4-angled or not, smooth or tuberculate.

- 1a. Limb of glands white; seeds tuberculate,
obtusely 4-angled ...20.1. var. *pycnostegia*
- 1b. Limb of glands white or pink; seeds
smooth, not angular ...20.2. var. *zornioides*

20.1. var. *pycnostegia*

Rare. In moist shady places. Hoshangabad. *Fl. & Fr.*: Sept. - Dec.

20.2. var. *zornioides* (Boiss.) Santapau in Bull. Bot. Soc. Bengal 8: 11. 1955. *Euphorbia zornioides* Boiss. in DC., Prodr. 15(2.1): 19. 1862; Hook. f., Fl. Brit. India 5: 246. 1887.

Rare. Hoshangabad (Joseph, 1963). *Fl. & Fr.*: Sept. - Dec.

21. *Euphorbia rosea* Retz., Observ. Bot. 4: 26. 1786; Hook. f., Fl. Brit. India 5: 251. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 193. 1994.

Herbs, perennial, prostrate, glabrous or sparsely hairy. Leaves opposite, obliquely obovate or spatulate, 0.7-1 x 0.5-0.7 cm, obtuse at apex, rounded at base, crenulate, serrulate or dentate, subsessile. Cyathia aggregated in lax clusters, rarely solitary. Involucral-lobes 2, deltoid, ciliate; upper glands longer than lower ones. Capsules 2-2.5 mm long, glabrous. Seeds 1-1.5 mm long, transversely rugose.

On rocky slopes, nearby drains or river banks. Indore, Mandla. *Fl. & Fr.*: Aug. - Sept.

22. *Euphorbia royleana* Boiss. in DC., Prodr. 15(2.1): 83. 1862; Hook. f., Fl. Brit. India 5: 257. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 195. 1994. *E. pentagona* Royle, Ill. Bot. Himal. Mts. 329, t. 82. 1836, *non* Haw., 1827.

Shrubs, erect, glabrous; stems and branches 5-7-angled with flat or somewhat excavated faces; spines in pairs on the protuberant portions of the undulating edges. Leaves few, spatulate, 10-15 x 3-5 cm, sessile, caducous. Involucres arranged in axillary, subsessile cymes, greenish yellow, hemispherical; lobes cuneate, fimbriate. Capsules ca 1.7 cm long, 3-angled, glabrous.

Rare. In arid and drier hilly regions. Bilaspur. *Fl. & Fr.*: April - June.

23. *Euphorbia serpens* Kunth in Humb., Bonpl. & Kunth, Nov. Gen. Sp. 2: 52. 1817; Mitra in J. Bombay Nat. Hist. Soc. 68: 854. 1971; A. R. Smith in Kew Bull. 32: 76. 1978. *Anisophyllum serpens* (Kunth) Klotzsch & Garcke, Abhandl. Akad. Berl. Phys. 1859: 23. 1860. *Chamaesyce serpens* (Kunth) Small, Fl. S. E. U. S. 709. 1903. *Euphorbia microphylla auct. non* Heyne ex Roth, 1821; Hook. f., Fl. Brit. India 5: 252. 1887, *p.p.* *E. orbiculata* var. *jawaharii* Rajagopal & Panigrahi in Taxon 17: 547. 1968.

Herbs, annual or perennial, prostrate; stems profusely branched, rooting at nodes. Leaves opposite, subquadrate or obliquely ovate, 2-6 x 1-5 mm, retuse at apex, cordate or subcordate at base, entire; stipules membranous, incised. Cyathia axillary, solitary. Involucres broadly campanulate; lobes deltoid; glands 4, oblong. Capsules ovoid, ca 1.5 mm long, 3-angled. Seeds 4-angled, smooth.

Rare. Mandla. *Fl. & Fr.*: Aug. - Dec.

24. *Euphorbia thymifolia* L., Sp. Pl. 454. 1753; Hook. f., Fl. Brit. India 5: 252. 1887; Mabberley in Taxon 26: 531. 1977; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 195. 1994. **Fig. 91.**

Herbs, annual, prostrate, divaricately branched, hispidly pubescent; stems 20-30 cm long. Leaves obliquely oblong or elliptic-oblong, 3-5 x 2.5-4 mm, rounded at apex, oblique at base, glabrous above, pubescent beneath. Involucres axillary, solitary or 2-3 together in an axil; lobes short, ciliate; glands minute or absent. Capsules ca 1.2 mm long, obtusely keeled, hairy. Seeds ca 7 mm long, 4-angled, with 5-6, transverse furrows.

Common in moist places and along the roads and ridges. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Durg, East Nimar, Indore, Mandla, Morena, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Surguja, Tikamgarh. *Fl. & Fr.*: Throughout the year.

25. *Euphorbia tirucalli* L., Sp. Pl. 452. 1753; Hook. f., Fl. Brit. India 5: 254. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 198. 1994. - *Thor.*

Shrubs or small trees, erect, 3-4 m high; branches terete, glabrous; sap milky. Leaves scaly, linear-oblong, narrow, 1-1.3 x 0.3 cm, thick, early caducous. Involucres in sessile or subsessile clusters; lobes shortly hairy;



Fig. 91. *Euphorbia thymifolia* L.

glands transversely ovate; bracteoles numerous, lacerate. Capsules ca 6 mm across, obtusely 3-lobed, minutely puberulous. Seeds ellipsoid, ca 5 mm long, dark brown with white caruncle, smooth.

Rare. In drier places of hilly or rocky regions. Chhatarpur, Damoh, Indore, Raipur, Tikamgarh. *Fl. & Fr.*: Aug. Sept.

15. EXCOECARIA L.

Undershrubs, shrubs or small trees; sap milky. Leaves opposite or alternate, elliptic or oblong to oblanceolate, entire or serrate, petiolate. Flowers in axillary or terminal racemes or spikes; males 1-3 in each bract; females at the base of the raceme or in separate raceme; bracts concave; bracteoles 2. Male tepals 3, subequal. Stamens 3, exserted. Disk absent. Female tepals as in males. Ovary globose, 3-locular; styles 3, recurved. Disk absent. Fruit a capsule of 3 cocci; valves elastically twisting. Seeds globose.

About 40 species; tropical regions of Old World; one in M.P.

Excoecaria cochinchinensis Lour., *Fl. Cochinch.* 2: 612. 1790. *E. bicolor* (Hassk.) Zoll. ex Hassk., *Retzia* 1: 158. 1855. - *Laila-majnu*.

Undershrubs, ca 1.5 m high. Leaves simple, opposite, elliptic, 5-10 x 1.5-4 cm, acute or shortly acuminate at apex, cuneate at base, entire at base, serrulate above, green above, red beneath, glabrous; petioles 0.7-1 cm long. Flowers in racemes, small. Tepals subequal. Capsules of 3 cocci.

Cultivated in gardens and parks. Indore. *Fl. & Fr.*: Sept. - Dec.

Latex is fish poison.

16. GLOCHIDION J.R. Forster & G. Forster, *nom. cons.*

Shrubs or trees, evergreen. Leaves alternate, distichous, entire, shortly petiolate. Flowers in axillary fascicles, small, often green or yellowish. Male tepals 5-6, spreading, 1-2-seriate, imbricate. Stamens connate in an ellipsoid or oblong, sessile column; anthers 3-8; cells linear, dehiscing extrorsely; connectives produced as free points or connate in an umbonate head. Pistillode absent. Female tepals 6, imbricate, tubular and unequally toothed or cleft. Ovary 3-15-locular; ovules 2 in each locule; styles connate in a

globose, conical or subclavate column, lobed at the tip. Fruit a capsule of 3 or more, 2-valved cocci; often with twice as many lobes as locules, globose or orbicular, depressed or intruded at the base. Seeds hemispherical or laterally compressed; testa crustaceous, with often succulent coat; albumen copious, fleshy.

About 300 species; Madagascar to W. Pacific region and tropical America; 8 in M.P.

- 1a. Leaves glaucous beneath; capsules depressed, 2-2.5 cm across ...6. *G. multiloculare*
- 1b. Leaves not glaucous; capsules not depressed, up to 1 cm across:
- 2a. Stems and leaves variously hairy:
- 3a. Stamens 6 ...3. *G. hirsutum*
- 3b. Stamens 3:
- 4a. Female flowers sessile or nearly so; capsules 3-lobed ...4. *G. johnstonei*
- 4b. Female flowers pedicellate; capsules 8-lobed ...7. *G. velutinum*
- 2b. Stems and leaves glabrous:
- 5a. Stamens 4-6:
- 6a. Capsules glabrous, obscurely lobed ...8. *G. zeylanicum*
- 6b. Capsules hoary, distinctly lobed ...5. *G. lanceolarium*
- 5b. Stamens 3:
- 7a. Leaves purplish beneath; capsules ca 0.6 cm across ...1. *G. assamicum*
- 7b. Leaves green beneath; capsules ca 1.5 cm across ...2. *G. ellipticum*

1. *Glochidion assamicum* Hook. f., Fl. Brit. India 5: 319. 1887. *Phyllanthus assamicus* Muell. Arg. in Flora 48: 378. 1865. *P. andersonii* Muell. Arg. in Flora 55: 3. 1872.

Small trees; branchlets angular or winged. Leaves elliptic or elliptic-oblong, 6-12 x 3-6 cm, acuminate at apex, rounded or oblique at base,

entire, coriaceous, glabrous, purplish beneath. Male and female flowers from the same axils, clustered; males pedicellate; females sessile. Tepals 6, hispid outside. Stamens 3. Ovary pubescent. Capsules globose, ca 6 mm across.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: April - Dec.

2. *Glochidion ellipticum* Wight, Icon. Pl. Ind. Orient. t. 1606. 1850; Hook. *f.*, Fl. Brit. India 5: 321. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 201. 1994. *G. hohenackeri* Bedd., Fl. Sylv. S. India 193. 1872; Hook. *f.*, Fl. Brit. India 5: 314. 1887.

Shrubs or small trees, monoecious, 2-5 m high; branchlets slender, angled, glabrous. Leaves elliptic-oblong, 6-12 x 2-4 cm, acuminate at apex, acute or sometimes oblique at base, with 6-8 pairs of lateral nerves. Flowers in axillary clusters; males and females together. Male tepals 3 + 3, equal, free, oblong, ca 3.5 mm long, obtuse, fleshy. Stamens 3; anthers 1.5 mm long, free. Female tepals 6, unequal, shortly decurrent, ca 2 mm long, thick, puberulous. Ovary ca 2.5 mm across, 4-5-locular; style conical, lobed. Capsules depressed globose, ca 1.5 cm across, 4-lobed, pubescent. Seeds 5-6 mm long, red, rounded on the back, smooth.

Along roadsides. Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. - Jan.

3. *Glochidion hirsutum* (Roxb.) Voigt, Hort. Suburb. Calc. 153. 1845; Hook. *f.*, Fl. Brit. India 5: 311. 1887; Airy Shaw in Kew Bull. 26: 275. 1972. *Bradleya hirsuta* Roxb., Fl. Ind. 3: 699. 1832. *Phyllanthus hirsutus* Muell. Arg. in Flora 48: 371. 1865 & in DC., Prodr. 15(2.2): 283. 1866.

Shrubs; young parts tomentose. Leaves oblong-lanceolate, 10-14 cm long, obtuse or subacuminate at apex, cordate or rounded at base, coriaceous, densely tomentose beneath; petioles short. Male and female flowers axillary, clustered together; peduncles short. Tepals 6, hirsute. Stamens 6. Ovary globose. Capsules globose, ca 1 cm across, 6-celled, green, obscurely lobed, clustered in the axils of leaves. Seeds red.

Rare. Raigarh. *Fl. & Fr.*: Nov. - Dec.

4. *Glochidion johnstonei* Hook. *f.*, Fl. Brit. India 5: 314. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 202. 1994.

Trees, 6-8 m high; branches pubescent. Leaves oblong or elliptic-oblong, 6-12 x 3.5-5 cm, acute at apex, hairy on both the surfaces; stipules lanceolate, pubescent, caducous. Flowers in axillary clusters; males on filiform, *ca* 1 cm long, pubescent pedicels; females sessile. Male tepals 6, 2-seriate, subequal, linear-oblong or obovate-oblong, 6-8 mm long, obtuse or subacute, sparsely hairy outside. Stamens 3; anthers acute. Female tepals 6, 2-seriate, hairy outside. Ovary 5-locular. Capsules depressed globose, 6-8 mm across, irregularly and slightly 3-lobed, pubescent, crowned with 3, rounded, pubescent style tips.

Rare. On hill slopes. Hoshangabad. *Fl. & Fr.*: April - Aug.

5. *Glochidion lanceolarium* (Roxb.) Voigt, Hort. Suburb. Calc. 153. 1845; Hook. *f.*, Fl. Brit. India 5: 308. 1887. *Bradleya lanceolaria* Roxb., Fl. Ind. 3: 697. 1832. *Phyllanthus lanceolarius* Muell. Arg. in Flora 48: 371. 1865.

Shrubs or small trees. Leaves elliptic-oblong or lanceolate, 6-13 x 3-6 cm, acuminate at apex, acute at base, coriaceous, glabrous, dark green above, pale beneath; petioles stout, 0.5-1 cm long. Male flowers many, yellowish, on 4-6 mm long pedicels. Tepals linear-oblong or lanceolate, glabrous. Stamens 4-6. Female flowers few, green, sessile. Tepals lanceolate. Ovary villous, 4-6-locular. Capsules subglobose, *ca* 1 cm across, 6-8-lobed.

Rajnandgaon, Shahdol, Sidhi. *Fl. & Fr.*: Jan. - Oct.

6. *Glochidion multiloculare* Voigt, Hort. Suburb. Calc. 152. 1845; Hook. *f.*, Fl. Brit. India 5: 307. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 202. 1994.

Dwarf undershrubs, gregarious, 0.9-1.2 m high; twigs sharply 2-angled, flexuous. Leaves oblong, linear-oblong or obovate, 7-17 x 3-8 cm, obtuse or sometimes apiculate at apex, sometimes purplish beneath. Flowers in axillary clusters; male and female flowers separate. Male tepals 3+3, equal, oblong, *ca* 3 mm long, obtuse. Stamens 4-12; anthers *ca* 1.5 mm long, free. Female tepals 6, unequal, *ca* 2 mm long. Ovary *ca* 2.5 mm across, 10-15-lobed. Capsules strongly depressed globose, *ca* 2.5 cm across. Seeds red, smooth.

Common in mixed forests. Bastar, Bilaspur, Raigarh, Raipur, Surguja. *Fl. & Fr.*: April - Nov.

7. *Glochidion velutinum* Wight, Icon. Pl. Ind. Orient. t. 1907. f. 2, 1852; Hook. f., Fl. Brit. India 5: 322. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 202. 1994. - *Khoda, Kalya.*

Trees, 5-8 m high; branchlets zigzag. Leaves elliptic-ovate or lanceolate, 5-9 x 3-5.5 cm, acute, obtuse or shortly acuminate at apex, usually acute at base, pubescent along nerves above, densely so beneath. Flowers in axillary clusters; males and females together. Male tepals 5-6, ovate, subacute, keeled and pubescent on the back. Stamens 3, connate in the lower half. Female tepals 5-6. Ovary and style pubescent; style enlarged. Capsules orbicular, depressed, ca 1 cm across, 8-lobed. Seeds bright red.

Common in sal forests and on the forest edge. Balaghat, Bilaspur, Hoshangabad, Mandla, Raipur. *Fl. & Fr.*: April - July.

8. *Glochidion zeylanicum* (Gaertn.) Adr. Juss., Euphorb. Gen. 107. t. 3. 1824; Hook. f., Fl. Brit. India 5: 310. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 204. 1994. *Bradleya zeylanica* Gaertn., Fruct. Sem. Pl. 2: 128. t. 109. 1790.

Trees, dioecious, 8-12 m high. Leaves broadly oblong, 4-13 x 2-5.5 cm, gradually acute at apex, obliquely truncate to rounded at base, glabrous; stipules deltoid, acute. Flowers shortly pedicellate; male and female together in umbellate clusters. Male tepals 6, 2-seriate, ovate-oblong, 2-3 mm long, glabrous. Stamens 4-6. Female tepals as in male. Ovary globose, 4-7-locular; style beaked, thick. Capsules subglobose, ca 7 mm across, obscurely lobed, beaked above, glabrous.

Rare. On hill slopes along the bank of drains and in mixed forests. Bilaspur, Sidhi. *Fl. & Fr.*: March - July.

17. HOMONOIA Lour.

Shrubs, dioecious. Leaves alternate, narrow, entire to serrate, glandular-scaly beneath; stipules linear, caducous. Flowers in axillary spikes, subsessile; spikes shorter than leaves, slender; bracts concave; bracteoles linear. Male perianth cupular, 3-lobed; tepals subequal, concave, acute, reflexed. Stamens many, exerted; filaments connate; anthers ellipsoid-globose. Female perianth 5-lobed. Ovary globose or 3-lobed, 3-locular; ovules axile; styles 3, stout. Fruit a capsule of 3, 2-valved cocci. Seeds biconvex to globose, smooth.

Two species; S.E. Asia and Malasia; one in M.P.

Homonoia riparia Lour., Fl. Cochinch. 637. 1790; Hook. f., Fl. Brit. India 5: 455. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 206. 1994. - *Surra*.

Shrubs, perennial, branched, 2-3 m high. Leaves linear to lanceolate, 10-20 x 1-2 cm, shortly acuminate at apex, acute at base, entire. Male flowers *ca* 5 mm across. Tepals 3, broadly elliptic, *ca* 3 mm long, glabrous. Female flowers *ca* 4 mm across. Tepals 5, ovate, *ca* 2 mm long, shortly acuminate, puberulous outside. Ovary *ca* 2 mm across, puberulous; styles shortly connate at base. Capsules globose, *ca* 4 mm across, tomentose. Seeds rounded, *ca* 1 mm across, yellowish brown.

Common along the bank of drains and on river beds. Balaghat, Bastar, Bilaspur, Hoshangabad, Raigarh, Raipur, Surguja, West Nimar. *Fl. & Fr.*: Jan. - April.

18. JATROPHA L.

Herbs, shrubs or trees, monoecious, often glandular or prickly. Leaves alternate, often digitately lobed, stipulate or exstipulate. Flowers in terminal, corymbose cymes; central flowers usually female. Perianth 2-seriate; lobes 5 + 5; outer sepaloid, imbricate; inner petaloid, free or half united, twisted. Stamens 8-10, monadelphous or diadelphous; filaments connate or those of outer series free, exserted; anther cells parallel, contiguous. Ovary globose, 3-locular; ovules 3, pendulous; styles 3, free or basally connate, entire or each 2-fid. Disk glands 5, free, yellow. Fruit a capsule, 3-valved, smooth or ribbed. Seeds ovoid, oblong or 3-angled, carunculate.

About 170 species; tropical and subtropical regions and N. America; 4 in M.P.

1a. Petioles eglandular; stipules absent or minute, entire, eglandular:

2a. Perianth yellowish green; capsules
ca 3 cm across

...1. *J. curcas*

2b. Perianth crimson; capsules *ca* 1 cm across

...3. *J. integerrima*

1b. Petioles glandular; stipules well developed, divided into narrow segments, glandular:

3a. Cultivated; stems egg-shaped, swollen ...4. *J. podagrica*

3b. Wild; stems not as above ...2. *J. gossypifolia*

1. *Jatropha curcas* L., Sp. Pl. 1006. 1753; Hook. f., Fl. Brit. India 5: 383. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 207. 1994. *Safed arand, Ratanjot.*

Shrubs, 1.5-4 m high. Leaves broadly ovate, cordiform, 5-15 x 5-13 cm, acute at apex, entire or shallowly 5-lobed; stipules caducous. Flowers in terminal, cymose panicles, small, yellowish. Perianth campanulate, 5-10-lobed; outer tepals equal, ovate-obovate, ca 4 mm long, sericeous at base inside. Stamens 10, 2-seriate; filaments ca 3 mm long. Ovary ca 2 mm across; styles ca 5 mm long. Capsules globose, ca 3 cm across, rugose when dry.

Common along cultivated fields and in wastelands. Balaghat, Bastar, Bilaspur, Chhatarpur, Durg, Indore, Mandla, Panna, Raipur, Seoni, Shahdol, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: Aug. - Jan.

The plant is used to treat skin diseases like scabies, eczema and ringworm. Seed oil is used for illumination and making soap. Seeds are also used as fish poison.

2. *Jatropha gossypifolia* L., Sp. Pl. 1006. 1753; Hook. f., Fl. Brit. India 5: 383. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 208. 1994. - *Kosoronda, Lal bherenda.*

Shrubs, 1.5-2 m high; branchlets glandular hairy. Leaves palmately lobed, 7.5-13 x 6-15 cm, subcordate; lobes obovate, acute at apex, glandular hairy on margin; stipules ciliate, ca 5 mm long, glandular. Flowers in glandular, corymbose cymes, small, red. Outer tepals ca 6 mm long, glandular hairy, acuminate; inner tepals ovate, ca 4 mm long, obtuse, ciliate. Stamens 8, 5+3; filaments basally connate; inner 3 longer. Ovary ca 2 mm across; styles ca 1.5 mm long. Capsules broadly oblong, ca 2 cm across, 3-lobed. Seeds oblong, 3-angled, greyish brown.

Common along roadsides and cultivated fields. Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, Mandla, Panna, Raigarh, Raipur, Rewa, Satna, Surguja. *Fl. & Fr.*: April - Sept.

At Bastar, tribal people prepare candles from the seeds. Stems are used as tooth brush to relieve toothache.

3. *Jatropha integerrima* Jacq., Stirp. Sel. Amer. 256. 1763; Airy Shaw in Kew Bull. 26: 284. 1972. *J. hastata* Jacq., Stirp. Sel. Amer. 256. 1763; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 208. 1994. *J. pandurifolia* Andr., Bot. Repos. 4: t. 267. 1802.

Shrubs, erect, 1-2 m high. Leaves fiddle-shaped, 6-12 x 4-7 cm, abruptly acuminate at apex, distantly dentate below. Flowers in long pedunculate, corymbose cymes, bright crimson; males numerous; females few. Male inner perianth crimson, obovate, large. Stamens 10, 2-seriate, 5 short and 5 long; inner whorl more or less connate. Female inner perianth obovate. Ovary *ca* 2 mm across. Capsules globose, *ca* 1 cm across, 3-angled.

Commonly cultivated in gardens for ornamental purpose and sometimes as an escape. Chhatarpur, Indore, Rewa, West Nimar. *Fl. & Fr.*: July - Jan.

4. *Jatropha podagrica* Hook. in Curtis, Bot. Mag. t. 4376. 1848; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 209. 1994.

Shrubs, xerophytic, 0.3-1.5 m high, tuberous at base, often widely but not strongly branched. Leaves broadly ovate, 5-lobed, 10-15 cm across; stipules divided into rigid, small, semipersistent segments. Peduncles and pedicels red. Male outer perianth orange-red. Stamens 10, 2-seriate. Female inner tepals oblong, *ca* 8 mm long. Capsules *ca* 1.5 cm long, 3-angled, longitudinally grooved.

Often planted in gardens. Bhopal (Oommachan, 1977). *Fl. & Fr.*: Oct.-Dec.

