

A taxonomic revision of species with a petaloid epicalyx bract allied to *Lasiopetalum bracteatum* (Malvaceae: Byttnerioideae)

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Abstract

Shepherd, K.A. & Wilkins, C.F. A taxonomic revision of species with a petaloid epicalyx bract allied to *Lasiopetalum bracteatum* (Malvaceae: Byttnerioideae). *Nuytsia* 29: 161–179 (2018). This treatment focuses on an informal group of six species where *Lasiopetalum bracteatum* (Endl.) Benth., *L. membranaceum* (Steud.) Benth. and *L. molle* Benth. are revised and lectotypified, an updated description of the Threatened species *L. rotundifolium* Paust is provided, and two new related species of conservation concern, *L. decoratum* K.A.Sheph. & C.F.Wilkins and *L. rupicola* K.A.Sheph. & C.F.Wilkins, are newly described. Images and distribution maps are included.

Introduction

Taxonomic research on the Western Australian species of the genus *Lasiopetalum* Sm. (subf. Byttnerioideae Burnett, Malvaceae) is ongoing (Shepherd & Wilkins 2015, 2017) and the recent publication of an interim key, which includes a number of potentially new but as yet unnamed taxa (Shepherd & Wilkins 2018), highlights more work yet to be done on this charismatic group. This treatment is another in the series, focusing on an informal group allied to *L. bracteatum* (Endl.) Benth. (the *L. bracteatum* group), characterised by fan-shaped hairs along most of the length of the style and a large, petaloid epicalyx bract usually positioned some distance from the base of the calyx. Updated descriptions are provided for *L. bracteatum*, *L. membranaceum* (Steud.) Benth., *L. molle* Benth. and *L. rotundifolium* Paust, and two new species are described herein as *L. decoratum* K.A.Sheph. & C.F.Wilkins and *L. rupicola* K.A.Sheph. & C.F.Wilkins. These species were respectively known under the informal phrase names *L. sp.* Badgingarra (E.A. Griffin 5278) and *L. sp.* Hill River (T.N. Stoate 5) and both are listed as taxa of conservation concern. As *L. rupicola* is currently only known from a single population on private property it may warrant recognition as a Threatened species.

Methods

This study was based on the examination of field collections, spirit material and herbarium specimens lodged at PERTH or loaned from other Australian institutions. The description of the indumentum and density of hairs follows Shepherd and Wilkins (2017). Leaf descriptions and measurements are

based on mature leaves unless otherwise stated. Seed measurements are not provided for *L. rupicola* and *L. molle* as only immature seeds were available for examination. Images of type material were viewed via *Global Plants* (<https://plants.jstor.org/>).

Taxonomy

The *L. bracteatum* group can be recognised by the following combination of characters: mature *stems* red-brown, glabrescent; *leaves* narrowly ovate to broadly ovate, or orbicular, with the base slightly to deeply cordate; *stipules* absent; *inflorescence* a dichasial cyme; *epicalyx bract* single, stalked, petaloid, ovate, usually distant from the flower-base (Figure 1C); *calyx* pink-mauve, without prominent ribs, usually with the inner base dark red or dark red and green; *petals* absent, *staminal* tube and *staminodes* absent; *anthers* 5, deep red, ovate with an obtuse apex, glabrous, with introrse dehiscence of white pollen from apical pores; *style* filiform with dense, white, reflexed, fan-shaped, stellate hairs along most of its length; *ovary* 3-carpellate with 2 ovules per carpel; *fruit* a loculicidal capsule.

For a key to the species in the *L. bracteatum* group see Shepherd and Wilkins (2018).

Lasiopetalum bracteatum (Endl.) Benth., *Fl. Austral.* 1: 266 (1863). *Corethrostylis bracteata* Endl. *Nov. Stirp.* Dec. 1: 1 (1839). *Type citation*: ‘Crescit in Novae-Hollandiae austro-occidentalis interioribus. (Röe.) Colitur in horto Hügeliiano.’ *Type specimen*: ‘Hugel [Hügel] n. 71. Baron Hugel cult[ivated] in Vienna from Swan River [Western Australia]’ (*lecto*, here designated: K 000686561! [right hand specimen]).

Corethrostylis coriacea Steud. in Lehmann, J.G.C. (ed.) *Pl. Preiss.* 1(2): 236 (1845). *Type citation*: ‘In N. Holl. austr. occ. Herb. Preiss. No. 1637.’ *Type specimen*: ‘In Australia occidentale’ [Western Australia], *L. Preiss* 1637 (*lecto*, here designated: LD 1241773!).

Erect, spreading *shrub* 0.6–1.5 m high, 0.4–1 m wide. *Young stems* with a dense indumentum of scattered to moderately dense stalked (to 0.7 mm long) stellate hairs with *c.* 12 arms, each to 1.5 mm long, over moderately dense to dense sessile stellate hairs with *c.* 8 arms, each to 0.2 mm long, with or without moderately dense red-tipped glandular hairs to 0.3 mm long. *Petioles* (4.3–)6–13(–18) mm long, indumentum as for young stems. *Leaves* pliable, ovate, moderately discolorous, (8–)19–45(–66) mm long, (8–)11–30(–46) mm wide, base slightly cordate, apex acute; margins entire to sinuate, scarcely to moderately recurved; abaxial surface with occasional to scattered stalked (*c.* 0.7 mm long) stellate hairs with 6–10 arms, each to 0.8 mm long, over moderately dense to dense stellate hairs with *c.* 8 arms, each 0.3–0.5 mm long, glandular hairs absent; adaxial surface smooth with scattered to moderately dense sessile or occasionally stalked (to 0.7 mm long) stellate hairs with *c.* 6–12 arms, each to 0.5 mm long, glandular hairs absent, glabrescent (sometimes with hair stalks remaining). *Inflorescence* a loose dichasium (often flexuose), 46–80(–98) mm long, with 8–22 flowers. *Peduncles* 10–37(–47) mm long with occasional stalked (to 0.5 mm long) stellate hairs with *c.* 8 arms, each to 1.3 mm long, over moderately dense stellate hairs with *c.* 12 arms, each to 0.15 mm long, and moderately dense red-tipped glandular hairs to 0.7 mm long. *Pedicels* 4.1–7(–9) mm long, indumentum as for peduncles but without the scattered large stellate hairs. *Bract* narrowly elliptic, 2.3–7.2(–12.3) mm long, 0.3–2.6(–5) mm wide. *Epicalyx bract* attachment usually mid-way or towards the pedicel base *c.* 4 mm below the calyx, with a dark pink stalk to 0.3 mm long, blade ovate, mauvish pink, 4–8 mm long, 2–5.8 mm wide; abaxial surface and margin with scattered stalked stellate hairs with *c.* 8 arms, each to 0.3 mm long, with or without occasional glandular hairs to 0.2 mm long; adaxial surface with scattered sessile stellate hairs with *c.* 4–6 arms, each to

0.2 mm long, and occasional glandular hairs to 0.2 mm long towards the base. *Calyx* bright pink to mauvish pink, base dark red without green markings, 4.8–8.3 mm long, with a tube 0.6–1.4 mm long; lobes narrowly ovate, 3.7–7.1 mm long, 2.3–3 mm wide; outer surface with moderately dense white stellate hairs with 8–10 arms, each to 0.2 mm long and moderately dense to dense red-tipped glandular hairs *c.* 1.1 mm long towards the lower 1/3, 0.2 mm long for the remainder; inner surface glabrous towards the base with moderately dense simple hairs or stellate hairs with 1–6 arms, each to 0.15 mm long, towards the apex, glandular hairs absent. *Staminal filaments* 0.4–0.6 mm long. *Anthers* 1.5–1.6 mm long, 0.7–0.9 mm wide. *Ovary* 0.9–1 mm long, 0.9–1 mm wide; outer surface tomentose with stellate hairs to 0.2 mm long, with or without inconspicuous glandular hairs to 0.2 mm long. *Style* 3–4.1 mm long. *Fruit* ellipsoid, 4.1–4.5 mm long, *c.* 3.5 mm wide, with residual moderately dense stellate hairs and scattered glandular hairs to 0.2 mm long. *Seed* ellipsoid, dull blackish tan with small black spots, 2.2–2.4 mm long, 1.4–1.7 mm wide, with moderately dense or occasional stellate hairs; aril a whitish cream cap with 2 long and 3 short arms to mid-length of seed, *c.* 1.5 mm long, *c.* 1.3 mm wide. (Figure 1)

