
Notes on the Piperaceae of China

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ABSTRACT. Four new species of *Piper* are described from China: *P. dolichostachyum*, *P. tsengianum*, *P. wangii*, and *P. yui*; one new combination is made: *Piper boehmeriifolium* var. *glabricaulis*; a new name, *Piper cathayanum*, is proposed for a later homonym; the identities of *Piper arboricola* and *P. philippinum* are discussed; and new synonyms and lectotypes are proposed for various other species of *Peperomia* and *Piper*.

The following notes are a precursor to the account of the Piperaceae to be published in volume 4 of the *Flora of China*. The Asian members of this family have been largely ignored by European taxonomists, and our studies have shown the need for a significant number of changes from the first floristic account of the family within China (Tseng in Chen et al., 1982). This account was produced without access to most of the types, or even published assessments of their identities, or to very much material from neighboring countries.

Peperomia blanda (Jacquin) Kunth, in HBK, Nov. Gen. Sp. 1: 67. 1816. *Piper blandum* Jacquin, Collectanea 3: 211. 1789. TYPE: Jacquin, Ic. Pl. Rar. 2, t. 218.

Peperomia arabica Decaisne ex Miquel, Syst. piperac. 1: 121. 1843. TYPE: Yemen. *P. A. Botta* s.n. (lectotype, here designated, P). Rejected syntype: South Africa. Cape of Good Hope to Port Natal, *Drége* s.n. (G).

Peperomia dindygulensis Miquel, Syst. piperac. 1: 122. 1843. TYPE: India. Habitat in rupibus Prov. Dindygul, *Wight* in *N. Wallich 6663B* (lectotype, here designated, K-WALL; isolectotype, P).

Peperomia esquirolii H. Léveillé, Repert. Spec. Nov. Regni Veg. 10: 149. 1912. Syn. nov. TYPE: China. Guizhou ("Kouy Tchéou"): 18 Mar. 1910, *Esquirol 710* (holotype, E; isotype, K).

Peperomia formosana C. DC., Annuaire Conserv. Jard. Bot. Genève 21: 223. 1920. Syn. nov. TYPE: Taiwan: Kel-nag Samtianneapass, *Warburg 9338* (holotype, B).

Peperomia japonica Makino, Bot. Mag. (Tokyo) 15: 145. 1901. Syn. nov. SYNTYPES: Japan. Loochoo, 1876, *Coll. Imp. Mus. s.n.* (in hb. Makino) & *H. Kuroiwa s.n.* (in hb. Makino); Okinawa, Nakizin, Mar. 1887, *S. Tashiro s.n.*; Prov. Tosa in Isl. Shikoku: Isl. Heshima, *K. Naganuma s.n.* & 17 June 1887, *T. Makino s.n.* & *Y. Yoshinaga s.n.* (in hb. Makino); Prov. Musashi: Tokyo, Bot. Gard. Koishikawa, cult. from Amami-Oshima, Nov. 1901, *Uchiyama* in *Makino s.n.* (all TI not seen).

Peperomia laticaulis C. DC., Annuaire Conserv. Jard. Bot. Genève 21: 223. 1920. Syn. nov. TYPE: Taiwan: in rupibus montium Kushaka, *Faurie 481* (lectotype, here designated, G-DC; isolectotypes, B, BM, P). Rejected syntypes: Taiwan: Urai, *Faurie 626* (B, BM, P).

A decision has been made to use a rather wide species concept for this pantropical *Peperomia blanda* complex. The variation in stature, leaf shape, coloring, and details of inflorescence morphology are considerable, but we believe that there are not sufficient discontinuities to justify the recognition of distinct taxa, at least in mainland Asia. Material from Japan is very uniform but not distinguishable from some of the collections from the mainland, and there is not a good case for keeping *Peperomia japonica* as a distinct species. The position within Taiwan is more perplexing. There are two distinct forms on the island: a very robust plant without any red pigmentation corresponding to *Peperomia japonica* and including *P. laticaulis*, and a much more delicate plant with red stems and undersides of the leaves and a distinctive epidermis, recently described as *P. sui* (Lin & Lu, 1995). However, the dividing line between these and the mainland plants is not clear, and for now we prefer to include everything within the one taxon. This does not do justice to the Taiwan plants, which taken in isolation would have to be treated as two distinct species. None of the syntypes of *Peperomia japonica* have been seen, but material from Japan proper is very uniform and all belongs to the one taxon of *Peperomia*. There can be no reasonable doubt as to the identity of *P. japonica*.

The opportunity has been taken to designate lectotypes for those taxa for which we have seen syntype material. In the case of *Peperomia arabica*, the specimen from Arabia (Yemen) is clearly in accord with the protologue and, in view of the specific epithet, it seems logical to select this as lectotype in preference to Miquel's other syntype from South Africa. The original material of *P. dindygulensis* in the Wallich herbarium is quite variable. Again, we have chosen a collection clearly associated with the locality from which the taxon was named and one representing one of the more clearly defined forms within the species (drying a rather pale green and with many terminal and subterminal inflorescences). There are two cited syntypes of *P. laticaulis*, *Faurie 481* and *Faurie 626*. These syntypes should both be in Geneva, but *Faurie 626* could not be located there and thus we feel obliged to select *Faurie 481* as the lectotype. Unfortunately, duplicates seen in B, BM, and P show *Faurie 626* to have better developed inflorescences.

