

## ***Dracaena breviflora* (Asparagaceae): an unusual species newly recorded in Singapore**

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**ABSTRACT.** *Dracaena breviflora* Ridl. (Asparagaceae) is newly recorded here for Singapore. A description and colour plates of this unusual species are included. Provisional conservation assessments of Endangered globally and Critically Endangered in Singapore are proposed.

**Keywords.** IUCN conservation assessment, Johor, Nee Soon fresh water swamp forest, Peninsular Malaysia, Seletar

### **Introduction**

Recent extensive fieldwork in Singapore in connection with plant conservation programmes and the preparation of accounts of the herbaceous monocot families for the *Flora of Singapore*, has resulted in a number of new discoveries (e.g. Niissalo et al., 2014; Leong-Škorničková & Boyce, 2015; Lim et al., 2018). During the surveys we came across two small populations of a very unusual *Dracaena* which, when sterile, we provisionally identified as a *Hanguana* sp. due to its leaf shape and overall habit. Closer observations revealed the presence of scale-like prophylls that were occasionally present among the youngest laminate leaves. Such prophylls are absent in non-stoloniferous *Hanguana* spp., which led to us placing the plants in *Dracaena*. We subsequently monitored the two locations and in 2015 were finally able to observe flowering.

The state of knowledge of *Dracaena* in the region is very poor. As previously mentioned by Ridley (1896), *Dracaena* species are by no means an easy group to study. This is partly because the leaves vary substantially in size even within a single plant, and the flowers and fruits of most species are very similar. Unfortunately, *Dracaena* species do not flower very often and their flowering time is rather unpredictable. In 1896, Ridley wrote an account on the *Dracaenas* of the Malay Peninsula, including Singapore. An updated version was published in the *Flora of the Malay Peninsula* in 1924 but since then there has been little progress in our understanding of the diversity of the genus in this region.

Based on the national checklist (Chong et al., 2009), seven native *Dracaena* species have been recorded in Singapore. Although the application of several names is uncertain and will be subject to critical revision in the near future, none of them could be applied to our recent collections. After scrutiny of the original descriptions and type

specimens of all *Dracaena* names from Southeast Asia, the extraordinarily short stem of the Singapore material left only two possibilities and the final identification was unproblematic. *Dracaena breviflora* Ridl. is very similar to *D. chiniana* I.M. Turner (previously called *D. congesta* Ridl., non *D. congesta* (Sweet) Schult.), but differs from it by having longer, more elongated leaves, inflorescences that are usually horizontal at anthesis (vs. erect), and most obviously by the much shorter flowers (c. 12 mm vs. c. 25 mm long from base of hypanthial tube to the tip of the tepals). The Singapore material matches *Dracaena breviflora* in all these aspects. Both species are native to Peninsular Malaysia, but *Dracaena breviflora* is more southern in its distribution, making it also the more likely species to be found in Singapore.

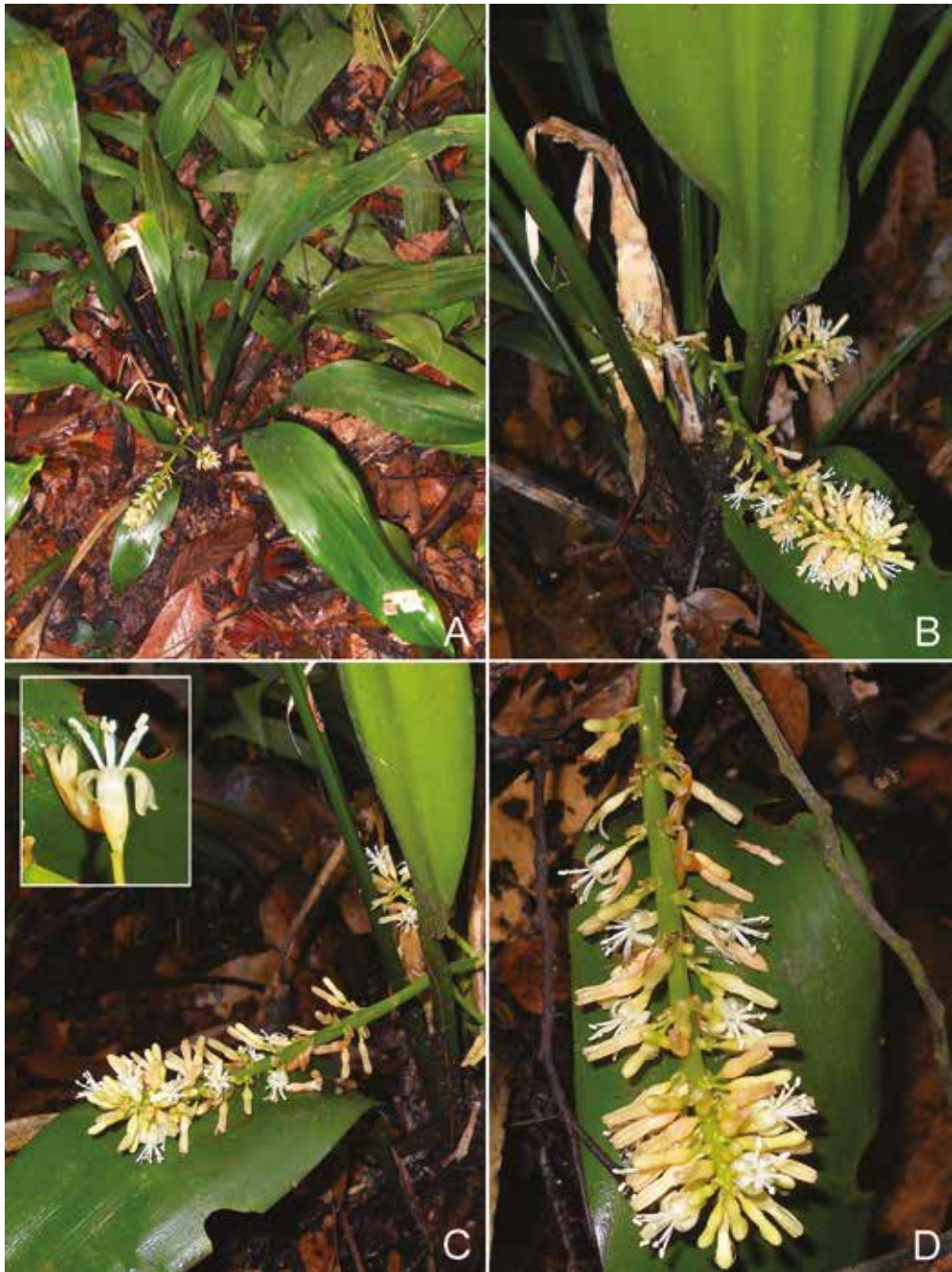
The general plant terminology here follows Beentje (2016). The global conservation assessment is based on the guidelines by (IUCN Standards and Petitions Subcommittee (2017). The local conservation assessment follows Davison et al. (2008).

