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A New Species and a New Variety of *Boehmeria* (Urticaceae) from the Himalaya with Special Reference to the Status of *B. penduliflora* Wedd. ex D. G. Long

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A new species *Boehmeria kamley* N. Acharya & Yonek. and a new variety of *B. densiflora* Hook. & Arn. var. *intermedia* N. Acharya & Yonek. are described from the Himalaya. Status of *B. penduliflora* Wedd. ex D.G. Long and *B. densiflora* Hook. & Arn. are discussed and a new combination *B. densiflora* var. *penduliflora* (Wedd. ex D.G. Long) N. Acharya & Yonek. is proposed.

Key words: *Boehmeria, Boehmeria densiflora var. intermedia, Boehmeria kamley, Boehmeria penduliflora*, Himalaya

Genus *Boehmeria* (Urticaceae) comprises ca. 100 species and is distributed from tropical to temperate regions in Asia, Oceania and America. This genus is quite difficult taxonomically and is known to have been differentiated under the intricate speciation including apomixis (Okabe 1963, Yahara 1983, 1990). Eight species have been recorded from Nepal (Hara 1982). In the course of revisional study of Nepalese *Boehmeria*, we found two undescribed taxa previously confused with the other species.

A new species *Boehmeria kamley* described here is very similar to *B. ternifolia* D. Don, distributed in the southern foothill of the Himalaya from Kumaon to Bhutan in sharing shrubby habit and opposite, anisophyllous, suborbicular leaves with teeth gradually larger towards apex. But they can be distinguished from each other by the following key:

1. Leaves shallowly 2- or 3-lobed at apex, often duplicate on lateral lobes, teeth triangular, acuminate; fruiting perianths with hairs 125-200 μm long (Fig. 1a) ..... *Boehmeria kamley* N. Acharya & Yonek.
1. Leaves not lobed at apex, teeth simple, ovate, acute; fruiting perianths with hairs 75-125 μm long (Fig.1b) ..... *Boehmeria ternifolia* D. Don

Boehmeria kamley appears to be similar to *B. platanifolia* (Maxim.) Franch. & Sav. ex C.H. Wright distributed in East China and Japan in its lobed leaves with acuminate teeth. *Boehmeria platanifolia* is, however, unbranched herbs up to 1 m tall and is easily distinguishable from *B.*

