

A NEW SPECIES OF *MUKIA* (CUCURBITACEAE) FROM SUMBA ISLAND, INDONESIA

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ABSTRACT

PRATAMI, M. P., CHIKMAWATI, T. & RUGAYAH. 2022. A new species of *Mukia* (Cucurbitaceae) from Sumba Island, Indonesia. *Reinwardtia* 21(1): 35–40. — *Mukia sumbensis* Pratami is described and illustrated as well as compared with its closely related species *M. maderaspatana* (L.) M.Roem. and *M. leiosperma* (Wight & Arn.) Wight. It differs in its tendril size, stem diameter, petiole hairiness, midrib indumentum on upper leaf surface, as well as in shape, margin, and surface of seed. Anatomically the leaf of the new species has two palisade layers, unlike the other two species which have only one layer.

Key words: Cucurbitaceae, *Mukia*, new species, Sumba.

ABSTRAK

PRATAMI, M. P., CHIKMAWATI, T. & RUGAYAH. 2022. Jenis baru *Mukia* (Cucurbitaceae) dari Pulau Sumba, Indonesia. *Reinwardtia* 21(1): 35–40. — *Mukia sumbensis* Pratami dipertelakan dan dibuat ilustrasinya. Jenis tersebut berkerabat dekat dengan *M. maderaspatana* (L.) M.Roem. dan *M. leiosperma* (Wight & Arn.) Wight tetapi berbeda pada ukuran sulur, diameter batang, rambut pada tangkai daun, dan juga pada ibu tulang daun, serta bentuk, ukuran, tepi, dan permukaan biji. Secara anatomi jenis baru ini memiliki dua lapisan palisade, tidak seperti dua jenis lainnya yang hanya memiliki satu lapis.

Kata kunci: Cucurbitaceae, jenis baru, *Mukia*, Sumba.

INTRODUCTION

Mukia Arn. is a cucurbitaceous genus of nine species distributed in Africa, South Asia, South-East Asia, and Australia (de Wilde & Duyfjes, 2010). The genus was firstly published by Arnott (1840), with one species *M. scabrella* (L.) Arn. as type species (now *M. maderaspatana* (L.) M.Roem.). In Australia, Telford (1982), enumerated six species, two of them *M. maderaspatana* (L.) M.Roem and *M. micrantha* (F.Muell.) F.Muell [now, *Austrobryonia micrantha* (F.Muell.) I. Telford] were widespread and polymorphic, while the other species were not validly published (Schaefer *et al.*, 2008). As many as six species have been recorded in Asia by de Wilde & Duyfjes (2006), namely *Mukia gracilis* (Kurz) W.J.de Wilde & Duyfjes, *M. rumphiana* (Scheff.) W.J.de Wilde & Duyfjes, *M. ritchiei*

(C.B.Clarke) W.J.de Wilde & Duyfjes, *M. javanica* (Miq.) C.Jeffrey, *M. leiosperma* (Wight & Arn.) Wight, and *M. maderaspatana* (L.) M.Roem.

Based on molecular data, the Asian species were found to be nested within the *Cucumis* (Schaefer, 2007; Renner *et al.*, 2007; Ghebretinsae *et al.*, 2007a; Telford *et al.*, 2011). Therefore, they transferred all of them to *Cucumis* (Ghebretinsae *et al.*, 2007b).

Nevertheless, in revising the Malesian Cucurbitaceae, de Wilde & Duyfjes (2010) continued to recognize *Mukia* as distinct from *Cucumis*. Pratami *et al.* (2019) found further seven seed characters (colour, shape, size, surface pattern, seed edge, transverse section at seed neck, and the markings of the inner seed coat surfaces), it supported de Wilde & Duyfjes in separating *Mukia* from *Cucumis*. Further molecular analysis on this group by Pratami *et al.* (2020) showed that, ISSR

Table 1. Characters differences of *M. maderaspatana*, *M. sumbensis*, and *M. leiosperma*

