

FLORA OF MADHYA PRADESH

Volume III

Editors : N.P. Singh • K.K. Khanna • V. Mudgal • R.D. Dixit



BOTANICAL SURVEY OF INDIA



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FLORA OF MADHYA PRADESH

VOLUME III

ANGIOSPERMS
(Hydrocharitaceae to Poaceae)
and
GYMNOSPERMS

Editors

N.P. Singh
K.K. Khanna
V. Mudgal
R.D. Dixit



भारतीय वनस्पति सर्वेक्षण
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Front Jacket : **Saccharum spontaneum L.**
(Courtesy : K.K. Khanna)

Back Jacket : **Typha angustifolia L.**
(Courtesy : K.K. Khanna)

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ABOUT THE PRESENT BOOK

The present book, the third and last volume of Flora of Madhya Pradesh, deals with an account of 706 species of angiosperms belonging to 241 genera and 37 families (Hydrocharitaceae to Poaceae) and 7 species of gymnosperms (mostly cultivated) under 5 genera and 4 families.

ABOUT THE FLORA OF MADHYA PRADESH VOLUME I

The first volume of Flora of Madhya Pradesh, published in 1993, deals with an account of 102 species of pteridophytes belonging to 51 genera and 36 families and 874 species of angiosperms belonging to 407 genera and 83 families (Ranunculaceae to Plumbaginaceae).

ABOUT THE FLORA OF MADHYA PRADESH VOLUME II

The second volume of Flora of Madhya Pradesh, published in 1997, deals with an account of 792 species of angiosperms belonging to 320 genera and 51 families (Primulaceae to Ceratophyllaceae).

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CONTENTS

131.	Hydrocharitaceae	...	...	1
132.	Burmanniaceae	...	...	7
133.	Orchidaceae	...	...	8
134.	Zingiberaceae	...	...	76
135.	Costaceae	...	...	92
135a.	Marantaceae	...	...	93
136.	Musaceae	...	...	95
136a.	Strelitziaceae	...	...	97
137.	Cannaceae	...	...	99
138.	Haemodoraceae	...	...	100
139.	Iridaceae	...	...	100
140.	Amaryllidaceae	...	...	101
141.	Hypoxidaceae	...	...	106
142.	Agavaceae	...	...	110
143.	Taccaceae	...	...	117
144.	Dioscoreaceae	...	...	118
145.	Liliaceae	...	...	129
145a.	Ruscaceae	...	...	142
146.	Smilacaceae	...	...	143
147.	Pontederiaceae	...	...	145
148.	Xyridaceae	...	...	147
149.	Commelinaceae	...	...	151
149a.	Flagellariaceae	...	...	171
150.	Juncaceae	...	...	172
151.	Arecaceae	...	...	173
152.	Pandanaceae	...	...	182
153.	Typhaceae	...	...	183
154.	Araceae	...	...	183
155.	Lemnaceae	...	...	197
156.	Alismataceae	...	...	200
157.	Butomaceae	...	...	206
158.	Najadaceae	...	...	208
159.	Aponogetonaceae	...	...	211
160.	Potamogetonaceae	...	...	212

161.	Zannichelliaceae	...	...	218
162.	Eriocaulaceae	...	...	219
163.	Cyperaceae	...	...	236
164.	Poaceae	...	...	340

GYMNOSPERMS

1.	Cycadaceae	...	...	546
2.	Cupressaceae	...	...	548
3.	Gnetaceae	...	...	550
4.	Pinaceae	...	...	550

REFERENCES	...	...	553
------------	-----	-----	-----

INDEX

1.	Botanical Names	...	...	557
2.	Local Names	...	...	589



Plate 1. Tropical dry deciduous forests during rainy season
(Courtesy: R.D. Dixit)



Plate 2. Tropical dry mixed deciduous forests
(Courtesy: K.K. Khanna)



Plate 3. Sal forests (Courtesy: K.K. Khanna)



Plate 4. Tropical moist deciduous forests (Courtesy: K.K. Khanna)



Plate 5. *Geodorum densiflorum* (Lam.) Schlechter
(Courtesy: K.K. Khanna)



Plate 6. *Gloriosa superba* L. (Courtesy: K.K. Khanna)



Plate 7. *Globba marantina* L. (Courtesy: K.K. Khanna)



Plate 8. *Costus speciosus* (J. Koenig) Sm. (Courtesy: K.K. Khanna)



Plate 9. *Dioscorea oppositifolia* L. (Courtesy: K.K. Khanna)



Plate 10. *Vanda tessellata* (Roxb.) Hook. ex G. Don
(Courtesy: K.K. Khanna)



Plate 11. *Asparagus racemosus* Willd. (Courtesy: K.K. Khanna)



Plate 12. *Typha angustifolia* L. (Courtesy: K.K. Khanna)



Plate 13. *Burmanna coelestis* D. Don
(Courtesy: K.K. Khanna)



Plate 14. *Tripogon jacquemonti* Stapf
(Courtesy: K.K. Khanna)



Plate 15. *Cymbopogon martinii* (Roxb.) Wats.
(Courtesy: K.K. Khanna)



Plate 16. *Commelina erecta* L. (Courtesy: K.K. Khanna)



Plate 17. *Floscopa scandens* Lour. (Courtesy: K.K. Khanna)



Plate 18. *Eriocaulon quinquangulare* L. (Courtesy: K.K. Khanna)



Plate 19. *Echinochloa stagnina* (Retz.)
P. Beauv. (Courtesy: K.K. Khanna)



Plate 20. *Sagittaria guayanensis* Humb., Bonpl. & Kunth
subsp. *lappula* (D. Don) Bogin (Courtesy: K.K. Khanna)



Plate 21. *Cenchrus ciliaris* L. (Courtesy: K.K. Khanna)



Plate 22. *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. (Courtesy: K.K. Khanna)



Plate 23. *Setaria verticillata* (L.) P. Beauv.
(Courtesy: K.K. Khanna)



Plate 24. *Oplismenus burmannii* (Retz.) P. Beauv.
(Courtesy: K.K. Khanna)



Plate 25. *Saccharum spontaneum* L. (Courtesy: K.K. Khanna)



Plate 26. *Vetiveria zizanioides* (L.) Nash
(Courtesy: K.K. Khanna)

LIST OF ILLUSTRATIONS

1.	<i>Lagarosiphon alternifolia</i> (Roxb.) Druce	...	...	5
2.	<i>Cymbidium aloifolium</i> (L.) Sw.	...	...	21
3.	<i>Eulophia explanata</i> Lindl.	...	...	33
4.	<i>Habenaria digitata</i> Lindl.	...	...	43
5.	<i>Nervilia prainiana</i> (King & Pantl.) Seidenf. & Smitin.	...	...	55
6.	<i>Oberonia falconeri</i> Hook. <i>f.</i>	...	...	58
7.	<i>Peristylus plantagineus</i> (Lindl.) Lindl.	...	...	64
8.	<i>Vanda testacea</i> (Lindl.) Rchb. <i>f.</i>	...	...	75
9.	<i>Zeuxine strateumatica</i> (L.) Schlechter	...	...	77
10.	<i>Hedychium coronarium</i> J. Koenig	...	...	88
11.	<i>Curculigo orchiodes</i> Gaertn.	...	...	108
12.	<i>Hypoxis aurea</i> Lour.	...	...	109
13.	<i>Dioscorea bulbifera</i> L.	...	...	122
14.	<i>Dioscorea oppositifolia</i> L.	...	...	125
15.	<i>Chlorophytum tuberosum</i> (Roxb.) Baker	...	...	137
16.	<i>Monochoria vaginalis</i> (Burm. <i>f.</i>) K. Presl	...	...	148
17.	<i>Xyris indica</i> L.	...	...	150
18.	<i>Murdannia nudiflora</i> (L.) Brenan	...	...	165
19.	<i>Murdannia spirata</i> (L.) Brückner	...	...	167
20.	<i>Juncus leschenaultii</i> Gay	...	...	174
21.	<i>Acorus calamus</i> L.	...	...	186
22.	<i>Limnophyton obtusifolium</i> (L.) Miq.	...	...	203
23.	<i>Sagittaria guayanensis</i> Humb., Bonpl. & Kunth subsp. <i>lappula</i> (D. Don) Bogin	...	...	205
24.	<i>Sagittaria trifolia</i> L.	...	...	207
25.	<i>Butomopsis latifolia</i> (D. Don) Kunth	...	...	209
26.	<i>Aponogeton natans</i> (L.) Engl. & K. Krause	...	...	213
27.	<i>Potamogeton crispus</i> L.	...	...	215
28.	<i>Eriocaulon breviscapum</i> Koern.	...	...	224
29.	<i>Eriocaulon raipurens</i> K.K. Khanna, V. Mudgal & Anand Kumar	...	...	231

