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Taxonomic revision of the genus *Hiptage* Gaertn. (Malpighiaceae) in India

R. C. SRIVASTAVA

ABSTRACT

SRIVASTAVA, R. C. (1992). Taxonomic revision of the genus *Hiptage* Gaertner (Malpighiaceae) in India. *Candollea* 47: 601-612. In English, English and French abstracts.

Nine species and two varieties are described and illustrated with synonymy, citations, typification, distribution and phenology. Keys to the species and varieties are worked. Exsiccata studied are cited.

RÉSUMÉ

SRIVASTAVA, R. C. (1992). Révision taxonomique du genre *Hiptage* Gaertner (Malpighiacées) en Inde. *Candollea* 47: 601-612. En anglais, résumés anglais et français.

Neuf espèces et deux variétés sont décrites et illustrées avec leurs synonymies, citations diagnostiques, typifications, répartitions et phénologies. Des clés de détermination sont ajoutées. Les spécimens étudiés sont cités.

Introduction

Genus *Hiptage* Gaertner belongs to the tribe *Hiraeae* of subfamily *Pyramidotorae* of *Malpighiaceae*. In this genus, the wing is divided into a bigger median part and two smaller, lateral parts. Sometimes the dorsal wing is present as a small crest. The genus is characterised by scandent or arborescent shrubs, calyx posteriorly provided with one dark-coloured gland which is often adnate to the pedicel (rarely the gland is wanting also); zygomorphic fragrant flowers; unequal stamens (1 anterior one being 2-3 times longer than 9 others). The structure of calycinal gland(s) has been accepted as being of primary importance for the distribution of sections and of species. The genus has been divided into 3 sections viz. *Archihiptage* (Nied.) Arènes (5 small calycinal glands), *Meta-hiptage* (Nied.) Arènes (calycinal glands absent), and *Hiptage* (one large calycinal gland). The only detailed work available on the taxonomy of this genus (on global basis) is that of NIEDENZU (1928). Subsequent studies were limited to particular areas and there is much need for a recent revision. HOOKER (1874) described only 3 species from present political boundaries of India. There was no subsequent study on this genus from this country. Present studies by the author under "Flora of India Project" have revealed that 9 species and 2 varieties of *Hiptage* Gaertner occur in Indian Forests. These are described and illustrated below with synonymy, citations, typification, and phenology. Key to the species and varieties are also worked out and exsiccata studied are cited. Vernacular names are also given wherever known.

Hiptage Gaertner, Fruct. 2: 169, t. 116. 1791; Hook. f. in Benth. & Hook. f., Gen. Pl. 1: 258. 1862 et Fl. Brit. Ind. 1: 418. 1874; Nied. in Engl. & Prantl, Nat. Pflanzenfam. 3(4): 54. 1890 et in Engl., Pflanzenr. 4(141): 67. 1928; Hutchinson, Gen. Fl. Pl. 2: 585. 1969. *Gaertnera* Schreb. in L., Gen. Pl. ed. 8, 1: 29. 1789 (non Lamk. 1791).

Type species: *H. madablota* Gaertner [*H. benghalensis* (L.) Kurz.].

Climbing or erect shrubs or small trees. Leaves opposite, entire, usually glandular at base; stipules minute, gland-like or absent. Racemes terminal or axillary, sometimes branched; peduncles bracteate; pedicels jointed, 2-bracteate. Flowers white, fragrant, the 5th petal discoloured; calyx 5-partite with one large gland partly adnate to the pedicels; petals clawed, unequal, silky; stamens 10, declinate, all fertile, one much longer than the others; filaments connate at the base; ovary 3-lobed, appendaged on the back; style 1 (rarely 2), filiform, at first circinate; stigma capitellate. Samaras 1-3, 3-winged; seeds sub-globose, cotyledons unequal, thick, curved.

Distribution. — Ca. 30 species distributed in West China, subtropical Asia, Formosa, Malaya and Pacific Islands. Nine species in India.

Key to the species

1. Inflorescence white appressed pubescent (softly tomentose, or silky white woolly) ... 2
- 1a. Inflorescence rusty or flavid tomentose 6
2. Branches elongate twiggy; leaves 5.5-8.5 × 1.5-3.7 cm; racemes 4-16 flowered 3
- 2a. Branches stout; leaves 9-21 × 4-9 cm; racemes 10-30-flowered 5
3. Leaves linear-elliptic, shortly acuminate at apices, petioles 3-4 mm long . **H. jacobsii**
- 3a. Leaves ovate-oblong, ovate-elliptic, acuminate or acute at apices; petioles more than 5 mm long 4
4. Leaf apices long acuminate. Pedicels articulated above middle. Sepals tomentose, greenish, glands ovoid **H. parvifolia**
- 4a. Leaf apices acute or obtuse; pedicels articulated in middle. Sepals glabrous and red; glands oblanceolate **H. thothathrii**
5. Leaf apices long acuminate; glands ca. 4-5 × 2 mm. Samaras 40-60 × 10-15 mm
H. benghalensis
- 5a. Leaf apices abruptly, shortly and obtusely acuminate; glands ca. 2 × 0.75 mm. Median wings of samaras ca. 13 × 3 mm **H. obtusifolia**
6. Trees; leaves flavid tomentose on both surfaces when young, glabrous above when old
H. candicans
- 6a. Dense bushy shrubs or climbers; leaves glabrous and glossy on both surfaces 7
7. Foliar glands deeply placed on intramarginal nervules. Racemes in fascicles
H. acuminata
- 7a. Foliar glands absent. Racemes not fascicled 8
8. Calycinal glands circular. Leaves ovate, abruptly acute or retuse at apices, tomentose above when young, sparsely pubescent on nerves beneath when old..... **H. nayarii**
- 8a. Calycinal glands oblong. Leaves oblong, elliptic-ovate, acuminate at apices, glabrous
H. sericea

