

A survey of the genus *Lasianthus* in Mount Burangrang, West Java

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Abstract: A survey of the genus *Lasianthus* and its morphological study based on living specimens was conducted at the Mt. Burangrang, West Java, in order to update the existing *Lasianthus* data. Sampling was carried out in three regencies around the Mt. Burangrang: West Bandung, Subang and Purwakarta. A total of 19 species were recorded from Mt. Burangrang. Those species covered three sections: sect. *Nudiflorae* (nine species), sect. *Lasianthus* (nine species) and sect. *Stipulares* (one species). Based on the collected specimens, the delimitation of the Asian *Lasianthus* as having 3-9 pyrenes is no longer applicable. The specimens of *L. capitatus* from the Mt. Burangrang contained 9-12 pyrenes. The existence of *L. rufus* (Korth.) Miq. is also discussed. The details of morphological description of the Mt. Burangrang *Lasianthus* are provided.

Keywords: diversity, *Lasianthus capitatus*, morphology, Rubiaceae.

Introduction

The genus *Lasianthus* belongs to the Rubiaceae family consisted of 230 recorded species (Zhu 1998; Davis et al. 2009; Zhu et al. 2012; Napiroon et al. 2018). Morphologically the genus is characterized by shrubs or trees (small trees) habitus; often with indumentum on the branches, petioles and the lower surface of the

leaves, especially on veins and midribs; has a pair of stipules opposite to leaf pair, with varying shapes and sizes; hermaphrodite flowers, small, located in axils of the leaves; fleshy fruit, blue, black or white (Zhu 2002; Purwantoro et al. 2010; Zhu & Taylor 2011; Zhu et al. 2012). It differs with the genus *Paralasianthus* based on the number of ovarian locules or pyrenes. *Lasianthus* has 3 to 9 pyrenes with thick walls, while *Paralasianthus* has only two pyrenes with thin walls (Zhu 2015).

Lasianthus is widely distributed in tropical to subtropical regions, including Asia (Yamazaki 1993; Zhu 2001, 2002; Hua 2002; Zhu & Taylor 2011; Zhu et al. 2012), Africa (Jannerup 2003), tropical America (Robbrecht 1982; Urban 2018; Zanoni & Mejia 1989) and Australia (Merrill & Perry 1940). In Indonesia, there are 81 *Lasianthus* species spread across Sumatra (51 species), Java (34 species), Kalimantan (27 species), Sulawesi (20 species), Lesser Sunda Islands (11 species), Maluku (9 species) and Papua, including Papua New Guinea (21 species) (Backer & van den Brink 1965; Zhu et al. 2012; Rugayah & Sunarti 2017)

Mount Burangrang is one of the important areas of western Java for the occurrence records of *Lasianthus*. However, none of comprehensive list of *Lasianthus* for the mountain was produced. The data for the *Lasianthus* species in the area are still limited. In recent explorations, two species of *Lasianthus* were newly recorded within the mountain, namely *L. stipularis* Blume and *L. stercorarius* Blume, at an altitude of 900 to 1100 m a.s.l. (Cahyanto et al. 2019). In addition, a lesser known species of *L. rufus* (Korth.) Miq., was identified to have type locality in this mountain but the type specimen was lost (Zhu et al. 2012). Since the information of *L. rufus* is very limited, Zhu et al. (2012) denoted *L. rufus* as a conspecific of *L. hirtus*. This study tries to reveal the diversity of *Lasianthus* species in the Mt. Burangrang area. The results of this study are expected to enhance better knowledge of the genus *Lasianthus* and be used to support its conservation.

Materials and Methods

Time and study site

Sampling was carried out from 2018 to 2022 in Mt. Burangrang in a position point between 107°31'7" – 107°32'56" E and 6°41'45" – 6°43'18" S (Fig. 1). The observation sites is included within three different districts. Within Subang district, four locations (Cijalu, Ciangrem, Jaha and Pasir Eurih), were surveyed. In Purwakarta district, six locations were surveyed (Koelega, Lebak Saat, Pasir Ipis, Paku Payung, Pasula and Cipulus), while in West Bandung district, survey was conducted only at Waspada hiking trails (Tab. 1).

Data collection

Exploration methods were used to survey the *Lasianthus* diversity within the target locations. Herbarium specimens were collected and prepared follows De Vogel (1987) and deposited in Cianjur Hortus Tjibodasensis (CHTJ) at Cibodas Botanic Gardens. The specimens were identified referring to Zhu et al. (2012) and Backer & van den Brink (1965).

Tab. 1 Study site in Mt. Burangrang, West Java.

Date of survey	Location	Altitude	District
8 August 2018	Block Cijalu	1250 – 1500	Subang
5 - 6 April 2019	Block Pasula	946 – 1104	Purwakarta
25 - 29 December 2019	Block Koelega and Block Lebak Saat	900 – 1150	Purwakarta
15 - 16 February 2020	Block Pasir Ipis and Block Gegerbentang	1100 – 1400	Purwakarta
6 - 20 March 2020	Block Paku Payung	1200 – 1500	Purwakarta
23 - 27 January 2021	Block Ciangrem	1100 – 1141	Subang
13 - 16 February 2021	Block Jaha	1133 – 1292	Subang
27 February 2021	Block Pasir Eurih, Cileutik	1100 – 1616	Subang
12 - 14 February 2022	Waspada Hiking trails, Cisarua	1200 – 2040	West Bandung

Results and Discussion

A total of 19 species of *Lasianthus* were identified from Mt. Burangrang. They comprise nine species of the sect. *Lasianthus*, nine species of the sect. *Nudiflorae* and one species of the sect. *Stipulares*. This result indicated that 58% of *Lasianthus* in Java were found in Mt. Burangrang. *Lasianthus biflorus* (Blume) M. Gangop. & Chakrab. is only recorded by note taken in the field without collecting any specimen because difficulty to access the plant in the field. One other collection have not been successfully identified since the specimen was incomplete without flowers and fruits but the specimen indicated it as different species to the rest.

Based on the specimen collected on Mt. Burangrang, the delimitation of *Lasianthus* by Zhu et al. (2012) was inaccurate. Zhu et al. (2012) restricted *Lasianthus* to those with drupes with 3–9 mature pyrenes. However, the specimen of *Lasianthus capitatus* Blume collected from Mt. Burangrang has 9-12 pyrenes. Therefore, it is recommended to revise the delimitation of the genus based on the pyrenes number for the Asian *Lasianthus* as having 3-12 pyrenes. It is also a new information for the description of *Lasianthus capitatus* that previously stated to have 6 pyrenes. A full description of the species is provided below.

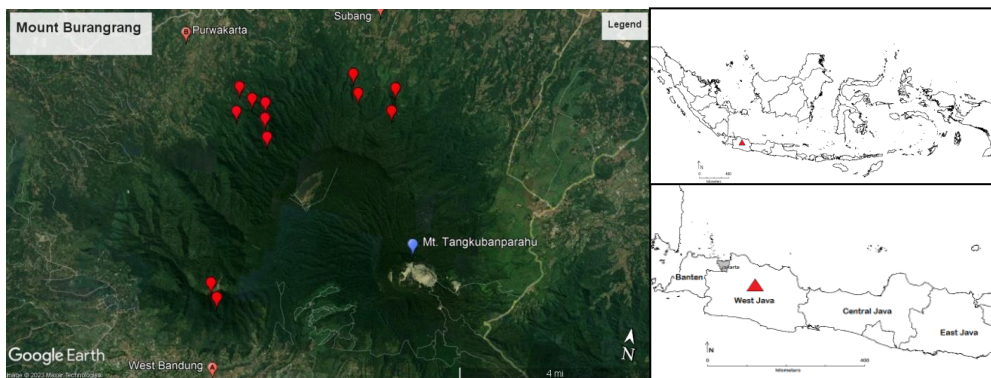


Fig. 1 Research site in Mt. Burangrang, West Java, Indonesia. A. West Bandung site, B. Purwakarta site. C. Subang site (UNEP-WCMC & IUCN 2020; Google earth).

Two species of *Lasianthus*, namely *L. attenuatus* and *L. rufus* were recorded from Mt. Burangrang by Miquel in 1856, but none of the specimens from this current expedition is fully agreed to those two species. The type specimen of *L. rufus* was collected from Mt. Burangrang by Korthals, but this specimen was destroyed (Zhu et al. 2012). One of the current specimen is closely related to the description of *L. rufus* by Miquel (1856) but differs in leaves shape and it was more well corresponded to *L. hirtus*. Probably, it was true that *L. rufus* and *L. hirtus* are conspecific as suggested by Zhu et al. (2012). If those two species is identical, then the valid name should be *L. rufus* (Korth.) Miq., since the name was published earlier.

The list of *Lasianthus* in Mt. Burangrang, West Java

***Lasianthus stipularis* Blume (sect. *Stipulares*)**

Description: Small shrubs to medium, ca. 2 m height, branchlets glabrous and lustrous. Leaves: blades elliptic to narrowly elliptic, 15-17 × 5-6 cm, base acute-cuneate, apex acute to acuminate, glabrous and glossy above, tomentose beneath, nerves ca. eight pairs, petioles 0.6-1.2 mm long. Stipules broadly triangular-ovate, ovate or ovate-orbicular, large, up to 10 mm long and broad at the base, membranaceous, glabrous, persistent. Bracts tomentose, ca. 10-15 mm length. Flowers sessile, corolla white, corolla tube ca. 10-15 mm long, lobes 5. Fruits ovoid-globose, blue, ca. 5-10 mm diam., glabrous; 4 pyrenes (Fig. 2).

