



Revision of the genera *Leptopus* and *Notoleptopus* (*Phyllanthaceae*) in Malesia

B. de Manuel Martin¹, P.C. van Welzen^{1,2,*}

Key words

Leptopus
Malesia
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Abstract A revision of *Leptopus* and *Notoleptopus* (*Phyllanthaceae* tribe *Poranthereae*) in Malesia is presented. Both genera are present with a single species in Malesia, *L. australis* and *N. decasnei*, respectively. Phylogenetically the two genera are distinct, but morphologically their differences are minimal. Nomenclature, descriptions, distributions and various notes are presented, just as a technical drawing of both species.

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INTRODUCTION

The genera *Leptopus* Decne. and *Notoleptopus* Voronts. & Petra Hoffm. are typical *Phyllanthaceae* Martinov, with simple, alternate, entire leaves and axillary, usually few-flowered fascicles of staminate and/or pistillate flowers. They belong to tribe *Poranthereae* Grüning, a group only recognized (see Vorontsova et al. 2007) after phylogenetic analyses by Wurdack et al. (2004), Samuel et al. (2005), and Kathriarachchi et al. (2005), in which it had high support. Hoffmann et al. (2006) provided the most recent formal description and classified the *Poranthereae* in subfamily *Phyllanthoideae* Kostel. Typical is the presence of (small) petals (though absent in a few species of *Actephila* Blume and in *Meineckia* Baill.). The generic circumscriptions within the *Poranthereae* were elucidated by Vorontsova et al. (2007), who showed that *Leptopus decasnei* (Benth.) Pojark. forms a clade separate from and not closely related to *Leptopus*. A formal recognition of the various clades was provided by Vorontsova & Hoffmann (2008), who established the genus *Notoleptopus* for *L. decasnei*, and finally left *Leptopus* with nine species.

Leptopus and *Notoleptopus* are morphologically very similar, with 5-merous flowers with 5 oppositipetalous bi-lobed disc glands and, in the staminate flowers, 5 free stamens and a pistillode. The differences between both genera are generally not considered as sufficient for generic distinction (Vorontsova & Hoffmann 2009), hence the fact that both were united for a long time. *Notoleptopus decasnei* (Benth.) Voronts. & Petra Hoffm. has a more hirsute indumentum with longer hairs (c. 0.8–1 mm long), visible with the naked eye, stem not glabrescent, leaf blades usually obovate, smaller, 0.25–5 by 0.2–3.3 cm, 1–2

times longer than wide and the black seeds are ridged on all sides, while *Leptopus australis* (Zoll. & Moritz) Pojark., the only species of *Leptopus* in Malesia, is glabrescent and more sericeous (hairs c. 0.5(–0.7) mm long), less directly visible with the naked eye, especially not on the older, more glabrous stems, leaf blades ovate to elliptic (to obovate), 1–8(–10) by 0.5–4 cm, (1–)2–3.5 times longer than wide, and dark brown seeds smooth on the back, only ridged at the sides.

When studying the material, it is evident that seemingly every pistillate flower turns into a fruit. Generally, this is an indication for self-pollination in bisexual flowers. It might also indicate the presence of an apomictic mechanism or a very efficient pollination strategy. Unfortunately, the flower biology of both taxa is unknown.

Leptopus australis has a SE Asian-W Malesian distribution and *N. decasnei* an E Malesian-Australian distribution. Both distributions overlap on Madura (island NE of Java) and in the Lesser Sunda Islands and occur in regions with a yearly dry season (for a climate map of Malesia and a discussion of climate-related patterns see Van Steenis 1979).

The revision of the genera presented here is part of the ongoing revision of the *Euphorbiaceae* s.lat. for the Flora Malesiana Project. Results can be found on the Malesian *Euphorbiaceae* website edited by Van Welzen (continuously updated). The two genera are already included in the key to the genera of the Malesian *Euphorbiaceae* and allied families (Van Welzen 2020).

MATERIAL AND METHODS

Physical herbarium material seen is held in L, U, WAG (all now in L). Types seen at L and U are indicated with a '!'; types from other herbaria were seen via JSTOR (continuously updated) and are indicated with '*'; all other types were not seen. The herbarium abbreviations follow Thiers (continuously updated). All plants were studied using a stereo-binocular microscope (Zeiss BRAND).

¹ Naturalis Biodiversity Center, Research Group Tropical Botany, P.O. Box 9517, 2300 RA Leiden, The Netherlands.

