

FLORA OF JOWAI

VOL. TWO

BOTANICAL SURVEY
OF INDIA

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And

Vicinity

MEGHALAYA

A contribution towards a detailed knowledge of the
Flora of the Northeastern region of India

{ IN TWO VOLUMES }

N. P. Balakrishnan

VOLUME TWO



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1. STROPHANTHUS DC.

Strophanthus wallichii DC, Prodr. 8: 418, 1844; Fl. Brit. Ind. 8: 655. 1882; Fl. As. 8: 260, 1939.

Large climbers; leaves elliptic-oblong or obovate, cuneate at base, caudate-acuminate or cuspidate, 5-12 × 2-4 cm; inflorescences dichotomous panicle of cymes; corolla pale yellow or pinkish-purple; tube 1.5-2.0 cm; lobes twisted, caudate, up to 5 cm; follicles lanceolate, 10-15 × 2-3 cm; coma of seeds 3-5 cm.

Primary forests, 100-800 m; fl. & fr. : Mar.-Dec.; Dawki.

2. WRIGHTIA R. Br.

Wrightia coccinea (Roxb.) Sims in Curtis, Bot. Mag. 53: t. 2696. 1826; Fl. Brit. Ind. 3: 654. 1882; Fl. As. 3: 259. 1939. *Nerium coccineum* Roxb. Fl. Ind. 2: 2. 1824.

Shrubs or trees, up to 20 m; leaves elliptic to ovate, obtuse or acute at base, caudate-acuminate, 9-15 × 3-7 cm; inflorescences terminal, few-flowered; corolla funnel-shaped, 2-3 cm, scarlet-red inside, pale green outside; corona cup-shaped, ± 5 mm; anthers pubescent; follicles 2, free, ± 30 cm.

Primary forests, in shaded places, 100-1000 m; fl. & fr. : Jan.-Dec.; Dawki.

3. CHONEMORPHA G. Don *nom. cons.*

Chonemorpha fragrans (Moon) Alston in Ann. R. Bot. Gard. Perad. 11: 203. 1929. *Echites fragrans* Moon, Cat. 20. 1824. *E. macrophylla* Roxb. Fl. Ind. 2: 13. 1832. *C. macrophylla* (Roxb.) G. Don, Gen. Hist. 4: 76. 1837; Fl. Brit. Ind. 3: 661. 1882; Fl. As. 3: 265. 1939.

Large climbers; leaves elliptic-ovate, obovate or suborbicular, rounded or cordate at base, cuspidate-acuminate, 15-40 × 12-30 cm; corolla 5-6 cm across, white, fragrant; tube 3.5-4.5 cm; follicles paired, 25-40 cm; seeds pale brown, ± 2.5 cm; coma white, 5-6 cm.

Primary forests, 100-1500 m; fl. & fr. : June-Feb.; Sohka.

4. AGANOSMA G. Don

Aganosma harmandiana Pierre in Spire, Caoutch. Indo-Ch. 109. 1906; Tsiang in Bull. Fan. Mem. Inst. Biol. Peiping, Bot. 9: 24. 1939, *desc. ampl.*

Twining shrubs; leaves ovate, oblong-ovate, rounded or subcordate at base, acute or short-acuminate at apex, 10-15 × 6-10 cm; puberulous on nerves beneath; petioles 5-10 cm; flowers in terminal compact panicle

cymes; peduncles 1-2 cm; calyx-lobes lanceolate, 5-8 × 1-2 mm, pubescent; corolla lobes lanceolate, 4-8 mm.

Primary forests, 100-500 m; fl. : May-June; Dawki, G. K. Deha 18461 —Previously known only from Indo-China.

5. ECDYSANTHERA Hook. & Arn.

Ecdysanthera micrantha DC. Prodr. 8: 442. 1844; Fl. Brit. Ind. 3: 662. 1882; Fl. As. 3: 266. 1939.

Large woody climbers; leaves ovate-oblong or oblong-lanceolate, acute or cuneate at base, obtusely acuminate or caudate-acuminate, 6-13 × 3-5 cm; flowers in stout peduncled paniculate trichotomous cymes; corolla urceolate, yellow; follicles 6-10 cm, spreading horizontally; seeds ± 2 cm, compressed.

Primary forests, 500-1500 m; fl. & fr. : Jan.-Dec.; Jowai.

6. ICHNOCARPUS R. Br. *nom. cons.*

Ichnocarpus affinis (R. & S.) Benth. in Benth. & Hook. f. Gen. Pl. 2: 717. 1876. *Echites affinis* R. & S. Syst. 4: 393. 1819. *I. ovatifolius* DC. Prodr. 8: 435. 1844; Fl. Brit. Ind. 3: 670. 1882.

Woody climbers; leaves orbicular-oblong or ovate-oblong, rounded or obtuse at base, acute or short-acuminate, 5-15 × 3-8 cm; inflorescences terminal, panicles or cymes; peduncles 2-5 cm; corolla white, 8-10 mm across; tube ± 3 mm; follicles 12-15 × 0.8-1.0 cm, pubescent.

Primary forests, 100-500 m; fl. & fr. : May-Nov.; Dawki, Ukhrain, near Dawki.

7. VALLARIS Burm. f.

Vallaris solanacea (Roth) O. Ktze. Rev. Gen. 2: 147. 1891. *Peltanthera solanacea* Roth, Nov. Pl. Sp. 132. 1821. *V. heynei* Spreng. Syst. 1: 635. 1825; Fl. Brit. Ind. 3: 650. 1882; Fl. As. 3: 256. 1939.

Erect or scandent shrubs; leaves oblong to elliptic-lanceolate, obtuse or acute at base, acuminate, 4-10 × 1.5-4.0 cm; lateral nerves 6-9 pairs; petioles 4-10 mm; cymes lax, axillary, dichotomous; pedicels 5-10 mm; corolla white, 1.3-1.8 cm across, pubescent; lobes ovate, rounded; follicles 10-15 × 2-3 cm; seeds ± 10 mm; coma ± 2 cm, silky.

Primary forests and forest edges, 1000-1400 m; fl. & fr. : Nov.-May; Jowai.

The flowers are fragrant.

8. *HOLARRHENA* R. Br.

Holarrhena antidysenterica (L.) Wall. Cat. 1672. 1829; Fl. Brit. Ind. 3: 644. 1882; Fl. As. 3: 254. 1939. *Nerium antidysentericum* L. Sp. Pl. 209. 1753.

Trees, 4-10 m; leaves elliptic-oblong, obtuse or rounded at base, acute or acuminate, 6-25 × 3-10 cm; flowers white, becoming yellowish, fragrant, in terminal or axillary corymbose cymes; corolla salver-shaped, 2.5-3.0 cm across; tube ± 1.2 cm; lobes oblong; follicles 20-35 × 0.5-1.0 cm; seeds ± 1.2 cm.

Primary and secondary forests, 100-1000 m; fl. & fr. : Apr.-Jan.; Dawki, Sohka.

9. *ALSTONIA* R. Br. *nom. cons.*

Alstonia scholaris (L.) R. Br. Mem. Wern. Soc. 1: 76. 1810; Fl. Brit. Ind. 3: 642. 1882; Fl. As. 3: 253. 1939. *Echites scholaris* L. Mant. Pl. 53. 1767.

Trees, 10-25 m; leaves verticillate, oblong-oblanccolate or oblong-obovate, 12-25 × 4-6 cm; lateral nerves parallel, many; inflorescences compact, subumbellate cymes, corolla-tube densely pubescent outside, 7-9 mm; lobes obovate, 3-4 mm, pale green to pale yellow; follicles 20-50 cm; seeds ciliate at margins; coma 1-2 cm.

Primary and secondary forests, 100-1000 m; fl. & fr. : Sept.-Feb.; Dawki.

10. *WILLUGHBEIA* Roxb. *nom. cons.*

Willughbeia edulis Roxb. Pl. Corom. 3: 77. t. 280. 1820; Fl. Brit. Ind. 3: 623. 1882; Fl. As. 3: 246. 1939.

Large woody climbers; leaves ovate-oblong or obovate, cuncate at base, cuspidate at apex, 8-13 × 3-6 cm; flowers pink, fragrant, in axillary few-flowered cymes; corolla-tube ± 5 mm; lobes narrowly oblong, ± 12 × 3 mm; fruits pyriform, 5-7 × 3-5 cm, yellowish-red.

Primary forests, 100-1000 m; fl. & fr. : May-Apr.; Garampani.

11. MELODINUS J. R. & G. Frost.

- 1a. Leaves chartaceous ; flowers ± 2.5 cm long ; corolla lobes oblong-lanceolate ; fruits ± 7 cm diam. ... *M. monogynus* 1
 1b. Leaves herbaceous ; flowers less than 1 cm long ; corolla lobes sub-orbicular ; fruits ± 4 cm diam. ... *M. khasianus* 2

1. **Melodinus monogynus** Roxb. Fl. Ind. 2: 56. 1824; Fl. Brit. Ind. 3: 629. 1882; Fl. As. 3: 248. 1939. '*Jermei-soh-brab*'.

Large climbers; leaves elliptic-oblong or oblong-lanceolate, cuneate or acute at base, acuminate, 12 - 17 \times 3 - 6 cm ; flowers white or yellowish, fragrant; calyx-lobes ciliate at margins; corolla tube 13 - 16 mm, villous inside; lobes up to 12 mm; fruits woody, globose, orange-yellow.

Primary forests, 1000 - 1800 m; fl. & fr. : Apr.-Jan.; Jarain, Jowai, Sonapur.

2. **Melodinus khasianus** Hook. f. Fl. Brit. Ind. 3: 629. 1882; Fl. As. 3: 248. 1939.

Large climbers; leaves elliptic-lanceolate or narrow-lanceolate, cuneate at base, acuminate, 8 - 12 \times 2 - 4 cm; flowers white, turning yellowish, fragrant; calyx-lobes ciliolate at margins; corolla tube 5 - 7 mm, puberulous outside; lobes up to 5 mm; fruits globose, woody, yellowish-white.

Primary forests, 200 - 1500 m; fl. & fr. : May-Jan.; Jowai, Garampani.

12. CARISSA L. *nom. cons.*

Carissa paucinervia A. DC. Prodr. 8: 333. 1844; Fl. Brit. Ind. 3: 631. 1882.

Stunted spiny shrubs, 75 - 100 cm high, dichotomously branched; spines straight, paired, sometimes branched, up to 3 cm long; leaves elliptic-lanceolate, 1.5 - 4.5 \times 0.2 - 1.0 cm; petioles ± 5 mm; flowers fragrant, in 3-chotomous cymes; corolla white, ± 2 cm, shortly white villous outside; anthers lanceolate; ovary 2-ovuled; style ± 6 mm; stigma ± 2 mm.

Open sunny places, 100 - 500 m; fl. : Aug.; Kopili riverbed, Garampani, Balakrishnan 47056.

13. TABERNAEMONTANA L.

Tabernaemontana divaricata (L.) R. Br. in R. & S. Syst. 4: 427. 1819. *Netium divaricatum* L. Sp. Pl. 209. 1758. *N. coronarium* Jacq. Coll. 1:

138. 1786. *T. coronaria* (Jacq.) Willd. Enum. Hort. Berol. 275. 1809; Fl. Brit. Ind. 3: 646. 1882; Fl. As. 3: 255. 1939.

Bushy shrubs, 1-4 m; leaves elliptic or oblong-lanceolate, cuneate at base, acute or acuminate, 7-15 × 2-4 cm; flowers white, fragrant, in axillary lax corymbose cymes; corolla tube 15-25 mm; lobes elliptic-oblong, 1.8-2.3 cm; follicles ellipsoid, 2-5 × 1-2 cm, fleshy, orange-red.

Shaded moist places in forests, 100-1400 m; fl. & fr.: Jan.-Dec.; Dawki, Khleihriat, Pdengsakab, Rytang, Syndai, Sohka.

14. RAUVOLFIA L.

- 1a. Young parts glabrous; leaves oblanceolate, 10-20 cm long, glabrous; corolla-tube 5-6 mm long; drupes ellipsoid. ... *R. densiflora* 1
 1b. Young parts pubescent; leaves elliptic or obovate, 5-8 cm long; corolla-tube 2-3 mm long; drupes globose. ... *R. tetraphylla* 2

1. **Rauvolfia densiflora** (Wall.) Hook. f. Fl. Brit. Ind. 3: 633. 1882; Fl. As. 3: 251. 1939. *Tabernaemontana densiflora* Wall. in Edw. Bot. Reg. 15: t. 1273. 1829. '*Larhei*'.

Shrubs, 1-2 m; leaves oblanceolate, cuneate at base, shortly acuminate, 10-20 × 3-6 cm; peduncles 5-7 cm; pedicels 4-6 mm; corolla white, tinged pink; tube inflated at apex; lobes elliptic-oblong; drupes 7-8 × 3-5 mm, purple-black.

Primary forests, in shaded moist places, 1000-1500 m; fl. & fr.: May-Nov.; Jarain, Jowai.

2. **Rauvolfia tetraphylla** L. Sp. Pl. 208. 1753.

Shrubs, up to 1 m; leaves elliptic or obovate, acute or cuneate at base, acute at apex, 5-8 × 2-4 cm, sparsely puberulous above, thinly pubescent beneath; peduncles 1-2 cm; pedicels 3-5 mm; corolla white; lobes oblong; drupes 1-2 cm diam., purplish-red.

Open places near forests and riversides, 100-500 m; fl. & fr.: Apr.-Nov.; Dawki, *Balakrishnan* 47328 —Introduced from tropical America, becoming naturalised at low altitudes.

15. ALYXIA R. Br. nom. cons.

- 1a. Peduncles of cymes 2-3 cm long; calyx-lobes less than 1 mm long ... *A. gracilis* 1
 1b. Peduncles of cymes 0.3-1.5 cm long; calyx-lobes 1.5-2.0 mm long ... *A. fascicularis* 2

1. *Alyxia gracilis* (DC.) Hook. f. Fl. Brit. Ind. 3: 634. 1882; Fl. As. 3: 249. 1939. *Hunteria gracilis* DC. Prodr. 8: 350. 1844.

Twining shrubs; leaves oblong-elliptic or lanceolate, acute or cuneate at base, obtusely acuminate at apex, 3-6×1.5-2.5 cm; lateral nerves obscure, horizontal; corolla green or greenish-yellow, 3-4 mm; follicles drupaceous, ellipsoid, ± 2×1 cm, smooth.

Primary forests, 100-1500 m; fl. & fr. : Apr.-Dec.; Dawki, Jarain.

2. *Alyxia fascicularis* (DC.) Hook. f. Fl. Brit. Ind. 3: 636. 1882; Fl. As. 3: 250. 1939. *Hunteria fascicularis* DC. Prodr. 8: 350. 1844. 'Tille-thang'.

Lianas; leaves oblong-elliptic or lanceolate, acute or cuneate at base, acuminate at apex, 3-10×1.5-3.5 cm; lateral nerves obscure, parallel; corolla green or greenish-yellow, 4-5 mm; follicles drupaceous, ellipsoid, ± 2×1 cm, slightly wrinkled.

Primary forests, 1000-1800 m; fl. & fr. : May-Dec.; Jarain, Jowai.

92. ASCLEPIADACEAE

- 1a. Erect terrestrial herbs or shrubs.
- 2a. Leaves narrow, 1-3 cm broad, acute at base; coronal processes laterally compressed, not hood-shaped. ... *Asclepias* 1
- 2b. Leaves broad, 4-15 cm broad, cordate at base; coronal processes spatulate, hood-shaped. ... *Calotropis* 2
- 1b. Twining, climbing, decumbent or epiphytic shrubs or herbs.
- 3a. Filaments free; pollen masses granular.
- 4a. Corona present. ... *Cryptolepis* 3
- 4b. Corona absent. ... *Pentaneura* 4
- 3b. Filaments connate; pollen masses waxy.
- 5a. Corolla tube curved, ± 1.5 cm or more long; anthers without a membranous tip. ... *Cerepegia* 5
- 5b. Corolla tube erect, less than 1 cm long; anthers with a membranous inflexed tip.
- 6a. Epiphytic or climbing by roots; leaves fleshy, succulent.
- 7a. Leaves orbicular; corolla urceolate. ... *Dischidia* 6
- 7b. Leaves ovate, oblong or lanceolate; corolla rotate. ... *Hoya* 7
- 6b. Twining climbers; leaves not fleshy or succulent.
- 8a. Corolla urceolate; lobes overlapping. ... *Gongronema* 8
- 8b. Corolla rotate; lobes valvate or patent.
- 9a. Flowers in elongate cymes with very long slender rachis. ... *Tylophora* 9
- 9b. Flowers in short crowded unbelliform cymes.
- 10a. Pollen masses pendulous. ... *Cynanchum* 10

10b. Pollen masses erect.

- | | |
|--|------------------------|
| 11a. Corona with 3-lobed appendage near top on inner angle; stigma truncate, included. ... | <i>Heterostemma</i> 11 |
| 11b. Corona without appendage; stigma conical, exerted. ... | <i>Gynema</i> 12 |

1. ASCLEPIAS L.

Asclepias curassavica L. Sp. Pl. 215. 1753; Fl. Brit. Ind. 4: 18. 1883; Fl. As. 3: 284. 1939.

Perennial erect herbs or shrubs, 0.5-1.5 m; leaves oblong-elliptic or lanceolate, acute at both ends, 6-15 × 1-3 cm; flowers in peduncled umbelliform cymes; corolla red, 7-9 mm long; lobes reflexed; coronal processes orange, 3-4 mm; follicles beaked, smooth; seeds flat, with silky coma.

Open or partially shaded grassy places, near villages, 100-1000 m; fl. & fr. : Mar.-Dec.; Garampani.

2. CALOTROPIS R. Br.

Calotropis gigantea (Willd.) Ait. f. Hort. Kew. ed. 2. 2: 78. 1811; Fl. Brit. Ind. 4: 17. 1883; Fl. As. 3: 282. 1939. *Asclepius gigantea* Willd. Sp. Pl. 1: 1264. 1798.

Shrubs, 1-4 m; leaves oblong or oblong-obovate, cordate at base, 8-30 × 4-15 cm; flowers many, in terminal or axillary cymes; peduncles 5-12 cm; corolla pale purple, fleshy, ± 4 cm diam.; lobes patent or recurved; coronal processes 10-12 mm, with a dorsal row of hairs; follicles curved, 8-10 × 2-4 cm; seeds ovate, ± 5 mm.

Open wastelands, 100-500 m; fl. & fr. : Jan.-Dec.; Dawki.

3. CRYPTOLEPIS R. Br.

Cryptolepis sinensis (Lour.) Merr. in Philip. J. Sci. 15: 254. 1919. *Pergularia sinensis* Lour. Fl. Cochinch. 169. 1790. *Cryptolepis elegans* G. Don, Gen. Syst. 4: 82. 1837; Fl. Brit. Ind. 4: 6. 1883; Fl. As. 3: 278. 1939.

Slender climbers; leaves oblong or oblong-lanceolate, rounded at base, obtuse or rounded and short-mucronate, 3-12 × 1.5-3.5 cm; flowers in

terminal or axillary paniculate cymes; corolla greenish-yellow, 2-3 cm across; follicles 10-13 × 0.5-0.7 cm; seeds with \pm 5 cm long white coma.

Primary forests, 500-1200 m; fl. & fr. : June-Apr.; Umjaisaw.

4. PENTANURA Bl.

Pentanura khasiana Hook. f. Fl. Brit. Ind. 4: 4. 1883; Fl. As. 3: 276. 1939.

Twining glabrous shrubs; leaves elliptic-lanceolate, acuminate at both ends, 8-12 × 3-4 cm; midrib stout; flowers in fascicles on short axillary peduncles; corolla subcampanulate, \pm 6 mm diam.; lobes pubescent inside; follicles incurved, obtuse; seeds with silky coma.

Primary forests, 100-1000 m; fl. & fr. : May-Oct.; Dawki, Syndai.

5. CEROPEGIA L.

Ceropegia angustifolia Wt. Contr. Bot. Ind. 31. 1834; Fl. Brit. Ind. 4: 72. 1883; Fl. As. 3: 308. 1939. **Fig. 17**

Twining shrubs; leaves elongate-lanceolate, acute at base, acuminate, 5-15 × 0.7-2.0 cm; flowers in axillary umbelliform cymes; peduncles 2-3 cm; pedicels 1-2 cm; corolla 2.5-3.5 cm, pale purple at base, brownish at apex; lobes short, suberect; follicles \pm 3 cm.

Open grasslands and on bushes, 1000-1500 m; fl. & fr. : July-Dec.; Jarain, *Balakrishnan* 46162 —Endemic to Meghalaya.

6. DISCHIDIA R. Br.

Dischidia nummularia R. Br. Prodr. Fl. Nov. Holl. 1: 461. 1810; Fl. Brit. Ind. 4: 49. 1883; Fl. As. 3: 299. 1939.

Slender epiphytic herbs; leaves orbicular, 4-10 × 4-9 mm; petioles 1-2 mm, glabrous; flowers 2-3 on short axillary racemes; corolla red, \pm 3 mm; coronal processes split into 2 divaricate or recurved long spatulate segments; follicles ellipsoid, curved, \pm 3 cm; seeds slender, \pm 1.5 mm.

Primary forests, in shaded places, 100-1000 m; fl. & fr. : May-Dec.; Dawki.



Fig. 17. *Ceropegia angustifolia* Wight
 a. Branch. b. L. S. of flower. c. & d. Stamens, inner and outer views. e. & f. Ovary, T. S. & L. S. views.

7. HOYA R. Br.

- 1a. Internodes more than 15 cm long ; flowers more than 3 cm diam. ;
 corolla glabrous within. ...
 1b. Internodes less than 10 cm long ; flowers less than 2 cm diam. ;
 corolla pubescent within.

H. griffithii l

- 2a. Leaves oblong-lanceolate, more than 12 cm long ; lateral nerves horizontal ; corolla pale pink. .. *H. fusca* 2
- 2b. Leaves elliptic-lanceolate, less than 10 cm long ; lateral nerves oblique ; corolla purple or pinkish purple.
- 3a Internodes more than 4 cm long ; leaves 7—10 × 2—4 cm, subcordate at base. ... *H. lobbii* 3
- 3b. Internodes less than 3 cm long ; leaves 2—5 × 1—2 cm, acute at base. ... *H. lanceolata* 4

1. **Hoya griffithii** Hook. f. Fl. Brit. Ind. 4: 59. 1883; Fl. As. 3: 306. 1939.

Stout climbers; leaves oblong-lanceolate or linear-oblong, 15-20 × 3-6 cm; midrib stout; nerves obscure; peduncles stout, 5-10 cm; pedicels 2-3 cm; corolla purple with reddish tinge inside, ± 3 cm diam.; corona white; processes elliptic-subulate, 2-lamellate at base, spurred at apex.

Primary forests in shaded places, 100-1000 m; fl. & fr.: May-Dec.; Dawki.

2. **Hoya fusca** Wall. Pl. As. Rar. 1: 68. t. 75. 1830; Fl. Brit. Ind. 4: 58. 1883; Fl. As. 3: 305. 1939.

Stout climbers; leaves 10-15 × 3-5 cm; midrib stout; petioles 1.5-2.5 cm; peduncles 1.0-2.5 cm; pedicels 2-3 cm; corolla ± 1.2 cm across; lobes ovate; coronal processes short, thick, concave, with recurved spurs on inner angles.

Primary forests, in shaded places, 1000-1500 m; fl. & fr.: May-Dec.; Jowai.

3. **Hoya lobbii** Hook. f. Fl. Brit. Ind. 4: 54: 1883; Fl. As. 3: 303. 1939.

Stout climbers; lateral nerves oblique; petioles 2-3 mm; peduncles 5-10 mm; pedicels 2-3 cm; corolla purplish pink, ± 1.3 cm diam.; coronal processes thick, terete, obtuse acute and raised on inner angles.

Primary forests, often on rocks, 100-1000 m; fl. & fr.: May-Dec.; Dawki, Nongthala.

4. **Hoya lanceolata** Wall. in Wt. Contr. Bot. Ind. 38. 1834; Fl. Brit. Ind. 4: 54. 1883; Fl. As. 3: 303. 1939.

Epiphytic with slender pendulous branches; lateral nerves oblique, obscure; peduncles 2.5-3.5 cm; pedicels 1.5-2.0 cm; corolla pinkish purple, ± 1 cm diam.; coronal processes stellately spreading, fleshy, obtuse with erect acute inner angles.

Primary forests, often in open places, 1000 - 1800 m; fl. & fr. : May-Nov.; Jowai, Umkhlaw.

8. GONGRONEMA Decaisne

Gongronema nepalense (Wall.) Decaisne in DC. Prodr. 8: 624. 1844; Fl. Brit. Ind. 4: 33. 1883; Fl. As. 3: 292. 1939. *Gymnema nepalense* Wall. Tent. Fl. Nep. 50. t. 38. 1826.

Extensive twiners; shoots and cymes puberulous; leaves oblong-ovate rounded or subcordate at base, acuminate, 8 - 16 × 3 - 7 cm; petioles 2 - 5 cm; peduncles 5 - 15 cm, branching into 3 arms, each bearing many-flowered umbels; pedicels 3 - 5 mm; corolla ± 5 mm diam. yellow; follicles 5 - 8 × 0.5 - 0.8 cm.

Primary forests, in shaded places, 100 - 1300 m; fl. & fr. : Aug.-Feb.; Dawki, Jarain, Nartiang.

9. TYLOPHORA R. Br.

Tylophora longifolia Wt. Contr. Bot. Ind. 50. 1834; Fl. Brit. Ind. 4: 42. 1883; Fl. As. 3: 294. 1939.

Slender climbers; leaves lanceolate or linear-lanceolate, subcordate at base, acuminate, 6 - 15 × 1 - 3 cm; petioles 5 - 15 mm; cymes elongate, bearing small distant umbels on long slender rachis; corolla creamy-white, ± 3 mm diam., follicles up to 12 cm; seeds oblong, truncate.

Primary forests, 1000 - 1500 m; fl. & fr. : June-Dec.; Jarain.

10. CYNANCHUM L.

Cynanchum wallichii Wt. Contr. Bot. Ind. 56. 1834; Fl. Brit. Ind. 4: 23. 1883; Fl. As. 3: 286. 1939.

Slender twiner; leaves ovate or oblong-lanceolate, cordate or sub-cordate at base, acuminate, 6 - 14 × 2 - 5 cm; petioles 2.5 - 3.0 cm; flowers in axillary simple umbels; peduncles; 1 - 2 cm; pedicels 5 - 10 mm; corolla greenish, 4 - 5 mm; lobes oblong-lanceolate; follicles 7 - 12 × 3 - 5 cm; seeds ovate, dark brown.

Primary forests, 100 - 500 m; fl. & fr. : July-Feb.; Dawki, G. K. Deka 21815 —Endemic to Meghalaya.

11. HETEROSTEMMA Wt.

Heterostemma alatum Wt. Contr. Bot. Ind. 42. 1834; Fl. Brit. Ind. 4: 47. 1883; Fl. As. 3: 300. 1939.

Slender twiner; leaves elliptic-ovate or elliptic-lanceolate, acute to rounded at base, acuminate, 7-15 × 3-8 cm; flowers in umbels; peduncles less than 1 cm; pedicels 5-10 mm; corolla reddish orange to yellowish, 8-13 mm diam.; lobes ovate; follicles linear, 9-12 × 0.5-0.8 cm; seeds ovate, margined.

Primary forests, 1000-1500 m; fl. & fr. : June-Feb. ; Jowai, Shangpung.

12. GYMNEMA R. Br.

- | | |
|---|------------------------|
| 1a. Plants glabrous; leaves rounded or subcordate at base; corolla ± 8 mm diam.; pedicels more than 1 cm long. ... | <i>G. tingens</i> 1 |
| 1b. Plants, at least shoots, pubescent; leaves acute or rounded at base; corolla ± 5 mm diam.; pedicels up to 6 mm long. | |
| 2a. Leaves glabrous, except nerves beneath; corolla lobes ciliolate and puberulous; follicles thinly coriaceous; seeds narrowly oblong. ... | <i>G. latifolium</i> 2 |
| 2b. Leaves pubescent beneath; corolla lobes glabrous; follicles thickly woody; seeds broadly elliptic. ... | <i>G. acuminatum</i> 3 |

1. **Gymnema tingens** (Roxb.) Spreng. Syst. 1: 844. 1825; Fl. Brit. Ind. 4: 31. 1883; Fl. As. 3: 288. 1939. *Asclepias tingens* Roxb. Fl. Ind. 2. 53. 1832.

Extensive climbers; branches soft, not woody; leaves broadly ovate cordate or subcordate at base, acuminate, 8-12 × 4-6 cm, glabrous; peduncles 1-2 cm; racemes 0.5-1.0 cm; pedicels 1-2 cm; corolla yellow or pale cream; follicles single, 10-12 × 0.5-1.2 cm; seeds ovate, margined.

Primary forests, 100-500 m; fl. & fr. : June-Dec. ; Dawki.

2. **Gymnema latifolium** Wall. in Wt. Contr. Bot. Ind. 45. 1834; Fl. Brit. Ind. 4: 30. 1883; Fl. As. 3: 288. 1939.

Large twiners; leaves elliptic-oblong or ovate-lanceolate, acute at base, acuminate, 8-12 × 4-7 cm, glabrous; main nerves puberulous beneath; peduncles 5-10 mm; racemes 5-10 mm; pedicels 4-6 mm; corolla pale yellow; lobes ciliolate and puberulous; follicles ± 7 cm.

Primary forests, 100-1000 m; fl. & fr. : June-Dec. ; Dawki, Sharma 20626.

3. **Gymnema acuminatum** Wall. Tent. Fl. Nep. 50. 1826; Fl. Brit. Ind. 4: 80. 1883; Fl. As. 3: 287. 1939.

Large twining shrubs; leaves ovate or elliptic-oblong, rounded or acute at base, acuminate, 6-10 × 4-7 cm, glabrous and glossy above, pubescent beneath; peduncles 5-8 mm; racemes 4-6 mm; corolla pale green; lobes glabrous; follicles ± 7 × 1 cm, ribbed.

Primary forests, 100-800 m; fl. & fr.: Aug.-Mar.; Dawki.

93. LOGANIACEAE

- | | | |
|--|-----|---------------------|
| 1a. Annual herbs; leaves 1-nerved, up to 2 cm long. | ... | <i>Mitrasacme</i> 1 |
| 1b. Woody plants; leaves many-nerved, more than 3 cm long. | | |
| 2a. Leaves tomentose at least beneath; hairs stellate or glandular-capitate; flowers 4-merous. | ... | <i>Buddleja</i> 2 |
| 2b. Leaves not tomentose beneath; hairs not stellate nor glandular-capitate; flowers 5-merous. | | |
| 3a. Corolla lobes imbricate; fruits dry, capsular. | ... | <i>Gelsemium</i> 3 |
| 3b. Corolla lobes valvate or contorted; fruits baccate, indehiscent. | | |
| 4a. Corolla lobes contorted in bud; ovary with many ovules in each cell; seeds angular, small. | ... | <i>Fagraea</i> 4 |
| 4b. Corolla lobes valvate in bud; ovary with 1 ovule in each cell; seeds not angular, large. | ... | <i>Gardneria</i> 5 |

I. MITRASACME Labill.

Mitrasacme elata R. Br. Prodr. Nov. Fl. Holl. 453. 1810. *M. nudicaulis* Bl. Bijdr. 849. 1826; Fl. Brit. Ind. 4: 80. 1883.

Erect annual herbs, 20-75 m; leaves in radical rosettes, sessile, oblong-lanceolate, narrow at base, blunt at apex, 5-20 × 3-8 mm; nerves 3-5, basal; panicles lax, terminal; pedicels 2-3 cm; corolla saucer-shaped, creamy-white; tube ± 1.5 cm; lobes elliptic to oblong, 4-8 mm; capsules globose, enclosed in calyx, 5-7 × 2-3 mm; seeds minutely warty.

Grasslands, marshy places and streamsides, 1000-1800 m; fl. & fr.: May-Dec.; Jarain.

2. BUDDLEJA L.

- | | | |
|--|-----|--------------------------|
| 1a. Leaves crenulate-dentate; corolla tinged with pink and yellow, orange at throat, fulvous-woolly outside; seeds tailed. | ... | <i>B. macrostachya</i> 1 |
| 1b. Leaves entire or subentire; corolla white, hairy or glabrescent outside; seeds not tailed. | ... | <i>B. asiatica</i> 2 |

1. **Buddleja macrostachya** Benth. Scroph. Ind. 42: 1835; Fl. Brit. Ind. 4: 81. 1883; Fl. As. 3: 313. 1939.

Shrubs, 1-3 m; leaves oblong-lanceolate to elliptic-lanceolate, cuncate at base, acuminate, 5-25 × 2-7 cm, glabrous above, rusty-villous beneath; lateral nerves 11-17 pairs; petioles up to 8 mm; spikes up to 20 cm; corolla pink or yellow with orange throat; tube 3-5 mm; lobes ± 1 mm; capsules oblong, acute, 8-12 mm.

Open secondary forests and thickets, 1000-1500 m; fl. & fr.: June-Dec.; Dawki.

2. **Buddleja asiatica** Lour. Fl. Cochinch. 72. 1790; Fl. Brit. Ind. 4: 82. 1883; Fl. As. 3: 312. 1939.

Shrubs 1-5 m; leaves oblong to ovate-lanceolate, acute to acuminate, 4-20 × 1-5 cm, glabrous above, densely woolly beneath; lateral nerves 7-12 pairs; petioles 6-8 mm; flowers thyrsoid in up to 25 cm long spikes; corolla white; tube 2-4 mm; lobes ± 1 mm; capsules ovoid, flattened, 6-7 mm.

Open places, thickets and secondary forests, 800-1500 m; fl. & fr.: Jan.-Dec.; Ioksi, Sohka.

3. GELSEMIUM Jussieu

Gelsemium elegans (Gardn. & Champ.) Benth. in J. Linn. Soc. Bot. 1: 90. 1857; Fl. As. 3: 314. 1939. *Medicia elegans* Gardn. & Champ. in Hook. J. Bot. Kew Misc. 1: 324. 1849.

Straggling shrubs; leaves ovate-lanceolate, rounded or oblique at base, acuminate, 8-12 × 2-6 cm; lateral nerves 6-7 pairs; petioles 3-10 mm; panicles terminal, leafy, 3-choromously branched; corolla 1.0-1.5 cm, bright yellow or orange; capsules ellipsoid, 4-10 × 3-4 mm; seeds ± 5 per cell, elliptic, winged around.

Secondary forests and thickets, 500-1700 m; fl. & fr.: Aug.-Apr.; Khleihriat, Nartiang, Shangpung, Sutnga.

4. FAGRAEA Thunb.

Fagraea ceilanica Thunb. Vet. Acad. Handl. Stockh. 3: 132. t. 4. 1782; Fl. Brit. Ind. 4: 83. 1883 (as *zeylanica*). *F. obovata* Wall. in Roxb. Fl. Ind. 2: 33. 1824; Fl. Brit. Ind. 4: 83. 1883. *p. p.*; Fl. As. 3: 318. 1939. *F. khasiana* Benth. in J. Linn. Soc. Bot. 1: 99. 1856; Fl. Brit. Ind. 4: 84. 1883; Fl. As. 3: 319. 1939. '*Dieng-suryukho*'.

Shrubs, climbers or small trees, up to 15 m, usually with aerial roots; leaves ovate, or oblong-obovate, cuneate at base, short-acuminate, 4-35 × 2-9 cm; lateral nerves obscure; cymes dichasial, thyrsoïd, 1-15-flowered; corolla widely funnel-shaped, 2-5 cm, white or cream-coloured; berries ovoid, 2-5 × 2-4 cm, shiny brown to black.

Primary forests, in shaded places, 100-1500 m; fl. & fr.: Jan.-Dec.; Sutnga.

5. GARDNERIA Wall.

Gardneria ovata Wall. in Roxb. Fl. Ind. 1: 400. 1820; Fl. Brit. Ind. 4: 93. 1833; Fl. As. 3: 320. 1939.

Large climbers; leaves oblong to ovate-lanceolate, rounded at base, acute, 6-13 × 2-6 cm; lateral nerves 6-9 pairs; petioles 5-7 mm; cymes suberect to pendulous, 4-8 cm, dichasial, trichotomous; corolla yellow to orange, 2-3 mm; berries globose, ± 8 mm diam., scarlet red; seeds 2, convex-orbicular.

Along edges of forests, 1000-1500 m; fl. & fr.: Mar-Dec.; Jarain, Laskein.

94. GENTIANACEAE

- | | | |
|---|-----|-------------------|
| 1a. Ovary 2-celled; stigma 1, entire or obscurely lobed. | ... | <i>Exacum</i> 1 |
| 1b. Ovary 1-celled; stigmas 2, spreading or recurved. | | |
| 2a. Corolla divided to far below the middle, with 1-2 depressions or pits near the base of each lobe. | ... | <i>Swertia</i> 2 |
| 2b. Corolla divided less than half way down, without depressions or pits. | | |
| 3a. Tall herbs; flowers 4-merous; corolla irregular, pinkish; stamens inserted at unequal heights. | ... | <i>Canscora</i> 3 |
| 3b. Stunted herbs; flowers 5-merous; corolla regular, blue; stamens inserted at equal heights. | ... | <i>Gentiana</i> 4 |

1. EXACUM L.

Exacum tetragonum Roxb. Fl. Ind. 1: 413. 1820; Fl. Brit. Ind. 4: 95. 1833; Fl. As. 3: 322. 1939. **Fig. 18**

Erect glabrous herbs, 20-80 cm; stems scarcely branched, 4-angled; leaves sessile, broadly lanceolate, acute to acuminate, 8-12 × 2-4 cm, basally 5-nerved; flowers in large compound terminal paniculate cymes;

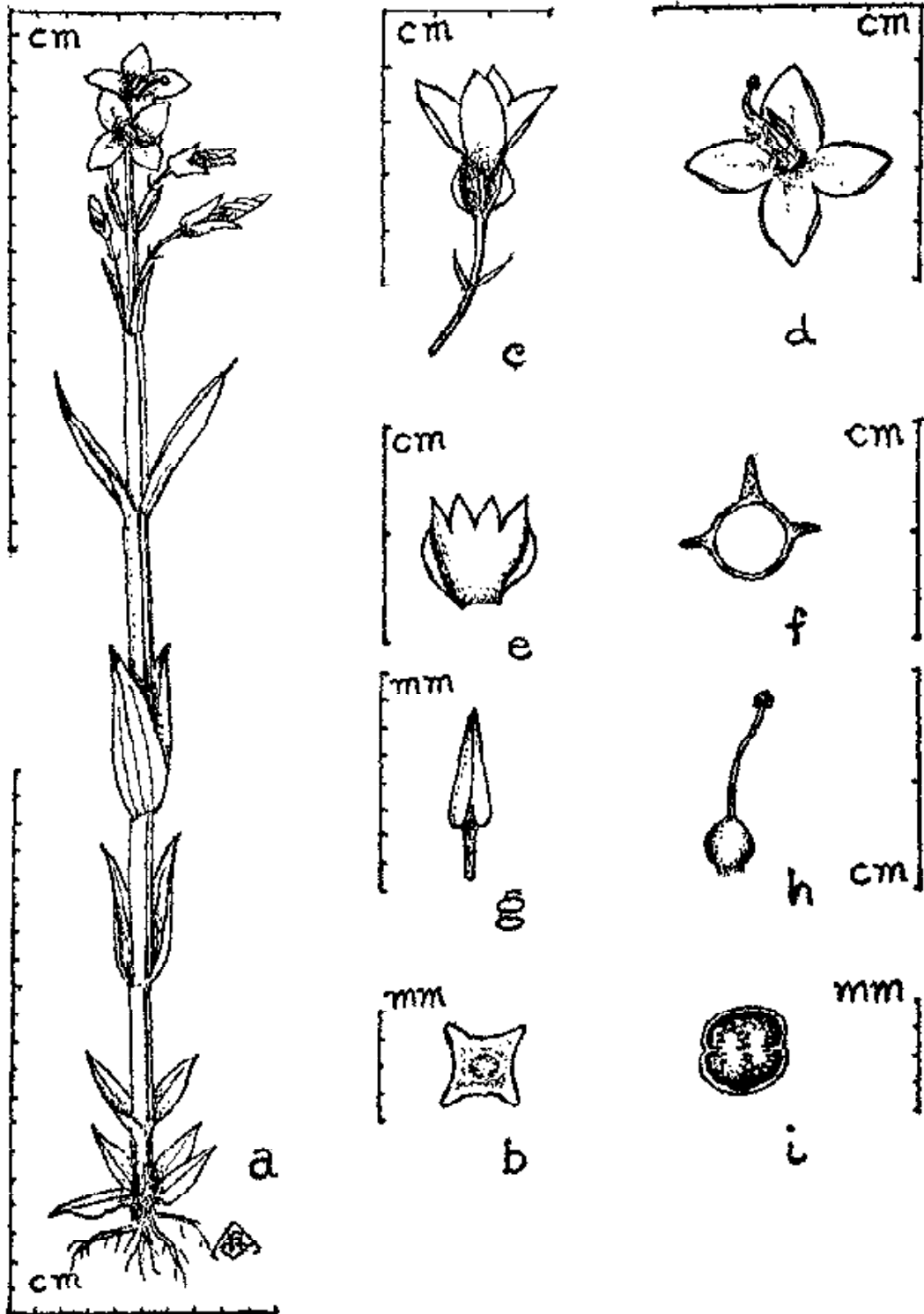


Fig. 18. *Exacum tetragonum* Roxb.

a. Habit. b. T. S. of stem. c. & d. Flower, side and top view. e. & f. Calyx split and spread and in cross section. g. Stamen. h. Pistil. i. Ovary in cross section.

calyx-lobes keeled; corolla blue; lobes oblong-elliptic, 15-20 mm; capsules subglobose or ellipsoid, \pm 7 mm diam.

Open grasslands and marshy places, 200-1600 m; fl. & fr. : Junc-Dec.; Dawki, Jowai, Shangpung.

2. SWERTIA L.

Swertia pulchella (D. Don) Clarke in Fl. Brit. Ind. 4: 125. 1883; Fl. As. 3: 325. 1939. *Ophelia pulchella* D. Don in Trans. Linn. Soc. 17: 525. 1837.

Erect herbs, up to 50 cm; leaves sessile, narrowly lanceolate, 3-10 \times 0.3-1.0 cm, 3-nerved at base; flowers in terminal panicle of cymes; calyx-lobes lanceolate, shorter than the corolla; corolla lobes ovate-lanceolate, 7-8 mm, with one orbicular pitted gland at base, pale cream or pale blue with deeper blue nerves and spots.

Open grasslands, 100-1500 m; fl. & fr. : Sept.-Jan.; Jarain, Nartiang.

3. CANSCORA Lamk.

Canscora andrographioides Clarke in J. Linn. Soc. 14: 431. 1875; Fl. Brit. Ind. 4: 105. 1883; Fl. As. 3: 322. 1939.

Slender erect branched herbs, 20-60 cm; stems quadrangular; leaves elliptic-lanceolate, 3-5 \times 0.8-1.2 cm, 3-5-nerved at base; cymes axillary, dichotomous, few-flowered; pedicels filiform; calyx 4-lobed, bilabiate; corolla pale purple with pink nerves; lobes obovate-oblong, 2-lipped; capsules oblong, \pm 7 mm.

Grasslands, forest edges and near streams in shaded places, 100-1600 m; fl. & fr. : Oct.-Mar.; Dawki, Jowai, Khleihrait, Khongsong.

4. GENTIANA L.

Gentiana quadrifaria Bl. Bijdr. 847. 1826; Fl. Brit. Ind. 4: 111. 1883; Fl. As. 3: 328. 1939.

Annual herbs, 5-15 cm; stems many, ascending, simple or branched; leaves radical and cauline, ovate-lanceolate, 15-25 \times 1-6 mm; flowers solitary, sessile; calyx-lobes lanceolate; corolla 8-12 mm, dark blue or purple; capsules ellipsoid, ovoid, 5-6 mm.

Open grasslands in moist situations, 1000 - 1800 m; fl. & fr. : May-Sept. : Jarain, Jowai, Raliang.

95. BORAGINACEAE

- 1a. Corolla with distinct scales in throat ; ovary deeply 4-lobed ; style gynobasic. ... *Cynoglossum* 1
- 1b. Corolla without scales in throat ; ovary entire or slightly 4-lobed ; style terminal on ovary.
 - 2a. Style 2-branched ; stigma terminal, capitate. ... *Ehretia* 2
 - 2b. Style entire, depressed-conical ; stigma annular, horizontal, below the apex.
 - 3a. Drupe unlobed ; pyrenes 2, 2-seeded. ... *Tournefortia* 3
 - 3b. Drupe deeply 2-lobed ; pyrenes 4, 1-seeded. ... *Heliotropium* 4

1. CYNOGLOSSUM L.

- 1a. Hairs on stems springing from tubercles ; branches of racemes up to 5 cm long. ... *C. glochidiatum* 1
- 1b. Hairs on stems not springing from tubercles ; branches of racemes more than 8 cm long. ... *C. furcatum* 2

1. **Cynoglossum glochidiatum** DC. Prodr. 10: 150. 1846; Fl. Brit. Ind. 4: 156. 1883; Fl. As. 3: 337. 1939.

Erect herbs, woody at base, up to 1 m; leaves lanceolate, attenuate at base, 3-6 x 0.5-2.0 cm, sparsely hispid; branches of racemes 3-5 cm; pedicels 1-2 mm; calyx-lobes ovate, obtuse, corolla pinkish-purple or blue, nutlets ovate, 3-4 mm, glochidiate.

Open grasslands, 1000-1800 m; fl. & fr. : July-Jan.; Carampani.

2. **Cynoglossum furcatum** Wall. in Roxb. Fl. Ind. 2: 6, 1824; Fl. Brit. Ind. 4: 155. 1883; Fl. As. 3: 337. 1939.

Erect herbs or undershrubs, up to 1.5 m; leaves oblong-lanceolate, sessile, entire, 8-10 x 2-4 cm, scabrous above; nerves prominent; branches of racemes 8-10 cm; pedicels ± 1 mm; calyx-lobes ovate to oblong; corolla purple or blue; nutlets 5-6 mm, glochidiate.

Open grasslands and paddy fields, 1000-1500 m; fl. & fr. : Oct.-July; Jowai.

2. EHRETIA P. Br.

Ehretia acuminata R. Br. Prodr. Fl. Nov. Holl. 497. 1810; Fl. Brit. Ind. 4: 141. 1883; Fl. As. 3: 333. 1939.

Trees, 3-5 m; leaves elliptic-oblong or oblanceolate, acute or acuminate, serrate, 6-15 × 2-5 cm; petioles 1.0-1.2 cm; panicles terminal, 6-12 cm; corolla white; tube 1-2 mm; lobes 2-3 mm; drupes ellipsoid, 3-4 mm; pyrenes 2, 2-celled; seed 1 in each cell.

Forests and edges of forests, 1000-1700 m; fl. & fr.: May-Oct.; Garampani, Nartiang, Shangpung.

3. TOURNEFORTIA L.

Tournefortia heyneana DC. Prodr. 9: 516. 1845 (*non* Clarke, 1883).
T. candollei Clarke in Fl. Brit. Ind. 4: 146. 1883; Fl. As. 3: 336. 1939.

Shrubs, often subscandent, 1-3 m; leaves ovate-lanceolate, obtuse or subcordate at base, acuminate, 6-10 × 2-4 cm, hairy beneath; petioles 5-6 mm; branches of racemes 3-5 cm; calyx-teeth linear-lanceolate, 2-3 mm; corolla-tube ± 6 mm; drupes sessile, 3-4 mm.

Primary forests, 100-500 m; fl. & fr.: June-Dec.; Dawki.

4. HELIOTROPIMUM L.

Heliotropium indicum L. Sp. Pl. 130. 1753; Fl. Brit. Ind. 4: 152. 1883.

Annual herbs, up to 75 cm; leaves ovate, narrowed or cordate at base, obtuse or subacute, undulate, 5-10 × 3-8 cm, hispid-pubescent; spikes leaf-opposed, 3-20 cm; corolla pale violet; tube ± 3 mm; lobes round, crenate; fruits subacutely 4-pointed, ± 4 mm; pyrenes 2, ovoid; seeds 2 in each.

Open moist places, paddy fields, roadsides, 100-500 m; fl. & fr.: Apr.-Aug.; Dawki.

96. CONVULVULACEAE

- | | | |
|--|-----|-------------------|
| 1a. Style absent; stigma 1, sessile. | ... | <i>Erycibe</i> 1 |
| 1b. Style(s) well-developed; stigmas 2. | | |
| 2a. Fruit indehiscent; pericarp fleshy or leathery. | ... | <i>Argyria</i> 2 |
| 2b. Fruit thin-walled capsule, opening by valves or irregularly dehiscent. | | |
| 3a. Outer sepals persistent, falling off with fruit; ovary 1-celled; capsule 1-seeded. | ... | <i>Porona</i> 3 |
| 3b. Outer sepals caducous or if persistent not falling with fruits; ovary 2- or 4-celled; capsules 2-4-seeded. | | |
| 4a. Pedicels pilose; outer sepals with many long white hairs; pollen grains smooth. | ... | <i>Merremia</i> 4 |
| 4b. Pedicels glabrous; outer sepals glabrous; pollen grains granulose or spinulose. | ... | <i>Ipomoea</i> 5 |

1. ERYCIBE Roxb.

Erycibe schmidtii Craib, Bot. Tidssk. 32: 352. 1916. *E. laevigata* (non Choisy, 1834) Clarke in Fl. Brit. Ind. 4: 181. 1883; Fl. As. 3: 361. 1939.

Long straggling shrubs; leaves elliptic or oblong-elliptic, acute to obtuse at base, acuminate, sinuate-dentate at margins, 10-15 × 4-7 cm; lateral nerves 8-10 pairs; petioles 1-2 cm; cymes axillary, simple or in short panicles; pedicels 4-5 mm; corolla 2.0-2.5 cm across, yellowish, silky outside; berry globose, ± 2.5 cm.

Primary forests, 1000-1800 m; fl. & fr.: Mar.-Dec.; Shangpung.

2. ARGYREIA Lour.

- | | | |
|---|-----|------------------------|
| 1a. Leaf-base rounded or rhomboid, never cordate. | ... | <i>A. splendens</i> 1 |
| 1b. Leaf-base cordate. | | |
| 2a. Bracts persistent; ovary 2-celled. | | |
| 3a. Outer bracts 0.8—1.2 cm; calyx-lobes longer than bracts. | | <i>A. barbiger</i> 2 |
| 3b. Outer bracts 1.5—3.0 cm; calyx-lobes shorter than bracts. | | <i>A. capitata</i> 3 |
| 2b. Bracts caducous; ovary 4-celled. | | |
| 4a. Leaves silvery-white beneath. | ... | <i>A. argentea</i> 4 |
| 4b. Leaves grey-tomentose or hispid beneath. | | |
| 5a. Corolla-tube glabrescent. | ... | <i>A. hookeri</i> 5 |
| 5b. Corolla-tube densely silky | ... | <i>A. roxburghii</i> 6 |

1. **Argyreia splendens** Sweet, Hort. Brit. ed. 2: 373. 1839; Fl. Brit. Ind. 4: 186. 1883; Fl. As. 3: 343. 1939.

Spreading climbers; leaves oblong-elliptic, acute or short-acuminate, 10-20 × 5-8 cm, silky-white beneath, glabrous above; lateral nerves 10-12 pairs; petioles 5-9 cm; cymes few-flowered, on 3-10 cm long peduncles; corolla 2.5-3.0 cm, pinkish-purple, white at throat; fruits 1-2 cm diam.

Secondary forests, open bushes and roadsides, 500-1500 m; fl. & fr.: Aug.-Feb.; Rytiang.

2. **Argyreia barbiger** Choisy, Conv. Or. 42. 1834. *Lettsomia barbiger* (Choisy) Clarke in Fl. Brit. Ind. 4: 193. 1883; Fl. As. 3: 344. 1939.

Slender climbers; leaves ovate or lanceolate, 3-8 × 2-6 cm, brown silky; lateral nerves 10-12 pairs; petioles 1-3 cm; flowers capitate on up to 6 cm long peduncles; bracts ovate, obtuse, patently hirsute; corolla pinkish-purple, 4-5 cm, setose outside; fruits subglobose, 1.5-2.0 cm diam., yellow.

Open grasslands and bushes, 1000-1800 m; fl. & fr.: July-Jan.; Maw-ryngkneng.

3. **Argyreia capitata** (Vahl) Choisy in Conv. Or. 41. 1834. *Convolvulus capitatus* Vahl, Symb. Bot. 3: 28. 1794. *Lettsomia strigosa* Roxb. Fl. Ind. 2: 80. 1824; Fl. Brit Ind. 3: 193. 1881; Fl. As. 3: 345. 1939.

Stout climbers; leaves ovate-lanceolate, cordate at base, acuminate, 8-16 × 5-12 cm, densely long patent hairy; lateral nerves 12-16 pairs; petioles 3-18 cm, long, brown hairy; flowers capitate on 10-15 cm long peduncles; bracts ovate, hirsute; corolla 4-5 cm, purple with darker throat; fruits 5-6 mm, orange-red.

Forest and forest-edges, 100-1000 m; fl. & fr. : Oct.-Apr.; Sonapur.

4. **Argyreia argentea** Choisy Conv. Or. 36. 1834; Fl. Brit. Ind. 4: 185. 1883; Fl. As. 3: 343. 1939.

Large climbers; leaves ovate-cordate, acute, 7-15 × 3-10 cm, hairy above; lateral nerves 12-15 pairs; petioles 4-8 cm; flowers subcapitate on 5-10 cm long peduncles; corolla ± 5 cm, pinkish purple; fruits subglobose, obscurely 4-lobed, 1.5-2.0 cm diam., orange.

Secondary forests and open bushes, 1000-1500 m; fl. & fr. : June-Dec.; Sutnga.

5. **Argyreia hookeri** Clarke in Fl. Brit. Ind. 4: 185. 1883; Fl. As. 3: 342. 1939. '*Tille-kumou-blang*'.

Large climbers; leaves ovate-cordate, abruptly acuminate at apex, 8-25 × 4-5 cm, glabrescent above; lateral nerves 10-12 pairs; petioles 8-15 cm; flowers few in dichotomous cymes on 5-30 cm long peduncles; corolla 5-6 cm, pink; fruits depressed-globose, orange-red; seeds white.

Forests and forest-edges, 500-1500 m; fl. & fr. : June-Jan.; Mynso.

6. **Argyreia roxburghii** Choisy, Conv. Or. 37. 1834; Fl. Brit. Ind. 4: 185. 1883; Fl. As. 3: 343. 1939.

Large spreading climbers; leaves ovate-cordate, acute, 5-15 × 3-8 cm, patently soft-villous on both sides; lateral nerves 10-14 pairs; petioles 3-8 cm; flowers in dense corymbs on 4-5 cm long peduncles; bracts often foliaceous; corolla pinkish purple inside, dark violet at throat, 4-5 cm; fruits subglobose, ± 1.5 cm diam., yellow.

Open grasslands, 100-1300 m; fl. & fr. : July-Feb.; Carampani to Khongsnong, Nartiang.

3. PORANA Burm. f.

Porana racemosa Roxb. Fl. Ind. 2: 41. 1824; Fl. Brit. Ind. 4: 222. 1883; Fl. As. 3: 353. 1939.

Slender twiners; leaves ovate, deeply cordate, acuminate, 2-10 × 2-7 cm, glabrous; basal nerves 3-5; petioles 2-5 cm; flowers in widely branched lax panicles; sepals equal, linear to oblanceolate, 7-12 × 2-3 mm, persistent; corolla ± 1 cm, white with yellow tube; capsules ovoid, 7-8 mm, green, persistent calyx forming reddish-green wings.

Secondary forests, forest edges and bushes, 400-1700 m; fl. & fr. : July-Dec.; Jarain, Jowai, Mynso.

4. *MERREMIA* Dennst. *nom. cons.*

Merremia vitifolia (Burm. f.) Hall. f. Bot. Jahrb. 16: 552. 1893; Fl. As. 3: 357. 1939. *Convolvulus vitifolius* Burm. f. Fl. Ind. 45. t. 18. f. 1. 1768. *Ipomoea vitifolia* (Burm. f.) Bl. Bijdr. 709. 1826; Fl. Brit. Ind. 4: 213. 1883.

Large twiners; leaves orbicular, cordate at base, palmately 5-7-lobed, 5-17 × 4-15 cm, densely hairy beneath; flowers 1-7 on axillary 1-15 cm long peduncles; calyx-lobes ovate, 1-2 cm, persistent; corolla funnel-shaped, 4-6 cm, bright yellow; capsules subglobose, ± 1.2 cm diam.; seeds black.

Grasslands, thickets and roadsides, 100-1000 m; fl. & fr. : Jan.-Dec.; Dawki.

5. *IPOMOEA* L.

Ipomoea tuba (Schlecht.) G. Don, Gen. Syst. 4: 271. 1838. *Convolvulus tuba* Schlecht. in Linnaea 6: 735. 1831. *I. grandiflora* (non Lamk.) Clarke in Fl. Brit. Ind. 4: 198. 1883.

Large twiners; stem tubercled or muricated; leaves orbicular or ovate, cordate at base, 5-16 × 5-14 cm; lateral nerves 6-8 pairs; flowers solitary or few on axillary 2-5 cm long peduncles; calyx ovate, obtuse, ± 2 cm, persistent; corolla salver-shaped, 9-12 cm, white with green bands; fruits ovoid, ± 2 cm, greenish-yellow.

Open places, roadsides and thickets, 100-500 m; fl. & fr. : Aug.-Mar.; Dawki, Sonapur.

Ipomoea batatas L. (Sweet Potato) is commonly cultivated for its edible root tubers.

97. SOLANACEAE

A family of considerable economic importance with the following under cultivation:

1. *Solanum tuberosum* L.—Potato; *Aloo*.
 2. *Solanum melongena* L.—Brinjal; '*Soh-buingon*'.
 3. *Lycopersicon esculentum* Mill.—'*Tomator*'.
 4. *Capsicum annuum* L.—Chilli, *Mirchi*.
- 1a. Flowers pendulous ; corolla more than 15 cm long. ... *Brugmansia* 1
 - 1b. Flowers erect ; corolla less than 5 cm long.
 - 2a. Calyx enlarged and inflated in fruit ; anthers longitudinally dehiscent. ... *Nicandra* 2
 - 2b. Calyx not enlarged and inflated in fruit ; anthers dehiscent by apical pores. ... *Solanum* 3

1. BRUGMANSIA PETS.

Brugmansia suaveolens (Willd.) Bercht. & Presl. Rost. 1. Solan. 45. 1823.

Shrubs, up to 5 m; leaves oblong or ovate-oblong, oblique at base, 9-25 × 4-17 cm, pubescent at first, glabrescent later; calyx 10-15 cm; corolla 20-30 cm, white, fragrant; berries long-acuminate, 9-11 cm, soft-hairy; seeds ± 1 cm.

Open places and wastelands, 100-1500 m; fl. & fr. : Jan.-Dec.; Dawki.

2. NICANDRA Adans. *nom. cons.*

Nicandra physalodes (L.) Gaertn. Fruct. 2: 237. t. 131. f. 2. 1791; Fl. Brit. Ind. 4: 240. 1883; Fl. As. 3: 364. 1939. *Atropa physalodes* L. Sp. Pl. 181. 1753.

Glabrous herbs, 3-15 cm; branches spreading; leaves ovate to lanceolate, decurrent at base, 8-15 × 3-7 cm; petioles 2-15 cm; corolla campanulate, 2-4 cm, blue; berries globose, ± 1.5 cm diam.; seeds discoid.

Open wastelands, roadsides and thickets, 1000-1800 m; fl. & fr. : June-Jan.; Jowai, Mynso, Nartiang, Raliang.

3. SOLANUM L.

- 1a. Armed plants ; leaves lobed or dissected.
- 2a. Stellate hairs with one arm longer than the others; leaves deeply pinnatifid. ... *S. sisymbriifolium* 1
- 2b. Stellate hairs with all arms equal ; leaves shallowly lobed.
- 3a. Flowers blue. ... *J. indicum* 2
- 3b. Flowers white.

- 4a. Lateral nerves of leaves prickly ; calyx prickly ; berries 20—25 mm diam. ... *S. aculeatissimum* 3
- 4b. Lateral nerves of leaves not prickly ; calyx not prickly ; berries 6—8 mm diam. ... *S. torvum* 4
- Unarmed plants ; leaves entire.
- 5a. Flowers white in peduncled umbels ... *S. nigrum* 5
- 5b. Flowers blue, in sessile umbels or solitary.
- 6a. Slender herbs ; stems rooting at lower nodes, hispid-puberulous ; leaves ovate or elliptic-ovate, rounded or acute at base. ... *S. lysimachioides* 6
- 6b. Erect shrubs ; stems not rooting at nodes, glabrous or rarely branchlets hispid ; leaves lanceolate or oblanceolate, cuneate at base.
- 7a. Branchlets hispid ; calyx-teeth 3—7 mm long. ... *S. macrodon* 7
- 7b. Branchlets glabrous ; calyx truncate or with minute teeth.
- 8a. Stems prominently zigzag ; pedicels usually 2—8 together ; fruits 5—7 mm diam. ... *S. laeve* 8
- 8b. Stems not zigzag ; pedicels usually solitary or rarely paired ; fruits 8—10 mm diam. ... *S. subtruncatum* 9

1. ***Solanum sisymbriifolium*** Lamk. Tabl. Encycl. 1(2): 25. 1792; Fl. As. 3: 371. 1939.

Viscid undershrubs, 0.5 - 1.0 m; leaves pinnatifid or bipinnatifid, 10 - 20 × 5 - 10 cm, stellate pubescent; flowers in racemes; calyx cup-shaped, prickly, accrescent; corolla 2.5 - 3.5 cm across, white or pale purple; berries ± 2.5 cm diam., shiny, orange yellow.

Open rocky situations, 800 - 1300 m; fl. & fr. : Aug.-May; Nartiang --Introduced from S. America and now naturalised.

2. ***Solanum indicum*** L. Sp. Pl. 187. 1753; Fl. Brit. Ind. 4: 234. 1883; Fl. As. 3: 369. 1939.

Prickly shrubs, up to 3 m; young shoots thickly stellate-hairy; leaves ovate-oblong, serrate or obtusely and shallowly lobed, 5 - 15 × 2 - 8 cm, green above, white and thickly stellate-tomentose beneath; flowers in extra-axillary racemose cymes; corolla bluish-purple; berries 1.5 - 2.5 cm diam., orange-yellow.

Open dry rocky situations, 100 - 1800 m; fl. & fr. : June-Feb.; Mawryngkneng, Raliang.

3. ***Solanum aculeatissimum*** Jacq. Coll. 1: 100. 1786; Fl. Brit. Ind. 4: 237. 1883. *S. khasianum* Clarke in Fl. Brit. Ind. 4: 234. 1883; Fl. As. 3: 371. 1939.

Prickly shrubs, 0.5 - 1.5 m; young parts yellowish-hirsute; prickles straight or recurved; leaves ovate-acute, cordate at base, shallowly lobed,

3-15 × 1-12 cm, prickly; flowers few in lateral racemes; calyx hirsute; corolla 8-9 mm across, white; berries yellow.

Open wastelands, 1000-1500 m; fl. & fr. : June-Dec.; Jarain.

4. **Solanum torvum** Sw. Prodr. 47. 1768; Fl. Brit. Ind. 4: 234. 1883; Fl. As. 3: 360. 1939.

Prickly shrubs, 1-3 m; prickles sparse; leaves ovate, serrate or shallowly and obtusely lobed, 5-20 × 3-15 cm, stellate-pubescent; flowers in extra-axillary racemes; calyx unarmed; corolla white, stellate-pubescent outside; berries yellow.

Open and partially shaded places near forests, 400-1200 m; fl. & fr. : May-Dec.; Nongringkoh, Sohka, Umtapoh.

5. **Solanum nigrum** L. Sp. Pl. 186. 1753; Fl. Brit. Ind. 4: 229. 1883; Fl. As. 3: 366. 1939.

Herbs, up to 1 m; leaves ovate-lanceolate or oblong-ovate, cuneate at base, acute or acuminate, 3-12 × 2-5 cm; petioles 1-2 cm; flowers in sub-umbellate cymes; corolla ± 2 cm across, stamens yellow; berries globose, 6-8 mm diam., reddish yellow to black.

Open and partially shaded places, 100-1500 m; fl. & fr. : May-Nov.; Jarain.

6. **Solanum lysimachioides** Roxb. Fl. Ind. 2: 257. 1832. *S. macrodon* Nees var. *lysimachioides* (Roxb.) Clarke in Fl. Brit. Ind. 4: 232. 1883.

Slender herbs; branches up to 70 cm, prostrate, decumbent, glandular-hispid; leaves ovate, acute to short-acuminate, 1-3 × 0.5-2.0 cm, hispid pubescent; petioles 0.5-2.5 cm; flowers solitary, axillary, pale purple; berries 8-10 mm diam., orange-red.

Forest edges in open moist places, 1000-1800 m; fl. & fr. : June-Nov.; Jowai.

7. **Solanum macrodon** Nees in Trans. Linn. Soc. 17: 43. 1834; Fl. Brit. Ind. 4: 232. 1883. *Lycianthes macrodon* (Nees) Ritter in Akh. Nat. Ver. Bremen 24: 468. 1920; Fl. As. 3: 372. 1939.

Shrubs, up to 1.5 m; leaves elliptic-lanceolate, acute or obtusely acuminate 8-16 × 3-6 cm; petioles 5-15 mm; pedicels axillary, solitary or 2-5 together, ± 1 cm; calyx-cup 3-4 mm; lobes many, linear, hispidulous; corolla 8-10 mm, purple or pale pink; lobes with 2 glandular spots at base; berries ± 6 mm, orange-red.

Shaded moist places near streams in forests, 1000-1500 m; fl. & fr. : July-Jan.; Jowai.

8. **Solanum laeve** Dunal, Solan. Synops. 22. 1816; Fl. Brit. Ind. 4: 231. 1883.

Herbs or undershrubs, 0.7 - 1.5 m; stems often tinged purple, minutely puberulous towards apex; leaves oblong-lanceolate, obliquely cuncate at base, acuminate, 8 - 20 × 2 - 8 cm; petiole 1 - 3 cm; pedicels 1 - 2 cm; corolla 6 - 8 mm, purple; berries orange-red.

Shaded moist places in forests, 100 - 1000 m; fl. & fr. : July-Dec.; Sohka.

9. **Solanum subtruncatum** Dunal in DC. Prodr. 13(1): 180. 1852; Fl. Brit. Ind. 4: 231. 1883. *Lycianthes subtruncata* (Dunal) Bitter in Akh. Nat. Ver. Bremen 24: 478. 1920; Fl. As. 3: 372. 1939.

Erect glabrous shrubs, 0.5 - 1.5 m; leaves lanceolate, cuncate at base, acuminate, 10 - 16 × 3 - 5 cm; petioles 5 - 10 mm; flowers axillary, solitary or paired; pedicels ± 1.5 cm; corolla ± 6 mm across, bluish-white; berries orange-red.

Shaded places in forests, 200 - 1000 m; fl. & fr.: July-Dec.; Jarain.

98. SCROPHULARIACEAE

- | | |
|--|-----------------------|
| 1a. Calyx asymmetrical, spathaceous, split down on one side. ... | <i>Centranthera</i> 1 |
| 1b. Calyx symmetrical, campanulate, 5-lobed. | |
| 2a. Corolla 4-lobed. | |
| 3a. Erect herbs or undershrubs; corolla rotate, white or yellow; stamens 4. ... | <i>Scoparia</i> 2 |
| 3b. Trailing herbs; corolla bilabiate, pink or purple; stamens 2. ... | <i>Nelsonia</i> 3 |
| 2b. Corolla 5-lobed. | |
| 4a. Corolla with lower lobes outside, overlapping in bud. | |
| 5a. Corolla-tube short, cup-shaped. ... | <i>Sapubia</i> 4 |
| 5b. Corolla-tube long, slender. | |
| 6a. Calyx distinctly ribbed; corolla-tube abruptly incurved above, pubescent outside. ... | <i>Striga</i> 5 |
| 6b. Calyx faintly ribbed; corolla-tube straight, glabrous outside. | |
| 7a. Basal leaves in rosette; flowers in condensed spikes or racemes; anthers 1-celled. ... | <i>Buchnera</i> 6 |
| 7b. Basal leaves distantly placed; flowers in lax racemes; anthers 2-celled. ... | <i>Alectra</i> 7 |
| 4b. Corolla with upper lobes outside, overlapping in bud. | |
| 8a. Anther-cells separate, parallel. | |
| 9a. Corolla pale yellow; corolla-palate with 2 folds; capsules 2-valved. ... | <i>Lindenbergia</i> 8 |
| 9b. Corolla pale purple; corolla-palate without folds; capsules 4-valved. ... | <i>Limnophila</i> 9 |
| 8b. Anther-cells confluent, divergent. | |
| 10a. Basal leaves in rosette; capsules loculicidal. ... | <i>Mazus</i> 10 |
| 10b. Basal leaves not in rosette; capsules septicidal. | |

- 11a. Flowers in terminal panicle of thyrsoid cymes; stamens exerted. ... *Scrophularia* 11
 11b. Flowers axillary, solitary or in terminal racemes; stamens included.
 12a. Calyx winged or keeled, gamosepalous. *Torenia* 12
 12b. Calyx not winged or keeled, polysepalous or nearly so. ... *Lindernia* 13

1. CENTRANTHERA R. Br.

- 1a. Leaves less than 8 mm broad; calyx 5—6 mm long; corolla less than 1.5 cm long, purplish at apex, yellow at base. ... *C. cochinchinensis* 1
 1b. Leaves more than 10 mm broad; calyx 20—25 mm long; corolla more than 4 cm long, entirely yellow. ... *C. grandiflora* 2

1. **Centranthera cochinchinensis** (Lour.) Merr. in Trans. Amer. Phil. Soc. Philad. n. s. 24: 353. 1935. *Digitalis cochinchinensis* Lour. Fl. Cochinch. 378. 1790. *C. hispida* R. Br. Prodr. Fl. Nov. Holl. 438. 1810; Fl. Brit. Ind. 4: 301. 1884.

Erect herbs, 15-30 cm; leaves linear-oblong, 1.5 × 0.3-0.8 cm; hispid; flowers subsessile, in terminal spike-like racemes; bracteoles 3-4 mm; corolla 10-15 mm, filaments woolly; capsules ovoid, 5-6 mm; seeds oblong, brown.

Open sunny localities in grasslands and secondary forests, 1000-1400 m; fl. & fr. : July-Jan.; Jowai.

2. **Centranthera grandiflora** Benth. Scroph. Ind. 50. 1835; Fl. Brit. Ind. 4: 301. 1884.

Erect herbs, 20-60 cm, rarely branched; leaves sessile, oblong-elliptic to narrowly linear, acute at base, acute to obtuse at apex, 2.5 × 1-3 cm; pedicels 5-8 mm; corolla 4-5 cm; filaments hairy; capsules globose, ± 1 cm; seeds oblong brown.

Open slopes of hills and forest edges, 1000-1500 m; fl. & fr. : May-Dec.; Jarain, Jowai, Raliang.

2. SCOPARIA L.

Scoparia dulcis L. Sp. Pl. 116. 1753; Fl. Brit. Ind. 4: 289. 1884.

Erect herbs or undershrubs, up to 1 m; stems angular; leaves elliptic, rhomboid, obovate or oblanceolate, serrate, 10-30 × 4-13 mm; flowers axillary, solitary or paired; pedicels 5-7 mm; corolla 5-6 mm across, white or pale pink with dark center; capsules oblong-ovoid, obtuse, 2-3 mm, 4-valved.

Dry and moist situations in wastelands and roadsides, 100-1000 m; fl. & fr. : Apr.-Dec.; Dawki, Garampani, Sutnga.

3. NELSONIA R. Br.

Nelsonia canescens (Lamk.) Spreng. Syst. Veg. 1: 42. 1825. *Justicia canescens* Lamk. Tab. Encycl. Meth. 1: 41. 1791. *N. campestris* R. Br. Prodr. Fl. Nov. Holl. 481. 1810; Fl. Brit. Ind. 4: 394. 1884; Fl. As. 3: 411. 1939.

Soft-villous, diffusely branched herbs, with trailing flowering stems; leaves obovate, oblong-ovate, acute or obtuse at apex, 2-5 × 1-3 cm; spikes 1-5 cm; bracts ovate, obtuse, 5-6 mm; bluish-pink or rose; capsules oblong, 4-5 mm; seeds 8-12, yellowish with brown granulations.

Open moist locations, 100-500 m; fl. & fr. : Mar.-Sept.; Dawki.

4. SOPUBIA D. Don

Sopubia trifida D. Don, Prodr. Fl. Nep. 88. 1825; Fl. Brit. Ind. 4: 302. 1884; Fl. As. 3: 382. 1939.

Erect herbs, 20-60 cm; leaves linear-filiform, lower ones mostly 3-fid, upper ones entire, 15-25 cm; flowers axillary, solitary; pedicels 1.0-1.5 cm; corolla subrotate, ± 1.2 cm across, yellow, with purple center; capsules ovoid, retuse at apex, 5-6 mm.

Open grasslands, 1000-1800 m; fl. & fr. : May-Nov.; Jowai, Nartiang, Raliang.

5. STRIGA Lour.

Striga lutea Lour. Fl. Cochinch. 22. 1790; Fl. Brit. Ind. 4: 299. 1884.

Herbs, 10-40 cm, rarely branched; leaves linear, obtuse, 10-15 × 1-2 mm, hispid or scabrid; calyx 4-5-lobed, 8-10-ribbed, 4-6 mm; corolla white or yellow; tube ± 8 mm; upper lip ± 1 mm long, emarginate; lower lip 3-4 mm; capsules oblong, ± 3 mm.

Grasslands, roadsides and paddy fields, 100-500 m; fl. & fr. : Jan.-June; Dawki.

6. BUCHNERA L.

Buchnera cruciata Buch.-Ham. in D. Don, Prodr. Fl. Nep. 91. 1825; Fl. Brit. Ind. 4: 298. 1884.

Simple or branched herbs, 20-60 cm; basal leaves oblong, obtuse, 2-5 × 0.5-1.5 cm; cauline leaves linear or lanceolate, narrowed at base, entire or toothed, 1-3 × 0.2-0.8 cm; flowers in terminal subcapitate racemes; bracts ovate, equal to calyx; corolla pale creamy or pale pink.

Open grasslands or pine forests, 1300-1800 m; fl. & fr.: Aug.-Jan.; Jowai - Shangpung, Mawryngkneng, Shangpung.

7. *ALECTRA* Thunb.

Alectra avensis (Benth.) Merr. in Philip. J. Sc. Bot. 12: 109. 1917. *Glossostyles avensis* Benth. Scroph. Ind. 49. 1835. *A. indica* Benth. in DC. Prodr. 10: 339. 1846; Fl. Brit. Ind. 4: 297. 1884.

Erect scaberulous herbs, 15-35 cm; leaves sessile or subsessile, ovate-lanceolate, cuneate to subcordate at base, coarsely toothed or lobed, 1.5-3.5 × 0.5-1.5 cm; spikes terminal, dense-flowered, 6-15 cm; bracteoles ciliate; corolla ± 6 mm, yellow; capsules subglobose, 4-lobed; seeds linear.

Open places, grasslands and pine forests, 1200-1800 m; fl. & fr.: Aug.-Jan.; Jowai, U. N. *Kanjilal* 8519.

8. *LINDENBERGIA* Lehm.

Lindenbergia muraria (Roxb.) Bruhl in J. Dep. Sc. Univ. Calc. 2: 27. 1920. *Stemodia muraria* Roxb. in D. Don, Prodr. Fl. Nep. 89. 1825. *L. urticifolia* Lehm. in Link & Otto, Ic. Pl. Rar. 95, t. 48. 1831; Fl. Brit. Ind. 4: 262. 1884.

Annual herbs, 10-40 cm; branches erect or ascending; leaves ovate cuneate at base, obtuse or subacute, crenate-serrate, 1-4 × 0.5-2.5 cm, sparsely hairy; petioles 6-20 mm; flowers solitary, axillary; pedicels up to 8 mm; corolla-tube 5-8 mm, yellow; capsules vertically 2-grooved, hairy.

Moist shaded places, 100-1500 m; fl. & fr.: June-Oct.; Jaintea Hills, G. Mann s. n.; Dawki.

9. *LIMNOPHILA* R. Br. *nom. cons.*

Limnophila chinensis (Osb.) Merr. in Amer. J. Bot. 3: 581. 1916; Fl. As. 3: 379. 1939. *Columnnea chinensis* Osb. Dagbok Ostind. Res. 230. 1757. *Stemodia hirsuta* Benth. Scroph. Ind. 24. 1835. *L. hirsuta* (Benth.) Benth. in DC. Prodr. 10: 388. 1846; Fl. Brit. Ind. 4: 268. 1884.

Erect or decumbent hirsute-pubescent herbs, 10-30 cm; leaves verticillate, obovate, oblanceolate or elliptic, serrulate, 1-4 × 0.5-2.0 cm,

flowers solitary or cymose; corolla pale purple; capsules orbicular, with persistent striate calyx; seeds angular.

Wet paddy fields and open marshes, 1000-1500 m; fl. & fr.: Aug.-Dec.; Raliang.

10. *Mazus* Lour.

Mazus pumilus (Burm. f.) van Steenis in Nov. Guinea n. s. 9: 31. 1958. *Lobelia pumila* Burm. f. Fl. Ind. 186. t. 60. f. 3. 1768. *M. rugosus* Lour. Fl. Cochinch. 385. 1793; Fl. Brit. Ind. 4: 259. 1884.

Herbs with tufted ascending stems, 5-40 cm; basal leaves opposite, obovate, 2-6 x 1-2 cm; upper leaves obovate-spathulate, cuneate at base, obtuse at apex, crenate-dentate, 1-3 x 0.5-2.5 cm; racemes 2-30 cm long; calyx 5-8 mm, 5-fid; corolla white with 2 yellow spots inside, upper lip pale purple; fruits 3-4 mm diam.

Rocky open and fairly dry places, 100-1400 m; fl. & fr.: May-Dec.; Garampani, Jowai-Jarain.

11. *Scrophularia* L.

Scrophularia elatior Benth. Scroph. Ind. 18. 1835; Fl. Brit. Ind. 4: 255. 1883; Fl. As. 3: 377. 1939.

Stout undershrubs, 1-2 m, glabrous or glandular above; leaves ovate or lanceolate, rounded or subcordate at base, coarsely dentate, 5-25 x 2-10 cm; petioles 3-8 cm; flowers in terminal thyrsoid panicles; corolla greenish-yellow; tube cup-shaped; lobes 5, short; stamens exerted; capsules ovoid, beaked, transversely dehiscent.

Open grasslands and pine forests, 1300-1800 m; fl. & fr.: July-Dec.; Jowai.

12. *Torenia* L.

- | | |
|--|----------------------|
| 1a. Leaves sessile or subsessile; flowers racemed at ends of branches; calyx wingless, narrowly ribbed; corolla yellow with purple throat. ... | <i>T. flava</i> 1 |
| 1b. Leaves petioled; flowers solitary, axillary; calyx winged; corolla pale purple or blue. | |
| 2a. Calyx cleft to the middle, narrowly winged; filaments appendaged at base. ... | <i>T. diffusa</i> 2 |
| 2b. Calyx cleft to the base, broadly winged; filaments not appendaged. ... | <i>T. violacea</i> 3 |

1. **Torenia flava** Benth. Scroph. Ind. 38. 1835; Fl. Brit. Ind. 4: 278. 1884.

Erect or decumbent hairy herbs, 15-30 cm, branching from base; leaves lanceolate or ovate-oblong, obtuse, subentire, 2-5 × 1-2 cm, glabrescent; calyx ± 1 cm at anthesis, ± 2 cm at fruiting; lobes elliptic, acuminate; corolla 2-3 cm; capsules ± 1 cm.

Open moist grassy places, 100-1000 m; fl. & fr.: June-Oct.; Dawki.

2. **Torenia diffusa** D. Don, Prodr. Fl. Nep. 86. 1825. *T. vagans* Roxb. Fl. Ind. 3: 96. 1832; Fl. Brit. Ind. 4: 277. 1884.

Erect or decumbent herbs, diffusely branched, rooting at nodes; leaves ovate or oblong-ovate, subobtuse, serrate 2-4 × 1-2 cm; calyx ± 1 cm at anthesis, ± 2 cm at fruiting; lobes narrowly oblong, acute, narrowly winged; corolla 2-3 cm; capsules linear, ± 1 cm.

Along streams and moist grassy open places, 100-1500 m; fl. & fr.: May-Oct.; Dawki, Jarain, Sonapur.

3. **Torenia violacea** (Azaola) Penn. in J. Arn. Arb. 24: 255. 1943. *Mimulus violacea* Azaola in Blanco, Fl. Filip. ed. 2: 357. 1845. *T. peduncularis* Hook. f. Fl. Brit. Ind. 4: 276. 1884.

Erect or decumbent herbs, widely branched, 10-45 cm; stems appressed-hairy, strongly tinged purple; leaves ovate, rounded at base, tapering at apex, 2-4 × 1-2 cm; calyx 5-winged; lobes ovate, abruptly acuminate; corolla 2-3 cm.

Open places, paddy fields, roadsides and along streams, 100-1000 m; fl. & fr.: May-Oct.; Syndai-Muktapur.

13. LINDERNIA All.

1a. Capsule about equal to calyx or shorter.

2a. Fruiting calyx cleft to the middle or less, 4-6 mm long; corolla 6-8 mm long. ... *L. crustacea* 1

2b. Fruiting calyx cleft to the base or nearly so, 2-3 mm long; corolla 3-4 mm long.

3a. Leaves sessile, entire or sinuate; sepals shorter than capsules. ... *L. multiflora* 2

3b. Leaves petioled, crenate-toothed; sepals equal to capsule. ... *L. elata* 3

1b. Capsule twice as long as calyx or longer.

4a. Leaves ovate; fertile stamens 4. ... *L. nummularifolia* 4

4b. Leaves linear, oblanceolate; fertile stamens 2.

5a. Leaves palmately nerved; capsules ellipsoid. ... *L. hyssopifolides* 5

5b. Leaves penninerved; capsules linear-lanceolate.

6a. Pedicels deflexed in fruit. ... *L. tenuifolia* 6

6b. Pedicels erect or horizontal in fruit. ... *L. antipoda* 7

1. **Lindernia crustacea** (L.) F. v. Muell. Syst. Cens. Austral. Pl. 1: 97. 1882. *Capriaria crustacea* L. Mant. 1: 87. 1767. *Vandelia crustacea* (L.) Benth. Scroph. Ind. 35. 1835; Fl. Brit. Ind. 4: 279. 1884.

Herbs, up to 20 cm, erect or creeping, rooting at nodes; leaves elliptic or ovate-lanceolate, rounded at base, obtuse at apex, blunt serrate, 5-20 × 3-10 mm; petioles 1-8 mm; pedicels 5-12 mm at anthesis, up to 20 mm in fruits; corolla purple or pinkish-purple; capsules oblong-ovoid, 3-4 mm.

Open marshy places, streamsides and paddy fields, 100-1000 m; fl. & fr.: June-Nov.; Garampani.

2. **Lindernia multiflora** (Roxb.) Mukerjee in J. Ind. Bot. Soc. 24: 131. 1945. *Torenia multiflora* Roxb. Fl. Ind. 3: 96. 1832. *Vandelia multiflora* (Roxb.) G. Don, Gen. Syst. 4: 549. 1838; Fl. Brit. Ind. 4: 280. 1884.

Herbs, up to 15 cm, suberect; leaves oblong-ovate to elliptic, subentire, 8-20 × 5-12 mm, glabrescent above, sparsely hirsute beneath; petioles 1-8 mm; pedicels 5-10 mm; corolla white to pale blue, with yellow throat; capsules ovoid-ellipsoid, 2.5-3.5 mm.

Marshy open places, amidst grass, 100-500 m; fl. & fr.: June-Nov.; Ioksi.

3. **Lindernia elata** (Benth.) Wettst. in Engler & Prantl, Pflanzenfam. 4(3b): 79. 1891. *Vandelia elata* Benth. Scroph. Ind. 36. 1835; Fl. Brit. Ind. 4: 280. 1884.

Slender suberect herbs, 15-25 cm, simple or 3-chotomously branched; leaves ovate, coarsely hairy, 6-12 × 3-8 mm; pedicels 10-15 mm; corolla ± 2 mm, hardly exceeding calyx, white or pale blue; capsules oblong-ovoid, ± 3 mm.

Marshy open grasslands, 100-1000 m; fl. & fr.: June-Nov.; Sonapur.

4. **Lindernia nummularifolia** (D. Don) Wettst. in Engler & Prantl, Pflanzenfam. 4(3b): 97. 1891. *Vandellia nummularifolia* D. Don. Prodr. Fl. Nep. 86. 1825; Fl. Brit. Ind. 4: 282. 1884.

Simple or sparsely branched erect herbs, 10-25 cm; leaves sessile, ovate or obovate, obtuse, crenate-serrate, 10-20 × 5-12 mm; pedicels 8-20 mm; corolla 5-6 mm, reddish-purple; lateral lobes of lip white; capsules ellipsoid, acuminate, ± 6 mm.

Open marshy places, 1000-1500 m; fl. & fr.: June-Nov.; Jarain.

5. **Lindernia hyssopioides** (L.) Haines, Bot. Bih. & Orissa 635. 1922. *Gratiola hyssopioides* L. Mant. Pl. 174. 1767. *Hysanthes hyssopioides* (L.) Benth. in DC. Prodr. 10: 419. 1846; Fl. Brit. Ind. 4: 283. 1884.

Slender erect herbs, 10-20 cm, diffusely branched; leaves sessile, distant, linear-oblong, or oblanceolate, subentire, 7-15 × 1-3 mm; pedicels filiform, 8-15 mm; corolla 7-9 mm, pale purple; capsules ovoid to ellipsoid, 4-5 mm, deflexed, pedicellate.

Open marshes, 100-1000 m; fl. & fr.: June-Nov.; Ioksi.

6. **Lindernia tenuifolia** (Colsm.) Alston in Trimen, Fl. Ceyl. 6. suppl.; 214. 1931. *Gratiola tenuifolia* Colsm. Prodr. Desc. Grat. 8. 1793. *Bonnaya tenuifolia* (Colsm.) Spreng. Syst. Veg. 1: 42. 1824; Fl. Brit. Ind. 4: 286. 1884.

Erect slender herbs, 10-20 cm; leaves sessile, linear, shallowly crenate or subentire, 7-20 × 1-2 mm, glabrous; pedicels 3-7 mm; corolla ± 2.5 mm, white; lower lip with yellow spot; upper lip with purple spot and yellow base; capsules terete, ± 1 cm.

Open marshes and paddy fields, 1000-1500 m; fl. & fr.: June-Dec.; Jowai, Nartiang.

7. **Lindernia antipoda** (L.) Alston in Trimen, Fl. Ceyl. 6. suppl.; 214. 1931. *Ruellia antipoda* L. Sp. Pl. 635. 1753. *Bonnaya veronicifolia* (Retz.) Spreng. Syst. Veg. 1: 41. 1824; Fl. Brit. Ind. 4: 285. 1884. *Gratiola veronicifolia* Retz. Obs. Bot. 4: 8. 1786.

Slender subdecumbent herbs, 10-30 cm, often rooting at lower nodes; leaves sessile, linear-elliptic to lanceolate, obtuse, remotely crenate-dentate, 10-25 × 5-10 mm; pedicels 1-3 cm; calyx deeply 5-lobed; corolla 6-10 mm, white or purple-blue; capsules 9-14 mm.

Open grasslands, marshes and streamsides, 100-1000 m; fl. & fr.: June-Dec.; Dawki, Ioksi.

99. OROBANCHACEAE

- | | |
|---|----------------------|
| 1a. Flowers solitary or few, terminal on slender scape; calyx spathaceous, split in front nearly to base; corolla subequally 5-lobed. ... | <i>Aeginetia</i> 1 |
| 1b. Flowers many, dense in axils of bracts on stout racemes; calyx cup-shaped, truncate or 5-toothed; corolla 2-lipped. ... | <i>Boschniakia</i> 2 |

1. AEGINETIA L.

Aeginetia indica L. Sp. Pl. 632. 1753; Fl. Brit. Ind. 4: 320. 1884; Fl. As. 3: 385, 1939.

Root-system consisting of fleshy interlaced fibres; scapes few together or solitary, 15-35 cm, yellow or reddish-brown, with scales at base; flowers

solitary terminal; calyx 3-5 cm, dark purple; corolla purple, pinkish or yellowish purple, 4-5 cm; limb fimbriate at margins; fruits ovoid, 1.5-2.0 cm; seeds yellowish.

Parasite on roots of *Imperata*, *Oryza* and other grasses, in shaded forests, 1000-1800 m; fl. & fr.: July-Dec.; Jarain, Ummulong.

3. BOSCHNIAKIA C. A. Mey

Boschniakia himalaica Hook. f. Fl. Brit. Ind. 4: 327. 1884.

Plants 10-40 cm, pale brown, tuberous at base; stems \pm 1.5 cm thick; scales many, rigid, oblong-ovate, obtuse or acute, 1.0-1.5 cm; brown; pedicels 6-8 mm; corolla erect, 13-16 mm, white, puberulous; upper lip entire; lateral lobes minute, subulate; capsules oblong, 2.0-2.5 cm.

Moist dense forests on humus soil, 1200-1500 m; fl. & fr.: Oct.-Feb.; Jowai, *Panigrahi* 4150.

100. LENTIBULARIACEAE

UTRICULARIA L.

- | | |
|--|-----------------------|
| 1a. Leaves ovate-orbicular, present at flowering time; bracts produced below the point of attachment; lip of corolla palmately 5-lobed, or crenate pinkish-purple. ... | <i>U. striatula</i> 1 |
| 1b. Leaves linear-spathulate, absent at flowering; bracts not produced below the point of attachment; lower lip of corolla entire, yellow. | |
| 2a. Pedicels in fruit curved; calyx-lobes in fruit obtuse. ... | <i>U. bifida</i> 2 |
| 2b. Pedicels in fruit erect; calyx-lobes in fruit acute. ... | <i>U. scandens</i> 3 |

1. **Utricularia striatula** Sm. in Rees. Cyclop. 37: no. 17. 1819.
U. orbiculata DC. Prodr. 8: 18. 1844; Fl. Brit. Ind. 4: 334. 1884.

Fig. 19

Erect herbs, 2-10 cm; leaves conspicuous at anthesis; scapes erect, filiform, 2-10 cm, 1-10-flowered; bracts 1.5-2.0 mm; pedicels 2-6 mm; calyx-lobes orbicular, emarginate; corolla white or tinged with pink, with a yellow spot on palate, 3-6 mm; lower lip orbicular, 3-10 mm across; spur curved.

Epiphytic, lithophytic or terrestrial in moist places, 1000-1800 m; fl. & fr.: June-Oct.; Jowai.

2. **Utricularia bifida** L. Sp. Pl. 18. 1753; Fl. Brit. Ind. 4: 332. 1884; Fl. As. 3: 386. 1939.

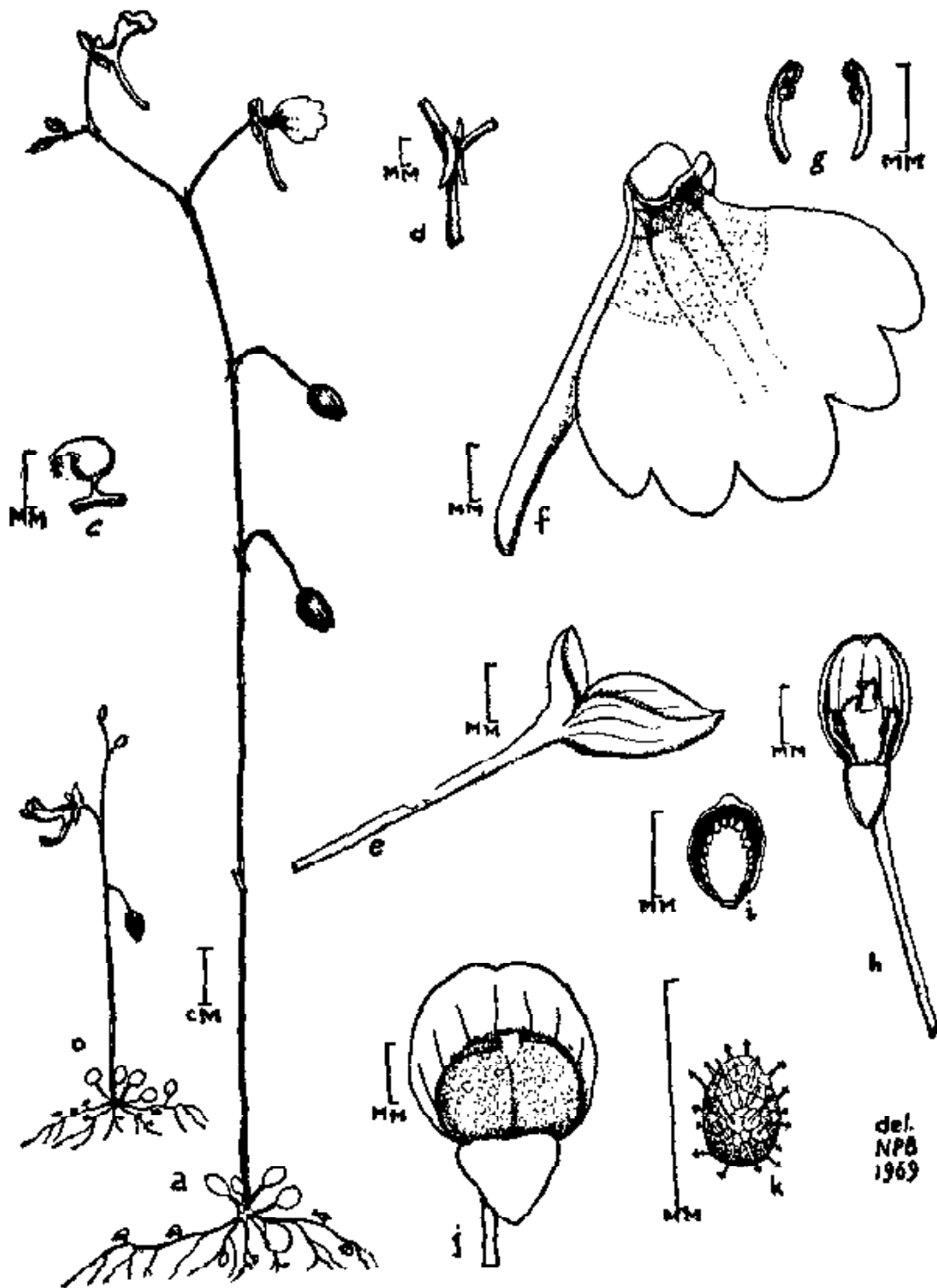


Fig. 19. *Utricularia striatula* Sm.

a. & b. Habit. c. Bladder. d. Bracts. e. Calyx. f. Corolla. g. Stamens. h. Flower with corolla removed. i. L. S. of ovary. j. Fruit with calyx. k. Seed.

Erect herbs, 5 - 15 cm; leaves absent at anthesis; scapes erect, 5 - 15 cm, 1 - 10-flowered; bracts 1 - 2 mm; pedicels 2 - 3 mm; calyx-lobes ovate, obtuse, reddish; corolla yellow, 5 - 6 mm; lower lip ovate, acute, 2 - 3 mm; spur funnel-shaped, 2 - 3 mm, curved.

Moist rocky or marshy places, 500-1800 m; fl. & fr.: June-Oct.; Ioksi, Jarain, Jowai, Raliang.

3. **Utricularia scandens** Benj. in *Linnaea* 20: 309. 1847. *U. wallichiana* Wt. Ic. Pl. Ind. Or. 4(4): 9. t. 1572. 1850; Fl. Brit. Ind. 4: 332. 1884; Fl. As. 3: 386. 1939.

Terrestrial herbs, 3-20 cm; leaves up to 1 cm long, absent at anthesis; scapes erect or twining, 3-20 cm, filiform, 1-8-flowered; bracts ovate-deltoid, \pm 1.5 mm; pedicels capillary, 3-4 mm; calyx-lobes broadly ovate, 2-3 mm; corolla yellow, 5-8 mm; lower lip orbicular; spur curved or straight.

Moist marshy open places, amidst grass, 1000-1500 m; fl. & fr.: June-Oct.; Amwee riverside, Jarain.

101. GESNERIACEAE

- | | | |
|--|-----|------------------------|
| 1a. Fruits indehiscent. | ... | <i>Rhynchosyche</i> 1 |
| 1b. Fruits dehiscent. | | |
| 2a. Seeds with at least one hair or hair-like process at each end or with one hair and capillary funicle. | | |
| 3a. Leaves fleshy; anthers exerted. | ... | <i>Aeschynanthus</i> 2 |
| 3b. Leaves subcoriaceous or membranous; anthers included. | | |
| 4a. Leaves subcoriaceous, more or less equal, often whorled; corolla with yellow lines in throat; fertile stamens 2. | ... | <i>Lysionotus</i> 3 |
| 4b. Leaves membranous, unequal, never whorled; corolla spotted inside; fertile stamens 4. | ... | <i>Loxostigma</i> 4 |
| 2b. Seeds not appendaged. | | |
| 5a. Corolla \pm 5 mm long, widely campanulate; ripe fruits spirally twisted. | ... | <i>Boea</i> 5 |
| 5b. Corolla more than 2 cm long, tubular or ventricose; ripe fruits straight. | | |
| 6a. Inflorescence lax, many-flowered; corolla broadly tubular, \pm 2.5 cm long; stigma emarginate. | ... | <i>Didymocarpus</i> 6 |
| 6b. Inflorescence short, few-flowered; corolla ventricose, 3-5 cm long, more than 1 cm wide; stigma shortly bifid. | ... | <i>Chirita</i> 7 |

1. RHYNCHOSYCHE Bl.

- | | | |
|---|-----|------------------------|
| 1a. Plants hirsute or patently villous; leaves elliptic, acuminate at both ends; lateral nerves 10-15 pairs; corolla white. | ... | <i>R. vestitum</i> 1 |
| 1b. Plants subglabrous, except young parts; leaves broadly elliptic-obovate, acute; lateral nerves 15-20 pairs; corolla pink. | ... | <i>R. ellipticum</i> 2 |

1. **Rhynchothecum vestitum** Clarke, Comm. & Cyrtandr. Beng. 132, t. 92. 1874; Fl. Brit. Ind. 4: 373. 1884; Fl. As. 3: 399. 1939.

Shrubs, up to 1.5 m; leaves dentate at margins, 15-25 × 6-10 cm, hirsute on both surfaces; cymes trichotomously paniculate, at lower axils or on leafless lower nodes, densely patent hairy; calyx-lobes linear, pinkish; corolla ± 7 mm; berries ± 7 mm diam., white.

Shaded forests on moist humus soil, 100-1200 m; fl. & fr.: Sept.-Jan.; Dawki, Khleihriat.

2. **Rhynchothecum ellipticum** (Dietr.) A. DC. Prodr. 9: 285. 1845; Fl. Brit. Ind. 4: 373. 1884; Fl. As. 3: 399. 1939. *Corysanthera elliptica* Dietr. Syn. Pl. 3: 582. 1843.

Shrubs, 1-2 m; young parts villous; leaves dentate at margins, 20-30 × 10-15 cm, subglabrous; cymes trichotomously paniculate, in lower axils or on leafless lower nodes; calyx lobes linear, pinkish; corolla ± 6 mm; berries ± 6 mm diam.; white.

Shaded forests, 100-1000 m; fl. & fr.: Aug.-Jan.; Dawki, Jowai, Khleihriat, Sohka.

2. AESCHYNANTHUS Jack *nom. cons.*

All the species are of ornamental value for their fleshy foliage and mostly scarlet flowers.

1a. Corolla 5 cm or more long.

2a. Leaves up to 4 cm broad; corolla ± 5 cm long, scarlet red with dark purple longitudinal stripes behind each lobe; seeds with 2 hairs at base. ... *A. parasiticus* 1

2b. Leaves more than 5 cm broad; corolla ± 6 cm long, pinkish-red; seeds with one hair at base. ... *A. superba* 2

1b. Corolla less than 4 cm long.

3a. Calyx-lobes linear-lanceolate, acuminate; seeds with 2 hairs at base. ... *A. sikkimensis* 3

3b. Calyx-lobes obtuse; seeds with one hair at base.

4a. Calyx-lobes persistent; corolla yellowish-green, less than 1.5 cm long. ... *A. acuminatus* 4

4b. Calyx-lobes deciduous; corolla scarlet-red, 2-3 cm long. ... *A. bracteatus* 5

1. **Aeschynanthus parasiticus** (Roxb.) Wall. Cat. no. 796. 1828. *Incurvillea parasitica* Roxb. Pl. Corom. 3: 88. t. 291. 1819. *Trichosporum grandiflorum* D. Don in Edinb. Phil. J. 7: 95. 1822. *A. grandiflorus* (D. Don) Spreng. Syst. Nat. Cur. Post. 238. 1827; Fl. Brit. Ind. 4: 338. 1884; Fl. As. 3: 389. 1939. 'Tiw-ri-shen',

Glabrous epiphytes; leaves lanceolate, acuminate, cuncate at base, 5-12 × 1.5-3.5 cm; flowers in terminal clusters; calyx greenish-white, foliaceous, ± 12 mm; lobes lanceolate, acute; corolla inflated upwards; filaments exerted, glandular hairy; capsule ± 15 cm long.

Dense moist forests, 1000-1700 m; fl. & fr.: Aug.-Jan.; Jaintea Hills, G. Mann s. n.; Jarain, *Balakrishnan* 49827; Jowai, *Panigrahi* 5224; R. S. Rao 2548 & 2551; Raliang, *Balakrishnan* 47021; Shangpung, U. N. *Kanjilal* 7292 —Endemic to Meghalaya.

2. ***Aeschynanthes superba*** Clarke, Comm. & Cyrtandr. Beng. t. 46. 1874; Fl. Brit. Ind. 4: 342. 1884; Fl. As. 3: 391. 1939.

Stout epiphytes; leaves elliptic-oblong, acute or acuminate, 10-20 × 5-8 cm; flowers umbellate, terminal or on old wood; bracts ovate-oblong, pink, deciduous; calyx reddish, 2.5-3.0 cm; lobes oblong, obtuse; corolla tubular, curved, oblique at mouth.

Shaded moist forests, 800-1500 m; fl. & fr.: July-Jan.; Jowai, *Panigrahi* 5231; Laskcin, near Raliang, *Balakrishnan* 50184; Mynse, U. N. *Kanjilal* 6587; Sohka, *Balakrishnan* 46734 —Endemic to Meghalaya.

3. ***Aeschynanthes sikkimensis*** (Clarke) Stapf in Curtis, Bot. Mag. 148: t. 8938. 1922; Fl. As. 3: 392. 1939. *A. maculatus* Lindl. var. *sikkimensis* Clarke in DC. Mon. Phan. 5: 24. 1883.

Epiphytic undershrubs; leaves oblong-lanceolate, caudate-acuminate, 8-15 × 2-4 cm; cymes axillary and terminal; bracts linear; pedicels slender; calyx 5-toothed; corolla curved, funnel-shaped, 2.5-3.0 cm, scarlet, glandular-hairy inside, yellowish outside.

Primary forests, 500-1500 m; fl. & fr.: May-Oct.; Jarain.

4. ***Aeschynanthes acuminatus*** DC. Prodr. 9: 263. 1845; Fl. Brit. Ind. 4: 341. 1884; Fl. As. 3: 391. 1939.

Slender epiphytes; leaves elliptic, cuneate at base, acuminate, 5-10 × 2-4 cm; cymes few-flowered, axillary; peduncles 1-3 cm; bracts ovate, ± 8 mm; calyx-lobes oblong, obtuse; corolla tubular, straight; upper lip erect; green; lower lip pendulous, yellow.

Moist forests, 100-1000 m; fl. & fr.: Oct.-Mar.; Dawki.

5. ***Aeschynanthes bracteatus*** DC. Prodr. 9: 261. 1845; Fl. Brit. Ind. 4: 342. 1884; Fl. As. 3: 391. 1939.

Woody epiphytic plants; leaves elliptic, oblong, acute to cuncate at base, acuminate at apex, 10-15 × 3-5 cm; flowers in terminal clusters;

bracts ovate, 2.5-3.0 cm; reddish; calyx-lobes nearly free, unequal, lanceolate; corolla tubular, wide upwards.

Primary forests, 1000-1800 m; fl. & fr.: July-Dec.; Jarain, Jowai.

3. *LYSIONOTUS* D. Don

Lysionotus serratus D. Don in Edinb. Phil. J. 7: 85. 1822; Fl. Brit. Ind. 4: 344. 1884; Fl. As. 3: 393. 1939.

Herbs, up to 35 cm; leaves opposite or ternate, elliptic-acuminate, crenate-serrate, 3-15 × 1-4 cm, whitish pale green beneath; cymes lax, many-flowered; peduncles 8-10 cm; bracts ovate, ± 3 mm; corolla tubular, inflated at middle, ± 2.5 cm, purple or white with purplish nerves; capsules 8-10 cm, reddish-brown.

Moist shaded forests, on trees or rocks, 1000-1800 m; fl. & fr.: July-Jan.; Jarain, Jowai, Sohka, Sutnga.

4. *LOXOSTIGMA* Clarke

Loxostigma griffithii (Wt.) Clarke in DC. Mon. Phan. 5: 60. 1883; Fl. Brit. Ind. 4: 344. 1884; Fl. As. 3: 394. 1939. *Didymocarpus griffithii* Wt. Ill. Ind. Bot. 2: 182. t. 159. 1850.

Erect herbs or undershrubs, 20-60 cm, thinly pubescent; leaves opposite, often unequal, elliptic, subfalcate, oblique at base, acute to acuminate at apex, serrate, 15-20 × 6-8 cm; cymes lax, many-flowered; peduncles 5-10 cm; bracts narrow, ± 6 mm; calyx pale pinkish green; corolla tubular, inflated above the base, yellow.

Shaded moist places in primary forests, 1000-1800 m; fl. & fr.: Oct.-Feb.; Khleihriat.

5. *BOEA* Lamk.

Boea multiflora R. Br. in Benn. Pl. Jav. Rar. 120, 1840; Fl. Brit. Ind. 4: 365. 1884; Fl. As. 3: 398. 1939.

Perennial herbs; stem woody at base; leaves radical, crowded at base, elliptic, acute, crenate, 8-15 × 3-6 cm, glabrous above, tomentose beneath; inflorescences cymose; peduncles many, 12-20 cm; corolla widely campanulate, bilabiate, puberulous outside; capsules glandular-puberulous.

Shaded moist places in forests, 100-1000 m; fl. & fr.: July-Oct.; Dawki,

6. DIDYMOCARPUS Wall. *nom. cons.*

Didymocarpus punduana DC. Prodr. 9: 267. 1845; Fl. Brit. Ind. 4: 349. 1884; Fl. As. 3: 395. 1939.

Erect herbs, 20-40 cm; leaves opposite, oblong, rounded or subcordate at base, acute or subacute, 5-20 × 3-10 cm, pubescent above, glabrescent and whitish beneath; inflorescences 10-15 cm across; peduncles 20-30 cm, dark purple; corolla funnel-shaped, ± 2.5 cm, purple.

Moist shaded forests, on rocks amidst moss, 1000-1800 m; fl. & fr.: Aug.-Dec.; Jarain.

7. CHIRITA Buch.-Ham.

- | | | |
|--|-----|--------------------------|
| 1a. Leaves 8-12 cm long; petioles 2-3 cm long; corolla white at base, dark purple above. | ... | <i>C. pumila</i> 1 |
| 1b. Leaves 15-20 cm long; petioles 4-8 cm long; corolla yellowish white. | ... | <i>C. oblongifolia</i> 2 |

1. **Chirita pumila** (Dietr.) D. Don, Prodr. Fl. Nep. 90. 1825; Fl. Brit. Ind. 4: 357. 1884; Fl. As. 3: 397. 1939. *Henckelia pumila* Dietr. in L. Sp. Pl. ed. 6. 1: 554. 1831.

Erect herbs, 10-50 cm; leaves opposite, often unequal, elliptic-oblong, acuminate at apex, closely serrate, 8-12 × 3-5 cm, hirsute above; cymes axillary, 1-5 flowered; peduncles up to 5 cm; calyx whitish; corolla tubular at base, funnel-shaped above, ± 3 cm, white at base, dark purple above.

Shaded moist places in dense forests, 500-1500 m; fl. & fr.: July-Dec.; Jarain, Syndai.

2. **Chirita oblongifolia** (Roxb.) Sinclair in Bull. Bot. Soc. Beng. 9: 102. 1957. *Incarvillea oblongifolia* Roxb. Fl. Ind. 3: 113. 1832. *Chirita acuminata* R. Br. in Ann. Sc. Nat. ser. 2. 13: 161. 1840; Fl. Brit. Ind. 4: 359. 1884; Fl. As. 3: 396. 1939. 'Khlewmar'.

Herbs or undershrubs, 1.5-2.0 m, unbranched, villous above; leaves subequal, elliptic or ovate, acuminate at apex, serrulate, 15-20 × 6-9 cm, hairy; cymes axillary, many-flowered; peduncles 1-6 cm; corolla tubular-ventricose, ± 3 cm, yellowish-white.

Shaded moist places in forests, 100-1500 m; fl. & fr.: Aug.-Jan.; Dawki, Raliang.

102. BIGNONIACEAE

- 1a. Leaves 1—2 m long ; fertile stamens 5 ; capsules septically dehiscent, sword-like, flat, 7—9 cm broad. ... *Oroxylum* 1
- 1b. Leaves up to 1 m long ; fertile stamens 4 ; capsules loculicidally dehiscent, angular or terete, 1—3 cm thick.
- 2a. Leaves 1-pinnate ; calyx shortly toothed ; seeds trigonous. ... *Stereospermum* 2
- 2b. Leaves 2-pinnate ; calyx shortly bilabiate or subspathaceous ; seeds flat. ... *Radermachera* 3

1. OROXYLUM Vent.

Oroxylum indicum (L.) Vent. Dec. Gen. Nov. 8. 1808 ; Fl. Brit. Ind. 4: 378. 1884 ; Fl. As. 3: 401. 1939. *Bignonia indica* L. Sp. Pl. 625. 1753. 'Dieng-kawai'.

Trees, 8-12 m, with few branches ; leaves ternately bipinnate, 1-2 m long ; leaflets broad-ovate, 6-12 × 4-8 cm ; flowers large, fleshy, purplish, in long terminal stout racemes, up to 1 m long ; capsules pendulous, sword-like, 0.5-1.0 m long, 7-10 cm broad ; seeds with a broad hyaline wing around.

Open forests, 100-1000 m ; fl. & fr. : June-Feb. ; Dawki, Ioksi.

2. STEREOSPERMUM Cham.

Stereospermum chelonoides (L. f.) DC. Prodr. 9: 210. 1845 ; Fl. Brit. Ind. 4: 382. 1884 ; Fl. As. 3: 404. 1939. *Bignonia chelonoides* L. f. Suppl. 282. 1781. 'Dieng-phisar'.

Trees, 10-20 m ; branches spreading ; leaves pinnate, 30-45 cm long ; leaflets 7-11, elliptic-oblong, long-acuminate, 5-15 × 3-8 cm ; flowers yellowish with purple tinge, fragrant, in lax terminal glabrous panicles ; calyx purplish ; capsules curved, compressed and angular, 35-50 cm long, 1-2 cm thick ; seeds trigonous, winged.

Primary forests, 100-500 m ; fl. & fr. : Apr.-Dec. ; Dawki.

3. RADERMACHERA Zoll. & Mer.

Radermachera gigantea (Bl.) Miq. in Ann. Mus. Bot. 8: 250. 1867. *Spathodea gigantea* Bl. Bijdr. 761. 1825. *Stereospermum hypostictum* Miq. Fl. Ind. Bat. Suppl. 565. 1860 ; Fl. Brit. Ind. 4: 384. 1884 ; Fl. As. 3: 405. 1939. 'Ka-wait-blai'.

Trees, 15-40 m ; leaves bi- to tripinnate, 75-100 cm ; leaflets elliptic to

lanceolate, caudate-acuminate, 4 - 12 × 1 - 4 cm; flowers white, tinged pinkish, in branched panicles; corolla tubular below, campanulate above; capsules angular, 30 - 45 cm long, 1 - 2 cm thick; seeds flat, concave, winged.

Forests, 100 - 1000 m; fl. & fr.: May-Nov.; Mynso.

103. PEDALIACEAE

SESAMUM L.

Sesamum orientale L. Sp. Pl. 634. 1753; Fl. As. 3: 407. 1939.

S. indicum L. Sp. Pl. 634. 1753; Fl. Brit. Ind. 4: 387. 1884.

Erect annual herbs, up to 1 m, glandular-hairy; lower leaves on 2 - 12 cm long petioles, often palmately 3-foliolate; upper leaves on shorter petioles, oblong-lanceolate to linear, with mucilaginous hairs beneath; flowers purplish or white; capsules oblong, ± 2.5 cm, obtusely 4-angled; seeds compressed, reticulate on sides, red-brown.

Open paddy fields, as escape from cultivation, 100 - 500 m; fl. & fr.: Oct.-Jan.; Dawki.

Cultivated throughout tropics for the edible oil.

S. orientale L. and *S. indicum* L. were published simultaneously. However, they were first united into one species by Graham (in Cat. Pl. Bomb. 126. 1839) and for this he chose the name *S. orientale* L. Hence, as per the Code, *S. orientale* L. is to be used as the correct name.

104. THUNBERGIACEAE

THUNBERGIA Retz. *nom. cons.*

- | | | |
|---|-----|-------------------------|
| 1a. Leaves 3--5-nerved; corolla red or orange; stamens exerted;
filaments 18--20 mm long. | ... | <i>T. coccinea</i> 1 |
| 1b. Leaves 5--7-nerved; corolla violet or blue; stamens included;
filaments 8--10 mm long. | ... | <i>T. grandiflora</i> 2 |

1. **Thunbergia coccinea** Wall. Tent. Fl. Nep. 1: 48. 58. t. 37. 1824; Fl. Brit. Ind. 4: 393. 1884; Fl. As. 3: 411. 1939.

Much-branched climbers with long pendent branches; leaves lanceolate rounded or shallowly cordate at base, acute to acuminate, serrulate, remotely toothed or undulate at margins, 15 - 20 × 6 - 10 cm; flowers fascicled at nodes of elongate racemose pendulous branches; corolla-lobes reflexed; filaments exerted; capsules ± 5 cm,

Primary forests, 500-1500 m; fl. & fr.: Aug.-Feb.; Sohka.

A fine ornamental with its pendent red flower bunches.

2. **Thunbergia grandiflora** (Rottl.) Roxb. in Lodd. Bot. Cab. t. 824. 1819; Fl. Brit. Ind. 4: 392. 1884; Fl. As. 3: 410. 1939. *Flemingia grandiflora* Rottl. in Nov. Act. Nat. Cur. 4: 202. 1803.

Large climbers; leaves orbicular, ovate, or ovate-lanceolate, subentire or angularly toothed, deeply cordate in lower ones, 5-15 × 4-12 cm; flowers in dense axillary short racemes or clusters; corolla blue or violet with creamy-white throat; capsules globose at base, narrowed into a triquetrous beak at apex, ± 4 cm.

Primary and Secondary forests, 100-1000 m; fl. & fr.: Apr.-Nov.; Dawki, Garampani.