No	Character states	<i>M. maderaspatana</i>	<i>M. sumbensis</i>	<i>M. leiosperma</i>
1	Stem diameter	0.4–1.4 mm	1.8–1.9 mm	0.8–1.2 mm
2	Tendrill	Thin (0.1 mm)	Thick (0.2 mm)	Thin (0.1 mm)
3	Indumentum types of petiole	Scabrous and hispid	Retrorse	Villous
4	Midrib indumentum size on upper leaf surface	Uniform	Not uniform	Uniform
5	Indumentum colour	Whitish, not shiny	Whitish, not shiny	Golden, shiny
6	Seed shape	Broadly ovate	Ovate	Ovate
7	Average seed size	4.27 × 3.16 mm	4.31 × 2.96 mm	5.50 × 3.40 mm
8	Seed surface	Convex and irregularly papillate	Convex and pitted or nearby smooth	Flat and smooth
9	Stomata in adaxial surface	Present	Absent	Absent
10	Size of stomata	19.70 × 11.31 μm	61.86 × 42.17 μm	21.92 × 14.21 μm
11	Size of epidermal cells	31.89 × 21.41 μm	159.15 × 105.40 μm	56.60 μm × 31.14 μm
12	Palisade layer	One	Two	One

markers can be used to distinguish *Cucumis* and *Mukia* as separate genera.

In working out all specimens of *Mukia* deposited in Herbarium Bogoriense (BO), there is one specimen *Iboet 497* from Sumba which has different characteristics from the other species of *Mukia*. Previously, de Wilde & Duyfjes have already noted on the specimen sheet that it has hairy petiole and different seed edges, which differ from *M. maderaspatana*. Therefore, we decided to do further observations on this specimen as well as on *M. leiosperma*.

MATERIALS AND METHODS

Morphological observations were carried out on all specimens of *Mukia* – in all numbering 285 sheets – deposited in Herbarium Bogoriense (BO) and in National Herbarium of the Netherlands (virtual herbarium).

Leaf anatomical preparations of *Iboet 497* herbarium specimen, has been made at the Laboratory of Ecology and Plant Resources, Department of Biology, IPB University, by making paradermal and transversal sections using Sass methods (1951). For the *M. maderaspatana* we used specimens *MPP 24*, *MPP 25*, and *MPP*

55, while for *M. leiosperma* specimens *Sauliere 68* and *Sauliere 142* were used.

RESULTS AND DISCUSSION

The results of our morphological observations on *Iboet 497*, showed that if it compared with *M. maderaspatana* it has bigger stem diameter, thicker tendrill, retrorse indumentum on petiole, bigger indumentum on midrib, and pitted surface of its seed. Comparison with *M. leiosperma* showed that *Iboet 497* has similar shape, size, and colour of fruit characters, but it has thinner tendrill, smaller seeds which have smooth surface (Table 1).

Table 1 as well as the accompanying Fig. 2 and Fig. 3 also summarises the results of our anatomical observations of the three species. It shows that the transversal leaf section has two layers of palisade tissue of *Iboet 497*.

Mukia sumbensis Pratami *spec. nov.* — TYPE: INDONESIA, Sumba, Taimanga, Kenangar, 15 Mei 1925, *Iboet 497* (holotype BO!, isotype L [photo!]). Figs. 1–3.

Morphologically the new species is closely related to *M. maderaspatana* but it has bigger stem

