

Hoya mirabilis Kidyoo, a New Species of *Hoya* (Asclepiadaceae) from Western Thailand

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ABSTRACT.— A new species of *Hoya* R.Br. (Asclepiadaceae) was discovered from western Thailand. Here a detailed description and illustrations of this newly revealed species, *Hoya mirabilis* Kidyoo, is provided. This species is related to *H. lacunosa* Blume, a common species, but they differ in their habitat and leaf and floral characters.

KEY WORDS: Asclepiadaceae, *Hoya*, new species, Thailand

INTRODUCTION

The genus *Hoya* R. Br. belongs to the milkweed family, Asclepiadaceae, and consists of at least 200 known species that occur from China, Southeast Asia to Oceania (Li et al., 1995; Wanntorp et al., 2006). Their common characters are a milky sap in all parts, opposite leaves, umbelliform inflorescence and star-shaped corona. In Thailand, there are approximately 40 known species (Kerr, 1951; Thaithong, 1995; Kidyoo and Thaithong, 2007; Wai et al., 2008). Recently, a potentially new species of *Hoya* was found in western Thailand. After intensive studies of herbarium specimens deposited at K, BM, P, L, AAU, SING and BKF, it appears that this is a new species and is described as such in the report.

SYSTEMATICS

Hoya mirabilis Kidyoo, spec. nov.
(Figures 1, 2A-D and 3)

Species *H. lacunosae* Blume similis, sed folia elliptica vel lanceolata, nervis lateralibus utrinque obscuris, 4-6 paribus angulo ca. 30-45° ascendentibus; corolla recurvula, lobis ovatis, apice reflexis; coronae segmenta ovata-oblonga, angulo externo obtusa differt.— Typus: *M. Kidyoo 1503* [holo BCU; iso BKF] Thailand, Ratchaburi Province, Suan Phung, Khao Leam, alt. 1100 m a.m.s.l., July 2011.

A small climbing epiphyte. *Stem and branches:* cylindrical, slender, 2-3 mm in diam., green or darkish brown color, sparsely pubescent when young, glabrous with age, internodes 1-5 cm long, with well-developed adventitious roots. *Leaves:* petiole glabrous to sparsely pubescent, 0.3-1 cm long 1.3-1.9 mm diam.; blade coriaceous to thick coriaceous, ovate, elliptic, lanceolate or oblanceolate, 2.5-7 cm long, 1-2.5 cm wide, margins entire, faintly recurved; adaxial surface dark green, glabrous; abaxial surface pale green with scattered hairs on margins; apex acute to acuminate, base cuneate to attenuate; midrib and nerves inconspicuous, lateral veins 4-6

