



# Contribution to a revision of *Hoya* (*Apocynaceae*: *Asclepiadoideae*) of Papuasias. Part II: eight new species, one new subspecies

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## Key words

*Apocynaceae*  
*Hoya*  
Indonesia  
*Marsdenieae*  
Papua New Guinea

**Abstract** In the present paper we publish eight new species from New Guinea, *H. domaensis*, *H. gauttierensis*, *H. liddleana*, *H. lucida*, *H. paradisea*, *H. pulleana*, *H. tarikuensis*, and *H. unirana*, and one subspecies, *H. krusensterniana* subsp. *laticorolla*. Five taxa were first diagnosed based on specimens at the Leiden herbarium, one species is only known from a collection at Edinburgh and Lae herbaria, while three are based on recently collected specimens. *Hoya leucantha*, originally described from a specimen in bud, has been identified among herbarium specimens and was also recently recollected. It is therefore fully described and illustrated for the first time.

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## INTRODUCTION

This paper includes the continuation of our taxonomic work on the genus *Hoya* R.Br. (*Apocynaceae*, *Asclepiadoideae*, *Marsdenieae*) in Papuasias (Simonsson Juhonewe & Rodda 2017). The genus is found from the Himalayan foothills, Okinawa (Japan), to Australia and the Fiji Islands, and with 350–450 species it is the largest genus of *Apocynaceae* in Asia (Rodda 2015, Endress et al. 2019).

*Hoya* species are generally epiphytic or more rarely terrestrial or hemi-epiphytic climbers and shrubs, with linear to orbicular leaves ranging from coriaceous to very thick and succulent. The flowers are generally held in many-flowered inflorescences that can be from almost spherical to convex, flat or concave. The corollas are very variable in size and shape (from 1 mm to almost 10 cm across, rotate, campanulate, urceolate to salverform). The flowers present a gynostegial corona, which is generally of five staminal lobes of very variable shape and size, and provide good characters for species delimitation. Extreme morphological features have been observed in *Hoya* species from New Guinea, such as very small leaves (*H. krusensterniana* Simonsson & Rodda, *H. microphylla* Schltr., *H. pulchella* Schltr. and *H. oxycoccoides* S.Moore); particularly large flowers (*H. gigas* Schltr. and *H. lauterbachii* K.Schum.); a salverform corolla (*H. versteegii* Simonsson & Rodda) (Simonsson Juhonewe & Rodda 2017). Based on the available checklists and revisions the diversity hotspots of *Hoya* are Borneo, New Guinea, and the Philippines (Pelser et al. 2011 onwards, Lamb & Rodda 2016, Rodda 2017, Cámara-Leret et al. 2020). However, a critical revision in the Philippines is needed to confirm numerous synonyms and therefore data on species numbers

and endemism may not be accurate (Simonsson Juhonewe & Rodda 2017).

Including the new taxa published here, New Guinea so far has 67 recognized *Hoya* taxa (including five subspecies); six species are doubtful either because of lack of type material or unavailability of complete specimens (updated from Cámara-Leret et al. 2020, Rodda et al. 2020). More than 90 % of the taxa are endemic to the island. In comparison, in Borneo there are 85 species and four subspecies (Rodda & Rahayu 2022), with about 50 % endemic taxa (Lamb & Rodda 2016). Only two species (*Hoya australis* R.Br. ex J.Traill and *H. coronaria* Blume) occur both in New Guinea and Borneo.

The number of species of *Hoya* in New Guinea has been steadily increasing in recent years: ten new species and one new subspecies from New Guinea were published by Simonsson Juhonewe & Rodda (2017). Seven of them were described based at least in part on recent collections from Papua New Guinea, while two were based solely on herbarium materials from Indonesian Papua.

Nadhanielle Simonsson spent six years in Papua New Guinea (2010–2016) to conduct extensive field work in all provinces and to establish *ex situ* collections of rare species and of plants that were encountered sterile in the field. In 2017 the remaining live plants were relocated to Lae Botanic Garden and to Singapore Botanic Gardens.

We were already aware while working on Simonsson Juhonewe & Rodda (2017) that additional new species from New Guinea were present in herbaria and awaited description, however, some were only available as incomplete specimens and before publishing them we still hoped that some might be represented among the living plants in cultivation at Lae Botanic Garden and Singapore Botanic Gardens. It was also possible that photos of them may surface online as nowadays new species of *Hoya* can be occasionally found posted on social media before they are formally described (Rahayu & Rodda 2019, Rodda &

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Rahayu 2020). That way we could have made a better description based on both live and more comprehensive herbarium materials. At present, two new species from Papua New Guinea have flowered in cultivation, one of which was also collected from Indonesia; one further species formerly known from one herbarium specimen from Leiden, Naturalis (L), Netherlands, was also recently photographed in Indonesia. For the remaining species, since no match with cultivated material has been made, we decided to proceed to publish them based on the available herbarium specimens alone. Five of the new species are based on specimens from L, which we did not see when we visited in 2010. We suspect that at that time they may have been on loan or were not accessible. We became aware of them in 2018 while working on the checklist of New Guinea flora (Cámara-

Leret et al. 2020) when digital images of the specimens became available and the specimens could be loaned to SING for examination. Among these specimens was *BW* (V.W. Moll) 13035 (L), bearing a label by Paul Forster from 1992 with the unpublished name *Hoya missilus*. The same species was also photographed by Imran in Indonesia, Papua Province, in late 2021. We identified this species as the enigmatic *H. leucantha* S.Moore, a species so far only known from the type specimen, which is in bud. We therefore include here a full description and illustrations of *H. leucantha*. Comparison with previously described species of *Hoya* from New Guinea, was carried out in person or via loans from A, BM, BO, FI, K, LAE, MO, P, SING, and UC herbaria (Thiers continuously updated).

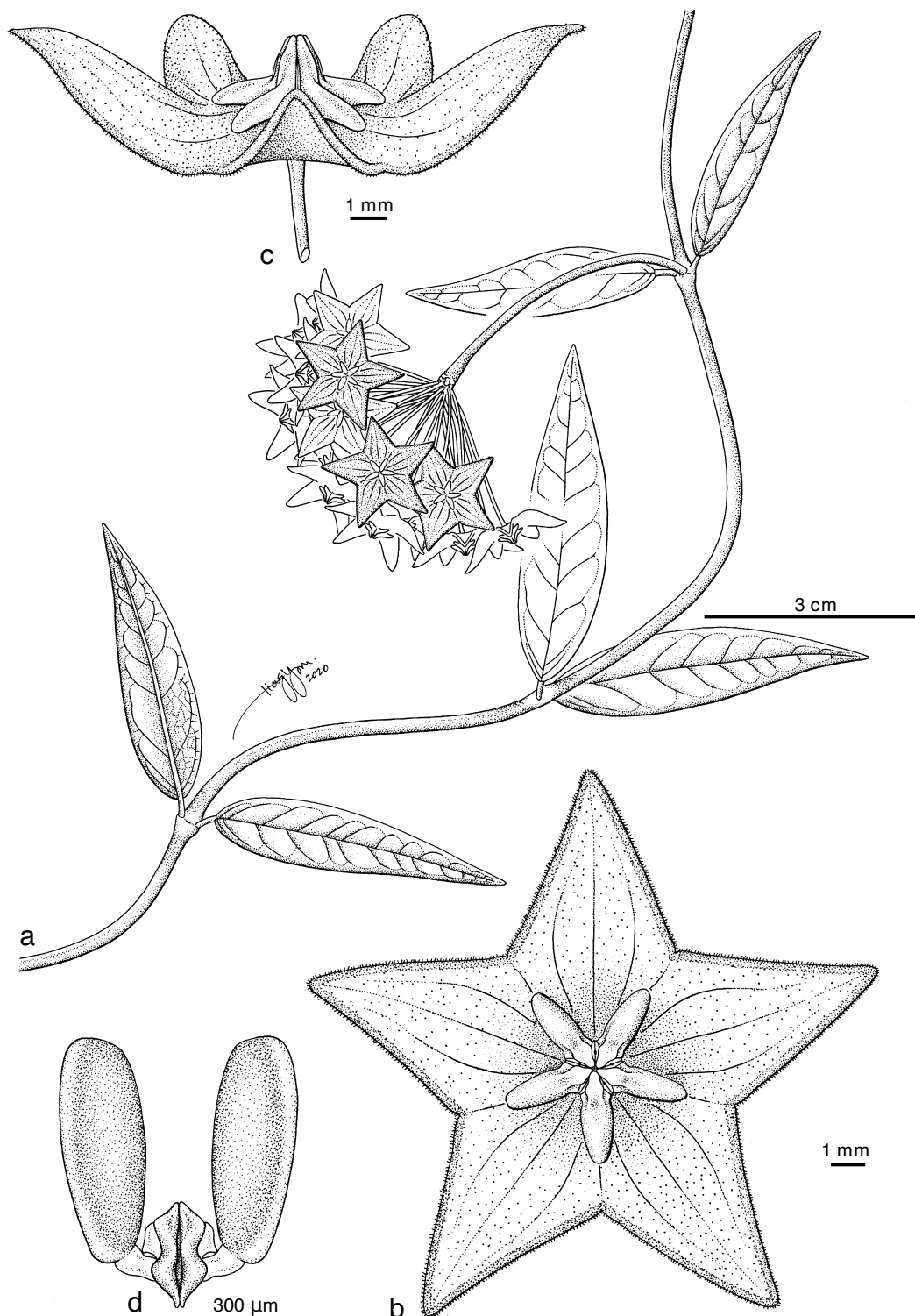


Fig. 1 *Hoya leucantha* S.Moore. a. Habit; b. flower (from above); c. flower (side view); d. pollinarium (all from V.W. Moll BW13035, L). — Drawing: X.Y. Loh.

The process of identification and description of taxonomic novelties from New Guinea will likely continue at a faster pace now that more publications on *Hoya* of the region are available, and we hope that more local botanists may get interested in collecting *Hoya* and publishing local revisions. However, revisions of groups of similar and likely closely related species will be very challenging. For instance, *Hoya coronaria*, which is sometimes considered in the separate genus *Eriostemma*, is at the moment considered an extremely widespread and variable species, but only once extensive molecular data becomes available its taxonomy can be clarified. Similarly, *H. verticillata* (Vahl.) G. Don, applied to specimens from South Asia, continental southeast Asia and throughout Sundaland, and *H. nicholsoniae* F. Muell. applied to specimens from Melanesia and Australia include a heterogeneous yet morphologically overlapping group, which will require to be carefully revised based on morphology and molecular data.

## A NEW DESCRIPTION OF *HOYA LEUCANTHA*

*Hoya leucantha* S. Moore — Fig. 1, 2

*Hoya leucantha* S. Moore (1916) 115. — Lectotype (designated here): *Boden Kloss s.n.* (lecto BM [BM000895752]), Indonesia, Papua Province, Utakwa River to Mt. Carstensz, Canoe Camp.

**Climber**, likely epiphytic, producing both twining stems and horizontal to pendulous, straight stiff stems, latex white. **Stems** cylindrical, slender, 1–1.8 mm diam, sparsely pubescent, internodes 2–7 cm long. **Roots** not observed. **Leaves**: petiole terete, channelled above, 1.5–2.5 by c. 0.5 mm, pubescent; lamina lanceolate, chartaceous, 18–45(–70) by 6–12(–15) mm, apex acuminate, base rounded or attenuate, glabrous; venation pinnate, midrib depressed on adaxial surface, secondary veins

6–10 each side. Basal colletes one, narrowly conical, c. 0.3 mm long. **Inflorescence** one per node, positively geotropic, pseudo-umbelliform, consisting of 20–30 flowers; **peduncle** extra-axillary, terete, 14–40 by c. 3 mm, older peduncles forming a rachis from previous flowerings, pubescent; **pedicels** filiform, 18–23 by c. 0.3 mm, glabrous. **Calyx** c. 2 mm diam; lobes narrowly deltate, 0.8–1 by c. 0.35 mm, apex rounded, glabrous. Basal colletes one at each calyx lobe sinus, ovate, c. 0.2 mm long. **Corolla** rotate, star-shaped, 12–15 mm diam when flattened; tube c. 3 mm long, cream to pale yellow or pink, outside glabrous, inside pubescent; lobes deltate, 5–6 by 4–4.5 mm, apex acuminate, cream to pale yellow or pink, outside glabrous, inside densely pubescent. **Corona** staminal, central part conical, surrounded by spreading or downcurved lobes, 2.3–2.6 mm high, 3.5–4.5 mm diam; lobes with an inner process erect, oblong, c. 1.5 by 0.5 mm, apex rounded, pale yellow, apically sometimes red, and a spreading outer process, oblong, 1.5–1.7 by 0.7–0.8 mm, apex rounded, cream to yellow, with basal revolute margins. **Pollinia** oblong, 380–220 by 130–150  $\mu$ m, with pellucid margin; **corpusculum** oblong with a central constriction, 150–170 by 80–90  $\mu$ m; **caudicles** oblong, c. 100  $\mu$ m long. **Ovary** narrowly conical, c. 1 by 0.2 mm, glabrous. **Fruit** and **seed** not observed.

