



## A new species of *Pilea* (Urticaceae) from the Talamanca Mountains, Costa Rica

A.K. MONRO

Department of Botany, The Natural History Museum, London, SW7 5BD, United Kingdom  
alm@nhm.ac.uk

### Abstract

A new species of *Pilea* from Costa Rica is described and illustrated: *Pilea matama* which most closely resembles the widespread species *Pilea imparifolia*. The affinities of this species are discussed and its position within Weddell's subdivisions of the genus indicated.

**Keywords:** Urticaceae, *Pilea*, Talamanca Mountains, Costa Rica, La Amistad National Park

### Introduction

*Pilea* Lindley (1821: tab. 4) is the largest genus in the Urticaceae comprising ca 715 species (Monro, 2004) worldwide and is distributed throughout the tropics, subtropics and temperate regions (with the exception of Australia, New Zealand and Europe). Southeast Asia is the centre of morphological and phylogenetic diversity for *Pilea* whilst the Greater Antilles and Andean countries are the centres of species diversity (Monro, 2006).

*Pilea* is easily distinguished from other Neotropical Urticaceae by the combination of opposite leaves and a single, ligulate, intrapetiolar stipule in each leaf axil. The majority of species are succulent herbs, epiphytes or small shrubs growing in heavy shade at altitudes between 1000 and 3000 m above sea-level. Within Mesoamerica 61 species are recognised (Monro, in prep.) and of these 33 are known from Costa Rica. To date the principle contributions to the taxonomy of this genus in Costa Rica are Standley's (1937) *Flora of Costa Rica* treatment, Burger's (1977) *Flora Costaricensis* treatment and this author's (2001) synopsis of the genus for Mesoamerica.

During a fieldtrip to the Matama ridge (Fila Matama) of the Talamanca Mountains and Costa Rican sector of La Amistad Binational Park several collections of an unknown *Pilea* species were made, which is here described as a new species. Its affinities are discussed and position within Weddell's (1869) subdivision of the genus indicated, which although not phylogenetic, is based on the most comprehensive world-wide treatment of the genus.

### Materials and methods

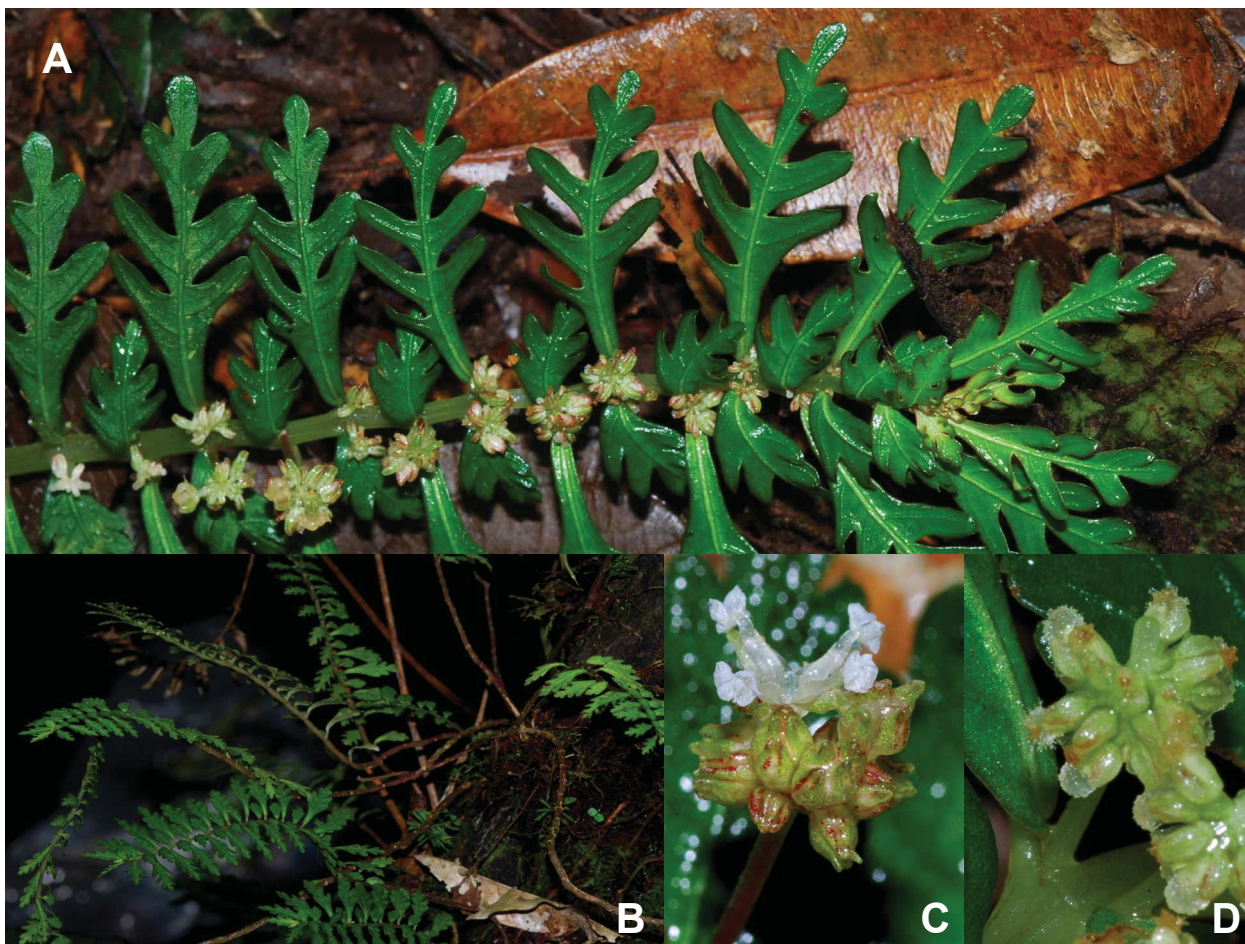
Herbarium specimens were compared with the collections at INB and BM, together with a loan of indeterminate MO material at BM. A morphological species concept developed during the course of previous taxonomic research on *Pilea* (Monro, 2001 & 2006) was employed to delimit and compare taxa. Material was examined under a Willd M3C binocular microscope and Planapo lens at X64 to X400 magnifications.