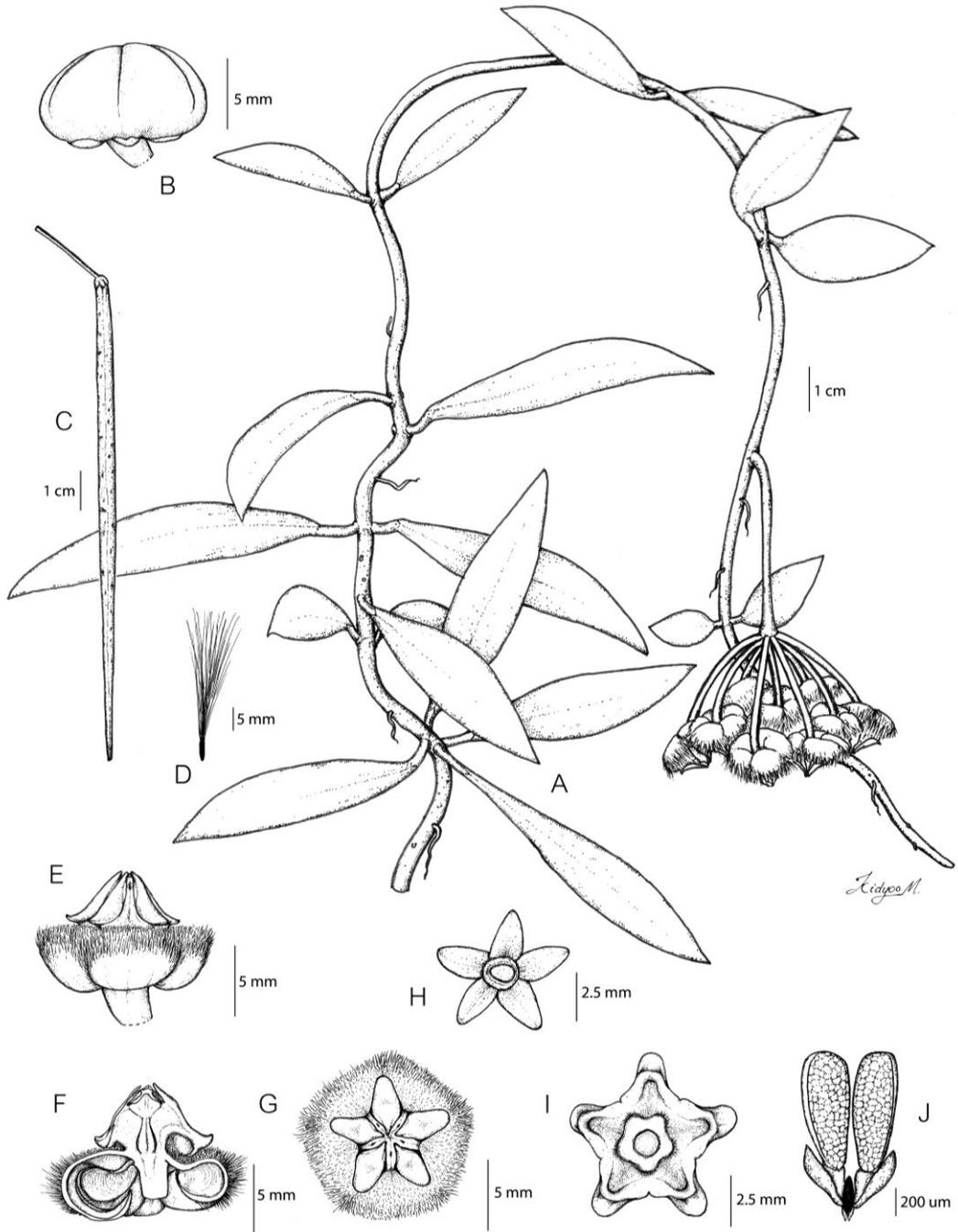


FIGURE 1. *Hoya mirabilis* Kidyoo showing (A) flowering branch, (B) side view of flower bud, (C) fruit, (D) seed, (E) side view of flower, (F) side view of flower (long section), (G) top view of flower, (H) calyx, (I) bottom view of corona and (J) pollinarium. Drawn by Manit Kidyoo from M. Kidyoo 1502, 1503 and 1504.