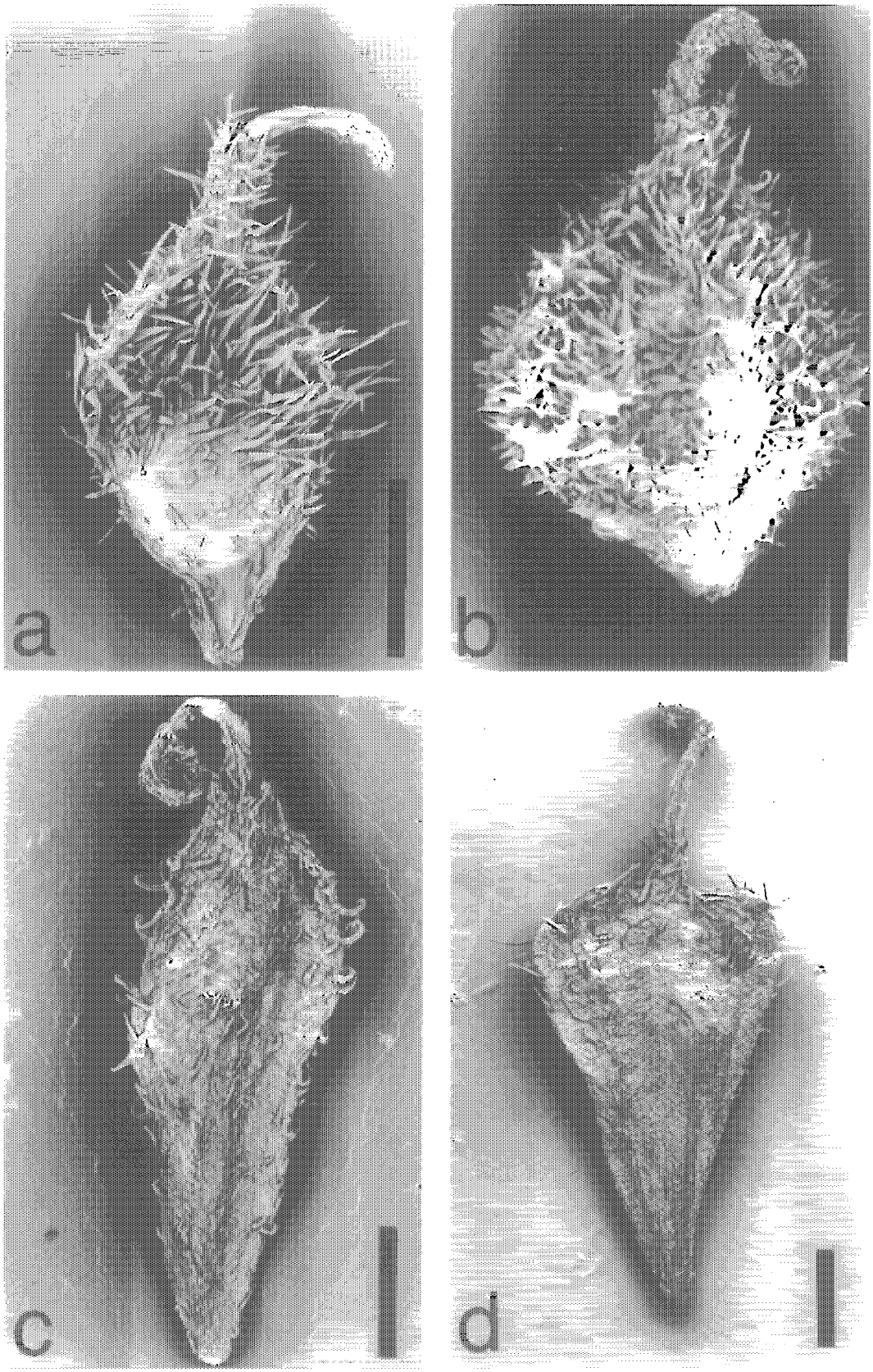

FIG. 1. SEM micrographs of fruiting perianths. a: *Bochmeria kamley* (*Grierson & Long 453*, E). b: *B. ternifolia* (*Suzuki et al. 9455157*, E). c: *B. densiflora* var. *intermedia* (*Dobremez 673*, BM). d: *B. densiflora* var. *penduliflora* (*Hara et al. 6307110*, BM). (scale bar = 0.5 mm)

kamley. *Boehmeria platanifolia* is an agamospermous taxon (Okabe 1963) whereas *B. kamley* bears male flowers and the pollen grains get well stained (98 %) when stained with cotton-blue (Fig. 2), which suggests that the latter is not agamospermous. *Boehmeria kamley* is distributed in the eastern Nepal and Bhutan and *B. ternifolia* is distributed from Kumaon to Bhutan, along the southern foothill of the Himalaya.

Boehmeria penduliflora Wedd. ex D.G. Long (syn.: *B. macrophylla* D. Don, non Hornem.) is a species widely distributed from Southeast Asia, Himalaya to Southeast China. This species is closely related to *B. densiflora* Hook. & Arn. of the Ryukyus, Taiwan, the Philippines and southeastern China in sharing such characters as shrubby habit, opposite lanceolate leaves, unbranched pendulous female inflorescences and stalked achenes with oblanceolate perianths. They have been treated as distinct species from each other based on the differences of such characters as leaf hairiness, shape and hairiness of fruiting perianths as well as that of geographical distribution (Hooker & Arnott 1836, Weddell 1854, 1869, Wright 1899, Wang 1981, Yahara 1981, Grierson & Long 1982, 1983), but Wang (1995) united them under the name *B. penduliflora* and treated *B. densiflora* as a variety of the former.