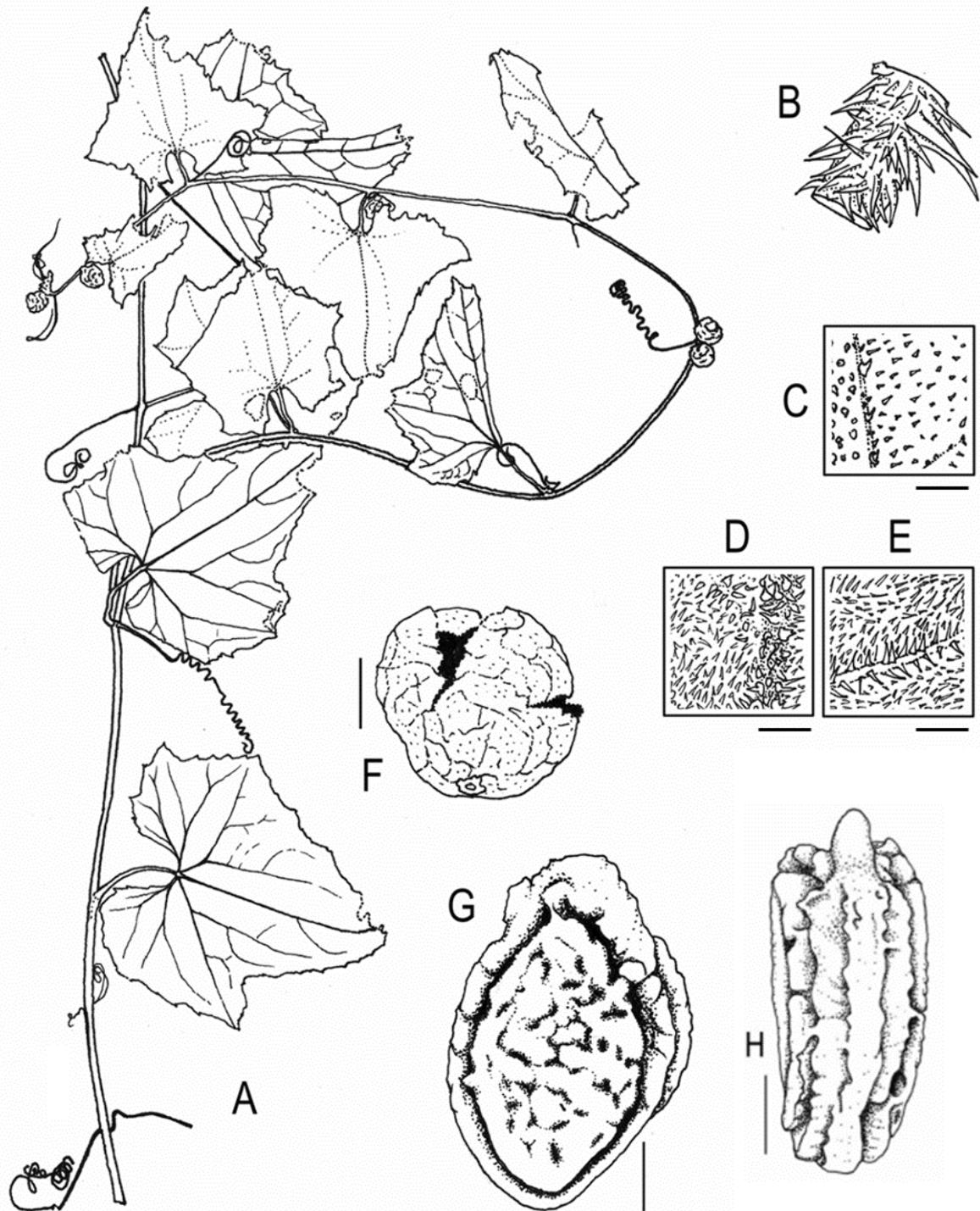


Fig. 1. *Mukia sumbensis* Pratami *spec. nov.* A. Habit, climbing stem. B. Petiole. C. Leaves adaxial. D–E. Leaves abaxial. F. Fruit. G. Seed. H. Seed edge. Scale bar = 1 mm. From *Iboet* 497. Drawn by W. A. Mustaqim.