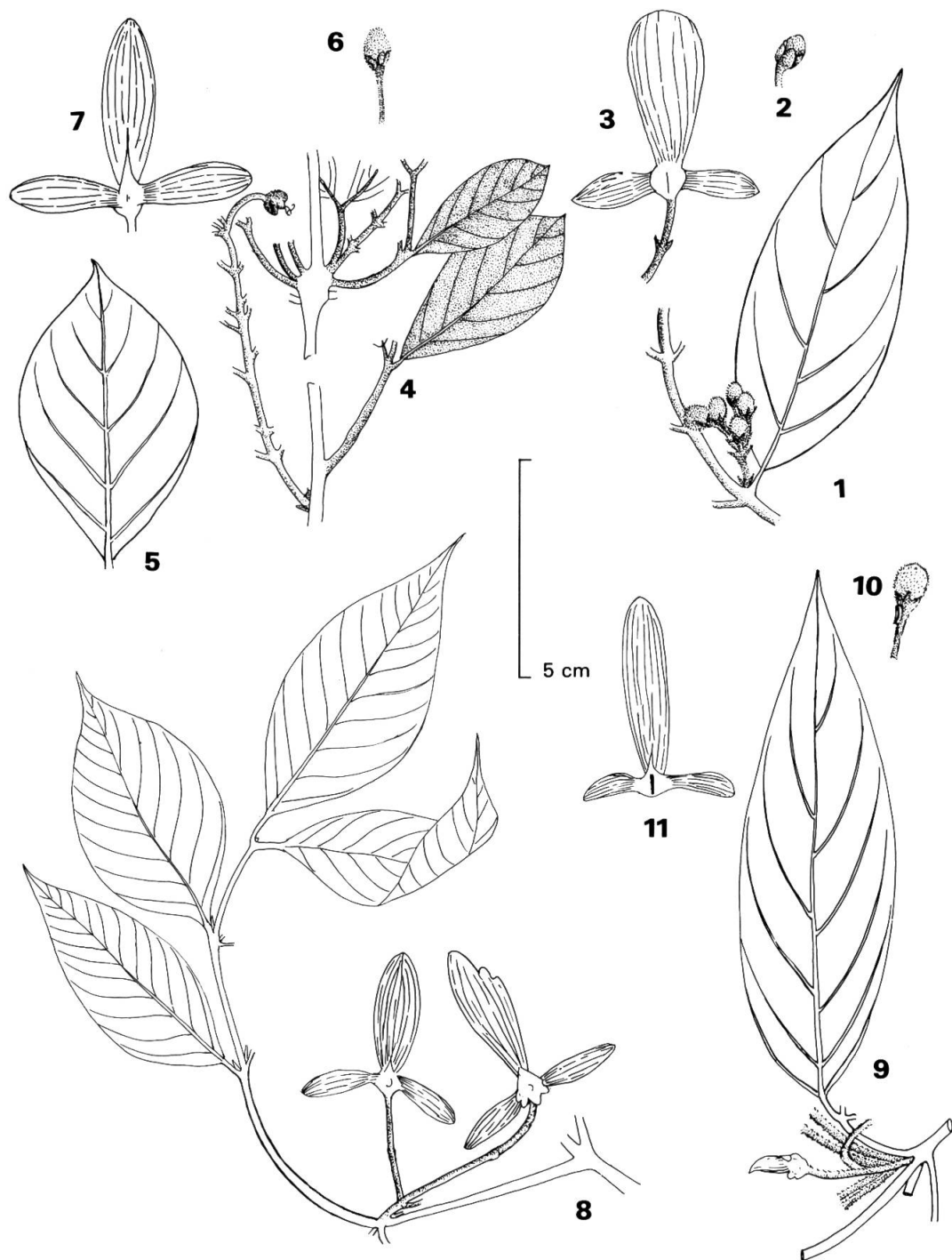
1. **Hiptage acuminata** Wall., Cat. No. 1065. 1828; Juss. in Ann. Sci. Nat. ser. 2, Bot. 13: 269. 1840 et in Arch. Mus. 3: 503. 1843; Hook. f., Fl. Brit. Ind. 1: 419. 1874; Nied. in Engl., Pflanzenr. 4(141): 80-81. 1928; Kanjilal & al., Fl. As. 1(2): 189. 1936.

Type: India, Bengal, *Wallich 1065* (K-Wall.) (microfiche in CAL!).

Vernacular name. — Jeremai-Soh-Pad-Purao (Kh.).



Map showing the distribution of endemics taxa.



Figs. 1-3. — *Hiptage acuminata*.

1, twig; 2, a bud; 3, a samara.

Figs. 4-7. — *Hiptage candicans*.

4, twig with young leaves; 5, an adult leaf; 6, a bud; 7, a samara.

Fig. 8. — *Hiptage parvifolia*.

Twig with samara.

Figs. 9-11. — *Hiptage sericea*.

9, twig; 10, bud showing calycinal gland; 11, a samara.

Shrubs, rarely climbers. Branches scabrid; branchlets pubescent when young. Leaves linear-lanceolate, 6-14 × 2.2-4.5 cm, caudate-acuminate, glabrous, coriaceous, foliar glands often present in intramarginal nervules; petioles ca. 5 mm long, glabrescent. Racemes axillary, 2.5-6 cm long, rusty-tomentose. Pedicels stout, ca. 8 mm long in buds, 2-2.5 cm long in fruits, articulated at ca. 1-1.2 cm below calyx; bracts ca. 2.3 mm long; bracteoles 1 mm long. Flowers ca. 1.7 cm across; sepals ca. 4 × 2 mm, tomentose above; glands ovoid, ca. 3 × 2 mm; petals suborbicular, ca. 10 × 3 mm; filaments 5-10 mm long; anthers ovoid, 1-2 mm long; styles ca. 1.25 cm long. Samaras dark brown, median wing oblanceolate-obovate, ca. 3.5 × 1.7 cm, lateral wings oblique-oblong, 1.8-2 × 0.5-0.8 cm; crista sometimes present, ca. 4 × 2 mm.

