

THE STATUS AND DISTRIBUTION IN SINGAPORE OF *FINLAYSONIA OBOVATA* WALL. (APOCYNACEAE)

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INTRODUCTION

This paper documents the distribution and status of *Finlaysonia obovata* Wall. (Apocynaceae) in Singapore. This species, also known as kalak kambing or oyod kambing (see Burkill, 1966), belongs to the family Apocynaceae and subfamily Asclepiadoideae (formerly Asclepiadaceae) (see Stevens, 2001 onwards). Most of the species in Asclepiadoideae are climbers and exude milky latex at the point of injury. Other more well-known members of this subfamily include species of *Asclepias*, *Calotropis*, *Dischidia*, and *Hoya*, all of which are common horticultural plants grown for their attractive flowers and some for their interesting foliage.

The genus *Finlaysonia* was named by Nathaniel Wallich in honour of George Finlayson (1790–1823) who was a surgeon in the service of the East India Company and a naturalist on the 1821–1822 mission to Siam and Cochinchina (present-day Thailand, and the southern third of Vietnam, respectively) (van Steenis-Kruseman & van Welzen, 2006). The specific epithet, *obovata* (from Latin *ob-*, reverse; *ovatus*, egg-shaped) is derived from the shape of the lamina which is egg-shaped with the narrower end proximal. This species is a woody climber with fleshy, shiny green, glabrous laminae that are ovate to broadly oblong and have a cuneate base (Fig. 1) (Ridley, 1923; Backer & Bakhuizen van den Brink, 1965; Keng, 1990). The opposite leaves have thick petioles and are borne on drooping branchlets. Flowers are borne by axillary, shortly-stalked, branched cymes. Each flower's corolla is dull yellow with or without a purplish tinge in the centre and is covered with white hairs (Fig. 2). The flowers are fetid and are probably pollinated by carrion-seeking insects such as flies or beetles. The ribbed fruits are green and fleshy and resemble a pair of buffalo horns (Fig. 3). Each fruit contains numerous brown, flat, oblong-obovate seeds.



Fig. 1. *Finlaysonia obovata* growing on a tree at the Kranji Canal. (Photograph by: Ria Tan).



Fig. 2. (a) Branched cyme with completely white flowers of the plant at the Kranji Canal. (Photograph by: Ria Tan). (b) Typical pale-yellow flowers with corolla covered in fine white hair and a purplish centre, here seen on specimen from Pulau Tioman, Pahang, Peninsular Malaysia. (Photograph by: Yeo Keng Hui Ron).



Fig. 3. The buffalo horn-shaped green, fleshy, ribbed fruits. (Photograph by: Ria Tan).

PAST AND PRESENT RECORDS

Finlaysonia obovata is distributed from the Bay of Bengal to the Moluccas and Northern Territory in Australia where it is known to be rare (Forster, 1996; Duke, 2006; Giesen et al., 2006). In Southeast Asia, it is recorded in Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Singapore, Thailand, and Vietnam. Although this species is said to be uncommon in its range, it is locally abundant in mangrove forests where it can be found (Giesen et al., 2006). In Singapore, it is usually found in mangrove forest fragments, and on tidal river banks (Ridley, 1923; Keng, 1990).

Prior to 1994, *Finlaysonia obovata* was only collected from Geylang and Kranji (Keng, 1990). Since then, it has been collected from several other localities such as Pasir Panjang Road, Pasir Ris Park, Pulau Unum, Sungei Khatib Bongsu (Table 1). This suggests that *Finlaysonia obovata* probably occurs in many mangrove forest patches in Singapore. This species was classified as nationally vulnerable in the 1st Edition of The Singapore Red Data Book (Turner et al., 1994) and its status has since been upgraded to nationally critically endangered in the 2nd Edition because it is estimated that there are fewer than 50 mature individuals left in the wild, with some evidence of decline or fragmentation of its natural habitat (Davison, 2008; Tan et al., 2008).

On 16 Nov.2009, in a biodiversity survey conducted at Sungei Berlayar, two small populations of *Finlaysonia obovata* were encountered by WFA and ST trailing on nipah palms (*Nypa fruticans*) at different parts of the creek. The 1-km mangrove strip along Sungei Berlayar is bordered by Keppel Country Club on the eastern bank, a furniture showroom followed by a stretch of state land on the western bank, terminating into the Circle Line-Labrador Park Station construction site furthest away from the sea. *Finlaysonia obovata* plants were observed at two separate locations along the western bank near the furniture showroom and the Circle Line-Labrador Park Station construction site. The climber was earlier encountered by PXN and WFA on 22 Sep.2009 at Seletar Camp Wet-Gap climbing on api api bulu (*Avicennia rumphiana*), bakau putih (*Bruguiera cylindrica*), and dungun (*Heritiera littoralis*) trees at the back mangrove zone. Also observed in the Seletar Camp Wet-Gap, were two other critically endangered native mangrove climbers, Australian rubber vine (*Gymnanthera oblonga*), and maiden's jealousy (*Tristellateia australasiae*) growing on other back-mangrove plants such as blind-your-eyes (*Excoecaria agallocha*), sea hibiscus (*Talipariti tiliaceum*), and teruntum bunga putih (*Lumnitzera racemosa*).

Table 1. Previous Singapore collections of *Finlaysonia obovata* Wall. deposited in the Herbarium, Singapore Botanic Gardens (SING, with bar code no.) and the Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU, with accession no.).

