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RESEARCH ARTICLE

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A new species of *Freycinetia* Gaudich. (*Pandanaceae*; *Freycinetoideae*) from the island of Halmahera, the Moluccas, Indonesia

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Key words

Freycinetia
Freycinetoideae
Halmahera
Moluccas
Pandanaceae

Abstract A new species of *Freycinetia* Gaudich. (*Pandanaceae*; *Freycinetoideae*) with conspicuous ellipsoid leaves and spiny auricles from the island of Halmahera in the Moluccan Archipelago is here newly described as *F. halmaherensis* A.P.Keim, W.Sujarwo & Sahroni. A full description of the new species and a key to the species of *Freycinetia* in the Moluccas are provided.

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INTRODUCTION

Freycinetia Gaudich. is a genus of approximately 300 species. The genus has its major diversity in the Malesiana floristic region with about 160 species currently recognised (Stone 1982, 1983a, Keim 2013a), of which nine species are currently recognised from the Moluccas, with *F. tidorensis* A.P.Keim as the most recent species proposed from Tidore Island, an island of approximately 19 km east of Halmahera Island (Keim 2013b). *Freycinetia* is unique in the *Pandanaceae* – a large palm-like monocotyledonous dioecious family with three or four lanceolate-elongate leaves terminally arranged and confined to the Old World tropics with approximately 1 000 species (Stone 1982) – as it is the only genus that possesses the climbing habit. So far, there are only three taxa in the genus known to be non-climbing: *F. arborea* Gaudich. (Stone 1983b), *F. dewildeorum* Pasaribu (Pasaribu 2010a, b), and *F. kwerbaensis* A.P.Keim (Keim 2012).

Furthermore, *Freycinetia* also retains auricles, which are small ear-like projections in the margin of the leaf sheath. In *Freycinetia* the auricles are longer and much more distinct than in the other genera within the family (the auricles in the other genera easily disintegrate), so much that the auricles are used as one of the distinctive morphological characters for the infra-generic classification of the genus (Stone 1968). It are also the auricles that are the most important distinctive morphological character in recognising the new taxon from Halmahera.

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The largest number of collections made in the Moluccas is from Halmahera Island, mainly by Teijsmann and De Vriese during their exploration of the archipelago from 1859 to 1860 (Teijsmann 1861a, b, 1877a, b). This is apparently related to the fact that Halmahera has a land area of 17 780 km^2, with which it is the largest island in the Moluccan Archipelago. Most of the island is still largely covered with lowland tropical rainforests, which is a suitable habitat for *Pandanaceae*, including the genus *Freycinetia*.

Unfortunately, the pandan flora on the island is still largely unknown and this is particularly true for the genus *Freycinetia* of which, up to now, only three species were known: *F. devriesei* Solms, *F. funicularis* (Savigny) Merr., and *F. kostermansii* B.C.Stone (Zu Solms-Laubach 1878, Warburg 1900a, b, Sambas 2014).

The most recent studies were by Callmander et al. (2014, 2015), but these studies only treated two genera: *Benstonea* Callm. & Buerki and *Pandanus* Parkinson. Thirty-nine collections of *Freycinetia* are made on the island, and one of them is proposed here as a new species, *Freycinetia halmaherensis*.

Key to the species of Freycinetia in the Moluccas

1. Leaf blade lanceolate-elongate or ellipsoid 2
1. Leaf blade oblanceolate (spathoideous) . . *F. kostermansii*
2. Leaf grass-like . . . . . *F. graminea*
2. Leaf not grass-like 3
3. Leaf ellipsoid . . . . . *F. keyensis*
3. Leaf lanceolate-elongate 4
4. Auricle lobed . . . . . *F. sumatrana*
4. Auricle tapered, not lobed 5
5. Auricle with obvious spines in the margin *F. halmaherensis*
5. Auricle without spines in the margin 6
6. Inflorescence and infructescence always terminal 7
6. Inflorescence and infructescence lateral . . . . *F. funicularis*

7. Berry prismatic 8
7. Berry rostrate . . . . . *F. devriesei*
8. Number of stigmatic remnants 1 or 2 . . . . . *F. tidorensis*
8. Number of stigmatic remnants 6–9 . . . . . *F. leptostachya*

TAXONOMIC TREATMENT

Freycinetia halmaherensis A.P.Keim, W.Sujarwo & Sahroni — Fig. 1, 2

Moderate climbing pandan with conspicuous ellipsoidal leaves and spiny auricles. — Type: *SM 7* (holo BO!), Indonesia, Moluccas, Halmahera, 2008.

Etymology. The epithet refers to Halmahera Island, where the type was collected.

