

## *Lasiopetalum prodigiosum* (Malvaceae: Lasiopetaleae), a new species from central-eastern New South Wales to south-eastern Queensland

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### Abstract

*Lasiopetalum prodigiosum* C.F.Wilkins, L.M.Copel. & K.A.Sheph., is recognised here as a new species that is currently only known from eight populations across central-eastern New South Wales to south-eastern Queensland. This species has historically been confused with *L. ferrugineum* Sm. ex Andrews and *L. macrophyllum* Graham but is supported as distinct based on molecular and morphological data. This paper provides diagnostic features that distinguish *L. prodigiosum* from other known species, as well as notes on its current distribution, and a key to allied species.

### Introduction

*Lasiopetalum* Sm. is an Australian endemic genus, consisting of c. 74 known taxa, in the tribe Lasiopetaleae J.Gay (Malvaceae Juss.). Western Australia is the centre of morphological diversity for the group, with 46 named and four unpublished taxa (with informal phrase-names) currently known (Western Australian Herbarium 1998–), while in eastern Australia, approximately 10 taxa, including two unpublished taxa, namely *Lasiopetalum* sp. Proston (J.A.Baker 17) Qld Herbarium and *L.* sp. Coochin Hills (L.S.Smith 14050), are recognised (Council of Heads of Australasian Herbaria 2024; Guymer 2022; PlantNet 2024; VicFlora 2024).

*Lasiopetalum ferrugineum* Sm. ex Andrews, was recently designated as the lectotype for *Lasiopetalum* (Shepherd and Wilkins 2018) and currently two varieties are recognised (*L. ferrugineum* Sm. ex Andrews var. *ferrugineum* and *L. ferrugineum* var. *cordatum* Benth.); however, further variation within this broadly defined taxon has been noted, with small and large-flowered forms sometimes recognised (Harden 1990). Field collections for the ongoing revision of the genus (Shepherd and Wilkins in prep.), in conjunction with the examination of herbarium specimens from across eastern Australia, has made it clear that a new taxon from northern New South Wales and southern Queensland may warrant taxonomic recognition. This taxon had previously been treated as a large-flowered variant of *L. ferrugineum* var. *cordatum* or sometimes included under *L. macrophyllum* Graham.

Samples of this potentially new taxon (C. Wilkins & E. Bennett CW NSW 37; C.F. Wilkins, B.A. Whitlock & L. Copeland CW 2054) were subsequently included in a project that used Angiosperm353 bait capture data to investigate phylogenetic and taxonomic

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relationships within *Lasiopetalum* and allied genera. Analyses of these data placed these samples as sister to a subclade including *L. ferrugineum* and other allied species recognised in the affinities section below (B. Anderson pers comm.). An examination of all relevant herbarium collections, including closer comparison of these northern plants with material from the type locality of *Lasiopetalum ferrugineum* var. *cordatum* in the Blue Mountains, has confirmed the distinctiveness of this taxon, named herein as *L. prodigiosum* C.F.Wilkins, L.M.Copel. & K.A.Sheph.

## Methods

Collections of *Lasiopetalum* held in CANB, MEL, NE, NSW, and PERTH were examined, along with the relevant literature pertaining to most currently recognised species in the genus. Further material may be present in the collections held at BRI but these have not been examined. Type specimens of allied taxa were viewed online via JSTOR Global Plants (<https://plants.jstor.org/>). Measurements were scored from freshly collected material, ethanol-preserved material and dried and rehydrated herbarium material. Due to the variation in size often evident in juvenile leaves for the genus, measurements were made from mature leaves only.

Distribution maps were created using QGIS version 2.18.16 and include version 7 of the Interim Biogeographic Regionalisation for Australia (IBRA) bioregions (Department of the Environment 2013). Botanical districts included in the selected specimens follow those originally proposed by L. Halasz (<https://www.anbg.gov.au/cpbr/ahnsir/ahnsir-manual/botanical-districts.html>).