We found that several specimens collected from Nepal, Northeast India and Yunnan Province of Southwest China have achenes very similar to *Boehmeria densiflora* (Fig. 1c) although they are almost identical with *B. penduliflora* in leaf hairiness. They are regarded as the intermediate plants between the two taxa. Although the upper surface of mature leaves of *B. penduliflora* and the intermediate plants is glabrous, their young leaves are pubescent with hairs similar to *B. densiflora*. Regarding the distribution, *B. penduliflora* is also found in Guangdong Province in Southeast China (X.Y. Zhu, pers. comm.) where *B. densiflora* is also distributed. They suggest that the characters used to distinguish *B. penduliflora* from *B. densiflora* are not always correlated to each other and geographical isolation between them is not great as hitherto considered. It supports Wang's view (1995) that both taxa were regarded as conspecific. The name *B. densiflora* was, however, published in

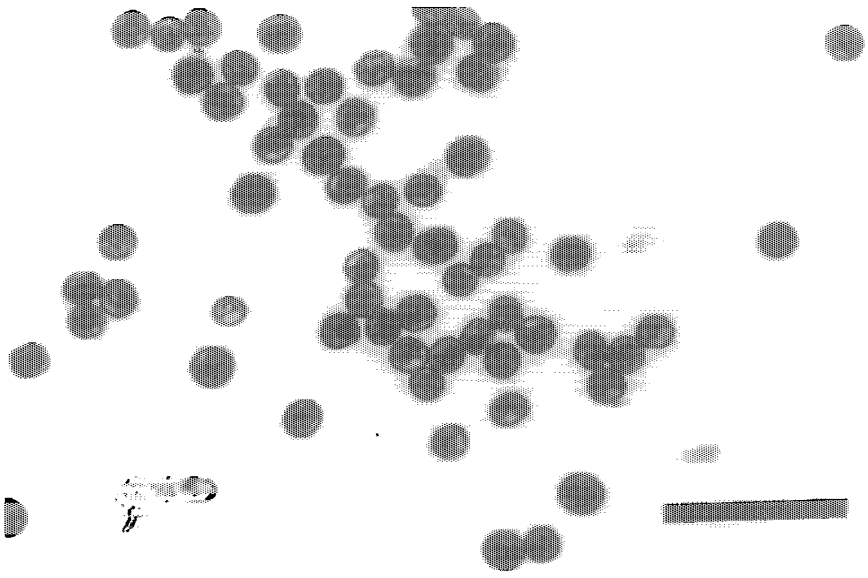

FIG. 2. Photograph of pollen grains of *Boehmeria kamley* (*Grierson & Long 1078*, E) stained with cotton-blue solution, under light microscope (scale bar = 60 μm)

1838 and antedates 144 years than *B. penduliflora* (1982), hence *B. densiflora* should be adopted as the species name. We treat here *B. penduliflora* as a variety of *B. densiflora* and the intermediate plants are described as a new variety of the latter. The distinctions among the three varieties are summarized in Fig. 3.

Boehmeria kamley N. Acharya & Yonek., **sp. nov.** (Fig. 4).

Boehmeria ternifolia auct. non D. Don; Grierson & Long, Fl. Bhutan 1 (1): 127 (1983), p. p.

Haec species *Boehmeriae ternifoliae* affinis, sed foliis apice leviter bi- vel trilobatis lobis lateralibus saepe duplicato-serratis, pilis perigonio-rum fructiferorum longioribus 125 - 200 μm longis differt.

Holotype: NEPAL, Koshi Zone, Sankhuwasabha Distr., Inkhuwa Khola, alt. 5000 ft., Jul. 5, 1974, *J.D.A. Stainton* 6995 (E).

