

The rediscovery of *Hoya obtusifolia* (Apocynaceae, Asclepiadoideae) in Singapore

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INTRODUCTION

An introduction to the *Hoya* species of Singapore was provided by Rodda & Ang (2012). Since that publication, which recognised 12 species, *Hoya wallichii* (Wight) C. M. Burton has been added to the list (Rodda et al., 2016). The species was earlier considered synonymous with *Hoya campanulata* Blume. This paper documents the rediscovery of *Hoya obtusifolia* Wight in Singapore. The last collection was made in 1914 so the species was considered as Presumed Nationally Extinct. Among the 13 species of *Hoya* occurring in Singapore, five are still considered as Presumed Nationally Extinct. An updated key to the *Hoya* species of Singapore is provided.

Distribution and variability of *Hoya obtusifolia*. *Hoya obtusifolia* occurs, from north to south, in Thailand, Peninsular Malaysia, Sumatra, Singapore, Borneo, and Java. It is an epiphytic climber in lowland and hill forests. It is characterised by strong climbing stems up to 10 mm in diameter, elliptic glabrous (when mature) leaves 10–20 × 4–8 cm, and very fleshy, rotate corollas ca. 2 cm in diameter. The flowers can be of variable colour, ranging from cream to yellow or orange, with pink or purple markings at the base of the corolla. The only species it can be confused with vegetatively is *Hoya imperialis* Lindl. which, however, has much larger flowers (> 6 cm in diameter).

***Hoya obtusifolia* in Singapore.** *Hoya obtusifolia* is listed as Presumed Nationally Extinct in Tan et al. (2008) and Chong et al. (2009). The oldest record of the species in Singapore is from Changi, dated February 1894, (*Ridley, H.N. s.n.* (SING) [SING120852]), while the most recent collection was from 1914, collected in Serangoon (*Burkill, I.H. s.n.* (SING) [SING120853]). In 2012, Joseph Lai found a large specimen of *Hoya obtusifolia* high up on a durian tree along Jalan Batu Ubin in Pulau Ubin. The plant was regularly monitored for flowers. In 2015, cuttings were collected by Joseph Lai with a lorry crane and brought into cultivation at Pulau Ubin, Singapore Botanic Gardens Potting Yard nursery, and Pasir Panjang Nursery. In 2016, both the plant in situ (Figs. 1, 2) and the ex situ collection at Singapore Botanic Gardens Potting Yard nursery bloomed profusely (Figs. 3, 4), allowing confirmation of the identification of the sterile material as *Hoya obtusifolia*. A herbarium voucher was made from the in situ plant and deposited in SING [SING0202925].

Conservation considerations. Only a single plant of *Hoya obtusifolia* was found in situ and therefore the species is to be considered Critically Endangered in Singapore, according to the guidelines provided by The Singapore Red Data Book, 2nd Edition (Davison et al., 2008). The cuttings collected in 2015 have been growing well at the Singapore Botanic Gardens and propagation is underway to allow re-introduction trial planting.

Description of the Singapore taxon. The following morphological description is based on specimens collected in Singapore.

Hoya obtusifolia Wight, Contr. Bot. India 38 (1834); Rintz, Malayan Nat. J. 30: 520 (1978); Jagtap & Singh, Fasc. Fl. India 24: 113 (1999); Noltie, Bot. Robert Wight 170 (2005).—TYPE: sin. loc. (Malaysia, Penang?), Wallich, Wall. Asclep. 38 [= Wall. Cat. 8167] (holotype K [K000895115]; isotypes E [E00179578], K [K001129115]).

Hoya teysmanniana Miq., Fl. Ned. Ind. 2: 522 (1857).—TYPE: Indonesia, Sumatra, Soengi Pagoe, s.d., *Teijsmann, J.E., 1170HB* (lectotype U [U0000686], designated by Rodda (2017: 50); possible isolectotype K [K000894744]).

Plant succulent, lignified at the base; epiphytic or hemi-epiphytic vines, rarely producing adventitious roots, erect or pendulous to 10 m long. Latex white. Leafy stems terete, up to 10 mm in diameter, pale green when young, later dark green or greyish brown, pubescent, hairs lost in older stems; internodes 5–20(–25) cm long. Leaves petiolate; petiole cylindrical, slightly channelled above, 10–20 mm long, 3–8 mm in diameter, pubescent when young; lamina fleshy, stiff, elliptic, 10–20 × 4–8 cm; pale to mid green above, pubescent when young, lighter green underneath with paler



Fig. 1. Large specimen of *Hoya obtusifolia* growing on a durian tree in Pulau Ubin starting to bloom. (Photograph by: J. Lai).

midrib, papillose with pubescent midrib when young, apex obtuse to acute apiculate or cuspidate, base round or very shallowly cordate, midrib raised on adaxial surface, secondary veins 4–10 on each side, branching at ca. 70° from midrib. Colleter one at each lamina base, ovate ca. 0.2 × 0.1 mm, pale brown, often visible on immature leaves only. Inflorescences positively geotropic, bearing 8–15(–30) flowers; peduncle extra-axillary, persistent, 20–50 mm long, 2.5–



Fig. 2. Inflorescence of *Hoya obtusifolia* growing on a durian tree in Pulau Ubin starting to bloom. (Photograph by: J. Lai).

