Taxonomy and morphology of *Thalictrum* (Ranunculaceae) in New Guinea

Renata Borosova 1, Timothy M. A. Utteridge 1 & André Schuiteman 1

**Summary.** The genus *Thalictrum* L. in New Guinea is revised based on morphological evidence. Full descriptions of the genus and the four taxa recognised are given. Two species are recognised: *Thalictrum papuanum*, widespread across New Guinea, and a new species described here; *T. umbraticola*, endemic to west New Guinea. Two new varieties are described: *Thalictrum papuanum* var. *acutisegmentum* and *T. papuanum* var. *laticarpellum*. One new synonym of *Thalictrum papuanum* var. *papuanum* is established: *T. papuanum* var. *oranjense*. Keys to the taxa and distribution maps, as well as preliminary conservation assessments, are provided.

**Key Words.** Conservation, Indonesia, IUCN, Malesia, new species, systematics.

**Introduction**

Ranunculaceae are a cosmopolitan family that includes many well-known temperate wildflowers and ornamental plants, including buttercups, hellebores and anemones, as well as several pharmaceutically important taxa. According to the Plants of the World Online (POWO 2019), there are 52 accepted genera and 3766 accepted species of Ranunculaceae. The family is distributed almost worldwide but is most diverse in temperate and colder regions; it is relatively rare in the tropics (Culham 2007). Ranunculaceae are thought to have originated in montane temperate areas of the northern hemisphere (Ziman & Keener 1989). The family shows a wide variation in morphological characters, especially in floral organisation and fruit types (Tamura 1995). In New Guinea, three genera are present: *Clematis* L., *Ranunculus* L. and *Thalictrum* L. (Cámara-Leret et al. 2020). Ranunculaceae of Malesia have been revised by Eichler (1958), and the alpine species have been treated by van Royen (1982) and more recently in Utteridge (2006). Most species occur at high elevations; for example, in a checklist of Mt Trikora, Mangen (1993) documented 16 species of Ranunculaceae, with 14 taxa above and only two taxa below 3000 m.

As part of ongoing research into the plant diversity and conservation of New Guinea at the Royal Botanic Gardens, Kew, the genera of Ranunculaceae on the island are being revised as the first stage towards a *Flora Malesiana* account. As part of this work, a revision of *Thalictrum* is presented here. Upon investigation it was found that the existing species, *Thalictrum papuanum*, did not fit all the material examined during this work. To account for all the variation, a new species was described as well as two further varieties.

The genus *Thalictrum* was first described by Linnaeus (1753: 545) and is considered one of the most diverse genera in the family in terms of the number of species and their morphological variation (Tamura 1995). It has T (= Thalictrum)-type chromosomes with the basic chromosome number x = 7 (Tamura 1993) and is included in the subfamily Thalictroideae (Wang et al. 2009). *Thalictrum* has great medicinal value as several species contain high levels of an anti-tumour drug, Thaliblastin (Thalicarpine) (Chen et al. 1993; Pajeva et al. 2004). All seeds of *Thalictrum* species investigated so far contain four unusual and diagnostically important fatty acids; two of these are the same as in *Aquilegia* L., whereas two have not been found in any other genus in Ranunculaceae (Aitzetmüller 1994). Comprising over 200 species (POWO 2019), *Thalictrum* is distributed in Eurasia, Americas, Africa and New Guinea (Mabberley 2008; Stevens 2001 onwards). In New Guinea it is represented by four endemic taxa (two species and two varieties).

**Materials and Methods**

Herbarium material and especially types deposited at B, BM, BO, CANB, E (online), GH, K, L, LAE, LUX (online), MU, P (online) and SING (online) were examined. Herbarium acronyms follow *Index Herbariorum* (Thiers, continuously updated). All cited specimens have been seen by the first author. Material was examined under a Leica M165 C binocular microscope at maximum magnification.
Nomenclatural practice follows Turland et al. (2018). Characters listed in the protologues and descriptions were compared to those present in herbarium material. Morphological terms follow Beentje (2016). Localities were manually geo-referenced using locality information from herbarium specimens, paper maps and electronic gazetteers. Maps were made using Simple Mapppr (Shorthouse 2010) with additional layers showing countries and relief. Assessment of conservation status was implemented using GeoCAT (Bachman et al. 2011) and follows the IUCN (2012) criteria.

