

STUDIES IN MALESIAN PIPERACEAE II

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SUMMARY

A number of names has been placed in the synonymy of the species *Piper mestonii* Bailey, *P. rodatzii* K. Schum. & Lauterb., *P. subbullatum* K. Schum. & Lauterb., and *P. subcanirameum* C. DC. One new species, *P. wabangense* Chew, is described from Papua New Guinea.

Piper mestonii Bailey

Piper mestonii Bailey, Rep. Exped. Bellenden-Ker (1889) 54; Chew, J. Arnold Arbor. 53 (1972) 13. — *Piper ruekeri* K. Schum. & Hollrung, Fl. Kaiser Wilh. Land (1889) 36; C. DC., Bot. Jahrb. 55 (1918) 204. — *Piper stenocarpum* C. DC., Ann. Cons. Jard. Bot. Genève 2 (1898) 270, syn. nov. — *Piper bilobulatum* C. DC., Nova Guinea 8, 2 (1910) 418, excl. forma *b*. — *Piper romeri* C. DC., Nova Guinea 8, 16 (1914) 1008, syn. nov. — *Piper nudipedunculum* C. DC., Bot. Jahrb. 55 (1918) 205, syn. nov. — *Piper albopunctatum* C. DC., op. cit. 210, syn. nov. — *Piper rupicola* C. DC., op. cit. 210, syn. nov. — *Piper macrostylum* C. DC., op. cit. 211, syn. nov. — *Piper capitellatum* C. DC., Candollea 1 (1922) 176; *ibid.* 2 (1925) 217, syn. nov. — *Piper sogerianum* C. DC., Candollea 1 (1923) 178; *ibid.* 2 (1925) 221, syn. nov. — *Piper sogerense* S. Moore, J. Bot. 61, Suppl. (1923) 40, syn. nov. — *Piper rhodocarpum* Trelease, J. Arnold Arbor. 9 (1928) 149. — Type: Australia, Queensland, Harvey's Creek, Russell, *Meston & Bailey s.n.* (isotype of *P. mestonii* in NSW).

Notes — In 1972 (J. Arnold Arbor. 53: 13) I reduced three species to *Piper mestonii* Bailey, the Queensland Long Pepper, which is reported to be common in New Guinea. I now add nine more names to the synonymy.

In the same paper, I considered *Piper stenocarpum* C. DC. a distinct species. After further examination of the holotype on loan from the Melbourne Herbarium, I now consider it not different from *P. mestonii*. The holotype has small, narrowly ovate laminae with short to very short petiole and fairly long apex. The inflorescence is at least as long as the leaves with the peduncle longer than the petioles. I have seen a vast number of collections in *P. mestonii* with this combination of characters. In fact, Craven & Schodde 982 (CANB) shows in the one collection both types of leaves: broad pentagonal ones common in *P. mestonii* and small, narrow, ovate leaves as in *P. stenocarpum*.

Piper romeri is based on two collections of Von Römer, viz. nos. 5 and 113. Both are extant at the Leiden Herbarium, and *von Römer 113* is here selected as lectotype. Von Römer's types show all the essential features of *P. mestonii*. Apart from the shorter infructescence in *P. romeri*, I find it hard to distinguish the two species.

Piper nudipedunculum is typified by *Schlechter 16739* from the Kani Region in Papua New Guinea. The holotype is in Berlin, and an isotype in the Arnold Arboretum. I have seen the collections and find them indistinguishable from our species.

Piper albopunctatum is based on *Ledermann 13052* from the Sepik Province in Papua New Guinea. Both holotype and isotype are in excellent condition in the Berlin Herbarium. The holotype is the sheet with an annotation in De Candolle's hand. The type collection is simply indistinguishable from *P. mestonii*. *Ledermann 13052* shows most convincingly the great variability of leaf forms in *P. mestonii*. In the isotype sheet, the leaves range from narrowly ovate with cuneate base and long attenuate apex to very broad ovate or pentagonal. Variation of leaf size is also very great.