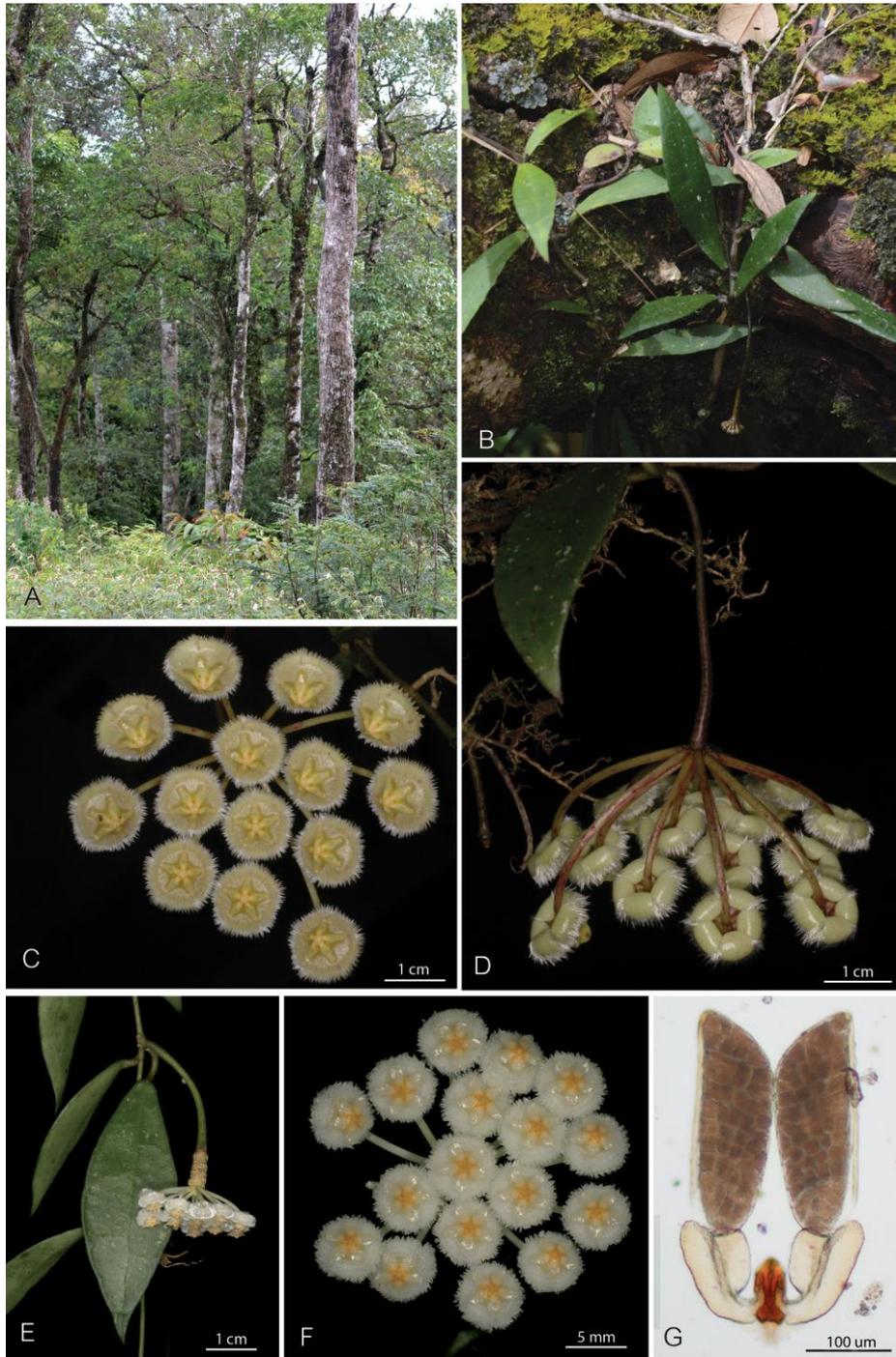


FIGURE 2. (A-D) *Hoya mirabilis* Kidyoo showing (A) habitat, (B) habit, (C) top view of inflorescence and (D) side view of inflorescence. (E-G) *Hoya lacunosa* Blume showing (E) a flowering branch. (F) top view of

pairs, acute angles to the midrib. *Inflorescences* (Fig. 1A): extra-axillary, slightly concave in top view, positively geotropic, 5-16 flowered; flower buds semi-spherical, slightly grooved along the joint between the corolla lobes, greenish-yellow lobes and reddish brown tube; peduncle slender, perennial, 3-11 cm long, 1.5-2 mm diam., glabrous to sparsely pubescent. *Pedicels*: pinkish-white with scattered reddish-purple spots, glabrous, various in length 0.9-1 cm long, straight in the center of umbel, up to 1.4-2.2 cm, curved at periphery. *Calyx* (Fig. 1H): greenish to reddish-brown, lobes nearly divided, ovate-oblong, 2.5-2.6 mm long, 1.8-2 mm wide, apex obtuse, abaxial surface sparsely pubescent, margin ciliate, inside with one small gland at base between lobes. *Corolla* (Fig. 1E-F): creamy to yellowish-white, ca. 1.5-1.7 cm diam., adaxial surface densely pubescent with long straight hair at base and margin of lobes, otherwise glabrous, abaxial glabrous, tubes 3.1-3.3 mm long; lobes reflexed, revolute, triangular-ovate, 0.5-0.6 mm long, 0.4-0.5 mm wide, apex acute. *Corona* (Fig. 1G-I): yellowish-white, 7.2-7.4 mm in diam., coronal scales ovate-oblong, 3.3-3.8 mm long, 2.2-2.4 mm wide, upper surface convex, lower surface not sulcate, outer angle slightly upcurved with obtuse apex; inner angle raised up higher than outer angle, lateral side with membranous edge, apiculus of inner angle emarginated, slightly raised up; anther appendages yellow, covering the receptive area of stigma. *Pollinarium* (Fig. 1J): pollinia obliquely oblong, yellow, 0.74-0.80 mm long, 0.30-0.32 mm wide, apex truncate, margins pellucid extending over all the dorsal margins of pollinarium; caudicles stout, hyaline, with broad wing, 0.40-0.42 mm long, 0.10-0.12 mm wide; corpusculum reddish brown, narrowly oblong, 0.25-0.27