30. <i>Eriocaulon truncatum</i> Buch.-Ham. ex Mart.	...	...	235
31. <i>Bulbostylis barbata</i> (Rottb.) C.B. Clarke	...	...	239
32. <i>Carex phacota</i> Spreng.	...	...	244
33. <i>Carex stramentitia</i> Boott ex Boeck.	...	...	246
34. <i>Cyperus brevifolius</i> (Rottb.) Hassk.	...	...	257
35. <i>Cyperus cephalotes</i> Vahl	...	...	260
36. <i>Cyperus cuspidatus</i> Kunth	...	...	262
37. <i>Cyperus flavidus</i> Retz.	...	...	268
38. <i>Cyperus platystylis</i> R. Br.	...	...	277
39. <i>Cyperus polystachyos</i> Rottb.	...	...	279
40. <i>Eleocharis acutangula</i> (Roxb.) Schult.	...	...	287
41. <i>Eriophorum comosum</i> (Wallich) Wallich ex Nees	...	...	292
42. <i>Fimbristylis dichotoma</i> (L.) Vahl	...	...	299
43. <i>Fimbristylis ovata</i> (Burm. f.) Kern	...	...	305
44. <i>Fimbristylis squarrosa</i> Vahl	...	...	307
45. <i>Fuirena umbellata</i> Rottb.	...	...	312
46. <i>Lipocarpa chinensis</i> (Osbeck) Kern	...	...	314
47. <i>Rhynchospora rubra</i> (Lour.) Makino	...	...	317
48. <i>Scirpus articulatus</i> L.	...	...	322
49. <i>Scirpus lacustris</i> L.	...	...	325
50. <i>Scleria caricina</i> (R. Br.) Benth.	...	...	333
51. <i>Scleria lithosperma</i> (L.) Sw.	...	...	335
52. <i>Scleria terrestris</i> (L.) Fass.	...	...	339
53. <i>Scleria tessellata</i> Willd.	...	...	341
54. <i>Alloteropsis cimicina</i> (L.) Stapf	...	...	358
55. <i>Eragrostiella nardoides</i> (Trin.) Bor	...	...	426
56. <i>Eulalia trispicata</i> (Schult.) Henr.	...	...	443
57. <i>Melanocenchris jacquemontii</i> Jaub. & Spach	...	...	463
58. <i>Oropetium roxburghianum</i> (Steud.) S.M. Phillips	...	...	471
59. <i>Oropetium thomaeum</i> (L. f.) Trin.	...	...	473
60. <i>Panicum miliaceum</i> L.	...	...	479
61. <i>Panicum walense</i> Mez	...	...	482

62.	<i>Paspalidium punctatum</i> (Burm. <i>f.</i>) A. Camus	...	...	485
63.	<i>Paspalum plicatulum</i> Michx.	...	...	488
64.	<i>Perotis indica</i> (L.) Kuntze	...	...	494
65.	<i>Rottboellia exaltata</i> L. <i>f.</i>	...	...	504
66.	<i>Sehima nervosum</i> (Rottl.) Stapf	...	...	514
67.	<i>Setaria pumila</i> (Poir.) Roem. & Schult.	...	...	520
68.	<i>Spodiopogon rhizophorus</i> (Steud.) Pilger	...	...	527
69.	<i>Tetrapogon tenellus</i> (Roxb.) Chiov.	...	...	533
70.	<i>Tragus roxburghii</i> Panigrahi	...	...	539
71.	<i>Urochloa panicoides</i> P. Beauv.	...	...	543

131. HYDROCHARITACEAE

(O.P. Misra and S.K. Srivastava)

About 16 genera and 100 species; cosmopolitan; 5 genera and 7 species in M.P.

- 1a. Stems present; leaves cauline:
 - 2a. Leaves mostly whorled; stamens 3; styles undivided; stigma fimbriate ...2. *Hydrilla*
 - 2b. Leaves scattered, fasciculate or subverticillate; stamens 2-3; styles notched; stigma not fimbriate ...3. *Lagurosiphon*
- 1b. Stems absent or plants with only stolons; leaves radical:
 - 3a. Leaves linear, narrow, sessile; male peduncles many-flowered:
 - 4a. Peduncles of female flowers spirally coiled; perianth 1-seriate ...5. *Vallisneria*
 - 4b. Peduncles of female flowers not spirally coiled; perianth 2-seriate ...1. *Blyxa*
 - 3b. Leaves linear-lanceolate to broadly ovate or suborbicular, distinctly petiolate; flowers solitary ...4. *Ottelia*

1. BLYXA Noronha ex Thouars

Herbs, submerged, tufted, acaulescent, stoloniferous. Leaves linear, acute, entire or minutely serrulate. Flowers unisexual or bisexual. Male flowers several in a tubular, 2-toothed spathe on long or short peduncles from the leaf axils. Sepals 3, linear. Petals 3, longer. Stamens 3-9, 1 or more rudimentary; anthers narrow, erect. Pistillodes 3, slender. Female flowers solitary in its spathe on peduncles as in male; hypanthium elongated above ovary. Perianth as in male. Staminodes absent or minute. Ovary very slender, beaked with the hypanthium; ovules many; style very short; stigmas 3, filiform. Fruit a capsule, fusiform, slender, included in the ventricose ribbed spine, many-seeded. Seeds with mucilaginous testa.

About 12 species; tropical regions of Old World; 3 in M.P.

1a. Flowers bisexual; stamens 3:

2a. Leaves 10-50 cm long; capsules 2.5-3.8 cm long; seeds with short tails ...1. *B. aubertii*

2b. Leaves 15-125 cm long; capsules 5-7.5 cm long; seeds with long tails ...2. *B. echinosperma*

1b. Flowers unisexual; stamens 9 ...3. *B. octandra*

1. *Blyxa aubertii* Rich. in Mem. Inst. Paris 12. 2: 19, 77. t. 4. 1812; Subram., Aquatic Angiosp. 59. 1962. *B. oryzetorum* (Decne.) Hook. f., Fl. Brit. India 5: 661. 1888. *B. griffithii* Planch. ex Hook. f., Fl. Brit. India 5: 661. 1888, p.p. *Diplosiphon oryzetorum* Decne. in Jacquem., Voy. Bot. 167. 1844.

Small herbs, slender. Leaves 10-50 x 0.5-1 cm, filamentous at apex, entire, finely serrulate or obscurely crenulate. Peduncles solitary or more, up to 40 cm long. Flowers bisexual. Petals linear, white with yellowish twisted ends. Stamens 3. Ovary long beaked. Capsules 2.5-3.8 cm long. Seeds ellipsoid, 1-2 mm long, with 8, longitudinal, tuberculate ribs, with a short tail.

In ponds. Bilaspur, Rajnandgaon. *Fl. & Fr.*: Oct. March.

2. *Blyxa echinosperma* (C.B. Clarke) Hook. f., Fl. Brit. India 5: 661. 1888; Subram., Aquatic Angiosp. 59. 1962. *Hydrotrophus echinospermus* C.B. Clarke in J. Linn. Soc. London (Bot.) 14: 8. t. 1. 1875. *Blyxa echinospermoides* Blatt. in J. Proc. Asiat. Soc. Bengal (N. S.) 26: 354. 1931. *B. talboti* Hook. f., Fl. Brit. India 5: 661. 1888.

Herbs, annual. Leaves variable in length, 15-125 x 1-1.4 cm, very finely acuminate; nerves 5, prominent. Flowers bisexual. Spathe long, linear, opening with a slit on one side, produced and tubular above the flower. Sepals greenish, obtuse. Petals white, often spirally twisted at the tip. Stamens 3. Capsules 5-7.5 x 0.4 cm, terete. Seeds ca 1.3 cm long, spinescent, with a long, filiform tail.

In shallow and deep water. Surguja. *Fl. & Fr.*: Feb.

