

## *Lechenaultia peregrina*, a new species of Goodeniaceae from northern Australia, New Guinea and the Moluccas

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### Abstract

Morphological studies of *Lechenaultia filiformis* R.Br. have determined that more than one taxon is presently included under that name. We here recognise the suite of disjunct populations from north-east Queensland, north-east Northern Territory, New Guinea and the Moluccas as a new species, *Lechenaultia peregrina* R.W.Jobson & R.L.Barrett. This is the third tropical species of *Lechenaultia* currently recognised, however further studies are required to assess the status of about five additional entities in the Northern Territory and Western Australia currently included in *L. filiformis* s.l. Seed article morphology is critical for species delimitation in tropical *Lechenaultia*, but seed articles are often absent from collections, or only immature, as they fall quickly once ripe.

### Introduction

*Lechenaultia* R.Br. (Goodeniaceae) is near-endemic to Australia, with twenty one species endemic to southern Western Australia, one in south Australia, four species in central Australia, three species endemic to northern Australia, and one species extending to New Guinea and the Moluccas (Leenhouts 1957; Morrison 1987, 1992; Carolin 2007). The description of *Lechenaultia orchestris* K.A.Sheph. & Hislop (Shepherd and Hislop 2020) and our new species brings the number of named species in the genus to 30. A sister relationship of *Lechenaultia* to a clade that includes *Anthotium* R.Br. and *Dampiera* R.Br. has now been well-established (Gardner *et al.* 2016; Shepherd *et al.* 2020).

*Lechenaultia filiformis* R.Br. is the best known tropical species in the genus, though *L. agrostophylla* F.Muell. (Mueller 1867) was recognised as distinct until 1987, and that name had been more widely applied in northern Australia (Morrison 1987). Morrison (1988) described *L. ovata* Morrison as a highly localised species from the top end of the Northern Territory and Barrett and Barrett (2015) described *L. mimica* M.D.Barrett & R.L.Barrett from the West Kimberley. Further investigation of the *L. filiformis* complex is warranted as reassessment of specimens suggests it includes a number of morphologically and geographically distinct entities.

Brown (1810) included three collections in his concept of *Lechenaultia filiformis*, two from north Queensland, and one from the Northern Territory. *Lechenaultia filiformis* in the strict sense (as typified by Morrison 1987) is probably restricted to the eastern Northern Territory and extending just over the border into Queensland

around the Gulf of Carpentaria. The lectotype morphotype is an annual with  $\pm$  filiform leaves and flowers with relatively long sepals, but relatively small corollas. A second form is partially sympatric with *L. filiformis* in the Borroloola region [here recognised as *L. sp.* Borroloola (T.S.Henshall 2671)], differing in being a perennial with  $\pm$  flat leaves and flowers with relatively short sepals, but very large corollas. The proximity of two taxa near the type location has probably confounded previous attempts to understand morphological variation in the complex. There are additional forms across the top end of the Northern Territory and Kimberley region of Western Australia, one of which corresponds to the type of *L. agrostophylla*, however detailed morphological studies are required to determine species limits in *L. filiformis* s. lat. *Lechenaultia* sp. Liverpool River (K.G. Brennan 7959), apparently allied to *L. ovata*, also requires resolution but appears to quite a distinctive entity (Barrett and Barrett 2015; K. Brennan, pers. comm.).

In assessing variation in *L. filiformis* s. lat., it is recommended that the following characters be critically examined: 1. Plants annual or with a distinctly perennial rootstock; 2. Plant habit (erect, spreading, ascending, decumbent, prostrate); 3. Leaf shape in section at midpoint (and general dimensions); 4. Leaves reducing in size up the stem or similar throughout; 5. Proportion of fruit developing articles; 6. Length of most sepals and relative length of longest sepal; 7. Corolla tube length; 8. Corolla total length; 9. Corolla wing shape on adaxial and abaxial petals; 10. Corolla colour; 11. Corolla aspect from side view; 12. Nature of tactile (pollination) guides (see Carolin 1959, 1960). 13. Article shape and size. Variation in article characteristics may be particularly diagnostic (see Carolin 1966; Morrison 1988; Barrett and Barrett 2015 for illustrations and descriptive notes).

A taxon from the Northern Territory that was initially thought to be only known from a single collection, *Lechenaultia* sp. Gove (K.G. Brennan 7684), has now been shown to match material from north-east Queensland, New Guinea and the Moluccas, all previously included under *L. filiformis* (and the only taxon within this range). Examination of a larger range of specimens has enabled a clear concept to be defined and it is readily distinguished from the typical form of *L. filiformis*. We here describe it as a new species, *Lechenaultia peregrina*, following observation in the field by RWJ and critical examination of specimens.