mm long, 0.08-0.09 mm wide. *Pistil*: 2 ovaries, glabrous, ca. 2 mm long; stigma conical, subquadrangular. *Follicles* (Fig. 1C): linear-lanceolate in outline, 12-15.5 cm long, 0.4-0.5 cm diam. *Seeds* (Fig. 1D): oblong, 3-4 mm long, ca. 1 mm wide; coma 2.5-3 cm long.

Anatomy.— The mature stem in cross section (Fig. 3A, B): Epidermal cells are rectangular to square in shapes, outer wall with thick cuticle. Periderm develops in the sub-epidermal layer. Cortex consists of polyhedral parenchyma. Tracheary elements of secondary xylem embedded in a matrix of fibrous cells. Pith cells are homogeneous, composed of polyhedral parenchyma cells. The leaf anatomy in cross-section (Fig. 3C): Both abaxial and adaxial epidermis consist of small rectangular to square epidermal cells, the outer walls are thickened and covered with the cuticle. The outer surfaces of abaxial epidermis are glabrous. Stomata are usually confined to the abaxial surface and are on the same level with the epidermal cells. Stomatal type is cyclocytic stoma (Fig. 3D). Mesophyll cells are heterogeneous, composed of 5-7 layers of palisade parenchyma cells and 6-8 layers of spongy parenchyma cells. Vascular system of midrib is composed of a simple arc-shaped strand that is surrounded by fiber cells. Scleroids and druse crystals are present in the mesophyll layer.

Distribution.— Thailand (Ratchaburi Province).

Habitat and Ecology.— A small climbing epiphyte, grows on tree trunks and branches, occurs in both semi-exposed and shady areas in hill evergreen forest, alt. 1050 - 1100 m. It associates with ants, roots usually occur and develop in an ant's nest