105. ACANTHACEAE

- | | |
|---|------------------------|
| 1a. Leaves spinous-serrate; corolla 3-lobed; upper lip absent. ... | <i>Acanthus</i> 1 |
| 1b. Leaves not spinous-serrate; corolla with 4 subequal lobes or 2-lipped with 3+2 lobes. | |
| 2a. Corolla lobes twisted in bud. | |
| 3a. Ovules more than 2 in each cell; capsules more than 6-seeded. | |
| 4a. Capsules 40—100-seeded. ... | <i>Hygrophila</i> 2 |
| 4b. Capsules 6—12-seeded. ... | <i>Aechmanthera</i> 3 |
| 3b. Ovules 2 in each cell; capsules 4-or fewer-seeded. | |
| 5a. Corolla-tube long and linear; stamens 2. ... | <i>Eranthemum</i> 4 |
| 5b. Corolla-tube usually short and cylindric at base, ventricose above; stamens 4. | |
| 6a. Seeds glabrous, areolate, with areola extending to margin. ... | <i>Hymenochlaena</i> 5 |
| 6b. Seeds partly covered with hairs, areolate or ex-areolate, but areola never extending to margins. | |
| 7a. Plants isophyllous; corolla not resupinate; pollen grains globose. | |
| 8a. Flowers in elongate spikes; pollen grains provided with bands, which may show various kinds of relief, but never carunculate or echinulate. ... | <i>Sympagis</i> 6 |
| 8b. Flowers strobilate; pollen grains without bands but always distinctly carunculate or echinulate. .. | <i>Tarphochlamys</i> 7 |
| b. Plants anisophyllous; corolla resupinate; pollen grains ellipsoid. | |
| 9a. Outer stamens slightly unequal, inner ones stout and incurved; anthers horizontal and ovoid; seeds covered with long hairs. ... | <i>Goldfussia</i> 8 |

- 9b. Outer stamens equal, inner ones never curved; anthers erect and elongate; seeds covered with very short hairs. ... *Pteracanthus* 9
- 2b. Corolla lobes imbricate in bud.
- 10a. Ovules 3—10 in each cell.
- 11a. Capsules compressed; seeds ovoid, hardly compressed. ... *Andrographis* 10
- 11b. Capsules subterete; seeds much compressed.
- 12a. Corolla-tube very slender, straight; ovary pubescent. ... *Gymnostachyum* 11
- 12b. Corolla tube funnel-shaped, curved; ovary glabrous. ... *Phlogacanthus* 12
- 10b. Ovules 2 or often 1 in each cell.
- 13a. Corolla distinctly 2-lipped.
- 14a. Stamens 4. ... *Lepidagathis* 13
- 14b. Stamens 2.
- 15a. Flowers in fascicles of 3; fascicles umbellate or capitate; anthers 1-celled. ... *Hypoestis* 14
- 15b. Flowers in spikes; anthers 2-celled.
- 16a. Bracts 2-or 4-ranked. ... *Rungia* 15
- 16b. Bracts not ranked. ... *Justicia* 16
- 13b. Corolla subequally 5-lobed.
- 17a. Calyx 4-partite, with subequal lobes.
- 18a. Corolla-tube ventricose. ... *Codonacanthus* 18
- 18b. Corolla-tube long, slender, tubular.
- 19a. Stamens 4. ... *Asystasia* 19
- 19b. Stamens 2. ... *Pseuderanthemum* 20

1. ACANTHUS L.

Acanthus leucostachys Nees in Wall. Pl. As. Rar. 3: 96. 1832; Fl. Brit. Ind. 4: 480. 1884; Fl. As. 3. 440. 1939.

Perennial herbs, up to 50 cm; stems woody at base, decumbent and woolly; leaves elliptic-oblong, spinous-serrate at margins, 10-20 × 3-6 mm, slightly hairy beneath; spikes terminal, solitary, 6-13 cm; bracts elliptic, spinous-toothed; calyx unequal, hairy; corolla white; capsules ellipsoid, compressed, 1.0-1.5 cm, shiny.

Primary forests, 100-1000 m; fl. & fr.: Nov.-June; Khlcihriat to Lumshnong.

2. HYGROPHILA R. Br.

Hygrophila salicifolia (Vahl) Nees in Wall. Pl. As. Rar. 3: 81. 1832; Fl. Brit. Ind. 4: 407. 1884. *Ruellia salicifolia* Vahl, Symb. Bot. 3: 84. 1794.

Erect herbs or undershrubs, up to 1 m, often rooting at lower nodes glabrous; leaves lanceolate, acute at both ends, 3-12 × 1-2 cm, glabrous; flowers in axillary clusters; calyx hispid-ciliate; corolla pale purple, blue or white with purple streaks; capsules 12-17 mm; seeds 20-28.

Shaded moist places in forests, 100-1000 m; fl. & fr.: May-Sept.; Syndai.

3. *AECHMANTHERA* Nees

- 1a. Anther-connective excurrent at tip; seeds glabrous. ... *A. leiosperma* 1
 1b. Anther-connective not excurrent at tip; seeds densely hairy. ... *A. gossypina* 2

1. ***Aechmanthera leiosperma*** Clarke in Fl. Brit. Ind. 4: 429, 1884; Fl. As. 3: 414, 1939.

Shrubs, up to 1 m, densely hairy; leaves ovate, rounded at base, acute at apex, crenulate, 6-8 × 3-4 cm; petioles 10-12 mm; panicles dichotomous leafy; corolla ± 2.5 mm, tubular, widened at middle; capsules 7-8 mm; seeds 6.

Primary forests, 1000-1500 m; Jaintea Hills, *Clarke s. n.* (CAL)—Endemic to Jaintia Hills.

Clarke (*l. c.*) states this to be abundant in Jaintea Hills, but has been apparently never collected since the one cited above.

2. ***Aechmanthera gossypina*** (Nees) Nees in Wall. Pl. As. Rar. 2: 87, 1832. *Ruellia gossypina* Nees in Wall. Pl. As. Rar. 1: 38, t. 42, 1830. *A. tomentosa* Nees in Wall. Pl. As. Rar. 3: 87, 1832; Fl. Brit. Ind. 4: 428, 1884; Fl. As. 3: 413, 1939.

Erect shrubs, up to 1.5 m, thickly velvety-tomentose in winter, deciduous and becoming pubescent in summer; leaves elliptic or ovate lanceolate, rounded at base, acute at apex; panicles dichotomous; corolla funnel-shaped, white; capsules ± 1.2 cm; seeds 8.

Primary forests, 1000-1600 m; fl. & fr.: July-Jan.; Myntang Valley, Mynso, Raliang.

4. *ERANTHEMUM* L.

Eranthemum suffruticosum Roxb. Fl. Ind. 1: 111, 1820; Kanjilal *et al.* Fl. As. 3: 439, 1939. *Daedalacanthus suffruticosum* (Roxb.) T. And. in J. Linn. Soc. 9: 488, 1867; Fl. Brit. Ind. 4: 420, 1884.

Undershrubs, up to 1 m; branches few, hairy towards apex; leaves elliptic, narrowed at both ends, 10-15 × 4-6 cm; lateral nerves 5-7 pairs;

petioles 2-3 cm; spikes 2.5-3.5 cm; bracts ovate, obtuse, mucronate, strongly nerved; corolla pale blue; tube slender, \pm 4 cm; capsules clavate; seeds 4, compressed, discoid.

Primary and secondary forests, 100-1000 m; fl. & fr.: June-Dec.; Sonapur.

5. HYMENOCHLAENA Bremek.

Hymenochlaena decurrens (Nees) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sec. 2. 41(1): 301. 1944. *Endopogon decurrens* Nees in DC. Prodr. 11: 104. 1847. *Strobilanthes adnata* Clarke in Fl. Brit. Ind. 4: 436. 1884; Fl. As. 3: 418. 1939.

Glabrous stunted shrubs, 0.5-1.5 m; leaves broadly elliptic, acuminate, subentire, 10-20 \times 3-8 cm; flowers in dense axillary or terminal tetragonous strobiliform spikes; bracts ovate-acute, \pm 20 \times 8 mm green, becoming scarious and purplish-brown; corolla blue, 8-12 mm; capsules 7-8 mm; seeds 4, ovoid, shiny.

Primary forests, in shaded places, 500-1500 m; fl. & fr.: Aug.-Jan.; Lumshnong.

6. SYMPAGIS Bremek.

- | | |
|---|------------------------|
| 1a. Leaves oblanceolate, distantly serrulate or subentire, glabrous; bracts lanceolate or oblanceolate. ... | <i>S. brunoniana</i> 1 |
| 1b. Leaves elliptic or ovate, serrate or denticulate, pubescent; bracts ovate, obovate or oblong. | |
| 2a. Spikes interrupted; bracts ovate, acute or subacute; corolla blue. ... | <i>S. monadelpha</i> 2 |
| 2b. Spikes continous; bracts obovate or obtuse; corolla white. ... | <i>S. maculata</i> 3 |

1. **Sympagis brunoniana** (Nees) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sect. 2. 41(1): 254. 1944. *Strobilanthes brunoniana* Nees in Wall. Pl. As. Rar. 3: 87. 1832; Fl. Brit. Ind. 4: 457. 1884; Fl. As. 3. 423. 1939.

Shrubs, up to 1 m; branches decumbent and rooting at base; leaves cuneate at base, acute at apex, 5-12 \times 1-3 cm; petioles 5-10 mm; spikes up to 10 cm, paniculate; corolla blue or pinkish-violet, pubescent outside; capsules oblong, \pm 8 mm, pubescent; seeds orbicular, pubescent.

Primary forests and forest edges, 100-1200 m; fl. & fr.: Aug.-Jan.; Sonapur.

2. **Sympagis monadelpha** (Nees) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sect. 2. 41(1): 254. 1944. *Strobilanthes monadelpha* Nees in Wall. Pl. As. Rar. 3: 87. 1892; Fl. Brit. Ind. 4: 457. 1884; Fl. As. 3: 423. 1939.

Erect rigid shrubs, up to 1 m; leaves elliptic, cuneate at base, acuminate at apex, serrate, 6-15 × 2-5 cm, pubescent; petioles 1-3 cm; spikes 3-8 cm, terminal and axillary, clustered or laxly paniced; corolla ± 2 cm; capsules ± 8 mm, pubescent; seeds orbicular, pubescent.

Primary forests, 1000-1600 m; fl. & fr.: Sept.-Feb.; Jowai, G. K. Deha 17521—Endemic to Meghalaya.

3. **Sympagis maculata** (Nees) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. Sect. 2. 41(1): 255. 1944. *Ruellia maculata* Nees in Wall. Pl. As. Rar. 3: 33. t. 250. 1892. *Strobilanthes maculata* (Nees) Nees in DC. Prodr. 11: 190. 1847; Fl. Brit. Ind. 4: 457. 1884; Fl. As. 3. 424. 1939.

Shrubs, up to 1 m; leaves elliptic or ovate, cuneate at base, acute at apex, crenate-serrate, 5-15 × 2-8 cm, pubescent on nerves; petioles 3-8 mm; spikes compact, 1-3 cm; bracts obovate or oblong, obtuse, corolla ventricose, ± 1.5 cm, white; capsules oblong, ± 8 mm, pubescent; seeds orbicular, long hairy.

Primary forests and forest edges, 1000-1700 m; fl. & fr.: Sept.-Jan.; Jowai-Jarain, Balakrishnan 42997 —Endemic to Meghalaya.

7. **TARPHOCHLAMYS** Bremek.

Tarphochlamys affinis (Griff.) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sect. 2. 41(1): 156. 1944. *Adenosma affinis* Griff. Notul. 4: 133. 1854. *Strobilanthes acrocephala* T. And. in J. Linn. Soc. 9: 473. 1867; Fl. Brit. Ind. 4: 454. 1884; Fl. As. 3: 422. 1939.

Undershrubs, ± 1 m; leaves ovate, rounded or acute at base, acute or obtuse, crenate, 3-8 × 1.5-3.0 cm; petioles 8-12 mm; spikes cylindrical, peduncled, solitary, terminal; bracts ovate, obtuse or subacute, ciliate at margins; corolla pale blue, ± 2.5 cm; capsules ± 8 mm, hairy; seeds orbicular, pubescent.

Primary forests, 500-1200 m; fl. & fr.: July-Jan.; Nartiang, Balakrishnan 47154; Rytang, Balakrishnan 50220 —Endemic to Meghalaya.

8. GOLDFUSSIA Nees

- | | | |
|---|-----|----------------------|
| 1a. Heads sessile, cymose, running into compound panicles; bracts caducous. | ... | <i>G. discolor</i> 1 |
| 1b. Herbs long-peduncled, solitary or fascicled; bracts persistent. | | |
| 2a. Plants hairy; bracts pectinate-dentate at margins, hirsute outside. | ... | <i>G. echinata</i> 2 |
| 2b. Plants glabrous; bracts entire, glabrous. | .. | <i>G. glabrata</i> 3 |

1. **Goldfussia discolor** Nees in DC. Prodr. 11: 172. 1847. *Strobilanthes discolor* (Nees) T. And. in J. Linn. Soc. 9: 477. 1867; Fl. Brit. Ind. 4: 462. 1884; Fl. As. 3: 426. 1939.

Shrubs, up to 1.5 m; leaves elliptic, cuneate or acute at base, acuminate, crenate-dentate, 5-12 × 2-5 cm, glabrous; petioles 3-5 mm; inflorescence a panicle of cymose heads; calyx and corolla dark red in bud; corolla ± 4 cm, pale purple when open; capsules ± 1 cm, pubescent at apex.

Primary forests, 1000-1800 m; fl. & fr.: June-Jan.; Khleihriat.

2. **Goldfussia echinata** (Nees) Balakr. *comb. nov.* *Strobilanthes echinata* Nees in Wall. Pl. As. Rar. 3: 85. 1832. *S. pectinata* T. And. in J. Linn. Soc. 9: 474. 1867; Fl. Brit. Ind. 4: 447. 1884; Fl. As. 3: 420. 1939.

Large spreading shrubs, 0.5-2.0 m; leaves elliptic, cuneate at base, acuminate, serrate, 5-12 × 2-4 cm, sparsely hairy above, hispid beneath; petioles 1-3 cm, villous; inflorescence subcapitate, pedunculate; bracts large, ovate; corolla funnel-shaped, 3-4 cm, pale purplish; capsules 12-16 mm; seeds ovate, glabrous.

Primary forests, 1200-1600 m; fl. & fr.: June-Jan.; Jowai-Jarain, Balakrishnan 42999.

3. **Goldfussia glabrata** (Nees) Balakr. *comb. nov.* *Strobilanthes glabrata* Nees in Wall. Pl. As. Rar. 3: 85. 1832; Fl. Brit. Ind. 4: 447. 1884; Fl. As. 3: 420. 1939.

Shrubs, 0.5-2.0 m; leaves elliptic, cuneate at base, acuminate, serrulate, 6-12 × 2-5 cm, glabrous; petioles 12-24 mm; flowers in ovoid pendulous heads; peduncles 3-5 cm; bracts ovate or oblong-ovate, ± 3 cm, white or pale greenish-white; corolla ± 4 cm, white; capsules oblong, ± 2 cm; seeds ovate, silky-hairy.

Primary forests, 100-1000 m; fl. & fr.: May-Dec.; Nongthala, Balakrishnan 46705 —Endemic to Meghalaya.

9. PTERACANTHUS (Nees) Bremek.

- 1a. Bracts ovate, 3—6 mm long.
 2a. Leaves crenate ; bracts foliaceous, petiolate; corolla \pm 1.5 cm long. ... *P. urophyllus* 1
 2b. Leaves entire or subentire ; bracts not foliaceous; corolla \pm 2.5 cm long.
 3a. Leaves oblong, hairy ; lower petioles up to 0.5 cm long. ... *P. rubescens* 2
 3b. Leaves ovate, glabrous ; lower petioles more than 2 cm long. ... *P. boerhaavioides* 3
 1b. Bracts lanceolate or linear-lanceolate, 10—25 mm long.
 4a. Spikes straight ; flowers close together ; bracts lanceolate. ... *P. nobilis* 4
 4b. Spikes zig-zag ; flowers laxly arranged ; bracts linear.
 5a. Spikes glabrous ; flowers white. ... *P. calycinus* 5
 5b. Spikes pubescent ; flowers orange-red or yellowish. ... *P. griffithianus* 6

1. **Pteracanthus urophyllus** (Nees) Bremek. in Verh. Ned. Akad. Wet. Afd. sect. 2. 41(1): 198. 1944. *Dipteracanthus urophyllus* Nees in Wall. Pl. As. Rar. 3: 82. 1832. *Strobilanthes urophylla* (Nees) Nees in DC. Prodr. 11: 192. 1847; Fl. Brit. Ind. 4: 472. 1884; Fl. As. 3: 433. 1939.

Shrubs \pm 1 m; leaves elliptic-lanceolate, cuneate at base, acuminate, 6-12 \times 2-4 cm; petioles 2-3 cm; flowers axillary and terminal, scattered on branchlets; bracts petioled at base; corolla curved, hairy outside, purple; capsules 8-10 mm; seeds ovate, pubescent.

Primary forests, 1000-1500 m; fl. & fr.: Feb.-Aug.; Jarain, *Balakrishnan* 46840 —Endemic to Meghalaya.

2. **Pteracanthus rubescens** (T. And.) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sect. 2. 41(1): 199. 1944. *Strobilanthes rubescens* T. And. in J. Linn. Soc. 9: 479. 1867; Fl. Brit. Ind. 4: 469. 1884; Fl. As. 3: 430. 1939.

Shrubs, up to 1 m; branches flexuous; leaves ovate, rounded at base, acuminate, 8-12 \times 1-4 cm, hairy beneath; petioles up to 4 mm; lower leaves sessile; spikes 3-10 cm, paniculate, lax-flowered; bracts ovate, \pm 3 mm; corolla purple or blue, straight; capsules 12-16 mm; seeds ovate, hairy at edges.

Primary forests, in shaded moist localities, 1000-1700 m; fl. & fr.: Oct.-Mar.; Jarain, *Balakrishnan* 49957; Jowal, *Panigrahi* 4164 —Endemic to Meghalaya.

3. **Pteracanthus boerhaavioides** (T. And.) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sect. 2. 41(1): 199. 1944. *Strobilanthes boerhaavioides* T. And. in J. Linn. Soc. 9: 479. 1867; Fl. Brit. Ind. 4: 469. 1884; Fl. As. 3: 431. 1939.

Shrubs, up to 1.5 m; branches flexuous; leaves rounded at base, acuminate, 6-15 × 4-8 cm; petioles 2-3 cm; spikes lax-flowered, curved, in axillary panicles; bracts ovate 3-4 mm; corolla bluish-purple, ± 2.5 cm; capsules oblanceolate, 10-12 mm.

Primary forests, in shaded stream-sides, 1000-1500 m; fl. & fr.: Aug.-Dec.; Jowai-Jarain, Jarain-Nongthala.

4. **Pteracanthus nobilis** (Clarke) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sect. 2. 41(1): 199. 1944. *Strobilanthes nobilis* Clarke in Fl. Brit. Ind. 4: 471. 1884; Fl. As. 3: 432. 1939.

Much-branched shrubs, 1-2 m; leaves elliptic, oblanceolate, acute or cuneate at base, short-acuminate, 10-20 × 4-8 cm, glaucous beneath; petioles ± 8 mm; spikes axillary, elongate, stout, 6-15 cm; bracts ± 2 cm; corolla ventricose, ± 2 cm, purple; capsules ± 2 cm; seeds ovate, hairy.

Primary forests, in shaded wet places, 1000-1500 m; fl. & fr.: Oct.-Mar.; Jarain, *Balakrishnan* 46855 —Endemic to Jowai District.

5. **Pteracanthus calycinus** (Nees) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sect. 2. 41(1): 199. 1944. *Asystasia calycinus* Nees in Wall. Pl. As. Rar. 3: 90. 1832. *Strobilanthes helicta* T. And. in J. Linn. Soc. 9: 479. 1867; Fl. Brit. Ind. 4: 469. 1884; Fl. As. 3: 431. 1939.

Shrubs ± 1 m; leaves elliptic-lanceolate, obtuse or acute at base, obtusely acuminate, serrate, 5-10 × 2-4 cm; petioles 1-2 cm; spikes zig-zag; elongated, 2-8 cm; flowers alternately arranged at angles of zig-zag; bracts linear, ± 1 cm; calyx reddish green; corolla ± 2.5 cm; capsules linear-lanceolate, 1.5-2.0 cm; seeds ovate, puberulous.

Shaded wet localities in primary forests, 1000-1500 m; fl. & fr.: June-Feb.; Jarain.

6. **Pteracanthus griffithianus** (Nees) Bremek. in Verh. Ned. Akad. Wet. Afd. Nat. sect. 2. 41(1): 199. 1944. *Triaenanthus griffithianus* Nees in DC. Prodr. 11: 169. 1847. *Strobilanthes griffithianus* (Nees) T. And. in J. Linn. Soc. 9: 481. 1867; Fl. Brit. Ind. 4: 470. 1884; Fl. As. 3: 482. 1939.

Shrubs, 1-2 m, much-branched; leaves elliptic-lanceolate, acute to cuneate at base, acuminate, denticulate or subentire, 4-15 × 1.5-4.5 cm; petioles 5-20 mm; spikes zig-zag, elongate, 2-10 cm; flowers alternately arranged at angles of zig-zag; bracts lanceolate, obtuse, 10-20 × 3-4 mm, glandular-pubescent; corolla ± 4 cm, pubescent; capsules ± 2 cm; seeds suborbicular, puberulous.

Primary forests, 500-1000 m; fl. & fr.: Oct.-Mar.; Lumshnong, *Bala-krishnam* 50093 —Endemic to Meghalaya.

10. ANDROGRAPHIS Nees

- | | | |
|---|-----|------------------------|
| 1a. Corolla-tube narrow, straight; limb conspicuously bilabiate; anthers bearded at base. | ... | <i>A. paniculata</i> 1 |
| 1b. Corolla-tube wide, curved at middle; limb not bilabiate; anthers not bearded at base. | ... | <i>A. laxiflora</i> 2 |

1. **Andrographis paniculata** (Burm. f.) Nees in Wall. Pl. As. Rar. 3: 116. 1832; Fl. Brit. Ind. 4: 501. 1884; Fl. As. 3: 440. 1939. *Justicia paniculata* Burm. f. Fl. Ind. 9: 1768.

Erect annual herbs, 40-80 cm; leaves subsessile, narrowed at both ends, 3-12 × 1-3 cm; racemes axillary, laxly paniculate, 3-10 cm; flowers in axils of linear bracts; corolla white, spotted purple; tube ± 6 mm; upper lip oblong, 7-8 mm; lower lip broad, cuneate, 3-fid, ± 6 mm; capsules compressed, 15-17 × 3-4 mm.

Wastelands, forest edges and roadsides, 100-1500 m; fl. & fr.: July-Dec.; Nartiang.

A bitter shrub, used by local people as anthelmintic and for various stomach ailments.

2. **Andrographis laxiflora** (Bl.) Lindau in Engler & Prantl, Pflanzenfam. 4. 3b: 323. 1897. *Erianthera laxiflora* Bl. Bijdr. 789. 1826. *A. tenuiflora* T. And. in J. Linn. Soc. 9: 502. 1867; Fl. Brit. Ind. 4: 502. 1884.

Ascending herbs, 50-100 cm; leaves ovate-oblong or lanceolate, rounded at base, acute, 4-10 × 2-4 cm; petioles 7-14 mm; racemes terminal or upper axillary paniculate; flowers pale pink; corolla-tube 5-6 mm; lobes unequal, ovate, 1-2 mm; capsules compressed, 12-15 mm, thinly glandular-hairy.

Forest edges and roadsides, usually in shaded places, 100-1200 m; fl. & fr.: May-Oct.; Sohka.

11. GYMNSTACHYUM Nees

Gymnostachyum venustum (Nees) T. And. in J. Linn. Soc. 9: 506. 1867; Fl. Brit. Ind. 4: 507. 1884; Fl. As. 3: 441. 1939. *Cryptophragmium venustum* Nees in Wall. Pl. As. Rar. 3: 80. 1832.

Herbs, up to 70 cm; leaves radical, elliptic-obovate, decurrent at base, acute, undulate at margins, 10-20 × 3-8 cm, membranous; petioles broadly winged towards apex, 5-8 cm; panicles terminal, lax, trichotomously branched, 20-60 cm, pubescent; corolla 2-3 cm, bluish; capsules linear, ± 2 cm; seeds ovoid, compressed.

Primary forests in shaded localities, 100-1000 m; fl. & fr.: Apr.-Dec.; Dawki, *R. N. De* 19252 & 20035; *Sharma* 13501; Sohka, *Balakrishnan* 49889 —Endemic to Meghalaya.

12. PHLOGACANTHUS Wall.

- | | | |
|--|-----|---------------------------|
| 1a. Thyrses of flowers axillary. | ... | <i>P. pubinervis</i> 1 |
| 1b. Thyrses of flowers terminal, spicate or paniculate. | | |
| 2a. Uppermost leaves more than 25 cm long; corolla tube not widened upwards. | | |
| 3a. Corolla less than 2.5 cm long. | ... | <i>P. wallichii</i> 2 |
| 3b. Corolla more than 3.5 cm long. | ... | <i>P. curviflorus</i> 3 |
| 2b. Uppermost leaves less than 23 cm long; corolla tube widened upwards. | | |
| 4a. Inflorescences more than 10 cm long; corolla orange-red. | ... | <i>P. thyrsoiflorus</i> 4 |
| 4b. Inflorescences less than 8 cm long; corolla yellow or pinkish-purple. | | |
| 5a. Leaves 15-22 cm long; corolla 15-20 mm long, yellow. | ... | <i>P. guttatus</i> 5 |
| 5b. Leaves 8-12 cm long; corolla 8-12 mm long, pinkish purple. | ... | <i>P. asperulus</i> 6 |

1. **Phlogacanthus pubinervis** T. And. in J. Linn. Soc. 9: 508. 1867; Fl. Brit. Ind. 4: 513. 1885; Fl. As. 3: 444. 1939.

Shrubs, 1-3 m, much-branched; leaves elliptic, acute at both ends, 6-10 × 2-4 cm, glabrous or puberulous on nerves beneath; lateral nerves 7-8 pairs; petioles 1-3 cm; pedicels up to 6 mm; calyx woolly within; corolla tubular, inflated, curved, ± 1.5 cm, yellowish with brown veins.

Primary forests, 1000-1500 m; fl. & fr.: Nov.-Mar.; Jowai, Sutnga.

2. **Phlogacanthus wallichii** Clarke in Fl. Brit. Ind. 4: 511. 1884; Fl. As. 3: 442. 1939.

Shrubs, up to 3 m; leaves elliptic, lanceolate or oblanceolate, narrowed at base, acuminate, undulate at margins, 25-30 × 8-12 cm; lateral nerves 7-9 pairs; petioles 2-4 cm; spikes 5-10 cm, short-paniculate; bracts linear; calyx-teeth villous; corolla tubular, curved, 17-18 mm, red, densely villous.

Primary forests, in shaded places, 100-1000 m; fl. & fr.: Nov.-Feb.; Syndai *U. N. Kanjilal* 2765 —Endemic to Meghalaya.

3. **Phlogacanthus curviflorus** Nees in Wall. Pl. As. Rar. 3: 99. 1832; Fl. Brit. Ind. 4: 511. 1884; Fl. As. 3: 442. 1939.

Shrubs, 1-3 m; stems stout, puberulous towards apex; leaves elliptic-oblanceolate, narrowed at base, acuminate, 25-30 × 10-15 cm; lateral nerves

8-10 pairs; petioles 1-6 cm; thyrses in terminal spikes, 10-20 cm; bracts linear; calyx villous; corolla tubular, curved, 3.5-4.0 cm, red or orange-red, densely villous.

Primary forests, 100-1000 m; fl. & fr.: Oct.-Mar.; Sonapur, Syndai.

4. **Phlogacanthus thyrsiflorus** (Roxb.) Nees in Wall. Pl. As. Rar. 3: 99. 1832; Fl. Brit. Ind. 4: 512. 1884; Fl. As. 3: 443. 1939. *Justicia thyrsiflora* Roxb. Fl. Ind. 1: 114. 1820. 'Soh-kajut'.

Shrubs, 1-2 m; leaves oblanceolate or elliptic-lanceolate, acute to acuminate apex, 15-25 × 4-8 cm glabrous; lateral nerves 10-12 pairs; petioles 1-5 cm; spikes terminal, 10-25 cm, stout, pubescent; bracts linear, 6-7 mm; calyx densely pubescent; corolla 15-18 mm; capsules oblanceolate, ± 3 cm.

Primary forests, 100-1000 m; fl. & fr.: Dec.-May; Dawki, Sohka-Dawki.

5. **Phlogacanthus guttatus** Nees in Wall. Pl. As. Rar. 3: 99. 1832; Fl. Brit. Ind. 4: 512. 1884; Fl. As. 3: 443. 1939.

Shrubs, 1-2 m; leaves elliptic-lanceolate, cuneate at base, acuminate, 12-22 × 5-8 cm; lateral nerves 8-11 pairs; petioles 2-3 cm; spikes in terminal panicles, 7-15 cm, pubescent; calyx pubescent; corolla 1.0-1.5 cm; lobes oblong, patent curved, yellowish-green with purple spots; capsules ± 2.5 cm.

Primary forests, 500-1200 m; fl. & fr.: Oct.-Mar.; near Khleihriat, Lumshnong.

6. **Phlogacanthus asperulous** Nees in Wall. Pl. As. Rar. 3: 99. 1832; Fl. Brit. Ind. 4: 512. 1884; Fl. As. 3: 444. 1939.

Shrubs, up to 1.5 m; leaves elliptic or lanceolate, cuneate at base, acuminate, undulate; 5-20 × 2-6 cm; lateral nerves 7-9 pairs; petioles 8-30 mm; spikes linear, 6-10 cm; calyx pubescent; corolla curved and inflated at mouth, 8-12 mm, pubescent; capsules ± 2 cm, glabrous.

Primary forests, 1000-1500 m; fl. & fr.: Mar.-July; Panglo Woods.

13. LEPIDAGATHIS Willd.

Lepidagathis incurva D. Don, Prodr. Fl. Nep. 119. 1825; Fl. As. 3: 451. 1939. *L. hyalina* Nees in Wall. Pl. As. Rar. 3: 95. 1832; Fl. Brit. Ind. 4: 521. 1885.

Perennial diffuse much-branched herbs, up to 2 m; leaves ovate or lanceolate cuneate at base, acute, 5-15 × 2-4 cm; spikes 1.5-3.5 cm, in terminal dense clusters; bracts lanceolate, acuminate mucronate, 8-12 mm, purplish-brown; corolla ± 6 mm, white with purple brown streaks; capsules 5-6 mm,

Forest edges, bushes and roadsides, in shaded places 100-1000 m; fl. & fr.: Oct.-Mar.; Dawki, Sohka.

14. *HYPOESTIS* R. Br.

Hypoestis triflora R. & S. Syst. Veg. 1: 141. 1817; Fl. Brit. Ind. 4: 557. 1885; Fl. As. 3: 540. 1939.

Much-branched herbs, up to 50 cm; leaves ovate, acute or subacute at base, acuminate, crenulate or wavy at margins, 2-8 × 1-5 cm, sparsely puberulous; petioles 5-30 mm; flowers in clusters of 3; clusters in axillary or terminal heads or umbels; outer bracts narrowly obovate to oblanceolate, 9-14 × 3-4 mm, puberulous outside; inner bracts linear-lanceolate, 6-10 × 2-3 mm; corolla 1-2 cm, pink or pale pinkish-white; capsules ellipsoid or obovoid.

- 1a. Flower-clusters sessile; corolla 1.0-1.5 cm; stamens as long as styles; seeds oblong. ... *var. triflora* 1
 1b. Flower-clusters on 5-25 mm long peduncles; corolla 1.5-2.0 cm; stamens longer than styles; seeds ovoid-orbicular. .. *var. pedunculata* 2

1. *var. triflora*

Shaded places in primary forests, 1000-1500 m; fl. & fr.: May-Dec.; Jowai.

2. *var. pedunculata* Balakr. in Bull. Bot. Surv. Ind. 16: 172. 1974.

Shaded moist places in primary forests, 1000-1500 m; fl. & fr.: Sept.-Dec.; Raliang, *Balakrishnan* 50252.

15. *RUNGIA* Nees

Rungia parviflora Nees in Wall. Pl. As. Rat. 3: 110. 1832; Fl. Brit. Ind. 4: 550. 1885; Fl. As. 3: 457. 1939.

Herbs, up to 35 cm, with ascending or erect branches; leaves ovate to linear-lanceolate, acute at base and apex, 1.5-6.0 × 0.4-1.0 cm; spikes terminal or axillary, 1-2 cm; bracts elliptic-oblong or obovate, 2-4 × 1-2 mm, scarious-margined; corolla blue or white; capsules ovoid, acuminate, 2-3 mm.

Roadsides, wastelands and forest edges, 100-1000 m; fl. & fr.: Jan.-Dec.; Dawki Sohka.

16. *JUSTICIA* L.

- 1a. Glabrous erect herbs, 20-50 cm high; leaves 10-15 × 3-5 cm; spikes slender, interrupted. ... *J. vasculosa* 1
 1b. Pubescent ascending herbs, 10-30 cm high; leaves 3-6 × 1-2 cm; spikes broad, not interrupted. ... *J. procumbens* 2

1. **Justicia vasculosa** (Nees) T. And. in J. Linn. Soc. 9: 515. 1867; Fl. Brit. Ind. 4: 533. 1885; Fl. As. 3: 454. 1939. *Gendurussa vasculosa* Nees in Wall. Pl. As. Rar. 3: 104. 1832.

Perennial herbs; stems glabrous, cylindrical; leaves ovate-lanceolate, attenuate at both ends, crisped pubescent on nerves beneath; petioles 1-3 cm; flowers opposite on 3-10 cm long spikes; corolla yellow with pink spots, pubescent.

Primary forests, in shaded places, 600-1300 m; fl. & fr.: Oct.-Mar.; Sutnga.

2. **Justicia procumbens** L. Sp. Pl. 15. 1753; Fl. Brit. Ind. 4: 539. 1885; Fl. As. 3: 455. 1939.

Slender much-branched herbs, with ascending-decumbent hairy branches; leaves ovate to oblong-ovate or lanceolate; spikes 1-8 × 0.5-0.8 cm, dense-flowered; bracts linear, 4-5 × 1 mm, hairy; corolla pale pink, 4-6 mm; capsules 4-5 mm; seeds 4.

Roadsides, wastelands and grasslands, 100-1500 m; fl. & fr.: Apr.-Dec.; Lumshnong, Nartiang, Sohka-Dawki.

17. **BARLERIA** L.

Barleria cristata L. Sp. Pl. 636. 1753; Fl. Brit. Ind. 4: 488. 1884; Fl. As. 3: 445. 1939.

Perennial shrubs, up to 75 cm; leaves elliptic-oblong, acute at both ends, 5-9 × 2-4 cm; petioles 3-8 mm; flowers solitary or paired in axils or in terminal clusters; bracteoles linear, ± 1 cm, pubescent; calyx-lobes pectinately toothed; corolla purple or pale blue, with white bands, 5-6 cm, pubescent; capsules ellipsoid, ± 1.5 cm.

Forest edges, roadsides and wastelands in shaded places, 100-500 m; fl. & fr.: Sept.-Feb.; Garampani.

18. **CODONACANTHUS** Nees

Codonacanthus pauciflorus (Nees) Nees in DC. Prodr. 11: 103. 1847; Fl. Brit. Ind. 4: 500. 1884; Fl. As. 3: 450. 1939. *Asystasia pauciflora* Nees in Wall. Pl. As. Rar. 3: 90. 1832.

Erect herbs, 30-60 cm; leaves ovate-elliptic to oblong-lanceolate acute at base, acuminate, 8-15 × 3-5 cm, pubescent on nerves beneath; racemes terminal, simple or branched, 8-15 cm, puberulous; pedicels 2-6 mm; flowers ± 8 mm; corolla ventricose, pink or whitish, 8-10 mm; capsules oblanceolate, 10-13 mm,

Forest, 100 - 1000 m; fl. & fr.: Feb.-Oct.; Dawki, Sutnga.

19. *ASYSTASIA* Bl.

Asystasia neesiana Nees in Wall. Pl. As. Rar. 3: 89. 1832; Fl. Brit. Ind. 4: 496. 1884.

Erect much-branched herbs, up to 1 m; leaves elliptic-lanceolate acute or rounded at base, acuminate, 10 - 22 × 5 - 10 cm; lateral nerves 10 - 15 pairs; petioles 1 - 4 cm; racemes terminal, simple or paniculate, up to 10 cm; corolla linear, tubular, up to 6 cm, pale pink; capsules 2 - 3 cm.

Primary forests, in shaded places, 100 - 900 m; fl. & fr.: Sept.-Feb.; Sohka.

20. *PSUEDERANTHEMUM* Radlk.

Pseuderranthemum indicum (Nees) A. M. & J. M. Cowan, Trees Bengal. 98. 1929; Fl. As. 3: 448. 1939. *Thyrsacanthus indicus* Nees in DC. Prodr. 9: 325. 1845. *Eranthemum indicum* (Nees) Clarke in Fl. Brit. Ind. 4: 497. 1884.

Undershrubs, up to 1 m, diffusely branched; branches terete, glabrous, brownish; leaves elliptic-lanceolate, acuminate, 10 - 15 × 3 - 5 cm; petioles 2 - 3 cm; racemes terminal, 3 - 10 cm; bracts linear; corolla white with purple veins, 2.5 - 3.0 cm; capsules cylindrical, 2.5 - 3.0 cm; seeds orbicular, tubercled, puberulous.

Primary forests, in shaded places, 1000 - 1800 m; fl. & fr.: Dec.-Mar.; Jowai, Mawryngkneng, Mynso.

106. VERBENACEAE

- 1a. Inflorescences spicate, centripetal, with the lowest flowers opening first.
 - 2a. Spikes capitate, ovoid; calyx tubular, 5-dentate; style bilobed; pyrenes of fruit 4. ... *Lantana* 1
 - 2b. Spikes slender, elongate, calyx 2-lobed or 2-partite; style entire; pyrenes of fruit 2. ... *Verbena* 2
- 1b. Inflorescences cymose, centrifugal, with the end flowers opening first.
 - 3a. Leaves digitate or rarely unifoliate. ... *Vitex* 3
 - 3b. Leaves simple.
 - 4a. Large climbers; stamens 5. ... *Sphenodesme* 4
 - 4b. Erect or straggling shrubs or trees; stamens 4.
 - 5a. Fruits dry, capsular. ... *Caryopteris* 5
 - 5b. Fruits fleshy, drupaceous.
 - 6a. Corolla regular; stamens isomerous, equal. ... *Callicarpa* 6

- 6b. Corolla 2-lipped ; stamens didynamous.
 7a. Flowers small ; drupe with 1 pyrene. ... *Premna* 7
 7b. Flowers large ; drupe with 4 pyrenes, often
 1-3 suppressed.
 8a. Calyx campanulate, lobate ; corolla-
 tube slender. ... *Clerodendrum* 8
 8b. Calyx saucer-shaped, entire ; corolla-
 tube widened upwards. ... *Holmskioldia* 9

1. LANTANA L.

Lantana camara L. var. **aculeata** (L.) Moldenke in *Torreyia* 34: 9. 1934. *L. aculeata* L. Sp. Pl. 627. 1753; Fl. As. 3: 460. 1939.

Erect bushy or straggling spiny shrubs, up to 2 m; leaves ovate, narrowed at base, acute, crenate-dentate, 5-8 × 3-5 cm; heads 6-10 mm; peduncles 4-7 cm; corolla tubular, 4-5-lobed, purple red outside, orange-red inside; tube 8-10 mm; lobes 4-5 mm; drupes globose, 5-6 mm, green, becoming bluish-black.

Wastelands, roadsides and edges 100-1400 m; fl. & fr.: Jan.-Dec.; Jarain-Jowai, Nartiang, Sohka.

2. VERBENA L.

Verbena officinalis L. Sp. Pl. 20. 1753; Fl. Brit. Ind. 4: 565. 1885; Fl. As. 3: 462. 1939.

Erect or decumbent herbs with woody rootstock, up to 1 m; stems 4-angled; leaves simple, 3-partite or variously pinnately lobed and coarsely toothed; spikes terminal, slender, 8-25 cm; calyx ± 2 mm; corolla straight or curved, pale purple, ± 1.5 cm; nutlets ± 1.5 mm, with a few longitudinal ribs.

Open grasslands and pine forests, 1000-1700 m; fl. & fr.: June-Nov.; Nartiang, Raliang.

3. VITEX L.

- 1a. Terminal leaflets sessile or subsessile ; inflorescence terminal. ... *V. pinnata* 1
 1b. Terminal leaflet petioled; inflorescence axillary.
 2a. Leaflets softly brownish-tomentose beneath ; corolla-tube with
 a ring of hairs inside, near base, otherwise glabrous. ... *V. vestita* 2
 2b. Leaflets glabrous or glabrescent beneath ; corolla-tube villous
 inside and also with a ring of hairs near base.
 3a. Lateral nerves 8-10 pairs ; corolla white with bluish or
 purplish shade in throat. ... *V. glabrata* 3
 3b. Lateral nerves 12-15 pairs ; corolla yellow. ... *V. peduncularis* 4

1. **Vitex pinnata** L. Sp. Pl. 638. 1753. *V. pubescens* Vahl, Symb. Bot. 3: 85. 1794; Fl. Brit. Ind. 4: 585. 1885; Fl. As. 3: 481. 1939.

Trees, 20-40 m; petioles 3-10 cm; leaflets 3-5, sessile or subsessile, ovate or obovate to elliptic-lanceolate, cuneate at base, 5-12 × 3-7 cm; lateral nerves 10-12 pairs; panicles densely brown tomentose; corolla ± 10 cm, pale blue outside, violet inside; drupes depressed-globose, 7-8 mm diam., black when ripe.

Primary forests, 100-500 m; fl. & fr.: Feb.-Sept.; Dawki.

2. **Vitex vestita** Schauer in DC. Prodr. 11: 692. 1847; Fl. Brit. Ind. 4: 587. 1885; Fl. As. 3: 485. 1939.

Shrubs or small trees, 5-10 m; petioles 3-5 cm; leaflets 3, elliptic-lanceolate, acute, rounded or cuneate at base, long-acuminate, 10-12 × 4-11 cm; lateral nerves 6-11 pairs; cymes 1-4 in each axil, brown-pubescent; corolla pale yellow or white, ± 8 mm; drupes globose, ± 6 mm diam.

Primary forests, 600-1200 m; fl. & fr.: Apr.-Sept.; Nartiang.

3. **Vitex glabrata** R. Br. Prodr. Fl. Nov. Holl. 512. 1810; Fl. Brit. Ind. 4: 588. 1885; Fl. As. 3: 485. 1939.

Trees, 15-25 m; young shoots tomentose; petioles 7-15 cm; leaflets 3-5, oblong-elliptic or obovate, acuminate at apex, 10-30 × 4-13 cm; petioles up to 3 cm; cymes solitary, 6-15 cm; pedicels up to 5 mm; corolla 5-7 mm, drupes oblong to obovoid, 1.5-2.0 cm.

Primary and secondary forests, 100-1200 m; fl. & fr.: July-Dec.; Dawki, Mynso-Nartiang.

4. **Vitex peduncularis** Schauer in DC. Prodr. 11: 687. 1847; Fl. Brit. Ind. 4: 587. 1885; Fl. As. 3: 484. 1939.

Trees, 20-25 m; young shoots pubescent; petioles 5-15 cm; leaflets 3-4, lanceolate or elliptic, acute at base, acuminate, 5-15 × 2-8 cm; cymes paniculate, 5-20 cm, lax-flowered; corolla ± 3 mm, glandular hairy at base inside; drupes obovoid, ± 1 cm.

Primary forests, 100-600 m; fl. & fr.: Mar.-Dec.; Dawki.

4. SPHENODESME Jack.

Sphenodesme pentandra Jack. var. **wallichiana** (Schauer) Munir in Gard. Bull. Sing. 21: 360. 1966. *S. pentandra* (non Jack, 1820) Clarke in Fl. Brit. Ind. 4: 602. 1885; Fl. As. 3: 496. 1939. *S. wallichiana* Schauer in DC. Prodr. 11: 622. 1847.

Large woody climbers; leaves elliptic-oblong to lanceolate, rounded at base, acute or acuminate, 5-15 × 2-4 cm; inflorescences axillary or terminal, panicles of 3-5-flowered heads, each with 6 foliaceous accrescent oblong-ob lanceolate involucre bracts; corolla purple; drupes globose, ± 4 mm diam., subtended by up to 2.5 cm long scarious bracts.

Forests and forest edges, 100-1000 m; fl. & fr.: Nov.-May; Dawki.

5. CARYOPTERIS Bunge

Caryopteris foetida (D. Don) Thellung in Viert. Nat. Ges. Zurich 64; 782. 1919. *Clerodendrum foetidum* D. Don, Prodr. Fl. Nep. 103. 1825. *Clerodendrum gratum* Schauer in DC. Prodr. 11: 674. 1847. *Caryopteris grata* (Schauer) Benth. Gen. Pl. 2: 1158. 1876; Fl. Brit. Ind. 4: 597. 1885.

Rambling shrubs, 2-3 m; branchlets puberulous; leaves elliptic, rhomboid-rounded at base, acute, serrate or denticulate, 8-12 × 2-5 cm; cymes axillary, corymbose, up to 2 cm; corolla white, glandular pubescent; fruits capsular, globose, ± 5 mm, finely ribbed.

Primary forests, 1200-1600 m; fl. & fr.: May-Oct.; Khleinekeng, near Jowai.

6. CALLICARPA L.

- | | |
|--|------------------------|
| 1a. Petioles more than 2.5 cm long; leaves entire or subentire. | |
| 2a. Leaves entire, thinly white-tomentose beneath; peduncles as long as petioles; calyx stellate-pubescent. ... | <i>C. arborea</i> 1 |
| 2b. Leaves subentire, thickly velvety white tomentose beneath; peduncles shorter than petioles; calyx almost glabrous. ... | <i>C. vestita</i> 2 |
| 1b. Petioles less than 2 cm long; leaves crenate, serrate or denticulate. | |
| 3a. Leaves cuneate at base, covered with golden-yellow appressed circular scales beneath. ... | <i>C. longifolia</i> 3 |
| 3b. Leaves subequally cordate, subcordate or rounded at base, without any scales beneath. | |
| 4a. Leaves densely stellate-tomentose beneath. ... | <i>C. rubella</i> 4 |
| 4b. Leaves stellate-hairy only on nerves beneath. ... | <i>C. psilocalyx</i> 5 |

1. **Callicarpa arborea** Roxb. Fl. Ind. 1: 405. 1820; Fl. Brit. Ind. 4: 567. 1885; Fl. As. 3: 463. 1939.

Trees or large shrubs, 3-15 m; innovations thinly scurfy tomentose; leaves ovate-elliptic or lanceolate, acute or cuneate at base, acuminate, 10-30 × 4-10 cm, glabrous above, except on nerves; inflorescences longer than petioles; peduncles up to 5 cm; flowers pinkish-purple; drupes globose, 2-3 mm diam., purple.

Secondary forests and grasslands, 500-1500 m; fl. & fr.: May-Dec.; Dawki, Garampani-Raliang, Jowai-Badarpur Road, Shangpung.

2. **Callicarpa vestita** Roxb. Fl. Ind. 1: 405. 1820; Fl. Brit. Ind. 4: 567. 1885; Fl. As. 3: 463. 1939. '*Dieng-lakhiat*'.

Small trees or shrubs, 1-4 m; leaves lanceolate, rounded or subcordate at base, acuminate, 15-35 × 7-15 cm, glabrous above; inflorescences as long as or shorter than petioles; peduncles ± 5 cm, stellate-pubescent; flowers pinkish-purple; drupes globose, ± 3 mm diam., shiny dark purple.

Secondary forests, 100-1200 m; fl. & fr.: Apr.-Dec.; Nongthala, Syndai, Umkhlaw, near Jarain.

3. **Callicarpa longifolia** Lamk. Encycl. Meth. 1: 563. 1783; Fl. Brit. Ind. 4: 570. 1885; Fl. As. 3: 465. 1939. *C. lanceolaria* Roxb. Fl. Ind. 1: 395. 1832. *C. longifolia* var. *lanceolaria* (Roxb.) Clarke in Fl. Brit. Ind. 4: 570. 1885.

Shrubs, up to 3 m; leaves elliptic or linear-lanceolate, acuminate at apex, 5-20 × 1-5 cm, glabrous above, minutely golden-yellow scaly and stellate pubescent on nerves beneath; petioles 5-20 mm, shorter than inflorescences; flowers pinkish-purple; drupes globose, ± 3 mm, white.

Forests, 100-600 m; fl. & fr.: June-Jan. Dawki.

4. **Callicarpa rubella** Lindl. in Edw. Bot. Reg. 11: t. 883. 1825; Fl. Brit. Ind. 4: 569. 1885; Fl. As. 3: 464. 1939.

Erect shrubs, up to 1 m; stem whitish; leaves oblong-lanceolate, cordate or subcordate at base, acuminate, crenate-serrate, 5-18 × 2-5 cm; petioles up to 1 cm; inflorescences 3-5 cm across; flowers red; drupes globose, ± 4 mm diam. shiny purple.

Primary, secondary and pine forests, partially sunny and open places, 600-1700 m; fl. & fr.: June-Jan.; Jarain, Jowai-Jarain, Nartiang, Raliang-Garampani, Umkhlaw.

5. **Callicarpa psilocalyx** Clarke in Fl. Brit. Ind. 4: 569. 1885; Fl. As. 3: 465. 1939.

Shrubs, with straggling branches, up to 2 m; leaves elliptic-lanceolate, rounded or subcordate at base, acuminate, serrate, 4-18 × 2-6 cm, glabrous above; petioles 5-10 mm; inflorescences 1-2 cm across; flowers pale pink; drupes globose, ± 2.5 mm diam., white.

Primary forests and forest edges, 1200-1700 m; fl. & fr.: June-Nov.; Jowai-Jarain, *Balakrishnan* 42218 —Endemic to Meghalaya.

7. *PREMNA* L. *nom. cons.*

1a. Inflorescences elongate, raceme of thyrses.	<i>P. racemosa</i> 1
1b. Inflorescences broadly corymbose panicles.	
2a. Straggling or climbing shrubs ; leaves glabrous.	<i>P. coriacea</i> 2
2b. Erect trees or shrubs ; leaves pubescent or tomentose beneath.	
3a. Leaves entire ; midrib hairy above ; inflorescence pyramidal ; calyx 5-toothed.	<i>P. bengalensis</i> 3
3b. Leaves cuspidate-serrate towards apex ; midrib glabrous above ; inflorescence corymbiform ; calyx 4-toothed.	<i>P. barbata</i> 4

1. ***Premna racemosa*** Schauer in DC. Prodr. 11: 633. 1847; Fl. Brit. Ind. 4: 571. 1885; Fl. As. 3: 470. 1939.

Trees, 5-15 m; leaves ovate-obovate or elliptic-oblong, cuneate at base, acute or acuminate, 4-12 × 2-5 cm, glabrous or sparsely pubescent on nerves; lateral nerves 4-5 pairs; petioles 5-12 mm; inflorescences up to 10 cm, interrupted spike of thyrses; flowers white, 3-4 mm, hairy inside; drupes obovoid, 3-4 mm.

Primary and secondary forests, 1000-1600 m; fl. & fr.: Apr.-Nov.; Jowai, Nongringkoh.

2. ***Premna coriacea*** Clarke in Fl. Brit. Ind. 4: 573. 1885; Fl. As. 3: 472. 1939.

Often epiphytic; leaves ovate or orbicular to elliptic-lanceolate, rounded or subcordate at base, short-acuminate, 8-15 × 6-10 cm; lateral nerves 4-7 pairs; petioles 2-4 cm; inflorescences corymbose panicles; corolla greenish-white, hairy at throat; drupes obovoid, ± 5 mm, black.

Forests, 1000-1300 m; fl. & fr.: Apr.-Sept.; Khleibriat.

3. ***Premna bengalensis*** Clarke in Fl. Brit. Ind. 4: 577. 1885; Fl. As. 3: 474. 1939.

Trees, 20-35 m; leaves ovate-oblong or elliptic-lanceolate, rounded at base, acuminate, 8-25 × 4-10 cm, stellate-pubescent on nerves; inflorescences large corymbiform panicles, stellate pubescent; corolla white, hairy at throat; drupes globose, obscurely verrucose.

Primary forests, 100-600 m; fl. & fr.: Apr.-Nov.; Dawki.

4. ***Premna barbata*** Schauer in DC. Prodr. 11: 636. 1847; Fl. Brit. Ind. 4: 579. 1885; Fl. As. 3: 476. 1939.

Trees or large shrubs, 5-10 m; leaves oblong-ovate or elliptic-lanceolate, rounded at base, cuspidate-serrate towards apex, 5-16 × 4-8 cm, glabrescent above, thinly pubescent beneath; petioles 10-25 mm; corolla

greenish-white, hairy at throat; drupes globose, 4-5 mm diam., obscurely verrucose, purple.

Primary forests, 100-1000 m; fl. & fr.: Apr.-July; Dawki.

8. CLERODENDRUM L.

- 1a. Panicles lax, elongate, often pendulous.
 - 2a. Inflorescences pendulous, lax-flowered. ... *C. wallichii* 1
 - 2b. Inflorescences erect, dense-flowered.
 - 3a. Leaves rounded or subacute at base; petioles 3-10 cm long. ... *C. viscosum* 2
 - 3b. Leaves cuneate or acute at base; petioles up to 2 cm long. ... *C. serratum* 3
- 1b. Panicles dense, corymbiform or capitate.
 - 4a. Leaves angular or sublobate; corolla-tube 10 cm or more long. ... *C. hastatum* 4
 - 4b. Leaves entire or dentate; corolla-tube less than 5 cm long.
 - 5a. Panicles corymbose. ... *C. colebrookianum* 5
 - 5b. Panicles capitate.
 - 6a. Leaves entire, cuneate or rounded at base; bracts ovate-lanceolate, ± 8 mm wide; drupes dark purple. ... *C. bracteatum* 6
 - 6b. Leaves dentate, truncate or subcordate at base; bracts linear-subulate, ± 4 mm wide; drupes red. ... *C. lasiocephalum* 7

1. **Clerodendrum wallichii** Merr. in J. Arn. Arb. 23: 220. 1952. *C. nutans* D. Don, Prodr. Fl. Nep. 103. 1825 (non Jack, 1820); Fl. Brit. Ind. 4: 591. 1885; Fl. As. 3: 491. 1939. 'Syntew-law-hariam'.

Shrubs, up to 4 m; leaves lanceolate or oblanceolate, cuneate at base, acute or acuminate, 5-25 \times 2-5 cm; lateral nerves 6-7 pairs; petioles 5-17 mm; inflorescences thyrsoid panicles; calyx red; corolla white with pungent smell; drupes globose, 10-15 mm, dark purple.

Forests and forest edges, 100-1500 m; fl. & fr.: Aug.-Apr.; Dawki, Jowai, Khleihriat, Sohka-Dawki.

2. **Clerodendrum viscosum** Vent. Jard. Malm. 1: t. 25. 1803. *C. infortunatum* (auctt. non L.) Clarke in Fl. Brit. Ind. 4: 594. 1885; Fl. As. 3: 487. 1939.

Shrubs, up to 2 m; leaves ovate to lanceolate, acuminate, entire or denticulate, 10-15 \times 6-9 cm, scabrous above, pubescent beneath; lateral nerves 6-9 pairs; inflorescences terminal, erect, lax panicles, ± 15 cm; calyx dark red, leathery; drupes bluish-black.

Primary forests and forest edges, 100-1000 m; fl. & fr.: Feb.-July; Syndai.

3. **Clerodendrum serratum** (L.) Spreng. Syst. 2: 758. 1825; Fl. Brit. Ind. 4: 592. 1885; Fl. As. 3: 490. 1939. *Valkameria serrata* L. Mant. Pl. 90. 1771.

Shrubs, 1-2 m; leaves ovate to oblong-obovate or oblanceolate, acute or acuminate, serrate, 10-30 × 3-12 cm, glabrescent; lateral nerves 6-8 pairs; inflorescences erect, narrow paniced, 10-25 cm; calyx cupular, shortly toothed, reddish; corolla ± 8 mm, hairy inside, pale red; drupes ± 8 mm diam., black.

Forests and forest edges, 100-1000 m; fl. & fr.: Jan.-Dec.; Dawki, Garampani, Khongsong.

4. **Clerodendrum hastatum** (Roxb.) Lindl. in Edw. Bot. Reg. 10: t. 1307. 1830; Fl. Brit. Ind. 4: 595. 1885; Fl. As. 3: 439. 1939. *Siphonanthus hastata* Roxb. Fl. Ind. 3: 67. 1832.

Shrubs, ± 2 m; leaves ovate or oblong, subcordate or truncate at base, acute or acuminate, 5-18 × 3-15 cm, membranous, often purplish beneath; lateral nerves 4-6 pairs; petioles 3-12 cm; inflorescences dense corymbose panicles; calyx green, red in fruit; corolla slender, 10-12 cm, white; drupes 8-10 mm diam., purplish-black.

Forest edges and shaded places amidst bushes, 200-1000 m; fl. & fr.: May-Jan.; Garampani.

5. **Clerodendrum colebrookianum** Walp. Rep. 4: 114. 1845; Fl. Brit. Ind. 4: 594. 1885; Fl. As. 3: 498. 1939.

Shrubs, 1-5 m; leaves broad-ovate, subcordate at base, acute, 10-20 × 6-16 cm; lateral nerves 6-9 pairs; petioles 2-15 cm; inflorescences compact corymbose panicles; calyx pubescent, cupular, scarlet-red in fruit; corolla white; drupes ± 8 mm diam., bluish-green.

Primary forests, 1000-1500 m; fl. & fr.: Apr.-Nov.; Jarain, Shangpung.

6. **Clerodendrum bracteatum** Walp. Rep. 4: 106. 1845; Fl. Brit. Ind. 4: 593. 1885; Fl. As. 3: 489. 1939. '*Dieng-rasna*'.

Shrubs, 3-5 m; leaves ovate, acuminate at apex, 8-20 × 4-12 cm; lateral nerves 5-7 pairs; petioles 1-8 cm; cymes capitate forming leafy panicles; calyx deeply lobed, pale greenish-white, red in fruit; corolla white, scented; tube ± 5 cm, pubescent inside; drupes ± 8 mm diam.

Forests and forest edges, in shaded places, 800-1600 m; fl. & fr.: Jan.-Dec.; Garampani, Jarain, Jowai, Jowai-Badarpur Road, Jowai-Jarain.

7. **Clerodendrum lasiocephalum** Clarke in Fl. Brit. Ind. 4: 594. 1885; Fl. As. 3: 489. 1939.

Shrubs, 1-3 m; leaves ovate or oblong-rhomboid, acuminate, 7-8 × 5-15 cm; lateral nerves 5-7 pairs; petioles 2-9 cm; inflorescences compact, capitate; calyx pubescent, reddish in fruit; corolla white; tube ± 3 cm; drupes ± 8 mm diam.

Primary forests, 1300-1600 m; fl. & fr.: Apr.-Sept.; Raliang.

9. HOLMSKIOLDIA Retz.

Holmskioldia sanguinea Retz. Obs. Bot. 6: 31. 1791; Fl. Brit. Ind. 4: 596. 1885; Fl. As. 3: 493. 1939.

Straggling woody shrubs; leaves ovate, truncate or rounded at base, acuminate, crenate, 4-14 × 3-10 cm; lateral nerves 4-6 pairs; petioles 1-3 cm; flowers clustered, axillary; corolla red, ± 2 cm; tube curved; drupes obovoid, with persistent disc-shaped scarlet-red or orange-red calyx, up to 2 cm across.

Secondary forests and forest edges, 100-1000 m; fl. & fr.: Oct.-May; Dawki, Jarain-Dawki.

107. LAMIACEAE

- 1a. Style terminal on ovary; nutlets attached on latero-ventral side and the surface of attachment large.
 - 2a. Corolla 2-lipped; upper lip 2-fid and each lobe bifid; lower lip 3-lobed. ... *Ajuga* 1
 - 2b. Corolla 1-lipped; upper lip deeply 2-fid, seemingly absent; lower lip 3-lobed and in association with 2 upper lobes forming a 5-lobed piece.
 - 3a. Herbs or undershrubs up to 1 m high; branches and leaves grey or brownish pubescent; inflorescence a panicle of lax-flowered raceme; filaments 6-7 mm long. ... *Teucrium* 2
 - 3b. Shrubs or small trees, 2-10 m tall; branches and leaves beneath densely white floccose-tomentose; inflorescences solitary, dense-flowered spikes; filaments 15-20 mm long. *Leucoscepttrum* 3
- 1b. Style gynobasic; nutlets attached basally and the surface of contact small.
 - 4a. Nutlets drupaceous with fleshy or strongly thickened exocarp and hard crustaceous endocarp. ... *Gomphostemma* 4
 - 4b. Nutlets with dry or often thin exocarp.
 - 5a. Upper lip of calyx with a shield-like protruberance at back; seeds more or less transverse; embryo with a bent radicle lying on one cotyledon. ... *Scutellaria* 5
 - 5b. Upper lip of calyx without any such protruberance; seeds erect; embryo with short straight radicle.
 - 6a. Stamens descending, lying upon or enclosed in lower lip.
 - 7a. Lower lip of corolla concave or boat-shaped, constricted at base. ... *Plectranthus* 6

- 7b. Lower lip of corolla patent, flat or slightly concave, broad at base.
- 8a. Fruiting calyx smooth ; lower lip sharply 2-toothed. ... *Orthosiphon* 7
- 8b. Fruiting calyx deeply pitted and fenestrate with transverse bars ; lip nearly entire.
- 9a. Corolla 4—5 mm long ; filaments of posterior pair of stamens appendaged at base ; fruiting calyx 2.0—2.5 mm long. ... *Mesona* 8
- 9b. Corolla 6—7 mm long ; filaments of posterior pair of stamens not appendaged ; fruiting calyx 5—8 mm long. ... *Geniosporum* 9
- 6b. Stamens ascending or spreading and projecting straight forwards.
- 10a. Stamens erect, divergent or spreading, but not ascending under upper lip of corolla ; corolla almost actinomorphic, generally not or less clearly 2-lipped.
- 11a. Anthers 2-celled ; locules parallel or divaricate. ... *Mosla* 10
- 11b. Anthers 1-celled ; locules confluent into one cell.
- 12a. Corolla 4-or 5-lobed ; stamens barely exerted ; filaments glabrous. ... *Elsholtzia* 11
- 12b. Corolla 4-lobed ; stamens long-exserted ; filaments bearded.
- 13a. Leaves verticillate, 3—10 in a whorl ; inflorescence slender, dense-flowered, simple ; verticillasters aggregate. ... *Eusteralis* 12
- 13b. Leaves opposite ; inflorescence stout, lax or dense-flowered, simple or branched ; verticillasters glomerate. ... *Pogostemon* 13
- 10b. Stamens ascending under the upper lip of corolla ; corolla always 2-lipped.
- 14a. Upper lip of corolla hooded, villous. ... *Leucas* 14
- 14b. Upper lip of corolla nearly flat, glabrous or pubescent.
- 15a. Anthers ovoid with 2 parallel cells.
- 16a. Anthers dimorphic ; cells of anterior anthers dimidiate, 1-celled ; cells of posterior stamens 2-celled ; nutlets smooth. ... *Anisomeles* 15
- 16b. Anthers uniform ; cells confluent ; nutlets papillate, hispid or scaly.
- 17a. Corolla white or purplish ; nutlets crowned with dense scaly or chaffy hairs, not winged at top. ... *Achyropermum* 16

- 17b. Corolla red or pinkish ;
nutlets without hairs or
scales, winged at top. ... *Colquhounia* 17
- 15b. Anthers uniform with 2, more or less
divaricate cells.
- 18a. Calyx-tube campanulate; co-
rolla-tube recurved. ... *Melissa* 18
- 18b. Calyx-tube ovoid or gibbous
at base ; corolla-tube nearly
straight.
- 19a. Calyx-tube villous with-
in, not distinctly nerved,
equally 5-toothed. ... *Craniotome* 19
- 19b. Calyx-tube naked with-
in, prominently nerved ;
upper lip 3-toothed and
lower lip 2-toothed. ... *Calamintha* 20

1. AJUGA L.

Ajuga macrosperma Benth. in Wall. Pl. As. Rar. 1: 58. 1830; Fl. Brit. Ind. 4: 704. 1885.

Herbs, 15 - 60 cm; branches ascending, often rooting at lower nodes; leaves ovate-oblong or obovate, cuneate at base, subacute, sinuate or lobed at margins, 4 - 15 × 3 - 6 cm; lateral nerves 5 - 7 pairs; petioles 1 - 5 cm; verticillasters in terminal simple 3 - 20 cm long spikes; calyx campanulate, 10-nerved; teeth 5, minute; corolla blue to crimson-red; nutlets \pm 1.5 mm diam., rugose.

Pine forests and forest edges, 1000 - 1700 m; fl. & fr.: Mar.-Nov.; Jarain, Jowai, Nartiang.

2. TEUCRIUM L.

Teucrium quadrifarium Buch.-Ham. in D. Don, Prodr. Fl. Nep. 108. 1825; Fl. Brit. Ind. 4: 701. 1885; Fl. As. 3: 529. 1939.

Erect herbs, 30 - 80 cm; stems villous; leaves oblong-ovate, cordate or rounded at base, bluntly acute, serrulate, 2 - 6 × 1 - 4 cm; lateral nerves, 5 - 8 pairs; petioles 3 - 10 mm; spikes in terminal panicles, 4 - 15 cm long; bracts ovate, acuminate, foliaceous, 7 - 15 cm; calyx tubular, 4 - 5 mm, 10-nerved; teeth 5; upper tooth ovate; corolla 3 - 4 mm, purple; nutlets ovoid, \pm 1.5 × 1 mm, rugose, dark brown.

Primary forests, 1000 - 1700 m; fl. & fr.: June-Dec.; Jarain, Jowai-Jarain, Mawryngkneng.

3. *LEUCOSCEPTRUM* Smith.

Leucosceptrum canum Smith, Exot. Bot. 2: 113, t. 116. 1806; Fl. Brit. Ind. 4: 699. 1885; Fl. As. 3: 529. 1939. '*Dieng-lakekhi*'.

Shrubs or small trees, 2-10 m; stems white woolly; leaves elliptic-lanceolate, cuneate at base, acuminate 15-30 × 3-10 cm; lateral nerves 10-14 pairs; petioles 2-4 cm; spikes terminal, simple, 8-15 cm; bracts subreniform, imbricating; calyx campanulate, ± 6 mm; corolla ± 10 mm, yellow to pink; nutlets trigonous, ± 4 mm, brown.

Primary forests, 1200-1800 m; fl. & fr.: May-Jan.; Laskein, Raliang.

4. *GOMPHOSTEMMA* Benth.

- | | |
|---|---------------------------|
| 1a. Corolla up to 2 cm long; tube slender, straight; limb very short; nutlets solitary. | <i>G. parviflorum</i> 1 |
| 1b. Corolla more than 3 cm long; tube incurved, broad; limb long; nutlets 3 or 4. | |
| 2a. Leaves more than 16 cm long; ovary villous. | ... <i>G. lucidum</i> 2 |
| 2b. Leaves less than 12 cm long; ovary glabrous. | |
| 3a. Leaves 3-6 cm long, velvety tomentose; corolla villous outside. | ... <i>G. velutinum</i> 3 |
| 3b. Leaves 7-12 cm long, glabrous or puberulous; corolla puberulous outside. | ... <i>G. ovatum</i> 4 |

1. ***Gomphostemma parviflorum*** Benth. in Wall. Pl. As. Rar. 2: 12. 1831; Fl. Brit. Ind. 4: 697. 1885; Fl. As. 3: 528. 1939.

Herbs or undershrubs, 0.5-2.0 m; stems dense-tomentose; leaves elliptic-ovate to oblanceolate, subcuneate at base, acuminate, serrate, 15-35 × 3-12 cm, hirsute above, white-tomentose beneath; lateral nerves 6-9 pairs; petioles 2-5 cm; verticillasters in lax or compact cymes, axillary or crowded at ends of branches; peduncles 1-4 cm; bracts linear; corolla yellow; nutlets ellipsoid, ± 6 mm, brown.

Primary forests, 100-900 m; fl. & fr.: Aug.-Dec.; Syndai-Muktapur.

2. ***Gomphostemma lucidum*** Benth. in Wall. Pl. As. Rar. 2: 12. 1831; Fl. Brit. Ind. 4: 697. 1885; Fl. As. 3: 527. 1939.

Herbs or undershrubs, 0.5-2.0 m; leaves elliptic to oblanceolate, attenuate at base, acuminate, serrulate, 18-30 × 4-10 cm; lateral nerves 5-9 pairs; petioles 1-3 cm; verticillasters in dense axillary clusters; bracts lanceolate, 5-10 mm; calyx 10-15 mm, red; teeth 3-5 mm; corolla ± 4 mm, yellow; nutlets ellipsoid, ± 6 mm, white.

- | | |
|---|-----------------------------|
| 1a. Leaves oblong-lanceolate or oblanceolate, densely or sparsely stellate-hairy beneath. | ... var. <i>lucidum</i> 1 |
| 1b. Leaves elliptic-ovate, densely white woolly tomentose beneath. | ... var. <i>canescens</i> 2 |

1. var. **lucidum**

Primary forests, 700-1500 m; fl. & fr.: May-Oct.; Jarain to Dawki, Jowai.

2. var. **canescens** Prain in Ann. Roy. Bot. Gard. Cal. 3: 263. 1891.

Primary forests, 1000-1600 m; fl. & fr.: May-Oct.; Jowai, Jowai-Jarain.

3. **Gomphostemma velutinum** Benth. in Wall. Pl. As. Rar. 2: 13. 1831; Fl. Brit. Ind. 4: 699. 1885; Fl. As. 3: 529. 1939.

Dwarf herbs, 8-15 cm; stems velvety tomentose; leaves elliptic-ovate, cuneate to rounded at base, acute, crenate, 3-6 × 1-3 cm, velvety tomentose; lateral nerves 4-5 pairs; petioles 3-12 mm; verticillasters few-flowered, axillary, sessile; bracts 5-10 mm; outer oblong, inner lanceolate; calyx 10-12 cm; teeth lanceolate; corolla yellow, ± 3 cm; nutlets oblong, ± 3 mm, brown.

Primary forests, in shaded moist places, 1200-1600 m; fl. & fr.: May-Sept.; Jowai.

4. **Gomphostemma ovatum** Benth. in Wall. Pl. As. Rar. 2: 12. 1831; Fl. Brit. Ind. 4: 699. 1885.

Herbs, 15-30 cm; leaves ovate-elliptic or oblong, acute to obtuse at base, subacute, serrate, 7-12 × 3-10 cm; lateral nerves 4-5 pairs; petioles 2-6 cm; verticillasters axillary, clustered; bracts ovate, obtuse, crenate, 10-15 mm; inner ones 5-8 mm; calyx ± 10 mm; teeth 3-4 mm; corolla yellow or orange, ± 4 cm; nutlets subglobose, ± 5 mm, brown.

Primary forests, 300-1000 m; fl. & fr.: May-Sept.; Rytang, near Garampani.

5. SCUTELLARIA L.

Scutellaria discolor Colebr. in Wall. Pl. As. Rar. 1: 66. 1830; Fl. Brit. Ind. 4: 667. 1885; Fl. As. 3: 519. 1939.

Herbs, 10-50 cm; leaves elliptic to suborbicular, cordate at base, obtuse, crenate, 15-35 × 15-25 mm; lateral nerves 7-9 pairs; petioles 1-3 cm; verticillasters lax, in terminal, simple, 8-15 cm long racemes; bracts linear, 1-3 mm; calyx campanulate, ± 2 mm; corolla 10-15 mm, pale blue; nutlets ellipsoid, ± 1 mm, brownish-black.

Forest edges, grasslands and pine forests, 1200-1800 m; fl. & fr.: May-Nov.; Jarain, Jowai, Raliang.

6. *PLECTRANTHUS* L'Herit *nom. cons.*

- | | |
|---|-------------------------|
| 1a. Leaves opposite or whorled; verticillasters dense-flowered; pedicels ± 1 mm long; fruiting calyx erect, tubular; nutlets trigonous. ... | <i>P. ternifolius</i> 1 |
| 1b. Leaves opposite; verticillasters lax-flowered; pedicels 3—5 mm long; fruiting calyx declinate, subcampanulate; nutlets oblong. | |
| 2a. Calyx-teeth acute; base of corolla gibbous at base; tube deflexed. ... | <i>P. japonicus</i> 2 |
| 2b. Calyx-teeth obtuse; base of corolla not gibbous at base; tube straight. ... | <i>P. striatus</i> 3 |

1. ***Plectranthus ternifolius*** D. Don, Prodr. Fl. Nep. 117. 1825; Fl. Brit. Ind. 4: 621. 1885; Fl. As. 3: 506. 1939.

Bushy shrubs, 1.0-1.5 m; leaves subsessile, elliptic-lanceolate, acute at base, acuminate, serrate, 5-12 \times 2-5 cm; lateral nerves 7-9 pairs; verticillasters in axillary or terminal simple or paniculate 3-10 cm long spikes; lower bracts foliaceous, upper short, ovate; calyx tubular 2-3 mm; corolla ± 4 mm, white, pink-spotted on upper lip; nutlets ovoid-trigonous.

Secondary forests and grasslands, 200-1200 m; fl. & fr.: Aug.-Mar.; Garampani-Raliang, Nongringkoh.

2. ***Plectranthus japonicus*** (Burm. f.) Koidz. in Bot. Mag. Tokyo 43: 386. 1929. *Scutellaria japonica* Burm. f. Fl. Ind. 130. 1768. *P. coesta* D. Don, Prodr. Fl. Nep. 117. 1825; Fl. Brit. Ind. 4: 619. 1885; Fl. As. 3: 507. 1939.

Herbs or undershrubs, 0.5-2.0 m; leaves ovate, acute at base, acuminate, serrate, 3-10 \times 1.5-4.5 cm; lateral nerves 5-8 pairs; petioles 1.5-4.5 cm; verticillasters lax-flowered, in terminal and upper axillary paniculate racemes; bracts ovate, 3-5 mm; calyx ± 2 mm, hispid outside, 10-ribbed; corolla ± 5 mm, pale purple; nutlets oblong, minutely tuberculate.

Primary forests, forest edges and grasslands, in shaded places, 500-1000 m; fl. & fr.: Aug.-Feb.; Mynso, Syndai.

3. ***Plectranthus striatus*** Benth. in Wall. Pl. As. Rar. 2: 17. 1831; Fl. Brit. Ind. 4: 618. 1885; Fl. As. 3: 507. 1939.

Herbs, often shrubby, 25-75 cm; leaves ovate, rounded or acute at base, acuminate, crenate, 4-8 \times 2-4 cm; lateral nerves 6-7 pairs; petioles 3-15 mm, winged above; verticillasters in terminal or upper axillary paniculate racemes; bracts ovate, 1-5 mm; corolla white with purple patches on lower lip; nutlets oblong, brown.

Pine forests and grasslands, in shaded places, 900-1600 m; fl. & fr.; Sept.-Feb.; Jowai, Mawryngkneng, Nartiang.

7. ORTHOSIPHON Benth.

Orthosiphon incurvus Benth. in Wall. Pl. As. Rar. 2: 15. 1831; Fl. Brit. Ind. 4: 614. 1885; Fl. As. 3: 502. 1939.

Shrubs or undershrubs, 0.3-1.2 m; leaves ovate-lanceolate, acute or cuneate at base, acute to acuminate, crenate, 5-10 × 2-5 cm; petioles 1.4-6.5 cm; verticillasters 4-6-flowered, in terminal 10-25 cm long simple racemes; bracts ovate, 3-5 × 2-3 mm, enlarging to 7 mm in fruit; corolla pinkish, 1.5-2.0 cm; nutlets ellipsoid, asperulous.

Secondary forests, forest edges and shaped grasslands, 200-800 m; fl. & fr.: June-Dec.; Garampani, Sonapur.

8. MESONA Bl.

Mesona parviflorum (Benth.) Briq. in Engl. & Prantl, Pflanzenfam. 4. 3a: 365. 1897. *Geniosporum parviflorum* Benth. in Wall. Pl. As. Rar. 2: 18. 1830. *M. wallichiana* Benth. in DC. Prodr. 12: 46. 1848; Fl. Brit. Ind. 4: 611. 1885; Fl. As. 3: 503. 1939.

Rigid annual herbs, 30-60 cm; leaves ovate-lanceolate, cuneate at base, acute, serrate, 2-7 × 1-3 cm; lateral nerves 9-11 pairs; petioles 5-19 mm; verticillasters in terminal or upper axillary simple 5-13 cm long spikes; bracts ovate, deflexed, purple; calyx campanulate, 3-4 mm, 8-nerved, corolla purple; nutlets obovoid, flattened, dark brown.

Primary forests and forest edges, 800-1200 m; fl. & fr.: Sept.-Jan.; Jarain-Dawki.

9. GENIOSPORUM Benth.

Geniosporum coloratum (D. Don) O. Ktze. Rev. Gen. Pl. 21: 517. 1891. *Plectranthus coloratus* D. Don, Prodr. Fl. Nep. 116. 1825. *G. strobiliferum* Wall. Pl. As. Rar. 2: 18. 1831; Fl. Brit. Ind. 4: 610. 1885; Fl. As. 3: 504. 1939.

Herbs or undershrubs, 0.5-1.0 m; leaves lanceolate, cuneate to rounded at base, acuminate, serrate, 5-12 × 2.5-5.5 cm; lateral nerves 8-10 pairs; petioles 5-25 mm; verticillasters in terminal 5-12 cm long simple or paniculate spikes; bracts ovate, 6-7 × 3-5 mm; calyx tubular, 3-4 mm; corolla white at base, purple above; nutlets ellipsoid, ± 1.5 mm.

Forests and forest edges, 300-1000 m; fl. & fr.: May-Oct.; Nongringkoh.

10: MOSLA Maxim.

Mosla dianthera (Buch.-Ham.) Maxim. in Bull. Acad. St. Petersb. 20: 457. 1875; Fl. Brit. Ind. 4: 647. 1885; Fl. As. 3: 517. 1939. *Lycopus dianthera* Buch.-Ham. in Roxb. Fl. Ind. 1: 144. 1820.

Erect herbs, 0.5-1.5 m, aromatic; leaves rhomboid-ovate, acute or cuneate at base, acute, dentate at margins, 1-2 × 0.5-1.0 cm, gland-dotted beneath; lateral nerves 5-6 pairs; petioles 2-5 mm; verticillasters in terminal paniculate 4-10 cm long spikes; bracts lanceolate, 1-2 mm; calyx campanulate, gibbous at base; corolla white or bluish purple, 3.0-3.5 mm; nutlets ellipsoid.

Grassy slopes and forest edges, in shaded places, 100-1000 m; fl. & fr.: July-Dec.; Rytiang.

11. ELSHOLTZIA Willd.

- | | | |
|---|-----|--------------------------|
| 1a. Inflorescences strobiliform; bracts broadly ovate, orbicular or obtuse. | ... | <i>E. strobilifera</i> 1 |
| 1b. Inflorescences spicate; bracts linear, setaceous. | | |
| 2a. Leaves ovate; petioles almost equal to leaf blade. | ... | <i>E. stachyodia</i> 2 |
| 2b. Leaves lanceolate; petioles much shorter than leaf blade. | ... | <i>E. blanda</i> 3 |

1. **Elsholtzia strobilifera** (Benth.) Benth. Lab. Gen. Sp. 163. 1833; Fl. Brit. Ind. 4: 645. 1885. *Cyclostigia strobilifera* Benth. in Wall. Pl. As. Rar. 1: 30. 1830.

Erect herbs, 20-50 cm; leaves ovate, acute or rounded at base, obtuse or subacute, crenulate-serrate, 1-3 × 0.5-2.0 cm; lateral nerves 4-6 pairs; petioles 2-10 mm; spikes terminal, ovoid or ellipsoid 1-2 cm long, 5-8 mm thick; bracts orbicular, 4-5 mm, imbricating and concealing flowers; corolla pale purple; nutlets oblong, ± 1 mm, brown.

Grasslands, wastelands and pine forests, 1400-1800 m; fl. & fr.: Jan.-June; Jowai-Ummulong.

2. **Elsholtzia stachyodia** (Link) Raiz. & Sax. in Ind. For. 92: 309. 1966. *Hyptis stachyodes* Link, Enum. 2: 106. 1822. *Aphanochilus incisa* Benth. in Wall. Pl. As. Rar. 1: 29. 1830. *E. incisa* (Benth.) Benth. in Edw. Bot. Reg. 13: t. 1282. 1829; Fl. Brit. Ind. 4: 644. 1885.

Erect herbs, 30-100 cm, aromatic; leaves acute at base, obtuse to acute, dentate or deeply serrate, 2-5 × 2-4 cm; petioles 2-4 cm; verticillasters in terminal cylindrical, 3-8 cm long spikes; bracts linear-setaceous; calyx-tube urceolate; corolla white, densely puberulous; nutlets ellipsoid, shiny-brown.

Primary and secondary forests, 900-1200 m; fl. & fr.: Sept.-Jan.; Mynso.

3. **Elsholtzia blanda** (Benth.) Benth. Lab. Gen. Sp. 162. 1838; Fl. Brit. Ind. 4: 643. 1885; Fl. As. 3: 516. 1939. *Aphanochilus blanda* Benth. in Wall. Pl. As. Rar. 1: 19. 1830.

Bushy undershrubs, 0.5 - 1.5 m; leaves acute to cuneate at base, acuminate, serrate, 3 - 10 × 0.7 - 2.5 cm; petioles 5 - 16 mm; verticillasters in terminal simple or paniculate 5 - 10 cm long spikes; bracts lanceolate, minute; calyx urceolate ± 1.5 mm, ± 3 mm in fruit; corolla white, ± 2.5 mm; lobes villous; nutlets ellipsoid, shiny-brown.

Primary forests and forest edges, 1000 - 1500 m; fl. & fr.: Sept.-Feb.; Jowai.

12. **EUSTERALIS** Rafin.

Eusteralis Rafin. Fl. Tellur. 2: 95. 1836; Bakh. f. and van Steenis in Taxon 17: 235 - 236. 1968; Panigrahi in Phytologia 32: 473 - 479. 1976. *Dysophylla* (non Bl. 1826) Hook. f. Fl. Brit. Ind. 4: 637 - 642. 1885; *p.p.*; El-Gazzar and Watson in Airy-Shaw in Taxon 16: 186 - 190. 1967.

Dysophylla auricularia (L.) Bl., the type species of *Dysophylla* Bl. has been transferred to *Pogostemon* Desf., leaving the rest of the species currently included in *Dysophylla* without a generic name. Airy-Shaw (*l.c.*) proposes to use *Dysophylla* El-Gazzar and Watson as a new substitute name and to conserve it. However, this proposal was rejected (in Taxon 17: 464. 1968). To solve the situation, Bakh. f. and van Steenis (*l.c.*) suggest to use the next available valid generic name, *Eusteralis* Rafin, a synonym of *Dysophylla*, and later elaborated by Panigrahi (*l.c.*).

- | | |
|--|----------------------|
| 1a. Plants glabrous or glabrescent; internodes 4—7 cm long; leaf-margins revolute; spikes 15—45 mm long, 15—20 mm thick. ... | <i>E. linearis</i> 1 |
| 1b. Plants pubescent; internodes 1—3 cm long, rarely up to 4 cm long; leaf-margins flat; spikes 6—16 cm long, 5—10 mm thick. ... | <i>E. stellata</i> 2 |

1. **Eusteralis linearis** (Benth.) Panigrahi in Phytologia 32: 476. 1976. *Dysophylla linearis* Benth. in DC. Prodr. 12: 157. 1848; Fl. Brit. Ind. 4: 639. 1885; Fl. As. 3: 513. 1939.

Herbs, 20 - 60 cm; leaves 4 - 5 in a whorl, sessile, linear to lanceolate, narrow at base, acute to acuminate, 3 - 7 × 0.5 - 1.0 cm; peduncles 1 - 2 cm; bracts lanceolate, 3 - 4 mm; calyx 3 - 4 mm, dark purple; teeth minute; corolla purple, ± 4 mm; tube slightly exserted; nutlets ellipsoid, ± 1 mm, brown.

Forests and forest edges, in marshy places, 1000 - 1700 m; fl. & fr.: Aug.-Dec.; Raliang.

2. **Eusteralis stellata** (Lour.) Panigrahi in Phytologia 32: 474. 1976. *Mentha stellata* Lour. Fl. Cochinch. 2: 361. 1790. *M. verticillata* (non L. 1753) Roxb. Fl. Ind. 3: 5. 1832. *M. quadrifolia* (non D. Don 1825) Roxb. l.c. 4. *Dysophylla verticillata* (Roxb.) Benth. in Wall. Pl. As. Rar. 1: 30. 1830; Fl. Brit. Ind. 4: 639. 1885; Fl. As. 3: 513. 1939. *D. quadrifolia* (Roxb.) Benth. l.c. 30; Fl. Brit. Ind. 4: 639. 1885; Fl. As. 3: 514. 1939.

Herbs or undershrubs, 10 - 100 cm; leaves 4 - 8 in a whorl, linear-lanceolate to linear-ovate, attenuate at base, acute to obtuse, remotely serrate, 3 - 6 × 0.2 - 0.5 cm; petioles 1 - 4 mm; peduncles 2 - 5 cm; bracts linear-lanceolate, 1 - 2 mm; calyx obconical, 1.5 - 2.0 mm; corolla purplish-pink, 2.0 - 2.5 mm; nutlets ellipsoid, rugulose, black or brown.

Open rocky places and forest edges, amidst grass, 100 - 1400 m; fl. & fr.: Mar.-Dec.; Dawki, Jarain, Jarain-Dawki, Jowai, Thangkuli, near Jarain.

13. POGOSTEMON Desf.

- 1a. Leaves ovate or oblong-ovate; filaments glabrous or nearly so. ... *P. brachystachys* 1
 1b. Leaves elliptic or lanceolate; filaments bearded.
 2a. Stems and branches with spreading patent hairs; verticillasters dense, close together. ... *P. auricularius* 2
 2b. Stems and branches with erect adpressed hairs; verticillasters in lax clusters. ... *P. strigosus*

1. **Pogostemon brachystachys** Benth. in DC. Prodr. 12: 156. 1848; Fl. Brit. Ind. 4: 637. 1885; Fl. As. 3: 512. 1939.

Straggling much-branched herbs, 20 - 80 cm; leaves obtuse or rounded at base, acute to acuminate, 3 - 6 × 1 - 3 cm; petioles 5 - 15 mm; verticillasters dense-flowered, in simple terminal racemes; bracts minute; calyx 2 - 3 mm, pinkish; corolla dull purple; nutlets ellipsoid, ± 1 mm.

Primary forests and forest edges in shaded places, 1000 - 1700 m; fl. & fr.: July-Dec.; Mawryngkneng.

2. **Pogostemon auricularius** (L.) Hassk. in Tijdsch. Nat. Geschied. 10: 127. 1843. *Mentha auricularia* L. Mant. Pl. 1: 81. 1767. *Dysophylla auricularia* (L.) Bl. Bijdr. 825. 1826; Fl. Brit. Ind. 4: 638. 1885; Fl. As. 3: 513. 1939.

Erect herbs, 30 - 60 cm; leaves rounded at base, subacute, serrate, 2.5 - 7.5 × 1 - 3 cm; petioles 2 - 8 mm; verticillasters in simple terminal 5 - 10 cm long racemes; bracts lanceolate, ± 3 mm; calyx 1 - 2 mm, campanulate; corolla ± 3 mm, pale purple; nutlets ellipsoid, less than 1 mm.

Secondary forests and forest edges in grasslands, 500 - 1000 m; fl. & fr.: July-Jan.; Umjaisaw to Seitsohma.

3. **Pogostemon strigosus** Benth. in DC. Prodr. 12: 155. 1848; Fl. Brit. Ind. 4: 636. 1885; Fl. As. 3: 512. 1939.

Erect herbs, 0.3 - 1.0 m, bushy; leaves rarely ternate, rounded or acute at base, acuminate, serrate, 4 - 8 × 1 - 3 cm; petioles 2 - 10 mm; verticillasters in terminal simple 6 - 12 cm long racemes; bracts linear-lanceolate, 3 - 4 mm; calyx ± 3 mm; corolla ± 4 mm, pale purple; nutlets ellipsoid, dark brown.

Primary forests and forest edges, 100 - 1600 m; fl. & fr.: June-Dec.; Dawki, C. K. Deha 18473; Jowai, Balakrishnan 42824; Ummulong, Balakrishnan 42998 —Endemic to Meghalaya.

14. LEUCAS R. Br.

- 1a. Verticillasters terminal or in uppermost leaf axils; bracts as long as calyx; calyx-teeth linear, 3—4 mm long, stellately spreading. ... *L. ciliata* 1
 1b. Verticillasters axillary and terminal; bracts much shorter than calyx; calyx-teeth subulate, ±1 mm long, erect. ... *L. mollissima* 2

1. **Leucas ciliata** Benth. in Wall. Pl. As. Rar. 1: 61. 1830; Fl. Brit. Ind. 4: 687. 1885; Fl. As. 3: 525. 1939.

Herbs with decumbent branches, 30 - 100 cm; leaves ovate or elliptic-lanceolate, acute or cuneate at base, acute, serrate at margins, 5 - 12 × 0.5 - 2.0 cm; petioles 5 - 20 mm; verticillasters in globose heads; bracts linear, 10 - 15 mm, bristly; calyx tubular, straight, 10 - 15 mm with a ring of hairs at mouth; corolla white, 2.0 - 2.2 cm; nutlets oblong, 3 - 5 mm, brown.

Grasslands and forest edges, in shaded places, 1000 - 1700 m; fl. & fr.: May-Nov.; Jarain, Jowai, Nongbah-Nartiang, Raliang, Umthalong.

2. **Leucas mollissima** Wall. Pl. As. Rar. 1: 62. 1830; Fl. Brit. Ind. 4: 682. 1885; Fl. As. 3: 525. 1939.

Herbs, 40 - 60 cm, often straggling; leaves ovate to lanceolate, acute or rounded at base, subobtuse or acute, serrate at upper margins, 15 - 35 × 10 - 20 mm; petioles 2 - 10 mm; verticillasters, 6 - 10-flowered; bracts linear, minute; calyx 7 - 8 mm; corolla white, 14 - 15 mm; nutlets ellipsoid, flattened, truncate at apex, ± 1.5 × 1.0 mm.

Secondary forests, forest edges and grasslands, 100 - 1000 m; fl. & fr.: May-Dec.; Garampani.

15. ANISOMELES R. Br.

Anisomeles indica (L.) O. Ktze. Rev. Gen. Pl. 512. 1891. *Nepeta*

indica L. Sp. Pl. 571. 1753. *A. ovata* R. Br. in Ait. Hort. Kew. ed 2: 364. 1811; Fl. Brit. Ind. 4: 672. 1885; Fl. As. 3: 521. 1939.

Herbs or undershrubs, 0.5-1.5 m; leaves ovate, cuneate, rounded or subcordate at base, acute, 4-6 × 2.5-3.5 cm; petioles 1-4 cm; verticillasters in terminal spikes and upper axillary clusters; bracts linear, 3-4 mm; calyx 6-7 mm to 9-10 mm in fruit; corolla purplish or blue, 10-15 mm; nutlets ovoid, 2.0 × 1.5 mm.

Forests, forest edges and wastelands, 400-1700 m; fl. & fr.: Sept.-Feb.; Dawki, Mawryngkneng.

16. *ACHYROSPERMUM* Bl.

Achyropermum wallichianum (Benth.) Hook. f. Fl. Brit. Ind. 4: 673. 1885. *Teucrium wallichianum* Benth. in Wall. Pl. As. Rar. 2: 19. 1831.

Herbs or undershrubs, 20-80 cm; leaves elliptic-ovate, cuneate at base, acute to acuminate, serrate, 10-15 × 3-6 cm; lateral nerves 6-8 pairs; petioles 5-20 mm; verticillasters in dense terminal cylindrical 3-6 × 1.8-2.2 cm spikes; bracts ovate-deltoid, ± 1 cm; calyx 7-8 mm, 10-nerved; corolla ± 1.5 cm, white or purple; nutlets ellipsoid, obtusely trigonous, ± 2 mm.

Primary forests, 800-1600 m; fl. & fr.: Aug.-Jan.; Dawki, Jowai, Mawryngkneng, Mynso.

17. *COLQUHOUNIA* Wall.

Colquhounia coccina Wall. In Trans. Linn. Soc. 19: 608. 1822; Fl. Brit. Ind. 4: 674. 1885; Fl. As. 3: 522. 1939.

Shrubs, 1-3 m; leaves ovate or lanceolate, rounded or acute at base, acute to acuminate, dentate-crenate, 6-12 × 3-7 cm; lateral nerves 7-11 pairs; petioles 5-20 mm; verticillasters in axillary and terminal subcapitate racemes; bracts ovate-lanceolate, 4-5 mm; calyx campanulate, ± 1 cm; corolla 2.5-3.0 cm, red or pink; nutlets ovoid.

Primary forests, 800-1200 m; fl. & fr.: July-Feb.; Sohka.

18. *MELISSA* L.

Melissa axillaris (Benth.) Bakh. f. in Back. & Bakh. f. Fl. Java 2: 629. 1965. *Geniosporum axillare* Benth. in Wall. Pl. As. Rar. 2: 18. 1831.

M. parviflora Benth. in Wall. Pl. As. Rar. 1: 65. 1830 (*non* Salisb. 1796); Fl. Brit. Ind. 4: 651. 1885; Fl. As. 3: 518. 1939.

Herbs, up to 1 m; leaves ovate or elliptic-lanceolate, rounded or acute at base, acute to acuminate, crenate-dentate, 15-70 × 8-30 mm; lateral nerves, 3-5 pairs; petioles 5-30 mm; verticillasters axillary, 4-8-flowered, clustered; bracts lanceolate, 1-2 mm; calyx campanulate, 6-7 mm to 7-8 mm in fruit, 13-nerved; corolla 8-9 mm, white or pale pink; nutlets obovoid, ± 8 × 2 mm.

Forests and open places near forests, 1000-1500 m; fl. & fr.: June-Dec.; Jowai.

19. CRANIOTOME Reichb.

Craniotome furcata (Link) O. Ktze. Rev. Gen. 516. 1891. *Ajuga furcata* Link, Enum. 2: 99. 1822. *C. versicolor* Reichb. Icon. Exot. 1: 39. t. 54. 1824; Fl. Brit. Ind. 4: 671. 1885; Fl. As. 3: 520. 1939.

Herbs, 30-70 cm; leaves ovate, cordate or rounded at base, acute to acuminate, crenate-dentate, 5-10 × 3-6 cm; lateral nerves 6-7 pairs; petioles 2-4 cm; verticillasters in terminal panicle of dichasial cymes; bracts subulate; calyx ovoid, contracted at throat, ± 1 mm; corolla white, pink or yellow; nutlets minute.

Primary forests and forest edges, 1000-1500 m; fl. & fr.: July-Nov.; Sutnga.

20. CALAMINTHA Mill.

Calamintha umbrosa (Bieb.) Benth. in DC. Prodr. 12: 233. 1848; Fl. Brit. Ind. 4: 650. 1885. *Melissa umbrosa* Bieb. Fl. Taur.-Cauc. 2: 63. 1808. *Thymus repens* D. Don, Prodr. Fl. Nep. 113. 1825. *C. repens* (D. Don) Benth. Lab. Gen. Sp. 392. 1836; Fl. As. 3: 517. 1939.

Slender much-branched herbs, 25-75 cm; leaves ovate, rounded or cuneate at base, acute to subobtusate, serrate at upper margins, 1-2 × 0.7-1.3 cm; petioles 3-10 mm; verticillasters in dense subcapitate whorls; bracts 2-4, subulate-filiform, 3-4 mm; calyx 4-5 mm, 13-nerved, inflated at base; nutlets subglobose, ± 1 mm.

Forests and forest edges, in open and shaded places, 1000-1500 m; fl. & fr.: July-Nov.; Jarain, Jowai.

108. PLANTAGINACEAE

PLANTAGO L.

Plantago erosa Wall. in Roxb. Fl. Ind. 1: 423. 1820; Fl. As. 3: 531. 1939. *P. major* (non L. 1753) *sensu* Hook. f. Fl. Brit. Ind. 4: 705. 1855. *p. p.*

Herbs; rootstock erect, stout, 1-3 cm; leaves radical, ovate-oblong to obovate, cuneate and decurrent at base, acute to subacute, sinuate-toothed, 3-10×1-3 cm; basal nerves 3-7; petioles up to 10 cm; peduncles axillary, slender 5-17 cm; spikes 3-13 cm; bracts ovate, 1-2 mm; flowers sessile; corolla salver-shaped, scarious, white, \pm 3 mm; capsules 1-4-celled, circumscissile; seeds 1-4, peltate, angled, black.

Forest edges, roadsides and wastelands, in shaded places, 1000-1600 m; fl. & fr.: Apr.-Sept.; Jowai, Nartiang.

109. AMARANTHACEAE

- | | | |
|---|-----|------------------------|
| 1a. Leaves alternate. | | |
| 2a. Scandent shrubs; fruits indehiscent, baccate. | ... | <i>Deeringia</i> 1 |
| 2b. Erect shrubs; fruits circumscissile, membranous. | | |
| 3a. Flowers bisexual; filaments connate at base into a cup; style 3-5 mm long; stigma 1; fruits 2-9-seeded. | ... | <i>Celosia</i> 2 |
| 3b. Flowers unisexual; filaments free; style \pm 1 mm long; stigma 2-4; fruits 1-seeded. | ... | <i>Amaranthus</i> 3 |
| 1b. Leaves opposite. | | |
| 4a. Inflorescence of elongate spikes, the constituent flowers or glomerules deflexed in fruit; bracts and bracteoles strongly spinescent. | | |
| 5a. Flowers arranged singly, all perfect. | ... | <i>Achyranthes</i> 4 |
| 5b. Flowers glomerulate, some sterile. | ... | <i>Cyathula</i> 5 |
| 4b. Inflorescence of panicles, racemes, glomerules or short congested spikes, the constituent flowers not strongly deflexed in fruit; bracts rarely spinescent. | | |
| 6a. Spikes in much-branched panicles; stigma 2, ascending, subulate. | ... | <i>Irsine</i> 6 |
| 6b. Spikes or glumes solitary; stigma 1, capitate. | ... | <i>Alternanthera</i> 7 |

1. DEERINGIA R. Br.

Deeringia amarantoides (Lamk.) Merr. Interpr. Herb. Amb. 211. 1917; Fl. As. 4: 3. 1940. *Achyranthus amarantoides* Lamk. Encycl. 1: 548. 1785. *Deeringia celosioides* R. Br. Prodr. 413. 1810; Fl. Brit. Ind. 4: 714. 1885.

Scandent or subscandent shrubs, 2-5 m; branches pendulous; leaves ovate or oblong-lanceolate, unequal, rounded or narrowed into petiole at base, acute to acuminate, 4-15 × 2-8 cm; lateral nerves 6-8 pairs; racemes simple or paniced, 5-30 cm; bracts triangular, ± 1.5 mm; pedicels filiform, ± 2 mm; berries obovoid, 4-7 mm, red; seeds ± 8, orbicular, emarginate at base.

Secondary and wasteland forests, 100-1000 m; fl. & fr.: June-Dec.; Dawki, Syndai.

2. CELOSIA L.

Celosia argentea L. Sp. Pl. 205. 1753; Fl. Brit. Ind. 4: 714. 1885; Fl. As. 4: 9. 1940. *Celosia cristata* L. Sp. Pl. 205. 1753. *C. argentea* var. *cristata* (L.) A. Das in Fl. As. 4: 9. 1940.

Erect annual, 0.5-1.5 m; leaves oblong to lanceolate or rhomboid-ovate, acute at both ends, 4-18 × 1-6 cm, often reddish, petioles 5-20 mm; spikes simple (or often complex and fasciated in cultivars), cylindrical, 2-20 × 1-2 cm; bracts oblong-ovate, 1-nerved, 3-7 mm; tepals 6-10 mm, white to pinkish; utricles obovoid, 3-4 mm, circumscissile; seeds 1-9, orbicular-cochleate, ± 1.5 mm, brown.

Common weed in dry localities, gardens, roadsides and wastelands, 100-600 m; fl. & fr.: June-Jan.; Garampani.

Often cultivated for ornamental purposes and as a vegetable.

3. AMARANTHUS L.

Amaranthus gracilis Desf. Tabl. Ec. Bot. 43. 1804. *A. viridis* L. Sp. Pl. ed. 2. 2: 1405. 1763, ex parte; Fl. Brit. Ind. 4: 720. 1885.

Herbs, 10-75 cm; leaves ovate-rhomboid, often elliptic-lanceolate, obtuse or concave at base, acute to rounded or retuse, 3-8 × 2-5 cm; flowers green, clustered; lower clusters axillary; upper ones in interrupted spikes; bracts ovate mucronate; tepals 3 or 4, scarious-white margined; utricles falling off with perianth, corrugated; seeds ± 1 mm, shiny brown or black.

Common weed in cultivated areas, 100-1300 m; fl. & fr.: Jan.-Dec.; Nartiang.

4. *ACHYRANTHES* L.

- 1a. Bracteoles with basal blade at least half the length of the awn ;
staminodes red with a fringed scale at back. ... *A. aspera* 1
- 1b. Bracteoles reduced to awns with minute auricles at base ; stamino-
des greenish, without any scales at back. ... *A. bidentata* 2

1. ***Achyranthes aspera*** L. Sp. Pl. 204. 1753; Fl. Brit. Ind. 4: 730. 1885; Fl. As. 4: 6. 1940.

Erect stiff shrubs or undershrubs, up to 1 m; leaves ovate to obovate, acute or obtuse at base, subacute or acuminate, 2-15 × 1-5 cm; lateral nerves 6-8 pairs; petioles 5-15 mm; spikes simple or paniculate, 3-40 cm; bracts ovate, broadened acuminate with excurrent awn at apex, 2-4 mm; utricles oblong, rounded at base, 2-3 mm; seeds orbicular-cochleate, reddish-brown.

Wastelands, near villages, forest edges and cultivated fields, 1000-1600 m; fl. & fr.: May-Dec.; Jarain, Jowai.

2. ***Achyranthes bidentata*** Bl. Bijdr. 545. 1825; Fl. Brit. Ind. 4: 730. 1885; Fl. As. 4. 7. 1940.

Erect or ascending herbs, 0.5-1.5 m; leaves elliptic-oblong or ovate-lanceolate, acute to obtuse at base, long-acuminate, 5-20 × 1-8 cm; lateral nerves 6-9 pairs; petioles 5-30 mm; peduncles with appressed hairs, 1-15 cm; bracts ovate, long-acute, reflexed after anthesis, 3-4 mm; utricles oblong, subtruncate, enclosed in hardened perianth, 2.0-2.5 mm.

Forest edges and secondary forests, 1000-1500 m; fl. & fr.: June-Dec.; Raliang, Sutnga.

5. *CYATHULA* Bl. *nom. cons.*

- 1a. Slender perennial herbs, often prostrate at base, 20-50 cm high ;
flowers clustered and clusters racemed ; tepals 2-3 mm long, ending
in short mucro. ... *C. prostrata* 1
- 1b. Stout erect undershrubs, 1-2 m tall ; flowers clustered and clusters
collected in dense globose heads ; tepals 4-6 mm long, ending in
long rigid hooked awns. ... *C. tomentosa* 2

1. ***Cyathula prostrata*** (L.) Bl. Bijdr. 549. 1825; Fl. Brit. Ind. 4: 723. 1885; Fl. As. 4: 5. 1940. *Achyranthes prostrata* L. Sp. Pl. ed. 2: 296. 1762.

Erect or ascending herbs; stems obtusely triangular, often tinged red; leaves ovate to rhomboid-obovate, acute to rounded at base, acute or sub-acute, 2-15 × 1-6 cm; petioles 1-10 mm; racemes 5-30 cm; rachis dense-

hairy; central flower of each flower-cluster perfect, the 2 lateral ones imperfect; utricles ovoid, 1-2 mm; seeds cochleate orbicular, shiny-brown.

Wastelands, near villages and forest edges, 1000-1600 m; fl. & fr.: July-Jan.; Garampani, Jowai, Sutnga.

2. **Cyathula tomentosa** (Roth) Miq. in DC. Prodr. 13(2): 327, 1849; Fl. Brit. Ind. 4: 722, 1885; Fl. As. 4: 4, 1940. *Achyranthes tomentosa* Roth, Nov. Sp. Pl. 167, 1821.

Erect densely woolly undershrubs; leaves elliptic to lanceolate or rhomboid-lanceolate, narrowed and cuncate at base, acute or acuminate, 4-25 x 1-6 cm; petioles 1-25 mm; racemes 2-25 cm, interrupted; clusters 15-20 mm across, 1-2 flowers perfect and the rest imperfect; utricles ovoid; seed solitary, pale brown.

Forests, forest edges and wastelands near forests, 1000-1500 m; fl. & fr.: June-Dec.; Jowai, Nartiang, Raliang.

6. IRESINE P. Br. *nom. cons.*

Iresine herbstii Hook. f. in Gardn. Chron. 654, 1206, 1864.

Succulent perennial herbs, erect or ascending, 0.5-1.5 m; leaves ovate-orbicular to obovate, subequally obtuse, rounded or truncate at base, acute or emarginate, 2-8 cm diam., fleshy, shiny-red; petioles 1-5 cm; spikes 5-50 cm; bracts ovate, concave, \pm 1 mm; flowers yellowish-white; tepals 5, oblong, nerveless, dense hairy at base.

Wastelands, near villages, 1200-1500 m; fl.: Sept.-Nov.; Shangpung.

7. ALTERNANTHERA Forsk.

Alternanthera sessilis (L.) R. Br. Prodr. 417, 1810; Fl. Brit. Ind. 4: 731, 1885. *Gomphrena sessilis* L. Sp. Pl. 225, 1753.

Herbs, 10-100 cm; leaves linear-lanceolate to oblong-oblongeolate, acute or cuncate at base, obtuse or rounded, 1-15 x 0.5-3.0 cm; lateral nerves 4-6 pairs; petioles 1-5 mm; head 2-4 mm diam., sessile, 1-4 in axils of fallen leaves, white or pinkish; rachis densely white-silky; tepals concave, 1.5-2.5 mm, 1-nerved, scarious; utricles obcordate or obreniform, 1.5-2.0 mm, yellowish; seeds orbicular-cochleate, reddish-brown.

Open localities in rice fields, roadsides and shallow ditches, 100-1000 m; fl. & fr.: July-Dec.; Garampani.

110. CHENOPODIACEAE

CHENOPODIUM L.

Chenopodium ambrosioides L. Sp. Pl. 219. 1753; Fl. Brit. Ind. 5: 4. 1886; Fl. As. 4: 10. 1940.

Erect or ascending perennials, up to 1.5 m; leaves lanceolate to rhomboid attenuate at base, subobtuse or acute, 2-12×0.5-5.0 cm; flowers sessile, in dense glomerules on axillary and terminal simple or paniced interrupted spikes; utricles enclosed in tepals, studded with minute yellow glands; seed solitary, lenticular-cochleate, ± 1 mm, reddish-brown.

Roadsides, and wastelands, 100-1000 m; fl. & fr.: Jan.-Dec.; Dawki, Ioksi.

111. POLYGONACEAE

POLYGONUM L.

- | | | |
|---|-----|---------------------------|
| 1a. Flowers 1—5 in axils of ordinary leaves. | ... | <i>P. plebeium</i> 1 |
| 1b. Flowers in pseudospikes, spurious heads or panicles. | | |
| 2a. Inflorescences open-paniculate. | | |
| 3a. Leaves triangular-cordate or sagittate at base. | ... | <i>P. dibotrys</i> 2 |
| 3b. Leaves ovate to oblong-lanceolate, cuneate or rounded at base. | ... | <i>P. molle</i> 3 |
| 2b. Inflorescences spiciform. | | |
| 4a. Stems simple, erect; leaves both radical and cauline; spikes solitary, terminal. | ... | <i>P. bistorta</i> 4 |
| 4b. Stems branched; leaves cauline; spikes several, racemose or paniculately arranged. | | |
| 5a. Spikes ovoid or subglobose, capitate. | | |
| 6a. Erect shrubs, woody at base; spikes many in widely branched corymbose panicles. | ... | <i>P. chinense</i> 5 |
| 6b. Prostrate or decumbent herbs; spikes few in once or twice forked panicles. | | |
| 7a. Stems creeping on rocks, rooting at nodes, pubescent; peduncles hispid; leaves ovate or elliptic. | ... | <i>P. capitatum</i> 6 |
| 7b. Stems decumbent, glabrous; leaves triangular-rhomboid, elliptic-lanceolate or ovate-lanceolate. | | |
| 8a. Leaves hastately ovate-lanceolate; petioles glabrous; nodes glabrous; peduncles glabrous. | ... | <i>P. microcephalum</i> 7 |
| 8b. Leaves triangular-rhomboid or elliptic-lanceolate; petiole-base hispid; nodes glandular-hispid; peduncles with hispid gland-tipped hairs. | ... | <i>P. nepalense</i> 8 |

- 5b. Spikes cylindrical or subfiliform.
- 9a. Plants armed with recurved sharp prickles at nodes or also on stems, petioles and midrib.
- 10a. Ochreae short with broad leafy amplexicaul limb ; petioles more than 3 cm long ; leaves triangular-peltate. ... *P. perfoliatum* 9
- 10b. Ochreae tubular ; petioles less than 2 cm long ; leaves lanceolate, not peltate.
- 11a. Stems slender, prostrate ; prickles few at nodes only ; ochreae not ciliate at mouth ; flowers sparsely arranged in panicles or simple racemes. ... *P. praetermissum* 10
- 11b. Stems stout, erect or decumbent ; prickles many at nodes, internodes and on midrib beneath ; ochreae ciliate at mouth ; flowers densely arranged. ... *P. strigosum* 11
- 9b. Plants unarmed.
- 12a. Ochreae with an apical leafy expanded limb. ... *P. orientale* 12
- 12b. Ochreae without leafy limb.
- 13a. Plants scabrous with long spreading hairs ; stems and petioles glandular-hairy. ... *P. viscosum* 13
- 13b. Plants glabrous or minutely pubescent, not glandular-hairy.
- 14a. Robust, erect plants ; stems creeping, erect ; bristles at mouth of ochreae 1.5—2.0 cm long. ... *P. barbatum* 14
- 14b. Slender, prostrate or decumbent herbs ; bristles at mouth of ochreae less than 1 cm long.
- 15a. Bristles at mouth of ochreae 3—10 mm long ; leaves elliptic-lanceolate to ovate-lanceolate, appressed-hairy ; spikes laxly flowered, 2—7 cm long ; nuts trigonous. ... *P. posumbu* 15
- 15b. Bristles at mouth of ochreae less than 3 mm long ; leaves linear-lanceolate, glabrous ; spikes densely flowered, cylindrical, 1—2 cm long ; nuts biconvex. ... *P. tenellum* 4

1. **Polygonum plebeium** R. Br. Prodr. 420. 1810; Fl. Brit. Ind. 5: 27. 1886; Fl. As. 4: 15. 1940.

Deep-rooted, much-branched prostrate herbs; leaves ovate, linear or linear-oblong, often spatulate, narrow at base, acute or obtuse, revolute at margins, 5-15 × 1-3 mm; lateral nerves obscure; petioles up to 2 mm;

ochraceous hyaline, lacerate; flowers axillary; achenes trigonous; \pm 1 mm black, shiny.

Open localities, wastelands and cult. fields, 100-1500 m; fl. & fr.: Mar.-Nov.; Dawki, Garampani, Raliang.

2. **Polygonum dibotrys** D. Don, Prodr. Fl. Nep. 78. 1825. *P. cymosum* Trev. in Nov. Act. Acad. Caes. Leopold Nat. Cur. 13: 177. 1826. *Fagopyrum cymosum* (Trev.) Meissn. in Wall. Pl. As. Rar. 3: 63. 1832; Fl. Brit. Ind. 5: 55. 1886; Fl. As. 4: 22. 1940. 'Jarain'.

Much-branched spreading herbs, with perennial rootstocks; leaves triangular or deltoid, short-acuminate, 5-10 \times 4-8 cm; nerves digitate from base; petioles up to 12 cm; spikes terminal or axillary, paniculate, lax-flowered; branches 5-10 cm; flowers white; perianth \pm 2 mm; achenes triangular, acutely angled, \pm 4 mm.

All sorts of wastelands, near villages and forest edges, 1000-1600 m; fl. & fr.: June-Jan.; Jowai, Sutnga.

Leaves used as vegetable.

3. **Polygonum mulle** D. Don, Prodr. Fl. Nep. 72. 1825; Fl. Brit. Ind. 5: 50. 1886; Fl. As. 4: 20. 1940. *P. paniculatum* Bl. Bijdr. 533. 1826; Fl. Brit. Ind. 5: 49. 1886; Fl. As. 4: 19. 1940.

Subscandent or straggling bushy shrubs, 1-4 m, often with zig-zag stems; leaves elliptic-ovate or lanceolate, acuminate or caudate-acuminate, 5-18 \times 2-7 cm; lateral nerves 10-25 pairs; petioles 8-20 mm; spikes in thyrsoid panicles, axillary or terminal, leafy, 4-5-times branched; pedicels 1-2 mm; flowers \pm 2 mm across, white; achenes ovoid, trigonous, \pm 3 mm, black.

Open places, near forests, 1300-1600 m; fl. & fr.: Aug.-Feb.; Jowai Nartiang.

4. **Polygonum bistorta** L. Sp. Pl. 360. 1753. *P. paleaceum* Hook. f. Fl. Brit. Ind. 5: 32. 1886; Fl. As. 4: 16. 1940.

Perennial herbs, with thick twisted rhizomes, 10-25 cm; leaves linear-oblong to lanceolate, cuneate at base, acute to acuminate, crenulate at margins, 7-25 \times 1-5 cm; lateral nerves 18-25 pairs; radical leaves long-petiolate; upper cauline leaves sessile or clasping; petioles winged; spikes up to 5 \times 1.5 cm; flowers pink; achenes trigonous, black.

Open grassy slopes, 1200-1600 m; fl. & fr.: Apr.-Nov.; Jowai, Jowai-Jarain, Khleihriat-Lumshnong, Raliang.

5. **Polygonum chinense** L. Sp. Pl. 363. 1753; Fl. Brit. Ind. 5: 44, 1886; Fl. As. 4: 16. 1940.

Shrubs, often scrambling among bushes; leaves oblong-lanceolate to ovate-deltoid or elliptic, truncate, subcordate, or often cuneate at base, acute to acuminate, serrulate at margins, 3-15 × 2-9 cm; lateral nerves 6-10 pairs; petioles 5-15 mm; heads in corymbose panicles, 4-8 mm across; achenes trigonous, ± 2.5 mm, dull black, enclosed in fleshy or coriaceous perianth.

Wastelands, bushes and forest edges, 500-1600 m; fl. & fr.: Apr.-Dec.; Jarain, Jowai, Jowai-Jarain, Laskein, Mawryngkneng, Raliang, Sonapur, Umtapoh.

6. ***Polygonum capitatum*** D. Don, Prodr. Fl. Nep. 73. 1825; Fl. Brit. Ind. 5: 44. 1886; Fl. As. 4: 18. 1940.