Peperomia heyneana Miquel, Syst. piperac. 1: 123. 1843. TYPE: Nepal. Kandrag Garhi, near Kathmandu ["Chandaghiri"], Feb. 1821, N. Wallich 6663C (holotype, K-WALL).

Peperomia duclouxii C. DC., Notul. Syst. (Paris) 3: 41. 1914. Syn. nov. TYPE: China. Yunnan: Hay-y, près Lou-Lo, *Ducloux 4760* (holotype, P).

The characters used to distinguish *Peperomia duclouxii* from *P. heyneana* are quantitative, and similar plants have been seen from throughout the range of that species. Moreover, there does not seem to be any discontinuity between the two taxa, and we feel confident that *P. duclouxii* was based on stunted material of *P. heyneana*.

Piper boehmeriifolium (Miquel) C. DC., in A. DC., Prodr. 16: 348. 1868. *Chavica boehmeriifolia* Miquel, Syst. piperac. 1: 265. 1843. TYPE: Bangladesh. Sylhet ["Sillet" or "Silhet"], N. Wallich 6654A (holotype, K; isotype, K-WALL).

Piper boehmeriifolium var. **boehmeriifolium**

Piper boehmeriifolium var. *tonkinense* C. DC., in Lecomte, Fl. Indo-Chine 5: 81. 1910. Syn. nov. TYPE: Vietnam. Vallée de Lankok (Mont-Bavi), dans les bois, 9 Mar. 1888, *Balansa 3628* (holotype, P).

Piper spirei C. DC., in Lecomte, Fl. Indo-Chine 5: 87. 1910. Syn. nov. TYPE: Laos. Phon thane, *Spire 258* (holotype, P; isotype, P).

Piper spirei var. *pilosius* C. DC., in Lecomte, Fl. Indo-Chine 5: 88. 1910. Syn. nov. TYPE: Cambodia. Frequens in montibus Krewanh ("Krewwaoh" on holotype), June 1870, *Pierre 4817* (holotype, P; isotypes, P).

Piper terminaliflorum Y. C. Tseng, Acta Phytotax. Sin. 17: 30. 1979. Syn. nov. TYPE: China. Yunnan: Fengqing, 2200 m, 24 June 1938, T. T. Yü 16454 (holotype, PE; isotypes, A, E).

Piper boehmeriifolium var. **glabricaule** (C. DC.) M. G. Gilbert & N. H. Xia, comb. et stat. nov. Basionym: *Piper glabricaule* C. DC., Notizbl. Königl. Bot. Gart. Berlin-Dahlem 6: 477. 1917. TYPE: China. Yunnan: Mengzi Xian, Mengzi ["Möngtse"] In silvis montium meridionali-orientalium, A. Henry 9482A (holotype, B; isotypes, A, K).

Piper boehmeriifolium is the most commonly collected erect species of *Piper* in China and Indochina. There is considerable variation in leaf width; associated with this is variation in the number of leaf veins, peduncle length, and bract diameter, the principal characters used to distinguish *P. boehmeriifolium* var. *tonkinense* from *P. glabricaule*. We are unable to define any discontinuity between *P. boehmeriifolium* s. str. and variety *tonkinense* that should be included within the species. Male plants appear to have effectively determinate growth, with the uppermost leaves very poorly developed so as to leave the inflorescences in a terminal position. Y. C. Tseng treated such plants as a distinct species, *P. terminaliflorum*. However, there are a few male plants from throughout the distribution of *P. boehmeriifolium* that resemble the type of *P. terminaliflorum*, and we believe that this species is also better included within *P. boehmeriifolium* s. str. The small fruits of *P. glabricaule* are more distinctive, but again the variation is almost continuous. We therefore prefer to treat *P. glabricaule* as a variety of *P. boehmeriifolium* rather than as a full species.

The type collections of *Piper spirei* and *P. spirei* var. *pilosius* are not distinguishable from *P. boehmeriifolium*. However, the Chinese collection that was the basis of the record of *Piper spirei* in the *Flora Reipublicae Popularis Sinicae* account (Tseng in Chen et al., 1982) has not been matched with any other species and is described here as the new species *P. dolichostachyum*.

Piper cathayanum M. G. Gilbert & N. H. Xia, nom. nov. Basionym: *Chavica sinensis* Champion ex Benth, Hooker's J. Bot. Kew Gard. Misc. 6: 116. 1854. *Piper sinense* (Champion ex Benth) C. DC., in A. DC., Prodr. 16: 361. 1868, nom. illegit. Blocking name: *Piper chinense* Miquel, London J. Bot. 4: 439. 1845. TYPE: Hong Kong: *Champion 491* (holotype, K, ex herb. Benth; isotype, K, ex herb. Hooker).

It is with distinct regret that we designate a new name for *Piper sinense*. This is a much better known species than that with the blocking name, *P. chinense*, which is certainly extremely rare or even extinct, known to us only from the type. Unfortunately the ICBN, Article 53.3, Example 8 (Greuter et al., 1994), is quite clear that "chinense" and "sinense" must be treated as homonyms; thus the later homonym must be given a new name.

K has two sheets of *Champion 491*, but the one from Benthams personal herbarium must be presumed to be the holotype, while the slightly better sheet from Hooker's personal herbarium is an isotype.