² Institute of Biology Leiden, Leiden University, P.O. Box 9505, 2300 RA Leiden, The Netherlands;
corresponding author e-mail: peter.vanwelzen@naturalis.nl.

TAXONOMIC ACCOUNT

LEPTOPUS

The genus *Leptopus* was established by Decaisne (1844), based on *Leptopus cordifolius* Decne. Morphologically the genus closely resembles *Andrachne* L., with which it has been united by various authors (Müller 1866, Pax & Hoffmann 1922, Govaerts et al. 2000). In the most recent classifications (Webster 1994, 2014, Radcliffe-Smith 2001) it is kept separate. Phylogenetically (e.g., Vorontsova et al. 2007), it is distinct from *Andrachne*, but morphologically the main difference is only in the position of the ovules: anatropous in *Leptopus*, hemitropous in *Andrachne* (Vorontsova & Hoffman 2009). Pojarkova (1940, 1960) made the first revisions of *Leptopus*, the latest is by Vorontsova & Hoffmann (2009), who also present a more elaborate history of the genus.

Leptopus Decne.

Leptopus Decne. (1844) 155; Pojark. (1960) 269; Airy Shaw (1972) 285; Whitmore (1973) 105; Airy Shaw (1982) 26, (1983) 33; G.L. Webster (1994) 40; Welzen (2000) 56, f. 7; Radcl.-Sm. (2001) 24; Welzen (2007) 352; Voronts. & Petra Hoffm. (2009) 627; G.L. Webster (2014) 66. — Type: *Leptopus cordifolius* Decne.

[*Arachne* Neck. (1790) 348, suppressed publication, nom. inval.: Turland et al. (2018: art. 34.1 App. 1)]. — *Andrachne* L. sect. *Arachne* Endl. (1840) 1119. — *Arachne* (Endl.) Pojark. (1940) 342. — Type: not indicated.

Hexakistra Hook.f. (1887): 283, nom. inval., in syn.

Thelypetalum Gagnep. (1925 '1924') 876. — Type: *Thelypetalum pierrei* Gagnep. (= *Leptopus australis* (Zoll. & Moritzi) Pojark.).

Archileptopus P.T.Li (1991) 38. — Type: *Archileptopus fangdingianus* P.T.Li (= *Leptopus fangdingianus* (P.T.Li) Voronts. & Petra Hoffm.) (see WCSP 2021).

Herbs to subshrubs, ascending to erect, monoecious. *Indumentum* absent or of simple hairs. *Stipules* small, late caducous to persistent, not glandular. *Leaves* alternate, distichous, simple; petiole reniform in transverse section, not pulvinate; blade papery to coriaceous, eglandular, discolorous, margin entire, venation pinnate, nerves looped and closed near the margin, veins and veinlets reticulate, indistinct. *Inflorescences* axillary fascicles on the youngest branches, with a single to few flowers of both sexes, staminate ones forming after fruit formation/dehiscence, sometimes on short brachyblasts; bracts present, small, resembling stipules. *Flowers* pedicellate, 5-merous, actinomorphic; sepals 5, not to at most slightly accrescent, imbricate, herbaceous; petals 5(–6); disc outside stamens. *Staminate flowers*: pedicels filiform, with basal abscission zone; petals smaller to as long as sepals; disc of 5(–6) segments, often deeply bilobed (then seemingly 10 segments), lobes often rounded; stamens 5, free, alternipetalous, filaments filiform, anthers opening laterally with lengthwise slits; pistillode indistinct or 3-lobed or of 3 free parts. *Pistillate flowers*: pedicels widening towards apex, not articulate; petals small, hidden under disc; disc annular, divided into 5 parts; ovary 3(–4)-locular (seemingly 4–5-locular in *L. fangdingianus* (P.T.Li) Voronts. & Petra Hoffm.), superior, globose; ovules 2 per locule; style minute, stigmas apically to almost completely split, apically broadened. *Fruits* faintly lobed to subglobose, capsular; columella slender, persistent, apically not or slightly broadened, glabrous to somewhat hairy. *Seeds* naked (micropylar fleshy appendages in *L. emicans* (Dunn) Pojark.), triangular in transverse section to reniform.

Distribution — Nine species, ranging from the Caucasus and Iran to the Himalayas, China, S and SE Asia and into *Malesia* (with a single species) east to the Lesser Sunda Islands and the Moluccas.