Perennial creeping herbs, with woody rootstocks; leaves bifarious, cuneate at base, acute to subacute, 1-5 × 0.5-3.0 cm; lateral nerves 7-9 pairs; petioles up to 3 mm; ochreae oblique at apex, up to 1 cm, finely hispid-ciliate; heads 6-12 mm; peduncles glandular-hairy; flowers pink or purplish; achenes trigonous.

Wastelands and shaded places near forests, 1200-1600 m; fl. & fr.: May-Dec.; Jarain, Jowai-Jarain.

7. ***Polygonum microcephalum*** D. Don, Prodr. Fl. Nep. 72. 1825; Fl. Brit. Ind. 5: 42. 1886; Fl. As. 4: 18. 1940.

Decumbent herbs, with woody base, up to 1 m; leaves ovate to elliptic-lanceolate, tapering to base, acute to short-acuminate, 6-13 × 2-4 cm; lateral nerves 7-9 pairs; petioles winged, up to 15 mm, sometimes auricled at base; heads 5-10 mm across, 1-5 on branched leafless wiry 1-3 cm long peduncles; flowers pale pink; achenes trigonous, granulate.

Roadsides and wastelands and forest edges, 200-1500 m; fl. & fr.: June-Oct.; Dawki, Jarain, Jowai.

8. ***Polygonum nepalense*** Meissn. Monogr. 84. t. 7. f. 2. 1826; *P. alatum* Spreng. Syst. Cur. Post. 154. 1827; Fl. Brit. Ind. 5: 41. 1886.

Erect or creeping annuals, 10-50 cm; nodes with simple and glandular-tipped hairs; leaves tapering or subcordate at base, acute to subobtuse, 2-6 × 1-3 cm; lateral nerves 8-12 pairs; petioles up to 10 mm, with 2 amplexicaul basal auricles; heads 2-4 on 1-5 cm long branched peduncles; bracts ovate-lanceolate, 1-3 mm; achenes lenticular or trigonous, 1.5-2.0 mm.

Grasslands, roadsides and cult. fields, 1000-1600 m; fl. & fr.: July-Dec.; Jowai, Nongbah-Nartiang.

9. **Polygonum perfoliatum** L. Sp. Pl. ed. 2: 521. 1763; Fl. Brit. Ind. 5: 46. 1886; Fl. As. 4: 20. 1940.

Climbing ascending herbs, 1-3 m; stems, petioles and main nerves of leaves armed with recurved prickles; leaves acute at apex, 2-8 × 1-7 cm; basal nerves 3-5; petioles 3-9 cm; limb of ochreae orbicular, 5-30 mm diam.; racemes simple or branched, terminal or upper axillary, ± 2 cm; flowers white or pink; achenes subtrigonous, apiculate, ± 4 mm diam., enclosed by fleshy blue-black perianth.

Open bushes and wastelands, 1300-1500 m; fl. & fr.: June-Nov.; Jowai.

10. **Polygonum praetermissum** Hook. f. Fl. Brit. Ind. 5: 47. 1886; Fl. As. 4: 21. 1940.

Glabrous herbs; stem simple, creeping-rooting at base, with reflexed bristles at nodes, 15-25 cm; leaves linear-oblong, sagittate at base, blunt-acuminate, 10-50 × 5-20 mm; lateral nerves 5-8 pairs; petioles 5-10 mm; racemes 15-25 mm, simple or forked, glandular-pubescent; flowers pink; achenes trigonous, punctate 1-2 mm.

Roadsides, near forests, 1300-1500 m; fl. & fr.: Apr.-Aug.; Jarain.

11. **Polygonum strigosum** R. Br. Prodr. 420. 1810; Fl. Brit. Ind. 5: 47. 1886.

Ascending-climbing herbs, up to 1 m; leaves ovate-oblong to linear-lanceolate, truncate, cordate or sagittate at base, acute to acuminate, 3-15 × 1-4 cm; ochreae 20-25 mm; spikes oblong or globose, 5-10 mm; peduncles simple or 2-3-times branched; achenes subglobose, trigonous, or lenticular, punctate, black, shiny.

Wastelands, near villages and forest borders, 1000-1500 m; fl. & fr.: June-Dec.; Jarain-Dawki, Nartiang.

12. **Polygonum orientale** L. Sp. Pl. 362. 1753; Fl. Brit. Ind. 5: 30. 1886.

Stout annual herbs, 1-2 m; stem woody below, hollow above, dense silky-villous; leaves ovate to broadly oblong, rounded or cordate at base, acute to acuminate, 10-20 × 2-6 cm; lateral nerves 7-10 pairs; petioles 2-8 cm; ochreae 1-3 cm, truncate and with green limb at mouth; racemes paniculate, 2-8 cm; peduncles thick, silky-pubescent; flowers white or pale pink; achenes orbicular, biconvex.

Wastelands, in marshy localities, dried ponds and ditches, 100-500 m; fl. & fr.: June-Nov.; Dawki.

13. **Polygonum viscosum** D. Don, Prodr. Fl. Nep. 71. 1825; Fl. Brit. Ind. 5: 36. 1886.

Branched ascending annuals, up to 2 m; leaves elliptic to linear-lanceolate, cuneate or acute at base, acute to acuminate, 5-18 × 1-3 cm; lateral nerves 14-18 pairs; petioles up to 10 mm; ochreae 8-12 mm, strigose, long-ciliate at mouth; racemes 2-5 cm, lax-flowered, on slender glandular-hairy peduncles; flowers red or pink; achenes trigonous, ± 3 mm, black.

Ditches and ponds near villages, 1300-1400 m; fl. & fr.: Aug.-Feb.; Nartiang.

14. **Polygonum barbatum** L. Sp. Pl. 362. 1753. *P. serrulatum* (non Lagasc. 1816) *sensu* Hook. f. Fl. Brit. Ind. 5: 38. 1886.

Ascending herbs, up to 1 m; leaves elliptic to linear-lanceolate, tapering or rounded at base, acute to acuminate 3-18 × 1-4 cm; lateral nerves 12-17 pairs; petioles up to 1 cm; ochreae 10-15 mm; racemes slender, 2-8 cm, paniculate; bracts obconical; flowers white or greenish-white; achenes trigonous, ± 2 mm, dark purplish-black.

Marshy places near pools and ditches, near villages, 100-1600 m; fl. & fr.: July-Feb.; Jowai, Nartiang, Sutnga.

15. **Polygonum posumbu** D. Don, Prodr. Fl. Nep. 71. 1825; Fl. Brit. Ind. 5: 38. 1886.

Perennial herbs with flaccid creeping-ascending stems, up to 1 m; leaves ovate to elliptic-lanceolate, cuneate or acute at base, acute to short-acuminate, 2-8 × 1-3 cm; lateral nerves 8-12 pairs; petioles 3-15 mm; ochreae tubular, 5-8 mm; spikes terminal, solitary or few, lax-flowered; peduncles 3-10 cm; bracts imbricate above, lax below, ciliate at mouth; achenes trigonous, 2.0-2.5 mm.

Wastelands, grassy slopes and shaded pine forests, 1400-1600 m; fl. & fr.: June-Dec.; Jowai.

16. **Polygonum tenellum** Bl. Bijdr. 530. 1825 (non Roxb. 1832). *P. minus* (non Huds. 1762) *sensu* Hook. f. Fl. Brit. Ind. 5: 36. 1886.

Creeping-ascending, profusely branched herbs; leaves ovate to linear-lanceolate, rounded or cordate at base, acute to acuminate, 1.3 × 0.5-1.5 cm; ochreae tubular, 5-10 mm, pubescent; spikes solitary or 2-3 together terminal or upper-axillary, 1-3 cm; peduncles filiform; flowers white or pink; achenes orbicular, biconvex, 1.5-2.0 mm, black.

Streamsides and marshy places near forests, 100-1000 m; fl. & fr.: Feb.-Aug.; Dawki.

112. NEPENTHACEAE

NEPENTHES L.

Nepenthes khasiana Hook. f. in DC. Prodr. 17: 102. 1873; Fl. Brit. Ind. 5: 70. 1886; Fl. As. 4: 25. 1940.

Erect, prostrate or scandent undershrubs, up to 4 m; leaves consisting of a basal lamina with excurrent tendrillar midrib, bearing at apex a pitcher; lamina sessile, often subamplexicaul, elliptic-lanceolate, narrower and cuneate at both ends, 20-50 × 3-10 cm; tendrillar stalk 2-7 cm; pitchers subcylindric, contracted towards mouth, with 2 longitudinal ribs or wings in front, 15-20 × 4-7 cm, with an ovate-suborbicular lid; racemes 15-60 cm, terminal or subterminal; peduncles terete, 10-25 cm; flowers greenish-red, ± 8 mm across; capsules ovoid-oblong, 2-3 × 0.5-0.8 cm; seeds minute.

Open rocky slopes amidst grass, forest edges and dense humid primary forests, 1200-1500 m; fl. & fr.: June-Oct.; Jarain, *Balakrishnan* 42266 & 46159; *G. K. Deka* 5037, 10148, 17128 & 17129; *H. Deka* 24458; *U. N. Kanjilal* 5819.

In open rocky grasslands, the plant appears stunted, whereas in dense forests and forest edges, it attains great height, climbing over bushes and trees. Endemic to Meghalaya. Due to constant and reckless collection for its curious pitcher, the plant is endangered. Measures are being taken for its conservation.

113. ARISTOLOCHIACEAE

ARISTOLOCHIA L.

Aristolochia tagala Cham. in Linnæa 7: 207. t. 5. f. 3. 1832. *A. roxburghiana* Klotz. in Monatsb. Berl. Akad. 596. 1859; Fl. Brit. Ind. 5: 75. 1886.

Perennial glabrous twiners; leaves ovate-oblong to lanceolate, cordate or subsagittate at base, acute to acuminate, wavy at margins, 6-25 × 3-16 cm; lateral nerves 2-3 pairs; petioles 1-6 cm; racemes 2-8-flowered; rachis 2-8 cm; perianth 2-3 cm, finely pubescent, greenish-yellow; lip purplish-brown; capsules ellipsoid, 6-ribbed, 3-4 cm; seeds obliquely triangular, narrowly winged, 2-3 mm.

Primary forests, 100-500 m; fl. & fr.: Apr.-Dec.; Dawki.

114. PIPERACEAE

1a. Epiphytic or terrestrial, succulent herbs; leaves exstipulate; flowers bisexual; stamens 2; anther-cells confluent; stigma 1, capitate or penicillate.

...

Peperomia 1

- 1b. Erect or climbing shrubs or undershrubs, rarely herbs ; leaves stipulate or with alate petiole-base ; flowers bisexual or unisexual ; stamens 2 or more ; anther-cells distinct ; stigmas 2—5, linear-subulate or obovate. ... *Piper* 2

1. PEPEROMIA Ruiz & Pav.

- 1a. Leaves opposite and alternate, ovate-deltoid, 20—25 mm diam., thin, membranous ; rachis of spikes densely hairy. ... *P. pellucida* 1
 1b. Leaves in whorls of 4, orbicular, 5—8 mm diam. ; rachis of spikes glabrous. = *P. tetraphylla* 2

1. **Peperomia pellucida** (L.) H. B. K. Nov. Gen. Sp. 1: 64. 1815; Fl. As. 4: 39. 1940. *Piper pellucidum* L. Sp. Pl. 30. 1753.

Erect or drooping much-branched herbs, 10 - 60 cm ; stems glabrous, succulent ; leaves rounded at base, acute to acuminate, thinly succulent, glossy above, pale beneath, 5 - 7-nerved ; spikes paired or solitary, green to greenish-white ; peduncles 4 - 8 mm ; rachis 1 - 6 cm ; berries globose, ± 7 mm, reticulate ; seed warty.

Sunny and shaded places, often on walls, rocks and roots, 100 - 1000 m ; fl. & fr. : July-Dec. ; Dawki, Syndai-Muktapur.

2. **Peperomia tetraphylla** (Forst. f.) Hook. & Arn. Bot. Beech. Voy. 2: 96. 1832. *Piper reflexum* L. f. Suppl. 91. 1781. *Piper tetraphyllum* Forst. f. Prodr. 5. 1786. *Peperomia reflexa* (L. f.) Dietr. Syn. Pl. 1: 180. 1831 (non H.B.K. 1815) ; Fl. Brit. Ind. 5: 99. 1886 ; Fl. As. 4: 38. 1940.

Annual or perennial, densely branched, tufted herbs, often epiphytic, 5 - 20 cm ; stems ribbed, sparsely hairy ; leaves orbicular or obovate, cuneate at base, obtuse or rounded, coriaceous, fleshy, pellucid-punctate, 3-nerved ; petioles 1 - 4 mm ; spikes solitary, 2 - 3 cm, white-hairy ; peduncles 1 - 2 cm ; bracts orbicular ; berries ovoid.

Shaded forests, rock-walls and roofs in villages, 1000 - 1500 m ; fl. & fr. : June-Dec. ; Nartiang, Sutnga.

2. PIPER L.

- 1a. Leaves broad and cordate at base.
 2a. Leaves 2—8 × 1—4 cm ; male spikes 2—6 cm long. ... *P. longum* 1
 2b. Leaves 10—17 × 5—10 cm ; male spikes 8—15 cm long. ... *P. betle* 2
 1b. Leaves cuneate, acute, obtuse or rounded at base.
 3a. Fruiting spikes globose or subglobose, 0.8—1.4 cm long.
 4a. Erect shrubs ; petioles 5—12 mm long. ... *P. mulesna* 3
 4b. Scandent shrubs ; petioles 2.5—5.5 cm long. ... *P. thomsonii* 4

- 3b. Fruiting spikes elongate, 7—20 cm long.
 5a. Fruits sessile on fleshy thickened pubescent spikes. ... *P. nepalense* 5
 5b. Fruits contracted at base into short pedicels on slender glabrous spikes.
 6a. Leaves 15—25 cm long ; petioles up to 5 mm long. ... *P. hymenophyllum* 6
 6b. Leaves 7—12 cm long ; petioles up to 15 mm long. ... *P. griffithii* 7

1. **Piper longum** L. Sp. Pl. 29. 1753; Fl. Brit. Ind. 5: 83. 1886; Fl. As. 4: 34. 1940.

Aromatic herbs or undershrubs, trailing on ground or climbing on trees; leaves orbicular to oblong-ovate, cordate at base, acute to acuminate; main nerves 5-7, prominent beneath; petioles absent in uppermost leaves, up to 3 cm in lower leaves; male spikes slender, yellow; peduncles 1-2 cm; female spikes fleshy, 2-3 × 0.5-0.6 cm; berries globose, 2-3 mm diam., red.

Primary forests, also cultivated, 100-1000 m; fl. & fr.: June-Feb.; Sohka.

Berries are used as a kind of pepper and also used in medicine.

2. **Piper betle** L. Sp. Pl. 28. 1753; Fl. Brit. Ind. 5: 85. 1886; Fl. As. 4: 35. 1940.

Large woody climbers, up to 10 m; leaves ovate or oblong-ovate, cordate or obliquely rounded at base, acute to acuminate; basal nerves 5-9, with 2 lateral nerves above; petioles 1-4 cm; peduncles 1-3 cm; female spikes 10-12 cm; peduncles 2-6 cm; fruiting spikes 11-13 cm; berries immersed in rachis, fleshy, ± 1 cm diam.

Usually cultivated, also in wastelands and near forests, 100-1000 m; fl. & fr.: May-Sept.; Umtapoh.

Leaves are used as a masticatory and also in medicine.

3. **Piper mullesua** D. Don, Prodr. Fl. Nep. 20. 1825. *P. brachystachyum* Hook. f. Fl. Brit. Ind. 5: 87. 1886; Fl. As. 4: 36. 1940.

Much-branched twiggy climbers, 1-3 m; leaves elliptic-ovate to lanceolate, rounded or acute at base, blunt-caudate-acuminate, 5-12 × 2-4 cm; main nerves 3-5; male spikes 4-7 cm, slender, drooping; female spikes 6-8 mm; rachis pubescent; berries 2-3 mm diam., partly sunk in rachis.

Primary forests, 1000-1600 m; fl. & fr.: May-Oct.; Jarain, Jowai, Khleihriat, Raliang, Shangpung.

4. **Piper thomsonii** (C. DC.) Hook. f. Fl. Brit. Ind. 5: 87. 1886; Fl. As. 4: 36. 1940. *Chavica thomsonii* C. DC. in DC. Prodr. 16(1): 389. 1839.

Scandent shrubs; leaves ovate to elliptic-oblong, truncate to acute at base, acute to acuminate, 8-13 × 3-6 cm; basal nerves 5, often with 2 pairs above; male spikes 3-5 cm; peduncles 0.5-1.0 cm; female spikes stout, 4-5 mm, subglobose; peduncles 3-4 mm; berries sessile, globose, 2-3 mm, red.

Primary forests and forest edges, 100-500 m; fl. & fr.: Apr.-Oct.; Dawki.

5. **Piper nepalense** Miq. Syst. Pip. 318. 1843; Fl. Brit. Ind. 5: 89. 1886.

Epiphytic shrubs; branches woody, slender; leaves ovate to oblong-ovate, rounded at base, acute to subacute, 4-8 × 3-5 cm; basal nerves 5, with a pair of lateral ones above; petioles 5-15 mm; male spikes 5-8 cm; peduncles up to 1 cm; female spikes 8-10 cm; peduncles ± 1 cm; fruiting spikes stout, curved, 10-12 cm; berries ovoid, 3-4 mm, green.

Primary forests, 1300-1600 m; fl. & fr.: July-Dec.; Nartiang, Raliang.

6. **Piper hymenophyllum** Miq. in Hook. J. Bot. 5: 554. 1853; Fl. Brit. Ind. 5: 93. 1886.

Slender shrubby climbers, up to 1 m; leaves elliptic to oblong-lanceolate, unequally narrowed and rounded at base, acuminate, 15-25 × 3-7 cm, membranous; lateral nerves ± 4 pairs; male spikes 2-4 cm; peduncles 3-6 mm; female spikes 4-6 cm; peduncles up to 1 cm; fruiting spikes 7-15 cm; berries oblong to subglobose, 4-6 mm, red.

Primary forests, 500-1000 m; fl. & fr.: Oct.-Mar.; Lumshnong.

7. **Piper griffithii** C. DC. in Seem. J. Bot. 163. 1866; Fl. Brit. Ind. 5: 81. 1886; Fl. As. 4: 33. 1940.

Scandent shrubs; leaves ovate to elliptic-oblong, obtuse or acute at base, acute to acuminate, 4-10 × 2-5 cm; basal nerves 5, with 2 suprabasal ones; male spikes 4-8 cm; peduncles 1-2 cm; female spikes 4-10 cm; peduncles 1-2 cm; fruiting spikes dense, compact, 10-15 cm; fruits globose, ± 4 mm, black when ripe.

Primary forests, 500-1000 m; fl. & fr.: July-Dec.; Sohka.

115. SAURURACEAE

Houttuynia Thunb. *nom. cons.*

Houttuynia cordata Thunb. Vet. Acad. Stockh. Handl. 4: 149. 151. t. 5. 1783; Fl. Brit. Ind. 5: 78. 1886; Fl. As. 4: 31. 1940.

Foetid glabrous perennials, 20-50 cm; leaves ovate, reniform-cordate at base, acute or acuminate, 3-8 x 2-6 cm; petioles 1-4 cm, often red; peduncles 1-5 cm; spikes cylindric, 1-3 cm, terminal; lowest bracts 4, petaloid, ovate-oblong, obtuse, \pm 1.5 cm, white; anthers yellow; capsules subglobose, \pm 2 mm; seeds 2-4, ellipsoid.

Shaded places in forests and wastelands, 1000-1600 m; fl. & fr.: June-Dec.; Jowai, Raliang, Raliang-Nongringkoh.

Leaves used as vegetable.

116. CHLORANTHACEAE

SARCANDRA Gard.

Sarcandra Gard. in Calc. J. nat. Hist. 6: 348. 1846; Swamy and Bailey in J. Arn. Arb. 31: 117-129. 1950; Swamy in Proc. nat. Inst. Sci. Ind. 19: 301-306. 1953 et in J. Arn. Arb. 34: 375-411. 1953.

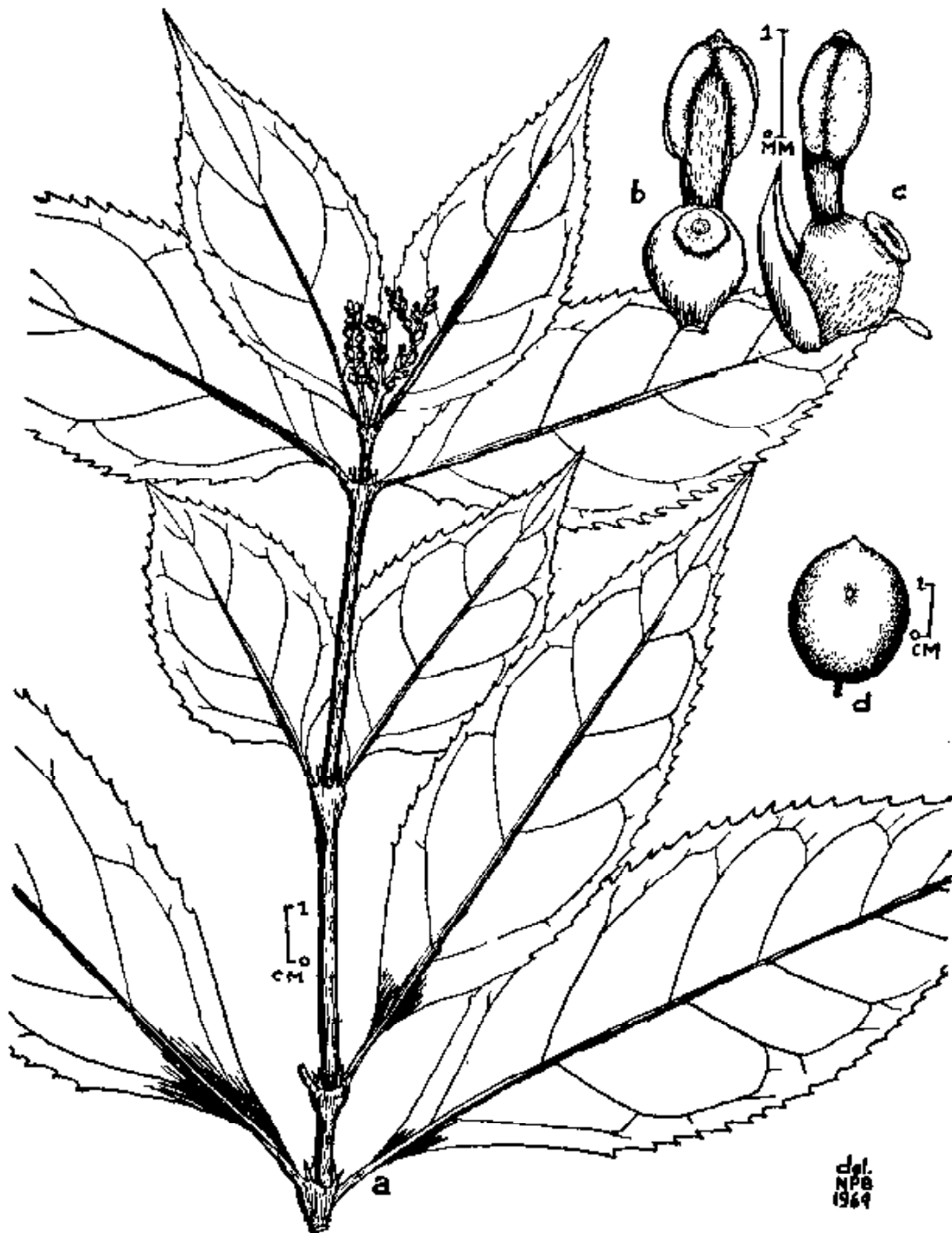
The genus has been resurrected and treated as distinct from *Chloranthus* by Swamy & Bailey (1950, 1953 & 1953.) The distinctions are as follows:

Xylem vesselless; stamen 1, club-shaped; pollen grains acolpate.	...	<i>Sarcandra</i>
Xylem vessel-bearing; stamens 3, basally connate; pollen grains polycolpate.	...	<i>Chloranthus</i>

Sarcandra glabra (Thunb.) Nakai, Fl. Sylv. Koreana 18: 17. 1930. *Bladhia glabra* Thunb. in Trans. Linn. Soc. 2: 331. 1794. *Chloranthus brachystachys* Bl. Fl. Jav. 8: 15. t. 2. 1829; Fl. Brit. Ind. 5: 100. 1866; Fl. As. 4: 10. 1940. **Fig. 20**

Glabrous shrubs, 1.0-2.5 m; leaves oblong-lanceolate, acute to cuncate at base, acuminate, coarsely or shallowly serrate at margins, 5-18 x 2-6 cm; lateral nerves 7-9 pairs; petioles 5-20 mm; spikes terminal, 1-2 cm, often in panicles; flowers white; stamen 2.0-2.5 mm; drupes sessile, ellipsoid, 5-6 mm, bright red; seed solitary, subglobose, fleshy.

Primary forests, 500-1600 m; fl. & fr.: May-Jan.; Jarain, *Balakrishnan* 49915; Halim 28620; Jowai, *Balakrishnan* 42295; U. N. *Kanjilal* 5813; Raliang, *R. S. Rao* 2601; Rytang, *Balakrishnan* 47054.



Sarcandra glabra (Thunb.) Nakai

Fig. 20. a. Twig. b & c. Flower, two views, showing ovary with stamen and bract. d. Fruit, showing scar of stamen.

117. MYRISTICACEAE

- 1a. Flowers in many-flowered panicles, each bearing a bracteole at foot of perianth ; anthers united in a fleshy oblong-turbinate spherical or 3-gonous column ; aril entire. ...
- 1b. Flowers in dense short racemes or fascicles, each bearing a bracteole on pedicel ; anthers in a whorl around a peltate disk ; aril shortly incised at apex. ...

Horsfieldia 3

Knema 2

1. *HORSFIELDIA* Willd.

Horsfieldia amygdalina (Wall.) Warb. Monogr. Myristic. in Nov. Act. Nat. Cur. 68: 310. 1897. *Myristica amygdalina* Wall. Pl. As. Rar. 1: 79. to. 90. 1830; Fl. Brit. Ind. 5: 106. 1886; Fl. As. 4: 43. 1940.

Trees, 10-20 m; leaves elliptic to oblanceolate, cuncate at base, obtuse to acute, 10-25 × 3-10 cm; lateral nerves 8-15 pairs; petioles 1-2 cm; male flowers yellow, in 8-12 cm long much-branched panicles; female flowers in short few-flowered panicles; fruits ellipsoid, obscurely trigonous; aril thin, fleshy, yellowish; seeds oblong, ± 2 cm.

Primary forests, 100-500 m; fl. & fr.: Nov.-May; Dawki.

Seeds and aril are edible.

2. *KNEMA* Lour.

Knema angustifolia (Roxb.) Warb. Monogr. Myristic. in Nov. Act. Nat. Cur. 68: 561. 1897. *Myristica angustifolia* Roxb. Fl. Ind. 3: 847. 1832; Fl. As. 4: 45. 1940. *M. erratica* Hook. f. & Th. Fl. Ind. 156. 1855. *M. longifolia* var. *erratica* (Hook. f. & Th.) Hook. f. Fl. Brit. Ind. 5: 110. 1886.

Trees, 8-15 m; leaves bifarious, ovate-elliptic, acute or obtuse at base, acute to acuminate, 10-40 × 3-12 cm; lateral nerves 15-25 pairs; petioles 7-16 mm; male flowers fascicled on tubercles on old branches; pedicels 5-6 mm; perianth urceolate, 5-6 mm, scarlet within; female flowers fascicled in axils of fallen leaves; perianth urceolate, 5-6 mm; fruits subglobose or ellipsoid, 2-3 cm, brownish-yellow, tomentose; aril scarlet-red.

Primary forests, 200-1200 m; fl. & fr.: Nov.-June; Dawki, Lumshnong.

118. LAURACEAE

- 1a. Inflorescences enclosed up to or during flowering time by an involucre of bracts.
- 2a. Flowers bisexual; anthers 2-locular. ... *Lindera* 1
- 2b. Flowers unisexual; anthers 4-locular.
- 3a. Fertile stamens 9-12; fruits inserted in small calyx-tube. *Lilsea* 2
- 3b. Fertile stamens 6; fruits inserted on disk-like cup. ... *Neolitsea* 3
- 1b. Inflorescences not enclosed in bud or during flowering by an involucre of bracts.
- 4a. Anthers 2-locular or rarely 1-locular.
- 5a. Mature fruits completely or partially enclosed by calyx-tube. ... *Cryptocarya* 4

5b. Mature fruits not enclosed in calyx-tube.	..	<i>Beilschmeidia</i>	5
4b. Anthers 4-locular.			
6a. Anthers all introrse.	...	<i>Actinodaphne</i>	6
6b. Anthers of at least one row extrorse.			
7a. Leaves prominently 3-nerved at base.	...	<i>Cinnamomum</i>	7
7b. Leaves penninerved.			
8a. Perianth segments reflexed, not clasping the fruit.	...	<i>Persea</i>	8
8b. Perianth segments erect, closely clasping the fruit.	...	<i>Phoebe</i>	9

1. *LINDERA* Thunb. *nom. cons.*

- 1a. Leaves trinerved at base.
 - 2a. Leaves broader towards apex, narrower towards base; short-acuminate at apex, glabrous and pale beneath; fruits ellipsoid. ... *L. melastomacea* 1
 - 2b. Leaves broader towards base, narrower towards apex, long-acuminate at apex, hairy on nerves and glaucous beneath; fruits globose. ... *L. caudata* 2
- 1b. Leaves penninerved.
 - 3a. Leaves 4—10 × 2—5 cm; petioles 3—6 cm long; umbels sessile or subsessile. ... *L. nacusua* 3
 - 3b. Leaves 12—20 × 6—10 cm; petioles 8—15 mm long; umbels on 6—10 mm long peduncles. ... *L. latifolia* 4

1. ***Lindera melastomacea*** (Nees) Vill. in Blanco, Fl. Philipp. ed. 3. Nov. - App. 181. 1880; Fl. Brit. Ind. 5: 185. 1886; Fl. As. 4: 98. 1940. *Daphnidium melastomaceum* Nees in Wall. Pl. As. Rar. 2: 63. 1831. 'Dieng-siasia'.

Large shrubs or small trees, 2-4 m; branches stiff, ascending; leaves elliptic-obovate to oblanceolate, cuneate at base, short cuspidate-acuminate, 4-7 × 1.5-3.5 cm; basal nerves prominent beneath, running up to apex; petioles 4-7 mm; umbels 3-5-flowered, axillary, subsessile; bracts orbicular, glabrous; pedicels silky-villous; fruits apiculate, ± 7 mm.

Primary forests, often in forest clearings, 1200-1500 m; fl. & fr.: Dec.-Aug.; Jarain.

2. ***Lindera caudata*** (Nees) Hook. f. in Fl. Brit. Ind: 5: 184. 1886; Fl. As. 4: 97. 1940. *Daphnidium caudatum* Nees in Wall. Pl. As. Rar. 2: 63. 1831.

Trees or large shrubs, 4-10 m; leaves ovate to elliptic-lanceolate, obtuse or acute at base, long caudate-acuminate, 5-10 × 2-5 cm; basal nerves running to apex; petioles 7-12 mm; umbels solitary, clustered or spicate; bracts and bracteoles concave, pubescent; pedicels hairy; fruits 6-7 mm diam., speckled yellow, seated on 6-cleft perianth-tube.

Primary forests, 1400-1600 m; fl. & fr.: Oct.-July; Khleihriat, Laskein, Raliang.

3. **Lindera nacusua** (D. Don) Merr. in *Lign. Sci. J.* 15: 419. 1936. *Laurus nacusua* D. Don, *Prodr. Fl. Nep.* 64. 1825. *Daphnidium bifarium* Nees in *Wall. Pl. As. Rar.* 2: 63. 1831. *Lindera bifaria* (Nees) Hook. f. in *Fl. Brit. Ind.* 5: 184. 1886; *Fl. As.* 4: 96. 1940.

Trees or large shrubs, 5-10 m; buds covered with imbricate silky tomentose scales; leaves oblong-elliptic to ovate-lanceolate, obtuse or acute at base, acute to acuminate, brown-villous beneath; lateral nerves 5-10 pairs; solitary or clustered, 6-8 mm across, 6-10-flowered; bracts 6-8, pubescent; fruits globose, greenish-white.

Primary forests, 1200-1600 m; fl. & fr.: Feb.-Aug.; Jowai.

4. **Lindera latifolia** Hook. f. *Fl. Brit. Ind.* 5: 183. 1886; *Fl. As.* 4: 95. 1940.

Trees, 5-10 m; branchlets grey-tomentose; leaves obovate, broad lanceolate or oblanceolate, acute or cuncate at base, rusty-tomentose beneath; lateral nerves 8-12 pairs; umbels 8-15 mm, axillary, solitary or clustered, 10-12-flowered; bracts 4, ovate, \pm 8 mm, pubescent; fruits \pm 8 mm diam., brown.

Primary forests, 1400-1600 m; fl. & fr.: Feb.-Oct.; Raliang, Balakrishnan 50171; U. N. Kanjilal 740 P —Endemic to Meghalaya.

2. LITSEA Lamk. *nom. cons.*

- | | | |
|--|-----|----------------------------|
| 1a. Perianth segments 0—3. | ... | <i>L. glutinosa</i> 1 |
| 1b. Perianth segments 4—9 or more. | | |
| 2a. Leaves strongly smelling of lemon, distinctly pellucid-dotted, deciduous. | ... | <i>L. cubeba</i> 2 |
| 2b. Leaves not smelling of lemon, not distinctly pellucid-dotted, persistent. | | |
| 3a. Perianth-tube much enlarged in fruit. | | |
| 4a. Leaves brownish-purple and pubescent on nerves beneath; lateral nerves 4—5 pairs. | ... | <i>L. semicarpifolia</i> 3 |
| 4b. Leaves glaucous or subglaucous and glabrescent beneath; lateral nerves 6—9 pairs. | ... | <i>L. laeta</i> 4 |
| 3b. Perianth-tube slightly or little enlarged in fruit. | | |
| 5a. Leaves broadly ovate to oblong-obovate, rounded or subcordate at base, 6—10 cm broad. | ... | <i>L. monopetala</i> 5 |
| 5b. Leaves elliptic-lanceolate or linear-lanceolate, acute or cuneate at base, 2—5 cm broad. | ... | <i>L. salicifolia</i> 6 |

1. ***Litsea glutinosa*** (Lour.) C. B. Robins. in Philip. J. Sci. Bot. 6: 321. 1911. *Sebifera glutinosa* Lour. Fl. Cochinch. 638. 1790. *L. sebifera* Pers. Syn. 2: 4. 1807; Fl. Brit. Ind. 5: 157. 1886; Fl. As. 4: 82. 1940.

Trees, 5-20 m; leaves elliptic-oblong, ovate-lanceolate, acute or narrowed at base, obtuse, acute or short-acuminate, 8-25 × 3-13 cm; lateral nerves 6-11 pairs; petioles 15-35 mm; umbellules 3-6, in lax umbels or corymbs; rachis 3-5 mm; peduncles 10-25 mm; bracts 4-6, concave, 2-3 mm, tomentose; fruits globose 8-10 mm.

Forests and forest edges, 100-800 m; fl. & fr.: Apr.-Feb.; Dawki, Garampani-Raliang.

2. ***Litsea cubeba*** (Lour.) Pers. Syn. Pl. 2: 4. 1806. *Laurus cubeba* Lour. Fl. Cochinch. 252. 1790. *Litsea citrata* Bl. Bijdr. 565. 1825; Fl. Brit. Ind. 5: 155. 1886; Fl. As. 4: 81. 1940.

Trees, 3-10 m; leaves lanceolate, to ovate-lanceolate, oblique at base, caudate-acuminate, 7-15 × 1.5-3.0 cm; lateral nerves 8-12 pairs; midrib purplish below; petioles 15-25 mm; umbels 5-flowered, solitary or in corymbs; bracts 4, ovate; peduncles 10-15 mm; fruits globose, 5-6 mm, on 1-2 cm long pedicels.

Forests and forest borders, 500-1500 m; fl. & fr.: Nov.-July; Khleihriat, Khongsnong, Umtapoh.

3. ***Litsea semicarpifolia*** (Nees) Hook. f. Fl. Brit. Ind. 5: 165. 1886; Fl. As. 4: 86. 1940. *Tetranthera semicarpifolia* Nees, Syst. Laurin. 559. 1886.

Trees, 6-10 m; leaves oblong-obovate or elliptic, acute to cuneate at base, acuminate, 15-18 × 6-12 cm; petioles 1-2 cm; umbels 6-flowered, axillary, fascicled or racemose; bracts 4-5; perianth-tube cup-shaped; lobes 6, oblong, pubescent; fruits depressed-globose, ± 1.5 cm across, seated, on cup-shaped puberulous perianth-tube.

Primary forests, 1200-1600 m; fl. & fr.: Jan.-July; Jowai.

4. ***Litsea laeta*** (Nees) Hook. f. Fl. Brit. Ind. 5: 169. 1886; Fl. As. 4: 88. 1940. *Tetranthera laeta* Nees in Wall. Pl. As. Rar. 2: 67. 1891.

Trees, 10-20 m; leaves elliptic, lanceolate or narrow-oblong, acute at base, short-acuminate or acute, 10-30 × 2-12 cm; petioles 1-2 cm; umbels axillary, solitary or fascicled, 3-6-flowered; peduncles 10-15 mm; bracts 4-5; flowers creamy yellow; fruits oblong-ovoid, ± 15 mm across, white, on thickened ± 10 mm long pedicels.

Primary forests, 900-1500 m; fl. & fr.: Nov.-May; Jarain, Khleihriat, Syndai.

5. **Litsea monopetala** (Roxb.) Pers. Syn. Pl. 2: 4. 1806. *Tetranthera monopetala* Roxb. Pl. Cor. 2: 26. t. 148. 1800. *L. polyantha* A. Juss. in Ann. Mus. Hist. Nat. Paris 6: 211. 1805; Fl. Brit. Ind. 5: 162. 1886; Fl. As. 4: 83. 1940. '*Dieng-jalawan*'.

Shrubs or trees, 5-20 m; leaves acute or obtuse and often apiculate at apex, 9-20 × 6-10 cm; lateral nerves 6-13 pairs; petioles 15-25 mm; umbellules in clusters or subcorymbs, 5-8-flowered; peduncles up to 8 mm; bracts 5, orbicular, tomentose; flowers yellow-green; fruits ovoid, 8-12 mm, black.

Primary forests and forest borders, 100-1500 m; fl. & fr.: Mar.-Sept.; Dawki, shangpung.

6. **Litsea salicifolia** (Nees) Hook. f. Fl. Brit. Ind. 5: 167. 1886; Fl. As. 4: 87. 1940. *Tetranthera salicifolia* Nees in Wall. Pl. As. Rar. 2: 66. 1831.

Trees or shrubs, 3-10 m; leaves acute or acuminate at apex, 10-18 × 2-5 cm; lateral nerves 7-14 pairs; petioles 7-15 mm; umbels in fascicles or in short racemes, 4-6-flowered; peduncles 2-5 mm; bracts 4-5, orbicular; fruits ellipsoid, 7-8 mm, purplish-black.

Primary and secondary forests, 100-1500 m; fl. & fr.: Feb.-June; Dawki, Laskein, Raliang, Umtapoh.

3. NEOLITSEA (Benth.) Mett. *nom. cons.*

- | | | |
|---|-----|---------------------|
| 1a. Leaves crowded at ends of branches; leaf-buds 2-3 cm long; flower-clusters 10-20 mm across; filaments of inner stamens with stalked glands. | .. | <i>N. cuipala</i> 1 |
| 1b. Leaves not crowded at ends of branches; leaf-buds up to 8 mm long; flower-clusters 5-10 mm across; filaments of inner stamens with sessile glands. | | |
| 2a. Branchlets and petioles tomentose with curly black hairs; leaves prominently white glaucous beneath; fruits 5-8 mm diam., on ± 1 mm thick pedicels. | ... | <i>N. pallens</i> 2 |
| 2b. Branchlets and petioles glabrescent or glabrous; leaves not prominently glaucous beneath; fruits 10-15 mm diam., on ± 2 mm thick pedicels. | ... | <i>N. cassia</i> 3 |

1. **Neolitsa cuipala** (D. Don) Kosterm. in Bull. Bot. Surv. Ind. 10: 287. 1969. *Tetranthera cuipala* D. Don, Prodr. Fl. Nep. 65. 1825. *Tetradenia lanuginosa* Nees in Wall. Pl. As. Rar. 2: 64. t. 576. 1831. *Litsea*

lanuginosa (Nees) Nees, Syst. Laur. 634. 1836; Fl. Brit. Ind. 5: 178. 1886; Fl. As. 4: 90. 1940.

Trees, 8-20 m; leaf-buds enclosed in softly pubescent scales; leaves elliptic-lanceolate to oblanceolate, cuneate or narrowed at base, acute to acuminate, 15-30 × 3-9 cm; lateral nerves 3-5 pairs; petioles 8-25 mm; umbels 4-flowered, in sessile or subsessile clusters; peduncles up to 5 mm; fruits ellipsoid, 12-16 mm.

Forests, 1400-1600 m; fl. & fr.: Nov.-Apr.; Jowai.

2. ***Neolitsea pallens*** (D. Don) Momiyama & Hara in J. Jap. Bot. 47: 269. 1972. *Tetranthera pallens* D. Don, Prodr. Fl. Nep. 66. 1825. *Tetradenia umbrosa* Nees in Wall. Pl. As. Rar. 2: 64. 1831. *Litsea umbrosa* (Nees) Nees, Syst. Laur. 623. 1836; Fl. Brit. Ind. 5: 179. 1886; Fl. As. 4: 91. 1940.

Trees or shrubs, 5-20 m; leaf-buds 5-7 mm; leaves oblong to lanceolate, rounded or acute at base, acute to caudate-acuminate, 8-15 × 2-3 cm; lateral nerves 2-4 pairs; petioles 15-35 mm; umbels 4-5-flowered, dense, axillary; peduncles ± 2 mm; perianth pale yellow, silky outside; fruits subglobose, purplish.

Forests and forest borders, 1200-1500 m; fl. & fr.: Mar.-Nov.; Jarain.

3. ***Neolitsea cassia*** (L.) Kosterm. in J. Sci. Res. Indones. 1: 85. 1952. *Laurus cassia* L. Sp. Pl. 369. 1753. *Litsea zeylanica* Nees, Amoén. Bot. Bonn. fasc. 1: 58. t. 5. 1823; Fl. Brit. Ind. 5: 178. 1886. *Neolitsea zeylanica* (Nees) Merr. in Philip. J. Sci. suppl. 57. 1906; Fl. As. 4: 92. 1940.

Trees, 5-25 m; leaves oblong-ovate to elliptic-lanceolate, acute at base, acuminate, 6-15 × 3-6 cm, strongly 3-nerved at base; lateral nerves 2-4 pairs; petioles 8-20 mm; umbels 4-5-flowered, in sessile 10-15 mm broad clusters; perianth silky; fruits ovoid-oblong, seated on ± 2.5 mm long cup-shaped perianth-tube.

Primary and secondary forests, 100-1500 m; fl. & fr.: Nov.-Apr.; Dawki, Jarain, Jowai, Khleihriat, Nartiang.

4. CRYPTOCARYA R. Br.

Cryptocarya amygdalina Nees in Wall. Pl. As. Rar. 2: 69. 1831; Fl. Brit. Ind. 5: 118. 1886; Fl. As. 4: 49. 1940.

Trees; leaves oblong-lanceolate to oblanceolate, acute or obtuse at base, acute or acuminate, 10-20 × 3-10 cm; lateral nerves 6-8 pairs; peti-

oles 15-20 mm; panicles terminal or from upper axils, pubescent, 10-18 cm; bracts linear or lanceolate, silky villous, 2-5 mm; flowers \pm 3 mm across, tomentose outside; fruits oblong, strongly ribbed when young.

Forests, 100-1000 m; fl. & fr.: Mar.-Nov.; Dawki.

5. BELLSCHMIEDIA Nees

Bellschmiedia roxburghiana Nees in Wall. Pl. As. Rar. 2: 29. 1831; Fl. Brit. Ind. 5: 121. 1886; Fl. As. 4: 51. 1940.

Trees, 8-15 m; leaves elliptic-oblong or elliptic-lanceolate, acute to cuneate at base, obtuse or short-acuminate, 8-18 \times 2-8 cm; lateral nerves 6-12 pairs; petioles 1-3 cm; panicles axillary or from axils of fallen leaves, 1-3 cm; bracts silky-tomentose; pedicels \pm 4 mm; flowers yellowish-green; fruits baccate, ovoid-oblong, 3.5-4.0 \times 2-3 cm, dark purple.

Forests, 100-500 m; fl. & fr.: Mar.-Aug.; Dawki.

6. ACTINODAPHNE Nees

Actinodaphne obovata (Nees) Bl. Mus. Bot. Lugd.-Bat. 1: 342. 1851; Fl. Brit. Ind. 5: 153. 1886; Fl. As. 4: 77. 1940. *Tetradenia obovata* Nees in Wall. Pl. As. Rar. 2: 64. 1831.

Trees, 10-15 m; leaves obovate or elliptic-oblong, acute or obtuse at base, acute or short-acuminate, 20-45 \times 7-15 cm; lateral nerves 5-7 pairs; petioles 25-65 mm; racemes axillary or lateral; bracts imbricate; peduncles up to 15 mm; fruits ellipsoid, 15-25 mm; stalk 3-4 mm thick.

Primary forests, 100-500 m; fl. & fr.: Mar.-Oct.; Dawki.

7. CINNAMOMUM Schaeff. *nom. cons.*

- | | | | | |
|-----|--|-----|-----------------------|---|
| 1a. | Leaves penninerved; panicles densely tomentose. | .. | <i>C. glaucescens</i> | 1 |
| 1b. | Leaves triplinerved at base; panicles glabrous or sparsely pubescent. | .. | | |
| 2a. | Leaves 18-30 cm long; panicles exceeding leaves. | ... | <i>C. bejolghota</i> | 2 |
| 2b. | Leaves up to 15 cm long; panicles not exceeding leaves. | ... | | |
| 3a. | Leaf-buds and young shoots glabrous; leaves glossy above; umbels 3-flowered; peduncles and flower-buds glabrous | ... | <i>C. pauciflorum</i> | 3 |
| 3b. | Leaf-buds and young shoots glabrous; leaves dull above; umbels 5-or more-flowered; peduncles and flower-buds appressed grey-hairy. | ... | <i>C. lamala</i> | 4 |

1. **Cinnamomum glaucescens** (Nees) Hand.-Mazz. in Oest. Bot. Zeits. 85: 214. 1936. *Ceciodaphne glaucescens* Nees in Wall. Pl. As. Rar. 2: 70.

1831. *Cinnamomum cecidodaphne* Meissn. in DC. Prodr. 15(1): 25. 1864; Fl. Brit. Ind. 5: 135. 1886; Fl. As. 4: 56. 1940.

Trees, 10-20 m; leaves elliptic-oblong or lanceolate, acute or cuneate at base, acute to blunt-acuminate, 6-13 × 2-7 cm; lateral nerves 4-6 pairs; petioles 8-25 mm; panicles 3-5 cm, densely tomentose; flowers white, tomentose; peduncles 2-4 mm; fruits ellipsoid; 2-4 cm, seated on enlarged perianth-cup.

Forests, 600-1000 m; fl. & fr.: Feb.-Oct.; Khongsnong.

2. ***Cinnamomum bejolghota*** (Buch.-Ham.) Sweet, Hort. Brit. ed. 1: 344. 1827. *Laurus bejolghota* Buch.-Ham. in Trans. Linn. Soc. 18: 559. 1822. *L. obtusifolia* Roxb. Fl. Ind. 2: 302. 1824. *C. obtusifolium* (Roxb.) Nees in Wall. Pl. As. Rar. 2: 73. 1831; Fl. Brit. Ind. 5: 128. 1886; Fl. As. 4: 56. 1940.

Trees, 5-15 m; leaves elliptic-oblong or lanceolate, acute or obtuse at base, acuminate, 18-30 × 3-9 cm, glaucous beneath, trinerved at base; petioles 12-18 mm; panicles subcorymbose; perianth ± 6 mm across; fruits ellipsoid, 8-13 mm, seated on enlarged ± 8 mm broad perianth-tube.

Primary forests, 1200-1500 m; fl. & fr.: Feb.-July; Jarain.

3. ***Cinnamomum pauciflorum*** Nees in Wall. Pl. As. Rar. 2: 75. 1831; Fl. Brit. Ind. 5: 129. 1886; Fl. As. 4: 57. 1940.

Shrubs or small trees, 3-10 m; leaves elliptic-obovate to oblong-lanceolate, acute or rounded or subcordate at base, acute to shortly acuminate, 5-12 × 2-5 cm; basal nerves 3-5; petioles 5-10 mm; panicles 3-8 cm, laxly branched; peduncles 6-8 mm; perianth 3-4 mm; fruits globose, 7-8 mm diam., seated on truncate or toothed perianth-tube.

Primary and secondary forests, 1200-1600 m; fl. & fr.: Apr.-Sept.; Jowai, Nartiang.

4. ***Cinnamomum tamala*** (Spreng.) Nees & Eberm. Handb. Med. Pharm. Bot. 2: 426. 1831; Fl. Brit. Ind. 5: 128. 1886; Fl. As. 4: 56. 1940.

Trees, 5-12 m; buds and young leaves silky pubescent; leaves ovate-oblong, lanceolate or often subfalcate, acute or rounded at base, acute to acuminate, 6-15 × 2-7 cm, subtriplinerved at base; petioles 7-12 mm; panicles 5-10 cm, finely grey-pubescent; peduncles 3-10 mm; perianth grey-silky pubescent; fruits ovoid, 12-15 mm, black when ripe.

Primary forests, 1300-1600 m; fl. & fr.: Feb.-Sept.; Jowai.

8. *PERSEA* Mill. *nom. cons.*

1a. Lateral nerves 15—20 pairs; panicles silky tomentose.	...	<i>P. duthiei</i> 1
1b. Lateral nerves 8—12 pairs; panicles glabrous.		
2a. Fruits oblong-ellipsoid.	...	<i>P. odoratissima</i> 2
2b. Fruits globose.	...	<i>P. globularia</i> 3

1. ***Persea duthiei*** (Hook. f.) Kosterm. in Reinwardtia 6: 191. 1962. *Machilus duthiei* Hook. f. Fl. Brit. Ind. 5: 861. 1890.

Trees, 5 - 10 m; young parts silky; leaves elliptic-lanceolate or oblanceolate, acute, cuneate or narrowly rounded at base, acute to short-acuminate, 10 - 25 × 3 - 6 cm; petioles 1 - 3 cm; panicles 8 - 15 cm; peduncles 2 - 5 mm; bracts 4 - 5, ovate, grey puberulous; fruits globose, 12 - 15 mm in elongated drooping panicles.

Primary forests, 100 - 1000 m; fl. & fr.: Oct.-Feb.; Dawki, Sutnga.

2. ***Persea odoratissima*** (Nees) Kosterm. in J. Sci. Res. Indones. 1: 116. 1952. *Machilus odoratissima* Nees in Wall. Pl. As. Rar. 2: 70. 1831; Fl. Brit. Ind. 5: 139. 1886; Fl. As. 4: 64. 1940.

Trees, 8 - 20 m; leaves crowded at ends of branches, oblong-ovate to oblanceolate, cuneate or obtusely narrowed at base, acute to short acuminate, 8 - 18 × 3 - 7 cm; petioles 8 - 18 mm; panicles subterminal, 10 - 15 cm, subcorymbosely branched; flowers yellowish-green, scented; fruits 13 - 19 mm, purple.

Forests and forest borders, 800 - 1400 m; fl. & fr.: Mar.-July; Khongsong, Nartiang, Raliang, Sutnga.

3. ***Persea globularia*** Kosterm. in Reinwardtia 6: 192. 1962. *Machilus globosa* A. Das in Assam For. Rec. 2: 9. t. 10. 1937; Fl. As. 4: 68. 1940. [non *P. globosa* (Lamk.) Spreng. 1825].

Trees, 5 - 15 m; leaves lanceolate to elliptic-lanceolate, cuneate base, blunt-acuminate, 5 - 15 × 1.5 - 4.0 cm; petioles 8 - 17 mm; cymes paniculate, with divergent branches, axillary or terminal; pedicels 3 - 5 mm, elongating in fruit up to 8 mm; fruits 10 - 12 mm diam., dark purple.

Forests, 1400 - 1600 m; fl. & fr.: Apr. - Aug.; Jowai.

9. *PHOEBE* Nees

Phoebe lanceolata (Nees) Nees, Syst. Laurin. 109. 1836; Fl. Brit. Ind. 5: 141. 1886; Fl. As. 4: 71. 1940. *Ocotea lanceolata* Nees in Wall.

Pl. As. Rar. 2: 71. 1831. *P. angustifolia* Meisen. in DC. Prodr. 15(1): 34. 1864; Fl. Brit. Ind. 5: 141. 1886; Fl. As. 4: 71. 1940.

Trees or large shrubs, 5-15 m; leaves lanceolate to linear-lanceolate, acute or cuneate at base, acute to long-acuminate, 8-20 × 0.8-7.0 cm; petioles 5-25 mm; panicles lax, corymbiform, axillary; bracts silky-pubescent, ± 1 cm; flowers greenish-yellow; perianth ± 3 mm, pubescent; fruits ovoid, 8-12 mm, black.

Forests, 100-1000 m; fl. & fr.: Apr.-Nov.; Dawki, Jowai-Bodarpur Road, Syndai.

119. PROTEACEAE

HELICIA Lour.

Helicia nilagirica Bedd. in Madr. J. Lit. Sci. ser. 3. 1: 56, t. 11. 1864; Fl. Brit. Ind. 5: 190. 1886. *H. erratica* Hook. f. Fl. Brit. Ind. 5: 189. 1886; Fl. As. 4: 106. 1940. '*Dieng-soh-pyrtied*'.

Trees, 2-10 m; leaves oblong-elliptic or lanceolate, cuneate to acute at base, short-acuminate, coarsely serrate, 8-20 × 4-8 cm; lateral nerves 6-9 pairs; petioles 15-25 mm; racemes 10-20 cm, axillary or at leafless nodes; pedicels 2-3 mm; perianth 13-14 mm, yellowish; fruits indehiscent, subglobose, apiculate at apex, stipitate at base, 2.5-3.5 cm diam.; seeds 1-2, pale red.

Primary and secondary forests, often associated with pines, 600-1500 m; fl. & fr.: Apr.-Jan.; Dawki, Jarain, Jowai.

120. THYMELAEACEAE

DAPHNE L.

- | | |
|---|-------------------------|
| 1a. Flowers in distinctly peduncled heads; peduncles 3-7 cm long. ... | <i>D. composita</i> 1 |
| 1b. Flowers in sessile or short-peduncled heads; peduncles up to 2 cm long. | |
| 2a. Lateral nerves 8-12 pairs; perianth-tube 4-5 mm thick; lobes 5-7 mm wide. ... | <i>D. shillong</i> 2 |
| 2b. Lateral nerves 14-22 pairs; perianth-tube 1-2 mm thick; lobes 1-2 mm. ... | <i>D. involucreta</i> 3 |

1. **Daphne composita** (L. f.) Gilg. in Engl. & Prantl, Pflanzenfam 8. 6a: 288. 1894. *Scopolia composita* L. f. Suppl. 409. 1781. *D. pendula* Smith in Pl. Ic. 2: 34. t. 34. 1790; Fl. Brit. Ind. 5: 194. 1886.

Shrubs or small trees, up to 10 m; leaves oblong-lanceolate to oblanceolate, cuneate at base, acute to acuminate, 7-12 × 3-4 cm; lateral nerves 9-14 pairs; petioles 3-5 mm; inflorescences axillary, solitary, pendulous, 4-14-flowered; involucre bracts 2, ovate, ± 1 cm; flowers pale yellow, fragrant, 15-20 mm; fruits ellipsoid, 10-15 × 4-5 mm, black.

Primary forests, in partially shaded places, 1300-1500 m; fl. & fr.: June-Dec.; Jowai.

2. **Daphne shillong** Bancrji in Kew Bull. 1927; 75-76. 1927; Fl. As. 4: 109. 1940.

Shrubs, 1-2 m; leaves lanceolate to obovate-lanceolate, acute to cuneate at base, acute to acuminate, undulate at margins 6-15 × 2-5 cm; petioles up to 8 mm; inflorescences subcapitate; peduncles 4-5 mm, hairy; flowers 12-17 mm, creamy-white, fragrant; fruits subglobose, 12-16 mm, red.

Primary forests, 1000-1400 m; fl. & fr.: Aug.-Jan.; Mynso, G. K. Deka 17336 —Endemic to Meghalaya.

3. **Daphne involucrata** Wall. in As. Res. 13: t. 6. 1820; Fl. Brit. Ind. 5: 193. 1885; Fl. As. 4: 110. 1940.

Shrubs or small trees, 1-6 m; leaves oblong-lanceolate, cuneate at base, acute to acuminate, undulate at margins, 7-18 × 2-5 cm; petioles 3-5 mm; inflorescences subcapitate, 6-10-flowered, enclosed by 2 bracts in buds; peduncles up to 2 cm; flowers white with pinkish tinge, scented; fruits ellipsoid, 7-9 mm, black.

Primary forests, 1200-1500 m; fl. & fr.: Nov.-Feb.; Jarain, Jowai, Khleihriat.

121. ELAEAGNACEAE

ELAEAGNUS L.

- | | | |
|---|-----|------------------------|
| 1a. Leaves glabrescent above; fruits 20—25 mm long; endocarp ribbed, densely hairy. | ... | <i>E. latifolia</i> 1 |
| 1b. Leaves glabrous above; fruits 8—10 mm long; endocarp not ribbed, glabrous. | ... | <i>E. pyriformis</i> 2 |

1. **Elaeagnus latifolia** L. Sp. Pl. ed. 2. 1: 177. 1762; Fl. Brit. Ind. 5: 202. 1885; Fl. As. 4: 114. 1940. '*Dieng-soh-sylang*'.

Straggling or scandent shrubs, often spiny; branches silvery and coppery scale-covered; leaves ovate-oblong, rounded or acute at base, acute or acuminate, 5-15 × 3-7 cm, silvery and clothed with ferruginous scales beneath;

lateral nerves 5-7 pairs; petioles 7-12 mm; flowers 12-13×4-5 mm, scented, in few-flowered dense, axillary fascicles; fruits ellipsoid, 8-ribbed, yellow or red.

Secondary and pine forests, in sunny places, 1400-1600 m; fl. & fr.: Nov.-Mar.; Jowai, Jowai-Jarain.

2. **Elaeagnus pyriformis** Hook. f. Fl. Brit. Ind. 5: 202. 1886; Fl. As. 4: 115. 1940. '*Dieng-soh-ang*'.

Scandent or straggling shrubs, 1-4 m; branches brown-scaly; leaves ovate to elliptic-oblong, rounded or subacute at base, acute to acuminate, 3-12×2-8 cm; flowers 10-12×3-4 mm, in few-flowered dense axillary fascicles; pedicels 2-3 mm; fruits pyriform, beaked at apex, yellow; covered with coppery scales.

Primary forests, 1400-1600 m; fl. & fr.: Nov.-Mar.; Jowai, Khleih-riat, Laskein.

122. LORANTHACEAE

1a. Flowers unisexual; calyx obsolete.	...	<i>Viscum</i> 1
1b. Flowers bisexual; calyx present.		
2a. Flowers 4-merous.	...	<i>Loranthus</i> 2
2b. Flowers 5-7-merous.		
3a. Flowers 6-7-merous, bracteolate.	...	<i>Macrosolen</i> 3
3b. Flowers 5-merous, ebracteolate.		
4a. Petals of old flowers free or slightly cohering at base.		<i>Helixanthera</i> 4
4b. Petals of even old flowers distinctly connate.		
5a. Corolla tube entire, completely connate.	...	<i>Dendrophihoe</i> 5
5b. Corolla tube split vertically on one side.	...	<i>Taxillus</i> 6

1. VISCUM L.

1a. Leaves present; inflorescences enlarged by development of adventitious flowers.	...	<i>V. monoicum</i> 1
1b. Leaves absent or scaly; inflorescences without adventitious flowers.	...	<i>V. articulatum</i> 2

1. **Viscum monoicum** DC. Prodr. 4: 278. 1830; Fl. Brit. Ind. 5: 224. 1886; Fl. As. 4: 118. 1940.

Shrubs, 40-60 cm; branches terete with only the terminal 2 internodes flattened, yellowish; leaves lanceolate or elliptic, somewhat falcate, obliquely narrowed at base, acute or short-acuminate, 2-10×0.6-4.0 cm; petioles 1-3 mm; inflorescences axillary or lateral fascicle of cymes; flowers sessile, 3-7 in each cup or bracts; fruits oblong-ellipsoid, 5-6×2-3 mm, yellowish, fleshy.

Forests, 100-500 m; fl. & fr.: Nov.-Feb.; Dawki, Laskein.

2. **Viscum articulatum** Burm. f. Fl. Ind. 311. 1768; Fl. Brit. Ind. 5: 226. 1886; Fl. As. 4: 119. 1940.

Shrubs; branches pendulous, 2- or 3-chotomously branched, up to 1 m long; internodes flattened, disarticulating at nodes, 2-10 mm broad; leaves bract-like, ± 1 mm; inflorescences lateral, sessile cymes, 1-5-flowered; bracts scaly, ± 1 mm, cupular; fruits globose, 3-4 mm, yellowish-green, glossy, smooth, wrinkled when dry.

Forests, 1200-1600 m; fl. & fr.: Nov.-Mar.; Jowai, Nartiang.

2. LORANTHUS Jacq. *nom. cons.*

- | | |
|---|---------------------------|
| 1a. Leaves glabrous or nearly so; fruits ellipsoid, turbinate. ... | <i>L. umbellifer</i> 1 |
| 1b. Leaves tomentose or mealy; fruits clavate or pyriform. | |
| 2a. Branchlets and young leaves with mealy tomentum; corolla brown inside; style red; fruits clavate. ... | <i>L. pulverulentus</i> 2 |
| 2b. Branchlets and young leaves covered with rusty tomentum; corolla red or purple inside; style purple; fruits pyriform. | |
| 3a. Flower-buds thickened upwards, club-shaped, straight; corolla dark red outside, purple inside, ± 2 mm thick. ... | <i>L. scurrula</i> 3 |
| 3b. Flower-buds linear-cylindric, curved; corolla dark brown outside, red inside, ± 1 mm thick. ... | <i>L. gracilifolius</i> 4 |

1. **Loranthus umbellifer** Schult. Syst. Veg. 7: 97. 1829; Fl. Brit. Ind. 5: 211. 1886. *Scurrula umbellifer* (Schult.) G. Don, Gen. Syst. 5: 421. 1834; Fl. As. 4: 126. 1940.

Stout shrubs; innovations rusty-pubescent; leaves elliptic-oblong, acute or narrowed at base, acute or obtuse, 8-10 \times 1-5 cm; lateral nerves 4-7 pairs; petioles 5-13 mm; flowers in umbels or racemes, sessile, fascicled on short axillary peduncles; buds slender, clavate; flowers 25-35 mm; corolla 12-18 mm, brownish-green, red at base and inside; filaments dark purple; fruits turbinate, 7-8 mm.

Forests, 700-1500 m; fl. & fr.: Aug.-Jan.; Ioksi, Jowai, Nartiang.

2. **Loranthus pulverulentus** Wall. in Roxb. Fl. Ind. 2: 221. 1824; Fl. Brit. Ind. 5: 211. 1886. *Scurrula pulverulenta* (Wall.) G. Don, Gen. Syst. 3: 421. 1834; Fl. As. 4: 125. 1940. 'Mahariang-basaw'.

Stout shrubs; leaves broad-ovate, round or acute at base, acute or obtuse, 5-15 \times 1-7 cm; lateral nerves 6-7 pairs; petioles 1-2 cm; inflorescences axillary, racemose or fasciculate, 1-2 cm; pedicels 6-8 mm; flowers 20-25 mm; filaments red; fruits scurfy white-tomentose when young, later glabrescent.

Forests, 1200-1800 m; fl. & fr.: Oct.-Mar.; Jowai.

3. **Loranthus scurrula** L. Sp. Pl. ed. 2. 472. 1762; Fl. Brit Ind. 5: 208. 1886. *Scurrula parasitica* L. Sp. Pl. 110. 1753; Fl. As. 4: 24. 1940.

Large bushy shrubs; leaves elliptic-oblong or obovate, rounded or cordate at base, obtuse or acute, 3-9 × 1-4 cm; lateral nerves 5-7 pairs; petioles 3-10 mm; flowers in fascicles or racemes; rachis 5-7 mm; pedicels 1-5 mm; corolla 6-8 mm, filaments purple below, reddish above; fruits pyriform, 7-9 mm, tomentose.

Forests, 100-1500 m; fl. & fr.: Nov.-Apr.; Dawki, Jowai, Laskein, Sohka-Dawki.

4. **Loranthus gracilifolius** Schult. Syst. Veg. 7(1): 99. 1829. *L. graciliflorus* DC. Prodr. 4: 300. 1830. *L. scurrula* var. *graciliflorus* (DC.) Kurz, For. Fl. Burm. 2: 319. 1877; Fl. Brit. Ind. 5: 209. 1886. *Scurrula gracilifolia* (Schult.) Danser in Blumea 2: 47. 1936; Fl. As. 4: 125. 1940.

Bushy shrubs; innovations white or rusty-tomentose; leaves oblong lanceolate, acute or rounded at base, obtuse or subacute, 3-8 × 1-3 cm; lateral nerves 5-7 pairs; petioles 3-6 mm; flowers in axillary fascicles or short racemes; pedicels 1-4 mm; corolla 6-8 mm; filaments purple; fruits pyriform, ± 8 mm, tomentose, when young.

Forests, 500-1000 m; fl. & fr.: Aug.-Feb.; Ioksi.

3. MACROSOLEN (Bl.) Reichb.

- 1a. Petioles 3-7 mm long; flowers in racemes; fruits pale yellow. ... *M. cochinchinensis* 1
 1b. Petioles 8-17 mm long; flowers in spikes; fruits bluish. ... *M. psilanthus* 2

1. **Macrosolen cochinchinensis** (Lour.) van Tiegh. in Bull. Soc. Bot. Fr. 41: 122. 1895; Fl. As. 4: 127. 1940. *Loranthus cochinchinensis* Lour. Fl. Cochinch. 1: 195. 1790. *L. ampullaceus* Roxb. Fl. Ind. 2: 189. 1824; Fl. Brit. Ind. 5: 200. 1886. *L. globosus* Roxb. Fl. Ind. 1: 550. 1820 et 2: 187. 1824; Fl. Brit. Ind. 5: 220. 1886.

Stout shrubs; young leaves brownish-red; leaves broadly elliptic to ovate-lanceolate, cuncate or rounded at base, acuminate, 5-12 × 2-6 cm; lateral nerves 5-7 pairs; racemes axillary, solitary or clustered, 5-10-flowered; buds clavate-obovoid; corolla 8-14 mm, greenish-yellow with dark red or brown neck and dark brown wings; fruits ellipsoid, 6-7 × 5-6 mm.

Primary and secondary forests, 100-1500 m; fl. & fr.: Dec.-May; Dawki, Raliang.

2. **Macrosolen psilanthus** (Hook. f.) Danser in Blumea 2: 36. 1936; Fl. As. 4: 128. 1940. *Loranthus psilanthus* Hook. f. Fl. Brit. Ind. 5: 222. 1886.

Robust shrubs: leaves ovate to elliptic-lanceolate, rounded or subcuneate at base, acute or acuminate, 5-15 × 2-6 cm; lateral nerves 6-7 pairs; spikes up to 3 cm, solitary or paired, axillary or often from old wood; peduncles 15-20 mm; corolla 3-4 cm, red at lower half, green at upper half; lobes yellowish; fruits obovoid, 6-7 mm.

Forests, 1300-1600 m; fl. & fr.: Nov.-July; Jarain, Jowai.

4. HELIXANTHERA Lour.

- | | | |
|---|-----|------------------------|
| 1a. Inflorescences many-flowered, glabrous. | ... | <i>H. parasitica</i> 1 |
| 1b. Inflorescences few-flowered, rusty-pubescent. | ... | <i>H. ligustrina</i> 2 |

1. **Helixanthera parasitica** Lour. Fl. Cochinch. 142. 1790; Fl. As. 4: 120. 1940. *Loranthus pentapetalus* Roxb. Fl. Ind. 1: 553. 1820 et 2: 211. 1824; Fl. Brit. Ind. 5: 206. 1886.

Stout shrubs; leaves ovate-lanceolate to suborbicular, rounded or cuneate at base, acute or obtuse, 5-12 × 2-5 cm; lateral nerves 6-8 pairs; petioles 7-20 mm; racemes 5-13 cm, axillary, solitary or in pairs or threes; corolla inflated at base, 5-angled or winged below middle, 4-6 mm, red, orange-yellow or white; lobes linear, reflexed; fruits obovoid, truncate, 6-8 mm, crimson-red.

Forests, 100-1500 m; fl. & fr.: Jan.-Aug.; Dawki, Mynso, Raliang.

2. **Helixanthera ligustrina** (Wall.) Danser in Bull. Jard. Bot. Btzg. ser. 3. 10: 317. 1929; Fl. As. 5: 121. 1940. *Loranthus ligustrinus* Wall. in Roxb. Fl. Ind. 2: 219. 1832; Fl. Brit. Ind. 5: 207. 1886. '*Makariang*'.

Stout shrubs; leaves oblanceolate to narrow-elliptic, acute or cuneate at base, acute or obtuse, 3-10 × 1-5 cm; lateral nerves 4-5 pairs; racemes axillary, solitary or paired, 1-2 cm; corolla 7-8 mm, rusty-pubescent, pink or scarlet-red; fruits ovoid or ellipsoid, truncate, 5-6 × 3-4 mm, green, turning to red.

Forests, 1000-1600 m; fl. & fr.: Jan.-Dec.; Nartiang, Pdengsakab.

5. DENDROPHTHOE Mart.

Dendrophthoe falcata (L. f.) Etting. in Denks. Akad. Wiss. Wein. Math.-Naturwiss. Cl. 32: 52. 58. ff. 14-15. 1872; Fl. As. 4: 123. 1940. *Loranthus falcatus* L. f. Suppl. 211. 1781. *L. longiflorus* Desr. in Lamk. Encycl. 3: 598. 1792; Fl. Brit. Ind. 5: 214. 1886.

Robust shrubs, 1-2 m; leaves linear to ovate-oblong, oblique or rarely

subcordate at base, obtuse or rounded, 6-15 × 1-7 cm; petioles 3-12 mm; racemes unilateral, axillary or supraaxillary, 1-7 cm, 10-25-flowered, corolla 3-5 cm, yellow, orange or red; lobes orange or red outside; greenish-yellow-inside; fruits oblong, 8-5 mm, black.

Forests, 1200-1500 m; fl. & fr.: Jan.-Dec.; Jarain.

6. TAXILLUS van Tiegh.

Taxillus vestitus (Wall.) Danser in Bull. Jard. Bot. Btzg. ser. 3. 10: 354. 1929; Fl. As. 4: 122. 1940. *Loranthus vestitus* Wall. in Roxb. Fl. Ind. 2: 218. 1824; Fl. Brit. Ind. 5: 212. 1886.

Stout shrubs; leaves ovate or elliptic-lanceolate, obtuse or round at base, obtuse, 3.5-7.5 × 1.5-3.5 cm; lateral nerves 4-5 pairs; petioles 3-12 mm; inflorescence a fascicle or umbel, axillary sessile or pedunculate; buds clavate; corolla brown-tomentose outside; fruits ovoid or ellipsoid, 8-12 mm, orange.

Forests, 1300-1600 m; fl. & fr.: Sept.-Feb.; Jowai.

123. SANTALACEAE

- | | | |
|--|-----|-----------------------|
| 1a. Semiparasitic or autophytic shrubs, flowers sessile in clusters or heads; anther-cells divergent, distant. | ... | <i>Dendrotrophe</i> 1 |
| 1b. Trees; male flowers in panicles; female flowers solitary; anther-cells parallel. | ... | <i>Pyralaria</i> 2 |

1. DENDROTROPHE Miq.

Dendrotrophe umbellata (Bl.) Miq. Fl. Ind. Bat. 1(1): 779. 1856. *Viscum umbellatum* Bl. Bijdr. 666. 1826. *V. heteranthum* DC. Prodr. 4: 279. 1830. *Henslowia heterantha* (DC.) DC. Prodr. 14: 632. 1857; Fl. Brit. Ind. 5: 233. 1886; Fl. As. 4: 130. 1940.

Erect or subscaudent shrubs; leaves obovate to suborbicular, cuneate or narrowed at base, obtuse or rounded; main nerves 5-9, basal, palmate; petioles 1-3 mm; flowers sessile in umbels; peduncles 2-4 mm; fruits ellipsoid, 3-4 mm; pyrenes 5-6-furrowed; fruiting pedicels clothed with bracts at the base and apex.

Primary forests, 1000-1600 m; fl. & fr.: Aug.-May; Khongsong, Nongringkoh, Wahjajar.

2. PYRULARIA Michx.

Pyralia edulis (Wall.) DC. Prodr. 14: 628. 1857; Fl. Brit. Ind. 5: 220. 1886; Fl. As. 4: 131. 1940. *Sphaerocarya edulis* Wall. in Roxb. Fl. Ind. 2: 371. 1824.

Deciduous trees, 2-6 m; nodes thickened, rarely thorny; leaves elliptic-oblong or ovate, cuneate or acute at base, acute to acuminate, crenulate towards apex, 5-12 × 2-5 cm; lateral nerves 4-8 pairs; petioles 3-6 mm; flowers axillary or terminal, solitary or in racemose panicles; pedicels 2-3 mm; drupes pyriform, obovoid, 3-5 cm, crowned by persistent lobes of perianth.

Primary forests, 1300-1500 m; fl. & fr.: Mar.-Oct.; Jarain.

124. BALANOPHORACEAE

BALANOPHORA FORST.

Balanophora dioica Royle, Ill. Bot. Himal. 330. 1836 et t. 99. 2. 1839; Fl. Brit. Ind. 5: 237. 1886; Fl. As. 4: 132. 1940.

Herbs, parasitic on roots; rootstock tuberous, lobed or branched, 5-30 cm across; rhizomes simple or branched; shoots 3-8 cm, with imbricating sessile scale-like leaves; inflorescences fleshy, club-shaped, 1.2-1.5 × 1.0-1.2 cm; peduncles 2-5 cm; bracts linear-lanceolate, reddish; filaments connate into a short column; anther 1, dome-shaped; fruits minute, drupaceous.

Moist shaded humus soil in primary forests, 1300-1600 m; fl. & fr.: Oct.-Feb.; Khleihriat, Raliang, Shangpung.

125. BUXACEAE

SARCOCOCCA Lindl.

Sarcococca saligna (D. Don) Muell.-Arg. in DC. Prodr. 16(1): 11. 1869. *Buxus saligna* D. Don, Prodr. Fl. Nep. 63. 1825. *S. pruniformis* Lindl. in Edw. Bot. Reg. 12. t. 1012, 1826; Fl. Brit. Ind. 5: 266. 1887; Fl. As. 4. 134. 1940.

Shrubs, 0.5-2.0 m; leaves elliptic-lanceolate to oblong-lanceolate, cuneate at base, acuminate, 4-12 × 2-5 cm; lateral nerves 4-6 pairs; petioles 5-10 mm; racemes 1-2 cm, axillary, unisexual or bisexual with male

flowers at apex and female flowers at base of raceme; fruits obliquely ellipsoid, 1.0-1.5 cm, fleshy, purple; seeds 1-2.

Shaded places in forests, 1000-1500 m; fl. & fr.: Apr.-Sept.; Nartiang, Sutnga.

126. DAPHNIPHYLLACEAE

DAPHNIPHYLLUM Bl.

Daphniphyllum himalayense (Benth.) Muell.-Arg. in DC. Prodr. 16(1): 4. 1869; Fl. Brit. Ind. 5: 354. 1887; Fl. As. 4: 170. 1940. *Goughia himalayensis* Benth. in Hook. Kew J. Bot. 6: 9. 1854.

Trees, 8-12 m; leaves crowded near apices of branches, oblong-lanceolate to oblanceolate, acute or cuneate at base, acute to acuminate, 10-20 x 3-5 cm; lateral nerves 8-13 pairs; petiole 3-5 cm; racemes 7-10 cm; flowers dioecious; perianth segments 3-8; stamens 5; anthers basifixed; ovary 2-celled, 3-4-ovuled; stigma short, thick; drupes ellipsoid, 12-15 x 5-7 mm.

Primary and pine forests, 1500-1800 m; fl. & fr.: Apr.-Dec.; Jowai, Ummulong, Thatlaskcin.

127. EUPHORBIACEAE

- 1a. Flowers enclosed in a 4-5-lobed involueral cup (cyathium) ... *Euphorbia* 1
- 1b. Flowers distinct, not enclosed in an involueral cup.
 - 2a. Ovary cells 2-ovuled.
 - 3a. Petals present, small.
 - 4a. Calyx-lobes valvate; filaments combined in a column. ... *Bridelia* 2
 - 4b. Calyx-lobes imbricate; filaments free. ... *Actephila* 3
 - 3b. Petals absent.
 - 5a. Disk absent.
 - 6a. Stamens connate by their connective in a column. .. *Glochidion*;
 - 6b. Stamens free.
 - 7a. Flowers in racemes, often fascicled on trunks; seeds with aril. ... *Baccaurea* 5
 - 7b. Flowers (male) in catkin-like spikes; flowers (female) in clusters; seeds without aril. ... *Aporosa*
 - 5b. Disk present.
 - 8a. Stamens inserted in cavities on disk; ovary 1-celled. ... *Antidesma*?
 - 8b. Stamens not inserted in cavities on disk; ovary 2-12-celled.
 - 9a. Stamens 12; ovary 2-celled. ... *Drypetes* 3
 - 9b. Stamens 2-5; ovary 3-12-celled.

10a. Calyx turbinate ; disk indistinct, connate with calyx. ...	<i>Bryonia</i> ?
10b. Calyx lobate, spreading ; disk distinct, not connate with calyx.	
11a. Anthers adnate to the angles of trigonous column. ...	<i>Sauropus</i> 10
11b. Anthers not adnate to the angles of column.	
12a. Pistillode present. ...	<i>Securinega</i> 11
12b. Pistillode absent. ...	<i>Phyllanthus</i> 12
2b. Ovary-cells 1-ovuled.	
13a. Petals present.	
14a. Inflorescences axillary ; stamens 3. ...	<i>Trigonostemon</i> 13
14b. Inflorescences terminal ; stamens many.	
15a. Flowers in compound cymes ; stamens not inflexed in bud. ...	<i>Jatropha</i> 14
15b. Flowers in spikes or racemes ; racemes inflexed in bud. ...	<i>Croton</i> 15
13b. Petals absent.	
16a. Leaves deeply lobed ; perianth campanulate. ...	<i>Manihot</i> 16
16b. Leaves not deeply lobed ; perianth of free sepals.	
17a. Perianth-lobes imbricate.	
18a. Male flowers in fascicles ; stamens 8 ; fruits echinate. ...	<i>Chaetocarpus</i> 17
18b. Male flowers in paniced cymes ; stamens 18—21 ; fruits not echinate. ...	<i>Baliospermum</i> 18
17b. Perianth-lobes valvate.	
19a. Anthers 4-celled. ...	<i>Macaranga</i> 19
19b. Anthers 2-celled.	
20a. Stamens numerous. ...	<i>Mallotus</i> 20
20b. Stamens 2—8.	
21a. Stamens 2 or 3. ...	<i>Sapium</i> 21
21b. Stamens 5—8. ...	<i>Alchornea</i> 22

1. EUPHORBIA L.

1a. Shrubs or trees ; branches angular with stipular thorns ; leaves crowded towards ends of branches, alternate, deciduous. ...	<i>E. nerifolia</i> 1
1b. Herbs ; branches terete, without thorns ; leaves spread along the branches, opposite, persistent. ...	<i>E. hirta</i> 2

1. **Euphorbia nerifolia** L. Sp. Pl. 451. 1753 ; Fl. Brit. Ind. 5: 255. 1887 ; Fl. As. 4: 140. 1940.

Shrubs or small trees, 2 - 6 m ; young branches fleshy, obtusely 5-angled, laticiferous ; leaves oblong-obovate or spatulate, cuneate at base, acute, δ - 20 \times 3 - 6 cm, deciduous when in flower ; petioles 1 - 5 mm ; cyathia in cymes ; peduncles twice or thrice dichotomous ; involucre lobes narrow, \pm 3 mm, fimbriate, yellow ; glands cross oval, 1.2 \times 4 - 5 mm ; fruits 3-lobed, \pm 1 cm across.

Secondary forests and village groves, 1200-1500 m; fl. & fr.: Feb. June; Nartiang.

2. **Euphorbia hirta** L. Sp. Pl. 454. 1753; Fl. As. 4: 141. 1940. *E. pilulifera sensu* Hook. f. Fl. Brit. Ind. 5: 250. 1887, *auct. ind. passim, sed non L.*

Erect or decumbent herbs, 10-50 cm, simple or dichotomously branched; leaves ovate-lanceolate or elliptic-lanceolate, rounded at one side of base, cuneate at the other, acute to subobtuse at apex, serrate-dentate, 1-5 × 0.5-2.5 cm; petioles 2-4 mm; cyathia in axillary, subsessile or pedunculate dense cymes; peduncles 1-10 mm; glands orbicular, minutely appendaged at back; capsules ± 1 mm, appressed-hispid.

Wastelands, grasslands and cult. fields in open places, 100-500 m; fl. & fr.: Jan.-Dec.; Dawki.

2. BRIDELIA Willd.

- | | |
|---|------------------------|
| 1a. Scandent shrubs; styles free or connate at base only; fruits with 2 pyrenes. ... | <i>B. stipularis</i> 1 |
| 1b. Erect trees or shrubs; styles connate for about half way; fruits with one pyrene only. | |
| 2a. Leaves elliptic-obovate, acute to acuminate at apex; pedicels of male flowers ± 3 mm long; fruits ellipsoid, 9-12 mm. .. | <i>B. pubescens</i> 2 |
| 2b. Leaves lanceolate to linear-lanceolate, obtuse or subacute at apex, pedicels of male flowers ± 1 mm long; fruits globose, 6-7 mm. ... | <i>B. monoica</i> 3 |

1. **Bridelia stipularis** (L.) Bl. Bijdr. 597. 1826; Fl. Brit. Ind. 5: 270. 1887; Fl. As. 4: 147. 1940. *Cluytia stipularis* L. Mant. Pl. 127. 1767.

Large scrambling or scandent shrubs, 2-10 m; branchlets pubescent or tomentose; leaves elliptic-oblong to obovate, rounded or subcordate at base, obtuse and often mucronate, 6-15 × 3-10 cm, tomentose beneath; lateral nerves 8-12 pairs; petioles 6-10 mm; stipules ovate-triangular, 3-10 mm; flowers in axillary clusters or terminal spikes; fruits ovoid, 10-12 × 8-10 mm.

Secondary and primary forests, 100-500 m; fl. & fr.: Aug.-Feb.; Dawki.

2. **Bridelia pubescens** Kurz in J. As. Soc. Beng. 42: 241. 1873; Fl. Brit. Ind. 5: 270. 1887; Fl. As. 4: 145. 1940.

Trees, 6-15 m; branchlets tubercled-lenticellate, pubescent; leaves rounded to subacute at base, acute to bluntly acuminate, 5-15 × 2-6 cm;

lateral nerves 8-12 pairs; petioles 4-10 mm; stipules linear-lanceolate, 4-6 mm; flowers 5-6 mm across, in axillary clusters or short spikes; fruits ellipsoid, subapiculate, red or purple-red.

Primary and secondary forests, 1300-1600 m; fl. & fr.: Apr.-Feb.; Jowai, *Deb* 24416; Raliang.

3. **Bridelia monoica** (Lour.) Merr. in Philip. J. Sci. Bot. 13: 142. 1918. *Cluytia monoica* Lour. Fl. Cochinch. 638. 1790. *B. tomentosa* Bl. Bijdr. 597. 1826; Fl. Brit. Ind. 5: 271. 1887; Fl. As. 4: 146. 1940.

Trees, 3-15 m; branches reddish; branchlets rusty-pubescent; leaves acute or obtuse at base, subacute to obtuse, 4-12 × 1-5 cm, finely pubescent beneath; lateral nerves 7-13 pairs; petioles 5-8 mm; stipules subulate-acuminate at apex; flowers 5-6 in each axillary clusters; pedicels ± 1 mm; fruits globose, purple-black.

Open secondary forests, 100-600 m; fl. & fr.: Mar.-Dec.; Rytiang.

3. ACTEPHILA Bl.

Actephila excelsa (Dalz.) Muell.-Arg. in Linnaea 32: 1863; Fl. Brit. Ind. 5: 282. 1887; Fl. As. 4: 148. 1940. *Anomospermum excelsum* Dalz. in Hook. Kew J. Bot. 3: 228. 1851.

Shrubs or small trees, 2-5 m; leaves elliptic, ovate-oblong, obovate or oblanceolate, cuneate or acute at base, acute to acuminate, 9-30 × 4-12 cm; lateral nerves 6-12 pairs; petioles up to 2 cm; flowers in axillary or extra-axillary clusters or short racemes; pedicels 1-3 mm; capsules depressed-globose, subtrigonus, ± 1.5 × 2.5 cm; seeds trigonus, ± 1 cm.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Oct.; Dawki, Syndai.

4. GLOCHIDION J. R. & G. Forst. *nom. cons.*

1a. Anthers 4-6.

- | | | |
|--|-----|--------------------------|
| 2a. Stipules stiff, triangular-acuminate; ovary 6-8-celled; style exerted. | ... | <i>G. lanceolarium</i> 1 |
| 2b. Stipules subulate-filiform; ovary 4-5-celled; style not exerted. | ... | <i>G. oblatum</i> 2 |

1b. Anthers 3.

- | | | |
|---|-----|------------------------|
| 3a. Female flowers subsessile or sessile. | ... | <i>G. khasicum</i> 3 |
| 3b. Female flowers pedicelled. | | |
| 4a. Leaves glaucous beneath; style broadly conical. | ... | <i>G. thomsonii</i> 4 |
| 4b. Leaves hoary-pubescent beneath; style clavate. | ... | <i>G. acuminatum</i> 5 |

1. **Glochidion lanceolarium** (Roxb.) Voigt, Hort. Suburb. Calc. 153. 1845; Fl. Brit. Ind. 5: 308. 1887; Fl. As. 4: 182. 1940.

Shrubs or small trees, 5-12 m; leaves elliptic-oblong or lanceolate, acute at base, acuminate or cuspidate, 8-20 × 3-8 cm; lateral nerves 7-10 pairs; petioles 5-12 mm; male flowers yellowish on 4-6 mm long pedicels; female flowers greenish, sessile or subsessile, fasciated; capsules subglobose, 6-8-lobed, 15-20 mm, red.

Secondary forests, 100-1400 m; fl. & fr.: July-Nov.; Dawki, Nartiang.

2. **Glochidion oblatum** Hook. f. Fl. Brit. Ind. 5: 312. 1887; Fl. As. 4: 184. 1940.

Trees, 4-8 m; leaves oblong or elliptic-lanceolate, subequally acute to obtuse at base, acute, 4-8 × 1.5-3.5 cm; lateral nerves 6-8 pairs; petioles 1-4 mm; male flowers ± 4 mm across, yellowish; pedicels filiform, 15-20 mm; female flowers minute, tomentose, sessile or subsessile; capsules depressed-globose, obscurely lobed, 15-20 mm, pubescent.

Forests, 100-500 m; fl. & fr.: Mar.-Dec.; Dawki.

3. **Glochidion khasicum** (Muell.-Arg.) Hook. f. Fl. Brit. Ind. 5: 324. 1887; Fl. As. 4: 187. 1940. *Phyllanthus khasicus* Muell.-Arg. in DC. Prodr. 15(2): 311. 1866.

Trees, 2-10 m; leaves elliptic or ovate-elliptic to lanceolate, obliquely acute, obtuse or rounded at base, acuminate, 5-13 × 2-4 cm; lateral nerves 5-7 pairs; petioles 3-6 mm; male flowers pale green, clustered on 1-2 mm long axillary peduncles; capsules depressed-globose, 8-10 mm, 6-12-lobed, red.

Forests, 1000-1400 m; fl. & fr.: May-Nov.; Pdengsakab.

4. **Glochidion thomsonii** (Muell.-Arg.) Hook. f. Fl. Brit. Ind. 5: 318. 1887; Fl. As. 4: 185. 1940. *Phyllanthus thomsonii* Muell.-Arg. in Flora 48: 375. 1865.

Shrubs or small trees, 2-10 m; leaves elliptic or oblong-elliptic obliquely acute or obtuse at base, acute or short-acuminate, 5-12 × 2-5 cm; lateral nerves 6-9 pairs; petioles 2-8 mm; male flowers few in axillary clusters; female flowers many in axillary clusters; pedicels 23-25 mm; capsules subglobose, obscurely 6-lobed, 8-12 mm, black.

Forests, 200-1200 m; fl. & fr.: June-Oct.; Jowai, Syndai.

5. **Glochidion acuminatum** Muell.-Arg. in *Linnæa* 32: 68. 1863; Fl. Brit. Ind. 5: 323. 1887; Fl. As. 4: 186. 1940.

Trees, 5-12 m; leaves elliptic-oblong to lanceolate, subequally cuneate, acute or rounded at base, acute to acuminate, 5-13 × 2-4 cm; lateral nerves 7-12 pairs; petioles 1-3 mm; male flowers greenish, in axillary fascicles; pedicels filiform, 1-3 mm; female flowers yellowish, in axillary clusters; capsules depressed-globose, 4-6-lobed, 6-8 mm; seeds red, shiny.

Secondary forests, 200-1400 m; fl. & fr.: Apr.-Oct.; Ioksi, Raliang.

5. **BACCAUREA** LOUR.

Baccaurea sapida (Roxb.) Muell.-Arg. in DC. Prodr. 15(2): 459. 1866; Fl. Brit. Ind. 5: 371. 1887; Fl. As. 4: 161. 1940. *Peirardia sapida* Roxb. Fl. Ind. 2: 254. 1832.

Trees, 8-15 m; leaves elliptic-oblong or elliptic-lanceolate, cuneate at base, acuminate, 10-22 × 3-9 cm; lateral nerves 5-10 pairs; petioles 15-35 mm; racemes paniced, 4-8 cm, on trunks, old leafless portions of branches; pedicels 1-2 mm; capsules ellipsoid, ± 2.5 cm, yellowish-brown; seeds flat, suborbicular, ± 1.2 mm; embedded in pink pulp.

Primary forests, 100-600 m; fl. & fr.: Mar.-July; Dawki.

6. **APORUSA** BL.

Aporusa dioica (Roxb.) Muell.-Arg. in DC. Prodr. 15(2): 472. 1866. *Alnus dioica* Roxb. Fl. Ind. 3: 580. 1832. *Aporusa roxburghii* Baill. Etud. Gen. Euphorb. 645. 1859; Fl. Brit. Ind. 5: 347. 1887.

Trees, 6-12 m; leaves elliptic or oblong-lanceolate, rounded or cuneate at base, obtuse or blunt-acuminate, obscurely crenate, 5-16 × 2-6 cm; lateral nerves 5-8 pairs; petioles 5-15 mm; male flowers in axillary catkin like 2-4 cm long spikes; female flowers in short spikes or rarely solitary, axillary; capsules ovoid-oblong, 8-10 mm, yellow; seeds 1 or 2, red.

Primary forests, 100-500 m; fl. & fr.: Dec.-June; Dawki.

7. **ANTIDESMA** L.

1a. Male flowers sessile; calyx not deeply lobed; fruits 7-8 mm long.

A. bursas 1

1b. Male flowers pedicelled; calyx deeply lobed; fruits up to 5 mm long.

- 2a. Leaves more or less hairy beneath; calyx-segments obtuse;
stamens 2. ... *A. diandrum* 2
- 2b. Leaves glabrous beneath; calyx-segments acute; stamens
3-4. ... *A. acuminatum* 3

1. ***Antidesma bunius*** (L.) Spreng. Syst. Veg. 1: 826. 1825; Fl. Brit. Ind. 5: 358. 1887; Fl. As. 4: 166. 1940. *Stilago bunius* L. Mant. Pl. 122. 1767.

Trees, 6-16 m; innovations pubescent; leaves oblong-lanceolate, elliptic-oblong, subcordate or acute at base, obtuse, acute or acuminate, 5-20 × 3-8 cm; lateral nerves 8-12 pairs; petioles 3-10 mm; flowers ± 2 mm across, in simple or rarely 5-12 cm long racemes or panicles; rachis rusty-pubescent; fruits globose or ellipsoid, compressed, red, turning to black.

Primary forests, 1300-1600 m; fl. & fr.: Apr.-Aug.; Raliang, Shangpung.

2. ***Antidesma diandrum*** (Roxb.) Roth, Nov. Pl. Sp. 369. 1821; Fl. Brit. Ind. 5: 361. 1887; Fl. As. 4: 167. 1940. *Stilago diandra* Roxb. Pl. Corom. 2: t. 166. 1802.

Shrubs or small trees; leaves oblong to lanceolate or obovate, cuneate or acute at base, acute to acuminate, 4-10 × 2-8 cm; lateral nerves 4-8 pairs; petioles 2-7 mm; racemes 2-8 cm, terminal or lateral; flowers minute, greenish-yellow; rachis glabrous; fruits obliquely ovoid, acute, 4-5 × 2.5-3.0 mm, purplish-red; pedicels ± 2 mm.

Primary forests and forest-borders, 100-1200 m; fl. & fr.: Apr.-Jan.; Jarain, Khleihriat, Sohka-Dawki, Rytiang.

3. ***Antidesma acuminatum*** Wt. Ic. Pl. Ind. Or. 6: 12. t. 1991. 1858; Fl. Brit. Ind. 5: 363. 1887; Fl. As. 4: 168. 1940.

Shrubs or small trees, 4-8 m; leaves oblong or elliptic-lanceolate, obtuse or acute at base, acuminate to caudate-acuminate, 6-25 × 2-8 cm; lateral nerves 5-10 pairs; petioles 4-10 mm; racemes terminal or upper axillary, 8-20 cm, simple or paniculate; rachis puberulous; flowers ± 2 mm across; pedicels 3-4 mm; fruits ellipsoid, acute, crowned by persistent stigmas, 3-4 mm, red.

Forests, 200-1000 m; fl. & fr.: May-Aug.; Narpoh Reserve, near Sonapur.

8. DRYPETES Vahl

Drypetes assamica (Hook. f.) Pax & Hoffm. in Engler, Pflanzenr. 81:

241. 1922; Fl. As. 4: 179. 1940. *Cyclostemon assamicus* Hook. f. Fl. Brit. Ind. 5: 342. 1887.

Trees, 10-18 m; leaves elliptic-oblong, subequally acute at base, acute to acuminate, distantly serrulate, 5-20 × 2-8 cm, glossy above, pale beneath; lateral nerves 8-12 pairs; petioles 3-12 mm; flowers in dense axillary clusters; fruits indehiscent, drupaceous, globose, 4-lobed, 15-20 mm diam., rusty-tomentose.

Forests, 100-500 m; fl. & fr.: Oct.-May; Dawki.

9. BREYNIA J. R. & G. Forst. *nom. cons.*

Breynia retusa (Dennst.) Alst. Fl. Kandy 22. f. 107. 1938. *Phyllanthus retusus* Dennst. in Schluess. Hort. Malab. 24. 1818. *P. patens* Roxb. Fl. Ind. 3: 667. 1832. *B. patens* (Roxb.) Rolfe in J. Bot. n.s. 11: 359. 1882; Fl. Brit. Ind. 5: 329. 1887; Fl. As. 4: 174. 1940.

Shrubs, up to 2 m; leaves elliptic to ovate-oblong, acute at base, acute to obtuse, 1-3 × 1-2 cm, glaucous beneath; lateral nerves 3-6 pairs; petioles 1-3 mm; flowers appearing with young leaves, solitary or fascicled; male flowers pale yellow; pedicels 2.0-2.5 mm; female flowers greenish; pedicels 1-2 mm; capsules subglobose, obscurely 3-lobed, 15-20 mm, orange-red; seeds with orange caruncle.

Forests, 100-1500 m; fl. & fr.: Mar.-July; Dawki, Jarain, Jarain-Syndai, Jowai.

10. SAUROPS Bl.

Saurops androgynus (L.) Merr. in Philip. For. Bull. 1: 30. 1903; Fl. As. 4: 172. 1940. *Cluytia androgyna* L. Mant. Pl. 128. 1767. *S. albicans* Bl. Bijdr. 596. 1826; Fl. Brit. Ind. 5: 332. 1887.

Shrubs, 1-8 m; leaves ovate or ovate-lanceolate, subrhomboid, subtruncate at base, subobtuse, 2-7 × 1-4 cm; lateral nerves 4-6 pairs; petioles 2-4 mm; stipules 1-2 mm; male flowers in axillary clusters, red-green; calyx-disciform, 6-10 cm across; female flowers axillary, solitary or few, orange-red; pedicels 2-6 mm; calyx 6-7 mm across; fruits ± 1.5 cm diam., white, tinged pink.

Forests, 100-900 m; fl. & fr.: July-Dec.; Syndai.

11. SECURINEGA JUSS.

Securinega virosa (Willd.) Pax. & Hoffm. in Engler & Prantl, *Pflanzenfam.* 19C: 60, 1931. *Phyllanthus virosus* Willd. *Sp. Pl.* 4: 587, 1805. *Flueggia microcarpa* Bl. *Bijdr.* 580, 1826; *Fl. Brit. Ind.* 5: 328, 1887. *F. virosa* (Willd.) Baill. *Etud. Gen. Euphorb.* 593, 1858; *Fl. As.* 4: 160, 1940.

Shrubs or small trees, 2-5 m; leaves oblong-obovate to elliptic-obovate, acute or cuneate at base, acute to obtuse, 2-6 × 1-3 cm; lateral nerves 5-8 pairs; petioles 3-10 mm; flowers axillary, solitary or in fascicles; male flowers with glandular-fleshy yellow disk; female flowers with thin pale green annular disk; fruits depressed-globose, 3-5 × 5-8 mm, fleshy, white; seeds trigonous.

Forests and forest borders, 100-1000 m; fl. & fr.: Apr.-Oct.; Um-tapoh.

12. PHYLLANTHUS L.

- | | | |
|---|-----|-------------------------|
| 1a. Stamens 5; ovules superposed in each cell. | .. | <i>P. reticulatus</i> 1 |
| 1b. Stamens 2-4; ovules collateral in each cell. | | |
| 2a. Trees with drupaceous fruits. | | <i>P. emblica</i> 2 |
| 2b. Herbs or shrubs with capsular fruits. | | |
| 3a. Ovary bullate-rugose; seeds transversely ribbed; leaves hispidulous beneath near margins. | ... | <i>P. urinaria</i> 3 |
| 3b. Ovary smooth or papillose; seeds longitudinally ribbed, rugulose or smooth; leaves never hispidulous. | | |
| 4a. Stipules simple, lanceolate, not auricled at base; seeds longitudinally 5-7-ribbed. | ... | <i>P. debilis</i> 4 |
| 4b. Stipules semisagittate or peltate; seeds rugulose or smooth. | | |
| 5a. Branchlets filiform, leaves elliptic-obovate, 3-7 mm broad; stipules minute, hastate or semisagittate; capsules 4-5 mm diam.; seeds smooth. | ... | <i>P. parvifolius</i> 5 |
| 5b. Branchlets rigid; leaves elliptic-oblanccolate, 2-4 mm broad; stipules broadly peltate; capsules 2-3 mm diam.; seeds rugulose. | ... | <i>P. roeperianus</i> 6 |

1. **Phyllanthus reticulatus** Poir. *Encycl. Meth.* 5: 298, 1804; *Fl. Brit. Ind.* 5: 288, 1887. *Kirganelia reticulata* (Poir.) Baill. *Etud. Euphorb.* 613, 1858; *Fl. As.* 4: 159, 1940.

Shrubs or small trees, up to 4 m; leaves elliptic or oblong-ovate, cuneate at base, subacute or rounded, 14-24 × 10-15 mm; lateral nerves 6-9 pairs; petioles 1.5-2.5 cm; stipules triangular, ± 1.5 × 1 mm; flowers axillary, solitary or in fascicles; male flowers on 5-10 mm long capillary pedicels;

female flowers on 5-8 mm long slender pedicels; fruits globose, 4-6 mm, purple-black; seeds trigonous, 1.5-2.0 mm, black.

Forests and forest borders, 100-500 m; fl. & fr.: Jan.-July; Dawki.

2. **Phyllanthus emblica** L. Sp. Pl. 982. 1753; Fl. Brit. Ind. 5: 289. 1887. *Emblica officinalis* Gaertn. Fruct. 122-123. t. 108. f. 2. 1790; Fl. As. 4: 159. 1940.

Trees, up to 15 m; leaves linear-oblong, obliquely subcordate at base, obtuse, 1-2 × 0.2-0.5 cm; lateral nerves 4-7 pairs; petioles ± 1 mm; stipules triangular, 1.0-1.5 mm, ciliolate at margins; flowers yellow, in axillary clusters, usually crowded towards lower portion of branches; fruits globose, obscurely 6-lobed, 2-3 cm, greenish or yellowish-green; seeds trigonous, ± 4 × 3 mm.

Secondary forests, 100-1000 m; fl. & fr.: Apr.-Dec.; Garampani, Ioksi.

3. **Phyllanthus urinaria** L. Sp. Pl. 982. 1753; Fl. Brit. Ind. 5: 293. 1887; Fl. As. 4: 155. 1940.

Erect or procumbent herbs, up to 50 cm; leaves oblong or linear, rarely subfalcate, subequally obtuse at base, obtuse or acute, 10-25 × 3-10 mm; lateral nerves ± 5 pairs; male flowers on distal nodes of branchlets; female flowers on proximal nodes of branchlets; fruits tuberculate, 2-3 mm diam., greenish-red; seeds ± 1 mm, pale grey-brown.

Wastelands, cult. fields and forest borders, 500-1500 m; fl. & fr.: Jan.-Dec.; Ioksi-Garampani, Jarain.

4. **Phyllanthus debilis** Willd. Sp. Pl. 4: 582, 583, 1804; Fl. Brit. Ind. 5: 299. 1887; Fl. As. 4: 155. 1940.

Herbs or undershrubs, 10-80 cm; leaves narrowly elliptic or obovate, acute at base, subacute, 8-20 × 4-10 mm; lateral nerves 4-5 pairs; stipules 1-3 mm; male flowers in 3-4-flowered clusters on proximal nodes of branchlets; female flowers solitary on distal nodes of branchlets; fruits globose, ± 2 mm, red-brown; seeds trigonous, yellow-brown.

Wastelands, roadsides and forest edges, 100-1000 m; fl. & fr.: June-Oct.; Garampani.

5. **Phyllanthus parvifolius** Buch.-Ham. in D. Don, Prodr. Fl. Nep. 63. 1825; Fl. Brit. Ind. 5: 294. 1887; Fl. As. 4: 152. 1940.

Shrubs, 1-2 m; leaves obovate or elliptic-obovate, acute to short cuneate at base, obtuse or rounded, 5-10 × 3-7 mm; lateral nerves 4-5 pairs; flowers purplish-brown, ± 1 mm across, solitary or few together; pedicels up to 2 mm; capsules globose, obscurely 3-lobed, 4-5 mm, purplish.

Forests and forest borders, 900 - 1500 m; fl. & fr.: July-Dec.; Jowai, Jowai-Jarain, Sohka-Dawki.

6. **Phyllanthus roeperianus** Muell.-Arg. in *Linnaea* 32: 28. 1863; *Fl. Brit. Ind.* 5: 294, 1887; *Fl. As.* 4: 153. 1940.

Shrubs, 15-35 cm; leaves rounded or subcordate at base, obtuse or acute, recurved at margins, 5-12 × 2-4 mm; lateral nerves 4-6 pairs; petioles 1-2 mm; flowers dull white, arising from tufts of minute fimbriate bracts; male flowers solitary; female flowers fascicled; capsules depressed-globose, obscurely 3-lobed, brown.

Forests and forest edges, 1200 - 1600 m; fl. & fr.: Mar.-Sept.; Jowai, Nartiang.

13. TRIGONOSTEMON Bl. *nom. cons.*

- 1a. Leaves crowded towards ends of branches, oblanceolate, panduriform; lateral nerves 12-16 pairs; flowers in axillary few-flowered clusters. ... *T. semperflorens* 1
 1b. Leaves scattered, not crowded at ends of branches, elliptic-lanceolate; lateral nerves 4-5 pairs; flowers in supra-axillary racemes. ... *T. chatterjii* 2

1. **Trigonostemon semperflorens** (Roxb.) Muell.-Arg. in *DC. Prodr.* 15(2): 1110. 1866; *Fl. Brit. Ind.* 5: 397. 1887; *Fl. As.* 4: 196. 1940.

Shrubs, 2-3 m; leaves rounded or cordate at base, acuminate, obscurely serrulate, 12-25 × 3-7 cm; petioles 3-8 mm; stipules subulate, 2-3 mm; male flowers clustered in axils, purplish; female flowers in clusters or solitary; petals dark purple with white veins; capsules depressed-globose, 3-lobed, 10-12 mm; hispid; seeds mottled light and dark brown.

Primary forests, 100 - 500 m; fl. & fr.: May-Oct.; Dawki.

2. **Trigonostemon chatterjii** Deb & Deka in *Indian For.* 91: 577, ff. 1-2. 1965.

Erect shrubs; leaves obliquely cuneate at base, long-caudate, 5-22 × 2-7 cm, pinkish beneath; petioles 1.5-4.5 cm; inflorescences up to 11 cm; peduncles filiform, up to 4 mm; male flowers ± 3 mm across; pedicels ± 3 mm; petals suborbicular; female flowers ± 1 cm; pedicels ± 8 mm, stout, gradually expanding upwards; petals obovate, ± 5 × 4 mm, hirsute outside; fruits not seen.

Primary forests, 100 - 300 m; fl.: Apr.; Dawki, G. K. Deka 19A-E.

14. *JATROPHA* L.

Jatropha curcas L. Sp. Pl. 1006. 1753; Fl. Brit. Ind. 5: 383. 1887; Fl. As. 4: 190. 1940.

Shrubs or small trees, 1-4 m; leaves suborbicular, ovate, entire on 3-5-angular or lobate, cordate or truncate at base, acute to short acuminate, 5-15 × 6-16 cm; petioles 4-13 cm; main branches of corymbs terminating in one female flower, other flowers male; bracts lanceolate, 4-7 mm; flowers yellow; drupes ellipsoid, 3.0-3.5 cm, pale yellow, turning to black; seeds ellipsoid, 19-21 × 9-10 mm, dark brown.

Wastelands, near villages, 200-1300 m; fl. & fr.: Jan.-Dec.; Garampani-Raliang.

15. *CROTON* L.

- | | |
|--|------------------------|
| 1a. Leaves ovate, cordate at base, palminerved; young shoots and inflorescences stellate-pubescent; stamens 18-30. ... | <i>C. caudatus</i> 1 |
| 1b. Leaves elliptic or oblong-lanceolate, cuneate at base, penninerved; young shoots and inflorescences glabrous or lepidote-scaly; stamens 10-12. | |
| 2a. Young shoots and inflorescences glabrous or with sparse ciliate scales; stamens 10-11. .. | <i>C. oblongus</i> 2 |
| 2b. Young shoots and inflorescences densely lepidote scaly; stamens 12. | |
| 3a. Leaves entire or minutely crenate-serrate; rachis of inflorescence 2-4 mm thick; capsules ovoid, ± 2.5 cm long; seeds ± 2 × 1.5 cm. ... | <i>C. joufra</i> 3 |
| 3b. Leaves repand-dentate; rachis of inflorescence 1-2 mm thick; capsules subglobose, ± 1.5 cm diam.; seeds ± 8 × 5 mm. ... | <i>C. ruxburghii</i> 4 |

1. ***Croton caudatus*** Geisl. Croton. Monogr. 73. 1807; Fl. Brit. Ind. 5: 388. 1887; Fl. As. 4: 194. 1940. '*Saphai-blai*'.

Large scandent shrubs, 5-20 m; leaves acute to acuminate, shallowly dentate-serrate at margins, 5-15 × 3-9 cm; basal nerves 3-5; lateral nerves 3-4 pairs; petioles 1-5 cm; stipules pinnatisect into filiform segments, ± 1 cm; racemes terminal, solitary, 10-25 cm; flowers in dense fascicles along rachis; capsules subglobose, subtrigonous, 20-25 mm, warty, rusty-pubescent, stellate-hairy; seeds longitudinally furrowed, 10-15 mm.

Forests, 100-600 m; fl. & fr.: Feb.-Sept.; Dawki.

2. ***Croton oblongus*** Burm. f. Fl. Ind. 205. 1768. *C. laevifolius* Bl. Bijdr. 603. 1825; Fl. Brit. Ind. 5: 391. 1887; Fl. As. 4: 195. 1940. '*Sohkymphria*'.

Shrubs or trees, 2-15 m; leaves acute to obtuse at apex, 4-20 × 2-9 cm; lateral nerves 6-12 pairs; basal glands stalked; petioles 5-20 mm; stipules filiform, with ciliate scales, 3-9 mm; racemes terminal, solitary, 5-10 cm; rachis with ciliate scales; capsules subglobose, \pm 8 × 10 mm, densely lepidote; seeds 2 or 3, brown-black.

Primary forests, 100-1300 m; fl. & fr.: Mar.-Jan.; Dawki, Jowai, Raliang.

3. **Croton joufra** Roxb. Fl. Ind. 3: 685. 1832; Fl. Brit. Ind. 5: 387. 1887; Fl. As. 4: 193. 1940.

Shrubs or small trees, 5-15 m; leaves elliptic, oblanceolate, acute at base, acuminate, remotely dentate, 5-30 × 2-9 cm; lateral nerves 10-16 pairs; petioles 1-5 cm; racemes terminal or upper axillary, 7-15 cm; rachis 2-4 mm, thick, lepidote; flowers creamy yellow; capsules ovoid, faintly 3-lobed, lepidote and greyish stellate-pubescent; seeds oblong.

Forests, 100-500 m; fl. & fr.: Nov.-June; Dawki.

4. **Croton roxburghii** Balakr. in Bull. Bot. Surv. Ind. 3: 39. 1901. (1902). *C. oblongifolius* Roxb. Fl. Ind. 3: 685. 1832 (*non* Delile, 1814; *nec.* Spreng. 1826); Fl. Brit. Ind. 5: 386. 1887; Fl. As. 4: 192. 1940.

Trees, 5-13 m; leaves crowded towards ends of branchlets, elliptic-ovate or oblong-lanceolate, acute or cuncate at base, acute to bluntly acuminate, 7-25 × 3-10 cm; lateral nerves 10-16 pairs; petioles 2-12 cm; stipules linear, \pm 6 mm; racemes terminal or axillary, 4-8 cm; flowers pale green-yellow, solitary or fascicled; capsules 3-lobed; seeds ellipsoid.

Forests, 500-1300 m; fl. & fr.: Feb.-Aug.; Jarain-Syndai, Syndai-Muktapur.

16. MANIHOT Mill.

Manihot esculenta Crantz, Inst. Herb. 1: 167. 1766. *M. utilisissima* Pohl, Pl. Bras. Ic. 1: 32. t. 24. 1827; Fl. As. 4: 199. 1940. 'Phan-kah'.

Shrubs, 1-4 m; roots tuberous, elongate; leaves alternate, peltate or subpeltate, 5-20 cm across, palmately 3-7-partite; lobes oblong-obovate to oblanceolate, acuminate, 8-17 × 1-6 cm; petioles 6-35 cm; stipules triangular, 5-7 mm; racemes in fascicles of 3-5, 5-8 cm; male flowers yellow; female flowers greenish yellow; fruits ellipsoid, 6-winged, \pm 15 mm, rugulose; seeds striped.

Wastelands, usually cultivated near villages, often found as an escape. 100-800 m; fl. & fr.: May-Sept.; Sohka.

Cultivated for edible tubers as a cheap source of carbohydrates.

17. CHAETOCARPUS Thw. *nom. cons.*

Chaetocarpus castanicarpus (Roxb.) Thw. Enum. Pl. Zeyl. 275. 1861; Fl. Brit. Ind. 5: 460. 1887; Fl. As. 4: 201. 1940. (sphalm. '*castanocarpus*'). *Adelia castanicarpa* Roxb. Fl. Ind. 3: 848. 1832.

Trees, 5-10 m; leaves ovate-elliptic or ovate-lanceolate, round or acute at base, acute to acuminate, 7-15 × 2-5 cm; lateral nerves 7-12 pairs; petioles 8-12 mm; flowers apetalous in axillary clusters; capsules ovoid, 10-15 mm, densely echinate with tawny-brittle spines; seeds ovoid, ± 8 mm, glossy black; caruncle fleshy, bilobed, crimson-red.

Primary forests, 100-500 m; fl. & fr.: Nov.-Mar.; Dawki.

18. BALIOSPERMUM Bl.

- 1a. Petioles 5-8 cm long; branches of inflorescences 2-4 cm long; calyx accrescent in fruit. ... *B. calycinum* 1
 1b. Petioles 3-5 cm long; branches of inflorescences less than 1 cm long; calyx not accrescent in fruit. ... *B. micranthum* 2

1. **Baliospermum calycinum** Muell.-Arg. in Flora 47: 470. 1864; Fl. Brit. Ind. 5: 462. 1887; Fl. As. 4: 203. 1940.

Shrubs, up to 2 m; leaves elliptic or lanceolate, acute or rounded at base, acuminate, sinuate-dentate at margins, 12-24 × 4-9 cm, finely hairy on nerves beneath; lateral nerves 10-14 pairs; petioles with 2 glands at apex; male flowers in 15-25 cm long panicles; female flowers in subcorymbosely branched 8-15 cm long panicles; capsules subglobose, 3-lobed, 8-10 mm.

Primary forests, 100-1300 m; fl. & fr.: Aug.-Dec.; Dawki, Jarain, Jowai.

2. **Baliospermum micranthum** Muell.-Arg. in Linnaea 34: 215. 1864; Fl. Brit. Ind. 5: 462. 1887; Fl. As. 4: 204. 1940.

Shrubs, up to 1.5 m; leaves elliptic to oblong-lanceolate, acute or rounded and 2-glandular at base, acute to caudate-acuminate, sinuate-dentate, 6-15 × 2-4 cm; lateral nerves 12-20 pairs; male flowers in 5-10 cm

long panicles with short lateral branches; female flowers in 3-7 cm long panicles; capsules depressed-globose, 3-lobed, \pm 8 mm.

Forests, 1300-1600 m; fl. & fr.: June-Dec.; Jowai.

19. MACARANGA THOUR.

Macaranga denticulata (Bl.) Muell.-Arg. in DC. Prodr. 15(2) 1000. 1866; Fl. Brit. Ind. 5: 446. 1887; Fl. As. 4: 218. 1940. *Mappa denticulata* Bl. Bijdr. 625. 1826.

Trees, 5-10 m; leaves peltate, deltoid-ovate, rounded or truncate and peltate at base, obtuse to acuminate, 7-25 \times 5-20 cm; with numerous red orbicular glands beneath; basal nerves 5-7; lateral nerves 10-12 pairs; petioles 5-20 cm; panicles axillary, 4-15 cm; male flowers in clusters along rachis; female flowers solitary along rachis; capsules subglobose, \pm 6 mm, blackish, with minute waxy orbicular glands; seeds 2-3 mm diam., black.