Taxonomic Treatment
Thalictrum L. (Linnaeus 1753: 545); Linnaeus (1754: 242); van Royen (1982: 1293 – 1294); Riedl & Nasir (1991: 95 – 111); Riedl (1992); Akroyd (1993: 290 – 292); Rau (1993: 132 – 143); Tamura (1993: 581 – 582); Tamura (1995: 474 – 475); Park & Festerling (1997: 258 – 271); Stace (1997: 95); Fu & Zhu (2001: 282); Park & Park (2008: 433 – 458, 2009: 89 – 99); Tamura (2011: 68); Soza et al. (2012: 180 – 192); Wang (2018: 56 – 57). Type: Thalictrum foetidum L. (Linnaeus 1753: 545; see Jarvis 1993: 883 – 884).

Perennial herbs; glabrous, sometimes puberulous or with glandular hairs. Roots fibrous, sometimes tuberous. Stems often sulcate and branched, glabrous, sometimes glandular. Petioles sheathing at base. Leaves basal and cauline, usually stipulate, 1 – 4 pinnate or ternate, rarely simple; basal leaves few to several, sometimes withered at flowering, petiolate; cauline leaves alternate, rarely opposite or verticillate, petiolate or sessile. Leaflets cordate to reniform, obovate, lanceolate to linear; margin lobed or crenate. Inflorescence terminal, occasionally also axillary, a cyme, a raceme or a panicule, sometimes reduced to a single flower. Bracts 1 – 2 (– 3), leaf-like or absent. Flowers small, bisexual, rarely unisexual, actinomorphic. Sepals (3 –) 4 – 5 (– 10), petaloid, flat, white, yellowish-green, pink or purple, reniform or spatulate to lanceolate, 1 – 18 mm long, caducous in fruit. Petals absent. Stamens 5 – many, usually more conspicuous than sepals; filaments linear, filiform to clavate or dilated above; anthers lateral, oblong to linear. Carpels free, 1-ovulate; style straight or hooked, usually persistent; stigma linear or deltoid. Fruit a head of achenes; achenes free, not to strongly compressed on both sides, body 1 – 3-ribbed on lateral sides, sessile or stipitate; persistent style short or long, straight, hooked to circinate (description includes taxa from outside New Guinea).

DISTRIBUTION. About 190 species, worldwide, mainly in temperate regions; two species in New Guinea.

Key to the species of Thalictrum in New Guinea

Herbs 4 – 30 cm tall. Petiole of cauline leaves 1 – 10 mm, petiolule of cauline leaves 1 – 5 mm. Inflorescence 1 – 3 (– 4)-flowered. Achenes 3 – 5.5 × 0.5 – 1.5 mm, 3-ribbed. Elevation 2300 – 4000 m

1. Thalictrum papuanum Ridl. (Ridley 1916: 10; Eichler (1958: 6 – 7); van Royen (1982: 1294 – 1296); Tamura (1995: 487); Utteridge (2006: 416 – 418).

For type and synonyms see varieties.

