

***Schizostachyum lengguanii* (Poaceae), a new native record and an updated key to the genus in Singapore**

X. Y. Ng*, H. K. Lua, Z. Y. Ooi & W. F. Ang

National Parks Board, 1 Cluny Road, Singapore 259569, Republic of Singapore; Email: ng_xin_yi@nparks.gov.sg (*corresponding author)

Abstract. Previously, two species of *Schizostachyum* were known to occur naturally in Singapore. A third species, *Schizostachyum lengguanii* was collected from old secondary vegetation in Singapore and represents a new native species record for Singapore. It is assessed as ‘Critically Endangered’ locally. An updated key to the native *Schizostachyum* species of Singapore is also presented.

Key words. Bambusoideae, *Schizostachyum*, conservation, new record

Recommended citation. Ng XY, Lua HK, Ooi ZY & Ang WF (2022) *Schizostachyum lengguanii* (Poaceae), a new native record and an updated key to the genus in Singapore. Nature in Singapore, Supplement 1: e2022117. DOI: 10.26107/NIS-2022-0117

INTRODUCTION

Bamboos (Poaceae: Bambusoideae) are represented by four species across three genera in the native flora of Singapore: *Gigantochloa*, *Schizostachyum*, and *Soejatmia* (Veldkamp et al., 2019). Members of the genus *Schizostachyum* are clumped bamboos, easily recognisable by a distinctive white-waxy area below the culm nodes (Veldkamp et al., 2019). The genus comprises about 70 species naturally distributed from South China, throughout Southeast Asia into the Pacific Islands and Madagascar (Clayton et al., 2022). It was known from two species native to Singapore in the recently published Flora of Singapore, namely, *Schizostachyum gracile* (Munro) Holttum and *Schizostachyum latifolium* Gamble, although Chua et al. (1996) believed that the latter was already extinct here. *Schizostachyum latifolium* is currently listed as ‘Presumed Nationally Extinct’, and the only extant native species, *Schizostachyum gracile*, is listed as ‘Critically Endangered’ in Singapore (Veldkamp et al., 2019).

NEW RECORD OF *SCHIZOSTACHYUM LENGGUANII*

On 23 and 26 December 2019, during field surveys carried out at the Live Firing Area Coastal Line at the Western Catchment, a flowering bamboo plant was first observed in a patch of old secondary forest, growing on swampy ground in a small valley near the head of a small stream, and encountered again at the edge of another secondary forest patch next to a vehicular track. The vegetation was composed of mostly native species such as *Syzygium* spp., *Vitex pinnata*, *Dillenia suffruticosa*, *Melastoma malabathricum* and *Artabotrys suaveolens*, with some exotic species such as *Clidemia hirta* and *Stachytarpheta indica* limited to the edges of the vegetation along the vehicular dirt track. The first encountered plant was estimated to be about 8 m tall, with longer culms bending and arching over. Further survey of the vegetation on site also revealed another stand of the same bamboo species which were about the same height or shorter. Seedlings were also observed in the forest understorey. Flowering and fruiting specimens were collected and deposited with the Singapore Herbarium (SING; Table 1) and were later identified to be *Schizostachyum lengguanii* K.M.Wong (Fig. 1). A description adapted from Wong (1995) and based on the observed plants in-situ and collected specimens, as well as an updated key to the native *Schizostachyum* species in Singapore, are provided below.

Schizostachyum lengguanii K.M.Wong, Bamboos Penins. Malaysia (1995) 176.

Description. Culm sheaths green, covered with short white and pale brown appressed hairs; blade lanceolate, erect then spreading; auricles small lobes 1.5–2.5 mm high, with bristles 6–10 mm long; ligule a subentire rim 0.5–1 mm high. Culms to 4–6 m long, to 8 m tall (Fig. 2), commonly 1–1.5 cm diameter; internodes 25–36 cm long, dark green. Branch complement typically a cluster of slender subequal branches, none dominant, these rebranching further. Leaf blades 12–21 cm long, 1.0–2.7 cm wide, glabrous below; stalk 2–5 mm long; auricles inconspicuous tiny lobes bearing a few fine bristles 1–2 mm long that break or fall off easily; ligule an inconspicuous subentire rim, not bristly. Inflorescence of pseudospikelets, spikelets 12–18 mm long; perfect flower one (Fig. 3a); lemma 8–9.5 mm long, with an apical point

hardly 0.1 mm long, with minute pale hairs at the apex and glabrous on the margin; paleas 9.5–11.5 mm long, with two tiny apical points hardly 0.1 mm long; lodicules 3; anthers c. 3.5 mm long, apex rounded. Fruit caryopsis, ovoid (Fig. 3b).

Distribution. Peninsular Malaysia, Singapore, and Sumatra. *Schizostachyum lengguanii* was previously only recorded at the type locality of Tasik Chini in Pahang, Peninsular Malaysia (Wong, 1995). Re-examination of previous collections in SING have revealed that it also occurs in other parts of Peninsular Malaysia (e.g., Segamat and Kota Tinggi, Johor) and in Pulau Bangka, Sumatra, Indonesia. In Singapore, it is only recorded from the Live Firing Area Coastal Line, in the Western Catchment, which represents a new locality in the distribution range of this species.

Habitat. In moist or swampy ground and along waterbodies in lowland forests.

Proposed conservation status in Singapore. As the vegetation where the bamboo was found is largely undisturbed and *Schizostachyum lengguanii* is not known to be commercially traded or available, we consider it to be native to the area. This is currently the only known location of *Schizostachyum lengguanii* in Singapore and fewer than 50 mature individuals have been observed. *Schizostachyum lengguanii* is thus assessed to be ‘Critically Endangered’ in Singapore according to the guidelines of Davison (2008).

Table 1. Local collections of *Schizostachyum lengguanii* K.M.Wong deposited with the Singapore Herbarium (SING), Singapore Botanic Gardens.

S/No.	Barcode No.	Collector	Collector No.	Date Collected	Locality
1.	0276265	Lua, H.K.; Ang, W.F.; Ng, X.Y.; Yeo, C.K.; Chia, E.; Teo, J.	SING 2019-1414	23 December 2019	Live Firing Area Coastal Line at Western Catchment
2.	0276266	Lua, H.K.; Ang, W.F.; Ng, X.Y.; Yeo, C.K.; Chia, E.; Teo, J.	SING 2019-1414	23 December 2019	Live Firing Area Coastal Line at Western Catchment
3.	0276267	Lua, H.K.; Ang, W.F.; Ooi, Z.Y.; Ng, X.Y.; Yeo, C.K.; Yong, C.H.C.; Tan, B.G.	SING 2019-1440	26 December 2019	Live Firing Area Coastal Line at Western Catchment
4.	0276268	Lua, H.K.; Ang, W.F.; Ooi, Z.Y.; Ng, X.Y.; Yeo, C.K.; Yong, C.H.C.; Tan, B.G.	SING 2019-1440	26 December 2019	Live Firing Area Coastal Line at Western Catchment



Fig. 1. Branch complement of *Schizostachyum lengguanii* made up of slender branches at each culm node. (Photograph by: Ang W. F.).



Fig. 2. Habit of *Schizostachyum lengguanii*, a clustering bamboo growing to about 8 m tall at the edge of a mature secondary forest in the Western Catchment in Singapore. (Photograph by: Ang W. F.).



Fig. 3. (A) Pseudospikelets of *Schizostachyum lengguanii*, showing three purple stigmas of the flower; (B) Ovoid caryopsis of *Schizostachyum lengguanii*. (Photographs by: Ang W. F.).

PROPAGATION AND CONSERVATION

The addition of *Schizostachyum lengguanii* to the flora of Singapore brings the number of native bamboo species to five and represents another extant native *Schizostachyum* species in Singapore along with *Schizostachyum gracile*. *Schizostachyum lengguanii* is only common in a few localities in Pahang and Johor (Peninsular Malaysia), a single locality in Sumatra and presently, in Singapore. It is potentially threatened at its type locality of Tasik Chini and at Merchong in Pahang, as the rise in water levels of Tasik Chini from tourism development in the area has extirpated many clumps due to flooding, while logging activities have also devastated parts of the Merchong population (Wong, 2004). The conservation of this species is therefore important owing to its small population throughout its range. To conserve this species in Singapore, a mature plant of *Schizostachyum lengguanii* and some seedlings were collected and transported back to the Native Plant Centre of the National Parks Board for propagation. Propagation by division of the mature plant was carried out according to various methods described in the literature (Wong, 1995). A mature clump propagated from division was also planted in the Bambusetum of the Singapore Botanic Gardens at the Tyersall Learning Forest. The only known locality of the species in Singapore is also currently protected from urban development as it is used for military exercises.

UPDATED KEY TO THE NATIVE *SCHIZOSTACHYUM* SPECIES OF SINGAPORE

1. Culm-sheath blades erect, ovate-triangular and inflated *S. gracile*
Culm-sheath blades spreading, lanceolate and leaf-like 2
2. Leaves pale, short-hairy all over on the lower side; leaf ligules bristly. Spikelets 18–32 mm long ... *S. latifolium*
Leaves glabrous or only a little hairy near the base; leaf ligules not bristly. Spikelets 12–14 mm long
..... *S. lengguanii*

ACKNOWLEDGEMENTS

We would like to thank Kenneth Er, Chief Executive Officer of the National Parks Board (NParks), Yap Him Hoo, Deputy Chief Executive Officer and Leong Chee Chiew, Executive Director for their support and direction in the flora survey and plant conservation work in Singapore. We would also like to thank Wong Khoon Meng for his thoughtful comments on the manuscript, David Middleton, and Serena Lee for facilitating access to the collections. Reuben Lim is thanked for propagating the plants in NParks Native Plant Centre and Lai Simin for facilitating the planting of stock plants in Singapore Botanic Gardens Learning Forest Bambusetum.

We dedicate this paper to Hugh Tan Tiang Wah who recently retired from the National University of Singapore (NUS). Of the botanical and horticultural research conducted by him over the years in NUS, we especially acknowledge his championing of research efforts and conservation work on the native plants of Singapore and for also training generations of plant biologists, many of whom are still involved in biological conservation in one way or another in Singapore and internationally.

LITERATURE CITED

- Chong KY, Tan HTW & Corlett RT (2009) A Checklist of the Total Vascular Plant Flora of Singapore: Native, Naturalised and Cultivated Species. Raffles Museum of Biodiversity Research, National University of Singapore, Singapore, 273 pp. Uploaded 12 November 2009. https://lkenhm.nus.edu.sg/wp-content/uploads/sites/10/app/uploads/2017/04/flora_of_singapore_tc.pdf (Accessed 1 May 2021).
- Chua KS, Soong BC & Tan HTW (1996) The Bamboos of Singapore. International Plant Genetic Resources Institute (IPGRI), Singapore, 71 pp.
- Clayton WD, Govaerts R, Harman KT, Williamson H & Vorontsova M (2022) World Checklist of Poaceae. Facilitated by the Royal Botanic Gardens, Kew. <http://wmsp.science.kew.org> (Accessed 19 May 2022).
- Davison, GWH (2008) The Red List Categories. In: Davison GWH, Ng PKL & Ho HC (eds.) The Singapore Red Data Book: Threatened Plants & Animals of Singapore. 2nd Edition. Nature Society (Singapore), Singapore, pp. 1–4.
- Veldkamp JF, Duistermaat H, Wong KM & Middleton DJ (2019) Poaceae (Gramineae). Flora of Singapore, 7: 219–501.
- Wong KM (1995) The Bamboos of Peninsular Malaysia. (Malayan Forest Records; No. 41). Forest Research Institute Malaysia (FRIM), Kepong, Kuala Lumpur, 200 pp.
- Wong KM (2004) Bamboo: The Amazing Grass. A Guide to the Diversity and Study of Bamboos in Southeast Asia. International Plant Genetic Resources Institute and University of Malaya, Malaysia, 80 pp.