



Beilschmiedia danhkyii (Lauraceae), a new species from Vu Quang National Park, Vietnam

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ABSTRACT

The new species *Beilschmiedia danhkyii* (Lauraceae) is described from Ha Tinh Province, Central Highland of Vietnam. *Beilschmiedia danhkyii* is characterized by ferruginous hairy terminal buds, branchlets and abaxial surfaces of lamina, subopposite leaves, adaxially impressed midrib and secondary veins, short inflorescence 2–3(–5) cm long, and large ellipsoid fruits 5–8 cm long, by which combination it is clearly distinguished from the other species of *Beilschmiedia* in the region. Taxonomic description, a table comparing morphological characters of the allied species, and color photo-plate are provided.

Keywords: flora, Indochina, Laurales, plant diversity, taxonomy

INTRODUCTION

Beilschmiedia Nees von Esenbeck (1831: 61, 69), with currently about 200–300 species, is a genus of trees or shrubs of the family Lauraceae distributed widely in most of tropical and subtropical region, with center of diversity in Southeast Asia or Africa (van der Werff 2001, Nishida 2008, de Kok 2021). In Vietnam, Nguyen (2017) enumerated 28 species, among which five are endemic to the country, and more recently, de Kok (2021) treated 12 species including two endemic species for the flora of Vietnam in his revision of *Beilschmiedia* in Thailand and Indochina. The difference in number of species may come from the lack of consensus and further botanical inventories and taxonomic studies are needed to elucidate the diversity of *Beilschmiedia* in Vietnam.

During our botanical expeditions in Vu Quang National Park, of Ha Tinh, Central Highland of Vietnam between 2015–2020, one unknown *Beilschmiedia* species was collected. After a careful examination based on the taxonomic literature of the genus in Vietnam and surrounding countries (Lecomte 1913, 1914, Liu 1932, Li *et al.* 2008, Liu *et al.* 2013, Nguyen 2017, de Kok 2016, 2021, Tagane *et al.* 2021) and herbarium specimens including digitized images from DLU, FU, HN, HNU, K, KAG, P, VNM, we are convinced that it is a new species and it is here described below.

TAXONOMY

Beilschmiedia danhkyii B.H.Quang, V.H.Nguyen & Tagane, *sp. nov.* (Figs. 1, 2)

Type:—VIETNAM. Ha Tinh Province: Vu Quang District, Vu Quang National Park, 18°17'20.5"N, 105°21'39.4"E, 109 m a.s.l., 12

December 2020, B.H. Quang, T.D. Binh, H.V. Nguyen, T.C. Toan VQG-VQ 15 [fl. & fr.] (holotype HN!; isotypes KAG!, the herbarium of Vu Quang National Park!).

Diagnosis:—Similar to *Beilschmiedia balansae* Lecomte (1913: 108) and *B. vidalii* Kostermans (1973: 336) of Vietnam in young twigs and terminal buds densely covered with ferruginous hairs, but distinguished from these two by its small tree habit to 8 m tall (vs. 10–28 m tall), more secondary veins (12–15 pairs vs. 3–6 pairs in *B. balansae* and 4–7 in *B. vidalii*) and ellipsoid fruits (vs. globose in *B. balansae* and pyriform to ovoid in *B. vidalii*).