Glabrous herb, 4 – 30 cm tall. Roots fibrous, rhizome slender. Stems erect, simple or occasionally branched. Basal leaves 1 – 9, blades (0.8 –) 1.5 × 3 × (0.5 –) 1 – 2.5 (– 3) cm, binate with 9 leaflets or sometimes tri-foliate; petiole (1 –) 1.5 – 6 (– 8) cm; rachis (0.2 –) 1 – 2.5 cm long; petiolule 0.1 – 1 cm long or leaflets sessile; terminal leaflet broadly elliptic, ovate to rhombic-ovate or suborbicular, (2.5 –) 3 – 15 × 3 – 15 mm, 3 – 7-lobed, sometimes lobes crenate. Cauline leaves 1 – 2, alternate, tri-foliate; binate with 9 leaflets or simple; petiole 1 – 10 mm; rachis (1 –) 2 – 5 mm; petiolule (0.5 –) 1 – 5 mm long; terminal leaflet broadly elliptic to orbicular ovate, 3 – 9 (– 13) × 3 – 11 (– 12) mm, 3 – 5 (– 7)-lobed, prominently palmately veined, base rounded, sometimes cuneate to subcordate, apex sharply acuminate, mucronate to mucronulate, sometimes rounded, margin usually revolute. Inflorescence racemose, 2 – 3 (– 4)-flowered, often reduced to a single flower; peduncle up to 6 cm long, sometimes slender and purple distally with white corms; pedicel erect or slightly recurved, (0.2 –) 0.5 – 2 (– 3) cm long. Bracts 1 – 2, simple, leaf-like, 1 – 5 mm long, ovate to lanceolate, entire or 1 – 3-lobed, shortly petiolate. Flowers bisexual, 4 – 8 (– 10) mm across. Sepals 4 – 5, ovate to elliptic, 2 – 3 × 1 – 2 mm, white, purple or pink. Stamens 5 – 25; filaments white, pink to purplish, (1.5 –) 2.5 – 3 (– 3.5) × (0.25 –) 0.5 – 1 mm, widest in the top third, base filiform, apex narrowly linear, narrower than anther. Anther 0.4 – 0.9 × 0.2 – 0.5 mm, obtuse at apex, connectives not projected. Carpels 6 – 14, erect, 2 – 4.5 × 0.5 – 1.1 mm, fusiform; at base 0.5 – 1.5 mm stipitate; style circinate coiled inwards, (0.4 –) 0.7 – 1.4 mm long; stigmatic surface along distal (0.5 –) 0.5 – 1 mm of the style. Achenes 6 – 14, erect at first, later curving downwards, light purple to deep.
Thalictrum papuanum Ridl. var. papuanum (Ridley 1916: 10). Type: [Indonesia. Papua Province: Mt Jaya], Camp XIII – XIV, 13 Jan. 1913, Kloss s.n. (holotype BM!; isotype K!).

**Thalictrum papuanum var. oranjense** H.Eichler (1958: 7) **synon. nov.** Type: Indonesia. Papua Province: Orange Mountains, Waterval biwak, 12 Feb. 1913, Versteeg 2474 (holotype L!; isotype BO!).

**Herb.** 4 – 30 cm tall. **Basal leaves** 1 – 8, blades (0.8 –) 1.5 – 2.5 × (0.5 –) 1 – 2.5 cm, biternate with 9 leaflets or sometimes tri-foliolate; petiole (1 –) 2 – 6 (– 8) cm; rachis (0.2 –) 1 – 2.5 cm; petiolule 1 – 10 mm or leaflets sessile; terminal leaflet broadly elliptic, ovate or suborbicular, (2.5 –) 10 – 15 × (3 –) 8 – 15 mm, 3 – 5-lobed. **Cauline leaves** usually tri-foliolate, sometimes simple; petiole 1 – 10 mm; rachis (1 –) 2 – 5 mm; petiolule (0.5 –) 1 – 5 mm long; terminal leaflet (4 –) 6 – 9 (– 13) × (3 –) 8 – 11 (– 12) mm, 3 – 5 lobed, mucronulate at apex. **Inflorescence** 1 – 2 (– 3)-flowered, peduncle up to 6 cm long; pedicel (0.2 –) 0.5 – 1.5 (– 3) cm long. **Bracts** 1 – 5 mm long, ovate to lanceolate, entire or 1 – 3-lobed. **Flowers** (4 –) 6 – 8 (– 10) mm across. **Sepals** 4 (– 5), white, tinged purple or light purple. **Stamens** 8 – 15; filaments white to purplish, (1.5 –) 2.5 – 3 (– 3.5) × (0.25 –) 0.5 – 1 mm, widest in the top third. **Carpels** (2 –) 3.5 – 4.5 × 0.5 – 1.1 mm; at base 0.5 – 1.5 mm stipitate; style (0.4 –) 0.7 – 1.4 mm long; stigmatic surface along distal (0.3 –) 0.5 – 1 mm of the style. **Achenes** falcate, compressed, (2.3 –) 3 – 5.5 × (0.5 –) 0.8 – 1.5 mm; body 3-ribbed, at base (0.5 –) 1 – 1.8 mm stipitate; style (0.5 –) 1.2 – 2 mm long. Fig. 1.