5 mm in diameter, sparsely pubescent, rachis bearing scars of previous flowerings, up to 9 mm in diameter; pedicels 2–3 cm long, 2–2.5 mm in diameter, sparsely pubescent. Calyx 10–12 mm in diameter, lobes triangular 3–5 × 2–2.5 mm, apex round, outside pubescent, pale yellow with red markings at the edge, inside glabrous, pale yellow with red markings at the edge, ciliate. Calycine colleter missing. Corolla succulent, rotate, ca. 2 cm in diameter (2.5–3 cm when flattened), glabrous, outside white to pale yellow, with a pale pink patch in between the calyx lobes, inside basally purple-pink, progressively fading into pale cream; tube 3.5–5 mm long; lobes triangular, 9–11 × 9–11 mm, apex acute. Staminal corona 8–9 mm in diameter, 4–5 mm high, corona lobes obovate, 3.5–5 × 2–2.2 mm, slightly convex above, sulcate underneath, outer process greenish white, apex obtuse, raised, inner process white, raised with an acuminate tip, incurved over the style head. Style head conical ca. 2 mm in diameter, style head apex acuminate ca. 2 mm long. Pollinarium erect, pollinia, oblong 950–1050 × 300–350 µm, apex and base rounded, corpusculum rhomboid 350–450 × 200–250 µm, caudicles, ca. 250 µm long. Anther appendages membranaceous, hyaline, apically round, ca. 1.5 × 1 mm. Ovary conical, 1.8–2 mm long, ca. 1 mm in basal diameter. Fruit a single follicle, fusiform, ca. 12.5 × 2 cm base with pedicel laterally attached, apex acute, recurved, seeds 3–3.5 × 1–1.2 mm, long comose.

Singapore specimens examined. Changi, Feb. 1894, *Ridley, H.N. s.n.* (SING [SING120852]); Bkt. Timah Nature Reserve, 15 Sep. 1914, *Burkill, I.H. s.n.* (SING [SING120853]); Serangoon, 1897, flowers white, centre pink, in mangroves, *s.coll.* 8932 (SING [SING120854]); Pulau Ubin, Jalan Batu Ubin, climber with coriaceous oblong leaves, climbing on old durian tree, flowers white. 6 Oct 2016, *Lai, J. SING2016-165* (SING [SING0202925 spirit]).