Identification: *L. stipularis*, the only species from sect. *Stipulares* in Mt. Burangrang, are easily recognized by their larges and ovate shape. It may be difficult to distinguish from *L. pseudo-stipularis* if the bracts are unknown.

Materials examined: Hilmi Nurhalim, HN002, 16 February 2020, Mt. Burangrang, Purwakarta, Muhammad Efendi, personal observation: Blok Cijalu, Blok Pasula.

***Lasianthus capitatus* Blume (sect. *Lasianthus*)**

Description: Small shrubs to medium, ca. 2.0 m height, branchlets terete, densely white – tomentose. Leaves: blades narrowly elliptic, 11-13.5 × 2.7-4 cm (1:4-3.25), base acute-cuneate, apex acuminate; coriaceous to subcoriaceous, glabrous and lustrous above, tomentose beneath; nerves 7 or 8 pairs, petioles 5-9 mm long. Stipules triangular, 3-5 mm length, 2-3 mm width, densely tomentose. Bracts linear, ca. 5 (or more), 5-10 mm long, tomentose, cymes peduncle ca. 8 mm. Flowers subsessile to 20 mm long, calyx densely long-villose, tube 1-2 mm long, lobes 6, linear, up to 12 mm long; corolla yellow ca. 20 mm long, lobes 6, ovate-triangular, ca. 10 mm long, long-villose outside, villose inside. Fruits subglobose, white, ca. 10-13 mm. diam., densely tomentose; crowned by persistent linear calyx lobes; pyrenes 9-12 (Fig. 3).

Identification: *L. capitatus* is easily recognized for its white and hairy berry fruits. Compared to Zhu et al. (2012) description, *L. capitatus* have six pyrenes, while the specimens collected from Mt. Burangrang have subsessile peduncle up to 2 cm, corolla yellow up to 20 mm length and 9 – 12 pyrenes (Fig. 3). This character

differences are a consideration for revising the species status of *L. capitatus* by observing more specimens from different locations in Java.

Materials examined: Nisrina Khairun Nisa, NK16, 27 February 2021, Blok Pasir Eurih, Cileutik, Mt. Burangrang, 1502 m asl.; Muhammad Efendi, WSP.002, 12 February 2022; 1450 m asl.

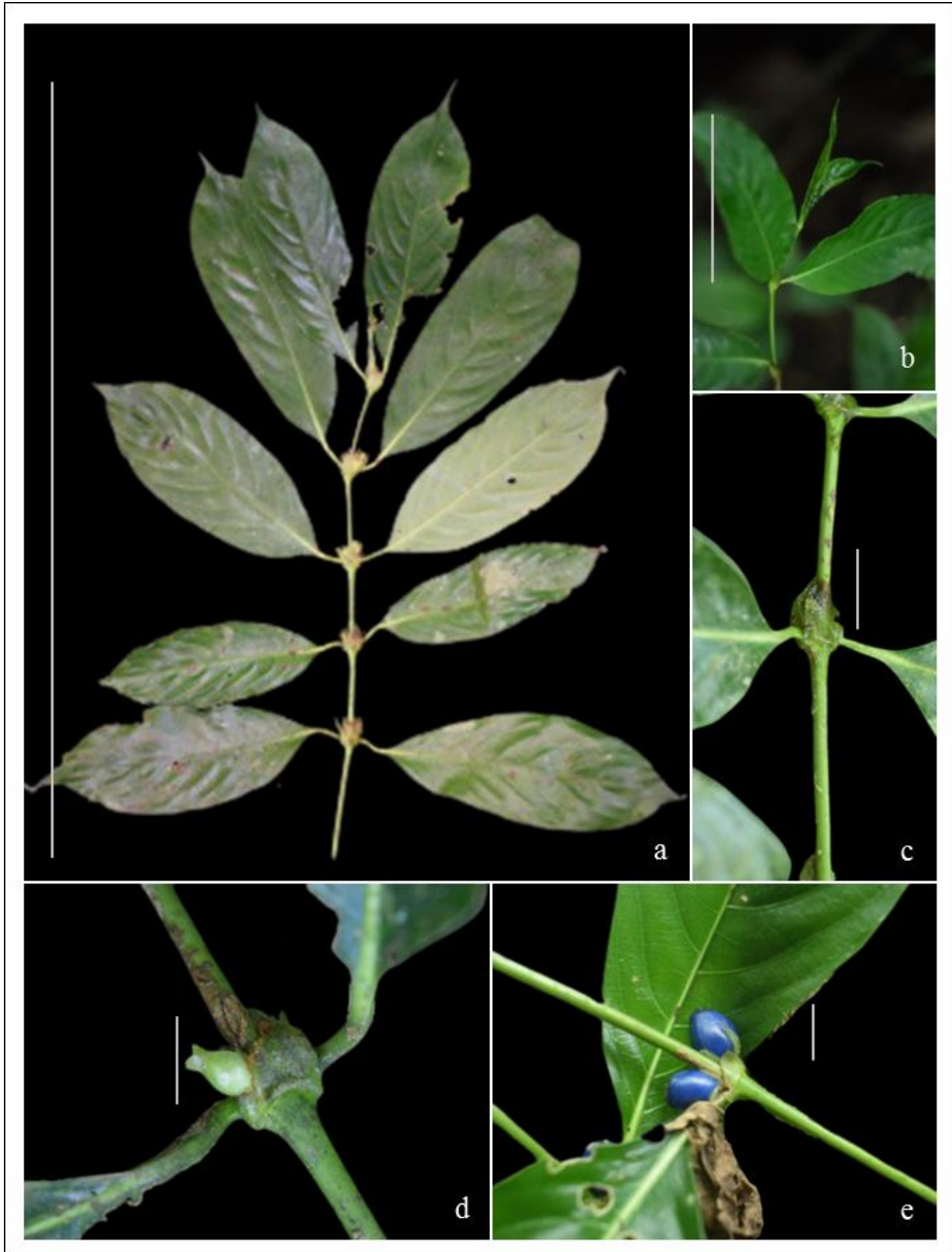


Fig. 2 *Lasianthus stipularis* Blume: a. branch; b. leaf; c. stem and stipule; d. stem, stipule and immature fruit; e. stem, stipule, and mature fruits. Scale bars: a = 30 cm; b = 15 cm; c = 1 cm, d = 1 cm; e = 1 cm.

***Lasianthus hirsutus* (Roxb.) Merr. (sect. *Lasianthus*)**

Description: Small shrub to medium, ca. 1-2 m height, branches and branchlets terete, densely purple-hirsute. Leaves: narrowly elliptic or oblanceolate, 14-20 × 5.5-7.5 cm, base oblique to acute-cuneate, apex acuminate-cuspidate; subcoriaceous-coriaceous, both above and lower surface densely hirsute; nerves 8-11 pairs, petioles