1. *Leptopus australis* (Zoll. & Moritzi) Pojark. — Fig. 1

Leptopus australis (Zoll. & Moritzi) Pojark. (1960) 270; Airy Shaw (1972 '1971') 285; Whitmore (1973) 105; Airy Shaw (1982) 26, (1983) 33; Welzen (2007) 353, f. 14; Voronts. & Petra Hoffm. (2009) 629. — *Andrachne australis* Zoll. & Moritzi in Zoll. (1845) 17; Backer & Bakh.f. (1963) 470. — *Arachne australis* (Zoll. & Moritzi) Pojark. (1940) 342, nom. inval. — Lectotype (designated by Vorontsova & Hoffmann 2009): *Zollinger 1399* (lecto W acqu. 1889 No. 24659*; isolecto A*, BM, LI, W*), Java, M. Geger, Insula Madura (Vorontsova & Hoffmann indicate that the lectotype is *Zollinger & Moritzi 1399*, but Moritzi never collected in Malesia, only Zollinger: www.nationaalherbarium.nl/fmcollectors).

Andrachne tenera Miq. (1859) 365. — *Agyneia tenera* Zoll. & Moritzi ex Miq. (1859) 365, nom. inval., in syn. — Type: *Anonymous (Zollinger) 2799* (holo U!), Java, bij Soember-waroe in Panaroeakan.

Andrachne australis Zoll. & Moritzi var. *angustifolia* Müll. Arg. (1866) 235. — Lectotype (designated indirectly by Vorontsova & Hoffmann 2009): *Cuming 1528* (lecto G-DC*; isolecto K 2 sheets*, L 3 sheets!), Philippines, Luzon, Prov. Batangao.

Andrachne polypetala Kuntze (1891) 592. — *Arachne polypetala* (Kuntze) Pojark. (1940) 342, nom. inval. — *Leptopus polypetalus* (Kuntze) Pojark. (1960) 271. — Type: *Kuntze 3661* (holo NY*), Vietnam, Turong in Annam. *Andrachne hirta* Ridl. (1923) 360. — *Leptopus hirtus* (Ridl.) Pojark. (1960) 271. — Type: *Ridley 14883* (holo K*), Malaysia, Perlis, Tebing Tinggi, near Kanga.

Andrachne calcarea Ridl. (1923) 361. — *Leptopus calcareus* (Ridl.) Pojark. (1960) 271; Airy Shaw (1972 '1971') 285. — Lectotype (designated by Vorontsova & Hoffmann 2009): *Annandale 1835* (lecto K*), Thailand, Kau Koh Suwan near Lampan.

Thelypetalum pierrei Gagnep. (1925 '1924') 876. — Type: *Pierre 6257* (holo P*, photograph K!; iso A*), Vietnam, Prov. Bien-hoa, Gia-lo-me, vers Bao-chiang.

Andrachne lanceolata Pierre ex Beille (1927) 539. — *Arachne lanceolata* (Pierre ex Beille) Pojark. (1940) 342, nom. inval. — *Leptopus lanceolatus* (Pierre ex Beille) Pojark. (1960) 270. — Lectotype (designated by Vorontsova & Hoffmann 2009): *Poilane 3316* (lecto P*; isolecto P*), Vietnam, Nhatrang, vallée du Sông Mow.

Leptopus philippinensis Pojark. (1960) 270. — Type: *BS (M. Ramos) 43333* (holo LE; iso US*), Philippines, Bohol.

Leptopus sanjappae Sumathi, Karthig., Jayanthi & Diwakar (2006) 155, f. 1. — *Leptopus calcareus* (Ridl.) Pojark. var. *sanjappae* (Sumathi, Karthig., Jayanthi & Diwakar) Chakrab. & N.P. Balak. (2008) 604. — Type: *Sumathi 17362* (holo CAL; iso K*, MCCH, PBL), Andaman Is., North Andaman, Tekkari, Saddle Peak National Park.