Flowers & fruits. — February-July.

Distribution. — India (Assam, Manipur, Meghalaya, Nagaland and Sikkim). Endemic.

Specimens examined. — **Assam:** Loc. not cited, *Kings coll. s.n.*, April 1893 (CAL). **Manipur:** Loc. not cited, *Watt. 7232* (CAL). **Meghalaya:** Khasi Hills, Loc. not cited, *Anonymous s.n.* (CAL 66401 & 66404); *Anonymous s.n.* (DD); *Griffith 915* (CAL); *Gustavmann 219* (DD); *Jenkins s.n.* (CAL 66405); *Kanjilal 6198* (ASSAM, DD); *Kings Coll. s.n.* (CAL); Cherrapunjee, *Collett s.n.* (CAL 66379); Barapani, *Geo Gallatly 115* (CAL); Bedan Falls, *Prain 46* (BSI); Mawsmi, *Sharma S. R. 19234* (ASSAM); Nongpoh, *Sharma 9962* (ASSAM); Umrait-river, *Kanjilal 6533* (ASSAM); Garo Hills near Nokrek, *Rupchand 2633* (DD); Jowai (near bridge to Jorain), *Deka 5170* (CAL). **Nagaland:** Kohima, *Prain s.n.* (DD). **Sikkim:** *Anonymous s.n.* (CAL 66276).

2. *Hiptage benghalensis* (L.) Kurz in J. As. Soc. Beng. 43(2): 136. 1879; Nied. in Engl., Pflanzent. 4(141): 77-78. 1928. *Banisteria benghalensis* L., Sp. Pl. 427. 1753. *Gaertnera racemosa* Roxb., Pl. Cor. 1, t. 18. 1795 et Fl. Ind. 2: 368. 1832. *Hiptage madablota* Gaertner, Fruct. 2: 169, t. 116. 1791; Hook. f., Fl. Brit. Ind. 1: 418. 1874.

Vernacular names. — Madhavilata (Hindi, Beng. Mani. & Sans.). Basanti (Beng.). Dimtri-ranqrikang (Mik.). Kereklatata (Asm.). Dugrak-budu (Garo). Ragatpit, Autala (Guj.). Baromali (Or.).

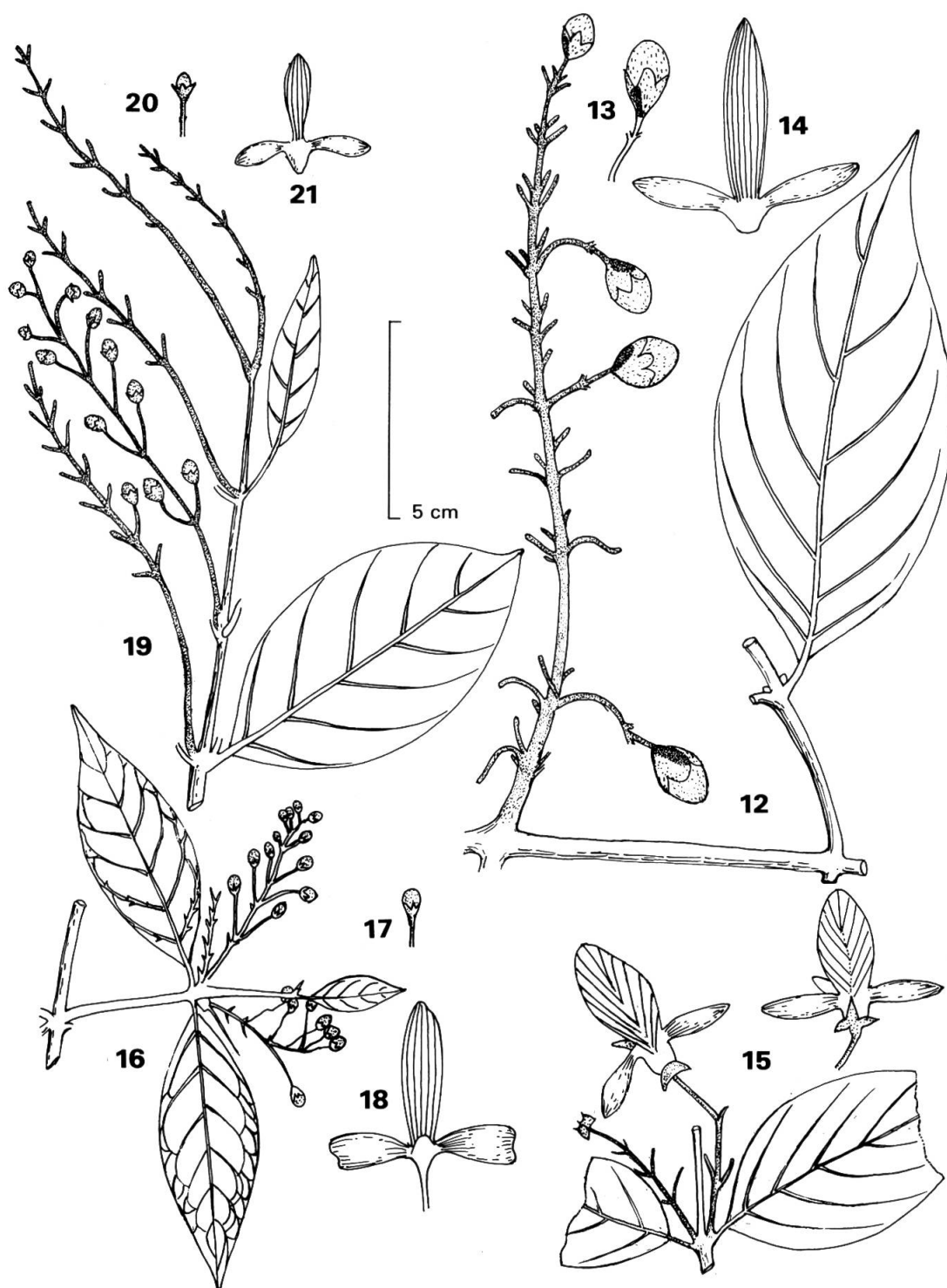
Climbers. Leaves oblong, ovate-lanceolate, 9-21 × 4-9 cm, acute or acuminate, sub-coriaceous, glabrous; petioles ca. 1 cm long. Racemes longer than leaves, 10-20 cm long, erect, softly tomentose; pedicels 1.5-2.0 cm long, thickened towards apex. Flowers white, with yellow centre, fragrant, 2-3 cm across; sepals ovate, elliptic or oblong, 8-10 × 2-4 mm, fulvous sericeous outside, calycinal glands oblong, elliptic to lanceolate, 4-5 mm long, half decurrent on the pedicels; petals sub-orbicular to obovate, ca. 1 cm long, hairy outside, margins fimbriate; anthers ovoid, 1-2 mm long, the anther of one stamen ca. 2 mm long; filaments ca. 6 mm long in shorter ones or ca. 10 mm long in longer one; style terete, 14-15 mm long, acute, slightly curved; ovary pubescent. Samaras variable in shape and size, middle wing oblanceolate or linear-oblong acute, obtuse or rounded at apex, 4-6 × 1.0-1.5 cm; lateral wings lanceolate, oblong, 2-3 × 0.8-1.5 cm; dorsal crista present, ca. 11 mm long.