**Distribution** — Known from three localities in Indonesia, West Papua Province: the type collection from Utakwa River, one specimen from Bomberai Peninsula, and one unvouchered record from Mimika regency (near Timika town) in Papua province (Imran, pers. comm.).

**Habitat & Ecology** — Unknown, it appears to be a lowland species, found along rivers.

**Conservation status** — Data Deficient (DD; IUCN 2012). Known only from the type specimen collected 106 years ago, a second collection from 59 years ago and a recent unvouchered collection, more collections and habitat data is needed before the conservation status can be assessed.

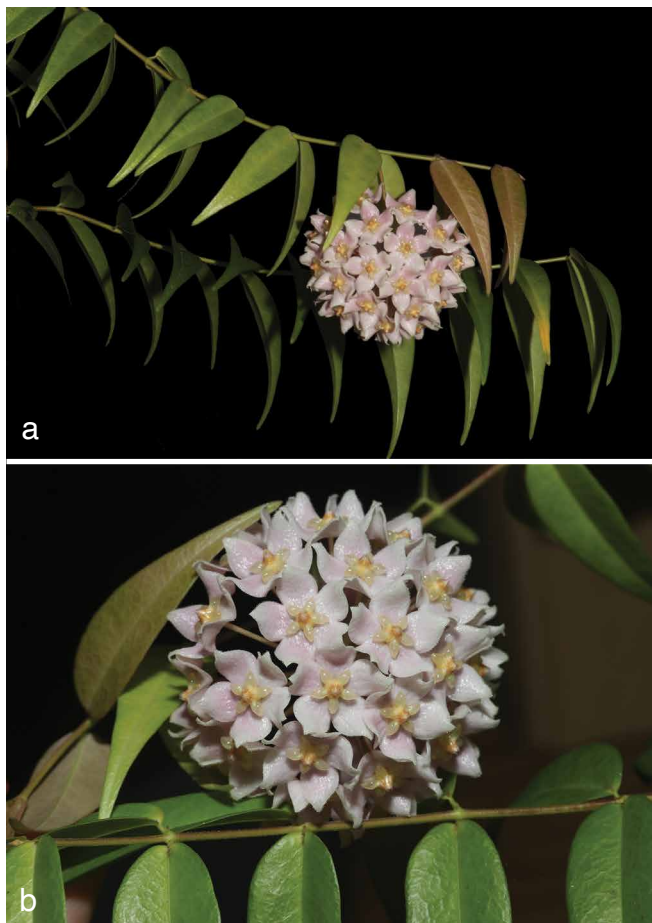
**Specimens examined.** INDONESIA, West Papua Province, Bomberai Peninsula, Kwafa, Sjugu-Wagura area, 26 Apr. 1963, BW (V.W. Moll) 13035 (L [L0834583]).

**Note** — The protologue of *H. leucantha* only mentions the type collection as ‘Canoe camp 500ft’ (Moore 1916). The only original material available for typification is *Boden Kloss s.n.* (BM [BM000895752]), which is therefore designated as the lectotype for the name. The shape of the corona of *H. leucantha* is uncommon among New Guinean species, consisting of a central conical portion formed by the inner lobe processes, surrounded by oblong spreading or downcurved outer processes. This is only partially visible in the small buds present on the type specimen. There the corona lobes have an erect inner process of c. 1 mm tall and a basally attached outer process ovoid, c. 0.3 mm long. *Hoya leucantha* is somewhat similar to *Hoya patella* Schltr. in corona morphology, as both species have erect, oblong inner corona processes and spreading narrow, oblong outer corona lobe processes, but they can be separated on peduncle length, number of flowers per inflorescence and corolla type and size (peduncle 1.4–4 cm long, 20–30 flowers per inflorescence, corolla rotate, 12–15 mm diam in *H. leucantha* vs peduncle 2–3 mm long, 1–2 flowers per inflorescence, corolla broadly campanulate, 3–4 cm diam in *H. patella*).

## NEW SPECIES

*Hoya domaensis* Rodda & Simonsson, *sp. nov.* — Fig. 3

Similar to *Hoya pulchella* Schltr. in corolla shape and size (campanulate, 1.5–2.5 cm diam) and leaf shape (elliptic to ovate), but distinguished by leaf size, texture and pubescence (coriaceous, 1.7–2.2 by 0.9–1.3 cm, glabrous to sparsely pubescent in *H. pulchella*; chartaceous, 3–5.5 by 1.7–2.2 cm, sparsely pubescent above, pubescent below in *H. domaensis*); corona lobes



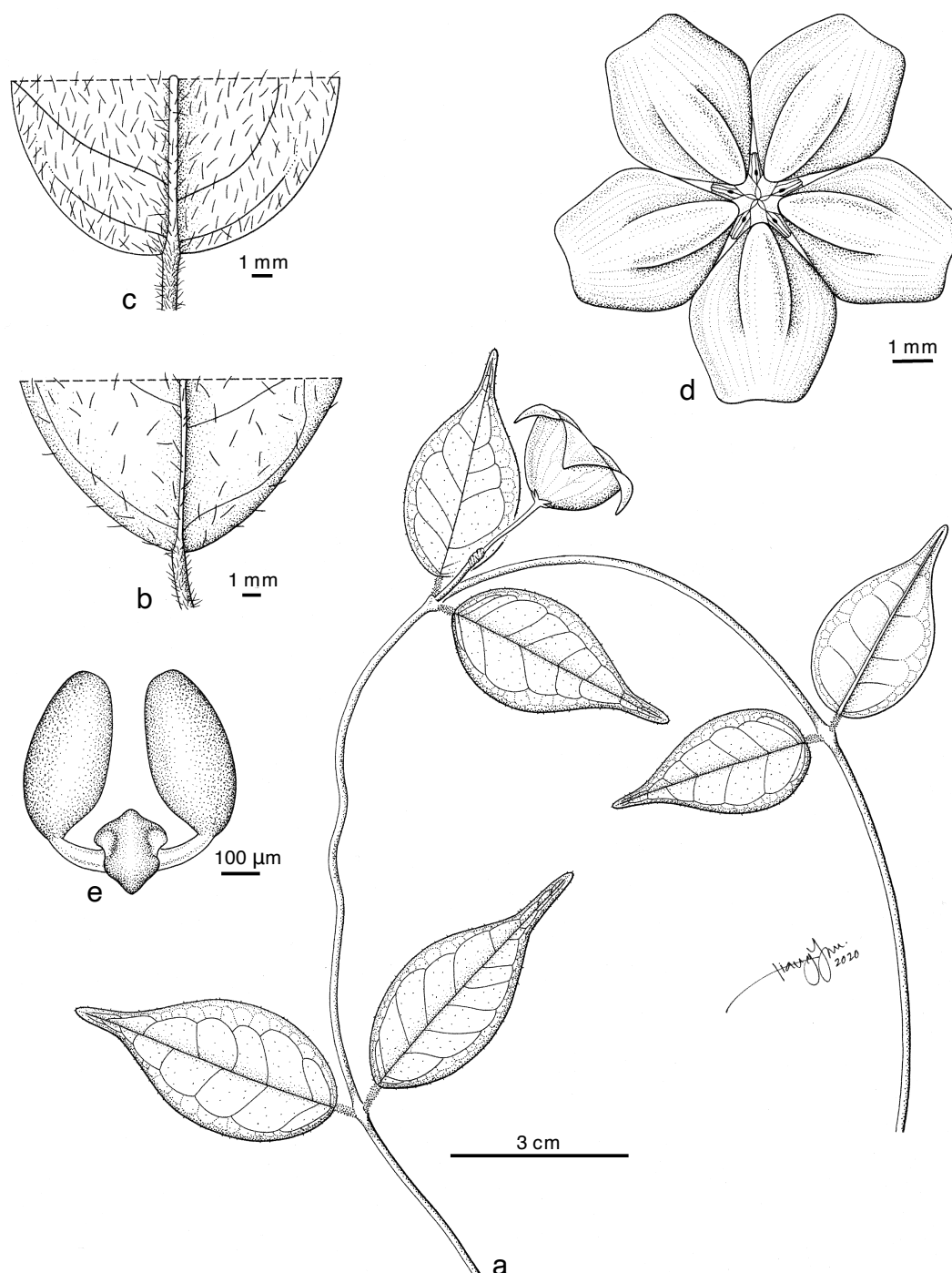
**Fig. 2** *Hoya leucantha* S. Moore. a. Habit, showing straight horizontal to pendulous stems; b. inflorescence. — Photo: Surisa Somadee.

texture (fleshy and dark crimson in *H. pulchella*, membranous and translucent in *H. domaensis*). — Type: *P.J.B Woods 151* (holo E; iso LAE), Papua New Guinea, Northern District (now Oro Province), West of Doma, near the track between Debana and Doma, S9°45' E148°29', 26 Oct. 1962.

**Etymology.** *Hoya domaensis* is named after Doma, the type locality.

**Climber**, epiphytic, latex colour unknown. **Stems** cylindrical, slender, 1–1.5 mm diam, sparsely pubescent to glabrescent, internodes 6–10 cm long. **Roots** adventitious. **Leaves**: petiole terete, 3–5 by c. 0.8 mm, pubescent; lamina ovate to elliptic, chartaceous when dry, 3–5.5 by 1.7–2.2 cm, sparsely pubescent above, pubescent below, apex acuminate, shortly caudate, base rounded; venation pinnate, secondary veins 3–8 each side. Basal colleters one at each lamina base, globose, c. 0.2 mm long. **Inflorescence** one per node, tropism unknown, likely positive, likely consisting of a single open flower; **peduncle** extra-axillary, terete, c. 8 by 0.8 mm, older peduncles forming

a rachis from previous flowerings, glabrous; **pedicels** filiform, 10–13 by c. 0.3 mm, glabrous. **Calyx** c. 5.5 mm diam; lobes oblong, c. 2 by 1 mm, apex acuminate, outside sparsely pubescent, inside glabrous. Basal colleters not observed; **bud** shape unknown. **Corolla** campanulate, 1.5–2.5 cm diam, creamy white with a slight pinky-brown flush near calyx and at apex of lobes; tube 10–15 mm long, outside glabrous, papillose, inside pubescent; lobes triangular, 4–5.5 by 10–12 mm, apex acute, outside glabrous, papillose, inside pubescent. **Corona** staminal, height uncertain, likely c. 2 mm (much flattened on the specimen), c. 11 mm diam; lobes spreading, broadly ovate, membranous and translucent, 4.5–6 by 3–4 mm, inner process acute with a rounded tip, outer processes truncate, slightly concave, basal revolute margins not observed. **Pollinia** oblong, c. 450 by 200  $\mu$ m, without pellucid margin; **corpusculum** rhomboid, c. 220 by 150  $\mu$ m; **caudicles** attached to the lower half of the



**Fig. 3** *Hoya domaensis* Rodda & Simonsson. a. Habit; b. lamina base (above); c. lamina base (underneath); d. corona, from above; e. pollinarium (all from *P.J.B. Woods 151*, E). — Drawing: X.Y. Loh.

corpusculum, c. 130  $\mu\text{m}$  long. *Ovary* not observed. *Fruit* and *seed* not observed.