Sparsely branched shrubs, up to 2.5 m tall; young branches puberulous (those of current year densely woolly); leaves opposite, anisophyllous, petiolate; leaf blade elliptic or suborbicular, 8.5-15 x 6.5-12.5 cm, rounded or cuneate at base, shallowly 2- or 3-lobed at apex, if 3-lobed the central lobe 1.5-4.5 cm long, acuminate; lateral lobes are a little smaller than or subequal to terminal one; margin coarsely toothed except base, teeth 7-13 on each side, triangular, 0.5-1.5 x 0.5-1.2 cm, gradually increas-

	var. *densiflora*	var. *penduliflora*	var. *intermedia*
Upper surface of leaves	hairy	glabrous (hairy when young)	glabrous (hairy when young)
Fruiting perianth	 Narrowly oblanceolate or obovate, gradually tapering towards apex, without tubular neck, hairy throughout.	 Narrowly oblanceolate or obtriangular with rounded shoulder and exserted tubular neck towards apex, hairy towards upper part.	 Narrowly oblanceolate or obovate, gradually tapering towards apex, without tubular neck, hairy throughout.
Distribution	SE China, Taiwan, Ryukyus, Philippines	Himalaya - SE China	Nepal, Assam, Yunnan

Fig. 3. Distinctions among the three varieties of *Boehmeria densiflora* Hook. & Arn.

FIG. 4. Holotype of *Bochmeria kamley* N. Acharya & Yonek. (*Stainton 6995*, E)

ing towards apex, teeth on lateral lobes often duplicate; both surfaces hispid with micropapillate hairs; petiole 5-8 cm long; stipules 0.6-0.9 cm long, narrowly triangular, hairy; male inflorescences axillary at the middle part of stems, paniculate or almost radiate, axis of panicles often leafy at apex; branches 5-12 cm long, simple or rarely branched; male flowers in clusters, densely arranged on inflorescence branches forming spikes; bracts ovate 2-3 mm long, hairy; bracteole narrow, lanceolate 0.5-1.2 mm long; each flower globular, 1.5 mm across, perianth 4-lobed, lobes ovate, 1.5-2 mm long, hairy outside; stamens 4, opposite to and longer than the perianth-lobes; a clavate pistillode present at the center; female spikes axillary at the upper part of stems, simple, 10-30 cm long, hispid; flower clusters interrupted, globular, 2.5-3 mm in diam. at fruiting stage; bracts broadly ovate, 2-3 mm long, hairy; bracteoles narrow, lanceolate, 0.5-0.7 mm long; a fruiting perianth 1.2-1.5 mm long, elliptic with a tubular neck, 2-lobed at apex, densely pubescent at upper half with micropapillate hairs 125-200 μm long; an achene compressed ellipsoid, ca. 1 mm long; style persistent, 1.5 mm long.

Other specimens examined. NEPAL, Koshi Zone, Sankhuwasabha Distr., Khandbari (1150 m) - Bhotebas (1800 m) Jul. 7, 1988, *M. Suzuki et al. 8820197* (KATH, TI, TUS). BHUTAN, Between Lobeysa and Lometsawa, alt. ca. 2000 m, Jun. 17, 1975, *A.J.C. Grierson & D.G. Long 453* (E); Gyom Jana, between Wangdu Phodrang and Pele La, alt. ca. 2150 m, May 16, 1979, *A.J.C. Grierson & D.G. Long 1078* (E); Tashigaon, Gamrichu, Jun. 11, 1985, *S. Bowes Lyon 9126* (E); Tongsa Distr., alt. 1060 m, Mar. 31, 1982, *A.J.C. Grierson & D.G. Long 4161* (E).

Distribution and habitat: Eastern Nepal and Bhutan. Pathsides in the forest at altitudes between 1000 -2150 m.

The specific epithet *'kamley'* is derived from the local name commonly used in Nepal, Sikkim and Bhutan for several *Boehmeria* species including this new one.