## Taxonomy

*Pilea matama* A.K. Monro, *sp. nov.* (Fig. 1. & Fig. 2)

*Species P. imparifoliae similis sed costa et nervis lateralibus foliorum supra prominentibus, foliis ad marginem laciniatis vel sinuatis, inflorescentiis staminalibus majoribus atque capitatis, floribus staminalibus majoribus, seminibus majoribus, differt*

**Type:**—Costa Rica, Limón, P.N. La Amistad, Cuenca del Río Banano, Fila Matama, buffer zone for Parque Nacional La Amistad, ‘La Ventana’, 09°48’56.4120”N, 83° 09’49.3560”W, 1200 m, A.K. Monro & D. Solano 5808 (INB!-holotype; BM!, CR!, PMA!, MO!).



**FIGURE 1.** A. Disposition of leaves and inflorescences, *Monro & Solano 5770* (Photo A.K. Monro). B. Habit in the field habit, *Monro & Solano 5848* (Photo A.K. Monro). C. Staminate inflorescence with flower at anthesis, *Monro & Santamaría 5761* (Photo A.K. Monro). D. Pistillate inflorescence with receptive flowers, *Monro & Solano 5808* (Photo A.K. Monro).

Herb to 25 cm; epiphytic, epipetric or terrestrial. Stems prostrate, occasionally erect, drying dull-yellow green, pale grey-green or dark green-brown, glabrous or occasionally brown peltate-glandular at flowering nodes, the cystoliths elliptic to punctiform or absent, the internodes  $2.5\text{--}10.0 \times 0.675\text{--}2.0$  mm, angulate to square in cross-section. Stipules  $0.5\text{--}0.675$  mm, deltate, drying red-brown to dark brown. Leaves petiolate, distichous, petioles at the same node subequal or unequal by ratio 1:1.5–2.5, major petioles  $0.75\text{--}2.5$  mm, minor petioles  $0.5\text{--}1.5$  mm or sessile, glabrous; laminae of leaves at the same node unequal by ratio 1:1.5–