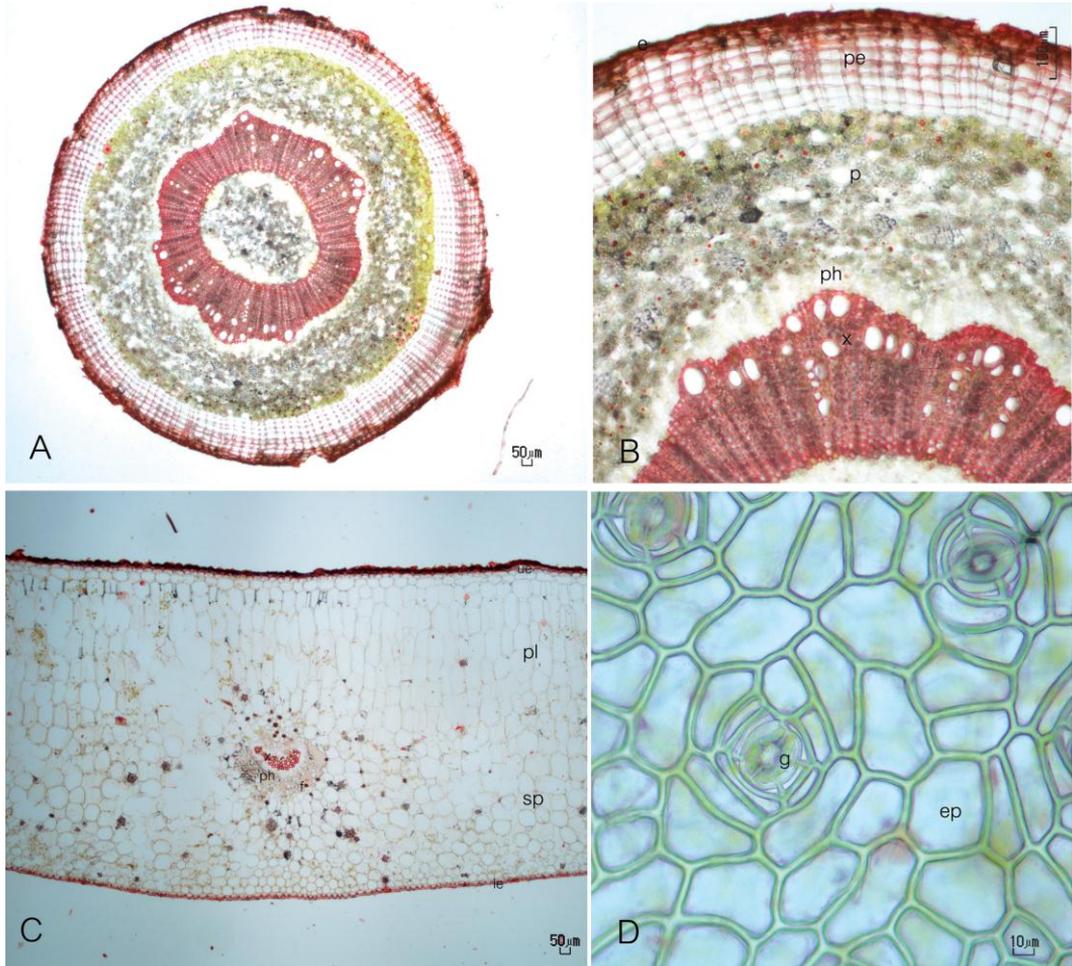


FIGURE 3. Anatomy of *H. mirabilis* Kidyoo, (A, B) x-section of stem, (C) x-section of leaf and (D) abaxial surface of leaf. Abbreviations: e, epidermis; ep, epidermal cell; f, fiber; g, guard cell; le, lower epidermis; p, parenchyma; pe, periderm; ph, phloem; ue, upper epidermis; x, xylem. Sections shown in (A-C) were stained with Safranin O.

on a gnarled tree. Flowering in July-September.

Conservation status.— Known from a single wild population through almost a century but its natural habitat is being destroyed by the violent local winds that fell trees on which *H. mirabilis* usually grows. This plant is, therefore, threatened. *Hoya mirabilis* could be considered as extremely rare and faces a high risk of extinction in the immediate future.

Notes.— *Hoya mirabilis* is related to *H. lacunosa* Blume (Table 1, Fig. 2E-G), widely spread species in Southeast Asia (Blume, 1826; Kerr, 1951; Hooker, 1883; Rintz, 1978). Both species have small leaves with faintly reflexed margin and positive geotropic, extra-axillary cymes with slender perennial peduncles. Their white corolla are rotate. Their pollinia comprise winged caudicles. However, they occur in different habitats. *Hoya mirabilis* grows in hill evergreen forest at about 1100 m a.m.s.l.,

TABLE 1. Morphological comparison of *H. mirabilis*, *H. lacunosa* and *H. wrayi*.

Characters	<i>Hoya mirabilis</i>	<i>Hoya lacunosa</i>	<i>Hoya wrayi</i>
Branches	Slender, sparsely pubescent	Slender, glabrous	Slender, glabrous
Leaves			
Shape	Ovate, elliptic, lanceolate, oblanceolate	Ovate, elliptic, lanceolate, oblanceolate	Lanceolate
Size (cm)	2.5-7 x 1-2.5	3-7 x 1-2.5	8.75-10 x 2.5-3.13
Base	Cuneate, attenuate	Cuneate, obtuse, rounded	Attenuate
Apex	Acute to acuminate	Acute to acuminate	Obtuse
Venation: lateral nerves	4-6 pairs, at acute (30°-45°) angles to the midrib	3-5 pairs, at right angles to the midrib	4 pairs, at about 30° to the midrib
Margin	Faintly recurved, sparsely pubescent along the margins	Faintly recurved, glabrous	Recurved, glabrous
Abaxial surface	Glabrous	Glabrous	Minutely papillose
Flowers			
Calyx lobes	Ovate-oblong, glabrous to sparsely pubescent, obtuse apex	Ovate, glabrous, acute to obtuse apex	Linear-oblong, papillose, acute apex
Corolla	Rotate, adaxially densely pubescent with long straight hair at base and margin	Rotate, adaxially pubescent	Campanulate-rotate, adaxially villous, margins frimbriate-crispate
Corolla lobes	Ovate, revolute, acute apex	Ovate, revolute, acute apex	Short- triangular, acute apex
Coronal scales	Ovate-oblong, outer angle obtuse and upcurved	Elliptic, outer angle acute and upcurved	Lanceolate, outer angle acute and upcurved
Pollinaria			
Pollinia	Obliquely oblong, apex truncate, margins pellucid	Obliquely oblong, apex acute, margins pellucid	Obliquely oblong, apex truncate, margins pellucid
Corpusculums	Narrowly oblong	Ovate	Broadly inflated cup-like (broadly ovate)
Caudicles	Stout with broad wing	Stout with broad wing	Stout with broad wing