Boehmeria densiflora Hook. & Arn., Bot. Beechey Voy.: 271 (1838); Wedd. in DC., Prodr. 16 (1): 215 (1869); Maxim. in Bull. Acad. Sci. St.-Petersb. 22: 254 (1876); C.H. Wright in Forbes & Hemsl. in J. Linn. Soc. Bot. 26: 484 (1899); Satake in J. Fac. Sci. Imp. Univ. Tokyo, sect. III, **4**: 479, f. 7A (1936); T.S. Liu & T.C. Huang in H.L. Li, Fl. Taiwan 2: 165, pl. 250 (1976); W.T. Wang in Acta Bot. Yunnan. 3: 415 (1981); Y.P. Yang et al. in T.C. Huang, Fl. Taiwan ed. 2, 2: 199 (1996).

Type: JAPAN, Loo Choo, Jun. 1827. *Lay s. n.* (K, non vidi).

var. **densiflora**

Boehmeria platyphylla D. Don var. *loochooensis* Wedd. in DC., Prodr. 16 (1): 213 (1869). - *B. penduliflora* Wedd. ex D.G. Long var. *loochooensis* (Wedd.) W.T. Wang in W.T. Wang & C.J. Chen, Fl. Reipubl. Popul. Sin. 23 (2): 354 (1995).

Type: Same as *B. densiflora* Hook. & Arn.

Distribution: Japan (the Ryukyus), Taiwan, SE China (Guangdong, Hongkong) and the Philippines.

var. **penduliflora** (Wedd. ex D.G. Long) N. Acharya & Yonek., **comb. nov.**

Boehmeria macrophylla D. Don, Prodr. Fl. Nepal.: 60 (1825), non Hornem. (1815); Hook. f., Fl. Brit. Ind. 5: 579 (1888); Tuyama in H. Hara, Fl. E. Himal.: 56 (1966); W.T. Wang in Acta Bot. Yunnan. 3: 415 (1981); Yahara in Acta Phytotax. Geobot. 32 (1-4): 13 (1981). H. Hara in H. Hara *et al.*, Enum. Flow. Pl. Nepal 3: 201 (1982). - *B. penduliflora* Wedd. [in Ann. Sci. Nat. ser. 4, 1: 199 (1854), nom. nud.; H. Hara in H. Hara *et al*, Enum. Flow. Pl. Nepal 3: 201 (1982), pro syn.] ex D.G. Long in Grierson & D.G. Long in Notes Roy. Bot. Gard. Edinburgh