Subshrubs, 9–50 cm high, stem generally branched only at base; flowering branches 1–1.5 mm thick, often tinged red, densely hairy when young, glabrescent. *Hairs* sericeous-hirsute (base upright, upper part bent horizontally), to c. 0.5(–0.8) mm long. *Stipules* triangular to subulate, 0.8–2.8 by 0.2–0.6 mm, apex acute, densely hairy. *Leaves*: petiole 0.3–3.4 cm long, hairy; blade elliptic to somewhat obovate, 1–8(–10) by 0.5–4 cm; (1–)2–3.5 times longer than wide, papery, symmetric, drying brownish or greyish green, base cuneate to attenuate, margin flat, apex rounded and mucronate to shortly acuminate, upper surface glabrous to (completely) hairy on midrib and margin, dark green when fresh, lower surface subglabrous to hairy on venation, light green when fresh, margin subglabrous to hairy; nerves 4–6, flat above, slightly raised below, distinct. *Flowers* green. *Staminate flowers* 2–3.8 mm diam; pedicel terete, 2.7–7 mm long, slightly hairy, green to maroonish; sepals 5, obovate, 0.8–2.3 by 0.7–1 mm, hairy outside, glabrous inside, green, veined when dry; petals 5, oblong to obovate, 0.5–1.2 by 0.2–0.3 mm, glabrous, whitish; disc of 5 bilobed glands (to seemingly 10 separate glands), strap-like, 0.7–1.2 by 0.1–0.2 mm, glabrous, whitish; stamens 5, glabrous, filaments 0.5–1.3 mm long, whitish, anthers c. 0.2–0.3 mm long, light yellow, 2-thecate, each theca bilobed; pistillode of 3 free lobes, to 0.8 mm long, glabrous, top slightly split. *Pistillate flowers* 5–6 mm diam, disc-shaped; pedicel terete, 1.2–5(–9 in fruit) mm long, pilose, green; sepals 5, ovate to obovate, 1.5–3.2 (–5.5 in fruit) by 1.5–2(–3.5 in fruit) mm, margin and outside pilose, shortly hirsute inside, green, clearly veined when dry; petals 5, minute and sticking to back of disk lobes, oblong to

