

**NOMENCLATURAL TRANSFERS IN  
EAST MALESIAN *MYRSINE* (*MYRSINACEAE*),  
AND THE DESCRIPTION OF *M. WARRAE*, A  
DISTINCTIVE NEW SPECIES FROM ULTRABASIC  
ENVIRONMENTS IN PAPUA NEW GUINEA**

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Recent studies in the palaeotropics indicate that *Rapanea* cannot be maintained as a separate genus from *Myrsine* (*Myrsinaceae*). Based on the latest evidence from comparative morphology, Papuasian *Rapanea* are thus transferred to *Myrsine*. The nomenclatural adjustment provides a foundation for future additions to the enlarged genus, previously represented by only three of the required binomials.

After the establishment of a complete set of *Myrsine* names for eastern Malesia, *M. warrae* W.N.Takeuchi & Pipoly is added to the redefined conspectus. The new plant is distinguished by large leaves, rostrate fruits, and an apparent restriction to ultrabasic substrates.

*Keywords.* *Myrsinaceae*, *Myrsine*, New Guinea, *Rapanea*, ultrabasics.

INTRODUCTION

The relationship between *Myrsine* L. and its satellites (inter alia *Rapanea* Aubl. and *Suttonia* A.Rich.) has been a historical focal point for taxonomic contention within the *Myrsinaceae*. Many regional authorities have defended positions on either side of a debate which continues to the present.

Mez (1901, 1902) was the first to state a credible rationale for the separate recognition of *Myrsine* and *Rapanea* (viz. the presence of a well-defined style and filaments in *Myrsine* and their absence in *Rapanea*). This established the basis for all subsequent interpretations of generic delimitations. When accepting their separation, Smith (1973) added a qualifying note that the filaments in *Myrsine* are connate into an apically free ‘flange’, while in *Rapanea* the filaments are completely fused to the corolla, the anthers thus appearing epipetalous. Fosberg & Sacht (1975, 1980) acknowledged the difference in staminal structure, but believed the distinction was not of sufficient importance for recognising two genera. Using similar arguments,

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various authors have taken positions for one or the other genus. Within the Pacific region, the authorities supporting separation have included Degener (1939), Oliver (1951), Smith (1973, 1981), Royen (1982), Sleumer (1986) and Larsen & Hu (1996). However, Hosaka (1940), Backer & Bakhuizen van den Brink (1965), Fosberg & Sachet (1975, 1980), Sachet (1975), Li (1978), Wagner *et al.* (1990), Pipoly & Chen (1995), Pipoly (1996, 2007) and Jackes (2005) have favoured assimilation of *Rapanea* into the older name *Myrsine*.

Based on examination of representative taxa throughout the palaeotropics, it is now apparent that staminal variation in *Myrsine* embraces many previously unreported character states. These recently documented observations include: (i) the presence of rudimentary filaments in pistillate flowers; (ii) intergradations (between species) in the degree of filament connation; (iii) the co-occurrence (within species) of staminate flowers with distinct filaments, and pistillate flowers with filaments adnate to the corolla (i.e. the male flowers conforming to *Myrsine* but the female ones conforming to *Rapanea*), and (iv) intergradations in the degree of staminal adnation to corolla tubes and/or their lobes within the same individual (see Pipoly, 1991, 1992a, 1992b, 1996). Far from being composed of discrete elements, the androecium variation is actually a continuum of morphotypic states, represented primarily by taxa with completely free filaments (*Myrsine sensu stricto*) and those where a staminal tube is fully adnate to the corolla (*Rapanea sensu stricto*), but also including many intermediate forms between these endpoints. Similar patterns of intergrading variation have been discerned in the styles and stigmas of neotropical *Myrsine* (Pipoly, 1991, 1992a). With respect to the criteria traditionally used to distinguish them, *Rapanea* and *Myrsine* should thus be regarded as one genus.

Papuan *Rapanea* were treated comprehensively by Sleumer (1986), and its alpine species were also reviewed by Royen (1982). Due to the retention of *Rapanea* by these investigators, there is a complete set of east Malesian binomials for *Rapanea*, and hardly any for *Myrsine*. Many regional floras have similar nomenclatural imbalances as a result of past geographically-restricted assessments.

Pipoly (1996) published a revision of Philippine *Myrsine* prior to an intended treatment of all Malesian congeners, but the wider study was placed in abeyance following a change in his organisational affiliation. As part of earlier preparations for the deferred revision, Pipoly began (in around 2006) an informal transfer of names from *Rapanea* to *Myrsine* (e.g. the *Rapanea* collections at LAE were labelled with appropriate *Myrsine* binomials). However, 18 of the intended transfers are still unpublished.