while *H. lacunosa* is commonly found in lowland evergreen forest at about 0-600 m a.m.s.l. Moreover, the corolla lobes of *H. mirabilis* are adaxially densely pubescent only at the base and margin, markedly different from *H. lacunosa*, the corolla lobes of which are densely pubescent all over the adaxial surface. Moreover, to the human nose, the new species is scentless, whereas *H. lacunosa* emits a very strong fragrance at night (Kidyoo, pers. obs.).

Another closely related species is *H. wrayi* King & Gamble, the endemic species

from Malaysia, described and illustrated by Rintz (1978) in his revision of the genus *Hoya* in Malaysia. His description was claimed to be based on the type specimen described and illustrated by King and Gamble (1908). However, I have found that the morphological description and illustration of *H. wrayi* made by Rintz does not correlate with the original version made by King and Gamble (1908). Thus, the taxonomic status of *H. wrayi* is still dubious and is not used to compare with the new species, *H. mirabilis*, described here.

Nevertheless, it should be useful to provide some comparative characters between this newly described species and *H. wrayi* described from the type specimen by King and Gamble (1908). *Hoya mirabilis* is clearly different from *H. wrayi*, both in leaf and floral characters (Table 1). *Hoya mirabilis* has small glabrous leaves with faintly recurved margin, whereas *H. wrayi* has large leaves with minutely papillose abaxial surface and conspicuously recurved margin. As for the floral structure, *H. mirabilis* has rotate corolla with dense long hairs only at the base and margin of the ovate lobes. Its corpusculum is narrowly oblong. In contrast, *H. wrayi* has campanulate-rotate corolla with villous adaxial surface, frimbriate-crispate margin, short triangular lobes and cup-like (broadly ovate) corpusculum.

The significant discontinuity in vegetative, floral and ecological characters detected between *H. mirabilis* and its two closely related species, *H. lacunosa* and *H. wrayi*, as mentioned above justifies the authenticity of *H. mirabilis* as a new species of milkweed from western Thailand. A key to the taxa of *H. mirabilis* and these two related taxa is presented below.

Key to *Hoya mirabilis* and closely related species (*H. lacunosa* and *H. wrayi*)

1. Large leaves, ca. 8-10 x 2.5-3 cm, minutely papillose on abaxial surface, margin recurved; corolla campanulate-rotate, coronal scales linear-oblong. *H. wrayi*
1. Small leaves, ca. 2.5-7 x 1-2.5 cm, glabrous on both surface, margin faintly recurved; corolla rotate, lobes revolute, coronal scales ovate or elliptic **2**
2. Lateral nerves at acute angles (30-45°) to the midrib, flower large, ca.11-13 mm

- diam., pubescent with densely long hair at base and margin of lobes. *H. mirabilis*
2. Lateral nerves at right angles to the midrib, flower small, ca. 5-7 mm diam., adaxial pubescent *H. lacunosa*

Additional specimens examined.—

Hoya mirabilis Kidyoo: M. Kidyoo 1502 (spirit material: branch with fruit, BCU), Thailand, Ratchaburi Province, Suan Phung, Khao Leam, alt. 1100 m a.m.s.l., April 2011.

Hoya mirabilis Kidyoo: M. Kidyoo 1504 (spirit material: flowering branch, BCU), Thailand, Ratchaburi Province, Suan Phung, Khao Leam, alt. 1050 m a.m.s.l., September 2011.

Hoya lacunosa Blume: M. Kidyoo 1100 (spirit material, BCU), Thailand, Nakorn Sri Thammarat Province, Khao Nan National Park.

Hoya lacunosa Blume: Blume s.n. (Type specimen, L), Indonesia, Java.

Hoya wrayi King and Gamble: Wray 371 (Type specimen, K), Malaysia, Perak, Gunung Batang Padang.

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