

Additional Novel Taxa of *Syzygium* and *Tristaniopsis* from Sabah and Sarawak, and a Surprising Discovery of *Shorea contorta*

P. S. ASHTON

Arnold Arboretum, Harvard University and Royal Botanic Gardens, Kew

Abstract

A further five species and two subspecies of *Syzygium*, and one subspecies of *Tristaniopsis* (Myrtaceae) are described as a precursor to the account of the family in the *Tree Flora of Sabah and Sarawak*. *Shorea contorta* Vidal is here recorded from Borneo for the first time.

Introduction

Since publishing new species of *Syzygium* (Ashton, 2007) and *Tristaniopsis* (Ashton, 2007) as precursors to my forthcoming account of Myrtaceae for the Tree Flora of Sabah and Sarawak (Soepadmo *et al.* (eds.), continuing), I have had the opportunity to examine the unidentified material at the herbaria of Singapore (SING) and Forest Research Institute Malaysia (KEP). Additional novelties, published here, have inevitably resulted, though reassuringly few. Striking is the addition of one further entity apparently endemic to the astonishing ultramafic Bukit Tawai Forest Reserve of NE Sabah, already replete with the endemics, *S. cornuflorum* P.S.Ashton, *S. soepadmo* P.S.Ashton and *Tristaniopsis merguensis* (Griff.) PeterG.Wilson & J.T.Waterh. ssp. *tavaiensis* P.S.Ashton. All these species have morphologically similar sister entities, often in nearby forests. A further novel species confined to ultramafics is more widespread in NE Sabah. These distributions, and many others published in the Tree Flora in other families, emphasize the important opportunities that Bukit Tawai provides for molecular and other approaches to examine speciation processes in tropical rain forest, and the vital necessity of satisfactory conservation and protection from fire, which has been a scourge of smaller ultramafic sites in Northeast Borneo.

This communication also provides me with the opportunity to make an unexpected new addition to the Dipterocarpaceae of Sabah and Sarawak, whose account in the Tree Flora was already published (Ashton, 2004): *Shorea contorta* Vidal [syn. *Pentacme contorta* (Vidal) Merrill & Rolfe, SAN 127272, Awang Amin Segun, Kepayang, Kuala Penyu, Sabah (K)]. The label states the habitat solely as 'lowland'. The tree was 10 m tall.

The specimen consists of the leafy shoot of an immature individual, with the distinct narrow raceme of the species, and equally distinct fallen fruit, glabrous throughout again suggesting immaturity. Kuala Penyu is on the coast of SW Sabah, at the northernmost tip of the Klias peninsula. The Klias peninsula is close to the northernmost extension in the coastal lowlands of the Neogene basin, which, running southwest to the Lambir Hills in Miri District, NE Sarawak, is so rich in tree species endemic to yellow sandy soils. This is the habitat which, with many mixed peat swamp entities, characterizes the geographical distribution named by Corner (1960) the Riau Pocket. This habitat is therefore quite different from the fertile clay loams so characteristic of the Philippine lowland mixed dipterocarp forest within which *S. contorta* was one of the most widespread and characteristic species. It is possible though that the collecting locality lies further inland, on clay loams more similar to many Philippine soils. With its recalcitrant seed and demanding seedling, it seems unlikely to have been introduced, though that cannot be ruled out. Otherwise, this is an example of a rare sweepstakes dispersal event, as unlikely in its way as that of the baobab, which have dispersed from Madagascar onto Australia. I beseech any visitor to Kuala Penyu to seek out this plant again: molecular genetic evidence might be revealing.

1. *Syzygium claviflorum* (Roxb.) Walpers ex Steudel, Nomencl. Bot., ed 2 (1841) 657.

Basionym: *Eugenia claviflora* Roxb., Fl. Ind. Ed. 2, 2 (1832) 488. – **Lectotype:** Maynmar, E. Chittagong, Wallich 3575B (K).

