



# *Freycinetia quezonensis*: A new species of *Freycinetia* Gaudich. (Pandanaceae; Freycinetoidae) from Quezon, Luzon Island, the Philippines

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**ABSTRACT:** *Freycinetia quezonensis* A.P. Keim, M.G. Nonato, C.C. Tan & W. Sujarwo is a newly described species from Llavac, Quezon areas in Luzon Island, the Philippines. *Freycinetia quezonensis* is characterized by the possession of lobed auricle, terminal infructescence with four cephalia (quaternate), and the number of stigma 6. The number of stigma is the most distinctive morphological character that separates *F. quezonensis* from the other four species that known to possess the lobed auricles: *F. nonatoi*, *F. sumatrana*, *F. vidalii*, and *F. walkeri*.

**KEY WORDS:** *Freycinetia*, *Freycinetia sumatrana*, *Freycinetia quezonensis*, Luzon, Pandanaceae, Philippines, Quezon.

## INTRODUCTION

The Philippines has been regarded as one of the 18 mega biodiversity in the world. The country possesses 2/3 of the earth's biodiversity and about 70 to 80% of the world's plant and animal species. In term of plant diversity, the country is 5<sup>th</sup> in the number of plant species and maintains 5% of the world's flora. Furthermore, the country is part of the region with the outstanding plant diversity, Malesia (i.e. Flora Malesiana), a floristic region that comprises political entities of Malaysia, Singapore, Indonesia, Brunei Darussalam, Philippines, East Timor, and Papua New Guinea. Despite these facts, the flora of the Philippines remains largely unknown and the possibility of the discovery of new species is still wide open. This is apparently true for its pandan flora (Cabrido, 2016).

Although the Philippines is one of the three countries in Malesia (the other two are Indonesia and Papua New Guinea), where the three traditionally known genera in Pandanaceae coexisted (*Freycinetia*, *Pandanus*, and *Sararanga*, with one endemic species bearing its name *S. philippinensis*), in general the pandan flora of the country is still poorly understood, especially regarding the genus *Freycinetia*.

Unlike the country's two neighbors, Indonesia and Malaysia, the study of this family in the Philippines can be regarded backward. The pandan flora of the Philippines was only fairly mentioned by Solms (1878) and although the number of known species increased, the pandan flora of the Philippines was again briefly described by Warburg (1900a, 1900b). The pandan flora of the country has finally gained its merit during serious

studies by Merrill (1908) and Martelli (1910a, 1910b). Prior to this study, the most recent publication of the genus in the Philippines was by Stone (1969) on the genus *Freycinetia* in the Philippines. After Stone, the study of the Philippine *Pandanaceae* has been moderately slow and no new information published (see Keim *et al.*, 2013) until the recent publication of a new species from the vicinity of Llavac in the Quezon Province in the Luzon Island, the Philippines, *Freycinetia nonatoi* (Keim and Tan, 2020).

The result of this current study indicates the existence of another new taxon with lobed auricles found in approximately the same locality with *F. nonatoi*, which possesses a distinctive morphological feature which has never been observed previously in the already known Philippine taxa with lobed auricles (*F. nonatoi*, *F. sumatrana*, and *F. vidalii*); thus, it is described here as a new species, *Freycinetia quezonensis* A.P. Keim, M.G. Nonato, C.C. Tan & W. Sujarwo.

The discovery of two recently proposed new species (*F. nonatoi* and *F. quezonensis*) in approximately the same area is strengthening the already widely known fact that the Philippines is one of the 18 mega biodiversity countries with a conspicuous high degree of endemism (Heaney *et al.*, 2005).

## TAXONOMIC TREATMENT

*Freycinetia quezonensis* A.P. Keim, M.G. Nonato, C.C. Tan & W. Sujarwo, *sp. nov.*

**Fig. 1**

**Type:** Philippines, Luzon Island, Quezon, Llavac, 14 May, 2013, C.C. Tan *s.n.* (BO! holotype; USTH! isotype)



**Fig. 1. *Freycinetia quezonensis* A.P. Keim, M.G. Nonato, C.C. Tan & W. Sujarwo. A.** The lobed auricle with minute spines on its margin. **B.** The infructescence show the 4 sausage-like cephalia, glabrous pedicels, and non-needle like berries. **C.** The type of C.C. Tan s.n. (BO! holo; USTH! iso.) **D.** Upper surface of a berry show the 6 stigmas **E.** Berries show 6 stigmas per berry. (i.e. stigmatic remains). **F.** A berry show that it is non needle-like berry. (A-C, Photographed by A.P. Keim; D-F, by C.C. Tan 2019)



**TABLE 1.** Morphological differences between *Freycinetia marginata*, *F. nonatoi*, *F. polystachya*, *F. quezonensis*, *F. sumatrana*, *F. vidalii*, and *F. walkeri*.

Species	Shape of auricle	Margin of auricles	Color of bracts	Number of cephalia	Number of stigma	Shape of berries
<i>Freycinetia marginata</i>	Terete	Entire	Reddish orange	3 to 4	2 to 3, mostly 2	Needle like
<i>F. nonatoi</i>	Lobed	Spiny	Yellow	3	-	-
<i>F. polystachya</i>	Terete	Entire	Orange, according to Martelli (1910b)	3 to 4	2 to 3, mostly 2	Non needle like
<i>F. quezonensis</i>	Lobed	Entire	Presumably purplish red based on the color of leaves on terminal part of stem, which is obviously deep purplish red	4	6	Non needle like
<i>F. sumatrana</i>	Lobed	Entire	White, according to Keim <i>et al.</i> (2011)	3 to 4	2 to 3, mostly 2	Non needle like
<i>F. vidalii</i>	Lobed	Entire	Orange	3	2 to 3, mostly 2	Non needle like
<i>F. walkeri</i>	Lobed	Entire	Orange	2 to 3	2	Non needle like

**Diagnosis:** Fairly robust climbing pandan; auricle obviously lobed with minute spines on margin; infructescences terminal with 4 cephalia; number of stigmas 6.