Primary and secondary wet forests, 400-1200 m; fl. & fr.: Feb.-Aug.; Jarain-Dawki, Garampani-Raliang, Laskein.

20. MALLOTUS LOUR.

- | | | |
|--|-----|---------------------------|
| 1a. Leaves truncate or subcordate at base. | ... | <i>M. leucocarpus</i> 1 |
| 1b. Leaves peltate or subpeltate at base. | | |
| 2a. Leaves white beneath, 3-5-nerved at base; capsules tubercled. | ... | <i>M. albus</i> 2 |
| 2b. Leaves pale green beneath, 7-9-nerved at base; capsules prickly and hairy. | ... | <i>M. roxburghianus</i> 3 |

1. **Mallotus leucocarpus** (Kurz) Airy-Shaw in Kew Bull. 16: 352. 1863; *Claoxylon leucocarpum* Kurz in J. As. Soc. Beng. 42(2): 244. 1874; Fl. Brit. Ind. 5: 413. 1887; Fl. As. 4: 211. 1940.

Shrubs, 1-2 m; shoots stellate-pubescent; leaves broadly ovate, obtusely acuminate at apex, repand dentate, 20-30 \times 18-28 cm; scabrid above; stellate-pubescent beneath, 3-nerved at base; petioles 8-20 cm; racemes stellate-pubescent; male flowers not seen; female flowers shortly pedicellate; capsules subglobose, 2-4-lobed, white, stellate-hispid; stalk 3-5 mm; seeds ovoid-globose; aril white, sappy.

Forests, 1400-1600 m; Fr.: Jan.; Thatlaskein.

2. **Mallotus albus** (Roxb.) Muell.-Arg. in *Linnæa* 34: 188. 1866; Fl. Brit. Ind. 5: 429. 1887; Fl. As. 4: 213. 1940. *Rottlera alba* Roxb. Fl. Ind. 3: 829. 1832.

Shrubs or small trees, 3-10 m; leaves broadly ovate or suborbicular, narrowly peltate or truncate at base, obtuse or bluntly acuminate, entire or sinuate-denticulate at margins, 10-25 × 5-20 cm, whitish or rusty-tomentose beneath; lateral nerves 3-6 pairs; petioles 4-18 cm; panicles pyramidal; male flowers clustered along rachis; female flowers solitary along rachis; capsules 4-lobed, white.

Forests, 1000-1600 m; fl. & fr.: Feb.-Dec.; Raliang, Syndai.

3. **Mallotus roxburghianus** Muell.-Arg. in *Linnæa* 34: 186. 1866; Fl. Brit. Ind. 5: 428. 1887; Fl. As. 4: 214. 1940. *Rottlera peltata* Roxb. Fl. Ind. 3: 828. 1832. (*non M. peltatus* Muell.-Arg. 1866).

Trees or shrubs, 2-10 m; leaves ovate or suborbicular, peltate and rounded at base, acuminate to caudate-acuminate, glandular dentate at margins, 8-20 × 5-18 cm, pubescent with simple and stellate hairs and scattered yellow glands beneath; basal nerves 8-10; lateral nerves 4-5 pairs; petioles 3-10 cm; racemes terminal, 15-30 cm; capsules ± 1.5 cm diam., covered with hairy spinules and yellow resinous glands.

Primary forests, 500-1500 m; fl. & fr.: Jan.-Aug.; Jowai, Sohka.

21. SAPIUM P. Br.

- | | | |
|---|-----|---------------------------|
| 1a. Petioles biglandular at apex; racemes simple. | .. | <i>S. eugeniifolium</i> 1 |
| 1b. Petioles eglandular; racemes paniced. | ... | <i>S. baccatum</i> 2 |

1. **Sapium eugeniifolium** Hook. f. Fl. Brit. Ind. 5: 470. 1888; Fl. As. 4: 206. 1940.

Trees, 6-12 m; leaves ovate-elliptic, acute or rounded at base, acute or subacute, 5-14 × 3-7 cm; lateral nerves 7-9 pairs; petioles 3-8 cm, dark brown; racemes terminal, 8-10 cm, dense-flowered; capsules subglobose, 10-12 mm across, woody, black; columella 3-winged, persistent; seeds globose, ± 6 mm.

Primary forests, 400-1000 m; fl. & fr.: May-Jan.; Umtapoh.

2. **Sapium baccatum** Roxb. Fl. Ind. 3: 694. 1832; Fl. Brit. Ind. 5: 470. 1888; Fl. As. 4: 206. 1940.

Trees, 10-30 m; leaves ovate-lanceolate or elliptic-ovate, round or subacute at base, acute to short-acuminate, 5-20 × 3-10 cm, glaucous beneath;

lateral nerves 8-12 pairs; petioles 2-10 cm, reddish-brown; racemes terminal, paniculate, 3-9 cm; fruits baccate, spongy, subglobose, 9-13 mm, red-purple, turning to purplish-black; seeds 5-6 mm.

Primary forests, 100-1200 m; fl. & fr.: Apr.-Oct.; Syndai.

22. ALCHORNEA Sw.

Alchornea tiliifolia (Benth.) Muell.-Arg. in *Linnaea* 34: 168. 1865; Fl. Brit. Ind. 5: 421. 1887; Fl. As. 4: 211. 1940. *Stipellaria tiliacifolia* Benth. in Hook. J. Bot. 6: 4. 1854.

Shrubs, or small trees, 1-5 m; leaves broadly ovate to ovate-rhomboid, truncate, rounded or subcordate at base, acute to short-acuminate, glandular-dentate at margins, 6-22 × 3-18 cm, pubescent on nerves beneath, trinerved at base; lateral nerves 4-6 pairs; petioles 8-12 cm; racemes simple or paniculate, 5-12 cm; pedicels 1-3 mm; capsules flattened, 12-15 mm, green, minutely purplish-tuberculate; seeds obovoid.

Primary forests, 100-1200 m; fl. & fr.: Apr.-Oct.; Jarain, Jarain-Sohka, Sohka-Dawki.

128. ULMACEAE

- | | |
|--|-----------------|
| 1a. Flowers sessile or subsessile; perianth-lobes of male flowers valvate, persistent after anthesis; cotyledons narrow. ... | <i>Trema</i> 1 |
| 1b. Flowers distinctly pedicelled; perianth-lobes of male flowers imbricate, caducous after anthesis; cotyledons broad. ... | <i>Celtis</i> 2 |

1. TREMA Lour.

Trema orientalis (L.) Bl. Mus. Bot. Lugd.-Bat. 2: 62. 1849; Fl. Brit. Ind. 5: 484. 1888; Fl. As. 4: 230. 1940. *Celtis orientalis* L. Sp. Pl. 1044. 1753.

Trees or shrubs, 5-15 m; leaves ovate-lanceolate or ovate-oblong, obliquely subcordate or rounded at base, caudate-acuminate, crenulate at margins, 8-20 × 3-10 cm; basal nerves 3-7; lateral nerves 3-6 pairs; petioles 5-15 mm; stipules 5-10 mm; cymes axillary, dense or lax-flowered, longer than petioles; perianth pubescent; fruits ovoid, compressed, 3-5 mm, black; pyrenes rugose.

Primary and secondary forests and village groves, 100-1000 m; fl. & fr.: Feb.-Aug.; Dawki.

2. CELTIS L.

Celtis cinnamomea Planch. in Ann. Sci. Nat. ser. 4. 10: 303. 1845; Fl. Brit. Ind. 5: 482. 1888; Fl. As. 4: 228. 1940.

Trees, 15-25 m; leaves obliquely ovate to ovate-lanceolate, rounded or subcordate at base, caudate-acuminate, 10-15 x 3-8 cm; basal nerves 3, reaching apex; lateral nerves 3-5 pairs; petioles 8-13 mm; cymes 3-5-flowered, crowded; perianth reddish-brown with yellow patches; fruits ovoid, \pm 8 mm, black, on 3-5 mm long peduncles; pyrenes 6-angular, rugose, whitish.

Forests, 100-1000 m; fl. & fr.: Jan.-Aug.; Dawki.

129. MORACEAE

- | | |
|--|--------------------------|
| 1a. Flowers numerous on inner surface of fleshy globose or obovoid-turbinate receptacle with a pore (ostiole) at apex. ... | <i>Ficus</i> 1 |
| 1b. Flowers not in such inflorescences. | |
| 2a. Leaves folded in bud, mostly with small stipular scales which leave no scar on branches. | |
| 3a. Leaves ovate, cordate, sharply serrate; fruits syncarpous. ... | <i>Morus</i> 2 |
| 3b. Leaves narrow-lanceolate, entire; fruit the result of one flower. ... | <i>Pseudostrobilus</i> 3 |
| 2b. Leaves spirally folded in bud; stipules mostly leaving an amplexicaul scar on branches. | |
| 4a. Stamen 1; ovary sunk in receptacle, forming syncarp in fruit. ... | <i>Artocarpus</i> 4 |
| 4b. Stamens 4; ovary not sunk in receptacle. ... | <i>Cudrania</i> 5 |

1. FICUS L.

- | | |
|---|------------------------|
| 1a. Monoecious; syconia with interfloral bracts. | |
| 2a. Trees or shrubs, not epiphytic, without aerial roots; leaves without glands; syconia without sclerotic cells; stamens 2, pistillode present. ... | <i>F. racemosa</i> 1 |
| 2b. Trees, often epiphytic, with or without aerial roots; leaves often with a gland beneath at petiole apex; syconia with an outer and inner layer of sclerotic cells in the wall; stamen 1; pistillode absent. | |
| 3a. Male flowers near ostiole; ovaries wholly red-brown. | |
| 4a. Basal bracts free, caducous; syconia 5-8 mm diam. ... | <i>F. concinna</i> 2 |
| 4b. Basal bracts cupular, persistent; syconia 2-3 cm diam. ... | <i>F. hookeriana</i> 3 |
| 3b. Male flowers disperse; ovaries with a red mark at base. | |
| 5a. Lateral nerves 5-7 pairs; venation with intercostals; syconia 2-3 cm diam. ... | <i>F. altissima</i> 4 |
| 5b. Lateral nerves numerous; venation without intercostals; syconia up to 1.5 cm diam. | |
| 6a. Aerial roots absent; syconia red or bluish-black with short basal subsistent bracts. ... | <i>F. benjamina</i> 5 |

- 6b. Aerial roots present, numerous ; syconia green-yellow, completely enclosed by hooded bracts which fall off as calyptra. ... *F. elastica* 6
- 1b. Dioecious ; syconia without interfloral bracts.
 - 7a. Scandent or epiphytic shrubs, climbing with nodal roots ; hairs generally septate ; achenes compressed. ... *F. sarmentosa* 7
 - 7b. Erect trees or shrubs, not climbing with roots ; hairs not septate ; achenes not compressed.
 - 8a. Leaves mostly opposite, without basal glands ; perianth gamophyllous, saccate, cupular or annular ; stigma of gall flowers widely infundibuliform. ... *F. hispida* 8
 - 8b. Leaves spirally arranged or distichous, often with glands in the axils of main lateral nerves ; perianth of free or lobate tepals ; stigma of gall flowers narrowly infundibuliform.
 - 9a. Leaves asymmetric at base ; stamens 1 or 2. ... *F. semicordata* 9
 - 9b. Leaves symmetric at base ; stamen 1.
 - 10a. Large trees, often buttressed ; male flowers sessile ; filaments shortly jointed ; stigma simple.
 - 11a. Flowers sessile or shortly pedicellate ; syconia without a rosette of apical bracts ; ovaries reddish-brown or pale brown. ... *F. variegata* 10
 - 11b. Gall and female flowers long pedicellate ; syconia with a conspicuous rosette of apical bracts ; ovaries white.
 - 12a. Leaves generally ovate-cordate, entire, villous beneath ; tepals of gall and female flowers free ; female styles hairy. ... *F. auriculata* 11
 - 12b. Leaves ovate-oblong or obovate-oblong, distally dentate, glabrous ; tepals of gall and female flowers saccate, entire ; female styles glabrous. ... *F. oligodon* 12
 - 10b. Shrubs or medium sized trees, rarely creepers ; male flowers mostly pedicellate ; filaments mostly free ; stigma often bifid.
 - 13a. Cystoliths absent in leaves ; male flowers ostiolar ; tepals glabrous or setose ; achenes tuberculate or echinate with dentate double keel at base.
 - 14a. Leaves entire, not palmately lobed. ... *F. lampanga* 13
 - 14b. Leaves dentate or denticulate, often palmately lobed.
 - 15a. Lower surface of leaves with smooth rufous tomentum ; pedicels of flowers glabrous. ... *F. hirta* 14
 - 15b. Lower surface of leaves with rather harsh tomentum ; pedicels of flowers hairy. ... *F. fulva* 15
 - 13b. Cystoliths present in leaves ; male flowers disperse ; tepals mostly glabrous ; achenes smooth, not keeled.
 - 16a. Syconia obpyriform or ellipsoid.

- 17a. Peduncles 1.5—3.5 cm long. ... *F. ichnopus* 16
 17b. Peduncles up to 1 cm long. ... *F. abelii* 17
 16b. Syconia ovoid or globose.
 18a. Shrubs up to 2 m high; innovations sparsely or densely hairy; leaves ovate-lanceolate, rounded or obtuse at base. ... *F. gasparriniana* 18
 18b. Trees, 5—15 m tall; innovations glabrous; leaves elliptic-lanceolate, acute at base. ... *F. nerifolia* 19

1. **Ficus racemosa** L. Sp. Pl. 1060. 1753. *F. glomerata* Roxb. Pl. Corom. 2: t. 123. 1798; Fl. Brit. Ind. 5: 535. 1888; Fl. As. 4: 264. 1940.

Trees, 10-30 m; trunk buttressed at base, \pm 3 m in girth; leaves oblong-obovate to lanceolate, acute or obtuse at base, caudate to blunt acuminate, 8-18 \times 3-8 cm; basal nerves 3; lateral nerves 4-6 pairs; petioles 2-6 cm; stipules ovate-lanceolate; syconia pyriform, turbinate at apex, \pm 3 cm across, clustered on tuberculate \pm 5 cm long branches on trunks; bracts 3, ovate-triangular; peduncles 1-3 cm; achenes minutely tuberculate.

Primary and secondary forests, 200-1000 m; fl. & fr.: Mar.-Aug.; Garampani, Sonapur.

2. **Ficus concinna** Miq. in Ann. Mus. Bot. Lugd.-Bat. 3: 286. 1867. *F. glabella* Bl. var. *affinis* King in Ann. R. Bot. Gard. Cal. 1(2): 50. 1888; Fl. As. 4: 244. 1940. *F. glabella sensu* Hook. f. Fl. Brit. Ind. 5: 511. 1888, *p. p.*

Trees, 10-20 m; leaves oblong-ovate, acute at base, acuminate, 6-12 \times 3-5 cm; lateral nerves 12-15 pairs; basal nerves 3-5; petioles 1-2 cm; stipules lanceolate, \pm 1 cm; syconia subglobose, 5-8 mm diam., reddish-purple, solitary or paired, axillary; basal bracts 3, free; peduncles 2-5 mm; achenes ovoid, smooth.

Primary forests, 200-1500 m; fl. & fr.: Nov.-Apr.; Dawki, Jowai, Kopili valley, Puriem Sirkep.

3. **Ficus hookeriana** Corner in Gard. Bull. Sing. 17: 378. 1960. *F. hookeri* Miq. Ann. Mus. Bot. Lugd.-Bat. 3: 215, 286. 1867 (*non* Sweet, 1827).

Trees or large shrubs, 3-15 m; leaves broadly elliptic or subobovate, rounded or slightly narrowed at base, obtuse or short-cuspidate, distantly denticulate at margins, 15-35 \times 10-20 cm; lateral nerves 6-8 pairs; stipules linear-lanceolate, 3-8 cm; syconia subglobose, 2-3 cm across, greenish-yellow, with crustaceous wall, axillary, solitary or paired; basal bracts 3, united into a cartilaginous cup; achenes obovoid, brown.

Primary forests, 1300-1600 m; fl. & fr.: May-Dec.; Raliang.

4. **Ficus altissima** Bl. Bijdr. 444. 1826; Fl. Brit. Ind. 5: 504. 1888; Fl. As. 4: 241. 1940.

Trees, 25-45 m; leaves broadly elliptic to ovate-lanceolate, acute or rounded at base, obtuse at apex, 10-20 × 6-12 cm; lateral nerves 5-9 pairs; petioles 2-5 cm; stipules lanceolate, 4.0-4.5 cm, sericeous-villous outside; syconia subglobose or ellipsoid, 2-3 cm, yellow, axillary, paired; basal bracts 3, ovate, 3-4 cm, scarious; achenes ellipsoid, shiny-brown.

Forests and near villages, 1000-1400 m; fl. & fr.: Oct.-Apr.; Nartiang.

5. **Ficus benjamina** L. Mant. Pl. 129. 1767; Fl. Brit. Ind. 5: 508. 1888; Fl. As. 4: 243. 1940.

Trees, 20-35 m; leaves ovate-elliptic, rounded or acute at base, shortly caudate-acuminate, 4-10 × 1.5-5.0 cm; lateral nerves many, anastomosing into an intra-marginal nerve; petioles 1-2 cm; stipules lanceolate, ± 1 cm; syconia depressed-globose, 1.0-1.5 cm diam., red, becoming bluish-black, axillary, solitary or paired, sessile; basal bracts 3, 2-3 mm; achenes reniform, pale brown.

Forests, forest borders and near villages, 100-500 m; fl. & fr.: Oct.-Apr.; Dawki.

6. **Ficus elastica** Roxb. Fl. Ind. 3: 541. 1832; Fl. Brit. Ind. 5: 508. 1888; Fl. As. 4: 242. 1940.

Gigantic trees, 20-40 m, with numerous aerial roots; trunk with strongly buttressed base; leaves elliptic-oblong, rounded or cuneate at base, caudate-acuminate; basal nerves 3-5; lateral nerves numerous; petioles 1.5-6.5 cm; stipules lanceolate, long-acuminate, connate into narrow red cap, 6-30 cm; syconia ovoid, ± 1.5 cm across, green-yellow, enclosed in 3, hooded fleshy bracts, leaving a saucer-shaped scar at base; achenes ovoid, tubercled.

Forests and near villages, 1300-1600 m; fl. & fr.: Aug.-Mar.; Raliang.

7. **Ficus sarmentosa** J. E. Sm. in Rees, Cyclop. 14: 45. 1810. *F. foveolata* Miq. Ann. Mus. Bot. Lugd.-Bat. 3: 294. 1867; Fl. Brit. Ind. 5: 528. 1888; Fl. As. 4: 261. 1940. '*Ka-jirisim*'.

Scandent shrubs; leaves lanceolate or elliptic-oblong, subacute or rounded at base, obliquely acute or acuminate; 8-18 × 3-6 cm; basal nerves 3; lateral nerves 5-8 pairs; petioles 5-15 mm; stipules ovate-lanceolate, ± 1.2 cm; syconia subglobose, ± 1.5 cm across, tuberculate, purplish, axillary, solitary; basal bracts 3, ovate, reflexed; achenes oblong-pyriform, papillose.

Primary forests, 1300-1500 m; fl. & fr.: Sept.-Feb.; Jowai.

8. **Ficus hispida** L. f. Suppl. 442. 1781; Fl. Brit. Ind. 5: 522. 1888; Fl. As. 4: 252. 1940.

Shrubs or small trees, 3-10 m; leaves opposite, ovate or elliptic-obovate, rounded or subcordate at base, acute-apiculate, dentate-serrate at margins, 10-25 × 5-12 cm; basal nerves 3-5; lateral nerves 5-8 pairs; petioles 1-5 cm; stipules in whorls of 4, ovate-lanceolate, ± 1 cm; syconia subpyriform, 2.0-2.5 cm across, yellow, paired or fascicled on short branches; peduncles 5-15 mm; basal bracts, 3; achenes ovoid, ± 1 mm, dark brown.

Forests, 100-600 m; fl. & fr.: Feb.-Sept.; Dawki, Sohka.

9. **Ficus semicordata** J. E. Sm. in Rees, Cyclop. 14: 71. 1810. *F. cunia* Roxb. Fl. Ind. 3: 561. 1832; Fl. Brit. Ind. 5: 523. 1888; Fl. As. 4: 253. 1940. '*Thylliangsang*'.

Trees, 5-10 m; leaves inequilateral, oblong-lanceolate to elliptic, semi-sagittate or subcordate at base, acuminate, remotely serrate, 15-30 × 6-12 cm; lateral nerves 9-14 pairs; petioles 5-25 cm; stipules linear-lanceolate, 2.0-2.5 cm; syconia geocarpic, on up to 10 m long leafless stolons arising from trunk base and running on ground, globose, turbinate, 10-15 mm, reddish-brown or white (when underground); basal bracts 3, hispid; peduncles ± 10 mm; achenes lenticular.

- 1a. Peduncles 3-10 mm long; syconia paired or solitary. ... var. *semicordata* 1
 1b. Peduncles up to 2 mm long; syconia clustered or glomerate. ... var. *conglomerata* 2

1. var. **semicordata**

Primary forests, 400-1200 m; fl. & fr.: Jan.-Dec.; Raliang-Garampani.

2. var. **conglomerata** (Roxb.) Corner, *l.c.* 449. *F. conglomerata* Roxb. Fl. Ind. 3: 559. 1832. *F. cunia* Roxb. var. *conglomerata* (Roxb.) Kurz, For. Fl. Brit. Burma 2: 461. 1877.

Primary forests, 400-1200 m; fl. & fr.: Jan.-Dec. Khongsong-Garampani.

10. **Ficus variegata** Bl. Bijdr. 459. 1826; Fl. Brit. Ind. 5: 535. 1888.

Trees, 7-12 m; leaves ovate-elliptic, rounded or subcordate at base, acute or acuminate, subrepand or remotely denticulate at margins, 10-25 × 5-10 cm; basal nerves 3-5; lateral nerves 4-5 pairs; petioles 2-5 cm; stipules ovate, 15-20 mm; syconia in fascicles from short tubercles or trunks or larger branches, globose, 23-28 mm, yellowish-green or red with white streaks; basal bracts 3, connate at base; peduncles 2-5 cm; achenes obovoid.

Primary forests, 100-1000 m; fl. & fr.: Jan.-Aug.; Dawki.

11. **Ficus auriculata** Lour. Fl. Cochinch. 666. 1790. *F. roxburghii* Miq. in Ann. Mus. Bot. Lugd.-Bat. 3: 296. 1867; Fl. Brit. Ind. 5: 534. 1888; Fl. As. 4: 262. 1940. 'Woh-lampin'.

Trees, 3 - 10 m; leaves ovate-orbicular, deeply cordate or round at base, short-acuminate, serrate-dentate at margins, 12 - 35 × 10 - 30 cm; lateral nerves 3 - 4 pairs; petioles 3 - 10 (-20) cm; stipules ovate-lanceolate, 15 - 20 mm; syconia from shortened leafless branches at trunk base, obpyriform, turbinate, 5 - 6 cm; basal bracts 3, ovate; peduncles 2 - 4 cm; achenes minutely tuberculate.

Forests and forest edges, also near villages, 400 - 1200 m; fl. & fr.: Jan.-June; Garampani, Khongsnong-Garampani, Sutnga.

Fruits edible.

12. **Ficus oligodon** Miq. in Ann. Mus. Bot. Lugd.-Bat. 3: 234. 1867. *F. pomifera* King. l.c. 171. t. 215: Fl. Brit. Ind. 5: 535. 1888; Fl. As. 4: 263. 1940.

Trees, 8 - 20 m; leaves lanceolate or elliptic-obovate, rounded or cuneate at base, acute to short-acuminate, remotely serrate at margins, 12 - 22 × 6 - 15 cm; basal nerves 3 - 5; lateral nerves 4 - 5 pairs; petioles 3 - 8 cm; stipules ovate-lanceolate, 12 - 16 mm; syconia on short leafless branches or tubercles from near base of trunks or main branches, subpyriform, 2.5 - 3.5 cm across, yellowish-green to red; peduncles 2.5 - 5.0 cm; achenes minutely papillose.

Forests, 600 - 1400 m; fl. & fr.: Dec.-Mar.; Jowai-Khleihriat.

13. **Ficus lamponga** Miq. Fl. Ind. Bat. suppl. 431. 1861. *F. lepidosa* Kurz, For. Fl. Brit. Burma 2: 450. 1873; Fl. Brit. Ind. 5: 522. 1888; Fl. As. 4: 258. 1940.

Trees, 5 - 12 m; leaves obovate or lanceolate, rounded or subacute at base, acute or shortly cuspidate, 10 - 20 × 3 - 12 cm; lateral nerves 8 - 12 pairs; petioles 10 - 35 mm; stipules lanceolate, ± 1 cm; syconia solitary or paired in leaf-axils or axils of fallen leaves, subpyriform, 12 - 15 mm across, orange-red when ripe; basal bracts 3, ovate-acute; peduncles 5 - 12 mm; achenes obliquely oblong, rugose, shiny-brown.

Primary forests, 200 - 1000 m; fl. & fr.: Sept.-Apr.; Syndai.

14. **Ficus hirta** Vahl, Enum. 2: 201. 1806; Fl. Brit. Ind. 5: 531. 1888; Fl. As. 4: 255. 1940.

Shrubs or small trees, 1 - 8 m; leaves oblong-lanceolate to suborbicular, rounded or cordate at base, 3 - 5-lobed, serrate-dentate, 10 - 30 × 3 - 15 cm;

basal nerves 3-7; lateral nerves 3-8 pairs; petioles 2-10 cm; stipules ovate-lanceolate, 1.5-2.0 cm; syconia paired, axillary or from axils of fallen leaves, subglobose, 1-2 cm, bristly hairy; basal bracts ovate, appressed hairy; peduncles \pm 2 mm; achenes ellipsoid, tuberculate.

- 1a. Leaves pubescent with rufous hairs beneath; syconia ellipsoid, up to 2 cm. ... var. *hirta* 1
 1b. Leaves densely velvety-tomentose beneath; syconia subglobose, 2.5-3.5 cm. ... var. *roxburghii* 2

1. var. **hirta**

Primary forests, 1000-1500 m; fl. & fr.: Jan.-Dec.; Jarain, Jarain-Dawki, Jowai.

2. var. **roxburghii** (Miq.) King *l.c.* 150, t. 189; Fl. As. 4: 256. 1940. *F. roxburghii* Miq. in Lond. J. Bot. 7: 456. 1848. **Fig. 21**

Primary forests, 100-500 m; fl. & fr.: Jan.-Dec.; Dawki, Garampani-Khongsngong, Jarain, Jowai, Raliang, Shangpung, Sohka-Dawki, Syndai.

15. **Ficus fulva** Bl. Bijdr. 478. 1825; Fl. Brit. Ind. 5: 531. 1888.

Trees or shrubs, 2-15 m; leaves ovate, obovate, or subrhomboid, rounded or subcordate at base, acute or short-apiculate, dentate-serrate, rarely 3-5-lobed, 10-25 \times 6-12 cm; basal nerves 3-5; lateral nerves 2-4 pairs; petioles 3-10 cm; stipules broadly ovate, truncate at base, acute; syconia crowded toward stem apices, axillary, solitary or paired, ovoid, \pm 15 mm, yellowish to brownish-green, densely brown pilose; basal bracts 3, ovate; peduncles \pm 2 mm; achenes obliquely ovoid, minutely tuberculate.

Forests, 1000-1600 m; fl. & fr.: July-Jan.; Jarain, Jowai.

16. **Ficus ischnopoda** Miq. in Ann. Mus. Bot. Lugd.-Bat. 3: 229. 1867. *F. pyriformis* var. *ischnopoda* (Miq.) King *l.c.* 158; Fl. As. 4: 257. 1940. *F. pyriformis sensu* Hook. f. Fl. Brit. Ind. 5: 533. 1888, *p. p.*

Shrubs or trees, 1-6 m; leaves oblong to narrow-lanceolate, narrowly rounded or acute at base, obtusely acuminate, revolute at margins, 4-15 \times 0.5-3.0 cm; basal nerves 8-12 pairs; petioles 5-15 mm; stipules subulate, 5-10 mm; syconia obpyriform, contracted at base into \pm 4 mm long stalk, obtuse or rounded at apex, 1.0-2.0 \times 0.8-1.2 cm, green-red to dark purple; basal bracts 3, triangular; peduncles 1.5-3.5 cm; achenes reniform.

Primary forests, 200-1000 m; fl. & fr.: June-Dec.; Jowai-Bodarpur Road, Sohka-Dawki.

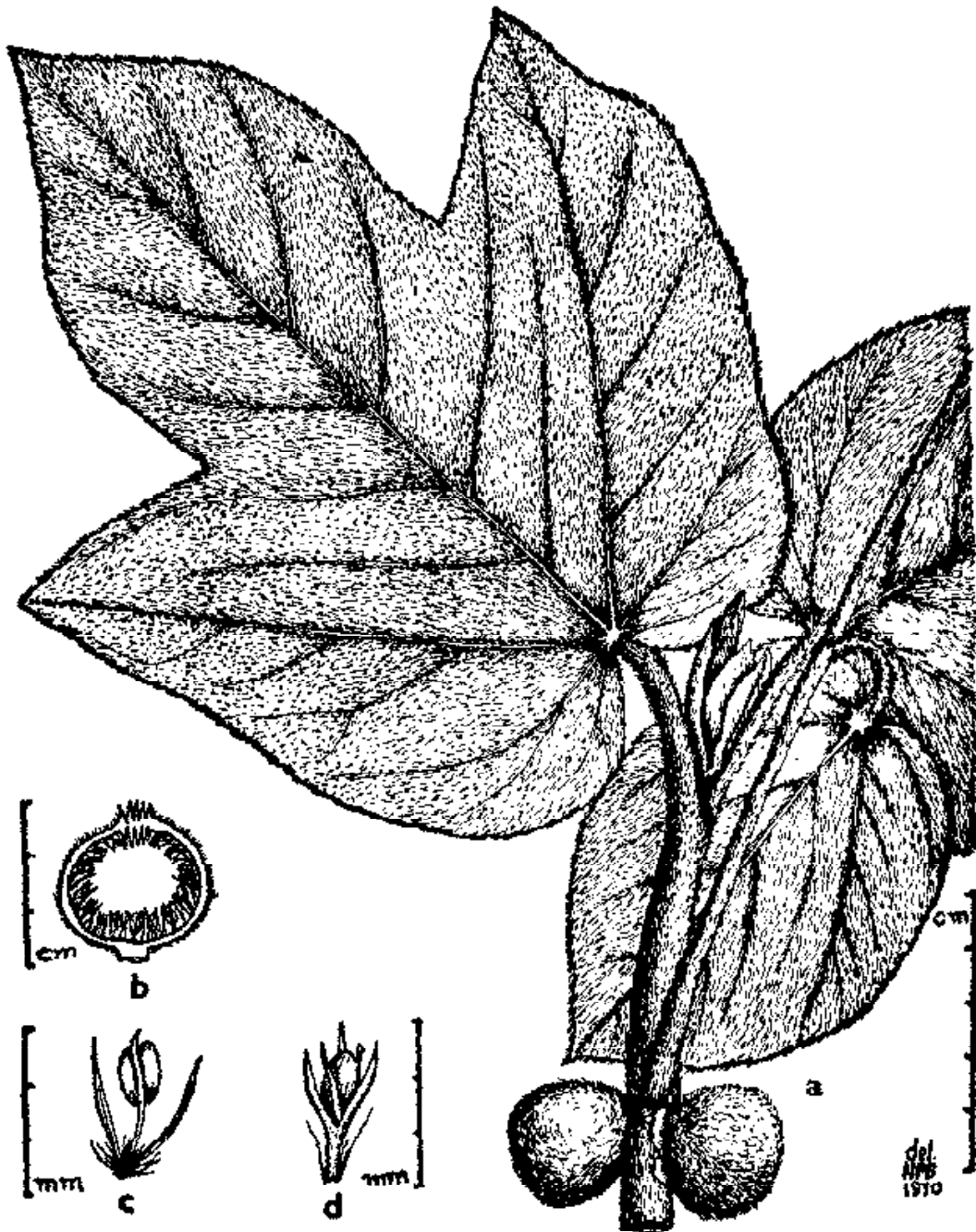


Fig. 21. *Ficus hirta* Vahl var. *saxburghii* (Miq.) King
 a. Twig. b. L.S. of syconia. c. Male flower. d. Female flower.

17. ***Ficus abelii*** Miq. Ann. Mus. Bot. Lugd.-Bat. 3: 239. 1867.
F. pyriformis sensu Hook. f. Fl. Brit. Ind. 5: 533. 1888, p. p. *F. pyriformis*
 var. *abelii* (Miq.) King. l.c. 158. *F. pyriformis*, var. *subpyriformis*
 (Miq.) King, l.c. 128; Fl. As. 4: 257. 1940.

Shrubs, 1-2 m; leaves oblong or narrow-lanceolate, acute or cuneate

at base, acute or short-acuminate, revolute at margins 8-10 × 1-2 cm; basal nerves 3; lateral nerves 10-12 pairs; petioles 2-10 mm; stipules subulate, 5-8 mm; syconia axillary, solitary, obpyriform, narrowed at base into 1-3 mm long stalk, obtuse or rounded at apex, 1.0-1.5 × 0.7-1.0 cm, hispid, brown; basal bracts 3, triangular; peduncles ± 1 cm; achenes reniform, tuberculate.

Forests, 100-500 m; fl. & fr.: Sept.-Mar.; Garampani.

18. **Ficus gasparriniana** Miq. in Hook. Lond. J. Bot. 7: 436. 1848. *F. silhetensis* Miq. in Ann. Mus. Bot. Lugd.-Bat. 3: 233, 291. 1867; Fl. Brit. Ind. 5: 533. 1888; Fl. As. 4: 258. 1940.

Shrubs, 1-3 m; leaves oblong-obovate, or oblanceolate, acute or rounded at base, acute or acuminate, undulate, at margins, 6-15 × 2-5 cm, hispid beneath; basal nerves 3; lateral nerves 4-6 pairs; petioles 1-3 cm; stipules lanceolate, ± 1 cm; syconia subsessile, axillary, solitary or paired, ovoid, 7-9 mm, green with white spots, pinkish-red; basal bracts 3, ovate; achenes obovoid, flattened, ± 2 mm, minutely papillose, brown-yellow, becoming purple and variegated.

Primary forests, 1200-1600 m; fl. & fr.: Apr.-Oct.; Jarain, Shangpung.

19. **Ficus nerifolia** J. E. Sm. in Rees, Cyclop. 14: n. 21. 1810. *F. nemoralis* Miq. in Lond. J. Bot. 7: 453. 1848; Fl. Brit. Ind. 5: 534. 1888; Fl. As. 4: 259. 1940. '*Soh-rom-blang*'.

Trees, or shrubs, 5-15 m; leaves lanceolate, or elliptic-oblong, inequilateral, cuneate at base, caudate-acuminate, 5-15 × 2-7 cm; basal nerves 3; lateral nerves 7-12 (-14) pairs; petioles 15-45 mm; stipules lanceolate, 8-15 mm; syconia axillary or from axils of fallen leaves, solitary or paired; subglobose or clavate, 6-8 mm across, red-brown; basal nerves 3; peduncles up to 3 mm; achenes subglobose, minutely wrinkled.

- 1a. Syconia sessile, subglobose. ... var. *fieldingii* 1
 1b. Syconia on 2-3 mm long peduncles, ellipsoid or clavate. ... var. *trilepis* 2

1. var. **fieldingii** (Miq.) Corner in Gard. Bull. Sing. 17: 426. 1960. *F. fieldingii* Miq. in Hook. Lond. J. Bot. 7: 439. 1848. *F. nemoralis* var. *fieldingii* (Miq.) King in Ann. R. Bot. Gard. Cal. 1(2): 163. 1888; Fl. As. 4: 259. 1940.

Primary and secondary forests, 1200-1600 m; fl. & fr.: May-Dec.; Jarain, Shangpung, Thatlaskein.

2. var. **trilepis** (Miq.) Corner in Gard. Bull. Sing. 17: 426. 1960. *F. trilepis* Miq. Ann. Mus. Bot. Lugd.-Bat. 3: 228. 1867. *F. nemoralis* var. *trilepis* (Miq.) King in Ann. R. Bot. Gard. Cal. 1(2): 162. 1888.

Primary forests, 1200 - 1500 m; fl. & fr.: Mar.-Sept.; Jarain, Jowai.

2. MORUS L.

Morus australis Poir. in Lamk. Encycl. Meth. 4: 380. 1797. *M. indica* (non L. 1753) *sensu* Hook. f. Fl. Brit. Ind. 5: 492. 1888. *M. acidosa* Griff. Notul. 4: 388. 1851; Fl. As. 4: 273. 1940.

Trees or shrubs, 2-7 m; leaves ovate, truncate or cordate at base caudate-acuminate, sharply serrate, 3-13 × 1-5 cm, 3-nerved at base; lateral nerves 5-6 pairs; petioles 1-4 cm; flowers in axillary, solitary, 1-3 cm long spikes; yellow-green; peduncles 5-15 mm; fruits ovoid, subglobose, black; seeds subglobose.

Secondary forests, near villages, often cultivated, 100-1000 m; fl. & fr.: Feb.-Sept.; Ioksi, Nongthala.

3. PSEUDOSTREBLUS Bur.

Pseudostreblus indica Bur. in DC. Prodr. 17: 220. 1873; Fl. Brit. Ind. 5: 487. 1888; Fl. As. 4: 276. 1940. '*Kacheeri-khlaw*'.

Trees, 5-10 m; young shoots pubescent; leaves narrow-elliptic or lanceolate, acute at base, acuminate, 5-20 × 3-5 cm; lateral nerves 10-20 pairs; petioles 5-12 mm; flowers greenish-red, axillary, solitary or in short cymes; fruits 1-celled, enclosed by perianth lobes, 7-8 mm across; seeds white.

Primary forests, 1000-1500 m; fl. & fr.: June-Jan.; Khongsnong, Laskcin, Mynso, Nartiang, Shangdain.

4. ARTOCARPUS J. R. & G. Forst. *nom. cons.*

Artocarpus integra (Thunb.) Merr. Interpr. Herb. Amb. 190. 1917; Fl. As. 4: 268. 1940. *Radermachia integra* Thunb. in Vet. Akad. Handl. Stockh. 37: 541. 1888. *A. integrifolia* L. f. Suppl. Pl. 412. 1781; Fl. Brit. Ind. 5: 541. 1888. '*Dieng-soh-phan*'.

Trees, 10-15 m; leaves obovate or elliptic-oblong, cuneate or acute at base, rounded, obtuse or broadly acute, 5-25 × 3-12 cm; lateral nerves

6-10 pairs; petioles 8-25 mm; stipules 15-80 mm, sheathing; male heads ellipsoid or clavate, 25-70 × 8-25 mm; peduncles 1-5 cm; female heads ellipsoid, 2-4 × 1-2 cm; peduncles 1-5 cm; syncarps cylindrical or clavate, 30-100 × 25-50 cm, covered with pointed tubercles; seeds ellipsoid, 25-30 × 15-20 mm.

Primary and secondary forests, often cultivated, 100-500 m; fl. & fr.: Mar.-Sept.; Dawki.

Fruits edible.

5. CUDRANIA Trec. *non. cons.*

- 1a. Young branches pubescent; leaves obtuse or acute, up to 9 cm long; lateral nerves 6-10 pairs. ... *C. cochinchinensis* 1
 1b. Young branches glabrous; leaves caudate-acuminate, up to 18 cm long; lateral nerves 3-5 pairs. ... *C. fruticosa* 2

1. **Cudrania cochinchinensis** (Lour.) Kudo & Masam. in Ann. Rep. Taihoku Bot. Gard. 2: 27. 1932. *Vaniera cochinchinensis* Lour. Fl. Cochinch. 564. 1790. *C. javanensis* Trec. in Ann. Sci. Nat. ser. 3. 8: 123. 1847; Fl. Brit. Ind. 5: 538. 1888; Fl. As. 4: 270. 1940.

Large straggling spiny shrubs or small trees; spines axillary, 15-20 mm; leaves oblong, obovate or oblanceolate, obtuse or rounded at base, acute or acuminate, 3-8 × 1-3 cm; lateral nerves 6-10 pairs; petioles 5-10 mm; stipules 1-2 mm; heads globose, 10-15 mm diam., solitary or paired, axillary; fruits globose 15-20 mm, velvety, orange; achenes enclosed in fleshy bracts and perianth.

Primary forests, 100-1000 m; fl. & fr.: Apr.-Nov.; Dawki.

2. **Cudrania fruticosa** (Roxb.) Kurz, For. Fl. Brit. Burma 2: 434. 1877; Fl. Brit. Ind. 5: 539. 1888; Fl. As. 4: 271. 1940. *Batis fruticosa* Roxb. Fl. Ind. 3: 763. 1832. '*Shihthanat*'.

Scandent or rambling shrubs; leaves lanceolate or oblong, rounded at base, abruptly acuminate at apex, 4-16 × 2-4 cm; basal nerves 3-5; lateral nerves 3-5 pairs; petioles 6-7 mm; heads solitary or paired; fruits ovoid or subglobose, 10-15 mm across, green, velvety or glaucous; achenes ovoid, protruding from fleshy perianth.

Primary forests, 1300-1600 m; fl. & fr.: Oct.-Mar.; Raliang.

130. URTICACEAE

- | | | |
|---|-----|-------------------------|
| 1a. Plants armed with stinging hairs. | | |
| 2a. Shrubs ; leaves simple ; ovary oblique. | ... | <i>Dendrocnide</i> 1 |
| 2b. Herbs ; leaves palmately lobed ; ovary straight. | ... | <i>Girardinia</i> 2 |
| 1b. Plants without stinging hairs. | ... | |
| 3a. Anthers erect in bud. | ... | <i>Poikilospermum</i> 3 |
| 3b. Anthers inflexed in bud. | | |
| 4a. Stigma penicillate (brush-like) ; perianth of female flowers mostly 3-partite. | | |
| 5a. Leaves opposite. | ... | <i>Pilea</i> 4 |
| 5b. Leaves alternate, distichous. | | |
| 6a. Male and female flowers aggregated on fleshy receptacle ; staminodes present. | ... | <i>Elatostema</i> 5 |
| 6b. Male flowers cymose ; female flowers aggregated on fleshy receptacle ; staminodes absent. | ... | <i>Procris</i> 6 |
| 4b. Stigma various, not penicillate ; perianth of female flowers tubular, not partite. | | |
| 7a. Calyx of female flowers minute or completely reduced. | ... | <i>Maoutia</i> 7 |
| 7b. Calyx of female flowers well-developed. | | |
| 8a. Calyx of female flowers membranous or dry in fruit. | | |
| 9a. Flower-clusters combined into spikes or panicles. | ... | <i>Boehmeria</i> 8 |
| 9b. Flower-clusters sessile, axillary, not in spikes or panicles. | | |
| 10a. Erect herbs or undershrubs ; stigma deciduous after anthesis, filiform. | ... | <i>Pouzolzia</i> 9 |
| 10b. Stems herbaceous, creeping ; stigma persistent after anthesis, ovate. | ... | <i>Chamaebainia</i> 10 |
| 8b. Calyx of female flowers fleshy in fruit. | | |
| 11a. Clusters of flowers interruptedly or densely spicate. | ... | <i>Sarcochlamys</i> 11 |
| 11b. Clusters of flowers not spicate. | | |
| 12a. Flower-clusters densely capitate ; stigma thinly discoid. | ... | <i>Villebrunea</i> 12 |
| 12b. Flower-clusters sessile or in cymes ; stigma filiform. | ... | <i>Debregeasia</i> 13 |

1. DENDROCNIIDE Miq.

Dendrocnide sinuata (Bl.) Chew in Gard. Bull. Sing. 21: 206. 1965. *Urtica sinuata* Bl. Bijdr. 505. 1825. *U. crenulata* Roxb. Fl. Ind. 3: 591. 1832 (non Sev. 1785). *Laportea crenulata* (Roxb.) Wedd. in Arch. Mus. Nat. Paris 9: 133. 1856; Fl. Brit. Ind. 5: 550. 1888; Fl. As. 4: 281. 1940.

Shrubs, 2 - 5 m; leaves oblong-ovate, rhomboid-elliptic or lanceolate, rounded or subcordate at base, acute or acuminate, 18 - 50 x 7 - 25 cm;

lateral nerves 12-15 pairs; petioles stout, 2-10 cm with retrorse short hairs; cymes in lax dichotomous axillary panicles, 5-16 cm, with retrorse stinging hairs; achenes obliquely ovoid, laterally compressed, \pm 4 mm, seated on minute perianth tube, crowned by \pm 4 mm long stigma.

Shaded places in moist primary forests, 100-1000 m; fl. & fr.: Aug.-Feb.; Dawki.

2. GIRARDINIA Gaud.

Girardinia palmata (Forsk.) Gaud. in Freyc. Voy. Bot. 498. 1830. *Urtica palmata* Forsk. Fl. Aegypt.-Arab. 159. 1775. *U. heterophylla* Vahl. Symb. Bot. 1: 79. 1790. *G. heterophylla* (Vahl) Decaisne in Jacq. Voy. Bot. 4: 151, t. 153. 1844; Fl. Brit. Ind. 5: 550. 1888; Fl. As. 4: 282. 1940.

Herbs, up to 2 m; stems and petioles appressed short hairy with brown recurved stinging hairs; leaves palmately 3-7 lobed, dentate-serrate, 10-30 cm across; 3-nerved at base; petioles 5-15 cm; stipules connate, foliaceous; spikes axillary, simple or rarely paniced, 8-20 cm; achenes compressed, obliquely ovoid, \pm 3 mm thick.

Shaded moist places in forests, 1400-1600 m; fl. & fr.: Sept.-Dec.; Jowai.

3. POIKILOSPERMUM Miq.

Poikilospermum suaveolens (Bl.) Merr. in Contr. Arn. Arb. 8: 47. 1934. *Conocephalus suaveolens* Bl. Bijdr. 483. 1825; Fl. Brit. Ind. 5: 545. 1888; Fl. As. 4: 272. 1940.

Large scandent shrubs or lianas, 5-25 m; leaves broadly ovate or oblong-ovate, obtuse, rounded or subcordate at base, acute, 10-30 x 8-22 cm, with numerous punctate or short-linear cystoliths beneath; lateral nerves 13-15 pairs; petioles 3-15 cm; heads 5-7 mm across, in short forked cymes, purple, fragrant; achenes oblong-lanceolate, enclosed in thin fleshy perianth.

Primary forests, 100-500 m; fl. & fr.: Jan.-Sept.; Dawki.

4. PILEA Lindl. *nom. cons.*

- | | | |
|--|-----|------------------------|
| 1a. Plants glabrous; leaves elliptic-lanceolate, entire. | ... | <i>P. glaberrima</i> 1 |
| 1b. Plants pubescent or tomentose; leaves ovate-suborbicular, crenate-dentate. | ... | <i>P. umbrosa</i> 2 |

1. **Pilea glaberrima** (Bl.) Bl. Mus. Bot. Lugd.-Bat. 2: 53-54. 1856. *Urtica glaberrima* Bl. Bijdr. 493. 1826. *P. smilacifolia* Wedd. in Ann. Sci. Nat. ser. 4. 1: 186. 1854; Fl. Brit. Ind. 5: 553. 1888; Fl. As. 5: 282. 1940.

Undershrubs, 0.5-1.5 m; leaves cuncate at base, acute, 6-25 × 2-7 cm; basal nerves 3, extending nearly to apex; petioles 1-5 cm; cymes axillary, paniculate, dichotomously branched, often in pairs; peduncles 5-30 mm; achenes ovoid, compressed, 2-3 mm, partly enclosed in persistent perianth.

Shaded moist places, near streams and mossy rocks, in primary forests, 1000-1500 m; fl. & fr.: Apr.-Aug.; Dawki, Sutnga.

2. **Pilea umbrosa** Wedd. in Ann. Sci. Nat. ser. 4. 1: 187. 1854; Fl. Brit. Ind. 5: 556. 1888; Fl. As. 4: 283. 1940.

Herbs, 30-80 cm; leaves obliquely rounded or shallow-cordate at base, acuminate or caudate-acuminate, 2-5 × 1-4 cm; basal nerves 3; lateral nerves 6-8 pairs; petioles 5-50 mm; cymes axillary, paniculate, with sessile flowers; peduncles 2-4 cm, pubescent; achenes flattened, often with raised intra-marginal ridge, pale brown.

Primary forests, in shaded moist places, 1000-1400 m; fl. & fr.: Aug.-Jan.; Mynso.

5. ELATOSTEMA Forst. *nom. cons.*

- | | | |
|--|-----|-------------------------|
| 1a. Peduncles of male receptacles more than 2 cm long. | ... | <i>E. sikkimense</i> 1 |
| 1b. Peduncles of male receptacles less than 1.5 cm long. | | |
| 2a. Leaves sessile, obliquely broad-auricled at base, 4-9 cm long; involucre bracts mucronate at apex. | .. | <i>E. hookerianum</i> 2 |
| 2b. Leaves subsessile, oblique but not auricled at base, 8-20 cm long; involucre bracts rounded at apex. | | |
| 3a. Leaves obliquely oblanceolate, 2.5-4.5 cm broad; receptacles 6-10 mm diam. | ... | <i>E. sessile</i> 3 |
| 3b. Leaves elliptic or linear-lanceolate, up to 2 cm broad; receptacles 12-20 mm diam. | ... | <i>E. rupestra</i> 4 |

1. **Elatostema sikkimense** Clarke in J. Linn. Soc. Bot. 15: 125. 1876; Fl. Brit. Ind. 5: 571. 1888.

Herbs, 25-75 cm; leaves falcately oblong or elliptic, unequally cuneate or acute at base, acuminate or caudate-acuminate, serrate above the middle, 8-20 × 3-5 cm; lateral nerves 5-8 pairs; petioles up to 8 mm; stipules linear, 6-20 mm; receptacles pinkish-green; peduncles filiform, 3-10 cm; bracts confluent, the 2 outer ones reproduced into 4-6 mm

flattened spurs; male receptacles 8-15 mm diam.; female receptacles 6-12 diam.; achenes fusiform, ribbed.

Primary forests, 1000-1500 m; fl. & fr.: Mar.-July; Jaintia Hills, Mann 912.

2. **Elatostema hookerianum** Wedd. Monogr. Urt. 309. 1856; Fl. Brit. Ind. 5: 567. 1888.

Herbs, up to 50 cm; leaves falcately oblong-lanceolate, auricled at base on lower margin, caudate-acuminate, serrate at upper half, 4-9 × 1-3 cm; basal nerves 3-5; lateral nerves 4-5 pairs; stipules linear, 6-8 mm; male receptacles 8-14 mm diam., yellow-green; female receptacles green, 5-10 mm diam., achenes ellipsoid, irregularly ribbed.

Primary forests, in shaded moist places, 1300-1400 m; fl. & fr.: Jan.-Dec.; Jowai.

3. **Elatostema sessile** Forst. Char. Gen. 106. 1776; Fl. Brit. Ind. 5: 563. 1888; Fl. As. 4: 284. 1940.

Herbs, 25-75 cm, often epiphytic; leaves elliptic-lanceolate, obliquely acute at base, caudate-acuminate, coarsely serrate, 8-15 × 2.5-4.5 cm; basal nerves extending up to apex; lateral nerves 4-6 pairs; stipules linear-lanceolate, 8-12 mm; male receptacles pale brownish-red, 8-11 mm diam.; female receptacles brownish-green, 6-9 mm diam.; achenes ellipsoid, ribbed.

Primary forests, in shaded moist places, 800-1500 m; fl. & fr.: Apr.-Aug.; Jarain-Dawki, Jowai, Sutnga.

4. **Elatostema rupestre** (D. Don) Wedd. in Arch. Mus. Hist. Nat. Paris 9: 364. 1856; Fl. Brit. Ind. 5: 564. 1888; Fl. As. 4: 284. 1940. *Procris rupestris* D. Don, Prodr. Fl. Nep. 60. 1825.

Herbs, up to 50 cm, often epiphytic; leaves elliptic-lanceolate or falcately lanceolate, cuneate at base, acuminate, crenate-serrate, 8-14 × 1-2 cm; lateral nerves 8-12 pairs; petioles up to 5 mm; stipules linear-lanceolate, 10-17 mm; male receptacles pale yellow-green, 8-15 mm diam.; female receptacles pale green, 6-12 mm diam., achenes longitudinally ribbed.

Primary forests, in shaded places, 500-1000 m; fl. & fr.: Mar.-July; Dawki, Jarain-Dawki.

6. PROCRIS Juss.

Procris laevigata Bl. Bijdr. 508. 1826; Fl. Brit. Ind. 5: 575. 1888;

Elatostema wightiana Wedd. in Ann. Sci. Nat. ser. 4. 1: 188. 1854. *P. wightiana* (Wedd.) Wedd. in Arch. Mus. Hist. Nat. Paris 9: 336. 1856; Fl. As. 4: 285. 1940.

Epiphytic undershrubs or herbs, 20-100 cm; leaves lanceolate or oblanceolate, obliquely cuneate at base, acuminate, distantly crenate, 10-20 × 2-4 cm; lateral nerves 7-11 pairs; petioles 4-10 mm; male flowers in small cymes, in axils of fallen leaves; peduncles ± 6 mm; female flowers capitate on fleshy clustered receptacles, in axils of fallen leaves; achenes ovoid, compressed, striate.

Primary forests, in shaded moist places, 1000-1300 m; fl. & fr.: May-Dec.; Sutnga.

7. MAOUTIA Wedd.

Maoutia puya (Hook. f.) Wedd. in Ann. Sci. Nat. ser. 4. 1: 193. 1854; Fl. Brit. Ind. 5: 592. 1888; Fl. As. 4: 296. 1940. *Boehmeria puya* Hook. f. in Lond. J. Bot. 3: 316. t. 7. 1851.

Shrubs or small trees, 3-5 m; leaves elliptic, obovate-elliptic, obtuse or rounded at base, acuminate, coarsely crenate-serrate, 9-14 × 5-7 cm; basal nerves 3; lateral nerves 2-3 pairs; petioles 5-50 mm; inflorescence axillary, globose, few-flowered heads, cymose-paniculate, 2-5 cm; achenes obliquely triangular or obovoid.

Primary forests in shaded moist places, 1200-1500 m; fl. & fr.: July-Feb.; Jowai.

8. BOEHMERIA Jacq.

- | | | |
|---|-----|-------------------------|
| 1a. Flower-clusters axillary. | ... | <i>B. sidaefolia</i> 1 |
| 1b. Flower-clusters combined in simple or paniculate spikes. | | |
| 2a. Leaves narrowly lanceolate, coriaceous. | ... | <i>B. macrophylla</i> 2 |
| 2b. Leaves suborbicular, broadly elliptic or ovate, membranous. | | <i>B. platyphylla</i> 3 |

1. **Boehmeria sidaefolia** Wedd. in Ann. Sci. Nat. ser. 4. 1: 203. 1854; Fl. Brit. Ind. 5: 576. 1888; Fl. As. 4: 287. 1940.

Diffuse undershrubs, 1-3 m; leaves elliptic to ovate-lanceolate, obtuse or rounded at base, serrate-dentate, 2-12 × 1-4 cm; lateral nerves 4-6 pairs; stipules linear-lanceolate, 5-7 mm; flowers clustered on naked axillary branchlets, terminated by a cluster of leaves; bracts lanceolate; 3-5 mm;

achenes oblong, compressed, closely covered with 4-toothed accrescent perianth.

Forests, 1000 - 1400 m; fl. & fr.: Aug.-Jan.; Mynsyngnat-Nartiang.

2. **Boehmeria macrophylla** D. Don, Prodr. Fl. Nep. 60. 1825; Fl. Brit. Ind. 5: 577. 1888; Fl. As. 4: 288. 1940.

Trees, or shrubs, 3 - 8 m; leaves narrow-lanceolate, often elliptic-lanceolate, obtuse or rounded at base, caudate-acuminate, serrulate, 10 - 30 × 2 - 8 cm, bullate-rugose above, pale and thinly strigose beneath; basal nerves 3, converging nearly to apex; lateral nerves 4 - 6 pairs; petioles 1 - 10 cm; stipules narrow-lanceolate, 10 - 12 mm; spikes axillary, 4 - 15 cm; bracts lanceolate, 3 - 5 mm; achenes obovate, cuneate, compressed.

Primary forests, 100 - 1000 m; fl. & fr.: Aug.-Feb.; Syndai-Muktapur.

3. **Boehmeria platyphylla** D. Don, Prodr. Fl. Nep. 60. 1825; Fl. Brit. Ind. 5: 578. 1888; Fl. As. 4: 288. 1940.

Shrubs, 1 - 2 m; leaves broadly ovate or elliptic to suborbicular, rounded or subcordate and often oblique at base, acuminate, coarsely dentate, 5 - 18 × 3 - 12 cm; basal nerves 3; lateral nerves 3 - 4 pairs; petioles 3 - 15 cm; stipules lanceolate, 6 - 7 mm; spikes axillary, drooping, simple or branched, solitary or clustered, 4 - 12 cm; male flowers white; female flowers greenish-yellow; achenes compressed, beaked at apex, ± 2 mm, tightly enclosed in 4-toothed fleshy pubescent perianth tube.

Primary forests, 1000 - 1500 m; fl. & fr.: June-Nov.; Jowai, Nartiang.

9. *POUZOLZIA* Gaud.

- | | | |
|--|-----|-----------------------|
| 1a. Leaves alternate, toothed or serrate. | ... | <i>P. frondosa</i> 1 |
| 1b. Leaves opposite or rarely alternate. | | |
| 2a. Leaves opposite or some alternate, ovate to ovate-lanceolate, acute at base; perianth lobes gibbous at back; stamens 4. | ... | <i>P. zeylanica</i> 2 |
| 2b. Leaves all opposite, oblong-lanceolate, rounded or cordate at base; perianth lobes abruptly inflexed at middle; stamens 5. | | <i>P. hirta</i> 3 |

1. **Pouzolzia frondosa** (D. Don) O. Ktze. Rev. Gen. 630. 1891. *Boehmeria frondosa* D. Don, Prodr. Fl. Nep. 59. 1825. *Margocarpus vimineus* Wedd. in Ann. Sci. Nat. ser. 4. 1: 203. 1854. *P. viminea* (Wedd.) Wedd. in DC. Prodr. 16(1): 228. 1869; Fl. Brit. Ind. 5: 581. 1888; Fl. As. 4: 290. 1940.

Perennial shrubs or undershrubs, 0.5 - 1.5 m; leaves oblong-lanceolate to elliptic-lanceolate, acute or obtuse at base, acute to long-acuminate,

2-15 × 1-6 cm, pale green or snow-white beneath; petioles 1-3 cm, red-brown; flower-clusters of male and female flowers axillary, greenish-yellow, 5-10 mm across; achenes ovoid, 2-3 mm, pale yellow, sparsely hispid at apex.

- 1a. Leaves (5-)8-16 cm long, pale green beneath. ... var. *frondosa* 1
 1b. Leaves 2-5 cm long, snow-white beneath ... var. *fulgens* 2

1. var. **frondosa**

Primary forests, in shaded places, 1000-1500 m; fl. & fr.: May-Nov. Jarain, Jowai, Narpoh Reserve, Raliang.

2. var. **fulgens** (Wedd.) Balakr. **comb. nov.** *Pouzolzia viminea* var. *fulgens* Wedd. in DC. Prodr. 16(1): 228. 1869; Fl. Brit. Ind. 5: 581. 1888; Fl. As. 4: 291. 1940.

Primary forests, 200-1000 m; fl. & fr.: May-Sept.; Narpoh Reserve, G. K. Deha 10109.

2. **Pouzolzia zeylanica** (L.) Benn. & Br. Pl. Jav. Rar. 1: 67. 1838. *Parietaria zeylanica* L. Sp. Pl. 1052. 1753. *Parietaria indica* L. Mant. Pl. 128. 1767. *Pouzolzia indica* (L.) Gaud. in Freyc. Voy. Bot. 12: 503. 1830; Fl. Brit. Ind. 5: 581. 1886.

Herbs, 0.3-1.0 m; leaves ovate to ovate-lanceolate, acute or obtuse at base, obtuse, acute or acuminate, 2-10 × 1-4 cm; basal nerves 3; lateral nerves 1 pair above the basal ones; petioles 5-20 mm; stipules linear-lanceolate, ± 3 mm, brownish-red; flower-clusters axillary, strigose with simple or hooked hairs; achenes ± 2 mm, ellipsoid; fruiting perianth with 4-5 ribs or wings.

Primary forests, 100-600 m; fl. & fr.: May-Sept.; Dawki.

3. **Pouzolzia hirta** (Bl.) Hassk. Cat. Hort. Bogor. 80. 1844; Fl. Brit. Ind. 5: 586. 1888; Fl. As. 4: 291. 1940. *Urtica hirta* Bl. Bijdr. 495. 1826.

Herbs, 25-75 cm; leaves lanceolate or oblong-lanceolate, rounded or cordate at base, acute to acuminate, 3-15 × 0.7-2.0 cm; basal nerves 3, rarely with 2 extra short ones; petioles up to 4 mm; stipules ovate, 3-4 mm; flower-clusters axillary, sessile, reddish, 5-10 mm diam., strigose with grey hooked or simple hairs; achenes ellipsoid, ± 2 mm; fruiting perianth 2-3-ribbed, rarely winged, dull black.

Steep gullies, rock crevices and grasslands, 1000-1500 m; fl. & fr.: May-Oct.; Jarain, Jowai.

10. CHAMABAINIA Wt.

Chamabainia cuspidata Wt. Ic. Pl. Ind. Or. 6: 11. t. 1981. 1853; Fl. Brit. Ind. 5: 580. 1888; Fl. As. 4: 290. 1940.

Diffuse ascending herbs; leaves ovate, rounded at base, acute, serrate-dentate at margins, 1-4 × 1-2 cm, 3-nerved at base; petioles 5-20 mm; stipules orbicular, acute, paired; male flowers clustered in upper axils; pedicels 2-3 mm; female flowers densely clustered in lower axils, surrounded by small lanceolate bracts; achenes ellipsoid, compressed, elliptic.

Primary forests, 1200-1400 m; fl. & fr.: July-Sept.; Jowai.

11. SARCOCHLAMYS Gaud.

Sarcochlamys pulcherrima (Roxb.) Gaud. Voy. Bonite, Bot. t. 289. 1844; Fl. Brit. Ind. 5: 588. 1888; Fl. As. 4: 292. 1940. *Urtica pulcherrima* Roxb. Fl. Ind. 3: 588. 1832.

Trees or shrubs, 2-5 m; leaves narrow-lanceolate, acute or obtuse at base, acute or acuminate, shallowly dentate at margins, 8-25 × 1-5 cm; basal nerves 3; petioles 1-8 cm; stipules connate at base; spikes paniculate, interrupted, glomerate, 4-8 cm; female flowers confluent with rachis; peduncles puberulous; achenes oblique, enclosed in fleshy accrescent perianth.

Primary forests, 100-1000 m; fl. & fr.: May-Jan.; Dawki, Sohka.

12. VILLEBRUNEA Gaud.

- | | | |
|---|-----|--------------------------|
| 1a. Leaves 3-nerved at base, distinctly serrate, pubescent above. | ... | <i>V. frutescens</i> 1 |
| 1b. Leaves penninerved, entire, glabrous above. | ... | <i>V. integrifolia</i> 2 |

1. **Villebrunea frutescens** (Thunb.) Bl. Mus. Bot. Lugd.-Bat. 2: 168. 1856; Fl. Brit. Ind. 5: 590. 1888. *Urtica frutescens* Thunb. Fl. Jap. 70. 1784; *Oreocnide frutescens* (Thunb.) Miq. Ann. Mus. Bot. Lugd.-Bat. 3: 131. 1867; Fl. As. 4: 293. 1940.

Bushy shrubs, up to 1 m; leaves ovate or elliptic to oblong-lanceolate, rounded or shallowly cordate at base, acuminate, finely serrate, 3-12 × 0.5-5.0 cm, whitish-mottled beneath, 3-nerved at base; lateral nerves 3-5 pairs; petioles 5-25 mm; stipules lanceolate, ± 7 mm; achenes orange, aggregate into ovoid, 7-8 mm long clusters, supported by cup-shaped bracts.

Forests, 1200-1400 m; fl. & fr.: May-Oct.; Jowai.

2. **Villebrunea integrifolia** Gaud. Voy. Bonite, Bot. t. 91. 1844; Fl. Brit. Ind. 5: 589. 1888. *Oreocnide integrifolia* (Gaud.) Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 306. 1869; Fl. As. 4: 293. 1940. 'Dieng-teingbah'.

Trees or shrubs, 3-8 m; leaves elliptic-oblong, obovate, acute or obtuse at base, caudate-acuminate, 10-35 x 3-12 cm; lateral nerves 9-12 pairs; petioles 1-10 cm; stipules connate at base, 5-10 mm; heads fascicled or in dichotomously branched cymes, 1-2 cm; peduncles hispid; flowers with persistent cupular bracts at base; achenes aggregated into a clustered head, ± 5 mm across, white.

Primary forests, 400-1200 m; fl. & fr.: Mar.-Aug.; Dawki, Syndai-Jarain.

13. DEBREGEASIA Gaud.

- 1a. Leaves narrow-elliptic or oblong-lanceolate; petioles up to 2 cm long; inflorescences on up to 1 cm long peduncles. ... *D. longifolia* 1
 1b. Leaves broadly ovate or suborbicular; petioles more than 3 cm long; inflorescences on 4-8 cm long peduncles. ... *D. wallichiana* 2

1. **Debregeasia longifolia** (Burm. f.) Wedd. in DC. Prodr. 16(1): 235. 1869; Fl. As. 4: 295. 1940. *Urtica longifolia* Burm. f. Fl. Ind. 197 (297). 1768. *D. velutina* Gaud. Bot. Bonite Voy. t. 90. 1843; Fl. Brit. Ind. 5: 590. 1888.

Shrubs or small trees, 3-5 m; leaves acute to subcordate at base, acute to acuminate, crenate-serrate, 5-25 x 1-7 cm, bullate and rough above, pale white or ash-tomentose beneath; basal nerves 3; lateral nerves 3-5 pairs; petioles 5-20 mm; stipules 2-fid, 5-10 mm; heads 3-5 mm across; achenes contained in fleshy perianth arranged in 6-8 mm thick heads, yellow or red.

Forests, 900-1400 m; fl. & fr.: May-Dec.; Jarain, Umtapoh.

2. **Debregeasia wallichiana** Wedd. Nouv. Arch. Mus. Hist. Nat. Paris 9: 464. t. 14. 1857; Fl. Brit. Ind. 5: 591. 1888; Fl. As. 4: 296. 1940. *Missiessya wallichii* Wedd. in Ann. Sci. Nat. ser. 4. 1: 195. 1854.

Trees or shrubs, 3-8 m; leaves crowded at apex of branches, rounded or shallowly cordate at base, acuminate or caudate, 5-30 x 5-25 cm; white appressed tomentose beneath; basal nerves 3; lateral nerves 6-7 pairs; petioles 6-23 cm, red; stipules bifid; heads 4-6 mm across; peduncles and pedicels red; achenes contained in fleshy perianth, arranged in 6-8 mm thick heads, pink.

- 1b. Inflorescence unisexual, androgynous or mixed ; male flowers always with a pistillode ; stamens 12 ; anthers dorsifixed or versatile ; stigma minute, punctiform ; staminodes present ; cupule completely or rarely partially enclosing the nuts.
- 2a. Inflorescence mostly unisexual ; cupules divided into lobes or segments which are sometimes completely fused ; each complete female dichasium surrounded by a cupule which is usually spiny. ... *Castanopsis* 2
- 2b. Inflorescence usually androgynous or mixed ; cupules never lobed or showing any indications of vertical divisions ; each flower of female dichasium surrounded by its own cupule, which is covered with scales or lamellae. ... *Lithocarpus* 3

1. QUERCUS L.

- 1a. Leaf-base rounded or truncate ; serratures of leaf 4—6 mm long ; petioles 4—6 cm long ; cupules densely long-subulate scaly. ... *Q. serrata* 1
- 1b. Leaf-base acute, obtuse or subcordate ; serratures of leaf less than 3 mm long ; petioles less than 3 cm long ; cupule with annular lamellae, not densely long scaly.
- 2a. Cupules saucer-shaped, woody at margin ; nuts cylindrical or oblong-ovoid, 3.5—4.5 cm long, velvety. ... *Q. semiserrata* 2
- 2b. Cupules cup-shaped, thin at margins ; nuts ovoid or subglobose, up to 2.5 cm long, glabrous, glossy.
- 3a. Leaves 3—5 cm long, stellate-pubescent beneath ; lateral nerves bifurcating near margins ; petioles up to 3 mm long ; cupules minutely scaly. ... *Q. semicarpifolia* 3
- 3b. Leaves 6—15 cm long, simply pubescent or glaucous beneath ; lateral nerves unbranched ; petioles 10—20 mm long ; cupules smooth.
- 4a. Leaves glaucous beneath ; lateral nerves up to 13 pairs ; nut ovoid. ... *Q. glauca* 4
- 4b. Leaves finely tomentose beneath ; lateral nerves 15—20 pairs ; nut globose. ... *Q. kamroopii* 5

1. *Quercus serrata* Thunb. Fl. Jap. 176. 1784 ; Fl. Brit. Ind. 5: 801. 1888 ; Fl. As. 4: 307. 1940.

Trees, 10-20 m ; leaves lanceolate, or elliptic-lanceolate, acute to acuminate at apex, spinulose-serrate with linear setaceous 4-6 mm long serratures, 8-16 × 2-6 cm ; lateral nerves 10-18 pairs ; stipules lanceolate, 5-6 mm ; male spikes 5-10 cm ; female spikes 2-4 cm ; fruits solitary or in pairs ; cupule hard, woody, embracing $\frac{3}{4}$ of the nut ; scales numerous, thinly tomentose, with dense subulate spines ; nuts subglobose, 20-25 mm diam., smooth.

Forests, 1000-1600 m ; fl. & fr. ; Mar.-Oct. ; Jowai, Khongsong-Raliang, Mynso,

2. **Quercus semiserrata** Roxb. Fl. Ind. 3: 641. 1832; Fl. Brit. Ind. 5: 604. 1888; Fl. As. 4: 308. 1940.

Trees, 15-25 m; leaves oblanceolate or elliptic-lanceolate, obtuse or cuneate at base, acute to short-acuminate, serrate at margin, 8-20 × 3-8 cm; lateral nerves 10-14 pairs; petioles 15-25 mm; male spikes solitary, axillary, 2-3-flowered; female spikes axillary, solitary, simple, 2-3-flowered; fruits on short stalks; cupules enclosing $\frac{3}{8}$ of nut, 2.5-3.0 cm across, brown-velvety outside, purplish inside, with 3-8 annular rings; nut with subterete umbo.

Forests, 1000-1500 m; fl. & fr.: Mar.-Dec.; Saipung.

3. **Quercus semicarpifolia** Sm. in Rees, Cyclop. 29: no. 20. 1819; Fl. Brit. Ind. 5: 601. 1888; Fl. As. 4: 306. 1940.

Shrubs or trees, 3-8 m; leaves elliptic-oblong or obovate, subcordate or cordate at base, obtuse or subobtuse, spinous-serrate, 3.0-5.0 × 1.5-3.5 cm; lateral nerves 8-10 pairs; male spikes crowded, 5-10 cm; female spikes axillary; fruits 2.0-2.5 cm diam.; cupules covering about $\frac{1}{2}$ the nut; scales imbricate, ovate-acute; nuts ovoid, subglobose, pointed brown.

Primary forests, 1200-1600 m; fl. & fr.: May-Sept.; Nartiang, Shang-pung.

4. **Quercus glauca** Thunb. Fl. Jap. 175. 1784; Fl. Brit. Ind. 5: 604. 1888; Fl. As. 4: 309. 1940. '*Dieng-sariwar*'.

Trees, 5-15 m; leaves oblong to ovate-lanceolate, acute or obtuse at base, caudate-acuminate, sharply serrate, 5-15 × 1.5-5.5 cm; lateral nerves 10-13 pairs; petioles 1-3 cm; male spikes axillary, pendulous, simple or paniced; female spike axillary, solitary, 2-5-flowered, 10-15 mm; cupules sessile, annular, with 4-5 lamellae, grey-tomentose, 8-12 mm diam., covering less than $\frac{1}{2}$ of nut; nuts exserted, 15-20 mm, brown.

Forests, 1200-1600 m; fl. & fr.: Mar.-Jan.; Jarain, Jowai.

5. **Quercus kamroopii** D. Don, Prodr. Fl. Nep. 57. 1825. *Q. lineata* (non Bl. 1828) *sensu* Hook. f. Fl. Brit. Ind. 5: 605. 1888; Fl. As. 4: 310. 1940.

Trees, 8-15 m; leaves lanceolate or oblong-lanceolate, acute or rounded at base, acuminate, setaceous-serrate at margin, 4-10 × 1-4 cm; petioles 3-8 mm; male spikes paired or in fascicles, 3-6 cm, brownish-pilose; female spikes solitary, 1-5-flowered, 1-2 cm, dense pubescent; cupules sessile, cup-shaped, minutely tomentose, with 5-7 annular lamellae; nuts truncate at base, \pm 2 cm, smooth.

Primary forests, 1200 - 1600 m; fl. & fr.: Mar.-Oct.; Jowai-Jarain, G. K. Deka 17173.

2. *CASTANOPSIS* Spach *nom. cons.*

- | | | |
|--|-----|-------------------------|
| 1a. Walls of cupules concealed by densely arranged spines. | | |
| 2a. Leaves sharply serrate; lateral nerves 15—20 pairs. | ... | <i>C. indica</i> 1 |
| 2b. Leaves entire; lateral nerves 10—14 pairs. | .. | <i>C. purpurella</i> 2 |
| 1b. Walls of cupules not concealed by spines. | | |
| 3a. Walls of cupules encircled by undulating spaced ridge, showing no trace of spines. | ... | <i>C. kurzii</i> 3 |
| 3b. Walls of cupules encircled by tufts of spines. | | |
| 4a. Leaves glabrous; lateral nerves 6—8 pairs. | ... | <i>C. armata</i> 4 |
| 4b. Leaves cinereous or ferruginous; lateral nerves 10—12 pairs. | ... | <i>C. tribuloides</i> 5 |

1. ***Castanopsis indica*** (Roxb.) DC. in Seem. J. Bot. 1: 182. 1863; Fl. Brit. Ind. 5: 620. 1888; Fl. As. 4: 321. 1940. *Castanea indica* Roxb. Fl. Ind. 3: 643. 1832. '*Dieng-saraing*'.

Trees, 10 - 25 m; leaves elliptic-oblong or lanceolate, rounded or obtuse at base, acute to acuminate, 8 - 20 × 5 - 10 cm; petioles 7 - 12 mm; male spikes 15 - 25 cm; female spikes solitary, axillary; cupules 25 - 35 mm diam., thin-walled, densely covered with subulate persistent, up to 15 mm long spines; nuts ovoid, 8 - 15 mm, brown.

Forests and forest borders, 500 - 1200 m; fl. & fr.: Feb.-Dec.; Nongthala-Sohka, Mynso, Syndai.

Nuts are edible.

2. ***Castanopsis purpurella*** (Miq.) Balakr. *comb. nov.* *Castanea purpurella* Miq. Fl. Ind. Bat. suppl. 352. 1861. *Castanopsis hystrix* DC. in Seem. J. Bot. 1: 182. 1863; Fl. Brit. Ind. 5: 620. 1888; Fl. As. 4: 322. 1940.

Trees, 10 - 25 m; leaves lanceolate or narrow-elliptic, rounded at base, acuminate, 5 - 15 × 2 - 7 cm; petioles 5 - 15 mm; male spikes in small panicles; female spikes in threes, 4 - 10 cm; cupules congested in spikes, covered with 3 - 5 mm long pubescent sharp spines; nuts, ovoid, conic, 3-angled, ± 13 mm, smooth.

Forests, 1200 - 1500 m; fl. & fr.: Jan.-Dec.; Jowai.

Nuts are edible; timber useful for railway sleepers.

3. ***Castanopsis kurzii*** (Hance) S. N. Biswas in Bull. Bot. Surv. Ind.

11: 189. 1969 (1971). *Quercus lanceifolia* Roxb. Fl. Ind. 3: 634. 1832 (non Schlect. & Cham. 1830); Fl. Brit. Ind. 5: 616. 1888; Fl. As. 4: 312. 1940. *Quercus kurzii* Hance in Seem. in J. Bot. 16: 328. 1878. *Castanopsis lanceifolia* (Roxb.) Hackel & Camus in Bull. Soc. Bot. France 68: 394. 1922. *Q. lanceifolia* Roxb. var. *semicristata* King in Fl. Brit. Ind. 5: 616. 1888; Fl. As. 4: 312. 1940.

Trees, 5-15 m; leaves lanceolate, oblong-lanceolate, acute or rounded at base, acuminate, 4-15 × 2-6 cm; lateral nerves 9-11 pairs; petioles 1-2 cm; spikes erect, stiff, 6-20 cm; cupules enclosing the nut, splitting up irregularly, ovoid, 2.0-2.5 × 1.0-1.3 cm, marked with 4-6 transverse undulating ridges; nuts ovoid, ± 2 × 1 cm.

Forests, 200-1500 m; fl. & fr.: May-Dec.; Dawki, Jarain-Dawki, Jowai, Sohka.

4. *Castanopsis armata* (Roxb.) Spach. Hist. Veg. Phan. 11: 185. 1842; Fl. Brit. Ind. 5: 622. 1888; Fl. As. 4: 323. 1940. *Quercus armata* Roxb. Pl. Corom. 3: 92. t. 296. 1820.

Trees, 15-25 m; leaves lanceolate or oblong-lanceolate, acute or caudate-acuminate, 8-23 × 3-8 cm; petioles 5-12 mm; male spikes 8-12 cm; female spikes 4-6 cm, solitary; cupules ovoid, 3.0-3.5 cm across, with numerous spines arranged in groups on wavy ridges; spines simple or stellately branched, flattened, 3-5 mm, pubescent; nuts solitary, ovoid, compressed or flattened.

Forests, 100-300 m; fl. & fr.: July-Jan.; Dawki, Lumshnong.

5. *Castanopsis tribuloides* (Sm.) DC. in Seem. J. Bot. 1: 182. 1868; Fl. Brit. Ind. 5: 622. 1888; Fl. As. 4: 324. 1940. *Quercus tribuloides* Sm. in Rees. Cyclop. 29(1): no. 13. 1819. 'Diengsning'.

Trees, 10-25 m; leaves lanceolate, acute at base, acuminate, 5-15 × 3-6 cm; matted-shiny tomentose beneath; petioles 5-20 mm; male spikes 15-30 cm; female spikes 5-12 cm; cupules globose, 10-25 × 8-20 mm; spines sharp pointed, 3-10 mm; nuts glabrous, brown.

Forests, 1000-1600 m; fl. & fr.: Aug.-Jan.; Jarain, Khongsong, Mynso, Nartiang, Sonapur, Sutnga.

The length of spines and the size of cupules vary considerably. Hook. f. (Fl. Brit. Ind.) and Kanjilal *et al.* (Fl. As.) report 4 varieties based on these characters; however these variations seem to be continuous and efforts to draw out clear-cut definitions of these varieties have failed.

3. LITHOCARPUS Bl.

- | | | |
|---|-----|------------------------|
| 1a. Cupules covering less than $\frac{1}{4}$ of mature nuts. | ... | <i>L. elegans</i> 1 |
| 1b. Cupules covering more than $\frac{1}{4}$ of mature nuts. | | |
| 2a. Leaves long caudate-acuminate, brown-pubescent on nerves beneath; stamens ± 12 ; nuts glabrous. | ... | <i>L. fenestrata</i> 2 |
| 2b. Leaves acute or acuminate, glabrous; stamens ± 10 ; nuts hairy. | ... | <i>L. dealbata</i> 3 |

1. **Lithocarpus elegans** (Bl.) Soepadmo in Reinwardtia 8: 236. 1970. *Quercus spicata* Sm. in Rees, Cyclop. 29: no. 12. 1819 (*non* Humb. & Bonpl. 1809); Fl. Brit. Ind. 5: 609. 1888. *Q. elegans* Bl. in Verh. Bat. Gen. K. & W. 9: 208. 1828. *Q. grandifolia* D. Don in Lamb. Gen. Pin. 2: 27, t. 8. 1824. *Pasania spicata* (Sm.) Oerst. in Vid. Medd. Naturh. For. Kjobn. 8: 83. 1867; Fl. As. 4: 314. 1940. *L. grandifolius* (D. Don) Biswas in Bull. Bot. Surv. Ind. 10: 258. 1968 (1969). 'Dieng-sarang'.

Trees, 10-30 m; leaves lanceolate or oblanceolate, acute or subcordate at base, abrupt-acuminate, 10-25 (-30) \times 4-10 cm; lateral nerves 10-15 pairs; petioles 5-20 mm; male spikes 5-20 cm; female spikes 7-15 cm; cupules solitary or paired, connate, confluent with stout rachis, 1.8-2.3 cm across; nuts ovoid, depressed with a very short umbo at apex, 1.5-2.0 cm, brown.

Forests, 500-1500 m; fl. & fr.: May-Oct.; Dawki, Jarain, Jowai, Khongsnong, Umtapoh.

2. **Lithocarpus fenestrata** (Roxb.) Rehder in J. Arn. Arb. 1: 126. 1919. *Quercus fenestrata* Roxb. Fl. Ind. 3: 633. 1832; Fl. Brit. Ind. 5: 608. 1888. *Pasania fenestrata* (Roxb.) Oerst. in Kjoeb. Vid. Med. 84. 1866; Fl. As. 4: 317. 1940.

Trees, 15-25 m; leaves oblong-lanceolate or elliptic-lanceolate cuneate and often oblique at base, 10-25 \times 3-6 cm; lateral nerves 10-13 pairs; petioles 8-15 mm; stipules linear-lanceolate; spikes erect, crowded at ends of branches, in panicles or fascicles, 10-20 cm; fruits 1-2 or in threes; cupules obconic or obovoid; scales triangular-ovate; nuts globose, apiculate, 1.5-2.0 cm, smooth.

Primary forests, 500-1200 m; fl. & fr.: Oct.-Aug.; Dawki, Jowai, Khongsnong-Garampani.

3. **Lithocarpus dealbata** (Miq.) Rehder in J. Arn. Arb. 1: 124. 1919. *Quercus dealbata* Miq. in Ann. Mus. Bot. Lugd.-Bat. 1: 107. 1863; Fl. Brit. Ind. 5: 609. 1888. *Pasania dealbata* (Miq.) Oerst. in Kjoeb. Vid. Med. 84. 1866; Fl. As. 4: 317. 1940. 'Soh-rang-khlaq',

Shrubs or small trees, 3-10 m; leaves elliptic-lanceolate, acute or cuneate at base, 8-12 × 3-5 cm; lateral nerves 8-14 pairs; petioles 5-15 mm; spikes in terminal fascicles, 10-19 cm; fruits in clusters of 1-3, stout, 10-18 cm; cupules woody; scales triangular, acute, appressed and connate at base; nuts subglobose, turbinate at apex, 12-16 mm, hoary.

Forests, 1000-1500 m; fl. & fr.: Jan.-Dec.; Jowai, Mynso.

185. CORYLACEAE

CARPINUS L.

Carpinus viminea Lindl. in Wall. Pl. As. Rar. 2: 4, t. 106. 1831; Fl. Brit. Ind. 5: 626. 1888; Fl. As. 4: 326. 1940.

Trees, 10-15 m; leaves ovate-lanceolate, rounded to subcordate at base, caudate-acuminate, double serrate, 7-10 × 2.5-5.0 cm; lateral nerves 10-12 pairs; petioles 3-12 mm; male spikes 25-50 mm; pendulous, lateral at base of young shoots; female spikes 5-10 cm, erect, terminal; nuts 2.5-3.5 mm, ribbed, adnate to base of large dentate 3-lobed wing-like bracts.

Forests, 1300-1600 m; fl. & fr.: Feb.-Aug.; Jarain, Jowai.

186. SALICACEAE

SALIX L.

Salix psilostigma Anderss. in Vet. Acad. Handb. Stockh. 1850: 496. 1851. *S. eriophylla* Anderss. in J. Linn. Soc. 4: 48. 1859; Fl. Brit. Ind. 5: 633. 1888.

Spreading bushy shrubs, 1-3 m; leaves elliptic-lanceolate to linear-lanceolate, rounded or subcordate at base, acute to short-acuminate, 2-8 × 0.8-1.8 cm; lateral nerves 15-23 pairs; petioles up to 2 mm; inflorescences slender, terminal, in unisexual catkins, dense-flowered; bracts obtuse, villous; male catkins 20-25 mm; female catkins 3-5 cm; capsules subovoid to ellipsoid, ± 2.5 mm, 2-valved; seeds minute.

Primary forests, 1400-1800 m; fl. & fr.: Mar.-Aug.; Jowai, Deb 24410, —Endemic to Meghalaya.

137. HYDROCHARITACEAE

BLYXA Thouars

Blyxa echinosperma (Clarke) Hook. f. Fl. Brit. Ind. 5: 661. 1888. Rao & Verma in Bull. Bot. Surv. Ind. 12: 140. 1970. *Hydrocharis echinosperma* Clarke in J. Linn. Soc. 14: 8. t. 1, 1875.

Acaulous herbs; leaves radical, sheathing at base, 10-60 × 0.5-1.0 cm; nerves 5-7, parallel; peduncles 1 or more, 5-30 cm; spathe 1-flowered, rarely 2-flowered, 4-10 cm; sepals linear, 6-8 × 1 mm; petals ± 13 mm; fruits linear, 3-7 cm; seeds many, ellipsoid, 1.5-2.0 × 0.7-1.0 mm; testa with 8 longitudinal rows of blunt spines with 1-3 mm long filiform tails at both or only one end.

Aquatic, in paddy fields and shallow ditches and ponds, 1000-1600 m; fl. & fr.: Jan.-Dec.; Amwee riverside, near Jarain, Mawryngkneng.

138. BURMANNIACEAE

BURMANNIA L.

- | | | |
|---|-----|-----------------------|
| 1a. Robust herbs with up to 15 cm long leaves; inflorescence usually a bifid many-flowered cyme at apex of stem. | ... | <i>B. disticha</i> 1 |
| 1b. Slender herbs with up to 1 cm long leaves; inflorescence a cluster of few flowers at apex of stem or rarely flowers solitary. | ... | <i>B. coelestis</i> 2 |

1. **Burmannia disticha** L. Sp. Pl. 287. 1753; Fl. Brit. Ind. 5: 664. 1888; Rao & Verma in Bull. Bot. Surv. Ind. 12: 142. 1970.

Annual herbs, 10-70 cm; leaves linear to lanceolate acute, up to 15 × 1.5 cm; cauline leaves reduced, lanceolate-acute, up to 7 × 0.6 cm; inflorescences bifid, each arm up to 8 cm; flowers sessile, blue or purple, often with yellow-tipped greenish lobes; perianth-tube cylindrical, trigonous, 3-4 mm; wings elliptic, 10-18 × 1-2 mm.

Open places in grasslands, marshes and paddy fields, 1000-1500 m; fl. & fr.: May-Sept.; Jarain, Mawryngkneng.

2. **Burmannia coelestis** D. Don, Prodr. Fl. Ncp. 44. 1825; Fl. Brit. Ind. 5: 665. 1888; Rao & Verma in Bull. Bot. Surv. Ind. 12: 142. 1970.

Slender annual herbs, up to 40 cm; leaves linear-lanceolate, acute or acuminate ± 10 × 1-3 mm; cauline leaves linear-subulate, up to 1 cm; flowers blue, solitary or few together clustered at apex of stems; perianth-

tube cylindrical-trigonous, ± 5 mm; wings elliptic to subobovate, $\pm 10 \times 2$ mm.

Open marshy places and paddy fields, 1000 - 1500 m; fl. & fr.: June-Nov.; Jarain - Jowai.

139. ORCHIDACEAE

A large family, with almost all the species of great biological and ornamental interest. Many species have been and are being indiscriminately removed from the forest. All the species are in bad need of conservation measures.

- | | | |
|--|-----|-------------------------|
| 1a. Fertile stamens 2 ; lip large, pouch-like | ... | <i>Paphiopedilum</i> 1 |
| 1b. Fertile stamen 1 ; lip various not pouched. | | |
| 2a. Plants terrestrial, with herbaceous stems and without tubers, corms, pseudobulbs or other thickenings ; pollinia granular, never waxy. | | |
| 3a. Saprophytic plants with no green leaves and flowering stems lacking green colour. | ... | <i>Aphyllorchis</i> 2 |
| 3b. Autophytic plants with leaves at or after flowering. | | |
| 4a. Flowers with lip at top. | ... | <i>Hetaeria</i> 3 |
| 4b. Flowers with lip at bottom. | | |
| 5a. Lip hairy inside, entire. | ... | <i>Goodyera</i> 4 |
| 5b. Lip glabrous inside, 2-lobed. | | |
| 6a. Claw of lip with toothed or fringed wings on either side. | ... | <i>Anoectochilus</i> 5 |
| 6b. Claw of lip without such wings. | ... | <i>Zeuxine</i> 6 |
| 2b. Plants epiphytic or terrestrial, if terrestrial stems with tubers, corms, corm-like thickenings or pseudobulbs or often rhizomatous or woody; pollinia usually waxy, sometimes granular. | | |
| 7a. Plants usually growing from underground tubers, always with erect leafy stems and terminal inflorescences ; pollinia 2, distinctly separate and each with own disk and caudicle. | | |
| 8a. Lip not spurred. | ... | <i>Herminium</i> 7 |
| 8b. Lip spurred. | | |
| 9a. Plant with solitary flower ; petals larger than sepals. | ... | <i>Diplomeris</i> 8 |
| 9b. Plant with few to many flowers ; petals as large as sepals. | | |
| 10a. Flowers axillary, solitary ; lip petaloid. | ... | <i>Brachycorythis</i> 9 |
| 10b. Flowers in terminal racemes ; lip not petaloid. | ... | <i>Habenaria</i> 10 |
| 7b. Plants without this combination of characters. | | |
| 11a. Plant growth monopodial ; stem usually growing indefinitely in length. | | |
| 12a. Pollinia 4, equal or unequal, united into 2 bodies. | | |
| 13a. Sheaths and scapes distinctly warted ; flowers ± 4 cm across. | ... | <i>Stauropsis</i> 11 |

- 13b. Sheaths and scapes not warted ; flowers less than 2 cm across.
- 14a. Flowers not resupinate (pedicels and ovary not twisted) ; spur not appendaged inside. ... *Acampe* 12
- 14b. Flowers resupinate (pedicel and ovary twisted) ; spur appendaged inside.
- 15a. Lip with an appendage at back just below the column. ... *Sarcanthus* 13
- 15b. Lip with no such appendage.
- 16a. Leaves semiterete ; racemes paniculate ; flowers ± 1 cm across. ... *Schoenorchis* 14
- 16b. Leaves flat ; racemes simple ; flowers ± 3 mm across. ... *Uncifera* 15
- 12b. Pollinia 2, often furrowed or more or less deeply split.
- 17a. Lip not spurred, but sometimes just concave at base.
- 18a. Stems elongated, more than 5 cm long ; leaves terete ; flowers in heads or rarely solitary. ... *Luisia* 16
- 18b. Stems short, less than 2 cm long or indistinct ; leaves flat ; flowers in many-flowered racemes or panicles.
- 19a. Leaves present when in flower ; inflorescence 8—20 cm long, many-flowered ; flowers dark pink with yellow patches ; column without foot. ... *Ornithochilus* 17
- 19b. Leaves absent when in flower ; inflorescences 2—3 cm long, 3—6-flowered ; flowers pink with dark pink spots ; column with a foot. ... *Kingidium* 18
- 17b. Lip with a distinct spur or deep sac at base.
- 20a. Lip more or less movable, inserted at the end of distinct column-foot ; spur curved upwards against lip.
- 21a. Flowers lasting many days, opening several together ; lip with keels and appendages inside spur. ... *Aeridas* 19
- 21b. Flowers lasting one or few days only, opening one or few together at a time ; lip without keels or appendages inside spur. ... *Micropera* 20
- 20b. Lip immobile ; spur straight, not curved.
- 22a. Spur cup-shaped. ... *Gastrochilus* 21
- 22b. Spur conical or cylindric.
- 23a. Leaves terete or flat ; flowers lax, blue, green or green and purple mixed, if pink then leaves terete ; column without foot. ... *Vanda* 22

- 23b. Leaves flat ; flowers dense, pinkish-white and purple mixed ; column with a foot. ... *Rhynchosstylis* 23
- 11b. Plant growth sympodial, each shoot of limited growth and followed by other shoots from (usually basal) axillary buds.
- 24a. Inflorescences basal, borne near the base of each shoot of sympodium or lateral, in axils of lower leaves of stems, rarely (in *Tainia*) borne on separate leafless shoots which alternate with vegetative shoots and appear as if arising from the base of each pseudobulb.
- 25a. Leaves conduplicate.
- 26a. Pollinia 8.
- 27a. Flowers white ; sepals forming a mentum with column-foot. ... *Phreatia* 24
- 27b. Flowers green or pale greenish-yellow ; sepals not forming a mentum ; column-foot absent. *Thelasis* 25
- 26b. Pollinia 2 or 4.
- 28a. Pseudobulbs consisting of several internodes and several leaves ; pollinia 2. ... *Cymbidium* 26
- 28b. Pseudobulbs consisting of single internode and single leaf ; pollinia 4.
- 29a. Bracts concealing flowers. *Sunipia* 27
- 29b. Bracts not concealing flowers. *Bulbophyllum* 28
- 25b. Leaves plicate.
- 30a. Sepals all connate into a tube. ... *Anthogonium* 29
- 30b. Sepals all free or connate at base only.
- 31a. Lip joined to column throughout its length. ... *Calanthe* 30
- 31b. Lip joined to column at its base only.
- 32a. Leaves solitary on each pseudobulb. ... *Tainia* 31
- 32b. Leaves several on each pseudobulb.
- 33a. Leaves articulate to petiole ; base of midlobe of lip narrow, ± 2 mm wide, with 2 ovoid callii ; spur absent. ... *Spathoglottis* 32
- 33b. Leaves not articulate to petiole ; base of midlobe of lip wider, without such callii ; spur present. ... *Phaius* 33
- 24b. Inflorescences terminal or in axils of upper leaves, occasionally on young shoots before leaves develop.

- 34a. Plant leafless and lacking green colour when in flower ; stem usually forming underground globose tubers. ... *Eulophia* 34
- 34b. Plants without this combination of characters.
- 35a. Pollinia without appendages, i.e. without disk, stipe or caudicle, almost free.
- 36a. Epiphytic or lithophytic plants ; leaves conduplicate, laterally compressed. ... *Oberonia* 35
- 36b. Terrestrial or rarely epiphytic plants ; leaves flat or plicate.
- 37a. Always terrestrial plants ; lip at the top of the flower, auricled at base ; column very short, not winged. ... *Malaxis* 36
- 37b. Terrestrial or epiphytic plants ; lip at the top or bottom of the flower, not auricled at base ; column long, winged at apical part. ... *Liparis* 37
- 35b. Pollinia appendaged, i.e. sometimes provided with a rudimentary disk or a caudicle which is glutinous at apex, attached in fours or pairs by viscous membrane.
- 38a. Pollinia 8.
- 39a. Usually terrestrial plants ; stems long-cylindric, slender, not pseudobulbous ; leaves many, scattered ; flowers large showy.
- 40a. Leaves thin, waxy, deciduous after flowering ; flowers white with yellow lip. ... *Thunia* 38
- 40b. Leaves firm, not waxy, persistent even after flowering ; flowers pink-purple. ... *Arundina* 39
- 39b. Usually epiphytic or lithophytic ; stems short, subglobose, ovoid, fusiform, ellipsoid or thick cylindric, pseudobulbous ; leaves few, mostly towards apex of stems ; flowers smaller, not showy
- 41a. Flowers spicate or racemose ; pollinia laterally flattened or subglobose.
- 42a. Inflorescences at upper nodes or terminal ; sepals free or connate at base only. *Eria* 40

- 42b. Inflorescences terminal ; sepals connate almost to apex with 3 short lobes at apex. *Cryptochilus* 41
- 41b. Flowers capitate or solitary or 2—3 together ; pollinia clavate.
- 43a. Stem pseudobulbous, discoid. ... *Porpax* 42
- 43b. Stem elongate.
- 44a. Stems with several internodes and several leaves ; flowers many in dense heads ; base of lip saccate. ... *Agrostophyllum* 43
- 44b. Stems with one internode and one leaf ; flowers few in lax heads ; base of lip narrow, not saccate. ... *Ceratostylis* 44
- 38b. Pollinia 4.
- 45a. Each branch of sympodial growth many-noded with many leaves ; inflorescences mostly at upper nodes, rarely terminal. ... *Dendrobium* 45
- 45b. Each branch of sympodial growth 1-noded, usually with 2 leaves ; inflorescences always terminal.
- 46a. Flowers solitary ; pollinia naked, without caudicles or disk.
- 47a. Leafy when in flower. *Katherinea* 46
- 47b. Leafless when in flower. *Pleione* 47
- 46b. Flowers in racemes ; pollinia with elastic caudicles or with disk.
- 48a. Basal part of lip concave, not distinct from blade ; lip 3-lobed. ... *Coelogyne* 48
- 48b. Basal part of lip saccate, distinctly separate from blade ; lip rarely 3-lobed.
- 49a. Floral bracts persistent ; lip erect, broad. *Pholidota* 49
- 49b. Floral bracts deciduous ; lip decurved, narrow. ... *Otochilus* 50

1. *PAPHIOPEDILUM* Pfitz. *nom. cons.*

Paphiopedilum venustum (Sims) Pfitz. in Engler, Bot. Jahrb. 19: 41. 1894. *Cypripedium venustum* Sims in Curtis, Bot. Mag. 47: t. 2129. 1820; Fl. Brit. Ind. 6: 173. 1890.

Leaves 4-10, elliptic-oblong, 12-18 × 3-4 cm, mottled with dark green above and purplish-green beneath; scapes 16-25 cm, 1-2-flowered, purple, puberulous; flowers 7-8 cm across; bracts ovate, ± 2 cm; dorsal sepal ovate, ± 3.5 × 3.0 cm, greenish-white with dark green veins; lateral sepals connate at base, ovate-lanceolate, ± 3 × 1.8 cm, ciliate at margins; petals oblanceolate, ± 5 × 1.3 cm, purplish-green, warty; lip with saccate, pouch-shaped midlobe, red, green reticulate.

Primary forests, in marshy or wet stream-sides in shaded places, 700-1400 m; fl. & fr.: Nov.-Mar.; Jaram, Lumshnong.

2. *APHYLLORCHIS* Bl.

Aphyllorchis montana Reichb. f. in Linnæa 61: 58. 1877; Fl. Brit. Ind. 6: 116. 1890.

Stems slender, erect, 25-35 cm, sheathed, terete; basal sheaths ovate, acute, ± 1 cm; upper sheaths lanceolate, acute, 1.5-2.5 cm; racemes few-flowered, 2-5 cm; bracts lanceolate, 6-18 mm, yellow, tinged purple; flowers pale brown or straw-coloured; sepals ovate-lanceolate, ± 7 mm; petals linear, ± 7 × 3 mm; lip obovate-oblong, obscurely 3-lobed; lateral lobes ovate, obtuse; midlobe ovate, obtuse; disk with 2 linear calli.

Forests, in shaded moist humus soil, 100-1000 m; fl. & fr.: June-Oct.; Jaintea Hills, Prain's Collector 304 (CAL).

3. *HETAERIA* Bl.

Hetaeria rubens (Lindl.) Benth. in Benth. & Hook. f. Gen. Pl. 3: 164. 1880; Fl. Brit. Ind. 6: 115. 1890. *Cerochilus rubens* Lindl. in Gard. Chron. 87. 1854.

Stems prostrate at base, decumbent-ascending at apex, 15-30 cm; leaves oblong-ovate or elliptic-lanceolate, oblique at base, 5-10 × 1-2 cm; racemes ± 15 cm, puberulous; flowers greenish-purple; bracts ovate, acute; sepals ovate, acute, ± 4 mm, 1-nerved; petals falcate, clawed at base, gibbous near apex; lip ± 5 mm, obliquely 3-lobed; lateral lobes rounded; midlobe clawed, often 2-fid; disk with 2 calli near base on both sides.

Primary forests, in dark humus soil, 1400-1600 m; fl. & fr.: Aug.-Dec.; Jowai.

4. GOODYERA R. Br.

- 1a. Plants 30—60 cm high; leaves lanceolate or elliptic-lanceolate, 8—15 × 2—4 cm; bracts 5—8 mm; flowers pale yellowish-brown. *G. procera* 1
 1b. Plants 10—15 cm high; leaves ovate-lanceolate, 3—5 × 1.5—2.5 cm; bracts 12—18 mm; flowers orange-yellow or red and yellow mixed. *G. foliosa* 2

1. **Goodyera procera** (Ker.-Gawl.) Hook. Exot. Fl. 1: t. 39. 1823; Fl. Brit. Ind. 6: 111. 1890. *Neottia procera* Ker.-Gawl. in Edw. Bot. Reg. 8: t. 629. 1822.

Caespitose herbs; stems stout; leaves cuneate at base, acuminate at apex; spikes erect, 5-20 cm, pubescent; flowers dense, pale brownish-yellow, ± 4 mm, scented; bracts lanceolate, pubescent; sepals ovate, obtuse, ± 4 mm, 1-nerved; petals spatulate, acute, crose on one side at apex; lip recurved, saccate at base, obtuse at apex; disk with 2 large callii.

Forests and forest borders, in shaded moist soil especially near streams, 800-1200 m; fl. & fr.: Mar.-Aug.; Jarain-Sohka.

2. **Goodyera foliosa** (Lindl.) Hook. f. Fl. Brit. Ind. 6: 113. 1890. *Georchis foliosa* Lindl. Gen. Sp. Orch. 496. 1840.

Stems slender, decumbent below; leaves acute; spikes erect, ± 5 cm, glandular-pubescent; flowers ± 8 mm, yellow with red and orange patches; bracts lanceolate; sepals ovate-lanceolate, acute, ± 8 × 3 mm; petals ob-lanceolate; lip oblong-ovate, saccate at base, setose inside; beak dilated, acute-infolded at apex.

Forests in shaded moist humus soil, also forest edges, 1200-1600 m; fl. & fr.: July-Oct.; Jowai, *Rita*, s. n. (CAL).

5. ANOECTOCHILUS Bl. *nom. cons.*

- 1a. Flowers greenish-brown; claw of lip toothed at margin. *A. luteus* 1
 1b. Flowers pinkish; claw of lip fimbriate at margin. *A. roxburghii* 2

1. **Anoectochilus luteus** Lindl. in J. Linn. Soc. 1: 179. 1857. *A. griffithii* Hook. f. Fl. Brit. Ind. 6: 96. 1890.

Stems decumbent-ascending; leaves ovate-elliptic, acute, 5-10 × 3-6 cm, dark purplish-red with yellow and red veins above, dull red beneath; racemes erect, 5-10 cm, pubescent; flowers brownish-green with white lip, ± 2 cm;

bracts lanceolate, pubescent; sepals oblong-ovate, ± 8 mm; petals oblong-ovate, beaked at apex; lip white with red base, clawed at base with 2 terminal divergent lobes; spur short, bifid.

Primary forests, in moss or humus covered moist soil in shaded places, 1200-1500 m; fl. & fr.: July-Dec.; Jarain-Jowai, *Balakrishnan* 46880.

2. **Anoectochilus roxburghii** (Wall.) Lindl. Gen. Sp. Orch. 499. 1840; Fl. Brit. Ind. 6: 95. 1890. *Chrysobaphus roxburghii* Wall. Tent. Fl. Nep. t. 27. 1826.

Stems 5-20 cm, slender, erect or arched; leaves ovate, acute, 2-5 \times 1-3 cm, dark brown-purple with red and yellow veins, purple beneath; racemes slender, ± 10 cm, pubescent; flowers pink with white lip, ± 1.5 cm; bracts lanceolate, ± 8 mm; petals lanceolate to oblanceolate, acuminate; lip clawed, with 2 oblong divergent terminal lobes; spur conical.

Primary forests, in shaded humus soil, often on rotting woods, 1000-1400 m; fl. & fr.: Aug.-Jan.; Lumshnong.

6. ZEUXINE Lindl. *nom. cons.*

Zeuxine gracilis (Breda) Bl. Fl. Java n.s. 56. t. 18. f. 2 & t. 23D. 1858. *Psychechilos gracile* Breda, Gen. Sp. Orch. Asclep. t. 9. 1827. *Monochilus affine* Lindl. Gen. Sp. Orch. 487. 1840. *Z. affine* (Lindl.) Hook. f. Fl. Brit. Ind. 6: 108. 1890.

Stems slender, erect, 15-25 cm; leaves subsessile, ovate-lanceolate, acute, reflexed, $\pm 2.5 \times 1.0$ cm; spikes slender, erect, 5-10 cm, pubescent, many-flowered; flowers ± 1 cm, white; bracts lanceolate acuminate; sepals ovate, concave, ± 6 mm, pubescent; petals oblanceolate, 3-4 mm; lip ± 4 mm, fleshy, sacrate at base, with 2 calli within; apex broadly 2-lobed at apex; lobes suborbicular, white; sac orange-red within.

Shaded places in forests amidst grass, 1000-1500 m; fl. & fr.: Sept.-Oct.; Jarain, Jowai.

7. HERMINIUM R. Br.

Herminium lanceum (Sw.) Vuijk in Blumea 11: 228. 1961; Hara in J. Jap. Bot. 44: 59. 1969. *Ophrys lancea* Sw. in Kongl. Vet. Akad. Handl. 21: 223. 1800. *Aceras angustifolia* Lindl. in Edw. Bot. Reg. 18: t. 1525. 1832. *H. angustifolium* (Lindl.) Hook. f. Fl. Brit. Ind. 6: 332. 1892.

Tubers 2, unequal, oblong; stems erect, 5-10 cm; leaves 1-2, linear,

10-20 × 0.8-1.2 cm; racemes erect, slender, many-flowered; peduncles compressed, sheathed; sheaths lanceolate, 15-25 mm; flower pale green, decurved, ± 2 mm across; bracts ovate-lanceolate; sepals oblong, ± 3 × 2 mm; petals linear; lip linear, ± 4 mm, 3-lobed; lateral lobes filiform, ± 1.2 mm, recurved; midlobe ovate, acute.

Open grassy slopes, 1200-1500 m; fl. & fr.: June-Nov.; Jarain-Jowai, Nartiang.

8. DIPLOMERIS D. Don

Diplomeris pulchella D. Don, Prodr. Fl. Nep. 26. 1825; Fl. Brit. Ind. 6: 167. 1890.

Rootstock creeping, subtuberous; stems 2-3 cm; leaves 1-2, sessile, oblong-ensiform, 7-10 × 0.8-1.0 cm; scapes erect, 7-9 cm, 1-flowered; flowers white, ± 2 cm across; bracts cymbiform, acuminate, sepals and petals ovate-lanceolate, 1-2 cm; 3-5-nerved; lip obovate or obcordate, ± 2 cm; spur incurved, thickened above the middle, 3-5 cm.

Primary forests in shaded humus-covered soil, 100-800 m; fl. & fr.: July-Dec.; Dawki.

9. BRACHYCORYTHIS Lindl.

Brachycorythis obcordata (D. Don) Summerh. in Kew Bull. 1955: 243. 1955. *Orchis obcordata* D. Don, Prodr. Fl. Nep. 230. 1825. *Habenaria galeandra* Benth. Fl. Hongk. 263. 1861; Fl. Brit. Ind. 6: 163. 1890.

Tubers oblong; stems erect, 15-30 cm; leaves sessile, oblong, acute, sheathing at base, 2.5-4.0 × 0.8-1.5 cm; spikes 3-8 cm, few-flowered, leafy; flowers pinkish-white, ± 1.3 cm across; bracts lanceolate, or oblong-ovate, ± 2.5 cm; sepals and petals ovate, acute, ± 8 × 4 mm; lip obcordate, short-clawed, entire, ± 1.2 cm; spur conical, short, acute.

Grasslands, on open hill slopes, 1000-1500 m; fl. & fr.: May-Sept.; Mawryngkneng, Umkhlaw.

10. HABENARIA Willd.

1a. Flowers golden yellow; midlobe of lip 3 times longer than lateral lobes. ...

H. acutifera 1

1b. Flowers greenish or white; midlobe of lip as long as or shorter than lateral lobes.

- 2a. Spur globose or subglobose, shorter than perianth lobes. ... *H. lacertifera* 2
 2b. Spur cylindric or clavate, longer than perianth lobes. ...
 3a. Bracts much shorter than pedicel-ovary. ... *H. khasiana* 3
 3b. Bracts as long as or longer than pedicel-ovary. ... *H. stenostachya* 4

1. **Habenaria acutifera** Lindl. Gen. Sp. Orch. 325. 1835; Fl. Brit. Ind. 6: 146. 1890.

Tubers 2, unequal; stems slender, erect, 8-20 cm; leaves few, sessile, linear-lanceolate, acuminate, 5-10 × 0.7-1.0 cm; inflorescences 5-10 cm; flowers ± 1.5 cm across; bracts lanceolate, acuminate; dorsal sepals oblong, obtuse, concave, ± 7 mm; lateral sepals oblong-ovate, concave, ± 9 mm; petals linear-oblong, ± 6 mm; lip erect, 3-lobed, ± 1 cm; lateral lobes subulate; midlobe linear; spur clavate, as long as pedicel-ovary.

Open grassy slopes, 1200-1700 m; fl. & fr.: July-Dec.; Jarain, Jowai-Badarpur, Khleihriat, Mawryngkneng.

2. **Habenaria lacertifera** (Lindl.) Benth. Fl. Hongk. 362. 1861; Fl. Brit. Ind. 6: 163. 1890. *Coeloglossum lacertifera* Lindl. Gen. Sp. Orch. 302. 1835.

Tubers 2, subequal; stems 1-2 cm, erect, sheathed; leaves oblong-lanceolate or elliptic-oblong, 3-6 × 1-2 cm; inflorescences stout erect, ± 20 cm; flowers greenish; bracts lanceolate; sepals and petals oblong-ovate, acute, ± 4 mm; lateral sepals falcate; lip reflexed, 3-lobed; lateral lobes filiform, curved; midlobe acute.

Open grasslands and shaded forest-borders, 1200-1500 m; fl. & fr.: Aug.-Feb.; Jarain, Raliang-Khongsong.

3. **Habenaria khasiana** Hook. f. Fl. Brit. Ind. 6: 151. 1890.

Tubers 2, unequal; stems 2-4 cm, erect; leaves subradical, sessile, linear, acuminate, 5-8 × 0.3-0.8 cm; inflorescences erect, bracts lanceolate, acuminate; sepals and petals ovate, acute, subequal, ± 4 mm; lip 3-lobed; lateral lobes filiform, spreading, longer than midlobe; midlobe linear, straight; spur straight or curved, thickened towards apex, 8-14 mm.

Open grassy slopes, 300-1500 m; fl. & fr.: July-Nov.; Jarain, Khleihriat, Rytang.

4. **Habenaria stenostachya** (Lindl.) Benth. Fl. Hongk. 362. 1861; Fl. Brit. Ind. 6: 153. 1890. *Platanthera stenostachya* Lindl. in Hook. J. Bot. 7: 37. 1855.

Tubers 2, unequal; stems stout, erect, 10-15 cm; leaves few, scattered, elliptic-lanceolate, acute at apex, 3-5 × 0.8-1.2 cm; inflorescences 10-15

cm; flowers white, ± 4 mm; bracts lanceolate, ± 1.3 cm; sepals and petals subequal, linear, obtuse, ± 4 mm; lip 3-lobed; lateral lobes linear, spreading; midlobe triangular, obtuse; spur clavate, 4-5 mm.

Grassy slopes and open forest borders, 1300-1600 m; fl. & fr.: June-Nov.; Jarain, Jowai.

11. STAUROPSIS Reichb. f.

Stauropsis undulata (Lindl.) Hook. f. Fl. Brit. Ind. 6: 27. 1890. *Vanda undulata* Lindl. in J. Linn. Soc. 3: 42. 1859.

Stems erect, 30-40 cm, ± 5 mm thick; leaves narrowly lanceolate, 7-13 \times 1.5-2.0 cm; scapes lateral, 12-15 cm; racemes 4-5 cm; flowers ± 4 cm across, white, with yellowish tinge; sepals oblanceolate, undulate, $\pm 2 \times 1$ cm; petals spatulate, acute, $\pm 2 \times 0.7$ cm, yellowish; lip $\pm 1.5 \times 1.0$ cm, 3-lobed, yellowish; lateral lobes streaked with pink; midlobe laterally compressed.

Epiphytic in shaded forests, 1300-1600 m; fl. & fr.: Mar.-Aug.; Jarain.

12. ACAMPE Lindl.

- | | |
|---|-----------------------|
| 1a. Inflorescences paniculate, as long as or longer than leaves;
flowers lax, pale yellow with red transverse lines. ... | <i>A. ochracea</i> 1 |
| 1b. Inflorescences corymbose, much shorter than leaves;
flowers dense, white with yellowish transverse bars. ... | <i>A. papillosa</i> 2 |

1. **Acampe ochracea** (Lindl.) Hochr. in Bull. N. Y. Bot. Gard. 6: 270. 1910. *Saccolabium ochraceum* Lindl. in Edw. Bot. Reg. Misc. 2: 1842; Fl. Brit. Ind. 6: 62. 1890.

Stems erect or pendulous, 15-30 cm, 5-7 mm thick; leaves narrowly oblong, 2-lobed at apex, 8-20 \times 0.6-2.0 cm; inflorescences 8-20 cm; flowers 6-9 mm across; sepals and petals $\pm 6 \times 2$ mm; lip 3-lobed, ± 5 mm; lateral lobes erect, ± 2 mm, toothed; midlobe ovate-triangular, serrulate, 2-auricled at base; spur conical, curved.

Epiphytic in primary forests, 200-500 m; fl. & fr.: Feb.-June; Dawki, Garampani.

2. **Acampe papillosa** Lindl. Fol. Orch. 2: 1853. *Saccolabium papillosum* Lindl. in Edw. Bot. Reg. 18: t. 1552. 1833; Fl. Brit. Ind. 6: 63. 1890

Stems erect, 10-20 cm, 6-8 mm thick; leaves narrowly oblong, obtusely 2-lobed at apex, 8-12×2-3 cm; inflorescences 12-15 cm; flowers 4-5 mm across; sepals and petals subequal, oblong, \pm 6 mm; lip sessile, 3-lobed; lateral lobes short; midlobe oblong-ovate, acute, crenate at margins; spur conical.

Epiphytic in forests, 1200-1500 m; fl. & fr.: Jan.-Aug.; Raliang.

13. SARCANTHUS Lindl.

- | | | |
|--|-----|----------------------------|
| 1a. Leaves terete. | ... | <i>S. appendiculatus</i> 1 |
| 1b. Leaves flat. | | |
| 2a. Leaves linear-lanceolate, acute or short acuminate at apex. | ... | <i>S. subulatus</i> 2 |
| 2b. Leaves oblong, 2-lobed at apex. | | |
| 3a. Leaves up to 6 cm long; racemes simple, 7-12 mm long, shorter than leaves. | ... | <i>S. insectifer</i> 3 |
| 3b. Leaves 10-20 cm long; racemes paniced, 25-45 cm long, longer than leaves. | ... | <i>S. racemifer</i> 4 |

1. **Sarcanthus appendiculatus** (Lindl.) Hook. f. Fl. Brit. Ind. 6: 67. 1890. *Aerides appendiculatum* Lindl. Gen. Sp. Orch. 242. 1833.

Stems pendulous, 20-40 cm; leaves 6-10 cm long, 2-3 cm thick; racemes lateral, 5-8 cm; flowers \pm 5 mm across, pale orange yellow with red streaks; sepals and petals oblong, reflexed, \pm 2×1 mm, pale orange-yellow with dark red veins; lip \pm 2 mm, 3-lobed; lateral lobes erect, acute, yellow; midlobe ovate, acute, pale pink; spur 2-celled, yellow with dark red veins; dorsal callus 2-lobed, pubescent.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: July-Nov.; Jarain.

2. **Sarcanthus subulatus** (Bl.) Reichb. f. in Bonpland. 5: 41. 1857. *Cleisostoma subulatus* Bl. Bijdr. 363. 1825. *S. secundus* Griff. Notul. 3: 362. 1851; Fl. Brit. Ind. 6: 67. 1890.

Stems elongate, 10-30 cm; internodes sheathed, 1.5-2.5 cm; leaves 10-18×0.9-1.2 cm; racemes simple, 2.5-8.0 cm; flowers \pm 8 mm, red with yellow or white marks; sepals subequal, oblong, obtuse, 2-4×1.0-1.5 mm; petals linear, oblanceolate, acute, \pm 2.5-1.0 mm; lip \pm 4.5 mm, pink; lateral lobes acute; midlobe concave, ovate, acute, \pm 2 mm; spur obtuse, \pm 2 mm, white, vertically septate; dorsal callus 2-lobed.

Epiphytic in primary forests, 400-1000 m; fl. & fr.: Aug.-Jan.; Narpoh Reserve, near Sonapur, G. K. Deka 10116,

3. **Sarcanthus insectifer** Reichb. f. in Bot. Zeit. 150. 1857; Fl. Brit. Ind. 6: 68. 1890.

Stems 10-30 cm; leaves oblong-obovate or lanceolate, obliquely and obtusely 2-lobed at apex, 2.5-6.0 × 1.3-1.6 cm; flowers ± 7 mm, greenish-yellow, with red-brown stripes; sepals and petals oblong-ovate; lateral lobes rounded; midlobe triangular, ovate, fleshy; spur conical, ± 4 mm, septate; dorsal callus large.

Epiphytic in primary forests, 1400-1600 m; fl. & fr.: May-Oct.; Jowai.

4. **Sarcanthus racemifer** (Lindl.) Reichb. f. in Walp. Ann. 6: 891. 1861. *Saccolabium racemiferum* Lindl. Gen. Sp. Orch. 224. 1833. *Sarcanthus pallidus* Lindl. in Edw. Bot. Reg. Misc. 78. 1840; Fl. Brit. Ind. 6: 68. 1890.

Stems 8-20 cm, 5-10 mm thick; leaves narrow-oblong, 2-lobed at apex, 10-20 × 1.3-4.3 cm; panicles much-branched; branches curved-drooping, laxly many-flowered; flowers 6-7 mm; sepals and petals 3-4 × 1-2 mm, 3-nerved, dark purple with yellow margins; lip 3-lobed, yellowish-white; lateral lobes triangular, ± 1 mm broad; midlobe ± 1.5 mm, incurved; spur obtuse, thick-walled, vertically septate, 6-7 mm; dorsal callus, 2-lobed.

Epiphytic in primary forests, 1000-1500 m; fl. & fr.: May-Sept.; Jowai, Syndai.

14. *SCHOENORCHIS* Bl.

Schoenorchis gemmata (Lindl.) J. J. Smith in Nat. Tijdschr. Ned. Ind. 72: 100. 1912. *Saccolabium gemmatum* Lindl. in Edw. Bot. Reg. Misc. 50. 1838; Fl. Brit. Ind. 6: 55. 1890 (sphalm: '*geminatum*').

Stems slender, curved, 10-25 cm; leaves semiterete, grooved above, 4-8 cm; racemes paniculate, axillary, 7-16 cm; flowers lax, ± 3 mm, purplish pink; sepals and petals subequal, oblong-ovate, ± 3 mm, 1-nerved; lip sessile, obscurely 3-lobed; lateral lobes small; midlobe ovate, concave, acute; spur conical, obtuse.

Epiphytic in forests, 1200-1600 m; fl. & fr.: May-Sept.; Jarain, Jowai.

15. *UNCIFERA* Lindl.

Uncifera obtusifolia Lindl. in J. Linn. Soc. 3: 40. 1859. *Saccolabium obtusifolium* (Lindl.) Hook. f. Fl. Brit. Ind. 6: 65. 1890.

Stems 4-6 cm; leaves 2-4, sessile, oblong-linear, obtusely 2-lobed at apex, 3-6 × 1.5-2.5 cm; racemes 3-8 cm, many-flowered; flowers ± 1 cm across, greenish-yellow; bracts ovate; sepals and petals ovate, obtuse, subequal, ± 6 mm; lip sessile, obscurely 3-lobed; lateral lobes truncate; mid-lobe cymbiform, acute; spur funnel-shaped at base, cylindrical, incurved at apex.

Epiphytic in primary forests, in shaded places, 700-1200 m; fl. & fr.: Aug.-Feb.; Nongthala.

16. *LUISIA* Gaud.

- | | | |
|--|-----|-------------------------|
| 1a. Flowers ± 3 cm across; petals longer than sepals. | | |
| 2a. Stems stout; flowers 1-3; lip clawed at base. | ... | <i>L. psyche</i> 1 |
| 2b. Stems slender; flowers many; lip auricled at base. | ... | <i>L. volucris</i> 2 |
| 1b. Flowers less than 1.5 cm across; petals as long as or shorter than sepals. | | |
| 3a. Stems stout, 12-18 cm long; leaves more than 8 cm long; sepals keeled; lip dark purple. | ... | <i>L. teretifolia</i> 3 |
| 3b. Stems slender, 5-10 cm long; leaves less than 6 cm long; sepals not keeled; lip green with purple spots. | ... | <i>L. inconspicua</i> 4 |

1. ***Luisia psyche*** Reichb. f. in Bot. Zeit. 98. 1863; Fl. Brit. Ind. 6: 24. 1890.

Stems many-noded, terete, 20-35 cm; leaves stout, terete, curved, 10-15 cm; inflorescence ± 1 cm, sheathed at base; flowers pale green-yellow; bracts broadly ovate, ± 1 mm; sepals ovate, subacute, ± 15 × 5 mm; petals linear-spathulate, obtuse, ± 3.5 × 0.5 cm; lip violet-brown, broadly ovate obtuse, ± 1.5 × 1.0 cm.

Epiphytic in forests, 1300-1600 m; fl. & fr.: May-Aug.; Jowai.

2. ***Luisia volucris*** Lindl. Fol. Orch. 1. 1852; Fl. Brit. Ind. 6: 25. 1890.

Stems many-noded, 15-25 cm; leaves terete, slender, curved, 12-16 cm; inflorescences ± 5 mm; flowers pale green with purple lip; sepals oblong-ovate, obtuse, 12-18 × 1-2 mm, reflexed; lip ± 8 mm, recurved at middle with infolded basal auricles; distal lobe ovate, obtuse, ± 7 mm.

Epiphytic in primary forests, 1300-1600 m; fl. & fr.: Apr.-Aug.; Jowai.

3. ***Luisia teretifolia*** Gaud. in Freyc. Voy. Bot. 427. t. 37. 1829; Fl. Brit. Ind. 6: 22. 1890.

Leaves stout, 8-12 cm, straight or slightly arched; inflorescences \pm 5 mm, many-flowered; flowers \pm 5 mm across, purplish-green; sepals and petals oblong or linear, obtuse, 3-4 \times 1.5-2.5 mm, green; lip \pm 4 \times 3 mm, fleshy; basal lobe subquadrate, longitudinally grooved and ridged; column dark purple.

Epiphytic in forests, 100-1000 m; fl. & fr.: May-Sept.; Dawki.

4. **Luisia inconspicua** (Hook. f.) King & Prantl. in Ann. R. Bot. Gard. Calc. 8: 203, t. 272, 1898. *Saccolabium inconspicuum* Hook. f. Fl. Brit. Ind. 6: 56, 1890.

Leaves short, stout, \pm 5 cm, curved; inflorescences \pm 4 mm, many-flowered; flowers \pm 3 mm, pale greenish-purple; sepals and petals broadly oblong; acute or subacute, \pm 4 mm; lip sessile, saccate at base; basal lobe suborbicular, infolded; distal lobe ovate, green.

Epiphytic or lithophytic in primary forests, 1200-1600 m; fl. & fr.: June-Nov.; Jowai, Nartiang.

17. ORNITHOCHILUS Lindl.

Ornithochilus difformis (Lindl.) Schlechter, Orch. Sino-Jap. 277, 1919, *in nota*. *Aerides difforme* Lindl. Gen. Sp. Orch. 242, 1833. *O. fuscus* Lindl. Gen. Sp. Orch. 242, 1830. *pro syn.*; Fl. Brit. Ind. 6: 76, 1890.

Stems up to 2 cm; leaves sessile, oblong to linear-lanceolate, 5-10 \times 2-5 cm; racemes 1 or 2, axillary, 8-20 cm, often branched; flowers \pm 1 cm across; bracts ovate, 2-3 mm; pedicel with ovary 3-5 cm; sepals oblong, 3-4 mm, yellow-brown with dark lines; petals linear-oblong, 3-4 mm, same colour as sepals; lip \pm 7 mm, dark pink; lateral lobes oblong-ovate, truncate, brown-striped; midlobe clawed, triangular, fimbriate at margins; spur curved, \pm 4 mm.

Epiphytic in primary forests, 100-1000 m; fl. & fr.: July-Feb.; Syndai.

18. KINGIDIUM Hunt

Kingidium taenialis (Lindl.) Hunt in Kew Bull. 24(1): 98, 1970. *Aerides taenialis* Lindl. Gen. Sp. Orch. 239, 1833. *Doritis taenialis* (Lindl.) Benth. in Benth. & Hook. f. Gen. Pl. 3: 574, 1883; Fl. Brit. Ind. 6: 31, 1890.

Fig. 22

Roots flat, up to 10 cm, 3-4 mm broad; stems up to 1 cm; leaves obovate, to oblong-lanceolate, narrowed at base, obtuse or acute at apex,

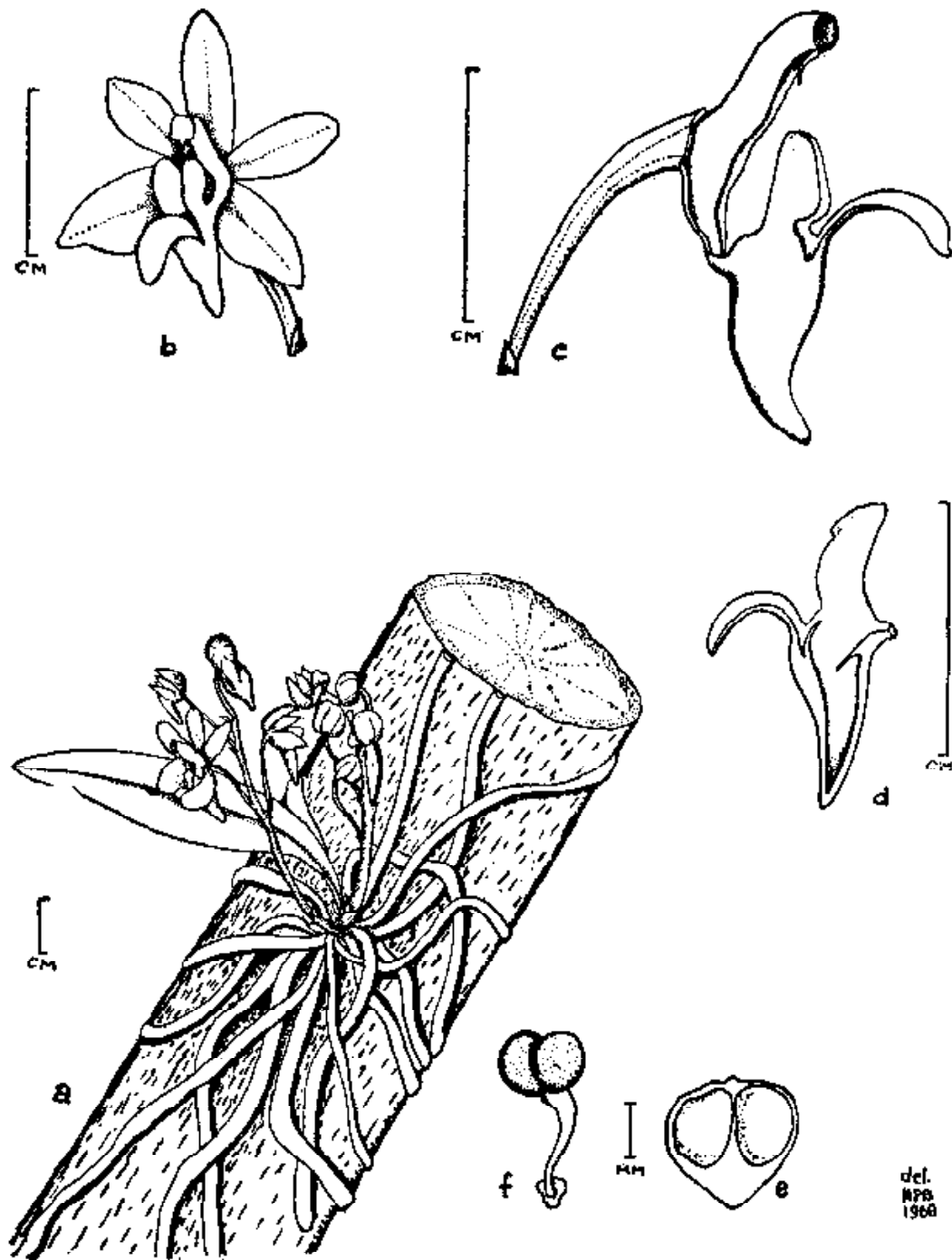


Fig. 22. *Kingidium taenialis* (Lindl.) Hunt

a. Habit. b. Flower. c. Ovary, column and lip. d. L. S. of lip with spur.
e. Operculum. f. Pollinia.

7-12 × 1-4 cm; inflorescences 2-3 cm, 3-6-flowered; flowers pink with dark pink spots, ± 2.5 cm across; bracts lanceolate, 2-3 mm; lip 3-lobed; lateral lobes linear, falcate, acute, ± 3 mm; midlobe obovate, ± 7 mm;

spur conical, \pm 6 mm, with 2 curved teeth inside on dorsal and ventral walls.

Epiphytic or lithophytic in primary forests and forest borders, 1200-1700 m; fl. & fr.: Mar.-Jan.; Raliang.

19. AERIDES Lour.

- | | |
|--|------------------------|
| 1a. Midlobe of lip ovate, crose at margins ; spur short, straight. ... | <i>A. multiflora</i> 1 |
| 1b. Midlobe of lip linear-lanceolate, wavy at margins ; spur long, recurved. ... | <i>A. odorata</i> 2 |

1. **Aerides multiflora** Roxb. Pl. Corom. 3: 63. t. 271. 1820 et Fl. Ind. 3: 475. 1832; Fl. Brit. Ind. 6: 44. 1890.

Stems suberect, stout, 10-15 cm; leaves linear-oblong, 2-lobed at apex, 10-20 \times 2-3 cm; racemes axillary, 1-2, arched or drooping; peduncles stout, sheathed; flowers \pm 4 cm across, pink; sepals and petals oblong, \pm 1.2 cm, fleshy, pink with dark pink spots; lip \pm 1.5 cm; midlobe with a fleshy 2-lobed callus at base; spur conical, \pm 2 mm.

Epiphytic in sunny places in forests and forest borders, 100-1200 m; fl. & fr.: May-Sept.; Dawki, Jarain-Dawki.

2. **Aerides odorata** Lour. Fl. Cochinch. 525. 1700; Fl. Brit. Ind. 6: 47. 1890.

Stems stout, suberect, 15-25 cm; leaves linear-oblong, unequally 2-lobed at apex, 20-25 \times 2-3 cm; racemes 1-3, lateral, 15-25 cm, arched or pendulous; flowers \pm 2 cm across, pale pink or pinkish white, scented; sepals obovate, acute, \pm 9 \times 8 cm, 7-nerved; petals rounded at apex, \pm 10 \times 5 mm, 7-nerved; lip 3-lobed, \pm 1.5 cm; lateral lobes broader than midlobe, obtuse; spur stout, recurved.

Epiphytic in primary and secondary forests and forest borders, 100-1000 m; fl. & fr.: May-Sept.; Dawki, Jarain-Dawki.

20. MICROPERA Lindl.

- | | |
|--|---------------------|
| 1a. Racemes many-flowered ; flowers \pm 18 mm across ; lip hatchet-shaped, laterally compressed ; column apex long. ... | <i>M. robusta</i> 1 |
| 1b. Racemes few-flowered ; flowers \pm 6 mm across ; lip slipper-shaped, not laterally compressed ; column apex short. ... | <i>M. manii</i> 2 |

1. **Micropera rostrata** (Roxb.) Balakr. in J. Bombay Nat. Hist. Soc. 67: 66, 1970. *Aerides rostratum* Roxb. Fl. Ind. 3: 474, 1832. *Camarotis purpurea* Lindl. Gen. Sp. Orch. 219, 1833. *Sarcochilus purpureus* (Lindl.) Hook. f. Fl. Brit. Ind. 6: 36, 1890. *p. p.*

Stems erect, 10-30 cm; leaves linear-lanceolate, obtusely 2-lobed at apex, 6-8 × 1.0-1.5 cm, fleshy; racemes lateral; flowers purplish-pink; sepals and petals subequal, spreading, ± 1 cm; lip saccate at base with an incurved stiff spine at back inside.

Epiphytic in primary forests, 1200-1600 m; fl. & fr.: May-Dec.; Jarain, Jowai, Umkhlaw.

2. **Micropera mannii** (Hook. f.) Tang & Wang in Acta Phytotax. Sin. 1: 94, 1951. *Sarcochilus mannii* Hook. f. Fl. Brit. Ind. 6: 36, 1890.

Stems 25-35 cm, erect; leaves oblong-lanceolate, obtuse at apex; 10-15 × 1-2 cm; racemes lateral, 3-5 cm; flowers pink; sepals and petals spatulately oblong, obtuse, ± 3 mm; petals narrower; lip obtuse, obscurely 3-lobed, saccate at base.

Epiphytic in primary forests, 200-1000 m; fl. & fr.: June-Jan.; Garampani.

21. GASTROCHILUS D. DON

Gastrochilus acutifolius (Lindl.) O. Ktze. Rev. Gen. 661, 1891. *Saccolabium acutifolium* Lindl. Gen. Sp. Orch. 233, 1833; Fl. Brit. Ind. 6: 61, 1890.

Stems 5-15 cm, erect or arched; leaves sessile, lanceolate, acute or acuminate at apex, 6-10 × 1-2 cm; inflorescences lateral; peduncles 2-3 cm; flowers ± 1 cm across, yellowish with purple and brown spots; sepals and petals oblong-lanceolate, acute, ± 6 mm, lip saccate, cup-shaped at base, ± 3 mm, obscurely 3-lobed; lateral lobes short; midlobe reniform, crose.

Epiphytic in primary forests, 1000-1500 m; fl. & fr.: Oct.-Feb.; Sutnga, Balakrishnan 50005.

22. VANDA R. BR.

- | | | |
|--|-----|----------------------|
| 1a. Leaves terete. | ... | <i>V. teres</i> 1 |
| 1b. Leaves flat. | | |
| 2a. Inflorescences shorter than leaves; flowers greenish-purple. | ... | <i>V. cristata</i> 2 |
| 2b. Inflorescences longer than leaves; flowers blue. | ... | <i>V. coerulea</i> 3 |

1. **Vanda teres** Lindl. Gen. Sp. Orch. 217. 1883; Fl. Brit. Ind. 6: 49. 1890.

Stems up to 1 m, green; leaves 8-12 × 0.4-0.6 cm; peduncles ± 6 cm; racemes zig-zag, 3-5-flowered; flowers 5-8 cm across, pink; bracts ovate, ± 3 mm; dorsal sepals obovate, rounded at apex, ± 2.5 × 1.5 cm; lateral sepals shortly clawed, ± 2.5 × 2.0 cm; petals suborbicular, ± 3 × 2.5 cm; lip 3-lobed, ± 4 × 5 cm; lateral lobes infolded over the column, 15-18 mm; midlobe wedge-shaped, bifid at apex, ± 2 × 1.5 cm; spur conical, ± 2.5 cm, yellow at throat.

Epiphytic in forests and forest-borders and often near villages, 100-1400 m; fl. & fr.: June-Dec.; Dawki.

2. **Vanda cristata** Lindl. Gen. Sp. Orch. 216. 1883; Fl. Brit. Ind. 6: 53. 1890.

Stems erect, stout, 10-20 cm; leaves keeled, 3-toothed at apex, 8-12 cm; inflorescences 3-5 cm; sepals oblong-lanceolate, obtuse, ± 2.5 × 1.0 cm, fleshy, greenish-yellow; petals linear, acute, ± 5 mm broad; lip 3-lobed, ± 3 cm, fleshy, greenish with dark purple red stripes; lateral lobes triangular, ± 1 cm; midlobe oblong, concave with 2 spindle-shaped divergent lobes at apex; spur conical, short.

Epiphytic or often lithophytic, in partially shaded places in forests, 1300-1600 m; fl. & fr.: Apr.-Nov.; Raliang.

3. **Vanda coerulea** Lindl. in Edw. Bot. Reg. n. s. 33: t. 30. 1847; Fl. Brit. Ind. 6: 51. 1890. **Fig. 23**

Stems erect, 10-30 cm; leaves obliquely truncate at apex, 10-20 × 1.5-2.5 cm; inflorescences 1-3, erect or suberect, 20-30 cm; flowers 8-10 cm across; sepals and petals subequal, obovate, rounded at apex, 4.0-4.5 × 2.0-2.5 cm, obscurely tessellate; lip ± 2.2 cm, 3-lobed, dark blue; lateral lobes ± 2 mm; midlobe oblong, emarginate at apex, fleshy; disk with 2 thick ridges; spur conical, ± 5 mm.

Epiphytic in primary and pine forests, 1300-1600 m; fl. & fr.: Sept.-Feb.; Nartiang.

23. RHYNCHOSTYLIS Bl.

Rhynchostylis retusa (L.) Bl. Bijdr. 286. t. 49. 1825; Fl. Brit. Ind. 6: 32. 1890. *Epidendrum retusum* L. Sp. Pl. 953. 1753.

Stems stout, erect, terete, 6-19 cm; leaves linear-oblong, subequal at apex, 25-30 × 2.5-3.5 cm; scapes lateral, often 2-3, stout, 2-8 cm; racemes

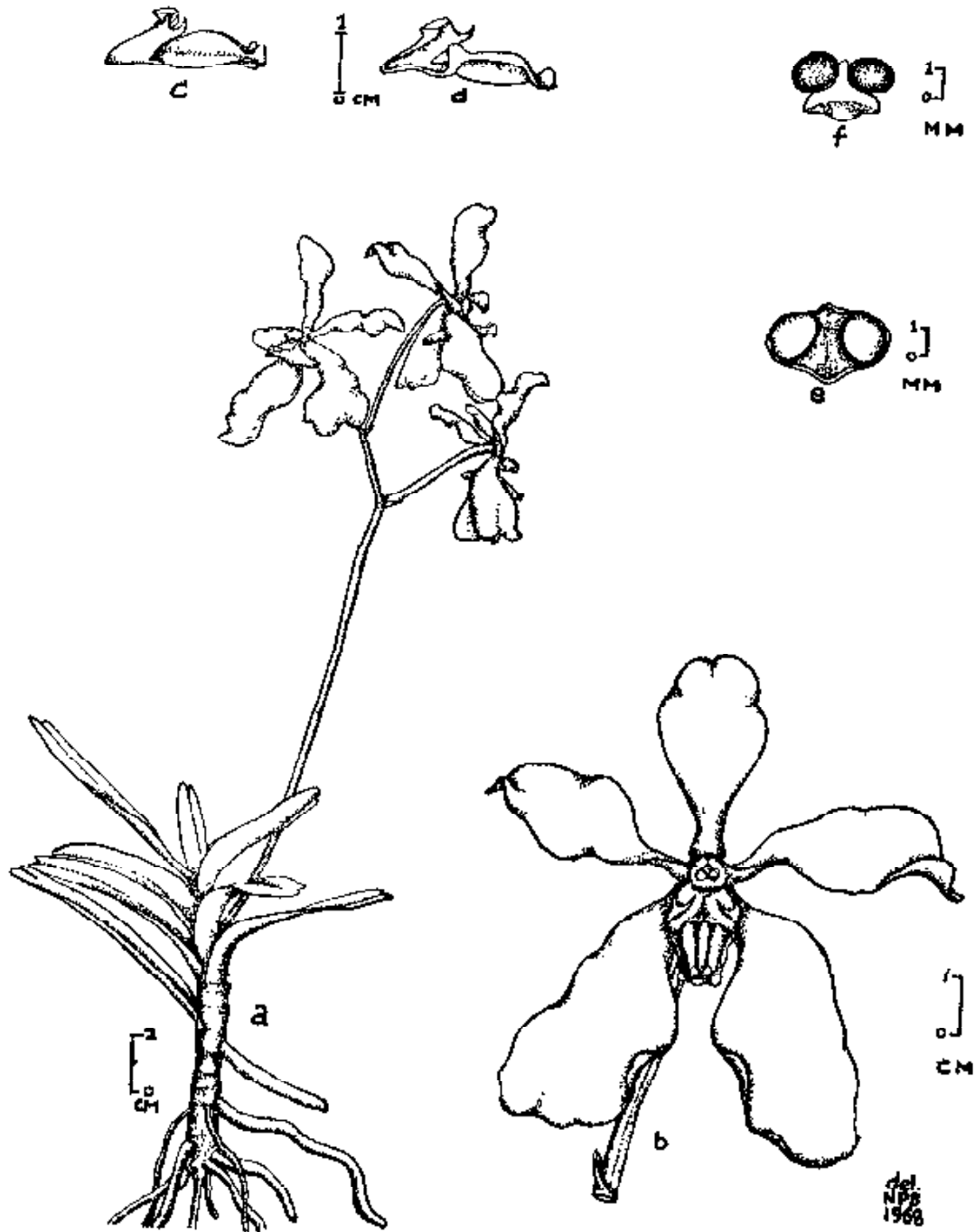


Fig. 23. *Vanda coerulea* Lindl.

a. Habit. b. Flower. c. Lip, side view. d. L. S. of lip. e. Operculum. f. Pollinia.

many-flowered, 30-50 cm; flowers 2.0-2.5 cm across, white, purple-blotched; sepals ovate, 8-12 × 5-6 mm; petals oblong, 8-12 × 3-4 mm; lip oblong, ± 1.2 cm, 5-nerved, pink; spur laterally compressed, ± 7 mm, short hairy.

Epiphytic in open forests, 200-1600 m; fl. & fr.: Aug.-Feb.; Dawki, Raliang.

24. PHREATIA Lindl.

Phreatia elegans Lindl. Gen. Sp. Orch. 63, 1830; Fl. Brit. Ind. 5: 810. 1890.

Pseudobulbs short, tufted; leaves linear-lanceolate or oblanceolate, acute to obliquely acute, 8-15 × 1-2 cm, 1-nerved; peduncles from base of pseudobulbs, slender, 10-20 cm; racemes many-flowered, decurved, 6-8 cm; flowers ± 2 mm across, white; bracts ovate-lanceolate ± 3 mm; sepals triangular, acute, ± 2 mm; petals ovate, ± 1.5 mm; lip short-clawed, ± 2 mm, hairy inside, incurved at margins.

Epiphytic in primary forests, 1300-1600 m; fl. & fr.: July-Oct.; Jowai.

25. THELASIS Bl.

- | | |
|--|------------------------|
| 1a. Pseudobulbs with one leaf only; flowers scattered on racemes. ... | <i>T. khasiana</i> 1 |
| 1b. Pseudobulbs with one leaf and a rudimentary sheath which often produces a small leaf-like scale; flowers compact in racemes. ... | <i>T. longifolia</i> 2 |

1. **Thelasis khasiana** Hook. f. Fl. Brit. Ind. 6: 87. 1890.

Pseudobulbs ovoid, ± 1.5 cm; leaves linear-oblong, acute, 8-10 × 0.8-1.1 cm; inflorescences 8-12 cm, sheathed at base; sheaths 3-5, ovate-acuminate, ± 6 mm; flowers lax, ± 2 mm; bracts ovate-acute, ± 1 mm; sepals ovate-lanceolate, ± 2 mm; petals lanceolate; lip ovate-oblong, ± 2 mm.

Epiphytic or lithophytic in primary forests, 1300-1600 m; fl. & fr.: July-Dec.; Jowai.

2. **Thelasis longifolia** Hook. f. Fl. Brit. Ind. 6: 87. 1890.

Pseudobulbs depressed-globose, ± 1 × 2 cm; leaves oblong-lanceolate, acute, 10-15 × 2-3 cm; peduncles erect, 8-12 cm, sheathed at base; racemes recurved; flowers pale greenish-yellow, ± 5 mm; pedicels with ovary ± 2 mm; sepals and petals oblong-ovate, 3-5 × 2.0-2.5 mm; lip elliptic-ovate, narrow and concave at base, recurved at tip, hyaline at margins ± 4 × 2 mm, obscurely 3-lobed.

Epiphytic in moist primary forests, 1300-1600 m; fl. & fr.: July-Dec.; Jarain.

26. CYMBIDIUM Sw.

- | | | |
|---|-----|-------------------------|
| 1a. Leaves distinctly petioled, elliptic-lanceolate. | ... | <i>C. lancifolium</i> 1 |
| 1b. Leaves sessile, linear-lanceolate. | | |
| 2a. Scapes drooping, many-flowered, dense; sepals and petals connate at base, not spreading widely. | ... | <i>C. cochleare</i> 2 |
| 2b. Scapes erect or arched, 1- or many-flowered; sepals and petals free, spreading widely. | | |
| 3a. Flowers white with pink-white column. | ... | <i>C. eburneum</i> 3 |
| 3b. Flowers straw-coloured or greenish-white-purple. | | |
| 4a. Leaves and scapes erect; sepals and petals straw-coloured. | ... | <i>C. munronianum</i> 4 |
| 4b. Leaves and scapes arched; sepals and petals greenish-white-purple with dark purple lines. | ... | <i>C. giganteum</i> 5 |

1. **Cymbidium lancifolium** Hook. Exot. Fl. t. 51. 1823; Fl. Brit. Ind. 6: 9. 1890.

Pseudobulbs fusiform, 5-8 cm, fleshy; sheaths ovate-lanceolate, acuminate, 2-3 cm; leaves acuminate, 7-10 × 1.5-2.0 cm; inflorescences lateral, 1-2, erect, 8-10 cm, few-flowered; flowers ± 4 cm across; bracts lanceolate, acute, ± 1.5 cm; sepals oblong, spreading, ± 2.2 × 0.5 cm; petals elliptic, ± 2 × 0.8 cm, white with pink midrib; lip concave, ± 1.8 cm, obscurely 3-lobed; lateral lobes white with purple veins; midlobe white with scattered purple spots; disk with 2 thick lamellae.

Primary forests, 1200-1800 m; fl. & fr.: May-Oct.; Jarain, Jowai, Khleihriat.

2. **Cymbidium cochleare** Lindl. in J. Linn. Soc. 3: 28. 1859. *Cyperorchis cochleare* (Lindl.) Benth. in J. Linn. Soc. 18: 318. 1881; Fl. Brit. Ind. 6: 15. 1890.

Pseudobulbs short; leaves 40-60 × 1.0-1.5 cm; inflorescences interfoliar, ± 30 cm; peduncles slender, 10-15 cm; sheaths few, narrow-lanceolate, acuminate, 3.5-4.5 cm; flowers ± 4 cm; bracts ovate, acute, ± 4 mm; sepals and petals oblanceolate, falcate, ± 4.5 × 0.5 cm, greenish-brown; lip slightly clawed at base, 3-lobed, ± 4 cm, green-yellow with purple spots; lateral lobes ovate; midlobe suborbicular, acute, undulate; disk 2-ridged with 2 short thin lamellae.

Primary forests, 1000-1500 m; fl. & fr.: Nov.-June; Jarain, Jowai.

3. **Cymbidium eburneum** Lindl. in Edw. Bot. Reg. n. s. 33: t. 67. 1847; Fl. Brit. Ind. 6: 11. 1890.

Pseudobulbs short, covered by leaf-sheaths; leaves linear, bifid at apex, 30-40 × 1.0-1.5 cm; inflorescences at base of pseudobulbs, 15-20 cm;

sheaths loose, lanceolate, 6-10 cm; racemes 1 or rarely 2-3-flowered; flowers 5-8 cm across; bracts ovate, ± 1 cm; sepals broadly oblong, $\pm 7 \times 3$ cm; petals subfalcate; lip 3-lobed, yellow inside, ± 5.5 cm; lateral lobes narrow, erect; midlobe ovate, acute, undulate and deflexed at margins; disk with a thick, 3-grooved yellow pubescent ridge.

Primary forests, 1000-1500 m; fl. & fr.: Mar.-Sept.; Lumshnong.

4. **Cymbidium munronianum** King & Prantl. in J. As. Soc. Beng. 64: 338. t. 2. 1895.

Leaves linear, 30-50 \times 2.0-2.5 cm, erect; inflorescences stout, 30-50 cm; sheaths 2-3, lanceolate, acuminate, ± 5 cm; racemes 15-20 cm, many-flowered; flowers ± 3.5 cm, scented; bracts lanceolate, ± 1.2 cm; sepals and petals oblong-lanceolate, $\pm 3 \times 0.6$ cm, purple-spotted at base; lip ovate-lanceolate, 3-lobed, ± 2.5 cm, yellow with purple stripes; midlobe ovate-lanceolate, reflexed; disk 2-lamellate.

Shaded places in primary forests, 1300-1600 m; fl. & fr.: Apr.-Sept.; Jowai, G. K. *Deka* 5206.

5. **Cymbidium giganteum** Lindl. Gen. Sp. Orch. 163. 1833; Fl. Brit. Ind. 6: 12. 1890.

Leaves linear-lanceolate, acuminate, 30-50 \times 2-3 cm; inflorescences lateral, stout, 20-35 cm; peduncles 10-15 cm; racemes 12-20 cm, many-flowered; flowers 8-10 cm; bracts ± 3 mm; sepals and petals oblong-lanceolate, $\pm 4.5-4.8 \times 0.8-1.5$ cm; lip 3-lobed, ± 3 cm; lateral lobes ovate, erect, streaked with purple lines; midlobe yellow-green with large purple blotches, orbicular or ovate, acute, ± 1.5 cm, undulate at margins; disk 2-ridged, pubescent.

Epiphytic in shaded primary forests, 1400-1600 m; fl. & fr.: Oct.-Nov.; Iaskein, *Balakrishnan* 50198; Mawryngkneng, G. K. *Deka* 5253.

27. SUNIPIA Sm.

Sunipia scariosa Lindl. Gen. Sp. Orch. 179. 1833; Fl. Brit. Ind. 5: 772. 1890.

Pseudobulbs ovoid, 2-3 cm; leaves oblong-lanceolate, 10-16 \times 2-3 cm; petioles ± 5 mm; peduncles 12-16 cm; sheaths tubular, ± 1 cm; racemes recurved, 12-15 cm; flowers ± 6 mm across, purple, concealed by ± 6 mm long bracts; dorsal sepal suborbicular, $\pm 4 \times 3$ mm; lateral sepals ovate-lanceolate, $\pm 5 \times 2$ mm; petals ovate, ± 3 mm, purplish-white; lip oblong, obtuse, concave, ± 4 mm, purple.

Epiphytic in shaded primary forests, 1200-1500 m; fl. & fr.: Apr.-Aug.; Jarain.

28. *BULBOPHYLLUM* Thouars *nom. cons.*

- | | | | |
|---|-----|------------------------|----|
| 1a. Pseudobulbs absent. | ... | <i>B. cylindraceum</i> | 1 |
| 1b. Pseudobulbs present. | | | |
| 2a. Scapes 1-3-flowered; flowers \pm 1.5 cm across or more. | | | |
| 3a. Sepals and petals purple-dotted. | | | |
| 4a. Leaves 2.4-1.0 cm; flowers \pm 1.5 cm across; lateral sepals almost as long as dorsal sepal. | ... | <i>B. griffithii</i> | 2 |
| 4b. Leaves 8-15 \times 1.5-2.0 cm; flowers \pm 2.5 cm across; lateral sepals 2-3 times as long as dorsal sepal. | ... | <i>B. elatum</i> | 3 |
| 3b. Sepals and petals red or purple-veined. | | | |
| 5a. Pseudobulbs globose; leaves long-petioled, broadly oblong or obovate. | ... | <i>B. striatum</i> | 4 |
| 5b. Pseudobulbs ovoid or oblong; leaves sessile or subsessile, lanceolate. | ... | <i>B. affine</i> | 5 |
| 2b. Scapes many-flowered; flowers less than 1 cm across. | | | |
| 6a. Petals ciliate-margined or serrulate. | | | |
| 7a. Flowers purplish; lip as long as sepals, hirsute; petals ciliate-margined. | ... | <i>B. penicillium</i> | 6 |
| 7b. Flowers white or yellowish; lip shorter than sepals, glabrous; petals serrulate. | ... | <i>B. gymnopus</i> | 7 |
| 6b. Petals entire. | | | |
| 8a. Scapes shorter than pseudobulbs. | ... | <i>B. cauliflorum</i> | 8 |
| 8b. Scapes much longer than pseudobulbs. | | | |
| 9a. Flowers dense, capitate or in condensed umbels. | ... | <i>B. piluliferum</i> | 9 |
| 9b. Flowers lax, racemose. | ... | <i>B. reptans</i> | 10 |

1. *Bulbophyllum cylindraceum* Lindl. Gen. Sp. Orch. 53. 1830; Fl. Brit. Ind. 5: 765. 1890.

Rhizomes creeping; leaves lanceolate, obtuse, 10-20 \times 2-4 cm; petioles 4-10 cm; peduncles 15-20 cm; racemes decurved; oblong, 2-3 cm, dense-flowered; flowers \pm 6 mm across, purple; bracts ovate-mucronate, \pm 2 mm; dorsal sepal triangular, \pm 2.5 mm; lateral sepals oblong-falcate, obtuse, \pm 4 mm; petals oblong, acute, \pm 1.5 mm; lip oblong-ovate, obtuse, \pm 2.5 mm.

Epiphytic in shaded places in forests, 100-1400 m; fl. & fr.: Oct.-Mar.; Dawki, Jarain.

2. *Bulbophyllum griffithii* (Lindl.) Reichb. f. in Walp. Ann. Bot. 6: 247. 1861; Fl. Brit. Ind. 5: 756. 1890. *Sarcopodium griffithii* Lindl. Fol. Orch. 6. 1855.

Pseudobulbs oblong, oblique, crowded, ± 1.5 cm; leaves oblong, acute; peduncles ± 1 cm; flowers 1-2 per raceme, greenish-yellow, purple-dotted; bracts lanceolate, acute; sepals and petals ovate, concave, ± 8 mm; lip oblong, obtuse, recurved, fleshy; disk 2-ridged.

Epiphytic in shaded places in forests, 1400-1600 m; fl. & fr.: Aug.-Feb.; Jowai.

3. **Bulbophyllum elatum** (Hook. f.) J. J. Sm. in Bull. Jard. Bot. Botz. ser. 3: 23. 1912. *Cirrhopetalum elatum* Hook. f. Fl. Brit. Ind. 5: 775. 1890.

Pseudobulbs ovoid, 2.0-3.5 cm; leaves oblong, obtuse or notched; peduncles 9-14 cm; flowers in 4-7-flowered heads or umbels, yellow, purple-dotted; bracts lanceolate, acute; dorsal sepal oblong-ovate, acuminate, ± 1 mm, revolute; petals broadly ovate, acute, ± 4 mm, 1-nerved; lip linear-ovate, obtuse.

Epiphytic in shaded forests, 1300-1500 m; fl. & fr.: June-Aug.; Jowai.

4. **Bulbophyllum striatum** (Griff.) Reichb. f. in Walp. Ann. Bot. 6: 257. 1861; Fl. Brit. Ind. 5: 755. 1890. *Dendrobium striatum* Griff. Notul. Syst. 3: 318. 1851.

Pseudobulbs ± 2 cm diam., distant on stout scale-covered rhizomes; leaves obtuse, 5-8 \times 2.0-3.5 cm, 2-3-sheathed; racemes 2-3-flowered; flowers 1.5-2.0 cm across, greenish-yellow, striped with brown-purple; dorsal sepal oblong-lanceolate; lateral sepals lanceolate, ± 8 mm, 5-nerved; petals ovate-lanceolate, acute, ± 5 mm; lip linear-oblong, obtuse, ± 7 mm, dull purple.

Epiphytic in shaded places in primary forests, 1300-1600 m; fl. & fr.: Sept.-Jan.; Jowai.

5. **Bulbophyllum affine** Lindl. Gen. Sp. Orch. 48. 1830; Fl. Brit. Ind. 5: 756. 1890.

Pseudobulbs 1.5-2.0 cm, distant on stout scale-covered rhizome; leaves subacute, 10-15 \times 2-3 cm; petioles 5-8 mm; peduncles 2-4 mm, sheathed; flowers solitary, ± 2.5 cm across, greenish-yellow, streaked with red; bracts ovate, 3-4 mm; sepals ovate-lanceolate, ± 1.8 cm, 3-5-nerved; petals linear-oblong, 3-nerved; lip ovate-obtuse, red-brown.

Epiphytic in shaded forests, 1400-1600 m; fl. & fr.: July-Dec.; Jowai.

6. **Bulbophyllum penicillium** Par. & Reichb. f. in Trans. Linn. Soc. 30: 151. 1874; Fl. Brit. Ind. 5: 764. 1890.

Pseudobulbs subglobose or ovoid, ± 2.5 cm; leaves oblong-lanceolate, acute, $10-15 \times 2-3$ cm; petioles 3-4 cm; peduncles terete, 10-14 cm; racemes 15-18 cm; pendent; flowers ± 2 cm, purple-yellow with dark purple lip; bracts lanceolate, ± 5 mm; sepals ovate-lanceolate, ± 1 cm; lateral sepals infolded; petals oblong, ± 1 mm; lip linear, hirsute with purple hairs.

Epiphytic in forests, and forest borders, 1200-1500 m; fl. & fr.: July-Aug.; Jowai-Jarain.

7. **Bulbophyllum gymnopus** Hook. f. Fl. Brit. Ind. 5: 764. 1890.

Pseudobulbs oblong-ovoid, 2-4 cm, distant on scale-covered rhizome; leaves oblong-lanceolate, acute and notched at apex, $8-15 \times 1.5-2.0$ cm; peduncles 1-4 cm, 2-3-sheathed; racemes laxly many-flowered, 3-15 cm; flowers ± 1 cm across, white with yellow lip; bracts ovate, ± 2 mm; dorsal sepal lanceolate, acuminate, ± 4 mm; lateral sepals sickle-shaped, ± 8 mm, infolded at lower half; petals linear, ± 5 mm; lip laterally compressed, obtuse, recurved, ± 4 mm.

Epiphytic in forests, 1200-1600 m; fl. & fr.: Nov.-July; Jowai, Raliang.

8. **Bulbophyllum cauliflorum** Hook. f. Fl. Brit. Ind. 5: 758. 1890.

Pseudobulbs subcylindric, 2-4 cm, distant on slender rhizomes; leaves oblong, obtuse, notched at apex, $5-8 \times 2.0-2.5$ cm; petioles 2-3 mm; peduncles 1-2 cm, from base of pseudobulbs; racemes 4-8-flowered, 1-2 cm; flowers ± 5 mm across, greenish-yellow; bracts lanceolate, ± 3 mm; sepals lanceolate, caudate at apex, ± 4 mm; petals broadly lanceolate, acuminate, ± 3 mm; lip oblong-ovate, obtuse ± 2 mm, fleshy, arched.

Epiphytic or rarely lithophytic; in forests, 1300-1600 m; fl. & fr.: June-Nov.; Jowai.

9. **Bulbophyllum piluliferum** King & Prantl. in Ann. R. Bot. Gard. Calc. 8: 76. t. 104. 1898.

Pseudobulbs depressed-globose, ± 6 mm, close together on rhizome; leaves linear or oblong-lanceolate, $4-7 \times 0.7-1.0$ cm; petioles 3-5 mm; peduncles solitary, 4-5 cm; bracts lanceolate, acute; flowers ± 7 mm, dark purple; dorsal sepal lanceolate, $\pm 5 \times 2$ mm; lateral sepals ovate, $\pm 4 \times 3$ mm; petals lanceolate, $\pm 2 \times 1$ mm; lip elliptic, deflexed at middle, $\pm 3 \times 2$ mm, dark purple, papillose above.

Epiphytic in primary forests, 1300-1500 m; fl. & fr.: May-Sept.; Jowai-Jarain.

10. **Bulbophyllum reptans** (Lindl.) Lindl. Gen. Sp. Orch. 51. 1830; Fl. Brit. Ind. 5: 768. 1890. *Tribrachia reptans* Lindl. Coll. Bot. t. 41a. 1825.

Pseudobulbs pyriform, 1-2 cm, distant on slender scale-covered rhizome; leaves linear-oblong, acute, 8-10 × 0.8-1.2 cm; peduncles 2-4 cm; racemes pendulous, 6-8 cm; flowers ± 4 mm, greenish-yellow, with pink nerves; bracts lanceolate; sepals oblong-falcate, adnate to the foot forming a saccate mentum; petals oblong, obtuse, ± 1 mm; lip linear-oblong, obtuse, ± 2 mm, curved, yellow.

Epiphytic in forests, 1200-1600 m; fl. & fr.: July-Dec.; Jarain.

29. ANTHOGONIUM Lindl.

Anthogonium gracile Lindl. Nat. Syst. ed. 2: 341. 1836; Fl. Brit. Ind. 5: 822. 1890.

Pseudobulbs underground, ± 7 mm across; stems 2-5 cm; leaves lanceolate, 15-25 × 1.0-1.6 cm, 5-nerved; racemes terminal, 20-40 cm; bracts ovate, 2-3 × 1-2 mm; flowers ± 2 cm, pale to dark pink; pedicels with ovary 10-12 mm; sepals connate, forming a long slender tube; lobes oblong, obtuse, ± 7 mm; petals falcate, clawed at base, ± 1.5 cm, pale pink with whitish patches; lip ± 1.5 × 1.2 mm, dark pink with red spots at apex.

Grasslands and open hillslopes, 1200-1500 m; fl. & fr.: June-Oct.; Jarain.

30. CALANTHE R. Br. *nom. cons.*

- | | | |
|--|-----|----------------------|
| 1a. Flowers pale yellow; spur present. | ... | <i>C. clavata</i> 1 |
| 1b. Flowers purplish-white; spur absent. | ... | <i>C. puberula</i> 2 |

1. **Calanthe clavata** Lindl. Gen. Sp. Orch. 251. 1833; Fl. Brit. Ind. 5: 854. 1890.

Stems stout, sheathed at base; sheaths acuminate, 6-8 cm; leaves 2-3, narrow-elliptic, 18-25 × 5-6 cm; peduncles 12-18 cm, lateral, sheathed; sheaths 3-4, tubular, acute at apex, 2.5-3.0 cm; racemes short, 2-3 cm; flowers ± 2 cm; sepals and petals lanceolate, acute, ± 8 mm, 3-nerved; lip ± 9 mm, 3-lobed; lateral lobes acute; midlobe suborbicular, emarginate; disk with 2 large triangular lamellae; spur ± 1 cm, inflated at apex.

Primary forests, in shaded humus soil, 1200-1600 m; fl. & fr.: Sept.-Feb.; Jowai, *Pantling s. n.* (CAL).

2. **Calanthe puberula** Lindl. Gen. Sp. Orch. 252. 1833; Fl. Brit. Ind. 5: 848. 1890.

Stems short, leaves elliptic, 15-20 × 3-5 cm, many-nerved; peduncles 14-20 cm, sheathed; sheaths tubular, acute, 2-3 cm; racemes 2-4 cm, few-flowered; flowers ± 2.5 cm across; sepals lanceolate or falcate-lanceolate, 1.2-1.8 cm; petals ± 1.2 × 0.2 cm, 3-nerved; lip ± 1.4 cm, 3-lobed; lateral lobes oblong, falcate; midlobe rhombic, acuminate, crenate at margins, ± 10 × 8 mm; disk 3-nerved.

Primary forests, in shaded humus soil, 1200-1500 m; fl. & fr.: Aug.-Dec.; Jowai, Rita s. n. (CAL).

31. TAINIA Bl.

- 1a. Pseudobulbs ovoid, leafless during flowering; inflorescences 20-30 cm long. ... *T. viridi-fusca* 1
 1b. Pseudobulbs fusiform, leafy throughout; inflorescences 50-60 cm long. ... *T. latifolia* 2

1. **Tainia viridi-fusca** (Hook.) Benth. in Benth. & Hook. f. Gen. Pl. 3: 515. 1833; Fl. Brit. Ind. 5: 820. 1890. *Calanthe viridi-fusca* Hook. in Curtis, Bot. Mag. 78: t. 4669. 1852.

Pseudobulbs ± 5 cm, crowded; leaves lanceolate, 25-35 × 5-8 cm; peduncles sheathed, 13-18 cm; racemes 8-12 cm, lax-flowered; flowers ± 4 cm across, greenish-brown; bracts lanceolate, ± 12 mm; sepals and petals oblong-lanceolate, ± 3 × 0.8 cm, 5-nerved; lip ± 15 mm, 3-lobed; lateral lobes rounded; midlobe ovate, recurved; disk 5-lamellate; spur ± 5 mm, obtuse.

Primary forests, in shaded humus-covered soil, 1200-1500 m; fl. & fr.: Apr.-Aug.; Jarain.

2. **Tainia latifolia** (Lindl.) Hook. f. Fl. Brit. Ind. 5: 820. 1890. *Ania latifolia* Lindl. Gen. Sp. Orch. 130. 1831.

Pseudobulbs ± 6 cm, oblique, warted; leaves broadly elliptic, ± 10 × 5 cm; peduncles ± 50 cm; racemes 8-10 cm, lax-flowered; flowers ± 3 cm across, pale brown; bracts lanceolate, ± 7 mm; sepals and petals lanceolate, ± 1.5 × 0.3 cm; lip yellowish, ± 1.5 cm; lateral lobes rounded; midlobe orbicular, retuse; disk 3-lamellate; spur saccate, ± 1 mm.

Primary forests in shaded places amidst grass, 1200-1500 m; fl. & fr.: Mar.-Aug.; Jarain.

32. SPATHOGLOTTIS Bl.

Spathoglottis pubescens Lindl. Gen. Sp. Orch. 120. 1831; Fl. Brit. Ind. 5: 814. 1890.

Pseudobulbs underground, 1.0-2.5 cm across; leaves linear-lanceolate, acuminate, 10-20×0.8-1.0 cm; peduncles terminal, slender, 15-30 cm; racemes 4-6 cm, 2-8-flowered; flowers yellow, ± 2 cm across; bracts lanceolate, acute, ± 6 mm; sepals elliptic-subacute, ± 12×7 mm, 5-nerved; petals obovate, obtuse, ± 15×10 mm, 7-nerved; lip ± 1.5 cm, 3-lobed; lateral lobes oblong, obtuse; midlobe obcordate with 2 short thick ridges on disk.

Grasslands and open hillslopes, 500-1500 m; fl. & fr.: July-Dec.; Jarain, Jarain-Syndai, Mawryngkneng.

33. PHAIUS Lour.

- 1a. Inflorescences from the base of pseudobulbs; flowers ± 10 cm across, brownish inside, white outside. ... *P. tankervilleae* 1
 1b. Inflorescences axillary at the middle of pseudobulbs; flowers 2-3 cm across, greenish-yellow. ... *P. longipes* 2

1. **Phaius tankervilleae** (Ait.) Bl. Mus. Bot. Lugd.-Bat. 2: 177. 1856. *Limodorum tankervilleae* Ait. in Hort. Kew. ed. 1. 3: 302. t. 12. 1789. *P. wallichii* Lindl. in Wall. Pl. As. Rar. 3: 46. t. 158. 1831; Fl. Brit. Ind. 5: 816. 1890.

Pseudobulbs conical, 5-10×3-5 cm; stems formed of long leaf-sheaths, ± 30 cm; leaves elliptic-lanceolate, 25-50×10-15 cm; peduncles erect, terete, up to 100 cm, 10-15-flowered; bracts spathaceous, ± 5×3 cm, white or bluish-white; sepals and petals lanceolate, ± 6×2 cm; lip ± 5 cm, 3-lobed; lateral lobes rounded; midlobe acute, crisped; spur 6-8 mm, retuse or forked at apex.

Terrestrial in moist shaded places in primary forests, 1000-1500 m; fl. & fr.: Apr.-Oct.; Jowai.

2. **Phaius longipes** (Hook. f.) Holtt. in Gard. Bull. Sing. 11: 266. 1947. *Calanthe longipes* Hook. f. Fl. Brit. Ind. 6: 195. 1890.

Stems slender, 25-40 cm, many-noded; leaves lanceolate, 15-20×4-5 cm; peduncles lateral, slender, erect, up to 30 cm; racemes 10-15 cm; bracts linear, 10-15 mm; sepals and petals ovate, acuminate, ± 12 mm, white or yellowish-green; lip ± 10 mm, erect, 3-lobed, white with yellow

spot at base; lateral lobes oblong, acute, incurved; midlobe crisped, retuse; disk with 2 yellow ridges.

Terrestrial in primary forests, shaded moist places, 1000-1500 m; fl. & fr.: Nov.-Apr.; Jarain.

34. EULOPHIA Lindl.

Eulophia sanguinea (Lindl.) Hook. f. Fl. Brit. Ind. 6: 8. 1890.
Cryptoptera sanguinea Lindl. in J. Linn. Soc. 3: 32. 1859.

Rhizome globose, up to 20 cm, covered with purplish-green bracts, leafless when flowering; inflorescences 50-75 cm; peduncles terete, 40-60 cm; racemes 10-15 cm, many-flowered; flowers pendulous, purple-brown, ± 2.5 cm across; bracts ± 1.2 cm; sepals ovate-lanceolate, $\pm 2.3 \times 1.0$ cm, 5-nerved; petals elliptic, apiculate, $\pm 1.5 \times 1.0$ cm, many-nerved; lip purple, 3-lobed, ± 1.7 cm, concave; lateral lobes rounded; midlobe ovate; disk with many crenulate nerves.

Saprophytic in humus covered soil in primary forests, 1000-1500 m; fl. & fr.: June-Dec.; Jarain, Umtapoh.

35. OBERONIA Lindl. *nom. cons.*

1a. Leaves not jointed.	...	<i>O. mannii</i> 1
1b. Leaves jointed.		
2a. Small or medium-sized plants; leaves less than 10 cm long.	...	<i>O. caulescens</i> 2
2b. Larger plants; leaves 10-35 cm long.		
3a. Inflorescences as long as or shorter than leaves.	...	<i>O. ensiformis</i> 3
3b. Inflorescences longer than leaves.		
4a. Lip broader than long; midlobe obreniform; sinus broad with a broad triangular process at apex.	...	<i>O. ritaii</i> 4
4b. Lip longer than broad; midlobe with 2 short lobules separated by a more or less trapezoid sinus.	...	<i>O. acaulis</i> 5

1. **Oberonia mannii** Hook. f. in Hook. Ic. Pl. t. 2003. 1890 et Fl. Brit. Ind. 6: 180. 1890.

Stems 5-8 cm, slender, few-leaved; leaves linear, acute, $2-3 \times 0.3-0.4$ cm; inflorescences erect, 3-5 cm; peduncles short, terete, slender; flowers yellowish, ± 2 mm; bracts lanceolate, erose, aristate at apex; sepals ovate, obtuse; petals oblong-ovate, mucronulate, ± 1 mm; lip 3-lobed, ± 1.1 mm; lateral lobes triangular-subulate; midlobe oblong, 2-fid at apex for half the length; lobes divergent, acuminate; sinus with a minute tooth.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: May-Oct.; Jaintia Hills, *Mann s. n.* (CAL).

2. **Oberonia caulescens** Lindl. Gen. Sp. Orch. 15. 1830; Fl. Brit. Ind. 5: 682. 1888.

Stems slender, 4-9 cm; leaves linear, ensiform, acuminate, 4-7 × 0.3-0.4 cm; inflorescences slender, 6-9 cm; peduncles bracteate; flowers pale brown, ± 2 mm; bracts lanceolate, erose, acute, ± 1.5 mm; sepals and petals spreading, obovate or linear, acute, ± 1 mm; lip obscurely 3-lobed, ± 2 mm; lateral lobes rounded; midlobe split for half way into 2 lobes; sinus with a short tooth.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: July-Dec.; Jaintia Hills, *Pantling s. n.* (CAL).

3. **Oberonia ensiformis** (Sm.) Lindl. Fol. Orch. Oberon. 4. 1852; Fl. Brit. Ind. 5: 679. 1888. *Malaxis ensiformis* Sm. in Rees, Cyclop. 22: no. 14. 1812.

Stems stout, short; leaves ensiform, falcate, acuminate, 15-30 × 1.3-1.8 cm; inflorescences from amongst leaves, 10-20 cm; racemes erect, decurved, dense-flowered; flowers brownish-yellow, ± 2 mm; bracts convolute, erose, acute, ± 1.5 mm; sepals ovate, subacute; petals elliptic-lanceolate, wavy or erose at margins; lip 3-lobed, puberulous, lateral lobes ovate, obtuse; midlobe obcordate with 2 round lobes; sinus narrow, acute.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: Oct.-Mar.; Jarain.

4. **Oberonia ritaii** King & Prantl. in J. As. Soc. Beng. ser. 2. 66: 579. 1897.

Stems up to 1.5 cm; leaves ensiform, acute, 3-12 × 0.4-0.6 cm; peduncles ± 3 cm; racemes 10-18 cm; flowers ± 2 mm; pedicels with ovary ± 1 mm; bracts erose at margins, acute, ± 2 × 0.5 mm; sepals ovate, obtuse, ± 1 × 0.5 mm; petals obovate, obtuse, ± 1 × 0.3 mm; lip orbicular, 3-lobed, ± 1 × 1.2 mm; lateral lobes obtuse, rounded; midlobe 2-fid for half into obtuse lobes.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: July-Dec.; Jarain.

5. **Oberonia acaulis** Griff. Itin. Not. 1848; 76. Pl. I. Not. 275 & Ic. t. 286. f. 1. 1851; Seidenf. in Dansk. Bot. Ark. 33: 20. f. 11. 1978. *O. myriantha* Lindl. Fol. Orch. Oberon. 4. 1859; Fl. Brit. Ind. 5. 679. 1890.

Stems up to 1.5 cm; leaves few, radical, ensiform, straight or falcate, 3-8 × 0.8-1.2 cm; inflorescences from amongst leaves, 15-20 cm; ped-

uncles 2-3 cm; racemes slender, decurved; flowers brownish, in whorls, ± 1 mm; bracts lanceolate, ± 2 mm, crose, acute; sepals and petals entire, acute; lip $\pm 1.2 \times 1.0$ mm; lateral lobes ovate, obtuse or acute; midlobe obcordate; lobes ovate, acute.

Epiphytic or lithophytic in primary forests, 1200-1500 m; fl. & fr.: June-Aug.; Jarain, Jowai, Sutnga.

36. MALAXIS Sw.

- | | | |
|--|-----|-----------------------|
| 1a. Flowers dense; lip apex 3-lobed. | ... | <i>M. latifolia</i> 1 |
| 1b. Flowers lax; lip apex entire or 2-lobed. | | |
| 2a. Dorsal sepals narrower than lateral sepals. | ... | <i>M. baurita</i> 2 |
| 2b. Dorsal sepals as broad as lateral sepals. | | |
| 3a. Leaves long-petioled; inflorescence as long as the leaves; flowers brown. | ... | <i>M. khasiana</i> 3 |
| 3b. Leaves sessile or short-petioled; inflorescences much longer than the leaves; flowers yellowish. | ... | <i>M. acuminata</i> 4 |

1. **Malaxis latifolia** Sm. in Rees, Cyclop. 22. 1812. *Diana congesta* Lindl. Bot. Reg. Sub. t. 825. 1827 et. Gen. Sp. Orch. 22. 1830. *Microstylis congesta* (Lindl.) Reichb. f. in Walp. Ann. Bot. 6: 206. 1861; Fl. Brit. Ind. 5: 689. 1890.

Stems 8-15 cm; leaves 3-6, elliptic-lanceolate, 10-25 \times 3-5 cm; peduncles erect, 6-12 cm, stout, longitudinally many-ridged; racemes 8-12 cm, dense-flowered; flowers ± 8 mm across, purplish; petals linear, obtuse, ± 2.5 mm; lip erect, subquadrately ovate, concave; lateral lobes elongate; midlobe obovate, acute.

Primary forests, in shaded moist humus covered soil, 1200-1500 m; fl. & fr.: May-Sept.; Jarain, *Balakrishnan* 46782.

2. **Malaxis baurita** (Lindl.) O. Ktze. Rev. Gen. 673. 1891. *Microstylis baurita* Lindl. Gen. Sp. Orch. 30. 1830; Fl. Brit. Ind. 5: 687. 1890.

Stems 5-8 cm; leaves ovate-lanceolate, acute, 5-8 \times 2.0-2.5 cm; peduncles erect, 5-10 cm; racemes erect, 5-10 cm; flowers pale yellow, subglobose; bracts ovate, acute; sepals and petals oblong, acute; lip ovate-lanceolate, entire or notched at apex with narrowly ovate auricles at base.

Primary forests, 1000-1500 m; fl. & fr.: May-Aug.; Jowai.

3. **Malaxis khasiana** (Hook. f.) O. Ktze. Rev. Gen. 673. 1891. *Microstylis khasiana* Hook. f. Fl. Brit. Ind. 5: 686. 1888.

Stems slender, 3-5 cm; leaves ovate or lanceolate, acute, 12-20 \times 2-4

cm, 5-nerved; peduncles 5-8 cm; racemes 3-6 cm, dense flowered; flowers \pm 6 mm; sepals broadly oblong, acute, hooded, concave, \pm 4 \times 3 mm; lip broad-concave, 3-lobed; basal lobes falcate, acute; apical lobe transversely oblong, crose at margins.

Primary forests, in humus-covered soil, 1200-1500 m; fl. & fr.: July-Nov.; Jarain.

4. **Malaxis acuminata** D. Don, Prodr. Fl. Nep. 29. 1825. *Microstylis wallichii* Lindl. Gen. Sp. Orch. 20. 1830; Fl. Brit. Ind. 5: 686. 1888.

Stems 10-25 cm, erect; sheaths 2-3, ovate-lanceolate, acute; leaves elliptic-lanceolate, acute, 6-10 \times 2-4 cm, greenish-purple; peduncles slender, erect, 4-10 cm; racemes 5-8 cm; flowers \pm 1 cm across; bracts lanceolate, acuminate, \pm 3 mm, reflexed; sepals and petals oblong, obtuse, \pm 5 mm; lip discoid, ovate, \pm 1 cm, notched or bifid at apex; auricles lanceolate, \pm 3 mm, acute, parallel; apical lobe \pm 3 mm, ovate, notched.

Primary forests, in shaded moist places, often near streams, 200-1500 m; fl. & fr.: Apr.-Sept.; Garampani, Jarain, Jowai.

37. LIPARIS L. C. Rich. *nom. cons.*

- | | |
|---|-------------------------------|
| 1a. Leaves ovate-elliptic or lanceolate, more than 3 cm broad. | |
| 2a. Leaves sessile. | ... <i>L. bituberculata</i> 1 |
| 2b. Leaves petioled. | |
| 3a. Leaves oblique at base. | ... <i>L. macrocarpa</i> 2 |
| 3b. Leaves symmetrical at base. | ... <i>L. acuminata</i> 3 |
| 1b. Leaves linear to elliptic-lanceolate, less than 2 cm broad. | |
| 4a. Leaves usually 3-5; column with 2-hooked awns at apex. | ... <i>L. resupinata</i> 4 |
| 4b. Leaves usually 2; column winged or not at apex. | |
| 5a. Pseudobulbs cylindric, 5-15 cm long. | ... <i>L. viridiflora</i> 5 |
| 5b. Pseudobulbs globose or ovoid, 1-2 cm long. | ... <i>L. luteola</i> 6 |

1. **Liparis bituberculata** (Hook.). Lindl. in Edw. Bot. Reg. 11: t. 882. 1825; Fl. Brit. Ind. 5: 696. 1890. *Cymbidium bituberculatum* Hook. Exot. Fl. 2: t. 116. 1824.

Stems short, cylindric, up to 15 cm, sheathed; leaves 2-4, acuminate, 8-12 \times 3-5 cm; peduncles 6-10 cm, in between leaves; racemes many-flowered, 10-15 cm; flowers purple, 1.0-1.5 cm across; bracts ovate, acute; pedicels \pm 1 cm; sepals oblong-ovate, revolute at margins; petals linear, filiform; lip obovate, cuneate at base, decurved, with 2 tubercles at base, retuse at apex, undulate at margins.

Primary forests in shaded humus-covered soil, 1200-1500 m; fl. & fr.: June-Oct.; Khleibriat.

2. ***Liparis macrocarpa*** Hook. f. Fl. Brit. Ind. 5: 696. 1890.

Stems robust, woody, 12-18 cm, naked; leaves 6-17 × 4-8 cm; petioles 1-3 cm; peduncles 8-13 cm, purplish; racemes lax-flowered, 10-15 cm; flowers 1.0-1.5 cm across, pale purplish-brown; bracts minute; pedicels ± 1 cm; sepals oblong-lanceolate; petals linear-lanceolate; lip obovate, undulate at margins, retuse at apex; capsules obovoid, ± 2 × 1 cm.

Primary forests, often streamsides, 1300-1600 m; fl. & fr.: Aug.-Jan.; Jowai.

3. ***Liparis acuminata*** Hook. f. Fl. Brit. Ind. 5: 696. 1890.

Stems slender, 9-14 cm, sheathed at base; leaves acuminate, 6-14 × 3-8 cm, membranous; peduncles 5-8 cm, in between leaves; racemes 15-25 cm, laxly many-flowered; bracts ovate, many, minute; pedicels 1-2 cm; flowers purple, ± 1 cm; dorsal sepals linear; lateral sepals falcately oblong-lanceolate; lip obovate; lateral lobes erect, or recurved; midlobe oblong, recurved, crenulate at margins, truncate at apex.

Shaded places in forests, 1400-1600 m; fl. & fr.: May-Sept.; Jowai.

4. ***Liparis resupinata*** Ridley in J. Linn. Soc. 22: 290. 1886; Fl. Brit. Ind. 5: 705. 1890.

Pseudobulbs ovoid-ellipsoid, 1-3 cm; leaves sessile, linear to elliptic-lanceolate, 2-5 × 0.5-1.0 cm; peduncles 3-5 cm, in between leaves; racemes slender, many-flowered, arched, 5-12 cm; flowers pale brown or reddish-yellow, ± 8 mm across; bracts lanceolate, acuminate, green; pedicels 2-3 mm; sepals oblong, obtuse, revolute at margins, ± 4 mm; petals linear-oblong; lip ovate-oblong, reflexed, with 2 auricles at base, rounded at apex.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: Sept.-Mar.; Sutnga.

5. ***Liparis viridiflora*** (Bl.) Lindl. Gen. Sp. Orch. 31. 1830; *p. p.*; Scidenf. in Dansk. Bot. Ark. 31: 82. f. 55. 1976. *Malaxis viridiflora* Bl. Bijdr. 392. 1825. *L. longipes* Lindl. in Wall. Pl. As. Rar. 1: 31. t. 35. 1830; Fl. Brit. Ind. 5: 703. 1890.

Pseudobulbs thicker at base; leaves oblanceolate or linear-lanceolate, 10-15 × 1-2 cm; peduncles terminal on pseudobulbs amidst leaves, 3-5 cm; racemes dense-flowered, 4-10 cm; flowers pale greenish-yellow or white, ± 6 mm across; bracts lanceolate, acute; pedicels ± 3 mm; sepals broadly oblong, obtuse, revolute at margins, ± 3 mm; petals filiform; lip obovate, retuse or obtuse at apex, reflexed.

Epiphytic in primary forests, 1300-1500 m; fl. & fr.: Oct.-Mar.; Jowai.

6. **Liparis luteola** Lindl. Gen. Sp. Orch. 32. 1830; Fl. Brit. Ind. 5: 704. 1890.

Leaves oblanceolate, 4-10×0.4-0.6 cm; peduncles 3-5 cm, arising from apex of new shoots; racemes 2-5 cm; flowers greenish-yellow, ± 5 mm across; bracts ovate, acute; sepals lanceolate, acute, 3-4 mm; petals filiform; lip oblong, ± 5 mm, curved, truncate at apex, crenate or undulate at margins.

Epiphytic in shaded places in forests, 1200-1500 m; fl. & fr.: May-Sept.; Jarain.

38. THUNIA Reichb. f.

Thunia alba (Lindl.) Reichb. f. in Bot. Zeit. 10: 764. 1852. *Phaius albus* Lindl. Gen. Sp. Orch. 128. 1830; Fl. Brit. Ind. 5: 818. 1890.

Stems 30-50 cm; leaves distichous, sessile, linear-lanceolate, 15-18×2-3 cm; racemes terminal, few-flowered, 5-8 cm; bracts white, cymbiform, ± 3 cm; flowers ± 5 cm across, white; sepals and petals lanceolate, ± 4×1 cm; lip ± 3.5×2.5 cm, white with purple patches in middle, crose-margined; disk 5-ridged; spur short, retuse.

Epiphytic or terrestrial, in shaded humid places in primary forests, 1200-1500 m; fl. & fr.: July-Aug.; Jarain, Jowai-Khleihriat.

39. ARUNDINA Bl.

- | | | |
|---|-----|--------------------------|
| 1a. Plants 15-45 cm high; leaves 3-8 mm broad; flowers ±2.5 mm across. | ... | <i>A. chinensis</i> 1 |
| 1b. Plants 60-120 cm high; leaves 10-15 mm broad; flowers ±3.5 cm across. | ... | <i>A. graminifolia</i> 2 |

1. **Arundina chinensis** Bl. Bijdr. 502. 1825; Fl. Brit. Ind. 5: 857. 1890.

Leaves sessile, linear, acuminate, 7-15×0.3-0.8 cm, 5-nerved; racemes terminal, simple 2-4-flowered, 5-8 cm; bracts ovate, acute, ± 4 mm; sepals and petals oblong-lanceolate, ± 20×6 mm, 7-nerved, pinkish-purple; lip ± 3 cm, 3-lobed, dark pink; lateral lobes rounded; midlobe oblong, 2-fid at apex, undulate at margins.

Terrestrial in grasslands, forest-edges and open hillslopes, 800-1400 m; fl. & fr.: June-Dec.; Dawki, Jarain.

2. *Arundina graminifolia* (D. Don) Hochr. in Bull. N. Y. Bot. Gard. 6: 270. 1910. *Bletia graminifolia* D. Don, Prodr. Fl. Nep. 29. 1825. *A. bambusifolia* Lindl. Gen. Sp. Orch. 125. 1830; Fl. Brit. Ind. 5: 857. 1890.

Leaves sessile, lanceolate, acuminate, 11.25 × 1.0-1.5 cm, 5-nerved; racemes 10-25 cm, 5-10-flowered; bracts ovate, acute, ± 8 mm; sepals lanceolate, ± 4 × 10 mm, pale pink; petals oblong-ovate, ± 4.5 × 1.5 cm, pale pink; lip ± 4 cm, 3-lobed, pink with dark pink spots; lateral lobes rounded; midlobe oblong, crisped and 2-fid at apex, with 2 fleshy undulate ridges on disk, dark pink.

Grasslands, secondary forests and forest borders, 500-1500 m; fl. & fr.: May-Dec.; Dawki, Jarain, Jowai, Raliang.

40. *ERIA* Lindl. *nom. cons.*

- | | | |
|---|-----|--------------------------|
| 1a. Leaves hirsute. | ... | <i>E. dasyphylla</i> 1 |
| 1b. Leaves glabrous. | | |
| 2a. Pseudobulbs uninodal. | | |
| 3a. Pseudobulbs less than 1 cm long. | ... | <i>E. muscicola</i> 2 |
| 3b. Pseudobulbs more than 3 cm long. | | |
| 4a. Pseudobulbs 1-leaved; inflorescences from the base of pseudobulbs. | ... | <i>E. carinata</i> 3 |
| 4b. Pseudobulbs 2-leaved; inflorescences terminal or lateral on pseudobulbs. | | |
| 5a. Flowers secund, ± 3 mm across, tomentose. | ... | <i>E. stricta</i> 4 |
| 5b. Flowers scattered, more than 1.5 cm across, glabrous. | ... | <i>E. coronaria</i> 5 |
| 2b. Pseudobulbs few- or many-noded. | | |
| 6a. Pseudobulbs well-spaced on creeping rhizome. | | |
| 7a. Pseudobulbs ovoid, 3-5-leaved; flowers greenish-yellow with purple marking on lip. | ... | <i>E. pubescens</i> 6 |
| 7b. Pseudobulbs terete, usually 2-leaved, rarely 3- or 4-leaved; flowers with pink lip. | ... | <i>E. ferruginea</i> 7 |
| 6b. Pseudobulbs more or less close together. | | |
| 8a. Stems 30-60 cm long, terete, not fleshy, nor pseudobulbous. | | |
| 9a. Leaves 7-8 mm broad; flowers greenish, ± 8 mm across. | ... | <i>E. paniculata</i> 8 |
| 9b. Leaves 2-3 cm broad; flowers brown, ± 1.8 cm across. | ... | <i>E. bambusifolia</i> 9 |
| 8b. Stems less than 15 cm long, fusiform or ellipsoid, pseudobulbous, fleshy. | | |
| 10a. Inflorescences terminal or subterminal, 2-3-flowered. | ... | <i>E. clavicaulis</i> 10 |
| 10b. Inflorescences lateral, many-flowered. | | |
| 11a. Racemes densely many-flowered. | ... | <i>E. spicata</i> 11 |
| 11b. Racemes laxly few-flowered; flowers ± 1 cm or more across. | | |

- | | | |
|---|-----|-----------------------|
| 12a. Racemes glabrous. | ... | <i>E. acervata</i> 12 |
| 12b. Racemes pubescent, or tomentose. | | |
| 13a. Flowers yellow-green; \pm 15 mm across; ovary with pedicel 15-20 mm long. | ... | <i>E. amica</i> 13 |
| 13b. Flowers white to dull white, 8-10 mm across; ovary with pedicel 3-8 mm long. | | |
| 14a. Lip pale yellow; ovary with pedicel \pm 8 mm long. | ... | <i>E. excavata</i> 14 |
| 14b. Lip flushed with purple; ovary with pedicel \pm 3 mm long. | ... | <i>E. pudica</i> 15 |

1. ***Eria dasyphylla*** Par. & Reichb. f. in Trans. Linn. Soc. 30: 147. 1874; Fl. Brit. Ind. 5: 808. 1890.

Stems slender, branched, creeping, hirsute; leaves sessile, usually in pairs, ovate-elliptic, 2.5-3.0 \times 0.8-1.0 cm, fleshy, thickened; peduncles 2-3 cm, 1-flowered, closely sheathed, hirsute; flowers \pm 1 cm across, pale greenish-yellow with brown lip; bracts cupular; dorsal sepal oblong-ovate, \pm 4 \times 8 mm; lateral sepals triangular, \pm 7 \times 5 mm; petals oblong, obtuse, \pm 3 mm, 1-nerved; lip obovate, obscurely 3-lobed, fleshy.

Epiphytic in primary forests, 1200-1600 m; fl. & fr.: May-Sept.; Jarain.

2. ***Eria muscicola*** (Lindl.) Lindl. in J. Linn. Soc. 3: 47. 1859; Fl. Brit. Ind. 5: 789. 1890. *Dendrobium muscicola* Lindl. Gen. Sp. Orch. 75. 1830.

Pseudobulbs depressed-globose, 5-8 mm across, clustered, reticulate; leaves linear-lanceolate, acute, 2-3 \times 0.4-0.5 mm; peduncles lateral amidst leaves, slender, terete, erect; flowers few, racemose, pale green, \pm 4 mm across; bracts ovate-lanceolate, \pm 5 mm; dorsal sepals lanceolate, \pm 7 \times 2 mm; lateral sepals broad at base, united with upcurved long foot forming a mentum; petals linear, 1-nerved; lip narrow-lanceolate, dilated at middle, \pm 4 mm.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: July-Dec.; Jarain.

3. ***Eria carinata*** (Gibs. in Calc. J. Nat. Hist. 5: 365. 1845; Fl. Brit. Ind. 5: 808. 1890.

Pseudobulbs ovoid, sulcate, \pm 3 cm; leaves lanceolate, acute 10-12 \times 2-4 cm; petioles 3-5 cm; peduncles lateral, 6-8 cm; sheaths few, uppermost one long, ensiform; racemes 3-4-flowered, 2-4 cm; flowers \pm 3 cm, drooping, pale pinkish brown; bracts lanceolate, 2-3 cm; sepals ovate-lanceolate, 2.2-2.5 cm, keeled, serrate at apex; lateral sepals forming a short obtuse mentum; petals rhombic, acute, \pm 2 mm; lip shortly clawed

at apex of foot, oblong, 3-lobed, ± 2 mm; midlobe ovate, ± 1.5 cm, reflexed; disk 3-lamellate.

Epiphytic or lithophytic in primary forests, 1300-1600 m; fl. & fr.: Aug.-Dec.; Jowai.

4. ***Eria stricta*** Lindl. Coll. Bot. t. 41 B. 1812; Fl. Brit. Ind 5: 791. 1890.

Pseudobulbs cylindrical, 5-10 cm, ribbed, close together; leaves 2, oblong-lanceolate, acutely bifid at apex, 8-10 \times 1.2-1.8 cm; peduncles terminal, 5-8 cm, slender; racemes 6-10 cm, pubescent; bracts cupular; pedicels ± 3 mm; sepals ovate, obtuse, ± 4 mm; petals oblong, obtuse, ± 4 mm; lip suborbicular, 3-lobed; lateral lobes acute, small; midlobe broad, round; disk with 2 basal oblong and one apical globose callii.

Epiphytic in primary forests, 1000-1400 m; fl. & fr.: Dec.-Apr.; Lumshnong.

5. ***Eria coronaria*** (Lindl.) Reichb. f. in Walp. Ann. Bot. 6: 272. 1861. *Coelogyne coronaria* Lindl. in Edw. Bot. Reg. Misc. 83. 1841. *Trichosma suavis* Lindl. in Edw. Bot. Reg. t. 21. 1842; Fl. Brit. Ind. 5: 827. 1890.

Stems tufted, cylindric, 6-15 cm; leaves lanceolate, 10-15 \times 2-3 cm; peduncles terminal, 5-8 cm; racemes 2-5 cm, laxly 2-4-flowered; flowers white with purple streaks on lip, ± 3.5 cm, scented; sepals and petals oblong lanceolate, $\pm 20 \times 8$ mm; spreading; lateral sepals adnate to foot forming a conical mentum; lip erect, 3-lobed, ± 1.5 cm; lateral lobes ovate, acute; midlobe suborbicular, acute, undulate at margins, purple at apex; disk with 2 thick yellow lamellae and 3 faint ridges.

Epiphytic in forests, 1000-1500 m; fl. & fr.: Nov.-Feb.; Jarain, Jowai.

6. ***Eria pubescens*** (Hook.) Lindl. in Edw. Bot. Reg. 11: t. 904. 1825. *Dendrobium pubescens* Hook. Exot. Fl. t. 124. 1824. *E. flava* Lindl. Gen. Orch. 65. 1830; Fl. Brit. Ind. 5: 801. 1890.

Rhizomes stout, creeping, covered with coriaceous sheaths; pseudobulbs ovoid or ellipsoid, $\pm 4.5 \times 2.3$ cm; leaves lanceolate, 14-17 \times 2-3 cm; peduncles 1-2, lateral on pseudobulbs, 8-10 cm, dense-woolly; racemes 10-15 cm, woolly-tomentose; flowers few, ± 2.5 cm across, scented; bracts ovate, 6-10 mm, tomentose; sepals ovate-lanceolate, obtuse, $\pm 12 \times 4$ mm, tomentose outside; petals oblanceolate, $\pm 10 \times 2$ mm, glabrous; lip ± 12 mm; midlobe broadly clawed, wavy at margins; disk with 2-3 thickened ridges, purple-dotted.

Epiphytic in forests, 200-1200 m; fl. & fr.: Apr.-Sept.; Dawki.

7. **Eria ferruginea** Lindl. in Edw. Bot. Reg. n. s. 25: t. 35. 1839; Fl. Brit. Ind. 5: 804. 1890.

Rhizomes creeping, stout, ± 6 mm thick; stems stout, 10-20 cm; leaves ovate-lanceolate, acute, 7-20 \times 3-6 cm, thickly coriaceous; peduncles sheathed at base, 5-15 cm, brown tomentose; racemes 5-10 cm; bracts broadly lanceolate, $\pm 14 \times 7$ cm; flowers white with pink lip, ± 3 cm across, pubescent outside; dorsal sepal oblong, acute, $\pm 2 \times 0.8$ cm; lateral sepals ovate, acute, ± 1.5 cm; petals oblanceolate, obtuse, ± 1.8 cm; lip ± 1.3 cm; lateral lobes truncate; midlobe oblong, retuse; disk pink with a dark ridge, purple-dotted.

Epiphytic in forests, 1300-1600 m; fl. & fr.: May-Sept.; Jarain.

8. **Eria paniculata** Lindl. in Wall. Pl. As, Rar. 1: 32. t. 36. 1830; Fl. Brit. Ind. 5: 789. 1890.

Stems close together, terete; leaves many, linear, 15-20 \times 6-8 mm, fleshy; inflorescences simple or branched; terminal or subterminal, 10-12 cm, tomentose; flowers pale green with white lip, purple-dotted; bracts ovate-lanceolate, ± 5 mm, hairy, reflexed; sepals green, ovate, obtuse, $\pm 4 \times 3$ mm, hairy outside; petals oblong-lanceolate, $\pm 3 \times 1.5$ mm; lip ± 3 mm; lateral lobes oblong; rounded; midlobe reniform, truncate at apex, tubercled at base; disk with large fleshy lamellae.

Epiphytic in primary forests, 1000-1500 m; fl. & fr.: Dec.-Apr.; Jowai, Lumshnong.

9. **Eria bambusifolia** Lindl. in J. Linn. Soc. 3: 61. 1859; Fl. Brit. Ind. 5: 805. 1890.

Stems close together, erect, ± 1.5 cm thick, purplish; leaves oblong-lanceolate to linear-oblong, 10-15 \times 2-3 cm; racemes lateral, 8-15 cm, simple or branched, tomentose; flowers pale pinkish-white with purple nerves; tomentose; bracts lanceolate to suborbicular, ± 8 mm, reflexed; sepals broadly oblong or ovate-lanceolate, $\pm 10 \times 5$ mm; petals oblanceolate, $\pm 10 \times 3$ mm, 3-nerved; lip oblong-ovate, 3-lobed, ± 1 cm; midlobe oblong, acute.

Epiphytic in primary forests, 1000-1500 m; fl. & fr.: Nov.-Apr.; Sutnga.

10. **Eria clavicaulis** Lindl. in Edw. Bot. Reg. Misc. 90. 1840; Fl. Brit. Ind. 5: 799. 1890.

Stems subclavate, 8-12 cm; leaves 2-4, sessile or subsessile, lanceolate, 4-8 \times 1.0-1.2 cm; flowers ± 1.5 cm across, white; bracts oblong or lan-

ceolate, acute, ± 2 cm, recurved; dorsal sepal ovate, acute, $\pm 12 \times 6$ mm; lateral sepals triangular, $\pm 13 \times 12$ mm; petals rhombic, obtuse, ± 12 mm; lip ± 1.2 cm, 3-lobed, white with purple edges; lateral lobes rounded, infolded; midlobe oblong, obtuse; disk with 2 short lateral calli at base and an elongate tomentose ridge.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: Nov.-Apr.; Jarain.

11. *Eria spicata* (D. Don) Hand.-Mazz. Symb. Sin. 7: 1352. 1936. *Octomeris spicata* D. Don, Prodr. Fl. Nep. 31. 1825. *E. convallarioides* Lindl. Gen. Sp. Orch. 70. 1830; Fl. Brit. Ind. 5: 791. 1890.

Stems stout, compressed, 5-10 cm, 2-3 cm thick, sheathed at base; leaves elliptic-lanceolate to oblanceolate, 8-25 \times 2.5-4.5 cm; peduncles 1-3, 3-5 cm; racemes nodding, 6-9 cm; flowers dense, ± 6 mm across, pale brownish-yellow with purple tinge; bracts oblong, acute, cross at margins, 4-6 mm; dorsal sepal broadly oblong, obtuse, $\pm 6 \times 4$ mm; lateral sepals ovate, acute; petals oblong-lanceolate, ± 6 mm; lip ± 8 mm, 3-lobed, shortly clawed at base; lateral lobes short, rounded; midlobe sub-orbicular, retuse.

Epiphytic in forests, 1000-1400 m; fl. & fr.: Aug.-Mar.; Jarain.

12. *Eria acervata* Lindl. in Paxt. Fl. Gard. 1: 170. 1850; Fl. Brit. Ind. 5: 796. 1890.

Pseudobulbs crowded, ellipsoid, 4-5 cm, ± 1.5 cm thick; leaves 2-6, lanceolate to oblanceolate, obtusely 2-lobed at apex, 7-12 \times 1.0-1.8 cm; peduncles 1-3, interfoliar, 2-3 cm; racemes 2-5 cm; bracts lanceolate, ± 8 mm, reflexed; flowers ± 1.5 cm across, white; pedicel with ovary slender, ± 2 cm; sepals ovate-lanceolate, $\pm 10 \times 4$ mm; lateral sepals acuminate; petals oblong, 3-nerved; lip obovate, ± 8 mm; lateral lobes obtuse; midlobe reflexed, ovate-acute; disk 3-ridged.

Epiphytic in primary forests, 1300-1500 m; fl. & fr.: Nov.-Apr.; Jowai.

13. *Eria unilca* Reichb. f. in Xenia Orch. 2: 162. t. 3. f. 6-9. 1870. *E. confusa* Hook. f. Ic. Pl. ser. 3: t. 1850. 1889; Fl. Brit. Ind. 5: 796. 1890.

Pseudobulbs club-shaped, 10-15 cm, 7-10 mm thick; leaves narrow-lanceolate, 15-20 \times 1.5-2.5 cm; inflorescences lateral, 1-3, suberect, 8-12 cm; peduncles dense-pubescent; ovary with pedicels 1.5-2.5 cm, red-pubescent; dorsal sepal lanceolate, acute; lateral sepals broad-triangular, ± 1 cm; petals linear-lanceolate; lip elliptic, shortly clawed, 3-lobed, 9-10 \times

7-8 mm; lateral lobes erect, triangular; midlobe oblong, retuse or bilobed; disk with 3 low dark red keels.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: Mar.-Aug.; Jarain.

14. **Eria excavata** Lindl. Gen. Sp. Orch. 67, 1830; Fl. Brit. Ind. 5: 795. 1890.

Pseudobulbs ellipsoid, 2-4 cm, ± 1 cm thick, curved, 2-3-noded; sheaths 2-3; leaves 4-6, lanceolate, 8-12 \times 2-3 cm; peduncles interfoliar, 2-5 cm; racemes 4-6 cm, bracts lanceolate, ± 7 mm; sepals ovate-lanceolate, concave, obtuse, $\pm 6 \times 4$ mm, 3-5-nerved; petals lanceolate, $\pm 6 \times 3$ mm; lip pale yellow at margins, saccate at base; lateral lobes short, erect; midlobe suborbicular, emarginate at apex; disk with 2 crenate ridges.

Epiphytic in primary forests, 1300-1600 m; fl. & fr.: June-Dec.; Mawryngkneng.

15. **Eria pudica** Ridl. in J. Linn. Soc. 32: 294. 1896; Deorj & Malhotra in J. Bombay Nat. Hist. Soc. 74(1): 205. 1977.

Pseudobulbs crowded; leaves 7-13 \times 1.5-2 cm oblong-lanceolate; inflorescence lateral, pubescent, ± 6 cm; ovary with pedicel ± 3 mm, woolly-tomentose; sepals ovate, dorsal smaller than the laterals, 4 \times 2.5, and 5 \times 3 mm respectively; petals elliptic-oblong, falcate, faintly bilobed at tip; lip 3-lobed; lateral lobes obscure; midlobe reflexed; fleshy, white flushed with purple.

Fl. June-July; Omtey, *Prain* 318 (CAL). This species hitherto known from Malaya and Singapore, has now been reported on the basis of the cited old collection. The description has been adapted from the paper referred to above.

41. CRYPTOCHILUS Wall.

Cryptochilus sanguinea Wall. Tent. Fl. Nep. 36, t. 26. 1824; Fl. Brit. Ind. 5: 827. 1890.

Pseudobulbs ovoid, 2.5-3.5 \times 2-3 cm; leaves 1-2 lanceolate, 10-18 \times 2-4 cm; peduncles erect, stout, 5-15 cm; spikes 5-10 cm; bracts linear-acuminate, ± 2 cm; flowers ± 1.2 cm, pubescent; sepals connate, 3-lobed at apex, ± 1.8 cm, blood-red; petals oblong, $\pm 8 \times 3$ mm, pinkish-yellow; lip recurved, retuse at apex, ± 1 cm, pale yellow.

Primary forests, 1400-1700 m; fl. & fr.: June-Nov.; Jowai, Jowai-Jarain.

42. PORPAX Lindl.

- | | | |
|---|-----|----------------------|
| 1a. Flowers 2 on each pseudobulb ; sepaline tube bilabiate ; leaves up to 5.5 cm long. | ... | <i>P. gigantea</i> 1 |
| 1b. Flowers solitary on each pseudobulb ; sepaline tube 3-toothed ; leaves up to 3 cm long. | ... | <i>P. meirax</i> 2 |

1. **Porpax gigantea** Deori in Bull. Bot. Surv. Ind. 17: 174. ff. 1-8. 1975 (1978).

Pseudobulbs clustered, depressed, loosely reticulate, \pm 1 cm diam.; leaves 2, broadly obovate, 2.5-5.5 \times 1.3-3.5 cm with shining silvery hairs on both surfaces; flowers paired on \pm 5 mm long scape, 1.4-1.7 cm long; bracts erect ovate, apiculate, hairy at margins; sepals connate into 2-lipped tube, 1.4-1.7 cm long; petals obliquely spatulate, acuminate, 10-12 \times 5-6 mm; lip falcate, 3-lobed, yellow; sidelobes laciniate-edged, upturned; midlobe narrow, oblong, obtuse, hairy.

Primary forests, \pm 1400 m, fl.: June-July; Deori 51757.

2. **Porpax meirax** (Par. & Reichb. f.) King & Pantl. in Ann. R. Bot. Gard. Cal. 8: 114. t. 158. 1898; Deori in Ind. For. 101; 689. 1975 *Cryptochilus meirax* Par. & Reichb. f. in Trans. Linn. Soc. 30: 148. 1874. *Eria meirax* (Par. & Reichb. f.) N. E. Br. in Gard. Chron. 1880: 603. 1880; Fl. Brit. Ind. 5: 786. 1890.

Pseudobulbs clustered, depressed-discoid, \pm 7 mm diam., leafless when in flower; leaves 2, oblong-elliptic, mucronate, \pm 2.5 cm long; flowers solitary, subsessile at apex of pseudobulbs, dull brown, 1.0-1.5 cm long; bracts erect, concave, acuminate; sepals connate into 3-toothed tube, \pm 8 mm long; petals oblong-lanceolate; lip obcuneiform, obtuse at apex; sidelobes rounded, upturned; midlobe narrow, obtuse at apex.

Primary forests, 1000-1500 m; fl.: Oct.; Jowai.

43. AGROSTOPHYLLUM Bl.

- | | | |
|---|-----|-----------------------|
| 1a. Stems 5-8 cm long ; leaves spatulate or oblanceolate ; lip exceeding the perianth ; midlobe reniform. | ... | <i>A. khasianum</i> 1 |
| 1b. Stems 12-35 cm long ; leaves lanceolate ; lip as long as perianth ; midlobe ovate or oblong. | | |
| 2a. Stems cylindric ; leaves many all along the stem ; midlobe of lip broadly ovate. | ... | <i>A. callosum</i> 2 |
| 2b. Stems thickened towards apex ; leaves few, crowded towards apex of stem ; midlobe of lip oblong. | ... | <i>A. brevipes</i> 3 |

1. **Agrostophyllum khasianum** Griff. in Calc. J. Nat. Hist. 4: 376. t. 19. 1844; Fl. Brit. Ind. 5: 824. 1890.

Stems cylindrical at base, flattened at apex; leaves obtuse-emarginate at apex, 8-15 x 1.5-2.0 cm; flowers pinkish, \pm 6 mm, in terminal heads; sepals ovate-lanceolate, \pm 4 x 3 mm; petals linear-oblong; lip 3-lobed; lateral lobes acute; midlobe undulate at upper margins.

Epiphytic in forests, 100-1000 m; fl. & fr.: July-Dec.; Dawki, Syndai.

2. **Agrostophyllum callosum** Reichb. f. in Seem. Fl. Vit. 296. 1868; Fl. Brit. Ind. 5: 824. 1890.

Stems clustered, cylindrical, 20-35 cm; leaves linear-lanceolate, notched at apex, 6-10 x 0.8-1.0 cm; flowers pink, \pm 2 mm, in terminal heads; sepals broadly ovate, concave, obtuse, \pm 2 mm; petals narrower than sepals; lip sessile, 3-lobed, \pm 3 mm, with a large callus at base; lateral lobes round; midlobe obtuse.

Epiphytic or lithophytic in forests, 1000-1600 m; fl. & fr.: June-Nov.; Jarain.

3. **Agrostophyllum brevipes** King & Pantl. in Ann. R. Bot. Gard. Calc. 8: 156. t. 213. 1898.

Stems arising from a branched scale-covered rhizome, subclavate, 10-20 cm; leaves linear-lanceolate, obtuse, 8-10 x 0.6-0.8 cm; flowers 2-3 mm, pale pink, white in buds, in terminal heads, \pm 1 cm diam.; sepals and petals oblong-ovate, obtuse, subequal, 2.0-2.5 cm; lip sessile, obscurely 3-lobed; lateral lobes rounded; midlobe longer than lateral lobes retuse at apex.

Epiphytic in forests, 1300-1600 m; fl. & fr.: Aug.-Nov.; Jowai.

44. CERATOSTYLIS Bl.

- | | | |
|--|-----|-----------------------|
| 1a. Stems with sheaths at base only; leaves terete; flowers white with yellow lip-apex. | ... | <i>C. teres</i> 1 |
| 1b. Stems with sheaths all along the branches; leaves flat; flowers pale yellow with pink patches. | ... | <i>C. himalaica</i> 2 |

1. **Ceratostylis teres** Reichb. f. in Bonpland. 2: 89. 1854; Fl. Brit. Ind. 5: 825. 1890.

Stems terete, erect, clustered, 15-20 cm; leaves crowded at apex of stems, \pm 5 cm; flowers \pm 8 mm, solitary or paired, pubescent; sepals connate into half way; petals lanceolate; lip spatulate, clawed at base, thick at apex, obtuse; disk with 2 raised lines.

Epiphytic or lithophytic in forests, 1200-1500 m; fl. & fr.: June-Dec.; Jaintia Hills, *Prain's Collector* 315 (CAL).

2. ***Ceratostylis himalaica*** Hook. f. *Ic. Pl. sec. 4: t. 2101. 1889; Fl. Brit. Ind. 5: 826. 1890.*

Stems puberulous, branched, clothed with scarios sheaths; leaves linear-lanceolate, acuminate, fleshy, 5-8 × 0.8-0.9 cm; flowers solitary or paired, terminal, ± 4 mm across, pubescent outside; bracts reflexed; sepals oblong-lanceolate to ovate, ± 2.5 mm; lip oblong-ovate; midlobe suborbicular, notched at apex.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: May-Aug.; Jarain.

45. DENDROBIUM Sw. *nom. cons.*

- 1a. Leaves overlapping, ensiform, laterally compressed, fleshy and nerveless.
- 2a. Flowers 1-2 on very short racemes. ... *D. terminale* 1
- 2b. Flowers many on long racemes. ... *D. acinaciforme* 2
- 1b. Leaves not overlapping, neither ensiform, nor laterally compressed, thin or coriaceous, at least midrib distinct.
- 3a. Stems up to 10 cm, tapering to both ends, simple; flowers ± 6 mm across; lateral lobes of lip strongly inciso-serrate. ... *D. eriaeflorum* 3
- 3b. Stems more than 15 cm, cylindrical or compressed, simple or with branch-like adventitious shoots at upper portion of stem; flowers more than 1.5 cm across; lateral lobes of lip not serrate.
- 4a. Flowers in 10-15 cm long racemes. ... *D. sulcatum* 4
- 4b. Flowers solitary, paired or in up to 5 cm long racemes.
- 5a. Flowers 1.5-2.0 cm across; lip prominently 3-lobed with narrow subacute side lobes. ... *D. pauciflorum* 5
- 5b. Flowers more than 3 cm across; lip not distinctly 3-lobed, or if so, then with broad rounded side lobes.
- 6a. Flowers golden or pale yellow.
- 7a. Stem covered with white striations (remnants of old sheaths), straight. ... *D. chrysanthum* 6
- 7b. Stem devoid of white striations, decumbent.
- 8a. Stem covered with black deciduous hairs; pedicels with ovary ± 2 cm long. ... *D. williamsonii* 7
- 8b. Stem glabrous; pedicels with ovary ± 3.5 cm long. ... *D. ochraceum* 8
- 6b. Flowers white or combination of white, pink, purple, yellow, orange and red.
- 9a. Flowers white with yellow, orange or red patches on disk of lip.
- 10a. Sheaths of stems glabrous; flowers on leafless stem. ... *D. heterocarpum* 9

- 10b. Sheaths of stems with black deciduous hairs; flowers usually on leaf-bearing stems.
- 11a. Stems stout, leaves 3.5—4.0 cm broad; petals ± 5.5 —4.5 cm; mid-lobe of lip entire or retuse at apex. *D. formosum* 10
- 11b. Stems slender; leaves 1—2 cm broad; petals $\pm 2.5 \times 1.0$ cm; midlobe of lip fringed at margins. *D. longicornu* 11
- 9b. Flowers creamy-white or pinkish white, with crimson or purple patches or streaks.
- 12a. Flowers white with purple-tipped petals and lip. ... *D. devonianum* 12
- 12b. Flowers creamy-white or pinkish-white, never with purple-tipped petals.
- 13a. Flowers 5—6 cm across; lip with 2 dark purple patches with creamy ring around at throat. ... *D. nobile* 13
- 13b. Flowers 3—4 cm across; lip not so.
- 14a. Flowers creamy-white with purple nerves on lip. ... *D. aphyllum* 14
- 14b. Flowers not so.
- 15a. Flowers 2—3 together on short peduncles, pinkish white with 2 dark purple blotches on lip. .. *D. transparentis* 15
- 15b. Flowers solitary at nodes, white with crimson lip. *D. cretaceum* 16

1. **Dendrobium terminale** Par. & Reichb. f. in Trans. Linn. Soc. 30: 149. 1859; Fl. Brit. Ind. 5: 725. 1890.

Stems erect, 4-15 cm; leaves sessile, oblong, 2.5-4.0 \times 0.5-0.7 cm; peduncles terminal, 1-2 cm; flowers ± 2 cm across, white with pink tinge; bracts obovate, acute, ± 7 mm; pedicel with ovary ± 2 cm; dorsal sepal ovate, obtuse, $\pm 10 \times 6$ mm; lateral sepals broadly ovate, $\pm 12 \times 9$ mm; petals oblanceolate, obtuse, $\pm 10 \times 3$ mm; lip obovate, $\pm 2.5 \times 1.2$ cm, recurved, emarginate or 2-lobed, puberulous at apex; mentum conical, recurved, ± 1.6 cm.

Epiphytic in forests, 1300-1600 m; fl. & fr.: Aug.-Feb.: Jowai.

2. **Dendrobium acinaciforme** Roxb. Fl. Ind. 3: 487. 1832; Fl. Brit. Ind. 5: 723. 1890.

Stems compressed, 15-30 cm; leaves sessile, distichous, ensiform, acute, laterally compressed, 3-4 \times 1.0-1.3 cm, fleshy; flowers arising from apical leafless portion of stems, ± 8 mm across, pale yellow; bracts ± 1 mm; pedicel with ovary ± 4 mm; lateral sepals ovate, acute, $\pm 5 \times 6$ mm; petals lanceolate, ± 4 mm; lip pale yellow with pink dots in the middle,

shortly clawed, widest at apex, tapering towards base, rounded-crenulate at apex, ± 7 mm.

Epiphytic in primary forests, 1200-1600 m; fl. & fr.: June-Nov.; Jowai.

3. **Dendrobium eriaeflorum** Griff. Notul. 3: 316. 1851; Fl. Brit. Ind. 5: 715. 1890.

Stems erect, pseudobulbs, 5-8 cm; sheaths large, truncate, ± 2 cm; leaves linear-oblong, obtuse, notched, $\pm 4 \times 6$ mm; peduncles 2-3, lateral, sheathed at base, 1-2 cm; racemes 4-6 cm, many-flowered; flowers greenish-yellow; bracts lanceolate, ± 2 mm; pedicel with ovary ± 6 mm; dorsal sepal and petals lanceolate, subequal, ± 8 mm; lateral sepals triangular, falcate, ± 9 mm; lip short-clawed, recurved, ± 8 mm; midlobe ovate, crisped; disk with thick median lamellae.

Epiphytic in primary forests, 1300-1500 m; fl. & fr.: Oct.-Feb.; Jarain, Jowai.

4. **Dendrobium sulcatum** Lindl. in Edw. Bot. Reg. n.s. 24: t. 65. 1838; Fl. Brit. Ind. 5: 749. 1890.

Stems erect, 20-30 cm; internodes 3-4 cm, sheathed; leaves sessile, mostly towards apex of stems, oblong-ovate, 10-15 \times 3-5 cm, 3-nerved; racemes subterminal, pendulous, 10-15 cm, densely many-flowered; flowers 2.5-3.0 cm across, yellow; bracts lanceolate, acute, ± 3 mm; pedicel with ovary ± 2 cm; sepals oblong, obtuse, $\pm 2.5 \times 1.0$ cm; petals elliptic, acute, $\pm 2.5 \times 1.0$ cm; lip ± 3 cm, clawed, broadly obovate, ciliate at margins, dark orange; disk pubescent; mentum conical, ± 3 mm.

Epiphytic in dense forests, 100-1000 m; fl. & fr.: June-Nov.; Dawki.

5. **Dendrobium pauciflorum** King. & Pantl. in J. As. Soc. Beng. 64: 332. t. 2. 1895. et in Ann. R. Bot. Gard. Calc. 8: 54. t. 76. 1898.

Stems erect, tapering to both ends, 15-25 cm, slender, inclined; leaves linear-lanceolate, acutely bifid at apex, 6-10 \times 1.8-2.2 cm; racemes on leafless stems, ± 1.5 cm, slender, arched, 1-4-flowered; flowers yellowish with purple margins; bracts ovate, ± 3 mm; dorsal sepal ovate, acute, $\pm 14 \times 4$ mm; petals ovate-lanceolate or rhomboid, undulate at margins, ± 12 mm; lip ± 12 mm; midlobe ovate, fimbriate; disk with 3 brown nerves.

Epiphytic in primary forests, 1300-1600 m; fl. & fr.: July-Dec.; Jowai.

6. **Dendrobium chrysanthum** Lindl. Gen. Sp. Orch. 80. 1830; Fl. Brit. Ind. 5: 747. 1890.

Stems pendulous, 30-60 cm; internodes 2.5-3.5 cm; leaves lanceolate, 10-15 × 2.0-3.5 cm; flowers 2-4 on short peduncles on leafless stems, ± 3.5 cm across, yellow with 2 blood red patches on lip; dorsal sepal and petals ovate, obtuse, ± 2 × 1.5 cm; lateral sepals joined at base, forming a short mentum; lip ovate orbicular, obtuse, shortly clawed, ciliate at margins, ± 2 cm, velvety hairy on disk.

Epiphytic in primary forests, 1300-1600 m; fl. & fr.: July-Feb.; Jowai.

7. **Dendrobium williamsonii** Day & Reichb. f. in Gard. Chron. 78. 1859; Fl. Brit. Ind. 5: 721. 1890.

Stems fusiform, 15-20 cm; internodes ± 3 cm; leaves few towards apex, oblong to oblanceolate 5-7 × 1.5-2.5 cm; flowers 1-2 in terminal short peduncles, ± 4 cm across, pale yellow with red lines on lateral lobes of lip; bracts ± 2 mm; dorsal sepal ovate or lanceolate, 2.5-3.0 cm; lateral sepals jointed to form a straight ± 1.5 cm long mentum; petals oblanceolate, ± 2.3 × 0.8 cm; lip ± 3 cm; lateral lobes crisped; midlobe orbicular, undulate, crisped at margins; disk with 3 ridges.

Epiphytic in forests, 1300-1600 m; fl. & fr.: Apr.-Sept.; Jowai.

8. **Dendrobium ochraceum** Lindl. in Edw. Bot. Reg. 21: t. 1756. 1835; Fl. Brit. Ind. 5: 747. 1890.

Stems stout, 12-15 cm; leaves lanceolate, obliquely acuminate at apex, 6-8 × 2.0-2.5 cm; peduncles leaf-opposed; flowers 3-4 cm across, golden yellow, mildly scented; bracts ovate, ± 2 mm; sepals oblong-lanceolate, ± 3 × 1.5 cm; petals elliptic-lanceolate, ± 3 × 1.5 cm; lip orbicular, ± 3 cm, yellow with red blotch on disk, and red lines at base, crose at margins, pubescent inside; mentum obtuse, ± 5 mm.

Epiphytic in primary forests, 1000-1500 m; fl. & fr.: Apr.-Nov.; Pudeing Sirkap, Jaintia Hills, *Prain's Collector* 287 (CAL).

9. **Dendrobium heterocarpum** Lindl. Gen. Sp. Orch. 78. 1830; Fl. Brit. Ind. 5: 737. 1890.

Stems subclavate, erect, cylindric, 10-20 cm; internodes ± 2 cm; leaves oblong-lanceolate, obliquely 2-lobed at apex, 5-10 × 1-2 cm; flowers 2-3 on short peduncles, 4-5 cm across, creamy white with reddish patches

on lip; lip obscurely 3-lobed; lateral lobes rounded, undulate at margins; midlobe ovate, acute; disk pubescent.

Epiphytic in forests, 1300-1500 m; fl. & fr.: Jan.-Oct.; Jowai.

10. **Dendrobium formosum** Roxb. in Wall. Pl. As. Rar. 1(2): 34. t. 29. 1830; Fl. Brit. Ind. 5: 721. 1890.

Stems erect, cylindric, 20-40 cm; internodes \pm 2.5 cm; sheaths pubescent; leaves broadly oblong, obliquely 2-lobed at apex, 7-12 cm; racemes 3-4 cm, 3-6-flowered, terminal or subterminal; flowers \pm 6 cm across, white; bracts lanceolate, \pm 8 mm, pale brown, pubescent; pedicel with ovary stout, \pm 4.5 cm, white; sepals oblong-lanceolate, 5.0-5.5 \times 1.5-2.0 cm; petals suborbicular, undulate at margins; lip obovate, entire, retuse, obscurely 3-lobed, \pm 6.5 cm, white with yellow patch inside; disk pubescent.

Epiphytic in primary forests, 800-1200 m; fl. & fr.: May-Oct.; Sohka.

11. **Dendrobium longicornu** Lindl. Gen. Sp. Orch. 80. 1830; Fl. Brit. Ind. 5: 720. 1890.

Stems cylindric, 30-45 cm; leaves linear-lanceolate, bifid at apex, 6-9 cm; flowers 2-4 on short peduncles, terminal or lateral, \pm 4 cm across, white with yellow patch on lip; bracts \pm 2 mm; pedicel with ovary \pm 3 cm; dorsal sepal and petals oblong, ovate, acute, subequal; lateral sepals ovate, acute, \pm 2.5 cm, jointed with foot forming a long conical mentum; lip suborbicular, obscurely 3-lobed, \pm 3.5 cm; disk 3-ridged.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: July-Dec.; Jarain.

12. **Dendrobium devonianum** Paxt. Mag. Bot. 7: t. 169. 1840; Fl. Brit. Ind. 5: 743. 1890.

Stems slender, terete, 25-50 cm, pendulous; sheaths inflated, longer than internodes; leaves linear-lanceolate, acute, 4-8 \times 0.5-0.6 cm; peduncles extra-axillary, \pm 2 mm, 1-2-flowered; flowers 3-4 cm across; bracts \pm 2 mm; pedicel with ovary \pm 2.5 cm; sepals lanceolate, acute, \pm 2.5 \times 1.0 cm, 5-nerved; petals ovate, acute, \pm 3 \times 1.5 cm, ciliate; lip orbicular-cordate, shortly clawed, fimbriate, \pm 3.5 cm, white with purple blotch at tip; disk with 2 yellow patches.

Epiphytic in forests, 1300-1500 m; fl. & fr.: May-Nov.; Jowai.

13. **Dendrobium nobile** Lindl. Gen. Sp. Orch. 79. 1830; Fl. Brit. Ind. 5: 740. 1890.

Stems erect, subcompressed, 30-60 cm; internodes ± 4 cm; leaves few towards apex, oblong, obliquely notched at apex, $10-14 \times 2-3$ cm; flowers 2-3 on short peduncles; pedicel with ovary purplish-white; sepals oblong, obtuse, acute, $\pm 3.5 \times 1.0$ cm; lateral sepals obtuse; petals elliptic, ± 2 cm broad; lip shortly clawed, ovate, acute at apex, reflexed, crose at margins, ± 3.5 cm, pubescent inside.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: Mar.-Oct.; Jarain.

14. **Dendrobium aphyllum** (Roxb.) C. E. C. Fischer in Gamble, Fl. Pres. Madras 1416. 1928. *Limodorum aphyllum* Roxb. Pl. Corom. 1: 34, t. 41. 1795. *D. pierardii* Roxb. in Hook. Exot. Pl. t. 9. 1824; Fl. Brit. Ind. 5: 738. 1890.

Stems cylindrical, close together, pendulous, 30-50 cm; internodes ± 3 cm, striate, sheaths as long as internodes; leaves lanceolate, acute, 5-8 cm; flowers 1-3 together on short peduncles on leafless stems, ± 3.5 cm across, creamy-white; bracts ± 2 mm; pedicels with ovary ± 2.5 cm, pinkish-white, sepals oblong-lanceolate, acute, $\pm 20 \times 8$ mm, 5-nerved; petals rounded at apex, $\pm 22 \times 12$ mm; lip orbicular, ± 2.7 cm, ciliate at margins, pubescent at base.

Epiphytic in shaded places in forests, 200-1000 m; fl. & fr.: May-Nov.; Dawki.

15. **Dendrobium transparens** Lindl. Gen. Sp. Orch. 79. 1830; Fl. Brit. Ind. 5: 738. 1890.

Stems cylindrical, 30-45 cm, close together, pendulous; internodes 2-3 cm, striate; leaves lanceolate, obliquely 2-lobed at apex, $6-10 \times 1-2$ cm; flowers pinkish-white, ± 3.5 cm across, on leafless nodes; bracts lanceolate, ± 6 mm; pedicel with ovary ± 2.5 cm, pale pink; sepals linear-lanceolate, $\pm 2.0 \times 0.6$ cm, 5-nerved; lateral sepals jointed with foot forming a short conical mentum; petals rounded $\pm 2 \times 1$ cm; lip elliptic-oblong, crose at margins, clawed at base, ± 2.5 cm; disk pubescent.

Epiphytic in primary forests, 200-1000 m; fl. & fr.: May-Dec.; Dawki.

16. **Dendrobium cretaceum** Lindl. in Edw. Bot. Reg. n. s. 33: t. 62. 1847; Fl. Brit. Ind. 5: 736. 1890.

Stems stout, cylindrical, 20-40 cm, pendulous; internodes ± 2.5 cm; sheaths inflated at apex; leaves lanceolate, $5-8 \times 0.8-1.5$ cm; flowers on leafless stems, ± 3 cm across; bracts acute, ± 2 mm; pedicels with ovary ± 2 cm; sepals and petals linear-oblong, obtuse, $\pm 23 \times 6$ mm; lip orbi-

cular, clawed at base, ciliate at margins, $\pm 2.5 \times 2.0$ cm; disk pubescent; mentum conical, ± 4 mm.

Epiphytic in forests, 1300-1600 m; fl. & fr.: May-Dec.; Jarain, Jowai, Raliang.

46. KATHERINEA Hawkes

- | | |
|--|------------------------|
| 1a. Pseudobulbs 15—22 mm thick; leaves 10—15 cm long; flowers 7—8 cm across; midlobe of lip thick, longitudinally sulcate. ... | <i>K. ampla</i> 1 |
| 1b. Pseudobulbs 5—15 mm thick; leaves 5—8 cm long; flowers 4—5 cm across; midlobe of lip thin, not sulcate. ... | <i>K. fuscescens</i> 2 |

1. **Katherinea ampla** (Lindl.) Hawkes in *Lloydia* 19(2): 95. 1956. *Dendrobium amplum* Lindl. Gen. Sp. Orch. 74. 1830; Fl. Brit. Ind. 5: 711. 1890.

Rhizomes wide-creeping, 4-5 mm thick; pseudobulbs at intervals of 8-12 cm, 3-5 cm; leaves elliptic, notched at apex, 10-14 \times 3-4 cm; flowers solitary, terminal, green brown, spotted purple; sepals lanceolate, 4-5 \times 1.0-1.6 cm; lip $\pm 3 \times 2$ cm, dark purplish-red above, pale green-yellow with purple spots below; lateral lobes rounded, $\pm 10 \times 8$ mm; midlobe ovate, crisped at margins, $\pm 2 \times 2$ cm; disk lamellate.

Epiphytic or lithophytic in forests, 1200-1600 m; fl. & fr.: Oct.-Feb.; Jarain.

2. **Katherinea fuscescens** (Griff.) Hawkes in *Lloydia* 19(2): 96. 1956. *Dendrobium fuscescens* Griff. Notul. 3: 308. 1851; Fl. Brit. Ind. 5: 712. 1890.

Rhizomes wide-creeping, ± 3 mm thick; pseudobulbs at intervals of 5-10 cm, 3-5 cm long; leaves elliptic-lanceolate, 5-8 \times 1.5-2.5 cm; flowers solitary, terminal, pale brown-purple; sepals and petals lanceolate, $\pm 2 \times 0.4-0.8$ cm; lip $\pm 2 \times 1.3$ cm; dull brownish-red; lateral lobes oblong, obtuse, 2-3-nerved; midlobe suborbicular, undulate at margins, emarginate or minutely mucronate at apex; disk with 2-3 lamellae of unequal length.

Epiphytic or lithophytic in forests, 200-1000 m; fl. & fr.: Oct.-Mar.; Dawki.

47. PLEIONE D. Don

Pleione maculata (Lindl.) Lindl. in Paxt. Fl. Gard. 2: 5. t. 39. f.1. 1851.