**DISTRIBUTION.** Endemic to New Guinea. Indonesia, Papua Province: Mt Jaya, Orange Mountains, Paniai Lakes. Papua New Guinea: Star Mountains. Map 1.

**SPECIMENS EXAMINED:** INDONESIA, PAPUA PROVINCE: Wamena, between Habbema and Pabilyo, 3300 m, 19 Oct. 1992, Argent 92940 (E!); Mimika, Freeport Ind. Conc. Area, Meren Valley, 3800 m, 9 March 1998, Baker et al. 934 (K!); Mimika, Freeport Ind. Conc. Area, Mt Idenburg, S slopes, 4000 m, 11 March 1998, Baker et al. 950 (BO!, K!); Mt Jaya, site 8 E of Carstensz Meadow, 3540 m, 21 Nov. 1998, Beaman 12144 (BO!); Mimika, Freeport Ind. Conc. Area, N Canyon, to the E of Bakopa Valley, 3600 m, 20 March 1999, Edwards 4195 (K!); [Paniai] Wissel lakes region, 2900 m, 31 July 1939, Eyma 4987 (BO!); Mt Jaya, W Irian, Carstensz Mts, 3540 m, 13 Dec. 1971, Hope ANU 10844 (CABN!); Mimika, Freeport Ind. Conc. Area, near base of Tramway at Mill Site, 2800 m, 18 March 1999, Johns 9895 (BO!, K!); [Papua, Mt Jaya], Camp XIII – XIV, 13 Jan. 1913, Kloss s.n. (BM!, K!); Valentinus NE of Koruppunn valley, trail from Lake Valley to base camp, 3290 m, 12 Aug. 1988, Mangen 1764 (BO!, GH!); Mt Jaya, W Agawagon Valley, 3230 m, 21 Aug. 1992, Miller 23590 (MU!); ibid., 21 Aug. 1992, Miller 23623 (MU!); Mimika, Freeport Ind. Conc. Area, Pylon, road near Grasberg mine, 3800 m, 6 March 1998, Puradyatmika et al. 10342 (K!); Mimika, Freeport Ind. Conc. Area, Mt Idenburg, S slopes near drill pad, 4000 m, 11 March 1998, Puradyatmika et al. 10372 (BO!, K!); Mt Jaya, Carstensz Meadow, 3400 m, 28 April 1973, Raynal 17347 (K!, P!); Mimika, Freeport Ind. Conc. Area, Wanagon River Valley, 3470 m, 26 April 2000, Utteridge et al. 357 (BO!, K!); Orange Mts, Waterval biwak, 12 Feb. 1913, Versteeg 2474 (BO!, L!). PAPUA NEW GUINEA, SANDAUN PROVINCE: Telefomin, Star Ms, Tarn in valley, N of Mt Capella, 3100 m, 18 April 1975, Barker & Umb LAE 67458 (E!, K!, L!); Telefomin, Sirius Mt, 12 & 23 April 1965, Craig 56.
Fig. 1. Holotype of *Thalictrum papuanum* Ridl. (BM! [BM000559558], © The Trustees of the Natural History Museum, London).
& 104 (CANB!, LAE!); Star Mts, camp 2, Tel Basin, 2950 m, 9 April 1975, Touw & Veldkamp 6383 (CANB!, L!); Star Mts, camp 10, Dagabulon, 3400 m, 5 May 1975, Veldkamp 6631 (CANB!, K!, L!); Telefomin, top of ridge, track from Tamanagabip to the E end of Mt Capella, 3300 m, 12 April 1975, Vinas LAE 67083 (CANB!).