Fairly robust climbing pandan, climbing up to 10 m high. *Stem* stout, green, glabrous, 1.5 to 2 cm diameter; internodes 1.5 to 2 cm; climbing root present, obvious. *Leaf* lanceolate-elongate, 50 to 65 cm long, 2 to 2.5 cm wide, acuminate apex, margin with minute spines on terminal and basal parts; adaxial surface shiny green, glabrous, no adaxial ventral pleats; abaxial surface light green, glabrous; adaxial and abaxial surfaces of leaves on terminal part of stem green with deep purplish red tints, conspicuous; leafsheath deep purplish red, glabrous; auricle obvious, persistent, lobed, margin with minute spines, brown. *Staminate inflorescence* terminal, ternate (with 3 separate elongated flowering parts), still enclosed in bracts; peduncle short, brown, 1 cm long; pedicel glabrous, brown, 4 cm long. *Staminate flowers* minute; anthers pale creamy brown. *Pistillate inflorescence* unknown. *Pistillate flower* unknown. *Infructescence* terminal, quaternate (with 4 cephalia) large, conspicuous, largest 18 cm long; bracts already fallen (caducous), presumably deep purplish red in color; peduncle short, 3 cm long, glabrous; pedicel obvious, 4 cm, yellowish green turns to yellow, glabrous. *Cephalium* lanceolate-elongate, sausage like, conspicuous, 10 to 12 cm long, 2.5 to 3 cm wide, green when young turns to dark creamy yellow when mature. *Berry* lanceolate-elongate, non needle-like shape, dark creamy yellow, small, 7 mm long, 1 to 1.5 mm wide; stigma 6, deep brown.

**Distribution:** Endemic.

**Habitat:** Lowland tropical rainforest 800 to 900 m altitudes about 100 meters away from local *Antidesma* plantations with a pond nearby.

**Conservation Status:** Critically Endangered (CR). This species is known so far only from the type and apparently has restricted distribution.

**Etymology:** The epithet refers to Quezon, the area in Luzon Island, where the type was collected.

**Vernacular name:** Pandan (Quezon language).

**Uses:** Local people mention that the cephalia are eaten by birds and land crabs.

**Notes:** A species of *Freycinetia* with lobed auricle is exceptionally rare. Prior to this study, there are four species known to possess this morphological feature; *F. nonatoi*, *F. sumatrana*, *F. vidalii*, and *F. walkeri*. *Freycinetia nonatoi* is an endemic species recently described from Luzon Island in the Philippines (Keim and Tan, 2020), *F. sumatrana* has a wide spread distribution from Andaman Island to the Moluccas (Keim *et al.*, 2011), *F. vidalii* is found in the Philippines and possibly Western New Guinea (Keim, 2012), and *F. walkeri* is endemic to Sri Lanka (Solms, 1878). The result of this current study indicates that there is another species new to science that possesses the lobed auricle proposed here as *F. quezonensis*.

Despite having the same possession of lobed auricle, nevertheless the margins of the auricles in *F. nonatoi* are decorated with conspicuous spines, whereas in *F. quezonensis* are minute or less obvious. Furthermore, the color of the bracts in *F. quezonensis* is assumed to be deep purplish red based on the colors of leaves on terminal part of stem, which is obviously deep purplish red, while in *F. nonatoi* are eye-catchingly yellow. The number of stigmas also distinct *F. quezonensis* from *F. nonatoi* (Table 1).

*Freycinetia quezonensis* is different from *F. sumatrana*, also particularly in the number of stigma (Table 1). In fact, prior to the discovery of *F. quezonensis*, there has been no record of any species with lobed auricles (*F. nonatoi*, *F. sumatrana*, *F. vidalii*, and *F. walkeri*) to possess such number of stigmas. The other four species have 3 or less number of stigmas per berry.

*Freycinetia quezonensis* is different from *F. walkeri* in the numbers of cephalia and stigma; the same morphological features that also distinct *F. quezonensis* from *F. vidalii*. *Freycinetia vidalii* itself is assumed here to be the juvenile form of *F. sumatrana* as there has been no distinctive morphological feature that separate *F. vidalii* and *F. sumatrana*. The type of *F. vidalii* (Vidal 3964, kept at K) itself is an immature (see Merrill, 1908). Further study with better collection is needed to ensure



its taxonomy. However, the discussion on the taxonomic position of *F. vidalii* is beyond the limit of this publication; thus will not be expanded.

The possession of infructescence with 4 cephalia also puts *F. quezonensis* near to *F. marginata* and *F. polystachya* (see Koorders, 1898; Martelli, 1910a, 1910b; Keim and Rustiami, 2007; Keim, 2012). However, the number of stigma is still the most distinctive morphological character that separate *F. quezonensis* from the rest of Philippine species. Furthermore, the shape of auricle is straightforwardly distinct *F. quezonensis* from *F. marginata* and *F. polystachya*, even when only sterile materials are available (Table 1).

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