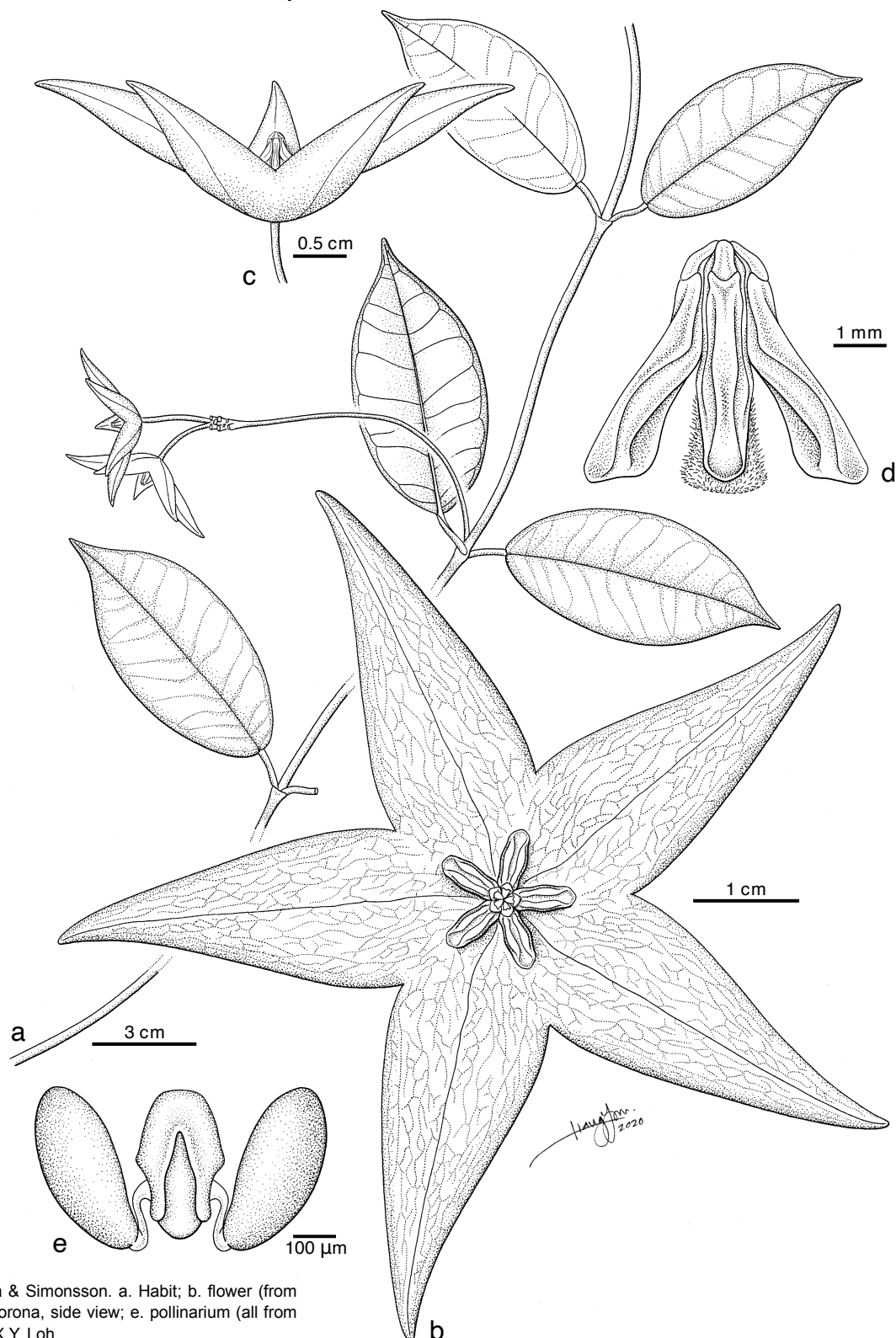
**Distribution** — The species is only known from the type locality west of Doma, Oro Province, Papua New Guinea.

**Habitat & Ecology** — No habitat information was provided on the type specimen. Based on the GPS coordinates indicated on the specimen label, *H. domaensis* is found in montane forests at about 1100 m altitude.

**Conservation status** — Data Deficient (DD; IUCN 2012). *Hoya domaensis* is known only from the type specimen collected 60 years ago.

**Note** — This is a very unusual species because it has membranous and seemingly translucent corona lobes, unlike any

species of *Hoya* discovered so far, where the lobes are generally fleshy and opaque. In New Guinea it is only vaguely similar and likely unrelated to a group of species that include *H. microphylla*, *H. oxycoccoides*, *H. pulchella* and *H. venusta* Schltr. They are all delicate epiphytic climbers with small leaves, wiry stems and snow-white flowers with red to maroon centres. *Hoya pulchella* has elliptic to ovate leaves and a broadly campanulate corolla of c. 2.5 cm wide, and it is therefore more similar to *H. domaensis*, while the other species have a more rotate corolla of c. 2 cm wide; *H. microphylla* has lanceolate to ovate leaves of 1–2 cm long; *H. venusta* has stouter stems and peduncles, and larger lanceolate leaves (up to 5 cm long); *H. oxycoccoides* has 1–1.5 cm long round leaves.



**Fig. 4** *Hoya gauttierensis* Rodda & Simonsson. a. Habit; b. flower (from above); c. flower (side view); d. corona, side view; e. pollinarium (all from K. Gjellerup 890, L). — Drawing: X.Y. Loh.

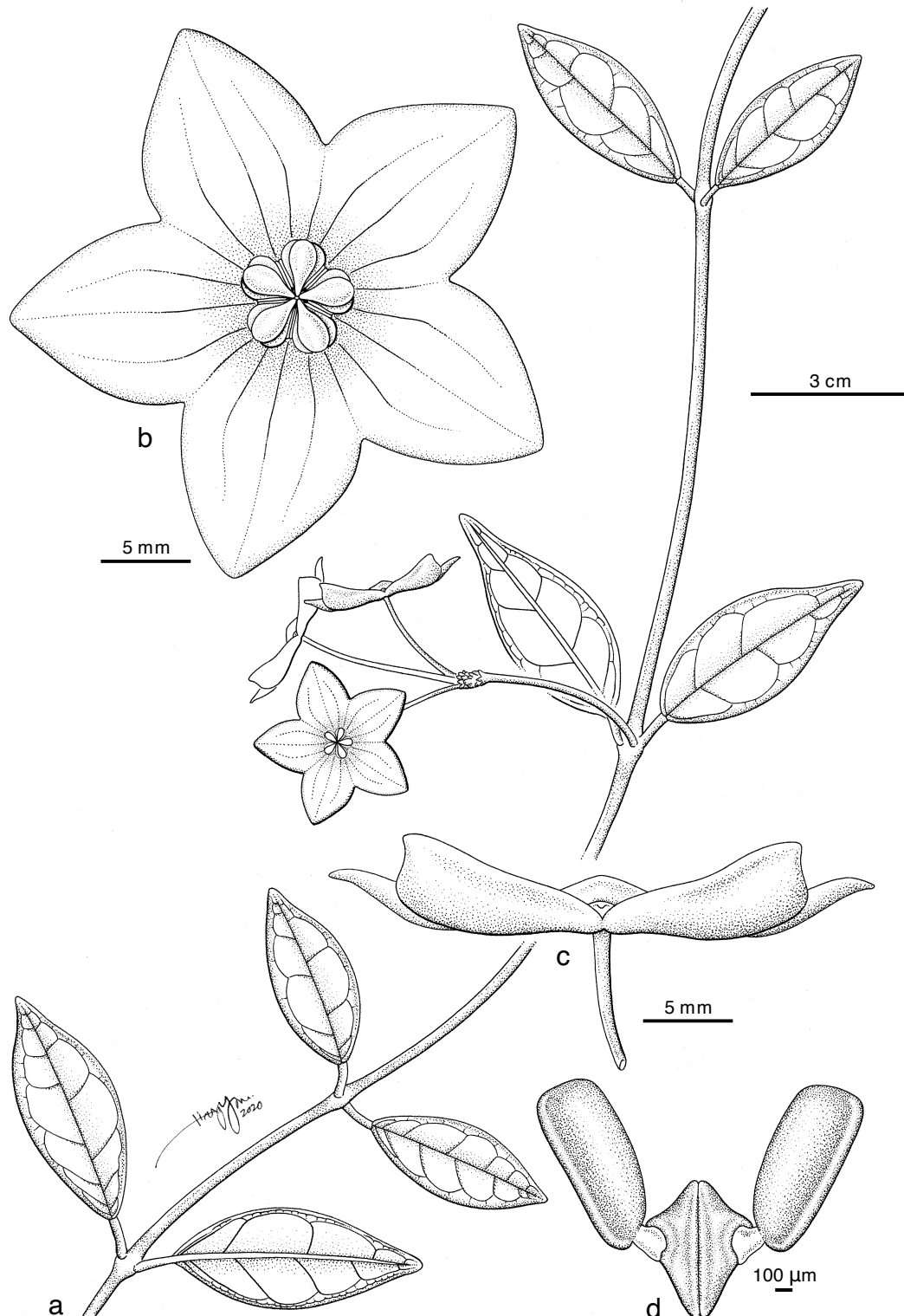


***Hoya gauttierensis* Rodda & Simonsson, sp. nov. — Fig. 4**

Similar to *Hoya leucantha* in flower shape (corolla rotate, star-shaped), but distinguished by leaf shape (elliptic in *H. gauttierensis*, lanceolate in *H. leucantha*), corolla size and corolla lobe shape (corolla 45–50 mm diam with narrowly triangular lobes in *H. gauttierensis*; 12–15 mm diam with deltate lobes in *H. leucantha*), and corona shape (stipitate, conical in *H. gauttierensis*; not stipitate, with a central conical part surrounded by spreading lobes in *H. leucantha*). — Type: K. Gjellerup 890 (holo L [L.2726492]; iso BO [BO0110492]), Indonesia, Papua Province, Gauttier Mountains, c. 350 m, 7 Nov. 1911.

**Etymology.** *Hoya gauttierensis* is named after the type locality in the Gauttier Mountains (now Pegunungan Gauttier).

**Climber**, likely epiphytic, latex colour unknown. **Stems** cylindrical, slender, 1.5–2 mm diam, pubescent to glabrescent, internodes 7–15 cm long. **Roots** not observed. **Leaves**: petiole terete, 1.2–2 by 1.5–2 mm, pubescent; lamina elliptic, coriaceous when dry, 5–12 by 3.5–5 cm, glabrous above, very sparsely pubescent underneath, apex cuspidate, base cuneate, rounded to very shallowly cordate; venation pinnate, secondary veins 7–12 each side. Basal colleter one at each lamina base, conical, c. 0.7 mm long. **Inflorescence** one per node, tropism unknown, likely positive, pseudo-umbelliform, consisting of 2–6 flowers; **peduncle** extra-axillary, terete, 4.5–9 cm by c. 1 mm, older peduncles forming a rachis from previous flowerings, pu-



**Fig. 5** *Hoya krusenstierniana* Simonsson & Rodda subsp. *laticorolla* Simonsson & Rodda. a. Habit; b. flower (from above); c. flower (side view); d. pollinarium (all from E.E. Henty et al. NGF 42752, L). — Drawing: X.Y. Loh.

bescent; *pedicels* filiform, 15–20 by c. 0.5 mm, glabrous. *Calyx* lobes reflexed at anthesis, ovate to oblong, 2–3 by 1.5–2 mm, apex acute, glabrous, sparsely ciliate. Basal collectors numerous, scattered along the base of calyx lobes, ovate, c. 0.25 mm long. *Bud* shape unknown. *Flower* colour unknown. *Corolla* rotate, star-shaped, 45–50 mm diam when flattened; tube  $\pm$  conical, c. 7 mm long, outside glabrous, inside pubescent; lobes narrowly triangular, 15–18 by 7–9 mm, apex acuminate, outside glabrous, inside pubescent. *Corona* staminal, conical, c. 4.5 mm high, c. 6 mm diam, with a stipe c. 1.5 mm tall, pubescent; lobes oblong, c. 4.5 by 1 mm, inner process erect, bifid, outer processes rounded, with basal revolute margins. *Pollinia* oblong, c. 430 by 180  $\mu$ m, without pellucid margin; *corpusculum* globose, c. 320 by 220  $\mu$ m; *caudicles* attached to the lower half of the corpusculum, S-shaped, c. 150  $\mu$ m long. *Ovary* oblong, c. 2 mm long, glabrous. *Fruit* and *seed* not observed.

**Distribution** — The species is only known from the type locality in Gauttier Mountains, Papua Province, Indonesia.

**Habitat & Ecology** — Based on the information included with the type specimen, this species was found ‘in forest, on riverbank’.

