



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

A.P. Keim<sup>1</sup>, W. Sujarwo<sup>2</sup>, D. Sahroni<sup>3</sup>

## Key words

*Freycinetia*  
*Freycinetioideae*  
Halmahera  
Moluccas  
*Pandanaceae*

**Abstract** A new species of *Freycinetia* Gaudich. (*Pandanaceae*; *Freycinetioideae*) 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.

**Citation:** Keim AP, Sujarwo W, Sahroni D. 2022. A new species of *Freycinetia* Gaudich. (*Pandanaceae*; *Freycinetioideae*) from the island of Halmahera, the Moluccas, Indonesia. *Blumea* 67 (2): 129–131. <https://doi.org/10.3767/blumea.2022.67.02.06>. Effectively published online: 15 October 2022.

## 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 1000 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.

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 17780 km<sup>2</sup>, 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 Callmänder 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*

<sup>1</sup> Research Center for Biosystematics and Evolution, National Research and Innovation Agency (BRIN), Cibinong 16911, Bogor, Indonesia; corresponding author e-mail: [arykeim@gmail.com](mailto:arykeim@gmail.com).  
<sup>2</sup> Ethnobotany Research Group, Research Center for Ecology and Ethnobiology, National Research and Innovation Agency (BRIN), Cibinong 16911, Bogor, Indonesia.  
<sup>3</sup> Directorate of Management of Scientific Collections, National Research and Innovation Agency (BRIN), Cibinong 16911, Bogor, Indonesia.

- 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
<i>Freycinetia halmaherensis</i>	Ellipsoidal	19–20 cm by 7.5–8 cm	With obvious spines
<i>F. micrura</i>	Elongate-lanceolate	7–10 cm by 4–7 mm	With minute spines
<i>F. pectinata</i>	Elongate-lanceolate	15–20 cm by c. 9 mm (according to Merrill & Perry 1939)	With obvious spines
<i>F. rigidifolia</i>	Elongate-lanceolate	16–24 cm by 8–10 mm	With obvious spines
<i>F. scandens</i>	Ellipsoidal	7–19 cm by 8–42 mm (according to Keim et al. 2020)	Integer, without spines
<i>F. spinifera</i>	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).

**Acknowledgements** The authors would like to express their gratitude to Dr. Martin Callmänder and the team of 2014–2015 field explorations in Halmahera Island for sharing good information regarding the pandan flora of the island. The authors would also like to extend deep appreciation to the staff of Herbarium Bogoriense (BO) for the facilities and access to the collections.



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

## REFERENCES

- Callmänder MW, Buerki S, Keim AP, et al. 2014. Notes on Benstonea (Pandanaceae) from the islands of Halmahera, New Guinea and Sulawesi. *Phytotaxa* 175(3): 161–165.
- Callmänder MW, Keim AP, Buerki S, et al. 2015. The genus Pandanus Parkinson (Pandanaceae) on Halmahera Island (Moluccas, Indonesia) with descriptions of three new species and a key to the species on the island. *Candollea* 70(2): 179–195.
- Keim AP. 2009. Pandanaceae of the island of Yapen, Papua (W. New Guinea), Indonesia, with their nomenclature and notes on the rediscovery of *Saranga sinuosa*, and several new species and records. *Blumea* 54: 255–266.
- Keim AP. 2012. The Pandan flora of Foja-Mamberamo Game Reserve and Baliem Valley, Papua-Indonesia. *Reinwardtia* 13(3): 271–297.
- Keim AP. 2013a. Introduction. In: Keim AP, Rugayah, Rustiami HR (ed), *Pandanaceae of Flora Malesiana in the past eight years (2005–2013): A state of the art*. Herbarium Bogoriense, Bogor: 1–2.
- Keim AP. 2013b. A new species of *Freycinetia* Gaudich. (Pandanaceae; Freycinetioideae) from Tidore Island, Moluccas, Indonesia. *Reinwardtia* 13(5): 441–444.
- Keim AP, Rahayu SE, Kartawinata K, et al. 2020. *Pandans of Java: Systematics and ethnobotany of the forgotten sacred plants of Java*. IPB Press, Bogor.
- Keim AP, Susiarti S, Amir M. 2008. Taksonomi Pandanaceae Pulau Seram: 1281–1326. Pusat Penelitian Biologi LIPI, Cibinong.
- Merrill ED, Perry LM. 1939. On the Brass collections of Pandanaceae from New Guinea. *Journal of the Arnold Arboretum* 20: 139–186.
- Pasaribu N. 2010a. *Freycinetia* (Pandanaceae) of Sumatra. PhD Thesis, Bogor Institute of Agriculture, Bogor.
- Pasaribu N. 2010b. Two new species of *Freycinetia* (Pandanaceae) from Sumatra, Indonesia. *Reinwardtia* 13(2): 147–150.
- Sambas EW. 2014. Komposisi jenis pohon pada hutan sub-pegunungan di Halmahera Tengah, Maluku Utara. *Seminar Nasional Penelitian dan Pengabdian pada Masyarakat* 4(1): 307–314.
- Stone BC. 1968. Materials for a monograph of *Freycinetia* Gaud. IV. Sub-division of the genus with fifteen new sections. *Blumea* 16(2): 361–372.
- Stone BC. 1982. New Guinea Pandanaceae: First approach to ecology and biogeography. In: Gressitt GL (ed), *Biogeography and Ecology of New Guinea 1*. Monographiae Biologicae 42: 401–436. Dr. W. Junk Publ., The Hague.
- Stone BC. 1983a. Studies in Malesian Pandanaceae 19: New species of *Freycinetia* and *Pandanus* from Malesia and Southeast Asia. *Journal of the Arnold Arboretum* 64(2): 309–324.
- Stone BC. 1983b. A guide to collecting Pandanaceae (*Pandanus*, *Freycinetia*, and *Saranga*). *Annals of the Missouri Botanical Garden* 70: 137–145.
- Teijsmann JE. 1861a. Verslag van den Hon Insp. v. Kultures J.E. Teijsmann over de door Z. Ed. in 1860 gedane reize in de Molukken. *Natuurkundig Tijdschrift voor Nederlandsch Indië* 23: 290–369.
- Teijsmann JE. 1861b. Verslag van den Hon Insp. v. Kultures J.E. Teijsmann over de door Z. Ed. in 1860 gedane reize in de Molukken. *Journal de Botanique Néerlandaise* 50: 297–344.
- Teijsmann JE. 1877a. Uitstapjes naar het binnenland van Noord-Halmahera. *Bijdragen tot de Taal-, Land- en Volkenkunde voor Nederlandsch Indië* 4e reeks, 1: 500–518.
- Teijsmann JE. 1877b. Bekort verslag eener botanische dienstreis naar de Molukken, van 12 Mei t/m 29 November 1876. *Natuurkundig Tijdschrift voor Nederlandsch Indië* 37: 75–148.
- Warburg O. 1900a. Pandanaceae. In: Schumann K, Lauterbach K (eds), *Flora der Deutschen Schutzgebiete in der Südsee*: 159–161. Gebrüder Borntraeger, Leipzig.
- Warburg O. 1900b. Pandanaceae. In: Engler HGA (ed), *Das Pflanzenreich IV*, 9: 1–100. Engelmann, Berlin.
- Zu Solms-Laubach HMCLF. 1878. *Monographia Pandanacearum*. *Linnaea* 42: 1–110.