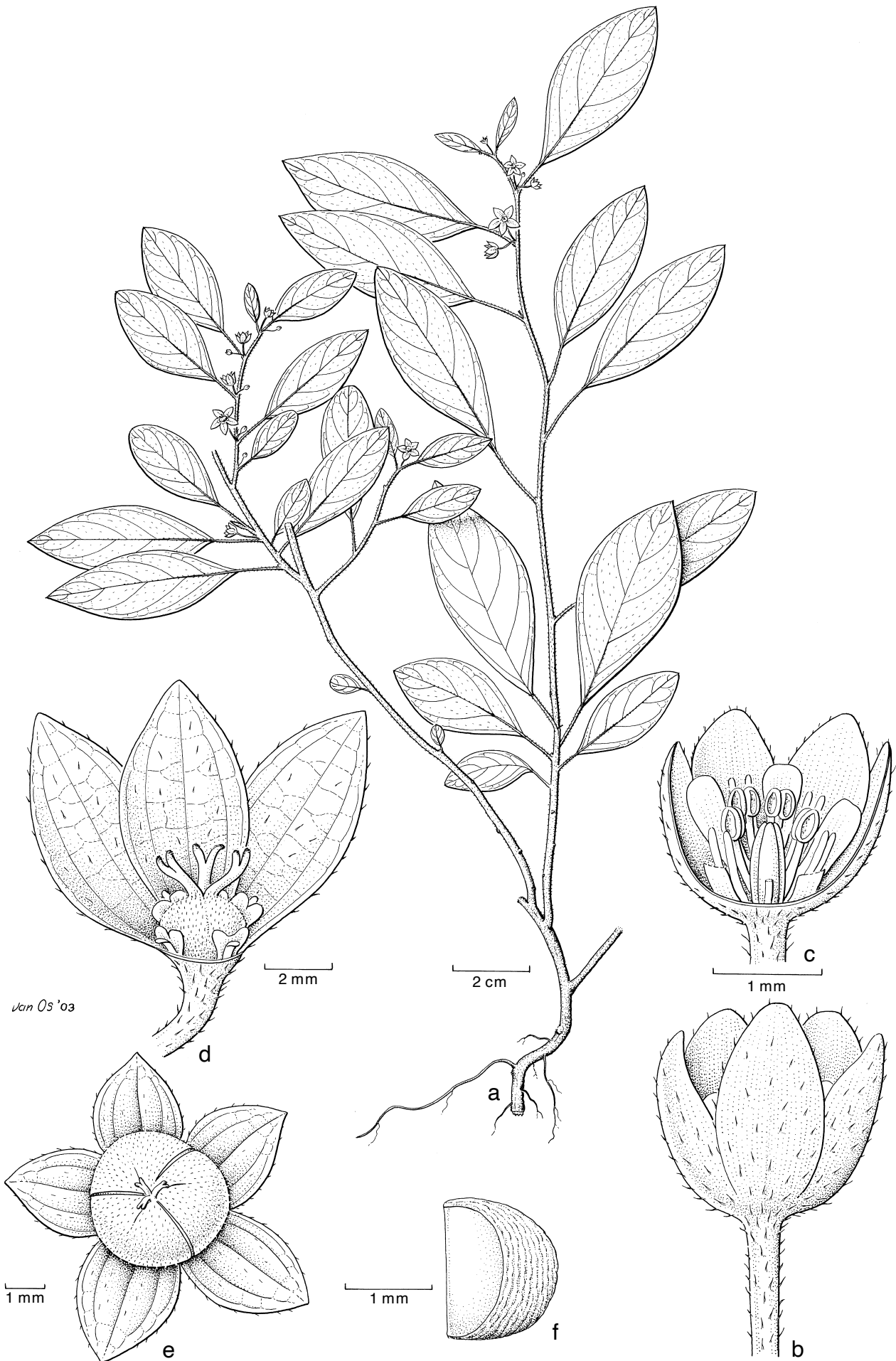


Fig. 1 *Leptopus australis* (Zoll. & Moritzi) Pojark. a. Habit; b. staminate flower outside; c. staminate flower with part of sepals, petals and disc glands removed; d. pistillate flower; e. fruit; f. seed (plant material used unknown, from L). — Drawing by Jan van Os, 2003.

obovate, 0.1–0.4 by 0.1–0.2 mm, glabrous, single vein generally visible; disc lobes 5, almost completely split and V-shaped, 0.6–0.8 mm long, apically often somewhat erose; ovary 0.5–0.6 by 0.7–0.9 mm, densely pilose, yellowish to light greenish; style c. 0.2 mm long, white to light greenish, pilose; stigmas 0.7–0.8 mm long, glabrous except sometimes for some hairs on clavate lobe apices, white to greenish. *Fruits* triangular in transverse section, c. 5 by 2.5 mm, yellow-green to white when ripe, shortly pilose, reticulately veined, white to light greenish when young; columella 1–1.5 mm long. *Seeds* 1.2–2 by 1–1.5 by 1–1.5 mm, sides ribbed, back convex and smooth, brown when dry.

Distribution — China (Hainan), Thailand, Andaman Islands, Vietnam; *Malesia*: Malay Peninsula, Sumatra, Java (including Madura), Borneo (Sabah), Philippines, Lesser Sunda Islands (Bali, Timor), Moluccas (Tanimbar Islands, Wetar).

Habitat & Ecology — Locally common in primary to disturbed tropical to evergreen forest, deciduous forest, dry Eucalypt savannah; in the shade to open spots, often on steep slopes, often between rocks or even lithophytic; soil: in shallow or deep soils on limestone or loam. Altitude: 15–1100 m. Presumably flowering and fruiting at least twice during the whole year except for January. According to Vorontsova & Hoffmann (2009) the IUCN Red List category is Least Concern (LC), as the extent of occurrence far exceeds 20 000 km².

Note — The young branchlets are often very hairy, but they are glabrescent. The difference with *Notoleptopus decaisnei* is then mainly in the subglabrous older branchlets, which are hairy in *N. decaisnei*.

NOTOLEPTOPUS

A monotypic genus recently established by Vorontsova & Hoffmann (2008), after a phylogenetic analysis by Vorontsova et al. (2007) of the tribe *Poranthereae*, in which the species appeared to be unrelated to *Leptopus*, the genus in which it was classified before.

Notoleptopus Voronts. & Petra Hoffm.

Notoleptopus Voronts. & Petra Hoffm. (2008) 50; G.L. Webster (2014) 67.
— Type: *Notoleptopus decaisnei* (Benth.) Voronts. & Petra Hoffm.
Leptopus auct. non Decne.: Airy Shaw (1980a) 122, (1980b) 645.