**Conservation status** — Data Deficient (DD; IUCN 2012). *Hoya gauttierensis* is known only from the type specimen collected 111 years ago.

**Notes** — This species has relatively large corollas with long narrow lobes, and a tall conical corona with oblong lobes, which sets it apart from most species from New Guinea. As mentioned in the diagnosis it is most similar to *H. leucantha*, but easily distinguished in leaf shape and size, corolla size, and corona type.

Additionally, the stipitate conical corona of *H. gauttierensis* is similar to that of *H. koteka* Simonsson & Rodda, which is also endemic to New Guinea. However, *H. koteka* is likely a shrub with single-flowered inflorescences and 7–10 by 2.5–3 mm, narrowly lanceolate corolla lobes, while *H. gauttierensis* is a climber with 2–6 flowered inflorescences and 15–18 by 7–9 mm, narrowly triangular corolla lobes.

***Hoya krusenstierniana* Simonsson & Rodda subsp. *laticorolla* Simonsson & Rodda, subsp. nov. — Fig. 5, 6**

Similar to *Hoya krusenstierniana* Simonsson & Rodda subsp. *krusenstierniana* in its pink, purple to crimson rotate to campanulate corollas, but differing in the size of the corolla (c. 20 mm in subsp. *krusenstierniana* vs 27–30 mm in subsp. *laticorolla*), and the corpusculum (c. 310 by 170  $\mu$ m in subsp. *krusenstierniana* vs 500–600 by 350–400  $\mu$ m in subsp. *laticorolla*). — Type: NGF (E.E. Henty, D.B. Foreman, M. Galore) 42752 (holo L [L0834584]; iso LAE), Papua New Guinea, Western District, Kiunga Subdistrict, Hong Kong Hill, Ok Tedi headwaters, 6900 ft (2103 m), 28 Oct. 1969.

**Etymology.** Named for its larger corollas compared with *Hoya krusenstierniana* subsp. *krusenstierniana*.

**Climber**, epiphytic, latex colour unknown. *Stems* cylindrical, slender, 1–2 mm diam, internodes (1–)4–12 cm long, pubescent to glabrescent. *Roots* not observed. *Leaves*: petiole terete, channelled above, 5–8 by c. 1 mm, pubescent to glabrescent; lamina elliptic, coriaceous, 20–50 by 6–20 mm, apex acuminate, base attenuate, margin recurved, glabrous; venation pinnate, midrib depressed on adaxial surface, secondary veins 3–7 each side. Basal collectors 1 or 2, ovate, 0.2–0.3 mm long. *Inflorescence* one per node, positively geotropic, pseudo-umbelliform, consisting of 1–5 flowers; *peduncle* extra-axillary, terete, 2–3.5 cm by 0.5–0.7 mm, older peduncles forming a rachis from previous flowerings, pubescent; *pedicels* filiform, 23–28 by c. 0.4 mm, glabrous. *Flowers* pink, purple to crimson. *Calyx* 4–5 mm diam; lobes broadly elliptic, 1.5–2 by 1–1.5 mm, apex rounded, glabrous. Basal collectors one at each calyx lobe sinus, ovate, 0.5–0.7 mm long. *Corolla* rotate or shallowly



**Fig. 6** *Hoya krusenstierniana* Simonsson & Rodda subsp. *laticorolla* Simonsson & Rodda, inflorescence *in situ* on Mount Mini. — Photo: Stephanus Venter.

campanulate, 27–30 mm diam when flattened; tube c. 6 mm long, outside glabrous, inside pubescent; lobes deltate, 9–11 by 8–10 mm, apex acute, outside glabrous, inside pubescent. *Corona* staminal, 1.5–2 mm high, 6–6.5 mm diam; lobes with basal process, rhomboid, 2–2.5 by 2.2–2.4 mm, outer apex slightly bilobed, with basal revolute margins; inner process oblong, c. 3 by 1.5 mm; outer process ovate, slightly raised, spreading, apex rounded. *Pollinia* oblong, 600–700 by 250–300  $\mu$ m, apex truncate, base rounded, with pellucid margin; *corpusculum* rhomboid, 500–600 by 350–400  $\mu$ m; *caudicles* attached towards the middle of the corpusculum, 150–200  $\mu$ m long. *Ovary* semiglobose, c. 0.5 by 1 mm, glabrous. *Fruit* and *seed* not observed.

**Distribution** — Known from two locations in Papua New Guinea, one of which was communicated to us as ‘Mt. Mini’ (Stephanus Venter, pers. comm.), which we have been unable to locate.

**Habitat & Ecology** — Growing high up in the mountains at 2000 m above sea level or more, it grows in the same habitat as *H. krusenstierniana* subsp. *krusenstierniana*. Based on recent observations by Stephanus Venter it was found in scrub with scattered trees, mainly *Podocarpaceae*, on peat soil.

**Conservation status** — Data Deficient (DD; IUCN 2012). The only vouchered collection is the type specimen collected 53 years ago, and the recent sighting at ‘Mt. Mini’.

**Note** — The two subspecies of *H. krusenstierniana* have the highest altitudinal record for *Hoya* in Malesia, as they grow at 1800–2600 m. The corona morphology of *H. krusenstierniana* subsp. *krusenstierniana* is quite variable (Simonsson Juhonewe & Rodda 2017: f. 16, 17) and therefore unlikely to be a good character for taxon separation, even though it appears that the centre of the corona of *H. krusenstierniana* subsp. *laticorolla* is more conical compared with specimens of *H. krusenstierniana* subsp. *krusenstierniana*. This feature is, however, often obliterated in herbarium specimens. As mentioned in the diagnosis, the reliable characters to separate the two subspecies lie in the corolla and corpusculum size. Since the two taxa occupy the same type of habitat and their morphological variation is still not well known we decided to consider the new taxon a subspecies of *H. krusenstierniana* rather than a new species.

***Hoya liddleana* Simonsson & Rodda, sp. nov. — Fig. 7, 8**

Similar to *Hoya onychoides* P.I.Forst., Liddle & I.M.Liddle in flower size (c. 5 cm diam in natural state), corolla shape, with inflexed ‘claw-like’ lobes and with oblong corona lobes, but differs in corolla pubescence (thinly pubescent inside in *H. liddleana* vs glabrous or occasionally only sparsely pubescent in *H. onychoides*), and corona shape (inner part conical, outer part spreading in *H. liddleana* vs entirely conical in *H. onychoides*). — Type:

*N. Simonsson & T. Nyhuus NS 0116L* (holo SING), Papua New Guinea, Milne Bay Province, Alotau, trail towards Gamopupu waterfall, 20 m, in lowland disturbed primary forest, living accession *NS08-100*, vouchered in cultivation in Stockholm, Sweden, on 26 Mar. 2016.

**Etymology.** Named after David and Iris Marie Liddle of Mareeba, Australia. David Liddle (–2009) was a keen plant collector, grower and amateur scientist. He described 15 new taxa together with Paul I. Forster (IPNI 2021) and ran a plant nursery with Iris Marie containing a large selection of *Hoya* species.

**Epiphytic climber** with white latex in all vegetative parts. **Stems** up to 10 m long, cylindrical, 2–10 mm diam, green to greyish brown, glabrescent; older stems leafless and lignified, up to 15 mm diam, internodes 3–30 cm long. **Adventitious roots** numerous, scattered along the stems. **Leaves:** petiole 15–50 by 3–7 mm, green to brown, glabrous (sometimes sparsely pubescent when young); lamina pendulous, lanceolate, very succulent and fleshy, 7–20 by 2–10 cm, up to 5 mm thick, dark green on adaxial surface, medium green on abaxial surface, glabrous, apex acute, base cordate; venation pinnate, midrib depressed on adaxial surface, secondary veins 4–7 each side, anastomosing in the middle between midrib and leaf margin or closer to the leaf margin. **Inflorescence** one per node, positively geotropic, pseudo-umbelliform, convex, consisting of 3–12 flowers; **peduncle** extra-axillary, terete, 2–7 cm by 2–5 mm, grey-brown, older peduncles forming a rachis from previous flowerings, glabrous; **pedicels** terete, 5–7 cm by c. 2 mm, light green, glabrescent. **Calyx** 10–12 mm diam; lobes triangular-ovate, 3.5–5 by 3.5–4.5 mm, apex rounded. **Corolla** rotate with inflexed ‘claw-like’ lobes, c. 5 cm diam in natural state (to 7 cm when flattened), deep pink to wine-red with whitish centre beneath the corona; tube 1.2–2.5 cm long,

outside glabrous, inside pubescent with thin hairs, glabrescent towards the centre; lobes fleshy, triangular-acuminate, 2–3 by 1.5–2.5 cm, margin c. 5 mm reflexed to revolute, apex acute, outside glabrous, inside pubescent with thin hairs. **Corona** staminal, c. 1.5 cm high, 2–2.8 cm diam, fleshy, cream, with a pink or maroon centre, inner part conical, c. 1.5 cm across, outer part spreading; lobes oblong, centrally ridged, 1.4–1.8 by 0.3–0.4 cm, inner process 6–8 by 4–6 mm, apex acuminate, meeting in centre, outer processes oblong, laterally concave, 1–1.3 cm long, 4–6 mm high, tip apically slightly raised, basally bilobed, with basal margins becoming revolute and touching each other only towards the apex of the outer corona lobe. **Pollinia** oblong, c. 1300 by 400–450 µm, with pellucid margin; **corpusculum** rhomboid with slight constriction in the middle, 600–700 by c. 400 µm; **caudicles** attached to the middle of the corpusculum, c. 200 by 150 µm. **Ovary** conical, c. 4 mm long, glabrous. **Fruit** and **seed** not observed.

**Distribution** — This species is known from the easternmost part of the Milne Bay Province of Papua New Guinea only. It is available in the horticulture trade as collection numbers SV416 and SV441, collected by Arne Kastberg (Sweden), from Tawali, also in eastern Milne Bay province.

**Habitat & Ecology** — A climber on trees in coastal or riverine forests, in bright or sunny habitats. Locally common in some of the forest remnants. It was also sighted on a *Ficus* sp. tree in a garden near Alotau town.

**Conservation status** — Critically endangered CRB1a,b(iii) (CR; IUCN 2012). This species appears to be common at the type locality, but it may be locally endemic as it has not been recorded elsewhere in Papua New Guinea, neither from herbarium specimens nor during the recent extensive fieldworks. Much of Milne Bay Province’s lowland rainforest has been, or is being, logged (Shearman et al. 2009) and the type locality is not inside a protected area, and surrounded by human settlements and by Alotau town, so may be lost in the near future.

**Specimens examined (paratypes).** Cultivated plant grown on from Papua New Guinea, Milne Bay Province, Alotau town, on tree along the beach, living accession *NS08-077*, vouchered at the Singapore Botanical Garden, Singapore, on 25 Sept. 2013 as *Rodda, M. MR426* (SING).

**Notes** — *Hoya liddleana* is most similar to the widespread (yet endemic to New Guinea) *H. onychoides* because both species have inflexed ‘claw-like’ corolla lobes and oblong corona lobes. They can be easily separated because the inner surface of the corolla of *H. onychoides* is glabrous (except a few scattered hairs inside at the base of the staminal corona and along margins) while in *H. liddleana* it is pubescent throughout inside. In *H. onychoides* the corona is distinctly conical and about as tall as wide, dark wine-red, while the corona of *H. liddleana* has a conical centre with prominent spreading outer processes and it is about half as tall as wide, cream, with pink or maroon centre.

*Hoya liddleana* is also similar to the recently discovered *H. stenaakei* Simonsson & Rodda (name improved, originally *H. stenaakei*; IPNI 2021), once again endemic to New Guinea. Both species have the inner surface of the corolla pubescent. The two species can be separated based on the shape of the corolla (inflexed in *H. liddleana* and rotate in *H. stenaakei*) and the shape of the corona (star-shaped with lobes oblong and only basally bilobed at the outer tip in *H. liddleana*; almost pentagonal with lobes rhomboid and distinctly bilobed at the outer tip in *H. stenaakei*).