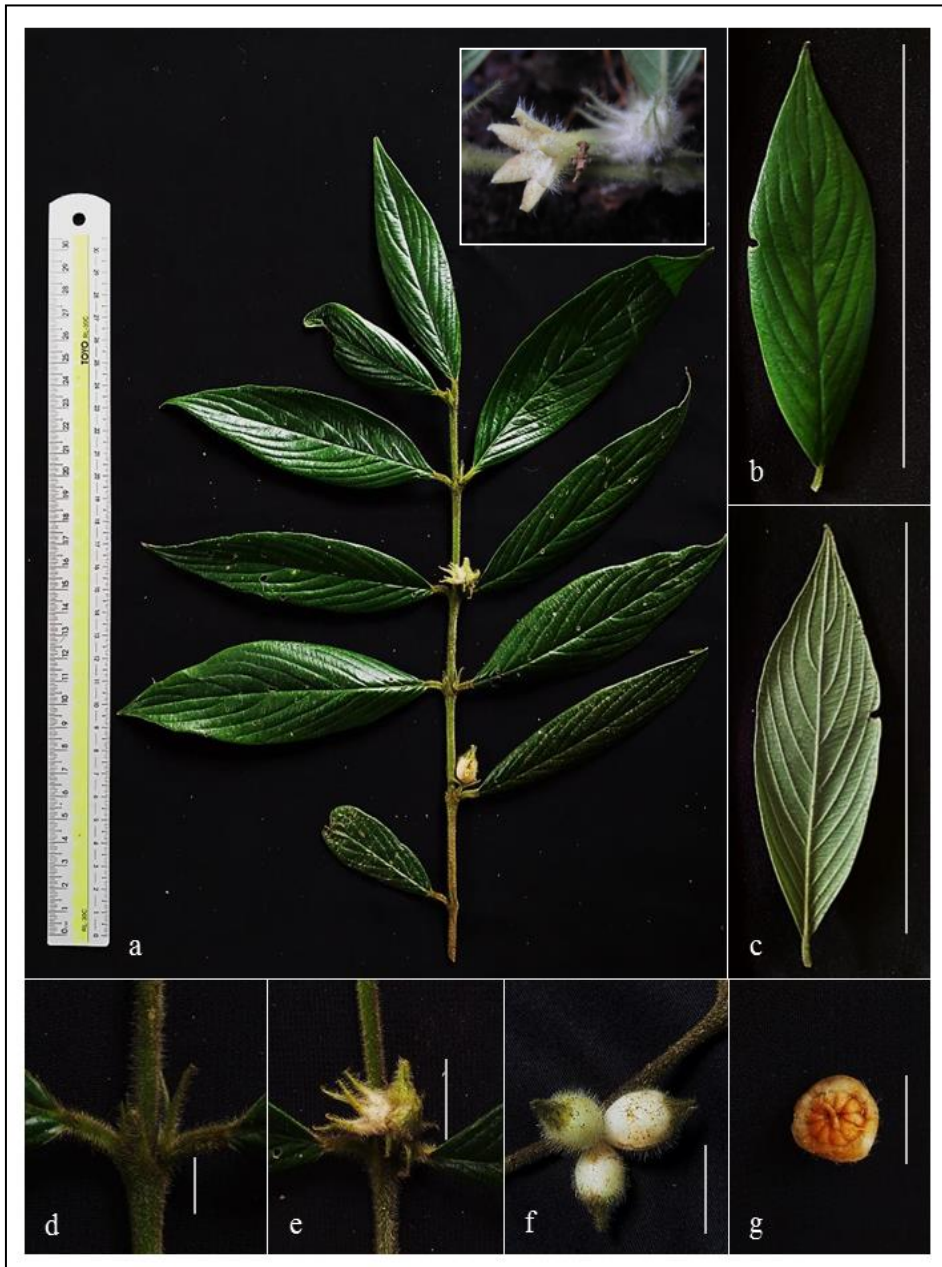


Fig. 3 *Lasianthus capitatus* Blume: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stipule and bracts; e. bracts; f. fruits; g. cross section of fruit; h. flower. Scale bars: a = 30 cm; b – c = 12 cm; d = 0.5 cm; e, g = 1 cm; f = 1.3 cm.

8-15 mm long. Stipules triangular, 6 mm length, 2 mm width, hirsute. Cymes sessile, covered with eight leaf-like bracts, in two layers, four outer bracts are more prominent than four inner bracts, 20-25 mm length, 10-15 mm width, hirsute. Flowers sessile, calyx densely long-hirsute, tube ca. 1 mm long, lobes 5, linear-lanceolate; corolla white, corolla tube ca. 15 mm, lobes 5, ovate, glabrous inside and

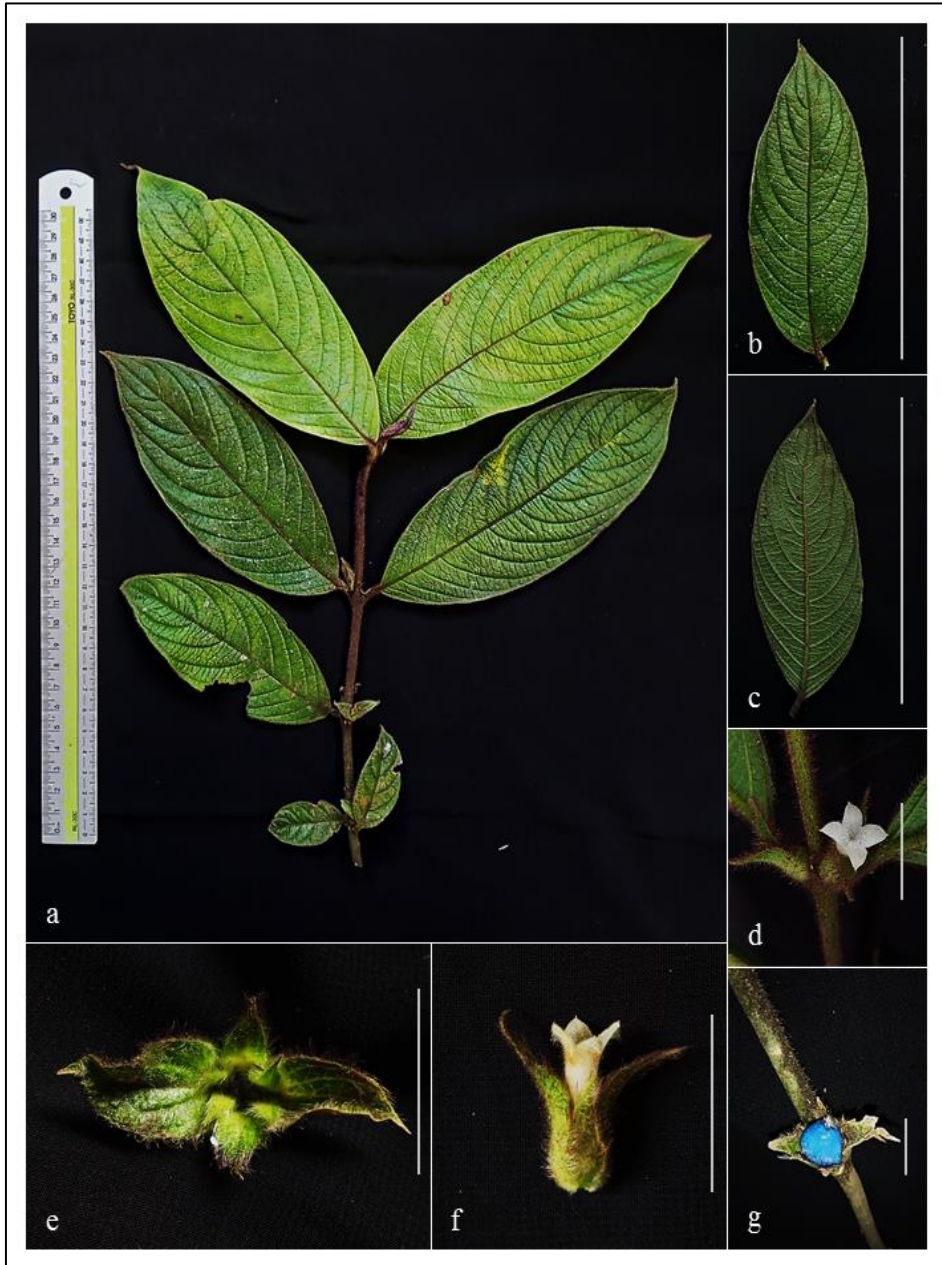


Fig. 4 *Lasianthus hirsutus* (Roxb.) Merr.: a. branch, b. upper leaf, c. lower leaf, d. flower, e. Bracts, f. flower with calyx and Corolla, g. fruit. Scale bars: a = 30 cm; b – c = 12 cm; d = 0.5 cm; e, g = 1 cm; f = 1.3 cm.

in the lower half, hirsute in the upper half. Fruits ovoid, blue, ca. 4-5 mm. diam., glabrous to hairy; crowned by persistent hirsute calyx lobes; pyrenes 5 (Fig. 4).

Identification: *L. hirsutus* is very similar to the description of *L. rufus*, but most different in large bracts (Fig. 4). In addition, asymmetrical base leaf, the young leaf shoot buds are purplish in color, and the larger leaves are effortless to recognize this species.

Material examined: Hilmi Nurhalim, HN009, 7 March 2020, Mt. Burangrang, Purwakarta; Nisrina Khairun Nisa, NK07, 14 February 2021, Blok Jaha, Mt. Burangrang, 1209 m asl.



Fig. 5 *Lasianthus rigidus* Miq.: a. branch (adaxial surface); b. branch (abaxial surface); c. stipule and bracts; d. abaxial leaf surface. Scale bars: a – b = 30 cm; c = 0.8 cm; d = 4 cm.

***Lasianthus rigidus* Miq. (sect. *Lasianthus*)**

Description: Small shrub to medium, ca. 1-2 m height, branchlets terete and enlarged at nodes, glabrous to subglabrous. Leaves: blades elliptic – narrowly elliptic, oblanceolate to narrowly obovate 7.5-14 × 3.5-5.1 cm, base oblique, obtuse and slightly cordate, apex shortly cuspidate or acuminate; coriaceous, glabrous and lustrous above, hirsute on midrib and nerves beneath; nerves 9-12 pairs, petioles no more 2 mm long. Stipules persistent, triangular to subulate form, 5-7 mm length, 6 mm width, hirsute. Bracts lanceolate to linear, 8-12 mm length, hirsute. Flowers sessile, calyx campanulate, 2-3 mm length; corolla salver-form, white, lobes 5, 10 mm length, puberulous outside, pubescent inside in the upper part. Fruits subglobose to globose, blue, 4-5 mm. diam., glabrous; pyrenes 4 or 5 (Fig. 5).

Identification: Both *L. rigidus* and *L. bracteolatus* have 4 or 5 pyrenes. However, *L. rigidus* can be distinguished by its larger leaves size, leaves obovate-oblong or obovate, apex shortly cuspidate or acuminate, the base oblique, obtuse, and/or slightly cordate.

Material examined: Nisrina Khairun Nisa, NK12, 15 February 2021, Blok Jaha, Mt. Burangrang, 1292 m asl., Muhammad Efendi, personal observation, Blok Cijalu, Blok Waspada.

***Lasianthus inodorus* Blume (sect. *Lasianthus*)**

Description: Small shrub to medium, up to 3 m height. Branchlets terete, glabrous and lustrous. Leaves: blades elliptic-obovate, 11-18.5 × 4.5-7 cm, base cuneate, apex cuspidate-acuminate; coriaceous, glabrous and lustrous above, puberulous on midrib and nerves beneath; nerves 5-7 pairs, petioles 7-18 mm long. Stipules triangular, 3-7 mm length, 3-7 mm width, glabrous and lustrous. Bracts obovate, 4-5 mm long, glabrous and lustrous. Flowers not observed. Fruits globose, orange, 5-7 mm diam., glabrous-subglabrous; pyrenes 5-6 (Fig. 6).

Identification: *L. inodorus* consists of three subspecies, namely subsp. *inodorus* with a wide distribution, subsp. *montigenus* and subsp. *pubescens* (Zhu et al. 2012). Fruit color is like *L. purpureus* but differs in the shape and size of the leaves.

Material examined: Nisrina Khairun Nisa, NK11, 15 February 2021, Blok Jaha, Mt. Burangrang, 1260 m asl; NK22, 27 February 2021, Blok Pasir Eurih, Cileutik, Mt. Burangrang, 1309 m asl.

***Lasianthus purpureus* Blume. (sect. *Lasianthus*)**

Description: Shrubs to treelets, up to 4 m height, branchlets terete, glabrous, and lustrous. Leaves: blades lanceolate, 13.5-21.5 × 3-4 cm, base acute-cuneate, apex acuminate; thin-coriaceous, both above and lower surface are glabrous, lustrous above; nerves 5-6 pairs, petioles 7-10 mm long. Stipules triangular, small, 1-2 mm length, 1-2 mm width, glabrous and lustrous. Cymes sessile, bracts absent. Flowers not observed. Fruit subglobose, orange, 10-14 mm diam., glabrous; pyrenes 4 (Fig. 7).

Identification: *L. purpureus* has a very distinctive fruit, colour of flower and leaves size. The flower is purple and tubular-shape, while the leaf is lanceolate shapes.

Material examined: Nisrina Khairun Nisa, NK17, 27 February 2021, Blok Pasir Eurih, Cileutik, Mt. Burangrang, 1570 m asl.

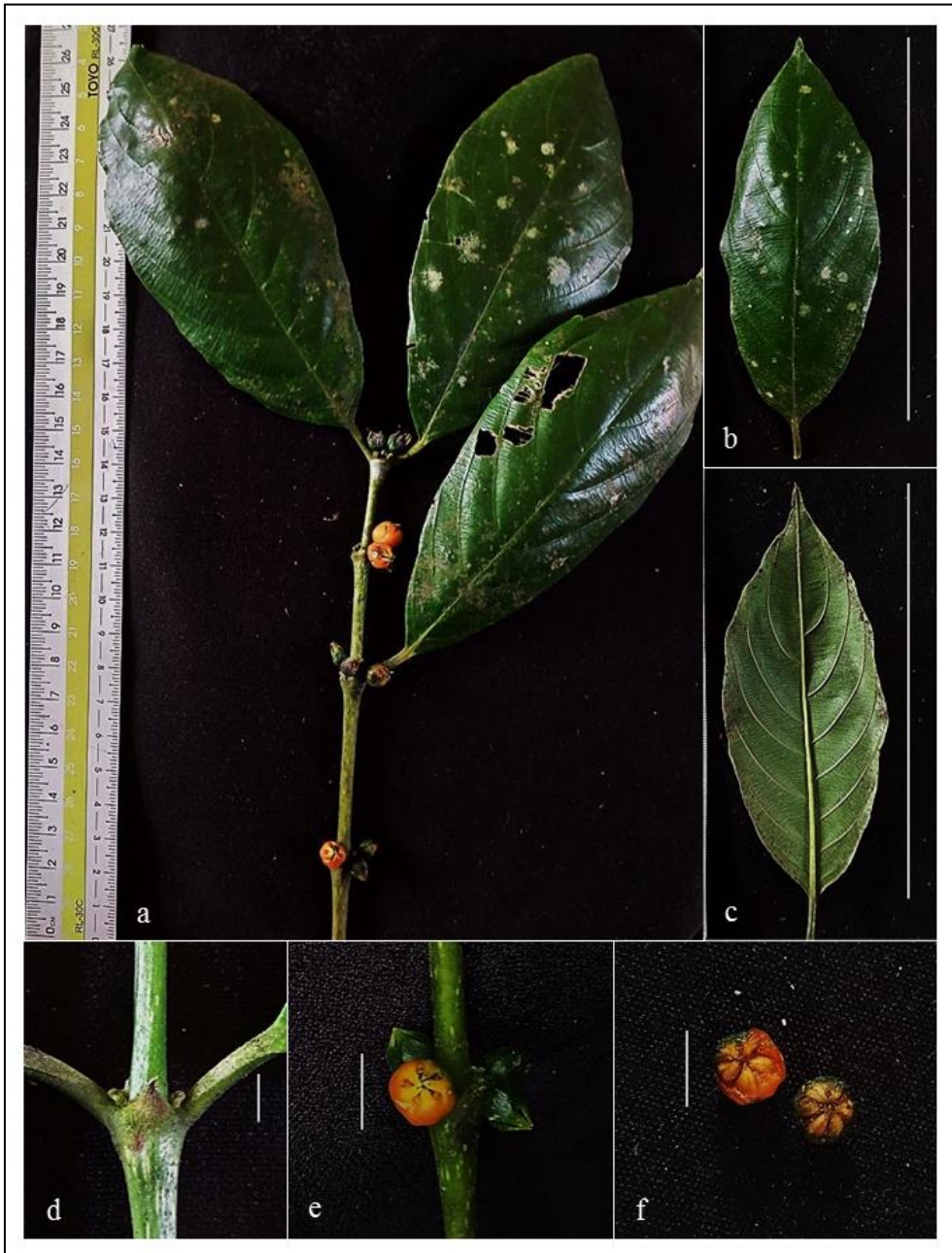


Fig. 6 *Lasianthus inodorus* Blume: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stipule and bracts; e. fruits; f. cross section of fruit. Scale bars: a = 27 cm; b – c = 14 cm; d = 0.4 cm; e – f = 0.5 cm.

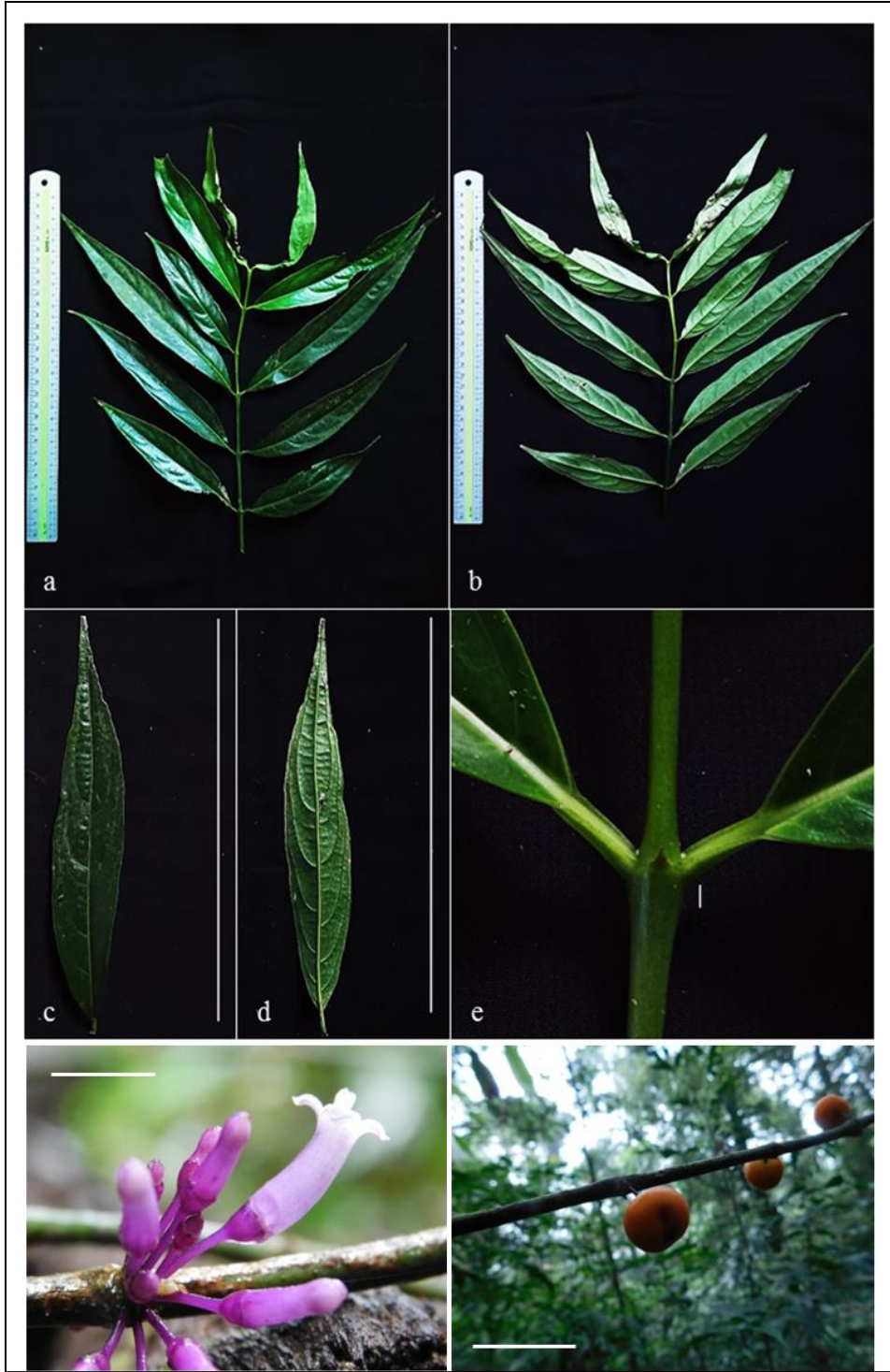


Fig. 7 *Lasianthus purpureus* Blume: a. branch (adaxial surface); b. branch (abaxial surface); c. adaxial leaf surface; d. abaxial leaf surface; e. Stipule; f. flower; g. fruit. Scale bars: a – b = 30 cm, c – d = 19 cm, e = 0.2 cm, f-g=1.0 cm

***Lasianthus cf. obscurus* (DC.) Blume ex Miq. (sect. *Lasianthus*)**

Description: Small shrub to medium, ca. 1-2 m height, branchlets terete, reddish-green, densely spreading tomentose. Leaves: blades narrowly elliptic, 15 × 4.5 cm, base cuneate, apex acuminate; membranaceous, glabrous above, tomentose on midrib and nerves beneath; nerves 7-9 pairs, petioles 8-10 mm long. Stipules triangular-lanceolate, 6-8 mm length, 4-5 mm width, pubescent. Bracts few, outer bracts ovate, inner bracts lanceolate, ca. 5 mm length. Fruits globose, 3-5 mm diam., subglabrous; pyrenes 5 (Fig. 8).



Fig. 8 *Lasianthus cf. obscurus* (DC.) Blume ex Miq.: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stipule and bracts; e. bracts; f. immature fruit. Scale bars: a = 30 cm; b - c = 20 cm; d = 0.8 cm; e - f = 0.5 cm.

Identification: Although no fruit has been found, this type has a distinctive shape and size of stipules, indumentum is only found on midrib and nerves beneath.

Material examined: Nisrina Khairun Nisa, NK10, 14 February 2021, Blok Jaha, Mt. Burangrang, 1255 m asl.

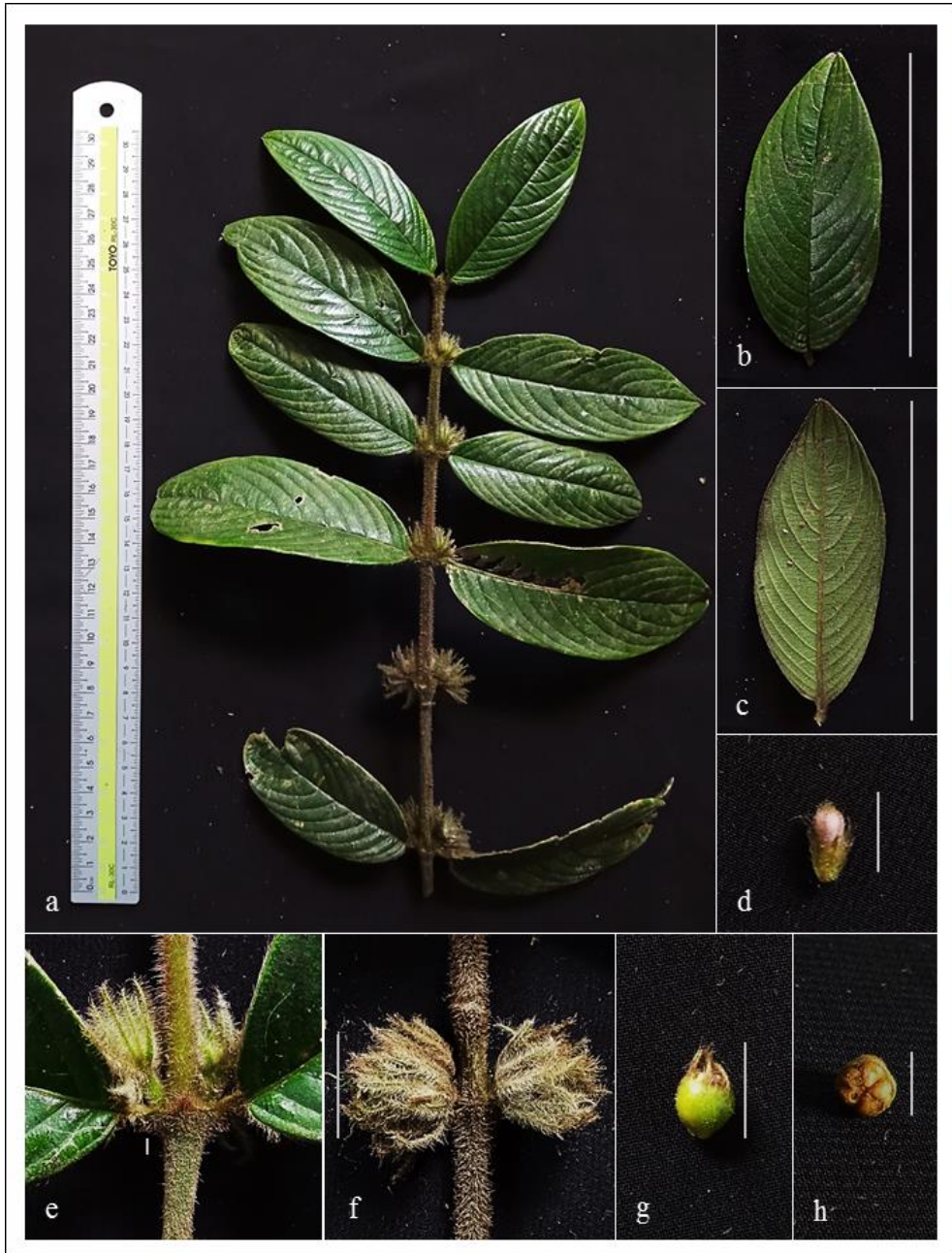


Fig. 9 *Lasianthus rhinocerotis* Blume: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. flower; e. stipule and bracts; f. bracts; g. immature fruit; h. cross section of fruit. Scale bars: a = 30 cm; b – c = 11 cm; d = 0.7 cm; e = 0.2 cm; f = 1 cm; g – h = 0.5 cm.

***Lasianthus rhinocerotis* Blume. (sect. *Lasianthus*)**

Description: Small shrub to medium, ca. 1-2 m height, branchlets terete, densely brown-villous. Leaves: blades elliptic, 9.5-13 × 4-5 cm, base subrounded, apex acute-acuminate; coriaceous, glabrous and lustrous above, densely brown-villous beneath; nerves 10-12 pairs, petioles 4-8 mm long. Stipules triangular, 1-2 mm length, 2-5 mm width, villous. Cymes subsessile, bracts linear, numerous, 10-20 mm long, villous, flowers are often covered with bracts. Flowers sessile, calyx lobes 5, corolla purplish-white, corolla tube 5-7 mm long, lobes 5, hirsute. Fruits globose, 1.7 – 1.2 cm length, 0.5-0.7 mm diam., subglabrous; crowned by hairy calyx lobes; pyrenes 5 (Fig. 9).

Identification: This species can be distinguished by numerous bractea and filliform. This species is widespread in Mt. Burangrang at 1450 – 2000 m asl.

Material examined: Nisrina Khairun Nisa, NK 19, 27 February 2021, Blok Pasir Eurih, Cileutik, Mt. Burangrang, 1538 m asl.; Muhammad Efendi et al., WSP.001, 12 February 2022, Waspada Hiking Trails, Mt. Burangrang, West Bandung, 1780 m asl.

***Lasianthus chrysonurus* (Korthl.) Miq. (sect. *Lasianthus*)**

Description: Small shrubs to medium, ca. 1.5 m height, branchlets terete, glabrous and lustrous. Leaves: blades oblanceolate; 10-13 × 3-3.5 cm, base acute-cuneate, apex acuminate-caudate; thin-coriaceous, both above and lower surface are glabrous, lustrous above; nerves 5-6 pairs, petioles 10-15 mm long. Stipules triangular-lanceolate, 10 mm length, 3 mm width, strigillose. Bracts ovate, no more than 2 mm length, strigillose. Flowers sessile, calyx lobes 5, corolla white, corolla tube 10 mm long, lobes 6, strigillose in the upper half. Fruits not observed (Fig. 10).

Identification: *L. chrysonurus* differs from *L. obscurus* by different indumentum (Zhu et al. 2012).

Material examined: Nisrina Khairun Nisa, NK13, 15 February 2021, Blok Jaha, Mt. Burangrang, 1282 m asl., Nisrina Khairun Nisa, NK03, 13 February 2021, Blok Jaha, Mt. Burangrang, 1135 m asl.

***Lasianthus clementis* Merr. (sect. *Nudiflorae*)**

Description: Small shrubs to medium, ca. 1-1.5 m height, branchlets terete, densely pubescent. Leaves: blades narrowly elliptic, 11-12 × 3-4 cm, base acute, apex acute-acuminate; chartaceous, glabrous above, densely pubescent beneath; nerves 4-6 pairs, petioles 5-8 mm long. Stipules triangular, minute, no more than 1 mm length and width, pubescent. Bracts absent. Flowers sessile, calyx lobes 5, corolla white, corolla tube 10 mm long, lobes 5, pubescent. Fruits irregular shape, blue, subglabrous; pyrenes 5 (Fig. 11).

Identification: *L. clementis* is a complex species with *L. fordii* and *L. hispidulus* (Zhu et al. 2012), because it is very similar in bractea absent, small leaves, flowers, and fruits, but the character is indumentum or hairy on branchlets, leaves beneath, calyx, and drupes.