19. MACARANGA Thou.

Shrubs or trees, dioecious. Leaves alternate, usually peltate, entire or dentate, ribbed, usually glandular beneath, petiolate, stipulate. Flowers in simple or paniculate spikes or racemes, small; bracts large or small. Male flowers clustered in each bract. Tepals 3-5, ovate, acute. Stamens 3 or 6-8, exserted. Disk absent. Pistillode absent. Female flowers solitary in each bract. Tepals 2-4, lanceolate. Ovary globose, 2-6-locular; ovule solitary

in each locule. Staminodes absent. Fruit a capsule of 2-valved cocci, echinate or pubescent.

About 240 species; tropical regions of Old World; 3 in M.P.

- 1a. Young parts rusty tomentose; leaves thick,
truncate at base ...1. *M. denticulata*
- 1b. Young parts not rusty tomentose; leaves
thinner, rounded at base:
- 2a. Inflorescence axis zigzag; bracts spatulate,
with a glandular appendage ...2. *M. indica*
- 2b. Inflorescence axis not zigzag; bracts ovate,
without glandular appendage ...3. *M. peltata*

1. *Macaranga denticulata* (Blume) Muell. Arg. in DC., Prodr. 15(2.2): 1000. 1866; Hook. f., Fl. Brit. India 5: 446. 1887. *Mappa denticulata* Blume, Bijdr. 625. 1826.

Small trees; young parts rusty tomentose. Leaves deltoid-ovate or peltate, 10-22 x 6-20 cm, acuminate at apex, truncate at base, entire or denticulate, subcoriaceous; petioles 6-18 cm long. Flowers in axillary racemes or panicles. Male flowers in clusters along rhachis; female flowers solitary along rhachis. Tepals 3-4. Capsules globose, ca 6 mm across, blackish.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Aug. - Dec.

2. *Macaranga indica* Wight, Icon. Pl. Ind. Orient. t. 1883. 1852; Hook. f., Fl. Brit. India 5: 446. 1887; Airy Shaw in Kew Bull. 26: 290. 1972.

Trees; branchlets glaucous. Leaves usually peltate, sometimes ovate or orbicular, 10-16 x 9-14 cm, acuminate at apex, rounded at base, dentate, glabrous or sparsely pubescent beneath, often with 2 glands near petiole; petioles 6-10 cm long; stipules large. Flowers in zigzag panicles; bracts spatulate, with a large, glandular appendage. Tepals greenish yellow. Capsules globose, ca 6 mm across, densely pubescent.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Aug. - Dec.

3. *Macaranga peltata* (Roxb.) Muell. Arg. in DC., Prodr. 15(2.2): 1010. 1866. *Osyris peltata* Roxb., Fl. Ind. 3: 755. 1832. *Macaranga roxburghii* Wight, Icon. Pl. Ind. Orient. t. 1949, f. 4. 1853; Hook. f., Fl. Brit. India 5: 448. 1887. *M. tomentosa* Wight, Icon. Pl. Ind. Orient. t. 1949, f. 1. 1853.

Trees, ca 8 m high. Leaves peltate, deltoid-ovate or elliptic-suborbicular, 7-18 x 7-14 cm, acuminate at apex, rounded at base, petiolate; stipules caducous. Flowers in axillary, rusty tomentose panicles, yellow; bracts ovate. Stamens 3, free. Capsules globose, ca 6 mm across, glandular pubescent, echinate when young.

Rare. Bastar. Fl. & Fr.: Jan. - March.

20. MALLOWUS Lour.

Trees, dioecious. Leaves simple, opposite or alternate, subcoriaceous, often glandular below, with basal pair of nerves usually the longest, petiolate; stipules caducous. Flowers in terminal or axillary, simple racemes or panicles. Male flowers subsessile, often clustered in the axil of bracts. Tepals 3 or 4, valvate. Stamens numerous, exserted; filaments free; anther lobes unequal; connectives broad. Female flowers solitary. Tepals 3-6, free or connate, valvate. Ovary 3 or 4-locular; ovules 3 or 4, laterally pendulous; styles 3, recurved, plumose or papillose. Disk absent. Fruit a capsule of 3 or 4 cocci; epicarp smooth or echinate, often glandular. Seeds globose or angular, black or greenish.

About 140 species; Indo-Malesia to E. Asia, Fiji, E. Australia, tropical Africa and Madagascar; one in M.P.

***Mallotus philippensis* (Lam.) Muell. Arg.** in Linnaea 34: 196. 1865-66; Hook. f., Fl. Brit. India 5: 442. 1887, "*philippinensis*"; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 210. 1994. *Croton philippense* Lam., Encycl. 2: 206. 1786. - *Kamala, Rori, Sindur, Sindoori, Tilwan*. Fig. 92.

Trees, evergreen, up to 8 m high; young parts pubescent; bark grey, exfoliate in small pieces. Leaves ovate-lanceolate, 8-20 x 3-10 cm, acute-acuminate at apex, rounded or cuneate at base, entire or closely dentate, glaucous and glandular beneath. Flowers whitish yellow. Male flowers clustered in 10-20 cm long, erect, terminal spikes. Tepals 4, lanceolate, ca 3 mm long. Stamens numerous. Female flowers distant, in 4-6 cm long



Fig. 92. *Mallotus philippensis* (Lam.) Muell. Arg.

spikes. Tepals 3-4, ovate-lanceolate, thick. Ovary reddish glandular; styles free, papillose. Capsules globose, 8-12 mm across, 3-lobed, covered with red granules. Seeds subglobose, 3-4 mm across, smooth.

Common in mixed forests along roadsides and river banks. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Panna, Raigarh, Raipur, Rajnandgaon, Satna, Seoni, Shahdol, Surguja, West Nimar. *Fl. & Fr.*: Oct. - May.

The fruits yield vermilion (*sindoor*) and young ones are used locally for dyeing clothes. The red powder of fruit surface is also used as anthelmintic especially for tapeworms. Seed powder is used to treat rheumatism. Wood is used as fuel.

21. MANIHOT Mill.

Shrubs or trees, monoecious. Leaves palmately 3-7-lobed, petiolate, stipulate; lobes 5-nerved from the base. Flowers in axillary or terminal racemes or panicles. Tepals 5, petaloid, lanceolate, imbricate, inrolled on margin, incurved at apex, with 5, small beaks near the middle in male flowers. Stamens 10, subexserted; filaments filiform; anthers oblong. Disk flat, 10-lobed. Pistillodes short, columnar. Ovary superior, globose, 3-locular; ovules 3, laterally pendulous; stigma massive, repeatedly branched, thin-folded, sessile. Fruit a capsule of 3, 2-valved cocci, globose or ellipsoid. Seeds biconvex, carunculate, smooth.

About 98 species; tropical and subtropical America; one in M.P.

Manihot esculenta Crantz, *Inst. Rei Herb.* 1: 167. 1766; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 211. 1994. *Jatropha manihot* L., *Sp. Pl.* 1007. 1753. *Manihot utilissima* Pohl, *Pl. Bras. Icon. Descr.* 1: 32. t. 24. 1826; Hook. *f.*, *Fl. Brit. India* 5: 239. 1886. - *Cassava*, *Tapioca*.

Shrubs, perennial, 1.5-3 m high; roots tuberous. Leaves 10-20 cm across; lobes oblong-obovate or oblanceolate, 8-17 x 1-6 cm, acuminate at apex, shortly decurrent at base, glaucous and minutely puberulous on veins beneath; stipules ovate-deltoid, 5-7 mm long. Flowers in racemes. Tepals 8-10 mm long, connate at base. Stamens in 2 whorls. Capsules ellipsoid, 6-winged, dehiscing into 2 valves.

Commonly grown in gardens for its tuberous edible roots. Chhatarpur, Indore. *Fl. & Fr.*: Feb. - March.

22. PEDILANTHUS Neck. *ex* Poit., *nom. cons.*

Shrubs, erect, often deciduous; sap milky. Leaves distichous, entire, fleshy; midrib prominent beneath; stipules tubercle-shaped, small. Flowers in cyathia arranged in forked or cincinnous cymes, bracteate, stalked, subpatent. Involucres shoe or boat-shaped, 5-lobed, bearing a vaulted nectary at base outside, provided with 2 or 4 glands and an apical ligule. Male flowers naked. Anthers during anthesis exserted, short, thick. Female flowers borne on firm stalk, naked. Ovary 3-locular, protruding after anthesis; ovule solitary in each locule; styles connate; stigmas 3, each 2-fid. Fruit a schizocarpous capsule, ejaculating the seeds and the valves; central column persistent; caruncle absent.

About 14 species; S. and N. America to tropical America; one in M.P.

Pedilanthus tithymaloides (L.) Poit. in Ann. Mus. Hist. Nat. 19: 390. t. 19. 1812; Hook. *f.*, Fl. Brit. India 5: 239. 1886; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 212. 1994. *Euphorbia tithymaloides* L., Sp. Pl. 453. 1753.

Shrubs, subsucculent, up to 2 m high. Leaves ovate or ovate-lanceolate, 3-15 x 1-9 cm, acute-obtuse at apex, truncate-cuneate at base; stipules dark brown. Cyathia in dense, terminal cymes, stalked. Involucres 9-13 mm long, obliquely bilateral; terminal lobes slightly ciliate, greenish yellow at base, red above; spur red with 4 glands on upper side.

Usually planted as hedge in gardens. Bhopal, Bastar, Chhatarpur, Indore. *Fl. & Fr.*: Oct. - Dec.

23. PHYLLANTHUS L.

Herbs, undershrubs or trees, monoecious. Leaves alternate, distichous, entire, penninerved, subsessile, stipulate. Flowers axillary, usually solitary, sometimes clustered. Tepals 4, 5 or 6, valvate or imbricate, free or basally connate, persistent. Stamens 3-6, opposite to tepals; filaments free or connate. Ovary 3-locular, rarely 5-12-locular; ovules 6, axile, collateral or superposed; styles 3, spreading, erect or reflexed. Disk glands 4, 5 or 6, free, alternate with tepals in male, usually annular in female. Fruit a capsule of 3, 2-valved cocci, drupe or berry, smooth or verrucose, sometimes fleshy and indehiscent, 6-seeded. Seeds generally triquetrous; testa crustaceous or variously muriculate.

About 600 species; tropical and subtropical regions; 11 in M.P.

- 1a. Tepals 4 or 5; disk glands in male flowers 4 or 5:
- 2a. Stamens 4, free; disk glands 4; fruit a fleshy, indehiscent drupe, ...1. *P. acidus*
- 2b. Stamens 3 or 5, connate (at least the inner); disk glands 5; fruit a dry, dehiscent capsule or fleshy berry:
- 3a. Stamens 3, all connate; ovary 3-locular; fruit a dry, dehiscent capsule:
- 4a. Leaves oblong-elliptic; flowers yellowish ...3. *P. amarus*
- 4b. Leaves ovate; flowers white ...9. *P. rheedii*
- 3b. Stamens 5, only inner ones connate; ovary 5-12-locular; fruit a fleshy, indehiscent berry ...8. *P. reticulatus*
- 1b. Tepals 6; disk glands in male flowers 6:
- 5a. Anthers transversely dehiscent:
- 6a. Stipules peltate, subsagittate; filaments free ...11. *P. virgatus*
- 6b. Stipules ovate or lanceolate, not peltate; filaments connate:
- 7a. Stipules lanceolate; tepals prominently scarious on margins; disk glands in male flowers star-shaped ...2. *P. airy-shawii*
- 7b. Stipules ovate; tepals obscurely scarious on margins; disk glands in male flowers peltate ...7. *P. missionis*
- 5b. Anthers vertically dehiscent:
- 8a. Trees or shrubs:
- 9a. Trees; stipules not spiny; drupes fleshy, indehiscent, 3-5 cm across ...4. *P. emblica*

9b. Shrubs; stipules spiny; capsules dry,
dehiscent, *ca* 0.5 cm across ...5. *P. lawii*

8b. Herbs:

10a. Disk of female flowers 6-lobed; capsules
smooth; seeds vertically muriculate ...6. *P. maderaspatensis*

10b. Disk of female flowers annular; capsules
verrucose; seeds transversely ribbed ...10. *P. urinaria*

1. *Phyllanthus acidus* (L.) Skeels, U.S.D.A. Bur. Pl. Indust. Bull. 148: 17. 1909; Webster, J. Arnold Arb. 38: 66. 1957; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 214. 1994. *Averrhoa acida* L., Sp. Pl. 428. 1753. *Cicca disticha* L., Mant. Pl. 124. 1767. *Phyllanthus distichus* (L.) Muell. Arg. in DC., Prodr. 15(2.2): 413. 1866; Hook. f., Fl. Brit. India 5: 304. 1887. *Harfarebari*.

Small trees, deciduous, 4-6 m high. Leaves compound, distichous; leaflets elliptic to obovate, 5-7 x 2-3.5 cm, acute at apex, rounded at base. Flowers on leafless branchlets; pedicels up to 5 mm long. Male flowers numerous, *ca* 4 mm across. Tepals 4, ovate, unequal, *ca* 2 mm long. Stamens 4, exserted; filaments recurved; anthers oblong, *ca* 0.5 mm long. Disk glands 4. Female flowers few, solitary. Ovary subglobose, 3-lobed; styles 3, reflexed, forked into subulate arms. Drupes depressed globose, *ca* 1.5 cm across, 6-8-angled, juicy; endocarp hard.

Commonly cultivated in gardens and parks. Bhopal, Indore. *Fl. & Fr.*: Oct. - April.

2. *Phyllanthus airy-shawii* Brunel ex Roux in Taxon 37(2): 469. 1988; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 214. 1994. *P. debilis* Klein ex Willd., Sp. Pl. 4: 582. 1805; Hook. f., Fl. Brit. India 5: 299. 1887.

Herbs, annual, erect, up to 70 cm high. Leaves elliptic-ovate, 1-2 x 0.8-1.2 cm, broadly acute at apex, acute to rounded at base; stipules lanceolate, 2-2.5 mm long, acuminate. Male tepals 6, obovate 1.8-2 mm long, subacute. Stamens 3; filaments connate. Female tepals 6, obovate, 2-2.2 mm long. Ovary 6-lobed; styles 3, 2-fid; stigmas obtuse. Capsules 3-valved, *ca* 4 mm across. Seeds *ca* 1 mm long, somewhat 4-angled.

Common in sal and mixed forests. Balaghat, Bastar, Bilaspur, Durg, Mandla, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: Aug. - Oct.

3. **Phyllanthus amarus** Schumach. & Thonn. in Danske Vid. Selsk. Skr. 4: 195. 1829; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 215. 1994. *P. fraternus* Webster in Contrib. Grey Herb. 176: 53. 1955. *P. niruri auct. non L.*, 1753; Hook. *f.*, Fl. Brit. India 5: 298. 1887. - *Jarumala*.

Herbs, annual, erect, up to 40 cm high; branchlets scabridulous on the angles. Leaves oblong-elliptic, 5-14 x 2-5 mm, obtuse at both ends; stipules lanceolate-subulate, *ca* 1 mm long. Flowers yellowish. Male tepals 5, ovate-rounded, *ca* 0.6 mm long. Stamens 3, connate. Female flowers solitary. Tepals 5, oblong-spathulate, 1-1.4 mm long. Styles free, 2-lobed. Capsules depressed globose, *ca* 2 mm across, smooth. Seeds *ca* 1 mm long, 3-angled, light brown with longitudinal ribs on the back.

Common as weed in gardens, fields and open sandy places near villages. Balaghat, Bilaspur, Chhatarpur, Damoh, Dhar, East Nimar, Mandla, Panna, Raipur, Shivpuri, Sidhi, Tikamgarh. *Fl. & Fr.*: Aug. - Dec.

4. **Phyllanthus emblica** L., Sp. Pl. 982. 1753; Hook. *f.*, Fl. Brit. India 5: 289. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 215. 1994. *Emblica officinalis* Gaertn., Fruct. Sem. Pl. 2: 122. t. 108. 1790. - *Aonla*, *Aonwala*.

Trees, deciduous, up to 8 m high; bark grey, peeling off in irregular pieces. Leaves oblong, 8-14 x 2-3 mm, obtuse at apex, obliquely subcordate at base; stipules ovate, 1-1.5 mm long. Flowers in axillary clusters towards lower portion of branchlets, greenish yellow. Male tepals 6, oblong, 1-1.2 mm long, obtuse. Stamens 3; filaments connate. Female tepals 6, oblong, 1.2-1.5 mm long, obtuse, valvate. Styles connate at base, twice 2-fid. Drupes globose, 3-5 cm across, obscurely 6-lobed. Seeds *ca* 6 mm long, dark brown, 3-angled.

Common in mixed forests throughout the state, also planted for its edible fruits. Balaghat, Bastar, Chhatarpur, Damoh, Durg, Hoshangabad, Mandla, Rajnandgaon, Sidhi, Shivpuri, Surguja. *Fl. & Fr.*: March - Dec.

The plant is highly medicinal and exploited for the preparation of local and ayurvedic medicines. The fruits are richest source of vitamin C and consumed in various forms.

5. **Phyllanthus lawii** J. Graham, Cat. Pl. Bombay 181. 1839; Hook. *f.*, Fl. Brit. India 5: 290. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 215. 1994.

Shrubs, 1-1.5 m high; stems rigid; branchlets spreading. Leaves distichous, crowded, linear-oblong, 3-8 mm long; stipules persistent on branchlets. Male flowers solitary or few together. Tepals 6, linear-oblong, 2-3 mm long, obtuse. Stamens 3; filaments connate in a short column. Female flowers solitary. Tepals 6, linear-oblong, *ca* 3 mm long. Styles shortly blunt, 2-fid. Capsules globose, *ca* 5 mm across, glabrous, smooth. Seeds *ca* 2 mm long, 3-angled, rounded on the back, glabrous.

Rare. Along the river banks and drains. Bilaspur, Raigarh, Raipur. *Fl. & Fr.*: Sept. - Oct.

6. *Phyllanthus maderaspatensis* L., Sp. Pl. 982. 1753; Hook. *f.*, Fl. Brit. India 5: 292. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 216. 1994. - *Kanocha*.

Herbs, annual, erect, up to 70 cm high; branches angular, often sulcate. Leaves oblong or obovate, 1.5-4 x 0.5-1 cm, rounded to subacute, often mucronate at apex, acute at base; stipules lanceolate, *ca* 2 mm long, acuminate. Male tepals 6, obovate, 0.7-1 mm long, obtuse, scarious on margin. Stamens 3, connate at base. Female flowers solitary. Tepals 6, obovate-spathulate. Styles distinct, suberect. Capsules globose, 2-3 mm across. Seeds *ca* 1.2 mm long, 3-angled, dark brown, convex at back, vertically muriculate.

Common along roadsides and in cultivated fields. Bilaspur, Damoh, Dhar, Durg, East Nimar, Hoshangabad, Rajnandgaon, Rewa, Seoni, Sidhi. *Fl. & Fr.*: July - Sept.

7. *Phyllanthus missionis* Hook. *f.*, Fl. Brit. India 5: 297. 1887.

Herbs or undershrubs, glabrous. Leaves distantly arranged, obovate or elliptic, 1.5-2 x 0.6-1 cm, acute at apex, rounded at base, entire, glabrous; petioles 1-2 mm long; stipules ovate. Flowers borne on 6-8 mm long peduncles. Tepals pale white. Filaments connate into a column. Capsules globose, 2-3 mm across, with persistent tepals.

Rare. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: July - Aug.

8. *Phyllanthus reticulatus* Poir. in Lam., Encycl. 5: 298. 1804; Hook. *f.*, Fl. Brit. India 5: 288. 1887; Tripathi *et al.*, Fl. Elem. Madhya

Pradesh 216. 1994. *Kirganelia reticulata* (Poir.) Baill., Etude Gen. Euphorb. 613. 1858.

Shrubs, straggling, 1.5-2.5 m high; branches pinkish. Leaves elliptic-oblong, 15-27 x 6-15 mm, obtuse at apex, rounded or cuneate at base; stipules lanceolate, 1-1.5 mm long. Male tepals 5, unequal, 1.8-2.3 mm long, imbricate; outer smaller, oblong-obovate; inner suborbicular. Female flowers solitary. Tepals as in male flowers. Styles 3, shortly 2-fid. Berries globose, purple-black, smooth. Seeds ca 1.7 mm long, 3-angled, finely granulate.

Common as hedge, in wastelands and deforested areas. Balaghat, Chhatarpur, Damoh, Durg, Panna, Raipur, Sidhi, Surguja. *Fl. & Fr.* Sept. - June.

9. *Phyllanthus rheedii* Wight, Icon. Pl. Ind. Orient. 5(2): t. 1895. f. 1. 1852; Hook. f., Fl. Brit. India 5: 283. 1887.

Herbs, erect, slender, ca 40 cm high; branches terete. Leaves ovate, acute at apex, rounded at base, glabrous, glaucous beneath; stipules decurrent. Flowers white. Male flowers in fascicles, ca 4 mm across. Stamens 3; filaments connate, forming a column. Female flowers solitary. Tepals 5, ovate, scarious. Ovary glabrous. Capsules globose, ca 3 mm across, smooth, on thickened pedicels.

Rare. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: Dec. - Feb.

10. *Phyllanthus urinaria* L., Sp. Pl. 982. 1753; Hook. f., Fl. Brit. India 5: 293. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 218. 1994. *P. leprocarpus* Wight, Icon. Pl. Ind. Orient. 5(2): t. 1895. 1852.

Herbs, annual, erect or procumbent, up to 60 cm high. Leaves oblong-obovate, 5-15 x 2.5-6 mm, obtuse-mucronate at apex, subequally rounded at base; stipules ovate-deltoid, ca 0.8 mm long. Bracts linear, ca 1 mm long, scarious, acute. Male tepals 6, oblong-obovate, 0.6-0.8 mm long. Stamens 3; filaments connate. Female flowers solitary. Tepals 6, oblong, ca 0.7 mm long. Styles connate at base. Capsules 2-3 mm across, verrucose. Seeds ca 1 mm long, 3-angled, greyish brown.

Common in shaded wastelands, gardens and fields. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Durg, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Sidhi, Surguja, Tikamgarh. *Fl. & Fr.*: July - Nov.

The plant is referred for the treatment of diarrhoea and dysentery.

11. *Phyllanthus virgatus* G. Forster, Fl. Ins. Austr. 65. 1786; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 218. 1994. *P. simplex* Retz., Observ. Bot. 5: 29. 1788; Hook. *f.*, Fl. Brit. India 5: 295. 1887.

Herbs, perennial, erect or decumbent-ascending, 25-40 cm high. Leaves linear-oblong, 1-3 x 0.3-0.6 cm, obtuse-apiculate at apex, rounded at base; stipules peltate, subsagittate, 1-1.2 mm long, acute. Flowers usually solitary, greenish yellow. Male tepals 6, oblong, *ca* 0.8 mm long, obtuse. Stamens 3, free. Female tepals 6, ovate-oblong, *ca* 10 mm long. Styles shortly 2-fid. Capsules globose, 2-2.5 mm across, slightly 3-lobed. Seeds *ca* 1.2 mm long, dark brown, 3-angled, finely tuberculate on back.

Common in wastelands, forest clearings, forest edges and grassy fields. Balaghat, Bastar, Bilaspur, Damoh, Durg, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Surguja. *Fl. & Fr.*: Aug. Nov.

Leaves are referred for the treatment of eye diseases.

24. RICINUS L.

Shrubs or small trees. Leaves spirally arranged, peltate, palmatifid, serrate-crenate, long petiolate; serratures callose; stipules of a leaf-pair connate. Flowers in narrow panicles, consisting of subsessile cymes; lower flowers male; upper ones female. Tepals 4-5, valvate in bud, patent or reflexed afterwards, often more or less coherent. Stamens many, in branched fascicles; anther cells 2, free for the greater part; connectives mucronate. Staminodes absent. Ovary globose, muricate or not; style short; stigmas branched, densely covered inside with stigmatic papillae. Fruit a capsule, ellipsoid or globose, 3-lobed, muricate. Seeds ellipsoid, carunculate.

A monotypic genus; E. and N.E. Africa to Middle East, naturalized throughout the tropics.

Ricinus communis L., Sp. Pl. 1007. 1753; Hook. *f.*, Fl. Brit. India 5: 457. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 219. 1994. - *Arandi*.

Large shrubs or small trees, evergreen, soft-wooded, glaucous, up to 4 m high. Leaves alternate, 20-40 cm across, 6-13-lobed; lobes ovate-

lanceolate, acuminate, irregularly serrate; petioles with 1-2 glands at apex. Flowers in terminal, pyramidal, leaf-opposed panicles. Male tepals ovate-lanceolate, unequal, ca 5 mm long, glandular. Stamens many. Female tepals 8-10 mm long, caducous; styles 3, 2-fid. Capsules 1.5-2 cm long, with 3, 2-valved cocci, echinate. Seeds oblong, smooth, shining.

Usually cultivated for oil seeds, sometimes found as an escape in wastelands. Bilaspur, Chhatarpur, Damoh, Dhar, Raigarh, Raipur, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: Sept. - May.

Roots and leaves are used to treat jaundice. Seed oil is used to treat skin diseases and rheumatism. It is also used for illumination, making soap, and in paint, varnish and candle industries.

25. SAUROPUS Blume

Herbs or undershrubs, monoecious. Leaves alternate, distichous, membranous; stipules minute. Flowers axillary, solitary or clustered, pedicellate. Perianth diskiform, urceolate or turbinate, 6-lobed. Stamens 3; filaments connate in a short, truncate, 3-angled column. Ovary ovoid or globose; ovules 2 in each locule; styles 3, very short, spreading, 2-fid. Fruits globose or depressed, fleshy, coriaceous, 6-valved or rupturing irregularly, containing 6, indehiscent, 3-angled, crustaceous or bony cocci. Seeds with fleshy albumen.

About 40 species: S. E. Asia and Indo-Malesia; one in M.P.

Sauropus quadrangularis Muell. Arg. in *Linnaea* 32: 73. 1863 & in DC., *Prodr.* 15(2.2): 242. 1866; Hook. *f.*, *Fl. Brit. India* 5: 335. 1887; Tripathi *et al.*, *Fl. Elem. Madhya Pradesh* 220. 1994.

Herbs or undershrubs, 30-60 cm high; young shoots angular. Leaves elliptic-oblong or obovate, 1-3.5 x 0.7-2 cm, apiculate at apex, obtuse or acute at base; stipules lanceolate. Pedicels filiform, up to 0.5 cm long. Male perianth divided up to half way down; tepals deltoid, up to 2 mm long, acute. Female perianth divided up to base; tepals obovate, 1-1.5 mm long, rounded. Fruits ca 8 mm across, rounded on the back, smooth.

Rare. Along the river bank, in sal forests and on rocky drain beds. Hoshangabad, Mandla, Raipur. *Fl. & Fr.*: Aug. - Nov.

26. SEBASTIANIA Spreng.

Herbs, rarely shrubs, monoecious. Leaves alternate, penninerved. Flowers in terminal or leaf-opposed, slender spikes, rarely in axillary and lateral, slender racemes. Male flowers 1-3 in each bract. Tepals 5, small, unequal, membranous. Disk absent. Stamens 2-4; filaments short, free or connate. Pistillode absent. Female flowers 1-few at the base of a male spike. Tepals 3, Disk absent. Ovary exserted, 3-locular; ovule solitary in each locule; styles 3, free or connate at base, entire, revolute or spreading. Fruit a capsule of 3 cocci, separating from a columella, globose; endocarp crustaceous. Seeds subglobose or cylindrical, strophiolate; testa smooth.

About 100 species; tropical America, E. United States and from W. Africa to Australia; one in M.P.

Sebastiania chamaelea (L.) Muell. Arg. in DC., Prodr. 15 (2.2): 1175. 1866; Hook. f., Fl. Brit. India 5: 475. 1888; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 222. 1994. *Tragia chamaelea* L., Sp. Pl. 981. 1753.

Herbs, erect or ascending, 30-80 cm high; branchlets puberulous. Leaves linear-lanceolate, 5-10 x 0.4-0.8 cm, acute or obtuse-apiculate at apex, cuneate at base, minutely dentate. Flowers in axillary spikes; bracts lanceolate. Male flowers minute, 3 in a cluster. Tepals ovate, rounded to acute. Stamens 3, free, alternate with tepals; filaments ca 0.15 mm long. Female flowers axillary or at the base of male spike, solitary. Tepals ovate, valvate, rounded, ciliate. Ovary 3-lobed, echinate; ovules pendulous; styles shortly connate. Disk absent. Capsules ca 5 mm across, 3-lobed, each coccus with 2, vertical rows of soft prickles. Seeds 5-6 mm long, yellow, rounded at ends.

Common in moist and mixed forests. Balaghat, Bastar, Bilaspur, Durg, Narsimhapur, Raigarh, Raipur, Rajnandgaon, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Aug. - Nov.

27. SECURINEGA Commerson *ex* Juss., *nom. cons.*

Shrubs, dioecious, armed or unarmed. Leaves alternate, obtuse or emarginate at apex, acute or cuneate at base, petiolate; stipules minute. Flowers in clusters around branchlets, pedicellate; bracts 2, lanceolate. Male tepals 5, imbricate. Disk of 5 (rarely 3 or 4) glands, alternate with stamens. Stamens 5 (rarely 3 or 4); filaments free. Pistillodes 2 or 3-forked. Female

tepals 5. Ovary globose, 3-locular; ovules 6, laterally pendulous; styles 3, 2-fid, spreading. Disk annular, flat, toothed, hypogynous. Fruit a capsule, globose, 3-valved; epicarp fleshy or coriaceous. Seeds 3, triquetrous; testa crustaceous.

About 20 species; tropical and subtropical regions; 2 in M.P.

- 1a. Armed (with arrested branchlets); pistillodes
2, free; capsules white ...1. *S. leucopyrus*
- 1b. Unarmed; pistillodes 3, connate below;
capsules grey ...2. *S. virosa*

1. *Securinega leucopyrus* (Willd.) Muell. Arg. in DC., Prodr. 15(2.2): 451. 1866; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 223. 1994. *Flueggea leucopyrus* Willd., Sp. Pl. 4: 757. 1806; Hook. *f.*, Fl. Brit. India 5: 328. 1887. - Hartho.

Shrubs, 2.5-5 m high; branchlets arrested, stiff, thorn like, bearing leaves and flowers. Leaves obovate, obcordate or rotundate, 1-2 x 0.6-1.5 cm, glaucous, reticulately veined beneath. Flowers in axillary clusters from a crowd of minute bracts; males numerous; females usually 1-5. Male flowers *ca* 2.5 mm across. Tepals concave, up to 0.7 mm long, obtuse. Stamens 5; filaments *ca* 2 mm long; anthers *ca* 0.4 mm long. Pistillodes 2, up to 1 mm long. Female flowers *ca* 0.7 mm across. Tepals ovate, up to 0.8 mm long. Ovary *ca* 0.5 mm across. Capsules *ca* 5 mm across, white.

Rare. On hilly slopes. Hoshangabad. *Fl. & Fr.*: Feb. - Nov.

2. *Securinega virosa* (Roxb. ex Willd.) Baill. in Adansonia 6: 334. 1865-66 *quoad syn. tantum excl. descr.*; Pax & Hoffm. in Engl., Nat. Pflanzenfam. (ed. 2) 19c: 60. 1931; Airy Shaw in Kew Bull. 35: 688. 1980; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 225. 1994. *Phyllanthus virosus* Roxb. ex Willd., Sp. Pl. 4: 578. 1805. *Flueggea microcarpa* Blume, Bijdr. 580. 1826; Hook. *f.*, Fl. Brit. India 5: 328. 1887. *Chirigodi*, Dalme, *Patala*. Fig. 93.

Shrubs, 3-5 m high; branchlets slender. Leaves obovate, 3-7 x 2-4 cm, emarginate at apex, thinly pubescent. Flowers in axillary clusters. Male flowers *ca* 3.5 mm across. Tepals ovate, concave, *ca* 1.5 mm long. Stamens 5; filaments *ca* 1.5 mm long; anthers *ca* 0.5 mm long. Pistillodes 3, up to 1 mm long, connate below. Female flowers *ca* 2 mm across. Tepals ovate,



Fig. 93. *Securinega virosa* (Roxb. ex Willd.) Baill.

up to 1 mm long. Ovary globose, *ca* 1 mm across. Capsules *ca* 4 mm across, grey. Seeds rounded on the back, with acute faces, minutely punctulate.

Common in forest clearings, edges of forests and along roadsides. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Hoshangabad, Indore, Mandla, Raipur, Rajnandgaon, Satna, Seoni, Sidhi, Tikamgarh. *Fl. & Fr.*: Aug. - Oct.

Roots and leaves are medicinal. Ripe fruits are edible.

28. TRAGIA L.

Herbs or shrubs, erect, twining or climbing, monoecious, hispid with stinging hairs. Leaves simple or palmatifid, alternate, penni-palm-ined, petiolate; stipules caducous. Flowers in axillary, slender racemes or spikes; bracts lanceolate. Male tepals 3, initially connate, ovate, valvate, acute. Stamens 3, free, included, alternate with tepals. Female tepals 6, ovate, pinnatifid, accrescent. Ovary pubescent, 3-locular; ovule solitary in each locule, axile; styles 3, stout, erect, stigmatiferous. Disk absent. Fruit a capsule, sessile, 3-lobed. Seeds globose, crustaceous.

About 100 species; tropical and subtropical regions; 2 in M.P.

- 1a. Branchlets densely pubescent;
leaves unlobed, acuminate ...1. *T. involucrata*
- 1b. Branchlets sparsely pubescent;
leaves 3-5-lobed, acute ...2. *T. plukenetii*

1. *Tragia involucrata* L., Sp. Pl. 980. 1753; Hook. f., Fl. Brit. India 5: 465. 1888; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 226. 1994.

Twining, perennial. Leaves ovate-oblong or elliptic, 5-9 x 3-4 cm, acuminate at apex, rounded at base, serrate; lateral nerves 4-5 on each side. Flowers in androgynous racemes. Male tepals *ca* 1 mm long. Female tepals *ca* 1.5 mm long, imbricate. Ovary *ca* 1.5 mm across; styles united below. Capsules of 3, 2-valved cocci, hispid.

Rare. On rocky river beds. Bastar, Bilaspur. *Fl. & Fr.*: Throughout the year.

2. *Tragia plukenetii* R. Sm. in Kew Bull. 37: 688. 1883; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 226. 1994. *T. cannabina* V. f., Suppl. Pl. 415. 1782, *nom. illegit.* *T. involucrata* var. *cannabina* Muell. Arg. in DC., Prodr. 15(2.2): 944. 1866; Hook. f., Fl. Brit. India 5: 465. 1888.

Shrubs, perennial, erect or climbing, up to 1.5 m high, sparsely pubescent. Leaves palmatifid or 3-5-lobed, 2-6 x 1-2 cm, acute at apex, truncate at base, obscurely pinnatifid, 5-nerved from base. Flowers in racemes. Male flowers ca 2 mm across. Tepals up to 1 mm long. Female flowers ca 2 mm across. Tepals up to 2 mm long, thinly pubescent. Ovary ca 1.5 mm across; styles slightly spreading. Capsules 7-8 mm across, 3-lobed. Seeds globose, ca 3 mm across.

Rare. On dry slopy places. Gwalior, Hoshangabad. *Fl. & Fr.*: Throughout the year.

29. TREWIA L.

Trees, deciduous, dioecious. Leaves alternate, with prominent basal pair of nerves, petiolate. Flowers in axillary, elongate, slender, pendulous paniculate racemes. Male flowers longer than female. Tepals 3 or 4, initially connate. Stamens 25, free, exserted. Female tepals 3-5, caducous. Ovary globose to obovoid, puberulous, 2 to 4-locular; styles 2-4, spreading, stigmatiferous. Disk absent. Fruit a drupe, ellipsoid, ovoid or globose; epicarp dry; endocarp crustaceous. Seeds oblong-globose; testa crustaceous.

Two species; India to Sri Lanka and Hainan; both of them in M.P.

- 1a. Tender parts fulvous pubescent; racemes up to 5 cm long; styles up to 5 mm long; drupes globose, ca 2 mm across ...1. *T. nudiflora*
- 1b. Tender parts glabrous; racemes 10-15 cm long; styles more than 12 mm long; drupes ovoid, ca 1 cm long ...2. *T. polycarpa*

1. *Trewia nudiflora* L., Sp. Pl. 1193. 1753; Hook. f., Fl. Brit. India 5: 423. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 231. 1994.

Fig. 94.

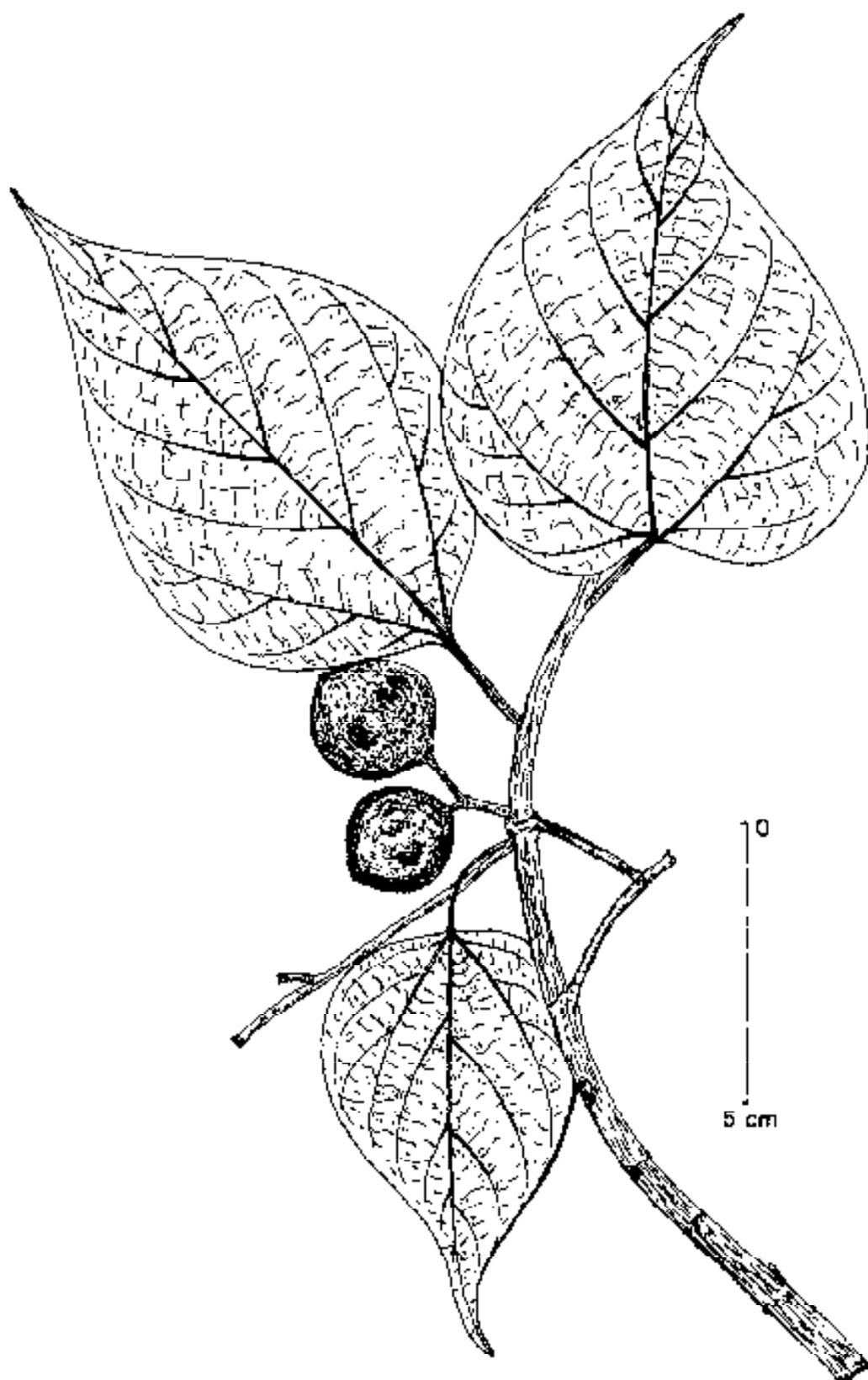


Fig. 94. *Trewia nudiflora* L.

Trees, 8-12 m high; tender parts fulvous pubescent. Leaves cordiform to broadly ovate, 5-10 x 4-8 cm, shortly acuminate at apex, subcordate-truncate at base, entire to irregularly crenate, glabrous. Flowers in 4-5 cm long racemes. Male flowers *ca* 5 mm across. Tepals ovate, *ca* 2.5 mm long, puberulous. Filaments *ca* 3 mm long. Female flowers *ca* 2.5 mm across. Ovary globose, *ca* 2 mm across, 2-locular; styles 2, stout, up to 5 mm long. Drupes globose, *ca* 2 cm across.

Rare. Along the bank of river and drains. Rewa. *Fl. & Fr.*: Feb. - March.

2. *Trewia polycarpa* Benth. in Benth. & Hook. *f.*, Gen. Pl. 3: 318. 1880; Hook. *f.*, Fl. Brit. India 5: 424. 1887; Tripathi *et al.*, Fl. Elem. Madhya Pradesh 231. 1994.

Trees, up to 10 m high. Leaves broadly ovate to digitate, 6-13 x 4-12 cm, gradually acuminate at apex, truncate or rounded at base, rarely subcordate, glaucous beneath. Flowers in 10-15 cm long racemes. Male tepals oblanceolate, *ca* 4 mm long, acute. Female tepals lanceolate, *ca* 4 mm long. Ovary *ca* 2.5 mm across, 3 or 4-locular; styles 3 or 4, slender. Drupes ovoid, *ca* 1 cm long.

Along the bank of river and drains. Panna, Rewa, Seoni. *Fl. & Fr.*: March - May.

124. URTICACEAE

(R.C. Srivastava)

About 52 genera and 1050 species; tropical to temperate regions; 10 genera and 17 species in M.P.

1a. Plants with stinging hairs:

2a. Leaves opposite; stigma penicillate ...10. *Urtica*

2b. Leaves alternate; stigma not penicillate:

3a. Stipules foliaceous; cystoliths punctiform; female perianth with one free and 3 connate tepals ...3. *Girardinia*

3b. Stipules not foliaceous; cystoliths linear; female perianth with all connate tepals ...4. *Laportea*

- 1b. Plants without stinging hairs:
- 4a. Shrubs or small trees:
- 5a. Flower-clusters in long spikes;
stigma penicillate ...1. *Boehmeria*
- 5b. Flower-clusters in panicles;
stigma not penicillate ...7. *Oreocnide*
- 4b. Herbs or undershrubs:
- 6a. Female perianth tubular; stigma not penicillate:
- 7a. Male perianth 2-3-fid; stamens 2 ...6. *Neodistemon*
- 7b. Male perianth 4-5-partite; stamens 4-5 ...9. *Pouzolzia*
- 6b. Female perianth not tubular;
stigma penicillate:
- 8a. Flowers in clusters on fleshy receptacles:
- 9a. Leaves alternate, sometimes
with a small, subopposite leaf;
female tepals not hooded ...2. *Elatostema*
- 9b. Leaves opposite; female tepals
broadly hooded ...5. *Lecanthus*
- 8b. Flowers in branched cymes,
not on fleshy receptacles ...8. *Pilea*

1. BOEHMERIA Jacq.

Shrubs or small trees, polygamodioecious, more or less pubescent. Leaves simple, alternate or opposite, crenate or serrate; cystoliths punctiform; stipules lateral, free, caducous. Flowers in axillary, sessile clusters, sometimes collected in simple or compound spikes, rarely in panicles, bracteate. Male perianth 3-5-partite; tepals corniculate below tip. Stamens as many as tepals. Pistillode rudimentary, clavate. Female perianth tubular, globose, 2-4-toothed, usually hairy. Stigma penicillate. Achenes enclosed within persistent, thin perianth.

About 50 species; tropical and N. subtropical regions; 3 in M.P.

- 1a. Leaves alternate; cystoliths distinct;
flowers in clusters ...1. *B. glomerulifera*

1b. Leaves opposite; cystoliths not distinct;
flowers in spikes:

2a. Female spikes longer than subtending leaves ...2. *B. macrophylla*

2b. Female spikes shorter or equal
to subtending leaves ...3. *B. scabrella*

1. *Boehmeria glomerulifera* Miq. in Zoll., Syst. Verz. 101, 104. 1854.
B. malabarica Wedd. in Nouv. Arch. Mus. Hist. Nat. Paris 8: 355. 1855-56; Hook. f., Fl. Brit. India 5: 575. 1888.

Large shrubs, up to 3.5 m high. Leaves alternate, ovate, 6-11 x 2.5-5 cm, acuminate at apex, rounded or subcordate at base, serrate or crenulate, glabrous above, softly pubescent beneath; cystoliths punctiform on upper surface. Flowers in axillary, small clusters, brown.

Rare. Bastar. *Fl. & Fr.*: Jan. - Feb.

2. *Boehmeria macrophylla* Hornem., Hort. Reg. Bot. Hafn. 2: 890. 1815, *non* D. Don, 1825 *nec* (Thunb.) Sieb. & Zucc., 1844; Friis & Marais in Kew Bull. 37(1): 164. 1982. *B. platyphylla* D. Don, Prodr. Fl. Nepal. 60. 1825; Hook. f., Fl. Brit. India 5: 578. 1888, *excl. var.*

Shrubs, perennial, erect, suffruticose. Leaves opposite, unequal, elliptic-ovate, up to 15 x 11 cm, acuminate-caudate at apex, rounded or cordate at base, crenate-serrate, bullate above, with bulbous-based hairs. Flowers clustered in pendulous spikes, creamy white. Male tepals 4, ovate, subacute. Stamens 4. Pistillode minute. Female perianth tubular-lageniform, with a 2-dentate mouth. Achenes obovoid, compressed, ca 1 x 0.5 mm, brown, hairy at apex.

Common in mixed forests usually in humid places. Bastar, Bilaspur, Hoshangabad, Raigarh, Shahdol, Sidhi, Surguja. *Fl. & Fr.*: Sept. - Dec.

3. *Boehmeria scabrella* Gaud., Voy. Uranie 499. 1830. *B. platyphylla* var. *scabrella* (Gaud.) Wedd. in Nouv. Arch. Mus. Hist. Nat. Paris 9: 365. 1856; Hook. f., Fl. Brit. India 5: 578. 1888.

Shrubs, perennial, erect, suffruticose. Leaves opposite, more or less equal, ovate-elliptic, 5-10 x 3-6 cm, acuminate-cuspidate at apex, rounded-subcordate at base, crenate-serrate, sparsely pubescent; petioles up to

7 cm long; stipules lanceolate. Flowers clustered in spikes, often paniculate. Achenes ovoid-ellipsoid, ca 1 mm long, brown, hairy at apex.

Along streams and in forest clearings. Bastar, Hoshangabad. *Fl. & Fr.*: Sept. Dec.

2. ELATOSTEMA J.R. Forster & G. Forster, *nom. cons.*

Herbs, erect to prostrate, polygamodioecious, slender; stinging hairs absent. Leaves alternate, distichous, sometimes with a small, subopposite leaf, entire or crenate, palmately veined, stipulate; cystoliths punctiform or linear, crowded. Flowers in axillary clusters, bracteate, bracteolate. Male perianth 4-5-partite. Stamens as many as tepals. Pistillode rudimentary. Female perianth 3-4-partite. Staminodes present. Stigma penicillate. Achenes ellipsoid or fusiform.

About 200 species; tropical regions of Old World; 2 in M.P.

- 1a. Leaves pubescent; cystoliths on both the surfaces; female involucrel bracts connate at base ...1. *E. cuneatum*
- 1b. Leaves glabrous; cystoliths only on lower surface; female involucrel bracts free up to base ...2. *E. surculosum*

1. *Elatostema cuneatum* Wight, Icon. Pl. Ind. Orient. 6: t. 2091. f. 3. 1853, "*cuneata*"; Hook. *f.*, Fl. Brit. India 5: 568. 1888; Mitra in Bull. Bot. Surv. India 9: 279. 1967.

Herbs, annual, erect, up to 20 cm high, often rooting near base. Leaves hatchet-shaped, 1-4 x 0.5-1.5 cm, rounded or subacute at apex, falcately cuneate at base, coarsely crenate above the middle, sometimes entire, subsessile; stipules ovate. Heads of female flowers axillary, solitary, sessile. Flowers green or white. Tepals 3, very short. Achenes ellipsoid, ca 0.5 mm long, yellow, ribbed.

In mixed forests as well as in moist rock crevices along streams. Bastar, Bilaspur, Mandla, Raigarh, Rajnandgaon, Rewa. *Fl. & Fr.*: Aug. - Oct.

2. *Elatostema surculosum* Wight, Icon. Pl. Ind. Orient. 6: t. 2091. f. 4. 1853; Hook. *f.*, Fl. Brit. India 5: 572. 1888. **Fig. 95.**

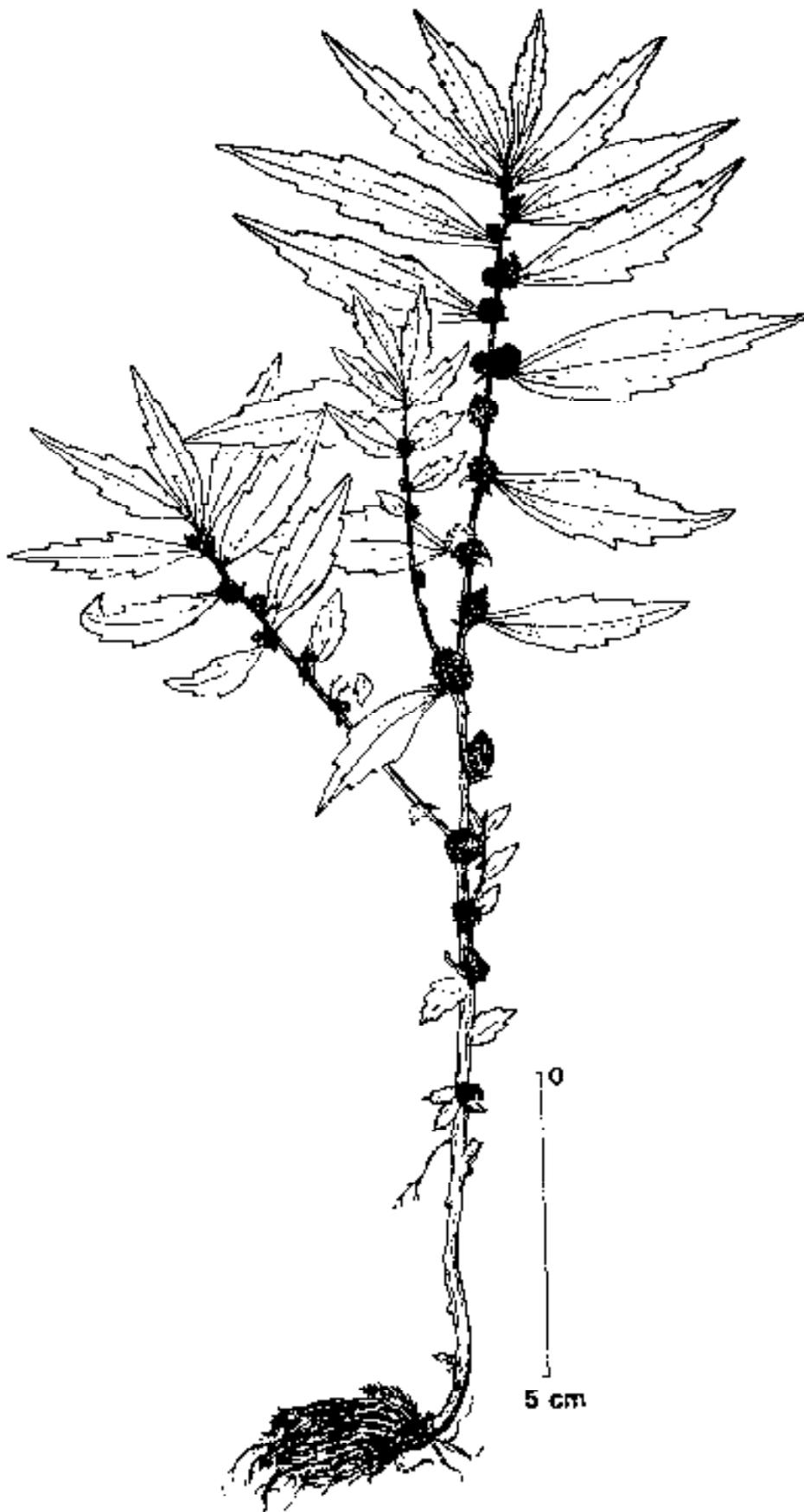


Fig. 95. *Elatostema surculosum* Wight

Herbs, stoloniferous. Leaves elliptic-oblong to ovate-lanceolate, 4-12 x 1-3 cm, obtuse to caudate at apex, acute or rounded at base, inequilateral, subentire, crenate-serrate to pinnatifid, glabrous, almost fleshy, sessile; cystoliths numerous on upper surface, few on lower surface. Male heads long pedunculate. Female heads sessile. Achenes slender, ribbed.

Rare. As forest undergrowth. Hoshangabad. *Fl. & Fr.*: Sept. - Oct.

3. GIRARDINIA Gaud.

Herbs or undershrubs, suffruticose; stinging hairs present, stout. Leaves alternate, serrate or dentate; cystoliths punctiform; stipules foliaceous, connate. Flowers in paniculate spikes or heads, armed with numerous stinging hairs. Tepals 3-5, free, valvate in male flowers, connate in a 2-3-toothed, ventricose tube in female ones. Stamens 4, Pistillode globose or clavate. Achenes oblique, tipped by style.

Two species; subtropical regions of Old World; one in M.P.

Girardinia diversifolia (Link) Friis in Kew Bull. 36: 145. 1981. *Urtica diversifolia* Link, Enum. Hort. Berol. Alt. 2: 385. 1822, non Blume, 1825. *U. palmata* Forssk., Fl. Aegypt.-Arab. 159. 1775. *U. heterophylla* Vahl, Symb. Bot. 1: 76. 1790. *Girardinia heterophylla* (Vahl) Decne. in Jacquem., Voy. Inde 4(Bot.): 151. t. 153. 1844; Hook. f., Fl. Brit. India 5: 550. 1888. *G. zeylanica* Decne. in Jacquem., Voy. Inde 4(Bot.): 152. 1844. *G. heterophylla* Decne. var. *palmata* Hook. f., Fl. Brit. India 5: 551. 1888 & var. *zeylanica* Hook. f., Fl. Brit. India 5: 551. 1888.

Herbs, perennial, erect, monoecious, 50-70 cm high. Leaves broadly ovate or suborbicular, 7-13 x 8-12 cm, acuminate at apex, cordate or truncate at base, entire, falcately dentate or 3-7-lobed, with appressed stinging hairs; stipules ovate, 9-15 mm long, foliaceous. Male flowers in simple or paniculate spikes. Tepals 4. Stamens 4. Pistillode globose. Female flowers in paniculate spikes. Tepals 3. Achenes obliquely ovoid, compressed.

In mixed forests and hill slopes. Bilaspur, Hoshangabad, Raigarh, Raipur, Shahdol, West Nimar. *Fl. & Fr.*: July - Dec.

The plant-ash is highly medicinal for ringworm and eczema.

4. LAPORTEA Gaud., *nom. cons.*

Herbs, annual or perennial, erect or diffuse; stinging hairs present. Leaves alternate, entire, crenate or serrate, petiolate; cystoliths linear; stipules lanceolate, sparsely hairy, caducous. Flowers in short, cymose clusters aggregated in axillary spikes or panicles. Male tepals 4-5, free, valvate. Stamens 4-5. Pistillode rudimentary, clavate or subglobose. Female tepals 4, unequal, connate at base. Ovary oblique; stigma linear, papillose on one side. Achenes oblique, tipped by style.

About 22 species; tropical, subtropical and temperate regions of E. Asia and N. E. America; one in M.P.

Laportea interrupta (L.) Chew. in Gard. Bull. Singapore 21: 200. 1965. *Urtica interrupta* L., Sp. Pl. 985. 1753. *Fleurya interrupta* (L.) Gaud., Voy. Uranie 497. 1830; Hook. f., Fl. Brit. India 5: 548. 1888. *Lal bichua*.

Herbs, annual, erect; stinging hairs scattered. Leaves ovate, 3-10 x 2-7 cm, acuminate at apex, subcordate, truncate or cuneate at base, crenate or serrate, sparsely covered with stinging hairs. Flowers in cymes; cymes in spikes or panicles, much aggregated, longer than the petiole, more than 30 cm long. Male tepals 4, ovate, pubescent outside. Female perianth shortly 4-lobed or toothed, stipitate, keeled on one side; keels decurrent on the stipes, reflexed. Achenes ovoid, compressed.

In moist places of mixed forests, hill slopes and river beds. Balaghat, Bastar, Dhar, Gwalior, Hoshangabad, Indore, Mandla. *Fl. & Fr.*: Aug. Dec.

5. LECANTHUS Wedd.

Herbs; stinging hairs absent. Leaves opposite, in unequal pairs, 3-ribbed at base, often oblique, serrate or smaller leaves entire, petiolate; cystoliths linear; stipules connate, scarious. Flowers in axillary, dense, pedunculate heads, shortly pedicellate, bracteolate. Male tepals 4-5, free, shortly hooded. Stamens 4-5. Pistillode rudimentary or absent. Female tepals 3-4, unequal, broadly hooded. Staminodes 4, minute. Ovary shortly stipitate; stigma penicillate. Achenes ovoid or ellipsoid.

Three species; tropical regions of Old World; one in M.P.

Lecanthus peduncularis (Wallich *ex* Royle) Wedd. in DC., Prodr. 16(1): 164. 1869. *Procris peduncularis* Wallich *ex* Royle, Ill. Bot. Himal. Mts. t. 83. 1836. *Lecanthus wightii* Wedd. in Ann. Sci. Nat. Bot. ser. 4. I: 187. 1854; Hook. *f.*, Fl. Brit. India 5: 559. 1888.

Herbs, annual, slender, succulent. Leaves obliquely ovate, obtuse, acute, acuminate or caudate at apex, subcuneate at base, subentire, coarsely dentate or serrate-crenate, membranous, sparsely pubescent above and on veins beneath; petioles slender, up to 4 cm long; stipules scarious, entire or toothed. Flowers of both the sexes in pedunculate heads; peduncles very stout, up to 15 cm long; receptacles flat or turbinate. Male tepals 4-5. Female tepals 3, very minute, unequal. Achenes ovoid, compressed, minute.

Rare. On moist rocky places and in humus rich soil. Hoshangabad. *Fl. & Fr.*: July - Oct.

6. NEODISTEMON Babu & Henry

Herbs, annual, erect, monoecious, slender; stinging hairs absent. Leaves alternate, coarsely dentate, 3-nerved, petiolate. Flowers in small, 3-fid, androgynous clusters combined in axillary and terminal, slender, pseudo-spikes, bracteate. Male perianth campanulate, 2-3-fid, valvate. Stamens 2, inflexed in bud. Pistillode woolly. Female perianth tubular, ventricose. Ovary included and more or less adnate to the perianth; stigma linear, caducous. Achenes broadly ovoid or rhomboid, acuminate, included in thickened, fleshy or thin, crustaceous perianth.

A monotypic genus; Indo-Malesia.

Neodistemon indicum (Wedd.) Babu & Henry in Taxon 19: 651. 1970. *Distemon indicum* Wedd. in Nouv. Arch. Mus. Hist. Nat. Paris 9: 551. t. 20A. 1857; Hook. *f.*, Fl. Brit. India 5: 588. 1888. **Fig. 96.**

Herbs, annual, pubescent. Leaves broadly ovate, 3-6 x 2-3.5 cm, acuminate at apex, cuneate at base, serrate, membranous; cystoliths punctiform; petioles 1-2.5 cm long, sparsely pubescent. Flowers in clusters arranged in interrupted pseudo-spikes; bracts ovate, acuminate. Male

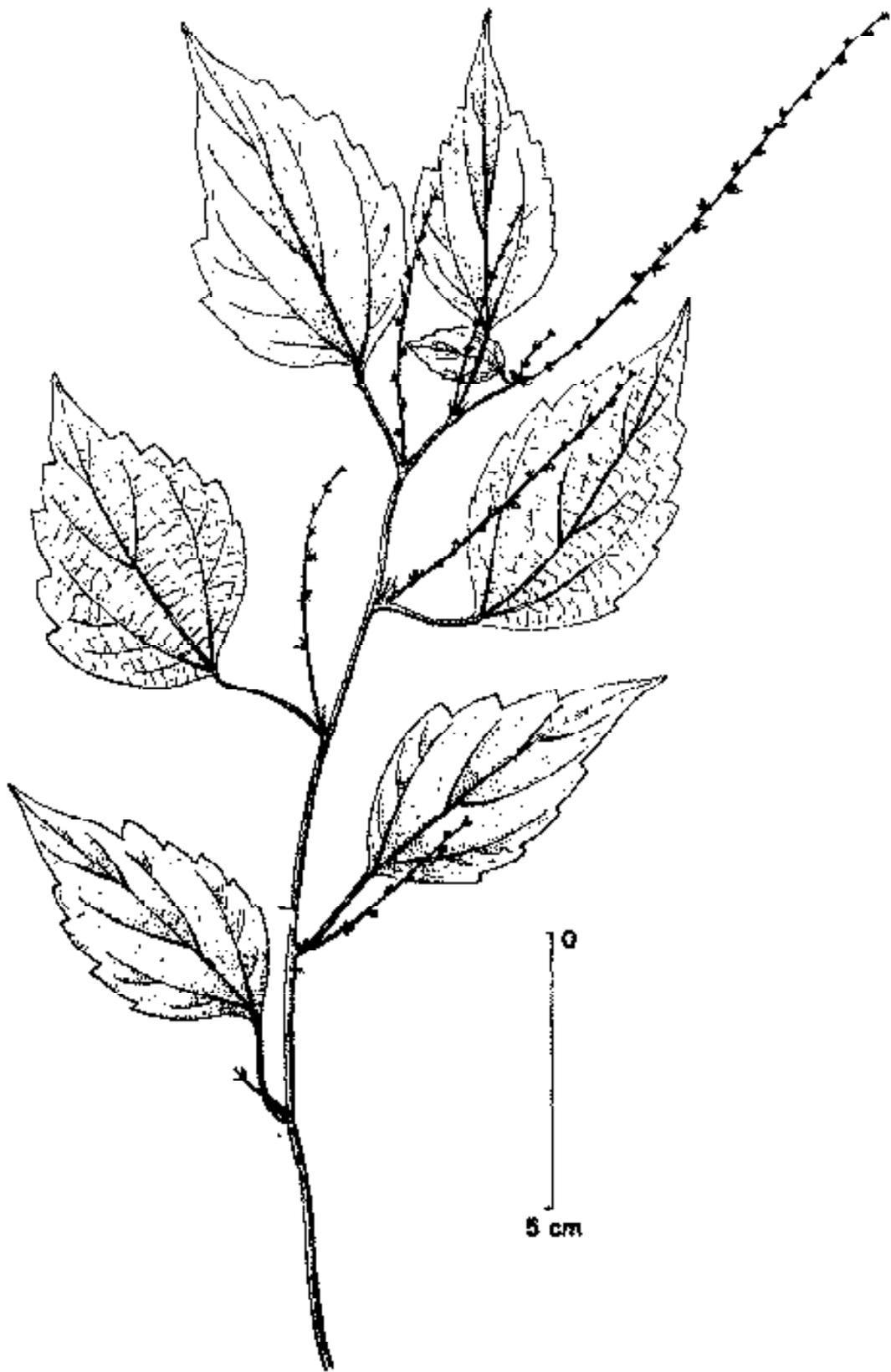


Fig. 96. *Neodistemon indicum* (Wedd.) Babu & Henry

flowers minute, tipped with hooked hairs. Female flowers strigose. Achenes ovoid, *ca* 2 mm long, beaked.

Rare. In mixed forests. Rajnandgaon. *Fl. & Fr.*: Nov.

7. OREOCNIDE Miq.

Shrubs or trees; stinging hairs absent. Leaves alternate, spirally arranged, entire or crenulate; cystoliths punctiform; stipules axillary, 2-fid. Flowers in axillary clusters arranged in branched cymes or panicles; bracts minute. Male perianth 3-5-fid. Stamens usually 4. Pistillode obovate-clavate, hairy at base. Female perianth tubular, more or less adnate to ovary. Staminodes absent. Ovules erect; stigma discoid, ciliate along margin. Achenes free or adnate to perianth, embraced by fleshy bracteoles.

About 20 species; China and Indo-Malesia; one in M.P.

Oreocnide integrifolia Miq., Pl. Jungh. 1: 39. 1851. *Villebrunea integrifolia* Gaud., Voy. Bouite, Bot. t. 91. 1866; Hook. f., Fl. Brit. India 5: 589. 1888.

Small trees; young parts pubescent. Leaves elliptic-oblong, 10-20 x 4-8 cm, acuminate at apex, acute at base, more or less entire, pubescent beneath; petioles *ca* 5 cm long. Flowers in globose clusters arranged in dichotomously branched cymes; peduncles hispid. Male tepals 3-4. Achenes aggregated in a head, white.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: March - Aug.

8. PILEA Lindl., *nom. cons.*

Herbs, monoecious or dioecious. Leaves opposite, in equal or unequal pairs, sometimes seemingly whorled, entire or serrate; cystoliths linear; stipules connate, intrapetiolar. Flowers in dichotomous, axillary, pedunculate cymes; bracts small or absent. Male tepals 2-4, free or connate in a cup, often gibbous or spurred. Stamens 2-4. Pistillodes conical or oblong. Female tepals 3, rarely 4, unequal, dorsal longest, sometimes gibbose or spurred. Staminodes minute, scaly or absent. Ovary straight; stigma sessile, penicillate. Achenes ovoid, oblong or ellipsoid, compressed, membranous or crustaceous.

About 250 species; tropical and subtropical regions; 2 in M.P.

- 1a. Leaves very small, up to 0.6 cm long, entire,
usually sessile ...1. *P. microphylla*
- 1b. Leaves large, 5-12 cm long, serrate, petiolate ...2. *P. scripta*

1. *Pilea microphylla* (L.) Liebm. in Vid. Selsk. Skr. 5(2): 302. 1851. *Parietaria microphylla* L., Syst. Nat. ed. 10. 2: 1308. 1759. *Pilea muscosa* Lindl., Coll. Bot. t. 4. 1821; Hook. f., Fl. Brit. India 5: 551. 1888.

Herbs, annual, prostrate or decumbent-ascending, delicate, somewhat fleshy. Leaves obovate-spathulate or elliptic-suborbicular, 1-6 x 1-5 mm, subacute or obtuse at apex, acute at base, entire, glabrous, usually sessile, with shining glands on lower surface. Flowers in axillary, sessile cymes. Male tepals 4, ovate-rounded. Female tepals 3. Achenes ellipsoid, ca 0.3 x 0.1 mm, brown, smooth.

In moist places. Bhopal, Chhatarpur, Raigarh. *Fl. & Fr.*: Dec. - Jan.

2. *Pilea scripta* (Buch.-Ham. ex D. Don) Wedd. in Nouv. Arch. Mus. Hist. Nat. Paris 9: 222. 1856; Hook. f., Fl. Brit. India 5: 556. 1888. *Urtica scripta* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 59. 1825.

Herbs, perennial, erect-ascending, branched, glabrous, somewhat fleshy; stems purple-streaked. Leaves subequal, elliptic-lanceolate, 5-12 x 2-5 cm, caudate-acuminate at apex, cuneate-rounded at base, serrate, glabrous; petioles 2-6 cm long; stipules ovate. Flowers in ca 4 cm long cymes. Male tepals not spurred. Female tepals 3, broad. Achenes ellipsoid, white, granulate.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Aug. - Nov.

9. *POUZOLZIA* Gaud.

Herbs or undershrubs; stinging hairs absent. Leaves simple, opposite, alternate or ternate, entire, crenate or serrate, sessile or petiolate; cystoliths punctiform; stipules lateral, free, often persistent. Flowers in axillary, unisexual or androgynous, sessile clusters, sometimes passing into leafy spikes. Male flowers shortly pedicellate. Perianth 4-5-partite; tepals free, valvate. Stamens 4-5, free. Pistillode rudimentary. Female flowers subsessile. Perianth tubular, 2-4-toothed. Ovary obovoid; stigma filiform, caducous. Achenes enclosed within accrescent perianth.

About 50 species; tropical regions; 4 in M.P.

- 1a. Flowers in axillary clusters; male flower buds acute or rounded; male tepals convex or gibbose, not plicate:
- 2a. Leaves more than 4 cm long; stipules linear; male flowers 5-merous ...1. *P. auriculata*
- 2b. Leaves up to 3 cm long; stipules broadly ovate; male flowers 4-merous ...4. *P. zeylanica*
- 1b. Flowers in terminal spikes; male flower buds truncate; male tepals plicate:
- 3a. Leaves up to 7 cm long; male flowers 5-merous ...2. *P. pentandra*
- 3b. Leaves more than 7 cm long; male flowers 4-merous ...3. *P. wightii*

1. ***Pouzolzia auriculata*** Wight, Icon. Pl. Ind. Orient. t. 1980. f. 2. 1853; Hook. f., Fl. Brit. India 5: 582. 1888.

Undershrubs, erect; young branches angular, puberulous to pubescent. Leaves alternate, ovate-lanceolate or elliptic, 4-8 x 2-4 cm, acute or acuminate at apex, rounded at base, ciliate on margin, hispid-puberulous above, pubescent beneath; petioles up to 3 cm long. Flowers in axillary, sessile clusters, greenish. Male flower buds rounded. Tepals 5. Stamens 5. Female perianth minutely toothed, ribbed in fruits. Achenes strigose, winged or not.

Rare. Bastar (Saxena & Khotele, 1976). Fl. & Fr.: Oct. - Dec.

2. ***Pouzolzia pentandra*** (Roxb.) Benn., Pl. Jav. Rar. 64. t. 14. 1838; Hook. f., Fl. Brit. India 5: 583. 1888. *Urtica pentandra* Roxb., Fl. Ind. 3: 583. 1832.

Herbs, perennial, erect, up to 90 cm high. Leaves opposite, oblong-lanceolate, 2-7 x 0.5-1 cm, acute or acuminate at apex, cordate at base or shortly petiolate; upper ones much smaller, mostly alternate, linear-oblong. Flowers in clusters arranged in terminal, up to 45 cm long, erect or nodding spikes, white. Male flower buds truncate. Female perianth with 2 or 3, broad, lateral wings in fruits. Achenes ovoid, shining black.

Along streams. Balaghat, Bastar, Bilaspur, Dhar, Gwalior, Hoshangabad, Indore, Mandla, Raigarh, Rajnandgaon, Surguja. *Fl. & Fr.*: Aug. Oct.

3. *Pouzolzia wightii* Benn., *Pl. Jav. Rar.* 1: 66. 1838; Hook. *f.*, *Fl. Brit. India* 5: 584. 1888.

Herbs or undershrubs, robust; stems puberulous or pubescent. Leaves opposite, alternate above, oblong-lanceolate below, 7-10 x 1-3 cm, acute at apex, rounded at base, scabrid above, pubescent beneath; upper leaves reduced to floral bracts. Flowers in axillary clusters, sessile, arranged in terminal, leafy spikes. Male flower buds truncate. Tepals plicate. Female perianth pubescent. Achenes winged.

Rare. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: June - Oct.

4. *Pouzolzia zeylanica* (L.) Benn., *Pl. Jav. Rar.* 1: 67. 1838. *Parietaria zeylanica* L., *Sp. Pl.* 1052. 1753. *P. indica* L., *Mant. Pl.* 128. 1767. *Pouzolzia indica* (L.) Gaud., *Voy. Uranie* 503. 1830; Hook. *f.*, *Fl. Brit. India* 5: 581. 1888.

Herbs, perennial, erect, glabrous or hoary pubescent. Leaves opposite or alternate, ovate or ovate-lanceolate, ca 3 x 1.5 cm, acute or acuminate at apex, cuneate or rounded at base, entire, appressed pubescent. Flowers in axillary, androgynous clusters, greenish white. Male flowers shortly pedicellate; buds rounded. Tepals 4, ovate-lanceolate, strigose outside. Stamens 4. Female flowers sessile. Styles linear, feathery. Achenes ovoid, shining black, 2-winged.

Rare. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: Sept. Oct.

10. URTICA L.

Herbs, monoecious or dioecious; stinging hairs present. Leaves opposite, dentate or lobulate; stipules lateral, free or connate. Flowers in axillary, unisexual or androgynous, cymose clusters. Male tepals 4, ovate, imbricate. Stamens 4, inflexed in bud. Pistillode cupular. Female tepals 4, ovate, usually much smaller. Ovary straight; stigma sessile or subsessile, penicillate. Achenes ovoid or oblong, compressed, thinly crustaceous, embraced by tepals.

About 45 species; subcosmopolitan especially N. temperate regions; one in M.P.

Urtica dioica L., Sp. Pl. 984. 1753; Hook. f., Fl. Brit. India 5: 548. 1888. Fig. 97.

Herbs, perennial; stems *ca* 1 m high, slender, angular, sparingly branched; stinging hairs copious. Leaves ovate-lanceolate, oblong or lanceolate, 1.5-6 cm long, acute-acuminate at apex, cordate at base, serrate; stipules free. Flowers in axillary, unisexual, rarely androgynous cymes, whitish or pale green. Inner fruiting tepals longer than the outer. Achenes ovoid-ellipsoid.

In moist habitats. Bhopal. *Fl. & Fr.*: Aug. - Sept.

The plant is referred to check excessive menstrual flow.

125. ULMACEAE

(K.K. Khanna)

Six genera and about 140 species; tropical and temperate regions especially of Northern hemisphere; 3 genera and 6 species in M.P.

- 1a. Stamens twice the number of tepals;
fruit a winged samara ...2. *Holoptelea*
- 1b. Stamens as many as tepals;
fruit a wingless drupe:
 - 2a. Flowers pedicellate; male tepals
imbricate; drupes 3-5-angled ...1. *Celtis*
 - 2b. Flowers sessile; male tepals valvate;
drupes 2-angled ...3. *Trema*

1. CELTIS L.

Trees, polygamous, often buttressed. Leaves alternate, entire or serrate, subcoriaceous, 3-nerved from base, petiolate; stipules lateral, caducous. Flowers in axillary, lax cymes or panicles, either only male, female, bisexual or mixed. Male flowers globose, pedicellate. Tepals 4 or 5. Stamens 4 or 5. Pistillode present or absent. Female flowers ovoid,

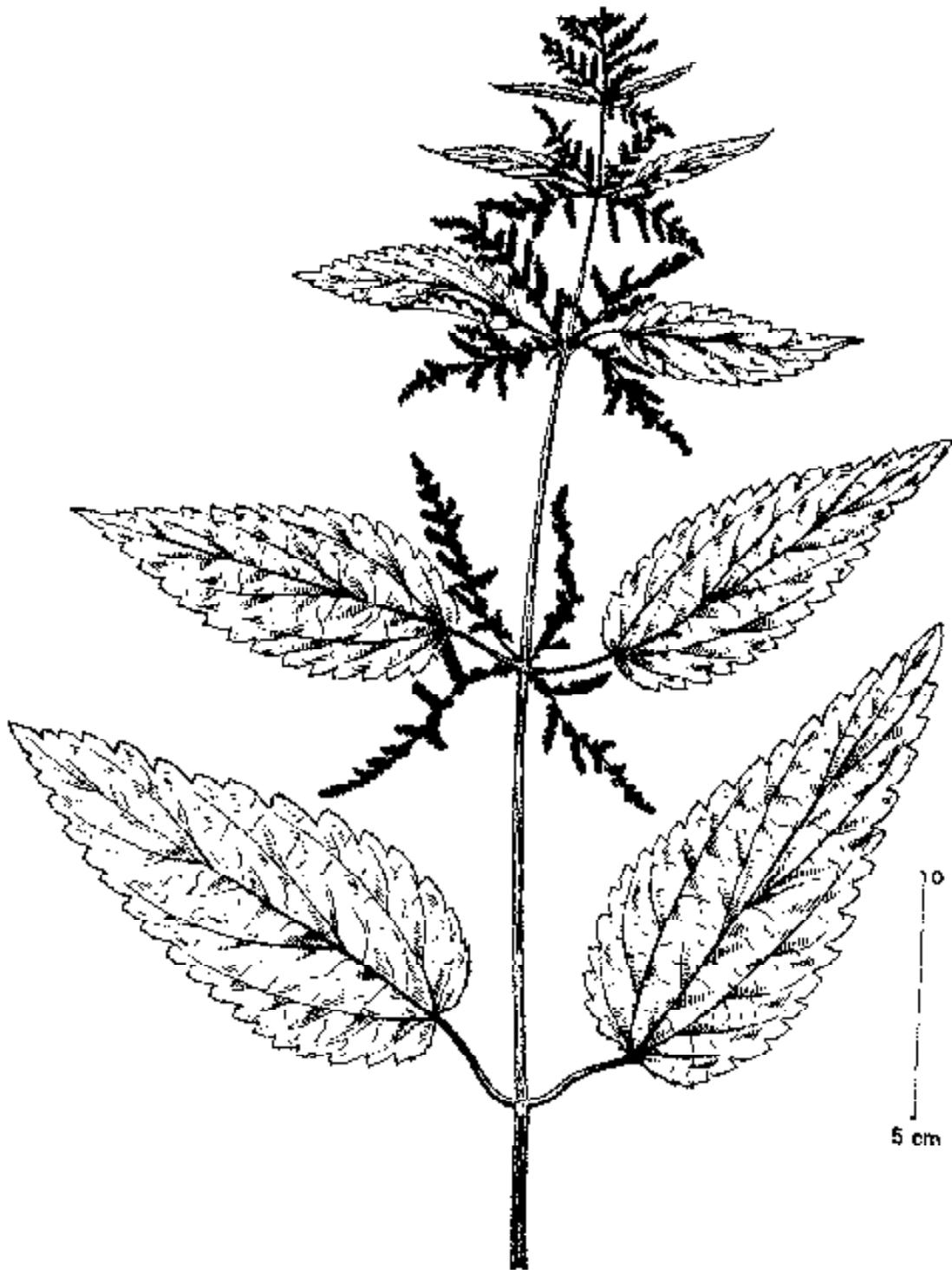


Fig. 97. *Urtica dioica* L.

pedicellate. Tepals as in males. Ovary globose or ellipsoid; style 2-armed, forked or not; stigma ciliate or papillose. Fruit a drupe, ovoid or globose, fleshy. Seeds ovoid.

About 60 species; tropical and temperate regions; 2 in M.P.

- 1a. Leaves strongly oblique, nerves 3-4 pairs;
male flowers 4-merous ...1. *C. tetrandra*
- 1b. Leaves not strongly oblique, nerves 1-2 pairs;
male flowers 5-merous ...2. *C. timorensis*

1. *Celtis tetrandra* Roxb., Fl. Ind. 2: 63. 1832; Hook. f., Fl. Brit. India 5: 482. 1888, incl. var. *hamiltonii* (Planch.) Hook. f. & var. *mollis* (Planch.) Hook. f. *C. trinervia* Roxb., Fl. Ind. 2: 65. 1832, non Lam., 1797. *C. nepalensis* Planch. in Ann. Sci. Nat. Bot. ser. III. 10: 298. 1848. *C. glabra* Planch., l.c. 298. *C. roxburghii* Planch., l.c. 302. *C. hamiltonii* Planch., l.c. 301. *C. serotina* Planch., l.c. 301.

Trees, up to 15 m high. Leaves obliquely ovate or ovate-elliptic, 6-23 x 3-8 cm, acute at apex, oblique at base, serrate, coriaceous, glabrous above, pubescent beneath; nerves 3-4 pairs; petioles up to 5 cm long; stipules linear to lanceolate. Flowers in tomentose cymes arranged in racemes; male cymes 2-5-flowered, on leafless new shoots; bisexual ones in leaf-axils. Tepals 4, ciliate, imbricate. Stamens 4. Drupes globose, 5-8 mm across, deep red or black when ripe.

In mixed forests. Bilaspur, Raipur, Shahdol. Fl. & Fr.: Jan. Feb.

The wood is used for various purposes.

2. *Celtis timorensis* Spanoghe in Linnaea 15: 343. 1841. *C. cinnamomea* Lindl. ex Planch. in Ann. Sci. Nat. Bot. ser. III. 10: 303. 1848; Hook. f., Fl. Brit. India 5: 482. 1888. *C. trinervia* Bedd., Fl. Sylv. S. India t. 312. 1873, non Roxb., 1832.

Trees, ca 8 m high; tender parts pubescent. Leaves ovate-elliptic, 6-11 x 3.5-5.5 cm, acute or acuminate at apex, rounded at base, entire or serrate along the upper half, subcoriaceous, more or less glabrous; nerves 1-2 pairs; petioles up to 7 mm long; stipules linear to lanceolate. Flowers in pubescent cymes arranged in racemes; male cymes borne on lower and leafless new shoots, 10-20-flowered; bisexual cymes borne in the axil of

new leaves, 4-7-flowered. Tepals 5, linear. Stamens 5. Drupes ovoid, angular.

Rare. Bastar. *Fl. & Fr.*: March - May.

The wood extract is considered to be antiseptic and blood purifier.

2. HOLOPTELEA Planch.

Trees, deciduous, polygamous. Leaves simple, alternate, entire, penninerved; stipules lateral, scarious. Flowers in fascicles on previous year's, leafless shoots. Perianth 4-8-partite; tepals mostly unequal, imbricate. Stamens usually 6-8, exserted; filaments erect; anthers hairy. Ovary compressed, stipitate; ovule solitary, pendulous; style 2-fid, stigmatic throughout. Fruit a samara, dry, winged; wings membranous or chartaceous, usually reticulate.

Two species; tropical Africa and India; one in M.P.

Holoptelea integrifolia (Roxb.) Planch. in Ann. Sci. Nat. Bot. ser. III. 10: 259. 1848; Hook. *f.* Fl. Brit. India 5: 481. 1888. *Ulmus integrifolia* Roxb., Pl. Coromandel 56. t. 78. 1796-1798 & Fl. Ind. 2: 68. 1832. - *Chilbil*.

Trees, 10-15 m high. Leaves elliptic-ovate, 8-14 x 4-7.5 cm, acute at apex, rounded at base, entire, glabrous, shining, puberulous along the veins beneath; petioles 1-1.5 cm long. Flowers in fascicles, sessile; male and bisexual mixed. Tepals 4, free, pubescent. Stamens 7-8. Samara suborbicular, 2-2.5 cm across; wings membranous, reticulately veined. Seeds flat.

Common on roadsides and around villages. Chhatarpur, Damoh, Indore, Mandla, Sagar, Satna, Seoni, Shivpuri, Sidhi. *Fl. & Fr.*: Jan.- April.

The wood is used as timber for constructing carts, doors, windows, cheap furniture, ploughs, yokes etc. Fruits are sometimes eaten. Decoction of the bark is applied to treat rheumatic swellings.

3. TREMA Lour.

Large shrubs or small trees, monoecious, subdioecious or polygamous; branches usually drooping. Leaves simple, alternate, often unequal, serrate, scabrid above, scabrid or silky pubescent beneath, 3-nerved at base;

stipules lateral, caducous. Flowers in axillary, condensed or lax cymes. Tepals 4-5, subimbricate. Male flowers globose. Stamens 4 or 5, glabrous. Pistillode present or absent. Female flowers ovoid. Ovary sessile; ovule pendulous; style 2-fid, hairy. Fruit a drupe, globose or ovoid, usually tipped by style.

About 15 species; tropical and subtropical regions; 3 in M.P.

- 1a. Leaves equal at base, glabrous beneath ...2. *T. politoria*
- 1b. Leaves unequal at base, tomentose beneath:
- 2a. Leaves covered beneath with long, erect, unicellular and short, appressed, multicellular, glandular hairs; male cymes up to 2.5 cm long; drupes globose ...1. *T. orientalis*
- 2b. Leaves covered beneath with only long, erect, unicellular hairs; male cymes more than 2.5 cm long; drupes ovoid ...3. *T. tomentosa*

1. ***Trema orientalis*** (L.) Blume, Mus. Bot. 2: 62. 1856; Hook. f., Fl. Brit. India 5: 484. 1888. *Celtis orientalis* L., Sp. Pl. 1044. 1753. *Beegh jeebhii*, *Dandami*, *Gio*. **Fig. 98.**

Large shrubs or small trees, sometimes scandent, up to 8 m high. Leaves ovate or elliptic to lanceolate, 6-15 x 2-5.5 cm, acuminate at apex, obliquely cordate at base, serrate, scabrid above, greyish brown tomentose beneath; petioles 5-10 mm long. Flowers in axillary, lax cymes, unisexual, green, 5-merous. Tepals 5, hirsute. Stamens 5. Pistillode present. Drupes globose, 3-5 mm across.

Common on hill slopes and in mixed forests. Balaghat, Bastar, Bilaspur, Hoshangabad, Mandla, Raigarh, Rajnandgaon, Seoni, Shahdol, Surguja. *Fl. & Fr.*: Sept. - Oct.

The wood is used for making tea chests, yokes, match boxes and as charcoal. Stem fibre is used for making ropes. Root extract is given to check diarrhoea and passing blood during urination.

2. ***Trema politoria*** Planch. in Ann. Sci. Nat. Bot. ser. III. 10: 326. 1848; Hook. f., Fl. Brit. India 5: 484. 1888. **Fig. 99.**

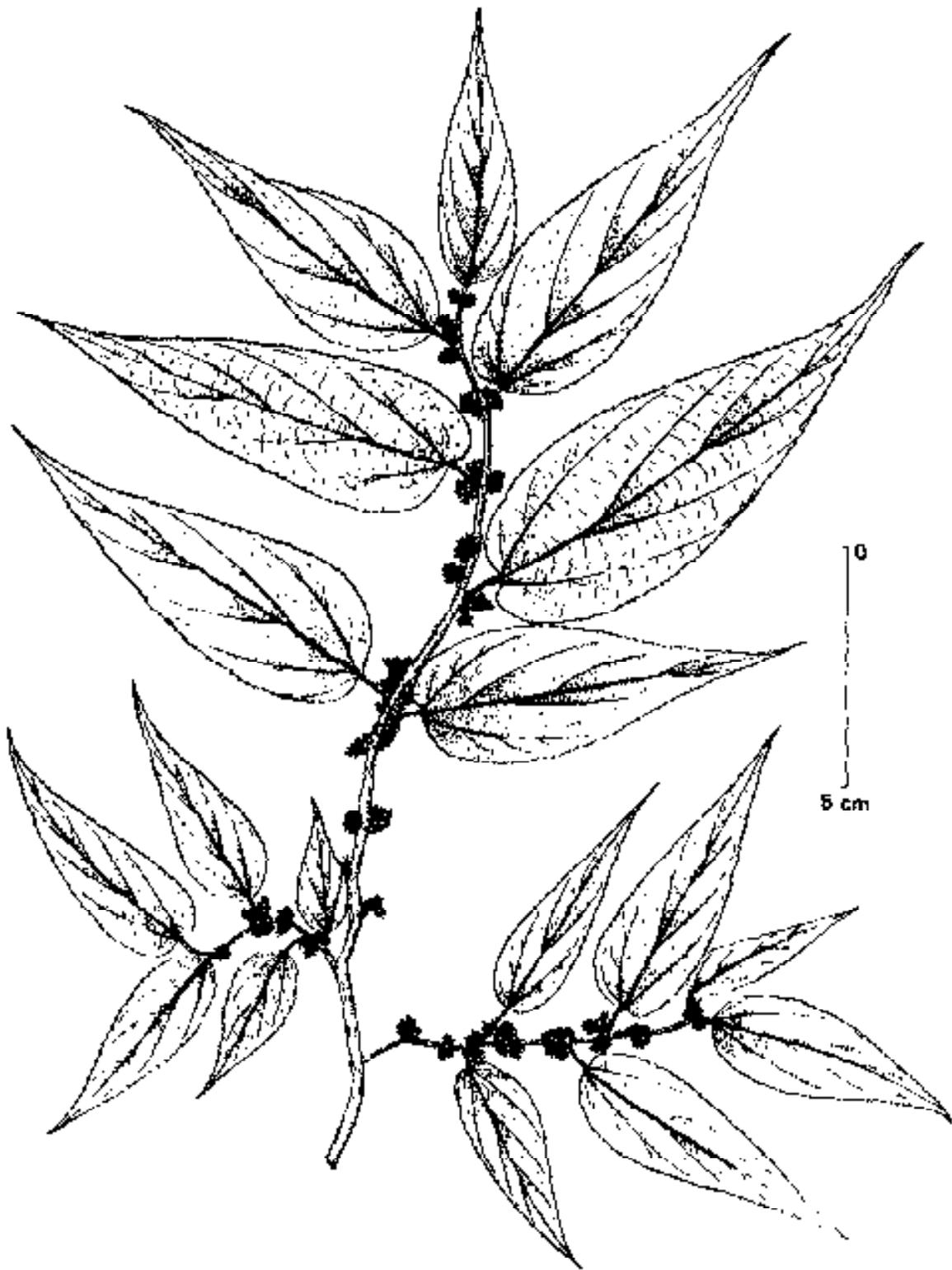


Fig. 98. *Trema orientalis* (L.) Blume



Fig. 99. *Trema politoria* Planch.

Small trees, 4-6 m high; twigs pubescent, scabrid. Leaves oblong or ovate-lanceolate, 4.5-12 x 1.5-4.5 cm, acute or acuminate at apex, equal, rounded or cordate at base, serrulate, shining above, scabrid on both the surfaces; petioles 4-10 mm long. Flowers in axillary cymes, unisexual, 5-merous, bracteate. Tepals 5, hispid, ciliate. Stamens 5. Pistillode present. Drupes ovoid, black.

Common in sandy alluvial soil of mixed forests. Bastar, Bilaspur, Chhindwara, Hoshangabad, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Seoni, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: April - Sept.

Leaves are used as sand paper.

3. *Trema tomentosa* (Roxb.) Hara, *Fl. East. Himal.* 2: 19. 1971. *Celtis tomentosa* Roxb., *Fl. Ind.* 2: 66. 1832. *Trema amboinensis* *unct. non* Willd. (*Celtis amboinensis*), 1806: Blume, *Mus. Bot.* 2: 61. 1856; Hook. *f.*, *Fl. Brit. India* 5: 484. 1888.

Small trees, velvety pubescent, 5-6 m high. Leaves broadly ovate to ovate-elliptic, 8-15 x 4-7 cm, acute to acuminate-caudate at apex, cordate at base, mostly asymmetrical, serrate, coriaceous, strongly scabrid above, tomentose beneath; stipules linear-lanceolate. Flowers in large, compact cymes; male and female ones either on same or on different vegetative branches; bracts ovate, acute. Tepals 4-5, elliptic. Pistillode present, compressed. Drupes ovoid, black when ripe.

Rare. West Nimar. *Fl. & Fr.*: Jan. - Dec.

126. CANNABACEAE*

(K.K. Khanna)

Two genera and 3 species; North temperate regions to S.E. Asia, widely cultivated elsewhere; one species in M.P.

*Often the family has been variously designated as Cannabiaceae, Cannabinaceae, Cannabidaceae and Cannabaceae, while in Append. II B of I.C.B.N. (1994) it has been cited as Cannabaceae, *nom. cons.* and hence, the same orthography has been followed here.

CANNABIS L.

Large herbs, annual, erect, dioecious; stems often angular, pubescent when young. Leaves simple, 3-8-foliolate, opposite or alternate, petiolate, stipulate. Flowers unisexual; male flowers in terminal, paniculate cymes; female flowers axillary, solitary. Male tepals 5, free. Stamens epipetalous, exerted. Pistillode absent. Female flowers enclosed within bracts. Tepals absent. Ovary 1-locular; ovule solitary; stigma 2. Fruit an achene.

A monotypic genus; native of Central Asia, often cultivated.

Cannabis sativa L., Sp. Pl. 1027. 1753; Hook. f., Fl. Brit. India 5: 487. 1888. - *Bhang*.

Herbs, aromatic, branched, 1-1.5 m high. Leaves opposite below, alternate above; leaflets or segments lanceolate, 2-14 x 0.3-2 cm, serrate, glandular pubescent; petioles up to 8 cm long; stipules filiform, 5-6 mm long. Male tepals ciliate. Stamens 5. Female flowers enclosed by membranous, leafy bracts; bracts glandular pubescent. Achenes globose or ovoid, 4-5 mm across, smooth, shining.

Occasionally in wastelands and along roadsides near habitations. Chhatarpur, Indore. *Fl. & Fr.*: March - Nov.

The stem yields fibre used for making ropes, sacs and tarpolin. The plant is highly narcotic. *Bhang*, *Ganja* and *Charas* are obtained from various parts of the plant. Leaves of the plants are used as *bhang* while flowering/fruitle portion of the female plants are used as *ganja*. *Charas* is obtained from the resin of the leaves just before the flowers are formed.

127. MORACEAE

(K.K. Khanna and B.P. Uniyal)

About 48 genera and 1200 species; tropical and subtropical regions, few in temperate zone; 6 genera and 33 species in M.P.

1a. Plants armed

...5. *Plecosperrnum*

1b. Plants unarmed:

- 2a. Flowers enclosed within a hollow,
closed receptacle ...3. *Ficus*
- 2b. Flowers exposed on receptacle:
- 3a. Stamen 1; ovary embedded; seeds large ...1. *Artocarpus*
- 3b. Stamens 4; ovary not embedded; seeds small:
- 4a. Female flowers usually solitary ...6. *Streblus*
- 4b. Female flowers in heads or spikes:
- 5a. Leaves usually glabrous; perianth
fleshy in fruit; style 2-fid ...4. *Morus*
- 5b. Leaves pubescent beneath; perianth
not fleshy in fruit; style undivided ...2. *Broussonetia*

1. ARTOCARPUS J.R. Forster & J.G.A. Forster, *nom. cons.*

Trees, unarmed; sap milky. Leaves simple, alternate, spirally arranged, entire, denticulate or lobed, coriaceous, petiolate, stipulate. Flowers densely crowded on axillary, solitary, globose, oblong or cylindrical, receptacles, unisexual. Male perianth 2-4-lobed. Stamen 1, erect. Pistillode absent. Female perianth tubular, confluent below with the receptacle. Ovary 1-locular. Fruit a syncarp (sorosis), globose or oblong, fleshy. Seeds large.

About 31 species; Indo-Malesia; 2 in M.P.

- 1a. Leaves glabrous; syncarps oblong,
20-50 cm long, tuberculate ...1. *A. heterophyllus*
- 1b. Leaves pubescent beneath; syncarps subglobose,
5-8 cm across, not tuberculate ...2. *A. lakoocha*

1. *Artocarpus heterophyllus* Lam., Encycl. 3: 209. 1789. *A. integrifolia auct. non L. f.*, 1782: King in Hook. f., Fl. Brit. India 5: 541. 1888. - *Kathal*.

Trees, evergreen, 10-15 m high. Leaves obovate or elliptic, 7-16 x 4.5-9 cm, entire, dark green, glossy above, pale beneath, glabrous; stipules large, caducous. Flowers in cylindrical heads; young ones enclosed within leathery, caducous sheath. Male heads clavate or ellipsoid. Perianth 2-lobed.

Female heads with spatulate stigma. Syncarps oblong, 20-50 cm long, tuberculate, stalked, hanging from old branches or on the trunk. Seeds oblong.

Cultivated throughout the state. Bilaspur, Chhatarpur, Surguja. *Fl. & Fr.*: Nov. - June.

Fruits are eaten raw, as vegetable and pickle. Wood is used for various purposes.

2. *Artocarpus lakoocha* Roxb., *Fl. Ind.* 3: 524. 1832; King in Hook. *f.*, *Fl. Brit. India* 5: 543. 1888. - *Barhal*.

Trees, deciduous, 8-10 m high; young parts tomentose. Leaves elliptic, oblong or ovate, 10-18 x 6-10 cm, entire or denticulate, glabrous above, pubescent beneath; stipules caducous. Flowers in axillary, globose or ovoid, shortly stalked heads. Male heads orange-yellow, ovoid. Anthers exserted. Female heads with exserted style. Syncarps subglobose, 5-8 cm across, yellow-orange when ripe, irregularly lobulate, not tuberculate. Seeds oblong.

Cultivated. Bhopal, Indore, Raigarh. *Fl. & Fr.*: March - July.

Fruits are edible. Seeds are purgative while bark infusion is applied to pimples and cracked skin.

2. BROUSSONETIA L' Herit. ex Venten., *nom. cons.*

Trees; sap milky. Leaves simple, alternate, entire, dentate or deeply lobed, pubescent beneath; stipules caducous. Flowers in axillary, solitary, dense, capitate or cylindrical spikes. Male flowers in cylindrical spikes. Perianth 4-lobed. Stamens 4. Pistillode minute. Female flowers in globose heads with persistent bracts. Perianth 3-4-toothed. Ovules pendulous; style excentric, filiform. Fruit an achene, surrounded by bracts and perianth, several arranged on a globose, stipitate receptacle.

About 7 species; E. Asia and Polynesia; one in M.P.

Broussonetia papyrifera Venten., *Tabl. Rogn. Veg.* 3: 547. 1799; Hook. *f.*, *Fl. Brit. India* 5: 490. 1888.

Trees, 8-10 m high; branches pubescent, marked with stipular scars. Leaves obliquely ovate or oblong, 10-25 x 7-15 cm, acuminate at apex, sometimes 3-lobed, dentate, scabrid above, pubescent beneath; petioles 3-5 cm long. Male spikes cylindrical, 5-6 cm long; peduncles pubescent. Female spikes capitate, compact, long pedunculate. Flowers red. Achenes in a head, red, fleshy, shining.

Raipur, Seoni. *Fl. & Fr.*: May - July.

Bark yields fibre while wood is used for umbrella sticks.

3. FICUS L.

Shrubs or trees, straggling or erect, sometimes with aerial roots; sap milky. Leaves simple or palmately lobed, alternate or opposite, decussate (both alternate and opposite in *F. exasperata*), symmetrical or asymmetrical, entire or dentate, glabrous, tomentose or scabrid, petiolate; stipules free or connate. Receptacles (hypanthodia or figs) with flowers on the inner surface, axillary or on leafless branches, solitary, paired or clustered, globose or pyriform, sessile or pedunculate, opening by an apical ostiole; ostiole closed by small, imbricate bracts. Flowers unisexual, of four kinds; male, female, gall and neuter (sterile male); usually male and female flowers together in the same receptacle, sometimes in separate receptacles. Male flowers ostiolar or dispersed. Tepals 2-7, free or connate. Stamens 1-7. Female flowers usually dispersed. Ovary ovoid, globose or ellipsoid, 1-locular; ovule solitary, anatropous; style single; stigma simple or 2-fid. Gall flowers dispersed, each enclosing an insect. Neuter flowers present or absent. Mature syconium smooth or ribbed, rarely splitting through the ostiole. Fruit an achene, white or brown, thinly pulpy.

About 800 species; tropical and subtropical regions especially Indo-Malesia; 25 in M.P.

1a. Receptacles sessile or subsessile:

2a. Leaves caudate-acuminate at apex:

3a. Acumen (apical tail) of leaf longer, 1/3 to 1/2 of the length of lamina

...20. *F. religiosa*

3b. Acumen (apical tail) of leaf shorter, less than 1/3 of the length of lamina:

4a. Leaves up to 5 cm broad:

- 5a. Receptacles 10-12 mm across,
dark bluish purple ...7. *F. concinna*
var. *sessililis*
- 5b. Receptacles 6-8 mm across,
yellowish green ...23. *F. talboti*
- 4b. Leaves more than 5 cm broad:
- 6a. Leaves abruptly caudate at apex;
receptacles depressed at apex ...2. *F. arnottiana*
- 6b. Leaves gradually acuminate at apex;
receptacles not depressed at apex ...21. *F. rumphii*
- 2b. Leaves otherwise at apex:
- 7a. Leaves densely whitish brown tomentose beneath ...16. *F. mollis*
- 7b. Leaves glabrous or puberulous:
- 8a. Receptacles 15-25 mm across,
yellow, orange or red on ripening:
- 9a. Plants liana; receptacle solitary ...5. *F. benjamina*
var. *nuda*
- 9b. Plants erect; receptacles paired:
- 10a. Leaves obtuse at apex; receptacles
globose, glabrous or puberulous
when young ...4. *F. benghalensis*
- 10b. Leaves shortly acuminate at
apex; receptacles oblong to
obovate, densely tomentose
when young ...9. *F. drupacea*
var. *pubescens*
- 8b. Receptacles 7-12 mm across, pink, purple,
black or cream-coloured on ripening:
- 11a. Receptacles in clusters; basal
bracts cupular ...8. *F. cupulata*
- 11b. Receptacles paired;
basal bracts not cupular:
- 12a. Aerial roots present, forming
pillar-roots; basal nerves of
leaves prominent; cystolith on
both the surfaces of lamina ...15. *F. microcarpa*

- 12b. Aerial roots absent, if present then not forming pillar-roots; basal nerves of leaves not prominent; cystolith only on one surface of lamina:
- 13a. Cystolith only on upper surface of lamina; receptacles pink to purple on ripening; bracts scarious; tepals 2-3 ...1. *F. amplissima*
- 13b. Cystolith only on lower surface of lamina; receptacles cream-coloured on ripening; bracts not scarious; tepals 4 ...25. *F. virens*
- 1b. Receptacles distinctly pedunculate:
- 14a. Leaves opposite, decussate ...13. *F. hispida*
- 14b. Leaves alternate, rarely opposite:
- 15a. Leaves obliquely semisaggitate or cordate at base ...22. *F. semicordata*
- 15b. Leaves otherwise at base:
- 16a. Scandent or straggling shrubs:
- 17a. Leaves ovate-elliptic or subrhomboid, young ones never lobed; receptacles globose or pyriform, up to 12 mm across:
- 18a. Leaves equilateral; receptacles greenish yellow on ripening ...11. *F. fruticosa*
- 18b. Leaves inequilateral; receptacles golden yellow-red on ripening ...24. *F. tinctoria*
- 17b. Leaves variable, young ones 3 to many-lobed; receptacles ellipsoid, 12-22 mm long ...12. *F. heterophylla*
- 16b. Erect shrubs or trees:
- 19a. Receptacles in clusters:
- 20a. Shrubs; leaves lanceolate, acuminate at apex ...14. *F. lanceolata*

- 20b. Trees; leaves ovate-oblong,
obtuse or acute at apex ...19. *F. racemosa*
- 19b. Receptacles solitary or paired:
- 21a. Leaves inequilateral, often gibbose
on one side ...24. *F. tinctoria*
- 21b. Leaves equilateral, never gibbose:
- 22a. Leaves glabrous beneath; male
and female flowers in same receptacle:
- 23a. Receptacles bright green ...3. *F. beddomei*
- 23b. Receptacles yellow-red ...17. *F. nervosa*
- 22b. Leaves tomentose beneath; male
and female flowers in separate receptacles:
- 24a. Leaves 3-5-lobed; receptacles
2.5-3.5 cm across ...6. *F. carica*
- 24b. Leaves usually not lobed;
receptacles up to 2 cm across:
- 25a. Leaves ovate or oblong-
elliptic, up to 10 cm broad,
subcoriaceous, scabrid
above ...10. *F. exasperata*
- 25b. Leaves broadly ovate or
orbicular, 11-19 cm broad,
membranous, not scabrid ...18. *F. palmata*

1. *Ficus amplissima* Sm. in Rees, Cycl. 14: n. 68. 1810; Corner in Gard. Bull. Singapore 18: 84. 1961. *F. tsiela* Roxb. ex Buch.-Ham. in Trans. Linn. Soc. Bot. 15: 149. 1826; King in Hook. f. Fl. Brit. India 5: 515. 1888. *F. indica* Willd., Sp. Pl. 4: 1146. 1806.

Trees, deciduous, spreading; aerial roots absent. Leaves spirally arranged, ovate or elliptic-lanceolate, 7-15 x 4-9 cm, acute or obtusely cuspidate at apex, rounded to cuneate at base, coriaceous, stipulate; cystolith only on upper surface. Receptacles axillary and on the twigs below leaves, paired, sessile, globose to pyriform, pink to purple on ripening, puberulous to villous; basal bracts white. Male flowers few. Tepals 2 in pedicellate flowers, 3 in sessile flowers. Female flowers sessile. Gall flowers pedicellate.

Rare. In villages. Bastar, Raipur. *Fl. & Fr.*: Dec. Feb.

Bark is used to treat colic pain while wood is used for making toys and posts.

2. *Ficus arnottiana* (Miq.) Miq., Ann. Mus. Lugd.-Bat. 3: 287. 1867; King in Hook. *f.*, Fl. Brit. India 5: 513. 1888; Corner in Gard. Bull. Singapore 21: 11. 1965. *Urostigma arnottianum* Miq. in Hook., Lond. J. Bot. 6: 564. 1847. - *Paras-pipal*.

Trees, up to 18 m high. Leaves alternate, broadly ovate, 6-17 x 5-15 cm, caudate-acuminate at apex, cordate at base, entire, subcoriaceous, glabrous, stipulate, long petiolate. Receptacles in axillary pairs or clustered on tubercles, sessile or subsessile, globose, red to purple, glabrous; basal bracts 3. Male flowers sessile, few near the ostiole of receptacle. Stamen 1. Female and gall flowers sessile or pedicellate. Achenes smooth.

Common in mixed forests amidst rocky boulders and along the drains. Bilaspur, Mandla, Panna, Satna, Seoni, Shahdol, Sidhi. *Fl. & Fr.*: Feb. April.

Wood is used for making charcoal.

3. *Ficus heddomei* King in Ann. Royal Bot. Gard. Calcutta 1: 26. t. 24. 1887 & in Hook. *f.*, Fl. Brit. India 5: 502. 1888. **Fig. 100.**

Trees, up to 15 m high. Leaves alternate, broadly elliptic to ovate, 12-20 x 8-14 cm, abruptly acuminate at apex, truncate to broadly acute at base, entire to sinuate, coriaceous; stipules foliaceous, caducous. Receptacles axillary, paired, pedunculate, globose, bright green; basal bracts 3, ovate-lanceolate, reflexed, persistent; internal bristles linear, glabrous. Male and female flowers mixed and spread throughout. Tepals brown, 3-4, unequal, glabrous. Stamen 1. Gall flowers similar. Achenes obovoid, smooth.

Rare. In moist deciduous forests. Mandla. *Fl. & Fr.*: Jan. April.

4. *Ficus benghalensis* L., Sp. Pl. 1059. 1753; King in Hook. *f.*, Fl. Brit. India 5: 499. 1888; Corner in Gard. Bull. Singapore 17: 381. 1959. *Urostigma bengalense* Gasp., Nov. Gen. Fic. 7. 1844. - *Bad, Bar, Bargad, Bat*.

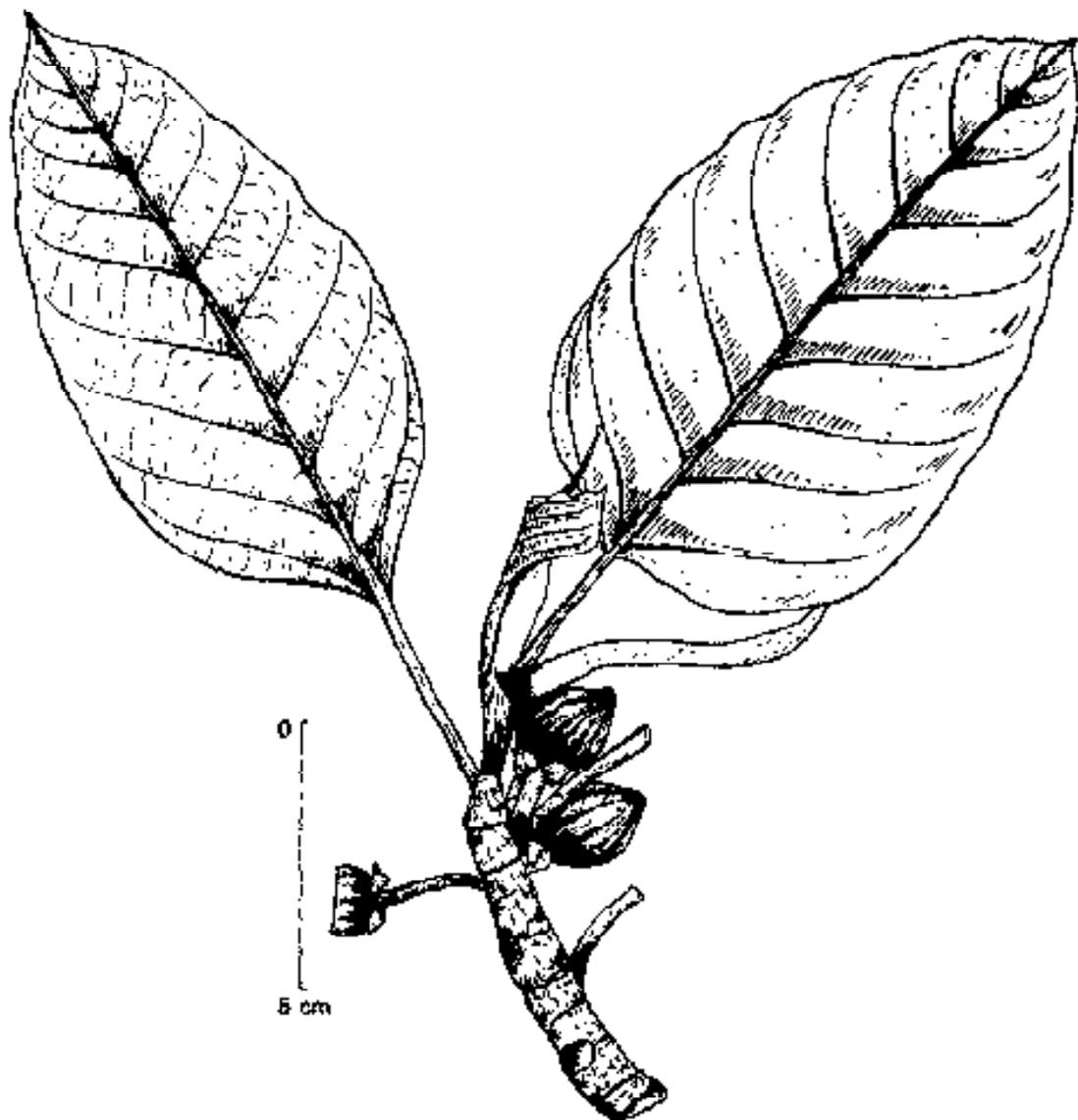


Fig. 100. *Ficus beddomei* King

Trees, 10-15 m high, evergreen; aerial roots forming prop roots. Leaves alternate, elliptic to ovate, 10-20 x 6-12 cm, obtuse at apex, rounded at base, entire, coriaceous, glabrous above, puberulous beneath, with abundant cystolith. Receptacles axillary, paired, sessile, globose, 1.5-2 cm across, red on ripening; basal bracts 3. Male flowers numerous, near the ostiole of receptacle. Tepals 3. Stamen 1. Female flowers sessile. Galls flowers pedicellate. Achenes globose-ellipsoid.

- 1a. Leaves not cupuliform, bases not joined together ...4.1. var. *benghalensis*
 1b. Leaves cupuliform, bases joined together forming a cup like structure ...4.2. var. *krishnae*

4.1. var. *benghalensis*

Common throughout the state on roadsides, in rural areas and secondary forests. Bastar, Bilaspur, Chhatarpur, Damoh, Hoshangabad, Indore, Panna, Raigarh, Raipur, Rewa, Sagar, Satna, Seoni, Sidhi, Surguja, Tikamgarh, West Nimar. *Fl. & Fr.*: Throughout the year.

The plant is worshipped. The bark is tonic, astringent, and used to treat dysentery, diarrhoea and diabetes. Latex is used to treat indigestion, sexual diseases, rheumatism, lumbago and toothache while shoot as tonic. Leaves are applied as poultice to abscess. Ripe figs are edible.

4.2. var. *krishnae* (C. DC.) Corner in Gard. Bull. Singapore 21: 14. 1965. *F. krishnae* C. DC. in Bot. Mag. t. 8092. 1906. - *Krishnabat, Makhankatori*.

Cultivated in gardens. Indore. *Fl. & Fr.*: Oct. - Jan.

5. *Ficus benjamina* L. var. *nuda* (Miq.) Barrett in Amer. Midl. Naturalist 45: 127. 1951. *Urostigma nudum* Miq. in Hook., Lond. J. Bot. 6: 584. 1847. *Ficus benjamina* L. var. *comosa* (Roxb.) Kurz, Forest Fl. Burma 2: 446. 1877; King in Hook. f., Fl. Brit. India 5: 508. 1888. *F. comosa* Roxb., Pl. Coromandel 2: 14. t. 125. 1799.

Liana. Leaves alternate, elliptic or ovate-elliptic, 5.5-10 x 2.5-5 cm, acute or acuminate at apex, cuneate or rounded at base, entire, coriaceous, glabrous; petioles 1.5-2 cm long; stipules lanceolate, 0.8-1 cm long.

Receptacles solitary, sessile or with a short, thick peduncle, subglobose to pyriform, yellow to orange on ripening. Male flowers shortly pedicellate, abundant. Stamen 1. Female flowers sessile. Gall flowers pedicellate.

Liana on mango trees, usually on bank of drains and in rocky forests. Bastar, Bilaspur, Raigarh, Surguja. *Fl. & Fr.*: Feb. - April.

6. *Ficus carica* L., Sp. Pl. 1059. 1753. - Anjir.

Small trees, much branched; branchlets slightly hispid or pubescent. Leaves alternate, deltoid, 3-5-lobed, 12-25 x 6-14 cm, cordate at base, serrate or dentate, coriaceous, scabrid, tomentose beneath; stipules small. Receptacles axillary, solitary or paired, globose, 2.5-3.5 cm across, yellowish purple on ripening. Male receptacles apple-shaped or spheroidal, on longer peduncles. Female receptacles pyriform, on short peduncles.

An European fig on roadsides and often cultivated in gardens for edible figs. Hoshangabad, Indore. *Fl. & Fr.*: Jan. - Oct.

Figs are nutritive and laxative. Leaves are used as fodder.

7. *Ficus concinna* Miq. var. *subsessilis* Corner in Gard. Bull. Singapore 17: 376. 1959. *F. subpedunculata* Miq., Ann. Mus. Lugd.-Bat. 3: 217, 286. 1867. *F. glabella auct. non* Blume, 1825: King in Hook. *f.*, Fl. Brit. India 5: 511. 1888, *p.p.*

Trees; young parts glabrous or pubescent. Leaves obovate-oblong or oblanceolate, 5-12 x 3-5 cm, abruptly acuminate or caudate at apex, acute or cuneate at base, entire, subcoriaceous, 3-nerved at base; petioles 2-2.5 cm long, glabrous; stipules ovate-lanceolate. Receptacles axillary, paired, from the scars of fallen leaves, sessile or subsessile, globose or pyriform, 10-12 mm across, dark bluish purple, smooth. Male flowers sessile. Tepals 2 in male flowers, 4 in female flowers. Female and gall flowers sessile or shortly pedicellate. Achenes ovoid or spherical.

Rare. Bastar. *Fl. & Fr.*: April - June.

8. *Ficus cupulata* Haines in Kew Bull. 1914: 155. 1914. - Akai-bat.

Shrubs or trees, 2-4 m high; bark wrinkled, tomentose; aerial roots absent. Leaves alternate, ovate, 10-13 x 4-5 cm, cuspidate-obtuse at apex,

cordate at base, entire, puberulous; basal nerves 5; petioles 3-4 cm long; stipules up to 2 cm long. Receptacles in clusters, sessile, subglobose, ca 1 cm across, purple on ripening, pubescent when young; basal bracts cupular, 2-3-lobed. Male and gall flowers in one receptacle. Tepals 4. Female flowers in separate receptacle. Tepals 3-4. Achenes tuberculate.

Rare. Endemic. Amidst sandstone rocks. Hoshangabad (Haines, 1914).
Fl. & Fr.: Feb. - Aug.

9. *Ficus drupacea* Thunb. var. *pubescens* (Roth) Corner in Gard. Bull. Singapore 17: 380. 1959. *F. mysorensis* Heyne ex Roth in Roem. & Schult., Syst. Veg. 1: 508. 1817; King in Hook. f., Fl. Brit. India 5: 500. 1888. *F. mysorensis* var. *pubescens* Roth in Roem. & Schult., Syst. Veg. 1: 508. 1817; King in Hook. f., Fl. Brit. India 5: 500. 1888.

Large trees; bark grey or brownish, smooth; young branchlets and petioles brown hairy. Leaves subdistichous to spiral, elliptic-ovate or obovate, 10-20 x 6-10 cm, shortly acuminate at apex, truncate-cordate at base, coriaceous; cystolith on both the surfaces; basal nerves 3; lateral nerves 10-14 pairs; petioles 2-3 cm long. Receptacles axillary, paired, sessile, oblong to obovate, ca 2.5 cm long, yellow to dull red, densely tomentose when young, covered with a stout conical tomentose stipule at first; basal bracts ovate, densely brown pilose, caducous. Male flowers pedicellate. Tepals 3-4, free. Female flowers sessile. Achenes smooth.

Rare. Sagar. *Fl. & Fr.*: Feb. - May.

10. *Ficus exasperata* Vahl, Enum. Pl. 2: 197. 1805; Corner in Gard. Bull. Singapore 21: 74. 1965. *F. asperrima* Roxb., Fl. Ind. 3: 554. 1832; King in Hook. f., Fl. Brit. India 5: 522. 1888.

Small trees, 5-8 m high. Leaves usually alternate, rarely opposite, ovate or oblong-elliptic, 12-18 x 7-10 cm, acute to acuminate at apex, cuneate at base, entire to sparingly dentate, subcoriaceous, scabrid above, tomentose beneath, stipulate; petioles up to 1 cm long. Receptacles axillary, solitary, pedunculate, globose, yellow on ripening; basal bracts 2-3. Male flowers sessile. Tepals 5, white, free. Stamen 1. Female flowers sessile. Gall flowers sessile to pedicellate. Achenes oblong.

Rare. In mixed forests. Hoshangabad. *Fl. & Fr.*: Feb. - April.

11. *Ficus fruticosa* Roxb., Fl. Ind. 3: 533. 1832; Merr. in Brittonia 4: 44. 1941. *F. hederacea* Roxb., Fl. Ind. 3: 538. 1832; Corner in Gard. Bull. Singapore 21: 58. 1965. *F. scandens* Roxb., Fl. Ind. 3: 536. 1832, non Lam., 1788; King in Hook. f., Fl. Brit. India 5: 526. 1888.

Scandent shrubs. Leaves alternate, ovate or elliptic, 5-8 x 3-5 cm, acute at apex, rounded at base, scabrid above, pubescent beneath; petioles ca 1 cm long. Receptacles solitary or paired, pedunculate, globose, ca 8 mm across, greenish yellow on ripening; basal bracts 3, persistent. Male flowers sessile, usually near the ostiole. Tepals 4, linear or lanceolate. Female flowers in separate receptacle.

Rare. Jabalpur (Hole, 1904). Fl. & Fr.: Aug. - Dec.

12. *Ficus heterophylla* L. f., Suppl. Pl. 442. 1782; King in Hook. f., Fl. Brit. India 5: 518. 1888; Corner in Gard. Bull. Singapore 21: 73. 1965.

Fig. 101.

Shrubs, ca 3 m high; branches often prostrate. Leaves alternate, distichous, elliptic-oblong, ovate or lanceolate, 3-8 x 1-3.5 cm, acute or shortly acuminate at apex, rounded at base, subentire or dentate, young ones 3 to many-lobed, membranous to subcoriaceous, scabrid, petiolate, stipulate. Receptacles axillary, solitary, pedunculate, ellipsoid, 12-22 x 8-15 mm, orange to red on ripening. Male flowers sessile. Gall flowers pedicellate. Achenes subcompressed, slightly keeled.

In mixed forests. Bastar, Raipur. Fl. & Fr.: May - June.

13. *Ficus hispida* L. f., Suppl. Pl. 442. 1782; King in Hook. f., Fl. Brit. India 5: 522. 1888; Corner in Gard. Bull. Singapore 21: 89. 1965. *F. oppositifolia* Roxb., Pl. Coromandel 2: 14. t. 124. 1799. *F. daemonia* Koenig ex Vahl, Enum. Pl. 2: 198. 1805. - *Bhuin-gular*, *Dadhuri*.

Shrubs or trees, hispid, 2-6 m high. Leaves opposite, decussate, ovate or oblong-elliptic, 8-23 x 4-10 cm, abruptly acute at apex, rounded or truncate at base, entire or minutely dentate, coriaceous, scabrid, hispid beneath; petioles 2-4 cm long. Receptacles on leafless, hanging twigs and arising in clusters from the trunk and main branches, depressed globose, pale yellow on ripening. Male flowers in 2 rows. Stamen 1. Female flowers sessile or pedicellate. Gall flowers sessile or pedicellate. Achenes lenticular.



Fig. 101. *Ficus heterophylla* L. f.

Common on roadsides, in fields and sal forests. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, East Nimar, Hoshangabad, Raigarh, Raipur, Rewa, Seoni, Sidhi. *Fl. & Fr.*: Jan. - June.

Ripe figs are edible. Figs, seeds and bark are purgative and emetic.

14. *Ficus lanceolata* Buch.-Ham. ex Roxb., *Fl. Ind.* 3: 557. 1832; King in Hook. *f.*, *Fl. Brit. India* 5: 536. 1888.

Shrubs, much branched, glabrous, ca 2 m high. Leaves alternate, lanceolate, 13-19 x 5-10 cm, acuminate at apex, rounded at base, entire or remotely dentate, dotted beneath, petiolate. Receptacles in dense clusters on woody branchlets, pedunculate, pyriform, red when young, with white warts; basal bracts 3, minute. Tepals 3-4 in male flowers, 3-toothed in female and gall flowers. Achenes obliquely ovoid, granulate.

Rare. On bank of drains, Surguja. *Fl. & Fr.*: April - June.

15. *Ficus microcarpa* L. *f.*; *Suppl. Pl.* 442. 1782; Corner in *Gard. Bull. Singapore* 17: 397. 1959 & 21: 22. 1965. *F. retusa* auct. non L., 1767; King in Hook. *f.*, *Fl. Brit. India* 5: 511. 1888.

Trees, evergreen; 8-10 m high; aerial roots forming prop roots. Leaves alternate, spirally arranged, elliptic-ovate or rhomboid, 4-8 x 3-5.5 cm, acute or obtuse at apex, cuneate at base, entire or undulate, glabrous or puberulous, petiolate, stipulate. Receptacles axillary, paired, sessile, globose, ca 1 cm across, pink to mauve-purple, black on ripening. Male flowers numerous. Tepals 3. Stamen 1. Female flowers sessile. Gall flowers similar to female ones, pedicellate. Achenes smooth.

Common in mixed forests, on hill slopes and in rock crevices. Bastar, Bilaspur, Chhatarpur, Mandla, Panna, Raigarh, Raipur, Sagar, Seoni, Surguja. *Fl. & Fr.*: March - Oct.

Figs are edible. Bark is used to treat liver diseases.

16. *Ficus mollis* Vahl, *Symb. Bot.* 1: 82. 1790; Corner in *Gard. Bull. Singapore* 21: 14. 1965. *F. tomentosa* Roxb. ex Willd., *Sp. Pl.* 4: 1136. 1806; King in Hook. *f.*, *Fl. Brit. India* 5: 501. 1888.

Trees, 8-12 m high; aerial roots often present. Leaves alternate, spirally arranged, ovate-elliptic or oblong, 8-18 x 4.5-12 cm, acute at apex, cordate

or rounded at base, entire, subcoriaceous, whitish brown tomentose beneath. Receptacles axillary, paired or clustered, rarely solitary, sessile, globose, brown, tomentose. Male flowers dispersed, subsessile. Stamen 1. Female flowers sessile. Gall flowers sessile or pedicellate. Achenes smooth.

In rock crevices, on hill slopes, roadsides, in forests as well as in sal forest clearings. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Gwalior, Hoshangabad, Mandla, Panna, Raipur, Rewa, Sagar, Satna, Seoni, Shahdol, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: April - June.

Fruits are edible.

17. *Ficus nervosa* Heyne ex Roth in Roem. & Schult., Syst. Veg. 1: 513. 1817; King in Hook. f., Fl. Brit. India 5: 512. 1888. *Urostigma modestum* Miq. in Hook., Lond. J. Bot. 6: 586. 1847. *Ficus modesta* Miq., Ann. Mus. Lugd.-Bat. 3: 263, 286. 1867. *F. angustifolia* Roxb., Fl. Ind. 3: 554. 1832.

Large trees, up to 20 m high. Leaves alternate, broadly elliptic-ovate or oblanceolate, 8-16 x 4-8 cm, acuminate at apex, rounded to acute at base, entire, subcoriaceous, glabrous, shining above; lateral nerves 8-10 pairs; petioles glandular at base; stipules ovate-lanceolate. Receptacles axillary, solitary or paired, pedunculate, subglobose to pyriform, yellow-red on ripening; internal bristles absent. Male flowers pedicellate, mostly towards ostiole. Tepals 3, lanceolate, glabrous, brown. Stamen 1. Female flowers sessile. Gall flowers pedicellate. Achenes smooth.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Feb. - March.

18. *Ficus palmata* Forssk., Fl. Aegypt.-Arab. 179. 1775; King in Hook. f., Fl. Brit. India 5: 530. 1888. *F. caricoides* Roxb., Fl. Ind. 3: 529. 1832. *F. virgata* Roxb., Fl. Ind. 3: 530. 1832. - Anjir.

Small trees, 2-3 m high; branches pubescent. Leaves broadly ovate or orbicular, sometimes 3-5-lobed, 12-24 x 11-19 cm, acute or apiculate at apex, cordate at base, denticulate, membranous, tomentose. Receptacles axillary, solitary, pedunculate, subglobose or pyriform, ca 2 cm across, yellow-purple on ripening, tomentose. Male flowers on hairy pedicels. Tepals 5. Stamens 2. Female and gall flowers sessile or pedicellate. Achenes 3-angled.

Along roadsides, often planted. Bilaspur, Chhatarpur, Damoh, Dhar, Rajnandgaon. *Fl. & Fr.*: June - Sept.

Fruits are edible.

19. *Ficus racemosa* L., Sp. Pl. 1060. 1753; Corner in Gard. Bull. Singapore 21: 34. 1965. *F. glomerata* Roxb., Pl. Coromandel 2: 13. t. 123. 1799; King in Hook. f., Fl. Brit. India 5: 535. 1888. *Gular, Umar.*

Trees, 6-10 m high; young branches hairy. Leaves alternate, ovate-oblong, 6-15 x 3-6 cm, obtuse or acute at apex, rounded or acute at base, entire, subcoriaceous, smooth, glabrous, stipulate. Receptacles in clusters on main branches of trunk or on leafless branches, pedunculate, subglobose or pyriform, 2-3 cm across, green to red. Male flowers sessile, in 2-3 rings near the ostiole. Stamens 2. Female flowers sessile or shortly pedicellate. Gall flowers long pedicellate. Achenes lenticular.

In wastelands and mixed forests, on the bank of drains and rivers. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Hoshangabad, Jabalpur, Jhabua, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Rewa, Sagar, Satna, Seoni, Shivpuri, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: Feb. - Sept.

The plant is considered sacred. Root is used to treat dysentery and diabetes while bark to stop bleeding. Latex is used to treat diarrhoea and piles, while leaves in bilious affections. Figs are stomachic, carminative and edible.

20. *Ficus religiosa* L., Sp. Pl. 1059. 1753; King in Hook. f., Fl. Brit. India 5: 513. 1888; Corner in Gard. Bull. Singapore 21: 6. 1965. *F. peepul* Griff., Not. Pl. Asiat. 4: 393. 1854. - *Peepal, Pipar.*

Trees, deciduous, 10-20 m high. Leaves alternate, broadly ovate, 8-16 x 6-13 cm, caudate-acuminate at apex, with 2-9 cm long acumen, truncate at base, undulate, coriaceous, shining, glabrous; petioles 4-8 cm long. Receptacles axillary, paired, sessile, subglobose, ca 1 cm across, pink-purple on ripening. Male flowers few, sessile, near the ostiole. Tepals 2. Stamen 1. Female and gall flowers sessile. Tepals 3-4. Achenes smooth.

Common throughout the state on roadsides, bank of drains and rivers, in fields, villages and sometimes in forests. Balaghat, Bhopal, Chhatarpur,

Damoh, Indore, Jabalpur, Panna, Raigarh, Raipur, Rajnandgaon, Shivpuri, Sidhi, Surguja, West Nimar. *Fl. & Fr.*: April - Sept.

The tree is considered sacred and worshipped. Figs are laxative and used to treat asthma; latex as tonic; bark for gonorrhoea and scabies while leaves to antidote snake bite.

21. *Ficus rumphii* Blume, Bijdr. 437. 1825; King in Hook. *f.*, Fl. Brit. India 5: 512. 1888; Corner in Gard. Bull. Singapore 21: 11. 1965. *F. cordifolia* Roxb., Fl. Ind. 3: 548. 1832, *non* Blume, 1825. **Fig. 102.**

Deciduous trees, up to 10 m high. Leaves ovate or ovate-oblong, 10-14 x 7-9 cm, gradually acuminate at apex, truncate or cordate at base, entire, subcoriaceous, glabrous, petiolate, stipulate. Receptacles axillary, paired, sessile, globose, more or less black on ripening, glabrous or puberulous; basal bracts 3. Male flowers few, near the ostiole. Tepals 3. Stamen 1. Achenes minutely tuberculate.

On roadsides. Bilaspur, Raigarh. *Fl. & Fr.*: March - July.

Fruits are edible.

22. *Ficus semicordata* Buch.-Ham. ex Sm. in Rees, Cycl. 14: n. 71. 1810, *non* Miq., 1867. *F. cunia* Buch.-Ham. ex Roxb., Fl. Ind. 3: 561. 1832; King in Hook. *f.*, Fl. Brit. India 5: 523. 1888. - *Bhuin gular*, Doomar, Ghwi. **Fig. 103.**

Trees, 6-8 m high; young parts hirsute. Leaves alternate, oblong or elliptic-lanceolate, 12-35 x 5-11 cm, acute or acuminate at apex, unequally semisagittate or cordate at base, entire or serrate, smooth or scabrid above, pubescent beneath, petiolate, stipulate. Receptacles paired or in clusters on long, leafless branches arising from main trunk, globose or pyriform, 1-2 cm across, reddish brown and ribbed on ripening, hispid; basal bracts 3. Male and gall flowers shortly pedicellate. Tepals 3. Stamen 1. Female flowers sessile or shortly pedicellate. Ovary globose. Achenes ovoid, tuberculate.

In mixed forests, on hill slopes and along drains. Balaghat, Bastar, Bilaspur, Mandla, Raigarh, Raipur, Rajnandgaon, Sidhi, Surguja. *Fl. & Fr.*: Throughout the year.

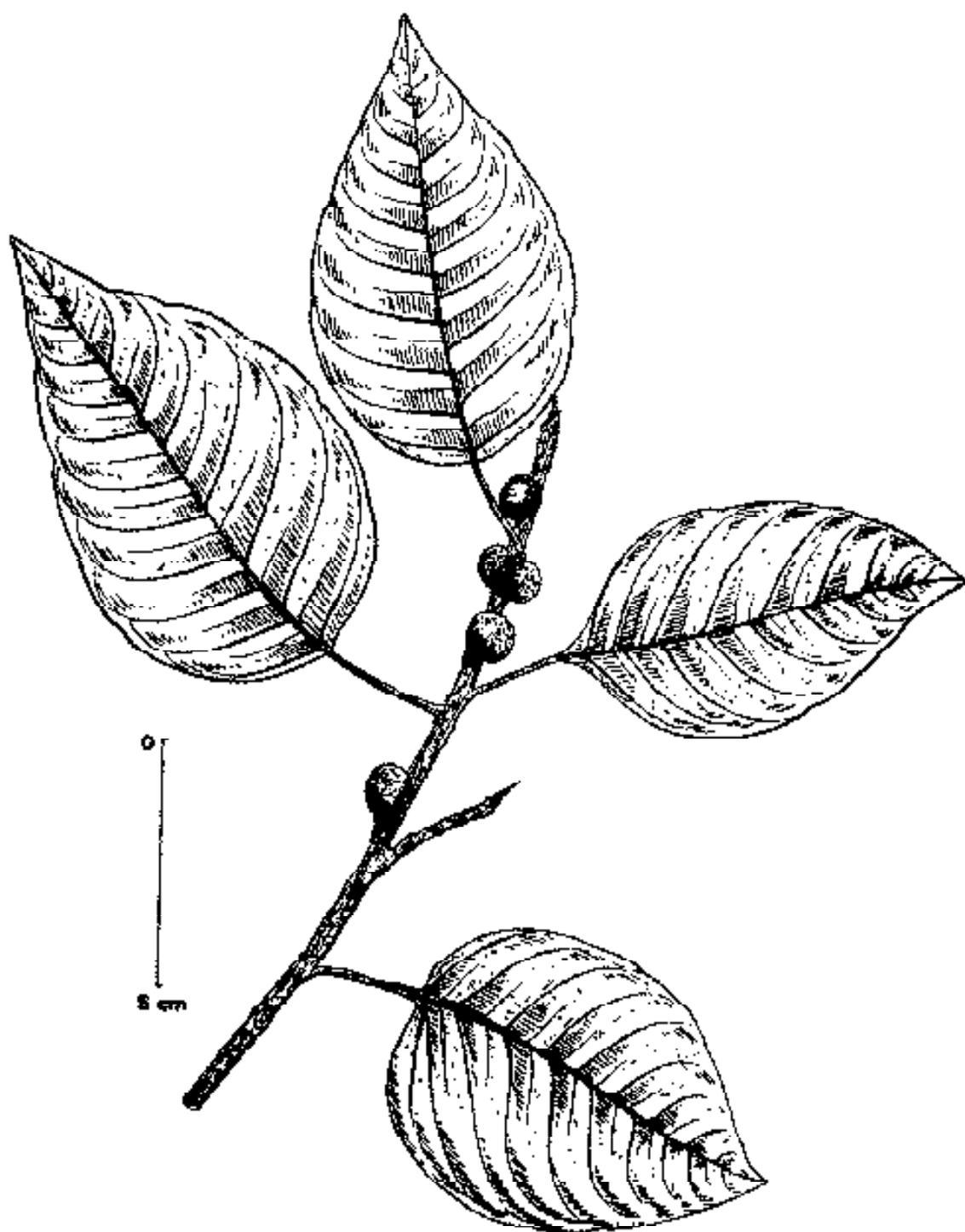


Fig. 102. *Ficus rumphii* Blume

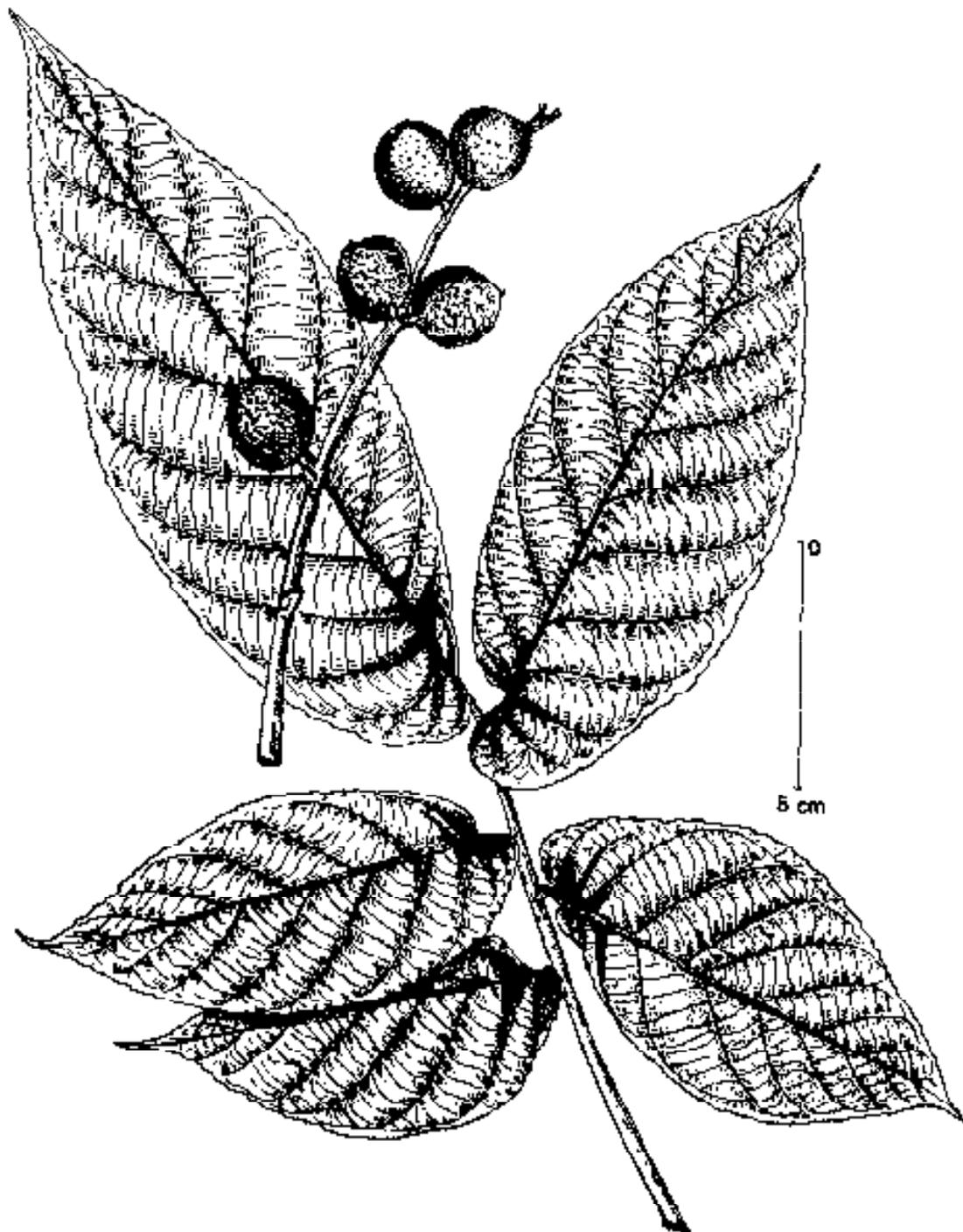


Fig. 103. *Ficus semicordata* Buch.-Ham. ex Sm.

Ripe figs are edible. Necklace of figs are tied to children's neck whose eyes are swollen and red.