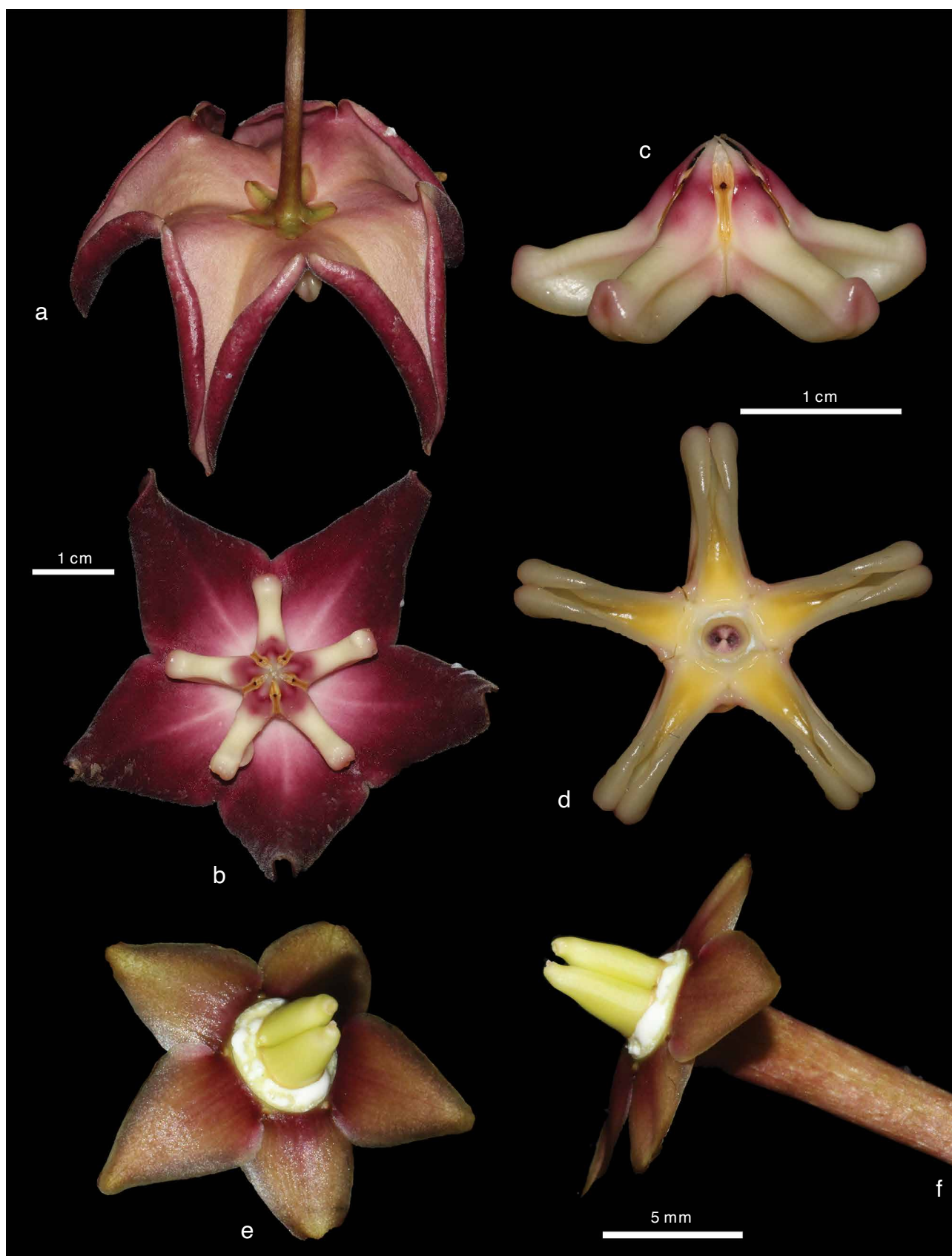
***Hoya lucida* Simonsson & Rodda, sp. nov.** — Fig. 9, 10

Similar to *Hoya magnifica* P.I.Forst. & Liddle in having large narrowly elliptic to broadly ovate leaves, 6–25 cm long, and white campanulate flowers, > 3.5 cm diam, but distinguished by the stem and leaf pubescence (glabrous



**Fig. 7** *Hoya liddleana* Simonsson & Rodda. Inflorescence: a. from *N. Simonsson & T. Nyhuus NS0116L*, living accession *NS08-100*, SING; b. from cultivated plant *NS08-077* (same collection as *M. Rodda MR426*, SING). — Photos: E. Elgerud.



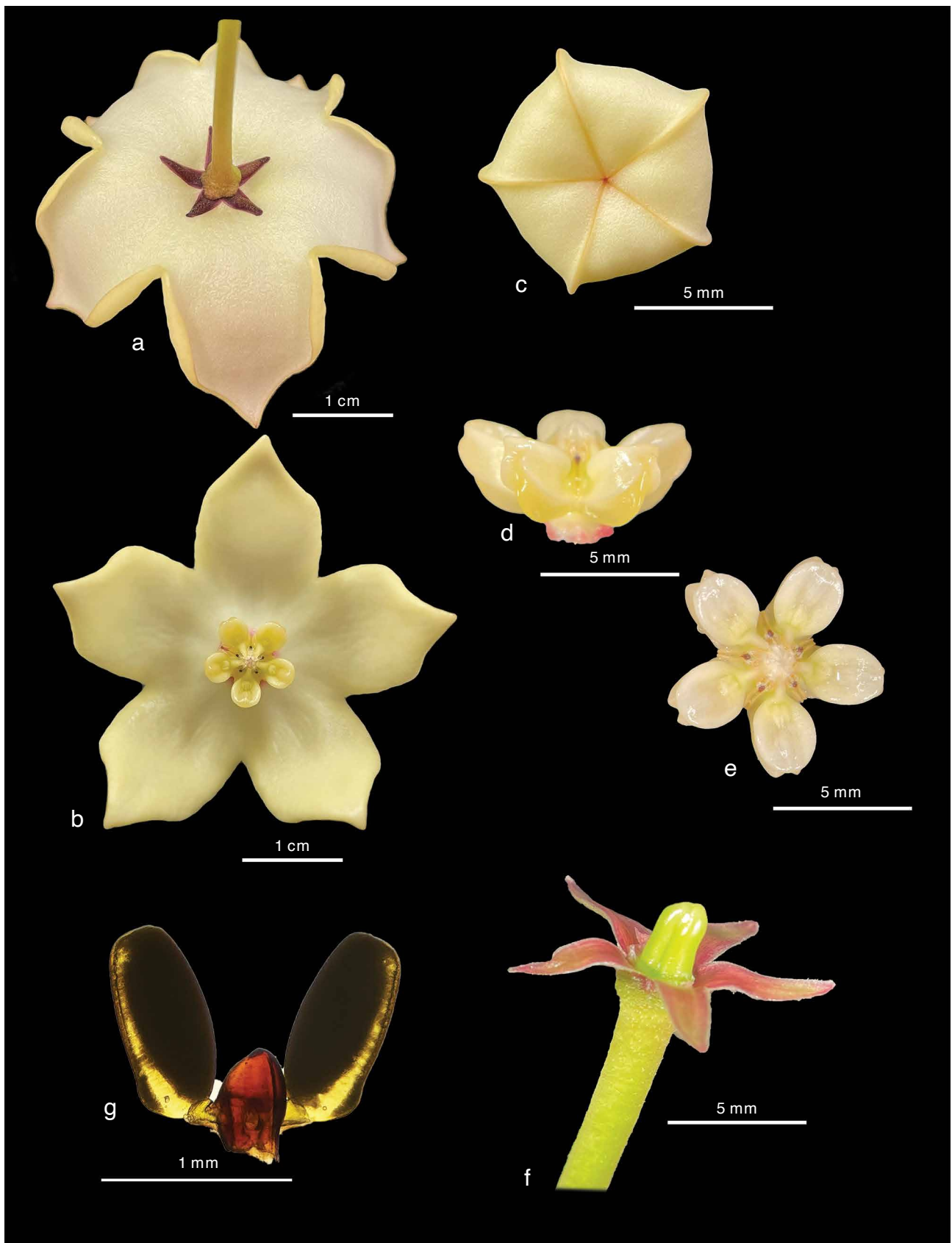


**Fig. 8** *Hoya liddleana* Simonsson & Rodda. a. Corolla, from underneath; b. corolla, from above; c. corona, side view; d. corona, from underneath; e. calyx and ovary, from above; f. calyx and ovary, side view; g. pollinarium (all from M. Rodda MR426, SING). — Photos: M. Rodda.

or sparsely pubescent in *H. lucida* vs densely pubescent in *H. magnifica*), and by the size and shape of the calyx lobes (narrowly lanceolate, 4–6 mm long in *H. lucida* vs lanceolate to ovate, 1.3–1.6 cm long in *H. magnifica*). — Type: M. Rodda & E.H. Yap MR2143 (holo SING; iso K, L, LAE), cultivated plant grown on from Papua New Guinea, Morobe Province, Garaina valley, along trail to Mt. Bishop, NS12-072, vouchered at the Singapore Botanic Gardens on 25 May 2021.

**Etymology.** The specific epithet '*lucida*' (Latin *lucidus*: light or bright), refers to the bright white showy flowers of the species.

**Climber**, epiphytic, latex white. **Stems** cylindrical, 3–15 mm diam, glabrous (sometimes sparsely pubescent when young), internodes 5–30 cm long. **Roots** adventitious. **Leaves**: petiole terete, channelled above, 1.5–2.5 by c. 0.3 cm, glabrous (pubescent



**Fig. 9** *Hoya lucida* Simonsson & Rodda. a. Flower (from underneath), b. flower (from above); c. bud; d. corona (side view); e. corona (from above); f. calyx and ovary; g. pollinarium (a–c: M. Rodda & E.H. Yap MR2133, SING; d–g: M. Rodda & E.H. Yap MR2143, SING). — Photos: M. Rodda.



**Fig. 10** *Hoya lucida* Simonsson & Rodda. Habit with inflorescence (from M. Rodda & E.H. Yap MR2143, SING). — Photo: M. Rodda.

when young); lamina variable in shape from narrowly elliptic to broadly ovate, succulent, (6–)10–25 by 3–15 cm, apex rounded to acuminate, base rounded or attenuate; glabrous (sparsely pubescent above when young); venation pinnate, midrib depressed on adaxial surface, secondary veins 5–10 each side. Basal colleters in groups of 5–7, oblong, 0.5–0.7 mm long. *Inflorescence* one per node, positively geotropic, pseudo-umbelliform, consisting of 5–15 flowers; peduncle extra-axillary, terete, 1–3 cm by 3–8 mm, older peduncles forming a rachis from previous flowerings, glabrous to pubescent; pedicels filiform, 30–40 by c. 1.5 mm, glabrous to sparsely pubescent. *Calyx* 12–15 mm diam; lobes narrowly lanceolate, 4–6 by 2–3 mm, apex acute, outside glabrous (sparsely pubescent), inside glabrous, ciliate. Basal colleters 2–4 in each sinus, narrowly acute, c. 0.5 mm long. *Corolla* rotate to broadly campanulate, 3.5–6 cm diam when flattened, snow-white, sometimes with red marking beneath corona; tube 10–12 mm long, outside glabrous, inside pubescent only beneath corona and near margins with short hairs; lobes deltate, 12–15 by 10–14 mm, apex acuminate, outside glabrous, inside pubescent along margins with short hairs. *Corona* staminal, 5–6 mm high, 8–12 mm diam, cream-white; lobes ovate or round to rhomboid, c. 3 by 5 mm, with inner process pointing diagonally and not covering the style head, c. 2.5 by 0.5 mm, apex acuminate, and a spreading or diagonally held outer process, c. 3.5 by 3 mm, apex rounded, with basal revolute margins. *Pollinia* oblong, 1000–1100 by 400–500  $\mu$ m, with pellucid margin; *corpusculum* ovoid, 500–600 by 300–400  $\mu$ m; *caudicles* attached towards the base of the corpusculum, 200–300  $\mu$ m long. *Ovary* c. 3 mm long, conical, glabrous at base, pubescent near tip. *Fruit* and *seed* not observed.

**Distribution** — Widely distributed in New Guinea, with most records in the more explored provinces of Madang and Morobe. However, several collections in herbaria are difficult to assign to either *H. lucida* or to *H. calycina* Schltr. subsp. *glabrifolia* P.I.Forst. & Liddle, especially when the characteristic buds are not present.