With the discovery of a new *Myrsine* in Papua New Guinea, formal publication of these transfers is now needed. There are only three *Myrsine* names currently available as substitutes for the *Rapanea* species accepted by earlier authorities in our region. Instead of using the existing nomenclature, it is more appropriate to establish a congeneric foundation of binomials, for the immediate purpose of recognising *Myrsine warrae*, but also to acknowledge the latest taxonomic evidence. The necessary transfers are made in the following section.

NOMENCLATURAL TRANSFERS IN PAPUASIAN *MYRSINE*

1. *Myrsine acrosticta* (Mez) Pipoly, **comb. nov.** – *Rapanea acrosticta* Mez, Bot. Arch. 2: 259 (1922). – Type: Papua New Guinea, East Sepik, Hunstein Mts, viii 1912, *C. Ledermann* 8510 (lecto K [chosen in Sleumer, 1986]).
2. *Myrsine arfakensis* (Kaneh. & Hatus.) Pipoly, **comb. nov.** – *Rapanea arfakensis* Kaneh. & Hatus., Bot. Mag. Tokyo 57: 230, fig. 20 (1943). – Type: W New Guinea, Angi District, forests on eastern slope of Lake Gita, 2000 m, 5 iv 1940, *R. Kanehira* & *S. Hatusima* 13521 (holo FU; iso A, BO).
3. *Myrsine augustae* (Mez) Pipoly, **comb. nov.** – *Rapanea augustae* Mez, Bot. Arch. 2: 212 (1922). – Type: Papua New Guinea, West Sepik, Felsspitze, vii–viii 1913, *C. Ledermann* 12488 & 12506 (syn B, destroyed).
4. *Myrsine cacuminum* (Mez) Pipoly, **comb. nov.** – *Rapanea cacuminum* Mez, Bot. Arch. 6: 232 (1924). – Type: W New Guinea, Oranje Mts, top of Mt Wichmann, 3100 m, ii 1913, *A. Pulle* 1044 (holo B, destroyed).
5. *Myrsine clemensiae* (Sleumer) Pipoly, **comb. nov.** – *Rapanea clemensiae* Sleumer, Blumea 31: 254 (1986). – Type: Papua New Guinea, Morobe District, Sattelberg, Sambanga, 6000 ft (1830 m), 1 x 1937, *M.S. Clemens* 7238 (holo L; iso A, B).
6. *Myrsine coriifolia* (Sleumer) Pipoly, **comb. nov.** – *Rapanea coriifolia* Sleumer, Blumea 31: 248 (1986). – Type: Papua New Guinea, Morobe Province, Bulolo Watut Divide, 12 km SW of Bulolo, *Castanopsis* dominated ridge, 07°17'S, 146°34'E, 1520 m, 8 x 1982, *H. Streimann* 8613 (holo L; iso A, BFC, K, LAE, UPNG).
7. *Myrsine dicksonii* (P.Royen) Pipoly, **comb. nov.** – *Rapanea dicksonii* P.Royen, Alpine Flora of New Guinea 3: 1969, fig. 602 F–J (1982). – Type: Papua New Guinea, Goilala Subdistrict, between Mt Dickson and Kuputivava, moss forest, 08°10'S, 147°10'E, c.9000 ft (2745 m), 12 ii 1964, *T.G. Hartley* 13022 (holo L; iso CANB).
8. *Myrsine gomphostigma* (Mez) Pipoly, **comb. nov.** – *Rapanea gomphostigma* Mez, Bot. Arch. 6: 232 (1924). – Type: W New Guinea, Vogelkop Peninsula, Arfak Mts, 2300 m, iv–v 1912, *K. Gjellerup* 1201 (holo B, destroyed).
9. *Myrsine inaequalis* (Kaneh. & Hatus.) Pipoly, **comb. nov.** – *Rapanea inaequalis* Kaneh. & Hatus., Bot. Mag. Tokyo 57: 232, fig. 21 (1943). – Type: W New Guinea, Angi District, mossy forests, 1800 m, 15 iv 1940, *R. Kanehira* & *S. Hatusima* 13440 (holo FU).
10. *Myrsine involucrata* (Mez) Pipoly, **comb. nov.** – *Rapanea involucrata* Mez, Pflanzenreich 9: 370 (1902). – Type: Papua New Guinea, Owen Stanley Range, Mt Scratchley, 10000–13000 ft (3000–4000 m), anno 1896, *A. Giulianetti* s.n. (holo K; iso L [fragment]).