- 1. Leaves ovate-lanceolate to oblong lanceolate 2
- 1a. Leaves linear-lanceolate, 3-6 times longer than broad var. **longifolia**
- 2. Median wing, oblanceolate, acute and narrow at apices var. **benghalensis**
- 2a. Median wing obovate, broader at apices var. **rothinii**

var. **benghalensis**

Type: India, *Savage Cat. 589.1* (LINN), (microfiche in CAL!).

Flowers & fruits. — January-April.



Figs. 12-14. — *Hiptage benghalensis*.
12, twig; 13, bud showing calycinal gland; 14, a samara.

Fig. 15. — *Hiptage benghalensis* var. *rothinii*.
Twig with attached samaras.

Figs. 16-18. — *Hiptage jacobsii*.
16, twig; 17, a bud; 18, a samara.

Figs. 19-21. — *Hiptage obtusifolia*.
19, twig; 20, a bud; 21, a samara.

Distribution. — Burma, S. China, Formosa, India, Indonesia, Malaysia, Philippines and Sri Lanka.

Chromosomes numbers. — $2n = 42, 56, 58, 60$ (Kumar & Subram., 1987).

Specimens examined. — **Andaman & Nicobar Islands:** South Andamans, *Heinig 237* (CAL); Ins. Nicobar, *Jelivek 177* (CAL); Dham Khari Hill Jungle, *King s.n.* (CAL 66301); Anikhet-Hill jungle, *Kings Coll. s.n.* (CAL); Mt. Haviett, *Parkinson 1085* (CAL). **Andhra Pradesh:** Vishakhapatnam, Kilagada, *Subba Rao 22591* (MH); *Wagh 2298* (BLAT); Kodur, *Wagh 7529* (BLAT); Tirumalai Hills, Chittoor, *Wagh 8176* (BLAT); Potangi, Saloor, *Kapoor 66978* (LWG). **Arunachal Pradesh:** Abor Exped., *Burkill 36756* (CAL); Aka Hills, *Anonymous 15725* (ASSAM); Kameng, *Panigrahi 15396* (CAL). **Assam:** Kamrup Dt., *Anonymous 816* (ASSAM); Mailongdisa, *Anonymous 184* (CAL); Lumding, *Anonymous 91* (CAL); Jorhat, near Golaghat Hotspring, *Yadav 81268* (LWG). **Bihar:** Chhotanagpur, Bongerbel, *Gamble 9081* (CAL); *Netrahat Paul 81047, 80595* (LWG); Champaran, *Thothathri 10118* (CAL). **Chandigarh:** Chandigarh, *Sharma 1682* (CU). **Gujrat:** Sasangir, *Singh, K. K. 2347* (CDRI). **Himachal Pradesh:** Hazara, *Anonymous 133* (CAL); Rainuka, *Rau, M. A. 11366* (BSD); Kangra, Shahpur, *Troup s.n.* (DD-8139); *Watt. s.n.* (CAL 66292). **Karnataka:** Loc. not cited, *Anonymous s.n.* (CAL 66342); M. M. Hills, *Manohar & Singh KFP 11048* (CAL); Chikmagloor Dt., *Saldanha KFP 9467* (CAL). **Kerala:** Travancore Dt., Thalappara Hills, *Calder & Ramaswami 739* (CAL); Iduki Dt., Thenkanchi, *Sharma 40874* (MH); Palghat Dt., Mukkali Forest, *Vajravelu 27806* (MH). **Madhya Pradesh:** Bastar Dt., *Saxena 1482, 5672* (SFRI); on way to Dharba, *Balakr. & Henry s.n.* (MH); Jabalpur, *Hole 243* (CAL); Guna, Makroodangarh, *Indorkar 16365* (Herb. SFRI, Jabalpur); Kanha, *Kotwal & Verma 19916* (SFRI); Chachai, Sidhi, *Panigrahi 2481* (BSA); Bailadilla, Bastar, *Panigrahi & Arora 6984* (BSA); Raigardh, *Srivastava R. C. s.n.* (BSA); Pachmarhi, *Witt. s.n.* (DD); Sagar, Rampura Res., *Witt. s.n.* (DD). **Maharashtra:** Victoria Garden, Bombay, *Anonymous 13872* (BLAT); Khandala, *Santapau 7303* (DD), *3607* (BLAT); *Saldanha 6508* (BLAT); *Anonymous 17814* (BLAT); Malbar Concan, *Hook. & Thoms. s.n.* (CAL); Pune, Coll. of Sci., *Anonymous s.n.