Piper rupicola is also based on *Ledermann's* collection which is no. *12540b*, not *12450b* as published. The type shows that same range of lamina variation typical of *P. mestonii*.

Piper macrostylum is typified by *Ledermann 12023* and *12805*, both in the Berlin Herbarium. I select as lectotype the sheet of *Ledermann 12023* that has an annotation in De Candolle's hand. *Piper macrostylum* has styles somewhat larger than average; but as this is the only difference of any significance, I prefer to refer *P. macrostylum* to *P. mestonii*.

The type of *P. capitellatum* is *Warburg 20735* from the Sattelberg. I have seen the holotype which is extant in the Berlin Herbarium, and I find the species not different from *P. mestonii*.

Piper sogerianum and *P. sogerense* are based on different duplicates of *Forbes 76* from Mt Sogere. De Candolle established his *P. sogerianum* in February 1923 on the Parisian duplicate. In June 1923, Moore separately described *P. sogerense* from another duplicate at the British Museum. I have seen both sheets and I confirm their identity with *P. mestonii*.

IRIAN JAYA. — Noordrivier (= Lorentz R.), Bivakeiland, von Römer 5, Sep. 1909 (syntype of *P. roemerii*: L); von Römer 113, Sep. 1909 (lectotype of *P. roemerii*: L).

PAPUA NEW GUINEA. — Kani Region, alt. 1100 m, *Schlechter 16739* (holotype of *P. nudipedunculum*: B; isotype: A). — Sattelberg, *Warburg 20735* (holotype of *P. capitellatum*: B). — Sepik Province, Felsspitze, alt. 1400–1500 m, *Ledermann 13052*, 22 Aug. 1913 (holotype of *P. albopunctatum*: B); alt. 1500 m, *Ledermann 12540b* (holotype of *P. rupicola*: B); Schraderberg, alt. 2040 m, *Ledermann 12023*, June 1913 (lectotype of *Piper macrostylum*: B); Felsspitze, alt. 1400–1500 m, *Ledermann 12805*, Aug. 1913 (syntype of *P. macrostylum*: B). — Sogeri, *Forbes 76* (holotype of *P. sogerianum*: P); *Forbes 76* (holotype of *P. sogerense*: BM); *Forbes 147*, 1885/1886 (paratype of *P. sogerense*: BM).

***Piper rodatzii* K. Schum. & Lauterb.**

Piper rodatzii K. Schum. & Lauterb., Fl. Schutzgeb. Südsee (1900) 262. — *Piper bilobulatum* C. DC. forma *b* C. DC., Nova Guinea 8, 2 (1910) 418, syn. nov. — *Piper rubramentum* C. DC., Nova Guinea 8, 2 (1910) 419, syn. nov. — *Piper brevipes* C. DC., Bot. Jahrb. 55 (1918) 213, syn. nov. — *Piper ledermannii* C. DC., Bot. Jahrb. 55 (1918) 217, syn. nov. — *Piper boorsmae* C. DC., Candollea 2 (1925) 216, syn. nov. — Type: New Guinea, Bismarck Range, *Rodatz & Klink 201*, July 1899 (B, holo).

Glabrous root climbers. *Leaves* very shortly petiolate; lamina usually elliptic, ovate to narrowly ovate; apex acuminate, often curved; base cuneate, very slightly asym-

metrical, not auriculate; lateral veins 3 pairs, rarely 4; the distal pair alternating, sometimes wide apart, from the midrib, the second pair arising from the base, often a little decurrent along the midrib, the 3rd and 4th pairs often very faint, arising directly from the base. Peduncular stalk much longer than the subtending petioles. *Inflorescence* often as long as the leaves. *Female flowers* sessile, very crowded along the peduncle; stigma sessile, minutely 3-fid, reflexed. Bracts long pedicellate, rounded; pedicel of bracts with multicellate hairs. *Fruits* sessile and crowded.