**Habitat & Ecology** — It inhabits montane forests between 800 and 1800 m altitude, where it grows as an epiphyte in both primary and mature secondary forests, on exposed trees along forest edges, paths or rivers, rarely inside the forest in full shade. Occasionally seen recolonising mature trees in subsistence gardens, if there are extant populations in primary forests nearby, showing an ability to recolonize disturbed areas.

**Conservation status** — Least Concern (LC; IUCN 2012). A species occurring over a large area in Morobe and Madang provinces but under-represented in herbarium collections.

**Specimens examined (paratypes).** Cultivated plant grown on from Papua New Guinea, NS12-106, vouchered at the Singapore Botanic Gardens on 1 Apr. 2021 as M. Rodda & E.H. Yap MR2133 (SING); cultivated plant grown on from Papua New Guinea, NS12-087, vouchered at the Singapore Botanic Gardens on 29 July 2021 as M. Rodda & E.H. Yap MR2159 (SING); cultivated plant grown on from Papua New Guinea, Morobe Province, Garaina valley, along trail to Mt. Bishop NS12-078, vouchered in Papua New Guinea, Eastern Highlands Province, Ukarumpa, on 2 Dec. 2013 as N. Simonsson & F. Juhonewe NS0083L (SING, LAE); cultivated plant grown on from Papua New Guinea, Morobe Province, Garaina valley, Saureli, camp 1, newly created garden in primary forest area. 1612 m, NS12-082, vouchered in Papua New Guinea, Eastern Highlands Province, Ukarumpa, on 2 Dec. 2013 as N. Simonsson & F. Juhonewe NS0082L (LAE, SING).

**Notes** — As mentioned in the diagnosis, the flowers of *H. lucida* are similar in size, corolla and corona morphology to these of *H. magnifica*, but the two species can be separated on size and shape of the calyx lobes (narrowly lanceolate, 4–6 mm long in *H. lucida*, lanceolate to ovate, 1.3–1.6 cm long in *H. magnifica*) and stem and leaf pubescence (glabrous or sparsely pubescent in *H. lucida*, densely pubescent in *H. magnifica*).

Based on herbarium records, specimens of *H. lucida* are often misidentified as *H. calycina* subsp. *glabrifolia* because of the large glabrous or glabrescent leaves and large flowers. Both taxa are widespread in the mountains of New Guinea and cannot be distinguished when not in flower, but upon seeing living materials we noticed that *H. lucida* has flattened buds and more broadly campanulate corollas that are thinner and flexible upon touch, while the buds are rounded and the corolla is stiffer and succulent in *H. calycina* subsp. *glabrifolia*. The scent from cultivated specimens from Morobe and Madang is similar to that of Lily of the Valley (*Convallaria majalis* L., *Asparagaceae*).

#### *Hoya paradisea* Simonsson & Rodda, sp. nov. — Fig. 11

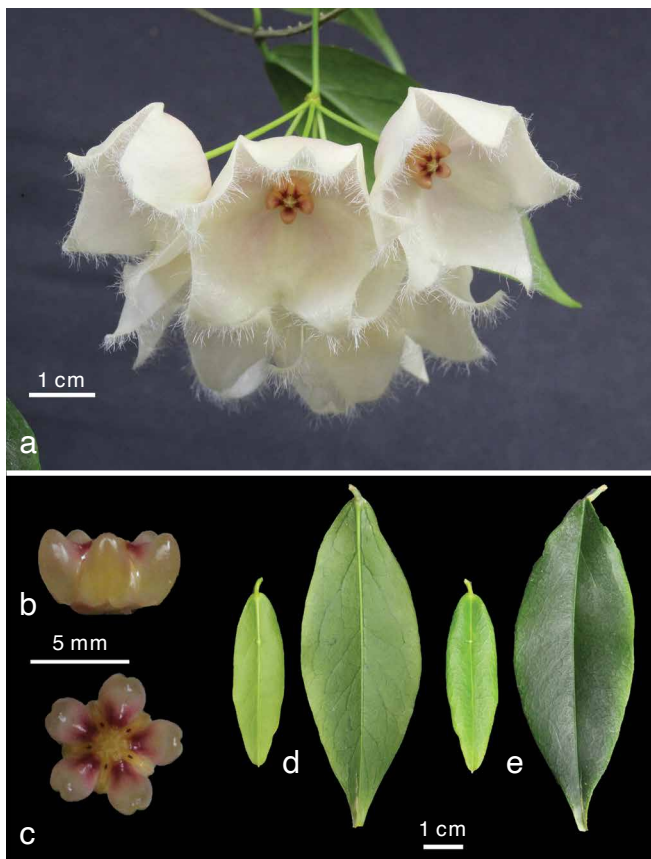
Similar to *Hoya juhonewiana* Simonsson & Rodda subsp. *juhonewiana* in corolla shape and size (campanulate, > 2.5 cm diam) and in corona/corolla diam ratio (corolla > 3 times as wide as corona) but distinguished on corolla pubescence (inside glabrous except for a pubescent ring beneath the corona and the entire margin of corolla covered with stiff, brittle, c. 3 mm long hairs in *H. paradisea*, vs thickly pubescent inside, usually almost glabrous near centre in *H. juhonewiana* subsp. *juhonewiana*), and leaf orientation and pubescence (not pendulous, glabrous in *H. paradisea*, vs pendulous, both surfaces covered by very stiff, erect, 1 mm or longer hairs in *H. juhonewiana* subsp. *juhonewiana*). — Type: N. Simonsson & F. Juhonewe NS0115L (holo SING), Papua New Guinea, Western Province, Black River near Dahamo village, 100 m in lowland primary forest, living accession NS11-159, vouchered in cultivation in Stockholm, Sweden on 25 Mar. 2018.

**Etymology.** The name refers to the exceptionally diverse rainforests of New Guinea which are sometimes called Paradise forests.

All measurements are from live material, measurements in brackets indicate dry size.

**Epiphytic climber** with white latex in all vegetative parts. **Stems** up to 5 m long, cylindrical, 1–2 mm diam, sparsely pubescent, green; older stems lignified, up to 4 mm diam, glabrous, greyish brown, often sending horizontal flowering branches with densely spaced internodes of 1–2 cm long, while the main climbing stems often have 5–15 cm long internodes. **Adventitious roots** numerous, scattered along the stems. **Leaves:** petiole 3–6 by c. 1 mm, sparsely pubescent turning glabrescent, lamina elliptic-lanceolate, coriaceous, 5–8 by 1.5–3 cm, medium green on both surfaces, apex caudate, base round to attenuate; venation pinnate, midrib depressed on adaxial surface, secondary veins more or less obscure, glabrous. Basal colleters often missing, when present one, ovoid, 0.3–0.4 mm long. *Inflorescence* one per node, extra-axillary, pseudo-umbellate, positively geotropic, convex, consisting of 7–10 flowers lasting about 2 days; *peduncle* terete, c. 4–10 cm by c. 1 mm, light green to brownish, glabrous to minutely pubescent, older peduncles forming a rachis from previous flowerings, but





**Fig. 11** *Hoya paradisea* Simonsson & Rodda. a. Inflorescence, side view; b. corona, side view; c. corona, from above; d. leaves, from underneath; e. leaves, from above (all from N. Simonsson & F. Juhonewe NS0115L, SING). — Photos: N. Simonsson.

occasionally dropped after flowering; *pedicels* terete, c. 3 cm by 1 mm, light green, glabrescent. *Calyx* c. 6 mm diam; lobes acute, c. 1.5 by 1 mm, apex acute. *Colleters* not observed. *Corolla* campanulate, c. 3 cm diam in natural state (4.5–5 cm when flattened or c. 1.5 cm when dry in natural state), creamy white with very slight pinkish or yellowish hue, outside glabrous, inside glabrous except for a pubescent ring beneath the corona and the entire margin of corolla covered with stiff, brittle, c. 3 mm long hairs; tube c. 3 cm diam (c. 1.5 cm diam), c. 1 cm deep; lobes broadly triangular, c. 1.4 by 1.6 cm (7–9 by 8–10 mm). *Corona* staminal, c. 4 (3–3.5) mm high, c. 7 (4.5–5.5) mm diam, fleshy, translucent creamy yellow with a maroon centre; lobes from above ovate, almost heart-shaped, c. 3 by 2.5 mm, inner processes horizontal and rounded, not touching each other in the centre, outer processes pointing upward and rounded, with basal revolute margin going almost all the way up to highest point of the corona, not basally fused with the filament tube. *Pollinia* oblong-ovate, c. 700 by 250  $\mu$ m, with pellucid margin; *corpusculum* oblong with a constriction in the middle, 300–350 by c. 200  $\mu$ m; *caudicles* attached at the lower half of the corpusculum, c. 150 by 50  $\mu$ m. *Ovary* conical, c. 2.5 mm long, glabrous. *Fruit* and *seed* not observed.

**Distribution** — This species was first collected in 2011 during an expedition along the Black River, the type locality, and has not been recorded elsewhere during other expeditions in Papua New Guinea. In 2021 we received photographic records of two additional collections from Mimika regency in Indonesian Papua province (Mt Timika area), indicating a wider distribution area (Imran pers. comm.). The species may be more common in southwest New Guinea, which is still much unexplored.

**Habitat & Ecology** — An epiphytic climber in lowland primary riverine forest, often growing near the ground or near streams

on trees and shrubs. At the type locality it was not observed in taller trees or sunnier and drier spots, only in shade or filtered sunlight. Locally common at the type locality.

**Conservation status** — Data Deficient (DD; IUCN 2012). This species has only been vouchered at the type locality where it appears to be locally common. Much of Papua New Guinea's Western Province's lowland rainforest has been, or is being, logged (Shearman et al. 2009) and the type locality is not inside a protected area and may be lost in the near future. The two records in Mimika regency, Papua Province, suggest that *H. paradisea* may be much more widespread and it is possible that it might be found in Lorentz National Park. The conservation assessment will need to be updated once more collections become available.

**Notes** — It is the only *Hoya* species in New Guinea having c. 3 mm long and very brittle hairs along the margins of the campanulate flowers, that move with the slightest air movement. It is here compared with *H. juhoneweana* subsp. *juhoneweana* because of the similarities in the corolla shape (campanulate) and in the small corona in comparison to the size of the corolla. It is not compared with *H. juhoneweana* subsp. *lindforsiana* Simonsson & Rodda, because this subspecies has a rotate corolla. The similarities with *H. juhoneweana* subsp. *juhoneweana*, however, do not automatically make it a subspecies of *H. juhoneweana* and the two taxa may not be closely related as other characters such as the leaf orientation and pubescence are quite different. They occur in different habitats, *H. paradisea* growing in the lowlands, *H. juhoneweana* subsp. *juhoneweana* from above 1300 m. Outside of New Guinea, *H. devogelii* Rodda & Simonsson also has campanulate flowers with long (c. 2 mm long) hairs on the corolla lobes. The two species can be separated on leaf shape, texture and size (linear-lanceolate, fleshy, 10–15 by 1–2 cm in *H. devogelii* and elliptic-lanceolate, coriaceous, 5–8 by 1.5–3 cm in *H. paradisea*) and corona morphology (stipitate, round when observed from above in *H. devogelii*; sessile, distinctly 5-lobed in *H. paradisea*). When not in flower, *H. paradisea* can be confused with many other New Guinean species with similar plain green, coriaceous leaves, for example *H. apoda* S.Moore, *H. evelinae* Simonsson & Rodda, *H. leucantha* S.Moore, *H. oreostemma* Schltr., and *H. solaniflora* Schltr. Their flowers show a great diversity in both size, shape, colour and orientation, but none of them have corolla lobes with 3 mm long hairs. The flowers of *H. paradisea* last about two nights only, and emit a very pleasant and noticeable scent during the night similar to a mixture of rose and citrus, reminding of the scent of rose geranium (*Pelargonium graveolens* L'Hér. hybrids, *Geraniaceae*).

#### ***Hoya pulleana* Rodda & Simonsson, sp. nov. — Fig. 12, 13**

Similar to *Hoya oxycoccoides* in the small ovate to rounded leaves, thin wiry stems and rotate corollas, but differs by having thicker leaves (1–1.5 mm thick in *H. pulleana* vs < 1 mm in *H. oxycoccoides*) and flower size (7–10 mm diam in *H. pulleana* vs c. 2 cm diam in *H. oxycoccoides*). — Type: A. Pulle 1217 (holo L [L0834578]; iso BO [BO0110493]), Indonesia, Papua Province, Lorentz River (Sungai Unir) near Kloofriver, 40 m, 24 Mar. 1913.