–*Syzygium longiflorum* Wall., Cat. (1831) 3575B, *nom. nud.*

Note: *E. claviflora* Roxb. Is, first, a validly published name, as is evident from the specimen of Wallich 3575B in the East India Company Herbarium at K. There are two sheets: one with two specimens in early post-anthesis, numbered A and B, the other a single fine specimen in anthesis numbered 3575B and annotated *Syzygium claviflorum* Wall., and *Eugenia claviflora* Roxb. in Roxburgh's handwriting. A further label is attached in another hand, noting E. Chittagong as provenance. This second specimen is therefore formally recognized here as lectotype.

1a. *Syzygium claviflorum* subsp. *tavaiense* P.S.Ashton, *subsp. nov.*

Subspecies novum a species typico ramulis crassioribus lamina ca 13 x 6 cm ampliore coriacissima petiolo crassiore costis tertiariis supra magis prominentibus elevatis floribus minoribus differt. – **Holotypus:** Borneo, Sabah, Sandakan, Telupid, Bukit Tawai Forest Reserve, Zainudin 5012, in flower (KEP)

Small smooth-barked **tree**. Differing from ssp. *claviflorum* as follows: **Twig** at first *ca* 3 mm diameter, stout; **leaf** blade *ca* 13 x 6 cm, broader, thickly leathery, base obtuse to broadly wedge-shaped hardly tapering into stalk, stalk *ca* 3 mm diameter; secondary veins not furrowed above, tertiary veins more distinctly raised above than beneath; **flower** to 8 mm long smaller.

Distribution and ecology: Based on two collections apparently simultaneously gathered from the same tree, the type and *Bojo & Cheksum OB 040*, from Tawai F.R., on ultrabasic substrate.

2. *Syzygium flagrimonte* P.S.Ashton, *sp. nov.*

Syzygio napiformi (Koorders & Valeton) Merr. & L.M. Perry *affinis sed frutex lamina minima obtusa petiolo 4 mm longo caudice receptaculi gracillimo facile distinguitur.* – **Holotypus**: Borneo, Sarawak, Mulu National Park, Gunung Api, summit ridge, 1600 m, *Argent & Jermy 1017* (A).

Shrub to 80 cm tall. Parts hairless. **Twig** *ca* 1 mm, round at first, round, wrinkled, drying blackish. **Leaf** blade 15-30 × 10-22 mm, elliptic, thinly leathery, black dotted beneath, pitted above, drying pale ochreous brown; base wedge-shaped terminating abruptly at *ca* 4 mm long, slender black-drying stalk; apex obtuse to subacuminate; veins dense, subequal, main veins 8-10 pairs, ascending, obscure above, slender but distinctly elevated beneath; tertiaries obscure; intramarginal vein within 1 mm of margin. **Flower** (post-anthesis) to 11 × 4 mm, comprising a 3 × 4 mm tapering, pale, buff, drying receptacle on a *ca* 1 mm diameter, slender, tapering pseudostalk; sepal lobes 4, 0.8 × 0.8 mm, small, 1 deltoid distant around the calyx rim; style extended to *ca* 4 mm. **Fruit** unknown.

Distribution and ecology: Known only from the type, in upper montane forest on the exposed karst and rocky summit ridge of Gunung Api ('fire mountain' – probably on account of occasional lightning fires implying occasional severe drought); at 1600 m.

Note: A distinctive upper montane, apparent a point endemic within the *S. attenuatum* group, distinguished from *S. napiforme*, which appears to be its sister species, by its habit and leaves, and unusually slender pseudostalk.

3. *Syzygium georgeae* P.S.Ashton, *sp. nov.*

Syzygio castaneo (Merr.) Merr. & L.M. Perry *affinis sed lamina ovata cordata nervis supra depressis lobis calycis in flore distinctis ovatis valde differt.* – **Holotypus**: Borneo, Sabah, S. Meliau, Telupid, Tawai Forest Reserve, *E. Soepadmo, T. Khalkausas, R. George, B.S. John & S. Davol* (FRI 41256, SING).