11. *Myrsine lamii* (Sleumer) Pipoly, **comb. nov.** – *Rapanea lamii* Sleumer, Blumea 31: 264 (1986). – Type: W New Guinea, N of Depapre, 120 m, 15 x 1954, *H.J. Lam* 7815 (holo L).
12. *Myrsine leucantha* (K.Schum.) Pipoly, **comb. nov.** – *Rapanea leucantha* K.Schum., Fl. Deutsch. Schutzgeb. Südsee, Nachtr. 345 (1905). – Type: Papua New Guinea, Morobe District, Sattelberg, 850 m, vii 1899, *E. Nyman* 715 (holo B, destroyed; iso S, WRSL [fragment]).
13. *Myrsine minutifolia* (Knoester, Wijn & Sleumer) Pipoly, **comb. nov.** – *Rapanea minutifolia* Knoester, Wijn & Sleumer, Blumea 31: 252 (1986). – Type: W New Guinea, Kebar Valley, Nettoti Mt, secondary forest on stony clay, 1940 m, 29 xi 1960, *Chr. Versteegh BW* 10368 (holo L).
14. *Myrsine revoluta* (Kaneh. & Hatus.) Pipoly, **comb. nov.** – *Rapanea revoluta* Kaneh. & Hatus., Bot. Mag. Tokyo 57: 233, fig. 23 (1943). – Type: W New Guinea, Angi District, Mt Koebre, 2400 m, 9 iv 1940, *R. Kanehira & S. Hatusima* 14068 (holo FU).
15. *Myrsine rhombata* (P.Royen) Pipoly, **comb. nov.** – *Rapanea rhombata* P.Royen, Alpine Flora of New Guinea 3: 1976, fig. 606 (1982). – Type: Papua New Guinea, Eastern Highlands District, Mt Wilhelm, E slopes, 28 vii 1959, *L.J. Brass* 30757 (holo L; iso A).
16. *Myrsine tempampan* (P.Royen) Pipoly, **comb. nov.** – *Rapanea tempampan* P.Royen, Alpine Flora of New Guinea 3: 1983, fig. 607 G–I (1982). – Type: Papua New Guinea, Morobe District, Saruwaget Range, Tempampan, upper edge of montane cloud forest, 3415 m, 18 ix 1964, *R.D. Hoogland* 9866 (holo L; iso CANB).
17. *Myrsine velutina* (Knoester, Wijn & Sleumer) Pipoly, **comb. nov.** – *Rapanea velutina* Knoester, Wijn & Sleumer, Blumea 31: 251 (1986). – Type: Papua New Guinea, Eastern Highlands District, Chimbu Subdistrict, Mt Wilhelm, Lake Aunde, edge of forest above swampy glen, 05°45'S, 145°05'E, 12000 ft (3655 m), 24 ix 1962, *A.N. Millar & P. Royen NGF* 14678 (holo L; iso LAE).
18. *Myrsine womersleyi* (Sleumer) Pipoly, **comb. nov.** – *Rapanea womersleyi* Sleumer, Blumea 31: 266 (1986). – Type: Papua New Guinea, Morobe District, Wau Subdistrict, Mt Kaindi summit, Edie Creek, 10 miles from Wau, 07°25'S, 146°45'E, 7200 ft (2195 m), 31 viii 1961, *J.S. Womersley & H. Sleumer NGF* 13926 (holo L; iso LAE).

#### DESCRIPTION

*Myrsine warrae* W.N.Takeuchi & Pipoly, **sp. nov.** Figs 1, 2.

Species haec inter speciebus congeneribus Papuasiae singularis fructibus valde rostratus usque ad  $9.6 \times 6.2$  mm statim distinguitur. – Type: Papua New Guinea,

Morobe Province, Bowutu Range, buttress ridge to Blue Mt, Nembehah, natural-growth hill forest on ultrabasics, 07°17'41"S, 147°05'38"E, 625 m, 27 ii 2005, *Takeuchi & Ama* 18923 (holo LAE; iso A, BISH, K, L, MO).