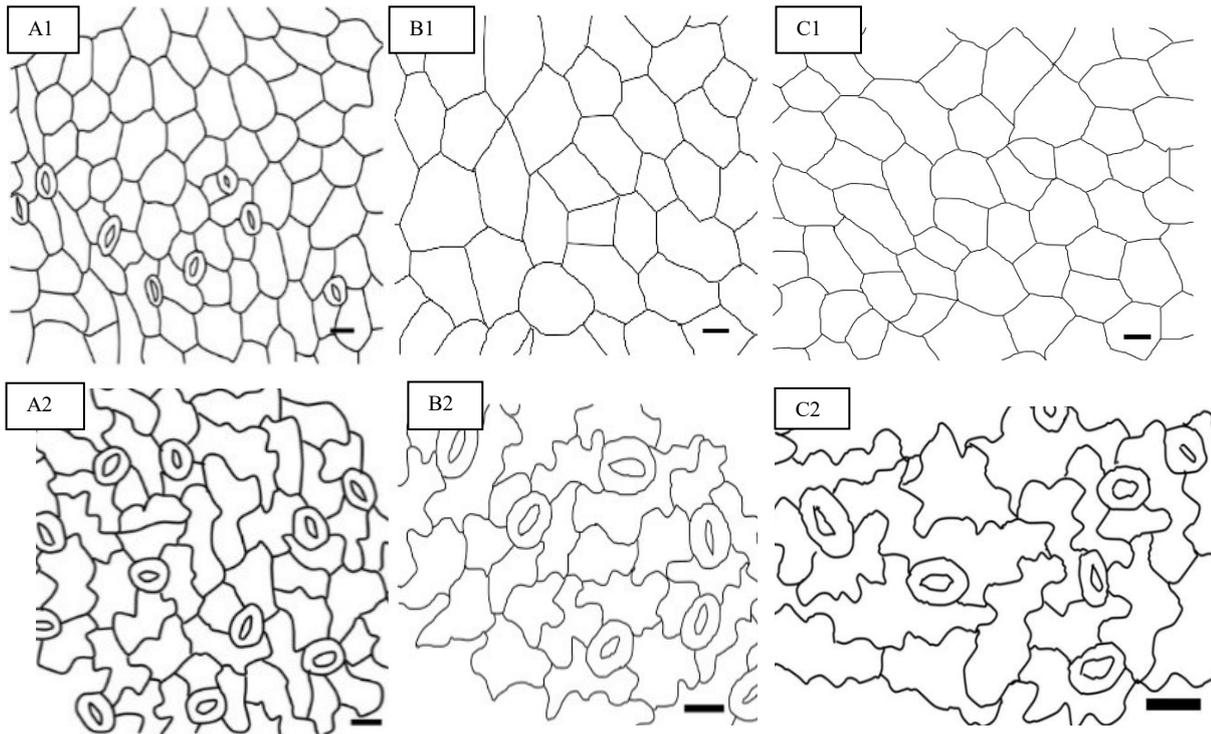


Fig. 2. Leaf anatomy (paradermal section) of *Mukia* spp. A. *Mukia maderaspatana**. B. *M. sumbensis*. C. *M. leiosperma*. 1. adaxial surface. 2. abaxial surface. Scale bar = 20 μ m. *Photo taken from Pratami *et al.* (2019).

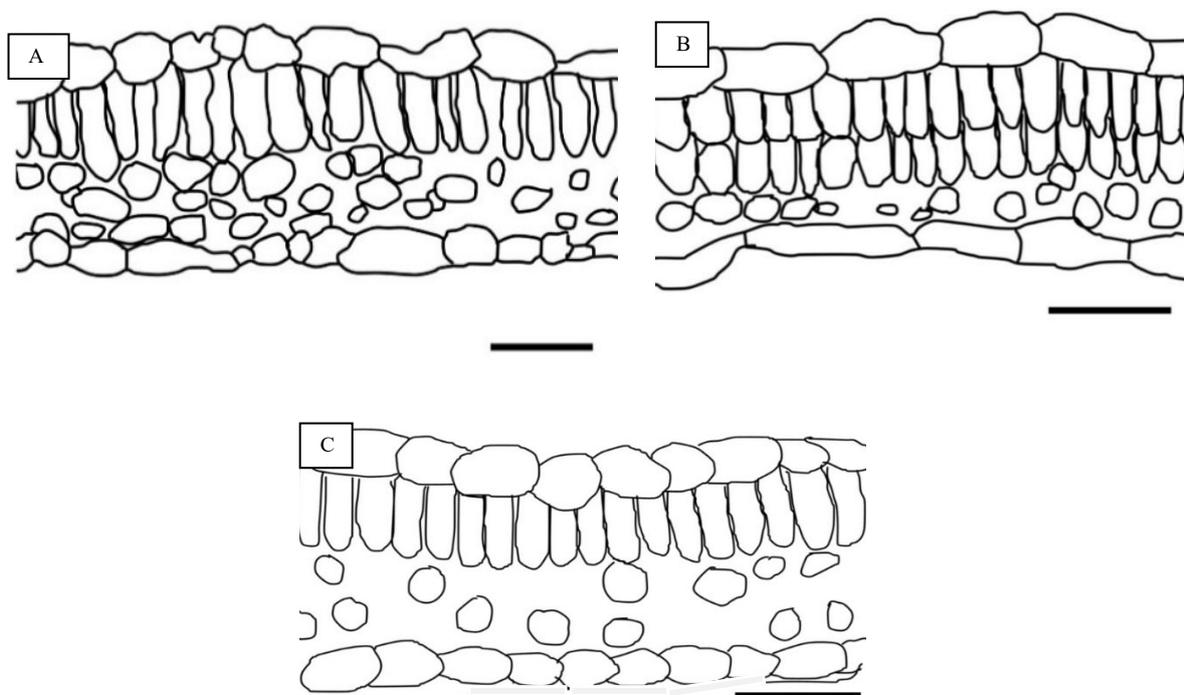


Fig. 3. Leaf anatomy (transverse section) of *Mukia* spp. A. *Mukia maderaspatana**. B. *M. sumbensis*. C. *M. leiosperma*. Scale bar = 50 μ m. *Photo taken from Pratami *et al.* (2019).

diameter, thicker tendril, retrorse indumentum on petiole, bigger indumentum on midrib, and pitted surface of its seed. Compared to *M. leiosperma* however, it has thinner of tendril, smaller size of seeds which have smooth surface.

Climbing herbs, monoecious. *Stem* scabrous or stiffly-hairy, 1.8–1.9 mm diameter. *Probract* absent. *Tendrils* simple and thick (0.2 mm). *Leaves*: petiole 1.7–2.3 cm long, 0.7–0.9 mm diameter, hispid with short to long, downwardly curved hairs (retrorse); blade subentire or 3–5-lobed, broadly ovate, subcircular or broadly hastate in outline, 10–29 cm diam., base shallowly to deeply cordate, apex acuminate, margin variously up to 5 mm dentate, upper leaf surface hispid or scabrous-hairy, lower leaf surface hirsute hairy, bigger on midrib, indumentum color whitish not shiny. *Male flowers* in fascicles of 2–20; pedicel 1–2 (–10) mm long. *Female flowers* solitary or in group up to 8; pedicel 1–2 mm long; calix and corolla not seen. *Fruit* 1–2 in axillary clusters, pedicel 0.2–0.5 cm, green and pale green, ripening red, darker striped or not, globose, 0.5–1.5 cm diam., with few coarse hairs; coarsely wrinkled when dry. *Seeds* numerous, whitish or pale brown, seeds not shining, ovate, 4.31 mm by 2.96 mm, margin narrow, faces convex, pitted or nearly smooth, groove along the edges of the seed.

Paradermal leaf section showed that anatomically the anomocytic stomata are confined to the abaxial surface, scattered among the irregularly shaped epidermal cells which are somewhat elongated, bumpy or lobed. From the leaf transversal section, characteristically it has two layers of palisade tissue.

Distribution. So far only known from Sumba.

Habitat & Ecology. Highland forest.

Etymology. The specific epithet refers to the name of the Island.

Conservation status. The status of this species is unknown according to the criteria of IUCN Red List. However, it can be categorized as an endangered new species, because so far it was only found once in one location.

Rarity note. Admittedly, the characterization of *M. sumbensis* is only based on a single herbarium specimen collected almost a century ago from a semi arid area in the Lesser Sunda Islands group. Nevertheless, we believe that the publication of this new species belonging to a problematical genus is fully justified especially to draw special

attention to the need to do further explorations to recollect and to ascertain its very existence in relation to the present precarious situation due to the threat of extreme climate changes now taking place.

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