***Dracaena breviflora*** Ridl., J. Bot. 34: 165 (1896). – TYPE: Cultivated in Singapore Botanic Gardens, 1895, *Ridley s.n.* (holotype SING [SING0233820]). (According to the protologue originally collected in Peninsular Malaysia, Ulu Batu Pahat [*Lake & Kelsall*], but likely collected at Ulu Kahang, see Notes below). (Fig. 1 & 2).

**Mesophyte** to c. 0.8 m tall; stem terete, to 2 cm in diam., basally semi-ascending, with age becoming leafless (up to 50 cm), old stem dark to mid brown, woody, young stem lighter rusty brown, terminally ascending with a crown of 8–12 leaves. **Leaves** to 80 cm long, spreading then arching, bases imbricate; *pseudopetiole* 18–38 cm long, c. 7–10 mm wide, accounting for 1/3–1/2 of the entire leaf length, cylindrical with a rounded adaxial channel with acute margins; *leaf blade* 24–55 × 6–11 cm, elliptic, base obtuse, tip broadly acuminate with apicule c. 4 mm long, leathery, irregularly corrugated, adaxially mid to dark green, abaxially lighter green, shiny; *midrib* obscure, barely visible abaxially in basal 1/3; *prophylls* scale-like, only occasionally present, associated with inflorescences, varying in size, to 10 cm long. **Inflorescence** terminal, *peduncle and rachis* together to 16(–20) cm long, bright light green, glabrous, finely ridged, base of peduncle erect, rachis almost horizontal, simple or rarely with one level of branching, branches (when present) short, to 4 cm long, inserted on the most basal part of the rachis; glomerules composed of 3–5 flowers, internodes between glomerules irregular, to 7 mm in length, glomerular bracts 1–8 × 1–3 mm, narrowly to broadly ovate with acute tips, membranaceous, clasping glomerule base, most visible on very young inflorescences (not visible in old inflorescences and infructescences, possibly caducous), floral bracts very small, 1–2 mm long, clasping pedicel base. **Flowers** c. 12 mm long, patent to axis to ascending on c. 3 mm long pedicel, slightly expanded and articulated at its apex; receptacle c. 1.5 mm long, obconical, light greenish, somewhat verrucose; flower with a tubular hypanthium 5–6 mm long, dividing into 6 tepals and 6 stamens; *tepals* c. 6 × 2.5 mm, oblong to slightly obovate, pale sulphur yellow to greenish externally (turning pale orange after anthesis), cream white internally, recurved at anthesis, apex slightly cucullate, rounded; *filaments* 4–5



**Fig. 1.** *Dracaena breviflora* Ridl. **A.** Habit of mature plant. **B.** Basal part of young stem showing accumulation of humus among the pseudopetioles (left) and old leafless stem (right). **C.** Habit of young plant. A, B from Seletar, Niissalo & Leong-Škorničková DRA-12; C from Nee Soon (Photos: J. Leong-Škorničková).



**Fig. 2.** *Dracaena breviflora* Ridl. **A.** Plant in flower. **B, C.** Inflorescence from two different angles (C inset: side view of flower). **D.** Close up of an inflorescence. From Seletar, Niissalo & Leong-Škorničková DRA-12 (Photos: M.A. Niissalo).