Coelogyne maculata Lindl. Gen. Sp. Orch. 43. 1830; Fl. Brit. Ind. 5: 841. 1890.

Pseudobulbs ovoid to subglobose, with a conical top, $\pm 2 \times 2$ cm, purple-mottled; leaves paired, lanceolate, 14-20 \times 2-3 cm; peduncles ± 2 cm; flowers solitary or paired, 5-6 cm across, white; bracts convolute, enveloping ovary, ± 2 cm; sepals and petals oblong-lanceolate, ± 3 cm; lip $\pm 3 \times 2.5$ cm, white with purple streaks at base and margins and yellow patches on disk; disk with ciliate lamellae.

Epiphytic or lithophytic in primary forests, 1200-1500 m; fl. & fr.: Oct.-Nov.; Lumshnong.

48. COELOGYNE Lindl.

- | | | |
|--|-----|------------------------|
| 1a. Inflorescences from an undeveloped pseudobulb at the base of old pseudobulbs. | | |
| 2a. Racemes pendulous. | ... | <i>C. flaccida</i> 1 |
| 2b. Racemes erect or inclined. | | |
| 3a. Leaves linear, up to 1 cm broad. | ... | <i>C. viscosa</i> 2 |
| 3b. Leaves elliptic-lanceolate, more than 3 cm broad. | | |
| 4a. Flowers distichous, white, up to 1 cm across; disk 4-6-ridged. | ... | <i>C. suaveolens</i> 3 |
| 4b. Flowers scattered, pale brown, 3-5 cm across; disk 3-ridged. | ... | <i>C. fuscescens</i> 4 |
| 1b. Inflorescences from the apex of mature pseudobulbs. | | |
| 5a. Sheaths absent on peduncles as well as on racemes. | ... | <i>C. punctulata</i> 5 |
| 5b. Sheaths present, either at base of peduncles or racemes. | | |
| 6a. Sheaths at the base of racemes only. | | |
| 7a. Pseudobulbs 5-8 \times 3-4 cm; flowers white; disk 3-ridged. | ... | <i>C. stricta</i> 6 |
| 7b. Pseudobulbs 2-3 \times 1-2 cm; flowers yellow or brownish; disk 2-ridged or lamellate. | ... | <i>C. prolifera</i> 7 |
| 6b. Sheaths at the base of peduncles only. | | |
| 8a. Rhizomes branching; flowers ± 12 mm across. | ... | <i>C. micrantha</i> 8 |
| 8b. Rhizomes simple; flowers ± 25 mm across. | | |
| 9a. Rhizomes slender; pseudobulbs 2-4 cm long; lip fimbriate-ciliate at margins. | ... | <i>C. fimbriata</i> 9 |
| 9b. Rhizomes stout; pseudobulbs 4-9 cm long; lip fringed with black hairs. | ... | <i>C. ovalis</i> 10 |

1. ***Coelogyne flaccida*** Lindl. Gen. Sp. Orch. 39. 1830; Fl. Brit. Ind. 5: 829. 1890.

Pseudobulbs ovoid-cylindric, 5-12 cm; leaves 2, linear-lanceolate to oblanceolate, cuneate at base, acuminate, 6-18 \times 2-6 cm; petioles 2-8 cm; racemes 8-16 cm, many-flowered; flowers white or creamy, ± 2 cm across; bracts ovate, ± 2 cm, caducous; sepals linear-oblong, acute, 18-22 \times 5-7

mm, 5-7-nerved; petals narrower, 3-nerved; lip 3-lobed, ± 1.6 cm; lateral lobes rounded; disk with 3 wavy yellow ridges.

Epiphytic in shaded forests, 1300-1600 m; fl. & fr.: Mar.-Aug.; Jarain.

2. **Coelogyne viscosa** Reichb. f. Allg. Gartenz. 24, 28: 218. 1858. *C. graminifolia* Par. & Reichb. f. in Trans. Linn. Soc. 30: 146. 1874; Fl. Brit. Ind. 5: 831. 1890.

Pseudobulbs ovoid, straight, curved at age, 3-5 cm, closely placed on scale-covered rhizome; leaves 2, linear, acute, 10-30 \times 0.8-1.0 cm; inflorescences 7-10 cm, 2-4-flowered, sheathed at base; flowers ± 5 cm across, white; bracts lanceolate, caducous; sepals oblong-lanceolate, sub-acute, ± 2.5 cm; lip 3-lobed; lateral lobes rounded, white with brown streaks; midlobe broadly ovate, acute, reflexed, white with yellow patch; disk 3-lamellate.

Epiphytic in shaded forests, 1200-1500 m; fl. & fr.: Mar.-Aug.; Jowai.

3. **Coelogyne suaveolens** (Lindl.) Hook. f. Fl. Brit. Ind. 5: 832. 1890. *Pholidota suaveolens* Lindl. in Gard. Chron. 1856: 372. 1856.

Pseudobulbs ovoid, ribbed, ± 5 cm, on stout scale-covered rhizome; leaves elliptic, acute, undulate at margins, 18-22 \times 5-7 cm; peduncle sheathed up to raceme; bracts lanceolate, ± 12 mm, caducous; sepals oblong-lanceolate, ± 1.5 cm; petals oblong-lanceolate, acute, ± 1.5 cm, narrower than sepals; lip 3-lobed, ± 1 cm; lateral lobes rounded; midlobe ovate, acute, reflexed.

Epiphytic in shaded forests, 1200-1500 m; fl. & fr.: May-Aug.; Jowai, Pantling s. n. (CAL).

4. **Coelogyne fuscescens** Lindl. Gen. Sp. Orch. 41. 1830; Fl. Brit. Ind. 5: 833. 1890.

Pseudobulbs long-cylindric, curved and furrowed at age, sheathed at base, 8-10 \times 1-2 cm; leaves 2, elliptic-lanceolate, acute, 10-20 \times 4-7 cm; peduncles sheathed at base, 4-6 cm; racemes 8-9-flowered, 10-15 cm; sepals lanceolate, concave, ± 4 cm, 7-nerved; petals linear, 3-nerved, slightly pinkish; lip 3-lobed, pale brown with dark brown patches and purple nerves on disk; midlobe ovate, acute.

Epiphytic or rarely lithophytic in primary forests, 1200-1400 m; fl. & fr.: Oct.-Mar.; Sutnga.



Top : Left : *Curcuma longa* L. ;

Right : *Calamus floribundus* Griff.

Bottom : Left : *Carex spiculata* Boott ;

Right : *Narenga fallax* (Balansa) Bor

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Top : Left to right : *Rhynchosstylis retusa* (L.) Bl., *Otochilus fusca* Lindl. & *Coelogyne stricta* (Don) Schltr.

Bottom : Left to right : *Arundina chinensis* Bl., *Phaius tankervilleae* (Ait.) Bl. & *Cymbidium eburneum* Lindl.

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5. **Coelogyne punctulata** Lindl. Coll. Bot. 7: t. 33. 1821. *Cymbidium nitidum* Roxb. Fl. Ind. 3: 459. 1832. *Coelogyne nitida* (Roxb.) Hook. f. Fl. Brit. Ind. 5: 837. 1890.

Pseudobulbs ovoid or subglobose, 3-6 × 1-2 cm, yellow or brown, glossy; leaves 2, lanceolate, acuminate, 10-20 × 2-3 cm; peduncles 10-15 cm; racemes 6-8-flowered, 5-10 cm; flowers ± 5 cm across, white; bracts lanceolate, acute, ± 3.5 cm, 7-nerved; petals linear-oblong, acute, 5-nerved; lip ± 3 cm; lateral lobes round, white with 2 round orange-bordered yellow patches; disk 3-lamellate.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: Oct.-Mar.; Jarain, near Amwee river.

6. **C. stricta** (Don) Schltr. in Fedde Repert. Beih. 4: 184. 1919; *Cymbidium strictum* Das, Prodr. Fl. Nep. 35. 1825. *Coelogyne elata* Das & Jain Fasc. Fl. Ind. 5: 28. 1980; Lindl. Gen. & Sp. Orch. 40. 1830; Hook. f. Fl. Brit. Ind. 5: 838. 1890.

Pseudobulbs oblong, compressed; sheaths lanceolate acuminate, 5-9 cm, brown; leaves lanceolate, 17-24 × 4-5 cm; peduncles terete, 6-8 cm; racemes few-flowered, 5-7 cm, with distichous sheaths at base; flowers ± 3 cm across, white; bracts rhomboid, acute, pale brown; sepals oblong-lanceolate, acute, ± 22 × 4 mm; petals linear; lip ± 2 × 1.5 cm, white with yellow patch in middle; lateral lobes rounded, embracing the column; mid-lobe ovate-oblong, erose at margins, reddish at tip.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: Apr.-Aug.; Jarain.

7. **Coelogyne prolifera** Lindl. Gen. Sp. Orch. 40. 1830; Fl. Brit. Ind. 5: 838. 1890.

Pseudobulbs ovoid, ± 1 cm apart on stout scale-covered rhizomes, sheathed at base; leaves elliptic-lanceolate, 7-15 × 2-3 cm; peduncles slender, 6-15 cm, naked; racemes zig-zag, few-flowered, distichously sheathed at base, 3-10 cm; flowers ± 2 cm across; bracts lanceolate, acuminate, ± 1.5 cm, caducous; sepals broadly lanceolate, ± 1.5 cm; petals linear, filiform; lip ± 2 cm; lateral lobes erect, orange-brown; midlobe subquadrate, reflexed, undulate at margins.

Epiphytic in primary forests, 1200-1600 m; fl. & fr.: Mar.-Aug.; Jarain, Jowai, Shangpung.

8. **Coelogyne micrantha** Lindl. in Gard. Chron. 1855; 173. 1855; Fl. Brit. Ind. 5: 836. 1890.

Pseudobulbs 3-8 cm apart on scale-covered rhizomes, 3-5 cm; leaves

oblong to linear-lanceolate, 8-20 × 0.6-1.2 cm; peduncles sheathed at base, 2-5 cm; racemes few-flowered, 2-3 cm; flowers pale brown; sepals oblong, ± 1 cm; petals filiform; lip ± 1.2 cm; lateral lobes small; midlobe oblong-ovate, retuse, pale brown with darker spots; disk 3-lamellate.

Epiphytic in primary forests, 1200-1500 m; fl. & fr.: Feb.-July; Jowai.

9. **Coelogyne fimbriata** Lindl. in Edw. Bot. Reg. 11: t. 868, 1825; Fl. Brit. Ind. 5: 836, 1890.

Pseudobulbs oblong-ovoid, distantly placed on scale-covered rhizomes; leaves lanceolate, 5-10 × 2-3 cm; peduncles 1-2 cm, sheathed at base, 1-2-flowered; flowers ± 2 cm across, pale brown; bracts lanceolate, acute; sepals lanceolate, ± 20 × 5 mm; petals filiform, recurved; lip ± 2.2 cm, 3-lobed, fimbriate; lateral lobes narrow; midlobe orbicular, purplish-yellow with brown streaks; disk 2-ridged.

Epiphytic in forests, 1200-1600 m; fl. & fr.: Sept.-Jan.; Jarain, Jowai.

10. **Coelogyne ovalis** Lindl. in Edw. Bot. Reg. 24; 91. Misc. 171, 1838; Fl. Brit. Ind. 5: 836, 1890.

Pseudobulbs fusiform, slightly curved, sheathed at base, 4-6 cm apart on scale-covered stout rhizomes; leaves lanceolate, 9-15 × 2-3 cm; peduncles 2-3 cm, sheathed at base; racemes 1-3-flowered; flowers ± 4 cm across, pale brown; bracts ovate-lanceolate, ± 3 cm; sepals lanceolate, ± 3 cm, 5-nerved; petals filiform, 1-nerved; lip ± 3 cm, 3-lobed; lateral lobes narrow; midlobe oblong; disk 2-lamellate.

Epiphytic in primary forests, 1000-1500 m; fl. & fr.: Oct.-Mar.; Lumshnong.

49. PHOLIDOTA Lindl.

- | | | |
|---|-----|--------------------------|
| 1a. Pseudobulbs 1-leaved; bracts ovate. | ... | <i>P. imbricata</i> 1 |
| 1b. Pseudobulbs 2-leaved; bracts linear-lanceolate. | | |
| 2a. Leaves elliptic-lanceolate; scapes drooping; flowers pale brown; bracts reflexed, persistent. | ... | <i>P. undulata</i> 2 |
| 2b. Leaves linear-lanceolate; scapes erect; flowers white; bracts erect, deciduous. | ... | <i>P. conwallariae</i> 3 |

1. **Pholidota imbricata** Hook. Exot. Fl. 2: t. 138, 1825; Fl. Brit. Ind. 5: 845, 1890.

Pseudobulbs oblong, grooved, 2-5 cm; leaves elliptic-lanceolate, acute, 15-30 × 2.5-8.0 cm; inflorescences from base of pseudobulbs, 15-40 cm, drooping; peduncles slender, short or long; bracts ± 5 × 6 mm with 2 spiny projections at base, pale brown; sepals cymbiform, acute at apex, ± 5 × 4

mm; lateral sepals keeled at base; petals linear-oblong, acute, $\pm 4 \times 2$ mm; lip sessile, 3-lobed, erect, saccate at base; lateral lobes rounded; midlobe oblong, reflexed, emarginate.

- 1a. Peduncles longer than pseudobulbs, 8—12 cm long. ... var. *imbricata* 1
 1b. Peduncles shorter than pseudobulbs, 1—3 cm long. ... var. *sessilis* 2

1. var. **imbricata**

Epiphytic in forests, 100 - 1400 m; fl. & fr.: June-Dec.; Dawki, Jarain, Jowai.

2. var. **sessilis** Hook. f. Fl. Brit. Ind. 5: 846. 1890.

Epiphytic in forests, 1300 - 1500 m; fl. & fr.: May-Nov.; Jowai.

2. **Pholidota undulata** Lindl. in Edw. Bot. Reg. 14: t. 1213. 1829.
P. rubra Lindl. Gen. Sp. Orch. 37. 1830; Fl. Brit. Ind. 5: 847. 1890.

Pseudobulbs close together, 3.5 - 4.5 cm; leaves acuminate, 15 - 20 \times 2 - 3 cm; petioles ± 2.5 cm; racemes from base of pseudobulbs, 1 or 2; peduncles short, 5 - 10 cm; racemes ± 15 cm, many-flowered; bracts lanceolate, acute, ± 15 cm; many-flowered; bracts lanceolate, acute, ± 5 mm, 3-nerved; lip $\pm 5 \times 3$ mm, 3-lobed; lateral lobes short, rounded; midlobe ovate, acute, reflexed; disk 5-nerved.

Epiphytic in forests, 1000 - 1500 m; fl. & fr.: Oct.-Mar.; Jarain, Jowai, Sutnga.

3. **Pholidota convallariae** (Reichb. f.) Hook. f. Icon. Pl. ser. 4: t. 1880, 1889; Fl. Brit. Ind. 5: 846. 1890. *Coelogyne convallariæ* Reichb. f. in Flora 277. 1872.

Pseudobulbs erect, or slightly inclined, subcylindric, $\pm 3 \times 1$ cm, 5 - 12 mm apart on rhizome; leaves 12 - 16 \times 1.0 - 1.5 cm; inflorescences arising from base of pseudobulbs, erect, 8 - 12 cm, sheathed; flowers ± 1 cm across; bracts pale brown, linear, ± 6 mm, pale brown; sepals and petals ± 5 mm; lip ± 4.5 mm, 3-lobed; lateral lobes rounded; midlobe ovate, acute; reflexed; column winged.

Forests, 1300 - 1600 m; fl. & fr.: July-Dec.; Shangpung.

50. **OTOCHILUS** Lindl.

- 1a. Leaves linear-oblong or lanceolate, ± 1 cm broad. ... *O. fusca* 1
 1b. Leaves elliptic-oblong or elliptic-lanceolate, more than 2 cm broad.
 2a. Flowers ± 2.5 cm across; lateral lobes of lip ± 16 mm long. ... *O. porrecta* 2
 2b. Flowers ± 1.5 cm across; lateral lobes of lip ± 5 mm long. ... *O. alba* 3

1. **Otochilus fusca** Lindl. Gen. Sp. Orch. 35. 1830; Fl. Brit. Ind. 5: 844. 1890.

Pseudobulbs cylindric, 4-6 cm; leaves acuminate, 10-20 × 0.8-1.2 cm; inflorescences slender, arched; peduncles ± 3 cm; racemes 10-12 cm, many-flowered; flowers white, ± 1.2 cm across; bracts lanceolate, acuminate, ± 1 cm; sepals lanceolate, acute, ± 13 × 3 mm; petals linear, acute, ± 12 × 2 mm; lip obscurely 3-lobed, ± 12 mm; midlobe linear, concave, acute, reflexed; column ± 1 cm, pink.

Epiphytic in forests, 1000-1500 m; fl. & fr.: Nov.-Mar.; Amwee, Jowai.

2. **Otochilus porrecta** Lindl. Gen. Sp. Orch. 36. 1830; Fl. Brit. Ind. 5: 844. 1890.

Pseudobulbs subcylindric or subclavate, 5-9 × 1-2 cm; leaves elliptic-lanceolate, short-acuminate, 18-24 × 4-6 cm; racemes 4-8 cm, lax-flowered; flowers white; bracts broad, acute, ± 2 cm; sepals lanceolate, ± 2.5 × 0.6 cm; petals linear, ± 2.5 cm; lip 3-lobed, ± 1.5 cm; lateral lobes falcate, obtuse; midlobe lanceolate, reflexed; claw orange-red; column with pinkish-brown tinge, ± 2.5 cm; apex of column winged.

Epiphytic in forests, and forest borders, 800-1400 m; fl. & fr.: Oct.-Mar.; Amwee.

3. **Otochilus alba** Lindl. Gen. Sp. Orch. 35. 1830; Fl. Brit. Ind. 5: 843. 1890.

Pseudobulbs subcylindric, 7-10 cm; leaves elliptic to oblong-lanceolate, acute to acuminate, 15-20 × 3-4 cm; peduncles 5-10 cm; sheaths pubescent; racemes zig-zag, 8-12 cm, laxly 10-15-flowered; flowers white; bracts linear-oblong to lanceolate, ± 1.3 cm; sepals lanceolate, ± 1.5 × 0.4 cm; petals linear; lip 3-lobed, white with 2 brown blotches; lateral lobes obtuse rounded; midlobe lanceolate, concave, reflexed; column with pale pink-brown patches.

Epiphytic in forests and forest borders, 1200-1600 m; fl. & fr.: Dec.-June; Jowai, Jowai-Jarain.

140. ZINGIBERACEAE

- | | | |
|--|-----|------------------|
| 1a. Leaves spirally arranged; sheaths connate on the sides opposite to lamina. | ... | <i>Costus</i> 1 |
| 1b. Leaves distichous; sheaths open on the side opposite to lamina. | | |
| 2a. Inflorescences with a terminal plume of sterile bracts. | ... | <i>Curcuma</i> 2 |
| 2b. Inflorescence without a terminal plume of sterile bracts. | | |
| 3a. Lateral staminodes minute or absent. | | |

- | | |
|--|---------------------------|
| 4a. Lip ligulate ; filaments adnate to lip for some length. | <i>Hornstedtia</i> 3 |
| 4b. Lip oblong-obovate or suborbicular ; filament not adnate to lip. | |
| 5a. Connective-appendage broad, petaloid. ... | <i>Anomum</i> 4 |
| 5b. Connective-appendage long, beak-like. | |
| 6a. Axis of inflorescence unbranched ; inflorescence capitate, cylindrical or spiciform. ... | <i>Zingiber</i> 5 |
| 6b. Axis of inflorescence branched ; inflorescence spicate, racemose or paniculate. ... | |
| 7a. Outer secondary bracts connate, funnel- or cup-shaped. ... | <i>Catimbum</i> 6 |
| 7b. All bracts with free margins. ... | <i>Alpinia</i> 7 |
| 3b. Lateral staminodes conspicuously petaloid. | |
| 8a. Filament adnate to lip for some length ; ovary unilocular. ... | <i>Globba</i> 8 |
| 8b. Filament not adnate to lip ; ovary trilocular. | |
| 9a. Anthers spurred at base. ... | <i>Caulleya</i> 9 |
| 9b. Anthers not spurred at base. | |
| 10a. Anthers with a petaloid crest at apex. ... | <i>Caulokaempferia</i> 10 |
| 10b. Anthers not crested at apex. | |
| 11a. Inflorescences on separate leafless shoots. ... | <i>Curcumorpha</i> 11 |
| 11b. Inflorescences terminal on leafy shoots. | |
| 12a. Flowers purple ; anther-cells separated by a broad connective. ... | <i>Hitchenia</i> 12 |
| 12b. Flowers white, yellow, orange or red ; anther-cells not separated. ... | <i>Hedychium</i> 13 |

1. COSTUS L.

Costus speciosus (Koenig) Smith in Trans. Linn. Soc. 1: 249. 1791; Fl. Brit. Ind. 6: 249. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 138. 1972. *Banksia speciosa* Koenig in Retz. Obs. Bot. 3: 75. 1783.

Stems 1-3 m, spirally twisted; leaves oblanceolate to obovate, caudate-acuminate, 12-25 × 4.5-7.5 cm, silky pubescent beneath; spikes terminal, ovoid or ellipsoid, 5-12 cm; bracts ovate spinescent at apex, 2.0-3.5 × 0.8-1.5 cm, red; corolla white; tube 1.2-2.3 cm; lobes oblong, subequal, 2-5 × 1.0-1.5 cm; lip obovate-orbicular, 3-8 cm; capsules globose-oblong, 1.5-2.0 cm, red; seeds black, arillate.

Shaded places in forests, 200-1500 m; fl. & fr.: June-Dec.; Dawki, Garampani, Jowai, Sutnga.

2. CURCUMA L.

- | | |
|---|--------------------------|
| 1a. Inflorescences on separate shoots, usually produced before leaves ; peduncles covered with bladeless sheaths. ... | <i>C. aneustifolia</i> 1 |
|---|--------------------------|

1b. Inflorescences terminal on leafy shoots ; peduncles enclosed within the leaf-sheaths.

- 2a. Rhizomes deep orange-yellow inside. ... *C. domestica* 2
 2b. Rhizomes white or pale yellow inside. .. *C. montana* 3

1. **Curcuma angustifolia** Roxb. in As. Res. 11: 338. t. 3. 1810; Fl. Brit. Ind. 6: 210. 1890; Rao & Verma in Bull. Bot. Surv. Ind. 14: 121. 1972.

Rhizomes pale yellow, faintly aromatic; leaf-bunch 30-50 cm; sheaths cuspidate; leaves oblong-lanceolate, subcaudate, 8-20 × 3-8 cm; ligules ± 1 mm; peduncles ± 10 cm; spikes 8-15 × 5-7 cm; plume-bracts lanceolate, 3.5-4.0 × 1.0-1.5 cm, purple; flowering bracts green or purplish-tipped; corolla-lobes ± 2.3 cm, yellow; lip ± 1.5 cm broad, emarginate.

Shaded moist places in forests, 1000-1500 m; fl. & fr.: May-Oct.; Pdengsakab.

2. **Curcuma longa** L. Sp. Pl. 1: 2. 1753 *pro max parte*; Koenig in Retz. Obs. Bot. 3: 72. 1783; Fl. Brit. Ind. 6: 214. 1890; Burt in Notes Roy. Bot. Gard. Edinb. 35(2): 212-213. 1977. *C. domestica* Valet. in Bull. Jard. Bot. Btzg. Ser. 2. 27: 31. 1918; Rao & Verma in Bull. Bot. Surv. Ind. 14: 122. 1972. 'Shyrmil'.

Rhizomes aromatic; leaf-bunch 0.5-1.0 m; sheaths ciliate near the ligules; leaves oblong, caudate-acuminate, 30-50 × 8-15 cm; spikes 10-15 × 5-7 cm; peduncles 10-25 cm; plume-bracts pinkish-white; lower bracts 5-6 cm, green; corolla-lobes ± 2 cm, white; lip orbicular, 3-lobed, ± 15 mm, creamy-white with yellow median band.

Primary forests, in shaded moist places, 200-1500 m; fl. & fr.: June-Nov.; Umjaisaw.

Often cultivated for the spice and dye from the rhizomes.

Burt in the paper cited has discussed at length the nomenclature concluding that *Curcuma longa* L. is the correct name, and has lectotyped by *Manjella kua* Rheede.

3. **Curcuma montana** Rosc. in Trans. Linn. Soc. 8: 355. 1807; Fl. Brit. Ind. 6: 214. 1890; Rao & Verma in Bull. Bot. Surv. Ind. 14: 122. 1972. 'Syhing-syrmil'.

Rhizomes strongly aromatic; leaf-bunch 70-100 cm; leaves elliptic-oblong-lanceolate, acute to short-acuminate, 25-45 × 12-20 cm; petioles deeply channelled, winged at basal half, 20-30 cm; spike ± 15 × 5 cm; peduncles 15-20 cm; bracts ovate, obtuse or subacute, 3-4 × 2-3 cm, pale green; bracts of coma pale pink; flowers pale yellow, 3-4 cm; corolla-lobes subequal; lip deflexed, obscurely 3-lobed.

Shaded moist places in forests, 1000-1300 m; fl. & fr.: Nartiang.
Rhizomes used by local people for wounds.

3. HORNSTEDTIA Retz.

Hornstedtia linguiformis (Schult.) K. Schum. in Engler, Pflanzenr. 20: 196. 1904. *Elettaria linguiformis* Schult. Mant. 1: 24. 1822. *Amomum linguiforme* (Schult.) Baker in Fl. Brit. Ind. 6: 235. 1892.

Rhizomes long creeping; stems 1-2 m; leaves lanceolate, acuminate at apex, 45-60 × 10-15 cm; ligules obtuse, 1.0-1.5 cm; peduncles 3-7 cm; sheaths oblong, brownish white; spikes ellipsoid, 6-9 cm; bracts oblong, acute, 4-6 × 2.5-3.0 cm, white below; lobes lanceolate, ± 3 cm; lip rhomboid, bilobed at apex, ± 6 cm; filaments ± 9 mm; fruits densely covered with subulate flexible spines.

Primary forests, in shaded places, 200-1000 m; fl. & fr.: Mar.-Aug.; Garampani.

4. AMOMUM L. *nom. cons.*

Amomum aromaticum Roxb. Fl. Ind. 1: 45. 1820; Fl. Brit. Ind. 6: 241. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 135. 1972.

Rhizomes white inside, faintly aromatic; leaves subsessile, linear-lanceolate or lanceolate, caudate-acuminate, 15-30 × 2-7 cm; ligules 2-5 mm, bilobed, purplish; spikes clavate, 4-6 cm; bracts oblong, 3-4 × 0.8-1.2 cm; peduncles ± 3 cm, elongating to 10 cm in fruits, hairy; calyx pinkish; corolla-tube slender; lobes lanceolate, 2.5-3.0 × 1.0-1.5 cm; lip obovate, 4.0-4.5 × 2.5-3.0 cm, white with a median yellow band and few pink streaks; capsules ovoid, ± 2.5 cm, fleshy.

Shaded moist places in primary forests, 100-600 m; fl. & fr.: Jan.-Dec.; Dawki.

5. ZINGIBER Boehm. *nom. cons.*

- | | | |
|--|-----|-----------------------|
| 1a. Spikes terminal. | ... | <i>Z. capitatum</i> 1 |
| 1b. Spikes radical or from base of the leafy stem. | | |
| 2a. Leaves 8-12 cm broad; peduncles up to 10 cm long. | ... | <i>Z. rubens</i> 2 |
| 2b. Leaves 2-4 cm broad; peduncles more than 15 cm long. | ... | <i>Z. purpureum</i> 3 |

1. **Zingiber capitatum** Roxb. in As. Res. 11: 348. 1810; Fl. Brit. Ind. 6: 249. 1892. Rao & Verma in Bull. Bot. Surv. Ind. 14: 138. 1972.

Rhizomes aromatic; stems 1.0-1.5 m; leaves sessile, linear, acuminate,

40-50 × 1.0-1.8 cm, pubescent beneath; ligules 2-3 mm; spikes 9-11 cm; peduncles short; bracts lanceolate or ovate-lanceolate, 3.0-6.5 × 1.0-1.5 cm; flowers yellow; corolla lobes lanceolate, ± 3 cm; midlobe of lip orbicular, ± 1.5 cm; lateral lobes of lip oblong; capsules oblong, ± 2 cm; seeds bright brown.

Secondary forests, forest-edges and grasslands in open places, 200-1500 m; fl. & fr.: July-Dec.; Garampani, Mawryngkneng, Umjaisaw.

2. **Zingiber rubens** Roxb. in As. Res. 11: 348. 1810; Fl. Brit. Ind. 6: 243. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 137. 1972.

Rhizomes pale brown, white inside; stems 1.2-1.5 m; leaves sessile oblong-lanceolate, acute at base, acuminate, 15-35 cm, pubescent beneath; petioles 3-12 mm; spikes subglobose, 3-5 × 2-3 cm; peduncles 3-9 cm; bracts oblong to ovate-lanceolate, red; corolla-lobes lanceolate, 2.0-2.3 cm; lip obovate, deeply 3-lobed, yellowish-white with red spots and streaks; capsules ellipsoid, 1.8-2.2 cm, red; seeds brown with white aril.

Shaded forests in moist places, 1200-1600 m; fl. & fr.: June-Nov.; Mynso, Raliang.

3. **Zingiber purpureum** Rosc. in Trans. Linn. Soc. 8: 348. 1807. *Z. cassumnar* Roxb. in As. Res. 11: 347. t. 5. 1810; Fl. Brit. Ind. 6: 248. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 137. 1972.

Rhizomes aromatic, bright yellow inside; stems 1-2 m; leaves sessile, lanceolate to linear, acuminate, 30-40 cm, pubescent along midrib beneath; peduncles 15-25 cm; spikes ellipsoid, 7-15 × 2-4 cm; bracts broadly ovate, obtuse or subacute, 3.0-4.5 × 2-3 cm, scarlet-red to greenish-red; flowers yellow; corolla-lobes lanceolate, ± 2.5 cm; lip 2-3 × 1.8-2.5 cm; capsules globose.

Shaded moist places in forests, 200-1000 m; fl. & fr.: June-Feb.; Lumshnong.

Often cultivated for spice.

6. CATIMBIUM JUSS.

Catimbium malaccense (Burm. f.) Holtt. in Gard. Bull. 13: 155. 1950. *Maranta malaccensis* Burm. f. Fl. Ind. 2. 1768. *Alpinia malaccensis* (Burm. f.) Rose, in Trans. Linn. Soc. 8: 345. 1807; Fl. Brit. Ind. 6: 255. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 140. 1972.

Stems several, stout, 1.5-2.0 m; leaves oblong-lanceolate, acuminate, 25-70 × 5-12 cm, villous beneath; petioles 17-25 mm; ligules ± 1 cm,

pubescent; racemes 25-30 cm; pedicels 5-7 mm; calyx campanulate, \pm 17 mm; corolla-tube 8-13 mm; lobes oblong, 3-4 \times 1-2 cm, white; lip ovate, 2-3 cm, yellow with deep red and yellow centre; fruits depressed-globose, 15-20 mm, yellowish to orange-red.

Secondary and bamboo forests, in deep shaded ravines, 500-1000 m; fl. & fr.: Mar.-Dec.; Jarain-Dawki.

7. ALPINIA Roxb. *nom. cons.*

Alpinia allughas (Retz.) Rosc. in Trans. Linn. Soc. 8: 346. 1807; Fl. Brit. Ind. 6: 253. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 139. 1972. *Heritiera allughas* Retz. Obs. Bot. 6: 17. t. 1. 1791.

Stems 1-2 m; leaves sessile or subsessile, oblong-lanceolate, acuminate, 25-50 \times 4-15 cm; ligules 5-6 mm; panicles terminal, 10-60 cm, pubescent; calyx pinkish, pubescent; corolla pink; tube 7-13 mm; lobes oblong, 8-16 \times 3-6 mm; lip obovate, 15-20 \times 10-15 mm, bilobed, white with a pair of pink lines at centre and pink margins; capsules globose, 10-16 mm, blue-black.

Primary forests, in shaded places, 100-500 m; fl. & fr.: May-Dec.; Dawki.

8. GLOBBA L.

- | | | |
|--|-----|----------------------|
| 1a. Inflorescences with many-bulbils; calyx brownish; corolla and lip yellow, tinged brown; anthers 4-6 mm long. | ... | <i>G. clarkei</i> 1 |
| 1b. Inflorescences without bulbils; calyx, corolla and lip yellow; anthers \pm 2 mm long. | ... | <i>G. racemosa</i> 2 |

1. **Globba clarkei** Baker in Fl. Brit. Ind. 6: 201. 1890; Rao & Verma in Bull. Bot. Surv. Ind. 14: 118. 1972.

Plants 0.5-1.5 m; leaves lanceolate, caudate, 20-30 \times 3-6 cm; sheaths often purplish; ligules 1-2 mm; inflorescences 20-30 cm; bracts \pm 2 cm, early caducous; flowers yellowish-brown or orange-yellow, 1-3 at tips of branches, mostly replaced by tiny white or brownish-green bulbils; corolla-tube 15-20 mm; lobes 8-9 \times 4.0-4.5 mm; staminodes 10-12 \times 2.0-3.5 mm, yellow; lip bilobed at apex, auricled at base, 15-20 mm; anthers crested.

Shaded moist places in forests, 1000-1500 m; fl. & fr.: June-Oct.; Jowai, Nartiang.

2. **Globba racemosa** Smith, Exot. Bot. 2: 115. t. 117. 1804; Fl. Brit. Ind. 6: 201. 1890; Rao & Verma in Bull. Bot. Surv. Ind. 14: 118. 1972.

Plants 40-80 cm; leaves lanceolate, subcaudate, 7-20 × 2.0-3.5 cm; sheaths purple-dotted; ligules ± 2 mm, bilobed; inflorescences 6-25 cm; bracts 1.0-1.5 cm, early caducous; flowers 2-5 at tips of branches, yellow; corolla-tube 1.5-2.5 cm; lobes 5-6 × 3-4 mm, bilobed at apex, auricled at base; anthers oblong-ovate, crested.

Shaded moist places in forests, 200-1500 m; fl. & fr.: May-Oct.; Dawki, Jowai, Pdengsakab, Syndai.

9. CAUTLEYA Royle

Cautleya gracilis (Smith) Dandy in J. Bot. 70: 328. 1954; Rao & Verma in Bull. Bot. Surv. Ind. 14: 121. 1972. *Roscoea gracilis* Smith in Trans. Linn. Soc. 13: 460. 1822. *R. lutea* Royle, Ill. Bot. Himal. 361. t. 89. f. 2. 1839. *C. lutea* (Royle) Hook. f. in Bot. Mag. t. 6991. 1888; Fl. Brit. Ind. 6: 208. 1890.

Terrestrial or epiphytic; stems 30-45 cm; sheaths reddish; leaves lanceolate, acuminate, 10-20 × 1-4 cm, pubescent beneath; ligules bilobed, 3-4 mm; spikes 3-7 cm, laxly 1-6-flowered; rachis flexuous, red-green; bracts 1-flowered, oblong-lanceolate, 7-12 mm; calyx red, 13-20 mm; corolla-tube 15-25 mm; lobes obovate, cuneate, cleft at apex into 5-6 mm broad lobes; capsules globose, 8-12 mm, bright red; seeds conical, deep blue or black.

Primary forests, in shaded moist places, 1000-1600 m; fl. & fr.: June-Oct.; Wahjajar.

10. CAULOKAEMPFERIA Larsen

- | | |
|--|----------------------|
| 1a. Leaves linear-lanceolate, 0.5-1.5 cm broad; bracts lanceolate, 2.5-3.5 × 0.5-1.0 cm; flowers white with yellow patch on lip. ... | <i>C. linearis</i> 1 |
| 1b. Leaves oblong, 2-4 cm broad; bracts oblong-lanceolate, 2.5-5.0 × 0.8-1.8 cm; flowers pinkish-red. ... | <i>C. secunda</i> 2 |

1. **Caulokaempferia linearis** (Wall.) Larsen in Saert. Bot. Tidssk. 60: 170. 1964; Rao & Verma in Bull. Bot. Surv. Ind. 14: 125. 1972. *Kaempferia linearis* Wall. in Roxb. Fl. Ind. 1: 20. 1820; Fl. Brit. Ind. 6: 223. 1890.

Stems 10-25 cm; leaves usually 7, acuminate, 5-10 cm; ligules ± 6 mm; spikes terminal, few-flowered; bracts 2 or sometimes 1; corolla-lobes oblong, 7-10 × 3-4 mm; lip 1-2 cm, entire or notched; anther-crest orbicular; capsules ± 2 cm.

Primary forests in shaded moist places, 100-1000 m; fl. & fr.: July-Dec.; Dawki.

2. **Caulokaempferia secunda** (Wall.) Larsen in Saert, Bot. Tidssk. 60: 170. 1964; Rao & Verma in Bull. Bot. Surv. Ind. 14: 125. 1972. *Kaempferia secunda* Wall. in Roxb. Fl. Ind. 1: 19. 1820; Fl. Brit. Ind. 6: 223. 1890.

Stems 6-30 cm; leaves 4-7, oblong-ovate, subequal and cuneate or rounded at base, caudate-acuminate, 4-14 cm, purplish beneath when young; ligules 5-10 mm; spikes terminal, few-flowered; bracts 1-8, caudate-acuminate; corolla-lobes oblong, $\pm 1.0 \times 0.4$ cm; lip 3.0-2.5 \times 1.5-2.0 cm, emarginate; capsules ± 1 cm.

Forest edges, grasslands and scrubs, in open and shaded places, 600-1500 m; fl. & fr.: June-Jan.; Jarain-Syndai, Sonapur-Khleihriat.

11. CURCUMORPHA Rao & Verma

Curcumorpha longiflora (Wall.) Rao & Verma in Bull. Bot. Surv. Ind. 13: 339. f. 1 10. 1971. *Boesenbergia longiflora* (Wall.) O. Ktze. Rev. Gen. 2: 685. 1891. *Gastrochilus longiflora* Wall. Pl. As. Rar. 1: 22. t. 25. 1829; Fl. Brit. Ind. 6: 217. 1890.

Rhizomes faintly aromatic; roots cylindrical, ending in oblong, ± 2 cm long whitish tubers; leaves 3-4, branched, oblong-lanceolate, subcordate or rounded at base, acuminate, 20-45 \times 7-12 cm; petioles 15-25 cm; spikes 1-5, radical; peduncles 0.5-4.0 cm; bracts 2-5, imbricate, lanceolate, 6-8 \times 1-2 cm; flowers white, reddish on lip; corolla-tube white below, pinkish upwards; lobes oblong-lanceolate 2.5-3.5 \times 0.6-0.9 cm, white.

Primary forests, in shaded places, 200-1000 m; fl. & fr.: Apr.-Oct.; Garampani.

12. HITCHENIA Wall.

Hitchenia careyana Benth. in B. & H. Gen. Pl. 3: 643. 1833; Fl. Brit. Ind. 6: 225. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 125. 1972.

Stems 1-2 m; leaves sessile, lanceolate or oblong, subcaudate-acuminate, 40-60 \times 8-15 cm; ligules ± 1 cm; spikes cylindrical, dense-flowered, 12-20 cm; lower bracts 5-6 cm, puberulous; upper bracts 2.5-3.0 cm, glabrous; bracteoles lanceolate, 2.5-3.0 cm; flowers pinkish-purple; calyx ± 1.2 cm; corolla-lobes linear, 12-14 \times 2-3 mm; claw of lip $\pm 9 \times 1$ mm; blade of lip cuspidate, 4-7 \times 1.5-2.5 mm; capsules oblong, ± 1.5 cm; seeds dark green.

Shaded places in forests, 200-1000 m; fl. & fr.: July-Dec.; Garampani.

13. HEDYCHIMUM Koen.

- 1a. Filament absent or if present equal to or 1—3 mm longer than lip.
 2a. Filament absent. ... *H. wardii* 1
 2b. Filament present.
 3a. Spikes open ; bracts closely convolute, not imbricating. ... *H. dekianum* 2
 3b. Spikes compact ; bracts particularly the lower three-fourths of the spike flat and closely imbricating. ... *H. coronarium* 3
- 1b. Filament exceeding the lip by 1 cm or more.
 4a. Flowers red or orange-yellow.
 5a. Flowers bright crimson-red ; corolla-tube as long as bracts. ... *H. coccineum* 4
 5b. Flowers orange-yellow ; corolla-tube exceeding bracts by 1—3 cm. ... *H. aurantiacum* 5
- 4b. Flowers white or yellow.
 6a. Lip 3—6 mm broad.
 7a. Spikes compact, cone-like ; bracts flat and imbricating ; filaments 5.5—6.5 cm long, pinkish-yellow at base, pink above. ... *H. ellipticum* 6
 7b. Spikes open ; bracts closely convolute, not imbricating ; filaments 2.5—3.5 cm long, bright red. ...
 8a. Spikes 5—10 cm long ; corolla-tube 2—3 cm long ; lip and staminodes 1.2-1.8 cm long ; stamens half as long as lip. ... *H. gracile* 7
 8b. Spikes 15—20 cm long ; corolla-tube 5—7 cm long ; lip and staminodes 2.2—3.2 cm long ; stamens longer than lip. ... *H. griffithianum* 8
- 6b. Lip 10—20 mm broad.
 9a. Leaves white puberulent beneath ; flowers bright yellow ; lip entire or notched. ... *H. gardnerianum* 9
 9b. Leaves appressed-hairy beneath ; flowers white ; lip distinctly bilobed with ± 1 cm deep sinus.
 10a. Spikes 40—60 cm long ; bracts 2—3-flowered ; corolla-tube 1.0—1.5 cm longer than bracts ; lip ± 3 cm long ; staminodes ± 3 cm long ; filaments 5—6 cm long. ... *H. stenopetalum* 10
 10b. Spikes 8—10 cm long ; bracts 1-flowered ; corolla tube ± 2.5 cm longer than bracts ; lip ± 2.2 cm long ; staminodes ± 1.5 cm long ; filaments ± 3 cm long. ... *H. calcaratum* 11

1. *Hedychium wardii* C. E. C. Fischer in Kew Bull. 1936: 283, 1936; Rao & Verma in Bull. Bot. Surv. Ind. 14: 130, 1972.

Rhizomes stout, pink, aromatic; stems 0.7–1.5 m; leaves sessile, oblong-lanceolate, caudate-acuminate, 30–50 × 5–9 cm, appressed-hairy beneath; ligules 3–10 mm; sheaths pubescent; spikes compact, cone-like, 8–20 × 3–5 cm; bracts obovate-oblong, 4–5 × 3.5–4.5 cm; flowers white, fragrant; corolla-tube 6.5–7.5 cm; lobes linear, 2–3 cm; lateral staminodes spatulate, 1.8–2.5 × 1.0–1.6 cm; lip suborbicular, 2.2–3.0 × 2.5–3.2 cm, bilobed.

Grasslands and secondary forests, open or partially shady places, 700-1300 m; fl. & fr.: July-Sept.; Nongringkoh, Umjaisaw-Mynsyngnat.

Hybrids between this species and *H. coronarium* have been noticed at Umjaisaw-Mynsyngnat, north of Nartiang, (*Balakrishnan* 47143), characterised by short-filamented stumpy stamens, a character which is intermediate between the long-filamented *H. coronarium* and non-filamented *H. wardii*.

2. ***Hedychium dekianum*** Rao & Verma in Bull. Bot. Surv. Ind. 11: 122. f. 1-3. 1969 (1971), & 14: 129. 1972.

Rhizomes white inside, faintly aromatic; stems 1.2-2.0 cm; leaves sessile, lanceolate to oblong-lanceolate, subcaudate, 30-50 × 5.5-13.0 cm, appressed-silky beneath; ligules 1-4 cm; spikes 10-17 cm; bracts oblong, 4-6 × 1.5-2.0 cm, pubescent; flowers white, with pale yellow blotch on lip, fragrant; corolla-lobes linear, 3.5-4.7 cm; lateral staminodes spatulate, 3.5-4.7 cm; lip suborbicular, 3.0-3.7 × 2.3-3.4 cm, bilobed.

Grasslands and secondary forests, on open or partially shaded places, 1200-1600 m; fl.: July-Sept.; Jarain-Jowai, *Balakrishnan* 46882; *Halim* 28636; Garampani-Raliang, *Balakrishnan* 46934; Ummulong, *Balakrishnan* 46119 —Endemic to Jaintia Hills.

3. ***Hedychium coronarium*** Koen. in Retz. Obs. Bot. 3: 78. 1783; Fl. Brit. Ind. 6: 225. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 128. 1972.

Stems up to 2 m; leaves subsessile, oblong-lanceolate, acuminate, 25-50 × 4-12 cm, appressed-hairy beneath; spikes 8-20 cm; bracts obovate, acute, 3-9 × 2-6 cm; flowers white or yellow, fragrant; corolla-tube longer than bracts; staminodes obliquely spatulate; lip suborbicular, clawed at base, entire or bifid.

Very variable as to flower and shape of staminodes. The following varieties are distinguishable:

- 1a. Flowers white with pale yellow blotch at base; staminodes more than 10 mm broad.
- 2a. Stamens shorter than lip; filaments white; staminodes 2-3 cm broad. ... var. *coronarium* 1
- 2b. Stamens longer than lip; filaments pinkish-yellow; staminodes 1.0-1.8 cm broad. ... var. *chrysoleucum* 2
- 1b. Flowers creamy-yellow or sulphur-yellow; staminodes 5-8 mm broad.
- 3a. Stamens ± 7 mm longer than lip. ... var. *subditum* 3
- 3b. Stamens 3-8 mm shorter than lip.

- 4a. Stems up to 1 m high ; lip 4.5—5.0 cm diam. ; filaments orange-yellow. ... var. *flavum* 4
 4b. Stems 1—2 m high ; lip 3—4 cm diam. ; filaments yellow. ... var. *urophyllum* 5

1. var. **coronarum** —‘*Todoh*’

Streamsides and moist shaded places, 200-1600 m ; fl. & fr. : May-Dec. ; Jarain, Jarain-Jowai, Jarain-Syndai, Jowai, Shangpung.

2. var. **chrysoleucum** (Hook. f.) Baker in Fl. Brit. Ind. 6: 226. 1892. *H. chrysoleucum* Hook. f. in Curtis, Bot. Mag. 76: t. 4516. 1850.

Shaded places in grasslands and secondary forests, 200-1500 m ; fl. & fr. : May-Oct. ; Jowai.

3. var. **subditum** (Turrill) Naik in Bull. Bot. Surv. Ind. 3: 71. 1961. *H. subditum* Turrill in Kew Bull. 1914: 370. 1914.

Primary forests, in shaded places, 1000-1500 m ; fl. & fr. : July-Jan. ; Jarain.

4. var. **flavum** (Roxb.) Baker in Fl. Brit. Ind. 6: 226. 1892. *H. flavum* Roxb. Fl. Ind. 1: 12. 1820.

Primary forests, in shaded places, 1200-1600 m ; fl. & fr. : July-Feb. ; Jowai, Jowai-Jarain.

5 var. **urophyllum** (Lodd.) Baker in Fl. Brit. Ind. 6: 226. 1892. *H. urophyllum* Lodd. Bot. Cab. t. 1785. 1892.

Primary forests, in shaded places, 1200-1600 m ; fl. & fr. : May-Dec. ; Jarain, Khleihriat, Jowai.

4. **Hedychium coccineum** Smith in Rees, Cyclop. 17: 5. 1811 ; Fl. Brit. Ind. 6: 231. 1892. ‘*Lyngtiang*’.

Stems 1.5-2.0 m ; leaves linear-lanceolate, acuminate at apex ; 25-50×4-8 cm, purplish and villous beneath ; ligules 1-2 cm, bifid, pinkish ; spikes 20-30 cm ; bracts 3.0-4.5×1.5-2.0 cm, convolute ; corolla-lobes 3.8-4.5 cm ; staminodes spatulate, ± 2.5 cm ; lip suborbicular, clawed, ± 2.5×2.0 cm, deeply bilobed.

Shaded places in forests and grasslands, 200-1400 m ; fl. & fr. : June-Dec. ; Jarain, Jarain-Syndai, Jowai, Umjaisaw-Scitsohma.

5. **Hedychium aurantiacum** Rosc. Monandr. Pl. t. 39. 1828 ; Fl. Brit. Ind. 6: 232. 1892 ; Rao & Verma in Bull. Bot. Surv. Ind. 14: 134. 1972.

Stems 0.8-1.2 m ; leaves lanceolate, narrowed at base, acuminate,

20-25×5-6 cm; spikes 15-30 cm, lax-flowered; bracts oblong, often 2-3-fid, 2.0-2.5 cm; lobes linear, 2.5-3.0 cm; staminodes oblanceolate, 2.5-3.0 cm; lip orbicular, distinctly clawed, deeply bifid at apex, 2.0-2.5 cm; filaments 2.0-3.5 cm; anthers linear, yellow.

Primary forests, in shaded places, 1000-1500 m; fl. & fr.: July-Feb.; Jarain.

6. **Hedychium ellipticum** Smith in Rees, Cyclop. 17: 2. 1811; Fl. Brit. Ind. 6: 228. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 131. 1972.

Terrestrial, rarely epiphytic; rhizomes aromatic; stems 0.7-1.3 cm; leaves oblong, caudate-acuminate, 25-30×8-12 cm; sheaths pink-margined; ligules ± 1 cm, pink; spikes 5-11 cm; bracts ovate-oblong, 2.8-3.0×0.8-1.0 cm; flowers white, becoming yellow, fragrant; corolla-tube 3.5-5.0 cm; lobes 4.0-4.5 cm; staminodes spatulate, 3.0-3.5×0.5-0.8 cm; claw of lip ± 1.2 cm; blade of lip bilobed, 1.2-1.8×0.5-0.6 cm.

Shaded places in forests, 500-1500 m; fl. & fr.: May-Dec.; Jowai, Umjaisaw-Seitsohma.

7. **Hedychium gracile** Roxb. Pl. Corom. 3: 48. t. 251. 1820; Fl. Brit. Ind. 6: 229. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 132. 1972. '*Latdoh*'.

Stems 20-60 cm; leaves sessile, oblong-lanceolate, caudate-acuminate, 11-25×3-8 cm; ligules 2-4 mm, bifid, pink; bracts oblong-lanceolate, 1.5-2.4×0.4-0.6 cm; flowers white or pale yellow; corolla-lobes 2.5-3.0 cm; staminodes linear, lip oblong, bilobed; filaments red.

Primary forests, in shaded moist places, 1000-1600 m; fl. & fr.: May-Dec.; Garampani-Raliang, Jarain, Jowai-Jarain, Nongbah-Nartiang.

8. **Hedychium griffithianum** Wall. in Hook. Kew Jour. 5: 369. 1853; Fl. Brit. Ind. 6: 229. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 132. 1972.

Stems 0.5-1.0 m; leaves subsessile, oblong-lanceolate, caudate-acuminate, 15-35×4-8 cm; ligules 4-10 mm, pinkish, bilobed; bracts oblong, convolute, 1.5-2.5×0.5-0.8 cm; flowers white, fragrant; corolla-tube 1.6-2.8 cm longer than bracts; lobes 3-4 cm; staminodes linear or oblanceolate, pinkish at base; filaments 3-4 cm; stamens orange.

Secondary forests and shaded grasslands, 500-1200 m; fl. & fr.: July-Feb.; Jarain, Raliang-Garampani.

9. **Hedychium gardnerianum** Rosc. Monand. Pl. t. 62. 1828; Fl. Brit. Ind. 6: 230. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 133. 1972.

Stems 1-2 m; leaves subsessile, oblong, caudate, 30-45 × 10-13 cm; ligules ± 2 cm, pink; spikes 20-30 cm, lax-flowered; bracts oblong, 3.5-4.5 × 1-1.4 cm, pinkish inside; corolla-tube 1.5-2.0 cm longer than bracts; lobes 3.0-4.5 cm; staminodes oblanceolate, ± 3 × 0.6 cm; lip obovate, 2.5-1.5 cm, emarginate; filaments 5.5-6.5 cm, bright red; anthers orange-red.

Shaded moist places in forests, 1000-1500 m; fl. & fr.: July-Dec.; Jarain-Jowai.

10. **Hedychium stenopetalum** Lodd. Bot. Cab. t. 1902. 1893; Fl. Brit. Ind. 6: 231. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 14: 133. 1972.

Stems 2-3 m; leaves oblong-lanceolate, subcaudate, 50-65 × 9-15 cm; ligules 1.5-2.0 cm, bifid; bracts oblong, 3.5-4.5 × 1.3-1.5 cm; flowers white with a pale yellow blotch in mouth, fragrant; corolla-lobes greenish-white, 4-5 cm; staminodes narrowly oblanceolate, ± 3.0 × 3.5 cm, notched; lip obovate, ± 3 × 1.5 cm, cuncate or short clawed at base, deeply bilobed.

Shaded places in forests, 1300-1600 m; fl. & fr.: July-Mar.; Jowai, Ummulong.

11. **Hedychium calcaratum** Rao & Verma in Bull. Bot. Surv. Ind. 11: 120. ff. 1-3. 1969 (1971) & 14: 133. 1972.

Stems ± 1 m; leaves subsessile, lanceolate, subcaudate at apex, 20-32 × 3.0-3.5 cm, appressed-hairy beneath; bracts lanceolate, acute, 3.3-4.0 × 0.9-1.1 cm; flowers white; corolla-tube 5.7-6.0 cm; lobes linear, subequal, ± 3 cm, curled; staminodes obliquely spatulate, ± 1.5 × 0.5 cm; lip obovate, ± 2.2 × 1.5 cm, shortly clawed at base, bilobed at apex; anthers linear, ± 1 cm, yellow.

Shaded moist places in forests, 1000-1400 m; fl. & fr.: July-Aug.; Jowai-Bodarpur Road, G. K. Deka 10134.

141. MARANTACEAE

PHRYNIUM Willd. *nom. cons.*

- | | | |
|--|-----|--------------------------|
| 1a. Inner bracts with obtuse scarious tips, breaking up into fibrillae ;
capsule-wall woody. | ... | <i>P. pubinerve</i> 1 |
| 1b. Inner bracts with acute spinulose tips, not breaking up into fibrillae ;
capsule-wall membranous. | ... | <i>P. placentarium</i> 2 |

1. **Phrynium pubinerve** Bl. Enum. Pl. Jav. 1: 58. 1827; Rao & Verma in Bull. Bot. Surv. Ind. 14: 141. 1972. *P. capitatum* (Auctt. plur. non Willd. 1797) Baker in Fl. Brit. Ind. 6: 258. 1892.

Rhizomes \pm 1 cm thick; leaves oblong to ovate-oblong, rounded or abruptly cuncate at base, cuspidate, 18-55 \times 7-25 cm; petioles 0.4-1.6 cm; spikes on upper half of the petioles, globose, 4-5 cm; peduncles absent or rarely up to 5 cm in fruits; bracts red; inner bracts oblong-lanceolate, 2.5-3.5 \times 1.3-2.0 cm; flowers purplish-red; capsules ellipsoid, subturbinate, 1.0-1.5 cm; seeds grey.

Shaded places in secondary and bamboo forests, 100-1200 m; fl. & fr: Jan.-Dec.; Jarain-Dawki, Nongthala, Sonapur.

2. **Phrynium placentarium** (Lour.) Merr. in Philip. J. Sci. 15: 230. 1919. *Phyllodes placentaria* Lour. Fl. Cochinch. 13. 1790. *Phrynium parviflorum* Roxb. Fl. Ind. 1: 7. 1820; Fl. Brit. Ind: 6: 259. 1892.

Rhizomes \pm 1 cm thick; leaves oblong-lanceolate, rounded or cuneate at base, cuspidate-acuminate, 25-50 \times 5-20 cm; petioles 45-90 cm, terete; spikes on upper half of the petiole, often only 5 cm below the blade, sessile, globose, 3.5-5.0 cm; outer bracts oblong, cuspidate, \pm 2.3 cm, inner ones oblong-lanceolate, 2.3-3.0 \times 0.7-1.0 cm; flowers white; capsules ellipsoid, 1.3-1.9 cm; seeds reddish-brown.

Shaded moist places in forests, 200-1000 m; fl. & fr.: May-Dec.; Nongthala, Umtapoh.

142. MUSACEAE

MUSA L.

Musa velutina Wendl. & Drude in Regel, Gartenflora 24: 65. t. 823. 1875; Fl. Brit. Ind. 6: 263. 1892.

Pseudostems 1.0-1.5 m, pale red at base, purple-blotched upwards; leaves oblong, rounded at base, truncate-rounded at apex, 60-100 \times 20-35 cm; midrib red beneath; petioles 40-50 cm; peduncles 1.5-2.0 cm thick, red, white hairy; bracts red-purple, pubescent, ovate-lanceolate, 15-20 cm; flowers 3-5 in a single row, orange-yellow; fruits subsessile, 6-7 \times 3-4 cm, pinkish-red, hairy; pulp white; seeds angular, black.

Shaded moist places in primary forests, 200-1400 m; fl. & fr.: Feb.-Oct.; Rytiang.

143. CANNACEAE

CANNA L.

Canna coccinea Mill. Gard. Dict. ed. 8: no. 3. 1768. *C. indica* (auctt. plur. non L. 1753) Baker in Fl. Brit. Ind. 6: 260. 1892.

Erect herbs, up to 1 m; leaves elliptic-oblong, 25-45 × 10-15 cm, pale green; sheaths pruinose; inflorescences simple; corolla 4.0-4.5 cm, red with yellow top; tube 8-10 mm; staminodes 2-3, spatulate, ± 40 × 8 mm, bright red; lip bright red with pale yellow in lower half, 3.5-4.0 × 0.4-0.5 cm; capsules 3.0-3.5 cm.

Wastelands, roadsides and forest edges, 200-1000 m; fl. & fr.: Jan.-Dec.; Garampani.

144. HYPOXIDACEAE

- | | | |
|---|-----|--------------------|
| 1a. Perianth-lobes on long stipes. | ... | <i>Curculigo</i> 1 |
| 1b. Perianth-lobes sessile or subsessile. | | |
| 2a. Leaves sessile. | ... | <i>Hypoxis</i> 2 |
| 2b. Leaves on long petioles. | ... | <i>Molineria</i> 3 |

1. CURCULIGO Gaertn.

Curculigo orchioides Gaertn. Fruct. 1: 63. t. 13. 1788; Fl. Brit. Ind. 6: 279. 1892.

Rootstock tuberous, crowned with fibrous remains of old sheaths; leaves linear-lanceolate, acuminate, 5-40 × 0.5-4.5 cm; petioles absent or up to 20 cm; scapes ± 2 cm; bracts lanceolate, 2-3 cm; flowers subsessile, distichous, yellow or orange; lower bisexual; upper male; perianth-lobes oblong, 8-12 × 2-3 mm on 2-5 cm long stipes; fruits oblong, ± 1 cm; seeds shiny-black.

Grassy slopes, wastelands, in open or partially shaded places, 500-1400 m; fl. & fr.: Mar.-Aug.; Jarain, Khelihriat.

2. HYPOXIS L.

Hypoxis aurea Lour. Fl. Cochinch. 200. 1790; Fl. Brit. Ind. 6: 277. 1892.

Rootstock globose or elongate, 5-15 mm; leaves linear, acute, 4-30 ×

0.2-0.5 cm, glabrous or villous beneath; scape 1.5-10.0 cm, villous when young; bracts setaceous, 1-5 mm; flowers solitary or 2-4 in a raceme; pedicels 3-6 mm, elongating up to 1 cm in fruits; perianth-lobes elliptic-lanceolate, 5-9×2-3 mm, yellow; capsules clavate, 8-10 mm, hairy; seeds shiny-black.

Pine forests, grasslands and wastelands, in open places, 1200-1600 m; fl. & fr.: May-Nov.; Jarain, Raliang.

3. MOLINERIA Colla

Molineria capitulata (Lour.) Herb. Amaryl. 84. 1837. *Leucojum capitulatum* Lour. Fl. Cochinch. 199. 1790. *Curculigo recurvata* Dryand in Ait. Hort. Kew ed. 2. 2: 253. 1811; Fl. Brit. Ind. 6: 278. 1892. '*Laliang*'.

Plants 30-150 cm; leaves lanceolate, acuminate, 20-90×3-20 cm, 11-19-nerved; petioles 10-85 cm, usually villous below; peduncles flattened, 6-25 cm, densely pubescent; floriferous part deflexed, 3-10 cm; pedicels up to 3 mm; flowers yellow; perianth-lobes oblong-lanceolate, 6-10×2-4 mm, villous outside; fruits subglobose, obscurely 3-angled, beaked, 6-10 mm, white or pink fleshy.

Shaded moist places in dense forests, 500-1500 m; fl. & fr.: Mar.-Dec.; Jowai, Nongthala, Umjaisaw-Mynsyngnat.

145. AMARYLLIDACEAE

CRINUM L.

Crinum amoenum Roxb. Fl. Ind. 2: 127. 1832; Fl. Brit. Ind. 6: 282. 1892.

Bulbs ovoid, 4-7 cm thick; leaves ensiform, acuminate, 25-65×2.0-3.5 cm, smooth or scaberulous at margins; peduncles lateral, solitary, arising from axils of old leaves, terete, 15-50 cm; umbel 3-12-flowered; spathes lanceolate, 4.5-5.5×1.0-1.5 cm; flowers white; perianth-tube 8-10 cm; lobes lanceolate, 5-7×0.6-1.0 cm; stamens shorter than segments; filaments red; anthers 10-13 mm.

Rocky open places in grasslands and forest edges, 200-1500 m; fl. & fr.: Apr.-Dec.; Dawki, Garampani, Jarain, Raliang, Sohka.

146. AGAVACEAE

- | | |
|--|-------------------|
| 1a. Leaves rigid, thick-fleshy, with an apical spine ; ovules many in each cell ; fruits capsular. ... | <i>Agave</i> 1 |
| 1b. Leaves flexuous, not fleshy, nor with an apical spine ; ovules solitary in each cell ; fruits baccate. ... | <i>Dracaena</i> 2 |

1. AGAVE L.

Agave sisalana Engelm. in Trans. Acad. Sci. St. Louis 3: 314. 1875.

Plants 1 - 2 m ; leaves linear-lanceolate, 100 - 180 × 10 - 14 cm, 2 - 4 cm thick, dark green, horny with tiny recurved spines at margins and a blackish-brown 1.5 - 3.0 cm long spine at apex ; panicles 5 - 8 × 0.6 - 1.0 m, densely flowered ; flowers erect, foetid ; perianth 5 - 6 cm ; tube 1.5 - 1.7 cm ; segments oblong ; bulbils on inflorescences with dentate leaves.

Wastelands in open places, 1200 - 1600 m ; fl. & fr. : Jan.-Dec. ; Raliang.

Introduced from trop. America and now naturalised.

2. DRACAENA L.

- | | |
|--|--------------------------|
| 1a. Leaves sessile, linear, ensiform, up to 2.5 cm broad. ... | <i>D. angustifolia</i> 1 |
| 1b. Leaves petioled, elliptic-lanceolate, more than 3 cm broad. | |
| 2a. Inflorescence a large spreading panicle. ... | <i>D. elliptica</i> 2 |
| 2b. Inflorescence a spiciform raceme, simple or branched at base only. ... | <i>D. spicata</i> 3 |

1. **Dracaena angustifolia** Roxb. Fl. Ind. 2: 155. 1832 ; Fl. Brit. Ind. 6: 327. 1892.

Erect shrubs or small trees, 2 - 4 m ; leaves with broad sheathing base, erect-patent, linear-lanceolate, 10 - 60 × 1.0 - 2.5 cm ; panicle with several well-developed branches, 10 - 60 cm ; flowers 1 - 4-nate in axils of acute scarious bracts ; pedicels articulate at apex, 4 - 7 mm ; perianth pale yellow, 2.0 - 2.5 cm ; berries 2.2 - 2.5 cm diam., orange.

Shaded moist places in forests, 100 - 1000 m ; fl. & fr. : Jan.-Dec. ; Jarain-Sohka, Sohka.

2. **Dracaena elliptica** Thunb. Diss. Bot. Dracaen. 6. 1808 ; Fl. Brit. Ind. 6: 330. 1892.

Erect shrubs, 1 - 4 m ; leaves spirally arranged or partly seemingly opposite on 0.5 - 2.0 cm long petioles, lanceolate or oblong, acutely acuminate, 6 - 25 × 3 - 8 cm ; flowers 2 - 4-nate or partly solitary ; pedicels articulate at

apex, 6-10 mm; perianth pale green outside, 1.5-2.5 cm; berries 1.5-2.0 cm diam., 2-3-lobed, orange-red.

Shaded moist places in forests, 100-800 m; fl. & fr.: Mar.-Sept.; Dawki, Syndai.

3. **Dracaena spicata** Roxb. Fl. Ind. 2: 157. 1832; Fl. Brit. Ind. 6: 328. 1892.

Erect shrubs, 1-3 m; leaves subverticillate, on 1-2 cm long petioles, elliptic-lanceolate or oblanceolate, acutely acuminate at apex, 10-50 × 3-8 cm; inflorescences 8-20 cm; flowers fascicled or partly solitary; pedicels 2-8 mm; articulate at apex; perianth pale yellow, 8-10 mm; berries orange, ± 1.5 cm diam., 3-lobed.

Shaded moist places in primary forests, 200-1000 m; fl. & fr.: Jan.-Dec.; Dawki, Syndai.

147. TACCACEAE

TACCA Forst. *nom. cons.*

Tacca laevis Roxb. Fl. Ind. 2: 171. 1824; Fl. Brit. Ind. 6: 288. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 15: 191. 1973. '*Mainkhlah*'.

Rhizomes subcylindric, sheathed, 1-2 cm diam.; leaves elliptic, ovate or oblong, 20-40 × 7-20 cm; petioles 20-40 cm; scapes 40-80 cm; flowers 4-15 on each scape, bluish-green or greyish-purple; pedicels 3-4 cm; bracts many, filiform; perianth spreading, oblong, 1.0-1.5 × 0.4-1.0 cm; fruits obconic, truncate, 6-ribbed, black.

Shaded moist places in primary forests, 100-1000 m; fl. & fr.: May-Dec.; Syndai-Muktapur.

148. DIOSCOREACEAE

DIOSCOREA L.

- | | |
|---|---------------------------|
| 1a. Stems twining to the right; male flowers usually sessile. | |
| 2a. Plants glabrous; stems abundantly prickly at base; basal nerves usually 7. | ... <i>D. glabra</i> 1 |
| 2b. Plants hairy, particularly petioles and inflorescences; stem not prickly; basal nerves usually 5. | ... <i>D. trinervis</i> 2 |
| 1b. Stems twining to the left; male flowers usually pedicelled. | |
| 3a. Leaves simple. | ... <i>D. bulbifera</i> 3 |

- 3b. Leaves compound.
- 4a. Middle leaflet 3-nerved from base; stamens 6; capsules 4-6 cm long. ... *D. hispida* 4
- 4b. Middle leaflet with a solitary midrib; stamens 3; capsules less than 3 cm long.
- 5a. Stems usually prickly; leaflets broadly oblanceolate or obovate; hairs reddish-brown or white; capsules slightly truncate at apex. ... *D. pentaphylla* 5
- 5b. Stems unarmed; leaflets ovate-elliptic or obovate; hairs white; capsules obtuse at apex. *D. kamoonenensis* 6

1. **Dioscorea glabra** Roxb. Fl. Ind. 3: 804. 1832; Fl. Brit. Ind. 6: 294. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 15: 199. 1973.

Stems ascending up to 8 m; leaves oblong-lanceolate, elliptic-ovate, rounded or cordate at base, acuminate or mucronate, 7-9 × 3-6 cm; petioles 4-8 cm; male inflorescence on up to 70 cm long leafless branches, 1-5 together, 1.5-3.0 cm; female inflorescences solitary or paired, up to 40 cm; capsules on 3-4 mm long stipes, retuse at base and apex; wings 1.5-1.8 × 1.4-2.0 cm.

Forests and forest borders in fairly sunny places, 1000-1500 m; fl. & fr.: Aug.-Mar.; Jarain.

2. **Dioscorea trinervia** Prain & Burk. in J. As. Soc. Beng. n. s. 10: 32. 1914; Rao & Verma in Bull. Bot. Surv. Ind. 15: 197. 1973. *D. oppositifolia* (non L. 1753) Hook. f. Fl. Brit. Ind. 6: 292. 1892. *p. p.*

Stems slender; bulbils elongated up to 1.5 cm; leaves alternate at base, opposite above, ovate-lanceolate, obtuse or rounded at base, acuminate-mucronate, 12-18 × 2-8 cm; petioles 2-5 cm, pubescent; male inflorescences 1-2 cm, 2-4 together on leaflets branches; female inflorescences solitary, axillary, up to 15 cm; capsules on 4-5 mm long stipes, truncate at apex; wings 15-18 × 13-17 mm.

Primary forests and forest borders, in shaded places, 200-1000 m; fl. & fr.: Aug.-Feb.; Rytang, Sohka-Dawki.

3. **Dioscorea bulbifera** L. Sp. Pl. 1033. 1753; Rao & Verma in Bull. Bot. Surv. Ind. 15: 201. 1973. *D. sativa* (non L. 1753) Thunb. Fl. Jap. 151. 1784; Fl. Brit. Ind. 6: 295. 1892.

Stems ascending, up to 30 m, terete or faintly angled; tubers globose or pyriform, 10-15 cm diam., with purplish-black skin; leaves broadly cordate, caudate-acuminate, 10-25 × 7-22 cm; basal nerves 5-7; petioles 7-13 cm; male inflorescences 1-4 together on large pendulous up to 1 m long panicles; female inflorescences solitary or paired, axillary, 20-45 cm; cap-

sules on ± 1 mm long stipe; wings semi-elliptic, rounded at both ends, 20-25 \times 6-9 mm.

Shaded places in forests, 200-1400 m; fl. & fr.: Jan.-Dec.; Jarain, Rytiang.

4. **Dioscorea hispida** Dennst. in Schluss. Hort. Malab. 15. 1818. *D. daemonia* Roxb. Fl. Ind. 3: 805. 1832; Fl. Brit. Ind. 6: 289. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 15: 193. 1973.

Stems up to 30 m, prickly, hispid when young; tubers subglobose, up to 30 cm; leaves 3-foliolate; petioles 10-20 cm; leaflets elliptic-oblong or obovate, acuminate or obtuse, 10-20 \times 8-12 cm; petiolules 7-10 mm; male inflorescences 1-4 together on axillary 15-30 cm long leafless branches; female inflorescences axillary, solitary or paired, 30-50 cm; capsules pale brown; wings semi-elliptic, 4-5 \times 1.1-1.3 cm.

Primary and secondary forests, 100-1000 m; fl. & fr.: July-Jan.; Sohka.

5. **Dioscorea pentaphylla** L. Sp. Pl. 1032. 1753; Fl. Brit. Ind. 6: 289. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 15: 193. 1973.

Stems up to 10 m, abundantly prickly; bulbils many, globose or ellipsoid; leaves 3-5-foliolate; petioles 8-10 cm; leaflets acutely rounded at base, acuminate-mucronate, 12-16 \times 3-6 cm; lateral nerves 5-7 pairs; petiolules 3-5 mm; male inflorescences up to 3 cm, on large axillary or terminal leafless branches; female inflorescences 1-3 together, up to 25 cm; capsules black; wings 20 \times 6 mm.

Shaded places in forests, 400-1200 m; fl. & fr.: July-Mar.; Nartiang.

6. **Dioscorea kamoensis** Kunth, Enum. Pl. 5: 395. 1850; Hook. f. Fl. Brit. Ind. 6: 290. 1892 (sphalm: *kumaonensis*); Rao & Verma in Bull. Bot. Surv. Ind. 15: 194. 1973.

Stems dark brownish-red, white-hairy when young; bulbils globose, 5-10 mm; leaves alternate, 3-5-foliolate; petioles 4-6 cm; leaflets subcaudate-acuminate, 7-11 \times 3-5 cm, glabrous or hispidulous on upper surface; basal nerves 2-3; petiolules 1-2 mm; male inflorescences 2-6 cm, 2-6 together, axillary; female inflorescences 1-3 together, pendulous, up to 27 cm; capsules hairy till ripening; wings 20-25 \times 6-8 mm.

Shaded places in forests, 1000-1500 m; fl. & fr.: Aug.-Mar.; Jowai-Jarain.

149. STEMONACEAE

STEMONA Lour.

Stemona tuberosa Lour. Fl. Cochinch. 400. 1790; Fl. Brit. Ind. 6: 298. 1892; Rao & Verma in Bull. Bot. Surv. Ind. 15: 203, f. 1-2, 1973.

Roots fasciculate, cylindrical, 15-30 cm, cream-coloured; stems woody below, branched, 3-6 m, subscaudent; leaves opposite, ovate-cordate, subcaudate-acuminate; basal nerves 9-13; petioles 4-9 cm; flowers 1-2 in condensed cymes, greenish with purple veins, 5-6 cm; pedicels 5-7 cm; bracts lanceolate, 5-10 mm; anthers 1.4 cm with 1.8 cm long linear appendage at apex; capsules ovoid, 4-5 cm.

Moist shaded places in primary forests, 100-500 m; fl. & fr.: Mar.-Aug.; Dawki.

150. LILIACEAE

- | | |
|--|-----------------------|
| 1a. Leaves reduced to minute membranous scales bearing 1 to many cladodes at axils. ... | <i>Asparagus</i> 1 |
| 1b. Leaves normal. | |
| 2a. All leaves radical. | |
| 3a. Ovary superior. | |
| 4a. Flowers in dense-flowered spikes; fruits baccate, 1-seeded. ... | <i>Tupistra</i> 2 |
| 4b. Flowers in lax racemes; fruits capsular, 3 or more-seeded. ... | <i>Chlorophytum</i> 3 |
| 3b. Ovary inferior. | |
| 5a. Leaves elliptic-lanceolate; stamens almost entirely connate into a hemispheric shortly dentate tube. ... | <i>Peliosanthes</i> 4 |
| 5b. Leaves linear; stamens free or connate only at the very base. ... | <i>Ophiopogon</i> 5 |
| 2b. Leaves cauline or radical and cauline. | |
| 6a. Flowers terminal, solitary or paired. | |
| 7a. Leaves whorled, oblong or oblanceolate; stamens 8-12. ... | <i>Paris</i> 6 |
| 7b. Leaves alternate, linear; stamens 6. ... | <i>Iphigenia</i> 7 |
| 6b. Flowers axillary and terminal, in panicles, racemes or corymbs. | |
| 8a. Leaves sheathing at base; flowers in terminal panicles. ... | <i>Dianella</i> 8 |
| 8b. Leaves not sheathing at base; flowers not in terminal panicles. | |
| 9a. Leaves opposite; outer perianth segments flat at base; anthers introrse. ... | <i>Polygonatum</i> 9 |
| 9b. Leaves alternate; outer perianth segments saccate or gibbous at base; anthers extrorse. | |

- | | |
|--|---------------------|
| 10a. Plants glabrous ; leaves sessile or subsessile ;
fruits baccate. ... | <i>Disporum</i> 10 |
| 10b. Plants glandular-pubescent ; leaves corda-
tely amplexicaul at base ; fruits capsular. ... | <i>Tricyrtis</i> 11 |

1. ASPARAGUS L.

- | | |
|---|-----------------------|
| 1a. Plants unarmed ; cladodes flat ; flowers solitary or in axillary
clusters. ... | <i>A. filicinus</i> 1 |
| 1b. Plants armed with recurved spines ; cladodes triquetrous ; flowers
in racemes. ... | <i>A. racemosus</i> 2 |

1. **Asparagus filicinus** Buch.-Ham. in D. Don, Prodr. Fl. Nep. 49. 1825; Fl. Brit. Ind. 6: 314. 1892.

Rootstock stout, creeping; stems erect; branches flexuous, subscaudent; cladodes 2-5 together, falcate, acuminate, striate, 3-6 × 0.2-0.4 mm; pedicels jointed above the middle, 1-3 mm; perianth subcampanulate, 2-3 mm, pale yellow; stamens short; anthers minute; berries 6-8 mm diam., red.

Forests in shaded and open places, 100-600 m; fl. & fr.: June-Oct.; Dawki.

2. **Asparagus racemosus** Willd. Sp. Pl. 152. 1799; Fl. Brit. Ind. 6: 316. 1892.

Rootstock stout, tuberous; stems climbing; cladodes 2-3 together, acute, falcate, 10-30 × 0.6-1.0 mm; pedicels solitary or paired, 3-5 mm, articulate above the middle; perianth 3-5 mm, white; anthers minute; purplish; berries 4-6 mm diam., red or pink.

Secondary forests, scrubs and forest edges, 100-1000 m; fl. & fr.: July-Nov.; Nongthala, Syndai.

2. TUPISTRA Ker.-Gawl.

Tupistra nutans Wall. in Edw. Bot. Reg. 15: t. 1228. 1829; Fl. Brit. Ind. 6: 324. 1892.

Rootstock creeping, ± 1.5 cm thick; leaves narrowly oblanceolate, cuneate at base, acute to acuminate, 50-100 × 5-8 cm, coriaceous glossy; petioles 10-50 cm; peduncles 4-10 cm, dark purple, decurved; spikes 6-15 cm, dense-flowered; bracts deltoid, 3-4 mm, scarious; perianth cup-shaped, hemispheric, 10-13 mm, pale creamy at base, dark purple above; stigma peltate, sessile, dark purple; berries subglobose, 1.7-2.3 cm diam.

Shaded places in dense forests, 1000-1500 m; fl. & fr.: Nov.-Apr.; Jarain, Laskein.

3. CHLOROPHYTUM Ker.-Gawl.

Chlorophytum khasianum Hook. f. Fl. Brit. Ind. 6: 334. 1892.

Herbs; leaves sessile, linear, flat, 20-50 × 0.5-1.5 cm; scape up to 85 cm, simple or branched; racemes 15-25 cm; pedicels erect, jointed in middle; bracts shorter than flowers; perianth white; lobes linear-oblong, ± 1 cm; anthers elongate, 2-lobed; capsules oblong, 8-12 mm, 5-6-seeded; seeds suborbicular, flat, black.

Shaded moist places in primary forests, 1000-1400 m; fl. & fr.: July-Mar.; Jarain.

4. PELIOSANTHES Andrews

- | | | |
|---|-----|----------------------|
| 1a. Leaves 5-nerved; petioles up to 10 cm long; racemes up to 3 cm long. | ... | <i>P. bakeri</i> 1 |
| 1b. Leaves many-nerved; petioles more than 20 cm long; racemes more than 5 cm long. | ... | <i>P. violacea</i> 2 |

1. **Peliosanthes bakeri** Hook. f. Fl. Brit. Ind. 6: 267. 1892.

Rootstock horizontal; leaves elliptic-lanceolate, acute, 15-20 × 2-4 cm; nerves 5, alternating with intermediaries; petioles 5-10 cm; peduncles 1-3 cm with scaly bracts at base; racemes dense-flowered, 1-3 cm; bracts subulate-lanceolate; perianth ± 3 mm diam., dark purplish-green; fruits subglobose; seeds oblong.

Shaded places in forests, 1000-1500 m; fl. & fr.: Nov.-Mar.; Jarain.

2. **Peliosanthes violacea** Baker in J. Linn. Soc. 17: 502. 1879; Fl. Brit. Ind. 6: 266. 1892.

Rootstock creeping; leaves elliptic-lanceolate to oblanceolate, acute, 20-30 × 6-10 cm; nerves many; petioles 20-30 cm; peduncles 2-5 cm, with scaly bracts at base; racemes dense-flowered, 6-10 cm; bracts lanceolate; perianth dark purplish-blue inside, greenish-grey outside; fruits subglobose; seeds oblong.

Forests, in shaded rocky places, 100-1000 m; fl. & fr.: Oct.-Mar.; Dawki, Sonapur.

5. OPHIOPOGON Ker.-Gawl. *nom. cons.*

Ophiopogon parviflorus (Hook. f.) Hara in J. Jap. Bot. 40: 21. 1965.
O. intermedius D. Don var. *parviflorus* Hook. f. Fl. Brit. Ind. 6: 269. 1892.

Rootstock very short; leaves tufted, linear, 15-50 × 0.4-0.8 cm, minutely toothed at margins; peduncles leafless, 10-25 cm; racemes 4-12 cm; bracts lanceolate; flowers solitary or fascicled, 5-8 mm diam., white, tinged with pale purple; fruits black; seeds bright blue.

Moist shaded places in primary forests, 1300-1700 m; fl. & fr.: Sept.-Feb.; Jowai.

6. PARIS L.

Paris polyphylla Smith in Rees, Cyclop. 20: 2: 1819; Fl. Brit. Ind. 6: 362. 1892.

Rootstock creeping, annulate, 1-4 cm diam., stems 10-75 cm; leaves 4-9 in a whorl at or above the middle of stem, oblong or oblanceolate, rounded or acute at base, acuminate, 5-15 × 1-3 cm; basal nerves 3; petioles 0.3-1.2 cm; sepals ovate-lanceolate, acuminate, 2-8 cm, 3-nerved, green; petals filiform, 3-13 cm, pale yellow; fruits subglobose, ± 6 cm diam., smooth; seeds ovoid, scarlet.

Shaded pine forests, 1400-1800 m; fl. & fr.: May-Dec.; Jowai.

7. IPHIGENIA Kunth *nom. cons.*

Iphigenia indica (L.) Kunth, Enum. Pl. 4: 213. 1843; Fl. Brit. Ind. 6: 357. 1892. *Melanthium indicum* L. Mant. Pl. 226. 1771.

Herbs with erect simple stem and small underground tuber, 8-30 cm; leaves erecto-patent, linear-lanceolate, acute, 3-15 × 0.2-0.5 cm; flowers terminal, solitary or paired, erect; pedicels 6-20 mm; perianth linear-lanceolate, acute, 5-8 × 1-2 mm, red-brown; filaments green at base, brownish-red at apex, 2-3 mm; stigmas red-brown; capsules oblong-ovoid, 1-2 cm.

Shaded places in pine forests, 1200-1600 m; fl. & fr.: May-Oct.; Umthalong.

8. DIANELLA Lamk.

Dianella ensata (Thunb.) R. J. Henderson in Taxon 26: 136. 1977.
Dracaena ensata Thunb. Diss. Bot. Drac. 4. 1808. *Dracaena ensifolia* L.

Mant. Pl. 1: 63. 1767. *Dianella ensifolia* (L.) DC. in Redoubte Liliac. 1. t. 1. 1802; Fl. Brit. Ind. 6: 337. 1892.

Erect herbs; 60-120 cm; leaves linear, sheathing at base, distichous, laterally complicate, linear, sharply keeled at base, 15-60 × 1-4 cm; inflorescences terminal, paniculate racemes or corymbs, 9-40 cm; pedicels 5-10 mm; perianth 6-8 mm, pale blue; filaments yellow or orange; anthers 2-3 mm; berries subglobose, 7-10 mm diam., shiny purple-blue.

Secondary forests and scrubs, 500-1500 m; fl. & fr.: May-Nov.; Jarain, Jowai, Khongsnong, Mynso, Syndai.

9. POLYGONATUM Mill.

Polygonatum oppositifolium (Wall.) Royle, Illus. Bot. Himal. 1: 380. 1839; Fl. Brit. Ind. 6: 320. 1892. *Convallaria oppositifolia* Wall. in As. Res. 13: 380, f. 1. 1820.

Stems 50-120 cm with tuberous rhizomes; leaves opposite or a few alternate, oblong-lanceolate, acuminate, 8-15 × 1-3 cm, pale beneath with 7-9 reddish nerves; petioles 2-6 mm; flowers many, axillary; pedicels 1-2 cm; perianth-tube, cylindric, 6-8 mm, pale pink with blue specks; lobes small, pink; filaments papillose; berries ovoid or ellipsoid, 6-7 mm, scarlet-red.

Shaded moss-covered places in primary forests, 100-1500 m; fl. & fr.: May-Dec.; Jowai, Jowai-Jarain, Laskcin.

10. DISPORUM Salisb.

- | | | |
|--|-----|-------------------------|
| 1a. Perianth-lobes spatulate, saccate at base. | ... | <i>D. cantoniense</i> 1 |
| 1b. Perianth-lobes lanceolate, long-spurred at base. | ... | <i>D. calcaratum</i> 2 |

1. **Disporum cantoniense** (Lour.) Merr. in Philip. J. Sci. 15: 229. 1919 et in Trans. Amer. Phil. Soc. Philad. n. s. 24: 109. 1935. *Fritillaria cantoniensis* Lour. Fl. Cochinch. 203. 1790. *D. pullum* Salisb. in Trans. Hort. Soc. Lond. 1: 331. 1812; Fl. Brit. Ind. 6: 360. 1892.

Erect herbs, 0.5-1.5 m, branched towards apex; leaves ovate-lanceolate, rounded or obtuse at base, acute to acuminate, 6-15 × 1-6 cm; umbels 4-7-flowered; peduncles up to 1 cm; pedicels 1-4 cm; perianth lobes acute, saccate or with up to 2 mm long spur, 10-15 mm, pale violet; anthers yellow; berries pendulous, blue-black.

Primary forests, in shaded moist places, 1200-1600 m; fl. & fr.: May-Nov.; Jarain, Jowai, Jowai-Jarain, Raliang.

2. **Disporum calcaratum** D. Don in Trans. Linn. Soc. 18: 516. 1841; Fl. Brit. Ind. 6: 359. 1892.

Erect herbs, 30 - 70 cm, sparsely branched; leaves ovate or lanceolate, rounded at base, acute to acuminate, 3 - 12 × 1 - 4 cm; umbels 4 - 6-flowered, peduncles up to 5 mm; pedicels 1 - 3 cm; perianth lobes, acuminate, with 4 - 6 mm long spur at base, 15 - 20 mm, pale yellow; anthers yellow; berries pendulous, blue-black.

Primary forests in shaded moist places, 1000 - 1500 m; fl. & fr.: May-Oct.; Jarain, Mawryngkneng, Umkhlaw.

11. TRICYRTIS Wall. *nom. cons.*

Tricyrtis pilosa Wall. Tent. Fl. Nap. 61. t. 46. 1826; Fl. Brit. Ind. 6: 359. 1892.

Erect glandular-pubescent herbs, 0.5 - 1.5 m, few-branched at apex; leaves sessile, ovate-lanceolate, rounded-subcordate and amplexicaul at base, acute, 5 - 15 × 2 - 7 cm; flowers subcorymbose or racemose, 2 - 3 cm across; pedicels up to 1.5 cm; perianth lanceolate, gibbous at base, 1.0 - 1.5 cm, white with purple spots; anthers purple; capsules linear, triquetrous, 2.5 - 3.0 cm; seeds brown.

Pine forests and shaded places in primary forests, 1300 - 1800 m; fl. & fr.: May-Oct.; Jowai.

151. SMILACACEAE

SMILAX L.

- 1a. Flowers very small or minute; sepals less than 3 mm long; stamens much shorter than sepals. ... *S. myrtillos* 1
- 1b. Flowers large or small; sepals more than 4 mm long; stamens as long as or longer than sepals.
 - 2a. Leaves truncate or subcordate at base; umbels sessile in axillary spikes. ... *S. aspera* 2
 - 2b. Leaves obtuse or acute at base; umbels peduncled, solitary, binate or on common axillary peduncle.
 - 3a. Umbels solitary or rarely binate.
 - 4a. Branches strongly prickly; petioles with prominent sheaths; peduncles bracteate. ... *S. ferox* 3
 - 4b. Branches with a few or without prickles; petioles with short or indistinct sheaths; peduncles not bracteate. ... *S. lanceifolia* 4
 - 3b. Umbels 2—3 on a common peduncle.
 - 5a. Branches terete, straight; sheath of petiole broad and auricled. ... *S. perfoliata* 5
 - 5b. Branches 4-angled, zig-zag; sheath of petiole narrow, not auricled. ... *S. quadrata* 6

1. **Smilax myrtillos** DC. Monogr. Phan, 1: 106. 1878; Fl. Brit. Ind. 6: 304. 1892.

Erect much-branched undershrubs; branches acutely angled, with a few small prickles; leaves ovate, acuminate, 3-5 × 1-3 cm; petioles decurrent on branchlets with 2 minute deciduous setaceous processes on either side; umbels solitary; peduncles 5-10 mm; pedicels slender, 6-8 mm; bracts lanceolate, acuminate; sepals and petals 3-4 times longer than stamens; berries 6-8 mm diam., black.

Primary and secondary forests, 1000-1500 m; fl. & fr.: May-Oct.; Jarain.

2. **Smilax aspera** L. Sp. Pl. 1028. 1753; Fl. Brit. Ind. 6: 306. 1892.

Subscandent shrubs; branches sparsely prickly; leaves ovate-deltoid or lanceolate, acuminate, 4-15 × 2-9 cm; basal nerves 5-9, often prickly beneath; petioles 1-2 cm; spikes 5-15 cm; umbels sessile; pedicels 2-4 mm; berries 6-8 mm diam., bluish-black.

Primary and secondary forests, 1000-1500 m; fl. & fr.: Sept.-Feb.; Jarain, Jowai.

3. **Smilax ferox** Kunth, Enum. Pl. 5: 251. 1850; Fl. Brit. Ind. 6: 307. 1892. '*Shiahkrot*'.

Stout shrubs, up to 2 m; branches terete; branchlets angled, unarmed; leaves elliptic, ovate or obovate-oblong, cuneate or rounded at base, acute, 5-10 × 2-4 cm; basal nerves 3-5; petioles broad, coriaceous, sheathing for half the length; umbels solitary or binate; peduncles 8-20 mm; bracteoles ovate, acuminate; berries ± 8 mm diam., green-purple.

Secondary forests, bushes and grasslands, 800-1200 m; fl. & fr.: July-Jan.; Jarain-Syndai, Jowai.

4. **Smilax lanceifolia** Roxb. Fl. Ind. 3: 792. 1832; Fl. Brit. Ind. 6: 308. 1892.

Climbing shrubs; branches subterete with very few scattered prickles; leaves orbicular, oblong or lanceolate, subcaudate-acuminate, 10-15 × 3-8 cm; petioles 1-2 cm with obscure sheaths; male umbels subsessile; peduncles 8-15 mm; pedicels filiform, 7-8 mm; bracteoles ovate; female umbels on stout ± 1 cm long peduncles; berries ± 6 mm diam.

Primary and secondary forests in bushes, 500-1500 m; fl. & fr.: Nov.-Mar.; Jarain, Jowai, Rytang.

5. **Smilax perfoliata** Lour. Fl. Cochinch. 622. 1790. *S. ocreata* DC.

Monogr. Phan. 1: 191. 1878. *S. roxburghiana* Hook. f. Fl. Brit. Ind. 6: 311. 1892.

Scandent, prickly shrubs; branches smooth; leaves ovate to ovate-lanceolate, acute at base, acuminate, 12-17 × 5-10 cm; basal nerves 3-5 from above the base; petioles with large auricles and often amplexicaul at base; umbels solitary or 2-3 on 2-6 cm long peduncles; berries ± 8 mm diam.

Shaded places in dense forests, 200-1500 m; fl. & fr.: Jan.-Dec.; Dawki, Garampani, Jarain-Dawki, Jarain-Jowai, Jowai, Raliang, Umjaisaw-Seitsohma.

6. ***Smilax quadrata*** DC. Monogr. Phan. 1: 183. 1878; Fl. Brit. Ind. 6: 308. 1892.

Scandent shrubs; branches unarmed, zig-zag; leaves oblong or elliptic-oblong, rounded at base, broadly cuspidate, 10-15 × 3-7 cm; basal nerves 3; petioles 8-12 mm; umbels solitary or 2-3 on common 10-13 mm long peduncles; pedicels 5-10 mm; female pedicels capillary; male pedicels rigid; berries subglobose, 6-7 mm diam., orange.

Open places in forests and forest edges, 200-1000 m; fl. & fr.: Nov.-Mar.; Jowai.

152. PONTEDERIACEAE

MONOCHORIA C. Presl

Monochoria hastata (L.) Solms in DC. Mon. Phan. 4: 523. 1883. *Pontederia hastata* L. Sp. Pl. 288. 1753. *M. hastaeifolia* Presl. Rel. Haenk. 2: 128. 1835; Fl. Brit. Ind. 6: 362. 1892.

Rhizome branched, creeping; leaves sagittate or hastate with cordate base and divergent basal lobes, acuminate, 7-25 × 5-20 cm; petioles 15-60 cm; sheaths purplish-green at base; inflorescences racemose or sub-umbellate, 4-7 cm; bracts oblong-lanceolate, 3-5 × 1.5-3.0 cm; pedicels 1.5-4.5 cm; perianth-lobes pale blue with green midrib, oblong or obovate, 10-18 × 4-12 mm; filaments white, ± 5 mm; anthers 3-4 mm; capsules ± 1 cm.

Pools, canals and marshy places, 100-500 m; fl. & fr.: Mar.-Dec.; Dawki.

153. XYRIDACEAE

XYRIS L.

- 1a. Dwarf herbs; leaves distinctly ensiform, usually at least some of them about as long as the scapes. ... *X. wallichii*
 1b. Tall herbs; leaves linear, the longest about $\frac{1}{2}$ — $\frac{3}{4}$ the length of scapes. ... *X. schoenoides* 2

1. ***Xyris wallichii*** Kunth, Enum. Pl. 4: 16. 1843; Fl. Brit. Ind. 6: 365. 1892. ...

Slender flaccid tufted herbs, up to 18 cm; leaves ensiform, falcate acuminate or subacute, 7-15 × 0.3-0.5 cm; scapes 10-18 cm, compressed, filiform; heads ovoid to subglobose, 5-8 mm; bracts oblong-ovate, brown with pale midrib; corolla yellow; tube ± 6 mm; lobes ± 5 mm; anthers ± 2 mm, yellow.

Moist shaded rocky cliffs, 1200-1500 m; fl. & fr.: Aug.-Nov.; Jarain, Jowai-Jarain.

2. ***Xyris schoenoides*** Wall. Pl. As. Rar. 3: 30. 1832; Fl. Brit. Ind. 6: 365. 1892.

Perennial tufted herbs, 30-90 cm; leaves linear, acuminate or subacute, 10-35 × 0.2-0.4 cm; scapes 20-90 cm, subcompressed, ribbed, with one distinct wing; heads subglobose or obovoid, keeled at apex, 6-8 × 4-5 mm, reddish-brown; corolla yellow; tube ± 6 mm; lobes ovate to obovate, ± 7 mm; anthers ± 2 mm, yellow.

Marshes and streamsides in open places, 1000-1400 m; fl. & fr.: June-Oct.; Jarain.

154. COMMELINACEAE

- 1a. Inflorescences or partial inflorescences subtended by 1-2, boat-shaped, complicate or cucullate bracts which after anthesis hide the fruits.
 2a. Petals free; 3 stamens fertile with 2-3 staminodes. .. *Commelina* 1
 2b. Petals united into a short or long tube; 6 stamens fertile with no staminodes.
 3a. Cymes enclosed within swollen leaf-sheaths in sessile axillary fascicles; capsules with 3 erect bilobed beaks. ... *Amischophacelus* 2
 3b. Cymes in biseriate imbricating peduncled axillary or terminal spathes; capsules without beaks. .. *Cyanotis* 3
 1b. Inflorescences or partial inflorescences not subtended by such bracts.

- 4a. Inflorescences capitate, perforating and emerging from the persistent leaf-sheaths. ... *Forrestia* 4
- 4b. Inflorescences scorpioid, spicate or paniculate, terminal or exerted from the top of leaf-sheaths.
- 5a. Fruits indehiscent, glossy-blue on maturity. ... *Adisia* 5
- 5b. Fruits loculicidally dehiscent capsules, not blue.
 - 6a. Sepals glandular-hairy; fertile stamens 6; capsules less than 3 mm long. ... *Floscopa* 6
 - 6b. Sepals usually glabrous, rarely puberulous; fertile stamens 2—3, with 0—4 staminodes; capsules 3 mm or longer.
 - 7a. Erect or suberect rather large herbs, with larger leaves; flowers zygomorphic; 3 antisepalous stamens fertile, alternating with 3 (rarely 2, 1 or 0) antipetalous staminodes, rarely one of the antisepalous stamen also transformed into staminode or absent. ... *Ansiloma* 7
 - 7b. Creeping low herbs, mostly with small leaves; flowers actinomorphic; 2 antisepalous and 1 antipetalous stamens fertile, 2 or 3 posterior ones transformed into staminodes or absent. ... *Murdannia* 8

1. COMMELINA L.

- 1a. Spathes funnel-shaped, about as broad as long in natural folded position; margins connate almost to the top.
 - 2a. Leaves elliptic-ovate or suborbicular, obtuse or rounded at apex, 2—8 cm long; spathes 10—15 mm long; seeds ribbed rugose. ... *C. benghalensis* 1
 - 2b. Leaves lanceolate, acute, acuminate or subacute at apex, 5—18 cm long; spathes 2—3 cm long; seeds smooth. ... *C. paludosa* 2
- 1b. Spathes somewhat boat-shaped, 2—6 times longer than broad in natural folded position; margins free or connate at very base only.
 - 3a. Leaves linear or linear-lanceolate, 5—17 × 0.5—1.5 cm; ovary with all cells 1-ovuled each. ... *C. appendiculata* 3
 - 3b. Leaves lanceolate to ovate-lanceolate, 3—10 × 1.0—2.5 cm; ovary with 2 anticus cells 2-ovuled each and the other posticus cell 1-ovuled or obsolete.
 - 4a. Leaves obliquely rounded at base, acute or acuminate at apex; upper branch of cyme 6—12-flowered; seeds pyramidal, narrowed at both ends, rugose, puberulous. ... *C. sikkimensis* 4
 - 4b. Leaves rounded at base, obtuse or subacute at apex; upper branch of cymes 2—4-flowered; seeds cylindric, rounded or truncate at one end, acute at the other end, smooth. ... *C. hasskarlii* 5

1. *Commelina benghalensis* L. Sp. Pl. 41. 1758; Fl. Brit. Ind. 6: 370. 1892.

Scandent or creeping herbs; stems up to 1 m; leaves cuneate or rounded at base, 2-8 × 0.8-3.5 cm; petioles 0-1 cm; sheaths 9-15 mm, densely hairy; spathes 1-3 together, axillary or terminal; peduncles absent or up to 1 cm; flowers blue; capsules pyriform, ± 6 mm; seeds oblong-subcylindric, greyish, closely pitted.

Wastelands, cultivated fields, gardens and forest edges, 100-500 m; fl. & fr.: Apr.-Dec.; Garampani.

2. ***Commelina paludosa*** Bl. Enum. Pl. Java 1: 2. 1827. *C. obliqua* D. Don, Prodr. Fl. Nep. 45. 1825 (*non* Vahl, 1805); Fl. Brit. Ind. 6: 372. 1892.

Creeping, ascending or scandent herbs, up to 3 m long; stems glabrous or pubescent; leaves sessile or subsessile, oblique at base, 5-18 × 1.0-5.5 cm, glabrous or puberulous or viscid hairy; sheaths 1-4 cm, glabrous or pubescent, ciliate or not at mouth; spathes terminal, glabrous or dense hairy; peduncles 0-4 cm; flowers violet or blue or white; capsules 4-5 mm; seeds compressed on one side.

- 1a. Stems stout, 1-3 m long, glabrous; leaves 6-19 × 1.5-5.5 cm, glabrous; sheaths glabrous; spathes glabrous. ... var. *paludosa* 1
 1b. Stems slender, up to 1 m long, pubescent; leaves 3-10 × 1-3 cm, pubescent or puberulous; sheaths long-ciliate at mouth and pubescent outside; spathes ciliate or viscid-hairy. ... var. *viscida* 2

1. var. ***paludosa***

Open places in forests, forest-borders and river-beds, 200-1500 m; fl. & fr.: Jan.-Dec.; Garampani, Jarain, Jowai, Mawryngkneng, Raliang.

2. var. ***viscida*** (Clarke) Rao & Kamm. in Bull. Bot. Surv. Ind. 3: 168. 1961. *C. obliqua* var. *viscida* Clarke in DC. Monogr. Phan. 3: 178. 1881.

Open places near forests and riverbeds, 1200-1600 m; fl. & fr.: June-Dec.; Jowai.

3. ***Commelina appendiculata*** Clarke, Comm. Cyrt. Beng. 13. 1874; Fl. Brit. Ind. 6: 374. 1892.

Erect or procumbent herbs, 0.2-1.0 m, diffusely branched; stems glabrous or pubescent; leaves sessile, narrowed at base, acute, hispid or ciliolate above; sheaths ± 2 cm, glabrous or pubescent, ciliate at margins; spathes solitary, terminal and axillary; peduncles slender, 3-5 cm; flowers blue or white, ± 1.2 cm across in 2-branched cymes; capsules ovoid, ± 7 mm; seeds with conical appendages at both ends, brown-black, smooth.

Open places in grasslands, secondary forests and bushes, 200-1000 m; fl. & fr.: Apr.-Dec.; Rytiang.

4. **Commelina sikkimensis** Clarke, Comm. Cyrt. Beng. 13. t. 6. 1874; Fl. Brit. Ind. 6: 369. 1892.

Creeping or subscandent herbs, 1-3 m; leaves sessile, glabrous or scaberulous above; sheaths 17-20 mm, glabrous or hirsute, ciliate at mouth; spathes few, solitary, terminal or axillary, ovate-lanceolate, cordate with rounded lobes at base, acuminate at apex; peduncles 2-3 cm; flowers \pm 1.5 cm across, blue; capsules oblong, narrowed at both ends.

Moist sandy soil, near streams and river beds in open places, 1300-1600 m; fl. & fr.: Apr.-Dec.; Raliang.

5. **Commelina hasskarlii** Clarke, Comm. Cyrt. Beng. 13. t. 3. 1874; Fl. Brit. Ind. 6: 370. 1892.

Erect or suberect creeping ascending herbs; stems much-branched; scabrid or glabrate; leaves sessile, narrowly lanceolate, 3-8 \times 1-2 cm; sheaths broad at base, \pm 1 cm, glabrous or sparsely ciliate at mouth; peduncles axillary, 10-25 mm; spathes cordate, complicate, 1.5-2.5 cm, glabrous, scabrid or hispid; cymes pubescent; petals bluish-purple; capsules quadrate, apiculate; seeds cylindrical-conic, smooth.

Grasslands, roadsides and wastelands, in open places, 100-1000 m; fl. & fr.: Apr.-Nov.; Dawki.

2. AMISCHOPHACELUS R. S. Rao & Kamm.

Amischophacelus axillaris (L.) Rao & Kamm. in J. Linn. Soc. Bot. 59: 306. 1966. *Commelina axillaris* L. Sp. Pl. 42. 1753. *Cyanotis axillaris* (L.) J. A. & J. H. Schult. in Roem. & Schult. Syst. Veg. 7(2): 1154. 1830; Fl. Brit. Ind. 6: 388. 1892.

Ascending or creeping herbs, 10-80 cm; stems somewhat fleshy, much-branched; leaves oblong-lanceolate to linear-lanceolate, acute, 4-15 \times 0.3-1.2 cm; sheaths 6-10 mm, swollen at base enclosing cymes; flowers blue or pale pink, only tips emerging from sheaths; capsules ellipsoid, \pm 6 mm, with 3 erect bilobed pubescent beaks; seeds scrobiculate, dark brown.

Open places in paddy fields, streamsides and marshy places and ditches, 100-800 m; fl. & fr.: Aug.-Feb.; Sonapur.

3. CYANOTIS D. Don *nom. cons.*

Cyanotis vaga (Lour.) J. A. & J. H. Schult. in Roem. & Schult. Syst.

Veg. 7(2): 1153. 1830; Fl. Brit. Ind. 6: 385. 1892. *Tradescantia vaga* Lour. Fl. Cochinch. 1: 193. 1790. *C. barbata* D. Don, Prodr. Fl. Nep. 46. 1825; Fl. Brit. Ind. 6: 385. 1892. 'Shburtlo'.

Bulbs ovoid, 1.5-2.0 cm, pink-brown outside, brownish-white inside; stems 10-100 cm, ascending, pinkish; radical leaves 3-5, 12-30 × 0.4-0.8 cm, sparsely hairy; cauline leaves 5-18 × 0.4-1.5 cm; sheaths 2.0-3.5 cm, hairy; inflorescences axillary, and terminal, 1-3 cm; peduncles 0-7 cm; spathes purplish-green, with cobwebby indumentum; flowers blue; capsules subquadrate, hairy at top; seeds pitted, greyish-brown.

Wastelands, roadsides and grasslands in open places, 200-1600 m; fl. & fr.: June-Dec.; Garampani, Jowai, Nartiang, Syndai.

4. FORRESTIA A. Rich.

Forrestia mollissima (Bl.) Kds. Exkursionfl. Java. 1: 282. 1911. *Campelia mollissima* Bl. Enum. Pl. 1: 7. 1827. *F. mollis* Hassk. in Flora 68. 1864; Fl. Brit. Ind. 6: 383. 1892.

Stems erect, rooting at basal nodes, 0.5-3.0 m, 5-15 mm thick; internodes 3-8 cm; leaves elliptic to obovate-oblong, long-filiform, 15-36 × 3-12 cm, hairy along nerves beneath; sheaths tubular, hairy; flowers 6-12 together in subsessile capitate cymes arising from split base of leaf sheaths; petals white or pale violet; capsules ellipsoid, 10-18 mm, pinkish-red to purple.

Shaded moist places in forests, 200-1000 m; fl. & fr.: Mar.-Dec.; Rytiang.

5. ACLISIA E. Mey.

Aclisia secundiflora (Bl.) Bakh. f. in Backer, Fl. Java 3: 658. 1968. *Commelina secundiflora* Bl. Enum. Pl. 1: 5. 1827. *A. sorzogonensis* E. Mey. in Presl, Rel. Haenk. 1: 138. t. 25. 1827. *Pollia sorzogonensis* (E. Mey.) Endl. Gen. 1029. 1840; Fl. Brit. Ind. 6: 367. 1892.

Stems up to 1.2 m, creeping and rooting at base, viscid-hairy; leaves lanceolate to oblong-lanceolate, cuncate at base, caudate-acuminate; petioles up to 3 mm; sheaths 2-4 × 0.3-1.0 cm, hairy; panicles ovoid, hairy; branches alternate or subopposite; bracts oblong, persistent; petals white or pale pink; fruits 6-7 mm diam., glossy blue.

Shaded moist places in forests, 100-1000 m; fl. & fr.: Jan.-Dec.; Dawki.

6. *FLOSCOPA* Lour.

Floscopa scandens Lour. Fl. Cochinch. 193. 1790; Fl. Brit. Ind. 6: 390. 1892.

Stems up to 2 m, 2-5 mm thick; creeping at base with ascending-erect extremities, often pinkish green; internodes 4-8 cm; leaves sessile, elliptic-lanceolate, cuneate at base, acuminate, 5-15 × 2.0-3.5 cm; sheaths 1.0-2.5 × 0.4-0.8 cm; inflorescences axillary or terminal, pyramidal; panicles 5-15 cm; peduncles and branches densely hairy; petals white, pink or lilac; capsules suborbicular-ellipsoid, compressed, ± 3 mm, loculicidal.

Shaded moist places, 1000-1500 m; fl. & fr.: June-Dec.; Jarain.

7. *ANEILEMA* R. Br.

Aneilema scaberrima (Bl.) Kunth, Enum. Pl. 4: 69. 1843; Fl. Brit. Ind. 6: 382. 1892. *Commelina scaberrima* Bl. Enum. Pl. Jav. 1: 4. 1827.

Erect or trailing herbs, up to 3 m, often rooting at lower nodes; leaves sessile, lanceolate to oblong-lanceolate, rounded or acute at base, acuminate, 7-17 × 1.5-5.0 cm; sheaths 1.5-4.0 cm, hispid; panicles terminal and in upper leaf axils; petals oblong or obovate, clawed, pinkish-white to blue-purple; capsules subtrigonus, pale yellow.

Shaded places in forests, 500-1200 m; fl. & fr.: July-Dec.; Jowai, Pdengsakab.

8. *MURDANNIA* Royle *nom. cons.*

- | | |
|---|-----------------------|
| 1a. Pedicels medianly jointed once; flowers 1-4, fascicled in axils of consecutive leaves; seeds in each cell. ... | <i>M. blumei</i> 1 |
| 1b. Pedicels not jointed; flowers in peduncled panicles; seeds 1-seriate in each cell. | |
| 2a. Radical leaves few to many; capsules 2-seeded. | |
| 3a. Stem solitary, erect, from the centre of the radical leaves and being enclosed at base within their sheaths; fertile stamens 3; staminodes 3. ... | <i>M. gigantea</i> 2 |
| 3b. Stems 4-8 or more from axils of radical leaves; fertile stamens 2; staminodes 4. ... | <i>M. simplex</i> 3 |
| 2b. Radical leaves absent, or if present early disappearing; capsules 3-5-seeded. | |
| 4a. Stout herbs; stems 2-5 mm thick; flowers 12-15 mm across; fertile stamens 3; staminodes 3; capsules 8-11 mm. ... | <i>M. divergens</i> 4 |
| 4b. Slender herbs; stems filiform, ± 1 mm thick; flowers ± 6 mm across; fertile stamens 2; staminodes 4; capsules 3-5 mm. ... | <i>M. nudiflora</i> 5 |

1. **Murdannia blumei** (Hassk.) Brenan in Hook. Ic. Pl. t. 3578. 1962. *Dichaespermum blumei* Hassk. Comm. Ind. 41. 1870. *Ancilema hamiltonianum* Clarke in DC. Mon. Phan. 3: 213. 1881; Fl. Brit. Ind. 6: 380. 1892.

Stems 15-40 cm, diffusely spreading; leaves linear-lanceolate or narrowly ovate-lanceolate, amplexicaul at base, acute at apex, 4-8 × 1.0-1.5 cm; sheaths 5-7 mm, ciliate at mouth; flowers in axillary and terminal fascicles; pedicels 4-6 mm, erect; petals white or pink; capsules oblong, ± 6 mm; seeds black, scabrid.

Swampy paddy fields, pools and streamsides, 100-1000 m; fl. & fr.: May-Nov.; Sonapur.

2. **Murdannia gigantea** (Vahl) Bruck. in Engler & Prantl, Pflanzenfam. ed. 2. 15a: 173. 1930. *Commelina gigantea* Vahl, Enum. 2: 177. 1806. *Ancilema giganteum* (Vahl) R. Br. Prodr. 271. 1810; Fl. Brit. Ind. 6: 379. 1892.

Erect herbs, 0.3-1.0 m; radical leaves few, linear, acuminate, 20-40 × 0.5-1.0 cm; cauline leaves gradually smaller upwards; sheaths 2-3 cm, glabrous; panicles terminal, stout, sparingly branched; pedicels ± 7 mm; bracteoles caducous; petals blue-violet; filaments bearded; capsules ellipsoid-mucronate, 8-10 mm; seeds dark brown, flocculent.

Marshy places and open grasslands, 800-1400 m; fl. & fr.: May-Dec.; Jowai-Jarain, Pdengsakab, near Jarain.

3. **Murdannia simplex** (Vahl) Brenan in Kew Bull. 1952: 186. 1952. *Commelina simplex* Vahl, Enum. Pl. 2: 177. 1806. *C. sinica* Roem. & Schult. Syst. Veg. 1: 376. 1817. *Ancilema sinicum* (Roem. & Schult.) Lindl. in Edw. Bot. Reg. 8: t. 659. 1822; Fl. Brit. Ind. 6: 379. 1892.

Perennial decumbent herbs; branches 4-6, arising from axils of radical leaves; radical leaves linear, 20-50 × 0.5-1.3 cm; cauline leaves 7-10 × 1.0-1.5 cm; sheaths with long white hairs above; panicles terminal; pedicels 5-7 mm; petals pink-purple; capsules ellipsoid-subglobose, 5-7 mm, red-purple; seeds subcylindric, white or pale brown.

Marshy and drier places, near forests and roadsides, 1000-1600 m; fl. & fr.: May-Nov.; Jowai, Raliang.

4. **Murdannia divergens** (Clarke) Bruck. in Engler & Prantl, Pflanzenfam. ed. 2. 15a: 173. 1930. *Ancilema divergens* Clarke, Comm. Cyrt. Beng. t. 16. 1874; Fl. Brit. Ind. 6: 376. 1892.

Perennial erect stout herbs, 0.3-1.0 m; leaves linear to narrow lanceolate, acute, 10-25 × 1-2 cm; sheaths 2-4 cm, viscid-hairy; panicles termi-

nal, much-branched; petals oblong, pinkish-blue; filaments bearded with pink hairs; capsules ellipsoid, subtrigonus, mucronate, seeds greyish-brown.

Open grasslands and waste places in fairly dry localities, 500 - 1200 m; fl. & fr.: June-Dec.; Ioksi.

5. **Murdannia nudiflora** (L.) Brenan in Kew Bull. 1952; 189. 1952. *Commelina nudiflora* L. Sp. Pl. 4. 1753, p. p. *Ancilema nudiflorum* (L.) R. Br. Prodr. 271. 1810; Fl. Brit. Ind. 6: 378. 1892.

Slender diffuse herbs; branches 10 - 50 cm, decumbent, rooting at base; leaves narrowly linear-lanceolate to ovate-lanceolate, 2 - 10 x 0.3 - 0.8 cm; sheaths 5 - 10 mm, hairy on margins or above; panicles terminal and also in upper leaf axils; flowers 2 - 12 on each cyme; pedicels 4 - 5 mm; petals white-pink or purple; filaments bearded; capsules subglobose, mucronate; seeds brown, rugose.

Marshy and other wet places in open, 100 - 1000 m; fl. & fr.: June-Dec.; Dawki, Ioksi.

155. JUNCACEAE

- | | | |
|---|-----|-----------------|
| 1a. Leaves sparsely long-ciliate; fruits 3- or fewer-seeded; placentas basal. | ... | <i>Luzula</i> 1 |
| 1b. Leaves glabrous; fruits many-seeded; placentas parietal. | ... | <i>Juncus</i> 2 |

1. LUZULA DC. *nom. cons.*

Luzula campestris (L.) DC. Fl. France 3: 161. 1805; Fl. Brit. Ind. 6: 401. 1892. *Juncus campestris* L. Sp. Pl. 329. 1753.

Perennial stoloniferous herbs; stems erect or ascending, 15 - 45 cm; lower leaves crowded at base, upper few diminishing in size, linear, rounded or obtuse, 3 - 15 x 0.3 - 0.6 cm, sparsely long-ciliate; flowers sessile, in dense capitate clusters collected at apex into short dense or lax 1 - 5 cm long umbellate inflorescences; capsules ovoid, 1.5 - 2.0 mm; seeds brown, faintly reticulate-ribbed.

Grasslands, sandy streamsides and pine forests, 1400 - 1800 m; fl. & fr.: Apr.-Nov.; Jowai.

2. JUNCUS L.

- | | | |
|---|-----|----------------------------|
| 1a. Inflorescences solitary, pseudo-lateral, many-flowered cymose; spathe continuous with stem. | ... | <i>J. effusus</i> 1 |
| 1b. Inflorescences terminal, lax corymbose heads; spathe not continuous with stem. | ... | <i>J. prismatocarpus</i> 2 |

1. **Juncus effusus** L. Sp. Pl. 326. 1753; Fl. Brit. Ind. 6: 392. 1892.

Erect perennial rhizomatous herbs, 40-120 cm; stem ribbed when dry, with dark brown closely embracing basal sheaths; cymes 1.5-5.5 cm; spathes of inflorescence acute, 15-20 cm; flowers partly sessile and partly stalked, up to 8 mm; floral bracts 2, ovate; capsules oblong, faintly reticulate.

Marshy places and ditches in grasslands, streamsides and river banks, 1200-1700 m; fl. & fr.: Apr.-Dec.; Jarain, Jowai.