Piper dolichostachyum M. G. Gilbert & N. H. Xia, sp. nov. TYPE: China. Yunnan: Jingping, 16 Apr. 1956, *Sino-Soviet Botanical Exped.* 67 (holotype, SCBI; isotype, KUN).

A *Piper boehmeriifolium*, nervis paginis foliis abaxillari-bus dense rufipilosis, non glabris vel sparse pallidipub-erulis, infructescentibus femineis longissimis (27–30 cm, non 6–12 cm), manifeste differt.

Erect, shrubby herb; most parts with reddish brown hairs. Stems 3–4 mm thick, furrowed when dry, glabrescent. Petiole 5–13 mm, densely pubescent, prophyll to 3 cm, glabrous; leaf blade elliptic-lanceolate to obovate, strongly asymmetrical, to 14–25 × 6–11 cm, thinly papery, base strongly obliquely cordate, basal lobes overlapping, bilateral difference to 3 mm, apex long acuminate, veins 8–10, 3 on the narrow side, up to 7 on broad side, apical pair arising 2–6 cm above base, alternate, nearly reaching leaf apex, next pair often also above base, reticulate veins lax, transversely oblong, slightly raised abaxially, without evident glands, abaxially densely brown-pubescent, almost tomentose on veins, adaxially sparsely minutely scabrid. Plants dioecious. Spikes leaf-opposed. Male spike not seen. Female spikes 27–30 × 0.6–0.7 cm in fruit, peduncle 4–4.5 cm, glabrous; rachis pubescent; bracts orbicular, peltate, margin pale when dried, 1.5–1.7 mm diam. Ovary ± cylindrical; stigmas 3 or 4, reflexed, very short and inconspicuous. Drupes densely packed, prismatic-cylindrical, ca. 2 × 1.5 mm.

This material was first identified as *Piper spirei* C. DC. (Tseng in Chen et al., 1982), but examination of the holotype of that name has shown it to be inseparable from *P. boehmeriifolium* and has revealed that this Chinese specimen was without a name. One of the more distinctive features is the extremely long infructescence, and it has been named accordingly (Greek: *dolichos* = long, *stachys*

= spike, as in the inflorescence of wheat). The other distinctive feature is the indumentum, which is quite dense and reddish brown, in contrast to *P. boehmeriifolium*, which is glabrous or only sparsely and inconspicuously puberulent.

Piper hongkongense C. DC., in A. DC., Prodr. 16: 347. 1868. TYPE: Hong Kong: Seemann (holotype, G-DC not found).

Chavica puberula Benthams, Fl. Hongk.: 335. 1861. Syn. nov. *Piper puberulum* (Benthams) Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, sér. 3, 31: 94. 1887, nom. illegit. Blocking name: *P. puberulum* (Benthams) Seemann, Fl. Vit. 268, t. 75. 1868, based on *Macropiper puberulum* Benthams, London J. Bot. 2: 235. 1843. TYPE: Hong Kong: Hance 10159 (holotype, BM).

The hairy species of *Piper* in southeastern China have been subjected to more than their fair share of nomenclatural problems. One of the more widely used names is *P. puberulum* (Benthams) Maximowicz, which is based on material collected on Hong Kong Island. Unfortunately, this is a later homonym of *P. puberulum* (Benthams) Seemann, which is based on a very different species from Fiji. Thus a name regarded as a synonym in all works subsequent to publication must be resurrected. A probable factor in the confusion between the two homonyms must have been the fact that both were based on taxa described by Benthams, the Fijian species in *Macropiper* and the Chinese species in *Chavica*. The next available name is *P. hongkongense*, which has been consistently ignored (Bretschneider, 1898) or treated as a synonym of *P. puberulum* (Benthams) Maximowicz (Hemsley, 1891) ever since it was published. There is a problem with the typification of *P. hongkongense* in that the protologue cited only one element, "Hongkong (Seemann! in h. DC.)," which was not found in the De Candolle herbarium in Geneva. Hemsley (1891) cited a collection by Seemann from Hong Kong under *P. puberulum* (Benthams) Maximowicz apparently in Kew, but no material attributed to Seemann was found there either. If another search of the Geneva herbarium fails to locate this material it is suggested that *Hance 10159*, the holotype of *Chavica puberula*, be designated the neotype of *P. hongkongense*.

The protologue of *Chavica puberula* gave no details of the type beyond "Hongkong, Hance" but there is only one collection in K and BM, *Hance 10159* in BM, that has been annotated by Benthams and it is assumed that this is the holotype.

The species varies from very densely hairy to quite thinly hairy. Material with a thinner indu-

mentum has often been regarded as conspecific with material from Taiwan and placed within "*Piper arboricola*." The Taiwan material is here regarded as belonging to an endemic taxon, *P. sintenense* (q.v.), while the mainland material seems to be better regarded as belonging to a single variable species.

Piper kadsura (Choisy) Ohwi, Acta Phytotax. Geobot. 3: 81. 1934. *Ipomoea kadsura* Choisy, Mém. Soc. Phys. Genève 6: 475. 1833. TYPE: Japan. "Iaponicae: Karami Kadfura, it. Saifin." (holotype, UPS-THUNB).

Piper arboricola C. DC., Annuaire Conserv. Jard. Bot. Genève 21: 221. 1920. Syn. nov. TYPE: Taiwan: in arboribus Ke-Lung, 13 May 1903, *Faurie 480* (lectotype, here designated, G; isoelectotypes, BM, P(2 sheets)).