3. *Blyxa octandra* (Roxb.) Planch. ex Thwaites, Enum. Pl. Zeyl. 332. 1864; Subram., Aquatic Angiosp. 60. 1962. *Vallisneria octandra* Roxb., Pl. Coromandel 2: 34. t. 165. 1802. *Blyxa roxburghii* Rich. in Mem. Inst. Paris 12, 2: 77. t. 5. 1812; Hook. f., Fl. Brit. India 5: 660. 1888. *B. griffithii* Planch. ex Hook. f., Fl. Brit. India 5: 661. 1888, *p.p.*

Herbs, dioecious. Leaves 10-50 x 0.5-1 cm, subentire or serrulate. Flowers unisexual. Male spathe tubular. Male flowers white. Petals linear. Stamens 9. Female spathe stouter. Petals filiform. Capsules 5-10 x 0.4 cm. Seeds tuberculate, acute or shortly tailed.

In shallow water of ponds and streams. Bilaspur, Raigarh, Raipur, Rajnandgaon. *Fl. & Fr.*: Sept. Feb.

2. **HYDRILLA** Rich.

Herbs, submerged, dioecious. Leaves 3-4-nately whorled or the lower opposite. Flowers unisexual. Male flowers solitary in subglobose, muricate spathe. Sepals 3, ovate or obovate, green. Petals 3, oblong or cuneiform. Stamens 3; anthers large, reniform, opening elastically. Pistillode minute. Female flowers 1-2 in a tubular, 2-toothed spathe. Sepals 3, linear, green. Petals 3, narrow. Ovary produced beyond the spathe into a filiform beak, 1-locular; styles 2-3, linear, undivided; stigmas fimbriate. Fruits subulate, smooth or muricate. Seeds 2-3, oblong, minute.

A monotypic genus; Old World.

Hydrilla verticillata (L. f.) Royle, Ill. Bot. Himal. Mts. t. 376. 1839; Hook. f., Fl. Brit. India 5: 659. 1888; Subram., Aquatic Angiosp. 55. 1962. *Serpicula verticillata* L. f., Suppl. Pl. 416. 1782. *Hydrilla polysperma* Blatt. in J. Proc. Asiat. Soc. Bengal (N. S.) 26: 356. 1931.

Herbs, perennial. Leaves 3-8 in a whorl, linear-oblong, 5-12 x 1.5-3 mm, entire or serrulate, with a strong midrib, sessile. Flowers minute, unisexual. Male flowers shortly pedicellate. Sepals ovate, green. Petals oblong. Female flowers sessile. Sepals and petals as in male, narrow. Fruits ca 5 mm long, shortly apiculate at both ends.

Common in fresh water ponds, ditches, rivers and tanks, often forming dense masses. Bilaspur, Damoh, Raigarh, Raipur, Sagar, Seoni, Shivpuri. *Fl. & Fr.*: Nov. - April.

3. LAGAROSIPHON Harv.

Herbs, submerged, dioecious. Leaves scattered, fasciculate or subverticillate, the lower ones sometimes opposite, serrulate. Flowers unisexual. Male flowers minute, many in an ovoid, 2-fid, axillary, sessile spathe. Perianth 2-seriate. Stamens 2-3, ovoid; 3 staminodes often present. Pistillode absent. Female flowers solitary, sessile in a narrow oblong spathe. Hypanthium produced into a long, filiform beak above the ovary. Perianth as in male. Staminodes absent. Ovary oblong; ovules many; styles 3, stout, notched. Fruits ovoid, oblong or linear; pericarp membranous. Seeds numerous.

About 9 species; tropical Africa and Madagascar; one in M.P.

Lagarosiphon alternifolia (Roxb.) Druce in Rep. Bot. Exch. Cl. Brit. Is. 1916: 630. 1917. *Vallisneria alternifolia* Roxb., Pl. Coromandel 2: t. 165. 1802 & Fl. Ind. 3: 750. 1832. *Nechamandra alternifolia* (Roxb.) Thwaites, Enum. Pl. Zeyl. 332. 1864; Subram., Aquatic Angiosp. 56. 1962. *N. roxburghii* Planch. in Ann. Sci. Nat. ser. 3, 11: 78. 1849. *Lagarosiphon roxburghii* (Planch.) Benth. in Benth. & Hook. f., Gen. Pl. 3: 451. 1883; Hook. f., Fl. Brit. India 5: 659. 1888. Fig. 1.

Herbs, annual, submerged, dioecious. Leaves linear, 1.5-3 cm long, acute, minutely serrulate, many-nerved, sessile. Male flowers minute, crowded in axillary, ovoid, 2-fid, sessile spathe. Outer tepals 3, enclosing 2, smaller inner tepals. Female flowers solitary, sessile, in tubular, 3-4 mm long, 2-fid spathe. Perianth pinkish, tubular, 3-lobed. Fruit an utricle, ovoid, indehiscent, enclosed in the spathe.

Usually in stagnant water. Bilaspur, Morena, Rajnandgaon. *Fl. & Fr.*: Nov. - April.

4. OTTELIA Pers.

Herbs, submerged or partially floating in fresh water. Roots fibrous. Leaves radical, crowded, of 2 forms; submerged leaves narrow, shortly petiolate; floating ones ovate, lanceolate or suborbicular, broad, long petiolate. Flowers solitary, bisexual, sessile, within a tubular, long pedunculate spathe. Sepals 3, linear or oblong. Petals 3, obovate or orbicular, longer than the sepals, with fleshy basal appendages. Stamens

