

Rediscovery in Singapore of *Calamus densiflorus* Becc. (Arecaceae)

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Abstract. *Calamus densiflorus* is a new record for Singapore after its rediscovery in the Rifle Range Road area in 2016. Its description, distribution and distinct vegetative characters are provided.

Key words. *Calamus densiflorus*, new record, Singapore

INTRODUCTION

Calamus densiflorus Becc. is a clustering rattan palm of lowland forest and was Presumed Nationally Extinct in Singapore (Tan et al., 2008; Chong et al., 2009). This paper reports its rediscovery in the Rifle Range Road area in 2016 and reassigns it status in Singapore to “Critically Endangered” according to the categories defined in The Singapore Red Data Book (Davison et al., 2008).

Description. *Calamus densiflorus* is a dioecious clustering rattan palm, climbing to 40 m tall (Fig. 1, p. 2). It has stems enclosed in bright yellowish green sheaths up to 4 cm wide. The spines are hairy, dense and slightly reflexed (Fig. 1, p. 2), with swollen bases. The knee of the sheath is prominent and the flagellum is up to 3 m long. The leaf is ecirrate, and without a petiole in mature specimens. The leaves are arcuate, about 1 m long with regularly arranged leaflets that are bristly on both margins. The male inflorescence has slightly recurved rachillae and is branched to 3 orders (Fig. 1). The female inflorescence has second order branching and its rachillae are slightly recurved and up to 10 cm long. The fruit is scaly and ovoid, about 2 cm long and 1.2 cm wide.

Distribution. *Calamus densiflorus* is a rattan of the lowlands to hills up to 600 m altitude and is distributed in Singapore, Peninsular Malaysia, and Thailand (Dransfield, 1979). It avoids swamp forests but can be found on river banks.

Herbarium records for Singapore (Table 1, p. 2) show that it was last collected in 1903 by Henry Nicholas Ridley in Bukit Timah. Previous to this were also collections made by Ridley in the 1890s in Bukit Mandai and the Gardens’ Jungle at the Singapore Botanic Gardens.

A clump of the rattan with some expired infructescences was first rediscovered in the Rifle Range Road area (herbarium specimen SING 2016-107) and the species was later found to also occur in the Chestnut Area after surveying the Central Catchment Nature Reserve for this palm.

Comparisons with *Calamus ridleyanus*. *Calamus densiflorus* is very easily confused with *Calamus ridleyanus* Becc. (Furtado, 1956; Dransfield, 1979) shown in Fig. 2 (p. 4). Besides a few vegetative characters (Fig. 3, p. 5) that can provide a tentative distinction from *Calamus ridleyanus*, several reproductive characters such as the spiny rachillae bracts and reflexed recurving rachillae in *Calamus ridleyanus* are needed to differentiate the two (Furtado, 1956; Dransfield, 1979). The suite of key features that differentiate between the two congeners are listed in Table 2. Besides superficial similarities in terms of general habit that explain why *Calamus densiflorus* is overlooked in the field, rattans are generally disregarded by plant collectors as they are “viciously spiny” (Dransfield, 1979). This rediscovery, that for *Salacca* (Loo, 2011) and the new record of *Plectocomiopsis* (Tan et al., 2011) vindicates Dransfield’s observation made 37 years ago.

CONCLUSION

More field work is needed to ascertain the distribution of *Calamus densiflorus* and its morphologically similar congener in Singapore. While it is certainly rare to spot in the field, it is an overlooked palm that requires further field studies.

This rediscovery also highlights the importance of our remnant forest patches in Singapore as a source and refuge for native species. Many of these species are overlooked or only discovered as new areas of the forests are accessed and explored. There are many more vegetated areas here that need to be thoroughly surveyed and documented.

Table 1. Singapore specimens of *Calamus densiflorus* Becc. in the Singapore Botanic Gardens' Herbarium (SING).

S/No.	Collector and Number	Date Collected	Location	Accession No.
1.	HN Ridley 11515	7 April 1903	Probably Bukit Timah Nature Reserve	0014613
2.	HN Ridley 11050	1898	Gardens Jungle, Singapore Botanic Gardens	0090478
3.	HN Ridley 6280	1891	Bukit Mandai	0090481
4.	HN Ridley 10861	1890	Gardens Jungle, Singapore Botanic Gardens	0090479
5.	HN Ridley 6280	1890	Gardens Jungle, Singapore Botanic Gardens	0090480



Fig. 1. *Calamus densiflorus*. A, habit, note the ecirrate leaves of the species; B, stem showing the slightly recurved spines characteristic of the species. Note the absence of leaf stalks in this mature specimen; C, dried male inflorescences.

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Table 2. Characters that differentiate *Calamus densiflorus* from *Calamus ridleyanus*. adapted from Dransfield (1979).

Characteristics	<i>Calamus densiflorus</i>	<i>Calamus ridleyanus</i>
Stem width	Stem with leaf sheaths to 4 cm wide.	Stem with leaf sheaths to 2.5 cm wide.
Leaf sheath colour and spines	Sheaths bright to yellowish green, armed densely with reflexed, blackish-brown spines; spine bases often joined by swollen ridges.	Sheaths dull green, rather densely armed with slightly upward pointing, hairy margined, pale-based, brown spines; spine bases only slightly swollen.
Presence of cirrus and leaf stalk	Leaf ecirrate to 1.1 m long, in juvenile specimens with leaf stalk to 20 cm long, in mature leaves usually with no leaf stalk.	Leaf subcirrate to about 1.3 m long with leaf stalk to 10 cm long in juvenile or mature leaves.
Bristles on leaflets	Leaflets conspicuously bristly on the 3 main veins above, and on the mid-vein below, and along margins.	Leaflets bristly along the mid-vein below, with no bristles on upper surface.
Inflorescence	Inflorescence with sparsely spiny bracts; female rachillae slightly recurved.	Inflorescence with spiny bracts; female rachillae distinctly recurved.



Fig. 2. *Calamus ridleyanus*. A, Habit; B, Stem showing the slightly upward pointing spines characteristic of the species. Note the presence of the leaf stalk in this mature leaf. C, recurved rachillae. Note the spiny prophyll characteristic of the species.



Fig. 3. Comparisons between *Calamus densiflorus* (left column) and *Calamus ridleyanus* (right column). A, the slightly recurved spines of *Calamus densiflorus*; B, the slightly upward pointing spines of *Calamus ridleyanus*; C, ecirrate; versus D, subcirrate leaves; E, sparsely spiny inflorescence bracts; versus F, densely spiny inflorescence bracts.