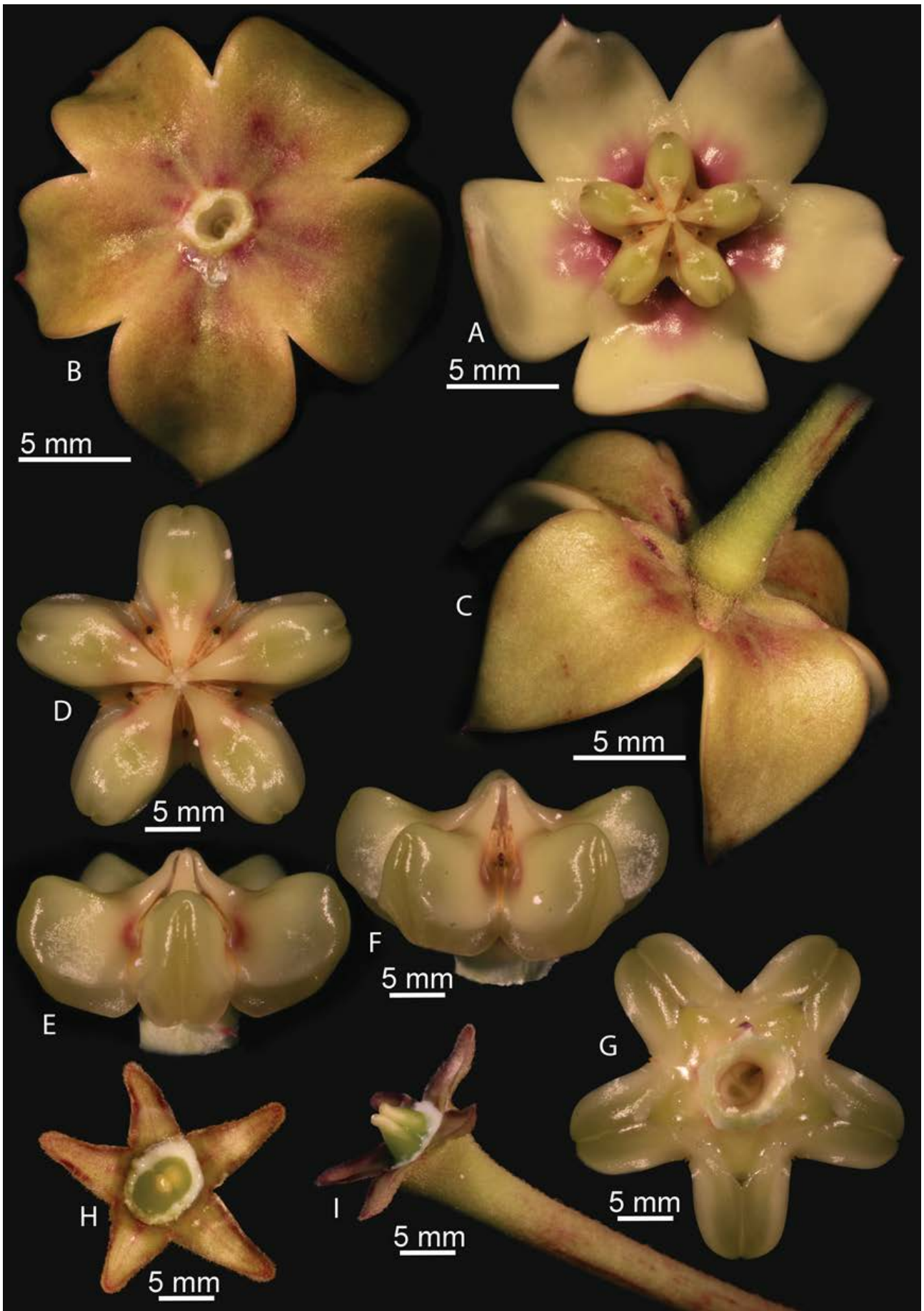


Fig. 3 *Hoya obtusifolia*. Cultivated plant at Singapore Botanic Gardens Potting Yard nursery. A, flower, top view; B, Corolla from underneath with calyx removed; C, pedicel, calyx and corolla, side view; D, corona, top view; E, F, Corona, side view; G, Corona, from underneath; H, Calyx and ovary, top view; I, Pedicel, calyx and ovary, side view. (Photographs by: M. Rodda).



Fig. 4. *Hoya obtusifolia*. Pollinarium. (Photograph by: M. Rodda).

Table 1. List of *Hoya* species recorded in Singapore and their national conservation status.

S/No.	Species	National Conservation Status	Notes
1.	<i>Hoya campanulata</i> Blume	Presumed Nationally Extinct	
2.	<i>Hoya caudata</i> Hook. f.	Critically Endangered	Rediscovered (Rodda & Ang, 2012)
3.	<i>Hoya coriacea</i> Blume	Presumed Nationally Extinct	
4.	<i>Hoya coronaria</i> Blume	Critically Endangered	Rediscovered (Yap, 2006)
5.	<i>Hoya diversifolia</i> Blume	Critically Endangered	
6.	<i>Hoya finlaysonii</i> Wight	Presumed Nationally Extinct	

7.	<i>Hoya lacunosa</i> Blume	Endangered	
8.	<i>Hoya latifolia</i> G. Don	Endangered	
9.	<i>Hoya obtusifolia</i> Wight	Critically Endangered	Rediscovered
10.	<i>Hoya revoluta</i> Wight ex Hook. f.	Presumed Nationally Extinct	
11.	<i>Hoya scortechinii</i> King & Gamble	Critically Endangered	New record (Yap, 2011)
12.	<i>Hoya verticillata</i> (Vahl) G. Don	Not Threatened	
13.	<i>Hoya wallichii</i> (Wight) C.M. Burton	Presumed Nationally Extinct	

KEY TO THE *HOYA* SPECIES OF SINGAPORE BASED ON REPRODUCTIVE CHARACTERS

(updated from Rodda & Ang, 2012)

1.	Inflorescence a concave umbel.....	2
	Inflorescence a convex umbel	4
2.	Corolla flat when fully opened, white with long white hairs; corona red.....	<i>Hoya caudata</i>
	Corolla revolute when fully opened	3
3.	Corona lobes upcurved, inner process yellowish, outer process white, corolla white and hairy	<i>Hoya lacunosa</i>
	Corona lobes bilobed, inner process red, outer process white, corolla pale pink and hairy	<i>Hoya revoluta</i>
4.	Corolla spreading when fully opened	5
	Corolla reflexed when fully opened	9
5.	Corolla campanulate, with lobes much shorter than the tube	6
	Corolla not as above; with distinct corolla lobes.....	7
6.	Umbels convex with up to 30 flowers	<i>Hoya campanulata</i>
	Flowers solitary	<i>Hoya wallichii</i>
7.	Peduncles clustered, flowers small, about 8 mm in diameter, yellow or pink; corona white	<i>Hoya latifolia</i>
	Peduncles solitary.....	8
8.	Corolla densely pubescent inside	<i>Hoya diversifolia</i>
	Corolla glabrous inside.....	9
9.	Corolla puberulous outside, white or yellow turning purple; corona yellow.....	<i>Hoya coronaria</i>
	Corolla glabrous outside, yellow or white; corona greenish white.....	<i>Hoya obtusifolia</i>
10.	Corolla densely pubescent inside	<i>Hoya coriacea</i>
	Corolla glabrous or puberulent.....	11
11.	Corona lobe outer process obtuse	<i>Hoya scortechinii</i>
	Corona lobe outer process acute.....	12
12.	Corolla white or pink; corona lobes white with deep pink inner process	<i>Hoya verticillata</i>
	Corolla lobes yellowish with deep red tips; corona white	<i>Hoya finlaysonii</i>

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