Medium-sized climbing pandan; leaf blades ellipsoid; auricle spiny. *Stem* glabrous, green, c. 1 cm diam; internodes 1.5–2 cm long, climbing roots present, distinct. *Leaf* blade ellipsoid, 19–20 by 7.5–8 cm, glabrous, green, apex acuminate; auricle tapered, margin with conspicuous spines. *Inflorescence*, *flowers*, *infructescence*, *cephalia* and *fruits* unknown.

Distribution — Endemic to Halmahera (N Maluku).

Habitat & Ecology — Apparently lowland tropical rainforest.

Conservation status — Data Deficient (DD). *Freycinetia halmaherensis* is so far known only from the type. The size of the populations and the area of occupancy are unknown.

Notes — The presence of the spines in the margin of the auricle is the distinctive morphological character of the members of sect. *Hemsleyella* according to the infrageneric classification proposed by Stone (1968). Prior to this present study, the section includes three species namely *F. rigidifolia*, *F. pectinata*, and *F. spinifera* (Keim 2009). Nonetheless, no member of the section is known to possess the ellipsoid leaves (Table 1). Thus, this taxon from Halmahera is proposed here as a new species, *F. halmaherensis*. *Freycinetia scandens*, with fairly similar ellipsoid leaves with obvious acuminate apex, is found in the Moluccas too, on Seram Island (Keim et al. 2008), and can easily be confused and misidentified in the field with *F. halmaherensis*; nevertheless, *F. halmaherensis* straightforwardly differs from *F. scandens* by the possession of the spiny auricle (Table 1). There is also another species known with minute