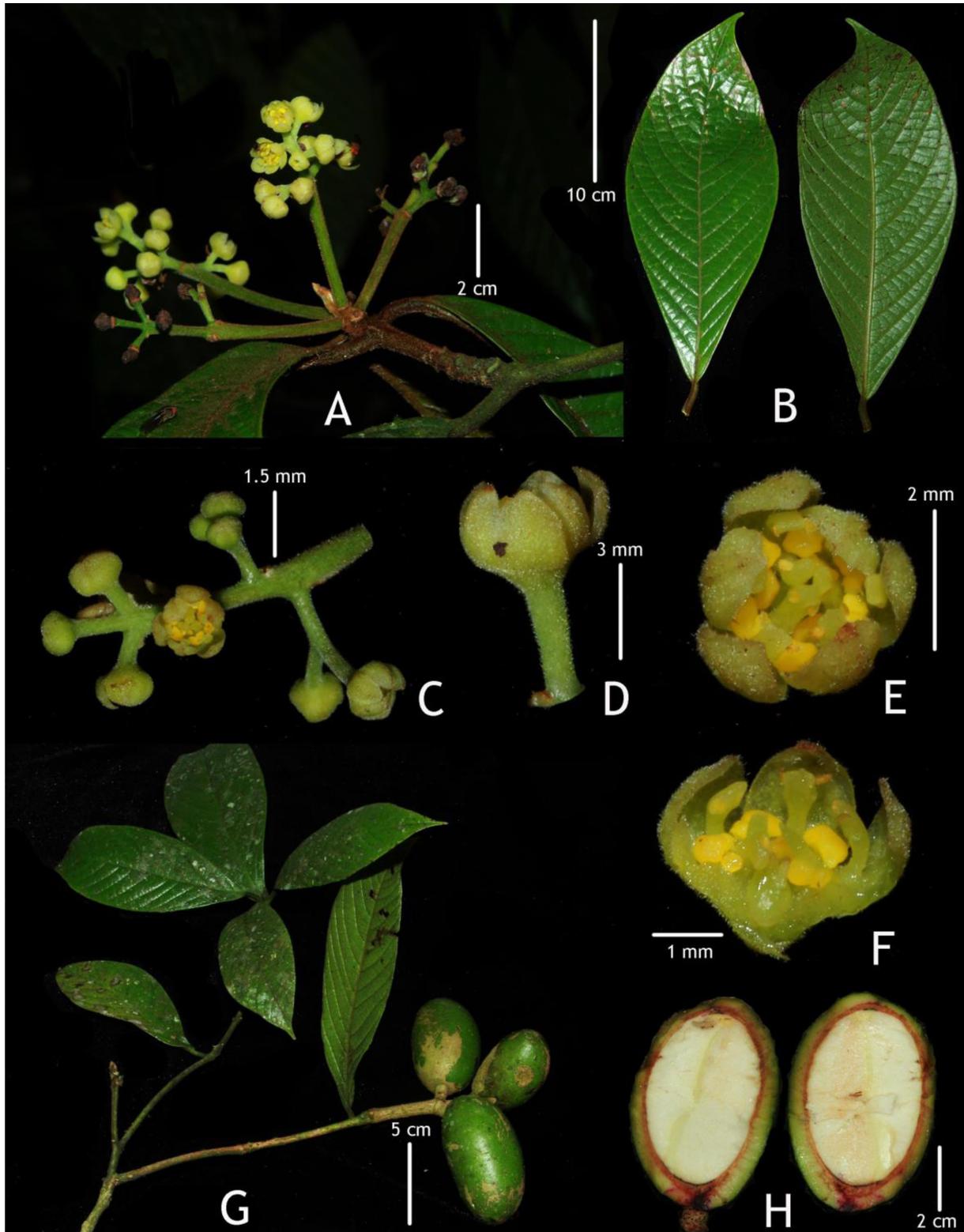


FIGURE 1. *Beilschmiedia danhkyii* B.H.Quang, V.H.Nguyen & Tagane. A. Inflorescences. B. Adaxial and abaxial leaf surfaces. C. Portion of inflorescence. D. Flower, side view. E. Flower, top view. F. Inside of flower (some tepals and stamens removed). G. Fruiting branch. H. Fruit longitudinally dissected. From Quang *et al.* VQG-VQ 15. Photos by Bui Hong Quang.