2. **Juncus prismatocarpus** R. Br. Prodr. 259. 1810; Fl. Brit. Ind. 6: 395. 1892.

Perennial herbs; stems tufted, 15-80 cm; leaves linear, terete or compressed, septate within, 5-25 × 0.1-0.3 cm; auricles 2, oblong; inflorescences made up of 5-10 many-flowered sessile or stalked heads; peduncles 0-5 cm; flowers sessile; capsules pale brown, acutely angled; seeds elliptic-oblong, acute or apiculate at apex, yellow.

Marshy places and ditches in grasslands and streamsides, 1000-1500 m; fl. & fr.: Apr.-Dec.; Jarain.

156. ARECACEAE

1a. Leaves palmatisect or partite.	...	<i>Licuala</i> 1
1b. Leaves pinnatisect.		
2a. Usually much-spiny climbers.		
3a. Monocarpic; flagellum absent; inflorescence terminating stem-apex.	...	<i>Plectocomia</i> 2
3b. Polycarpic; flagellum often present; inflorescence inserted on leaf-sheaths.	...	<i>Calamus</i> 3
2b. Erect shrubby or arborescent, devoid of spines or rarely with few spines.		
4a. Leaflets sinuately lobed and toothed, white beneath.	...	<i>Wallichia</i> 4
4b. Leaflets not lobed, entire, green beneath.		
5a. Lower leaflets not modified into spines; spadices infrafoliar; ovary 1, undivided.	...	<i>Pinanga</i> 5
5b. Lower leaflets modified into spines; spadices interfoliar; ovaries 3, free.	...	<i>Phoenix</i> 6

1. LICUALA Thunb.

Licuala peltata Roxb. Fl. Ind. 2: 179. 1832; Fl. Brit. Ind. 6: 430. 1892.

Stems annulate, 1.5-4.5 m, 5-10 cm thick; petioles margined with stout 5-7 mm long spines; leaves peltate-orbicular, radiately multi-partite, 1.2-1.8 m diam.; lobes 12-30, truncate or bicrenate at apex; peduncles

spiny; spadices erect; spikes 3-5, 15-20 cm; spathes tubular, 20-30 cm; fruits obovoid, apiculate, $\pm 1.5 \times 1.0$ cm, orange-red.

Primary forests, 100-500 m; fl. & fr.: Jan.-June; Dawki.

2. PLECTOCOMIA Bl.

Plectocomia khasyana Griff. in Calc. J. Nat. Hist. 5: 106. 1845; Fl. Brit. Ind. 6: 478. 1893.

Stems 18-25 m, ± 10 cm thick, spreading; leaves up to 3 m; leaflets lanceolate or elliptic-lanceolate, subfalcate, whitish beneath, spinulose at margins, 40-60 \times 6-8 cm, 3-costate; rachis with digitate spines beneath; male spikes 40-60 cm, pendulous; rachillae, 2.0-2.5 cm; spathes oblong, acute, 5-6 cm, greyish-hairy; fruits globose, apiculate, ± 2.5 cm; scales with recurved fimbriate tips.

Primary forests, 100-1000 m; fl. & fr.: Feb.-July; Jarain, Syndai.

3. CALAMUS L.

- | | | |
|---|-----|----------------------------|
| 1a. Leaf-rachis produced into a long clawed cirrus; sheaths not flagelliferous. | ... | <i>C. latifolius</i> 1 |
| 1b. Leaf-rachis not cirriferous; sheaths flagelliferous. | | |
| 2a. Leaflets 1-costate. | ... | <i>C. erectus</i> 2 |
| 2b. Leaflets 3-7-costate. | | |
| 3a. Leaflets usually fascicled in groups on each node of the rachis with long vacant spaces in between. | ... | <i>C. floribundus</i> 3 |
| 3b. Leaflets scattered on each side of the rachis. | | |
| 4a. Leaflets narrowly lanceolate-elliptic, inequidistant; costae 5-7; largest leaflets 25-45 \times 4-6 cm; fruits ± 20 mm long, brown. | ... | <i>C. acanthospathus</i> 4 |
| 4b. Leaflets linear-ensiform, equidistant; costae 3; largest leaflets 15-35 \times 1-2 cm; fruits 7-11 mm, yellowish. | | <i>C. leptospathus</i> 5 |

1. **Calamus latifolius** Roxb. Fl. Ind. 3: 775. 1832; Fl. Brit. Ind. 6: 455. 1893.

Scandent shrubs; stems ± 3 cm thick; leaves 2.0-2.5 m, terminating in up to 1 m long pinniferous part with whorled 2-3 cm long flat spines; petioles 10-20 cm, spinulose at margins; rachis clawed beneath; leaflets inequidistant, 14-15 pairs, lanceolate to elliptic-lanceolate, 30-35 \times 6-8 cm, 5-7-costate; female spadix terminating in a tail-like appendix.

Primary forests, 100-1200 m; fl. & fr.: Mar.-Oct.; Dawki, Jarain, Narpuh Reserve.

2. **Calamus erectus** Roxb. Fl. Ind. 3: 774. 1832; Fl. Brit. Ind. 6: 438. 1892.

Erect tufted, 4-5 m; stems 2-4 cm thick; leaves 3-5 m; sheaths with long flat spines; ochrea split into 2 oblong auricles, 5-7 cm, deciduous; petiolar spines flat, in whorls or half-whorls, 2-3 cm; leaflets equidistant, 5-7 cm apart, ensiform or narrowly lanceolate, spinulose-margined; 60-75 × 3-4 cm; costa bristly on both surfaces; male spadix ± 1 m or more long, often produced into flagelliform appendix; fruits ellipsoid, 2.5-3.5 × 2.0-2.5 cm, yellowish-red.

Primary forests, 100-1000 m; fl. & fr.: Jan.-Dec.; Sohka-Dawki, Syndai.

3. **Calamus floribundus** Griff. in Calc. J. Nat. Hist. 5: 56. 1845; Fl. Brit. Ind. 6: 444. 1892. 'Ryshang'.

Scandent; stems 3-6 m, 2.0-2.5 cm thick; leaves 0.6-1.0 m; sheaths with dark brown 2-3 cm long spines; flagellae sometimes present, elongate, irregularly clawed; ochreae 10-15 mm, bristly; petioles, rachis and lower spathes with short and long scattered and flattened spines; leaflets inequidistant, in remote fascicles of 2-3, narrowly lanceolate, 50 × 3.5 cm; costae 3-5, bristly; male spadix 1.5-2.5 m, with spinescent flagellum; fruits subglobose, ± 1 cm, pale brownish-yellow.

Primary forests, 100-1000 m; fl. & fr.: Mar.-Oct.; Rytiang, Sohka-Dawki, Syndai.

4. **Calamus acanthospathus** Griff. in Calc. J. Nat. Hist. 5: 39. 1845; Fl. Brit. Ind. 6: 448. 1892.

Subscandent; stems 3-5 cm thick; leaves up to 1.5 m; sheaths almost woody, obliquely truncate with short broad-based spines, often reduced to tubercles; petioles 6-10 cm, prickly above and on margins; rachis prickly in middle; leaflets inequidistant; male spadix ± 3 m, terminating in long flagellum; female spadices 1.5-2.0 m; fruits broadly ovoid, ± 2.0 × 1.5 cm, brown.

Primary forests, in shaded places, 500-1500 m; fl. & fr.: Mar.-Feb.; Jarain, Jowai, Syndai.

5. **Calamus leptospadix** Griff. in Calc. J. Nat. Hist. 5: 49. 1845; Fl. Brit. Ind. 6: 441. 1892.

Scandent; stems 1.2-1.5 cm; leaves 0.5-1.0 cm; sheaths, petioles and rachis scurfy-ferruginous; sheaths with flat solitary or aggregated spines and flattened clawed flagellum; costae closely bristly; male spadix slender,

produced into filiform flagellum; fruits subglobose, yellowish with reddish-brown patches.

Primary forests, in shaded places, 100 - 1000 m; fl. & fr.: Apr.-Nov.; Khleihriat-Sonapur, Syndai.

4. WALLICHA Roxb.

Wallichia densiflora Mart. Hist. Nat. Palm. 3: 190. 1838; Fl. Brit. Ind. 6: 419. 1892.

Erect, stems up to 5 m; leaves pinnatisect, 2.5 - 3.0 m; sheaths villous, ultimately fibrous; leaflets alternate or lower 2-4-nate, oblong or linear-oblong, sinuately lobed, acutely toothed, 30 - 60 cm, white beneath; spadices peduncled, interfoliar, 3.0 - 4.5 cm, branched; spathes tubular, purple; male flowers yellow; female flowers purplish; fruits ovoid, \pm 1.2 cm, dull purple.

Primary forests, 200 - 1400 m; fl. & fr.: Jan.-Dec.; Dawki, Sutnga, Syndai.

5. PINANGA Bl.

Pinanga gracilis (Roxb.) Bl. in Rumphia 2: 77. 1839; Fl. Brit. Ind. 6: 407. 1892. *Areca gracilis* Roxb. Fl. Ind. 3: 619. 1832. '*Lypiat*'.

Stems 2 - 6 m, 5 - 20 mm thick; leaves sparingly pinnate, \pm 1 m; petioles and sheaths scurfy; leaflets sessile, 25 - 40 \times 2 - 0 cm; spadices simple or bearing 2 - 6 reflexed branches; spathes bifid, \pm 12 cm; fruits ellipsoid, \pm 1.2 cm, smooth, scarlet or orange-red.

Primary forests, 100 - 1000 m; fl. & fr.: Jan.-Dec.; Jarain, Lumshong, Syndai.

6. PHOENIX L.

Phoenix humilis Royle, Ill. Bot. Hirmal. 10: 399. 1839; Fl. Brit. Ind. 6: 426. 1892. '*Satlat*'.

Stem short, up to 25 cm high, tufted, rarely elongate, up to 25 cm thick; leaves 1 - 2 m, subglaucous; petioles \pm 2.5 cm broad at base; lower leaflets spiny, \pm 10 cm; upper scattered and interruptedly fascicled, linear, 20 - 50 \times 0.6 - 1.5 cm; spathes 16 - 20 cm, fringed at margins; fruiting spadices on 1.0 - 1.5 cm long flattened peduncles; branches slender, up to 20 cm; fruits ovoid, 1.2 - 1.5 cm, orange-red.

Open places in grasslands and pine forests, 1200-1600 m; fl. & fr.: Apr.-Dec.; Jowai, Khongsong-Raliang, Raliang, Shangpung.

157. PANDANACEAE

PANDANUS Parkins

- 1a. Low shrubs, up to 2 m high; spathes pale yellow; flowers with offensive smell; carpels not connate. ... *P. foetidus* 1
 1b. Arborescent, 2-4 m high; spathes white; flowers sweet-scented; carpels connate in groups. ... *P. odoratissimus* 2

1. **Pandanus foetidus** Roxb. Fl. Ind. 3: 742. 1832; Fl. Brit. Ind. 6: 483. 1893.

Branched bushy shrubs; leaves 70-130 × 1.0-3.5 cm; marginal spinules distant, recurved at lower part, ascending above; flowers with highly offensive smell; male spadices 3-4 cm, many on a branched, peduncle, enclosed in spinulose spathe; female spadices solitary, terminal; spathes leafy; fruits oblong or subglobose, 4-10 cm, echinate with thorny persistent stigmas.

Primary forests, in shaded and partially sunny moist places, 100-1000 m; fl. & fr.: June-Jan.; Dawki, Sohka-Dawki.

2. **Pandanus odoratissimus** L. f. Suppl. 64. 1781; Stone in Gard. Bull. Sing. 22: 236. 1967. *P. fascicularis* Lamk. Encycl. 1: 372. 1783; Fl. Brit. Ind. 6: 485. 1893.

Shrubs or small trees; leaves gradually tapering, 60-200 × 8-9 cm; marginal spinules small and ascending, those of keel pointing one way or other; male spadices many, pendulous; 25-60 cm; stamens many, with connate filaments; female spadices solitary, terminal; fruits ovoid, 15-25 cm, orange-yellow; drupes obconic, rounded with subulate persistent style at apex, 2.5-4.5 cm.

Primary and secondary forests, 100-1500 m; fl. & fr.: Mar.-Dec.; Jowai.

158. SPARGANIACEAE

SPARGANIUM L.

Sparganium angustifolium Michx. Fl. Bor. Amer. 2: 189. 1808;
S. simplex Huds. Fl. Angl. 2: 401. 1778, *p. p.*; Fl. Brit. Ind. 6: 490. 1893.

Rhizomes creeping, 3-4 mm thick; stems zig-zag in flowering part; leaves erect, spongy, linear, obtuse, 50-100×0.5-1.5 cm; male flowers in clusters of 3-20; heads 5-8 mm diam., spicate or in racemes; female flowers basal on inflorescences in clusters of 2-5; heads sessile or with 2.0-2.5 mm long stalk, indehiscent.

Marshy places near forests and streams, 1500-1700 m; fl. & fr.: Apr.-Nov.; Jowai.

159. ARACEAE

- 1a. Plants climbing on trees or creeping on rocks with stout long fibrous stems.
 - 2a. Petioles winged; spathe up to 2 cm long; spadix stipitate, subglobose or ellipsoid, up to 1 cm. ... *Pothos* 1
 - 2b. Petioles not winged; spathe more than 4 cm long; spadix sessile, elongate-subcylindric, more than 4 cm. ... *Rhaphidophora* 2
- 1b. Plants not climbing and without long stem.
 - 3a. Plants prickly. ... *Lasia* 3
 - 3b. Plants not prickly.
 - 4a. Leaves pedately or pinnately partite or compound.
 - 5a. Leaves 3-sect and again pinnatisect; flowers and leaves appearing at different times. ... *Amorphophalus* 4
 - 5b. Leaves pedately lobed or palmately compound; flowers and leaves appearing together. ... *Arisaema* 5
 - 4b. Leaves simple, entire or lobed only at base.
 - 6a. Leaves linear-lanceolate; spathe absent; spadix sessile. ... *Acorus* 6
 - 6b. Leaves otherwise; spathe present; spadix on peduncles.
 - 7a. Spadix terminated by a sterile appendage.
 - 8a. Caudex present particularly in adult plants; leaves not peltate; ovules basal, 1-2 in each cell. ... *Alocasia* 7
 - 8b. Caudex absent; leaves peltate; ovules parietal, many in each cell. ... *Colocasia* 8
 - 7b. Spadix not with a sterile appendage.
 - 9a. Rhizomatous herbs. ... *Stendnera* 9
 - 9b. Tuberous herbs.
 - 10a. Leaves lanceolate, more than twice as long as broad; spathe fully convolute; ovules basal. ... *Gonatanthus* 10
 - 10b. Leaves broadly ovate-oblong or suborbicular, twice or less as long as broad; spathe spread out at least partially; ovules parietal. ... *Remusatia* 11

1. POTHOS L.

Pothos scandens L. Sp. Pl. 968. 1753; Fl. Brit. Ind. 6: 551. 1898.

Stems creeping, 0.5-2.0 cm thick; leaves elliptic, ovate or oblong 15-100 × 5-28 mm; petioles oblanceolate, narrowed at base, obtuse, 5-100 × 3-20 mm; peduncles sheathed, 5-10 mm; sheaths imbricate, ovate, acute, 3-5 mm; spathe cuspidate, 4-6 × 3-4 mm; spadix subglobose, ellipsoid-obovoid, 4-5 mm, yellow; berries oblong 12-16 mm, scarlet.

Primary forests, 100-1500 m; fl. & fr.: Feb.-Oct.; Jarain, Jarain-Jowai.

2. RHAPHIDOPHORA Hassk.

- | | | |
|--|-----|-------------------------|
| 1a. Leaves entire. | ... | <i>R. calophyllum</i> 1 |
| 1b. Leaves pinnatifid. | | |
| 2a. Leaves elliptic-ovate, up to 30 cm long, divided up to 2 cm away from midrib; pistil truncate; stigma sessile. | ... | <i>R. glauca</i> 2 |
| 2b. Leaves oblong, more than 35 cm long, divided almost to the costa; pistil conoid; stigma elevated. | | |
| 3a. Spathe purplish-brown. | ... | <i>R. affinis</i> 3 |
| 3b. Spathe yellow or creamy-yellow. | | |
| 4a. Leaves drying black; lobes with 1-3 prominent costae. | ... | <i>R. decursiva</i> 4 |
| 4b. Leaves drying brown; lobes of leaves with only 1 prominent costa. | ... | <i>R. grandis</i> 5 |

1. **Rhaphidophora calophyllum** Schott, Prodr. 380. 1860; *R. lancifolia* Schott, Prodr. 380. 1860; Fl. Brit. Ind. 6: 545. 1893. *R. schottii* Hook. f. Fl. Brit. Ind. 6: 544. 1893. '*La-padong-rit*'.

Stems 6-8 mm thick; leaves lanceolate or falcately lanceolate, oblique at base, cuspidately acuminate, 15-25 × 4-8 cm; all nerves uniformly distinct; petioles 8-20 cm; peduncles 3-5 cm, elongating up to 10 cm in fruits; spathes ovate, beaked, 8-11 × 4-6 cm, orange outside, dark red inside; spadix 5-6 cm, elongating up to 10 cm; stigma raised, pulvinate.

Primary moist forests, 1000-1500 m; fl. & fr.: Aug.-Mar.; Jarain, Jarain-Dawki, Jowai, Jowai-Jarain.

2. **Rhaphidophora glauca** (Wall.) Schott in Bonpl. 5: 45. 1857 et Prodr. 382. 1860; Fl. Brit. Ind. 6: 547. 1893. *Pothos glaucus* Wall. Pl. As. Rar. 2: 45. t. 156. 1831.

Stems stout, 1-3 cm thick; leaves oblique, 12-30 × 9-20 cm, lobes 3-5, unequal, falcately linear-lanceolate, narrowed at base, caudate-acuminate; primary lateral nerves 2-many; peduncles 8-16 cm; spathes ovate-oblong or oblong-lanceolate, 10-14 × 3-5 cm, with 6-10 × 1.5-2.0 cm pale yellow.

Primary forests, 1400-1600 m; fl. & fr.: July-Mar.; Raliang.

3. **Rhaphidophora affinis** Schott in Bonpl. 5: 45. 1857 et Prodr. 385. 1860; Fl. Brit. Ind. 6: 548. 1893.

Stout climbers; stems 3-4 cm thick; leaves ovate-oblong, subcordate at base, 50-100 cm; lobes 10-20, lanceolate, truncate or obliquely acuminate, unicostate, 2-4 cm broad; petioles 35-50 cm; peduncles 10-15 cm; spathes oblong, acuminate, 12-15 cm, purplish-brown outside, pale yellow inside; spadix cylindrical, obtuse, $\pm 10 \times 3$ cm; seeds ellipsoid, glabrous or glandular-verrucose.

Primary forests, 1400-1600 m; fl. & fr.: July-Mar.; Raliang.

4. **Rhaphidophora decursiva** (Roxb.) Schott in Bonpl. 5: 45. 1857; Fl. Brit. Ind. 6: 547. 1893. *Pothos decursiva* Roxb. Fl. Ind. 1: 456. 1820.

Stems stout, 2-3 cm thick; leaves oblong, 30-90 cm, glaucous beneath; lobes 5-15, unequal, falcately ensiform, acuminate, 15-30 \times 3-8 cm; primary nerves 1-3; petioles stout, 15-30 cm; peduncles 8-15 \times 1.0-1.5 cm; spathes oblong-obovate, beaked, 12-18 \times 8-10 cm, creamy-yellow, subcoriaceous; spadix 8-15 \times 2-3 cm; drupes yellow.

Primary forests, 1000-1500 m; fl. & fr.: July-Mar.; Jarain-Jowai.

5. **Rhaphidophora grandis** Schott in Ost. Bot. Zeitschr. 349. 1858. *R. eximia* Hook. f. Fl. Brit. Ind. 6: 547. 1893, *p.p.*

Stems 5-9 cm thick; leaves oblong-ovate, subcordate at base, acute, 50-75 \times 35-45 cm; lobes 14-17, linear falcately acuminate, 20-25 \times 3-5 cm; peduncles 12-16 \times 1-2 cm; spathes oblong, cuspidate, 20-25 cm, pale yellowish-white and turning to yellow outside, white inside; spadix 10-15 \times 1-2 cm; berries orange-yellow.

Primary forests, 100-1000 m; fl. & fr.: June-Feb.; Sohka-Dawki.

3. LASIA LOUR.

Lasia spinosa (L.) Thw. Enum. Pl. Zeyl. 336. 1864. *Dracontium spinosum* L. Sp. Pl. 967. 1753. *L. heterophylla* Schott, Melet. 1: 21. 1832; Fl. Brit. Ind. 6: 550. 1893.

Rhizomes 2-3 cm thick, branched; petioles, leaf-nerves and peduncles all prickly; petioles 40-100 cm; leaves hastate-sagittate with broad and narrow basal lobes, deeply pedately pinnatifid, 20-60 cm diam.; peduncles 30-50 cm; spathes convolute, 14-40 cm; spadix sessile, cylindrical, 2-5 cm, scarlet; berries obovoid, hexagonal, warted-muricate.

Swamps, ditches and riverbanks, 100-500 m; fl. & fr.: Jan.-Nov.; Dawki.

4. AMORPHOPHALLUS Bl. *nom. cons.*

Amorphophallus bulbifer (Roxb.) Bl. in Rumphia 1: 148. 1835; Fl. Brit. Ind. 6: 515. 1893. *Arum bulbiferum* Roxb. Fl. Ind. 3: 510. 1832.

Tubers depressed-globose, 5-20 cm; leaves solitary, many-lobed, each lobe pinnatifid into obovate or lanceolate 5-15 cm long segments; petioles 30-120 cm, greenish to pink with deep green stripes; peduncles 15-30 cm, coloured like petiole; base of spathe tubular; limb 8-30 × 5-22 cm, pinkish-green, mottled outside with pink, inside orange; spadix sessile; appendage of spadix oblong-conoid, rounded at apex, 4-12 × 2.0-3.5 cm white or creamy.

Shaded moist places in forests and near villages, often cultivated; 100-1000 m; fl. & fr.: May-Nov.; Garampani.

Tubers edible.

5. ARISAEMA Mart.

- | | | |
|--------------------------------|-----|---------------------------|
| 1a. Leaves pedately compound. | ... | <i>A. tortuosum</i> 1 |
| 1b. Leaves palmately compound. | | |
| 2a. Leaflets 3. | ... | <i>A. petiolulatum</i> 2 |
| 2b. Leaflets 8 or more. | ... | <i>A. consanguineum</i> 3 |

1. **Arisaema tortuosum** (Wall.) Schott, Melet. 1: 17. 1832; Fl. Brit. Ind. 6: 502. 1893. *Arum tortuosum* Wall. Pl. As. Rar. 2: 10. 1830. '*Thynrow-baian*'.

Tuber depressed-globose, 2-3 cm; leaves 2-3; leaflets 7-17, oblong or elliptic, short acuminate; central leaflet petiolate, others sessile; petioles 30-60 cm; peduncles 18-75 cm; spathes lanceolate; tube subcylindrical, 8-5 × 1.5-2.0 cm; limb erect, ovate or oblong, acute to acuminate 4-12 × 2.5-4.5 cm; spadix 16-30 cm; appendage long, curved, sigmoid, tapering to filiform tail; berries ovoid, ± 1 cm, red.

Shaded places in primary forests, 500-1500 m; fl. & fr.: Mar.-Nov.; Raliang, Syndai-Muktapur.

2. **Arisaema petiolulatum** Hook. f. Fl. Brit. Ind. 6: 498. 1893.

Rhizomes 5-6 cm, ± 1 cm thick; leaf solitary, trifoliolate leaflets petiolulate, ovate, cuspidate, narrowly rounded at base, 15-25 × 5-10 cm;

lateral nerves 8-12 pairs; petioles 30-40 cm; peduncles 25-35 cm; spathes ± 12 cm; tube $\pm 6 \times 1$ cm; limb lanceolate, $\pm 6 \times 2$ cm, purplish-green; spadix 6-7 cm; appendage $\pm 3.5 \times 1.5$ cm; berries red.

Shaded moist places in forests, 1200-1600 m; fl. & fr.: Jan.-Dec.; Kheihriat.

3 **Arisaema consanguineum** Schott in Bonpl. 7: 27. 1859; Fl. Brit. Ind. 6: 505. 1893.

Tubers subglobose, 1.5-2.0 cm, white; leaf solitary; leaflets 8-20, sessile, linear-lanceolate or oblanceolate, 7-25 \times 0.5-4.0 cm; petioles 25-120 cm, pinkish-green; peduncles 20-60 cm; tube of spathe narrow, funnel-shaped, 4-7 \times 1.5-2.2 cm, glaucous-green; limb ovate-lanceolate, with long filiform tail, 3-5 cm wide; spadix 2.5-4.5 cm; appendage exerted from the tube; berries red.

Shaded moist places in forests, forest borders and pine forests, 1300-1600 m; fl. & fr.: Mar.-Oct.; Jowai, Shangpung-Raliang.

6. ACORUS L.

- 1a. Leaves with a prominent midrib; flowering spadix 4-10 cm long, 6-15 mm thick. ... *A. calamus* 1
 1b. Leaves without any midrib; flowering spadix 3-10 cm long, 3-4 mm thick. ... *A. gramineus* 2

1. **Acorus calamus** L. Sp. Pl. 324. 1753; Fl. Brit. Ind. 6: 555. 1893. '*Ry-niaw*'.

Rhizomes 1-3 cm thick, compressed, aromatic; leaves linear, 60-80 \times 0.8-1.2 cm; peduncles ± 30 cm, 3-6 mm thick; spathes 30-70 cm; spadix 4-6 \times 0.8-1.5 cm; tepals $\pm 2.5 \times 1.0$ mm; glaucous-green berries oblong, ± 2 mm, reddish.

Primary forests, in shaded places 1000-1500 m; fl. & fr.: May-Oct.; Nartiang.

2. **Acorus gramineus** Soland. in Ait. Hort. Kew. 1: 474. 1789; Fl. Brit. Ind. 6: 556. 1893.

Rhizomes 5-7 mm thick, aromatic; leaves linear, 30-50 \times 0.4-0.7 cm; peduncles slender, 10-20 cm; spathes 8-25 \times 0.2-0.3 cm; spadix 3-10 \times 0.3-0.4 cm; tepals obovate; berries ± 2 mm, green-brown; seeds 2-3, oblong.

Primary forests, 1300-1600 m; fl. & fr.: Nov.-July; Mawryngkeng.

7. *Alocasia* G. Don. *nom. cons.*

Alocasia fornicata (Roxb.) Schott in Ost. Bot. Wochenbl. 4: 410. 1854; Fl. Brit. Ind. 6: 526. 1893. *Arum fornicatum* Roxb. Fl. Ind. 3: 501. 1832. '*Thynrowka-lymia*'.

Caudex inclined or prostrate, 15-60 cm, \pm 4 cm thick; leaves peltate, ovate-lanceolate, sagittate, acute or obtuse, 20-45 \times 10-25 cm; basal lobes connate for up to $\frac{1}{2}$ their length, obtuse or subacute; petioles 20-90 cm; peduncles 12-18 cm; spathes 7-10 cm; tube ovoid, \pm 2.5 cm; limb oblong, 2.0-2.5 cm broad, cuspidate, greenish yellow; appendage of spadix 2.5-3.0 cm.

Shaded places in primary forests, 100-1000 m; fl. & fr.: Mar.-Nov.; Syndai-Muktapur.

8. *Colocasia* Fabric. *nom. cons.*

- | | | |
|--|-----|-----------------------|
| 1a. Leaves glaucous beneath; basal lobes almost totally connate; spathes 6-10 cm long. | ... | <i>C. affinis</i> 1 |
| 1b. Leaves rarely glaucous; basal lobes connate for $\frac{1}{2}$ to $\frac{3}{4}$ their length; spathe 15-35 cm long. | ... | <i>C. esculenta</i> 2 |

1. ***Colocasia affinis*** Schott in Bonpl. 7: 28. 1859; Fl. Brit. Ind. 6: 528. 1893.

Tubers globose, 1.0-2.5 cm diam.; leaves 1-3, peltate, ovate-rounded, retuse or sinuate at base, cuspidate-acute or obtuse, 5-15 \times 4-12 cm; peduncles 1-3, 5-12 cm; tube of spathe \pm 1.5 cm, greenish; limb linear-lanceolate, acuminate, 5-9 \times 1.0-1.2 cm; appendage of spadix acute, 30-40 \times 2-3 mm, golden yellow.

Shaded moist places in forests and near villages, 100-500 m; fl. & fr.: June-Jan.; Dawki.

2. ***Colocasia esculenta*** (L.) Schott, Melet. 1: 18. 1832. *Arum esculentum* L. Sp. Pl. 965. 1753. *C. antiquorum* Schott, Melet. 1: 18. 1832; Fl. Brit. Ind. 6: 523. 1893.

Rhizome hard, often tuberous; leaves peltate, ovate or subtriangular, subacute-cuspidate, 30-50 \times 10-30 cm; basal lobes ovate, obtuse; petioles 1.0-1.2 cm, often purplish-violet; spathes convolute, curved in flowers; tube greenish; limb narrowly lanceolate, acuminate, pale yellow; appendage of spadix tail-like, 3.5-6.5 cm, grey or reddish-grey.

Moist shaded places in forests and also cultivated near villages, 100-500 m; fl. & fr.: June-Dec.; Dawki.

Tubers edible.

9. STEUDNERA C. Koch.

Staudnera colocasioides Hook. f. Fl. Brit. Ind. 6: 520, 1893.

Stems erect, \pm 3.5 cm thick; leaves broadly ovate, emarginate or retuse at base, acute, 25-60 \times 15-50 cm, purplish when young; petioles 30-45 cm; peduncles 12-18 \times 4-5 mm; spathes erect; tube ovoid, 2.0-2.5 \times 0.8-0.9 cm; limb narrowly lanceolate, acuminate, 12-20 \times 3-4 cm, creamy-yellow with brownish blotches inside; spadix cylindrical, \pm 5 cm, yellowish-white.

Primary forests, in shaded places, 100-1000 m; fl. & fr.: July-Feb.; Nongthala.

10. GONATANTHUS Klotz.

Gonatanthus pumilus (D. Don) Engler & Krause in Engler, Pflanzenr. 71: 19. 1920. *Caladium pumilum* D. Don, Prodr. Fl. Nep. 21. 1825. *Arum sarmentosum* Fischer in Hort. Petropol, 1835-38. *G. sarmentosus* (Fischer) Klotz. in Link, Klotz. & Otto. Ic. Pl. Rar. Hort. Berol. 1: 33. 1841; Fl. Brit. Ind. 6: 522. 1893. '*Shrew-khlaw*'.

Terrestrial or epiphytic; corms 0.5-3.0 cm diam.; leaves 1-4, oblong-ovate, peltate-rounded or sinuate-rounded at base, acuminate at apex, 6-23 \times 4-15 cm; petioles 6-40 cm; peduncles 1-2, suberect, curving in fruit; spathes 12-20 cm; tube globose-ovoid; limb linear-lanceolate, 12-20 cm, green, becoming yellow; spadix 2.5-4.0 cm; male zone cylindrical, 1-2 \times 0.3-0.5 cm, creamy, neutral zone 7-12 mm; female zone 0.5-1.0 \times 0.3-0.6 cm, green.

Primary forests in shaded places, 1000-1500 m; fl. & fr.: May-Nov.; Dawki, Jarain.

11. REMUSATIA Schott

- | | | |
|--|-----|------------------------|
| 1a. Bulbiferous shoots simple or rarely sparsely branched; limb of spathe reflexed, 8-12 cm long, cuspidate. | ... | <i>R. vivipara</i> 1 |
| 1b. Bulbiferous shoots much-branched; limb of spathe erect, 2-7 cm long, acuminate. | ... | <i>R. hookeriana</i> 2 |

1. **Remusatia vivipara** (Lodd.) Schott, Melet. 1: 18. 1832; Fl. Brit. Ind. 6: 521. 1893. *Caladium viviparum* Lodd. Bot. Cab. t. 281. 1820.

Tubers depressed-globose, 3-7 cm, pinkish outside, pale pink inside; bulbiferous shoots 15-30 \times 0.5-0.7 cm; leaves broad, ovate-cordate, acumi-

nate, 12-42 × 9-30 cm; petioles 20-50 cm; peduncles 6-10 cm, sheathed at base; tube of spathe ovoid, 2.5-4.5 cm, green outside, pale inside; limb trapezoid, 8-12 × 4-5 cm, pale green, yellow inside; spathes slightly exceeding the tube.

Primary forests, in shaded moist places, often epiphytic or lithophytic, 1000-1500 m; fl. & fr.: Mar.-Dec.; Jowai-Khleihriat.

2. **Remusatia hookeriana** Schott in Ost. Bot. Wochenbl. 133. 1858; Fl. Brit. Ind. 6: 522. 1893.

Tubers depressed-globose or subglobose, 2-4 cm diam., brown or pinkish-red; leaves ovate-oblong, cordate at base, acuminate, ± 10 × 5 cm; petioles ± 20 cm; peduncles sheathed at base, 6-15 cm; tube of spathe 1.5-2.5 cm; limb oblong-lanceolate, 2-7 × 1-4 cm, erect, pale yellow inside, greenish outside, reflexed.

Moist shaded places in forests, often epiphytic or lithophytic, 1000-1500 m; fl. & fr.: Mar.-Dec.; Sutnga.

160. ALISMATACEAE

- | | |
|--|---------------------|
| 1a. Leaves sagittate; carpels inserted on a large observable globular or oblong receptacle; achenes more or less compressed. ... | <i>Sagittaria</i> 1 |
| 1b. Leaves ovate to elliptic; carpels crowded on a minute receptacle; achenes swollen, round in cross-section. ... | <i>Caldesia</i> 2 |

1. SAGITTARIA L.

Sagittaria sagittifolia L. Sp. Pl. 993. 1753; Fl. Brit. Ind. 6: 561. 1893.

Stolons long, ending in tubers; leaf-lobes linear-lanceolate, acute; terminal lobe 4-16 × 1-2 cm, 5-9-nerved; petioles 20-90 cm; racemes 25-100 cm; bracts elliptic, connate at base, 4-15 mm; flowers 1.0-1.5 cm across; lower flowers female, upper ones male; petals white; stamens yellow; achenes obliquely obovate, 3-5 × 1.5-3.0 mm; seeds ± 1 mm, pale brown.

Pools, ditches and paddy fields, 400-1200 m; fl. & fr.: May-Nov.; Jarain-Syndai, Mynso, Nartiang.

2. CALDESIA Parl.

Caldesia grandis Samuel. Svensk. Bot. Tidskr. 24: 116, f. 1. 1930.

Leaves suborbicular, truncate at base, apiculate, 8-13 × 9-15 cm; main nerves 13-17; transverse nerves 0.5-0.7 mm apart; petioles 35-60 cm;

panicles 25-45 cm, producing turions between flowers; peduncles 50-70 cm; bracts lanceolate, 1-2 cm; pedicels 2-3 cm; sepals 3-5 × 1-2 mm; petals white, 4-5 × 2-3 mm; stamens 9-11; filaments \pm 2 mm; carpels 8-20; achenes elliptic, 3-4 mm; seeds \pm 2 mm, brownish-yellow.

Pools and ditches, 1000-1600 m; fl. & fr.: Apr.-Sept.; Nartiang, Mawryngkneng.

161. BUTOMACEAE

TENAGOCIARIS Hochst.

Tenagocharis latifolia (D. Don) Buchen. in Abh. Natur. Ver. Bremen 2: 2, 3 & 6. 1868. *Butomus latifolius* D. Don, Prodr. Fl. Nep. 22. 1825. *B. lanceolatus* Roxb. Fl. Ind. 2: 315. 1832. *Butomopsis lanceolata* (Roxb.) Kunth, Enum. Pl. 3: 165. 1841; Fl. Brit. Ind. 6: 562. 1893.

Erect herbs, 10-50 cm; leaves oblong-lanceolate or oblanceolate, acute at base, tipped by an obtuse hard point, 4-15 × 1-4 cm; main nerves 3-5; petioles 5-15 cm; umbels 2-16-flowered; peduncles 5-30 cm; pedicels 5-10 cm; sepals green, white-margined; petals ovate or obovate, obtuse, 8-15 mm, white; stamens 8-13; achenes 10-13 mm; seeds oblong smooth.

Paddy fields, pools and ditches, 100-1000 m; fl. & fr.: Mar.-Aug.; Dawki.

162. POTAMOCETONACEAE

POTAMOGETON L.

Potamogeton nodosus Poir. in Lamk. Encycl. Meth. Bot. Suppl. 4: 535. 1816. *P. indicus* Roxb. Fl. Ind. 1: 471. 1820 (*nom R. & S.* 1818); Fl. Brit. Ind. 6: 565. 1893.

Stems slender, terete, branched, floating; leaves lanceolate to elliptic-oblong, cuneate, rounded or subcordate at base, acute, 8-10 × 2-6 cm; submerged leaves linear or elliptic-lanceolate, up to 20 cm; petioles 3-20 cm; stipules \pm 3.5 cm; peduncles axillary or leaf-opposed, 2-15 cm; spikes brownish, 2.5-3.5 cm, dense-flowered; perianth lobes suborbicular; drupelets oblique, shortly beaked.

Aquatic, in ponds and lakes, 100-1500 m; fl. & fr.: Feb.-Nov.; Jowai.

163. ERIOCAULACEAE

ERIOCAULON L.

- 1a. Anthers white or yellow.
- 2a. Stemless ; leaves 2--5 cm long ; usually flat, 1.0--1.5 mm broad at middle ; anthers white. ... *E. sieboldianum* 1
- 2b. Stems up to 4 cm, underground ; leaves 4--12 cm long, filiform, 0.5--0.8 mm broad at middle ; anthers yellow. ... *E. miserum* 2
- 1b. Anthers black.
- 3a. Involucral bracts about twice as long as the flower-head. ... *E. xeranthemum* 3
- 3b. Involucral bracts shorter or equalling the flower-head.
- 4a. One of the male petals much longer than floral bracts. ... *E. cristatum* 4
- 4b. Male petals subequal, shorter than or equalling floral bracts.
- 5a. Robust herbs, 25--100 cm high ; leaves and scapes usually hairy ; leaves 2--10 mm broad ; heads 8--12 mm broad. ... *E. brownianum* 5
- 5b. Small herbs, up to 40 cm, but usually much less ; leaves and scapes glabrous ; leaves 0.7--3.0 mm broad ; heads 2--6 mm broad.
- 6a. Female sepals 3 ; petals 3. ... *E. luzulaefolium* 6
- 6b. Female sepals 2 ; petals absent. ... *E. achiton* 7

1. **Eriocaulon sieboldianum** Steud. Syn. Pl. Cyp. 2: 272. 1855; Fl. Brit. Ind. 6: 577. 1893.

Leaves flat, narrowly linear, obtuse; sheaths shorter than or equal to leaves; heads subglobose, 2.5-3.5 mm; receptacle subglobose, conical; involucral bracts oblong-lanceolate, long-acuminate; floral bracts oblong-lanceolate, long-acute, purplish-black with pale margins; male flowers: sepals 3, petals minute; female flowers: sepals absent or 2-3, linear; petals 1-2 or absent, subulate; seeds red-brown.

Marshy open places, 1200-1500 m; fl. & fr.: July-Nov.; Jowai.

2. **Eriocaulon miserum** Koern. in Linnaea 27: 607. 1856; Fl. Brit. Ind. 6: 575. 1893.

Stems up to 4 cm, 2-4 mm thick, underground; peduncles 10-28 cm; sheaths 2-5 cm; heads subglobose, 2-8 mm; receptacle globose or columnar; bracts obovate, apiculate, short hairy; male flowers: sepals 3, free or connate, lanceolate, hairy; petals subequal, hairy; anthers yellow; female flowers: sepals 3, broad-oblong; petals 3, spatulate, glandular-villous; seeds yellow-brown.

Marshy open places, 1200-1600 m; fl. & fr.: May-Nov.; Jowai.

3. **Eriocaulon xeranthemum** Mart. in Wall. Pl. As. Rar. 3: 29. 1832; Fl. Brit. Ind. 6: 584. 1893.

Leaves linear, 8-40 × 1-3 mm; peduncles 2-3 (-5), equal to or twice as long as leaves; sheaths 2-3 cm; heads 4-6 mm across; receptacle globose, glabrous; involucre bracts lanceolate, acuminate, yellowish, shiny; male flowers: sepals 3, free or partially connate, obovate, subtruncate, hairy; petals minute; female flowers: sepals 3, oblanceolate, rounded at apex, glabrous; petals 3, oblanceolate, glandular-ciliate; seeds linear-ellipsoid, pale yellow.

Marshy places in open grasslands, often in shallow water, 1000-1400 m; fl. & fr.: July-Nov.; Jarain.

4. **Eriocaulon cristatum** Mart. in Wall. Pl. As. Rar. 3: 28. 1832; Fl. Brit. Ind. 6: 574. 1893.

Stems short, up to 2 cm; leaves 50-180 × 1-2 mm; peduncles solitary or paired, 15-40 cm; sheaths 4-6 cm; heads globose, 5-7 mm; receptacles flat or concave, glabrous or sparsely hairy; bracts obovate-oblong, ± 2 mm, pale, tinged black; floral bracts rounded-subtruncate, apiculate; male flowers: sepals 3, hairy; petals 3, 2 small and the third 2-3 times larger, villous with a large black gland; female flowers: sepals 3, rarely 2, spatulate; petals 3, spatulate, glandular-ciliate.

Marshy open grasslands, 1200-1600 m; fl. & fr.: May-Nov.; Jowai-Jarain.

5. **Eriocaulon brownianum** Mart. in Wall. Pl. As. Rar. 3: 25. t. 25. 1832; Fl. Brit. Ind. 6: 576. 1893. '*Bad-thiad*'.

Leaves linear, acute, 12-50 cm; peduncles 1-6 together, 25-100 cm, pubescent at apex; heads depressed-globose; receptacle flat or convex, villous; involucre bracts obovate, obtuse-apiculate; male flowers: sepals 3, oblong, hairy; petals 3, subequal, glandular-hairy; female flowers: sepals 2-3, oblanceolate; petals linear, glandular-hairy; seeds ovoid, dark brown.

Swamps, marshy places and streamsides, 1200-1700 m; fl. & fr.: July-Dec.; Jarain, Jowai, Ummulong.

6. **Eriocaulon luzulaefolium** Mart. in Wall. Pl. As. Rar. 3: 28. 1832; Fl. Brit. Ind. 6: 582. 1893.

Leaves linear-lanceolate, acute, 20-80 mm; peduncles many, 10-25 cm; sheaths subequal to leaves; heads subglobose or obconic, 3-6 mm; receptacle subglobose, villous; involucre bracts obovate; floral bracts obovate, apiculate, black with white hairs at back; male flowers: sepals 3, spatulate, black, hairy at back; petals 3; female flowers: sepals oblanceolate; petals hairy at apex; seeds ellipsoid, brown.

Marshy places, paddy fields and streamsides, 200-1000 m; fl. & fr.: Aug.-Jan.; Garampani.

7. **Eriocaulon achiton** Koern. in *Linnaea* 27: 630. 1856; Fl. Brit. Ind. 6: 584. 1898.

Leaves linear-lanceolate, acute, 20-40 × 0.7-1.0 mm, 3-5-nerved; peduncles 4-9 cm; sheaths acuminate, 3-4 cm; heads subglobose, or obconic, 2-4 mm; receptacle subglobose, villous; involucrel bracts oblong, obtuse, ± 2 mm; floral bracts obovate, apiculate; male flowers: sepals 2, narrowly oblanceolate; seeds ellipsoid, reddish-brown.

Marshy places, near streams and rivers, 1000-1500 m; fl. & fr.: Aug.-Nov.; Jarain.

164. CYPERACEAE

(See A. S. Rao & D. M. Verma in *Records of the Botanical Survey of India* 21(2): 209-220. 1981 on the morphology and salient taxonomic characters with illustrations).

- | | | |
|--|-----|-----------------------|
| 1a. Nut enclosed in a sac-like structure (utricle). | ... | <i>Carex</i> 1 |
| 1b. Nut not enclosed in an utricle. | | |
| 2a. Flowers with hypogynous scales or bristles, representing the perianth. | | |
| 3a. Perianth consisting of scales. | | |
| 4a. Inflorescence paniculate; hypogynous scales keeled, ciliate on keel, placed at right angles to the glumes. | ... | <i>Hypolytrum</i> 2 |
| 4b. Inflorescence capitate; hypogynous scales neither keeled nor ciliate, placed parallel with the glumes. | ... | <i>Lipocarpa</i> 3 |
| 3b. Perianth consisting of filiform or setaceous bristles. | | |
| 5a. Leaves reduced to bladeless sheaths; inflorescence a single spikelet without subtending scales. | ... | <i>Eleocharis</i> 4 |
| 5b. Leaves well-developed; inflorescence with few to numerous spikelets, paniculate or capitate, with leafy bracts. | | |
| 6a. Nuts beaked by persistent style base. | ... | <i>Rhynchospora</i> 5 |
| 6b. Nuts not beaked. | ... | <i>Scirpus</i> 6 |
| 2b. Flowers without any hypogynous scales or bristles, i.e. without perianth. | | |
| 7a. Nuts beaked by persistent style base, forming a beak or button at top. | | |
| 8a. Leaves all reduced to bladeless sheaths; inflorescence consisting of a single spikelet. | ... | <i>Eleocharis</i> 4 |
| 8b. Leaves at least some with well-developed blades; inflorescence umbellate or capitate with few to many spikelets. | | |

- 9a. Style base persisting like a beak on nut ; stigmas 2 ; nuts lenticular. ... *Rhynchospora* 5
- 9b. Style base persisting like a minute button on nut ; stigmas 3 ; nuts trigonous. ... *Bulbostylis* 7
- 7b. Nuts not beaked by persistent style base.
 - 10a. Flowers all unisexual ; spikelets all bisexual or bisexual and male or female and male ; nuts borne on a more or less trilobed disk. ... *Scleria* 8
 - 10b. Flowers bisexual, at least for greater part (a few in each spikelet may be male or female by abortion) ; nuts not borne on disk.
 - 11a. Style dilated at base, articulate with ovary, often fimbriate. ... *Fimbristylis* 9
 - 11b. Style continuous with ovary.
 - 12a. Glumes spirally arranged. ... *Scirpus* 6
 - 12b. Glumes exactly distichous. ... *Cyperus* 10

1. CAREX L.

- 1a. Spikelets sessile, oblong, ovoid or subglobose, bi- or rarely unisexual ; cladophylls absent ; stigmas 2. ... *C. nubigena* 1
- 1b. Spikelets at least the lower ones peduncled, of varied shape, bi- or unisexual ; cladophylls present ; stigmas 2, rarely 3.
 - 2a. Spikelets solitary, terminating stem, bi- or unisexual ; cladophylls ochreiform ; stigmas 3, rarely 2. ... *C. speciosa* 2
 - 2b. Spikelets several, bisexual ; cladophylls utriculiform ; stigmas 3.
 - 3a. Spikelets all or almost all 3—15 mm long ; utricles ellipsoid.
 - 4a. Fertile glumes mucornate or mucronulate, stramineous with reddish-brown dots and streaks ; style base swollen ; utricles slightly or strongly inflated, 1.2—1.7 mm broad. ... *C. cruciata* 3
 - 4b. Fertile glumes mostly acute, sometimes a few mucronulate, reddish-brown ; style base uniformly thick ; utricles not or scarcely inflated, 0.5—0.8 mm broad. ... *C. filicina* 4
 - 3b. Spikelets all or almost all 20—60 mm long ; utricles broadly obovoid.
 - 5a. Utricles inflated, bright red. ... *C. baccans* 5
 - 5b. Utricles not inflated, yellowish-green. ... *C. spiculata* 6

1. **Carex nubigena** D. Don in Trans. Linn. Soc. 14: 326. 1825; Fl. Brit. Ind. 6: 702. 1894.

Tufted herbs, 15-75 cm; stems 1.0-2.5 mm thick; leaves 6-10, clustered at base, shorter than stem, 1.5-3.0 mm broad, conduplicate; inflorescences pyramidal, spicate, 1-5 cm; lower 1-2 bracts foliaceous, equal to spikes; upper bracts setaceous 2-15 cm; spikelets contiguous, obtuse, 5-9×5-7 mm; glumes ovate to oblong-lanceolate, acute-mucronate, 2.5-3.5 mm; utricles ovoid, compressed-biconvex, 3.4×1.2-1.8 mm; nuts suborbicular, biconvex, 1.5-2.0 mm.

Wastelands in dry moist to muddy places, 1000 - 1500 m; fl. & fr.: May-Sept.; Jowai-Jarain.

2. **Carex speciosa** Kunth, Enum. Pl. 2: 504. 1837; Fl. Brit. Ind. 6: 729. 1894.

Tufted herbs, 10 - 40 cm; rhizomes up to 7 cm long, 3 - 5 mm thick; stems trigonous, up to 1 mm thick; leaves clustered at base, acuminate, longer than stem, up to 10 mm broad; inflorescences racemose, consisting of usually 2, distant spikelets; bracts sheathing, foliaceous; spikelets sub-cylindric, 1 - 2 cm; glumes oblong to ovate-oblong, 2.5 - 3.5 mm; utricles inflated, triquetrous, 4.5 - 5.5 × 1.9 - 2.5 mm, white-pubescent at angles; nuts ellipsoid, 3 - 4 × 1.8 - 1.2 mm, brown.

Forest floors, in dry open wet places, 1000 - 1500 m; fl. & fr.: May-June; Jarain.

3. **Carex cruciata** Wahlenb. in Vet. Akad. Handl. Stockh. 24: 149. 1803; Fl. Brit. Ind. 6: 715. 1894.

Tufted herbs, 30 - 150 cm; rhizomes up to 20 cm, 4 - 6 mm thick, brown outside, white inside; stems erect, trigonous, 3 - 5 mm thick; leaves exceeding stems, acuminate, 4 - 12 mm broad; sheaths reddish-brown; panicles 15 - 45 cm; partial panicles 4 - 10, solitary or paired, subpyramidal, 4 - 10 × 3 - 5 cm; bracts foliaceous, 25 - 50 cm; spikelets numerous, 6 - 15 mm; glumes ovate, 2 - 3 × 1.5 - 2.0 mm; utricles ellipsoid, obscurely trigonous, 3 - 4 × 1.2 - 1.7 mm; nuts ellipsoid, trigonous, acute, 1.5 - 2.2 mm, brown.

Wastelands, forest borders, in dry or moist places in grasslands, 100 - 1500 m; fl. & fr.: May-Mar.; Dawki, Jarain, Jarain-Muktapur, Jowai, Jowai-Bodarpur, Jowai-Jarain, Nongthala, Raliang.

4. **Carex filicina** Nees in Wt. Contr. Bot. Ind. 123. 1894; Fl. Brit. Ind. 6: 717. 1894.

Tufted herbs, 60 - 150 cm; rhizomes short, 3 - 5 mm thick, purplish-red or black; stems slender, erect or nodding, 2 - 4 mm thick; leaves shorter than to as long as the stem, 4 - 15 mm broad; panicles 10 - 40 cm; partial panicles solitary or paired, ovate to lanceolate, 3 - 12 × 2 - 6 cm; spikelets numerous, 5 - 15 mm; glumes ovate-lanceolate 1.5 - 2.0 × 0.5 - 1.2 mm; utricles divaricate, ellipsoid, trigonous, beaked, 2.5 - 4.0 × 0.6 - 0.8 mm; nuts ellipsoid, trigonous, apiculate, 1.2 - 1.6 × 0.5 - 0.8 mm, brown.

Wastelands, along streams and forests, 900 - 1500 m; fl. & fr.: May-Aug.; Jarain, Nartiang.

5. **Carex baccans** Nees in Wt. Contr. Bot. Ind. 122. 1884; Fl. Brit. Ind. 6: 722. 1894.

Tufted herbs, 1-2 m; stems erect or nodding, 4-8 mm thick; leaves exceeding stem, 5-12 mm; panicles 30-80 cm; partial panicles 5-11, ellipsoid, 6-15 × 3-5 cm; bracts foliaceous, 60-100 cm; spikelets 3-5 cm; glumes oblong-ovate, mucronate, 3-5 mm, reddish-brown; utricles broadly obovoid, beaked, obscurely trigonous, 3.5-4.0 × 2.0-2.5 mm; nuts ellipsoid, 2.5-2.8 mm, dark brown.

Roadsides, wastelands, and near forests, 1300-1700 m; fl. & fr.: Sept.-Mar.; Jowai, Mawryngkneng.

6. **Carex spiculata** Boott in Proc. Linn. Soc. Lond. 1: 288. 1845; Fl. Brit. Ind. 6: 724. 1894.

Tufted herbs, 45-95 cm; stems erect, 2-3 mm thick; leaves exceeding stems, 5-10 mm broad; panicles rigid to slender, narrow, 15-40 cm; spikes oblong-lanceolate, 5-8 × 2.0-3.5 cm; spikelets 1.5-5.5 cm; glumes linear-oblong, mucronate, 4.5-5.0 mm; utricles ellipsoid, trigonous, ± 3 × 1 mm, 5-9-nerved on each face; nuts ellipsoid, ± 2 mm, deep brown.

Roadsides, streamsides and marshy places in forests, 1000-1500 m; fl. & fr.: July-Jan.; Jarain, Makoh-Nartiang, Raliang.

2. HYPOLYTRUM L. C. Rich.

Hypolytrum nemorum (Vahl) Spreng. Syst. 1: 233. 1825. *Schoenus nemorum* Vahl, Symb. Bot. 2: 8. 1794. *H. latifolium* L. C. Rich. in Pers. Syn. Pl. 1: 70. 1805; Fl. Brit. Ind. 6: 678. 1894.

Rhizomes purplish outside, purple-white inside; stems 3-angled, 0.5-1.0 m, 3-5 mm thick; leaves in basal clusters and a few cauline, 25-120 × 1.5-3.0 cm; panicles corymbose, lax, 3-13 cm across; bracts 2-4, up to 35 cm; branches divaricate, compressed; spikelets mostly solitary, obovoid-oblong, 2-5 × 2 mm; glumes obovate-suborbicular, obtuse, 1.3-2.0 mm, brown; perianth scales narrowly oblanceolate, 1.2-1.7 mm; nuts ovoid to suborbicular, biconvex, short-beaked, 2.0-2.5 mm, brown, rugulose.

Moist and swampy places in grasslands, and forests, often submerged or half submerged, 100-1000 m; fl. & fr.: Jan.-Dec.; Nongthala.

3. LIPOCARPHA R. Br. *nom. cons.*

Lipocarpa chinensis (Osbeck) Kern in Blumea, suppl. 4: 167. 1958.

Scirpus chinensis Osb. Dagb. Ostind. Resa 220. 1757. *Hypaelyptum argenteum* Vahl, Enum. Pl. 2: 283. 1806. *L. argentea* (Vahl) Steud. Nom. Bot. ed. 1. 485. 1821; Fl. Brit. Ind. 6: 667. 1893.

Annual tufted herbs, 10-65 cm; rhizomes up to 3×0.5 cm; stems rigid, obtusely trigonous, 1.0-2.2 mm thick, greyish-green; leaves rigidulous, $\frac{1}{2}$ - $\frac{3}{4}$ as long as stems, 2-5 mm broad, scaberulous at margins; inflorescences capitate, 8-20 mm across; bracts 2-3, dilated at base, 4-14 cm; spikelets 4-7, ovoid to oblong-ovoid, $5-12 \times 3-5$ mm, glistening greyish-white; glumes spathulate, concave, with short erect incurved triangular tip, 1.9-2.8 mm, purple-streaked, 5-7-nerved; perianth-scales ± 2 mm; nuts oblong-obovoid, apiculate, slightly curved, 1.0-1.4 mm, fuscus.

Swamps, shallow puddles, roadsides, paddy fields and streamsides, 100-1600 m; fl. & fr.: Apr.-Nov.; Jarain, Ummulong-Jowai.

4. ELEOCHARIS R. Br.

- 1a. Spikelets ovoid-oblong, distinctly wider than the stem, few-flowered; glumes membranous. ... *E. subvivi para* 1
 1b. Spikelets subcylindric, about as broad as the stem, many-flowered; glumes coriaceous. ... *E. acutangula* 2

1. ***Eleocharis subvivi para*** Boeck. in Linnaea 36: 424. 1870; Fl. Brit. Ind: 6: 629. 1893.

Annual or perennial herbs, 15-50 cm; stolons up to 2.5 cm long, ± 1.5 mm thick; stems slender, subterete, ± 1 mm thick; leaf-sheaths 2-3, reddish-purple, subtruncate at mouth, 5-10 cm; spikelets 4-9 \times 1-2 mm; glumes narrowly oblong-lanceolate, obtuse, ± 3 mm, hyaline with red-brown bands; perianth-bristles 6, unequal, whitish; nuts obovoid, compressed-biconvex, narrowed above the neck, ± 1.2 mm, brown; style base ovoid.

Swampy places along streams, ditches and paddy fields 1400-1700 m; fl. & fr.: Jan.-Oct.; Jowai.

2. ***Eleocharis acutangula*** (Roxb.) Schult. in R. & S. Syst. Mant. 2: 91. 1824. *Scirpus acutangulus* Roxb. Fl. Ind. 1: 216. 1820. *S. fistulosus* Poir. Encycl. 6: 749. 1804 (*non* Forsk. 1775). *E. fistulosa* (Poir.) Schult. in R. & S. Syst. Mant. 2: 89. 1824; Fl. Brit. Ind. 6: 626. 1893.

Perennial herbs, 30-80 cm; stolons ± 2 mm thick, purplish; stems triquetrous, concave on one side, 3-5 mm thick; leaf-sheaths 2-3, loose, purplish, oblique at mouth, 7-20 cm; spikelets 20-35 \times 3-4 mm, glaucous-green to stramineous; glumes closely appressed, oblong-ovate, 4.0-5.5 mm,

scarious-margined; perianth-bristles 6, unequal, brown; nuts broadly obovoid, biconvex, constricted at apex into a short distinct beak, 1.5-2.0 mm, brown; style base conic.

Swamps, along streams, ponds and ditches, often half submerged, 600-1500 m; fl. & fr.: June-Oct.; Jowai, Umjaisaw-Seitsohma.

5. RHYNCHOSPORA Vahl *nom. cons.*

- | | |
|---|------------------------|
| 1a. Leaves clustered at base; spikelets in single terminal heads; styles entire or shortly bifid. ... | <i>R. rubra</i> 1 |
| 1b. Leaves all along the stem; spikelets in elongated racemes or panicles; styles deeply bifid. | |
| 2a. Perianth-bristles shorter than the nut; nuts as broad as long. | <i>R. rugosa</i> 2 |
| 2b. Perianth-bristles as long as or longer than the nut; nuts about half as broad as long. ... | <i>R. griffithii</i> 3 |

1. **Rhynchospora rubra** (Lour.) Makino in Bot. Mag. Tokyo 17: 180. t. 7. f. 1a-b. 1903. *Schoenus ruber* Lour. Fl. Cochinch. 1: 41. 1790. *R. wallichiana* Kunth, Enum. Pl. 2: 289. 1837; Fl. Brit. Ind. 6: 668. 1893.

Perennial tufted herbs, 20-70 cm; rootstock woody, \pm 5 mm thick, blackish; stems \pm 1.2 mm thick; leaves 4-8, about as long as or $\frac{1}{2}$ as long as stems, 17-28 cm \times 1.5-3.5 mm; heads solitary, 8-15 mm across; bracts 4-8, up to 8 cm, white ciliate at margins below, scabrid above; spikelets lanceolate, compressed, 5-8 mm, reddish-brown; glumes 6-7, ovate, mucronate, 4-5 mm; perianth-bristles 2-5; nuts biconvex, ovoid, truncate, 1.5-2.0 mm, brown.

Grasslands and forest borders, in fairly dry localities, 100-1300 m; fl. & fr.: June-Nov.; Garampani, Jarain, Jowai-Bodarpur Road.

2. **Rhynchospora rugosa** (Vahl) Gale in Rhodora 46: 275. t. 835. f. 1. A-B. 1944. *Schoenus rugosus* Vahl, Eclog. Amer. 2: 5. 1798. *R. glauca* Vahl, Enum. Pl. 2: 233. 1806, *nom. illeg.*; Boeck. in Linnaea 37: 585. 1873; Fl. Brit. Ind. 6: 671. 1893.

Perennial tufted herbs, 20-80 cm; stems slender, trigonous; leaves rigid, canaliculate, 15-50 \times 0.2-0.4 cm; sheaths truncate at mouth; panicles narrow, 20-30 cm; rays slender, ascending; spikelets pedicelled, lanceolate to ovate-lanceolate, 3-4 mm, ferruginous; glumes 5-7, \pm 1.5 mm, brown; nuts broadly obovoid, truncate, 1.5-1.8 mm, transversely wrinkled, chestnut brown; beak conic, \pm 1.2 mm.

Swamps and marshy grasslands, 1200-1700 m; fl. & fr.: June-Oct.; Ummulong-Jowai.

3. **Rhynchospora griffithii** Boeck. in *Linnaea* 38: 404. 1874; Fl. Brit. Ind. 6: 672. 1893.

Perennial tufted herbs, 40-70 cm; stems slender, obtusely 3-angled; leaves rigid, canaliculate, 16-28 × 2-3 mm, scaberulous at margins; sheaths truncate at mouth; panicles lax, narrow, 15-35 × 1-2 cm; spikelets 2-8 clustered together, lanceolate, 4-5 mm, ferruginous; glumes 5-6, oblong-lanceolate, acute, 4-5 mm; perianth bristles 5-6, subequal, 4-5 mm; nuts narrowly obovoid, ± 2 mm, brown with faint transverse undulate markings; beaks narrowly conical, ± 1.5 mm.

Open marshy places and streamsides, 1200-1500 m; fl. & fr.: July-Nov.; Jarain Road, G. K. Deka 10163 —Endemic to Meghalaya.

6. SCIRPUS L.

- | | |
|---|------------------------|
| 1a. Leaves scattered all along the stems; inflorescences umbellate; perianth bristles when present, much longer than nut. ... | <i>S. wichurai</i> 1 |
| 1b. Leaves absent or when present in a basal cluster; inflorescences umbellate, capitate or reduced to a solitary spikelet; perianth-bristles when present shorter than to equalling the nut. | |
| 2a. Stems terete. ... | <i>S. juncoides</i> 2 |
| 2b. Stems triquetrous or 3-winged. ... | <i>S. mucronatus</i> 3 |

1. **Scirpus wichurai** Boeck. in *Linnaea* 36: 729. 1870. *S. eriophorum* Clarke in Fl. Brit. Ind. 6: 661. 1893.

Perennial herbs, 0.5-2.0 m; stems subterete or trigonous above, 5-7 mm thick, brownish-stramineous, purple at nodes; leaves acuminate, 25-40 × 0.6-1.0 cm; umbels nodding, decomposed, 10-25 cm across; bracts several, foliaceous, longest usually subequal or exceeding the umbel; rays drooping, 10-20 cm; spikelets solitary or in clusters of 2-4, oblong-ellipsoid, terete, obtuse, 3.5 × 2.0-2.5 mm; glumes tightly imbricating, ovate, mucronate, 1.5-2.0 mm, brown, 3-nerved; perianth-bristles 5-6, filiform; nuts oblong-ovoid, trigonous, 1.0-1.3 mm, beaked, brown.

Swamps, ditches and streamsides, often half submerged, 1300-1700 m; fl. & fr.: July-Sept.; Ummulong-Jowai.

2. **Scirpus juncoides** Roxb. Fl. Ind. 1: 218. 1820. *S. erectus* (auctt. non Poir. 1829) Clarke in Fl. Brit. Ind: 6: 656. 1893.

Perennial tufted herbs; rhizomes woody, creeping up to 2 cm; stems 10-75 × 0.2-0.3 cm; leaves absent; sheaths 2-3, cuspidate, uppermost 3-10 cm, oblique at mouth; inflorescences pseudolateral, capitate, rarely reduced to a solitary spikelet; bracts solitary erect, stem-like with a callous

tip, 2-15 cm; spikelets oblong-ovoid, obtuse, 8-20 × 3-5 mm; glumes broad ovate, obtuse-mucronate, 3-4 mm; perianth-bristles 5-6, retrorsely scabrid; nuts obovoid, biconvex, apiculate, 1.7-2.2 mm, pitted, black.

Marshy places, ditches, ponds and streamsides, often half-submerged 200-1500 m; fl. & fr.: Mar.-Jan.; Jarain-Jowai, Jarain-Muktapur, Jowai-Nartiang.

3. **Scirpus mucronatus** L. Sp. Pl. 50. 1753; Fl. Brit. Ind. 6: 657. 1893.

Perennial herbs; rhizomes creeping up to 15 cm; scales ovate; stems rigid, 5-15 × 0.3-0.7 cm; leaves absent; sheaths 1-2, brown; inflorescences lateral, capitate, 10-25 mm across; bracts solitary, stem-like, usually 1-5, rarely up to 17 cm long, acute; spikelets 3-15, oblong-ovoid, subterete, acute, 10-20 × 0.3-0.4 cm; glumes broad-ovate, acute-mucronulate, 3-4 mm, pale to purple-brown; perianth-bristles 6-8, unequal; nuts obovoid, plano-convex, apiculate, ± 2 mm, brown-black.

Swamps, ditches, streamsides, often half-submerged, 800-1700 m; fl. & fr.: Mar.-Jan.; Jarain, Jowai.

7. *BULBOSTYLIS* Kunth *nom. cons.*

Bulbostylis densa (Wall.) Hand.-Mazz. in Karsten & Schenk, Vegetationsb. 20. 7: 16. 1930. *Scirpus densus* Wall. in Roxb. Fl. Ind. 1: 231. 1820. *B. capillaris* var. *trifida* (Nees) Clarke in Fl. Brit. Ind. 6: 652. 1893.

Annual tufted herbs, 5-40 cm; stems capillary; leaves filiform, $\frac{1}{2}$ - $\frac{3}{4}$ as long as stem; sheaths white hairy at mouth; umbels lax, simple or compound, bearing 2-many spikelets, sometimes reduced to solitary spikelet; bracts awned, 2-4 mm, or rarely up to 8 mm; rays 1-several, suberect; spikelets solitary, oblong-ovate, 3-5 × 1.8-2.0 mm; glumes spiral, ovate-lanceolate, acute-mucronate, 1.5-2.0 mm, dark brown; nuts obovoid, trigonous, ± 1 mm, granular, brown.

Paddy fields, wastelands and forest edges, often in crevices of rocks, 1300-1800 m; fl. & fr.: June-Nov.; Jowai, Shangpung.

8. *SCLERIA* Berg.

- 1a. Hypogynous disc-lobes hemispherical, broadly rounded at top. ... *S. terrestris* 1
 1b. Hypogynous disc-lobes ovate-lanceolate, acute, mucronulate or notched.

- 2a. Annual herbs; terminal partial panicles 2—4 cm long; nuts cancellate, purplish-black. ... *S. biflora* 2
- 2b. Perennial herbs; terminal partial panicles 4—13 cm long; nuts smooth or faintly reticulate; glossy-white to blue-black. ... *S. levis* 3

1. ***Scleria terrestris*** (L.) Fass. in *Rhodora* 26: 159. 1924. *Zizania terrestris* L. Sp. Pl. 991. 1753. *S. radula* Hance in *Ann. Sci. Nat. Bot.* 18: 232. 1862; *Fl. Brit. Ind.* 6: 691. 1894. *S. elata* Thw. *Enum. Pl. Zeyl.* 353. 1864; *Fl. Brit. Ind.* 6: 690. 1894. 'Ka-sor'.

Erect or scrambling over lushes, 1-4 m; rhizomes up to 10 cm, purplish-black outside, white inside; stems slender, 2-8 mm thick; leaves rigid, acuminate, 15-75 × 0.5-2.2 cm; sheaths often with up to 5 mm broad wings; inflorescence paniculate, terminal and 2-5 lateral ones, 5-15 × 1-8 cm; spikelets linear-lanceolate, 3.0-4.5 mm; glumes ovate, acute; disc-lobes 3, rounded; nuts ovoid subglobose, terete or obtusely trigonous, apiculate, 2.5-3.0 × 2-3 mm, glossy-white or purplish-black.

Wastelands, paddy fields and forest edges, in dry or marshy places, 100-1500 m; fl. & fr.: Feb.-Dec.; Dawki-Jarain, Jarain, Jarain-Syndai, Jowai, Jowai-Jarain.

2. ***Scleria biflora*** Roxb. *Fl. Ind.* 3: 573. 1832; *Fl. Brit. Ind.* 6: 687. 1894.

Annual tufted herbs, 15-50 cm; roots strongly aromatic; stems triquetrous, 1-2 mm thick, purplish at base; leaves obtuse, 7-15 × 0.2-0.5 cm; sheaths narrowly winged; inflorescence paniculate, terminal and 2-3 lateral ones, 2-4 cm; spikelets subsessile, linear-lanceolate, ± 3 mm, keeled; nuts globose, terete, beaked, 2.0-2.5 mm, white hairy.

Open moist places and ditches, 100-700 m; fl. & fr.: July-Aug.; Garampani.

3. ***Scleria levis*** Retz. *Obs. Bot.* 4: 13. 1786. *S. hebecarpa* Nees in *Wt. Contr. Bot. Ind.* 117. 1834; *Fl. Brit. Ind.* 6: 689. 1894.

Perennial herbs, scrambling over bushes, 30-100 cm; rhizomes creeping, up to 7 cm; stems solitary or 2-3 approximate, slender, triquetrous, 1-3 mm thick; leaves acute, 20-40 × 0.4-0.8 cm; sheaths triquetrous, often with up to 2 mm broad wings; ligules ovate, ciliate; inflorescences paniculate, terminal and 1-2 lateral, 3-10 × 2.0-3.5 cm; spikelets lanceolate, 3-6 mm; glumes ovate, acute or mucronate, 3-4 mm, pale brown with darker margins; disc-lobes ovate, bidentate at apex; nuts subglobose, apiculate, 2.0-2.5 mm, rugulose, glossy-white to blue-black.

Open moist places amidst grasses and bushes, 200-800 m; fl. & fr.: Mar.-Nov.; Garampani.

9. FIMBRISTYLIS Vahl

- 1a. Styles flat, usually fimbriate ; stigmas 2 ; nuts lenticular.
 - 2a. Leaves not ligulate. ... *F. hookeriana* 1
 - 2b. Leaves ligulate.
 - 3a. Nuts trabeculate.
 - 4a. Surface-cells of nuts arranged in 5--10 vertical rows on each face. ... *F. dichotoma* 2
 - 4b. Surface-cells of nuts arranged in 12--20 vertical rows on each face. ... *F. tomentosa* 3
 - 3b. Nuts not trabeculate.
 - 5a. Spikelets 4--8 × 3.0--4.5 mm ; glumes 2.5--3.3 mm long ; anthers less than 1 mm long ; styles up to 1.5 mm long. ... *F. schotenoides* 4
 - 5b. Spikelets 7--20 × 3.5--6.0 mm ; glumes 5--6 mm long ; anthers more than 1--5 mm long ; styles more than 2.5 mm long. ... *F. tristachya* 5
- 1b. Styles triquetrous, usually not fimbriate ; stigmas 3 ; nuts trigonous.
 - 6a. Glumes spiral.
 - 7a. Cauline leaves with well-developed blades. ... *F. complanata* 6
 - 7b. Cauline leaves (at least upper ones) reduced to bladeless sheaths.
 - 8a. Leaves present, equitant, laterally flattened, lacking distinct midrib. ... *F. miliacea* 7
 - 8b. Leaves absent or if present never equitant, dorso-ventrally flattened with distinct midrib. ... *F. aphylla* 8
 - 6b. Glumes all or at least lower ones distichous or subdistichous.
 - 9a. Annual herbs ; leaves strongly falcate in one direction ; glumes hairy. ... *F. fimbristylodes* 9
 - 9b. Perennial herbs ; leaves not or slightly irregularly curved ; glumes glabrous.
 - 10a. Spikelets in clusters of 2--4 or sometimes a few solitary ; glumes 3.5--5.0 mm long. ... *F. nigrobrunnea* 10
 - 10b. Spikelets solitary or sometimes a few in clusters of 2--3 ; glumes 3--4 mm. ... *F. eragrostis* 11

1. **Fimbristylis hookeriana** Boeck. in *Linnaea* 37: 22. 1871; *Fl. Brit. Ind.* 6: 641. 1893.

Annual tufted herbs, 5-25 cm; stems trigonous, 1.0-1.5 mm thick; leaves slightly exceeding the stems, 1.5-2.5 mm broad; sheaths stramineous; umbels compound or decompound, rarely simple, 3.5-9.0 × 2-10 cm; rays 3-5, rigid, subcompressed; bracts up to 12 cm; spikelets in clusters of 2-6, linear-lanceolate, acute, 5-12 × 1.5-2.0 mm; glumes oblong-adpressed, mucronate, 3.5-4.0 mm, rusty-green; nuts obovoid, lenticular, 1.0-1.5 × 0.7-1.0 mm, brown.

Open grasslands, among boulders, 1000-1400 m; fl. & fr.: Aug.-Sept.; Jarain-Muktapur.

2. **Fimbristylis dichotoma** (L.) Vahl, Enum. Pl. 2: 287. 1806, *p. p.* *Scirpus dichotoma* L. Sp. Pl. 50. 1753. *F. diphylla* Vahl, Enum. Pl. 2: 289. 1806; Fl. Brit. Ind. 6: 636. 1893.

Annual or perennial tufted herbs, 10-100 cm; rhizomes short woody \pm 5 mm thick; stems trigonous, compressed below the umbel, 1.0-1.5 mm thick; leaves $\frac{1}{4}$ - $\frac{1}{2}$ as long as stem, 1.5-5.0 mm broad; umbels compound, 3-8 cm across; bracts foliaceous, up to 10 cm; rays flattened, up to 6 cm; spikelets ovoid-oblong, terete, acute, 4-12 \times 2-3 mm; glumes oblong-ovate, acute-mucronate, 2-3 mm, chestnut brown, glossy, 3-nerved; nuts obovoid, apiculate, 0.9-1.2 \times 0.7-0.9 mm, glossy brown.

Forests and grasslands, open or partially shaded places, 100-1000 m; fl. & fr.: Mar.-Dec.; Dawki-Sohka, Umjaisaw-Seitsohma.

3. **Fimbristylis tomentosa** Vahl, Enum. Pl. 2: 290. 1806. *F. podocarpa* Nees in Wt. Contr. Bot. Ind. 98. 1894, *p. p.*; Fl. Brit. Ind. 6: 638. 1893.

Annual tufted herbs, 15-50 cm; stems slender, trigonous, 1.0-1.5 mm thick; leaves falcate, acuminate, $\frac{1}{2}$ - $\frac{3}{4}$ as long as stem, 2.0-3.5 mm broad; umbels compound, lax, 2-4 cm across; bracts as long as or exceeding the umbel; lower ones 4.0-8.5 cm; rays 4-6, 2.0-3.5 cm; spikelets oblong-ovoid, acute, 6-11 \times 3-4 mm, brown; glume broadly ovate, mucronulate, 3.0-3.5 mm, pale brown with green midrib and several lateral nerves; nuts suborbicular, lenticular, 1.0-1.5 mm, stramineous.

Shaded places in forests, and forest edges, 200-1000 m; fl. & fr.: Aug.-Sept.; Rytang.

4. **Fimbristylis schoenoides** (Retz.) Vahl, Enum. Pl. 2: 286. 1806; Fl. Brit. Ind. 6: 634. 1893, *p. p.* *Scirpus schoenoides* Retz. Obs. Bot. 5: 14. 1789.

Perennial tufted herbs, 5-40 cm; stems \pm 1 mm, thick; leaves canaliculate, shorter than to equalling to the stem, obtuse, up to 1 mm broad, ligulate; umbels reduced to 1-2 spikelets; bracts setaceous 0.5-3.0 cm; rays up to 1.5 cm; spikelets ovoid to oblong-ovoid, terete, acute, 4-8 \times 3.0-4.5 mm; glumes broadly ovate to suborbicular, muticous, 2.5-3.0 mm; nuts obovoid, biconvex, umbonate, 1.2-1.7 \times 0.9-1.2 mm, brown.

Wastelands and paddy fields, 100-1000 m; fl. & fr.: July-Oct.; Sohka.

5. **Fimbristylis tristachya** R. Br. Prodr. 226. 1810 (*non* Thw. 1864, *nec* Clarke in Fl. Brit. Ind. 6: 649. 1893). *F. schoenoides* (*non* Vahl) *sensu* Clarke in Fl. Brit. Ind. 6: 634. 1893, *p. p.*

Perennial tufted herbs, 25-60 cm; rhizomes up to 3 cm, creeping,

5-7 mm thick; scales lanceolate, brown-black; leaves canaliculate, $\frac{1}{2}$ - $\frac{3}{4}$ as long as stem, 0.7-1.2 mm broad; ligules a fringe of hairs; umbels reduced to 1-3 spikelets; bracts setaceous, 5-15 mm; rays slender, up to 17 mm; spikelets ovoid or oblong-ovoid, terete, acute, 7-20 \times 3.5-6.0 mm; glumes broadly ovate, mucronulate, 5-6 mm; nuts ovoid, biconvex, umbonulate, 1.2-1.5 \times 0.9-1.2 mm.

Marshy places and paddy fields, 1300-1600 m; fl. & fr.: June-Oct.; Jarain-Jowai.

6. **Fimbristylis complanata** (Retz.) Link, Hort. Berol. 1: 292. 1827; Fl. Brit. Ind. 6: 646. 1893. *Scirpus complanata* Retz. Obs. Bot. 5: 14. 1789.

Annual or perennial herbs, 20-100 cm; stems slender, strongly compressed, 1-2 mm broad; leaves shorter than or equal to stems, 3-5 mm broad; ligules sometimes fringed hairy; sheaths compressed, strongly keeled; umbels compound or supracompound, 2-8 cm broad; bracts foliaceous, shorter than to equalling the umbel, 2-8 cm; rays 5-9, flattened up to 6 cm; spikelets oblong-lanceolate, polygonal, obtuse, 5-7 \times 2-3 mm; glumes ovate-oblong, keeled, mucronate, 2.0-2.5 mm, scarious-margined, 3-nerved, dark brown; nuts obovoid, trigonous, 0.8-1.2 \times 0.5-1.0 mm, white-stramineous.

Swamps, wastelands and marshy grasslands, 1300-1700 m; fl. & fr.: June-Sept.; Jowai-Jarain, Ummulong-Jowai.

7. **Fimbristylis miliacea** (L.) Vahl, Enum. Pl. 2: 287. 1806; Fl. Brit. Ind. 6: 644. 1893. *Scirpus miliaceus* L. Syst. Veg. 10: 868. 1759.

Annual or perennial tufted herbs, 10-50 cm; stems 4-5-angled, 1.0-1.7 mm thick; leaves equitant, distichous, 1-3 mm broad, eligulate; umbels lax to rather dense, decomposed; bracts up to 3 cm; rays 7-15, suberect to spreading, up to 5 cm; spikelets solitary, terete, obtuse, 2-5 \times 5-25 mm; glumes oblong-ovate, 1.0-1.5 mm, 3-nerved; nuts obovoid, trigonous, 0.6-0.7 \times 0.3-0.4 mm, stramineous.

Open moist or swampy places and paddy fields, 100-1000 m; fl. & fr.: June-Oct.; Dawki.

8. **Fimbristylis aphylla** Steud. Syn. 2: 114. 1855. *F. quinquangularis* var. *crassa* Clarke in Fl. Brit. Ind. 6: 644. 1893.

Annual or perennial tufted herbs, 20-80 cm; stems acutely 5-angled, 1.5-2.5 mm thick; leaves several on sterile shoots, solitary on flowering shoots, 2-3 mm broad; sheaths of flowering stems inflated, acute at apex; umbels lax, decomposed, 2-8 cm broad; bracts setaceous, up to 5 cm;

rays up to 10 cm; spikelets ovoid, subterete, acute, 2-5 × 1.2-2.0 mm; glumes ovate, mucronulate, 1-2 mm, pale to dark brown, 3-5-nerved; nuts obovoid, suborbicular, trigonous, 0.4-0.8 × 0.3-0.5 mm.

Swamps, ditches, streamsides and drains, in shallow waters, 100-1000 m; fl. & fr.: May-Nov.; Carampani.

9. **Fimbristylis fimbristylodes** (F. v. Muell.) Druce in Rep. Bot. Exch. Cl. Brit. Isles 1916: 623. 1917. *Abildgaardia fimbristylodes* F. v. Muell. Fragm. Phyt. Austral. 8: 273. 1874.

Annual herbs, 2-6 cm; stems slender, triquetrous, 0.3-0.5 mm thick; leaves numerous in basal rosettes, strongly falcate, clockwise or anticlockwise, 3-7 × 0.2 cm; umbels simple or compound, 1.5-3.0 cm; bracts 2-4, filiceous, up to 13 mm; rays 2-5; spikelets solitary, lanceolate, compressed, 3-5 × 1.5-2.0 mm, dark brown to blackish; glumes subdistichous, ovate-lanceolate, acute, 2.5-3.0 mm, keeled; nuts obovoid; truncate at base, 0.7-0.8 × 0.5-0.6 mm.

Marshy open places, near streams and rocky places, 500-1000 m; fl. & fr.: Aug.; Ioksi.

10. **Fimbristylis nigrobrunnea** Thw. Enum. Pl. Zeyl. 494. 1864; Fl. Brit. Ind. 6: 648. 1893.

Perennial herbs, 5-60 cm; stems slender, trigonous, 0.5-1.0 mm thick; leaves many, usually $\frac{1}{4}$ - $\frac{1}{2}$ to as long as stem, rounded or abruptly acuminate, 2-5 mm broad; umbels simple or compound; bracts filiceous, erect, up to 15 mm; rays 1-6, up to 3 cm; spikelets in clusters of 2-4, ovoid, 5-15 × 2-4 mm; glossy, dark brown; glumes broadly ovate, keeled, acute, 3.5-5.0 × 2.2-4.0 mm; nuts obovoid, \pm 1 mm, yellow-brown.

Open moist or swampy places, 1000-1600 m; fl. & fr.: Apr.-Oct.; Jarain, Jowai-Bodarpur, Jowai-Raliang.

11. **Fimbristylis eragrostis** (Nees) Hance in J. Inn. Soc. 13: 132. 1873. *Abildgaardia eragrostis* Nees in Wt. Contr. Bot. Ind. 95. 1834.

Perennial tufted herbs, 20-60 cm; stems trigonous, 0.5-1.5 mm thick; leaves flat, triangular at tip, eligulate, 2-3 mm broad; umbels usually compound, simple or decomposed, 2.5-5.0 cm across; rays suberect, 1.5-5.0 cm; bracts foliaceous, up to 2 cm; spikelets solitary, ellipsoid, 5-15 × 2-3 mm; glumes ovate, mucronulate, 3-4 mm, brown; nuts shortly stipitate, obovoid, trigonous, 0.8-1.0 × 0.6-0.8 mm, brown, verrucose.

Open hillslopes, 900-1200 m; fl. & fr.: July-Oct.; Jarain.

10. CYPERUS L.

- 1a. Rachilla articulated above the lower 2 empty glumes and caducous along with the persistent glumes ; spikelets 1—4-flowered.
 - 2a. Stigmas 3 ; nuts trigonous. ... *C. cyperoides* 1
 - 2b. Stigmas 2 ; nuts lenticular.
 - 3a. Glumes winged on keels. ... *C. kyllingia* 2
 - 3b. Glumes not winged on keels.
 - 4a. Rhizomes stoloniferous, 3—40 cm long ; cluster of spikelets solitary, subglobose or ovoid, green ; mature nuts yellow-brown. ... *C. brevifolius* 3
 - 4b. Rhizomes not stoloniferous, 1—4 cm long ; clusters or spikelets 2—3 ; central one cylindric, white, mature nuts black. ... *C. sesquiflorus* 4
- 1b. Rachilla not articulated, persistent ; glumes caducous ; falling away gradually from base to apex ; spikelets 1- to many-flowered.
 - 5a. Stigmas 2 ; nuts lenticular.
 - 6a. Outer superficial cells of nuts longitudinally oblong, the nuts thus appearing imperfectly zonate and transversely wrinkled. ... *C. latespicatus* 5
 - 6b. Outer superficial cells of nuts subquadrate-hexagonal, the nuts thus appearing reticulate or punctulate.
 - 7a. Leaves all clustered at base only ; spikelets linear-lanceolate ; glumes not grooved. ... *C. flavidus* 6
 - 7b. Leaves clustered at base and also scattered upwards ; spikelets oblong ; glumes broad-ovate, usually grooved on the sides. ... *C. sanguinolentus* 7
 - 5b. Stigmas 3 ; nuts trigonous.
 - 8a. Rachillae conspicuously winged by the decurrent glume bases.
 - 9a. Spikes cylindric ; spikelets numerous.
 - 10a. Stolons usually present ; spikelets ascending, acicular or linear-oblong ; wings of rachilla white-hyaline, soon caducous ; glumes elliptic-oblong. ... *C. distans* 8
 - 10b. Stolons absent ; spikelets ascending to divaricate, broad ; wings of rachilla coloured, persistent ; glumes ovate. ... *C. digitatus* 9
 - 9b. Spikes broadly ovate or obovate ; spikelets few to several.
 - 11a. Stolons present, long ; glumes closely overlapping. ... *C. pangorei* 10
 - 11b. Stolons absent or if present very short ; glumes distant. ... *C. tenuiculmis* 11
 - 8b. Rachillae not winged, but sometimes hyaline-margined.
 - 12a. Annual herbs ; spikelets digitate ; glumes aristate with its awns about as long as its body. ... *C. cuspidatus* 12
 - 12b. Perennial or annual herbs ; spikelets spicate or digitate ; glumes acute or mucronate.
 - 13a. Spikelets in lax spikes ; glumes obovate to sub-orbicular ; filaments united at base in an annular callus. ... *C. iria* 13

- 13b. Spikelets in dense spikes or digitate ; glumes linear-lanceolate or ovate-oblong ; filaments free.
- 14a. Spikelets in elongated spikes ; rachis much longer than the spikelets, hispidulous. ... *C. pilosus* 14
- 14b. Spikelets clustered or digitate ; rachis shorter than spikelets, glabrous.
- 15a. Inflorescence capitate, without distinct rays ; umbels simple. ... *C. compressus* 15
- 15b. Inflorescence umbellate with distinct rays ; umbels compound.
- 16a. Perennial herbs ; rhizomes without stolons ; leaves 7—20 mm broad ; bracts much exceeding the umbels ; stigmas long. ... *C. diffusus* 16
- 16b. Annual or perennial herbs ; rhizomes stoloniferous ; leaves 2—5 mm broad ; bracts shorter than to equalling the umbel ; stigmas short. ... *C. halpan* 17

1. **Cyperus cyperoides** (L.) O. Ktze. Rev. Gen. Pl. 2: 333. 1898. *Scirpus cyperoides* L. Mant. Pl. 2: 181. 1771. *Mariscus sieberianus* Clarke in Fl. Brit. Ind. 6: 622. 1893.

Perennial tufted herbs, 10-100 cm ; stems rigid, 2-5 mm thick ; leaves 3-10, as long as or shorter than the stem ; sheaths red-brown ; umbels simple ; lowest bracts 13-45 cm ; rays 6-10, 1-9 cm ; spikes cylindrical, 10-40 × 6-12 mm ; spikelets linear-lanceolate, 3-6 mm ; rachilla winged ; glumes oblong-ovate, greenish-stramineous, several-nerved ; nuts linear-oblong, apiculate, ± 2.2 × 0.5 mm, yellow-brown to dark brown.

Very variable species, the following 2 varieties are noticed :

- 1a. Spikes long-peduncled, cylindric with divaricate spikelets ; glumes membranous. ... var. *cyperoides* 1
- 1b. Spikes sessile or peduncled, somewhat, obovoid-cylindric with ascending spikelets ; glumes subchartaceous. ... var. *bengalensis* 2

1. var. **cyperoides**

Forest edges, wastelands, cultivated fields and open marshy grasslands, 100-1500 m ; fl. & fr. : Mar.-Dec. ; Dawki, Garampani, Raliang, Umjaisaw.

2. var. **bengalensis** (Clarke) Kukenth. in Engler, Pflanzenr. 101: 520. 1936. *Mariscus cyperinus* var. *bengalensis* Clarke in Fl. Brit. Ind. 6: 621. 1893.

Forest borders, streamsides and grasslands, 200-1000 m ; fl. & fr. : May-Nov. ; Garampani, Umjaisaw-Mawkoh.

2. **Cyperus kyllingia** Endl. Cat. Hort. Vindob. 1: 94. 1842. *Kyllingia monocephala* Rottb. Descr. Icon. 13. t. 4. 1773, *p. p.*; Fl. Brit. Ind. 6: 588. 1893.

Perennial herbs, 8-40 cm; rhizomes creeping, 1-5 cm, 1.0-2.5 mm thick; scales oblong, brown; stems usually 2-3, sometimes up to 8 together in linear succession, compressed-triquetrous, 1.0-1.5 mm thick; leaves up to as long as stems, 1.5-3.5 mm broad; sheaths purplish-brown; inflorescences capitate; bracts 3-4, foliaceous, 6-15 cm; spikes solitary, subglobose, 6-9 mm broad, green; spikelets ovate, 2.5-3.0 × 1 mm; glumes keeled, mucronulate, 5-7-nerved; conspicuously red-dotted; nuts obovoid, lenticular, 1.2-1.5 mm, brown-black.

Streamsides, forest borders and marshy paddy fields, 100-1000 m; fl. & fr.: June-Oct.; Umjaisaw-Mawkoh.

3. **Cyperus brevifolius** (Rottb.) Hassk. Cat. Hort. Bogor. 24. 1844. *Kyllingia brevifolia* Rottb. Descr. Icon. 13. t. 4. f. 3. 1773; Fl. Brit. Ind. 6: 588. 1893.

Perennial herbs, 10-90 cm; rhizomes sometimes branched, 4-40 cm, 1.5-2.0 mm thick, pinkish; scales oblong-ovate; stems 5-20 together, 1-3 cm apart; leaves 1-5, much shorter than or equal to stems, 5-20 × 1.5-3.5 mm; sheaths purplish-brown; inflorescence capitate; bracts 3 or 4, foliaceous, up to 20 cm; spikes solitary or often with 2-3 additional small lateral ones; spikelets elliptic-lanceolate, 2.5-3.5 mm; glumes keeled, mucronate; nuts obovoid or oblong-obovoid, 1.0-1.5 mm, yellow to brown.

Wastelands, in sandy soil, near forests and paddy fields, 100-1000 m; fl. & fr.: Mar.-Nov.; Dawki-Sohka, Garampani, Jowai, Jowai-Jarain, Mawkoh-Nartiang, Sohka.

4. **Cyperus sesquiflorus** (Torr.) Mattf. & Kukenth. in Engler, Pflanzenr. 101: 591, f. 6 E-J. 1936. *Kyllingia cylindrica* Nees in Wt. Contr. Bot. Ind. 91. 1884; Fl. Brit. Ind. 6: 588. 1893 (*non C. cylindricus* Boeck. 1859). *K. sesquiflora* Torr. in Ann. Lyc. N. York 3: 287. 1836.

Perennial herbs, 20-45 cm; rhizomes 1-4 cm, 2.0-3.5 mm thick; scales oblong-ovate; stems solitary or 2-3 together, 1.0-1.5 mm thick; leaves 3-7, $\frac{1}{2}$ as long as to equal to stems, up to 20 cm, 2-3 mm broad; sheaths red brown, subtruncate at mouth; inflorescences capitate; bracts 3-5, foliaceous, up to 15 cm; spikes solitary or sometimes with 2 smaller ones, cylindric, 7-10 × 4-6 mm; spikelets elliptic-lanceolate, 2.5-3.0 × 1.0-1.2 mm; glumes 2.0-2.5 mm, 7-9-striate; nuts obovoid, lenticular, $\pm 1.5 \times 1.0$ mm, black.

Roadsides and wastelands, 100-1500 m; fl. & fr.: July-Sept.; Jowai, Umjaisaw.

5. **Cyperus latespicatus** Boeck. in Flora 42: 441. ('443'). 1859. *Pycneus latespicatus* (Boeck.) Clarke in Fl. Brit. Ind. 6: 590. 1893.

Annual tufted herbs, 6-40 cm; stems rigid, 1.0-1.5 mm thick; leaves 3-5, flat, $\frac{1}{2}$ - $\frac{3}{4}$ as long as stem, 2-3 mm broad; sheaths truncate at mouth, brown; umbels simple; bracts 2-4, foliaceous, spreading, lower 1 or 2 exceeding the umbel, 5-11 cm; rays 1-4, up to 7 cm; spikelets oblong-lanceolate, compressed, 10-17 \times 3.5-4.0 mm; glumes oblong-ovate, 3.0-3.5 mm, 3-nerved; nuts obovoid, lenticular, apiculate, \pm 1.5 mm, black.

Moist places in ditches, streamsides, and wastelands, 1000-1500 m; fl. & fr.: June-Dec.; Jarain-Syndai, Nartiang, Umjaisaw-Seitsohma.

6. **Cyperus flavidus** Retz. Obs. Bot. 5: 13. 1789. *Pycneus capillaris* Nees in Linnaea 9: 283. 1834; Fl. Brit. Ind. 6: 591. 1893.

Perennial herbs, 15-75 cm; stems 1-2 mm thick; leaves 1-4, 1-2 mm broad; sheaths reddish-brown, truncate at mouth; umbels simple, lax or dense; bracts 2-4, foliaceous; rays 1-4, up to 11 cm; spikelets linear, compressed, 8-34 \times 1.5-3.0 mm, 15-50-flowered; glumes closely compressed-imbricating, oblong-ovate, 1.5-2.5 mm, muticous, pale brown to chestnut-brown, 3-nerved; nuts obovoid, lenticular, apiculate, 0.8-1.2 mm, black-brown.

Wastelands, forest borders, paddy fields and marshy places in grasslands, 1200-1500 m; fl. & fr.: June-Sept.; Jarain-Syndai, Jowai-Jarain.

7. **Cyperus sanguinolentus** Vahl, Enum. Pl. 2: 351. 1806. *Pycneus sanguinolentus* Nees in Linnaea 9: 283. 1834; Fl. Brit. Ind. 6: 590. 1893.

Annual or perennial herbs, 10-80 cm; rhizomes \pm 2 mm thick; stems 1-2 mm thick; leaves several, clustered at base, 1.5-4.0 mm broad; sheaths brown; umbels capitate, contracted; bracts 2-5, foliaceous, 5-20 cm; rays 1-3, suberect, up to 4 cm; spikelets congested, 3-20 together, ovate or oblong-lanceolate, 5-25 \times 2-3 mm; glumes ovate, 2.2-2.5 mm, obtuse, brown; keel green, 3-5-nerved; nuts obovoid or suborbicular, 1.0-1.8 mm, apiculate, black-brown.

Wastelands and river banks, on moist sandy soil, 1000-1500 m; fl. & fr.: Apr.-Jan.; Nartiang.

8. **Cyperus distans** L. f. Suppl. 103. 1781; Fl. Brit. Ind. 6: 607. 1893.

Perennial tufted herbs, 20-100 cm; rhizomes stout, short; stems rigid, 1.3-3.5 mm thick, swollen at base; leaves 6-12, subequal to stem, 4-10 mm broad; umbels decomposed, lax, 10-25 cm across; bracts 4-8, foliaceous, up to 85 cm; rays 5-12, 9-20 cm; spikes pyramidal, lax; spikelets linear-acicular, 0.6-1.0 cm, \pm 1 mm thick; glumes appressed, elliptic, 1.5-2.0 mm, reddish-brown, 3-5-nerved; nuts ellipsoid, apiculate, 1.3-1.6 mm, dark brown.

Streamsides, ditches and moist wastelands, 200-1500 m; fl. & fr.: Jan.-Dec.; Garampani, Jowai.

9. **Cyperus digitatus** Roxb. Fl. Ind. 1: 209. 1820; Fl. Brit. Ind. 6: 618. 1893.

Rhizomes woody, short-creeping; stems 40-130 cm, 3-6 mm thick, swollen at base; leaves plicate or flat, subequal to stems, 6-12 mm broad; umbels compound or decomposed, 25-40 cm across; bracts 3-8, foliaceous, up to 60 cm; rays 6-10, up to 15 cm; spikes cylindric, 3-6 \times 1-2 cm; spikelets linear, 5-20 \times 1.0-1.5 mm; glumes elliptic-oblong, 2.0-2.3 mm, keeled, mucicous or cuspidate, stramineous-rufous; nuts oblong-ellipsoid, apiculate, 1.0-1.3 mm, yellow-brown.

Swamps and paddy fields, 100-1000 m; fl. & fr.: May-Dec.; Garampani.

10. **Cyperus pangorei** Rottb. Descr. Icon. 31. t. 7. f. 3. 1773. *C. tegetum* Roxb. Fl. Ind. 1: 208. 1832; Fl. Brit. Ind. 6: 613. 1893.

Perennial herbs, 40-80 cm; rhizomes woody, 6-9 mm thick, strongly aromatic; stolons 10-20 cm, \pm 2 mm thick, grey-brown; stems 4-5 mm thick; leaves usually reduced to bladeless sheaths, up to 20 cm, 4-7 mm broad; sheaths 3-5, brown; umbels compound, lax, 20-35 cm across; bracts 3-5, up to 60 cm; rays 6-12, up to 15 cm; spikelets clustered, linear, 12-25 \times 2.5-3.0 mm; glumes elliptic-oblong, \pm 3 mm, mucicous; keel 3-5-nerved, green, reddish at sides; nuts obovoid, apiculate, \pm 1.5 mm, black-brown.

Streamsides and open grasslands, 1000-1500 m; fl. & fr.: July-Dec.; Nartiang.

11. **Cyperus tenuiculmis** Boeck. in Linnaea 36: 286. 1870. *C. zollingeri* (non Steud. 1855) Clarke in Fl. Brit. Ind. 6: 613. 1893.

Annual or perennial herbs, 15-30 cm; rhizomes short woody; stems slender, swollen at base, 1.0-2.5 mm thick; leaves 5-8, usually $\frac{1}{2}$ - $\frac{3}{4}$ as long as stem, 2-8 mm broad; lower sheaths purplish; umbels simple or compound, lax, 8-20 cm across; bracts 3-7, up to 20 cm; rays 3-10, up to

20 cm; spikes broadly ovate; spikelets linear-lanceolate, compressed, 1-3 × 1.5-2.0 mm; glumes elliptic-lanceolate, 3-4 mm, 7-9-nerved; nuts obovoid, trigonous with obtuse angles, 1.5-2.0 mm, black.

Marshy and dry places, paddy fields and wastelands, 1000-1600 m; fl. & fr.: June-Sept.; Jarain, Jarain-Syndai.

12. **Cyperus cuspidatus** Kunth in H. B. K. Nov. Gen. Sp. 1: 204. 1815; Fl. Brit. Ind. 6: 598. 1893.

Annual caespitose herbs, up to 17 cm; stems slender, ± 0.5 mm thick; leaves 4-6, shorter than to longer than stem, 0.5-1.0 mm broad; lower sheaths purplish; umbels simple or compound; bracts 2-4, up to 10 cm; rays 1-3, up to 3 cm; spikelets linear, compressed, 4-12 × 1.0-1.3 mm; glumes ovate, aristate, ± 2 mm, usually rufous-ferruginous; keel 3-nerved, green; nuts obovoid, apiculate, ± 1 mm, chestnut brown, punctulate.

Wastelands, in moist places, near paddy fields, 1000-1400 m; fl. & fr.: July-Dec.; Nartiang.

13. **Cyperus iria** L. Sp. Pl. 45. 1753; Fl. Brit. Ind. 6: 606. 1893.

Annual tufted herbs, 5-70 cm; stems compressed, 1-3 mm thick; leaves shorter than to subequal to the stem, 1.5-5.0 mm broad; sheaths purplish; umbels simple or compound, lax, 5-20 cm across; bracts 3-7, up to 30 cm; rays 3-8, up to 15 cm; umbellules subdense; spikes narrow, 1-4 cm; spikelets linear-oblong, compressed, 3-9 × 1.5-2.0 mm; nuts obovoid-ellipsoid, apiculate, 1.0-1.5 mm, glossy dark brown.

Paddy fields and wastelands, 100-700 m; fl. & fr.: May-Dec.; Dawki, Nartiang.

14. **Cyperus pilosus** Vahl, Enum. Pl. 2: 354. 1806; Fl. Brit. Ind. 6: 609. 1893.

Perennial tufted herbs, 20-80 cm; stolons up to 7 cm, ± 1 mm thick; stems 2.5-5.0 mm broad, scabrid at angles above; leaves shorter than stems, 6-10 mm broad; lower sheaths purplish; umbels compound, lax, 10-40 cm across; bracts up to 60 cm; rays 2-10, up to 20 cm; spikes sessile, linear, 2-5 cm; spikelets distichous linear, compressed, 6-12 × 1.5-2.0 mm; glumes loosely imbricating, ovate-elliptic, muticous, 1.5-2.0 mm, yellow or reddish-brown, 5-9-nerved; nuts obovoid, apiculate, ± 1 mm, black.

Marshy places in wastelands and forest borders, 100-1400 m; fl. & fr.: May-Oct.; Jarain-Muktapur, Jowai, Shangpung to Garampani.

15. **Cyperus compressus** L. Sp. Pl. 46. 1753; Fl. Brit. Ind. 6: 605. 1893.

Annual tufted herbs, 5-50 cm; stems 1-2 mm thick; leaves shorter than to subequal to stems, 1.5-4.0 mm broad, greyish-green; sheaths red-brown; umbels simple, lax; bracts 3-7, up to 30 cm; rays 1-8, up to 15 cm; spikelets in clusters of 4-12, linear-oblong, subcompressed-subquad-rangular, 1.0-3.5 × 3-5 mm; glumes ovate mucronate, 3.0-4.5 mm, yellow or brownish, many-nerved; nuts obovoid, apiculate, 1.5-1.7 mm, glossy, black-brown.

River-beds, streamsides and paddy fields, 100-700 m; fl. & fr.: May-Dec.; Dawki.

16. **Cyperus diffusus** Vahl, Enum. Pl. 2: 321. 1806; Fl. Brit. Ind. 6: 608. 1893.

Perennial tufted herbs, 20-80 cm; stems 2-5 mm thick; leaves subequal to stems, 8-20 mm broad; sheaths purplish; umbels decompound, lax, 9-30 cm across; bracts 4-12, up to 50 cm; rays 6-25, up to 20 cm; spikelets in clusters of 2-4, lanceolate, subcompressed, 5-12 × 2 mm; glumes remote, spread out, ovate to suborbicular, mucronate, 1.5-2.0 mm; keel 3-nerved; nuts ellipsoid; nuts acute, ± 1.5 mm, black-brown.

Marshy paddy fields and grasslands, 100-1500 m; fl. & fr.: May-Feb.; Dawki.

17. **Cyperus halpan** L. Sp. Pl. 45. 1753 (*'haspan'*); Fl. Brit. Ind. 6: 600. 1893.

Perennial or rarely annual herbs, tufted, 8-70 cm; rhizomes up to 5 cm; scales purplish-red; stems 1-3 mm thick, often ribbed; leaves 3-7, $\frac{1}{2}$ - $\frac{3}{4}$ as long as stems, 1.5-4.0 mm broad; sheaths reddish; umbels compound or decompound; bracts 2-3, as long as or shorter than umbels; rays 10-15, up to 12 cm; spikelets digitate, linear-lanceolate, compressed, 3-12 × 1.0-1.5 mm; glumes ovate-oblong, mucronulate, 1.0-1.7 mm, yellowish-red; nuts broadly obovoid, trigonous, apiculate, ± 0.5 mm, yellow.

Streamsides, ditches and paddy fields, 100-1500 m; fl. & fr.: Jan.-Dec.; Dawki, Garampani, Mawryngkneng, Raliang.

165. POACEAE

An economically important family with the following species under cultivation:

1. *Eleusine coracana* Gaertn.—African Millet—'Unei'.
2. *Oryza sativa* L.—Rice—'Ukhaw'.
3. *Zea mays* L.—Maize—'Ruhadem'.

- 1a. Spikelets 1-many-flowered, breaking up at maturity above the more or less persistent glumes, or if falling entire, then not 2-flowered with the lower floret male or barren and upper bisexual.
- 2a. Shrubs or trees with woody often tall persistent culms, very rarely perennial herbs; leaf-blades flat, many-nerved, often with transverse veins, usually with a petiole-like base and articulate with the sheath; spikelets bisexual; lemmas 5- to many-nerved, usually awnless; lodicules usually 3; stigmas mostly 2 or 3.
 - 3a. Stamens 3, rarely 6.
 - 4a. Leaves not tessellate; ultimate branches of inflorescence with bracts at base. ... *Thamnocalamus* 1
 - 4b. Leaves tessellate; ultimate branches of inflorescence without bracts at base.
 - 5a. Style 1, with 3 stigmatic branches. ... *Arundinaria* 2
 - 5b. Styles 2, with 2 stigmatic branches. ... *Chimonobambusa* 3
 - 3b. Stamens 6 or more.
 - 6a. Pericarp of fruits thin, adnate to grain, adhering to hilum only.
 - 7a. Filaments free. ... *Bambusa* 4
 - 7b. Filaments connate. ... *Oxytenanthera* 5
 - 6b. Pericarp of fruits crustaceous or fleshy, separable from grain.
 - 8a. Spikelets with 1 central floret bisexual. ... *Cephalostachyum* 6
 - 8b. Spikelets with 2—5 central florets bisexual.
 - 9a. Spikelets with 2—3 central florets bisexual; lodicules absent. ... *Dendrocalamus* 7
 - 9b. Spikelets with 3—5 central florets bisexual; lodicules present. ... *Pseudostachyum* 8
- 2b. Perennial or annual herbs with herbaceous, very rarely somewhat woody culms; leaf-blades usually sessile and not articulated with sheaths.
 - 10a. Spikelets with 1 fertile floret (male or female in unisexual 1-flowered spikelets), with or without 1 or 2 male or barren florets below it, the latter often much reduced.
 - 11a. Glumes minute (usually represented by 2 semicircular inconspicuous lips), or suppressed; fertile lemma and palea very similar in shape and texture; spikelets firmly compressed; stamens usually lax; florets bisexual or unisexual. ... *Leersia* 9
 - 11b. Glumes well-developed; fertile lemma and palea not similar.
 - 12a. Spikelets with 2 florets; the lower male or barren, the upper bisexual.
 - 13a. Lower floret empty and without a palea; glumes up to half the length of the spikelet; rachilla produced beyond the upper floret and sometimes bearing

- an empty lemma ; spikelets falling with part of the pedicel attached. ... *Thysanolaena* 10
- 13b. Lower floret male or barren, usually with a palea ; upper glume as long as the spikelets ; rachilla disarticulating below the upper floret and not produced beyond it ; glumes more or less persistent.
- 14a. Glumes unequal, the lower acute, the upper acuminate ; upper lemma awned with a perfect awn or at least a bristle. ... *Arundinella* 11
- 14b. Glumes equal in size, obtuse or mucronate ; upper lemma unawned. ... *Isachne* 12
- 12b. Spikelets with one fertile floret.
- 15a. Base of glumes bearded at base ; rachilla disarticulating below the glumes. ... *Garnotia* 13
- 15b. Base of glumes not bearded at base ; rachilla disarticulating above the glumes.
- 16a. Lemmas 1—3-nerved, awnless ; glumes and lemmas very similar in texture, hyaline or thinly membranous, shiny ; grain usually with a free pericarp. ... *Sporobolus* 14
- 16b. Lemmas 3—5-nerved, frequently awned ; glumes longer and firmer than the hyaline lemma or when the lemma is longer than the latter, indurated ; grains with adhering pericarp. ... *Muhlenbergia* 15
- 10b. Spikelets usually with 2 or more fertile florets or if with one fertile floret, then sterile florets present above it.
- 17a. Tall grasses with large plume-like panicles ; lemmas or rachilla-joints bearing long silky hairs, which envelop the lemma (at least in fertile florets) ; lemmas awnless or with a straight awn from the tip, often thin.
- 18a. Lemmas glabrous ; rachilla long-villous. ... *Phragmites* 16
- 18b. Lemmas hairy all over the back ; rachilla glabrous. ... *Arundo* 17
- 17b. Low moderately high grasses ; lemma and rachilla glabrous or hairy, but with the hairs not enveloping the lemma, or if so, then the lemma with a geniculate awn.
- 19a. Lemmas usually 5- to many-nerved, awnless or awned, awn usually simple, not kneed or twisted.
- 20a. Lemmas not awned, at most mucronate, often furnished with reflexed tubercle-based bristles at margins. ... *Cenotheca* 18

- 20b. Lemmas awned or shortly mucronate, without tubercle based bristles; upper lemmas represented by a pencil of retrorsely barbed awns. ... *Lophatherum* 19
- 19b. Lemmas 1—3-nerved, awnless.
- 21a. Stout reed-like grasses; lemmas usually emarginate or 2—4-lobed or toothed at apex. ... *Neyraudia* 20
- 21b. Low grasses; lemmas entire at apex.
- 22a. Spikelets sessile or very shortly pedicelled, loosely to densely imbricate in digitate spikes or spike-like racemes, rarely solitary. ... *Eleusine* 21
- 22b. Spikelets in open contracted or spike-like panicles, rarely in solitary secund spikes.
- 23a. Inflorescence a panicle, sometimes spike-like. ... *Eragrostis* 22
- 23b. Inflorescence a solitary or secund spike. ... *Eragrostiella* 23
- 1b. Spikelets 2-flowered, falling entire at maturity, usually with the upper floret bisexual and the lower male or barren and if the latter, often reduced to the lemma or rarely the lemma entirely absent; all alike or more often differing in size, shape and structure, frequently dorsally compressed.
- 24a. Male and female spikelets in separate inflorescences or in different parts of the same inflorescence and of different appearance; lemmas hyaline or membranous and thinner than the glumes.
- 25a. Female spikelets completely enclosed in the metamorphosed leaf-sheath which takes the form of globose or cylindrical osseous or ivory bead-like structure. ... *Coix* 24
- 25b. Female spikelets not enclosed in a false involucre as above. ... *Polytoca* 25
- 24b. Spikelets all bisexual or with male or barren and bisexual spikelets mixed in the same inflorescence and so arranged that a male or barren spikelet is near a bisexual spikelet or if unisexual then the lemma of the fertile floret indurated.
- 26a. Spikelets solitary or paired, more or less similar; glumes usually smaller or sometimes suppressed; lower lemma mostly resembling the upper glume in texture; upper lemma papery to very tough and rigid, usually awnless.
- 27a. Spikelets with an involucre of bristles subtended by a solitary bristle and falling with or without the bristles at maturity. ... *Setaria* 26
- 27b. Spikelets falling singly, not subtended by bristles, or if so then the bristles persisting after the spikelets have fallen.
- 28a. Spikelets arranged in more or less open panicles.
- 29a. Spikelets usually arranged in cylindrical spike-like panicles; upper glume inflated or not. ... *Sacciolepis* 27

- 29b. Spikelets arranged in more or less open panicles, or with panicles contracted and spike-like.
 - 30a. Spikelets distinctly gibbous and laterally much compressed. ... *Cyrtococcum* 28
 - 30b. Spikelets not or only slightly gibbous at base. ... *Panicum* 29
- 28b. Spikelets arranged in one-sided spikes or spike-like racemes ; spikes or racemes digitate or scattered, rarely solitary.
 - 31a. Lemma of upper floret thinly cartilaginous, usually with flat hyaline margins.
 - 32a. Spikelets awnless. ... *Digitaria* 30
 - 32b. Spikelets awned. ... *Alloteropsis* 31
 - 31b. Lemma or upper floret more or less crustaceous or coriaceous, usually with narrow inrolled margins, exposing much of the palea.
 - 33a. Spikelets laterally compressed, obliquely ovate ; upper glume boat-shaped, with rows of glands or hooked hairs or bristles between the nerves. ... *Pseudechinolaena* 32
 - 33b. Spikelets dorsally compressed or almost terete, the glumes and lower lemma rounded on the back or only keeled at the tip.
 - 34a. Lower glume turned towards rachis, the back of the upper lemma turned away from it, *i.e.* spikelets adaxial. ... *Brachiaria* 33
 - 34b. Lower glume (when present) turned away from the rachis of the racemes or spikes, the back of the upper lemma facing it, *i.e.* spikelets abaxial.
 - 35a. Glumes awnless, if acuminate, then the upper lemma mucronate. ... *Paspalum* 34
 - 35b. Glumes acuminate or awned, rarely only acute ; upper lemma not mucronate.