Until recently the name *Piper arboricola* had been applied almost entirely to material of what is here named as *P. sintenense*. Examination of duplicates of the syntypes of *P. arboricola* in BM and P shows that this represents a rather broad-leaved form of *Piper kadsura* and that *P. arboricola* must be treated as a synonym of that species. Japanese authors have spelled the epithet as "*kadzura*," presumably in accordance with current transliteration of the vernacular name upon which the epithet is based. This is not in accordance with the spelling used in the protologue and associated literature, which should be retained. *Faurie 480* is selected as the lectotype of *P. arboricola* in preference to *Faurie 479*, because although the two collections are very similar in quality there seem to be more sheets of *Faurie 480* available. Records of this species from Fujian and Zhejiang are based on material that seems better regarded as a form of *Piper wallichii*.

Piper kwashoense Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 235. 1911. TYPE: Taiwan: Kwashoto, 1907, *Kawakami & Kobayashi 475* (holotype, "Tokyo Univ.").

This taxon has been named as *Piper philippinum* Miquel, following the account of Philippine Piperaceae by Quisumbing (1930: 110). However Miquel's (1843) protologue clearly excludes the taxon described by Quisumbing, as it refers to a plant with 5-veined leaves, lax female inflorescences 10–12 cm long, and ovoid fruits 4–5 mm long, apparently free from the rachis. Quisumbing used the name for a plant with 7-veined leaves, female spikes 3–9 cm long, and relatively dense and subglobose fruit, 2–3 mm in diameter, partly con-

nate to the rachis. The mistake seems to have come from Miquel, who based the protologue proper on a female plant, "*Cuming* in herb. de Lessert 1642," and then added a note that another collection, *Cuming 912*, might be the male of the same species though it did have a number of differences. This latter collection is much more widely distributed, and *P. philippinum* has been interpreted as if *Cuming 912* were the type and the description in the protologue ignored.

Piper macropodium C. DC., Bull. Herb. Boissier, sér. 2, 4: 1026. 1904. TYPE: China. Yunnan: Simao Xian, Simao ["Szemao"], 1370 m, A. Henry 12210D (holotype, Z not seen; isotype, K).

Piper szemaoense C. DC., Notizbl. Königl. Bot. Gart. Berlin-Dahlem 6: 481. 1917. Syn. nov. TYPE: China. Yunnan: Simao Xian, Simao ["Szemao"], 1370 m, A. Henry 12210B (lectotype, here designated, B; isoelectotypes, A, E, K, MO).

Piper szemaoense was separated from the completely glabrous *P. macropodium* by the presence of an indumentum. The two taxa are sympatric and, from the numbering used, were regarded by the collector as just one species. All other variation is continuous, and we have no hesitation in maintaining only one taxon. Two collections were listed in the protologue of *P. szemaoense*, *Henry 12210A* and *12210B* (as *Henry 1210A* and *1210B*). The latter collection is selected as lectotype because it is female, and thus taxonomically more informative, and also because it seems to be slightly more widely distributed.

Piper pedicellatum C. DC., J. Bot. 4: 164. 1866. TYPE: Bangladesh ["Bengalia orient."]. Griffith 4404 (lectotype, here designated, K not seen; isoelectotype, P).

Piper curtipedunculum C. DC., Notizbl. Königl. Bot. Gart. Berlin-Dahlem 6: 481. 1917. Syn. nov. TYPE: China. Yunnan: Mengzi Xian, Mengzi ["Mongtse"], A. Henry 10438 (holotype, B; isotypes, A, E, K).

The protologue of *Piper pedicellatum* lists three elements, *Hooker & Thomson s.n.* from Sikkim, in Geneva ("Herb. Cand."), and two collections by Griffith, 4404 and 4418, from "Bengalia orient.," now Bangladesh, in Kew. The Geneva sheet of the Hooker and Thomson collection was not located during a visit to Geneva and, because most exsiccatae of these collectors were distributed with very incomplete label data, there is often doubt as to which sheets belong to the same collection. Thus, it does not seem advisable to select this collection

as the type. *Griffith 4418* is of female material, and De Candolle indicated some doubts (probably unjustified) about the identity of this collection in a later account of this species (C. De Candolle, 1869: 350) so this syntype also seems best rejected. *Griffith 4404* is of male material, and as the epithet alludes to the distinctively long-stalked male bracts, it seems best to select this as the lectotype.

The minor quantitative differences in leaf shape, peduncle length, and bract size used to separate *Piper curtipedunculum* from *P. pedicellatum* have proved too ill-defined to justify the maintenance of two taxa, especially when material from the full range is considered.

Piper pubicatum C. DC., in Lecomte, Fl. Indo-Chine 5: 74. 1910. TYPE: Vietnam. "In nemore Vän Xà, 4 May 1886, *Bon 3139bis*" (holotype, P).

There is some doubt as to the identity of the type of this species. The above specimen is the only sheet so named found in the Paris herbarium. It was determined by C. De Candolle. The protologue gives the type as *Bon s.n.* from "Tonkin, environs de Ninh Binh," but no such material was seen and we have assumed that *Bon 3139bis* must be the collection upon which the species was based. The material has 5-veined leaves with more or less symmetrical, cuneate bases, glabrous bracts, and very densely packed, globose fruit ca. 1 mm in diameter. The protologue describes the leaves as 5-veined with slightly oblique bases and glabrous bracts. In distinct contrast, Chinese material so named has 7–9-veined leaves with distinctly oblique bases, rounded to almost cordate on one side, and hairy bracts. It seems certain that the Chinese material is not correctly named. Because it has not been possible to match it with any other species, it is described below as a new species, *Piper wangii*.