Subarborescent shrubs or trees to 10 m in height, terrestrial, glabrous. *Branchlets* terete, (1.5–)2.5–5(–7) mm diameter, lax, apical bud conoid-subulate; surfaces nigrescent, brunnescent, or greyish, dull, striate, not lenticellate, prominently marked by fusiform-lunate abscission scars; periderm crustaceous, flaky; internodes 0.1–4.1 cm. *Leaves* alternate, spiral, crowded, often 3–5-pseudowhorled; petioles 5–12(–16) × 1–3 mm, broadly channelled on upper side, rounded beneath, longitudinally rugose, black; leaf blades elliptic or oblanceolate, (6.8–)11.3–23(–27) × (1.6–)4.2–6.6(–8.8) cm, subcoriaceous; surfaces opaque, adaxially fuliginous, abaxially brown or tawny-brown, bifacially black-pusticulate in reflected light, pellucid punctate under transmitted light, glandular lines absent; lamina base cuneate-attenuate; margin reflexed; apex abruptly or gradually acuminate, acumen to c.2 × 1.5 cm; venation eucamptodromous, secondaries (11–)15–22(–29) per side, 1–21(–27) mm apart, inconspicuous, at the lamina centre diverging (40–)55–80° from midribs, turned abruptly 1–7 mm before the margin, closing by periclinally looping nerves or not, partial intersecondary veins numerous; midribs impressed above, strongly raised below, higher-order nervation



FIG. 1. *Myrsine warrae* W.N.Takeuchi & Pipoly. Unmounted duplicate from the type collection. The large leaves are often arranged in apically-crowded pseudowhorls (*Takeuchi & Ama* 18923).



FIG. 2. *Myrsine warrae*, fruit detail. Fruits are reddish-brown, furrowed, and distinctively beaked (Takeuchi, Jisaka, Towati & Ama 18992).

bifacially prominulous; reticulum irregular, finely areolate. *Inflorescence* not seen. *Infructescence* below the leaves, fasciculate; peduncle callose, globuliform or discoid-cylindrical,  $0.8-3(-3.4) \times 1.2-3(-3.5)$  mm, perennating; peduncle bracts deltoid, to  $1.8 \times 1.6$  mm, congested, imbricated, spiral, obscuring surfaces, persisting, scarious or thickened, rarely fimbriolate; pedicels  $(1-2)2.5-5.2(-6.1) \times 0.2-0.7$  mm, ebracteate, non-articulate, smooth; calyx 4-partite, lobes triangular,  $(0.6-0.9-1.2) \times (0.7-1-1.3)$  mm, laxly spotted, ciliolate. *Fruits* (after drying) solitary or up to 5 together on the peduncle summit, ovoid-globose or ellipsoid,  $(6-8.2-9(-9.6) \times (3.5-4.8-6.2)$  mm inclusive of the  $(0.8-1.2-2(-2.5) \times 1-2.1$  mm beak; rostellum abruptly conoid, crowned by a 4-lobulate stigma; exocarp red, reddish-brown, or black, irregularly furrowed, set with glandular spots and lines; endocarp usually  $7-8.5 \times 5-5.7$  mm when mature,  $0.5-0.9$  mm thick, rostrate, crustaceous; seed single, apically inserted on the free-central column, endosperm not ruminant.

*Field notes.* Stems unbuttressed, without exudate, outer bark  $\pm$  smooth, sapwood straw; leaf blades fleshy-coriaceous, dark green above, pale green beneath, bifacially punctate, midribs red; infructescence fragile, easily dislodged by handling; fruits green or light brown, epicarp marked by red spots and streaks.

*Distribution.* Currently known only from the type locality in the Bowutu Mts of Morobe Province (Fig. 3).