A small **tree** with many scrambling branches, to 10 m tall, 15 cm diameter, with smooth grayish white bark. Parts hairless. **Twig** 1-2 mm diameter apically, slender, at first distinctly narrowly 4-winged. **Leaf** blade 4.5-6 × 2-3.2 cm, ovate-lanceolate, thinly leathery, satiny, drying golden-brown and finely black dotted beneath, dark yellow-brown and densely minutely pitted above; base shallowly cordate, subsessile with a stalk *ca* 1 mm long, drying black; apex acute to subacuminate; venation distinct beneath, drying blackish, forming a net with the tertiaries, veins subequally slender and hardly raised beneath, distinctly furrowed above, *ca* 11 main pairs with many irregular intermediates branching among the tertiaries; intramarginal vein *ca* 1 mm within margin, hardly arched. **Panicle** to 3-terminal, to 5 cm long, *ca* 1 mm diameter in flower, quadrangular; bracts minute caducous. **Flower** bud *ca* 4 × 3 mm, small, club shaped with slender pseudostalk; sepal lobes 4, ovate, subacute, hyaline towards margins, clasping corolla; stamens many; style *ca* 3 mm long. **Fruit** not seen.

Distribution and ecology: Known only from the type. Common along a stony occasionally flooded river bank on ultramafic substrate.

Notes: Clearly related to *S. castaneum*, I only recognize it from that variable species owing to its conspicuously different leaf shape with its venation distinctly furrowed on its upper surface. This is one more distinct sister ecospecies of ultramafic substrates, for which the Tawai Forest Reserve provides the richest repository.

Named in honour of Rena George, a young Sarawakian field botanist of extraordinary promise who died in the field while following her avocation.

4. *Syzygium oblanceolatum* (C.B. Robinson) Merr., Philip. J. Sc. 79 (1951) 405.

Basionym: *Eugenia oblanceolata* C.B. Robinson, Philip. J. Sc. 4, C (1909) 400.

– **Lectotype:** Philippines, Samar, *loc. incert.*, *Cuming 1676* (BM).

Key to subspecies -

1. Leaf blade *ca* 23 cm long, oblanceolate; main veins *ca* 14 pairs 2
 Leaf blade to 17 cm long, elliptic, base cuneate; main veins 6-10 pairs
 ssp. **kinabaluense**
2. Leaf base subcordate to cordate ssp. **oblanceolatum** (Philippines)
 Leaf base abruptly tapering, occasionally cuneate ssp. **kihamense**

4a. *Syzygium oblanceolatum* ssp. *kihamense* (Merrill & Perry) P.S. Ashton, *stat. nov.*

Basionym: *S. kihamense* Merrill & Perry, Mem. Amer. Ac. 18 (1939) 150; Burgess, Timbers of Sabah (1966) 412. – **Holotype:** Borneo, Kalimantan, W. Kutei, near Kiham, Batu Bong, *Endert 2341* (BO; iso, K).

– *S. petakense* Merrill & Perry, *loc. cit.*, Beaman, Pl. Mt Kinabalu 5 (2004) 223. – **Holotype:** Borneo, E. Kalimantan, W. Kutei, near Long Petak, *Endert 4063* (BO).