Piper rhytidocarpum J. D. Hooker, Fl. Brit. India 5: 92. 1886. TYPE: Bangladesh. Chittagong, 22 Sep. 1850, *Hooker & Thomson s.n.* (lectotype, here designated, K; isotype, K).

Piper madidum Y. C. Tseng, Acta Phytotax. Sin. 24(5): 382, fig. 1. 1986. Syn. nov. TYPE: China. Xizang: Medog, Beibeng, 850 m, 9 Apr. 1983, *B. S. Li & S. Z. Cheng 3990* (holotype, PE not seen; isotypes, (2, not annotated) PE).

Rejected syntypes. BANGLADESH ("East Bengal"). *Griffith 4423* (K); Chittagong, 17 July 1850, *Hooker & Thomson s.n.* (K). *F. de Silva & W. Gomez* in *Wallich 6658B* (K).

The collection designated here as lectotype is annotated by Hooker and is the only collection cited in the protologue with apparently mature fruit. The material of *Piper madidum* from southeastern Xizang is a good match in all features, including the peculiar sessile scales on the undersides of the leaves, though the fruits are too immature to show the granulose surface of the fruits upon which the specific epithet was based. No material annotated by the author was seen, but two unnamed sheets matching in all details and fitting the description have been seen.

Piper sarmentosum Roxburgh, in Hunter, Asiatic Res. 11: 565. 1810. *Chavica sarmentosa* (Roxburgh) Miquel, Syst. piperac. 1: 242. 1843. TYPE: "cultivated in Calcutta," Roxburgh tab. 1267 (lectotype, here designated, K).

Piper albispicum C. DC., in Lecomte, Fl. Indo-Chine 5: 85. 1910. Syn. nov. TYPE: Vietnam. Tonkin méridional: In sepib. Ninh Binh., 4 Nov. 1881, *Bon 982* (holotype, P).

Piper brevicaulis C. DC., Annuaire Conserv. Jard. Bot. Genève 2: 272. 1898. Syn. nov. TYPE: Vietnam. Tonkin: village de Tchontiao, a la base du Mont-Bavi, July 1886, *Balansa 3631* (lectotype, here designated, P).

Piper gymnostachyum C. DC., in Lecomte, Fl. Indo-Chine 5: 72. 1910. Syn. nov. TYPE: Cambodia. Phuoc-than, *Thorel "T"* (lectotype, here designated, P).

Piper lolot C. DC., Annuaire Conserv. Jard. Bot. Genève 2: 272. 1898. Syn. nov. TYPE: Vietnam. Tonkin, Environs de Quang-yen. Sep. 1885, *Balansa 539* (holotype, P).

Piper pierrei C. DC., in Lecomte, Fl. Indo-Chine 5: 78. 1910. Syn. nov. TYPE: Vietnam. In sylvis ad Bao-chiang in austro Cochinchine, Sep. 1869, *Pierre 4814* (holotype, P; isotype, P).

Piper saigonense C. DC., in Lecomte, Fl. Indo-Chine 5: 79. 1910. Syn. nov. TYPE: Vietnam. Ad urbem Saigon in austro Cochinchine, Aug. 1872, *Pierre 1142* (holotype, P; isotypes, MO, P).

Piper sarmentosum is a distinctive species, easily recognized by the creeping, more or less terrestrial habit, virtually unmatched among Asiatic *Piper*, combined with the very distinctive leaves, which are usually palmately veined or almost so with a very minute "powdery puberulent" indumentum, and infructescences white at anthesis and with fruits fused to the rachis when mature.

The earliest literature reference to this taxon appears to be by Hunter (1807) who used the provisional name "*Piper latifolium*" for a sterile plant. In subsequent correspondence with Roxburgh, it was established that this was the same as a species in cultivation in Calcutta and provisionally named by Roxburgh. Hunter published the name and description that Roxburgh had supplied in an appen-

dix to volume 11 of "Asiatick Researches," but this has been largely overlooked; the name is more often given as validated in 1820 in Roxburgh's *Flora Indica*. No Roxburgh herbarium material has been located, but the species was illustrated for Roxburgh (painting 1267) and this makes an adequate lectotype. The leaves are often used as a condiment and also medicinally, and it is likely that it has been spread by humans: many of the records are from around habitation. It was therefore surprising to find that so many collections from Vietnam and Cambodia have been described as distinct species. It seems that C. De Candolle failed to recognize the extremely distinctive habit and based his descriptions on minor variations in leaf size and shape, due largely to variation between the lower leaves and the uppermost leaves associated with the inflorescences, and also variation in size and color of the inflorescence with age.

Two collections annotated as *Piper brevicaule* by C. De Candolle were found in the Paris herbarium: *Balansa 3631* from "Tonkin: village de Tchontiao, a la base du Mont-Bavi" and Godefroy in *Harmand s.n.* from Saigon. The protologue cited two syntypes, *Balansa 3631* with details almost exactly as above, and "Cambodge (*Harmand* in h. Mus. Par. Spec. fructiferum)." In view of the apparent discrepancy between protologue and herbarium specimen, it seems best to designate the *Balansa* collection as lectotype, especially as De Candolle himself wrote "sp. nov." on the sheet. *Piper gymnostachyum* was based on two collections by Thorel: "T," a male collection from Phuoc-than, Cambodia, and "V," a fruiting collection from Nha-met, Vietnam. The latter collection, particularly the infructescences, has been infested by fungi, making it difficult to see the indumentum, particularly the "naked spikes" alluded to by the epithet. It thus seems preferable to select the better preserved male collection as the lectotype.