HABITAT. Upper montane and subalpine forest, subalpine shrubbery, scrub and meadow and alpine grassland. Growing on strongly weathered limestone rocks, in shallow high elevation valleys and on old landslide scars; elevation: 2800 – 4000 m.

CONSERVATION STATUS. This is a geographically widespread species. The extent of occurrence (EOO) is estimated to be over 39,000 km². It is inferred from the number of specimen records and the availability of suitable habitat that the area of occupancy (AOO) also exceeds the values needed for a threatened category. This species is therefore assessed as of Least Concern (LC), according to IUCN (2012). The region remains poorly explored botanically and under-collected and field surveys are needed to determine the current distribution, population size and habitat status of this species.

PHENOLOGY. Flowering and fruiting from Feb. to Dec.

NOTES. Thalictrum papuanum var. papuanum is distinct on account of the combination of these characters: glabrous herb up to 30 cm tall with basal leaves usually biolate, sometimes tri-foliolate, filaments (1.5 – 2.5 – 3 (– 3.5)) × 0.5 – 1 mm, widest in the top third, narrowed at apex and filiform at base, achenes compressed, falcate, 3 – 5.5 × (0.5 – 0.8 – 1.5 mm, at base (0.5 –) 1 – 1.8 mm stipitate and with (0.5 –) 1.2 – 2 mm long style.

Thalictrum papuanum var. oranjurese is not recognised as distinct. It was described by Eichler (1958: 7) based on a single collection from the Oranje Mountains [= part of the Jayawijaya range including Mt Trikora], which he stated differed in shorter stem, only up to 10 cm, usually having a single flower, basal leaves usually ternate with shorter leaflets 3 × 4 mm, cauline leaves ternate to simple, in having fewer stamens, 7 – 12 with smaller filaments 2 × 0.25 mm and in having smaller achenes 2.5 × 0.75 mm. We have found this falls within the variation of the taxon across its range. The taxon is now known to be widely distributed through much of the central mountain range of New Guinea, and the modern collections from Papua New Guinea have expanded the known range. The type locality of Mt Jaya is now positioned centrally within the distribution area.

Thalictrum papuanum Ridl. var. acutisegmentum Borosova var. nov. Type: Indonesia, Papua Province: N end of Hanekam tunnel, Mt Jaya, 14 Aug. 1998, Marsden 189 (holotype K!).

http://www.ipni.org/urn:lsid:ipni.org:names:77218846-1

Herb, 10 – 13 cm tall. Basal leaves 3 – 7, blades 1.5 – 3 × 1.5 – 3 cm, biolate with 9 leaflets; petiole (1.5 –) 3 – 4 (– 7) cm long; rachis 0.5 – 1 cm long; petiolule 1 – 5 mm long; terminal leaflet broadly elliptic, rhombic-ovate or suborbicular, 6 – 9 × 5 – 10 mm, 5 – 7-lobed.
Fig. 2. Holotype of *Thalictrum papuanum* Ridl. var. *acutisegmentum* Borosova (K! [K000171074], © copyright of the Board of Trustees of the Royal Botanic Gardens, Kew).
Fig. 3. Holotype of *Thalictrum papuanum* Ridl. var. *laticarpellum* Borosova (K! [K000575511]), © copyright of the Board of Trustees of the Royal Botanic Gardens, Kew.)
Fig. 4. Holotype of *Thalictrum umbraticola* Borosova (LI L1740670), © Naturalis Biodiversity Center, Leiden, reproduced with permission.)
Cauline leaves usually biternate with 9 leaflets; petiole 2 – 5 mm long; rachis 4 – 5 mm long; terminal leaflet 6 – 9 × 5 – 9 mm; (3 –) 5 (– 7)-lobed, leaflets sharply acuminate to mucronate at apex. Inflorescence 3 (– 4)-flowered, branched; peduncle 2 – 6 cm long; pedicel slender, red, (0.5 –) 1 – 2 cm long. Bracts 2 – 5 mm long, ovate, entire or 1 – 3-lobed.

Flowers 4 – 6 mm across. Sepals pink. Stamens 15 – 25; filaments pink, 2 – 3 × 1 mm, widest in the top third. Carpels 4 – 4.5 × 0.5 – 0.7 mm; at base c. 1.5 mm stipitate; style 0.8 – 1.2 mm long; stigmatic surface along distal 0.5 – 1 mm of the style. Achenes falcate, strongly compressed, 4 – 5 × 0.5 – 0.8 mm, body 3-ribbed, at base 1.5 – 2 mm stipitate; style 1 – 1.5 mm long. Fig. 2.

RECOGNITION. This variety is unique in the following combination of characters: 10 – 15 cm tall herb, cauline leaves usually biternate with 9 leaflets, leaflets sharply acuminate to mucronate at apex, inflorescence 3 (– 4)-flowered and achenes up to 0.8 mm wide.

DISTRIBUTION. Endemic to Papua Province in Indonesia, and currently only known from the type collected from the northern end of the Hanekam Tunnel in the Mt Jaya region. Map 1.

SPECIMEN EXAMINED. INDONESIA, Papua Province: N end of Hanekam tunnel, Mt Jaya, 14 Aug. 1998, Marsden 189 (holotype K!).

HABITAT. Disturbed lower montane forest, Casuarina zone; elevation: 2300 m.

CONSERVATION STATUS. Since there is only one collection of this variety and in the absence of information on threats, a conservation category of Data Deficient (DD) is proposed for this variety. Further field surveys in the area are recommended.

PHENOLOGY. Collected flowering and fruiting in Aug.

ETYMOLOGY. From the Latin acutus, pointed, and segmentum, segment, referring to the sharply acuminate apices of the leaflets.

NOTES. The new variety described here, Thalictrum papuanum var. acutisegmentum, is morphologically similar to T. papuanum var. papuanum in its overall size, having basal leaves biternate with similar size leaflets, filaments the same shape and size and achenes strongly compressed, falcate, long stipitate and with style circinnate.

Thalictrum papuanum var. acutisegmentum is recognised by sharply acuminate leaflets, biternate cauline leaves, 3 (– 4)-flowered inflorescence and narrower achenes. The description is based on the study of several duplicates of a single collection. This combination of characters was only observed in these specimens and not in any other collections studied. However, since there is some overlap in characters with var. papuanum, more collections are needed to determine if this taxon is sufficiently distinct to be recognised at species level.

Thalictrum papuanum Ridl. var. laticarpellum Borosova var. nov. Type: Papua New Guinea, Mt Piora, Eastern Highlands Province, 31 Aug. 1975, Sands 1577 (holotype K!).

http://www.ipni.org/urn:lsid:ipni.org:names:77218847-1
Delicate herb, 5–7 cm tall. Basal leaves 5–9, blades 1.2–1.8 × 0.8–2 cm, biternate with 9 leaflets; petiole (1–)1.5–3 (–4) cm, white, filamnetous; rachis 2–5 mm long; petiole 1–3 mm long; terminal leaflet broadly elliptic, rhombic-ovate or suborbicular, 3–6 × 3–6 mm, 3–5-lobed. Cauline leaves biternate with 9 leaflets, rarely tri-foliolate; petiole 2–5 mm; rachis 4–5 mm; petiole 2–4 mm; terminal leaflet 3–6 × 3–6 mm; 3–5-lobed, prominently veined, mucronulate at apex. Inflorescence 1–2-flowered; peduncle 4–6 cm long, slender, purple distally to 3 cm high from small white corms; pedicel 0.7–0.8 cm long. Bracts 2 mm long, lanceolate, entire. Flowers c. 6 mm across. Sepals purple. Stamens 5–10; filaments 3 × 0.5 mm, widest in the top third. Carpels 3–3.5 × 1.5 mm; at base up to 1 mm stipitate; style 0.8–1.2 mm long; stigmatic surface along distal 0.5–1 mm of the style. Achenes obovate to lanceolate, strongly compressed, 4 × 1.5 mm, body 3-ribbed, base up to 1 mm stipitate; style 1 mm long. Fig. 3.