The new species is well represented by collections, going back to a collection by Banks and Solander from the Endeavour River in 1770. It was illustrated for Banks' only recently published Florilegium (Banks 1982: Plate 176) and by Bailey (1913: 282, Fig. 250). Brown's original description of *L. filiformis* included specimens from both Queensland and the Northern Territory, so encompassed both *L. filiformis* and *L. peregrina* as defined here, but Morrison (1987: 21) chose Brown's collection from North Island, in the Gulf of Carpentaria, as the lectotype for the species, assigning the name to the Gulf taxon. It is noteworthy that Bentham (1869: 44) maintained both *L. filiformis* and *L. agrostophylla* as distinct species, though with some reservations, and noted differences between the syntypes of *L. filiformis* from the Northern Territory and Queensland. Bentham's assessment was hampered by limited material to determine the extent of variation between populations and regions, a situation which can now be addressed. Both *L. filiformis* and *L. agrostophylla* were maintained as distinct species until *L. agrostophylla* was included as a synonym of *L. filiformis* by Morrison (1987). It is likely that future studies will reinstate *L. agrostophylla* for an entity in the western Northern Territory and eastern Kimberley, as Morrison (1987) typified the name on a specimen from the upper Victoria River.

### Key to tropical, annual (or occasionally short-lived perennial) species of *Lechenaultia* (modified from Barrett and Barrett 2015)

1. Plants decumbent. Leaves lanceolate to narrowly elliptic, 1.5–5 mm wide. Articles 0.7–1.4 mm long, short-oblong to elliptic, less than twice as long as wide..... 2
- 1: Plants ascending to erect. Leaves filiform to linear or very narrowly lanceolate, up to 41 mm long, up to 2.1(–3.0) mm wide. Articles 2.0 mm or longer, elongate and irregularly cylindrical or irregular in shape, more than twice as long as wide..... 3
2. Corolla 9–14 mm long when dry, rich mauve on lobes with a broad yellow throat, a white line separating the colours. Articles grey, 0.7–1.3 mm long, a short-oblong plate with an oblong 'cushion' (lifting at each end) on each 'face', food bodies absent..... ***L. sp.* Liverpool River (K.G. Brennan 7959)**
- 2: Corolla 5.5–8(–10) mm long when dry, white, pale mauve or pale mauve with yellow palate. Articles reddish-brown, 1.0–1.4 mm long, oblong-elliptic with rounded corners, main plane a raised pale rim, each 'face' with two raised areas joined by a rib, with pale food bodies in pockets on one side..... ***L. ovata***

- 3. Corolla 9.5–19 mm long, pale mauve with a white throat, lacking any yellow markings. Articles simple, elongate and irregularly cylindrical, with a low, elongate furrow on each side ..... *L. mimica*
- 3: Corolla 9.5–25 mm long, usually either rich dark purple, pale mauve, pinkish or white, with yellow markings. Articles complex, in side-view consisting of a thin plate with a ‘cushion’ on each face, each cushion raised to a thick diverging short spur at each end, to create a ±trilobed apex at each end ..... 4
- 4. Corolla pale mauve, pinkish or white, 9.5–13 mm long. Longest adaxial sepal 2.5–5.1 mm long. Articles 1.9–2.3 mm long, with a central depression that has a regularly cracked pattern, the whole ‘cushion’ is surrounded by a raised rim. Perennial (thinly woody at base and with a thin rhizome). Wet boggy sand in seasonal swamps and in grasslands ..... *L. peregrina*
- 4: Corolla usually rich dark blue–purple with thin bright yellow stripes on palate, 13.5–25 mm long (dry). Longest adaxial sepal up to 8.5 mm long. Article ‘cushions’ not depressed nor cracked, 2.9–3.3 mm long. Annual or perennial. Usually in non-waterlogged habitats..... *L. filiformis* s.l.

### Taxonomy

*Lechenaultia peregrina* R.W.Jobson & R.L.Barrett, *sp. nov.*

**Type:** Queensland: Olive River Environmental Reserve, 5 km E by road of ‘Bromley’ Homestead, 45 km E of Moreton Telegraph Station, Cape York Peninsula, 18 June 2007, *P.I. Forster PIF32817* & *K.R. McDonald* (holo: NSW 921773; iso: BRI AQ0752787, (plus spirit material), MEL 2407327, MEL 2407328).

