

Tristaniopsis flexuosa (Myrtaceae), a new species from ultramafic soils in the Philippines

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Abstract

A new species of *Tristaniopsis* (Myrtaceae) from the Philippines, *Tristaniopsis flexuosa* Fernando & Peter G. Wilson, is formally described and illustrated. At present, the species is known only from a single locality in upper montane forest in extreme ultramafic habitat and we provide an assessment of its conservation status. Its relationship to other Malesian species of *Tristaniopsis* is discussed, and a key to the identification of the Philippine species provided.

Introduction

Tristaniopsis Brongn. & Gris is a genus of c. 50 species, with a distribution extending from Myanmar and Thailand in the north, through Malesia and extending to eastern Australia and New Caledonia. According to the *Philippine Plants* website (Pelser et al. 2011 onwards) only four named species of *Tristaniopsis* are recorded from the Philippines, all first described before 1920. They were all named by Elmer D. Merrill as species of the genus *Tristania* R.Br. and were subsequently transferred to *Tristaniopsis* by Wilson and Waterhouse (1982). Given the diversity of habitats in the Philippines, it is likely that further species are yet to be discovered. In Borneo, which has a much larger land area, it is estimated that there are well over 20 species, many of which are undescribed (Berhaman 2011).

During preliminary floristic field surveys (Fernando et al. 2017) and a later, more detailed, study of the forest habitat types on Dinagat Island (Lillo et al. 2019), a distinctive vegetation type was recorded in upper montane forest on ultramafic substrates. This forest formation consists of shrubs and small trees attaining no more than 3 meters in height. In this distinctive habitat, several unnamed taxa were identified, including a rather distinctive species of *Tristaniopsis*. Two of the other four *Tristaniopsis* species recorded from the Philippines are also known to occur on ultramafic substrates but this one is much smaller, has an unusual growth habit, and occurs at a much higher elevation. We therefore recognise this as a new species, *Tristaniopsis flexuosa*.

Plants were studied in the field and specimens collected by the first author. Initial observations were made on fresh material and confirmed and supplemented by additional measurements of dried herbarium material.

Key to the Philippine species of *Tristaniopsis*

- 1 Leaves to 1.5 cm long; peduncles 4–6 mm long *T. flexuosa*
- 1* Leaves >3.5 cm long; peduncles >10 mm long..... 2
- 2 New growth and inflorescences densely yellowish-brown tomentose *T. oblongifolia*
- 2* New growth and/or inflorescences puberulent or finely pubescent..... 3
- 3 Lamina narrowing to a rounded-auriculate base; petiole 2–3 mm long *T. littoralis*
- 3* Lamina decurrent; petiole c. 10 mm long..... 4
- 4 Inflorescences 5–10 cm long, upper branches lax; flowers c. 2 mm across *T. micrantha*
- 4* Inflorescences 4–6 cm long, upper branches compact; flowers c. 4 mm across *T. decorticata*

Description

Tristaniopsis flexuosa Fernando & Peter G. Wilson, **sp. nov.**

Type: Philippines: Dinagat Island, Municipality of Loreto, Mount Redondo, 876 m elevation, dwarf forest on ultramafic soil, *E.S. Fernando 4186*, 1 Sep 2016 (holotype PNH; isotypes LBC, NSW).

Diagnosis: Differs from all other named Philippine taxa of *Tristaniopsis* in having distinctive flexuose stems, relatively small leaves with obtuse to rounded apex, and a compact inflorescence.

Shrub or small *tree* to c. 2.5–3 m tall, stem c. 5–6 cm diameter, much branched and with flexuose stems. *Bark* smooth, grey, flaking off to reveal red-brown under-bark. *Twigs* not conspicuously angular; young stems and leaves with a loose indumentum of pale, spreading hairs, glabrescent. *Leaves* broadly elliptic to obovate, 12–18(–24) mm long, 5–10(–14) mm wide, the smaller leaves tending to be at the base of each leaf cluster on the twig; juvenile leaves densely pubescent on both surfaces and along the midrib and margins, mature leaves generally glabrescent; petiole 1–2 mm long, sometimes indistinct, or appearing winged; base cuneate to attenuate; apex obtuse to rounded; secondary veins 7–10 on each side of the midrib, not distinct in fresh material; midrib slightly sunken on the adaxial surface, raised on the abaxial surface; margins slightly thickened and revolute, intramarginal vein distinct. *Inflorescence* a compact dichasium, subterminal or terminal, usually shorter than the leaves; peduncle 4–6 mm long, densely pubescent. *Flowers* creamy white to pale yellow, up to 7–11 mm across; pedicel 2–3 mm long, pubescent; hypanthium 3–8 mm across, 2–3 mm deep, the lobes 0.5–1 mm long x 1–2 mm wide; petals 5, each 2.5–4 mm across; stamens yellowish, 3 opposite each petal, joined at the base, glabrous; middle stamen with filament to 1 mm long, those of side stamens to 0.5 mm long; anthers basifixed, 0.3 mm long; stigma capitate; style 0.5–1.5 mm long; ovary half-inferior, 3 mm diameter; immature fruit subglobose, reddish, with prominent stylar scar, the surface smooth and glossy; mature capsule and seeds not known. **Fig. 1**

Distribution: Endemic to the Philippines. Thus far known only from the type locality on Mount Redondo, Dinagat Island.