Material examined: Nisrina Khairun Nisa, NK15, 15 February 2021, Blok Jaha, Mt. Burangrang, 1288 m asl.

***Lasianthus cf. constrictus* Wight. (sect. *Nudiflorae*)**

Description: Small shrubs to medium, ca. 1-1.5 m, branchlets terete, subglabrous. Leaves: blades narrowly elliptic-lanceolate, 10-15 × 3.5-4.5 cm, base acute-cuneate, apex acuminate; subcoriaceous, glabrous, and lustrous above, strigose on midrib and nerves beneath; nerves 6-7 pairs, petioles 5-7 mm long. Stipula triangular, small, 1-2 mm length, 1 mm width, strigose. Bracts absent. Flowers not observed. Fruits globose, blue, 5 mm diam., glabrous; pyrenes 4 (Fig. 12).



Fig. 10 *Lasianthus chryseus* (Korth.) Miq.: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stipule; e. bracts; f. flower. Scale bars: a = 26 cm; b – c = 11 cm; d = 1 cm; e = 0.2 cm; f = 1 cm.

Identification: *L. constrictus* belongs to the group without bractea, the fruit is blue, with a calyx constricted at the base of the cupular limb (Zhu et al. 2012).

Material examined: Nisrina Khairun Nisa, NK09, 14 February 2021, Blok Jaha, Mt. Burangrang, 1222 m asl.



Fig. 11 *Lasianthus clementis* Merr.: a. branch; b. fruit; c. cross section of fruit; d. leaf and flower; e. flower. Scale bars: a = 25 cm; b – c = 1 cm; d = 3 cm; e = 1 cm.

***Lasianthus fordii* Hance. (sect. *Nudiflorae*)**

Description: Small shrubs to medium, ca.1-2 m height, branchlets terete, glabrous to pubescent. Leaves: blades narrowly elliptic, 10-15 × 3-5 cm, base cuneate, apex acuminate-cuspidate; subcoriaceous, glabrous, and lustrous above, hirsute on midrib and nerves beneath; nerves 6-8 pairs, petioles 6-8 mm long. Stipules triangu-



Fig. 12 *Lasianthus constrictus* Wight.: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. calyx; e. fruits. Scale bars: a = 30 cm; b - c = 13 cm; d - e = 0.5 cm.

lar, minute, no more than 1 mm length and width, pubescent. Bracts absent. Flowers sessile, calyx lobes 5, corolla purplish-white, corolla tube 10 mm long, lobes 5, glabrous outside, villous inside. Fruits globose, 3-5 mm diam., glabrous; pyrenes 5-6 (Fig. 13).



Fig. 13 *Lasianthus fordii* Hance: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. calyx; e. flowers; f. stipule, calyx, and immature fruit; g. cross section of fruit. Scale bars: a = 27 cm; b – c = 14 cm; d, f, g = 0.5 cm; e = 1 cm.

Identification: Two varieties of *L. fordii* can be distinguished by the shape of the leaf blade. Our specimen is more similar to var. *fordii*, refers to Zhu et al. (2012). It differs from var. *microphyllus* by elliptic leaf shape and apex acuminate-cuspidate.

Material examined: Nisrina Khairun Nisa, NK05, 13 February 2021, Blok Jaha, Mt. Burangrang, 1250 m asl.

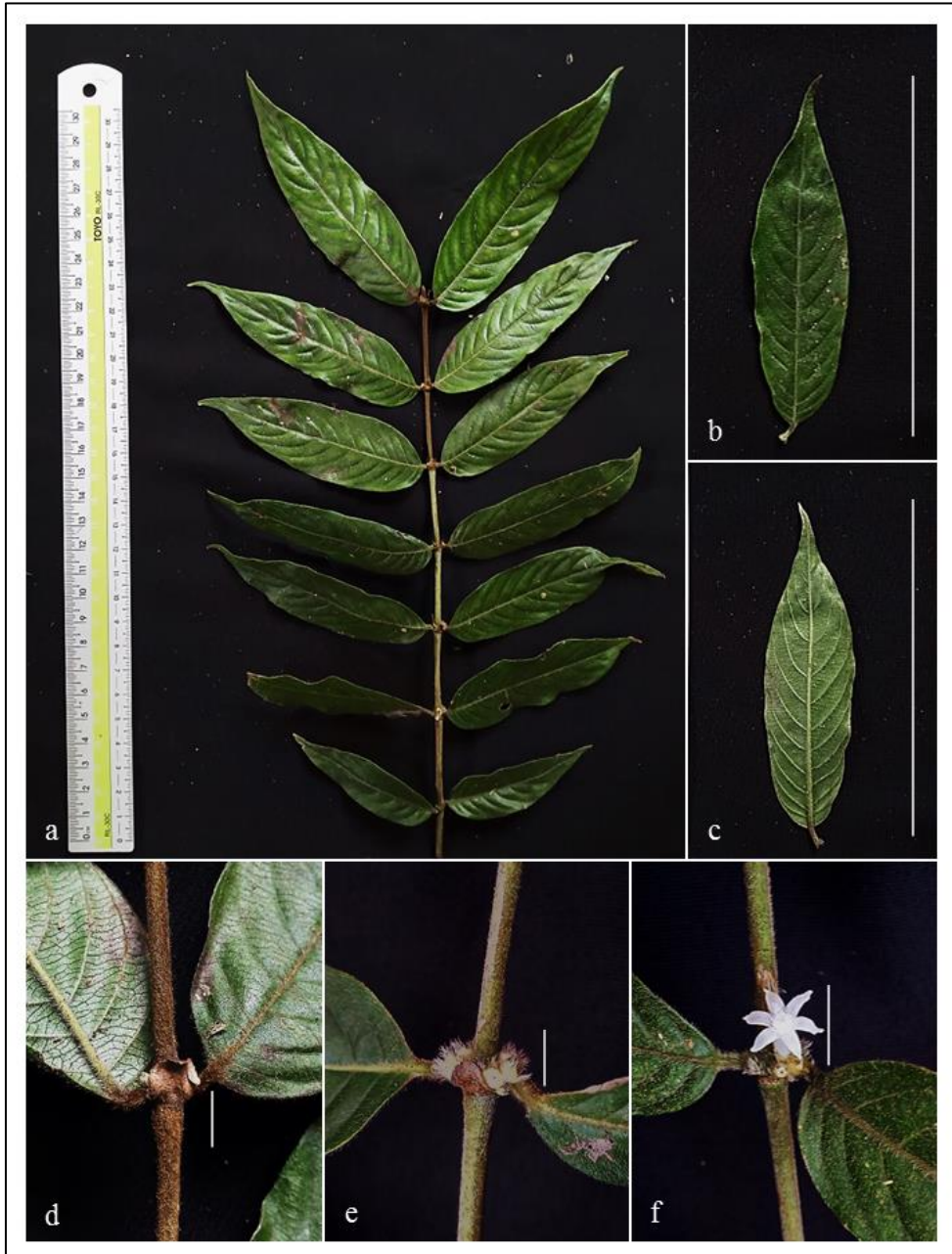


Fig. 14 *Lasianthus hirtus* Ridl.: a. branch, b. upper leaf, c. Lower leaf, d. Stipula, e. flower buds, f. flowers. Scale bars: a = 30 cm; b – c = 12 cm; d = 0.5 cm; e = 1 cm; f = 1.3 cm.

***Lasianthus hirtus* Ridl. (sect. *Nudiflorae*)**

Description: Small shrubs to medium, ca. 2 m height, branchlets terete, densely brown-pilose. Leaves: blades lanceolate, 7.5-12.5 × 2-3.5 cm, base obtuse and/or rounded, apex acuminate; chartaceous, both above and lower surface densely pilose; nerves 10-12 pairs, petioles 3-5 mm long. Stipules ovate, 3-4 mm length, 3-4 mm width, pilose. Bracts absent. Flowers sessile, calyx lobes 5; corolla white, lobes 6, pilose. Fruits not found (Fig. 14).



Fig. 15 *Lasianthus hispidulus* (Drake) Pit.: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stipule; e. flowers; f. immature fruits; g. cross section of fruit. Scale bars: a = 30 cm; b – c = 11 cm; d = 0.1 cm; e = 1 cm; f – g = 0.5 cm.

Identification: *L. hirtus* has a lanceolate leaf shape with an obtuse and/or rounded base, apex acuminate. It differs from the description of *L. rufus* which has unequal leaf bases.

Material examined: Nisrina Khairun Nisa, NK21, 27 February 2021, Blok Pasir Eurih, Cileutik, Mt. Burangrang, 1100 m asl., Nisrina Khairun Nisa, NK24, 27 February 2021, Blok Pasir Eurih, Cileutik, Mt. Burangrang, 1616 m asl.

***Lasianthus hispidulus* (Drake) Pit. (sect. *Nudiflorae*)**

Description: Small shrub to medium, ca. 1-1.5 m height, branchlets terete, densely villous. Leaves: blades narrowly elliptic-elliptic, 11-11.5 × 4-4.5 cm, base cuneate, apex acuminate-cuspidate; chartaceous, glabrous above, densely villous beneath; nerves 6 pairs, petioles 5-8 mm long. Stipules triangular, minute, no more than 1 mm length and width, hirsute. Bracts absent. Flowers sessile, calyx lobes 5; corolla white, corolla tube 10 mm long, lobes 5, villous. Fruits globose, blue, 3-5 mm diam., hirsute; pyrenes 5 (Fig. 15).