*Lechenaultia* sp. Gove (K.G. Brennan 7684), Barrett & Barrett (2015: 479)

Erect to spreading or ascending perennial herb to 40 cm high, with 1–21 primary branches, 11–60 cm long, spindly stems sometimes supported by other vegetation, glabrous except for subsessile glandular hairs clustered in the axil of the leaf base near the stem, sparse on the sepals, and various hairs on the corolla. Stems herbaceous, 0.9–1.8 mm diam., pale brown, bark not or scarcely developing, primary branches 0.6–0.8 mm diam., ±angular when dry with irregular, narrow translucent wings. Leaves alternate, scattered, erect to spreading, linear, 7–25 mm long, 0.4–0.6 mm wide, becoming somewhat reduced towards inflorescence, glabrous, margin entire (irregularly wrinkled when dry), base not constricted, apex subacute to acuminate; petiole usually not distinct, sometimes to 0.4 mm long. Inflorescences open, appearing to be terminal, monochasial cymes, with 1–3 distant flowers, with 1–3 leaves between each flower; bracts not differentiated from leaves. Peduncles 1.5–5.5 mm long. Sepals ±linear, unequal, narrowing to a fine point, adaxial sepal distinctly longer, 4.2–5.1 mm long, *c.* 0.5 mm wide, other sepals 1.8–3.5 mm long, *c.* 0.2 mm wide, glabrous. Corolla 10.5–14.5 mm long, pale mauve, pale pink or cream on lobes, becoming paler with age, and whitish to cream in throat of adaxial surface, whitish to cream on abaxial surface, long slit on adaxial side almost to base; glabrous outside, with dense, soft, sinuous simple hairs 0.3–0.5 mm long on the inside margins of the adaxial lobes matting together, shorter, simple, ±straight hairs 0.1–0.3 mm long moderately dense inside throat and sometimes extending to wing margins; throat white inside; lobes unequal in length, adaxial lobes united with lower lobes in basal 3.3–4.1 mm, otherwise free to base, free part of adaxial lobes 5.3–6.8 mm long, held in line with united part of abaxial lobes for the length of the indusium, then spreading-erect, inner wing reduced or absent, outer wings 0.7–0.9 mm wide, apex usually with 3 blunt teeth; abaxial three lobes united in basal 6.5–8.2 mm (inner surface with dense rows of hairs 0.1–0.3 mm long), lobes 2.7–5.2 mm long, both wings running full length of lobes, sometimes apex exceeding the lobes by up to 0.4 mm, 0.3–0.8 mm wide, obtuse to subacute, margins weakly erose to entire. Stamens with filaments 1.6–2.4 mm long; anthers 0.8–1.0 mm long, *c.* 0.3 mm wide. Pollen pale yellow, ovoid, *c.* 0.1 mm long, *c.* 0.05 mm diam., Style 6.0–7.9 mm long, glabrous except for a patch of subsessile glandular hairs, *c.* 0.05 mm long on rear of indusium, basal part mostly hidden within corolla tube; indusium broader than long, 0.8–0.9 mm long, 1.1–1.4 mm wide, with subsessile glandular hairs above, dense short bristles 0.1–0.3 mm long on lips, mouth gaping. Ovary 15–28 mm long, ±linear, glabrous. Fruit 24–31 mm long (not including retained sepals), articles 5–9 opposite to subopposite pairs, seeds usually developing only in lower two thirds of fruit. Articles cream to dull brown, 1.9–2.3 mm long, 0.7–0.8 mm wide, ±pentangular in section, abaxial surface (against the placental axis) ±flat with distinct but with very narrow ‘wings’, glabrous; adaxial surface with a raised, central ridge sloping to the ‘wings’, in places ±roughened with friable material, lateral ‘cushions’ have a central depression that has a regularly cracked pattern and the whole ‘cushion’ is surrounded by a slightly raised rim. Figure 1.



**Fig. 1.** *Lechenaultia peregrina* A, habitat; B, habit; C, leaves; D, flower and hypanthium; E, F, flower; G, fruit; H, seed article top view; I, side view; J, lower side (with attachment scar). Vouchers: A, C–E from R. W. Jobson 3775 & P.C. Baleeiro (NSW); B from R.A. Fryer 3059 (CNS); F, G from R.A. Fryer 6093 (CNS); H–J from P.I. Forster PIF32817 & K.R. McDonald. (Seed articles = 2.0 mm long). Photos A, C–E by R.W. Jobson; B, F, G by R. Fryer; H–J by R.L. Barrett.

**Diagnostic characters:** *Lechenaultia peregrina* is similar to *L. filiformis* and *L. mimica* but differs by articles having lateral cushions with a central depression that has a regularly cracked pattern. Other diagnostic character states include: perennial; leaves filiform; peduncles 1.5–5.5 mm long; adaxial sepals 4.2–5.1 mm long; corolla pale mauve, pinkish or white, 9.5–13 mm long; inner wing of adaxial lobes absent or reduced.

**Additional specimens examined:** [\* indicates digital image examined] AUSTRALIA: QUEENSLAND: Endeavour River, 17 June 1770, J. