

## REDISCOVERY IN SINGAPORE OF *PINANGA SIMPLICIFRONS* (MIQ.) BECC. (ARECACEAE)

W. F. Ang, Alvin Francis S. L. Lok and H. T. W. Tan\*

Department of Biological Sciences, National University of Singapore

14 Science Drive 4, Singapore 117543, Republic of Singapore

(\*Corresponding author: [dbsttw@nus.edu.sg](mailto:dbsttw@nus.edu.sg))

### INTRODUCTION

This paper documents the rediscovery, distribution and status of *Pinanga simplicifrons* (Miq.) Becc. in Singapore (Fig. 1). The genus *Pinanga* belongs to the family Arecaceae (also Palmae), and consists of 152 species distributed from India and southern China, through Southeast Asia to New Guinea (Govaerts & Dransfield., 2005; Dransfield et al., 2008).



Fig. 1. *Pinanga simplicifrons* is a small palm with simple, long, oblong leaf blades with forked tips. Length of leaf blade (arrowed) = 29 cm. (Photograph by: Alvin Francis Lok Siew Loon).

*Pinanga* is best represented in Southeast Asia, with the greatest species diversity centred in the wetter areas of the Sunda Shelf (Dransfield et al., 2008). *Pinanga* species are distinguished from most other palms by the entire margins of the leaf blades of leaves or leaflets (as opposed to being abruptly broken off), a single floral bract encasing the inflorescence, the rachillae of the inflorescence bearing male and female flowers in triads throughout the rachilla length, the usually slightly hollowed basal attachment of the ruminant seed, and the usual presence of a prominent crownshaft (Dransfield et al., 2008). Thirty-two species of *Pinanga* are known to occur in Peninsular Malaysia and Thailand (Lim, 2001).

### PAST AND PRESENT RECORDS

Six *Pinanga* species are known to be native to Singapore—*Pinanga disticha* (Roxb.) Blume ex H. Wendl., *Pinanga limosa* Ridl., *Pinanga malaiana* (Mart.) Scheff., *Pinanga singaporensis* Ridl., *Pinanga simplicifrons* (Miq.) Becc., and *Pinanga subruminata* Becc. (Table 1) (Keng et al., 1998; Chong et al., 2009). However, only the nationally endangered *Pinanga malaiana* is still extant, with all other species being listed as being nationally extinct in Singapore (Tan *et. al.*, 2008). Native *Pinanga* species were noted to occur in Bukit Mandai, Bukit Timah, Choa Chu Kang, Kranji, and Seletar, all known to be moist forest habitats in Singapore (Keng et al., 1998).

Table 1. Singapore collections of native species of *Pinanga* Blume deposited in the Herbarium, Singapore Botanic Gardens (SING).

S/No.	Species	Bar Code No.	Collector	Collector's No.	Date Collected	Locality
1.	<i>Pinanga disticha</i> (Roxb.) Blume ex H. Wendl.	0014943	C. X. Furtado	s.n.	12 Sept.1932	Botanic Gardens
2.	<i>Pinanga disticha</i> (Roxb.) Blume ex H. Wendl.	0014944	C. X. Furtado	s.n.	13 Sept.1932	Botanic Gardens
3.	<i>Pinanga disticha</i> (Roxb.) Blume ex H. Wendl.	0058286	Sidek	605	22 May 1995	Botanic Gardens
4.	<i>Pinanga limosa</i> Ridl.	0014945	H. Kelsall	s.n.	1890	-
5.	<i>Pinanga limosa</i> Ridl.	0014947	Anonymous	s.n.	1907	Bukit Timah
6.	<i>Pinanga limosa</i> Ridl.	0014949	H. N. Ridley	s.n.	Apr.1902	Bukit Timah
7.	<i>Pinanga limosa</i> Ridl.	0014946	J. S. Goodenough	s.n.	15 Apr.1890	Chan Chu Kang
8.	<i>Pinanga limosa</i> Ridl.	0014948	H. N. Ridley	s.n.	1909	MacRitchie Reservoir
9.	<i>Pinanga limosa</i> Ridl. var. <i>limosa</i> Ridl.	0058030	H. N. Ridley	s.n.	21 Jan.1892	Seletar
10.	<i>Pinanga malaiana</i> (Mart.) Scheff.	0014910	C. X. Furtado	s.n.	27 Nov.1932	Botanic Gardens
11.	<i>Pinanga simplicifrons</i> (Miq.) Becc.	0014911	C. X. Furtado	26130	16 Dec.1932	Botanic Gardens
12.	<i>Pinanga simplicifrons</i> (Miq.) Becc.	0014912	C. X. Furtado	26130	14 Dec.1932	Botanic Gardens
13.	<i>Pinanga singaporensis</i> Ridl.	0058032	H. N. Ridley	s.n.	29 Oct.1900	Bukit Mandai
14.	<i>Pinanga singaporensis</i> Ridl.	0058033	H. N. Ridley	s.n.	1900	Bukit Timah
15.	<i>Pinanga singaporensis</i> Ridl.	0058031	H. N. Ridley	s.n.	1901	Stagmont

### DETAILS OF THE REDISCOVERY

*Pinanga simplicifrons* is a short, clumping palm, usually growing below 1 m tall (Whitmore, 1985; Jones, 1995; Keng, 1998; Lim, 2001) (Fig. 2). The stems are slender, about 8 mm in diameter with overlapping dry leaf sheaths throughout. The leaf blades are 25–35 cm long, simple, oblong in shape, deeply forked at the apex and prominently veined from the





Fig. 2. This plant grows together with other swamp forest species such as *Aglaonema nitidum* (bottom left). Plant height to tip of crown shaft = 97 cm. (Photograph by: Alvin Francis Lok Siew Loon).



Fig. 3. Scarlet fruits emerging from the dried prophyll. Lower fruit length = 0.8 cm. (Photograph by: Alvin Francis Lok Siew Loon).

mid rib to the margins (Fig. 1). The inflorescence is encased in a rigid prophyll, and bears flowers on both sides of the rachis. When fruiting, the prophyll splits open to reveal 2-cm long, curved fruits that ripen from green to scarlet (Fig. 3). *Pinanga simplicifrons* is distinguished from other *Pinanga* species by the lack of a crownshaft and the extraordinary inflorescence which bursts through the marcescent leaf bases and where the prophyll is persistent. This small palm is known to occur from southern Thailand, through Peninsular Malaysia, Singapore, Sarawak, Brunei Darussalam and Sumatra. *Pinanga simplicifrons* thrives in lowland forests, often in swampy areas with rich alluvial soil under canopy (Jones, 1995; Whitmore, 1985) and is said to be common in the swamp forests of Sedili region in Johore (Corner, 1978).

On 4 Feb.2010, in a survey carried out at the edge of the Nee Soon Swamp Forest, a small clump of *Pinanga simplicifrons* was rediscovered at a single locality in a primary freshwater swamp forest fragment between the Singapore Armed Forces Nee Soon Firing Range I and the Executive Golf Course Driving Range, to the East of a service road off Mandai Road Track 7 (Fig. 4). The plant was in fruit (Fig. 2) and was found growing in the shade beneath dense canopy cover, together with other characteristic swamp forest plants such as *Aglaonema nitidum* and *Dracaena cantleyi* (Fig. 2). No other clumps or individuals were found within the area, although it is highly likely that there are other individuals or viable populations of this palmet in the deeper reaches of Nee Soon Swamp Forest, since the small palm discovered was in fruit, assuming cross-pollination and another plant as the pollen parent. Dispersal of this palm is likely to be carried out by frugivorous understorey forest birds, as this species is rather short, and the scarlet fruit probably attracts bird species that forage through the undergrowth.

The swampy, shaded forest habitat that *Pinanga simplicifrons* thrives in has declined substantially throughout Singapore. Nee Soon Swamp Forest is the last of primary freshwater swamp forest in Singapore, yet it is encroached by a golf course, military training area, and a pipeline (Fig. 4). The forest's plants and animals are also still very much under-surveyed and studied (Ng & Lim, 1992), hence, there is a good possibility that it still contains many rare species, including those now thought nationally extinct. Relevant agencies that have ownership to properties adjacent or within the boundaries of the forest should also exercise caution and due diligence to ensure that disturbance to this remnant, relic habitat is minimal. About 30% of Singapore's native vascular plants are considered globally or nationally extinct (Chong et al., 2009). While this staggering figure may seem contradictory to Singapore's Garden City reputation, the occasional rediscovery of deemed nationally extinct plants over the years brings hope for Singapore's biodiversity.