Material examined: Nisrina Khairun Nisa, NK14, 15 February 2021, Blok Jaha, Mt. Burangrang, 1288 m asl.

***Lasianthus iteophyllus* Miq. (sect. *Nudiflorae*)**

Description: Small shrubs to medium, ca. 1-2 m height, branchlets terete, subglabrous. Leaves: blades lanceolate, 8.5-9.5 × 2.2-2.5 cm, base acute-cuneate, apex acuminate; subcoriaceous, glabrous and lustrous above, hirsute on midrib and nerves; nerves 6-8 pairs, petioles 3-4 mm long. Stipules triangular with swollen base, 2-4 mm length, 2 mm width, glabrous-subglabrous. Bracts absent. Flowers not observed. Fruits globose, black, 4-8 mm diam., glabrous; pyrenes 5-6 (Fig. 16).

Identification: *L. iteophyllus* belongs to the *Lasianthus* family with black fruit from Mount Burangrang, with two other species i.e., *L. stercorarius* and *L. hirtus*. This species can be distinguished from *L. stercorarius* by leaf blades lanceolate, base acute-cuneate and nerves 6-8 pairs, stipules only 2-4 mm and pyrenes 5-6. Vegetatively, it differs from *L. hirtus* in the shape of the leaf blade and the shape of the leaf blade base.

Material examined: Hilmi Nurhalim, HN004, 16 February 2020, Mt. Burangrang, Purwakarta; Nisrina Khairun Nisa, NK18, 27 February 2021, Blok Pasir Eurih, Cileutik, Mt. Burangrang, 1544 m asl.

***Lasianthus lucidus* Blume. (sect. *Nudiflorae*)**

Description: Small shrub to medium, ca. 1-1.5 m height, branchlets terete, glabrous and lustrous. Leaves: blades ovate, 6-7 × 3-3.5 cm, base cuneate-rounded, apex cuspidate; subcoriaceous, glabrous and lustrous above, strigose on midrib and nerves beneath; nerves 4-5 pairs, petioles 6-7 mm long. Stipules triangular, minute, no more than 1 mm length and width, strigose. Bracts absent. Flowers sessile, calyx lobes 5, corolla white, corolla tube 10 mm long, glabrous outside, villous inside. Fruits ovoid, blue, 6 mm diam., glabrous; pyrenes 5 (Fig. 17).

Identification: This type is easily distinguished from other types, especially on the shape of the leaves and acuminate shoot leaf.

Material examined: Nisrina Khairun Nisa, NK 20, 27 February 2021, Blok Pasir Eurih, Cileutik, Mt. Burangrang, 1288 m asl.

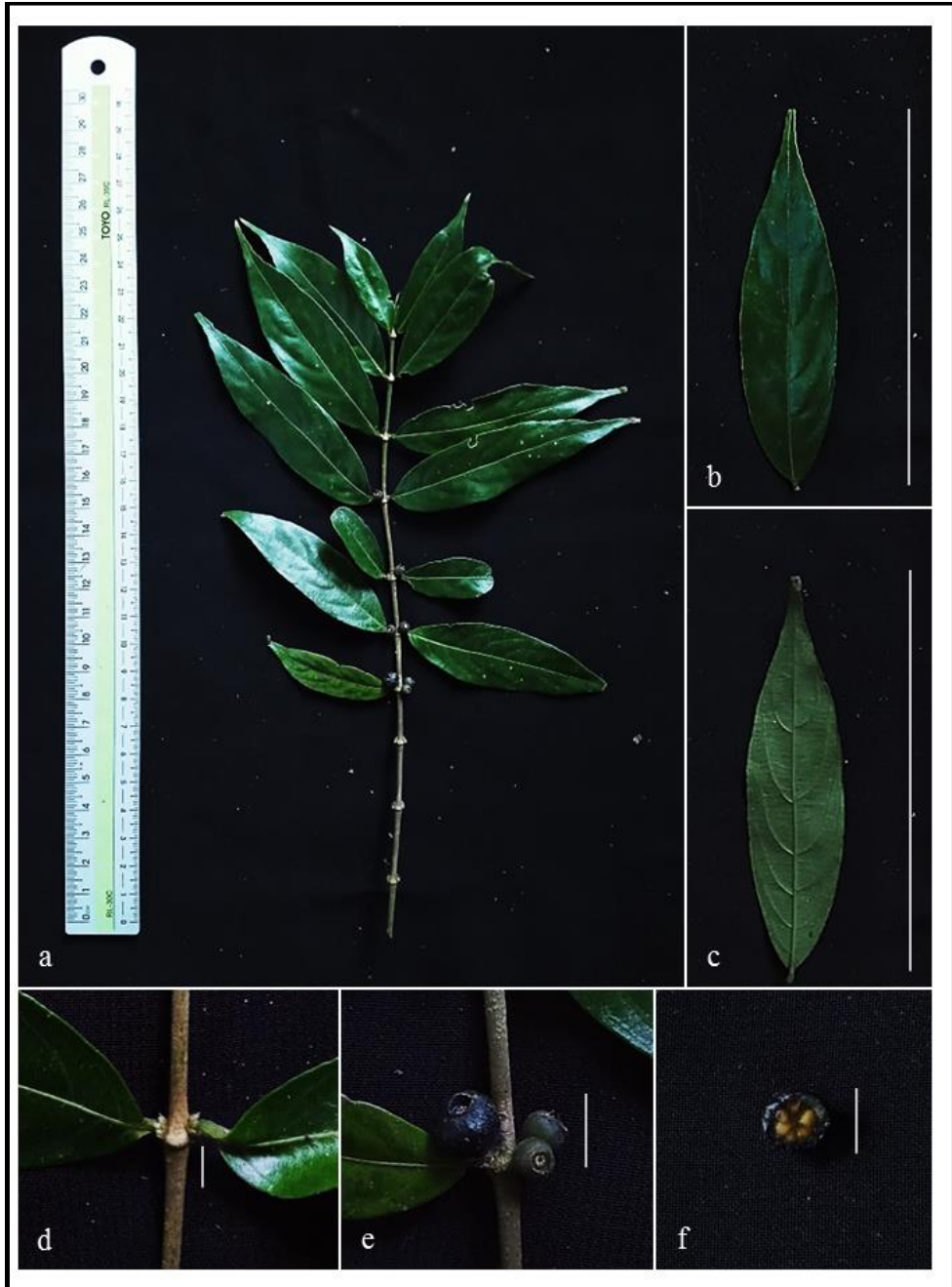


Fig. 16 *Lasianthus iteophyllus* Miq.: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stipule; e. fruits; f. cross section of fruit. Scale bars: a = 30 cm; b – c = 9 cm; d = 0.4 cm; e – f = 0.8 cm.

***Lasianthus stercorarius* Blume. (sect. *Nudiflorae*)**

Description: Shrub to small tree, up to 4 m height, branchlets terete, glabrous-subglabrous. Leaves: blades narrowly elliptic-lanceolate, 15-19 × 4.5-6 cm, base cuneate-rounded, apex acuminate; subcoriaceous, glabrous above, puberulous on