* (BLAT); Jidgad Ravine, Murbad Range, Pune, *Anonymous 113888* (CAL); Thana Dt. Naneghat, Bhairaw Baba, *Billore 110938* (BSI); Pune, *Cherian 65956* (BSI); Pune Dt., Nandgaon Temple to village Ambavane, *Reddi 95893* (CAL); Pune Dt., Katepani Forest Facing Kolaba Dt. border, *Reddi 95935* (CAL); Rajni ner Sattar-Ambavare-Mulshi Taluk, *Reddi 101053* (CAL); Mahabeleswar, Fitzgeraldghat, *Santapau 12580* (BLAT); Mumbra, *Shenoy 2629-31, 2593* (BLAT); Tegur-Dharwar-Belgam Rd., *Sedwick 5492* (BLAT). **Manipur:** *Watt. 7226* (CAL); Thoubal, *Anonymous 18368* (DD); Imphal, *Meebold 639* (CAL). **Meghalaya:** Khasi Hills, Shillong, *Anonymous s.n.* (CAL 66275); Burneyhat, Khasia, *Clarke 43262* (CAL). **Mizoram:** Changsie, Lushai, *Prazer s.n.* (CAL 66280). **Nagaland:** Naga Hills, *Anonymous 21073, 2968, 18389* (ASSAM); *Prair s.n.* (CAL 66283); Loc. not cited, *Bor 2968* (DD). **Orissa:** Bhanjam, *Anonymous s.n.* (CAL); Saurabota, Gankam, *Anonymous 14112* (CAL); Kokakora, *Mooney 2634* (DD). **Punjab:** Hoshiarpur, *Aitchinson s.n.* (DD); *Mishra 47098* (BSD). **Rajasthan:** Mt. Abu, *King s.n.* (CAL 66322). **Sikkim:** Kalagaiti, *Ribu s.n.* (CAL). **Tamilnadu:** Madras, *Anonymous s.n.* (CAL 66326); Annamalainagar, *Thiagarajan s.n.* (LWG); Travancore, *Bourdillon 704* (CAL); Madurai Dt., Sirumalai, *Chandrabose 54279* (CAL); Pachenda Hills, Vijaypatanam, *Anonymous 13931* (CAL); Kanyakumari Dt., Verrapulli R. F., *Henry 48233* (CAL); Madurai Dt., Suruli, *Subram. K. 9400* (MH); Madurai Dt., Combai, *Raju 12931* (CAL); Nilgiri Dt., Malapalam, *Sebastine 2594* (CAL, MH). Coimbatore Dt., Villingiri Hills, *Sebastine 2354* (CAL); Thakkumalai-Chinnathadagam, *Sebastine 684* (CAL); Aliyar, *Sebastine 15636* (MH); Trichy, Fort. of Pachamalai, *Sebastine 7891* (CAL); Nilgiri Dt. Bokkapuram, *Sharma 35445* (MH). Arcot Dt., On way to Kambukudi, *Subraniam K. 6496* (CAL, MH); Tirunelveli, Kalakkadu R. F., *Vajravelu 27866* (MH). **Uttar Pradesh:** Dehradun, Lachhivala, *Rao T. A. 2177* (BSD); Tons nala, *Sahni s.n.* (DD); Mothronwala, Dehradun, *Dakshni 3943, 8025, 8049* (BSD); Bindal near Hathi Bakla School, Dehradun, *Babu 35219* (BSD); Haldwani, *Bahadur, S. s.n.* (DD 10161); Tanakpur, Kumaon, *Bhattacharya 20399* (BSD); Kumaon, *Devidson s.n.* (DD); Kumaon, Jeolikota, *Gill 510* (CAL); Kheri, *Inayat s.n.* (DD); Dudha, *Anonymous s.n.* (DD); Chamoli, Garhwal, *Osmaston s.n.* (DD); Allahabad, *Srivastava, R. C. s.n.* (BSA); Garhwal, Bagoli, *Singh s.n.* (DD). **West Bengal:** Tipera, Fatikroy Rd., *Biswas 5012* (CAL); Ind. Bot. Garden, *Deb 279* (CAL); *Debbarmann 2768, 6052* (CAL); *Robert 9979* (BSIP).

var. **longifolia** (Nied.) Srivastava in J. Econ. Taxon. Bot. 4(3): 1025-1026. 1983. *H. benghalensis* f. *longifolia* Nied. in Arb. Bot. Inst. Ak. Braunsber. 6: 40. 1915.

Type: Indonesia, Bogor, *Hochr. No. 33* (L) Photo!

Flowers and fruits. — March-May.

Distribution. — Indonesia and India (Assam, Uttar Pradesh, West Bengal).

Specimens examined. — **Uttar Pradesh:** Kaluwala, Siwalik & Jaunsar Div., *Sware B. D. 27* (BSI). **West Bengal:** HBG, *Anonymous s.n.* (CAL 66259); *King s.n.* (DD); Loc. not cit., *Anonymous s.n.* (DD); *Anonymous s.n.*, *Gaertnera racemosa* (DD).

var. **rothinii** Srivastava in Nat. Acad. Sci. Letters 6(7): 223-225. 1983.