Fig. 4. The site of the rediscovery of *Pinanga simplicifrons* is the forest fragment on the left. The central road (a service road off Mandai Road Track 7) leads to the Singapore Armed Forces Nee Soon Range I and cuts through part of Nee Soon Swamp Forest. A pipeline belonging to the Public Utilities Board lies on the right side of the road. (Photograph by: Alvin Francis Lok Siew Loon).

#### ACKNOWLEDGEMENTS

We would like to express our gratitude to the Chief Executive Officer and staff members of the National Parks Board (NParks) for allowing us access to collections of *Pinanga simplicifrons* at the Herbarium, Singapore Botanic Gardens (SING), as well as for granting us permission to access the Central Catchment Nature Reserve, and to John Dransfield for kindly confirming the identity of the plant, and providing critical comments to improve this article.

#### LITERATURE CITED

- Chong, K. Y., H. T. W. Tan & R. T. Corlett, 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 Nov.2009. [http://rmbur.nus.edu.sg/raffles\\_museum\\_pub/flora\\_of\\_singapore\\_tc.pdf](http://rmbur.nus.edu.sg/raffles_museum_pub/flora_of_singapore_tc.pdf). (Accessed 29 Mar.2010).
- Corner, E. J. H., 1978. The freshwater swamp-forest of South Johore and Singapore. *Gardens' Bulletin, Singapore*, Supplement 1: 1–266 pp.
- Dransfield, J., N. W. Uhl, C. B. Asmussen, W. J. Baker, M. M. Harley & C. E. Lewis, 2008. *Genera Palmarum: The Evolution & Classification of Palms*. Kew Publishing, UK. 732 pp.
- Govaerts, R. & J. Dransfield, 2005. *World Checklist of Palms*. Kew Publishing, UK. 235 pp. (Updated online at: <http://www.kew.org/wcsp/>). (Accessed 14 Mar.2010).
- Jones, D. L., 1995. *Palms Throughout the World*. Smithsonian Institution Press, Washington, D. C.. 410 pp.
- Keng, H., S. C. Chin & H. T. W. Tan, 1998. *The Concise Flora of Singapore. Volume II: Monocotyledons*. Singapore University Press, Singapore. 215 pp.
- Lim, C. K., 2001. Unravelling *Pinanga* Blume (Palmae) in Peninsular Malaysia. *Folia Malaysiana* 2(2): 219–276.
- Ng, P. K. L. & K. K. P. Lim, 1992. The conservation status of the Nee Soon freshwater swamp forest of Singapore. *Aquatic Conservation: Marine and Freshwater Ecosystems* 2(3): 255–266.
- Ridley, H. N., 1925. *The Flora of the Malay Peninsula. Volume V*. L. Reeve & Co., Ltd, London. 469 pp.
- Tan, H. T. W., B. C. Tan, K.-x. Tan, Ali bin Ibrahim, P. T. Chew, K. S. Chua, H. Duistermaat, S.K. Ganesan, M. W. K. Goh, A. T. Gwee, R. Kiew, S. M. L. Lee, P. Leong, J. Lim, A. F. S. L. Lok, A. H. B. Loo, S. K. Y. Lum, T. Morgany, Saifuddin bin Suran, S. Sim, Haji Samsuri bin Haji Ahmad, Y. C. Wee, K. F. Yap, C. K. Yeo & J. W. H. Yong, 2008. Checklists of threatened species: Seed plants. In: Davison, G. W. H., P. K. L. Ng & H. C. Ho (eds.), *The Singapore Red Data Book: Threatened Plants and Animals of Singapore. 2<sup>nd</sup> Edition*. Nature Society (Singapore), Singapore. Pp. 213–245.
- Whitmore, T. C., 1985. *Palms of Malaya*. Oxford University Press, Singapore. 132 pp.