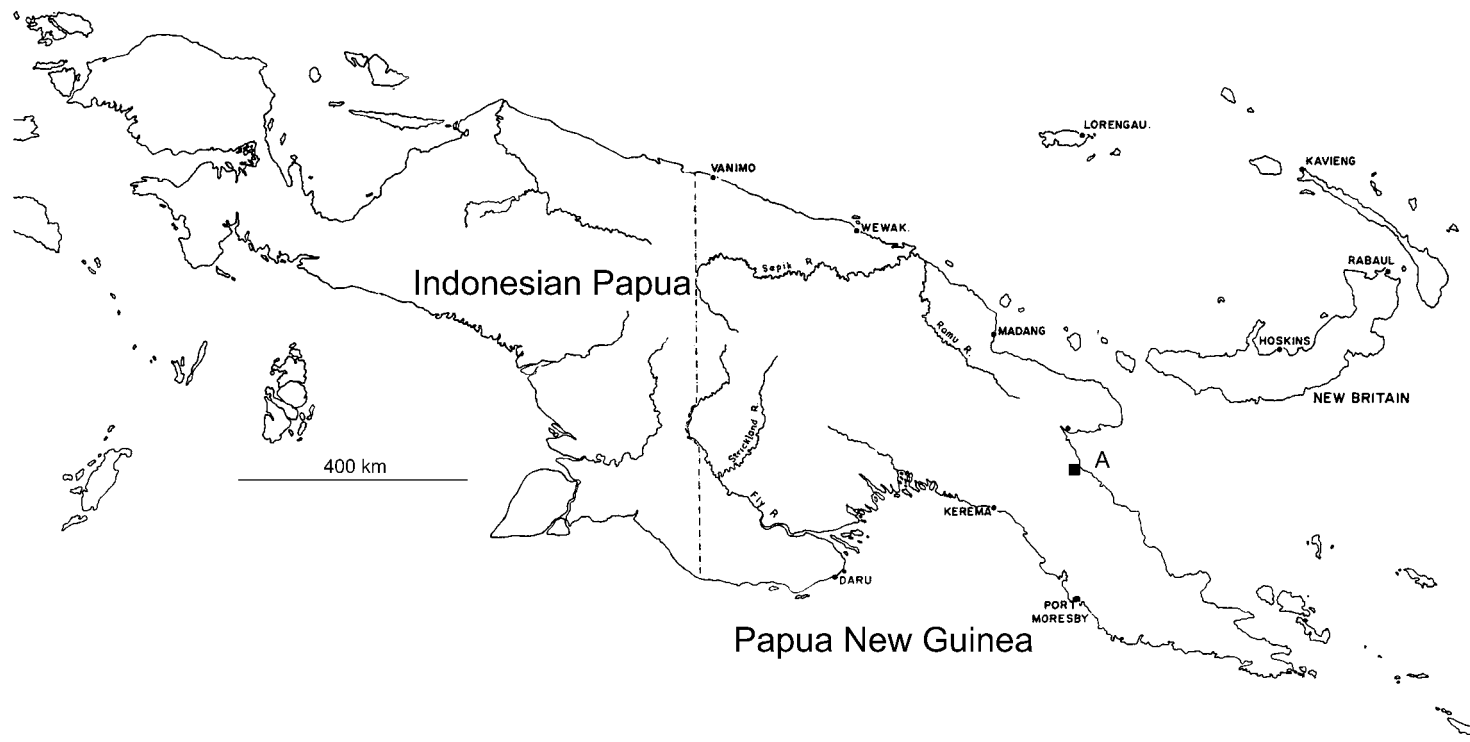


FIG. 3. Island of New Guinea. A, Nembabah, type locality for *Myrsine warrae*.

*Habitat.* Hill forest on ultrabasics, 625–825 m elevation.

*Phenology.* Fruiting in late February to early March.

*Etymology.* Named after forester Terry Warra, former managing director of the PNG National Forest Authority, and a long-serving director of the PNG Forest Research Institute in Lae.

*Additional specimen examined.* PAPUA NEW GUINEA. Morobe Province, Bowutu Range, buttress ridge to Blue Mt, stunted Massenerhebung forest on ultrabasics, 07°17'12"S, 147°04'08"E, 825 m, 1 iii 2005, *Takeuchi, Jisaka, Towati & Ama* 18992 (A, BO, L, LAE).

#### Notes

- 1 *Myrsine warrae* is immediately and uniquely identified by its conspicuously rostrate fruits. This feature is not an artefact of drying, the endocarp having the same shape as the dried mericarp. Although the inflorescence is unknown, fruiting calyces and stigmas are always tetramerous in the specimens at hand.
- 2 With leaf blades to  $27 \times 8.8$  cm, *Myrsine warrae* has longer leaves than any Papuasian congener. Only *Myrsine coriifolia* (Sleumer) Pipoly has comparably sized blades, but in that species the reproductive structures are pentamerous, and the globose fruits (though crowned by subconical-apiculate stigmas) are not rostrate.
- 3 Using the current *Rapanea* revision (Sleumer, 1986), *Myrsine warrae* will key without result to couplets 18–21. Royen's (1982) key breaks down at couplet 8, mainly due to the large leaves on the new plant and the predominance of small-leaved taxa in Royen's alpine treatment.
- 4 In Malesian environments, *Myrsine densiflora* Scheff. is found primarily on ultrabasic soils behind the mangrove zone or in lowland regrowth (Sleumer, 1986; Pipoly, 1996), a pattern also seen along the Bowutu coastline (Takeuchi, pers. obs.). *Myrsine warrae* is known only from the ultrabasic terrain adjoining these *M. densiflora* habitats. Judging from the substrate preferences of Philippine congeners (Pipoly, 1996), the new species is probably a genuine ultrabasic specialist in the manner of *Myrsine densiflora*.