Type: Manipur: Imphal, Lemokong, *Srivastava 83295* (LWG).

3. *Hiptage candicans* Hook. f., Fl. Brit. Ind. 1: 419. 1874; Srivastava in J. Econ. Taxon. Bot. 4(3): 936-937. 1983.

Type: Burma, Bank below Yensgheon, *Wallich 9020* (K-Wall.), (microfiche in CAL!).

Small tree. Young branches densely flavid-tomentose. Leaves lanceolate-ovate, ovate-oblong or elliptic-lanceolate, 6-9.5 × 1.5-5 cm, acute or obtuse at bases, acute or shortly acuminate at apices, coriaceous, young ones densely flavid-tomentose on both surfaces, adult ones glabrous above; petioles tomentose, ca. 5 mm long. Racemes 9-14 cm long, pedicels 14-17 mm long; bracts lanceolate-ovate, 3-4 mm long; bracteoles lanceolate, 2-2.5 mm long. Flowers white, 2-3 mm across; buds subglobose-ovoid, 0.75-1 × 0.6-0.8 cm; sepals ovate, 5-6 mm long, ca. 2 mm decurrent on pedicels; petals flavate, fimbriate; filaments ca. 11 mm long, anthers ovoid, 1-2 mm; styles ca. 1.5 cm long. Samaras pilose, median wings lanceolate or oblanceolate-oblong, 2.5-4 × 5-14 mm; lateral wings ovate, 6-14 × 5-11 mm.

Flowers and fruits. — March-May.

Distribution. — Burma, Cochinchina (?) and India (Nagaland & Manipur).

Specimens examined. — **Manipur:** Bhingsow village, *Watt. G. 6503* (CAL). **Nagaland:** Shugna, *Jagarmani 475* (DD); Naga Hills, *Jagarmani 476* (DD); Loc. not cit., *Anonymous 44* (CAL).

Notes. — This Burmese species is known from India only by three specimens, two from Nagaland and one from Manipur. A thorough expertised exploration is needed to locate more populations in the areas of known occurrence.

4. *Hiptage jacobsii* Srivastava in Indian Forester 110(5): 499-502. 1984.

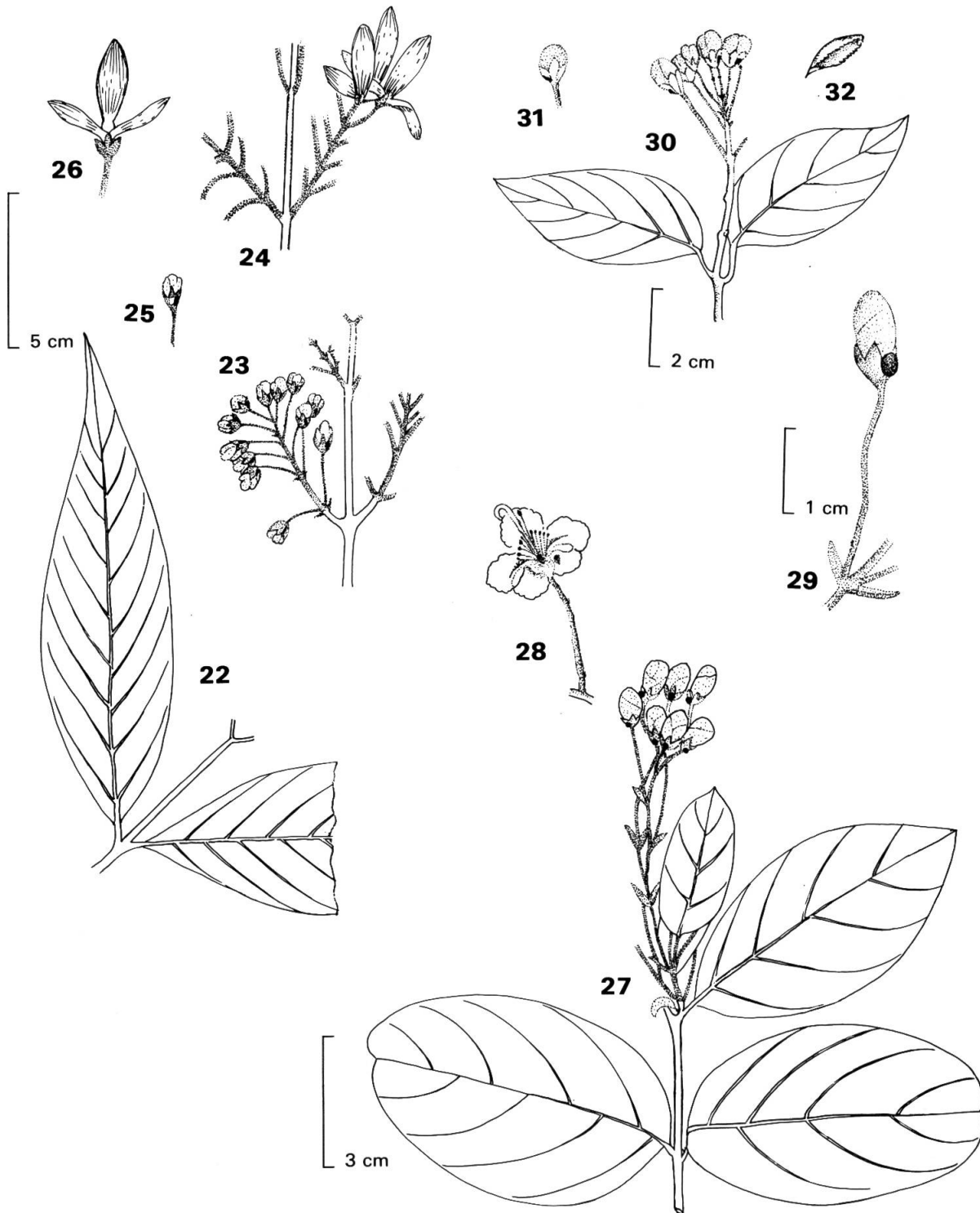
Type: India, Mizoram, Lushai Hills, Acar Forest, Lungleh (3000-4000 ft.), April 14, *A. T. Gage 146* (CAL-Holotype); Lushai Hills, Locality not mentioned, *Mrs. Pary s.n.* (CAL-Paratype).