Piper sintenense Hatusima, Acta Phytotax. Geobot. 4: 210. 1935. TYPE: Taiwan. Prov. Taihoku, in silvis districtus Kanko, Nov. 1932, *S. Hatusima s.n.*

Piper hispidum Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 234. 1911. Not *P. hispidum* Kunth, in HBK. Nov. Gen. Sp. 1: 50. 1816. TYPE: Taiwan: Koshun, Garanbi, 1896. *Y. Tashiro s.n.* (holotype, TAI; [Tokyo, photo] TAI).

Most material of this taxon has been named as *Piper arboricola* (see Tseng in Chen et al., 1982). Examination of type material of *P. arboricola* has shown clearly that it belonged to *P. kadsura* and that the name was incorrectly applied to this spe-

cies. This taxon is most easily recognized by the membranous leaves, usually drying dark green, and by the coarse curved hairs on the stems. The only available name is *Piper sintenense*.

Piper thomsonii (C. DC.) J. D. Hooker, Fl. Brit. India 5: 87. 1886. *Chavica thomsonii* C. DC., Prodr. 16: 389. 1868. TYPE: India. Khasia Mountains, 20 June 1850, *Hooker & Thomson 18* (holotype, B; isotype, K).

Piper bavinum C. DC., Annuaire Conserv. Jard. Bot. Genève 2: 270. 1898. Syn. nov. TYPE: Vietnam. Mont Bavi, vallée de Lankok, entre Moc-ha et Lang-nuong, *Balansa 3630* (lectotype, here designated, P).

Piper punctulivenum C. DC., in Lecomte, Fl. Indo-Chine 5: 77. 1910. Syn. nov. TYPE: Laos. Luang Prabang, *Thorel s.n.* (lectotype, here designated, P).

Piper punctulivenum var. *parvifolium* C. DC., in Lecomte, Fl. Indo-Chine 5: 77. 1910. Syn. nov. TYPE: Laos. Paklai, *Thorel s.n.* (holotype, P).

This species is very common in southwestern China and can be recognized instantly by the characteristic dark red glands of the leaves; the long-acuminate leaves with pale undersides and short infructescences are also distinctive. *Piper bavinum* has been distinguished primarily by having shorter inflorescences and lacking the very finely powdery pubescent indumentum of *P. thomsonii* s. str., but it is now clear that there is a continuity in variation such that it is not possible to justify treating these two taxa as distinct. *Piper punctulivenum* and its variety are clearly this species with even more prominent leaf glands than in the rather poorly preserved types of *P. bavinum*.

Piper thomsonii has sometimes been included within *Piper sylvaticum* Roxburgh, most notably by Long (1984), but there are discrepancies between the taxon as accepted here and the protologue of Roxburgh's species. Most notably, the protologue mentions the leaves as being "broad-cordate, obtuse, lobes of the base large, equal, circular," which coupled with the mention of stems creeping on the ground is much more suggestive of another one of Roxburgh's species, *Piper sarmentosum*. The type illustration includes an enlargement of a leaf tip that is clearly bluntly acuminate; it must be assumed that the "obtuse" in the protologue does not refer to the leaf apex as a whole, which is shown as being very distinctly acuminate in overall form.

The protologue of *Piper bavinum* cites two collections, *Balansa 3627* and *Balansa 3630*. Neither collection is of very high quality, both being so poorly dried that the usually distinctive dark red glands can only be seen with careful examination. Choice of a lectotype is somewhat arbitrary, but it

could be argued that the specimen citation by C. De Candolle (1910), "Tonkin: mont Bavi, vallée de Lankok, entre Moc-ha et Lang-nuong (*Balansa*)," clearly refers to *Balansa* 3630 from exactly that locality. This could be regarded as a move toward lectotypification by the original author and, as the quality of the material is uniform, it is best to confirm this selection as the lectotype. The material of *P. punctulivenum* is of much better quality with nothing to pick between the two syntypes of *P. punctulivenum* s. str., both unnumbered *Thorel* collections, one from Luang Prabang and the other from the same area as the holotype of variety *parvifolium* (Paklai). The collection from Luang Prabang is selected as lectotype on the grounds that it is more likely that there could be significant differences between the material from different localities than between the two collections from the same area (Paklai).

Presumed paratype of P. bavinum. VIETNAM. Forêts du Mont-Bavi, au-dessus de la pagode de Dèin-Touan, 18 Mai 1888, *Balansa* 3627 (P).

Piper tsengianum M. G. Gilbert & N. H. Xia, sp. nov. TYPE: China. Yunnan: flanks of Shweli valley, ca. 24°20'N, 98°33'E, 2100–2400 m, May 1925, *Forrest* 26411 (holotype, A; isotype, E).

A *Piper flavifloro*, paginis foliis abaxillaribus squamis griseo-albis obtectis, non pallidiviridis nudis, inflorescentibus maribus longissimis griseo-viridis, non flavis, manifeste differt.