Distribution — New Guinea.

Notes — The holotype of *P. rodatzii* is still extant in the Herbarium in Berlin. It consists of two sheets in excellent condition, containing materials in fruit. I have seen these collections and those of the synonyms cited above and am confident that they are properly assigned to this species.

Piper bilobulatum forma *b* is based on *Versteeg 1015*, still extant in the Bogor Herbarium. This is simply indistinguishable from *P. rodatzii*. *Piper rubramentum* is based on another element of *Versteeg 1015* in the Herbarium at Bogor. The type is in excellent condition and is readily identifiable as belonging to *P. rodatzii*.

The holotype of *Piper brevipes* shows some distinction from those of *P. rodatzii*. Having studied a large range of materials of *P. rodatzii*, I see no reason to recognise *P. brevipes* as a distinct species.

Piper ledermannii is based on *Ledermann 10971 & 11409* from the Sepik Province in Papua New Guinea. I select *Ledermann 11409* in the Berlin Herbarium as the lectotype. *Piper ledermannii* is conspecific with *P. rodatzii*.

Piper boorsmae is based on *Boorsma 6* from West New Guinea, i.e., Irian Jaya. The holotype is in the Herbarium at Bogor. I find no reason to consider this species distinct from *P. rodatzii*.

Piper rodatzii is close to *P. macropiper* Pennant, but is readily distinguished from the latter in a number of characters such as the base of the lamina not being auriculate, stigma very small and venation pattern different.

IRIAN JAYA. — Sine loc: *Boorsma 6* (holotype: BO); *Versteeg 1015*, p.p. (BO).

PAPUA NEW GUINEA. — Bismarck Range: *Rodatz & Klink 201* (holotype in B). — Sepik Province: *Ledermann 10971, 11409, 11800* (Herb. B).

***Piper subbullatum* K. Schum. & Lauterb.**

Piper subbullatum K. Schum. & Lauterb., Fl. Schutzgeb. Südsee (1900) 262. — *Piper torricellense* Lauterb. in K. Schum. & Lauterb., Nachtr. Fl. Schutzgeb. Südsee (1905) 239, syn. nov. — *Piper grandispicum* C. DC., Nova Guinea 8, 2 (1910) 417, syn. nov. — *Piper wichmannii* C. DC., Nova Guinea 8, 2 (1910) 418; Chew, J. Arnold Arbor. 53 (1972) 20, f. 6, syn. nov. — *Piper lageniovarium* C. DC., Leaflet. Philipp. Bot. 3 (1910) 767; Quisumbing, Philipp. J. Sci. 43 (1910) 44, f. 15, syn. nov. — *Piper grande* Ridley, Trans. Linn. Soc. Bot. ser. 2, 9 (1916) 142, non Vahl (1798), syn. nov. — *Piper pergrande* C. DC., Candollea 1 (1923) 268, syn. nov. — *Piper anisopleurum* C. DC., Bot. Jahrb. 57 (1922) 354, syn. nov. — Type: New Guinea, Siganu Wodsa, *Lauterbach 2343*, 1896 (B, holo; K, iso).

Dioecious shrubs to soft wooded trees. *Lamina* moderately petiolate; asymmetrically broad ovate; to 28 cm long, 21 cm broad, length : breadth ratio often 3 : 2; the upper side glabrous, the lower minutely hirtellous on the veins only; apex shortly acuminate; base asymmetrical, deeply to broadly cordate; lateral veins 4 or 5 pairs, the dis-

tal pair arising from the midrib at c. 1.5 cm from the base, the rest directly from the base, the broader side often with 1 or 2 more veins; margin ciliate. Petiole usually as long as the sinus of the base of the lamina is deep. Stipules c. 5 cm long, usually longer than petioles. *Inflorescences* to 40 cm long, often as long as leaves, the female inflorescences usually shorter; peduncular stalks shorter than petioles. *Male flowers* 2-staminate; stamens 0.5 mm long; anthers reniform, dehiscing apically; filaments short, broad, and stout. *Female flowers* sessile; stigmas 3-fid, subsessile; bracts round, peltate, long pedicellate. *Fruits* sessile, somewhat obconical, free at maturity.