Diagnostic features. Readily distinguished from morphologically allied species by a combination of the following characters: plant aromatic; leaves pliable, ovate, base slightly cordate, apex acute, adaxial surface smooth, both surfaces with a mix of scattered large stellate hairs and moderate to dense small stellate hairs; inflorescence a loose (often flexuose) dichasium up to 98 mm long with 8–22 flowers, peduncles 10–37(–47) mm long.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 27 Oct. 1992, *P. Armstrong* PGA 92004 (PERTH); 14 Jan. 1993, *P. Armstrong* PGA 93002 (PERTH); Oct. 1994, *M. Aylward s.n.* (MEL, PERTH 05466873); 17 Oct. 1978, *R.J. Cranfield* 859 (PERTH); 18 Nov. 1988, *R.J. Cranfield* 7618 (PERTH); 26 Feb. 2009, *A. Crawford* ADC 1986 (K, PERTH); 3 Oct. 1997, *M. Hislop & B.A. Fuhrer* MH 947 (PERTH); 1 Oct. 1999, *F. Hort* 684 (CANB, PERTH); 6 Nov. 2006, *F. Hort* 2932 (AD, CANB, PERTH); 23 Nov. 2010, *F. Hort* 3675 (NSW, PERTH); 28 Sep. 1991, *G.J. Keighery* 13183 (PERTH); 9 Oct. 2005, *B. Koch* BK 10 (PERTH); 6 Nov. 2000, *K. Macey* 274 (PERTH); 26 Nov. 1996, *A. Markey* 752 (PERTH); 8 Oct. 1996, *A. Markey* 1205 (PERTH); 14 Sep. 1992, *S. Patrick* 1210 (PERTH); 1 Oct. 1992, *S. Patrick* SP 1292 A (PERTH); 11 Oct. 2016, *K.A. Shepherd & C.F. Wilkins* KS 1631 (PERTH); Oct. 1959, *L. Steenbohm* 2323 (PERTH); 28 Oct. 1986, *A. Taylor s.n.* (PERTH); 5 Dec. 2004, *C.F. Wilkins* 2098 (PERTH).

Phenology. Flowering observed through spring to early summer from September to November. Fruiting from early summer.

Distribution and habitat. Jarrah Forest and Swan Coastal Plain bioregions of the South West Botanical Province, found on the Darling Scarp east of Perth from Mundaring to Lesmurdie, in the Canning River catchment, and further south in the Dryandra Woodland (Figure 2). This species grows in orange clay-loam or yellow-brown to brown loamy-sand with laterite, often over granite. Plants are frequently found growing in or near creek lines or along the edge of sheet granite in open jarrah and marri forest or woodland over dense heath.

Conservation status. This species is listed by Smith and Jones (2018) as Priority Four under Conservation Codes for Western Australian Flora. While a few populations do occur within the conservation estate, a number of collections are situated near urban areas. These populations in particular may be vulnerable to ongoing development, increased fire frequency and dense weed infestations, and as such, further survey is required to confirm their current status.



Figure 1. *Lasiopetalum bracteatum*. A – habit; B – ovate leaves with a scarcely cordate base and scattered stellate hairs on the adaxial surface; C – a loose dichasial inflorescence covered in stellate hairs and red-tipped glandular hairs with narrowly elliptic bracts (black arrow) and ovate, petaloid epicalyx bracts (white arrow) positioned some distance from the base of the pink flowers. Unvouchered specimens from near Lesmurdie Falls, Lesmurdie. Photographs by K.A. Shepherd.

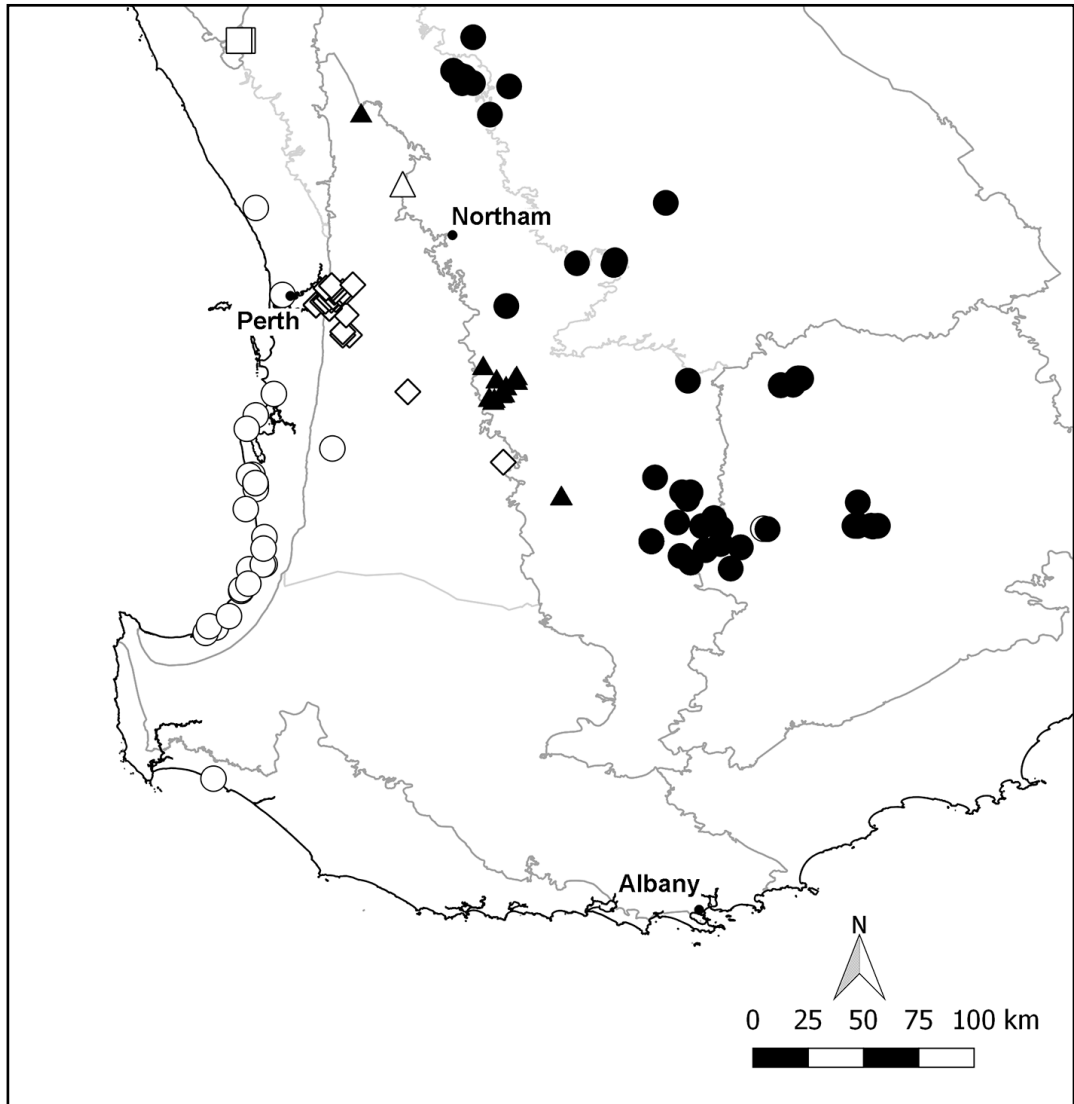


Figure 2. Distribution map of *Lasiopetalum bracteatum* (◇), *L. decoratum* (△), *L. membranaceum* (○), *L. molle* (●), *L. rotundifolium* (▲) and *L. rupicola* (□) in Western Australia, with IBRA regions (Department of the Environment 2013) in grey and subregions in pale grey.