3.8, the major laminae in a pair 6–28 × 4–11 mm, elliptic or obovate, sub-chartaceous to chartaceous; pinnately nerved, the secondary nerves 4–6 pairs, 45–60° to the midrib, crookedly curved; upper surface drying dark green or dark brown, glabrous, cystoliths fusiform, "V" shaped and "Y" shaped, or absent, midrib and secondary nerves prominently raised; lower surface drying pale grey-green, glabrous, eglandular, midrib and secondary nerves not raised; base symmetrical, decurrent; margins sinuate to lacinate, the basal 1/3 to 1/2 entire; apex asymmetrically tridentate; minor laminae in a pair 4.0–10.5 × 2.5–6.5 mm, ovate to elliptic, the base asymmetrical, cordate/cuneate, margin sinuate, otherwise as major laminae. Inflorescences 6–15 per stem, unisexual, rarely bisexual, staminate and pistillate inflorescences asynchronous, staminate inflorescences and infructescences synchronous, infructescences frequently including receptive pistillate flowers; bracts 0.375–1.0 mm; bracteoles 0.5–0.75 mm. Staminate inflorescences 1 or 2 per axil, 7–20 mm, bearing 5–39 flowers in a compact head; peduncle  $\frac{3}{4}$  or more inflorescence length, glabrous, occasionally with cystoliths present; pedicels 0.5–0.75 mm, glabrous. Staminate flowers 2.5 × 1.5 mm immediately prior to anthesis, green-brown; tepals 4, 2.5 mm, glabrous, the subapical appendage 0.75 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences solitary, 1.5–6.0 mm, bearing 3–16 flowers in a compact head; peduncle 1/3 to 1/2 inflorescence length, glabrous; pedicels 0.5–0.75 mm, glabrous. Pistillate flowers 0.75–1.0 mm, adaxial tepal 0.675–1.25 mm, oblong, elliptic or ovate, the dorsal tepal appendage ca 0.5 mm, oblong or ovate; the lateral tepals 0.5–0.675 mm, asymmetrically ovate. Infructescences 5–12 mm; peduncle 2/3 to 3/4 infructescence length; achenes 1.75–2.0 × 1.0 mm, compressed, asymmetrically ellipsoid, the margin narrowly thickened.

**Distribution:**—Provinces of Limón and Cartago, the Caribbean flank of the Talamanca Mountains, Matama ridge, at 1300–1500 m in wet tropical montane forest.

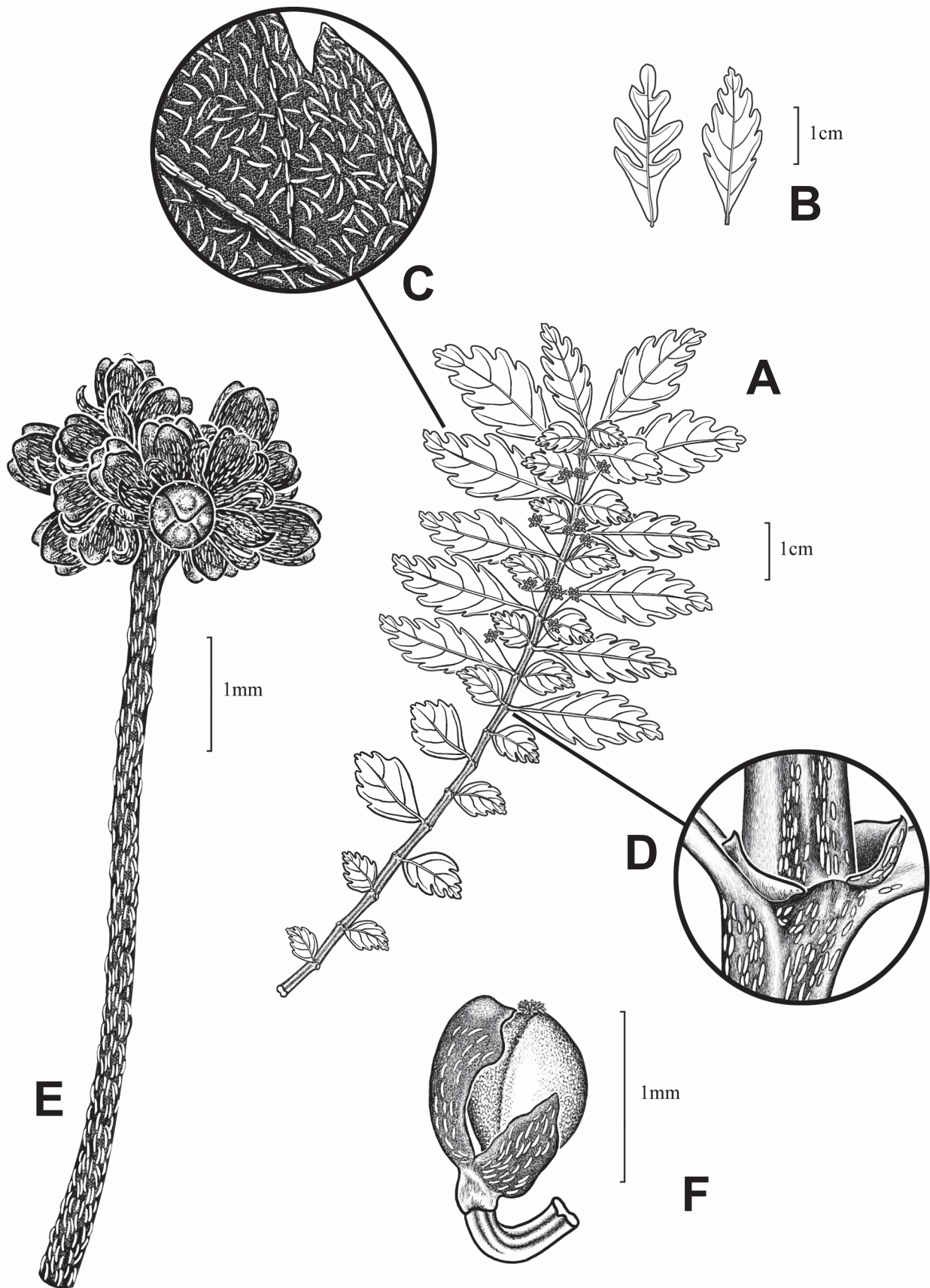
**Etymology:**—Refers to locality of all known collections of this species, Fila Matama.