Small shrubs, erect, monoecious. *Indumentum* of simple hairs, most parts hirsute. *Stipules* small, late caducous. *Leaves* alternate, distichous, simple; petiole reniform in transverse section, not pulvinate; blade chartaceous, eglandular, margin entire, venation pinnate, nerves looped and closed near margin, veins and veinlets reticulate, indistinct. *Inflorescences* axillary fascicles, with a single to few flowers of both sexes; bracts present, small, similar to stipules. *Flowers* 5-merous, actinomorphic; pedicels likely articulate above base, but impossible to establish correctly; sepals 5, herbaceous; petals 5; disc outside stamens. *Staminate flowers*: pedicel slender; petals slightly shorter than sepals; disc glands 5, bilobed for less than 1/3, lobes rounded; stamens 5, free, filaments filiform, anthers opening laterally with lengthwise slits; pistillode of 3 free segments, apices slightly bifid. *Pistillate flowers*: petiole sturdier than in staminate flowers, apically somewhat widening; sepals slightly accrescent in fruit; petals much shorter than sepals; disc annular, regularly and deeply divided into 5 emarginate or erose segments; ovary 3-locular, superior, densely pilose; ovules 2 per locule; style indistinct, stigmas bifid to base, apically rounded. *Fruits* 3-lobed, capsular; columella slender, persistent, apically not broadened, puberulent. *Seeds* naked, triangular to reniform in transverse section, abaxial side convex, all sides ribbed.

Distribution — A monotypic genus, *Malesia*: Java, Lesser Sunda Islands, New Guinea, and Australia.

1. *Notoleptopus decaisnei* (Benth.) Voronts. & Petra Hoffm. — Fig. 2

Notoleptopus decaisnei (Benth.) Voronts. & Petra Hoffm. (2008) 53, f. 6.
— *Andrachne decaisnei* Benth. (1873) 88; Backer & Bakh.f. (1963) 470.
— *Arachne decaisnei* (Benth.) Pojark. (1940) 342. — *Leptopus decaisnei* (Benth.) Pojark. (1960) 271; Airy Shaw (1980a) 123, (1980b) 645, (1982) 26.
— *Leptopus decaisnei* (Benth.) Pojark. var. *decaisnei*: Airy Shaw (1980b) 645. — Lectotype (designated here): *Bowman s.n.* (lecto K [K000186432]*), Australia, Queensland, near Peak Downs.
Andrachne decaisnei Benth. var. *orbicularis* Benth. (1873) 88. — *Andrachne fruticosa* Decne. ex Müll.Arg. var. *orbicularis* (Benth.) Pax & K. Hoffm. (1922) 173. — *Andrachne orbicularis* (Benth.) Domin (1927) 315. — *Arachne orbicularis* (Benth.) Pojark. (1940) 342. — *Leptopus orbicularis* (Benth.) Pojark. (1960) 272. — *Leptopus decaisnei* (Benth.) Pojark. var. *orbicularis* (Benth.) Airy Shaw (1978) 379, (1980a) 123, (1980b) 646. — Type: *C. Harper s.n.* (holo K [K000186433]*), W Australia, Port Walcott.
[*Leptopus dominianus* Pojark. (1960) 511 (index), nom. nud.]
Andrachne fruticosa Decne. ex Müll.Arg. (1866) 235, nom. illeg., non L. — *Arachne fruticosa* (Decne. ex Müll.Arg.) Hurus. (1954) 339. — Syntypes: *Anonymous s.n.* (ex Herb. P) (G-DC*, 2 sheets), Indonesia, Timor; *F. von Mueller s.n.* (G-DC*), New Holland (Australia), Victoria River; *Zollinger 2795* (not seen), Indonesia, Java.

Subshrubs, 10–50 cm high; internodes 0.5–2 cm long; flowering branchlets 0.05–0.3 mm diam, hairy, likely not glabrescent. *Indumentum* hirsute hairs of c. 0.8–1 mm long. *Stipules* triangular, 1–2.5 by 0.25–0.5 mm, membranous, apex attenuate, sometimes slightly acute, hairy. *Leaves*: petiole 0.25–3 mm long, pubescent to densely pubescent; blade elliptic to obovate, 2.5–50 by 2–33 mm, 1–2 times longer than wide, symmetric, base cuneate to slightly attenuate, margin flat to slightly sinuate, densely ciliate, apex attenuate to acute, adaxial surface puberulous to pubescent, abaxial surface densely pubescent, venation of 3–5 lateral veins per side, midrib very prominent, flat on adaxial surface and elevated abaxially. *Flowers*: sepals ovate, with patent simple hairs, ciliate, apex acute to slightly rounded, midrib prominent; disc glabrous. *Staminate flowers* 0.4–0.8 mm diam in bud, 0.9–1.5 mm diam when open, coronate, light yellowish to reddish brown; pedicel terete, slightly thickened apically and basally, 0.8–1.7 by 0.03–0.12 mm, hairy; sepals ovate to elliptic, 0.6–1 by 0.25–0.5 mm; petals elliptic to obovate, 0.75–1.1 by 0.1–0.2 mm, glabrous to slightly pubescent, margin entire, apex acute to attenuate, midrib prominent; disc glands in Malesian material small and indistinct, bilobed; stamens: filaments 0.25–0.5 mm long, glabrous, anthers 0.15–0.22 by 0.2–0.25 mm, yellowish brown; pistillode 0.1–0.2 mm long, subsessile. *Pistillate flowers* 1.5–3 mm diam in bud, 2.5–3.5 mm when open, disc-like, puberulous; pedicel terete, thickened especially apically, 1.5–4.5 (–6.5 in fruit) mm long, pubescent to densely pubescent; sepals ovate, 2.2–3 (–3.4 in fruit) by 1.2–1.9 (–2.1 in fruit) mm; petals elliptic to ligulate to obovate, 0.35–0.55 by 0.18–0.3 mm, slightly pilose, margin entire, apex narrowly rounded, distinctly veined; disc lobes strap-like, c. 0.5 by 0.3 mm; ovary globose to slightly oblate, 0.5–1 by 0.75–1.3 mm, densely pubescent; stigmas 0.55–0.8 mm long. *Fruit* triangular in transverse section, 1.5–3.5 by 2.7–4.5 mm, densely pubescent, reticulately veined; columella 1.2–1.7 mm long. *Seeds* 1.35–1.8 by 1–1.3 by 0.75–1 mm, black when dry.