Distribution — Philippines, New Guinea, Bismarck Archipelago, Solomon Islands and Vanuatu.

Notes — *Piper subbullatum* was originally described as a *species incertae sedis*; and its identity has remained unknown ever since.

In 1972, I was fortunate to be able to study the holotype of *P. subbullatum*, on loan from the Berlin Herbarium. It consists of a young twig bearing three leaves and a very young spike. The leaves show all the characteristics of *P. wichmannii*, but the spike is much too immature to permit definite identification with the latter species. Thus I left the identity of *P. subbullatum* unsolved. On a recent visit to the herbarium at Kew, I located an isotype of *P. subbullatum*. This collection consists of a twig with three leaves and three spikes in excellent condition. Being mature materials, they show all the essential characteristics of the species cited in synonymy above, particularly *P. wichmannii*, under which name this species has hitherto been known.

The holotype of *P. torricellense*, also extant in the Berlin Herbarium, contains a specimen with the longest female spike I have seen in this species. The isotypes of *P. grandispicum* in Bogor, Leiden and Utrecht are similarly found to be with very long spikes. Apart from this character, there is really no essential difference between these species and *P. subbullatum*.

Piper pergrande was proposed by De Candolle to replace *P. grande* which is a later homonym of *P. grande* Vahl, an American species. The collections cited by Ridley are in the British Museum and have been found to be conspecific with *P. subbullatum*.

The type of *P. lageniovarium* from the Philippines has been examined and found to be indistinguishable from *P. subbullatum*.

There is strong circumstantial evidence that *P. subbullatum* (synonym = *P. wichmannii*) is the ancestor of *P. methysticum*, the Kava plant of the South Pacific (Le Bot & Caballion, pers. comm.).

The collections cited under *P. wichmannii* in J. Arnold Arbor. 53 (1972) 20–25 are to be added to the following.

PHILIPPINES. — Mindanao. Davao: Mt Apo: Elmer 10589, May 1909 (isotype of *P. lageniovarium*: K, NSW).

IRIAN JAYA. — Near Alkmaar bivouac: Versteeg 1581 (lectotype of *P. grandispicum*, L; isotypes: BO, U); Branderhorst 363 (isotypes of *P. grandispicum*: BO, L, U). Côte du Nord: Atasrip 39, Exped. Wichmann 1903 (holotype of *P. wichmannii*: L); Atasrip 6, Exped. Wichmann 1903 (BO, L). Idenburg R.: Brass 13276, March 1939 (A, BRI). Camp I: alt. 700 ft: C.B. Kloss s.n., 1913 (lectotype of *P. pergrande*: BM). Canoe Camp: alt. 150 ft, C.B. Kloss s.n. (syntype of *P. pergrande*: BM).

PAPUA NEW GUINEA. — Mt Toricelli: Schlechter 14389 (holotype of *P. torricellense*: B). — Morobe: Craven & Schodde 1095, 1370 (L).

BISMARCK ARCHIPELAGO. — Namatanai: Matakan "beim Bache Tahanamasa", G. Peekel 372 (holotype of *P. anisopleurum*: B). — New Britain: Waterhouse 933 (L).

***Piper subcanirameum* C.DC.**

Piper subcanirameum C. DC., Candollea 1 (1923) 196; *ibid.* 2 (1925) 221. — *Piper trombek* van Royen, Alp. Fl. New Guinea 3 (1982) 1278, *syn. nov.* — Type: New Guinea, Irian Jaya, *sine loc.*, Boorsma 7 (BO, *holo.*).

Glabrous climber. *Leaves* moderately petiolate, coriaceous; lamina ovate, commonly 7–9 cm long, 3–4.5 cm broad; apex acuminate, c. 0.6 cm long, base rounded, truncate to cordate, symmetrical; main lateral veins 2 pairs, the basal pair issuing from the base, the distal pair from the midrib c. 1.5 cm from the base; the midrib giving off one more pair of short curved lateral veins near the apex. Petiole c. 1 cm long. *Female inflorescence* shorter than leaves, peduncular stalk 1–1.5 cm long, usually longer than petiole, the floriferous part to 4 cm long, to 1 cm in diameter. *Female flowers* sessile, crowded; stigmas 3- to 4-fid, reflexed sessile. Bracts irregularly rounded, peltate. *Fruits* sessile, almost entirely conerescent.

Distribution — New Guinea.

Habitat & Ecology — In primary and disturbed habitats; reported abundant between 3000 and 4000 m altitude.

Notes — *Piper trombek* belongs to this species. I have compared the type material (Wheeler ANU 6408) and most of the collections cited by Van Royen with the holotype of *P. subcanirameum* which is still extant in Herbarium Bogoriense in Bogor, Indonesia, and can find no difference between them.

The species was first proposed and diagnosed in De Candolle's key to the species of *Piper* in 1923, but details of the type collection were revealed only in a posthumous paper in 1925.

IRIAN JAYA. — *Sine loc.*: Boorsma 7 (BO).

PAPUA NEW GUINEA. — Chimbu: Mt Wilhelm, alt. 3100 m: Borgmann 249, Oct 1960 (LAE); alt. 1000 ft: McVean & Wade 7219, May 1966 (CANB, LAE); alt. 3000 m: Brass 30747, July 1959 (A, CANB, LAE). — East Madang: Finisterre Range, alt. 7850 ft: Pullen 6054, Nov. 1964 (CANB, LAE). — Morobe: Edie Creek, alt. 9700 ft: Sayers NGF 19985, Sep. 1964 (BRI, CANB, LAE, NSW); alt. 6800 ft: Kairo & Streimann NGF 30885, Aug. 1967 (BRI, CANB, LAE, NSW). Ogeramngang, alt. 6000 ft: Clemens 4798, Dec. 1936 (A, BRI); Sattelberg, alt. 6000–8000 ft: Clemens 7556, Nov. 1937 (A); alt. 5000–6000 ft: Clemens 7605, Nov. 1937 (A); alt. 6000 ft: Clemens 9096, Oct. 1938 (A). — Western Highlands: alt. 8500 ft: Robbins 345, July 1957 (CANB); Kubor Range, alt. 10,600 ft: Pullen 5021, July 1962 (A, BRI, CANB, LAE); alt. 9500 ft: Pullen 5219, Aug. 1963 (CANB, LAE); Mt Hagen: alt. 10,000 ft: Wheeler ANU 6152, Jan. 1966 (LAE); alt. 10,800 ft: Wheeler ANU 6408, July 1967 (type of *P. trombek*: CANB, L, LAE). — Southern Highlands: Lalibu, alt. 6500 ft: Womersley & Wooliams NGF 24994, Sep. 1967 (CANB, LAE, NSW); Mt Giluwe, alt. 10,000 ft: Schodde 1861, Aug. 1961 (A, CANB, LAE); alt. 10,500 ft: Coope & Waring NGF 29988, July 1967 (LAE); alt. 11,900 ft: Vanderberg *et al.* 39768, Sep. 1968 (LAE); Tari, alt. 2750 m: Vink 17518 (LAE).

Piper wabagense* Chew, *spec. nov.

Piperi subbullato C.DC. affinis sed foliis coriacei et bullatis, stigmatibus 3-, 4- vel 5-partibus, antheris reniformibus notabiliter. — Typus: NE New Guinea, Southern Highlands, Wabag, near Lake Inim, 5° 30' N, 143° 40' E, alt. c. 2800 m, J.R. Flenley ANU 2793, May 1965 (CANB, *holo.*; BRI, LAE, NSW, *iso.*).