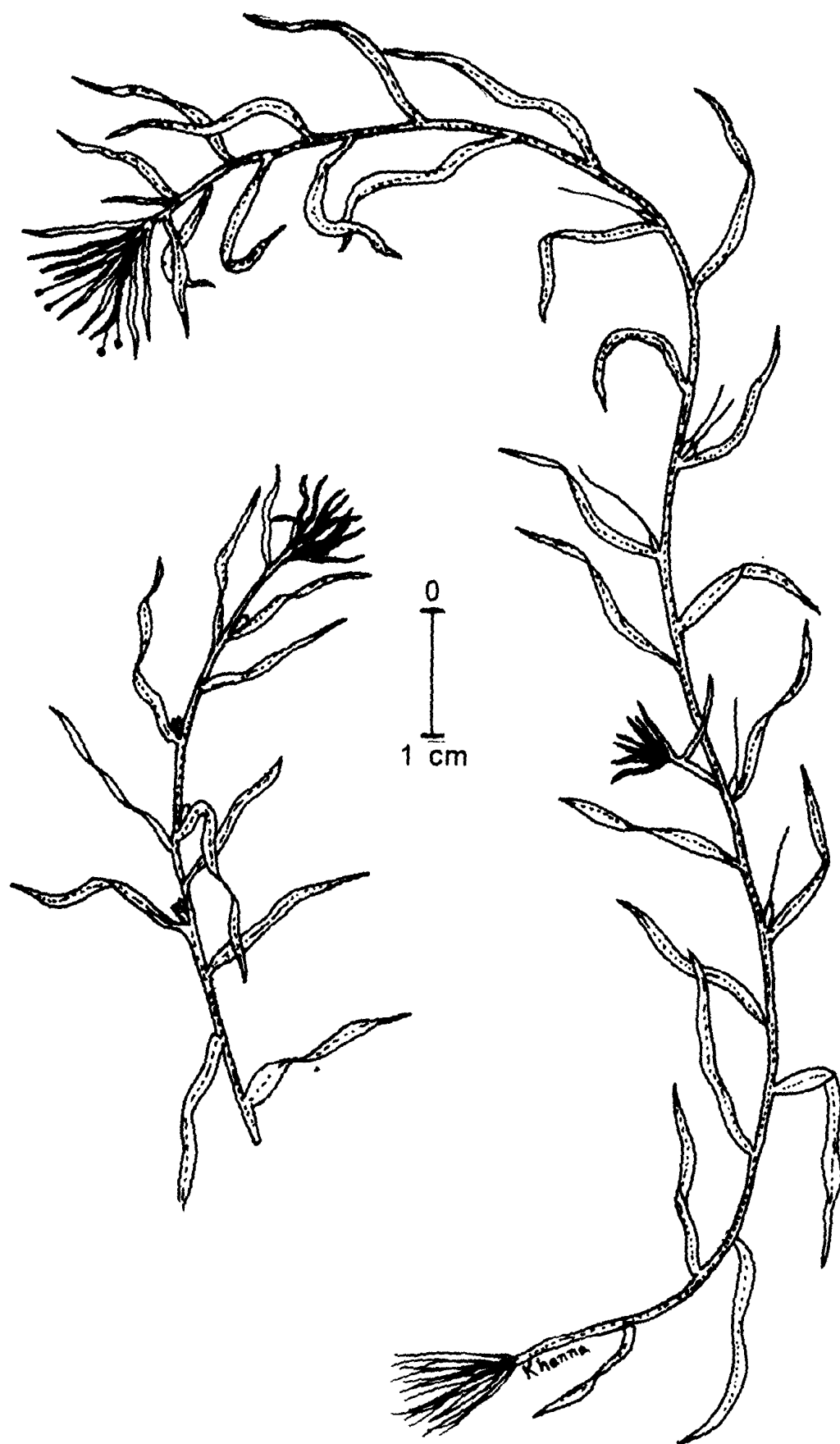


Fig. 1. *Lagarosiphon alternifolia* (Roxb.) Druce

6-15 in 2-5 series; anthers erect. Ovary oblong, beaked; ovules many; styles 6, linear, 2-fid. Fruits oblong or ellipsoid, enclosed in a spathe, 3-6-winged. Seeds many, oblong.

About 40 species; tropical and subtropical regions especially of Old World; one in M.P.

Ottelia alismoides (L.) Pers., Syn. Pl. 1: 400. 1805; Hook. f., Fl. Brit. India 5: 662. 1888; Subram., Aquatic Angiosp. 61. 1962. *Stratiotes alismoides* L., Sp. Pl. 535. 1753.

Herbs, annual, submerged to partly floating and rooting in mud. Floating leaves broadly ovate or suborbicular, 5-20 x 3-15 cm, rounded, acute or acuminate at apex, cordate-truncate at base, undulate, 3-11-nerved; submerged leaves linear-lanceolate. Spathe 2.5-3.5 cm long, tubular, with 6 undulate margins. Sepals linear-oblong, 1-1.5 cm long. Petals white with yellow base, obovate-orbicular, 2-3 cm long. Fruits ellipsoid, 2.5-5 cm long, 6-valved, enclosed in the spathe. Seeds oblong, minute.

Common in ponds, lakes and roadside ditches. Balaghat, Bilaspur, Morena, Raigarh, Raisen, Rajnandgaon, Sagar, Satna, Shivpuri, Sidhi, Surguja. *Fl. & Fr.*: Oct. March.

5. VALLISNERIA L.

Herbs, submerged, tufted, dioecious, acaulescent, stoloniferous. Leaves very long. Flowers unisexual, the male many, minute in an ovoid, 3-lobed, shortly pedunculate spathe; the female solitary in a tubular, 3-toothed spathe, terminal on long, filiform, spiral peduncle. Sepals 3. Petals absent. Male flowers: Stamens 1-3; filaments thick; anthers didymous. Pistillode absent. Female flowers: Staminodes 3, each 2-fid. Ovary narrow, not produced upwards; ovules numerous; styles 3, splitted into broad stigmatic lobes. Fruits linear, included in the spathe. Seeds numerous, oblong.

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

Vallisneria natans (Lour.) Hara in J. Jap. Bot. 49: 136. 1974. *Physkium natans* Lour., Fl. Cochinch. 2: 662. 1790. *Vallisneria spiralis auct. non* L., 1753; Hook. f., Fl. Brit. India 5: 660. 1888, *p.p.*; Subram., Aquatic Angiosp. 57. 1962.

Herbs, annual, rooting in mud. Leaves radical, linear, 5-40 x 0.3-0.8 cm, obtuse, 3-9-nerved, sheathing at base. Male flowers many in 5-6 mm long spathe. Sepals 3, ovate-oblong. Petals absent. Female flowers solitary in a tubular, 3-toothed spathe; peduncles *ca* 1 cm long, filiform. Fruits 5-7 cm long.

Common in muddy bottom of ponds and ditches. Balaghat, Bastar, Bilaspur, Gwalior, Indore, Raigarh, Raipur, Sagar, Seoni, Shivpuri, Sidhi, Tikamgarh. *Fl.* & *Fr.*: Dec. Feb.

132. BURMANNIACEAE

(Ram Lal)

About 21 genera and 165 species; tropical regions of both hemispheres; one species in M.P.

BURMANNIA L.

Herbs, annual, erect. Stems simple or branched. Leaves ensiform, acuminate at apex; radical leaves sometimes reduced to scales or absent. Flowers solitary or few, fascicled or unilateral on branches of forked cyme, bisexual, bracteate, pedicellate. Perianth persistent, 2-seriate, tubular at base; outer series 3-lobed, with narrow wings; inner series 3-lobed, smaller or sometimes obsolete; tube 3-winged. Stamens 3, sessile or subsessile; anther cells separated by a broad connective, dorsally crested and spurred at base, inserted on the mouth of perianth-tube, dehiscing laterally by transverse slits. Ovary inferior, 3-locular; ovules on axile placentae; style short or nearly equal to perianth-tube; stigma 3-lobed. Fruit a capsule, more or less 3-winged. Seeds minute, oblong or subglobose.

About 57 species; subtropical regions; one in M.P.

Burmannia coelestis D. Don, Prodr. Fl. Nepal. 44. 1825; Hook. *f.*, Fl. Brit. India 5: 665. 1888; Hajra in Fasc. Fl. India 19: 9. 1988.

Herbs, slender, usually unbranched, 5-20 cm high. Stems simple, slightly margined, glabrous. Leaves both radical and cauline, elliptic or linear-lanceolate, scale-like, 4-10 x 1-1.5 mm. Flowers 1-3 in a cluster, *ca* 7 mm across; pedicels 2-4 mm long; bracts lanceolate, 2-4 x 1-1.5 mm. Perianth

purplish blue with yellow blotches; outer lobes *ca* 6 x 3 mm, adnate to ovary; inner lobes ovate, *ca* 2 x 1.5 mm. Ovary oblong or ovoid, *ca* 2 mm long; ovules many. Capsules obovoid, dehiscing transversely.

Balaghat, Bilaspur, Raigarh, Raipur, Surguja. *Fl.* & *Fr.*: Sept. April.

133. ORCHIDACEAE

(K.K. Khanna)

About 795 genera and 17,500 species; cosmopolitan; 34 genera and 89 species in M.P.

1a. Plants epiphytic:

2a. Leaves equitant, ensiform ...20. *Oberonia*

2b. Leaves otherwise:

3a. Leaves 1-2:

4a. Lateral sepals adnate to foot of column forming a mentum; petals oblong-ovate; column with foot ...5. *Bulbophyllum*

4b. Lateral sepals not forming a mentum; petals linear; column without foot:

5a. Rhachis zigzag; sepals rounded, ovate or broadly ovate; labellum distinctly 3-lobed, saccate at base ...26. *Pholidota*

5b. Rhachis not zigzag; sepals oblong-lanceolate, linear-oblong, linear or lanceolate; labellum entire or obscurely lobed, not saccate at base ...16. *Liparis*

3b. Leaves more than 2:

6a. Labellum not spurred:

7a. Flowers with a mentum; column with a distinct foot:

8a. Pollinia 4; caudicle absent ...7. *Dendrobium*

- 8b. Pollinia 8; caudicle present ...10. *Eria*
- 7b. Flowers without a mentum; column with a very short, indistinct foot or without foot:
 - 9a. Leaves terete, fleshy ...17. *Luisia*
 - 9b. Leaves flat, membranous or coriaceous, not fleshy:
 - 10a. Labellum entire or obscurely lobed; column winged; pollinia 4 ...16. *Liparis*
 - 10b. Labellum distinctly 3-lobed; column unwinged; pollinia 2 ...6. *Cymbidium*
- 6b. Labellum spurred:
 - 11a. Column with a distinct foot:
 - 12a. Leaves terete; mid lobe of labellum 2-fid, lateral lobes forming a tube round the column ...22. *Papilionanthe*
 - 12b. Leaves flat; mid lobe of labellum entire, lateral lobes not forming a tube round the column ...3. *Aerides*
 - 11b. Column with an indistinct foot or without foot:
 - 13a. Spur longitudinally septate ...23. *Pelatantheria*
 - 13b. Spur not septate:
 - 14a. Spur distant from the base of labellum ...29. *Rhynchostylis*
 - 14b. Spur at the base of labellum:
 - 15a. Flowers more than 2 cm across:
 - 16a. Leaves membranous; flowers terminal; pollinia 8 ...31. *Thunia*
 - 16b. Leaves coriaceous; flowers lateral; pollinia 2 or 4 ...33. *Vanda*

- 15b. Flowers up to 2 cm across:
- 17a. Plants up to 10 cm high:
- 18a. Mid lobe of labellum hairy
or fimbriate ...12. *Gastrochilus*
- 18b. Mid lobe of labellum neither
hairy nor fimbriate ...4. *Ascocentrum*
- 17b. Plants more than 10 cm high:
- 19a. Stems slender; mid lobe of labellum
not lobulate; pollinia 4 ...28. *Pomatocalpa*
- 19b. Stems stout; mid lobe of
labellum not lobulate; pollinia 2
or unequally 2-partite ...¹ *Acampe*
- 1b. Plants terrestrial:
- 20a. Leafless, either throughout or during
flowering time or leafy only during
flowering time:
- 21a. Leafless throughout:
- 22a. Labellum entire; spurred ...9. *Epipogium*
- 22b. Labellum 3-lobed, not spurred ...6. *Cymbidium*
(*C. macrorhizon*)
- 21b. Leafless or leafy only during
flowering time:
- 23a. Sepals and petals pubescent ...21. *Pachystoma*
- 23b. Sepals and petals glabrous:
- 24a. Leaves solitary, orbicular,
broadly ovate, reniform-cordate
or broadly infundibuliform ...19. *Nervilia*
- 24b. Leaves 2 or more, linear,
oblong-lanceolate, broadly
elliptic-lanceolate, broadly
lanceolate or ovate-elliptic ...11. *Eulophia*
- 20b. Leafy throughout the plant life:
- 25a. Labellum spurred or saccate at base:

- 26a. Labellum spurred at base:
- 27a. Spur cylindrical:
- 28a. Lateral sepals connate at base, forming a mentum with the base of labellum; petals and dorsal sepal not forming a hood ...32. *Tropidia*
- 28b. Lateral sepals free, not forming a mentum; petals with the dorsal sepal forming a hood:
- 29a. Bracts not foliaceous; flowers 2-3 cm across ...15. *Habenaria*
- 29b. Bracts foliaceous; flowers ca 5 cm across ...27. *Platanthera*
- 27b. Spur globose, ellipsoid, scrotiform or conical:
- 30a. Pollinia 8:
- 31a. Leaves distichous, not plaited ...31. *Thunia*
- 31b. Leaves not distichous, plaited ...25. *Phaius*
- 30b. Pollinia 2:
- 32a. Inflorescence lateral, on a separate leafless shoot ...11. *Eulophia*
- 32b. Inflorescence terminal, on a central leafy shoot ...24. *Peristylus*
- 26b. Labellum saccate at base:
- 33a. Inflorescence terminal, glandular pubescent; pollinia granular ...34. *Zeuxine*
- 33b. Inflorescence lateral, glabrous; pollinia waxy:
- 34a. Inflorescence erect; labellum inferior ...11. *Eulophia*
- 34b. Inflorescence decurved; labellum superior ...13. *Geodorum*
- 25b. Labellum neither spurred nor saccate at base:

- 35a. Flowers solitary in the axil of leaves,
progressively reduced in size upwards ...8. *Epipactis*
- 35b. Flowers in racemes or spikes:
- 36a. Inflorescence lateral or axillary;
column long:
- 37a. Sepals connate forming a swollen
tube; foot long; pollinia 8 ...2. *Acanthephippium*
- 37b. Sepals free; foot very short
or absent; pollinia 2-4 ...6. *Cymbidium*
- 36b. Inflorescence terminal; column short:
- 38a. Dorsal sepal forming a hood
with lateral petals; margin of
sepals and petals not curved:
- 39a. Leaves radical, linear-lanceolate,
up to 0.7 cm broad; labellum
geniculate at the middle, glabrous
inside (but with thickenings), with
basal calli ...30. *Spiranthes*
- 39b. Leaves cauline, ovate or
elliptic, 2.8-4.5 cm broad;
labellum not geniculate,
glandular or bristly hairy
inside, with subterminal calli ...14. *Goodyera*
- 38b. Dorsal sepal and lateral petals
distinct, not forming a hood; margin
of sepals and petals revolute, reflexed,
recurved or incurved:
- 40a. Labellum superior;
column straight ...18. *Malaxis*
- 40b. Labellum inferior; column
incurved ...16. *Liparis*

1. ACAMPE Lindl., *nom. cons.*

Herbs, epiphytic. Roots stout, vermiform. Stems stout, thick, covered with leaf sheaths. Leaves distichous, obliquely 2-lobed at apex, coriaceous,

lorate or ligulate. Flowers in few to many-flowered panicles, small, fragile; peduncles with cupular sheaths; bracts short, persistent. Sepals fleshy, brittle, flat; dorsal sepal slightly larger than the lateral ones; lateral sepals adnate to the small spur of the labellum. Petals resemble sepals, straight. Labellum thick, 3-lobed, saccate or spurred; mid lobe fleshy; lateral lobes small or absent. Column short, stout, without foot. Anthers 2-celled; pollinia 2, globose, waxy, entire or unequally 2-partite, on a long caudicle; gland oblong, small. Fruit a capsule.

About 12 species; Indo-Malesia to Africa; 3 in M.P.

- 1a. Stems *ca* 10 cm long; mid lobe of labellum
rhomboid ...1. *A. congesta*
- 1b. Stems more than 20 cm long; mid lobe of
labellum ovate-oblong or oblong:
 - 2a. Stems 50-70 cm long; spur conical to
cylindrical; mid lobe of labellum narrowly
ovate ...2. *A. papillosa*
 - 2b. Stems 20-30 cm long; spur rounded;
mid lobe of labellum broadly ovate
or rounded ...3. *A. praemorsa*

1. *Acampe congesta* Lindl., Fol. Orchid. *Acampe* 2. 1853.
Saccolabium congestum (Lindl.) Hook. f., Fl. Brit. India 6: 63. 1890.

Epiphytes. Stems short, *ca* 10 cm long, very stout. Leaves narrowly strap-shaped, 15-20 cm long, unequally 2-lobed at apex with a mucro in between. Flowers crowded, white, with yellow and purple tinge; peduncles 4-5 cm long, with short internodes. Sepals and petals oblong. Labellum white with red stripes, 3-lobed, with two tubercles at base; mid lobe rhomboid with acute angles, papillose above; lateral lobes small; spur shortly conical, hairy inside.

Surguja (Tiwari and Maheshwari, 1963). *Fl. & Fr.*: Aug. Dec.

2. *Acampe papillosa* (Lindl.) Lindl., Fol. Orchid. *Acampe* 2. 1853; Khanna *et al.* in *J. Econ. Tax. Bot.* 23(3): 711. 1999. *Saccolabium papillosum* Lindl. in Edward's Bot. Reg. 18: t. 1552. 1833; Hook. f., Fl. Brit. India 6: 63. 1890.

Epiphytes. Stems erect, stout, clustered, 50-70 cm long. Leaves conduplicate, curved, 7.5-10 x 1.3-1.6 cm, truncate or obliquely notched at apex, coriaceous, fleshy. Flowers in 4-8-flowered, subcorymbose racemes, fragrant; peduncles simple, leaf-opposed. Sepals spreading, yellow, oblong, subequal. Petals yellow with brown blotches, subspathulate, narrower than sepals. Labellum adnate to the base of column, longer than sepals, 3-lobed; mid lobe white with purple streaks, ovate-oblong, decurved, crenate; lateral lobes very small or absent; disk transversely rugulose; spur pale yellow, cylindrical, hairy inside. Capsules fusiform, ridged.

Surguja. *Fl. & Fr.*: Oct. Dec.