**Etymology.** Named after its collector, August Adriaan Pulle (1878–1955).

**Climber**, likely epiphytic, with white latex in all vegetative parts. **Stems** cylindrical, slender, 1–2 mm diam, pubescent to glabrescent, internodes 1–4(–10) cm long. **Roots** not observed. **Leaves**: petiole terete, 2–3 by 0.4–0.8 mm, pubescent; lamina ovate to round, 1–1.5 mm thick and very coriaceous when dry, 8–16 by 5–12 mm, glabrous above, sparsely pubescent to glabrescent underneath, apex rounded, occasionally shortly apiculate, base rounded to very shallowly cordate; venation pinnate, secondary veins 3–5 each side, barely visible. *Colleter* 1 at each lamina base, globose, 0.2–0.25 mm long. **Inflorescence**



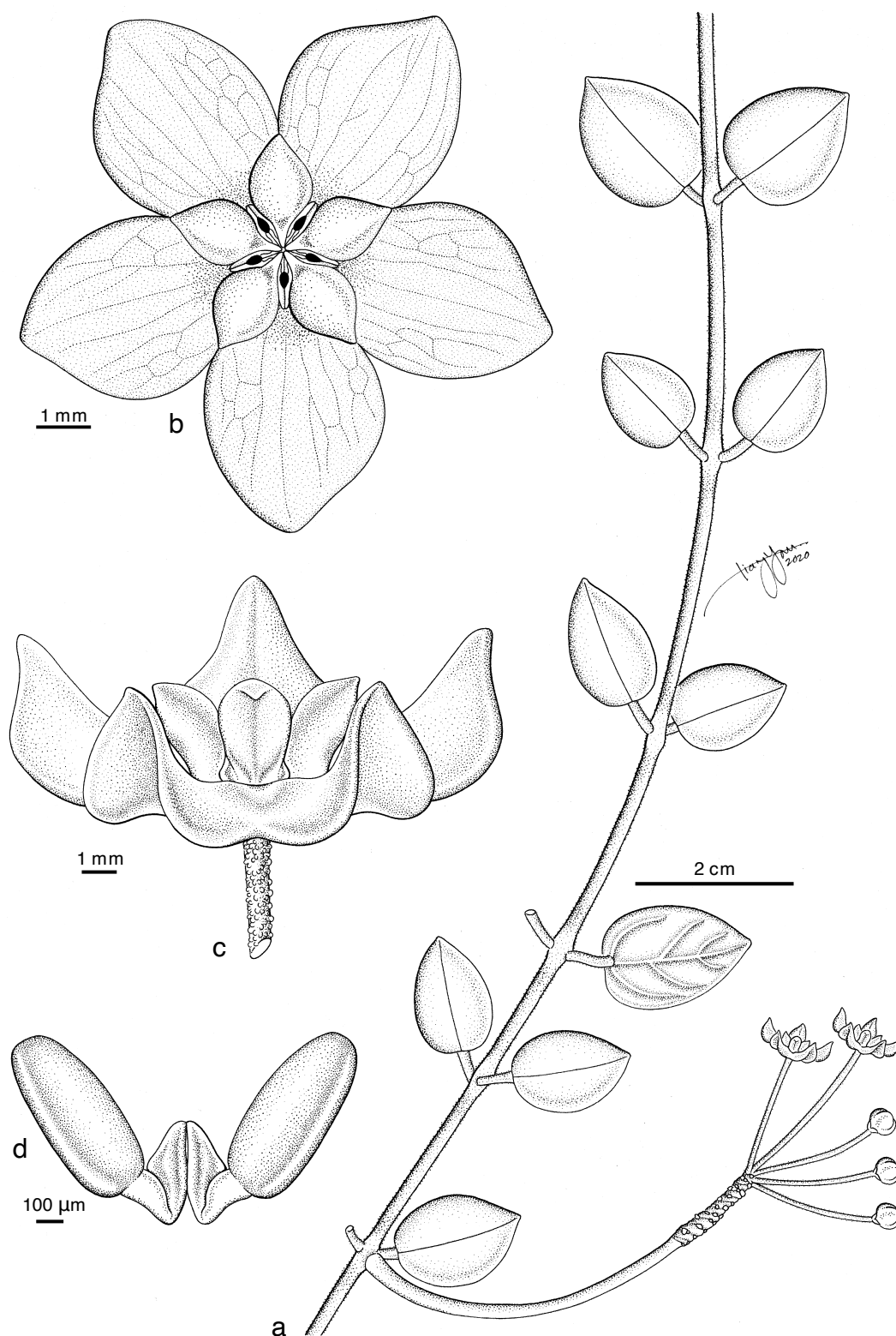


Fig. 12 *Hoya pulleana* Rodda & Simonsson. a. Habit; b. flower (from above); c. flower (side view); d. pollinarium (all from A. *Pulle* 1217, L.). — Drawing: X.Y. Loh.

one per node, negatively geotropic, pseudo-umbelliform, consisting of 3–9 flowers; *peduncle* extra-axillary, terete, 5–7 cm by 0.8–1 mm, older peduncles forming a rachis from previous flowerings, pubescent; *pedicels* filiform, 10–22 by c. 0.3 mm, pubescent. *Calyx* c. 3 mm diam; lobes oblong, 1.2–1.5 by 0.6–0.8 mm, apex rounded, outside sparsely pubescent, inside glabrous, ciliate. Basal colleters one at each calyx lobe sinus, ovate, c. 0.1 mm long. *Buds* globose. *Flowers* white to light yellow-green. *Corolla* rotate, 7–10 mm diam when flattened; tube c. 1.5 mm long, outside glabrous, inside pubescent, glabrescent towards the centre; lobes elliptic-ovate, 3–3.5 by

3–3.2 mm, apex acute, outside glabrous, inside pubescent, margins recurved. *Corona* staminal, c. 1.7 mm high, c. 3.5 mm diam; lobes broadly elliptic, 1.5–1.8 by 0.9–1.1 mm, inner process acuminate, erect, c. 1 by 0.1 mm, outer processes raised, forming an acute angle with the inner process, apex rounded, with basal revolute margins. *Pollinia* oblong, c. 600 by 250 µm, with pellucid margin; *corpusculum* rhomboid, c. 350 by 250 µm; *caudicles* attached at the lower half of the corpusculum, c. 150 µm long. *Ovary* narrowly conical with a globose base, c. 1.7 mm long, base c. 0.7 mm wide, glabrous. *Fruit* and seed not observed.



**Fig. 13** *Hoya pulleana* Rodda & Simonsson. Inflorescence with buds and open flower. — Photo: Surisa Somadee.

**Distribution** — Only known from two localities in the southern part of Indonesia's Papua province, near Sungai Unir and at Kelurahan Iwaka, Iwaka, Mimika Regency.

**Habitat & Ecology** — The label on the type specimens only mentions the habitat as 'forest'. The plant observed at Kelurahan Iwaka was found in lowland riverine forest (Imran pers. comm.).

**Conservation status** — Data Deficient (DD; IUCN 2012). The only vouchered collection is the type specimen collected 109 years ago, and the recent sighting in Indonesia at Kelurahan Iwaka.

**Note** — Forster and Liddle suggested to use the name '*dischidioides*' for this species and labelled the type specimen with this name. However, we feel that the small leaves are the only resemblance between *H. pulleana* and some species of *Dischidia* R.Br., while the flowers are very much within the morphological variation of *Hoya* species. There are numerous small-leaved *Hoya* species in New Guinea, but the majority of them are found in montane forest. Among species with similar leaves only *H. oxycoccoides* has been recorded from the lowlands; its leaves are thinly coriaceous, the flowers of *H. oxycoccoides* are c. 2 cm diam, with flat corolla lobe margins and a maroon corona, while *H. pulleana* has 1–1.5 mm thick and very coriaceous leaves, 3–9-flowered umbels with flowers 7–10 mm diam and recurved corolla lobe margins making the white corona the dominant feature of the flower.

***Hoya tarikuensis* Rodda & Simonsson, sp. nov. — Fig. 14**

Similar to *Hoya uncinata* Teijsm. & Binn. from Java and Sumatra in the deeply lobed rotate corolla with inflexed lobes but distinct in the shape of the corona (stipitate, with corona lobes laterally compressed in *H. uncinata* vs sessile with spreading lobes in *H. tarikuensis*). — Type: *W.M. Docters van Leeuwen* 9869 (holo L [L.2720319]; iso K), Indonesia, Papua Province, Rouffaer River, 175 m, Aug. 1926.

**Etymology.** Named after the type locality by Tariku river (Sungai Tariku), formerly known as Rouffaer river.

**Climber**, latex colour unknown. **Stems** cylindrical, slender, 2–3 mm diam, glabrous, internodes 4–15 cm long. **Roots** not observed. **Leaves**: petiole terete, channelled above, 5–10 by 1.5–2 mm, pubescent to glabrescent; lamina elliptic-lanceolate, very coriaceous when dry, 4–15 by 1.5–7 cm, glabrous, apex acuminate to acute, base rounded to acute; venation pinnate, midrib depressed on adaxial surface, secondary veins 3–6 each side, barely visible. Colleter 1, along midrib and slightly

sunken in, 2–3 mm from lamina base, broadly conical, c. 0.5 by 0.5 mm. **Inflorescence** one per node, tropism unknown, pseudo-umbelliform, consisting of 3–6 flowers; **peduncle** extra-axillary, terete, 4–10 cm by 1–2 mm, glabrous, older peduncles forming a rachis from previous flowerings; **pedicels** filiform, 11–14 cm by c. 0.3 mm, glabrous. **Calyx** 1.5–2 mm diam; lobes deltate, 0.5–0.7 by 0.2–0.3 mm, apex acute, glabrous. Basal colleters one at each calyx lobe sinus, conical, c. 0.1 mm long. **Flowers** white. **Corolla** rotate with inflexed lobes, 8–10 mm diam when flattened; tube c. 1 mm long, outside glabrous, inside pubescent, glabrescent towards the centre; lobes ovate, 3–4 by 2.5–3 mm, margins reflexed apex acute, outside glabrous, inside pubescent. **Corona** staminal, sessile, c. 1 mm high, 3.5–4.5 mm diam; lobes spreading, ellipsoid, 1.4–2.2 by 0.7–1 mm, inner process acuminate, outer processes raised, rounded, with basal revolute margins. **Pollinia** oblong, c. 380 by 120 µm, with pellucid margin; **corpusculum** oblong, with slight constriction in the middle, c. 120 by 80 µm; **caudicles** attached in the middle of the corpusculum, c. 80 µm long. **Ovary** conical, 0.7–1 mm long, glabrous. **Fruit** and **seed** not observed.

**Distribution** — The species is only known from the type locality in Indonesia, Papua Province, by the Tariku River.

**Habitat & Ecology** — The only data provided on the type specimen indicate that this species was found in hills, in the forest.

**Conservation status** — Data Deficient (DD; IUCN 2012). *Hoya tarikuensis* is known only from the type specimen collected 96 years ago.

**Notes** — *Hoya tarikuensis* is most similar to *H. uncinata*, which is not native to New Guinea but found in Java and Sumatra. *Hoya uncinata* is peculiar in having clear latex. We do not know the latex colour of *H. tarikuensis*. We suspect that the similarities in corolla shape between the two species do not reflect a close relationship between the species as other features such as the corona and the pollinarium are clearly different: corona stipitate, with corolla lobes laterally compressed in *H. uncinata* vs sessile with spreading lobes in *H. tarikuensis*; corpusculum of the pollinarium almost as large as the pollinium in *H. uncinata* vs corpusculum less than half as long as pollinium in *H. tarikuensis*.