S/No.	Accession/Bar Code No.	Herbarium	Collector	Collector's No.	Date Collected	Locality	Locality notes
1.	3927	SING	H. N. Ridley	s.n.	1900	Kranji	
2.	3928	SING	H. N. Ridley	s.n.	21 Aug.1900	Geylang	
3.	37675	SING	H. N. Ridley	s.n.	1901	Geylang	
4.	3931	SING	I. H. Burkill	s.n.	18 Oct.1913	Mt. Zein	
5.	3932	SING	I. Ngadiman	376	31 Aug.1955	Kranji	
6.	3929	SING	J. F. Maxwell	81-70	10 Apr.1981	Kranji	
7.	2007001215	SINU	H. T. W. Tan & A. Ibrahim	Jan-94	23 Mar.1994	Pasir Panjang Road	Canal next to BP house
8.	2007001216	SINU	L. S. Chua	22/94	1994	Pasir Ris Mangroves	
9.	3930	SING	J. Lai	119	26 Nov.1996	Khatib Bongsu	
10.	2007001222	SINU	M. d/o Thangavelu, A. H. B. Loo & H. T. W. Tan	M 225	21 Apr. 1999	Sungei Buloh Nature Park	
11.	2007001223	SINU	M. d/o Thangavelu, A. H. B. Loo and H. T. W. Tan	M 225	21 Apr.1999	Sungei Buloh Nature Park	
12.	2007001217	SINU	K. Y. Ang & K.-x. Tan	26	14 Mar.2003	Sungei Mandai	Survey Site (MD1)
13.	2007001218	SINU	K. Y. Ang & K.-x. Tan	31	17 Mar.2003	Sungei Mandai	Survey Site (MD2)
14.	2007001219	SINU	K. Y. Ang & K.-x. Tan	40	24 Mar.2003	Sungei Mandai	Survey Site (MD3)
15.	2007001220	SINU	K. Y. Ang & K.-x. Tan	60	27 Mar.2003	Sungei Mandai	Survey Site (MD6)
16.	2007001221	SINU	K. Y. Ang & K.-x. Tan	74	28 Mar.2003	Sungei Mandai	Survey Site (MD5)
17.	53927	SING	S. Lee	2004-05	14 Apr.2004	Pulau Unum	

Currently, this species consists of a few individuals found at the Kranji Canal, Pasir Ris Park mangrove forest patch, Pulau Ubin, Pulau Unum, Seletar Camp Wet-Gap, Sungei Berlayar, Sungei Buloh Wetland Reserve, and Sungei Mandai, based on recent sightings and herbarium records.

DISCUSSION

A possible reason for *Finlaysonia obovata*'s rarity could be because of the destruction of its habitat, the back mangrove zone. In Singapore, total mangrove forest area declined with the dawn of urban development since the 1960s (Hilton & Manning, 1994). None of the mangrove forest patches remaining are primary forests, all having previously been cleared mainly for timber or shrimp farming and re-grown after abandonment. Many large patches have also been reclaimed or developed into urban areas, leaving either no trace or only small strips of this vegetation mainly comprised of pioneer species such as api-api putih (*Avicennia alba*), and perepat (*Sonneratia alba*) that can tolerate high inundation and salinity. Back-mangrove species typically require environmental conditions similar to land plants, but with some elements of the tidal region to select against their land plant competitors (i.e. low salinity and wetter substrate). This zonation can be clearly seen in large areas of mangrove forests which are absent in Singapore.

The global area of mangrove forests has been on a steady decline from 1980–2005 (FAO, 2007). The mangrove forests of Southeast Asia account for approximately 0.31% of the world's total, yet the largest area and species richness occurs here (Field, 1995; Valiela et al., 2001; FAO, 2007). With the impending global sea-level rise through climate change, mangrove forests worldwide are likely to suffer further losses as they are forced to retreat landward to cope with increasing salinity and inundation. However, human settlements and competition with inland plants limit the extent to which mangrove forests can retreat. Furthermore, back mangrove species, such as *Finlaysonia obovata* are located at the landward fringes of the mangrove—sandwiched between the true mangrove plants and inland forests or human settlements. The two-pronged pressures on the back mangrove species could make survival exceptionally challenging for plants in Southeast Asia. In Singapore, as most of the mangrove vegetation grows in narrow strips abutting upon development, there may be limited scope for the mangroves to retreat. Hence, wild populations of *Finlaysonia obovata* are likely to be extirpated if appropriate measures are not taken to conserve this species.

In a recent study conducted on *Finlaysonia obovata*, triterpene acid found to have antibacterial activity against fish pathogens was isolated from leaf extracts (Mishra & Sree, 2008). Studies on triterpene acid reported beneficial biological properties such as antitumour, anticancer, antiviral, antimicrobial and anti-inflammatory activity (Mahato & Sen, 1997). This indicates great bioprospecting potential of triterpene acid to provide cures for various diseases. What other useful products that can be obtained from this species remains to be seen, but the potential cannot be tapped if the species becomes extinct. *Finlaysonia obovata* also has potential as an ornamental plant, owing to its attractive foliage and interesting-looking fruits. As this species grows in a physiologically dry, rather open habitat, it can be cultivated in urban areas, most of which are also dry and open.

Thus, the dwindling wild populations of *Finlaysonia obovata* call for conservation concern and action.

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