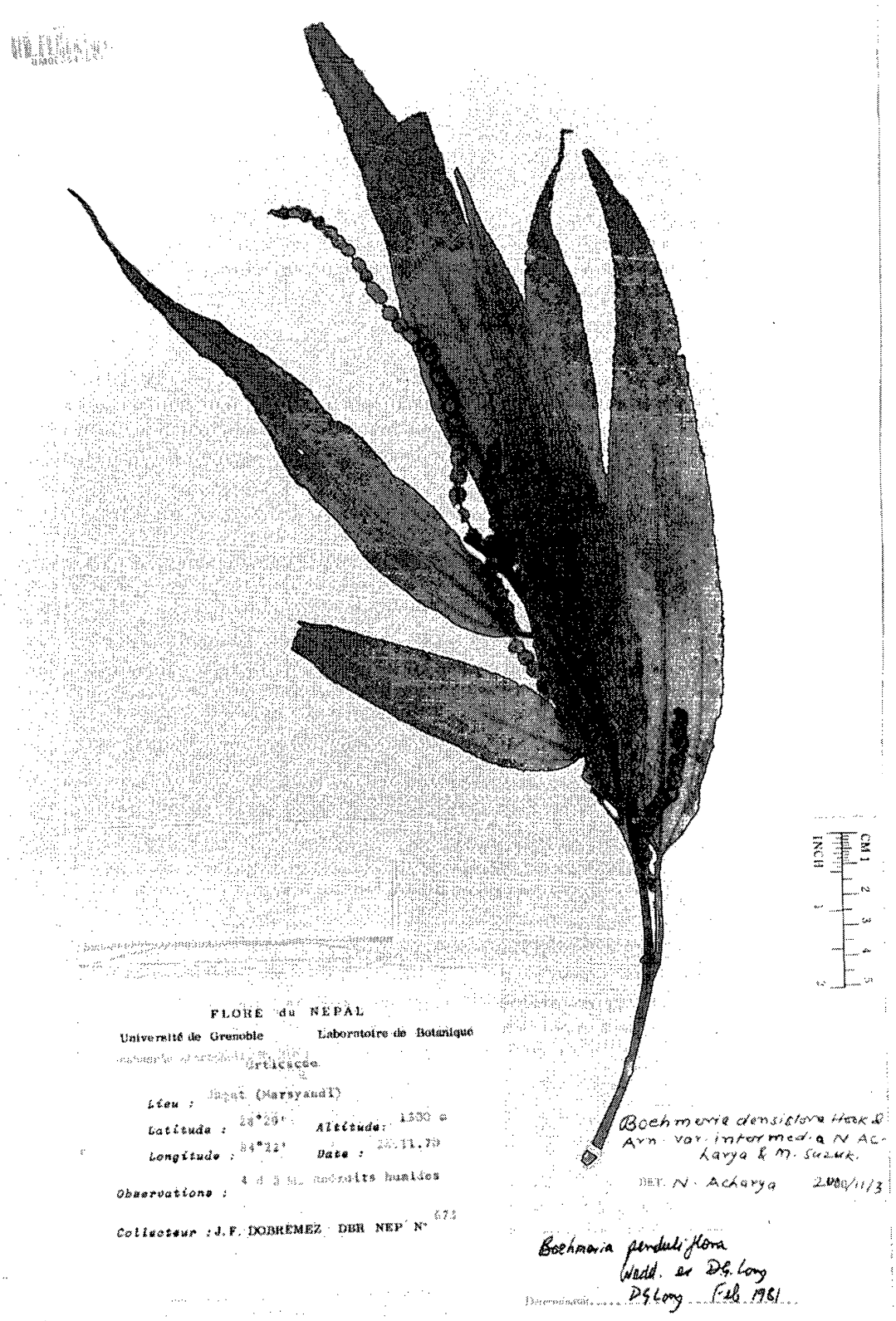

FIG. 5. Holotype of *Boehmeria densiflora* Hook. & Arn. var. *intermedia* N. Acharya & Yonek. (*Dobremez 673*, BM)

40: 130 (1982); Grierson & D.G. Long, Fl. Bhutan 1 (1):125 (1983); W.T. Wang in W.T. Wang & C.J. Chen, Fl. Reipubl. Popul. Sin. 23 (2): 354-355 (1995), incl. var. *penduliflora*, cet. excl.

Lectotype (Grierson & Long 1982): NEPAL, "Ad Narainhetty Nepalensium." *F. Buchanan-Hamilton s. n.* (BM!).

Distribution: Himalaya (Nepal to Bhutan), Burma, Thailand, SW to SE China (Xizang, Yunnan, Sichuan, Guizhou, Guangxi and Guangdong).

var. **intermedia** N. Acharya & Yonek., **var. nov.** (Fig. 5).

Haec varietas inter var. *densifloram* et var. *penduliflora* sita. Folia supra glabrescentia. Perigonia fructifera apice gradiatam attenuata haud tubulosa constanter hirsuta.

Holotype: NEPAL, Gandaki Zone, Gorkha Distr., Jagat, Marshyangdi, 28°29'N, 84°22'E, alt. 1300 m, Nov. 28, 1970, *J.F. Dobremez 673* (BM).