Climbing shrubs. Branches glabrous. Leaves linear-elliptic, 5.5-8.5 × 1.5-2.5 cm, bases acute, apices shortly acuminate, sub-coriaceous, glabrous; petioles 3-4 mm long, glabrous. Panicles axillary or terminal; peduncles 3.5-9 cm long, 0.75-1 mm thick, white, appressed tomentose; bracts ca. 1.75 mm long; bracteoles ca. 1 × 0.75-1 mm. Floral buds globose or sub-globose, 4-8 × 4-5 mm; sepals 1.5-2 × 1-1.5 mm, calycinal glands ca. 2 × 1 mm; petals 10-11 mm long, denticulate; anthers ovoid, ca. 1 × 0.5 mm, filaments ca. 5 mm long; styles 12-13 mm long. Samaras pale brown, ecristate; middle wing of samaras elliptic or oblanceolate, 38-43 × 10-11 mm, sometimes slightly broader in middle, tapering at both ends, sub-acute or rounded at apices, glabrous; lateral wings obovate, 18-20 × 7-8 mm.

Flowers and fruits. — March-May.

Distribution. — India (Mizoram). Endemic. Known by the Type collections only.

Notes. — An extremely rare plant. Further explorations are needed in the type locality.



Figs. 22-26. — *Hiptage benghalensis* var. *longifolia*.
 22, leaves; 23, twig with buds; 24, twig with samaras; 25, a bud; 26, a samara.

Figs. 27-29. — *Hiptage nayarii*.
 27, twig; 28, a flower; 29, a bud showing calycinal gland.

Figs. 30-32. — *Hiptage thoatharii*.
 30, a twig; 31, a bud showing calycinal gland; 32, a petal.

5. *Hiptage nayarii* Srivastava in Indian Forester 110(5): 499-502. 1984.

Type: India, Tamil Nadu, Tinnevely Dt., Kil-Manimuthar (Bridge-falls), *Sebastine 3673* (Holotype in MH; Isotype in CAL).

Shrubs. Branches woody, rusty tomentose when young, glabrescent with age. Leaves ovate, 7-8.5 × 3-5 cm, bases obtuse or acute, apices abruptly acute sometimes retuse; young leaves softly tomentose, sub-coriaceous, old ones glabrous and shining above, yellow brown or dull grey-brown beneath, sparsely pubescent on nerves beneath; petioles ca. 5 × 1.5 mm, appressed tomentose. Peduncles axillary or terminal, ca. 6-7 cm long, tomentose; bracts foliaceous, ovate, 5-6 × 2 mm; bracteoles very minute. Flowers white; pedicels 25-37 mm long, thickened below calyx, brown tomentose; buds oblong, ca. 10 × 5 mm; sepals ovate, 4-5 × 1.5-2 mm, white tomentose, calycinal glands circular, ca. 2-2.5 mm in diam.; petals obovate or sub-orbicular, ca. 10 × 4 mm, denticulate, dorsally tomentose; anthers ovoid, ca. 10-11 mm long, broader at base, glabrous; ovary sericeous, styles 10-12 mm long, sericeous at base, stigma linear.

Flowers and fruits. — June-August.

Distribution. — India (Tamil Nadu). Endemic.

Specimens examined. — **Tamil Nadu:** Tinnelvely Dt., Kilh-Manimuthar, Bridge-falls, *Sebastine 3673* (CAL, MH).

Notes. — A species of rare occurrence. Fruits not yet found. Further explorations are needed to judge its status.

6. *Hiptage obtusifolia* DC., Prodr. 1: 583, 1824; Nied. in Engl., Pflanzenr. 4(141): 79. 1928.

Type: China, *Roxburgh s.n.* (G-DC 583.2), (microfiche in CAL!).

Climbers. Young branches somewhat silky white pubescent. Leaves oblong to elliptic-oblong, 9-10 × 3.5-7 cm, acute or obtuse at bases, apiculate at apices, coriaceous, glabrous; petioles 5-10 mm long, glabrous. Racemes axillary 7-14 cm long, whitish woolly (slightly above middle). Flowers white, buds 3-4 × 2-3 mm, glands ca. 2 × 0.75 mm; sepals concave, rounded ca. 3 × 2 mm, obtuse, densely greyish pubescent; petals rounded, ca. 1.4 cm long, fringed, villous; filaments 4-8 mm long; anthers ovoid, ca. 1 mm long; style ca. 8 mm long. Samaras brown, median wings ca. 13-15 × 3-5 mm, lateral wings ca. 10 × 2.5 mm.

Flowers and fruits. — March-May.

Distribution. — Brazil, Burma, Celebes, China, Formosa, India (Andamans and Assam), Java, Philippines and Thailand.

Specimens examined. — **Andaman & Nicobar Islands:** Wright Myo, Edges of Forests, *Balagr. & Bhargava 3476* (PBL); Dhanikhari Hill Jungle, *Kings Coll. s.n.* (BSI 2415, 2416); Peel Island, Inland forests, *Rao & al. 7700* (PBL); Portmonat, 18.3.1893, *Kings Coll. s.n.* (CAL); Anikhet-Hill Jungle, S. Andamans, 5.3.1893, *Kings Coll. s.n.* (CAL 66271). **West Bengal:** HBC, Cult., *Anonymus s.n.* (DD, CAL 66359, 66360).