RECOGNITION. This variety is unique in the following combination of characters:

Delicate, 5–7 cm tall herb, cauline leaves usually biternate with 9 leaflets, terminal leaflets of basal and cauline leaves the same size 3–6 × 3–6 mm, mucronulate at apex, inflorescence 1–2-flowered, achenes obovate to lanceolate, up to 1 mm stipitate, 1.5 mm wide.

DISTRIBUTION. Endemic to Papua New Guinea, Mt Piora. Map 1.

SPECIMEN EXAMINED. PAPUA NEW GUINEA, Mt Piora, Eastern Highlands Province, 31 Aug. 1975, Sands 1577 (holotype K!).

HABITAT. High level areas of sub-alpine tussock heath; elevation: 3500 m.

CONSERVATION STATUS. Since there is only one collection of this variety and in the absence of information on threats, a conservation category of Data Deficient (DD) is proposed for this variety. Further survey in the area is recommended.

PHENOLOGY. Collected flowering and fruiting in Aug.

ETYMOLOGY. From the Latin latus, broad, and carpellum, carpel, referring to the broader carpels compared with the other varieties.

NOTES. This new variety, Thalictrum papuanum var. laticarpellum, is morphologically similar to T. papuanum var. papuanum in its overall size, having basal leaves biternate, filaments the same shape and size and achenes strongly compressed, stipitate and with cincinnate style. Thalictrum papuanum var. laticarpellum is recognised by its terminal leaflets of basal and cauline leaves being the same size (3–6 × 3–6 mm) and mucronulate at the apex, having a 1–2-flowered inflorescence, achenes obovate to lanceolate, up to 1 mm stipitate and 1.5 mm wide. This combination of characters was only observed in these specimens and not in any other collections studied.

Thalictrum umbraticola Borosova sp. nov. Type: Indonesia. Papua Province: Star Mts, Sibil Valley, Oemboek, 15 May 1959, Kalkman 4055 (holotype L!; isotypes BM!, CANB!, GH!).

http://www.ipni.org/urn:lsid:ipni.org:names:77218848-1

Glabrous herb, (20–)25–40 cm tall. Roots fibrous, rhizome slender. Stems erect, branched. Basal leaves 6–10, blades 3–7 × 3–9 cm, biternate with 9 leaflets; petiole 4–12 cm; rachis 1–4.5 cm long; petiole 0.3–1 cm long; terminal leaflet broadly elliptic, ovate or suborbicular, (9–)11–18 × (8–)10–15 (–18) mm, 5 (–7)-lobed. Cauline leaves 1–2, alternate, tri-foliolate, rarely biternate with 9 leaflets or simple; petiole 13–23 mm; rachis (if present) and petiololes 5–15 mm long; terminal leaflet broadly elliptic to orbicular ovate, 9–13 (–15) × 9–12 (–16) mm, 3–7-lobed, prominently palmately 3–5-veined, base rounded, sometimes cuneate to subcordate, apex mucronulate, margin slightly revolute. Inflorescence racemose, 4–6-flowered, branched; peduncle (4–)8–13 cm long; pedicel erect or slightly recurved, (0.5–)1–3 (–4) cm long. Bracts 1–2, leaf-like, 4–13 (–15) mm long; ovate to lanceolate, entire or lobed. Flowers (3.5–)4–5.5 mm across. Sepals 4, ovate to elliptic, 2 × 1 mm, white to light purple. Stamens 8–15; filaments white, (1.5–)2–2.5 × 0.2–0.5 mm, widest in the top third, base filiform, apex narrowly linear, narrower than anther. Anther 0.5 mm long, obtuse at apex, connectives not projected. Carpels 6–9, erect, white at base, light red at apex, 2.5–3 × 0.5 mm, fusiform; at base 0.5–1 mm stipitate; style linear, coiling inwards, 1–1.5 mm long; stigmatic surface along distal 0.5–0.8 mm of the style. Achenes 6–9, erect at first, later curving downwards, fusiform, falcate, strongly compressed, 3.5–5.5 × 0.5 mm, body 1–2-ribbed, dorsal suture usually straight, ventral suture usually convex, 0.5–1 mm stipitate; style 1.5–2 mm long, circinnately coiled inwards. Fig. 4.