- 36a. Leaf-blades linear ; racemes dense ; culms erect or suberect. ... *Echinochloa* 35
- 36b. Leaf-blades lanceolate to ovate ; racemes loose to moderately dense ; culms creeping and ascending. ... *Oplismenus* 36
- 26b. Spikelets often paired, with one sessile and the other pedicelled, those of each pair similar or more often dissimilar, rarely solitary and all alike ; glumes as long as the spikelets and enclosing the florets, more or less rigid and firmer than lemmas, which are both hyaline and/or membranous ; upper lemma usually awned.
- 37a. Spikelets solitary, pedicelled or almost sessile at the nodes of a tough or fragile rachis ; inflorescence of a single raceme or of several racemes. ... *Dimeria* 37
- 37b. Spikelets in pairs, rarely in threes, similar or dissimilar, a sessile and a pedicelled or one short and the other long-pedicelled, rarely the pedicelled one reduced.
- 38a. Spikelets of each pair similar, the sessile and the pedicelled bisexual.
- 39a. Spikelets arranged in a single or in several racemes, the latter being digitate or arranged along a very short main axis ; pedicelled spikelets rarely reduced to pedicel (in *Apocopis*).
- 40a. Lower glume deeply or shallowly furrowed at back. ... *Microstegium* 38
- 40b. Lower glume more or less flat, very shallowly depressed but not furrowed or rounded at back.
- 41a. Lower glume broadly truncate ; pedicelled spikelets much reduced, usually represented by the pedicel only, very rarely present ; stamens 2. ... *Apocopis* 39
- 41b. Lower glume not markedly truncate ; pedicelled spikelets developed ; stamens usually 3, rarely 2.
- 42a. Lower glume 2-keeled, depressed between keels. ... *Eulalia* 40
- 42b. Lower glume convex on the back, at least at maturity. ... *Pogonatherum* 41

- 39b. Spikelets arranged in more or less ample panicles or compound racemes arranged along a central axis ; upper lemma awnless or awned from the entire top or from between 2 terminal teeth.
- 43a. Rachis of racemes breaking up.
- 44a. Spikelets awned. ... *Erianthus* 42
- 44b. Spikelets not awned. ... *Saccharum* 43
- 43b. Rachis of racemes tough or tardily breaking up ; spikelets deciduous from their pedicels.
- 45a. Upper lemma cleft ; branches of the panicle whorled ; spikelets all pedicelled. ... *Eccoilopus* 44
- 45b. Upper lemma not or hardly 2-toothed.
- 46a. Lemmas awned.
- 47a. All spikelets pedicelled. ... *Miscanthus* 45
- 47b. One spikelet pedicelled, the other sessile. ... *Narenga* 46
- 46b. Lemmas awnless.
- 48a. Panicles narrow, contracted, silvery ; glumes very delicate ; callus-hairs twice as long as the glumes. ... *Imperata* 47
- 48b. Panicles broader or widely spreading ; glumes indurated, brown or reddish-brown ; callus hairs very short or absent.
- 49a. Spikelets oblong, one sessile and the other pedicelled ; rachis of racemes tardily breaking up. .. *Narenga* 46
- 49b. Spikelets ovate or obovate, one short and the other long-pedicelled ; rachis of racemes tough. ... *Sclerostachya* 48
- 38b. Spikelets of each pair dissimilar, the sessile one bisexual, the pedicelled ones male or sterile, or completely absent or if more or less similar, then the joints of the raceme and the pedicel thick and swollen.
- 50a. Joints of rachis and pedicel of the pedicelled spikelet (if not much reduced) swollen, 3-angled, rounded or flattened.
- 51a. Sessile spikelet with a male and a bisexual floret ; lemma awned, rarely awnless.
- 52a. Racemes 1-noded, reduced to 3 bisexual spikelets, enclosed in a boat-shaped spathe. .. *Apluda* 49
- 52b. Racemes many-noded, not contained in a spathe-like sheath. ... *Ischaemum* 50
- 51b. Sessile spikelets with a bisexual floret only, or occasionally with a male floret below ; upper lemma awnless.
- 53a. Racemes several, at the tip of the peduncle. ... *Thyrsia* 51
- 53b. Racemes solitary, terminating the culm and branches.
- 54a. Sessile spikelets globose ; lower glume pitted all over ; pedicelled spikelets reduced. ... *Rytidix* 52
- 54b. Sessile spikelet not spherical in shape.
- 55a. Spikelets paired, one sessile, the other pedicelled. ... *Coelorhachis* 53
- 55b. Spikelets solitary, sessile, the pedicelled suppressed or rudimentary ; pedicels fused to the internode. .. *Ophiuros* 54

- 50b. Joints of rachis and the pedicel narrow, seldom thickened upwards, occasionally with a translucent longitudinal groove ; sessile spikelet usually awned.
- 56a. Racemes not interrupted by spathe, collected into whorled panicles ; joints and pedicels not furrowed.
- 57a. Spikelets laterally compressed. ... *Chrysobogon* 55
- 57b. Spikelets dorsally compressed. ... *Sorghum* 56
- 56b. Racemes interrupted by spathes or the espathate racemes digitate or in pairs or solitary, terminal, sometimes the joints and/or pedicels with a translucent median furrow.
- 58a. Margins of lower glumes inturned and rounded at the sides, at most keeled upwards ; callus mostly sharp and long ; awn usually hairy.
- 59a. Upper lemma 2-lobed or 2-cleft and awned from the sinus. ... *Hyparrhenia* 57
- 59b. Upper lemma not 2-lobed or cleft, stipitate and passing into the awn. ... *Themeda* 58
- 58b. Margins of lower glume of the sessile spikelets sharply infolded, 2-keeled ; awn glabrous.
- 60a. Upper lemma of sessile spikelet not cleft, often stipitate and passing into the awn.
- 61a. Spikelets arranged in false racemes, terminating the branches and branchlets of a true panicle ; pedicels with a median translucent furrow. ... *Capillipedium* 59
- 61b. Spikelets arranged in false racemes which are either solitary and terminal or subsessile, arranged along a central axis, but not at the tips of capillary branches. ... *Dichanthium* 60
- 60b. Upper lemma of sessile spikelet 2-lobed or 2-cleft, awned in the sinus.
- 62a. Aromatic grasses ; racemes in pairs supported by spathes, often collected into huge panicles, one pair of spikelets in each raceme homogamous, male or neuter, all others heterogamous. ... *Cymbopogon* 61
- 62b. Not aromatic ; racemes in pairs, or digitate or solitary.
- 63a. Racemes solitary at the end of the culms and their branches ; joints and pedicels often somewhat stout ; pedicelled spikelets male, neuter or suppressed. ... *Schizochyrium* 62
- 63b. Racemes 2-nate or more rarely digitate, usually all pairs of spikelets heterogamous and all sessile spikelets bisexual and alike or the lowest more or less reduced and barren but still resembling the upper fertile spikelet. ... *Andropogon* 63

1. THAMNOCALAMUS Munro

Thamnocalamus prainii (Gamble) A. Camus, *Bambusécs* 54. 1913; Fl. As. 5: 54. 1940. *Microcalamus prainii* Gamble in J. As. Soc. Beng. 49(2): 207. t. 7. 1891. *Arundinaria prainii* (Gamble) Gamble in Ann. R. Bot. Gard. Calc. 7: 21. t. 19. 1896 et in Fl. Brit. Ind. 7: 383. 1896. 'Sampit'.

Climbing; culms slender, up to 10 m, yellow; internodes solid, 20-22 cm, 5-7 mm diam.; culm-sheaths 2-15 x 1-2 cm; blade subulate, 3-5 mm; ligules short, rounded; leaves oblong-lanceolate, rounded at base, setaceous at apex, 5-10 x 0.7-1.5 cm; spikelets 2.5-3.5 cm, 3-6-flowered, in terminal or axillary panicles; glumes 2 or 3, lanceolate, keeled, ciliate at margins.

Primary forests, 1200-1600 m; fl. & fr.: indefinite; Jowai-Jarain.

2. ARUNDINARIA Michx.

Arundinaria suberecta Munro in Trans. Linn. Soc. 26: 32. 1868; Fl. Brit. Ind. 7: 385. 1896; Fl. As. 5: 41. 1940. 'Lambnang', 'Namlong'.

Erect wiry shrubs; culms 2-4 m; internodes 15-25 cm, 7-8 mm thick; nodes swollen; culm-sheaths papery, attenuate upwards, 5-15 x 1.0-1.5 cm; blade subulate, leafy, 1.2-3.7 cm; ligule fimbriate at tip; leaves linear-lanceolate, narrow at base, scabrous, serrate and revolute at margins, 5-15 x 0.5-0.7 cm; leaf-sheaths striate, slightly hairy when young; ligules long, pubescent; inflorescences unknown.

Forests and banks of rivers, 1000-1500 m; Jowai.

3. CHIMONOBAMBUSA Makino

- | | | |
|---|-----|--------------------------|
| 1a. Culms 2.5-3.5 cm thick; nodes with spines; inflorescences on leafy branches. | ... | <i>C. griffithiana</i> 1 |
| 1b. Culms 1.0-1.5 cm thick; nodes without spines; inflorescences on separate leafless branches. | ... | <i>C. khasiana</i> 2 |

1. **Chimonobambusa griffithiana** (Munro) Nakai in J. Arn. Arb. 6: 151. 1925; Fl. As. 5: 45. 1940. *Arundinaria griffithiana* Munro in Trans. Linn. Soc. 26: 30. 1868; Fl. Brit. Ind. 7: 379. 1896. 'Khnap'.

Culms erect, single, 3-10 m; internodes 16-22 cm, 2.5-3.5 cm thick; nodes prominent with a ring of spinules; culm-sheaths broad at base, attenuate upwards, 15-22 x 10-12 cm; blade triangular, 5-25 mm; ligules short, ciliate-hairy; leaves linear-lanceolate, 10-13 x 1.0-1.3 cm; racemes

terminal, paniculate; spikelets 2.5-3.5 cm; glumes 2, ovate-lanceolate, hairy on back.

Forests and forest borders, 1000-1500 m; Jaintia Hills, *Munro s. n.*

2. **Chimonobambusa khasiana** (Munro) Nakai in J. Arn. Arb. 6: 151. 1925; Fl. As. 5: 47. 1940. *Arundinaria khasiana* Munro in Trans. Linn. Soc. 26: 28. 1868; Fl. Brit. Ind. 7: 381. 1896. 'Ekhra'.

Bushy shrubs; culms 2-4 m; internodes 15-20 cm, 1.0-1.5 cm thick; culm-sheaths papery, straw-coloured, 15-22 × 4-5 cm; blade subulate, ± 2.5 cm; ligules subulate, 5-7 mm; leaves linear-lanceolate, 7-10 × 0.7-0.8 cm; racemes fascicled at leafless or leafy nodes; spikelets 10-18 mm, 2-3-flowered; glumes 2, ciliate at apex and margins.

Forests and forest borders, 1000-1600 m; Jowai.

Locally used for walls of houses.

4. BAMBUSA Schrad. *nom. cons.*

- | | |
|--|----------------------|
| 1a. Culm-sheaths usually yellow-stripped; spikelets flattened. ... | <i>B. vulgaris</i> 1 |
| 1b. Culm-sheaths usually green, rarely yellow-stripped; spikelets cylindrical. | |
| 2a. Culm-sheaths with large auricles; blades of sheaths short-triangular, reniform or cordate at base. ... | <i>B. tulda</i> 2 |
| 2b. Culm-sheaths with small auricles; blades of sheaths long-triangular, broad-rounded at base. ... | <i>B. pallida</i> 3 |

1. **Bambusa vulgaris** Schrad. in Wendl. Collect. Pl. 2: 26. t. 47. 1810, Fl. Brit. Ind. 7: 391. 1896; Fl. As. 5: 34. 1940.

Culms 6-15 m; internodes 25-45 cm; 5-10 cm thick; nodes with a ring of brown hairs; culm-sheaths 15-25 × 17-23 cm, concave at apex, shiny inside, ciliate at margins; blade triangular, decurrent with 2 rounded falciform auricles at base, acuminate at apex, 15-25 × 1-3 cm; spikelets oblong-lanceolate, compressed, in bracteate interrupted clusters of 3-10 on long leafless branches; glumes 1-2, ovate-acute, 6-9 mm, ciliate towards apex.

Forests and forest borders, 1000-1500 m; Jowai.

Used for building huts and making baskets.

2. **Bambusa tulda** Roxb. Fl. Ind. 2: 193. 1832; Fl. Brit. Ind. 7: 387. 1896; Fl. As. 5: 27. 1940. 'Skhong', 'Kernai'.

Culms 15-22 m; internodes 30-55 cm, 6-10 cm thick; culm-sheaths 15-22 × 15-25 cm, attenuate towards apex, appressed-hairy outside, shiny

smooth inside; blade triangular or reniform, decurrent at base into rounded long-fringed auricles, cuspidate at apex, 15-35 × 10-20 cm, hairy inside; leaves linear or oblong-lanceolate, 10-30 × 1.5-3.5 cm; spikelets 2.5-7.5 cm, 7-10-flowered, in fascicles of 3-5 on leafless branches.

Forests and forest borders, 500-1500 m; Jowai, Sutnga, Syndai, Umtapoh.

Used for building huts.

3. **Bambusa pallida** Munro in Trans. Linn. Soc. 26: 97. 1868; Fl. Brit. Ind. 7: 389. 1896; Fl. As. 5: 30. 1940. '*Ka-skhen*'.

Culms 10-20 m; internodes 50-70 cm, 5-8 cm thick; culm-sheaths straight, truncate at apex, 17-30 × 20-25 cm, appressed white-hairy when young; blade triangular-acuminate at apex, 12-30 × 10-20 cm, fringed with bristles, black hairy outside; leaves linear-lanceolate, rounded at base, subulate at apex, 10-20 × 1-2 cm; spikelets 8-30 mm, in interrupted fascicles on leafless branches.

Forests and forest borders, 200-1500 m; Jowai, Syndai.

Used for building huts and making baskets.

5. OXYTENANTHERA Munro

Oxytenanthera nigrociliata (Buse) Munro in Trans. Linn. Soc. 26: 228. 1868; Fl. Brit. Ind. 7: 401. 1896; Fl. As. 5: 37. 1940. *Bambusa nigrociliata* Buse in Miq. Pl. Jungh. 3: 389. 1854.

Culms 10-15 m, 1-5 cm thick; internodes 34-70 cm; culm-sheaths 20-40 cm, ciliate at margins, truncate at apex; blades ovate-lanceolate; ligules triangular; auricles rounded hairy inside; leaves lanceolate, subequally rounded at base, subulate at apex, 15-30 × 2-4 cm; sheaths stiff, ciliate at margins; panicles large; spikelets stiff, few in capitate whorls of 3-8, 5-7-flowered, linear; glumes 1-3, ciliate at margins, with brown or purple hairs.

Forests and forest borders, 200-1500 m; Ioksi, Jowai.

6. CEPHALOSTACHYUM Munro

- | | |
|---|-----------------------|
| 1a. Leaves 3-5 cm wide; palea entire at apex; anthers blunt. ... | <i>C. capitatum</i> 1 |
| 1b. Leaves 1.5-2.5 cm wide; palea bifid at apex; anthers apiculate. | <i>C. pallidum</i> 2 |

1. **Cephalostachyum capitatum** Munro in Trans. Linn. Soc. 26: 139. 1868; Fl. Brit. Ind. 7: 412. 1896; Fl. As. 5: 18. 1940. '*Ternap*'.

Subscandent; culms 5-10 m, yellow; internodes 50-100 cm, 2.5-3.0 cm thick; culm-sheaths truncate at apex, 15-30 × 5-7 cm, covered with brown pubescence at back; blade narrow, lanceolate, white-hairy; auricles 2, fringed; leaves ovate-lanceolate, unequal and rounded at base, twisted-setaceous at apex, 10-20 × 3-5 cm; spikelets 1.5-2.0 cm, in terminal or axillary globose heads of 2.5-4.0 cm diam.; glumes ovate, ending in scabrous awn.

Primary forests and forest clearings, 1200-1600 m; Jowai.

2. **Cephalostachyum pallidum** Munro in Trans. Linn. Soc. 26: 140. 1868; Fl. Brit. Ind. 7: 412. 1896; Fl. As. 5: 17. 1940. '*Serrah*'.

Shrubby; culms 8-10 m, greenish-yellow; internodes 30-50 cm, 1.5-2.0 cm thick; culm-sheaths truncate at top, 15-25 × 4-6 cm, thin-papyraceous, appressed brown-pubescent; blade lanceolate, rounded at base, decurrent into small fringed auricles; ligules narrow, toothed; leaves ovate-lanceolate, unequal and rounded at base, setaceous at apex, 5-12 × 1.5-2.5 cm; spikelets 1.5-2.0 cm, in terminal globose heads of ± 2.5 cm diam.; glumes ovate, ending in ± 5 mm long awn.

Primary forests and forest borders, 1000-1500 m; Jarain.

7. DENDROCALAMUS Nees

- | | |
|---|------------------------|
| 1a. Leaves 0.5—2.0 cm broad; rachis of spikes solid or nearly so; spikelets spinescent. ... | <i>D. strictus</i> 1 |
| 1b. Leaves 3—8 cm broad; rachis of spikes usually hollow; spikelets not spinescent. | |
| 2a. Culm-sheaths 30—50 × 15—20 cm, glabrescent or glabrous. ... | <i>D. hamiltonii</i> 2 |
| 2b. Culm-sheaths 20—25 × 25—30 cm, densely black or brown hairy. | <i>D. hookeri</i> 3 |

1. **Dendrocalamus strictus** (Roxb.) Nees in Linnaea 9: 476. 1834; Fl. Brit. Ind. 7: 404. 1896; Fl. As. 5: 6. 1940. *Bambusa stricta* Roxb. Pl. Corom. 1: 58. t. 80. 1798.

Densely tufted; culms 6-15 m; internodes 30-45 cm, 8-10 cm thick; culm-sheaths 8-30 cm, covered outside with black or golden brown stiff hairs; blade triangular-subulate, 6-8 cm, hairy on both sides; leaves linear-lanceolate, obliquely rounded at base, sharp-acuminate at apex, 4-20 × 0.5-2.0 cm; spikelets 8-12 mm, in spaced fascicles on rachis; glumes 2 or more, ovate, spinescent, surrounded by ciliate tufts of hairs.

Forests and forest edges, 100-600 m; Garampani.

2. **Dendrocalamus hamiltonii** Munro in Trans. Linn. Soc. 26: 151. 1868; Fl. Brit. Ind. 7: 405. 1896; Fl. As. 5: 9. 1940. '*Ka-Seirt*'.

Tufted; culms 15 - 22 m; internodes 30 - 50 cm, 10 - 15 cm thick; culm-sheaths glabrous and shiny inside, with patches of brown hairs outside; blade ovate-lanceolate, 12 - 20 cm, glabrous outside, hairy at base inside; leaves broadly lanceolate, rounded at base, acuminate at apex, 25 - 35 × 3 - 4 cm; spikelets ovoid, ± 1 cm, purple, in spaced heads on rachis; glumes 2, ovate, obtuse at apex.

Forests and forest-borders, 200 - 1500 m; Jowai, Raliang.

3. **Dendrocalamus hookeri** Munro in Trans. Linn. Soc. 26: 151. 1868; Fl. Brit. Ind. 7: 405. 1896; Fl. As. 5: 8. 1940.

Large tufted; culms 15 - 20 m; internodes 40 - 50 cm, 10 - 15 cm thick; culm-sheaths glabrous and shiny inside, densely covered with black or brown hairs outside; blade triangular, 4 - 8 × 2 - 4 cm, hairy at top; leaves oblong-lanceolate, rounded at base, long-acuminate at apex, 20 - 28 × 4 - 8 cm; spikelets ovate-acute, 8 - 10 mm, in spaced heads on rachis; glumes 2, ovate, obtuse.

Primary forests and forest borders, 1200 - 1600 m; Jowai, Raliang.

8. PSEUDOSTACHYUM Munro

Pseudostachyum polymorphum Munro in Trans. Linn. Soc. 26: 142. 1868; Fl. Brit. Ind. 7: 409. 1896; Fl. As. 5: 13. 1940. 'Serrah', 'Silloh'.

Large shrubby; culms up to 17 cm; internodes 20 - 22 cm, 3.0 - 3.5 cm thick; culm-sheaths triangular-truncate, 15 - 20 × 3.5 - 4.0 cm, shortly auricled with a tuft of bristles; blades long-acuminate on young culms and triangular on others; ligules short, narrowly dentate; leaves oblong-lanceolate, unequally rounded at base, attenuate and twisted at apex, 10 - 35 × 3 - 5 cm; panicles with branches fascicled at nodes; spikelets ± 5 mm; glume 1, mucronate, 1-nerved.

Primary forests and often cultivated near villages, 100 - 1500 m; Sutnga, Syndai.

9. LEERSIA Sw. *nom. cons.*

Leersia hexandra Sw. Prodr. Veg. Ind. Occ. 21. 1788; Fl. Brit. Ind. 7: 94. 1896; Fl. As. 5: 173. 1940.

Culms forming dense masses, 60 - 120 cm; nodes hairy; leaves erect, linear, 7 - 20 × 0.5 - 1.0 cm; panicles 5 - 10 cm; branches 2 - 3 cm, erect or spreading; spikelets closely imbricating, oblong-compressed, 3 - 4 mm;

glumes reduced to a rim at the apex of pedicel; lemma oblong, 3-4 mm, 5-nerved, laterally compressed, ciliate at keels; palca linear-oblong, 3-nerved, ciliate on keels.

Open marshy places in grasslands and paddy fields, 1000-1500 m; fl. & fr.: Aug.-Dec.; Garampani, Raliang.

10. THYSANOLAENA Nees

Thysanolaena maxima (Roxb.) O. Ktze. Rev. Gen. Pl. 2: 794. 1891; Fl. As. 5: 176. 1940. *Agrostis maxima* Roxb. Fl. Ind. 1: 319. 1820. *T. agrostis* Nees in Edinb. New Phil. J. 18: 180. 1835; Fl. Brit. Ind. 7: 61. 1896.

Culms 1.5-3.5 m; leaves lanceolate, subamplexicaul at base, acuminate at apex, 30-60 × 5-10 cm, scabrid at margins; sheaths shiny; ligules truncate, cartilaginous; panicles 30-60 cm; branches filiform, many-branched; spikelets ovate-lanceolate, acuminate, 1.2-2.6 mm; rachilla produced into a short stipe; glumes subequal, ovate, 1-nerved.

Wooded slopes, forest edges and grasslands, 100-1000 m; fl. & fr.: Oct.-Apr.; Dawki.

Panicles used for making soft brooms.

11. ARUNDINELLA Raddi

- | | |
|---|-------------------------|
| 1a. Spikelets more than 6 mm; upper lemma with 2 setae, one on each side of the awn at the tip. ... | <i>A. khasiana</i> 1 |
| 1b. Spikelets less than 5 mm; upper lemma with a single awn or the awn absent. | |
| 2a. Upper lemma not awned or if so, awn not more than 2 mm long. ... | <i>A. bengalensis</i> 2 |
| 2b. Upper lemma bearing a geniculate awn. ... | <i>A. nepalensis</i> 3 |

1. **Arundinella khasiana** Steud. Syn. Pl. Glum. 1: 115. 1854; Fl. Brit. Ind. 7: 71. 1896; Fl. As. 5: 181. 1940.

Culms robust, up to 2 m; leaves flat or convolute, serrulately scabrid, 10-55 × 0.4-1.0 cm; ligule a ridge of hairs; panicles contracted, thyrsiform, 15-30 cm; spikelets 6-7 mm; lower glume lanceolate, 5-nerved; upper glume similar; lower floret male; lemma ovate, lanceolate, ± 6 mm, 5-nerved; upper floret bisexual.

Open grasslands and waste places, 1200-1600 m; fl. & fr.: June-Dec.; Jowai, Jowai-Jarain, Ummulong.

2. **Arundinella bengalensis** (Spreng.) Druce in Rep. Bot. Exch. cl. Brit. Isles 605. 1916; Fl. As. 5: 185. 1940. *Panicum bengalense* Spreng. Syst. Veg. 1: 311. 1825. *A. wallichii* Steud. Syn. Pl. Glum. 1: 114. 1854; Fl. Brit. Ind. 7: 75. 1896.

Culms stout, erect, ± 1 m; leaves flat, lanceolate, acuminate, 30-45 \times 0.4-0.8 cm, glabrous or villous, scabrid; panicles erect, spiciform, 5-30 cm; branches 2.5-3.0 cm; spikelets ovoid, secund, imbricate; lower glume ovate, ± 2.5 mm, 3-nerved; upper glume lanceolate, ± 3 mm; lower florets male; lemma oblong-obtuse, 5-nerved; upper floret bisexual.

Open grasslands and wastelands, 1000-1600 m; fl. & fr.: June-Dec.; Jarain, Jarain-Wah Umngot, Jowai-Jarain, Mawryngkneng.

3. **Arundinella nepalensis** Trin. Gram. Panic. 62. 1826; Fl. As. 5: 183. 1940. *A. brasiliensis* (non Raddi, 1823) Hook. f. Fl. Brit. Ind. 7: 73. 1896.

Culms stout, erect, up to 1 m; leaves lanceolate, acuminate, 30-45 \times 0.4-0.8 cm, glabrous or villous; panicles elongate, erect, up to 30 cm; branches stout, spiciform, 2.5-3.0 cm; spikelets 3-4-seriate, ovoid, secund-imbricate; lower glume ovate-acute, ± 2.5 mm, 3-nerved; upper glume lanceolate, ± 3 mm, 5-nerved; lower floret male; lemma lanceolate, 5-nerved, ciliate on margins; upper floret bisexual.

Grasslands and wastelands, 100-1600 m; fl. & fr.: July-Jan.; Dawki, Jarain-Sohka, Jowai, Nartiang.

12. ISACHNE R. Br.

- | | | |
|---|-----|-----------------------|
| 1a. Pedicels glandular; spikelets 2.0-2.5 mm long. | ... | <i>I. himalaica</i> 1 |
| 1b. Pedicels eglandular; spikelets 1.5-1.7 mm long. | ... | <i>I. albans</i> 2 |

1. **Isachne himalaica** Hook. f. Fl. Brit. Ind. 7: 23. 1896; Fl. As. 5: 197. 1940.

Culms erect from base, 30-60 cm; leaves linear, ensiform, serrulate, 4-12 \times 0.8-1.0 cm; sheaths glabrous, hirsute at margins; ligules a ring of stiff hairs; panicles pyramidal, 2.5-3.5 cm; spikelets subglobose; lower glumes ovate, membranous, many-nerved, glabrous, scabrid or bristly; lower lemma ovate, ± 1.5 mm; upper lemma smaller.

Paddy fields and open marshy wastelands, 1000-1500 m; fl. & fr.: June-Dec.; Nartiang.

2. **Isachne albans** Trin. Sp. Gram. 1: t. 85. 1826; Fl. Brit. Ind. 7: 22. 1896; Fl. As. 5: 196. 1940.

Culms erect, 30-130 cm; leaves linear-lanceolate, minutely toothed and cartilaginous at margins, 5-20 × 0.7-2.5 cm; sheaths loose, smooth, striate; ligule a ridge of stiff hairs; panicles compound, 8-40 cm, up to 20 cm broad; branches and pedicels capillary; spikelets globose, 1.0-1.75 cm; branches and pedicels capillary; spikelets globose, 1.0-1.5 mm; lower glumes orbicular, many-nerved; lower floret male; upper bisexual.

Forest edges, roadsides and waste places, 1200-1600 m; fl. & fr.: July-Dec.; Jowai.

13. GARNOTIA Brongn.

Garnotia acutigloma (Steud.) Ohwi, in Bot. Mag. Tokyo 55: 393. 1941. *Urache acutigloma* Steud. Syn. Pl. Glum. 121. 1854. *G. stricta* Brongn. in Duperr. Voy. Coq. Bot. 133. t. 21. 1831; Fl. Brit. Ind. 7: 243. 1896; Fl. As. 5: 152. 1940.

Culms up to 1 m; nodes often bearded; leaves linear-lanceolate, involute at margins; sheaths smooth, hirsute at margins; ligules membranous, ring-topped and ciliate; panicles flexuous; pedicels scabrid, capillary; rachilla disarticulating and with a tuft of hairs at apex; glumes 3-nerved; rounded at back, ± 4 mm; upper glume similar; lemma lanceolate, ± 3 mm.

Shaded places near forests, 100-1000 m; fl. & fr.: June-Dec.; Dawki.

14. SPOROBOLUS R. Br.

Sporobolus piliferus (Trin.) Kunth, Enum. Pl. 1: 211. 1833; Fl. Brit. Ind. 7: 251. 1896; Fl. As. 5: 119. 1940. *Vilfia pilifera* Trin. Diss. Bot. 157. 1824.

Annuals; culms erect, 5-35 cm; leaves linear, flat, tapering to apex, sometimes convolute, serrulate at margins, 3-15 × 0.2-0.4 cm; ligule a ring of dense hairs; panicles dense-flowered, strict, narrow, 3-9 cm; spikelets 1.2-2.0 mm; lower glumes lanceolate, ± 0.5 mm, nerveless; upper glume lanceolate, ± 1.5 mm, 1-nerved; palea narrowly oblong, truncate.

Roadsides, wastelands and pine forests, 1200-1600 m; fl. & fr.: July-Dec.; Jowai.

15. MUHLENBERGIA Schreb.

Muhlenbergia huegelli Trin. in Mem. Acad. Sci. Petersb. ser. 6. 6(2): 293. 1841; Fl. As. 5: 148. 1940. *M. viridissima* Steud. Syn. Pl. Glum. 1: 178. 1854; Fl. Brit. Ind. 7: 259. 1896.

Culms weak, scrambling over stunted bushes, up to 1.5 m; leaves linear-lanceolate, acuminate, 8-15 × 0.4-0.8 cm; sheaths loose; ligules membranous, lacerate; panicles up to 20 cm, flexuous, interrupted; spikelets ± 2 mm; pedicels scabrid; lower glume ± 1 mm, 1-nerved; lemma ovate-lanceolate, 2.0-2.5 mm, 3-nerved, hairy.

Near villages and forest edges, in open moist places, 1000-1500 m; fl. & fr.; May-Sept.; Nartiang.

16. PHRAGMITES Trin.

Phragmites karka (Retz.) Steud. *Nouv. Bot. ed. 2.* 2: 324. 1841; *Fl. Brit. Ind.* 7: 304. 1896; *Fl. As.* 5: 88. 1940. *Arundo karka* Retz. *Obs. Bot.* 4: 21. 1786.

Culms up to 7 m, hollow; leaves distichous, linear to broadly lanceolate, subulate; inflorescences large decomposed; panicles 15-60 × 10-40 cm, silky hairy at base; branches filiform; spikelets many-flowered, 1.0-1.6 cm; lower glume oblong-lanceolate, 3-5-nerved; upper glume oblong-lanceolate, ± 5 mm, 3-nerved; upper lemma 10-12 mm, 3-nerved; lower lemma 11-13 mm.

Forests and open places, 1000-1500 m; fl. & fr.: July-Nov.; Jarain-Umngot, Nartiang.

Inflorescences used as brooms.

17. ARUNDO L.

Arundo donax L. *Sp. Pl.* 81. 1753; *Fl. Brit. Ind.* 7: 302. 1896; *Fl. As.* 5: 89. 1940.

Culms 2-8 m; leaves linear-lanceolate, 30-60 × 2-7 cm; inflorescence large, terminal, decomposed, plumose panicle, 30-60 cm, erect; branches scaberulous; spikelets 2-7-flowered, laterally compressed, 8-10 mm; glumes subequal, lanceolate, acuminate, keeled at back, 3-5-nerved; lemmas 6-10 mm, ovate-lanceolate, acuminate, 2-toothed, 5-9-nerved; aristate at apex.

Open places in forests and as hedge plant, 500-1300 m; fl. & fr.: Aug.-Dec.; Ioksi, Nartiang.

18. CENTOTHECA Desv.

Centotheca lappacea (L.) Desv. in *Nouv. Bull. Soc. Philom.* 2: 189. 1810; *Fl. Brit. Ind.* 7: 332. 1896; *Fl. As.* 5: 59. 1940. *Cenchrus lappaceus* L. *Sp. Pl. ed. 2:* 1488. 1763.

Culms ascending, erect, 15 - 120 cm, simple or branched; leaves elliptic-lanceolate to linear-lanceolate, 5 - 30 × 1 - 3 cm; ligules truncate, \pm 2 mm; panicles loose, 12 - 25 × 8 - 20 cm; branches numerous, up to 15 cm; pedicels capillary; spikelets ovate-oblong, 4 - 7 mm, loosely 2 - 4-flowered; glumes narrowly lanceolate, 3 - 5-nerved, 3 - 4 mm; lemmas oblong-acute, 5 - 7-nerved; upper florets with rigid bristles near margins.

Wastelands and forest edges in shaded places, 200 - 1000 m; fl. & fr.: July-Dec.; Sonapur.

19. *LOPHATHERUM* Brongn.

Lophatherum gracile Brongn. in Dupeur. Voy. Coq. Bot. 50. t. 8. 1831; Fl. Brit. Ind. 7: 331. 1896; Fl. As. 5: 60. 1940.

Culms erect or ascending from a geniculate base, 50 - 150 cm; leaves lanceolate, 10 - 25 × 1.2 - 3.5 cm; sheaths loose, compressed, keeled, hairy; panicles lax, 15 - 45 cm, composed of a few distant or clustered branches; rachis scaberulous; branches triquetrous; spikelets 6 - 12 mm; lower glume 2 - 3 mm, 5-nerved, pilose at margins; upper glume similar, 5 - 7-nerved, 3.5 - 3.5 mm, glabrous.

Grasslands, in shaded places, 1000 - 1500 m; fl. & fr.: June-Dec.; Jowai, Thangkuli, near Jarain, Jowai.

20. *NEYRAUDIA* Hook. f.

Neyraudia reynaudiana (Kunth) Keng & Hitchc. in Amer. J. Bot. 21: 131. 1934; Fl. As. 5: 115. 1940. *Arundo reynaudiana* Kunth, Rev. Gram. 1: 275. t. 49. 1830. *N. madagascariensis* Hook. f. var. *zollingeri* Hook. f. Fl. Brit. Ind. 7: 305. 1896.

Perennial; culms erect, up to 4 m; leaves linear-lanceolate, 30 - 60 × 1 - 3 cm; sheaths woolly at throat; ligules fimbriate; panicles large, silvery, olive-grey; branches filiform; spikelets 4 - 8-flowered, 6 - 8 mm; glumes subequal, 2.0 - 2.5 mm, 1-nerved; lemma 3 - 4 mm, 3-nerved; awn \pm 1 mm, scabrid, recurved.

Forests and forest edges, 100 - 1500 m; fl. & fr.: Sept.-Feb.; Dawki, Jowai.

21. *ELEUSINE* Gaertn.

Eleusine indica (L.) Gaertn. Fruct. 1: 8. 1789; Fl. Brit. Ind. 7: 293. 1896.; Fl. As. 5: 108. 1940. *Cynosurus indicus* L. Sp. Pl. ed. 1: 72. 1753.

Culms tufted, 10-75 cm; leaves crowded at base, 10-35 × 0.2-0.5 cm, erect; spikes 2-4, digitate, subumbellate, 2-15 × 0.4-0.5 mm; rachis pubescent to villous at base; spikelets ovate or oblong 4-7 mm; glumes lanceolate, acute; lower 2-3 mm; upper 3-4 mm; lemmas lanceolate, acute; lower 2-3 mm; upper 3-4 mm; lemmas lanceolate, acute, 3-4 mm.

Roadsides and wastelands, 100-600 m; fl. & fr.: June-Nov.; Garampani.

Eleusine coracana (L.) Gaertn., the African Millet is often cultivated as the first crop in burnt out forests at low elevations.

22. ERAGROSTIS P. Beauv.

- | | | |
|--|-----|------------------------|
| 1a. Spikelets broadly ovate or oblong, ±3 mm wide. | ... | <i>E. unioloides</i> 1 |
| 1b. Spikelets linear to narrowly oblong-lanceolate, up to 2.5 mm wide. | | |
| 2a. Spikelets narrowly oblong-lanceolate, 2.0-2.5 mm wide; lemmas 2.0-2.5 mm long. | ... | <i>E. gangetica</i> 2 |
| 2b. Spikelets linear, 1.0-1.5 mm wide; lemmas 1.5-2.0 mm long. | ... | <i>E. nigra</i> 3 |

1. **Eragrostis unioloides** (Retz.) Steud. Syn. Pl. Glum. 1: 264. 1854; Fl. As. 5: 99. 1940. *Poa unioloides* Retz. Obs. Bot. 5: 19. 1789. *E. amabilis* [nom (L.) Hook. & Arn. 1838] Hook. f. Fl. Brit. Ind. 7: 317. 1896.

Culms lax-tufted or solitary, 15-45 cm, unbranched, 2-3-noded; leaves basal, tapering to a fine point, 3-10 × 2-5 mm; panicles lanceolate, ovate or oblong, 5-14 × 3-4 cm; spikelets strongly compressed, 20-50-flowered; glumes lanceolate to ovate, ± 2 mm, 1-nerved; lemmas closely imbricate, ovate or elliptic, ± 2 mm; keels narrowly winged.

Open marshy places, streamsides and paddy fields, 1000-1500 m; fl. & fr.: July-Dec.; Jowai, Thangkuli.

2. **Eragrostis gangetica** (Roxb.) Steud. Syn. Pl. Glum. 1: 266. 1854; Fl. As. 5: 101. 1940. *Poa gangetica* Roxb. Fl. Ind. 1: 341. 1820. *E. stenophylla* Miq. in Verh. Kon.-Ned. Inst. 3: 4, 39. 1851; Fl. Brit. Ind. 7: 318. 1896.

Culms tufted, 50-100 cm, simple or branched; leaves few, narrow, convolute, 5-20 cm; panicles linear-oblong, 5-15 cm; branches solitary; spikelets linear, 4-6 mm, 10-30-flowered; glumes ovate-oblong, acute, 1-nerved, 1.4-1.6 mm; lemmas broadly ovate, subacute, nearly 2.5 mm.

Open marshy places in grasslands, 1000-1500 m; fl. & fr.: May-Dec.; Jowai, Nongringkoh.

3. **Eragrostis nigra** Steud. Syn. Pl. Glum. 1: 267. 1854; Fl. Brit. Ind. 7: 324. 1896; Fl. As. 5: 101. 1940.

Culms 25-100 cm, simple or branched; leaves mostly basal, elongate-lanceolate, tapering, 20-60 × 0.2-0.3 cm; sheaths bearded at mouth; ligules ciliate; panicles spreading, ovate-oblong, up to 60 cm; branches in whorls of 3-5; spikelets linear-oblong, 4.0-4.5 mm, olive-grey; pedicels 4-6 mm; glumes acuminate, strongly 1-nerved, 1.5-1.8 mm; lemmas ovate-acute, 1.5-1.7 mm.

Open grasslands, in moist places, 1000-1500 m; fl. & fr.: May-Oct.; Jaintia Hills, *Mann* 907.

23. ERAGROSTIELLA BOR

Eragrostiella leioptera (Stapf) Bor in Indian For. 66: 270. 1940 et Fl. As. 5: 106. 1940. *Eragrostis leioptera* Stapf in Hook. f. Fl. Brit. Ind. 7: 325. 1896.

Culms densely tufted, 30-60 cm; leaves filiform, 20-30 cm, sub-keeled on back; racemes 15-25 cm, erect, slender, spikelets secund, distichously spreading, oblong, compressed, 0.8-1.2 cm, 10-20-flowered; glumes sub-equal, ± 1.7 mm, the lower distinctly keeled; upper dorsally rounded; lemmas broadly ovate, obtuse, ± 2.5 mm.

Grasslands in moist open and partially shaded places, also along paddy fields, 1000-1600 m; fl. & fr.: Aug.-Dec.; Jowai-Jarain, Khleihriat, Sutnga.

24. COIX L.

- | | | |
|---|-----|--------------------------|
| 1a. Annual; spikelets 2-3 mm wide; lower glume of male spikelets narrowly or hardly winged. | ... | <i>C. lacryma-jobi</i> 1 |
| 1b. Perennial; spikelets 5-6 mm broad; lower glume of male spikelets broadly winged. | ... | <i>C. gigantea</i> 2 |

1. **Coix lacryma-jobi** L. Sp. Pl. 972. 1753; Fl. Brit. Ind. 7: 100. 1896; Fl. As. 5: 453. 1940.

Culms stout, 1-2 m, branching, rooting at lower nodes; leaves cordate at base, acuminate, 10-50 × 2-5 cm; sheaths often very broad; ligules frilled, ± 1 mm; peduncles 4-8 cm; male spikelets imbricate, 8-12 mm, up to 2 mm broad; lower glume ovate, narrowly winged and incurved at margins; female spikelets ovoid, entirely enclosed in hardened involucre bracts, forming a bony yellowish-white or bluish-grey involucre.

Wet places near villages, wastelands, and forest edges, 800-1500 m; fl. & fr.: May-Oct.; Laksein, Nartiang.

2. **Coix gigantea** Roxb. Fl. Ind. 3: 570. 1832; Fl. As. 5: 454. 1940. *C. lacryma-jobi* L. var. *gigantea* (Roxb.) Stapf ex Hook. f. Fl. Brit. Ind. 7: 100. 1896.

Culms stout, erect, 2-3 m, \pm 2 cm diam. at base; leaves obtuse or subcordate at base, acuminate, 50-120 \times 2-3 cm; peduncles 5-15 cm; male spikelets ternate, with the central pedicellate; lower glumes elliptic to obovate, winged towards apex, \pm 3 cm; upper glumes lanceolate; female spikelets same as in previous species, ovoid, white to bluish-grey, polished.

Wet places, near paddy fields and forest edges, 400-1200 m; fl. & fr.: Aug.-Jan.; Myntang Valley.

25. POLYTOCA P. Br.

Polytoca digitata (L. f.) Druce in Rep. Bot. Exch. Cl. Brit. Isles 4: 641. 1916; Fl. As. 5: 456. 1940. *Apluda digitata* L. f. Suppl. Pl. 434. 1781; *P. bracteata* R. Br. in Benn. Pl. Jav. 20: t. 5. 1838; Fl. Brit. Ind. 7: 101. 1896.

Culms up to 1.5 m; leaves linear, narrowed at base, acuminate, 45-60 \times 1.5-2.5 cm; sheaths hairy; racemes terminal, stiff; male spikelets ovate, 6-7 mm; pedicels rudimentary and fused with rachis; lower glume ovate, mucronate, 7-nerved; upper glume ovate-oblong, acuminate; female spikelets 2-nate, lanceolate, 12-18 mm; lower glume oblong, obtuse, keeled, villous towards base, ciliate at margins; upper glume 6-7 mm, long-rostrate.

Open grasslands, 500-1500 m; fl. & fr.: July-Dec.; Jarain-Sohka, Nartiang-Nongbah.

26. SETARIA P. Beauv. *nom. cons.*

- | | | |
|---|-----|---------------------------|
| 1a. Leaves 12-70 mm wide; inflorescence a lax panicle, 25-50 \times 18-22 cm. | ... | <i>S. palmifolia</i> 1 |
| 1b. Leaves 3-8 mm wide; inflorescence a cylindric and dense spiciform panicle, 1-7 \times 0.8-1.3 cm. | ... | <i>S. pallide-fusca</i> 2 |

1. **Setaria palmifolia** (Koen.) Stapf in J. Linn. Soc. Bot. 42: 186. 1914; Fl. As. 5: 284. 1940. *Panicum palmifolium* Koen. in Naturf. 23: 208. 1788; *P. plicatum* (non Lamk. 1791) Willd. Enum. Pl. 1033. 1809; Fl. Brit. Ind. 7: 55. 1896.

Culms 50-250 cm; internodes 5-15 cm; leaves linear-lanceolate,

finely acuminate, 15-60 × 1.2-7.0 cm; plicate between nerves, sparsely hairy; ligules of long hairs; panicles contracted, nodding; branches alternate, filiform, 4-10 cm; spikelets ovoid, acute; ± 3 mm; lower glumes ovate, obtuse, 5-nerved; upper glumes ovate, obtuse, 7-nerved.

Grasslands and forest edges, in shaded places, 200-1500 m; fl. & fr.: July-Nov.; Nartiang, Nongringkoh.

2. **Setaria pallide-fusca** (Schum.) Stapf & Hubb. in Kew Bull. 1930: 259. 1930; Fl. As. 5: 291. 1940. *Panicum pallide-fuscum* Schum. Beskr. Guin. Pl. 58. 1827.

Culms tufted, 30-60 cm; leaves linear, tapering to a fine point, 5-25 × 0.3-0.7 cm; sheaths keeled; ligules lacinate-ciliate; panicles spiciform, 1-7 cm, rufous-purple; bristles ± 8 in each involucre; scaberulous, 7-10 mm; lower glumes 3-nerved; upper glumes 5-nerved; lemma 5-nerved.

Open grasslands, 500-1500 m; fl. & fr.: Aug.-Dec.; Jarain, Dawki, Sohka.

27. SACCOILEPIS Nash

Sacciolepis indica (L.) A. Chase in Proc. Biol. Soc. Wash. 21: 8. 1908; Fl. As. 5: 216. 1940. *Aira indica* L. Sp. Pl. 63: 1753. *Panicum indicum* (non Mill. 1768) L. Mant. Pl. 2: 184. 1771; Fl. Brit. Ind. 7: 41. 1896.

Culms 10-80 cm, ascending or erect; leaves linear-lanceolate, flat, 4-10 × 0.3-0.5 cm, hairy below, scabrid at margins; sheaths compressed; ligules short, obtuse, fimbriate at apex; panicles narrow, spiciform, 3-7 × 0.4-0.5 cm; spikelets crowded, greenish-purple, ovoid-acute; lower glume ovate-acute, 0.5-1.5 mm, 3-5-nerved; upper glume ovate, subacute, 1.5-3.5 mm, strongly 7-11-nerved, often ciliate.

Open marshy places near streams and paddy fields, 100-500 m; fl. & fr.: May-Nov.; Dawki.

28. CYRTOCOCCUM Stapf

Cyrtococcum oxyphyllum (Steud.) Stapf in Hook. Ic. Pl. ser. 5: t. 3096. 1922; Fl. As. 5: 239. 1940. *Panicum oxyphyllum* Steud. Syn. Pl. Glum. 1: 65. 1854. *P. pilipes* Buse in Miq. Pl. Jungh. 3: 276. 1854; Fl. Brit. Ind. 7: 57. 1896.

Culms 15-45 cm, decumbent, creeping and branching at base; leaves oblong-lanceolate, acuminate at apex, 2-12 × 0.2-0.8 cm; sheaths glabrous or with ciliate margins; panicles short, lax; branches 2.5-3.5 cm, pilose; spikelets gibbous, laterally compressed, 1.5-2.0 mm; lower glumes ovate, acute or cuspidate, 5-nerved; upper glumes obtuse, 3-nerved, pubescent.

Forests and forest edges, in shaded places, 100-300 m; fl. & fr.: June-Dec.; Dawki.

29. PANICUM L.

- | | |
|---|-------------------------|
| 1a. Leaves ovate-acuminate, cordate-amplexicaul and broad at base; spikelets oblique, somewhat gibbous at base. ... | <i>P. brevifolium</i> 1 |
| 1b. Leaves linear to narrowly lanceolate, acute to subobtuse and narrow at base; spikelets symmetrical. | |
| 2a. Sheaths glabrous, ciliate-hairy at margins; spikelets ± 1.5 mm long; glumes smooth. ... | <i>P. humidorum</i> 2 |
| 2b. Sheaths puberulous, not ciliate at margins; spikelets ± 2 mm long; glumes strongly nerved. ... | <i>P. inconstum</i> 3 |

1. **Panicum brevifolium** L. Sp. Pl. 59. 1753; Fl. As. 5: 237. 1940.
P. ovalifolium Poir. in Lamk. Encycl. Meth. Bot. Suppl. 4: 279. 1816;
 Fl. Brit. Ind. 7: 44. 1896.

Culms 20-120 cm, rooting at basal nodes, sparingly branched; leaves spreading, narrowly ovate-lanceolate, cordate, amplexicaul at base, acuminate, 4-10 × 1-3 cm, scaberulous at margins; sheaths glabrous or ciliate; panicles broadly oblong, ovate or obovoid; branchlets numerous, alternate or verticillate; spikelets oblong-ovate, subacute, often purplish, pubescent; lower glume 1.5-2.5 mm, 3-5-nerved; upper glume 5-nerved.

Forests and forest edges, in shaded places, 500-1200 m; fl. & fr.: May-Nov.; Syndai.

2. **Panicum humidorum** Hook. f. Fl. Brit. Ind. 7: 53. 1896; Fl. As. 5: 228. 1940.

Culms procumbent and creeping below, rooting at lower nodes, up to 2 m; leaves flat, linear, obtuse at base, acuminate, 10-25 × 0.6-1.4 cm; ligules narrow, erose; panicles contracted, effuse, 15-35 × 5-10 cm; branches capillary; spikelets obovoid, 1.0-1.5 mm, often purple; lower glume ovate-lanceolate, ± 1 mm, 3-nerved; upper glume lanceolate, ± 1.8 mm, obscurely 5-nerved; lemma 5-nerved.

Marshy places, forests, near streams and open wetlands, 1000-1500 m; fl. & fr.: July-Dec.; Amwee riverside, Jarain.

3. **Panicum incomtum** Trin. Gram. Panic. 200. 1826. *P. sarmentosum* (non Roxb. 1820) Hook. f. Fl. Brit. Ind. 7: 54. 1896; Fl. As. 5: 235. 1940.

Culms branched, swollen and rooting at lower nodes, rambling over vegetation, up to 15 m; leaves linear-lanceolate, rounded at base, acuminate, 30-40 × 1-3 cm, scattered at base; panicles spreading, ovoid, 8-35 cm; spikelets elliptic, ovoid, obtuse, 1.3-2.0 mm, ciliolate; lower glume obovate, obtuse, 0.7-1.8 mm; upper glume acute at apex, 1.5-2.0 mm, 5-nerved.

Forests and forest edges, open places, 100-600 m; fl. & fr.: June-Dec.; Rytiang, near Garampani.

30. DIGITARIA Fabric. *nom. cons.*

- | | |
|---|------------------------|
| 1a. Pedicels terete; pairs of spikelets always verrucose, <i>i.e.</i> covered with minute warty growths as if sprinkled with fine grains of sand. | |
| 2a. Culms erect; leaves all linear; inflorescences of 2-6 racemes, 4-10 cm long; pedicels 1-3 mm; fruits purplish. ... | <i>D. violascens</i> 1 |
| 2b. Culms creeping and rooting at nodes; young leaves rather broad; inflorescences of 2-3 racemes, 1.5-7.0 cm long; pedicels 0.5-0.8 mm; fruits pale, not purple. ... | <i>D. longiflora</i> 2 |
| 1b. Pedicels trigonous or triquetrous; hairs on the spikelets, if any, never verrucose. | |
| 3a. Pedicels with a ring of long hairs at apex; hairs on spikelets clavate, <i>i.e.</i> passing abruptly into obtuse, obovate or globular head, much broader than the hair. ... | <i>D. ternata</i> 3 |
| 3b. Pedicels without long hairs at apex; hairs on spikelets, if any, without a globular thickening, not clavate. | |
| 4a. Leaves more than 1 cm wide; upper glume nerved or nerveless, triangular, scaly, up to 0.7 mm long. ... | <i>D. setigera</i> 4 |
| 4b. Leaves less than 0.8 cm wide; lower glume present or absent; upper glume well-developed. | |
| 5a. Spikelets broad and turgid; upper glume broad and rounded at apex; fruits distinctly apiculate. ... | <i>D. cruciata</i> 5 |
| 5b. Spikelets narrow and compressed; upper glume narrow, acute; fruits not apiculate. ... | <i>D. ciliaris</i> 6 |

1. **Digitaria violascens** Link, Hort. Berol. 1: 229. 1827; Fl. As. 5: 208. 1940. *Paspalum longiflorum* (non Retz. 1786) Hook. f. Fl. Brit. Ind. 7: 17. 1896, *p. p.*

Culms 25-45 cm, prostrate and straggling at base; leaves linear to lanceolate, tapering to fine point; 6-18 × 0.4-0.7 cm; ligules membranous, truncate; racemes 5, subdigitate, 8-15 cm; rachis flat, 0.5-0.8 mm wide, scabrid on winged margins; pedicels triquetrous; spikelets biseriate,

elliptic-oblong, acute, 1.6 - 1.8 mm; lower glume absent; upper glume ovate oblong, 1.2 - 1.7 mm, 5 - 7-nerved, silky.

Open places, roadsides, paddy fields and wastelands, 100 - 1000 m; fl. & fr.: June-Dec.; Dawki.

2. ***Digitaria longiflora*** (Retz.) Pers. Syn. Pl. 1: 85. 1805; Fl. As. 5: 211. 1940. *Paspalum longiflorum* Retz. Obs. Bot. 4: 15. 1786; Fl. Brit. Ind. 7: 17. 1896, *p. p.*

Culms often creeping, rooting at lower nodes; leaves linear-lanceolate, 2 - 8 × 0.2 - 0.4 cm; racemes 2 - 3, digitate, slender, 2 - 7 cm, subdigitate; rachis flat; spikelets ovate-lanceolate, acute, 1.3 - 1.5 cm, pale green or whitish; lower glumes absent; upper glumes oblong, subobtusate, 3 - 5-nerved, with dense lines of appressed hairs between nerves and along the margins; lemma hyaline, 7-nerved.

Open places in paddy fields, wastelands and forest edges, 100 - 1000 m; fl. & fr.: June-Dec.; Garampani.

3. ***Digitaria ternata*** (A. Rich.) Dyer. Fl. Cap. 7: 376. 1898; Fl. As. 5: 209. 1940. *Cynodon ternatus* A. Rich. Tent. Fl. Abyss. 2: 405. 1851. *Paspalum ternatum* (A. Rich.) Hook. f. Fl. Brit. Ind. 7: 17. 1896.

Culms erect, decumbent below, 15 - 50 cm; leaves linear-lanceolate, 10 - 20 × 0.3 - 0.7 cm; racemes 3 - 5, subdigitate, 8 - 12 cm; pedicels 2 - 3-nate, with a tuft of hairs at swollen tips; spikelets elliptic-oblong, obtuse, 1.0 - 1.3 mm; lower glume absent; upper glume 3-nerved with 4 lines of clavate silvery hairs; lemma oblong, subacute 5 - 7-nerved.

Shaded places in grasslands, 400 - 1200 m; fl. & fr.: July-Dec.; Khongs-nong-Raliang.

4. ***Digitaria setigera*** Roth in Roem. & Schult. Syst. Veg. 2: 474. 1817. *Panicum corymbosum* Roxb. Fl. Ind. 1: 295. 1820. *D. corymbosa* (Roxb.) Merr. Enum. Philip. Fl. Pl. 1: 53. 1925; Fl. As. 5: 205. 1940. *Paspalum sanguinale* Lamk. var. *extensum* Hook. f. Fl. Brit. Ind. 7: 15. 1896.

Culms creeping below, rooting at nodes, up to 15 m; leaves linear-lanceolate, 15 - 20 × 1 - 2 cm; ligules truncate, ± 2 mm; racemes up to 20, subdigitate, 10 - 15 cm; pedicels angled, scabrid, 2-nate; spikelets elliptic, acute, ± 3 mm; lower glume hyaline, scaly; upper glume narrow-lanceolate, ciliate on margins, 3-nerved; lemma hyaline, 5 - 7-nerved, hairy on lateral nerves.

Wastelands, grasslands and forest edges, 100 - 600 m; fl. & fr.: July-Dec.; Garampani.

5. **Digitaria cruciata** (Steud.) A. Camus in LeComte, Fl. Gen. Indoch. 7: 399, 1922. *Panicum cruciatum* Steud. Syn. Pl. Glum. 1: 39, 1854. *Paspalum sanguinale* Lamk. var. *cruciatum* (Steud.) Hook. f. Fl. Brit. Ind 7: 14, 1896.

Culms decumbent and creeping at base, branched, 20-50 cm; leaves linear-lanceolate, 3-15 × 0.4-0.6 cm; ligules membranous, ± 2 mm, truncate; racemes 3-4, subdigitate, 4-6 cm; rachis narrow, 0.3-0.5 mm wide, flexuous; spikelets ovate-oblong, acute, ± 2.5 mm; lower glume obscure; upper glume ovate, obtuse, 3-nerved.

Wastelands and cult. fields, 1000-1500 m; fl. & fr.: June-Dec.; Nartiang.

6. **Digitaria ciliaris** (Retz.) Koel. Descr. Gras. 27, 1802. *Panicum ciliare* Retz. Obs. Bot. 4: 16, 1786. *P. adscendens* HBK. Nov. Gen. Sp. Pl. 1: 97, 1816. *Paspalum sanguinale* [non (L.) Lamk. 1791] Hook. f. Fl. Brit. Ind. 7: 13, 1896, *p. p.* *D. adscendens* (HBK.) Henr. in Blumea 1: 92, 1934; Fl. As. 5: 204, 1940.

Culms tufted, ascending, or prostrate, often rooting at lower nodes, 30-60 cm; leaves linear, contracted and rounded at base, 8-12 × 0.4-0.8 cm; racemes 4-9, subdigitate, 5-12 mm, finely pubescent at base; spikelets appressed, lanceolate, acute, 3.0-3.5 mm, pale brownish green, tinged purple; lower glume ovate, ± 4 mm; upper lanceolate, 3-nerved, hairy between nerves; lemma 7-nerved.

Roadsides and wastelands, 100-500 m; fl. & fr.: June-Nov.; Dawki.

31. ALLOTEROPSIS C. B. Presl

Alloteropsis semialata (R. Br.) Hitchc. in Contr. U. S. Nat. Herb. 12: 210, 1909; Fl. As. 5: 213, 1940. *Panicum semialatum* R. Br. Prodr. Fl. Nov. Holl. 192, 1810. *Axonopus semialatus* (R. Br.) Hook. f. Fl. Brit. Ind. 7: 64, 1896.

Culms 30-40 cm, densely tufted, thickened at base; leaves narrow, linear 20-30 × 0.4-0.6 cm; sheaths hairy with ciliate margins; racemes subdigitate or subverticillate, 4-12 cm; rachis pubescent; spikelets sessile, ± 6 mm, pale brown; lower glumes ovate-lanceolate, aristulate at apex, strongly 3-nerved, ciliate at margins; upper glumes ovate-lanceolate, short-aristate, ± 5 mm, dark hairy at margins.

Forests and forest edges, mostly in moist open places, 1200-1600 m; fl. & fr.: May-Sept.; Jowai, Nartiang.

32. PSEUDECHINOLAENA (Hook. f.) Stapf

Pseudechinolaena polystachya (HBK.) Stapf in Prain, Fl. Trop. Afr. 9: 495. 1919; Fl. As. 5: 266. 1940. *Echinolaena polystachya* HBK. Nov. Gen. Sp. 1: 119. 1816. *Panicum uncinatum* Raddi, Agrost. Bras. 41. 1823; Fl. Brit. Ind. 7: 58. 1896.

Culms rooting and branching at base; leaves ovate-lanceolate, acuminate, 5-10 × 0.5-1.4 cm; sheaths pubescent with ciliate margins; ligules short, membranous-scarious, truncate; panicles 4-20 cm; rachis slender, smooth; branches 2-6, filiform, flexuous, spiciform, 2-3 cm; spikelets 4-5 mm, ovate, compressed laterally; lower glume oblong-lanceolate, ± 4 mm, 3-nerved with silky hairs; upper glume ± 4.5 mm, gibbous, 7-nerved, reddish, hispid.

Forests and forest edges, in shaded places, 100-500 m; fl. & fr.: Aug.-Dec.; Dawki.

33. BRACHIARIA Griseb.

Brachiaria distachya (L.) Stapf in Prain, Fl. Trop. Afr. 9: 565. 1919; Fl. As. 5: 281. 1940. *Panicum distachyum* L. Mant. Pl. 138. 1767; Fl. Brit. Ind. 7: 37. 1896.

Culms 15-50 cm, often rooting at basal nodes, hairy at nodes; leaves linear-lanceolate, rounded and amplexicaul at base, acuminate, 2-6 × 0.5-0.8 cm; ligules thickened, hairy; panicles 2-5 cm; racemes 2-3, simple, 2-3 cm; spikelets 2.5-3.0 mm; lower glume 1.5-1.8 × 2.2-2.5 mm, 5-7-nerved; upper glume 2-3 mm, 7-nerved.

Shaded places in forests and roadsides, 100-1000 m; fl. & fr.: May-Nov.; Syndai.

34. PASPALUM L.

- | | | |
|--|-----|------------------------|
| 1a. Racemes more than 7 cm long and spikelets fringed with white hairs at margins. | ... | <i>P. conjugatum</i> 1 |
| 1b. Racemes up to 7 cm long and spikelets not hairy at margins. | | |
| 2a. Leaves hairy; spikelets oblong-orbicular, acute at apex, ± 1.2 mm long. | ... | <i>P. compactum</i> 2 |
| 2b. Leaves glabrous; spikelets orbicular, obtuse at apex, more than 2.2 mm long. | ... | <i>P. orbiculare</i> 3 |

1. **Paspalum conjugatum** Berg. in Act. Helv. Phys. Math. 7: 129. t. 8. 1772; Fl. Brit. Ind. 7: 11. 1896; Fl. As. 5: 255. 1940.

Culms 20-60 cm, creeping and stoloniferous; leaves linear-lanceolate, acute or acuminate, 5-20 × 1.0-1.8 cm; spikes 2 or rarely 3, spreading; spikelets 2-seriate, ovate-orbicular, apiculate, lenticular, 1.4-1.5 mm; lower glume absent; upper glume convex, long ciliate on marginal nerves; lower floret sterile; lemma flat, similar to upper glume; upper floret bisexual; lemma broadly ovate, apiculate, smooth.

Shaded places, near forests and other wet places, 200-1000 m; fl. & fr.: July-Dec.; Syndai.

2. **Paspalum compactum** Roth, Nov. Pl. 36. 1821; Fl. Brit. Ind. 7: 12. 1896; Fl. As. 5: 251. 1940.

Culms ascending from decumbent base, 15-25 cm; leaves ovate-lanceolate, rounded and decurrent at base, acuminate, 2-8 × 0.5-1.4 cm, hairy; spikes 0.5-2.5 cm, in pyramidal 3-6 cm long panicles; opposite or subverticillate; spikelets 2-seriate, ovate-oblong, plano-convex, ± 1 mm; lower glume absent; upper glume ovate, 5-nerved, hyaline at margins; lemma flat, ovate-obtuse, 3-nerved, hyaline.

Open places in wet marshy and streamsides, 1200-1600 m; fl. & fr.: June-Dec.; Jowai-Jarain.

3. **Paspalum orbiculare** Forst. Fl. Insul. Austr. Prodr. 7. 1786; Fl. As. 5: 254. 1940.

Culms, up to 75 cm, spongy below, tufted; leaves sublanccolate, fine acuminate, 15-35 × 7-10 mm; spikes 2-5, alternate, 4-7 cm; spikelets many in 2 rows, overlapping, plano-convex, ovate-elliptic, obtuse, 2.0-2.5 mm; lower glume absent; upper glume 5-nerved; lower floret sterile; lemma flat, 3-nerved, yellow or brown; upper floret bisexual; lemma polished, involute at margins.

Marshy places, banks of streams and paddy fields, 100-500 m; fl. & fr.: Aug.-Dec.; Dawki, Garampani.

35. ECHINOCHLOA P. Beauv.

Echinochloa crus-galli (L.) P. Beauv. Ess. Agrost. 53. 161. 1812. *Panicum crus-galli* L. Sp. Pl. 56. 1753; Fl. Brit. Ind. 7: 30. 1896. *E. crus-pavonis* [non (HBK.) Schult. 1824] Bor. Fl. As. 5: 248. 1940.

Culms up to 1.75 m; leaves linear to lanceolate, narrow at base, tapering to fine point, 12-32 × 1.0-2.5 cm, scabrid, cartilaginous at margins;

panicles erect, linear-oblong, 10-30 cm; axis triquetrous; spikelets in compact clusters, ovate-elliptic, 3.0-3.5 mm; lower glume membranous, 3-5-nerved; upper glume mucronate or cuspidate, 5-nerved; lemma with aristate cuspidate tips.

Open wastelands and roadsides, 1000-1400 m; fl. & fr.: July-Nov.; Nartiang.

36. OPLISMENUS P. Beauv.

Oplismenus compositus (L.) P. Beauv. Ess. Agrost. 54. 168, 169. 1812; Fl. Brit. Ind. 7: 66. 1896; Fl. As. 5: 262. 1940. *Panicum compositum* L. Sp. Pl. 57. 1753.

Culms up to 1 m, ascending and decumbent, rooting at lower nodes; leaves linear-lanceolate, constricted at base, acuminate, 4-12 x 0.5-1.5 cm, sparsely hairy; sheaths densely ciliate at margins; ligules short, truncate, ciliate; panicles up to 18 cm; racemes decreasing in length upwards; spikelets oblong-lanceolate; glumes \pm 3 mm, produced at apex into stiff purple viscid 4-5 mm long awns.

Forests and forest edges, in shaded places, 100-1000 m; fl. & fr.: June-Dec.; Dawki, Sohka.

37. DIMERIA R. Br.

Dimeria ornithopoda Trin. Fund. Agrost. 167. t. 14. 1820; Fl. Brit. Ind. 7: 104. 1896; Fl. As. 5: 420. 1940.

Culms slender, 8-25 cm, branching, bearded at nodes; leaves linear setaceous, 2-7 x 0.1-0.2 cm; racemes 2-3-nate, 2-4 cm, reddish brown; rachis subverticillate, \pm 0.5 mm wide; spikelets linear, obtuse or acute; upper glume as long as spikelets, ciliate at margins.

Marshy and other moist open places, 1000-1400 m; fl. & fr.: July-Dec.; Jarain.

38. MICROSTEGIUM Nees

- | | | |
|--|-----|-----------------------|
| 1a. Upper lemma well developed, split to middle into 2 long glabrous triangular lobes. | .. | <i>M. petiolare</i> 1 |
| 1b. Upper lemma small, shortly 2-lobed or entire. | ... | <i>M. vagans</i> 2 |

1. **Microstegium petiolare** (Trin.) Bor in Ind. For. Rec. Bot. 1: 3, 87. 1938; Fl. As. 5: 328. 1940. *Spodiopogon petiolaris* Trin. in Mem.

Acad. Sci. Petersb. ser. 6, 2: 301. 1832. *Ischaemum petiolare* (Trin.) Hack. in DC. Monogr. Phan. 6: 238. 1889; Fl. Brit. Ind. 7: 138. 1896.

Culms 60-100 cm, rooting at lower nodes; leaves lanceolate, setaceous-acuminate, 20-30 × 0.2-0.3 cm, appressed-hairy; sheaths ciliate at margins; ligules linear-oblong, 5-9 mm; racemes 10-20, 6-10 cm, simple or divided; joints and pedicels subtrigonous, oblong-lanceolate, 4-5 mm; callus minutely hairy; lower glumes 2-toothed, 6-8-nerved, scabrid-ciliate at keels; upper glume 3-nerved, scabrid, keeled.

Pine forests, 1300-1600 m; fl. & fr.: Aug.-Dec.; Jowai.

2. ***Microstegium vagans*** (Steud.) A. Camus in Ann. Soc. Linn. Lyon, n. s. 68: 200. 1921. *Pollinia vagans* Steud. Syn. Pl. Glum. 1: 410. 1855; Fl. Brit. Ind. 7: 115. 1896. *Ephelopogon gratus* Steud. Nom. ed. 2, 1: 556. 1840. *P. grata* (Steud.) Hack. in DC. Monogr. Phan. 6: 175. 1889; Fl. Brit. Ind. 7: 115. 1896. *M. gratum* (Steud.) A. Camus l. c. 201. 1921; Fl. As. 5: 195. 1940.

Culms 80-150 cm; leaves linear-lanceolate, 10-20 × 0.8-2.0 cm; sheaths glabrous or sparsely hairy; ligules membranous; racemes 7-12, 6-10 cm, green or purplish, simple or divided; rachis flexuous; joints 2.4-2.7 mm, dilated at top; spikelets oblong, 3.5-4.0 mm; lower glume ovate-oblong, obtuse, 2-toothed, 4-nerved; upper glume ovate, obtuse, 3.5-4.0 mm, 4-5-nerved, ciliate on keels.

Forests and forest edges, 100-1000 m; fl. & fr.: July-Dec.; Dawki, Sonapur.

39. *Apocopsis* Nees

Apocopsis paleacea (Trin.) Hochr. in Bull. N. Y. Bot. Gard. 6: 262. 1910; Fl. As. 5: 349. 1940. *Ischaemum paleaceum* Trin. in Mem. Acad. Sci. Petersb. ser. 6, 2: 293. 1832.

Culms 20-100 cm, ascending, obscurely grooved; leaves broadly lanceolate, rounded at base, acuminate, 5-12 × 0.4-1.0 cm; sheaths with tubercle-based hairs; racemes 2-4-nate, 3-4 cm, glabrescent, streaked with purplish-black; joints of rachis 1.5-2.0 mm; sessile spikelets obovate or subcuneiform, 4-5 mm; lower glume 4-5 mm, 6-10-nerved, ciliolate, purple; upper glume oblong, ciliolate at margins, 3-5-nerved, brown; pedicelled spikelets sterile, 1-2 mm, yellow-hairy.

Grasslands and pine forests, 1300-1700 m; fl. & fr.: July-Dec.; Jowai, Mawryngkneng, Nartiang, Ummulong.

40. EULALIA Kunth

- 1a. Upper glume of sessile spikelets aristate at apex. ... *E. pallens* 1
 1b. Upper glume of sessile spikelets not aristate.
 2a. Racemes verticillate on a villous 15—30 cm long rachis, forming
 a panicle; upper lemma 2-toothed. ... *E. fastigiata* 2
 2b. Racemes digitate or fascicled at apex of peduncle.
 3a. Basal sheaths of leaves covered with brown or golden-
 yellow wool. ... *E. speciosa* 3
 3b. Basal sheaths of leaves glabrous.
 4a. Spikelets 2—4 mm long. ... *E. trispicata* 4
 4b. Spikelets 5—6 mm long. ... *E. quadrinervis* 5

1. ***Eulalia pallens*** (Hack.) O. Ktze. Rev. Gen. Pl. 2: 775. 1891; Fl. As. 5: 340. 1940. *Pollinia pallens* Hack. in DC. Monogr. Phan. 6: 156. 1889; Fl. Brit. Ind. 7: 110. 1896.

Culms 60-90 cm; leaves linear, tapering to apex, 15-25 × 0.1-0.2 cm; racemes 5-6, silky hairy, 5-10 cm; spikelets narrow-lanceolate, 3-4 mm, purple or yellowish; lower glume bicuspidate, 2-nerved; upper glume lanceolate, aristate at apex, hyaline at margins; lemma of upper floret oblanceolate, 2-fid with 10-15 mm long awn at apex.

Open grasslands and secondary forests, 1200-1600 m; fl. & fr.: Aug.-Jan.; Jowai, Nartiang.

2. ***Eulalia fastigiata*** (Steud.) Haines, Bot. Bih. & Or. 1014. 1924; Fl. As. 5: 336. 1940. *Saccharum fastigiatum* Steud. Syn. Pl. Glum. 1: 409. 1855. *Erianthus fastigiatus* Steud. l. c. 409. 1855; Fl. Brit. Ind. 7: 125. 1896.

Culms 1.0-1.5 m; leaves linear, narrow at base, acuminate, 30-60 × 0.5-0.7 cm; racemes 8-10 cm, verticillate on nodes of panicle, black-violet, densely silky hairy; spikelets linear-lanceolate, 4-5 mm, brownish or reddish-black; lower glume acuminate, 2-toothed, 3-nerved, hairy; upper glume 1-nerved, ciliate at apex; lemma of lower floret linear, obtuse, 3.5-4.5 mm; lemma of upper floret oblong, 2-toothed at apex with ± 1.2 cm long awn at apex.

Grasslands and secondary forests, 500-1400 m; fl. & fr.: Aug.-Jan.; Ioksi, Garampani, Nartiang.

3. ***Eulalia speciosa*** (Debeaux) O. Ktze. Rev. Gen. Pl. 2: 775. 1891; Fl. As. 5: 338. 1940. *Erianthus speciosa* Debeaux in Acta Soc. Linn. Bord. 32: 53. 1878. *Pollinia speciosa* (Debeaux) Hack. in DC. Monogr. Phan. 6: 159. 1889; Fl. Brit. Ind. 7: 113. 1896.

Culms, 0.8-1.2 m; leaves linear, acuminate, 30-50 × 0.4-0.7 cm,

villous or glabrous; racemes 4-8, fasciculate, 8-20 cm, grey or reddish below the middle; lower glumes truncate, emarginate, white-hairy; upper glume oblong, truncate, hyaline at margins; lemma of lower floret oblong, obtuse; lemma of upper floret 2-fid, with 1.5-2.0 cm long twisted awn.

Secondary forests and grasslands, in open places, fl. & fr.: Aug.-Dec.; Mysore, Nartiang.

4. ***Eulalia trispicata*** (Schult.) Henr. in Blumea 3: 453. 1940. *Andropogon tristachys* Roxb. Fl. Ind. 1: 261. 1820 (non HBK. 1816). *A. trispicatus* Schult. Syst. Veg. 2: 452. 1824. *E. argentea* Brongn. in Duperr. Voy. Coq. Bot. 2(2): 92. 1830. *Pollinia argentea* (Brongn.) Trin. in Bull. Acad. Sci. Petersb. 1: 71. 1836; Fl. Brit. Ind. 7: 111. 1896. *E. tristachya* (Roxb.) O. Ktze. Rev. Gen. Pl. 2: 775. 1891; Fl. As. 5: 339. 1940.

Culms 0.3-1.2 m, tufted; leaves erect, linear, acuminate, 10-45 × 0.2-0.6 cm; racemes 2-12, subdigitate, 5-15 cm; rachis firm, filiform, compressed; spikelets oblong, 2.5-3.0 mm; lower glume linear-oblong, truncate or 2-mucronate at apex; upper glume oblong, hyaline, 1-nerved; lemma of lower floret whitish, ciliate; lemma of upper floret bidentate or lobed at apex, with 1-2 cm long awn at apex.

Grasslands and forest edges, 1000-1400 m; fl. & fr.: Aug.-Dec.; Nartiang.

5. ***Eulalia quadrinervis*** (Hack.) O. Ktze. Rev. Gen. Pl. 2: 775. 1891; Fl. As. 5: 337. 1940. *Pollinia quadrinervis* Hack. in DC. Monogr. Phan. 6: 158. 1889; Fl. Brit. Ind. 7: 110. 1896.

Culms 0.6-1.0 m; leaves linear, acuminate, 10-20 × 0.4-0.7 cm, hairy; racemes 3-6, 7-15 cm, spreading, white hairy; spikelets oblong-lanceolate, 5-6 mm, pale brown; lower glume 4-nerved; upper glume shiny, hyaline at apex, 3-nerved; lemma of lower floret 4.5-5.5 mm, 2-nerved; lemma of upper floret cuneiform, bilobed near base, with 1.7-2.0 cm long awn at apex.

Grasslands and secondary forests, 1000-1500 m; fl. & fr.: Sept.-Dec.; Jowai, Nartiang.

41. POGONATHERUM P. Beauv.

- | | | |
|---|-----|---------------------------|
| 1a. Racemes more than 4 cm long; spikelets 4-5 mm long. | ... | <i>P. rufo-barbatum</i> 1 |
| 1b. Racemes less than 4 cm long; spikelets up to 3 mm long. | | |
| 2a. Spikelets 2.5-3.0 mm long; callus hairs up to 1.5 mm long; lower floret present, male; upper floret with 2 stamens. | ... | <i>P. panicum</i> 2 |
| 2b. Spikelets not more than 2 mm long; callus hairs ± 2 mm long; lower floret empty or obsolete; upper floret with 1 (or rarely 2) stamens. | ... | <i>P. crinitum</i> 3 |

1. **Pogonatherum rufo-barbatum** Griff. Not. Pl. As. 3: 81. 1851; Fl. Brit. Ind. 7: 142. 1896; Fl. As. 5: 346. 1940.

Culms 25-60 cm, nodes bearded; leaves lanceolate, tapering to fine point, 5-10 × 0.5-0.6 cm; sheaths glabrous, auricled; ligules convex upwards; racemes 4-6 × 0.4-0.5 cm; pedicels ± 2 mm; lower glumes ± 3 mm, 2-lobed at apex, ciliate at margins, 3-5 or 7-nerved; upper glume 3.0-3.5 mm, awned at apex; awn 15-20 mm; keel scaberulous above; lower floret male; upper bisexual.

Moist rocky places, streamsides and forest edges, 1000-1500 m; fl. & fr.: July-Dec.; Kbleihriat, *Balakrishnan* 50052; Nartiang, *Balakrishnan* 47102 —Endemic to Meghalaya.

2. **Pogonatherum paniceum** (Lamk.) Hack. in Allg. Bot. Zeits. 12: 178. 1906; Fl. As. 5: 347. 1940. *Saccharum paniceum* Lamk. Encycl. Meth. Bot. 1: 595. 1785. *P. saccharoideum* P. Beauv. Ess. Agrost. 176, 177. 1812; Fl. Brit. Ind. 7: 141. 1896.

Culms tufted, 10-50 cm; nodes glabrous; leaves linear-lanceolate, acuminate, 2-7 × 0.1-0.4 cm; sheaths smooth, fimbriate at mouth; ligules reduced; racemes 1.5-3.0 × 0.1-0.2 cm; pedicels 1.0-1.5 mm; lower glumes 2-3 mm, truncate at apex, 2-3-nerved; upper glume 2.5-3.0 mm, obtuse, keeled, awned at apex; awn 12-14 mm; lower florets male with 2 stamens; upper bisexual.

Rocky places in shaded forest edges and streamsides, 1200-1500 m; fl. & fr.: May-Nov.; Jowai.

3. **Pogonatherum crinitum** (Thunb.) Kunth, Enum. Pl. 1: 478. 1833; Fl. Brit. Ind. 7: 141. 1896. *Andropogon crinitus* Thunb. Fl. Jap. 40. t. 7. 1784.

Culms slender, tufted, 10-30 cm; nodes short-pilose; leaves linear-lanceolate, 4-6 × 0.3-0.5 cm; sheaths smooth, fimbriate at mouth; ligules short, long-pilose; racemes 2-3 cm; pedicels 1.5-2.0 mm; lower glumes truncate, ± 2 mm; upper glume 1.5-2.0 mm, shortly ciliate at apex, awned at apex; awn ± 1 cm, brown; lower floret male; upper bisexual.

Rocky cliffs, roadsides and other moist shaded places, 1200-1600 m; fl. & fr.: May-Nov.; Jowai, Jowai-Jarain, Raliang.

42. ERIANTHUS Michx.

- | | | |
|---|-----|--------------------------|
| 1a. Leaves almost all reduced to midrib; upper lemma entire at apex, very narrow. | ... | <i>E. rufipilus</i> 1 |
| 1b. Leaves broad; upper lemma 2-fid at apex, awned in sinus. | ... | <i>E. longisetosus</i> 2 |

1. **Erianthus rufipilus** (Steud.) Griseb. in Nachr. Ges. Wiss. Gott. 93. 1868. *Saccharum rufipilum* Steud. Syn. Pl. Glum. 1: 409. 1855. *E. pallens* Hack. in DC. Monogr. Phan. 6: 145. 1889. *E. versicolor* var. *pallens* (Hack.) Hook. f. Fl. Brit. Ind. 7: 124. 1896. *E. fulvus* Hack. in DC. Monogr. Phan. 6: 147. 1889; Fl. As. 5: 323. 1940.

Culms robust, 1-2 m; leaves linear, narrowed at base, setaceous at apex, 30-70 × 0.8-1.5 cm; ligules rounded-truncate, 1-2 mm; panicles erect, short, oblong, 20-25 cm, dense, mauve-purple, fading to fulvous colour; pedicels filiform; spikelets lanceolate, 2.5-3.0 mm, brownish; lower glume 2-nerved; upper glume 1-nerved, acute or 2-mucronulate.

Grasslands, in shaded places, 1200-1600 m; fl. & fr.: Sept.-Feb.; Jowai-Jarain.

2. **Erianthus longisetosus** Anderss. in Oefers. K. Vet. Akad. Forh. Stockh. 163. 1855; Fl. Brit. Ind. 7: 124. 1896; Fl. As. 5: 324. 1940.

Culms 2.0-2.5 m, stout; leaves flat, lanceolate, tapering to a fine point, narrowed at base, 30-100 × 1.0-2.5 cm; ligules round, shortly ciliate; panicles solitary or binate, erect or drooping, 15-45 cm; racemes reddish or golden brown hairy; pedicels thickened upwards, cupped at apex; spikelets oblong-lanceolate, 4.5-5.0 mm, golden brown; pedicelled spikelets with long hairs; lower glumes 2-6-nerved; upper glume 1-nerved, truncate or 2-toothed at apex.

Grasslands and secondary forests, 1000-1600 m; fl. & fr.: Sept.-Feb.; Jowai, Jowai-Garampani.

43. SACCHARUM L.

- | | |
|---|--------------------------|
| 1a. Stems silky hairy below the panicles; lower glume glabrous. ... | <i>S. spontaneum</i> 1 |
| 1b. Stems glabrous below the panicles; lower glume dorsally villous. | |
| 2a. Leaves villous at basal portion; joints of racemes 3-4 mm long; sessile spikelets short, 2.5-3.5 mm long. ... | <i>S. arundinaceum</i> 2 |
| 2b. Leaves villous only at the very base; joints of racemes 6-7 mm long; sessile spikelets 5-6 mm long. ... | <i>S. procerum</i> 3 |

1. **Saccharum spontaneum** L. Mant. Pl. 2: 183. 1771; Fl. Brit. Ind. 7: 118. 1896; Fl. As. 5: 319. 1940.

Culms 1-4; leaves narrowly linear-lanceolate, capillary at tip, scabrid, 45-160 × 0.4-0.5 cm; sheaths auricled; inflorescences lanceolate; branches 5-10 cm, the lower 4-5-nate; upper 1-2-nate; spikelets lanceolate, 3-6 mm; lower glume lanceolate, acuminate, 2-toothed, 3-6 mm, 2-nerved; upper glume oblong-ovate, often mucronate, 1-nerved.

Forest edges and grasslands, 1400-1700 m; fl. & fr.: Nov.-Mar.; Mawryngkneng.

2. **Saccharum arundinaceum** Retz. Obs. Bot. 4: 14. 1786; Fl. Brit. Ind. 7: 119. 1896; Fl. As. 5: 320. 1940.

Culms up to 6 m; leaves lanceolate, tapering at apex, up to 150×5 cm; upper leaves reduced; inflorescence large, silky; panicle up to 60 cm; branches subverticillate; sessile spikelets 2.5-2.7 mm; pedicels 2.0-2.5 mm; joints of rachis 3.5-4.0 mm; lower glume chartaceous, with a few hairs at tip; upper glume glabrous; pedicelled spikelets dorsally villous.

Secondary forests and grasslands, 700-1400 m; fl. & fr.: Oct.-Feb.; Jowai-Carampani, Lumshnong.

3. **Saccharum procerum** Roxb. Fl. Ind. 1: 243. 1820; Fl. As. 5: 321. 1940.

Culms 4-5 m, solid, terete; leaves linear-lanceolate, tapering to fine point, ± 150×5 cm; inflorescence large, silvery or grey; rachis joints 6-7 mm; pedicels 2.5-3.5 mm; sessile spikelets 3-4 mm; lower glume ± 5 mm, finely acuminate; upper glume setaceous and curved at apex, hairy at margins.

Forest edges and open clearings in forests, 900-1500 m; fl. & fr.: Oct.-Mar.; Jarain-Dawki, Jowai.

44. **ECCOILOPUS** Steud.

Eccoilopus cotulifer (Thunb.) A. Camus in Ann. Soc. Linn. Lyon, n. s. 70: 92. 1923; Fl. As. 5: 308. 1940. *Andropogon cotulifer* Thunb. Fl. Jap. 41. 1784. *Spodiopogon cotulifer* (Thunb.) Hack. in DC. Monogr. Phan. 6: 187. 1889; Fl. Brit. Ind. 7: 108. 1896.

Culms 80-150 cm, erect, 4-8-noded; leaves linear-lanceolate, narrowed at base, finely acuminate, 15-50×0.8-1.2 cm; sheaths keeled, free from culms; ligules oblong, obtuse, 3-4 mm, membranous; panicles 15-20 cm; branches whorled; spikelets linear-lanceolate, subfusiform, 5-6 mm; lower glume minutely 2-dentate at apex, ± 6 mm, strongly 4-8-nerved; upper glume lanceolate, 2-dentate at apex, mucronate at the sinus between teeth, 7-nerved.

River banks and forests edges, in open places, 1000-1600 m; fl. & fr.: June-Nov.; Mynso.

45. *MISCANTHUS* Anders.

Miscanthus nepalensis (Trin.) Hack. in DC. Monogr. Phan. 6: 104. 1889; Fl. Brit. Ind. 7: 107. 1896; Fl. As. 5: 311. 1940. *Eutalia nepalensis* Trin. in Mem. Acad. Sci. Petersb. ser. 6, 2: 333. 1832.

Culms 60-150 cm; leaves linear, 30-50 × 0.6-1.0 cm, glabrous; ligules ± 2 mm, truncate; panicles flabelliform, 10-15 cm, spreading; racemes 8-12 cm, capillary, nodding, fulvous-hairy; pedicels capillary, swollen, at tips; spikelets ovate-lanceolate, 2.0-2.5 mm; lower glume obtuse, emarginate, hairy; upper glume ovate-lanceolate, 1-nerved, scaberulous on keels and margins.

Grasslands, on rocky situations; 500-1500 m; fl. & fr.: Aug.-Dec.; Garampani-Kaliang.

46. *NARENGA* Bor

- 1a. Panicles golden or golden-brown in colour; sessile spikelets 4-5 mm long. ... *N. fallax* 1
 1b. Panicles purplish or greyish-purple in colour; sessile spikelets 2.5-3.0 mm long. ... *N. porphyrocoma* 2

1. **Narenga fallax** (Balansa) Bor in Kew Bull. 1948: 162. 1948. *Saccharum fallax* Balansa in Mort, J. de Bot. 4: 80. 1890. *Erianthus chrysothrix* Hack. in Oestr. Bot. Zeitschr. 41: 6. 1891; Fl. Brit. Ind. 7: 125. 1896.

Culms 1.0-2.5 m, ± 1 cm thick, rusty tomentose below panicle; leaves linear, narrowed at base, 40-80 × 1.0-1.5 cm, glabrous or sparsely hirsute; panicles linear 30-40 cm, covered with golden brown or rusty hairs; nodes reddish-bearded, ciliate; branches subverticillate; racemes 8-10 cm; spikelets 4-5 mm; lower glume narrowly truncate, 2-nerved; upper glume truncate, ± 2.5 mm; lemma of upper floret with 3-6 mm long awn.

Shaded places in grasslands, 500-1000 m; fl. & fr.: June-Nov.; Ioksi.

2. **Narenga porphyrocoma** (Trin.) Bor in Indian For. 66: 267. 1940. *Eriochrysis porphyrocoma* Trin. in J. Bot. 14: 294. 1876. *E. narenga* Steud. Syn. Pl. Glum. 1: 411. 1855. *Saccharum narenga* (Steud.) Wall. Cat. no. 8856. 1848; Fl. Brit. Ind. 7: 120. 1896.

Culms 2.0-2.5 m, silky below panicle; leaves narrow at base, 30-60 × 0.5-0.6 cm; panicles 30-45 cm, purplish woolly; branches 2-4-nate, filiform, appressed; spikelets oblong, brown, 2.5-3.0 mm; glumes 2.5-3.0

mm; lower glume short hairy at margins; upper glume keeled, ciliate at margins, 3-nerved; lemma of lower floret oblong, obtuse, ciliate; lemma of upper floret linear-oblong, emarginate, ciliate.

Open grasslands, 1200-1500 m; fl. & fr.: July-Dec.; Nartiang.

47. IMPERATA Cyr.

Imperata cylindrica (L.) P. Beauv. Ess. Agrost. 165. 1812; Fl. As. 5: 310. 1940. *Lagurus cylindricus* L. Syst. Nat. ed. 10: 878. 1759. *I. arundinacea* Cyr. Pl. Rar. Neap. 2: 26. 1792; Fl. Brit. Ind. 7: 106. 1896.

Rootstock creeping; culms solid, 20-200 cm; nodes densely hairy; leaves linear-lanceolate, narrowed at base, acuminate, 10-150 cm; ligules ciliate, dorsally silky; panicles spiciform, cylindrical, 3-30 cm; pedicels swollen at tips, covered with long fine white hairs; spikelets lanceolate, ± 3 mm; lower glumes lanceolate, hyaline at apex, 3-9-nerved; upper glumes keeled; lemma hyaline, ciliate, 1.5-2.0 mm.

Open grasslands and wastelands, marshy and also in fairly dry places, 1000-1500 m; fl. & fr.: May-Nov.; Jarain-Dawki, Jowai-Jarain, Raliang.

48. SCLEROSTACHYA (Hack.) A. Camus

Sclerostachya fusca (Roxb.) A. Camus in Le Comte, Fl. Indoch. 7: 243. 1922; Fl. As. 5: 313. 1940. *Saccharum fuscum* Roxb. Fl. Ind. 1: 241. 1820; Fl. Brit. Ind. 7: 120. 1896.

Culms 1.5-2.5 m; leaves linear-lanceolate, contracted at base, setaceous-acuminate, 75-115 \times 2-4 cm, scabrid at margins; sheaths longer than the internodes; ligules rounded, ± 3 mm, brown, ciliate; panicles dense, 30-60 cm; axis angular, pubescent, bearded at nodes; branches filiform 6-10 cm, pubescent; spikelets obovate-oblong, $\pm 3 \times 1.5$ mm; upper glumes 4-ribbed, 5-nerved, pilose on keels.

Grasslands, 1000-1500 m; fl. & fr.: May-Sept.; Jowai-Khleihriat.

49. APLUDA L.

Apluda nutica L. Sp. Pl. 82. 1753; Fl. As. 5: 432. 1940. *A. varia* L. subsp. *nutica* (L.) Hack. Monogr. Androp. 197. 1889; Fl. Brit. Ind. 7: 150. 1896.

Culms ascending or decumbent, up to 2.5 m; leaves linear-lanceolate, cuspidate-acuminate, 10-35 \times 0.3-0.5 cm, scaberulous at margins; sheaths rarely hairy; racemes paniculate, each enclosed in a peduncled spathe; spikelets in threes, one sessile and 2 pedicellate; lower glumes convolute, obtuse, ± 4.5 mm; upper glume boat-shaped, 2-mucronate, keeled, ± 4.5 mm, 5-7-nerved.

Open grasslands, 200-1500 m; fl. & fr.: Aug.-Dec.; Garampani, Shangpung.

50. ISCHAEMUM L.

- 1a. Ligules 2—3 mm long; sessile spikelets 4—5 mm long; lower glume of sessile spikelets smooth and margins expanded below the middle. *I. indicum* 1
 1b. Ligules 4—8 mm long; sessile spikelets 6—7 mm long; lower glume of sessile spikelets with rugosities and margins narrowly and evenly inturred from base to apex. ... *I. geobelii* 2'

1. **Ischaemum indicum** (Houtt.) Merr. in J. Arn. Arb. 19: 320. 1938; *Phleum indicum* Houtt. Nat. Hist. II, 13: 198, t. 90. f. 2. 1782. *I. ciliare* Retz. Obs. Bot. 6: 36. 1791; Fl. Brit. Ind. 7: 133. 1896. *I. aristatum* (non L. 1753) Bor in Fl. As. 5: 425. 1940.

Culms 50-60 cm; leaves linear-lanceolate, 5-15 × 0.5-1.2 cm; sheaths glabrous or hirsute; racemes spiciform, geminate or rarely 3, 3-8 cm, appressed together or spreading; sessile spikelets green, reddish or violet, ovate-oblong, 4-5 mm; lower glume 3.5-5.0 mm, 2-toothed, 5-7-nerved; upper glume 3.5-5.0 mm, shortly aristate, 3-5-nerved; pedicelled spikelets 3.5-5.0 mm, obovate; lower glume auricled at base.

Grasslands, roadsides and forest edges, 1200-1500 m; fl. & fr.: Aug.-Dec.; Jarain.

2. **Ischaemum geobelii** Hack. in Ost. Bot. Zeits. 51: 149. 1901. *I. aristatum* var. *imbricatum* Hack. Monogr. Phan. 6: 203. 1889; Fl. Brit. Ind. 7: 127. 1896. *Meoschium imbricatum* Hack. l. c. 203. 1889. *I. imbricatum* (Hack.) Ridl. Fl. Mal. Pen. 5: 200. 1925; Fl. As. 5: 422. 1940.

Culms 0.5-1.2 m; leaves linear-lanceolate, 10-25 × 0.6-2.5 cm, silky at margins; racemes 2-3, 5-12 cm, erect, appressed together; sessile spikelets oblong, 6-7 mm; lower glume oblong-lanceolate, 2-toothed, 5-7-nerved; upper glume ovate, mucronate, scaberulous at keels, 1-nerved; pedicelled spikelets ovate; pedicels ± 2 mm; lower glume ovate, winged on one margin, 7-nerved, reddish or white.

Forests and grasslands, in shaded moist places, 500-1500 m; fl. & fr.: Aug.-Dec.; Dawki, Jowai, Jowai-Jarain, Shangpung.

51. THYRSIA Stapf

Thyrsia zea (Clarke) Stapf in Hook. Ic. Pl. 31: t. 3078. 1922; Fl. As. 5: 434. 1940. *Rottboellia zea* Clarke in J. Linn. Soc. Bot. 25: 86. t. 85. 1889; Fl. Brit. Ind. 7: 152. 1896.

Culms ± 2 m; leaves linear, serrulate and ciliate at margins, 80-100 \times 1-2 cm, white above; sheaths compressed, keeled above; nodes puberulous; panicles of subverticillate spikes 25-40 cm; peduncles 2-5 cm; joints ± 4 mm, linear, subcompressed; sessile spikelets obovate, ± 4 mm; lower glume ± 4 mm, depressed and scabrid at back; upper glumes ovate, ± 4 mm, 3-nerved; pedicelled spikelets 3.4-3.8 mm, similar to sessile ones.

Grasslands in open and partially shaded places, 1200-1600 m; fl. & fr.: Aug.-Dec.; Jowai-Garampani, Nartiang.

52. RYTLIX Raf.

Rytilix granularis (L.) Skeels, U. S. Dep. Agr. Bur. Pl. Indus., 282: 20, 1913. *Cenchrus granularis* L. Mant. 2. App. 575, 1771. *Manisuris granularis* (L.) L. f. Nov. Gram. Gen. 40, 1779; Fl. Brit. Ind. 7: 159, 1896. *Hackelochloa granularis* (L.) O. Ktze. Rev. Gen. Pl. 2: 776, 1891; Fl. As. 5: 441, 1940.

Culms erect, ± 1 m, hirsute with tubercle-based hairs; leaves lanceolate or linear-lanceolate, cordate-amplexicaul at base, acuminate at apex; sheaths hirsute; spikes 1.5-2.5 cm, partly enclosed in spathaceous sheaths; sessile spikelets globular, 2.0-2.5 mm; lower glume ovate-oblong, obtuse, 3-nerved; lower lemma ovate-obtuse; pedicelled spikelets ovate; lower glume 5-7-nerved; upper glume boat-shaped, keeled.

Open grasslands, 200-1400 m; fl. & fr.: Aug.-Jan.; Garampani.

53. COELORACHIS Brongn.

- | | | |
|---|-----|----------------------|
| 1a. Panicles congested, consisting of fascicles of 4-6-noded branches carrying the racemes and arising from the axil of an upper leaf, with a spathe at each node; joints of racemes ± 2 mm long. | ... | <i>C. khasiana</i> 1 |
| 1b. Panicles lax, consisting of several long raceme-bearing branches arising from axil of an upper leaf, 2-3-noded and forming an open panicle; joints of racemes ± 4 mm long. | ... | <i>C. striata</i> 2 |

1. **Coelorachis khasiana** (Hack.) Bor in Indian For. Rec. Bot. 1(3): 101, 1938 et in Fl. As. 5: 448, 1940. *Rottboellia striata* subsp. *khasiana* Hack. in DC. Monogr. Phan. 6: 302, 1889; Fl. Brit. Ind. 7: 157, 1896.

Culms erect, solid, much-branched, 50-100 cm; leaves linear-lanceolate, acuminate, 60-130 \times 3-4 cm; sheaths shorter than the internodes; ligules narrow, ± 1 mm, convex upwards; racemes in fascicles from spathe-like leaf-sheaths; peduncles often capillary and enlarged at apex; racemes

2.5 - 3.0 cm; joints clavate; pedicels strap-shaped; sessile spikelets \pm 4 mm; pedicelled spikelets 1-2 mm or rudimentary.

Shaded places, near forests, 200 - 1000 m; fl. & fr.: Aug.-Jan.; Dawki.

2. **Coelorachis striata** (Steud.) A. Camus in Ann. Soc. Linn. Lyon, n. s. 68: 197. 1921; Fl. As. 5: 447. 1940. *Rottboellia striata* Steud. Syn. Pl. Glum. 1: 361. 1854; Fl. Brit. Ind. 7: 157. 1896.

Culms erect, 70 - 120 cm; leaves linear-lanceolate, acuminate, 60 - 120 \times 0.8 - 4.5 cm; sheaths rounded, hirsute, ciliate at outer margins; racemes 2.5 - 5.0 cm, exserted from sheaths; joints 3.5 - 4.5 mm; sessile spikelets 4 - 5 mm; pedicelled spikelets small; pedicels equal to joints.

Forest edges and grasslands, 1300 - 1600 m; fl. & fr.: Aug.-Dec.; Jowai-Shangpung.

54. OPHIUROS Gaertn. f.

Ophiuros megaphyllus Haines, Bot. Bih. & Or. 1058. 1924; Fl. As. 5: 449. 1940. *O. corymbosus* Hook. f. Fl. Brit. Ind. 7: 160. 1896, *p. p.*

Culms erect, 1.5 - 2.0 m; leaves ensiform, 80 - 120 \times 0.5 - 3.5 cm, acute along margins; racemes 5 - 15, fascicled in axils of spathes or leaf-sheaths, 7 - 10 cm; peduncles swollen at apex, often geniculate; spikelets sunk in rachis joints, 3.5 - 4.0 mm; lower glume 3.5 - 4.0 mm, 7 - 9-nerved, with a few pits or smooth; upper glume boat-shaped, 3 - 1-nerved, hyaline.

Grasslands and forest edges, in open or partially shaded places, 500 - 1000 m; fl. & fr.: July-Dec.; Garampani, Nongringkoh.

55. CHRYSOPOGON Trin. *nom. cons.*

- 1a. Culms creeping at base; panicles 3-10 cm long; sessile spikelets 3.0-4.5 mm long, with 3-4 mm long callus decurrent on the peduncle. *C. aciculatus* 1
 1b. Culms erect; panicles 18-30 cm long; sessile spikelets 5-8 mm, without a decurrent callus. ... *C. gryllus* 2

1. **Chrysopogon aciculatus** (Retz.) Trin. Fund. Agrost. 188. 1820; Fl. As. 5: 357. 1940. *Andropogon aciculatus* Retz. Obs. Bot. 5: 22. 1789; Fl. Brit. Ind. 7: 188. 1896.

Culms 20 - 60 cm; leaves linear, rounded at base, obtuse or acute at apex, 2 - 15 \times 0.3 - 0.5 cm; sheaths rounded; panicles erect, narrow; branches slender, filiform; sessile spikelets linear, 2 - 4, 2 - 4 mm, compressed, dor-

sally aristate; lower glume linear-subulate, 2-4 mm, 2-3-nerved; upper glume lanceolate, 2-4 mm, shortly aristate; keels scabrid.

Forest edges, roadsides and wastelands, 1300-1600 m; fl. & fr.: Aug.-Jan.; Jowai.

2. **Chrysopogon gryllus** (L.) Trin. Fund. Agrost. 188. 1820; Fl. As. 5: 358. 1940. *Andropogon gryllus* L. Cent. Pl. 2: 33. 1756; Fl. Brit. Ind. 7: 187. 1896.

Culms 60-160 cm; leaves linear, acute at apex, 15-35 × 0.5-0.8 cm, ciliate at margins; ligules narrow, ciliate; panicles lax; branches whorled, 5-8 cm; sessile spikelets linear; callus straight, acute, 7-10 mm; lower glume cartilaginous, involute at margins; upper glumes lanceolate, ± 7 mm, ciliate at margins; awn as long as spikelets; pedicelled spikelets longer than the sessile ones; lower glume aristulate; upper glume ciliate.

Grasslands, open and partially shaded places, 200-1500 m; fl. & fr.: May-Dec.; Garampani, Nartiang, Nongringkoh.

56. *Sorghum* Moench. *nom. cons.*

Sorghum nitidum (Vahl) Pers. Syn. Pl. 1: 101. 1805; Fl. As. 5: 351. 1940. *Holcus nitidus* Vahl, Symb. Bot. 2: 102. 1791. *Andropogon serratus* Thunb. Fl. Jap. 41. 1784; Fl. Brit. Ind. 6: 185. 1896.

Erect, tufted perennial, 1.5-2.5 m, villous at nodes; leaves setaceous-acuminate, 20-60 × 0.5-1.2 cm, sparsely tubercle-based hairy; scabrid at margins; sheaths terete, silky-villous at mouth; ligules ± 1 mm; panicles elongate; lower branches distantly whorled; upper alternate; spikelets 2-nate, sessile or pedicelled; spikelets elliptic-acute, ± 4 mm; glumes 5-7-nerved, dark brown or black, polished, hairy or hispid on keels.

Grasslands, open or partially shaded places, 200-1500 m, fl. & fr.: May-Dec.; Garampani, Nartiang, Nongringkoh.

57. *Hyparrhena* Fourn.

Hyparrhena griffithii Bor in Indian For. Rec. Bot. 1(3): 92. 1938; Fl. As. 5: 394. 1940. *Andropogon filipendulus* (non Hochst. 1846) Hook. f. Fl. Brit. Ind. 7: 209. 1896, *p. p.*

Perennial with creeping rhizomes; culms erect, up to 2 m; leaves linear, rounded at base, finely acuminate, 30-40 × 0.7-0.9 cm; sheaths often white-hairy, ciliate at margins; ligules membranous, up to 2 mm; panicles up to 40 cm; branches erect, filiform; spathes setaceous-acuminate,

up to 15 cm; racemes in pairs; peduncles bearded at base; lower glumes \pm 6.5 mm, 11-nerved, 2-toothed; upper glumes oblong-lanceolate, \pm 6.5 mm, 3-4-nerved, ciliate at margins.

Open grasslands and forests edges, 1000-1500 m; fl. & fr.: Aug.-Jan.; Nartiang.

58. THEMEDA Forsk.

- | | |
|---|-------------------------|
| 1a. Involucral spikelets entirely glabrous or puberulous on lower glumes, never with tubercle-based bristles. ... | <i>T. villosa</i> 1 |
| 1b. Involucral spikelets covered with numerous or sparse tubercle-based bristles on lower glume. | |
| 2a. Sessile spikelets awnless. ... | <i>T. intermedia</i> 2 |
| 2b. Sessile spikelets awned. | |
| 3a. Racemes less than 1.5 cm long; pairs of involucral spikelets inserted at the same level. ... | <i>T. triandra</i> 3 |
| 3b. Racemes more than 1.5 cm long; pairs of spikelets inserted at different levels. | |
| 4a. Involucral spikelets 10-20 mm long; column of awns more than 3.5 cm long. ... | <i>T. arundinacea</i> 4 |
| 4b. Involucral spikelets 11-12 mm long; column of awns less than 2.5 cm long. ... | <i>T. subsericans</i> 5 |

1. ***Themeda villosa*** (Poir.) A. Camus in Le Comte, Fl. Gen. Indoch. 7: 364. 1922; Fl. As. 2: 409. 1938. *Anthistiria villosa* Poir. in Lamk. Encycl. Meth. Bot. suppl. 1: 396. 1814. *A. gigantea* Cav. subsp. *villosa* (Poir.) Hack. in DC. Monogr. Phan. 6: 674. 1889; Fl. Brit. Ind. 7: 217. 1896.

Culms tufted, stout, up to 2 m; leaves linear-lanceolate, tapering to narrow base, acuminate, 20-30 x 0.4-0.6 cm; inflorescences large, leafy, decomposed; spatheoles boat-shaped, keeled, 2.5-3.0 cm; peduncles 1.0-1.5 cm, villous at tip; involucral spikelets 4, inserted in pairs at different levels; lower glume lanceolate, 10-14 mm, 2-keeled; upper glume shorter, hyaline, 3-nerved; sessile spikelets 7-10 mm; lower glume oblong-lanceolate, truncate, 7-8-nerved; upper glume 7 mm, 3-nerved.

Open places in grasslands, 900-1300 m; fl. & fr.: Sept.-Jan.; Garampani-Jowai, Ioksi, Khleihriat.

2. ***Themeda intermedia*** (Hack.) Bor in Indian For. Rec. Bot. 1(3): 95. 1938 et in Fl. As. 3: 414. 1939 et Grass, Burma, Ceyl., Ind. & Pak. 251. 1960. *T. gigantea* subsp. *intermedia* var. *intermedia* Hack. in DC. Monogr. Phan. 6: 675. 1889.

Culms tufted, up to 4 m; leaves linear-lanceolate, petioled at base, acuminate, up to 1 m long, 1.5 cm wide; inflorescences nodding; spatheoles

boat-shaped, keeled, 2.5-4.6 cm; peduncles 1.0-1.5 cm; involucrel spikelets oblong-lanceolate, inserted at different levels; lower glume lanceolate, 10-14 mm, many-nerved; upper glume 10-12 mm, 3-nerved; sessile spikelets \pm 10 mm; lower glume brown hairy; upper glume glabrous.

Pine forests and wastelands, 1300-1600 m; fl. & fr.: Sept.-Jan.; Jowai.— Bor (*l.c.* 1960) states that this is a putative hybrid between *T. arundinacea* and *T. villosa*, in which the awn is missing.

3. ***Themeda triandra*** Forssk. Fl. Aeg.-Arab. 178. 1775; Fl. As. 5: 406. 1940. *Anthistiria imberbis* Retz. Obs. 3: 11. 1783; Fl. Brit. Ind. 7: 211. 1896.

Culms erect, ascending, up to 3 m; leaves linear, rounded at base, acuminate at apex, up to 35 x 0.8 cm; inflorescence leafy, narrow, nodding at apex; spatheoles lanceolate, attenuate at apex, compressed, 2-5 cm; peduncles up to 1 cm; involucrel spikelets lanceolate to linear-lanceolate, 8-10 mm; lower glume lanceolate, acute; sessile spikelets linear-oblong, 7-10 mm; lower glume obtuse, 7-nerved; upper glume 7-10 mm, 1-nerved.

Grasslands and secondary forests, 900-1400 m; fl. & fr.: Sept.-Dec.; Ioksi.

4. ***Themeda arundinacea*** (Roxb.) Ridley in Trans. Linn. Soc. ser. 2. 3: 401. 1893; Fl. As. 5: 411. 1940. *Anthistiria arundinacea* Roxb. Fl. Ind. 1: 256. 1820. *A. gigantea* Hack. subsp. *arundinacea* (Roxb.) Hack. in DC. Monogr. Phan. 6: 674. 1889; Fl. Brit. Ind. 7: 217. 1896.

Culms up to 6 m, \pm 1.5 cm thick; leaves linear, attenuate towards base, subulate at apex, up to 1 m long, 1.0-1.5 cm wide; inflorescence erect, nodding at apex; spatheoles 3-8 cm; peduncles \pm 1 cm, swollen at apex, hairy; involucrel spikelets inserted at different levels, \pm 1.5 cm; lower glume lanceolate, covered with golden hairs at back, many-nerved; upper glume 3-nerved, acuminate; sessile spikelets \pm 8 mm, bearded with brown hairs; lower glume oblong, 2-toothed, brown.

Grasslands and pine forests, 1200-1600 m; fl. & fr.: Aug.-Jan.; Jowai, Nartiang.

5. ***Themeda subsericans*** (Steud.) Ridley, Fl. Malay. Pen. 5: 212. 1925; Fl. As. 5: 411. 1940. *Anthistiria subsericans* Steud. Syn. Pl. Glum. 1: 401. 1855.

Culms up to 1 m, hairy below; leaves linear, acuminate, up to 35 cm long, 0.8-1.3 cm wide; sheaths scabrid and hairy; inflorescences panicles of compound racemes seated on peduncles, concealed in 2-4 cm long spatheoles; involucrel spikelets 11-12 mm, covered on the back with numer-

ous golden or rufous hairs; lower glume narrowly elliptic, acuminate 2-keeled; upper glume 3-nerved; sessile spikelets \pm 1 cm, densely brown hairy; awn \pm 2.4 cm, hispid on column.

Grasslands, 1000 - 1500 m; fl. & fr.: Aug.-Dec.; Amwee, near Jarain Hook. f. & Thomson s. n. (CAL). —Bor (l. c. 1900) states this may be a hybrid between *T. arundinacea* and *T. villosa*.

59. CAPILLIPEDIUM Stapf

- 1a. Leaves narrowed or rounded at base; panicles 10—25 cm long; spikelets oblong, obtuse; lower glume of sessile spikelets channelled on back. ... *C. parviflorum* 1
- 1b. Leaves narrowed and gradually tapering at base; panicles 5—10 cm long; spikelets lanceolate; lower glumes of sessile spikelets flat on back. ... *C. assimile* 2

1. **Capillipedium parviflorum** (R. Br.) Stapf in Prain, Fl. Trop. Afr. 9: 169. 1917; Fl. As. 5: 362. 1940. *Holcus parviflorus* R. Br. Prodr. 199. 1810. *Andropogon micranthus* Kunth, Rev. Gram. 1: 165. 1829; Fl. Brit. Ind. 7: 178. 1896.

Culms 1 - 2 m; erect or ascending, simple or sparingly branched; leaves linear, tapering to a fine point, 20 - 35 \times 0.2 - 0.4 cm, pubescent or glabrous; panicles 10 - 25 cm, decomposed; primary branches subverticillate; racemes reduced to one sessile and 2 pedicelled spikelets; sessile spikelets oblong, 3 - 5 mm; glumes \pm 8 nerved, scabrid.

Pine forests, roadsides in shaded moist places, 1200 - 1600 m; fl. & fr.: Sept.-Dec.; Jowai.

2. **Capillipedium assimile** (Steud.) A. Camus in Fl. Gen. Indoch. 7: 314. 1922; Fl. As. 5: 363. 1940. *Andropogon assimilis* Steud. in Zoll. Syst. Verz. 58. 1854; Fl. Brit. Ind. 7: 170. 1896.

Culms 1.9 - 3.5 m, decumbent-ascending, rooting at base, branching above; leaves linear-lanceolate, acuminate-setaceous, 6 - 15 \times 0.3 - 0.6 cm, hispidulous; panicles 5 - 10 cm, decomposed; branches capillary; racemes 7 - 10 mm, peduncled, 2 - 3-jointed; sessile spikelets linear-oblong, 2 - 4 mm; lower glume oblong, 2 - 4 mm; inflexed at margins, 2-keeled, ciliate on keels; upper glume 2.5 - 3.5 mm, ciliate at apex.

Pine forests and roadsides, 1300 - 1600 m; fl. & fr.: Aug.-Jan.; Jowai.

60. DICHANTHIUM Willem.

Dichanthium caricosum (L.) A. Camus in Bull. Mus. Hist. Nat. Paris 27: 549. 1921; Fl. As. 5: 370. 1940. *Andropogon caricosus* L. Sp.

Pl. ed. 2: 1480. 1763. *A. caricosus* subsp. *genuinus* Hack. in DC. Monogr. Phan. 6: 568. 1889; Fl. Brit. Ind. 7: 196. 1896.

Perennials; culms ascending, rooting at lower nodes, 30-60 cm; leaves narrowly linear, rounded at base, setaceous-acuminate, 15-20 × 0.3-0.5 cm; sheaths compound; ligules ciliate; racemes subdigitate, 2-4-nate, 4-8 cm; peduncles 5-12 mm; pedicels linear, flat, hairy at margins; spikelets distichous; sessile spikelets 4-5 mm; lower glume obovate, subobtuse, keeled at margins, 8-12-nerved; upper glumes 3-keeled, depressed near median keel.

Grasslands and waste places, 1300-1600 m; fl. & fr.: July-Dec.; Jowai.

61. CYMBOPOGON Spreng.

- | | | |
|---|-----|-----------------------|
| 1a. Peduncles shorter than spatheoles; racemes 2.0-2.5 cm; sessile spikelets 5-6 mm; awns 10-12 mm. | ... | <i>C. khasianus</i> 1 |
| 1b. Peduncles as long as or longer than spatheoles; racemes 1.5-2.0 cm; sessile spikelets 4-5 mm; awns 7-10 mm. | ... | <i>C. exsertus</i> 2 |

1. **Cymbopogon khasianus** (Duthie) Bor in Indian For. Rec. Bot. 1(3): 92. 1938; Fl. As. 5: 390. 1940. *Andropogon khasianus* Duthie, Fodd. Grass. N. India 88. 1888. *A. nardus* L. var. *khasianus* (Duthie) Hack. in DC. Monogr. Phan. 6: 603. 1889; Fl. Brit. Ind. 7: 206. 1896.

Perennial; culms up to 2 m; leaves linear, up to 2 cm wide; sheaths terete; panicles elongate, 40-90 cm; spathes lanceolate, 1.8-3.0 cm; spatheoles 1.2-1.8 cm; racemes one sessile and the other peduncled; sessile spikelets elliptic-oblong, 5-6 mm; lower glumes ovate-lanceolate, 2-keeled, 7-9-nerved; lower glume of pedicelled spikelets lanceolate, many-nerved; upper glumes obovate, 3-nerved.

Grasslands, and secondary forests in open places, 1000-1500 m; fl. & fr.: Aug.-Dec.; Dawki, Ioksi-Nongringkoh, Jarain-Sohka, Jowai, Jowai-Garampani, Nartiang.

2. **Cymbopogon exsertus** (Hack.) A. Camus in Rev. Bot. App. 1: 287. 1921; Fl. As. 5: 391. 1940. *Andropogon nardus* L. var. *exsertus* Hack. in DC. Monogr. Phan. 6: 608. 1889; Fl. Brit. Ind. 7: 207. 1896.

Culms short, slender, 1-2 m; leaves up to 1 m long, 5-8 mm wide; sheaths terete, loose; panicles 25-35 cm, lax-flowered; branches short, 1-4-noded, erect, strict; upper branches 1-noded; spathes 15-20 mm; racemes 15-20 mm, 5-6-jointed; spikelets lanceolate, 4-6 mm, linear-lanceolate; lower glume 2-toothed, nerveless; keels hardly margined; upper lemma densely ciliate.

Grasslands and secondary forests, 1000-1500 m; fl. & fr.: Aug.-Dec.; Ioksi-Nongringkoh, Jowai, Khongsnong-Ioksi,

62. SCHIZACHYRIUM Nees

- 1a. Annuals ; leaves up to 4 cm ; culms up to 60 cm ; peduncles 1—3 cm long ; joints 2.0—2.5 mm. ... *S. brevifolium* 1
 1b. Perennials ; leaves upto 50 cm ; culms 60—200 cm ; peduncles 3—5 cm long ; joints 5—7 mm. ... *S. sanguineum* 2

1. **Schizachyrium brevifolium** (Sw.) Nees, Agrost. Bras. 332. 1829; Fl. As. 5: 398. 1940. *Andropogon brevifolius* Sw. Prodr. Veg. Ind. Occ. 26. 1788; Fl. Brit. Ind. 7: 165. 1896.

Culms weak, up to 60 cm, ascending from decumbent base; leaves linear, obtuse at base, sharply pointed at apex, 2.5-3.5 × 0.2-0.6 cm; sheaths compressed, keeled; racemes filiform, clavate upwards; peduncles enclosed in a spathe, 1.0-2.5 cm, 5-11-jointed; sessile spikelets linear-lanceolate; glumes equal, 2-dentate, scaberulous on keels; upper glume boat-shaped, 1-nerved; ciliolate; pedicelled spikelet reduced to minute glume, produced into ± 4 mm long bristle.

Forest edges, and roadsides, 100-700 m; fl. & fr.: Aug.-Jan.; Dawki.

2. **Schizachyrium sanguineum** (Retz.) Alst. Suppl. Fl. Ceyl. 334. 1931. *Rottboellia sanguinea* Retz. Obs. Bot. 3: 25. 1783. *S. semiberbe* Nees, Agrost. Bras. 336. 1829; Fl. As. 5: 399. 1940. *Andropogon hirtiflorus* (non Kunth, 1832) Hook. f. Fl. Brit. Ind. 7: 167. 1896.

Culms 0.5-2.0 m; leaves linear, shortly acute, 20-50 × 0.2-0.5 cm; sheaths striate, glabrous; racemes slender; peduncles 4-5 cm, enclosed in a spathe, 8-14-jointed; sessile spikelets linear-lanceolate, 6-8 mm; lower glumes subequal, reddish or dark brown, 2-keeled, 3-4-nerved; upper glumes subulate, 1-nerved, ciliolate at margins; pedicelled spikelets lanceolate, ± 4 mm; lower glume flat, 2-keeled, 5-7-nerved; upper glume 3-nerved.

Grasslands and forest edges, 1300-1600 m; fl. & fr.: July-Jan.; Jowai-Jarain, Nartiang.

63. ANDROPOGON L.

Andropogon ascinodes Clarke in J. Linn. Soc. Bot. 25: 87. t. 36. 1889; Fl. As. 5: 380. 1940. *A. apricus* (non Trin. 1836) Hook. f. Fl. Brit. Ind. 7: 169. 1896.

Culms 0.5-2.0 m; leaves linear, acuminate, 10-90 × 0.1-0.5 cm, pubescent at base, scabrid at distal portion; sheaths setaceous at apex; ligules truncate, 1-2 mm; racemes spiciform, 15-25 mm, hispid, paniculate; pedicels ± 3.5 mm; spikelets compressed laterally, oblong, ± 5 mm; lower glumes linear, truncate, scabrid on keels, 5-9-nerved; upper glumes with 10-15 mm long awn.

Grasslands and waste places, in open, 1000-1400 m; fl. & fr.: Sept.-Jan.; Nartiang.

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