## Taxonomy

***Lasiopetalum prodigiosum*** C.F.Wilkins, L.M.Copel. & K.A.Sheph. *sp. nov.*

**Type:** New South Wales: Northern Tablelands, Gibraltar Range National Park, 30 October 2004, *C.F. Wilkins 2054, B.A. Whitlock & L. Copeland* (holo: NSW 837867; iso: PERTH 07971087).

Erect *shrub* 0.5–1.5 m high, 0.5–1 m wide. *Young stems* with a ferruginous tomentum of scattered, stalked (c. 0.6 mm long), multi-angulate or appressed stellate hairs with c. 12 arms (each to 0.4 mm long), over a layer of dense, smaller, white, stellate hairs; late-glabrescent. *Stipules* absent. *Petioles* 12–29.3 mm long. *Leaves* narrowly ovate to ovate, discolorous, 33–93 mm long, 20–51 mm wide, base cordate, margin entire or sinuate, flat or scarcely recurved, apex acute; abaxial surface with a tomentose indumentum of white (sometimes with pale ferruginous centres), stalked (c. 0.3 mm long) or sessile, multi-angulate, stellate hairs with c. 12 arms (each to 0.4 mm long), over a layer of smaller, dense, white, appressed stellate hairs; adaxial surface with dense, white (sometimes with ferruginous centres), appressed stellate hairs with c. 10 arms (each to 0.2 mm long); early glabrescent. *Inflorescence* a moderately loose dichasium, 19–35 mm long, with 4 or 5(–8) flowers. *Peduncles* 5–15 mm long, indumentum as in young stem except hairs sessile. *Pedicels* 1.4–5 mm long. *Bracts* narrowly ovate to linear, 1.5–4.5 mm long, 0.3–0.7 mm wide. *Epicalyx bracts* 3, attached directly below calyx, non-petaloid, scarcely fused at base (to c. 0.5 mm long), narrowly triangular to narrowly ovate, 2.4–5.2 mm long

(central bract longest), 0.6–1.5 mm wide. *Calyx* 5-merous, base indumentum rusty tomentose, apex creamy white, inner surface whitish green, 9.1–14.1 mm long; calyx tube 2.3–3 mm long; lobes ovate 6.5–7.3 mm long, 5.1–6.7 mm wide, widths equal, apex acute; outer surface with base and central lobe densely hairy, with ferruginous, stalked (to 0.3 mm long) or sessile, multi-angulate, stellate hairs with c. 12 arms (each arm to 0.7 mm long), over a dense layer of smaller, white, stellate hairs, towards the margin of each lobe; inner surface without a prominent central rib, base and central lobe with a dense tomentum of white, brittle, appressed, stellate hairs with c. 10 arms (each to 0.3 mm long), glabrous towards lobe margins and apex. *Petals* dark red, obovate, 1.5–3.1 mm long, 0.5–1.3 mm wide, glabrous or abaxial surface with scattered, white, stellate hairs. *Hypogynous cup, staminal tube and staminodes* absent. *Staminal filaments* 2.5–4.8 mm long, glabrous. *Anthers* 5, dark red (with white apex around upwardly dehiscent pores), oblong or elliptic with an obtuse apex, 2.5–3.1 mm long, 0.8–1.2 mm wide, glabrous. *Ovary* 3- or 4-locular with 2 ovules per locule, 4.5–4.8 mm long, 4.6–5.5 mm wide; outer surface densely hairy, with stalked (c. 0.3 mm long), white or golden, appressed, stellate with c. 12 arms (each to c. 0.7 mm long), above a layer of smaller, brittle hairs. *Style* 0.6–2 mm long, glabrous or basal third densely hairy, with hairs white, sessile, stellate. *Fruit* ellipsoid, c. 4.5 mm long, c. 4 mm wide. *Seed* ellipsoid, c. 2.5 mm long, c. 1.3 mm wide, dark brown, smooth, densely stellate hairy; *aril* consisting of a cream cap with two lobes (c. 1.3 mm long). (Figures 1, 2)

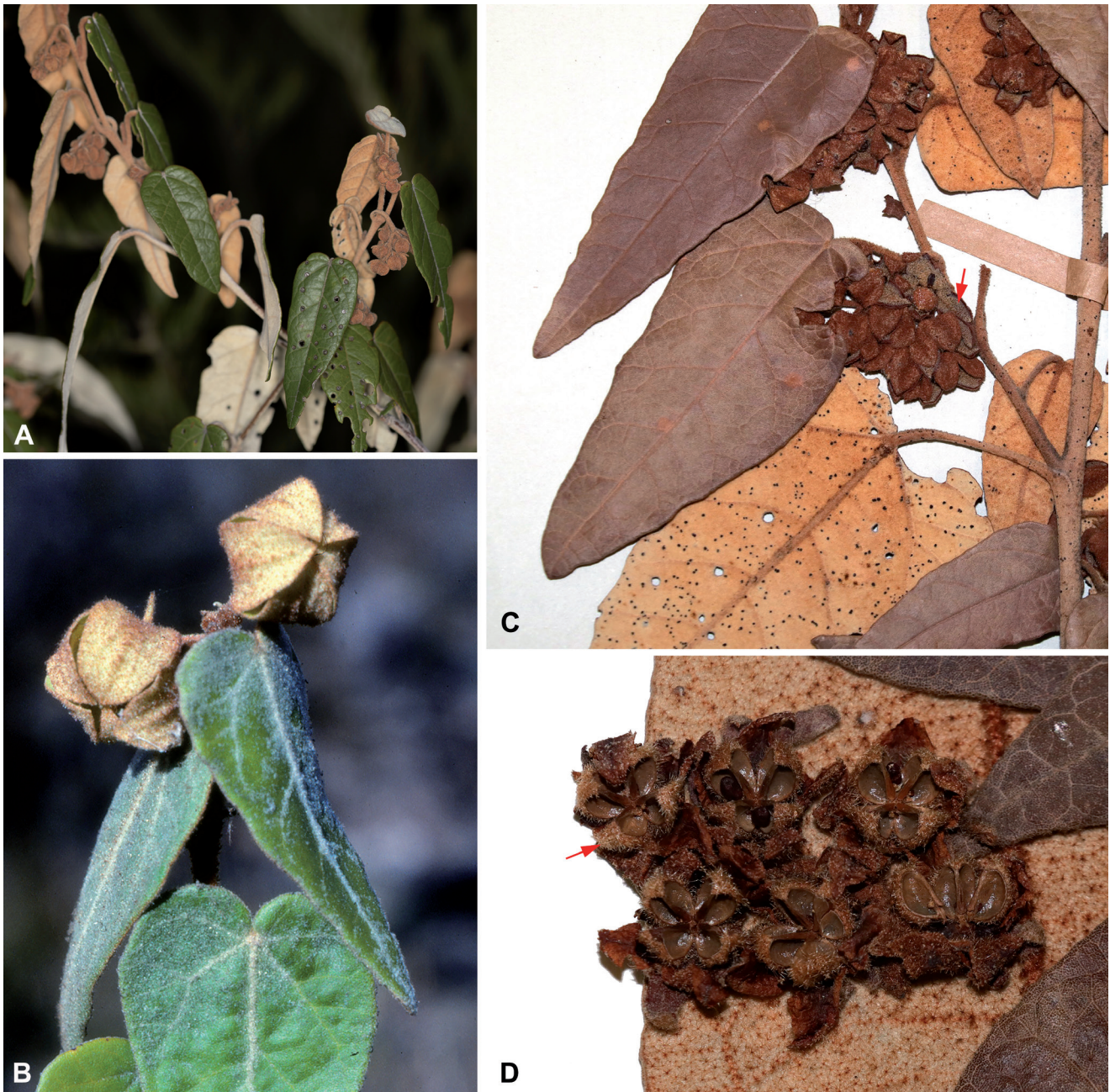
**Diagnostic characters:** Distinguished from morphologically similar species of *Lasiopetalum* by the following combination of characters: leaves discolorous, narrowly ovate to ovate, margins entire to sinuate, apex acute, 33–93 mm long, 20–51 mm wide; inflorescence a moderately open dichasium 19–35 mm long, with 4–5(–8) rusty tomentose flowers with a creamy white apex and whitish-green inner surface; three narrowly triangular or narrowly ovate epicalyx bracts 2.4–5.2 mm long (central longer); dark red petals 1.5–3.1 mm long; calyx large, 9.1–14.1 mm long, inner surface base and central lobe with dense, white, brittle, appressed, stellate hairs, glabrous towards margins and apex, outer surface base and central lobe with dense, ferruginous, stellate hairs, with smaller, white, hairs towards the margins; staminal filaments long (2.5–4.8 mm); anthers long (2.5–3.1 mm long); ovary large (4.5–4.8 mm long, 4.6–5.5 mm wide), with dense, white or golden, appressed, stellate hairs with arms to 0.7 mm long over smaller, white, brittle, hairs; style glabrous or basal third with dense, white, stellate hairs.