Affinities. *Lasiopetalum bracteatum* is most similar to *L. membranaceum* as both species have pliable, ovate leaves, but it is distinct in being aromatic, the leaves having scattered large stellate hairs and moderate to dense small stellate hairs below (*cf.* scattered to moderately dense large stellate hairs only), and the flowers being bright pink to mauve-pink and dark red at the very base of each calyx lobe (*cf.* mauvish pink calyx with dark red along the centre and base of each lobe) (Figure 1).

Typification. The Hügel specimen on the top right hand side of sheet K 000686561 is a relatively small fragment with a few leaves and two young inflorescences; however, it is still a good match for the protologue. The label on the sheet states the material was cultivated in Hügel's garden in Vienna. There is no indication that this material originally came from J.S. Roe as stated in the type citation. While the type citation refers to a Roe collection from the 'interior of south

western Australia' *L. bracteatum* is generally confined to creek lines on the Darling Scarp just east of Perth, although it has also been collected from Dryandra Woodland to the south. Roe and Hügel did visit the 'upper Swan River', presumably where *L. bracteatum* typically grows, in early December 1833 [incorrectly stated as 1883 in George 2009: 533]. Roe also supplied Hügel with duplicates of his specimens before he left the Swan River Colony (Hercock 2014) but no Roe collections of *L. bracteatum* have been found to date. The two left hand specimens (K 000686560!) on the same sheet are Drummond n. 65 collections, which were cited by Bentham in his *Flora Australiensis* treatment but do not constitute type material.

Corethrostylis coriacea was regarded by Steudel (1845) as having the same bracts as Endlicher's *C. bracteata* and indeed Bentham (1863) treated this species as a synonym of *L. bracteatum*. The Preiss 1637 collection housed at LD is a relatively small fragment and while there is a possibility of further type material being located, this specimen is readily identified as *L. bracteatum* and matches Steudel's brief description in *Plantae Preissianae*. As such it is designated here as the lectotype for *C. coriacea*.

Lasiopetalum decoratum K.A.Sheph. & C.F.Wilkins, *sp. nov.*

Type: Toodyay, Western Australia [precise locality withheld for conservation reasons], 7 November 2006, *F. Hort* 2926 (*holo:* PERTH 07485980; *iso:* AD, CANB, K, MEL, NSW).

Lasiopetalum sp. Badgingarra (E.A. Griffin 5278), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au> [accessed 30 January 2018].

Lasiopetalum molle subsp. *boothendarrense* E.M.Benn. & K.Shepherd ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 30 January 2018]; G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 543 (2000), *nom. inval.*

Erect or spreading *subshrub* or *shrub* (0.2–)0.6–1.5(–2) m high, 0.5–1.7 m wide. *Young stems* tomentose, with scattered sessile or stalked (*c.* 0.5 mm long) stellate hairs with 10–15 arms, each to 0.6–0.8 mm long, over dense sessile stellate hairs with *c.* 12 arms, each to 0.6 mm long, and scattered to dense red-tipped glandular hairs to 1.3 mm long. *Petioles* (5–)9–17 mm long, indumentum as for young stems. *Leaves* thick, stiff, ovate to broadly ovate, rarely scarcely trilobed, discolorous, (5.4–)16.5–28.3 mm long, (7–)14.2–22 mm wide, base slightly cordate, apex acute or rounded-acute; margins entire to sinuate, moderately recurved; abaxial surface densely hairy to tomentose with moderately dense sessile stellate hairs with *c.* 15 arms, each to 0.3 mm long, and with scattered glandular hairs to 0.8 mm long on rib; adaxial surface scarcely rugose, new growth with scattered to moderately dense stalked (*c.* 0.2 mm long) stellate hairs with *c.* 10 arms, each to 0.4 mm long, and scattered glandular hairs to 1 mm long, glabrescent with residual hair stalks. *Inflorescence* a loose dichasium, (21–)35–74 mm long, with 6–12(–18) flowers. *Peduncles* 9.7–17.1 mm long, densely hairy with or without scattered stalked (*c.* 0.15 mm long) stellate hairs with *c.* 12 arms, each to 0.5 mm long, over stellate hairs with *c.* 12 arms, each to 0.4 mm long, and scattered to dense red-tipped glandular hairs, 0.4–1.5 mm long. *Pedicels* 6.2–8.2 mm long, indumentum as for peduncles. *Bract* elliptic, 1.7–4 mm long, 0.8–2.5 mm wide. *Epicalyx bract* attachment on mid- to lower pedicel, 3–5 mm below the calyx, with a dark pink stalk 0.4–1 mm long, blade ovate, mauvish pink, 4.5–8 mm long, 3–7 mm wide; abaxial surface with scattered stalked (to 0.5 mm long), stellate hairs with *c.* 12 arms, each to 0.3 mm long, over scattered stellate hairs with *c.* 12 arms, each to 0.3 mm long, and scattered

glandular hairs to 1 mm long; adaxial surface with scattered stellate hairs with *c.* 6 arms, each to 0.3 mm long, with scattered glandular hairs to 0.3 mm long towards the base. *Calyx* mauvish pink, base dark red without green markings, 5–8.3 mm long, with a tube 1–1.8 mm long; lobes narrowly ovate, spreading to reflexed at peak flowering, 3.7–6.5 mm long, 1.3–2.1 mm wide; outer surface with moderately dense to dense stellate hairs with *c.* 12 arms, each to 0.3 mm long, with dense red-tipped glandular hairs to 1.5(–2.5) mm long towards the lower 1/3 and to 0.4 mm long for the remainder; inner surface glabrous at base with scattered to moderately dense white simple hairs or stellate hairs with 2–6 arms, each to 0.2 mm long, towards the apex, glandular hairs absent. *Staminal filaments* 0.3–0.4 mm long. *Anthers* 0.8–1.5 mm long, 0.5–0.8 mm wide. *Ovary* 0.9–1.5 mm long, 0.9–1.5 mm wide; outer surface with dense stellate hairs to 0.3 mm long, glandular hairs absent or scattered towards the apex. *Style* 2.7–3.9 mm long. *Fruit* ellipsoid, 2.9–4.5 mm long, 2.9–4.5 mm wide with dense stellate hairs and scattered inconspicuous glandular hairs 0.3 mm long towards the apex. *Seed* ellipsoid, dull blackish brown with few stellate hairs, *c.* 2 mm long, *c.* 1 mm wide; aril a cream cap with 2 arms as long as the seed and 3 shorter arms, *c.* 2.7 mm long, *c.* 1 mm wide. (Figure 3)

Diagnostic features. The following combination of features differentiates *L. decoratum* from related species in the *L. bracteatum* group: leaves thick and stiff, ovate to broadly ovate and densely hairy to tomentose below; inflorescence a loose dichasium with 6–12(–18) flowers; calyx lobes narrow (1.3–2.1 mm wide) with long glands up to 2.5 mm long on the outer surface.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 3 Dec. 2008, *A. Crawford* 1905 (PERTH); 25 Sep. 1988, *E.A. Griffin* 5278 (PERTH); 5 Dec. 1992, *E.A. Griffin* 8239 (PERTH); 16 Mar. 2006, *F. Hort* 2992 (K, PERTH); 8 Oct. 1991, *S. Patrick* SP 888 (PERTH); 6 Aug. 1992, *S. Patrick* SP 1161 (PERTH); 21 Nov. 2002, *S. Patrick* & *G. Paczkowska* PS 4550 (PERTH).

Phenology. Flowering begins in spring and extends through to summer from August to December. Fruits form through early summer from November and December.

Distribution and habitat. From the southern margin of the Geraldton Sandplains and eastern edge of the Jarrah Forest bioregions, north of Badgingarra and near Toodyay (Figure 2). This species is found in the gullies and slopes of breakaways in grey, brown or brown-yellow, loamy sand and lateritic gravel and boulders, growing in Mallee over heath, or low woodlands of *Eucalyptus accedens* or *Xylomelum* and *Banksia*.

Conservation status. This species is currently listed by Smith and Jones (2018) as Priority Two under Conservation Codes for Western Australian Flora, under the name *L. sp.* Badgingarra (*E.A. Griffin* 5278). While this species has a relatively restricted distribution, the three known populations occur within the conservation estate.

Etymology. The epithet is from the Latin *decoratum* (decorate), and refers to the attractiveness of this species with its prolific pink flowers and showy pink epicalyx bracts.

Affinities. *Lasiopetalum decoratum* is similar to *L. molle* in having ovate, thick, stiff leaves that are somewhat rugose with densely hairy to tomentose stellate hairs on the abaxial surface; however, it differs in having recurved rather than strongly revolute leaf margins, a loose inflorescence,



Figure 3. *Lasiopetalum decoratum*. A – habit; B – shrub showing masses of pink flowers with large, petaloid epicalyx bracts and discoloured leaves; C – loose dichasial inflorescences of pink flowers with a deep red base and dense glands on each peduncle, pedicel and outer calyx; D – broadly ovate, rugose, thick and stiff leaves with a slightly cordate base and pink flowers with narrow calyx lobes. Voucher: F. Hort 2926. Images: F. & J. Hort.

flowers with narrower calyx lobes (1.3–2.1 mm wide vs 2–2.6 mm) and a mauvish pink calyx with a dark red base only, as opposed to a pink calyx with the base and the centre of each lobe being dark red to red.

Lasiopetalum membranaceum (Steud.) Benth., *Fl. Austral.* 1: 266 (1863). *Corethrostylis membranacea* Steud. *Pl. Preiss. [J.G.C. Lehmann]* 1(2): 236 (1845). *Type citation*: 'In arenosis colliculosis sylvae ad portum Lechenault, ditionis Wellington, 13. Dec. 1839. Herb. Preiss. No. 1656.' *Type specimen*: Wellington [Western Australia], 13 December 1839, *Preiss* 1656 (*lecto*, here designated: P 02142993 image!; *isolecto*: BR 0000013331498 image!; F1010364 image!; G 00358450 [two specimens] image!; G 00358451 image!; HBG 512352 image!; K 000686558! [right hand specimen]; LD 1418052!; MEL 52357!; MEL 52358!; MEL 52359!; MO 357429 image!; P 02142994 image!; S 12-17746 image!; TCD 0010956 image!; W 310082!; W!).

Erect, spreading *subshrub* or *shrub* (0.2–)0.3–0.5(–1) m high, 0.5–1 m wide. *Young stems* with a dense indumentum of scattered to moderately dense stalked (to 0.6 mm long) stellate hairs with *c.* 12 arms, each to 1.1 mm long, above scattered to moderately dense stellate hairs with *c.* 6 arms, each to 0.4 mm long, and scattered red-tipped glandular hairs to 0.6 mm long. *Petioles* (1.8–)10–20.8 mm long, indumentum as for young stems. *Leaves* pliable, ovate, scarcely discolorous, (8–)19.5–39 mm long, (8–)11–27 mm wide, base slightly to moderately cordate, apex acute or rounded-acute; margins entire to sinuate, slightly to moderately recurved; abaxial surface with scattered to moderately dense stalked (*c.* 0.3 mm long) or sessile stellate hairs with *c.* 10 arms, each to 0.8 mm long, and occasional to scattered glandular hairs to 0.5 mm long; adaxial surface smooth or scarcely rugose with scattered stalked (*c.* 0.3 mm long) stellate hairs with *c.* 10 arms, each to 0.7 mm long, glandular hairs absent, glabrescent. *Inflorescence* a loose dichasium, 38–81 mm long, with 7–14 flowers. *Peduncles* 19–30.6 mm long, with scattered stalked (to 0.4 mm long) stellate hairs with *c.* 8 arms, each to 1.6 mm long, over moderately dense to dense stellate hairs with *c.* 8 arms, each to 0.3 mm long, and moderately dense red-tipped glandular hairs to 0.5 mm long. *Pedicels* 4.2–9.5(–14) mm long, indumentum as for peduncles but without the scattered large stellate hairs. *Bract* narrowly ovate, 2.1–4.3(–7) mm long, 0.6–2(–3) mm wide. *Epicalyx bract* attachment usually mid-pedicel *c.* 4 mm below the calyx, with a dark pink stalk *c.* 0.5 mm long, blade ovate, mauvish pink, 3.2–6.5 mm long, 2.1–4.1 mm wide; abaxial surface and margin with scattered stalked stellate hairs with 10–12 arms, each to 1.3 mm long, and occasional glandular hairs to 0.3 mm long; adaxial surface with moderately dense sessile stellate hairs with 4–6 arms, each to 0.2 mm long, and occasional glandular hairs to 0.3 mm long. *Calyx* mauvish pink, dark red at the base and centre of each lobe, sometimes grading to pale green, 5.3–6.3 mm long, with a tube 1.3–1.4 mm long, lobes narrowly ovate, 4.9–6.5 mm long, 2.3–3.5 mm wide; outer surface with dense to tomentose stellate hairs with 8–10 arms, each to 0.25 mm long and moderately dense to dense red-tipped glandular hairs *c.* 1.1 mm long towards the lower 1/3, *c.* 0.5 mm long for the remainder; inner surface glabrous towards the base, with moderately dense simple or stellate hairs with 1–6 arms, each to 0.2 mm long, towards the apex, glandular hairs absent. *Staminal filaments* 0.5–0.6 mm long. *Anthers* 1.4–1.9 mm long, 0.8–0.9 mm wide. *Ovary* 0.9–1 mm long, 0.9–1 mm wide; outer surface tomentose, with stellate hairs to 0.2 mm long, inconspicuous glandular hairs present or absent. *Style* 2.5–3 mm long. *Fruit* ellipsoid, 3.6–4.5 mm long, 3.3–4 mm wide, with residual dense stellate hairs and scattered glandular hairs to 0.15 mm long. *Seed* dull blackish brown with few stellate hairs, body *c.* 2.5 mm long, 1.7 mm wide; aril a cream cap with 3–5 arms reaching to mid-length of seed, *c.* 1.3 mm long, *c.* 1 mm wide. (Figure 4)

Diagnostic features. *Lasiopetalum membranaceum* may be distinguished from other species in the genus with petaloid epicalyx bracts by the following: pliable ovate leaves with a slightly to moderately cordate base, long petioles (1.8–)10–20.8 mm, and scattered to moderately dense large stellate hairs only on the abaxial surface. The mauvish pink calyx lobes have an acuminate apex and are broad (to 3.5 mm wide). The inner surface of the calyx is also distinctive as the deep red colour at the base extends upwards to more than halfway through the centre of each lobe, sometimes grading to green (Figure 4D).



Figure 4. *Lasiopetalum membranaceum*. A – habit; B – ovate, slightly to moderately cordate leaves with a scarcely rugose surface; C – flower showing the narrowly elliptic, petaloid epicalyx bracts towards the base of each pedicel and splayed calyx lobes with short glandular hairs; D – pink flower showing the deep red colour at the base extending upwards towards the centre of each lobe (sometimes grading to green). Unvouchered specimens from Kings Park. Images: K.A. Shepherd and M. Brotherson.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 24 Oct. 1998, B. Bischoff BNC 829 (PERTH); 4 Dec. 1971, M.L. Cambridge s.n. (PERTH 02704587); 7 Jan. 2009, B. Fellows & J. Waud BCF 82 (K, PERTH); 23 Nov. 1998, S.A. Fisher 315 (PERTH); 19 Mar. 2001, A. Horan s.n. (PERTH 05767563); 19 Oct. 1995, B.J. Keighery 2440 (PERTH); 4 Nov. 1987, G.J. Keighery & J.J. Alford 1604 (PERTH); 5 Dec. 1992, G.J. Keighery 12740 (PERTH); 10 Nov. 1969, V. Mann & A.S. George 42 (PERTH); 14 Feb. 2001, G.S. McCutcheon GSM 3020 (PERTH); 1 Nov. 2005, Wildflower Society of W.A. Paganoni PAG OP/36 (PERTH); 20 Oct. 1972, S. Paust 1366 A (CANB, PERTH); 6 Nov. 2003, C. Smith s.n. (PERTH 06586384); 23 Oct. 1994, C. Tauss s.n. (PERTH 03980820); Nov. 1920, E.H. Wilson & D.A. Herbert s.n. (PERTH 01046101); 8 Dec. 1993, C.F. Wilkins & K.A. Shepherd CW 622 (PERTH); 18 Jan. 1994, C.F. Wilkins & K.A. Shepherd CW 630 (PERTH); 24 Apr. 1994, C.F. & J. Wilkins CW 673 (PERTH); 28 Sep. 2003, C.F., J.A., S.A. Wilkins & S. Blake CW 1778 (PERTH).

Phenology. *Lasiopetalum membranaceum* flowers from mid-spring to summer. Fruits appear in summer from December.

Distribution and habitat. This species is usually found in the Jarrah Forest, Swan Coastal Plain and Warren bioregions of the South West Botanical Province in white or grey sand over limestone associated with *Eucalyptus gomphocephala*, *E. marginata*, *Banksia* or *Allocasuarina* woodlands. It is naturally occurring in Kings Park and extends southwards along the coast to near Black Point east of Augusta (Figure 2). An outlying collection currently determined as *L. membranaceum* was made near Tarin Rock in the Mallee bioregion. This collection was recorded as growing on grey sand over laterite associated with *Allocasuarina*, *Grevillea* and *Chamelaucium* shrubland. Further collections are required from this location to confirm the taxonomic status of this population.

Conservation status. This species is currently listed by Smith and Jones (2018) as Priority Three under Conservation Codes for Western Australian Flora. While *L. membranaceum* has historically been found at a number of sites in the Swan Coastal Plain south of the city of Perth, populations are in close proximity to urban regions and may be subject to increasing pressure from development, fire frequency and encroachment of weeds. More field work is required to determine the health of populations across the known distribution of this species, particularly on the Swan Coastal Plain.

Affinities. See notes under *L. bracteatum*.

Typification. The P 02142993 Preiss 1656 specimen at the Museum National d'Histoire Naturelle is designated herein as the lectotype. This sheet comprised part of Steudel's own herbarium indicated by the left hand label bearing the distinctive red 'Herbarium Steudel' annotation at the top, with notes in handwriting that is comparable to the examples given in Cloike (1964, Plate 11: 2 & 3).

The specimen on the left hand side of the K 000686558 isolectotype is a Drummond 155 collection (K 000686559) and is not considered to be type material.

Lasiopetalum molle Benth., *Fl. Austral.* 1: 266 (1863). *Type citation:* 'Drummond, n. 26 and 108'. *Type specimens:* Swan R[iver, Western Australia, 1842], *J. Drummond* 2: 26 (*lecto*, here designated: K 000686068!; *isolecto*: G 00358452 image!; G 00358453 image!; K 000686065! [left hand specimen 'a']; LD 1615045!; P 02142991 image!); Swan R[iver, Western Australia], *J. Drummond* 3: 108 (*syn*: E 00279385 image!; G 00358454 image!; G 00358455 image!; G 00358456 image!; K 000686064! [right hand specimen]; K 000686066!; P02142992 image!; TCD 0010946 [left hand specimen] image!).

Erect or spreading *subshrub* or *shrub* (0.2–)0.3–1.5(–2) m high, 0.5–1.7 m wide. *Young stems* with a dense to tomentose indumentum of moderately dense sessile or stalked (*c.* 0.15 mm long) stellate hairs with 8–10 arms, each to 0.3 mm long, over moderately dense stellate hairs with *c.* 6 arms, each to 0.25 mm long, and occasional red-tipped glandular hairs to 0.4 mm long. *Petioles* (2.8–)3.8–8.2(–15) mm long, indumentum as for young stems. *Leaves* thick and stiff, narrowly ovate to ovate, strongly discolourous, (5–)14–24.3(–39) mm long, (3–)6.7–12(–25) mm wide, base slightly cordate, apex acute or rounded-acute; margins entire to sinuate, strongly recurved to inrolled; abaxial surface tomentose, with scattered stalked (*c.* 0.2 mm long) stellate hairs on veins with *c.* 14 arms, each to 0.3 mm long, over stellate hairs with *c.* 12 arms, each to 0.3 mm long, and glandular hairs to 0.25 mm long present or absent on rib; adaxial surface rugose, new growth with dense stalked (to 0.25 mm long) stellate hairs with *c.* 12 arms, each to 0.3 mm long, with scattered glandular hairs to 0.2 mm long, glabrescent with residual glandular hairs and hair stalks. *Inflorescence* a compact dichasium, 19–50 mm long, with (7–)9–11(–18) flowers. *Peduncles* 8–14.3 mm long, with dense sessile or occasionally stalked (*c.* 0.15 mm long) stellate hairs with 12–16 arms, each to 0.35 mm long, and occasional to moderately dense red-tipped glandular hairs to 0.6 mm long. *Pedicels* 1.8–5.3 mm long, indumentum as for

peduncles. *Bract* elliptic, narrowly ovate or ovate, 1.2–2.7(–4.3) mm long, 0.3–0.7(–1.6) mm wide. *Epicalyx bract* attachment towards the upper pedicel, 0.5–1.3 mm below the calyx, with a dark pink stalk 0.5–1 mm long, blade ovate, mauvish pink, 4.5–6.6 mm long, 3.1–5.2 mm wide; abaxial surface with dense stellate hairs with *c.* 12 arms, each to 0.4 mm long, with scattered glandular hairs to 0.4 mm long; adaxial surface with moderately dense stellate hairs with *c.* 4–6 arms, each to 0.2 mm long, and scattered glandular hairs to 0.25 mm long. *Calyx* mauvish pink to pale pink, base and central lobe dark red, rarely with green and dark red markings, 5.8–7.5 mm long with a tube 0.5–1.2 mm long; lobes narrowly ovate, 4.8–6.5 mm long, 2–2.6 mm wide; outer surface with dense stellate hairs with *c.* 12 arms, each to 0.6 mm long, and moderately dense red-tipped glandular hairs to 1.8 mm long towards the lower 1/3, *c.* 0.4 mm long for the remainder; inner surface with glabrous base and scattered to moderately dense simple or stellate hairs with 2–6 arms, each to 0.2 mm long, towards the apex, glandular hairs absent. *Staminal filaments* 0.5–0.8 mm long. *Anthers* 1.7–2 mm long, 0.6–1 mm wide. *Ovary* 0.5–1 mm long, 0.5–1 mm wide; outer surface with dense stellate hairs to 0.3 mm long, glandular hairs absent. *Style* 3.3–3.9 mm long. *Fruit* ellipsoid, *c.* 4 mm long, *c.* 4 mm wide, with residual stellate hairs, glandular hairs absent. *Seed* dull blackish brown with occasional stellate hairs, aril a cap with 2 long arms almost to full length of seed and 4 shorter arms. (Figure 5)

Diagnostic features. *Lasiopetalum molle* is distinguished from allied species in the *L. bracteatum* group by the following combination of characters: leaves thick and stiff, narrowly ovate to ovate with strongly recurved to inrolled margins, rugose above (Figure 5C) and with a tomentose indumentum of stellate hairs below; inflorescences compact, comprising mauvish pink to pale pink flowers with broad calyx lobes 2–2.6 mm wide with a dark red base that extends up the centre of each lobe (Figure 5D).

Selected specimens examined. WESTERN AUSTRALIA: *c.* 22 km W of Newdegate on road to Lake Grace, 1 Sep. 1990, *D.E. Albrecht & B.A. Fuhrer* DEA 4120 (CANB, MEL, PERTH); Tarin Rock, 7 Sep. 1966, *A.M. Ashby* 1952 (PERTH); 33 miles W of Lake Grace, 28 Aug. 1968, *E.M. Bennett* 2276 (BRI, CANB, K, PERTH); Dilling Railway Rd, 6 km from Corrigin, 6 May 1997, *R. Davis* 3122 (PERTH); junction of Higginson Rd and Deep Well Rd *c.* 15 km N of Kellerberrin, 12 Oct. 2000, *R. Davis* WW 17-53 (PERTH); *c.* 7–9 km E of Dumbleyung on Wagin to Lake Grace Rd, 17 Sep. 1984, *D.B. Foreman* 748 (BRI, K, MEL, PERTH); E Bending Reserve Rd, 26 Aug. 2001, *J.P. Francis* 61 (PERTH); 0.05 km E of Burngup South Rd on southern boundary of South Buniche NR, 2 Feb. 1998, *M.S. Graham* MSG 938 (PERTH); southern end of bush remnant on Konnongorring – Dowerin Rd *c.* 7 km E of Konnongorring, 13 Sep. 2005, *M. Hislop* 3512 (AD, PERTH); on the northern boundary of Water Reserve 16418, 1.3 km W of Craig Rd junction, *c.* 4 km NW of Wongan Hills, 18 Sep. 1998, *G.J. Keighery & N. Gibson* 5956 (PERTH); 32 km S of Pithara to Wongan Hills, 23 Aug. 1973, *B.R. Maslin* 3377 (CANB, PERTH); 17.5 km E Lake Grace to Newdegate, 28 Aug. 1973, *B.R. Maslin* 3426 (AD, PERTH); Wyalgima Hill *c.* 11 km N of Beverley, 15 July 1999, *L.W. Sage, J.P. & E.B. Pigott* LWS 1551 (PERTH); Burngup Water Reserve, Solomko Rd, 50 m N Mallet Ridge, 18 Sep. 1996, *M. & J. Stewart* 14 (CANB, NSW, PERTH); Gardner Reserve, S of Tammin, 25 Nov. 1994, *K.A. Shepherd & C.F. Wilkins* KS 144 (PERTH); 25.7 km E Lake Grace toward Newdegate, 9 Sep. 1994, *K.A. Shepherd, J.A. Chappill & J.A. Wege* KS 76 (PERTH); E of Dumbleyung on Lake Grace Rd, 23 Nov. 1993, *C.F. Wilkins* CW 369 (PERTH); Wongan to Pithara Rd, 11 Sep. 2003, *C.F. Wilkins & J.A. Wege* CW 1707 (PERTH); 600 m from Quairading to Cunderdin Rd along a breakaway, 9 Oct. 2004, *C.F. & J.A. Wilkins* CW 1968 (MEL, PERTH).

Phenology. Winter and spring flowering from June to October. Fruiting from early to mid-summer.

Distribution and habitat. From Wongan Hills to Newdegate in the Avon Wheatbelt and Mallee bioregions of the South West Botanical Province in Western Australia (Figure 2). This species grows in



Figure 5. *Lasiopetalum molle*. A – habitat; B – habit; C – dichasial inflorescence and narrowly ovate, thick and stiff leaves with a slightly to moderately cordate base and slightly rugose surface with scattered residual hair stalks; D – pale pink flowers covered in stellate and glandular hairs with broadly ovate, pale pink, petaloid epicalyx bracts (black arrow) and pale pink calyx lobes with a deep red base and centre. Voucher: K.A. Shepherd & C.F. Wilkins KS 1612. Images: K.A. Shepherd.

open mallee woodland with scrub or heath, often on breakaways of lateritic ridges or in creek beds, in yellow, yellow to red-brown, grey or white sandy clay or sand, mainly with lateritic gravel over granite.

Conservation status. This species is relatively widespread and not considered to be under threat at this time.

Affinities. See notes under *L. decoratum*.

Typification. Bentham had access to material from various herbaria while compiling *Flora Australiensis*. His own herbarium included, in part, specimens from Hooker's Herbarium now housed at Kew. Both Drummond's '26' gathering from his second series and the '108' gathering from his third series match the protologue, with many of the duplicates being of reasonable quality. The K 000686068 specimen is a good match for the protologue and is the only sheet of the *Drummond 2: 26* collections seen to date that bears the Herbarium Hookerianum stamp and as such is selected as the lectotype. On the K 000686064 sheet (*Drummond 108*, Herbarium Hookerianum) only the right hand fragment is *L. molle*; the two left hand fragments are *L. rotundifolium*.

Lasiopetalum rotundifolium Paust, *Nuytsia* 1(4): 356, Figures 6, 12 (1974). *Type*: 5–6 miles south of New Norcia, Western Australia, 1 October 1947, C.A. Gardner 8690 (*holo*: PERTH 1096338!; *iso*: CANB *n.v.*, K 000749705!).

Erect to spreading *subshrub* or *shrub* 0.5–1.5 m high, 0.6–0.8 m wide. *Young stems* with a tomentose indumentum of scattered to moderately dense stalked (to 0.8 mm long) or sessile stellate hairs with *c.* 12 arms, each to 1.2 mm long, over dense sessile stellate hairs with *c.* 12 arms, each to 0.4 mm long, with or without scattered glandular hairs to 0.7 mm long. *Petioles* 2.4–4.5(–9) mm long, indumentum as for young stems. *Leaves* thick and stiff, orbicular, discolorous, 6–24 mm long, 6–23.8 mm wide, base deeply cordate, apex rounded, rarely rounded-acute; margins irregularly sinuate, strongly recurved; abaxial surface tomentose, with scattered stalked (to 0.6 mm long) stellate hairs with *c.* 12 arms, each to 1.1 mm long, above dense sessile stellate hairs with *c.* 12 arms, each to 0.4 mm long, and scattered glandular hairs to 0.4 mm long on rib; adaxial surface rugose, new growth with dense stalked (*c.* 0.3 mm long) stellate hairs with *c.* 16 arms, each to 0.6 mm long, over stellate hairs and scattered glandular hairs to 0.4 mm long, glabrescent with residual glandular hairs and hair stalks. *Inflorescence* a compact dichasium, 26–42 mm long, with 9–14(–16) flowers. *Peduncles* 8.5–15 mm long, with dense sessile or occasionally stalked (to 0.7 mm long) stellate hairs with *c.* 12 arms, each to 0.5 mm long, with scattered red-tipped glandular hairs to 0.7 mm long. *Pedicels* 3.1–6 mm long, indumentum as for peduncles except for moderately dense rather than scattered glandular hairs. *Bract* ovate to narrowly elliptic, 3.5–5 mm long, 0.7–2.8 mm wide. *Epicalyx bract* attachment mid to upper pedicel *c.* 2 mm below the calyx, with a dark pink stalk to 0.3 mm long, blade ovate, mauvish pink, 3.6–11 mm long, 3–8.8 mm wide; abaxial surface with dense stellate hairs with *c.* 12 arms, each to 0.7 mm long, with or without scattered glandular hairs; adaxial surface with dense stellate hairs with *c.* 6 arms, each to 0.3 mm long, with or without scattered glandular hairs to 0.25 mm long. *Calyx* mauvish pink, green at the base and centre of lobe with a dark red patch in the middle, 6.3–8.5 mm long with a tube 0.8–1.2 mm long; lobes narrowly ovate, 5.1–6.5 mm long, 1.3–2.7 mm wide; outer surface with dense sessile stellate hairs with *c.* 12 arms, each to 0.3 mm long and moderately dense red-tipped glandular hairs *c.* 2.3 mm long towards the lower 1/3, *c.* 0.4 mm long for the remainder; inner surface glabrous at base, with moderately dense simple or stellate hairs with 1–6 arms, each to 0.2 mm long, at the centre and apex, glandular hairs absent. *Staminal filaments* 0.4–0.6 mm long. *Anthers* 1.7–1.8 mm long, 0.6–1.2 mm wide. *Ovary* 1–1.1 mm long, 1–1.1 mm wide; outer surface with dense stellate hairs to 0.25 mm long, glandular hairs absent. *Style* 2.9–4.1 mm long. *Fruit* ellipsoid, 3.5–4 mm long, 3–3.5 mm wide, with residual dense stellate hairs, glandular hairs absent. *Seed* dull blackish brown with few to moderately dense white stellate hairs, 1.8–2.3 mm long, 1–1.1 mm wide, aril a cream cap with 1 arm almost length of seed and 2 or 3 shorter arms, *c.* 2 mm long, *c.* 1 mm wide. (Figure 6)

Diagnostic features. *Lasiopetalum rotundifolium* is readily identified within the genus by its orbicular leaves, which are discolorous, thick and stiff, with a deeply cordate base and tomentose indumentum on the abaxial surface. The inflorescence is a compact dichasium 26–42 mm long of mauve-pink flowers that are green at the base and along the central lobe with a dark red patch in the middle (Figure 6D).

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 12 Oct. 1999, D. Box 272 (PERTH); 19 Nov. 1998, J.A. Cochrane JAC 3012 (PERTH); 8 May 1997, R. Davis 3185 (PERTH); 13 Dec. 2007, T. Erickson & T. Clifton TEE 293 (K, PERTH); 29 Sep. 2004, F. & B. Hort & J. Brown 2318 (PERTH); 9 Sep. 1998, K. Kershaw *s.n.* (CANB, DNA, PERTH 05426472); 2 Sep. 1999, K. Kershaw 2012 (AD, MEL, NSW, PERTH); 7 Sep. 1999, K. Kershaw 2015 (K, NSW, PERTH); 30 Sep. 1999, K. Kershaw 2033 (BRI, DNA, HO); 25 Oct. 2002, K. Kershaw & L. Sage KK 2341 (CANB, PERTH); 14 Sep. 1995, J. Page JP 8 (PERTH); 21 Sep. 2016, K.A. Shepherd



Figure 6. *Lasiopetalum rotundifolium*. A – habitat; B – habit; C – orbicular, stiff and discolorous leaves with a deeply cordate base and rounded apex; D – dichasial inflorescence of flowers covered in stellate and glandular hairs, with broadly ovate, pale pink, petaloid epicalyx bracts (white arrow), and pale pink calyx lobes that are green at the base and centre of each lobe with a dark red patch in the middle. Vouchers: *K.A. Shepherd, S. Willis, F. Walmsley & C. Shepherd* KS 1629 (A, C) and *K.A. Shepherd & C.F. Wilkins* KS 1619 (B, D). Images: K.A. Shepherd.

& *C.F. Wilkins* KS 1619 (PERTH); 8 Oct. 2016, *K.A. Shepherd, S.R. Willis, F. Walmsley & C. Shepherd* KS 1629 (CANB, MEL, PERTH); 9 Oct. 2004, *C.F. Wilkins & J.A. Wilkins* CW 1962 (MEL, PERTH).

Phenology. Flowering from spring to early summer and fruiting from early to mid-summer.

Distribution and habitat. *Lasiopetalum rotundifolium* is currently known from only a few populations around Pingelly and Narrogin near the boundary between the Avon Wheatbelt and Jarrah Forest bioregions of the South West Botanical Province (Figure 2). The type collection was made in the 1940s from near New Norcia but there are no extant populations currently recorded from this area.

This species is found on red-brown, lateritic, sandy loam over laterite, in open *Eucalyptus marginata* or *E. accedens* woodlands, over shrubs or heath.

Conservation status. This species was presumed extinct until the authors rediscovered it in 1994. *Lasiopetalum rotundifolium* is currently listed as Threatened in Western Australia under the category of Endangered and therefore considered to be facing a very high risk of extinction (Smith & Jones 2018).

Affinities. *Lasiopetalum rotundifolium* is similar to *L. molle* in having a compact inflorescence and stiff, rugose, leaves. It is readily distinguished from it by the orbicular and deeply cordate leaves (*cf.* ovate or narrowly ovate and slightly cordate), somewhat broader epicalyx bracts 3–8.8 mm wide (*cf.* 3.1–5.2 mm) and the pale pink calyx lobes having a green base with a dark red patch (*cf.* dark red base that extends up the centre of each lobe).

While *L. rupicola* has leaves that are orbicular and deeply cordate like *L. rotundifolium*, they are pliable and scarcely discoloured rather than stiff and discoloured.

Lasiopetalum rupicola K.A. Sheph. & C.F. Wilkins, *sp. nov.*

Type: private property between Cataby and Dandaragan, Western Australia [precise locality withheld for conservation reasons], 22 August 2016, K.A. Shepherd & C.F. Wilkins KS 1595 (*holo:* PERTH 08877866; *iso:* AD, BRI, CANB, MEL, NSW).

Lasiopetalum sp. Hill River (T.N. Stoate 5), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 30 January 2018].

Lasiopetalum miseryense E.M. Benn. & K. Shepherd ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 30 January 2018]; G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 543 (2000), *nom. inval.*

Erect, spreading *subshrub* or *shrub* (0.2–)0.3–1.5(–2) m high, 0.5–1.7 m wide. *Young stems* with a dense indumentum of sessile or occasionally stalked (to 0.7 mm long) stellate hairs with *c.* 12 arms, each to 1.5 mm long, over moderately dense stellate hairs with *c.* 6 arms, each to 0.4 mm long, with scattered to moderately dense red-tipped glandular hairs to 1.3 mm long. *Petioles* 4.1–12.2 mm long, indumentum as for young stems. *Leaves* pliable, orbicular, rarely broadly ovate, scarcely discoloured (5.5–)8–27.3 mm long, (6.5–)9.1–26.4 mm wide, base deeply cordate, apex rounded; margins entire to sinuate, strongly recurved; abaxial surface with scattered to moderately dense sessile or stalked stellate hairs with *c.* 8 arms, each to 0.8 mm long, with or without scattered glandular hairs on the rib to 0.3 mm long; adaxial surface rugose, new growth with moderately dense stalked (*c.* 0.5 mm long) stellate hairs with *c.* 10 arms, each to 0.7 mm long, with scattered glandular hairs to 0.3 mm long towards margins, glabrescent with glandular hairs and hair stalks remaining. *Inflorescence* a loose dichasium, 21–55 mm long, with 6–19 flowers. *Peduncles* 5.5–23.6 mm long, with occasional stalked (*c.* 0.3 mm long) stellate hairs with *c.* 12 arms, each to 0.5 mm long over moderately dense sessile stellate hairs with 6–10 arms, each to 0.3 mm long, with occasional or moderately dense red-tipped glandular hairs to 1.4 mm long. *Pedicels* 3.5–7.7 mm long, indumentum as for peduncles but without large stellate hairs. *Bract* ovate, 2–8 mm long, 1.1–4.9 mm wide. *Epicalyx bract* attachment mid- to lower pedicel, *c.* 2–6 mm below the calyx, with a dark pink stalk *c.* 0.5 mm long, blade ovate, mauvish pink, 4–8 mm long, 2.4–6 mm wide; abaxial surface with dense stalked and sessile stellate hairs with *c.* 8 arms, each to 0.6 mm long, and scattered glandular hairs to 0.5 mm long; adaxial surface