3. *Acampe praemorsa* (Roxb.) Blatter & McCann in J. Bombay Nat. Hist. Soc. 35: 495. 1932. *Epidendrum praemorsum* Roxb., Pl. Coromandel 34. t. 43. 1795. *Saccolabium praemorsum* (Roxb.) Hook. f., Fl. Brit. India 6: 62. 1890. *S. wightianum* (Lindl.) Hook. f., Fl. Brit. India 6: 62. 1890. *Acampe wightiana* Lindl., Fol. Orchid. Acampe 2: 95. 1853. *Vanda wightiana* Lindl. ex Wight, Icon. Pl. Ind. Orient. 5(1): 9. t. 1670. 1851.

Epiphytes. Stems stout, sheathed with leaf bases, up to 30 cm long. Leaves alternate, distichous, oblong, 15-20 x 1.7-2.5 cm, emarginate with unequally deeply cleft at apex, entire, coriaceous. Flowers in corymbose panicles; peduncles stout, with minute, cupular bracts. Sepals and petals more or less similar, coriaceous; dorsal sepal obovate-oblong, mucronulate; lateral sepals oblong-ovate. Petals creamy yellow with pinkish stripes, oblanceolate-spathulate. Labellum 3-lobed, saccate, fleshy; mid lobe ligulate, more or less reflexed; lateral lobes small, erect. Column with 2, erect, terminal horns. Capsules subcylindrical, longitudinally ribbed.

On *Mangifera indica* and other trees in deciduous forests. Mandla, Raigarh. *Fl. & Fr.*: Aug. Dec.

2. ACANTHEPHIPIUM Blume

Herbs, terrestrial. Stems pseudobulbous; pseudobulbs conical, sheathed, articulate, exposed. Leaves plaited, articulate, large, convolutive mostly towards apex, shortly petiolate. Flowers in lateral, erect racemes arising from the young pseudobulb, large, resupinate. Sepals connate to form a swollen tube, with short, free, recurved tips; lateral sepals adnate to the

long, curved foot of column forming a saccate mentum. Petals free, more or less spatulate, narrow, as long as sepals. Labellum saddle-shaped, small, mobile, 3-lobed; mid lobe recurved; lateral lobes erect. Column rather long; foot very long, spurred or not. Anthers 4-celled; pollinia 8, in 2 bundles of 4 each, waxy, unequal. Fruit a capsule.

About 15 species; tropical Asia to Fiji; 2 in M.P.

- 1a. Petals yellowish white with pink dots; lateral lobes of labellum hatchet-shaped ...1. *A. bicolor*
- 1b. Petals pale pink with red lines; lateral lobes of labellum not hatchet-shaped ...2. *A. striatum*

1. *Acanthephippium bicolor* Lindl. in Edward's Bot. Reg. 20: t. 1730. 1835; Hook. *f.*, Fl. Brit. India 5: 815. 1890.

Large herbs, terrestrial. Pseudobulbs ovoid or fusiform, *ca* 9 cm long, stout, fleshy, with persistent sheaths. Leaves 2 or 3, broadly elliptic or ovate-oblong, unequal in size, 20-35 x 7-9.5 cm, acute-acuminate at apex, narrowed to sheathing petiole. Flowers in short, 3-flowered racemes, fleshy; racemes arising from the axil of scale at about the base or from the top of new pseudobulb, enveloped in foliaceous scaly sheath; bracts foliaceous, cymbiform. Sepals fusiform, forming a pitcher-like calyx-tube; dorsal sepal oblong, cohering with the lateral sepals; lateral sepals obliquely oblong, fused with the foot forming the base of pitcher. Petals yellowish white with pink dots, spatulate, erect, fleshy. Labellum 3-lobed, jointed to a long, recurved foot. Column subcylindrical, stout. Capsules green, ellipsoid, 8-10 cm long, ridged, long stipitate.

Bastar. *Fl. & Fr.*: Dec. Feb.

2. *Acanthephippium striatum* Lindl. in Edward's Bot. Reg. Misc. 24: 45. 1838; Hook. *f.*, Fl. Brit. India 5: 816. 1890.

Large herbs, terrestrial. Pseudobulbs elongate-obpyriform, 7.5-10 x 4-5 cm, with violet-streaked sheaths. Leaves 2-3, elliptic, 18-25 x 6-10 cm, acuminate at apex, 5-nerved. Flowers in subcapitate racemes borne on stout peduncles; bracts large, cymbiform. Dorsal sepal oblong, obtuse; lateral sepals ovate-triangular, acute, forming a conical mentum. Petals pale pink with bold red lines, oblong-spatulate, concealed by the sepals.

Labellum pale pink with bold red lines, oblong, concealed, 3-lobed, shortly clawed; mid lobe triangular, small; lateral lobes triangular-falcate. Column foot with a short, obtuse spur.

Bastar (Mooney, 1942; Tiwari and Maheshwari, 1963). *Fl.*: July - Aug.

3. **AERIDES** Lour.

Perennials, epiphytic. Stems usually long, stout, sheathed with leaf bases. Leaves alternate, distichous, flat, spreading, sheathing at base, coriaceous, sessile. Flowers in few to many-flowered leaf-opposed racemes or panicles, fragrant. Sepals and petals similar, spreading; lateral sepals slightly oblique, decurrent on the column foot. Labellum adnate to column foot, 3-lobed, sessile, spurred; mid lobe spreading; lateral lobes small; spur usually bent forwards. Column short, thick, wingless, with a foot. Anthers 2-celled, terminal; pollinia 2, globose, waxy, with long, narrow caudicles; gland small. Fruit a capsule, ribbed.

About 40 species; tropical Asia, E. Asia and W. Malesia; 3 in M.P.

1a. Lateral lobes of labellum smaller than mid lobe:

2a. Sepals obovate-orbicular; spur hook like,
curved

...1. *A. maculosum*

2b. Sepals oblong; spur conical, straight

...2. *A. multiflorum*

1b. Lateral lobes of labellum larger than mid lobe

...3. *A. odoratum*

1. *Aerides maculosum* Lindl. in Edward's Bot. Reg. 31: t. 58. 1845; Hook. f., Fl. Brit. India 6: 45. 1890. *Saccolabium speciosum* Wight, Icon. Pl. Ind. Orient. 5(1): 9. t. 1674-1675. 1851.

Epiphytes. Leaves channelled, linear-oblong or oblong, 13-23 x 2-3 cm, green mottled with purple, with 2, unequal, rounded lobes at apex. Flowers in simple or branched, up to 24 cm long racemes, pedicellate; peduncles terete, stout, sheathed; bracts minute, ovate. Sepals obovate-orbicular, subequal; lateral sepals mucronulate. Petals faintly pinkish white, oblong-elliptic. Labellum straight, 3-lobed; mid lobe deep rosy pink, finely crisped on margin; lateral lobes pinkish white, smaller than mid lobe, spreading; spur hook like, curved downwards. Column pink, oblong. Capsules 3-5 cm long, strongly ribbed.

In open deciduous forests on *Terminalia* sp., *Acacia catechu* and *Mangifera indica*. Bastar (Tiwari and Maheshwari, 1963). *Fl. & Fr.*: May - Sept.

2. *Aerides multiflorum* Roxb., Pl. Coromandel 3: 68. t. 271. 1820 & Fl. Ind. 3: 475. 1832; Hook. f., Fl. Brit. India 6: 44. 1890.

Epiphytes, 10-20 cm high. Stems suberect. Leaves conduplicate, linear-oblong, 11-24 x 1.5-2 cm, recurved, obtuse, 2-fid at apex, sheathing at base. Flowers in axillary, simple, densely many-flowered, drooping racemes; peduncles stout, sheathed. Sepals and petals more or less similar, pink with dark pink spots, oblong, fleshy. Labellum adnate to the base of column, triangular, twice as long as the sepals; mid lobe with a fleshy, 2-lobed callus at base; lateral lobes small; spur conical, straight. Column with thickened margins; foot short. Anthers beaked. Capsules subclavate, ca 2 cm long, stipitate.

On a number of trees like *Shorea robusta*, *Mangifera indica*, *Diospyros* sp. and *Madhuca longifolia*. Balaghat, Bastar, Bilaspur, Hoshangabad, Raigarh, Sidhi, Surguja. *Fl. & Fr.*: July - March.

3. *Aerides odoratum* Lour., Fl. Cochinch. 2: 525. 1790; Hook. f., Fl. Brit. India 6: 47. 1890.