**Specimens examined: NEW SOUTH WALES: North Coast:** North Obelisk, 2 km W of Urbenville, 13 Oct. 1990, *A.R. Bean 2496* (BRI, HO, MEL!, NSW!); Glassy Mtn, 11 km SE of Woodenbong, 1 Jun. 1999, *A.S. Benwell 123* (NE!); North Obelisk Mtn, Coutts Crown, 1.5 km WSW of Urbenville, 10 Jun. 1999, *A.S. Benwell 125* (NE!); North Obelisk, 2 km W of Urbenville, 6 Sep. 1994, *C.F. Wilkins CW NSW 37 & E. Bennett* (PERTH!). **Northern Tablelands:** Werrikimbe National Park, 2.9 km SE of Cobcrofts Rd, along Carey's Trail, 19 Jul. 2007, *L.M. Copeland 4247 & P. Thomas* (BRI!, CANB!, NE!, NSW!); 19 km E of Deepwater on Miles Shaw Rd, Butterleaf, 1 Dec. 1995, *J.T. Hunter 3785* (BRI, MEL!, NE!, NSW!); Butterleaf State Forest, c. 20 km NE of Glen Innes, Mt Scott, 16 Jun. 1996, *J.T. Hunter 3929* (NE!); Butterleaf

State Forest, Compartment 211, 200 m SW of Scott Trig point, 18 Jun. 1996, P.G. Richards 536, D. Moffat & J.T. Hunter (CANB!, NE!, NSW!); Gibraltar Range, c. 40 miles NE of Glen Innes, s.dat., J.B. Williams s.n. (NE28381!); Gibraltar Range, NE of Glen Innes, s.dat., J.B. Williams 588 & E.K. Winterholder (NE!); Gibraltar Range, NE of Glen Innes, Feb. 1958, E.K. Winterholder s.n. (NE28379!); Gibraltar Range, Oct. 1958, J.B. Williams 588A & E.K. Winterholder (NE!). **Central Western Slopes:** Yarrowa Fire Trail, c. 15 km south-west of Denman, Wollemi National Park, 23 Nov. 2014, R.L. Johnstone 3547 & W. Holzinger (NSW!).

**QUEENSLAND: Moreton:** Mt Ernest, 10 Nov. 1992, P.I. Forster 12366 & G. Leiper (BRI, CANB, NSW 282728!, MELI, KI!).

**Distribution:** *Lasiopetalum prodigiosum* ranges from the far northern section of Wollemi National Park in New South Wales to south-eastern Queensland (Figure 3). Throughout its range, *L. prodigiosum* is uncommon and sporadic with effectively just eight populations currently known. We have examined very limited material from Queensland; however, specimens examined from Mount Ernest in Mount Barney National Park, are confirmed as *L. prodigiosum* (Figure 2). It is likely that plants referred to as *L. ferrugineum* var. *cordatum* in Main Range National Park by Leiper *et al.* (2017), are also referable to *L. prodigiosum*, which based on current knowledge would be the northern limit of the species. Examination of all Queensland material is required to confirm the current range of this species.