Shrubs, climbing, 1.2–2 m, apparently glabrous. Stems pale brown when dry, 2–2.5 mm thick, terete, striated. Prophylls ca. 15 mm; petioles 8–13 mm; leaf blade lanceolate, 8–10.5 × 3.2–4.5 cm, papery, base ± rounded to subcuneate, symmetrical, apex long acuminate; veins 5, apical pair arising 0.5–1.5 cm above base, alternate, other pair basal, reticulations raised adaxially, inconspicuous abaxially, without evident glands, abaxially with dense layer of ?sessile scales. Plants dioecious. Spikes leaf-opposed. Male spikes 7–20 cm, 2–2.5 mm thick; peduncles to 1.8 cm; rachis densely hairy, bracts orbicular, 1.3–1.5 mm wide, peltate, obscurely gland-dotted, subsessile. Stamens 3 or 4, filaments longer than anthers, anthers ovoid, apically confluent. Female spike (only one seen) shorter and thicker than male, ca. 2.5 cm long, 3.3 mm thick; peduncle ca. 2 cm; rachis hairy, bracts similar to those of male, 1–1.2 mm wide. Ovary globose to slightly oblate, slightly wider than bracts, free; stigmas 4, linear-lanceolate, tightly adpressed to ovary. Fruit not seen. Flowering May–June.

We are hesitant to describe collections lacking fruits as a new species, but we believe that these can only be related to *Piper flaviflorum*. The differences from that species are so clearly marked that the two species must be treated as distinct. The exact nature of the covering of the abaxial leaf surfaces is difficult to make out but seems best regarded as a layer of sessile scales.

Paratypes. CHINA. Yunnan: Shweli-Salwin divide, ca. 25°45'N, 98°40'E, 2100–2450 m, June 1924, *Forrest* 24388 (E, K).

Piper wallichii (Miquel) Handel-Mazzetti, Symb. Sin. 7: 155. 1929. *Chavica wallichii* Miquel, Syst. piperac. 2: 254. 1843. *Piper aurantiacum* Wallich ex C. DC., in A. DC., Prodr. 16: 357. 1868, nom. illegit. (cited *Chavica wallichii* as a synonym). TYPE: Nepal. "In Nepalia," 1821, *N. Wallich* 6658A (lectotype, here designated, K; isoelectotypes, A, BM, P).

Piper aurantiacum var. *hupeense* C. DC., Notizbl. Königl. Bot. Gart. Berlin-Dahlem 6: 478. 1917. *Piper wallichii* var. *hupeense* (C. DC.) Handel-Mazzetti, Symb. Sin. 7: 155. 1929. TYPE: China. Hubei: A. Henry 3893 (lectotype, here designated, B; isoelectotypes, GH, K).

Piper emeiense Y. C. Tseng, Acta Phytotax. Sin. 24: 385, fig. 3. 1986. Syn. nov. TYPE: China. Sichuan: Mt. Emei, C. H. Hsiung 32838 (holotype, IBSC).

Piper ichangense C. DC., Notizbl. Königl. Bot. Gart. Berlin-Dahlem 6: 480. 1917. TYPE: China. Hubei: Hupeh occidentalis: prope Ichang, Oct., *Wilson* 499 "489" (holotype, B; isotypes, A, K, P).

Piper martinii C. DC., Notul. Syst. (Paris) 3: 41. 1914. Syn. nov. TYPE: China. Guizhou ("Kouy Tchéou"): environs de San-pin, rocailles au-dessus de la grande grotte, L. Martin & E. Bodinier 2298 (lectotype, here designated, P; isoelectotype, E).

This taxon was first named as "*Piper aurantiacum*" by Wallich in his Catalog, under his number 6658 and including two collections, one from Nepal collected by himself and the other from Sillet, now in Bangladesh, collected by F. de Silva and W. Gomez, but no description was given and that name is invalid. The first valid name was that of Miquel, who cited the original Wallich collections but did not take up Wallich's epithet. The collection from Sillet was subsequently included by Hooker as a syntype of *P. rhytidocarpum*, and thus Wallich's own collection from Nepal is the only sensible choice as lectotype. The protologue of *Piper aurantiacum* var. *hupeense* cited two collections: *Wilson* 499 in CAL and A. Henry 3893 in B. Both are well represented by duplicates in a number of major herbaria, but because it has not been possible to see the cited collection of *Wilson* 499, and another sheet of this collection was made the type of *Piper*

ichangense, it seems advisable to select the Henry collection as lectotype. The type of *P. ichangense* was given as Wilson "489." There are rather complete sets of Wilson's collections in A and K, so it was puzzling when it was not possible to locate any *Piper* with this number. The problem was solved by examination of the holotype sheet in B, which has two labels: an original with "499" and a second label added in B with "489," clearly a copying error. There are two collections of *P. martinii* cited in the protologue, both in Paris and annotated by De Candolle: *Cavalerie* 2387 and *Martin & Bodinier* 2298. Other things being equal, we have selected the latter as lectotype in view of the epithet used for the taxon, and because there is a duplicate specimen in Edinburgh; *Cavalerie* 2387 seems to be a unicate.