× 0.3–0.5 mm, erect, white; *anthers* dorsifixed, 1.5–1.8 × 0.8–1 mm, cream to pale yellow; *ovary* superior, c. 2.5 × 1.7 mm, ellipsoid, cream white, 3-locular, smooth, with an apical swelling at the apex of each vertical loculicidal dehiscence line; *style* c. 8 mm long, 0.20–0.25 in diam., erect, terete, white, smooth; stigma c. 0.4 × 0.3 mm, obscurely 3-lobed, capitate, finely verrucose. **Ripe fruit** not seen (‘globose, brown-red’ according to information on the label of *Kiew RK 1981*).

*Distribution.* Based on our recent extensive surveys on the remaining primary forest patches in Singapore (Niissalo et al., 2017), the species is only found in the Nee Soon freshwater swamp forest (NSFS) and adjacent areas near Upper Seletar. In Peninsular Malaysia the species has been recorded from four or five localities (all historic collections) across Johor: Sungai Tebrau and Castlewood (both in the area of today’s Johor Bahru and possibly the same locality), Ulu Kahang, Gunung Pantı, and two more recent collections in an area now included in Endau-Rompın National Park (Ridley, 1896; herbarium specimens).

*Ecology & phenology.* In Singapore *Dracaena breviflora* seems to be restricted to swamp forest. In both locations (NSFS and Seletar) the species occurs beside streams in locations with permanently moist soil. Based on historical collections and our observations, the species seems to lack a specific flowering period.

*Provisional IUCN conservation assessment.* *Dracaena breviflora* is known currently and historically from a total of six to seven localities, including in Singapore, with a known global Extent of Occurrence of less than 5000 km<sup>2</sup>. Three of the known localities are in protected areas (Central Catchment Nature Reserve, Singapore, Endau-Rompın National Park, Malaysia, and Gunung Pantı Recreational Forest, Malaysia), but fairly recent collections are not known from Gunung Pantı and the number of individuals in Singapore is extremely small. The localities near Johor Bahru (Castlewood and Sungai Tebrau) have been deforested. From the above it is evident that the suitable habitat is severely fragmented and with a continuing decline in the Extent of Occurrence, the extent and quality of the habitat, and the number of locations. The species should therefore be considered Endangered EN B1ab(i,iii,iv) (IUCN, 2017). In Singapore only four clumps have been found despite extensive effort, and the species should be considered Critically Endangered (CR/D) nationally (Davison et al., 2008).

*Additional specimens examined.* MALAYSIA: **Johor:** Ulu Kahang, 28 Oct 1892, *Lake & Kelsall s.n.* (SING, flowering voucher); Sungai Tebrau, 1903, *Ridley s.n.* (SING, with old inflorescences); Castlewood, 1903, *Ridley s.n.* (SING, fruiting voucher); Castlewood, Feb 1904, *Ridley 12017* (K with old inflorescence, SING flowering voucher); Castlewood, 1905, *Ridley 12212* (K, with buds); Gunung Pantı, 8 Dec 1892, *Ridley s.n.* (SING, “small var.”, fruiting voucher); Endau, South Plateau, 17 Apr 1986, *Kiew RK 2185* (SING, flowering voucher); Sungai Salat on Sungai Endau, 3 Sep 1985, *Kiew RK 1981* (SING, fruiting material [“ripe fruits globose, purple-brown”]).

SINGAPORE: **Central Catchment Nature Reserve:** border of Upper Seletar and Nee Soon, 3 Apr 2015, *Niissalo DRA-12* (SING; incl. flowers in spirit); Nee Soon, 3 Apr 2015, *Leong-Škorničková & Aung Thame DRA-3* (SING, sterile); Nee Soon, 10 Feb 2015, *Leong-Škorničková & Aung Thame* (photo only, population marked as *DRA-9* for monitoring purposes)

*Notes.* The species was described by Ridley (1896) from plants grown in Singapore Botanic Gardens. Ridley stated that the plants were originally collected by Lake & Kelsall in Ulu Batu Pahat but we could trace only a single specimen of this species collected by Lake & Kelsall which predates the protologue. It was collected from Ulu Kahang (also Johore) on 28 October 1892 and the label on this specimen is written in Ridley's hand and annotated as 'D. breviflora n. sp.' We suspect that Ridley made a mistake in the protologue, most likely because the collecting trip of Lake & Kelsall in 1892, during which the species was collected, ended in Ulu Batu Pahat on 5 November 1892 (Wong et al., 1988).

Only a single specimen deposited in Singapore herbarium could be located to match the protologue and is therefore considered to be the holotype. Another two sheets at K are marked as type material, *Ridley 12017* [K000400063] and *Ridley 12212* [K000400062], but although both are this species, neither of them are original material as they postdate the protologue. As already noted by Ridley, this species is easy to recognise due to its *Hanguana*-like habit with leaves that are recurved and form a fairly large tuft. The very short flowers are unusual and unlike any other *Dracaena* species we have seen so far in Singapore.

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