**Figure 1.** *Lasiopetalum prodigiosum*. A – flowering branchlet showing discolorous leaves and young flowers with dense ferruginous hairs on the outer calyx, peduncles and pedicels; B – mature flowers showing a narrow epicalyx bract (one of three) at the base of the calyx, and two large flowers with broad calyx lobes with ferruginous hairs at the base and centre with cream hairs towards the margins and apex; C – specimen with open flowers highlighting the dense stellate hairs across the whole inner surface of the calyx (red arrow); D – mature, open fruits highlighting the capsule outer surface with the mix of large stellate hairs that obscure short, brittle hairs below. Images by: A – P. Sheringham (unvouchered from Gibraltar Range); B – G. Leiper (unvouchered, Mt Ernest); C – L. Copeland (J.B. Williams 588 & E.K. Winterholder NE 28380); D – L. Copeland (A. Benwell 123 NE082749A).



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12366

EX QUEENSLAND HERBARIUM (BRI)  
 Flora of Queensland Moreton  
*Lasiopetalum ferrugineum* var. *cordatum* Benth.  
 Coll. P. I. Forster PIF12366 10 NOV 1992  
 +G. Leiper  
 28°18'S 152°42'E Alt. 820 m.  
Depth m.  
 Mt Ernest.  
 Low heathland dominated by *Leptospermum* spp., on rhyolite  
 flows & outcrops.  
 Shrub to 60cm high, green-brown calyx.  
 Common in area.

Det. Sterculiaceae  
 Dups. MEL NSW CBG K  
 \*May be cited as computerised collection number AQ 549468  
 (Archival Paper)

Figure 2. Photograph a *Lasiopetalum prodigiosum* specimen held at K (P.I. Forster 12366 & G. Leiper), highlighting the broad, discoloured leaves and large flowers. Image by K.A. Shepherd.



**Figure 3.** Distribution map of *Lasiopetalum prodigiosum* with IBRA subregions in pale grey (Department of the Environment 2013).

**Habitat:** This species grows in rocky areas at altitudes ranging from 500–1000 m, in shallow, brown sandy loams or grey clayey sands, over granite, sandstone, trachyte and volcanic geologies in low heathland or *Eucalyptus* woodlands associated with *Eucalyptus cameronii*, *E. williamsiana*, *Hibbertia riparia*, *Leptospermum* and *Pomaderris*.

**Phenology:** Flowers have been recorded from June through to December. Old fruits were present on specimens collected in June (A.S. Benwell 123, NE 082749A).

**Conservation status:** Although this species appears to be sporadic and uncommon, *Lasiopetalum prodigiosum* is represented in several conservation reserves such as Wollemi, Cottan-Bimbang, Werrikimbe, Gibraltar Range, Butterleaf, Toonumbar, Mount Barney and Main Range National Parks. Population sizes are small and are therefore vulnerable to stochastic events such as intense wildfires. A particularly intense fire in late 2019 burnt the type population in Gibraltar Range National Park and killed all adult plants, with a small number of seedling recruits only reaching maturity four years later. As such, while this species may currently be known from several

populations in the reserve system, it may still be under threat and vulnerable to local extinctions.

**Etymology:** From the Latin *prodigiosus* (huge, enormous, wonderful), in reference to the large and striking foliage and flowers of this species compared to most other species of *Lasiopetalum*.

**Affinities:** Based on Angiosperm353 bait capture data *L. prodigiosum* is placed sister to a clade with other eastern states species including *L. ferrugineum* var. *ferrugineum*, *L. ferrugineum* var. *cordatum*, *L. joyceae*, *L. parviflorum*, and *L. rufum* (B.M. Anderson, pers. comm.) (*L. macrophyllum* was not sequenced).

The inner surface of the calyx of *L. prodigiosum* has dense, stellate hairs throughout (Figure 1C); a feature shared with *L. rufum*, *L. joyceae* and *L. ferrugineum*. *Lasiopetalum prodigiosum* is readily differentiated from *L. rufum* and *L. joyceae* by its large, narrowly ovate to ovate leaves (vs linear to narrowly oblong or narrowly ovate leaves) and moderately open dichasium (vs open monochasium or rarely a dichasium). *Lasiopetalum prodigiosum* has most often been confused with *L. ferrugineum* and can be