Notes. — A species of rare occurrence. Presently known from Andaman Islands only.

7. *Hiptage parvifolia* Wight & Arnott, Prodr. Fl. Pen. Ind. Or. 107. 1834; Hook. f., Fl. Brit. Ind. 1: 419. 1874; Nied. in Engl., Pflanzenr. 4(141): 79. 1928.

Type: Ceylon, *Wight 358* (type could not be traced out).

Climbing shrubs. Branches and shoots elongate twiggy. Leaves ovate-oblong or ovate-elliptic 6-8.5 × 2.7-3.7 cm, acute to acuminate at bases, acuminate at apices, glabrous; petioles ca. 7 mm, glabrescent. Racemes with appressed pubescence, 4-5 cm long, pedicels sepals ovate, 3-3.5 × 1.5-2 mm, glands ovoid, ca. 3 mm long; petals 7-9 × 1-1.2 mm; filaments 5-11 mm long; anthers ovoid, 1-1.5 mm long; styles 1-1.5 cm long. Samaras light brown, median wing obovate, 2-3.5 × 0.8-1.4 cm, apex rounded, lateral wings elliptic, 1.5-2 × 0.75 cm.

Flowers and fruits. — February-May.

Distribution. — China, India (Assam, Karnataka, Tamil Nadu, Kerala and Meghalaya), Sri Lanka and Burma.

Specimens examined. — **Assam:** Mibgsemdi, Herb. G. Watt., *REP 11815* (CAL 66385 & 66386).

Notes. — This species was first described from Sri Lanka and then frequently reported from peninsular India during subsequent years. But except for one specimen (*REP 11815* Herb. G. Watt. — as *H. acuminata* in CAL) from Assam, no other specimen could be traced out. Further expertised explorations are required to rediscover it in nature.

8. *Hiptage sericea* Hook. f., Fl. Brit. Ind. 1: 419. 1874; Nied. in Arb. Bot. Inst. Ak. Braunsberg 6: 44. 1915 et in Engl., Pflanzenr. 4(141): 81-82. 1928. *Clerodendron sericeum* Wall., Cat. No. 1814, 1828, no.n. nud.

Type: Burma, Tinang, *Wallich 1814* (K-Wall.), (microfiche in CAL!).

Climbers. Branches densely covered with short brown tomentum. Leaves oblong, elliptic or ovate, 7.5-12.5 × 2.2-3.5 cm, acute to rounded at bases, acuminate at apices; foliar glands absent, glabrous; petioles 5-6 mm long. Pedicels ca. 2.8 cm long, articulated at ca. 1.3 cm below calyx, thicker below calyx, brown tomentose. Flowers white, buds sub-globose to ovoid, 5-6 mm long; sepals elliptic-ovate, 3 × 2 mm, apices rounded, densely tomentose outside, glabrous inside; glands oblong, 2-3 mm long; outer petals elliptic, inner ones orbicular, 6-8 × 2-5 mm, tomentose outside, glabrous inside, denticulate; anthers ovoid, ca. 1 mm long, filaments 5-12 mm; styles acute, ca. 12 mm long. Samaras reddish brown, median wings oblong, 3-4.5 × 0.75-1 cm, lateral wings ovate, 1.5-2.8 × 1.5-0.8 cm.

Distribution. — Burma, China, India (Assam, Meghalaya, Karnataka, Kerala, Sikkim and Tamil Nadu), Malacca and Penang.

HOOKER (1874) Mentioned it to occur in Eastern Peninsula, Penang and Malacca, while BLATTER (1930) reported it from China as well. There is no mention of this species in Kanjilal & al. (1936) in "Flora of Assam".

Specimens examined. — **Assam:** Nowgaon, *Anonymous s.n.* (CAL 66281); Pabhoi Forest, Darang Dt., *Kanjilal 3742* (ASSAM); Loc. not cited, *Jenkins s.n.* (CAL 66282). **Karnataka:** N. Kanara, *Bell 5743* (BLAT); Kundagudda, Agumbe, *Raghavan 97306* (BSI). **Kerala:** Pomudi, *Ansari 50194*; Loc. not cited, *Thomson, s.n.* (DD). **Meghalaya:** Khasi Hills, *Simons s.n.* (DD). **Nagaland:** Kohima, *Prain s.n.* (DD). **Sikkim:** *Anonymous s.n.* (DD). **Tamil Nadu:** Tinnelvely, Upper Dam to Kannikatti, *Sebastine 9954* (MH).

9. *Hiptage thothathrii* Balakr. & Srivastava in J. Econ. Taxon. Bot. 4(3): 985-986. 1983.

Type: India, N. Andamans, Saddle Peak, *Balakrishnan 5377* (PBL).

Climbers. Leaves ovate-elliptic, 4.5-5.5 × 2.5-3.5 cm, acute at apices, obtuse at bases, glabrous; petioles 5-6 cm long, glabrous. Inflorescence appressed pubescent; pedicels 14-20 mm long, articulated at middle; bracts ca. 2 mm long, pubescent; bracteoles abortive or very minute. Buds globose, 5-8 × 3-5 mm; sepals ovate, 4 × 2 mm, glabrous, apices rounded, calycinal glands 4 × 1 mm; petals sub-orbicular, ca. 5 × 5 mm, white, tomentose, margins fimbriate; filaments in shorter stamens ca. 6 mm long, longer ones 10-11 mm long, anthers ovoid, 1-1.5 mm long, ovary sericeous, styles ca. 10 mm long, Fruits not seen.

Flowers. — March.

Distribution. — India (Andaman Islands). Known by the Type collection only.

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