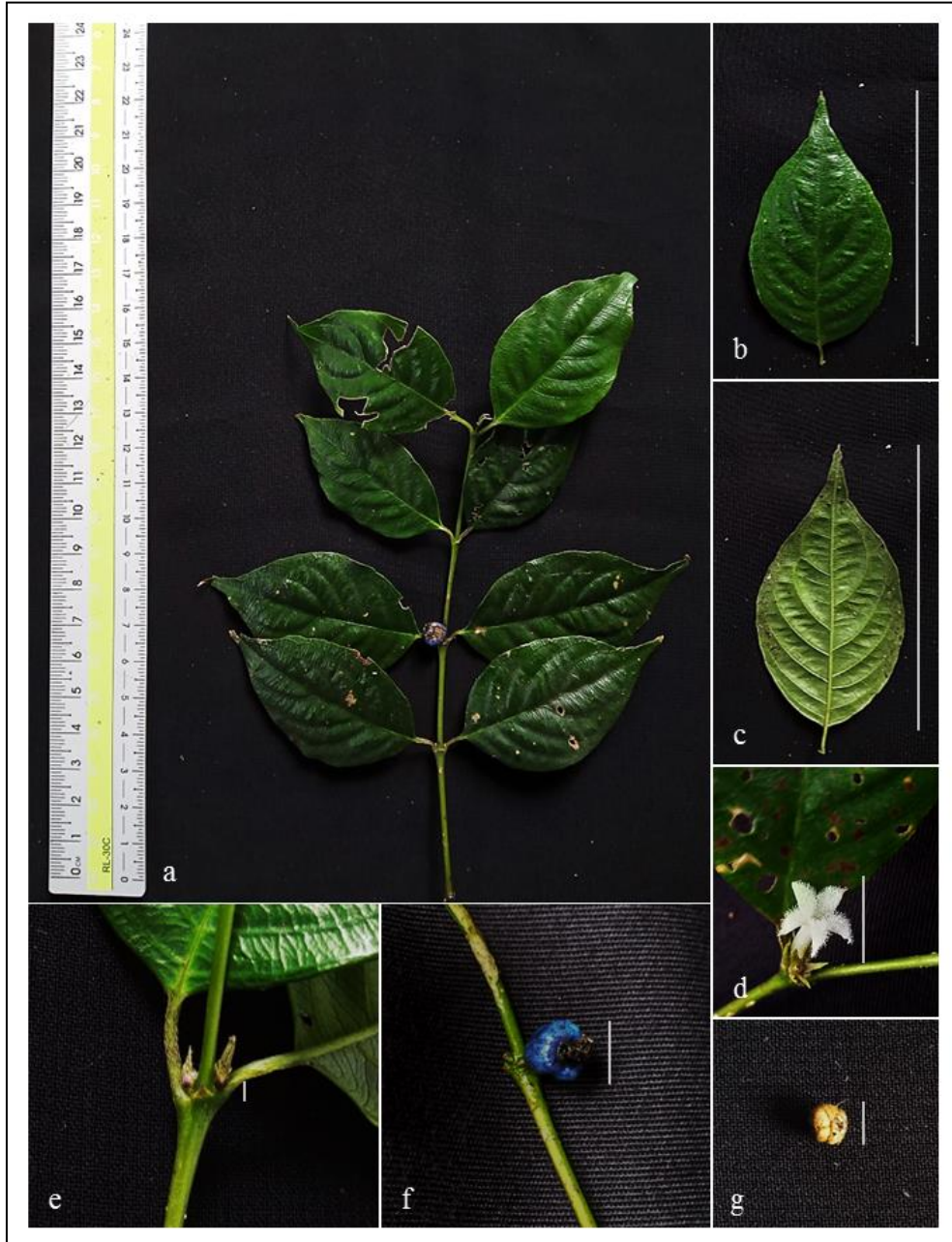


Fig. 17 *Lasianthus lucidus* Blume: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stem and flower; e. stipule; f. fruit; g. cross section of fruit. Scale bars: a = 24 cm; b – c = 7 cm; d = 1 cm; e = 0.1 cm; f – g = 0.6 mm.

midrib and nerves beneath; nerves 9-13 pairs, petioles 3-6 mm long. Stipules triangular with swollen base, 4-6 mm length, 4-6 mm width, subglabrous. Bracts absent. Flowers not observed. Fruits subglobose, black, 3-8 mm diam., glabrous; pyrenes 7 – 8 (Fig. 18).

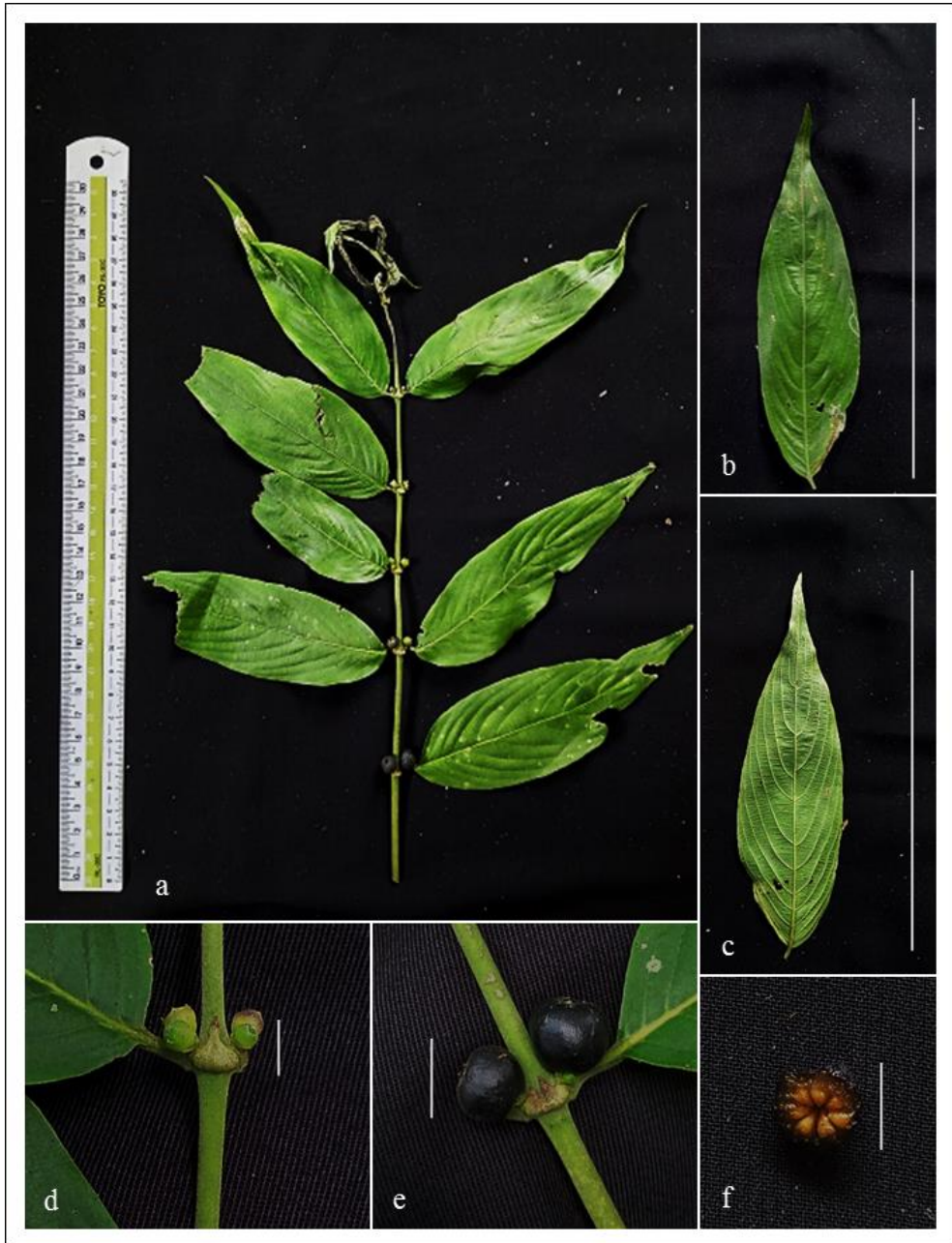


Fig. 18 *Lasianthus stercorarius* Blume: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stipule and immature fruits; e. stipule and mature fruits; f. cross section of fruit. Scale bars: a = 30 cm; b – c = 15 cm; d = 0.6 cm; e – f = 0.8 cm.

Identification: This type is like *L. iteophyllus* and *L. hirtus* because of the black color of the fruit. Differences with *L. iteophyllus* leaf blade shape, stipules, number of veins and number of pyrenes. *Lasianthus stercorarius* similar to *L. hirtus* in character of ovate and membranaceous stipules, differs in character of hairs on leaves, petioles, stipules subglabrous (without spreading pilose hairs) and pyrenes 7-8 (not 5).

Material examined: Hilmi Nurhalim, HN00, 16 February 2020, Mt. Burangrang, Purwakarta; Nisrina Khairun Nisa, NK01, 23 January 2021, Blok Ciangrem, Patok Beusi, Mt. Burangrang, 1141 m asl.



Fig. 19 *Lasianthus tomentosus* Blume: a. branch; b. adaxial leaf surface; c. abaxial leaf surface; d. stem, stipule, and calyx; e. stem, stipule and flower; f. cross section of fruit. Scale bars: a = 20 cm; b – c = 9 cm; d = 0.1 cm; e = 1 cm; f = 0.5 cm.

***Lasianthus tomentosus* Blume (sect. *Nudiflorae*)**

Description: Small shrubs to medium, ca. 2 m height, branchlets terete, glabrous-subglabrous. Leaves: elliptic, 8-12.5 × 3-5.5 cm, base cuneate, apex cuspidate; coriaceous, glabrous and lustrous above, tomentose beneath; nerves 5-6 pairs, petioles 5-7 mm long. Stipules triangular, minute, 1 mm length and width, tomentose. Bracts absent. Flowers sessile, calyx lobes 5, corolla white, corolla tube 10 mm long, lobes 4-5, tomentose. Fruits blue, globose, 3-5 mm diam., subglabrous; pyrenes 5 (Fig. 19).

Identification: *L. tomentosus* is similar to *L. lucidus* and differs from *L. lucidus* in having tomentose hairs on branchlets, leaf abaxial surface, and flowers.

Material examined: Nisrina Khairun Nisa, NK08, 14 February 2021, Blok Jaha, Mt. Burangrang, 1211 m asl.



Fig. 20 *Lasianthus* sp.: a. branch (adaxial surface); b. branch (abaxial surface); c. adaxial leaf surface; d. abaxial leaf surface; e. stipule. Scale bars: a – b = 30 cm; c – d = 7 cm; e = 0.1 cm.

***Lasianthus* sp.**

Description: Small shrubs to medium, ca. 1-1.5 m height, branchlets terete and enlarged at nodes, pubescent. Leaves: blades narrowly elliptic-elliptic, 6-9.5 × 3-3.5 cm, base cuneate, apex acuminate; subcoriaceous, glabrous and lustrous above, pubescent on midrib and nerves beneath; nerves 5-7 pairs, petioles 5-7 mm long. Stipules triangular, minute, no more than 1 mm length, pubescent. Bracts absent. Flowers not observed. Fruits globose, blue, 5 mm diam., glabrous (Fig. 20).

Material examined: Nisrina Khairun Nisa, NK02, 23 January 2021, Blok Ciangrem, Patok Beusi, Mt. Burangrang, 1128 m asl.

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