distinguished from *L. ferrugineum* var. *ferrugineum* by virtue of its inflorescence having fewer flowers (4–8 vs 8–10) as well as its larger filaments (4.5–4.8 vs (0.6–)1.1–1.3 mm long), usually larger anthers (2.5–2.8 vs 0.9–1.9(–2.8) mm long, larger ovary (4.5–4.8 vs 1.5–2.5 mm long) and less compact inflorescence. This new species can also be consistently recognised as distinct from *L. ferrugineum* var. *cordatum* as the latter has unique hairs on the ovary, which are small and brittle, while the outer surface of the ovary of *L. prodigiosum* has a mix of dense, appressed white or golden stellate hairs with arms to 0.7 mm long over smaller, brittle hairs. In addition, the inner surface of the calyx of *L. prodigiosum* has stellate hairs only while in *L. ferrugineum* var. *cordatum* fine, glandular hairs are intermixed with stellate hairs on the inner calyx.

*Lasiopetalum macrophyllum* and *L. parviflorum* are distinct from *L. prodigiosum*, as the base of the inner calyx in both species is glabrous with stellate hairs present only on the margins and apex, rather than having dense, stellate hairs throughout as seen in *L. prodigiosum*, *L. rufum*, *L. joyceae* and *L. ferrugineum*. *Lasiopetalum prodigiosum* can be further identified from *L. macrophyllum* by its narrowly triangular to narrowly ovate epicalyx bracts 0.6–1.5 mm wide (vs elliptic to ovate epicalyx bracts 1.3–5.3 mm wide) and from *L. parviflorum* by its broader leaves (20–46 mm wide vs 1.2–9 mm wide) and larger flowers (9.1–14.1 mm long vs 3–3.7(–5) mm long).

**Notes:** *Lasiopetalum ferrugineum* var. *cordatum* (S. Bell s.n. NSW 440805) was collected in a similar locality to *L. prodigiosum* (R.L. Johnstone 3547 & W. Holzinger NSW 879921) in the North Wollemi National Park, indicating that these species may co-occur.

### Key to species allied to *L. prodigiosum*

- 1: Calyx with the inner surface glabrous, except for the stellate hairs confined to the margin and apex of each lobe
- 2: Leaves narrowly ovate to ovate, 25–130 mm long, 10–70 mm wide. Calyx 5.3–10.2 mm long ..... **L. macrophyllum**
- 2: Leaves usually linear, sometimes narrowly oblong to very narrowly elliptic, 30–70 mm long, 1.2–9 mm wide. Calyx 3–3.7(–5) mm long ..... **L. parviflorum**
- 1: Calyx with the inner surface covered in stellate hairs throughout
- 3: Leaves linear, narrowly oblong or very narrowly ovate, 1–6(–10) mm wide. Inflorescence a loose monochasium or rarely a dichasium
- 4: Inflorescence with 2–3(–5) flowers; calyx 4–7.5 mm long, with calyx lobes 4.4–5.4 mm wide ..... **L. rufum**
- 4: Inflorescence with 3–5(8) flower. Calyx (6.3–)9–12.2 mm long, with calyx lobes 8–8.3 mm wide .... **L. joyceae**
- 3: Leaves narrowly elliptic, narrowly oblong, narrowly ovate to ovate, 7–51 mm wide. Inflorescence a moderately loose to compact dichasium
- 5: Calyx inner surface with stellate hairs throughout. Ovary outer surface with large, white or golden, appressed stellate hairs over a layer of smaller, brittle, hairs
- 6: Inflorescence a moderately open dichasium with 4–8 flowers. Staminal filaments 2.5–4.8 mm long, anthers 2.5–3.1 mm long; ovary 4.5–4.8 mm long, 4.6–5.5 mm wide ..... **L. prodigiosum**
- 6: Inflorescence a compact (closed) dichasium with 8–10 flowers. Staminal filaments (0.6–)1.1–1.3 mm long, anthers 0.9–1.9(–2.8) mm long; ovary 1.5–2.5 mm long, 2–3.1 mm wide ... **L. ferrugineum** var. **ferrugineum**

- 5: Calyx inner surface with fine glandular hairs intermixed with stellate hairs. Ovary outer surface with small, brittle hairs only ..... **L. ferrugineum** var. **cordatum**

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