Distribution — *Malesia*: Java (Madura), Lesser Sunda Islands (Roti, Sumba, Timor), Papua New Guinea (Central Province); Australia (Queensland).

Habitat & Ecology — Scarce to locally fairly common in usually (more) open places in rocky surroundings between grass tussocks and in open Eucalypt woodland. The plants appear to be much cropped by wallabies (*Pullen 9616*). Altitude: 1–500 m. Flowering and fruiting: February to May.

Note — A geocline may be present as staminate disc lobes and pistillode seem to be smaller on Madura (near Java) and much larger in Australia. However, the material was too scarce to be certain.

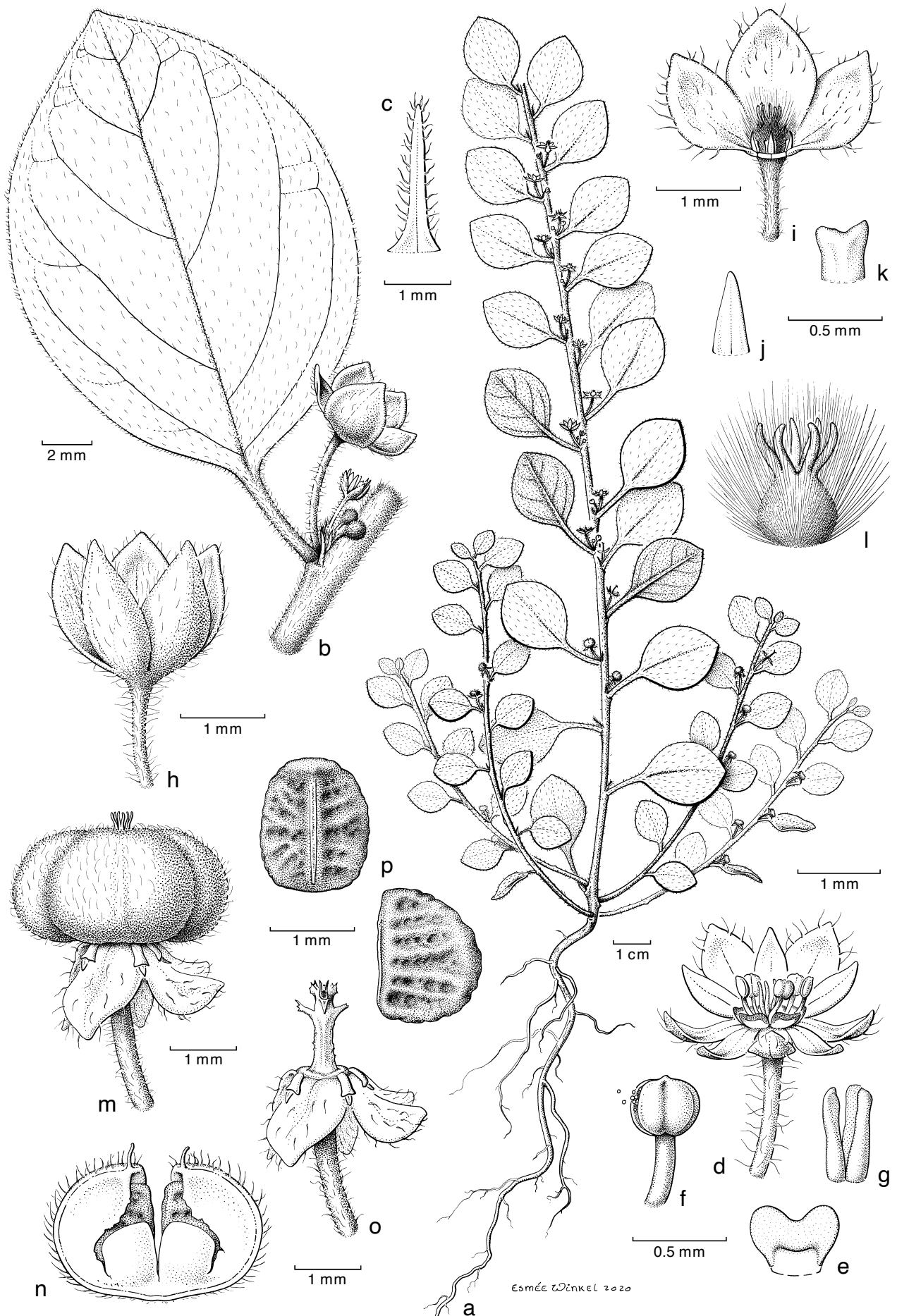


Fig. 2 *Notoleptopus decaisnei* (Benth.) Voronts. & Petra Hoffm. a. Habit; b. leaf with axillary fascicle; c. stipule; d. staminate flower; e. stamens in abaxial (right) and adaxial (left) view; f. stamen; g. pistillode; h. pistillate flower; i. pistillate flower with part of sepals removed; j. petals; k. disc gland; l. pistil; m. fruit; n. two partly loculicidally dehiscent mericarps; o. columella after dehiscence; p. seeds in frontal and side view (a–c, h–l: *Backer 20396*; d–g: *Fraser 267*; m–p: *Backer 20830*; all L). — Drawing by Esmée Winkel, 2020.

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IDENTIFICATION LIST

- 1 = *Leptopus australis* (Zoll. & Mortizi) Pojark.