Tree. Parts hairless. **Twig** ca 3 mm diameter, stout with long internodes, sharply 4-angled, smooth, dark red-brown. **Leaf** blade ca 23 x 6 (12-24 x 4-8) cm, large, oblanceolate, densely minutely pitted above, sparsely black dotted beneath, drying dull rust brown, paler above; base wedge-shaped, tapering into ca 5 mm long stout stalk; acumen to 5 mm long, broad, tapering, twisted down; veins unequal, main veins ca 14 pairs, prominent and distinctly raised more so beneath, furrowed along their crests above, ascending, with few shorter intermediates; tertiaries evident throughout; intramarginal vein 1-4 mm within margin, hardly raised, weakly arched. **Panicle** axillary to ramiflorous, with to 10 cm long straight erect rachis, to 6 cm long basal branches and shorter branches above, quadrangular. **Flowers** in dense terminal clusters, subtended by 2 pairs of bracteoles; buds to 4 x 3 mm, obovoid to spherical, without distinct pseudostalk; sepal lobes 4, 2 x 3 mm, broadly ovate acute, more or less warty, hyaline along margin; stamens many; style extended 5 mm. **Fruit** ripening white, to 15 x 12 mm, ellipsoid, sessile, with 7 mm diameter, prominent apical calyx crown.

Ecology: In mixed dipterocarp forest on fertile clay loams including black volcanic soils, at low altitude, below 800 m.

Distribution: Northeast Borneo, E. Kalimantan, Pulau Laut and throughout Sabah [Balong Tawau (*San 30139*); Kalabakan (*San 91444*); Diwata, Lahad Datu (*San 39968*); Segama Rd, Lahad Datu (*San 31616*); Sandakan (*San 10186*); Sepulut, Keningau (*San 101325*); Pangi (*San 27439*); slopes of Bt Batanga, Sipitang (*San 16622*)].

Note: Related to *Syzygium papillosum* (Duthie) Merr. & L.M. Perry of Peninsular Malaysia and southern Kalimantan, in which the twig is round, leaf more leathery with deeply cordate base. *S. kihamense* and *S. petakense*, both collected by Endert in West Kutei, East Kalimantan differ in no consistent way.

4b. *Syzygium oblanceolatum* ssp. *kinabaluense* P.S.Ashton, ssp. nov.

A species typico lamina elliptica basim versus cuneata 6.7-17 x 3.5-7.5 cm minore costis lateralibus utrinsecus 6-10 differt. – Holotypus: Borneo, Sabah, Ranau, Km 58 Kinabalu-Tambunan Rd, 5°47'N, 116°20'E, 1450 m asl, in flower, *J.S. Beaman 7937 (K)*.

Differing from the two other subspecies as follows: leaf blade 6.5-17 x 3.5-7.5 cm, generally elliptic, base cuneate; veins 6-10 pairs, lax in arrangement.

Ecology: Apparently quite common in lower montane forest, at 1450-1700 m.

Distribution: Endemic to Gunung Kinabalu and the northern Crocker Range [Kundasang (*San 28884*); Mesilau, Kinabalu (*San 48001, 42835, RSNB 4214*); Tenompok (*SFN 26942*); Ranau, Kinabalu N.P. (*San 79580*)].

5. *Syzygium praestantilimum* P.S.Ashton, sp. nov.

Syzygio rosulento (Ridl.) Merr. & L.M. Perry clare affinis sed arbuscula partibus glabris lamina enorme coriacissima petiolo ca 8 mm longo paniculis, 4 cm longis conspicue distinguitur. – Holotypus: Borneo, Brunei Darussalam, Labi, path to Bukit Teraja, *Peng. Mohamad (BRUN 18339, SING)*.