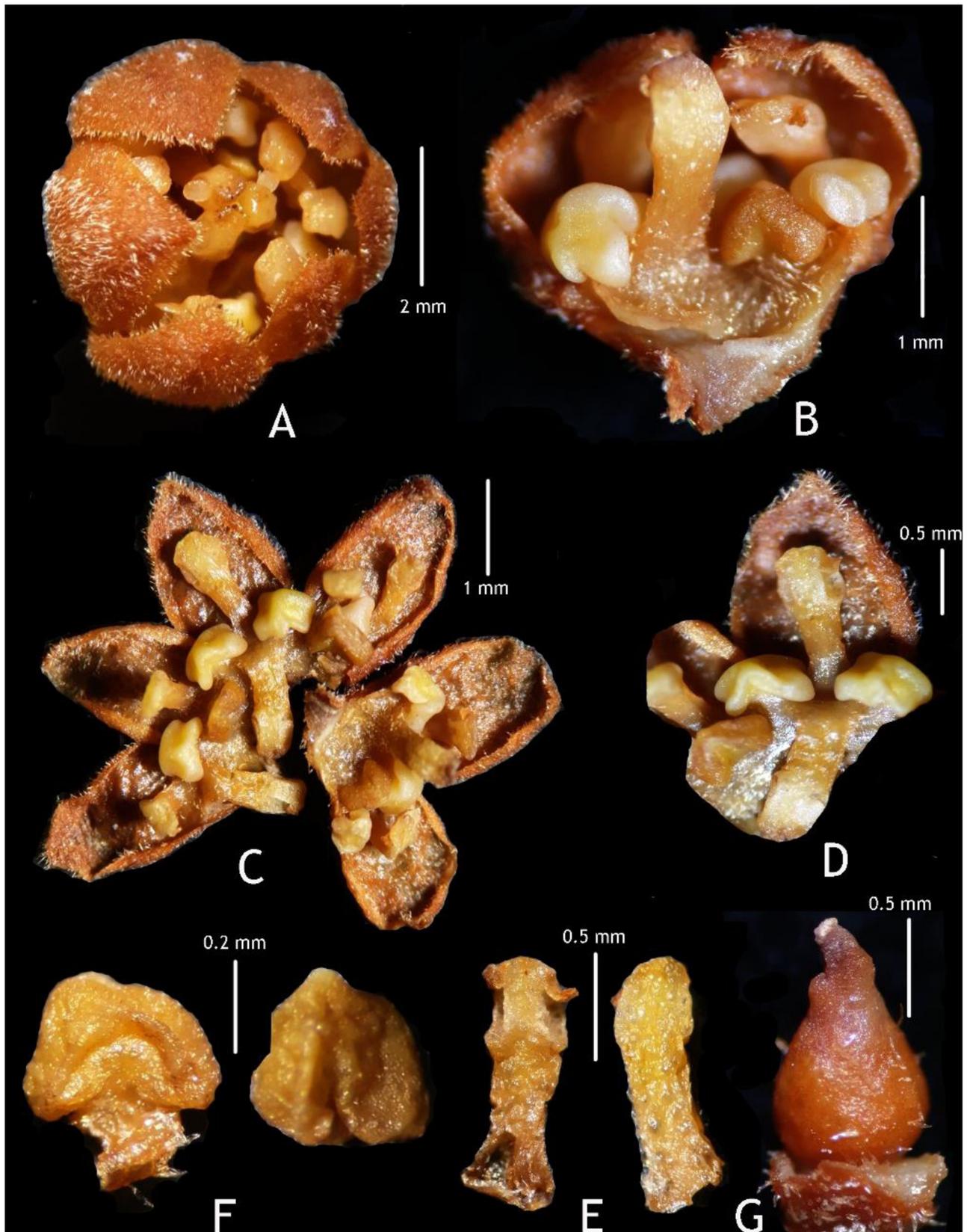


FIGURE 2. *Beilschmiedia danhkyii* B.H.Quang, V.H.Nguyen & Tagane. A. Flower, top view. B. Flower with part of receptacle and tepals removed. C. Flower opened out. D–E. Stamens. F. Glands. G. Pistil. From Quang *et al.* *VQG-VQ* 15 (HN).

Tree, 5–8 m tall. **Bark** grayish brown. **Terminal buds** ovoid, 1–2 mm long, apex acute, densely ferruginous hairy. **Twigs** densely ferruginous hairy when young, glabrescent, grayish brown, lenticellate. **Leaves** subopposite; petioles 0.6–1.3 cm long, densely ferruginous hairy when young, glabrescent, slightly sunken adaxially, rounded abaxially;

blades elliptic, elliptic-obovate, oblanceolate, 8–19.8 × 3.5–10 cm, thinly coriaceous, adaxial surface glabrous except midrib and secondary veins which are ferruginous hairy, abaxial surface ferruginous hairy, apex acuminate, acumen to 1.2 cm long, margin entire, base cuneate to acute, midrib sunken adaxially, prominent abaxially, secondary veins 12–15 pairs, sunken adaxially, prominent abaxially, tertiary veins scalariform-reticulate, prominent abaxially. **Inflorescences** axillary, paniculate, 2–3(–5) cm long, (3–)10–15-flowered; rachis densely yellowish brown hairy. **Flowers** yellow to yellowish green *in vivo*; pedicel 0.8–3 mm long, densely yellowish brown hairy; bracteoles ovate to linear, 1–2 mm long, densely yellowish brown hairy on both surfaces, caducous. **Receptacular tube** not distinct, tepals 6, ovate to broadly ovate, 2–3.5 × 1–2 mm, apex acute, sparsely yellowish brown hairy on both surfaces. **Stamens** 9, 3-whorled, first and second whorls introrse, third whorl extrorse, stamens in third whorl with a pair of glands at base; glands reniform, ca. 0.3 mm long, glabrous; filaments, 0.4–0.7 mm long, hairy near base; anthers 0.4–0.7 mm long, glabrous, 2-celled; staminodes 3, spatulate, ca. 0.8 mm long, glabrous. **Ovary** ovoid, 0.6–0.8 mm long, glabrous, style ca. 0.2 mm long, stigma capitate, ca. 0.1 mm in diam. **Infructescence** usually bearing two or three mature fruits. **Fruits** ellipsoid, 5–8 cm long, 2–4 cm in diam., apex obtuse to rounded, glabrous, green to dark green *in vivo*, reddish brown *in sicco*; fruiting stalks 3–5 cm long, thickened, 0.5–0.6 cm in diam.