Epiphytes, ca 20 cm high. Leaves flat, linear-oblong, 8-15 x 2-3 cm, unequally 2-fid at apex, not contracted at the sheathing base, thick. Flowers in lateral, supra-axillary, many-flowered, arched or pendulous racemes; racemes 1-3, with short, distant sheaths; bracts broad, sheathing. Sepals obovate, spreading; lateral sepals larger. Petals pinkish white, oblong, falcate, shorter than sepals, rounded at apex. Labellum adnate to the short foot of column, 3-lobed; lateral lobes larger than mid lobe, obtuse; spur stout, recurved. Anthers beaked. Capsules fusiform, ca 2 cm long, winged.

On *Shorea robusta*. Raigarh, Surguja. *Fl. & Fr.*: Nov. - April.

4. *ASCOCENTRUM* Schlechter ex J.J. Sm.

Herbs, epiphytic. Leaves unequally 2-lobed at apex, fleshy. Flowers in many-flowered, erect or drooping racemes, small. Sepals and petals similar. Labellum immovably fixed to the base of column, 3-lobed, spurred; mid lobe tongue-shaped, larger than lateral lobes, pointing forwards or

downwards; lateral lobes triangular or rounded, small, erect; spur shorter than ovary and pedicel, with a small thickening at its mouth at the base of the mid lobe, without keels. Column short, without foot. Pollinia 2, cleft, on a short, narrow or widened caudicle. Fruit a capsule.

About 5 species; S.E. Asia to Borneo; one in M.P.

Ascocentrum micranthum (Lindl.) Holttum, Gard. Bull. Sing. 11: 275. 1947. *Saccolabium micranthum* Lindl., Gen. Sp. Orchid. Pl. 220. 1833; Hook. f., Fl. Brit. India 6: 59. 1890. *Cleisostoma micranthum* King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8: 234. t. 312. 1898. *Saccolabium fissum* Ridl. in J. Linn. Soc. London (Bot.) 32: 361. 1896.

Small herbs, epiphytic, erect, 8-10 cm high. Leaves up to 11 x 1.5 cm, rather deeply and unequally 2-lobed at tip; lobes rounded. Flowers in horizontal or drooping, up to 7 cm long racemes. Sepals very broad, blunt at tips. Petals white with purple spots, as long as sepals but only half as broad. Labellum purple, 3-lobed, spurred; mid lobe oblong, fleshy, with a thickening at base; lateral lobes small, rounded; spur parallel to ovary and close to it, about as long as mid lobe. Column with swollen area on either side of the rostellum.

Surguja (Tiwari and Maheshwari, 1963). *Fl.*: June July.

5. BULBOPHYLLUM Thouars, *nom. cons.*

Epiphytes, with sympodial branches. Rhizomes creeping. Pseudobulbs globose or subglobose-ovoid, naked or covered with the remains of old sheaths, 1-articulate. Leaves 1 or 2, terminating pseudobulb, oblong, ovate or lanceolate, articulate, petiolate, sometimes caducous. Flowers in racemes, umbels or heads borne on a separate scape from the base of pseudobulb or rhizome, small to large, resupinate or not. Sepals unequal; dorsal sepal about half as long as lateral sepals; lateral sepals adnate to the foot of the column forming a short mentum. Petals smaller than sepals. Labellum tongue-shaped, mobile, hinged to the end of column foot, entire or 3-lobed, polymorphous, coriaceous or fleshy, strongly recurved. Column short, winged or toothed at apex, produced into a long, upcurved foot at base. Anthers 2-celled; pollinia 4. Fruit a capsule.

About 1200 species; tropical regions; one in M.P.

Bulbophyllum triste Rchb. f. in Walp., Ann. Bot. Syst. 6: 253. 1861; Hook. f., Fl. Brit. India 5: 768. 1890. *B. micranthum* Hook. f., Fl. Brit. India 5: 768. 1890. *B. alopecurum* Rchb. f. in Gard. Chron. 2: 70. 1880; Hook. f., Fl. Brit. India 5: 770. 1890.

Small epiphytes. Rhizomes naked and leafless during flowering. Pseudobulbs globose-ovoid, small. Leaves 2 from each pseudobulb, narrowly oblong, 7-12 cm long, acute at apex, flaccid, subcoriaceous. Flowers in small, densely flowered racemes; scape slender, 14-17 cm long; floral bracts lanceolate, acute. Dorsal sepal oblong-ovate, concave, obtuse, 3-nerved; lateral sepals falcately oblong, obtuse, incurved on margins. Petals pink, ovate-oblong, shorter than dorsal sepal, 1-nerved. Labellum purple, oblong-lanceolate, obtuse, stipitate, convex on upper surface and with a divided protuberance; spur slender. Column with apical processes; foot much curved.

Surguja (Tiwari and Maheshwari, 1963). *Fl.*: Feb. May.

6. CYMBIDIUM Sw.

Herbs, terrestrial or epiphytic. Roots tufted. Pseudobulbs short or elongate, covered with overlapping sheaths of leaf bases. Leaves long, narrow, erect or curved, coriaceous, jointed on sheaths. Flowers in axillary, few to many-flowered, erect or pendulous racemes, fleshy, resupinate. Sepals and petals free, narrow, more or less equal, wide spreading. Labellum small, 3-lobed, sessile on the base of column; mid lobe recurved. Column long, slender; foot very short or absent. Anthers 1 or imperfectly 2-celled; pollinia 2 or 4, subglobose, waxy, joined by a common caudicle or sessile; gland broad. Fruit a capsule.

About 40 species; tropical Asia to Australia; 3 in M.P.

- 1a. Plants epiphytic; racemes pendulous;
foot very short ...1. *C. aloifolium*
- 1b. Plants terrestrial; racemes erect or
suberect; foot absent:
 - 2a. Plants leafy; mid lobe of labellum orbicular ...2. *C. ensifolium*
var. *haematodes*
 - 2b. Plants leafless; mid lobe of
labellum oblong ...3. *C. macrorhizon*

1. **Cymbidium aloifolium** (L.) Sw. in Nova Acta Regiae Soc. Sci. Upsal. 6: 73. 1799; Hook. f., Fl. Brit. India 6: 10. 1890. *Epidendrum aloifolium* L., Sp. Pl. 953. 1753. *Cymbidium aloefolium* Blume, Bijdr. 378. t. 19. 1825. *C. bicolor* Lindl., Gen. Sp. Orchid. Pl. 164. 1833; Hook. f., Fl. Brit. India 6: 11. 1890. *C. erectum* Wight, Icon. Pl. Ind. Orient. 5(1): 21. t. 1753. 1851. *C. mannii* Rchb. f. in Flora 55: 274. 1872. **Fig. 2.**

Epiphytes, tufted. Roots vermiform. Pseudobulbs covered with sheaths of leaf bases. Leaves oblong, 22-30 x 2-2.5 cm, unequally or obtusely 2-lobed at apex, coriaceous, stout, with a prominent midnerve. Flowers in 20-30 cm long, pendulous racemes, pedicellate; bracts minute, persistent. Sepals lanceolate, acute, entire, spreading; lateral sepals falcate. Petals yellow, vinaceous in the centre, oblong or lanceolate, erect, acute. Labellum 1.6-1.8 cm long, 3-lobed, saccate; mid lobe yellow with purple stripes, broadly ovate; lateral lobes mottled with brown-purple, oblong, entire; throat with 2 ridges and calli. Column clavate; foot very short. Pollinia 2, unequally 2-fid. Capsules ovoid to pyriform or ellipsoid.

On trees near water fall. Bastar. *Fl. & Fr.*: Feb. May.

2. **Cymbidium ensifolium** (L.) Sw. var. **haematodes** (Lindl.) Trimen, Syst. Cat. Fl. Pl. Ceylon 89. 1885; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 186. 1981. *C. haematodes* Lindl., Gen. Sp. Orchid. Pl. 162. 1833. *C. cyperifolium* Wallich ex Lindl., Gen. Sp. Orchid. Pl. 163. 1833; Hook. f., Fl. Brit. India 6: 13. 1890. *C. viridiflorum* Griff., Itin. Pl. Khasyah Mts. 126. 1848. *Limodorum longifolium* Roxb., Fl. Ind. 3: 468. 1832.

Terrestrials. Roots thick, vermiform. Stems covered with sheaths of leaf bases. Leaves radical, linear to lanceolate, 60-80 x 1.5-3 cm; lower leaves conduplicate, membranous; upper ones more or less erect, acute, scabrous on margins. Flowers in many-flowered, suberect racemes; bracts green, lanceolate, acute. Sepals oblong-lanceolate, subequal, 7-nerved. Petals dull yellow with pink nerves, lanceolate, acute, 9-nerved. Labellum ca 2 cm long, sessile at the base of column; mid lobe orbicular, revolute; lateral lobes rounded. Column incurved; foot absent. Pollinia 4, sessile in pairs on a gland, one of each pair smaller. Capsules ca 5 cm long.

On sandy soil of drainage bank. Bilaspur. *Fl. & Fr.*: Oct. Dec.

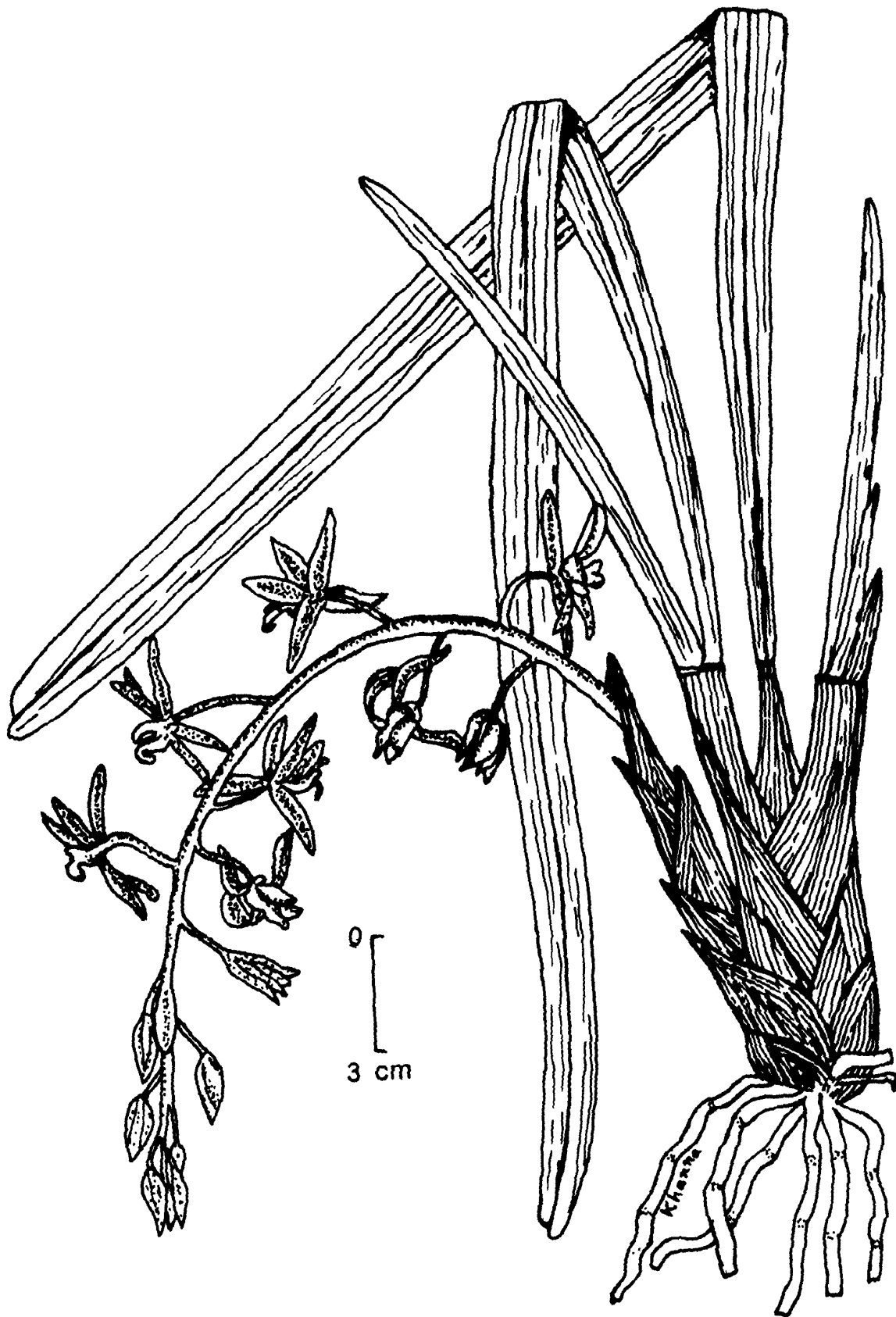


Fig. 2. *Cymbidium aloifolium* (L.) Sw.

3. *Cymbidium macrorhizon* Lindl., Gen. Sp. Orchid. Pl. 162. 1833; Hook. f., Fl. Brit. India 6: 9. 1890.

Terrestrials, leafless. Rootstocks branched, creeping. Scape short, basal sheath conduplicate, *ca* 4 cm long. Flowers in 6-8-flowered, 10-15 cm long, erect racemes, pedicellate; bracts lanceolate, 1.5-2 cm long, foliaceous. Sepals yellow with pink tinge, linear-lanceolate, acuminate, spreading or reflexed. Petals whitish with pink streaks, shorter and broader than sepals. Labellum white with purple blotches along the margin, *ca* 2 cm long; mid lobe oblong, acute; lateral lobes narrow, erect, inflexed on margins. Column with crimson streaks on the inner surface, curved; foot absent. Pollinia 4, sessile.

In leaf litters of forest floor. Bilaspur, Surguja. *Fl. & Fr.*: July Nov.

7. DENDROBIUM Sw., *nom. cons.*

Epiphytes. Stems articulate, sympodial with elongate or pseudobulbous shoots. Leaves alternate on shoots or terminal on pseudobulbs, membranous or coriaceous, sessile. Flowers solitary, paired or in few to many-flowered racemes or clusters, leaf-opposed or terminal on pseudobulb. Sepals subequal; lateral sepals obliquely adnate by their bases to the column foot forming a mentum. Petals smaller or larger than sepals. Labellum mobile or immobile, entire or 3-lobed, contracted or clawed at base, usually with thickenings on the inner side; lateral lobes embracing the column; disk ridged or lamellate. Column short, angled or 2-toothed at apex, with a short or long foot. Anthers attached at the apex of column by a filament; pollinia 4, waxy, sessile, without caudicle, free or slightly adhering by a viscus. Fruit a capsule.

About 900 species; tropical and subtropical Asia to Australia and Pacific regions; 13 in M.P.

1a. Stems more than 1 m long:

2a. Petals orange-yellow; labellum
without a pouch, deeply fringed

...4. *D. fimbriatum*

2b. Petals white with violet tips; labellum
with a distinct pouch, not fringed

...9. *D. moschatum*

1b. Stems up to 1 m long:

- 3a. Inflorescence terminal raceme or both terminal and lateral racemes:
 - 4a. Leaves ovate-oblong ...5. *D. formosum*
 - 4b. Leaves linear-lanceolate:
 - 5a. Petals yellow or greenish white; mentum not spurred ...6. *D. herbaceum*
 - 5b. Petals white; mentum spurred ...13. *D. wightii*
- 3b. Inflorescence distinctly lateral, never terminal:
 - 6a. Labellum trumpet-shaped:
 - 7a. Plants pendulous; petals pale white or purple ...7. *D. lituiflorum*
 - 7b. Plants erect or suberect; petals magenta or rosy purple ...11. *D. regium*
 - 6b. Labellum otherwise:
 - 8a. Petals yellow or greenish yellow:
 - 9a. Petals broadly ovate; labellum reniform; capsules *ca* 4 cm long ...3. *D. denneanum*
 - 9b. Petals lanceolate; labellum panduriform; capsules *ca* 2 cm long ...8. *D. macrostachyum*
 - 8b. Petals pinkish white, light pink or pink-red:
 - 10a. Stems stout; leaves coriaceous ...10. *D. nobile*
 - 10b. Stems slender; leaves chartaceous or membranous:
 - 11a. Bracts *ca* 2 mm long; sepals oblong or oblong-lanceolate:
 - 12a. Petals oblong or elliptic; labellum as long as broad ...1. *D. aphyllum*
 - 12b. Petals broadly ovate; labellum longer than broad ...2. *D. crepidatum*
 - 11b. Bracts *ca* 6 mm long; sepals linear-lanceolate ...12. *D. transparens*