with moderately dense stellate hairs with *c.* 4–6 arms, each to 0.2 mm long, and scattered glandular hairs to 0.6 mm long. *Calyx* mauvish pink, base dark red without green markings, 5.5–6.5 mm long with a tube 0.5–0.7 mm long; lobes very narrowly ovate, 4.8–6 mm long, 1.2–1.3 mm wide; outer surface with dense stellate hairs with *c.* 6 arms, each to 0.3 mm long and moderately dense red-tipped glandular hairs 2.2 mm long towards the lower 1/3, to 0.5 mm long for the remainder; inner surface glabrous at base, with moderately dense simple or stellate hairs with 1–6 arms, each to 0.2 mm long, at centre and apex, glandular hairs absent. *Staminal filaments* 0.5–0.8 mm long. *Anthers* 1.4–1.5 mm long, 0.7–0.8 mm wide. *Ovary* 0.9–1 mm long, 0.9–1 mm wide; outer surface with dense stellate hairs to 0.2 mm long, inconspicuous glandular hairs present or absent. *Style* 2.5–3.3 mm long. *Fruit* ellipsoid, 3.6–4 mm long, 3–3.7 mm wide, with residual small stellate hairs, with or without scattered glandular hairs to 0.15 mm long. *Seed* dull blackish brown with few stellate hairs, aril a cream cap with 3–5 arms to halfway down seed. (Figure 7)

Diagnostic features. *Lasiopetalum rupicola* is a range-restricted species distinguished from other species by its orbicular leaves that are thin and pliable, with a deeply cordate base and scattered to moderately dense stellate hairs on both surfaces. The calyx lobes are also narrow, being 1.2–1.3 mm wide at the widest point.

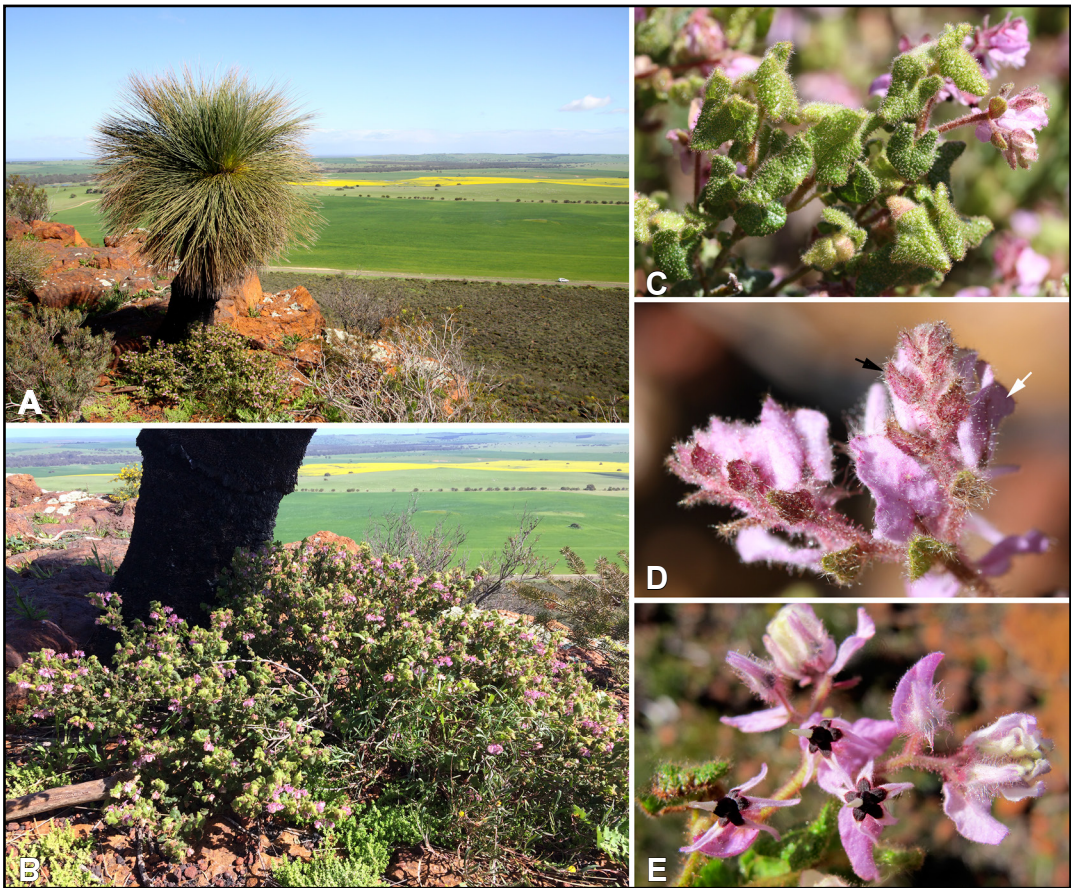


Figure 7. *Lasiopetalum rupicola*. A – habitat; B – habit; C – orbicular to broadly ovate, scarcely discolorous leaves with a rounded apex and deeply cordate base; D – young dichasial inflorescence of pink flowers covered in stellate hairs and long glandular hairs, with ovate, dark pink bracts (black arrow) and broadly ovate, pale pink, petaloid epicalyx bracts (white arrow); E – flowers with narrow, pale pink calyx lobes, each with a deep red base. Voucher: K.A. Shepherd & C.F. Wilkins KS 1595. Images: K.A. Shepherd (A–D) and C.F. Wilkins (E).

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 11 Sep. 1988, *E.A. Griffin* 5051B (PERTH); 20 Sep. 1988, *S.D. Hopper* 6740 (PERTH); 25 Sep. 1991, *S.J. Patrick* SP 815 (PERTH); Oct. 1952, *T.N. Stoate* 5 (PERTH).

Phenology. Flowers and immature fruits observed on specimens collected in spring from September to October.

Distribution and habitat. Found in the Geraldton Sandplains bioregion on a steep hillside and summit of a mesa in brown loam with lateritic gravel and boulders associated with low heath of *Allocasuarina humilis*, *Daviesia*, *Grevillea* and *Hakea* on private property between Cataby and Dandaragan.

Conservation status. This species is currently listed by Smith and Jones (2018) as Priority One under Conservation Codes for Western Australian Flora, under the name *Lasiopetalum* sp. Hill River (T.N. Stoate 5). This species is currently only known from a single population in remnant native vegetation on private property, which is surrounded by cleared farmland. A Threatened species, *Eucalyptus dolorosa* Brooker & Hopper, also occurs in the immediate vicinity. While there have been no surveys in the area targeting *L. rupicola* it is probable that some effort has been undertaken to search for populations of *E. dolorosa*, and as *L. rupicola* is a relatively conspicuous plant (when in flower) one could surmise that it would be collected if observed. Moreover, as this species appears to grow in a very specific habitat it seems the potential for further viable populations to be discovered is relatively low. It is probable that this species will be recognised as Threatened in the future.

Etymology. From the Latin *rupes* (rock) -*cola* (inhabitant) in reference to where this species grows.

Affinities. *Lasiopetalum rupicola* is similar to *L. membranaceum* in having pliable leaves with scattered to moderately dense hairs on both leaf surfaces; however, it can be distinguished from this species as its leaves are orbicular and deeply cordate, rather than ovate with a slightly cordate base. The calyx lobes are also narrower than in *L. membranaceum* (1.2–1.3 mm wide vs 2.3–3.5 mm), there are long glandular hairs at the base of the outer surface of the calyx (to 2.2 mm vs c. 1.1 mm) and the base of the lobes are dark red rather than dark red at the base and centre of each lobe (sometimes grading to pale green) (Figure 7).

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