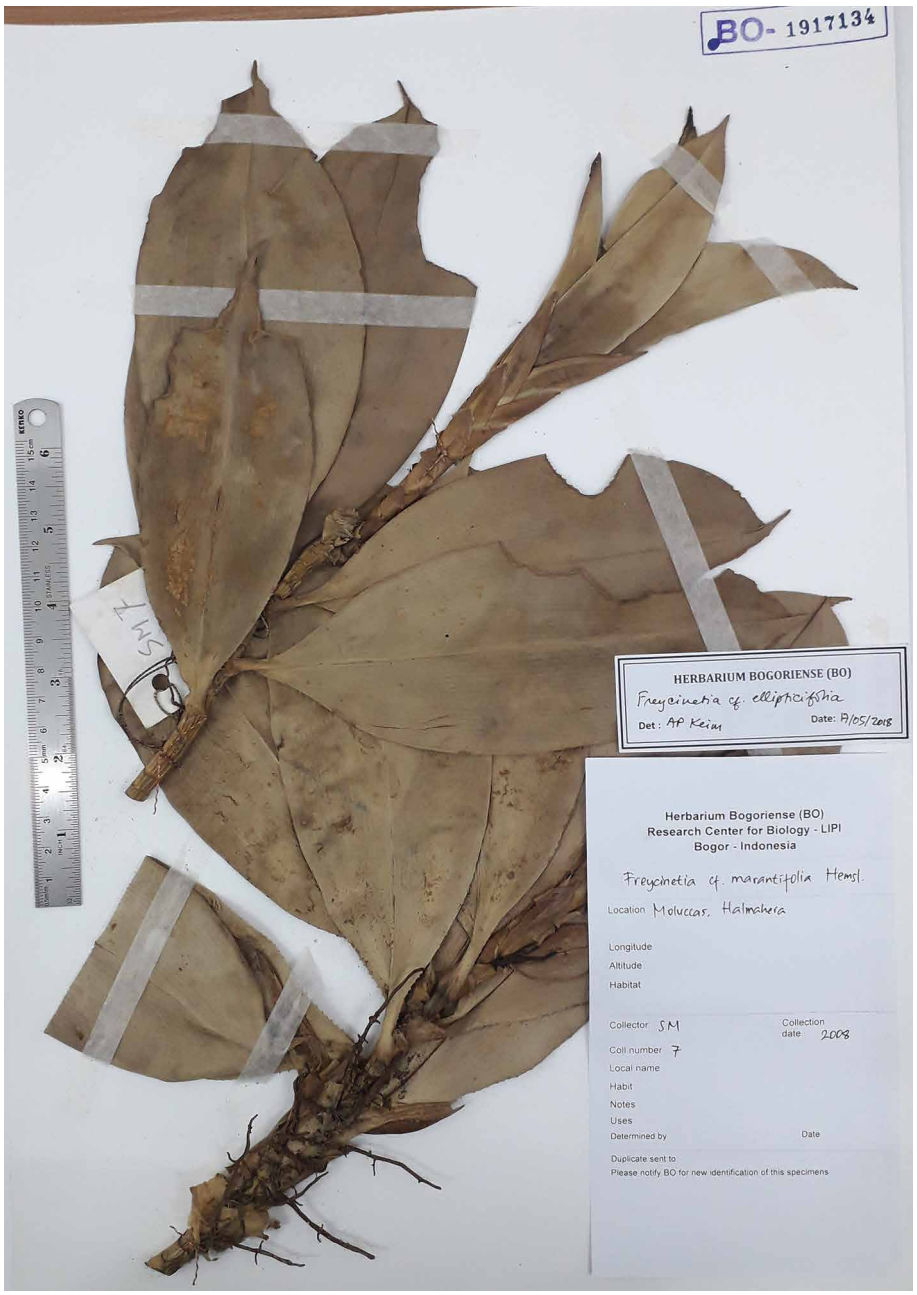

Fig. 1 *Freycinetia halmaherensis* A.P. Keim, W.Sujarwo & Sahroni showing the ellipsoidal leaves each with acuminate apex. — Photo: Ary Prihardhyanto Keim. 2022.

Table 1 Morphological differences between *Freycinetia halmaherensis*, *F. micrura*, *F. pectinata*, *F. rigidifolia*, *F. scandens*, and *F. spinifera*

Species	Leaf shape	Leaf dimension	Margin of auricles
Freycinetia halmaherensis	Ellipsoidal	19–20 cm by 7.5–8 cm	With obvious spines
F. micrura	Elongate-lanceolate	7–10 cm by 4–7 mm	With minute spines
F. pectinata	Elongate-lanceolate	15–20 cm by c. 9 mm (according to Merrill & Perry 1939)	With obvious spines
F. rigidifolia	Elongate-lanceolate	16–24 cm by 8–10 mm	With obvious spines
F. scandens	Ellipsoidal	7–19 cm by 8–42 mm (according to Keim et al. 2020)	Integer, without spines
F. spinifera	Elongate-lanceolate	36–37 cm by c. 1 cm	With obvious spines

spines in the margin of the auricle, *F. micrura*, from Sulawesi, but this species has lanceolate-elongate leaves (Stone 1983a; Table 1).

Describing a new species of *Freycinetia* based on vegetative morphological characters only is very exceptional; however, *F. halmaherensis* possesses two very strong distinctive morphological characters that combined are not shared with any species of sect. *Hemsleyella*, even not with all other *Freycinetia* species: the ellipsoid leaves and spiny auricles. Thus, *F. halmaherensis* is proposed here as a new species and a new member of sect. *Hemsleyella*.

No duplicates are known of the type, nor any other collections representing this new species in other herbaria (Peter van Welzen checked for L).

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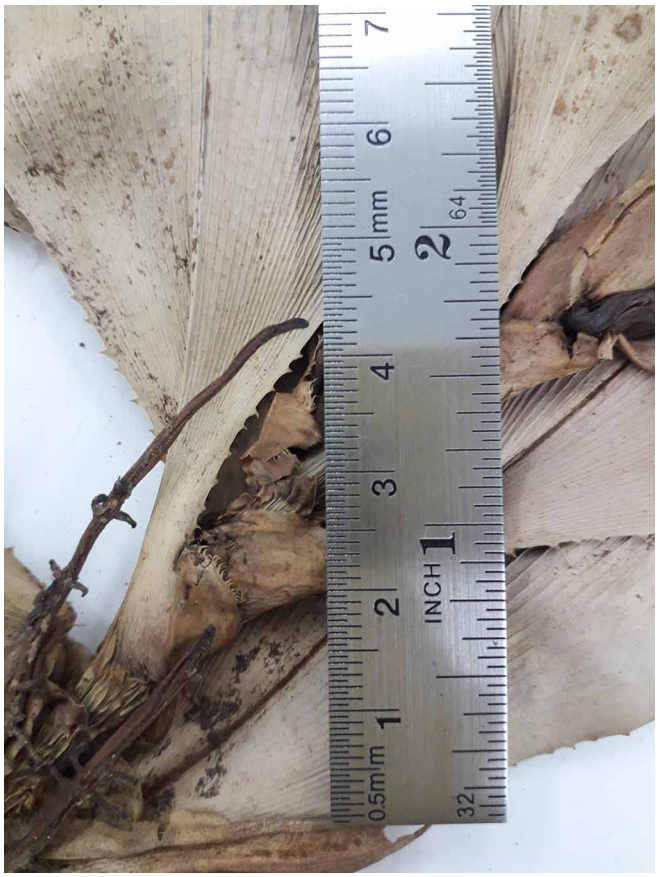

Fig. 2 *Freycinetia halmaherensis* A.P. Keim, W.Sujarwo & Sahroni showing the spiny auricle. — Photo: Ary Prihardhyanto Keim. 2022.

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