Additional specimens examined:—VIETNAM. Ha Tinh Province: Vu Quang District, Vu Quang National Park, 18°16'34.2"N, 105°22'14.8"E, 86 m a.s.l., 23 July 2015, *Yahara et al. V3459* [ster.] (DLU, FU, the herbarium of Vu Quang National Park); *ibid.*, 18°16'36.3"N, 105°22'08.1"E, 168 m a.s.l., 23 July 2015, *Yahara et al. V3497* [young fr.] (DLU, FU, the herbarium of Vu Quang National Park).

Distribution:—Vietnam (so far known only from Vu Quang National Park).

Habitat:—*Beilschmiedia dankhyii* grows near streams in primary broad-leaved forest, at elevation from 80 to 170 m. It is associated with *Leptostachya wallichii* Nees, *Ficus pyriformis* Hook. & Arn., *Rhamnoneuron balansae* (Drake) Gilg, *Gironniera subaequalis* Planch., *Sloanea sinensis* (Hance) Hemsl., *Musa* sp., and *Osmunda banksiifolia* (C.Presl) Kuhn.

Phenology:—Flowering specimens were collected in December and fruiting in July and December.

Etymology:—The specific epithet *dankhyii* is named after Mr. Nguyen Danh Ky, the director of the Vu Quang National Park, who made a great contribution for conservation of the primary forests in Vu Quang National Park, and supported us to collect and discover this new species.

Vernacular name:—Chấp dankhyii

Preliminary conservation status:—Critically Endangered (CR). *Beilschmiedia dankhyii* is known only from three locations in primary broad-leaved evergreen forest in Vu Quang National Park, at elevation between 80 and 170 m, which are 50–1500 m apart each other. The extent of occurrence (EOO) is 0.059 km² and the area of occupancy (AOO) is 8 km². Although it is likely to have more subpopulations in the region, the area is considered as a single locality based on IUCN (2021) criteria of the area of occurrence estimated less than 10 km². It is locally not a rare species but the number of mature individuals is estimated less than 250 from our field observation. The habitat is located within the protected area of Vu Quang National Park and it is well protected. Given this situation, it is assessed here as Critically Endangered (CR) C2a(ii), following IUCN criteria (2021).

Notes:—*Beilschmiedia dankhyii* is characterized by ferruginous hairy terminal buds, branchlets and abaxial surface of lamina, subopposite leaves, adaxially impressed midrib and secondary veins, short inflorescence 2–3(–5) cm long, and large ellipsoid fruits 5–8 cm long and 2–4 cm in diam., by which combination it is clearly distinguished from all other *Beilschmiedia* species known from Indochina. In addition to *B. balansae* and *B. vidalii* mentioned in the above diagnosis, *B. dankhyii* is also similar to *B. ferruginea* Liu (1932: 107) and *B. poilanei* Liu (1932: 109) of Vietnam in having densely ferruginous hairy buds, twigs and leaves, though de Kok (2021) excluded the former species from *Beilschmiedia* due to its inflorescence typical for the genus *Dehaasia* (type 2 of van der Werff 2001). *Beilschmiedia dankhyii* is distinguished from *B. ferruginea* by its shorter plant height (5–8 m tall in *B. dankhyii* vs. 20 m tall in *B. ferruginea*), more secondary veins (12–15 pairs vs. 10–12 pairs), and inflorescence short, axillary and paniculate, 2–3(–5) cm long (vs. paniculate-racemose inflorescence with the lateral flowers of the cymes strictly opposite, arising as lateral branches of newly sprouted shoots, (2–)6–10 cm long); and from *B. poilanei* by its lamina elliptic, elliptic-obovate or oblanceolate and ferruginous hairy on abaxial surface (vs. lanceolate and glabrous). A detailed comparison between these species is shown in Table 1.

TABLE 1. Morphological comparison of *Beilschmiedia danhkyii* with its putative closest allies. The characters of *B. balansae*, *B. vidalii*, *B. ferruginea*, and *B. poilanei* are derived from Lecomte (1913, 1914), Liu (1932), and de Kok (2021) and their type specimens.

| Morphological characters | <i>B. danhkyii</i> | <i>B. balansae</i> | <i>B. vidalii</i> | <i>B. ferruginea</i> | <i>B. poilanei</i> |
|---------------------------|---|---|---|---|--|
| Tree height | 5–8 m tall | 15–28 m tall | 10–25 m tall | 20 m tall | 5–8 m tall |
| Terminal buds | ovoid, 1–2 mm long | ovoid, 3.6–3.9 mm long | ovoid, 4–5 mm long | ovoid, 2–3 mm long | lanceolate, 2–4.4 mm long |
| Leaf blades | elliptic, elliptic-obovate, oblanceolate, 8–19.8 × 3.5–10 cm, thinly coriaceous, apex acuminate, base cuneate | elliptic, 4–9 × 2.8–4.2 cm, coriaceous, apex rounded to acuminate, base cuneate | elliptic to elliptic-lanceolate, 6.5–20 × 2.2–7.8 cm, apex rounded to acuminate, base cuneate to obtuse | ovate-oblong, 10–12 × 4–5.5 cm, thinly coriaceous, apex acuminate, base cuneate | lanceolate, 7.5–15 × 1.4–4 cm, coriaceous, apex long-acuminate, base cuneate, sometimes asymmetric |
| Number of secondary veins | 12–15 pairs | 3–6 pairs | 4–7 pairs | 10–12 pairs | 9–18 pairs |
| Petiole length | 0.6–1.3 cm long | 1–1.6 cm long | 0.8–2 cm long | 0.8–1 cm long | 0.9–2.5 cm long |
| Inflorescences | paniculate, 2–3(–5) cm long, densely yellowish brown hairy | paniculate, 3–6 cm long, densely hairy | paniculate, 1–3 cm long, sparsely hairy | paniculate-racemose, (2–)6–8 cm long, densely hairy | paniculate-racemose, 1.2–6 cm long, sparsely hairy |
| Bracteoles | ovate to linear, 1–2 mm long, | lanceolate, 1.2–1.4 mm long | ovate to linear, 1–3 mm long | ovate, ca. 2 mm long | linear, 1.2–1.8 mm long |
| Receptacular tube | not distinct | 0.6–1 mm long | not distinct | not distinct | ca. 1 mm long |
| Tepals | ovate or broadly ovate, 2–3.5 × 1–2 mm, apex acute, sparsely pubescent on both surfaces | ovate, 0.5–1.6 × 0.6–1.2 mm, apex acute, pubescent on both surfaces | ovate or broadly ovate, 0.8–1.2 × 0.6–1 mm, apex acute, sparsely hairy on both surfaces | suborbicular, 1 × 1 mm long, apex obtuse, sparsely hairy on both surfaces | ovate, 1.5–2 × 1–1.3 mm, apex acute, sparsely to densely hairy outside |
| Stamens | 1–1.5 mm long, filaments hairy near base | 0.8–1.5 mm long, filaments sparsely hairy | 1–1.1 mm long, filaments densely pubescent | > 1 mm long, filaments glabrous | 1–1.3 mm long, filaments sparsely hairy |
| Anthers | 0.4–0.7 mm long | 0.5 mm long | 0.5 mm long | - | 0.5 mm long |
| Ovary | 0.6–0.8 mm long, glabrous | 0.5 mm long, glabrous | ca. 0.7 mm long, glabrous | - | ca. 1 mm long, glabrous |
| Style | 0.2 mm long | ca. 0.5 mm long | ca. 0.3 mm long | - | 0.9–1.4 mm long |
| Fruits | ellipsoid, 5–8 cm long, 2–4 cm in diam. | globose, 3.7–8.2 cm long, 4–7.2 cm in diam. | pyriform to ovoid, 4.5–6 cm long, 5 cm in diam. | ellipsoid, 2.8 cm long, 2 cm in diam. | ellipsoid to clavoid, 2–3.2 cm long, 1–2 cm in diam. |

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