Treelet to 8 m tall, occasionally reaching the canopy, 60 cm diameter, with drooping branches bearing the huge leaves on long internodes. Parts hairless. **Twig** ca 3 mm diameter, round to compressed, dark warm brown. **Leaf** blade ca 25 × 14 (20-35 × 12-16) cm, elliptic, leathery, dull, drying mauve-brown obscurely minutely pitted above, rust-brown obscurely minutely dotted beneath; base wedge-shaped terminating abruptly at the 7-12 mm long, 3 mm diameter, stout black-drying stalk; apex to 12 mm, slender acuminate; veins unequal, main veins ca 17 pairs with a few shorter less prominent intermediates, deeply furrowed above, prominent beneath; tertiaries lax, more or less distinctly raised beneath, hardly sunken above; intramarginal veins 1(2) pairs, somewhat arched, ca 6 mm within margin. **Inflorescence** to 4 cm long, 3-terminal or 1-axillary, round, singly branched, flowers clustered at branch endings; bracts and bracteoles to 2 × 2 mm, ovate-deltoid, acute, subpersistent. Post-anthesis **flower** calyx 5 × 4 mm, obovoid to top-shaped without distinct pseudostalk, with 4, 2 × 2 mm deltoid sepal lobes, hyaline at margins, becoming reflexed; stamens many; style extending 4 mm. Young **fruit** to 6 mm diameter, spherical, sessile and densely clustered, wrinkled on drying, ripening pinkish white.

Ecology: Local but sometimes abundant as an understorey tree, in mixed dipterocarp forest on deep yellow sandy soils, in a habitat shared with other

understorey trees sharing large leathery leaves, including *S. velutinum* A.P. Davis.

Distribution: Known from the type, Andulau Forest Reserve in Brunei Darussalam (*BRUN 18283*) and from sterile collections (*Field herbarium numbers AG 02747, AG 03847, AG 3210-058*) from the large research plot in Lambir N.P. at Miri in Sarawak.

Note: Closely resembling *S. rosulentum* in the herbarium but a small subcanopy tree with much larger leathery leaf and shorter inflorescence. The inflorescence in both species is, as Merrill defines it in his key to the genus (1939, 141), with flowers in dense heads, each flower ‘subtended by two decussate and approximate pairs of bracts’. Examination of atypical inflorescences of species with this character persuades me that it is caused by extreme shortening of the terminal branchlets of a panicle. The two taxa co-exist in the same stands.

6. *Syzygium tubiflorum* P.S.Ashton, *sp. nov.*

Syzygio zeylanico (L.) DC., *S. kinabaluense* (Stapf) Merr. & L.M. Perry late affinis sed lamina nervis obscuris calyce in flore fructuque leve terete satis distincta. – **Holotypus:** Boreno, Sabah, Maliau Basin, top ridge, 1220 m, coll. Maig, Sidikin & Jeprin (*MB 904*, SING).

Treelet to 5 m tall. Parts hairless. **Twig** 0.5-1 mm diameter apically, very slender, narrowly but distinctly 4-winged, drying dark brown to blackish, smooth. **Leaf** blade 15-40 × 3-15 mm, lanceolate, small, leathery, drying pale grey-brown, faintly densely pitted above, densely prominently black dotted beneath; base wedge-shaped, tapering into ca 4 mm long, 0.5 mm diameter, very slender stalk; apex to 12 cm long slender acuminate; venation obscure above the sunken midrib excepted, unequal, the ca 6 pairs of irregularly disposed main veins evident beneath only, slender and hardly raised. **Inflorescence** ca 15 mm long, 1 mm diameter, erect, singly branched, round terminal or axillary panicle; bracts to 7 × 1 mm, lorate-lanceolate, falling early. **Flowers** unknown. Young fruit 5 × 2 mm, torch-shaped, sessile, without distinct pseudostalk, without ribs, smooth, drying black; sepal lobes 4, deltoid, minute, falling early; bracteoles ca 3 mm long, linear, fugaceous.

Distribution and ecology: Known only from the type, from the Meliau summit ridge at 1220 m.

Note: A distinct entity in the *S. zeylanicum* group, but at once distinguished by its leaf venation, smooth, round young fruit, and early falling bracts and

bracteoles. As a member of that group and as the fruit indicates, the flower for which it is named, though as yet unknown, must possess an elongate tubular pseudostalk devoid of the sharp angles characteristic of the elongate pseudostalks of sister species.