Soft wooded shrubs 5–8 m high; wood white, rays prominent; twigs usually covered with fine brown pubescence; pith large; plants occasionally monoecious. *Leaves* moderately petiolate; lamina slightly asymmetrical, broad ovate; 15–20 cm long, 10–15 cm broad; often strongly bullate; coriaceous to rigid, the upper surface usually glabrous, the lower lightly to densely pubescent; lateral veins 4 pairs, the distal pair arising alternately 2–5 cm from the base, the rest directly from the base; intercostals numerous, fairly prominent; apex short-acuminate; base broadly asymmetrically cordate. Petiole 2–4 cm long, those of the lower leaves up to 8 cm long. Stipules adnate to petiolate, early caducous. Prophyll 3–4 cm long, often thickly pubescent on the outside. *Inflorescences* at least as long as leaves, often much longer; bracts rounded, peltate, pedicel villose. Male inflorescences 10–12 cm long, 0.4 cm in diameter, peduncular stalk 1–1.5 cm long; females 10–20(–25) cm long, 0.75 cm in diameter, peduncular stalk 2 cm long. *Male flowers* with 2 stamens; stamens fairly long pedicellate, filaments 1.5 mm long; anthers reniform, c. 1 × 1 mm, bilocular, 2-valved. *Female flowers* sessile, crowded, free, 1.6 mm long, 1.4 mm broad, obconical; stigma sessile, 3-, 4-, or 5-fid, the parts often irregular in size and shape. *Fruits* 3 mm long, 2 mm broad, sessile, crowded, free.

Distribution — Papua New Guinea.

Notes — *Piper wabagense* appears to be a close relative of *P. subbullatum* (= *P. wichmannii*), also an arborescent species, from which it differs in the following characters: a) lamina bullate and strongly coriaceous; b) twigs often covered with a fine pubescence; c) stigmas 3-, 4-, or 5-fid; d) anthers reniform, dehiscing by lateral longitudinal slits.

The female spikes have been reported to be erect even at fruit (*Brass* 30924, *Hoogland & Schodde* 69229, *Flenley* 2793). If this is the rule, then it is an additional distinction from *P. subbullatum* which has pendulent spikes.

Piper wabagense (specific epithet derived from the name of the type locality) is a much-branched shrub of both primary and secondary vegetation and is particularly abundant in clearings of *Nothofagus* forests at about the 2500-metre contour.

PAPUA NEW GUINEA. — Morobe: Huon Peninsula, alt. 7500 ft: *Hoogland* 9457, July 1964 (A, BRI, CANB, LAE); alt. 7600 ft: *Hoogland* 9615, Aug. 1965 (A, BRI, CANB, LAE). — Eastern Highlands: Asaro-Mairifutica Divide, alt. 8500 ft: *Pullen* 400, Aug. 1957 (A, BRI, CANB, LAE); Mt Otto, alt. 2200 m: *Brass* 30924, Aug. 1959 (CANB). — Western Highlands: Daule Peninsula, alt. 8175 ft: *Quisumbing* 65838, Sep. 1960 (L); Lake Inim, alt. 8300 ft: *Flenley* ANU 2793, May 1965 (BRI, CANB, LAE, NSW); Kaugel Valley, alt. 7000 ft: *Robbins* 446, July 1957 (CANB); Upper Kaugel Valley, alt. 7700 ft: *Bowers* 425, Nov. 1968 (LAE); Yaibos, alt. 7000 ft: *Flenley* ANU 2271, Dec. 1964 (CANB, LAE); Yaki R. Valley, alt. 8000 ft: *Hoogland & Schodde* 6922, July 1960 (A, BRI, CANB, LAE). — Central: Kerau Mission: *Frodin* 665, June 1971 (CANB); Mt Tofa, alt. 2310 m: *Brass* 4011, Sep. 1933 (A, BRI).