23. *Ficus talboti* King in Ann. Royal Bot. Gard., Calcutta 1: t. 63. 1887 & in Hook. f., Fl. Brit. India 5: 512. 1888; Corner in Gard. Bull. Singapore 21: 19. 1965.

Trees. Leaves alternate, ovate-elliptic or oblong, 8-12 x 3-5 cm, abruptly acuminate at apex, acute at base, entire, subcoriaceous, glabrous. Receptacles axillary, paired, sessile, depressed globose, 6-8 mm across, yellowish green. Male flowers dispersed. Tepals 3-4. Stamen 1. Female flowers sessile. Gall flowers pedicellate. Achenes smooth.

Rare. Jhabua (Samvatsar, 1996). *Fl. & Fr.*: Dec. - Feb.

24. *Ficus tinctoria* G. Forster, Fl. Ins. Austr. 76. 1786.

Large shrubs or trees; erect or straggling, epiphytic when young; aerial roots present; twigs usually glabrous, sometimes pubescent towards apex. Leaves alternate, oblong, elliptic-lanceolate or subrhomboid, 5-15 x 2-7 cm, acute or acuminate at apex, cuneate at base, usually unequal, entire or lobed, coriaceous or subcoriaceous, smooth or scabrid, distinctly 3-nerved; petioles 4-10 mm long. Receptacles axillary, solitary or paired, pedunculate, globose, 8-12 mm across, orange or golden yellow-red on ripening, glabrous. Male flowers sessile or shortly pedicellate. Stamen 1. Female and gall flowers sessile. Achenes compressed.

1a. Plants erect ...24.1. subsp. *gibbosa*

1b. Plants straggling ...24.2. subsp. *parasitica*

24.1. subsp. *gibbosa* (Blume) Corner in Gard. Bull. Singapore 17: 476. 1959 var. *gibbosa*. *F. gibbosa* Blume, Bijdr. 466. 1825; King in Hook. f., Fl. Brit. India 5: 496. 1888.

Rare. Bilaspur, Sidhi. *Fl. & Fr.*: July - Dec.

24.2. subsp. *parasitica* (Willd.) Corner in Gard. Bull. Singapore 17: 476. 1959. *F. parasitica* Willd. in Mem. Acad. R. Sci. Berlin 2: 102. 1798. *F. gibbosa* Blume var. *parasitica* (Willd.) King in Ann. Royal Bot. Gard. Calcutta 1: 6, t. 2 a-b. 1887 & in Hook. f., Fl. Brit. India 5: 497. 1888.
Kama.

On sandy alluvial soil along roadsides, in mixed and sal forests, often straggling on *Butea* sp. and *Ficus religiosa*. Balaghat, Bastar, Bilaspur, Damoh, Hoshangabad, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni, Sidhi, Surguja. *Fl. & Fr.*: June - Nov.

The leaves are used as sand paper.

25. *Ficus virens* Dryander in Aiton, Hortus Kew. 3: 451. 1789; Corner in Gard. Bull. Singapore 17: 376. 1959 & 21: 9. 1965. *F. infectoria* Roxb., Fl. Ind. 3: 551. 1832, non Willd., 1806; King in Hook. f., Fl. Brit. India 5: 515. 1888. - *Gasti, Pakar*.

Trees, deciduous, 6-10 m high; aerial roots from the branches. Leaves alternate, oblong-ovate, oblong-elliptic or elliptic to obovate, 6-15 x 3.5-9 cm, abruptly acuminate at apex, rounded, truncate or cuneate at base, entire, glabrous; petioles 4-6 cm long; stipules broadly ovate, ca 1 cm long, puberulous. Receptacles axillary, paired, sessile or subsessile, globose, white to cream-coloured on ripening. Male flowers shortly pedicellate. Tepals 4. Stamen 1. Female flowers sessile. Gall flowers pedicellate. Achenes smooth.

- 1a. Leaves elliptic to obovate, cuneate at base; receptacles sessile ...25.1. var. *glabella*
- 1b. Leaves oblong-ovate or oblong-elliptic, rounded or truncate at base; receptacles subsessile ...25.2. var. *virens*

25.1. var. *glabella* (Blume) Corner in Gard. Bull. Singapore 17: 377. 1959. *F. glabella* Blume, Bijdr. 452. 1825; King in Hook. f., Fl. Brit. India 5: 511. 1888, *p.p.*

Rare. Bastar (Subramanyam & Henry, 1966). *Fl. & Fr.*: April - Dec.

25.2. var. *virens*

In mixed forests, on rocky hill slopes, bank of drains and between rock boulders. Balaghat, Bastar, Bilaspur, Chhatarpur, Damoh, Dhar, Durg, Hoshangabad, Indore, Jabalpur, Mandla, Panna, Raigarh, Raipur, Rajnandgaon, Satna, Seoni, Shivpuri, Surguja, West Nimar. *Fl. & Fr.*: April - Jan.

Ripe figs are edible.

4. MORUS L.

Shrubs or trees, erect, unarmed; sap not milky. Leaves simple, alternate, spirally arranged, entire, dentate or serrate, petiolate; stipules narrow, caducous. Flowers in axillary, ebracteate catkins or spikes. Male perianth 4-lobed. Stamens 4. Pistillode rudimentary. Female perianth in 2 rows, swollen and juicy in fruit, more or less confluent into a syncarp. Ovary compressed, glabrous. Staminodes absent. Fruit an achene, forming a syncarp (sorosis). Seeds subglobose, fleshy.

About 7 species; subtropical regions; 3 in M.P.

- 1a. Female catkins ovoid:
- 2a. Leaves acute; styles short, free, glabrous or slightly hairy ...1. *M. alba*
- 2b. Leaves caudate-acuminate; styles long, connate below, hairy ...2. *M. australis*
- 1b. Female catkins linear, cylindrical ...3. *M. macroura*

1. *Morus alba* L., Sp. Pl. 986. 1753; Hook. *f.*, Fl. Brit. India 5: 492. 1888. - *Shahoot*, *Toot*.

Shrubs or small trees, deciduous, dioecious or monoecious, 3-5 m high. Leaves ovate to lanceolate, 5-11 x 3.5-9 cm, acute at apex, cordate at base, serrate or dentate, sometimes lobed, glabrous above, slightly puberulous beneath. Catkins pendulous, green. Male catkins elongated. Female catkins short, ovoid; peduncles shorter than spikes. Tepals 4. Styles free. Sorosis purple to red when ripe, sweet.

Cultivated in orchards, gardens, parks and along roadsides. Chhatarpur, Hoshangabad, Raigarh, Sagar. *Fl. & Fr.*: Jan. - May.

Leaves are used for rearing silkworms. Fruits are edible.

2. *Morus australis* Poir. in Lam., Encycl. 4: 380. 1797. *M. indica auct. non* L., 1753; Roxb., Fl. Ind. 3: 596. 1832; Hook. *f.*, Fl. Brit. India 5: 492. 1888. - *Shahoot*.

Shrubs or trees, dioecious, 2-3 m high. Leaves ovate, 4-13 x 3.5-10 cm, caudate-acuminate at apex, cordate at base, unequally serrate, often

3-lobed, membranous, usually glabrous; petioles 1.5-3.5 cm long. Male catkins elongated, laxly flowered, borne on short peduncles. Female catkins short, ovoid. Tepals 4, obovate. Styles long, connate below, hairy. Sorosis subglobose or ovoid, dark purple.

Cultivated in gardens, parks and rural areas. Bilaspur, Chhatarpur, Surguja. *Fl. & Fr.*: Jan. - June.

Leaves are used for rearing silkworms. Fruits are edible.

3. *Morus macroura* Miq., Pl. Jungh. 42. 1851. *M. laevigata* Wallich ex Brandis, Forest Fl. N.W. India 409. 1874; Hook. f., Fl. Brit. India 5: 492. 1888.

Large trees; young shoots hairy. Leaves broadly ovate, 7-18 cm long, caudate or long acuminate at apex, mostly cordate and oblique at base, often lobed and dentate, sparsely pubescent when young; petioles 2-4 cm long. Both male and female catkins pendulous, solitary in the axil of leaves, narrow, densely flowered; peduncles hairy. Male catkins villous. Female catkins glabrous. Tepals 2, hairy. Styles nearly free, papillose. Sorosis cylindrical, pale yellow.

Cultivated. Indore. *Fl. & Fr.*: March - April.

5. PLECOSPERMUM Trécul

Shrubs or trees, often scandent. Leaves simple, usually alternate, sometimes opposite, entire, crenate or serrate. Flowers in cymose, capitate clusters, borne on fleshy receptacle. Perianth tubular; tepals 4-5, valvate or imbricate. Stamens as many as and opposite the tepals. Ovary 1-locular; ovule solitary; style simple or 2-partite. Fruit a drupe or often aggregated in fleshy pseudocarps or syncarps.

Two species; India and Myanmar; one in M.P.

Plecosperrnum spinosum (Heyne ex Willd.) Trécul in Ann. Sci. Nat. Bot., ser. 3. 8: 124. 1847; Hook. f., Fl. Brit. India 5: 491. 1888. *Trophis spinosa* Heyne ex Willd., Sp. Pl. 4: 734. 1806.

Shrubs, scandent, armed; sap milky. Leaves alternate, elliptic-ovate, 5-7 x 2.5-4 cm, acute at apex and base, subcoriaceous; petioles ca 1 cm

long; stipules scaly. Flowers in axillary, pedunculate clusters, white, sessile, pubescent. Tepals 4, ovate-lanceolate, pubescent. Syncarps variously shaped.

Rare. Bastar (Mooney, 1942). *Fl. & Fr.*: Feb. - April.

6. STREBLUS Lour.

Shrubs or trees, unarmed or armed; sap milky. Leaves simple, alternate, serrate or variously dentate, shortly petiolate; stipules small. Flowers in axillary racemes, cymes, spikes or heads, sessile or pedunculate. Male flowers 3-5, minute, sessile, in globose clusters. Tepals 4. Stamens 2-4. Pistillode present. Female flowers usually solitary. Tepals 4. Ovary ovoid. Style stigmatiferous. Fruit a drupe, thin-fleshy, enclosed by perianth.

About 22 species; Madagascar and Indo-Malesia; one in M.P.

Streblus asper Lour., *Fl. Cochinch.* 2: 615. 1790; Hook. *f.*, *Fl. Brit. India* 5: 489. 1888. - *Sihore*. Fig. 104.

Small trees, unarmed, profusely branched, 4-5 m high. Leaves elliptic, obovate or rhomboid, 2.5-5 x 1.5-2.5 cm, acute or acuminate at apex, cuneate at base, serrate or irregularly dentate, coriaceous, scabrid; petioles pubescent; stipules caducous. Male flowers in globose, pedunculate heads. Tepals imbricate. Stamens 4. Female flowers usually solitary, pedicellate. Tepals imbricate, enlarged in fruit. Drupes yellow, enclosed by enlarged perianth, 1-seeded.

Along roadsides in sandy alluvial soil and by the side of water falls. Bastar, Raipur. *Fl. & Fr.*: May - Aug.

Latex is used to treat pneumonia and swelling of cheeks while stem to relieve toothache.

128. CASUARINACEAE

(K.K. Khanna)

Four genera and about 70 species; Indo-Malesia, Australia and W. Pacific regions; one species in M.P.

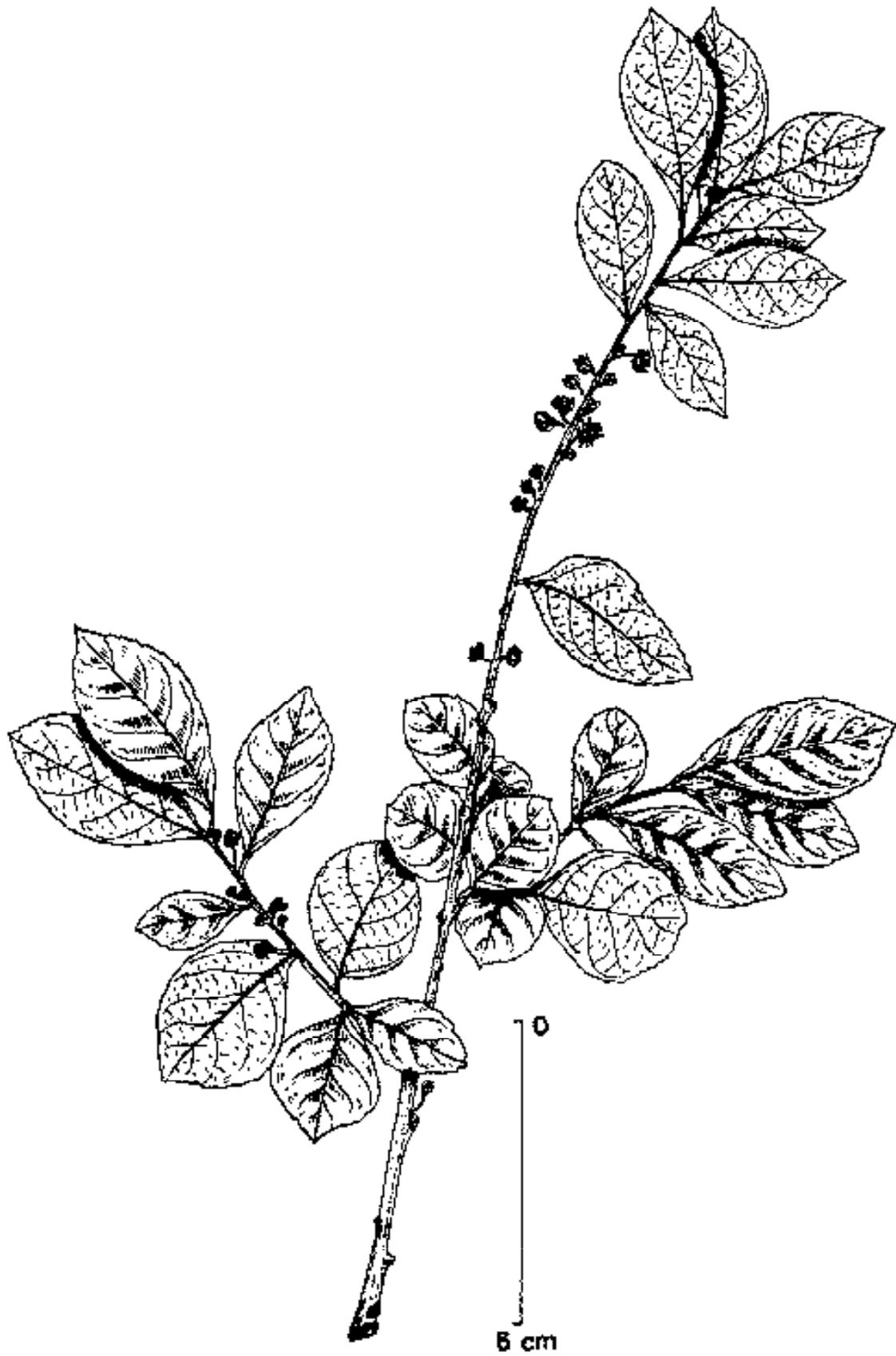


Fig. 104. *Streblus asper* Lour.

CASUARINA L.*

Tall trees, monoecious or dioecious; branches green, drooping. Leaves reduced to scales. Male flowers in terminal, terete spikes, monandrous. Tepals present. Stamen 1. Female flowers in axillary, cone like spikes; bracts and bracteoles subtending flowers; bracts persistent. Tepals absent. Ovary ovoid, superior, 1-locular; ovules 2; style short, filiform. Fruit a carpophore, globose or ovoid, woody, with several, winged nutlets.

About 70 species; tropical regions of Old World; one in M.P.

Casuarina equisetifolia L., Amoen. Acad. 4: 143. 1759, "*equisetifolia*"; Hook. f., Fl. Brit. India 5: 598. 1888. *C. muricata* Roxb., Fl. Ind. 3: 519. 1832.

Trees, evergreen, dioecious, 10-15 m high; branches drooping. Leaves scaly, 6-7 per node, alternating with ribs of upper node. Male spikes terminal, cylindrical, 3-4 cm long. Tepals 2, lanceolate. Female spikes axillary, ovoid, cone like, becoming woody, shortly pedunculate. Carpophores ovoid, 1.5-3 x 1-2 cm; nutlets thin, compressed.

Planted in gardens, rest houses and forest nurseries. Chhatarpur, Damoh, Rewa, Satna, Shahdol, Shivpuri, Tikamgarh, West Nimar. *Fl. & Fr.*: March - July.

The wood is used as poles and fuel.

129. SALICACEAE

(K.K. Khanna)

Two genera and about 335 species; subcosmopolitan especially Northern regions but not in Malesia and Australia; 2 genera and 2 species in M.P.

- | | |
|---|----------------------|
| 1a. Leaves deltoid, cordate at base; disk cupular | ...1. <i>Populus</i> |
| 1b. Leaves lanceolate or elliptic-lanceolate,
cuneate or rounded at base; disk scaly | ...2. <i>Salix</i> |

*Farr *et al.* (1979) have attributed *Casuarina* to Adanson but with reference to the notes of Friis (1980), it should be to Linnaeus.

1. POPULUS L.

Trees, deciduous, dioecious; buds resinous. Leaves simple, alternate, variable in shape, entire, dentate or lobed, 3-5-nerved from base, penninerved above; stipules fugacious, membranous, narrow. Flowers in lax catkins, unisexual, often pedicellate; bracts dentate or lobed, caducous. Perianth reduced to a cupular disk, entire, dentate or irregularly lobed. Stamens 4-30; filaments free, filiform; anthers usually large. Ovary sessile, seated within the disk; ovules many on 2-3 placentae. Fruit a capsule, 2-4-valved. Seeds small, with long, dense coma.

About 35 species; North temperate regions; one in M.P.

Populus alba L., Sp. Pl. 1034. 1753; Hook. f., Fl. Brit. India 5: 638. 1888. - *Safeda*.

Large trees, 10-15 m high; buds covered by numerous imbricate scales; leaf buds and shoots cottony tomentose. Leaves deltoid, 6-12 cm long, cordate at base, sinuately lobed or dentate, palmately lobed on young shoots; petioles 4-6 cm long. Flowers in hairy catkins, appearing in advance of leaves; bracts lanceolate, dentate. Disk shallow, entire; nectary absent. Female flowers shorter than male. Capsules ca 6 mm long, shortly stipitate.

Bhopal, Jabalpur. *Fl. & Fr.*: March - July.

The bark is diuretic and antipyretic.

2. SALIX L.

Shrubs or trees, erect, dioecious. Leaves simple, alternate, usually pinnately nerved, petiolate, stipulate. Flowers in axillary or terminal, simple catkins, borne on short, axillary shoots with dwarfed leaves, unisexual, spirally arranged along rhachis of catkin, each subtended by a caducous bract. Perianth absent. Disk simple or of 2-fid scales. Stamens 2-many; filaments free or variously connate. Ovary superior, sessile or stipitate, glabrous or hairy; ovules 4-8, subbasal; style short, 2-4-fid. Fruit a capsule, 2-valved.

About 300 species; temperate and cold regions of Northern hemisphere, few in Southern hemisphere but not in Australia; one in M.P.

Salix tetrasperma Roxb., Pl. Coromandel 1: 66, t. 97, 1798 & Fl. Ind. 3: 753, 1832; Hook. f., Fl. Brit. India 5: 626, 1888. *Banjari, Bod, Nained.*

Small trees, deciduous, *ca* 6 m high; young parts glabrous to silvery tomentose. Leaves lanceolate or elliptic-lanceolate, 5-12 x 1.5-2 cm, acuminate at apex, cuneate or rounded at base, glandular-serrate, membranous to subcoriaceous, glabrescent, glaucous beneath; stipules ovate, caducous. Flowers in axillary or terminal, hairy catkins, terminating dwarfed, axillary shoots; peduncles 3-12 cm long. Male flowers sessile; bracts 1-flowered, ovate, densely white hairy. Stamens 4-12, free, villous at base, exserted. Female flowers shortly pedicellate. Capsules ovoid, *ca* 3 mm long, glabrous or puberulous; valves recurved.

Amidst rock boulders, along streams, rivers and edges of forests. Balaghat, Bastar, Bilaspur, Hoshangabad, Raigarh, Rajnandgaon, Rewa. *Fl. & Fr.*: Oct. - Feb.

The bark is used for various purposes. Leaves are referred for the treatment of epilepsy and rheumatism.

130. CERATOPHYLLACEAE

(O.P. Mishra and B.K. Shukla)

One genus with 2 species (up to 30 species as recognized by some authors); cosmopolitan; both in M.P.

CERATOPHYLLUM L.

Herbs, aquatic, submerged, monoecious; roots absent. Leaves whorled, 4-10 at each node, rather rigid, dichotomously dissected, with two rows of minute teeth along the upper side of the ultimate segment, tipped by two bristles, usually with a purplish hair of tannin filled cells in between. Flowers in the axil of one leaf of a whorl, solitary, unisexual, actinomorphic. Male perianth of 10-15 tepals, slightly connate at base, arranged in the form of an involucre. Stamens 12-30, in whorls, exserted. Pistillode absent. Female flowers bristle like, pointed. Tepals as in male. Ovary superior, ovoid, 1-locular; ovule solitary, pendulous; style filiform, oblique, stigmatic on one side. Fruit a nutlet, laterally compressed, with persistent, thickened style as spine at apex, with or without 2, lateral spines at base.

- 1a. Leaves mostly 2-times forked, segments usually 4, rarely 2-3, rather stiff; nutlets with one apical and two lateral spines ...1. *C. demersum*
- 1b. Leaves mostly 3-4-times forked, segments 7-12, flaccid; nutlets with only one apical spine ...2. *C. submersum*

1. ***Ceratophyllum demersum* L.**, Sp. Pl. 992. 1753; Hook. f., Fl. Brit. India 5: 639. 1888.

Herbs, up to 2 m long; internodes 1-3 cm long. Leaves 4-9 in a whorl, 1-3.5 cm long, dichotomously forked, with 2-4, filiform, minutely dentate segments. Flowers axillary, solitary, minute, sessile. Male tepals 9-12, linear, greenish white, ciliate at apex. Female tepals as in male flowers. Nutlets ellipsoid or ovoid, laterally compressed, ca 4.5 mm long, blackish, minutely tuberculate; apical spine 5-9 mm long; basal spines 5-7 mm long, straight or slightly recurved.

Common in stagnant and slow moving water, ditches and ponds. Bilaspur, Chhatarpur, Raipur, Rajnandgaon, Sidhi. *Fl. & Fr.*: Oct. - Feb.

The plant is used to antidote scorpion sting.

2. ***Ceratophyllum submersum* L.**, Sp. Pl. ed. 2. 1409. 1763.

Herbs, up to 1 m long, rough, collapsing in a tassel when taken out of water; internodes 0.5-2.8 cm long. Leaves 6-10 in a whorl, 1.7-2.5 cm long, dichotomously forked, with 7-12, filiform, minutely dentate segments. Flowers axillary, solitary, sessile. Male tepals 6-10, linear, greenish white, ciliate at apex. Female tepals as in male flowers. Nutlets ellipsoid or ovoid, compressed, ca 4 mm long, purple-black when ripe; apical spine soft, ca 0.5 mm long.

Grows usually in association with *Hydrilla verticillata* in shallow parts of lakes and muddy ponds. Chhatarpur. *Fl. & Fr.*: Oct. - Nov.

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