Etymology: The specific epithet refers to the distinctive flexuose stems (Fig. 1A, B).

Habitat: Occurs in dense dwarf forest, 1–2 m tall, on ultramafic soils, on gentle slopes, 840–879 m elevation. Rather uncommon at site.

Other specimens examined: PHILIPPINES: Dinagat Island, Municipality of Loreto, Mount Redondo, 846 m elevation, *E.S. Fernando 3836B*, 29 Sep 2015 (LBC, PNH); 849 m elevation, *E.S. Fernando 4176*, 1 Sep 2016 (LBC, NSW, PNH, SING).

Affinities: *Tristaniopsis flexuosa* does not show clear affinities to any other Philippine species. Morphologically, it most nearly approaches *Tristaniopsis elliptica* (Stapf) Peter G. Wilson & J.T. Waterh., a species from Borneo that occurs on ultramafic substrates at some locations, particularly in the vicinity of Mount Kinabalu. *Tristaniopsis elliptica* also has relatively small, obtuse leaves and three stamens per fascicle. It is also reported to have a ‘crooked’ habit in some cases (Ashton & Teo 2011). However, *T. elliptica* is a much larger tree with a broader bole, to c. 20 m tall and 30–40 cm diameter. It has larger leaves that are commonly 5 x 2.5 cm (range 3–10 x 1.5–3.5) while in *T. flexuosa* they are mostly in the range of 1.2–1.8 x 0.5–1 cm, and the secondary lateral veins are more numerous (20–24 compared with 7–10 in *T. flexuosa*). The two species are likely to be sister taxa but their respective geographic areas are about 1000 km apart and have been separated since the formation of the Sulu Sea from the early to mid-Miocene through to the late Miocene when it reached its present extent, c. 9 Ma (Lai et al. 2021).



Fig. 1. *Tristaniopsis flexuosa* Fernando & Peter G.Wilson. **A, B.** Habit and close-up of branching and stems showing parts of the outer bark peeling off, revealing reddish-brown under-bark; **C.** Leafy part of crown showing inflorescences; **D.** Close-up of inflorescences and flowers, showing the three stamens per fascicle and the fine, spreading indumentum; **E.** Immature fruit. A–C from *E.S. Fernando 4186*; D from *E.S. Fernando 4176*; E from *E.S. Fernando 3836B*. Photos: Edwino S. Fernando.

Notes: Shrubby plants of *Tristaniopsis flexuosa* in its type locality were about 1 m tall, but already flowering and fruiting. The larger plants grow to about 2.5–3 m tall, often protruding through the canopy of the dwarf forest and readily distinguishable owing to their open crowns (Fig. 1A). Some of the shrubs and small trees associated with this new species in the dense dwarf forest include *Dacrydium beccari* Parl. (Podocarpaceae), *Fagraea gitingensis* Elmer (Gentianaceae), *Leptospermum amboinense* Blume (Myrtaceae), *Medinilla theresae* Fernando (Melastomataceae), *Psychotria surigaoensis* Sohmer & A.P.Davis (Rubiaceae), *Rhodomyrtus surigaoensis* Elmer (Myrtaceae), *Scaevola micrantha* C.Presl (Goodeniaceae), *Tarenna elongata* Merr. (Rubiaceae), *Ternstroemia gitingensis* Elmer (Pentaphragmataceae), and two pitcher plants, *Nepenthes mindanaoensis* Sh.Kurata and *Nepenthes erucooides* A.S.Rob. & S.G.Zamudio (Nepenthaceae), among many others.

Ultramafic substrates are known from other mountain ranges in the southern Philippines, but the habitats differ, and *Tristaniopsis flexuosa* has not been recorded from any of them. Mount Hamiguitan on the Pujada Peninsula in south-eastern Mindanao is ultramafic and has dwarf mossy forest but this is found at 1160–1600 m elevation, nearly twice as high as Mount Redondo. It is a UNESCO World Heritage site and relatively well-collected. Mount Hilong-hilong in north-eastern Mindanao is probably ultramafic but does not have a dwarf forest at the summit (c. 2100 m), only a typical mossy forest.

Provisional conservation assessment: The entire area of dwarf forest on Mount Redondo above 750 m elevation is estimated at only 5.27 km² (Lillo et al. 2019) and *Tristaniopsis flexuosa* is known thus far only from this single location. Its Extent of Occurrence (EOO) is, thus, less than 100 km² and its Area of Occupancy (AOO) less than 10 km², all within the threshold of IUCN's Critically endangered (CR) category. The Mount Redondo area is still within a mineral reservation (for chromite and associated mineral deposits, including nickel) and parts of it have previously been subjected to open pit mining for chromite. The species will be at serious risk should mining be allowed to continue on this site. A continuing decline is inferred or projected in the (i) extent of occurrence; (ii) area of occupancy; and (iii) area, extent and/or quality of habitat due to the possibility of further mining. Following IUCN (2012) and the *Guidelines for Using the IUCN Red List Categories and Criteria* (IUCN Standards and Petitions Subcommittee 2019), we regard this species as Critically Endangered CR B1ab(ii,iii)+2ab(i,ii,iii).

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