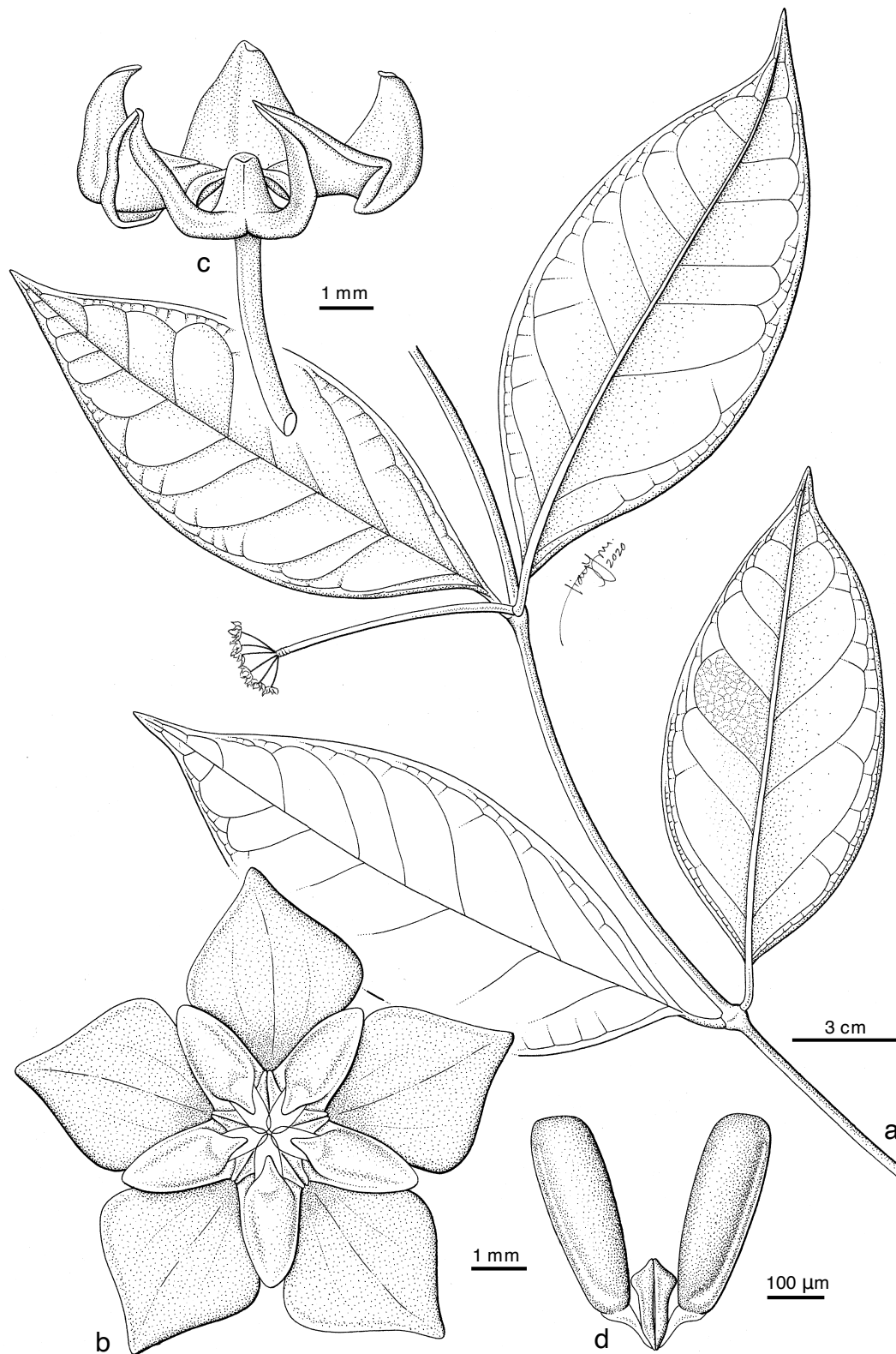
In New Guinea the most similar species to *H. tarikuensis* in habit is *H. chloroleuca* Schltr. as both species have large thin leaves with acute base in combination with small flowers (c. 1 cm when dry), but *H. chloroleuca* has rotate corollas, while *H. tarikuensis* has deeply lobed inflexed corollas. Other species with deeply lobed corollas are *H. exilis* Schltr. and *H. oreostemma* Schltr., but their corolla lobes are reflexed (vs inflexed in *H. tarikuensis*). *Hoya pulleana* (published here) has deeply lobed corollas with inflexed corolla lobes just like *H. tarikuensis* but the leaves of *H. pulleana* are ovate to round, 8–16 by 5–12 mm (vs elliptic-lanceolate, 4–15 by 1.5–7 cm in *H. tarikuensis*).

***Hoya unirana* Rodda & Simonsson, sp. nov. — Fig. 15**

Similar to *Hoya chloroleuca* in the large, densely placed chartaceous leaves with acute bases, but differing in corolla size and shape (rotate, flat, 20–22 mm diam with reflexed lobe margin in *H. unirana* vs rotate, slightly concave, c. 1.2 cm diam, with flat lobe margin in *H. chloroleuca*). — Type: *G. Versteeg* 1235 (holo L [L0834580]; iso BO [BO0110494]), Indonesia, Papua Province, Zandvoort-Sabang, 15 June 1907.

**Etymology.** Named after its type locality, Sungai Unir (formerly Lorentz river). The two duplicates of the type collection were labelled in 1991 as '*Hoya greenii* P.Forster & Liddle ms.', a nomen nudum, and likely intended to name the species after Ted Green of Kaaawa, USA. Another species from the Philippines, *H. greenii* Kloppenb. was named after him in 1995.

**Climber**, likely epiphytic, latex colour unknown, all vegetative parts glabrous. **Stems** cylindrical, slender, 2–4 mm diam, inter-



**Fig. 14** *Hoya tarikuensis* Rodda & Simonsson. a. Inflorescence, side view; b. corolla from above side view; c. corona, from above; d. pollinarium (all from V.M. Docters van Leeuwen 9869, L). — Drawing: X.Y. Loh.

nodes 3–12 cm long. *Roots* not observed. *Leaves*: petiole terete, channelled above, 10–25 by 1.5–2 mm; lamina elliptic to ovate, chartaceous, 8–15 by 4–6 cm, apex acuminate-cuspidate, base acute; venation pinnate, midrib depressed on adaxial surface, secondary veins 4–8 each side. Basal colleters one, broadly triangular, 0.5–0.8 mm long. *Inflorescence* one per node, tropism unknown, likely positive, pseudo-umbelliform, consisting of 6 or more flowers; *peduncle* extra-axillary, terete, 2–8 cm by 1.5–2.5 mm, older peduncles forming a rachis from previous flowerings, glabrous; *pedicels* filiform, 28–33 by c. 0.8 mm, gla-

brous. *Calyx* c. 4 mm diam; lobes deltate, 1.3–1.6 by c. 1 mm, apex acute, glabrous. Basal colleters scattered along the inner base of the calyx lobes, globose, c. 0.2 mm long. *Corolla* rotate, 20–22 mm diam when flattened, creamy greenish-yellow; tube c. 5 mm long, outside glabrous, inside pubescent, with shorter hairs towards the centre; lobes elliptic-ovate, 8–10 by 6–8 mm, apex acute, margin reflexed, outside glabrous, inside densely pubescent. *Corona* staminal, 1.5–2 mm high, 8.5–10 mm diam, creamy yellow with pink centre; lobes lanceolate, 5–5.5 by 1.9–2.1 mm, inner process oblong, covering the style head

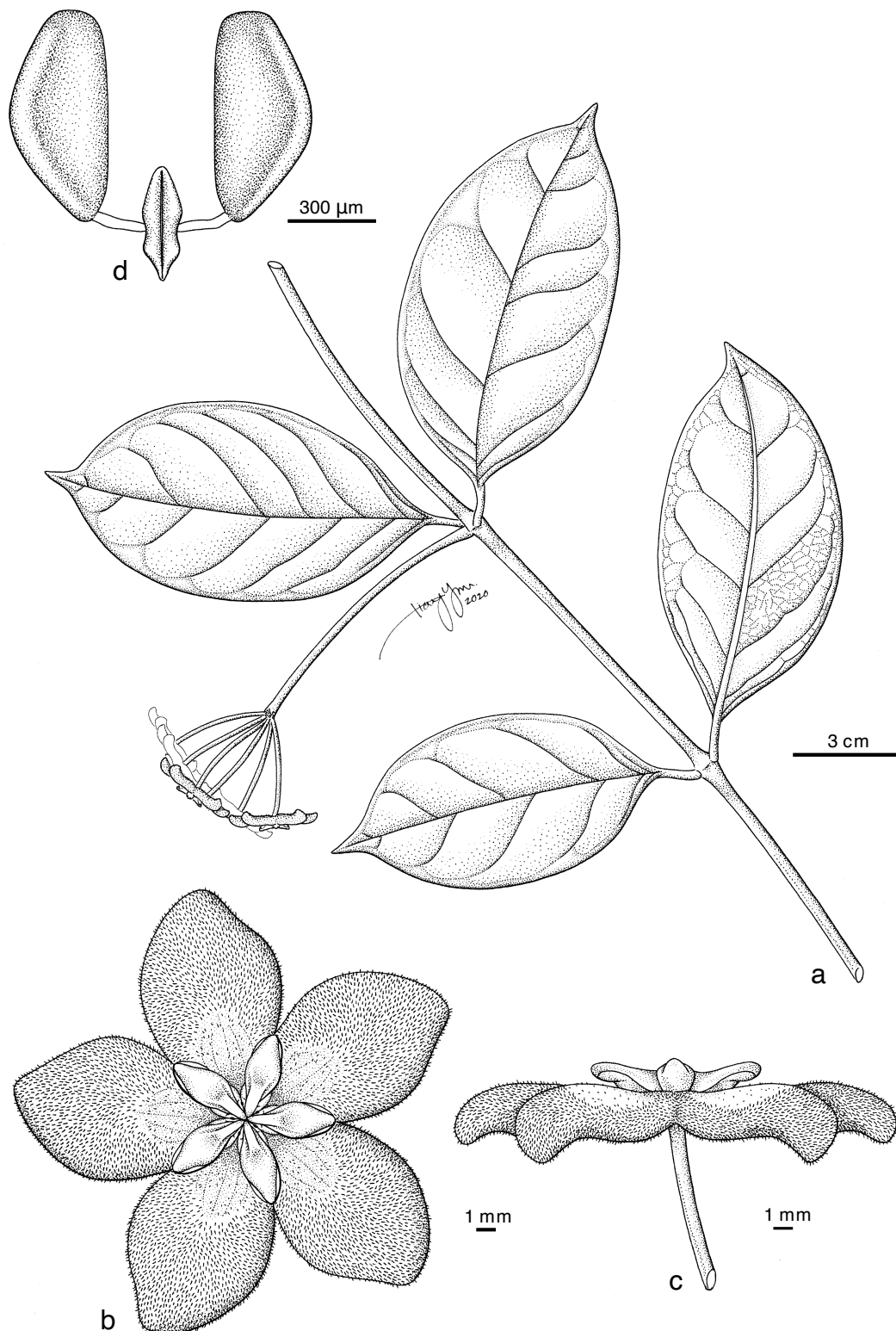
and joining in the middle, c. 1.5 mm long, outer processes spreading, apex truncate, with basal revolute margins. *Pollinia* lunate, 600–700 by c. 300  $\mu$ m, with pellucid margin; *corpusculum* oblong, c. 330 by 140  $\mu$ m; *caudicles* linear, c. 150  $\mu$ m long. *Ovary* conical, c. 1.5 mm long, glabrous. *Fruit* and *seed* not observed.

**Distribution** — Only known from one location in Indonesia, Papua Province, Sungai Unir (formerly Lorentz river).

**Habitat & Ecology** — Based on the label data it was collected in a forest habitat with bamboos.

**Conservation status** — Data Deficient (DD; IUCN 2012). *Hoya unirana* is known only from the type specimen collected 115 years ago.

**Note** — *Hoya unirana* is most similar to the two lowland species *H. chloroleuca* and *H. tarikuensis* (described above), in having thin leaves that can grow to > 10 cm long, with acute bases, and having inflorescences with at least 6 flowers, but can be distinguished in the corolla size (c. 2 cm in *H. unirana*), compared to 0.8–1.2 cm in *H. chloroleuca* and *H. tarikuensis*. *Hoya subglabra* Schltr. also has similar leaves and rotate flowers of c. 2 cm diam, but it grows only at 400–1500 m altitude.



**Fig. 15** *Hoya unirana* Rodda & Simonsson. a. Habit; b. flower (from above); c. flower (side view); d. pollinarium (all from G. Versteeg 1235, L). — Drawing: X.Y. Loh.



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