Well-branched shrubs, 4 -5 m tall; branches slender, often glabrous; leaves opposite, isophyllous, petiolate; blades lanceolate, 7-22 x 1.5-4 cm, gradually tapering to acuminate apex, base cuneate, sharply serrulate with subequal teeth at margin from the base to acumen, coriaceous, glabrous above, pubescent beneath, strongly rugose, reticulations conspicuously elevated beneath; petioles 3-5 cm long, hairy; inflorescences axillary, male ones on the lower nodes of branches, 4-5 cm long, branched at base, puberulous; male flowers globular, 1 mm across, 4-merous; perianth lobes elliptic, hairy at upper part; stamens 4, glabrous, opposite to the lobes; pistillode present, clavate, with tufts of hairs on its base; female inflorescences on the upper nodes of branches, spicate with many glomerules, slender, 14-16 cm long, pendulous; glomerules contiguous, 5 mm across, many-flowered; fruiting perianth obovate or oblanceolate, creamy white, 1.8-2.5 mm long, apex gradually narrowed, 2-lobed without tubular neck, base attenuate, hairy throughout with many hooked hairs; style slender, 0.5-1 mm long, exserted from perianth, curved at apex; an achene compressed ellipsoid, 0.7-1 mm long, with a stalk ca. 1 mm long.

Other specimens examined. INDIA, Sikkim?, Rongzo, Aug. 29, 1912, *G.H. Cave 2000* (E); Meghalaya, Khasiya Hills, *W.S. Kurz s. n.* (E). CHINA, Yunnan, precise locality unknown, Oct. 1922, *J.F. Rock 6986* (NY); Yunnan, *A. Henry 12540* (NY); Yunnan, alt. 4600 ft., Aug. 31, *A. Henry 9063A* (NY).

Distribution: Nepal, India (Sikkim, Assam) and SW China (Yunnan). Alt. 1300-1700 m.

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References

Grierson, A.J.C. & D.G. Long. 1982. Notes relating to the flora of Bhutan: V. Notes Roy. Bot. Gard. Edinburgh. 40 (1): 115-138.

___. 1983. *Boehmeria* Jacq. *In*: Flora of Bhutan 1 (1): 124-127. Royal Botanic Garden, Edinburgh.

Hara,H. 1982. *Boehmeria*. *In*: Hara, H., Chater, A.O. & L.H.J. Williams. (eds.) An

Enumeration of Flowering Plants of Nepal 3: 201-202. Trustees of British Museum (Natural History), London.

Hooker, W.J. and G. A.W. Arnott. 1836. The Botany of Captain Beechey's Voyage. 271. London.

Okabe, S. 1963. Apomixis in genus *Boehmeria*. Sci. Rep. Tohoku Imp. Univ., Ser. 4 Biol. 29:207-215.

Wang, W.T. 1981. Revisio Boehmeriae Sinicae. Acta Bot. Yunnan. 3 (3): 307-328. (in Chinese).

___. 1995. *Boehmeria* Jacq. *In*: Wang, W.T. and C.J. Chen (eds.) Flora Reipublicae Popularis Sinicae 23 (2) : 320-355. Science Press, Beijing (in Chinese).

Weddell, H.A. 1854. Revue de la Familie des Urticees. Ann. Sci. Nat., Bot., Ser. 4 (1): 173 - 212.

___. 1869. *Boehmeria* Jacq. *In*: De Candolle, A. (ed.) Prodromus Systematis Naturalis Regni Vegetabilis 16 (1):195-216. Parisiis.

Wright, C.H. 1899. *Boehmeria densiflora* Hook. et Arn. *In*: Forbes, F.B. & W.B. Hemsley, Enumeration of all plants known from China proper, Formosa, Hainan, the Corea, the Luchu Archipelago, and the Island of Hongkong; together with their distribution and synonymy. J. Linn. Soc., Bot. 26:484.

Yahara, T. 1981. Taxonomic studies of the Urticaceae 1. The genus *Boehmeria* in Thailand. Acta Phytotax. Geobot. 32 (1-4):1-21.

___. 1983. A biosystematic study on the local population of genus *Boehmeria* with reference to apomixis. J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 13: 217-261.

___. 1990. Evolution of agamospermous races in *Boehmeria* and *Eupatorium*. Pl. Spec. Biol. 5: 183-196.

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