Tseng (in Chen et al., 1982) distinguished *Piper wallichii* and *P. martinii* as follows:

- 1a. Male spikes ca. 2× as long as leaf blades, peduncles 2.5–3× as long as petioles; petioles of female bracts barely elongated in fruit, sparsely pubescent *P. martinii*
- 1b. Male spikes nearly as long as leaf blades, peduncles nearly as long as petioles; petioles of female bracts elongated to 2 mm in fruit, densely long white pubescent *P. wallichii*

The differences in inflorescence dimensions are not well defined and do not justify recognition of distinct taxa. The bract characters sound extremely distinctive, but we have not seen any material that matches the description given for *Piper wallichii*. This includes the types of *P. wallichii* and *P. martinii*, which key out together in the above key and are certainly conspecific.

Piper emeiense was distinguished from *P. wallichii* by the small leaves, which have palmate lateral veins and a very thin indumentum, and by the short peduncles. Other collections seen from near the type locality, Mount Emei, show a transition between juvenile climbing stems with foliage very like that seen in the type collection of *P. emeiense* and flowering stems with adult foliage typical of *P. wallichii*. We believe that there can now be little doubt that *C. H. Hsiung* 32838 is material of *P. wallichii* that has flowered in an unusually juvenile stage, directly from the climbing stems without the production of normal flowering stems.

Piper wangii M. G. Gilbert & N. H. Xia, sp. nov.
TYPE: China. Yunnan: Jing Hong, Nan-hsien-ho, 800 m, Oct. 1936, *Wang C. W.* 79466 (holotype, A; isotypes, KUN, PE).

A *Piper pubicatum*, foliis (5–)7(–9)-nervis (non 5-nervis) basibus manifeste obliquis (non aequilateris), stipiti-

bus bracteorum pilosis (non glabris), fructibus maioribus (plus quam 1.5 mm, non ca. 1 mm) differt; a *P. boehmeriifolium* et *P. pedicellato*, habitu scandentibus, foliis latioribus (7–12 cm, non (2.5–)4–9.5 cm), inflorescentibus femineis brevioribus (ca. 3 cm, non 6–14 cm) differt.

Climbers, glabrous except for rachis. Stems finely striated, tuberculate. Prophylls ca. as long as petioles; petioles 1–1.5 cm; leaf blade broad-elliptic to ovate, (12.5–)15–21 × 7–12 cm, papery, base obliquely rounded-cuneate, apex acute to acuminate; veins (5–)7(–9), apical pair arising (2–)3–6.5 cm above base, almost reaching leaf apex, 1(or 2) pair(s) basal, reticulate veins conspicuous, densely finely glandular. Plants dioecious. Spikes leaf-opposed. Male spike not seen. Female spikes ca. 3 cm in young fruit; peduncle 1–1.4 cm; bracts peltate, orbicular, stalk pilose, 0.7–1 mm diam., margin not entire, glabrous abaxially. Ovary distinct; stigmas 3 or 4, short, ovate-lanceolate. Unripe drupe subglobose, ca. 1.5 mm diam. Flowering May–June, October.

Material of this species was originally identified as *Piper pubicatum* C. DC. Examination of the presumed holotype of *P. pubicatum*, *Bon* 3139 bis, shows this to be a distinct species, easily distinguished by the 5-veined leaves with symmetrical, cuneate bases, glabrous bracts, and densely packed, globose, fruits ca. 1 mm in diameter. The Chinese material is related to species such as *P. boehmeriifolium* and *P. pedicellatum*, which have similarly shaped and textured leaves, but it is easily recognized by the combination of the climbing habit, broader leaves, and short inflorescences. One sheet (*Wang* 76584) states that the leaves are edible.

Paratypes. CHINA. Yunnan: Lan Chang Xian, 1500 m, May 1936, *Wang C. W.* 76584 (A, IBSC).

Piper yui M. G. Gilbert & N. H. Xia, sp. nov.
TYPE: China. Yunnan: Kiukiang Valley, Chingontum, 1300 m, 25 Sep. 1938, *T. T. Yü* 20434 (holotype, A; isotypes, E, PE).

A *Piper nudibaccato*, apicibus foliis rotundatis vel subacutis, non acutis vel acuminatis, et bracteis obovatis ca. 1.5 mm longis, non orbicularis ca. 1 mm diam., differt.

Climbers, woody. Stems dark brown when dry, striated, minutely hispidulous when young. Prophylls ca. as long as petioles; petiole 0.8–1.4 cm, hispidulous; leaf blade elliptic, to 9 × 4.5 cm, papery, drying dark green, base obliquely cordate to ± rounded, one side to 3 mm higher, almost symmetrical in uppermost leaves, apex rounded to broadly acute; veins 5(–7), apical pair arising 0.3–0.8(–1.2) cm above base, others basal, reticulations

slender, raised both sides in dry material, finely glandular, very finely and sparsely puberulent on veins, otherwise glabrous. Plants dioecious. Spikes leaf-opposed. Male spike not seen. Female spikes to 15 cm in fruit; peduncle to 5.3 cm, rachis and undersides of bracts densely brownish hairy; bracts obovate, ca. 1.5×1 mm. Ovary ovoid, partly connate to rachis; stigmas 3 or 4, ellipsoidal, reflexed. Drupe (immature) ellipsoid, ca. 6×3 mm, slightly rugulose, partly connate to rachis. Young fruit September–October.

The strictly elliptical leaves with rounded apices of this species are immediately distinctive and are not matched by any species from China and Indochina. *Piper hamiltonii* C. DC. is the only species with leaves similar in shape, but this poorly known species from northern India has completely different inflorescences and the similarity is probably due to convergence.

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