RECOGNITION. Thalictrum umbraticola is unique in the following combination of characters: style circinnately coiled inwards at apex, 6–9 achenes, 1–2-ribbed on each side, 3.5–5.5 × 0.5 mm, basal leaves few, blades up to 9 cm long with leaflets up to 1.8 cm long and it grows at relatively low elevations (1200–1300 m), under arched limestone rock, in very damp and rather dark habitat.

DISTRIBUTION. Endemic to West Papua; Star Mountains (Sibil valley, Oemboek) and Paniai lakes. Map 2.

SPECIMENS EXAMINED. INDONESIA: [Paniai] Wissel lake region, biv. 12–14, [1200 m], 7 Jan. 1939, Eyma 4248 (BO!, K!, L!); Star Mts, Sibil valley, Oemboek, 1200 –
1300, 15 May 1959, Kalikman 4055 (BM!, CANB!, GH!, L!).

**Habitat.** Under arching limestone rock, very damp, rather dark, lower montane forest; elevation: 1200 – 1300 m.

**Conservation Status.** Due to sparsity of herbarium material and in the absence of information on threats, a conservation category of Data Deficient (DD) is proposed for this species; having only two collections does not allow us to calculate EOO or AOO. Further surveys in the area are recommended.

**Phenology.** Flowering and fruiting from Jan. to May.

**Etymology.** From the Latin *umbra*, shade, and *-cola*, dweller, referring to the shady habitat of this species.

**Notes.** *Thalictrum umbratricola* is morphologically close to *T. javanicum* Blume and *T. uncatum* Maxim. (as delimited by Zheng *et al. 2018*) in height, glabrous habit and styles hooked at apex. It differs conspicuously from *T. javanicum* in the basal leaves (*T. umbratricola* binate vs *T. javanicum* 3 – 4 ternate), stipitate achenes (stipe 0.5 – 1 mm vs achenes sessile) and style length (1 – 2 mm vs 0.6 – 1 mm); and from *T. uncatum* in leaf blade size (3 – 7 × 3 – 9 cm vs 9.5 – 13 × 15 cm) and style length (1 – 2 mm vs 2.2 – 3 mm). It differs from both in the smaller sepals (2 × 1 mm vs achenes sessile) and style length (1 – 2 mm vs 0.6 – 1 mm); and from *T. umbratricola* in leaf blade size (3 – 7 × 3 – 9 cm vs 9.5 – 13 × 15 cm) and style length (1 – 2 mm vs 2.2 – 3 mm). It differs from both in the smaller sepals (2 × 1 mm vs achenes sessile) and style length (1 – 2 mm vs 0.6 – 1 mm); and from

**Acknowledgements**

We thank the curators and staff of the following herbaria for access to or loan of material and their assistance: Jackeck Wajar (BM), staff of Herbarium Bogoriense (BO), Brendan Lepschi (CANB), Erzsebet Gyongy (E), Anthony R. Brach (GH), Nicolleen Sol (L), Tiberius Jimbo and Thomas Magun (LAE), Odile Weber (LUX), Dr Michael A. Vincent (MU), Florian Jabbour (P) and Serena Lee M.I. (SING). The comments and suggestions of two anonymous reviewers were extremely useful and we thank them for helping to improve the manuscript; we also thank Carmen Puglisi for useful discussions and constructive comments.

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