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## REFERENCES

- BACKER, C. & BAKHUIZEN VAN DEN BRINK, R. C. (1965). Myrsinaceae. *Flora of Java* 2: 194–203.
- DEGENER, O. (1939). *Flora Hawaiiensis, or New Illustrated Flora of the Hawaiian Islands*. Privately published: Honolulu.
- FOSBERG, F. R. & SACHET, M. (1975). Polynesian plant studies 1–5. *Smithsonian Contr. Bot.* 21: 1–25.
- FOSBERG, F. R. & SACHET, M. (1980). Systematic studies of Micronesian plants. *Smithsonian Contr. Bot.* 45: 1–40.
- HOSAKA, E. (1940). A revision of the Hawaiian species of *Myrsine* (*Suttonia*, *Rapanea*) (Myrsinaceae). *Occas. Pap. Bernice P. Bishop Mus.* 16: 25–76.
- JACKES, B. (2005). Revision of *Myrsine* (Myrsinaceae) in Australia. *Austral. Syst. Bot.* 18: 399–438.
- LARSEN, K. & HU, C.-M. (1996). Myrsinaceae. In: LARSEN, K. (ed.) *Flora of Thailand* 6: 81–178. Royal Forest Department: Bangkok.
- LI, H.-L. (1978). Myrsinaceae. In: LI, H.-L., LIU, T.-S., HUANG, T.-C., KOYAMA, T. & DEVOL, C. (eds) *Flora of Taiwan* 7: 47–67. Epoch Publishing: Taipei.
- MEZ, C. (1901). Myrsinaceae. In: URBAN, I. (ed.) *Symbolae Antillanae* 2: 397–500.
- MEZ, C. (1902). Myrsinaceae. In: ENGLER, A. (ed.) *Das Pflanzenreich* 9: 1–437.
- OLIVER, W. (1951). The flora of the Three Kings Islands: additional notes: with notes on *Suttonia*. *Rec. Auckland Inst. Mus.* 4: 111–112.
- PIPOLY, J. J. (1991). Systematic studies in the genus *Myrsine* L. (Myrsinaceae) in Guyana. *Novon* 1: 204–210.
- PIPOLY, J. J. (1992a). Estudios en el género *Myrsine* (Myrsinaceae) de Colombia. *Caldasia* 17: 3–9.
- PIPOLY, J. J. (1992b). Notes on the genus *Myrsine* (Myrsinaceae) in Peru. *Novon* 2: 392–407.
- PIPOLY, J. J. (1996). Contributions toward a new flora of the Philippines: I. A synopsis of the genus *Myrsine* (Myrsinaceae). *Sida* 17: 115–162.
- PIPOLY, J. J. (2007). Myrsinaceae of Papua. In: MARSHALL, A. & BEEHLER, B. (eds) *The Ecology of Papua. The Ecology of Indonesia Series, Vol. 6*, pp. 416–428. Conservation International. Periplus Editions (HK) Ltd: Hong Kong.
- PIPOLY, J. J. & CHEN, C. (1995). Nomenclatural notes on the Myrsinaceae of China. *Novon* 5: 357–361.
- ROYEN, P. VAN (1982). *The Alpine Flora of New Guinea. Vol. 3: Taxonomic Part, Winteraceae to Polygonaceae*. J. Cramer: Vaduz.
- SACHET, M. (1975). Flora of the Marquesas, 1: Ericaceae–Convolvulaceae. *Smithsonian Contr. Bot.* 23: 1–34.
- SLEUMER, H. (1986). A revision of the genus *Rapanea* Aubl. (Myrsinaceae) in New Guinea. *Blumea* 31: 245–269.
- SMITH, A. C. (1973). Studies of Pacific Island plants, XXV. The Myrsinaceae of the Fijian region. *J. Arnold Arbor.* 54: 1–41 & 228–292.
- SMITH, A. C. (1981). Myrsinaceae. In: SMITH, A. C., *Flora Vitiensis* 2: 782–810. Pacific Tropical Botanical Garden: Lawai.
- WAGNER, W. H., HERBST, D. & SOHMER, S. (1990). *Manual of the Flowering Plants of Hawaii*. University of Hawaii Press and Bernice P. Bishop Museum Press: Honolulu.