7. *Syzygium valentissimum* P.S.Ashton, *sp. nov.*

Lamina magna coriaccissima costis lateralibus subaequalibus ramulis quadrangularibus paniculis erectis crassis gemmis obconicis facile distinguitur.

– **Holotypus:** Borneo, Sabal-Balai Ringin Forest Reserve, Klingkang Range, Sri Aman, in flower bud, *Julaihi & al.* (S. 83369, KEP).

Canopy **tree** to 30 m tall; bark brown. Parts glabrous. **Twig** *ca* 4 mm diameter apically, at first quadrangular, smooth, dark chocolate-brown. **Leaf** blade 7-15 × 5-6 cm, ovate to lanceolate, thickly leathery yet margin hardly inrolled, drying dark chocolate-brown dull below, somewhat glistening above; base broadly wedge shaped tapering into *ca* 15 mm long, 3 mm diameter, stout black-drying stalk; apex to 8 mm long down-turned acuminate; veins subequal, main veins *ca* 18 pairs with many intermediates, tertiary veins reticulate, venation overall finely but distinctly more or less equally raised on both surfaces. **Panicles** to 5-terminal or subterminal axillary, to 11 mm long (immature), ascending, stout, quadrangular, 2-branched. **Flower** bud (young) to 5 × 4 mm, obconical without distinct pseudostalk; sepals 4, *ca* 3 × 4 mm, broadly hemispherical, obtuse, cupped, broadly imbricate and tightly clasping corolla; stamens many. **Fruit** unknown.

Distribution and ecology: On the lower sandstone slopes, in mixed dipterocarp forest, of the Kingkang range (the type) and Gunung Buri (S. 43414, *Ilias Pa'ie*), respectively to the north and south of the Serian-Sri Aman road in West Sarawak.

Note: At once distinguished by its relatively large thickly leathery leaf with subequal veins, quadrangular twigs, and stout erect panicles with obconical buds. The leaves recall *S. selukaifolium* P.S.Ashton of NE Sarawak in which the twig is terete and the panicle axillary with torch-shaped buds, and *S. merrillii* (C.B. Rob.) Merr., which shares the buds and panicle of *S. selukaifolium*, but in which the twig is also quadrangular.

8. *Tristaniopsis microcarpa* P.S.Ashton, Gard. Bull. Sing. 57 (2005) 273.

– **Holotype:** Borneo, Look Mengulang, P. Sakar, in flower, *H.S. Martyn* (San 21623, K).

8a. *Tristaniopsis microcarpa* ssp. *corymbosa* P.S.Ashton, ssp. nov.

Tristaniopsis microcarpa late similis sed lamina coriaccissima, ramuli caduci lamina infra inflorentia alabastrique persistenter alutaceo-cinerascentibus.

– **Holotypus:** Borneo, Sabah, Telupid, mile 87½, Hap Seng logging area, in flower, Kodoh & Tarmiji (*San* 8366, K).

Small **tree** to 20 m tall, to 40 cm diameter, with red brown peeling bark. **Twig** at first, leaf beneath, inflorescence and flower bud persistently densely buff cinereous. **Leaf** blade (8-)16-35 × (3.5-) 6-12 cm, oblanceolate, thickly leathery.

Distribution and ecology: Endemic to ultramafic substrates in eastern Sabah, on rocky sites often beside rivers [the type; Telupid, Bt. Tawai (*SAN* 13451, *FRI* 41309); Telupid, S. Ruku-Ruku (*SAN* 70315)]; also at 850 m on the Mt. Silam summit (*SAN* 63945) and in lower montane *kerangas* at 1000 m on G. Lutong, Meliau basin (*FRI* 36238).

Notes: Differing from subspecies *microcarpa* only in leaf texture and indumentum, and possibly smaller stature at maturity. It appears to occur on shallower, more humic soils. A specimen (*FRI* 41309) was misidentified as *T. merguensis* ssp. *tavaiensis* in the original description of that entity (Ashton, 2006).

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