2 = *Notoleptopus decaisnei* (Benth.) Voronts. & Petra Hoffm.

- Annandale 1835: 1.
Backer 18053: 1; 19573: 2; 20291: 2; 20396: 2; 20830: 2; 37053: 1 – Beaman et al. 10122: 1 – BS series 27530: 1; 33223: 1; 43333: 1 – Buwalda 4194: 1; 7210: 1; 7275: 1.
Charoenphol, Larsen & Warncke 3636: 1 – Chermisrivathana 1500: 1 – Chin 879: 1 – Clason C 56: 1 – Clason-Laarman F39: 1 – Cuming 1528.
De Vogel 2780: 1 – De Voogd 1696: 1 – Dilmy 1046: 1.
Elbert 4633: 1; 4633a: 1 – Esser 98-86: 1; 98-120: 1.
Forbes 3325: 1 – Fraser 269: 2.
Geesink, Hattink & Phengkai 6757: 1.
Iboet 129: 2 – Imay 49: 1.
KEP FRI series 27045: 1 – Kerr 4155: 1; 8810: 1; 10871: 1; 11193: 1; 15348: 1; 19841: 1 – Koorders 24465: 1 – Kooy 123: 1; 420: 1; 421: 2; 700: 1; 718: 2; 891: 1 – Kuntze 3661: 1.
Larsen 9829: 1 – Larsen et al. 31260: 1 – Larsen, Smitinand & Warncke 1102: 1; 1553: 1.
Maradjo 404: 1 – Maxwell 75-367: 1; 86-601: 1; 86-702: 1 – Merrill 11538: 1 – Middleton 199: 1 – Middleton, Linday & Pooma 2114: 1.
Pierre 6257: 1 – PNH series 15742: 1; 18596: 1 – Poilane 3316: 1 – PPI series 24625: 1 – Pullen 6916: 2 – Put 1030: 1.
Rabil 315: 1 – Ridley 14883: 1 – Rappard 79: 2.
SFN series 35249: 1; 27802: 1 – Smitinand, Sleumer et al. 1224: 1 – Sumathi 17362: 1.
Van Beusekom & Charoenphol 1884: 1 – Van Beusekom, Geesink & Wid 3303: 1 – Verheijen 2449: 2.
Widjaja 1222: 1.
Zollinger 1399: 1; (Anonymous) 2799: 1.