**Additional specimens examined (paratypes):**—COSTA RICA: Cartago: Turrialba, Parque Nacional Barbilla, cuenca de Martina, Sendero Barthón, Quebrada Avispa, 09°55'15"N, 83°23'55"W, 1600 m, 8 Mar 2001, *E. Mora 1862* (INBio, MO)

Limón: El Progreso, on the avioneta trail to Fila Matama, Valle de La Estrella, 09°47'18"N, 83° 08'45W, 1350 m, 19 Apr 1989, *G. Herrera & A. Chacón 2658* (BM, MO); Zona Protectora Río Banano, drainage of Río Banano, Fila Matama, buffer zone for P.N. La Amistad, 'Barranco' plot by camp, 09°48'49.3560"N, 83° 10'02.1000"W, 1300 m, 23 Oct 2007, *A.K. Monro & D. Santamaría 5761* (BM, CR, INB, MO, PMA); drainage of Río Estrella, Fila Matama, buffer zone of Parque Nacional La Amistad, 09°48'16.6680"N, 83°10'10.6320"W, 1400–1500 m, 24 Oct 2007, *A.K. Monro & D. Solano 5770* (BM, CR, INB, MO, PMA); drainage of Río Estrella, Fila Matama, Parque Nacional La Amistad, 'point 55', 09°48'06.7320"N, 83°10'33.7080"W, 1400–1500 m, 27 Oct 2007, *A.K. Monro & D. Solano 5771* (BM, CR, INB).

**Discussion:**—This species falls into Weddell's (1869) *Heterophyllae* species group and Killip's (1960) *Centradenoideae* species group. *Pilea matama* A.K. Monro is characterised by anisophyllous distichous leaves with the nerves of the adaxial leaf laminae prominently raised and frequently lower surface lacking cystoliths. *Pilea matama* closely resembles *P. imparifolia* Weddell (1852: 212) which also occurs in Costa Rica. The two species may be readily distinguished on leaf morphology, staminate inflorescence arrangement and morphology, staminate flower size and achene size as summarized below:

	<b><i>Pilea matama</i> A.K. Monro</b>	<b><i>Pilea imparifolia</i> Wedd.</b>
<b>Midrib and secondary nerves of adaxial leaf laminae</b>	prominently raised	not raised
<b>Staminate inflorescence</b>	7–20 mm, flowers borne in a compact head	2–3 mm, flowers borne in a loose panicle
<b>Staminate flowers</b>	ca 2.5 mm	1.0–1.5 mm
<b>Achene</b>	1.75–2.0 mm	1.0–1.25 mm



**FIGURE 2.** A. Habit and stem. B. Variation in leaf shapes. C. Adaxial leaf surface. D. Stipules. E. Staminate inflorescence. F. Achene and persistent perianth. (A, C-E based on *Monro & Solano 5808*; B based on *Monro & Solano 5808* and *Monro & Solano 5771*).

*Pilea matama* also resembles *P. trichomanophylla* A.K. Monro which occurs in Panama. The two species may be readily distinguished on leaf anisophylly and morphology, stipule morphology, and achene size as summarized below:

	<b><i>Pilea matama</i> A.K. Monro</b>	<b><i>Pilea trichomanophylla</i> A.K. Monro</b>
<b>Stipules</b>	0.5–0.675 mm, deltate	0.75–1.5 mm, auriculate
<b>Leaves</b>	of unequal size at each node by ratio greater than 1:1.5	of equal or subequal size at each node, where subequal ratio less than 1:1.5
<b>Midrib and secondary nerves of adaxial leaf laminae</b>	prominently raised	not raised
<b>Achene</b>	1.75–2.0 mm	0.75–1.0 mm

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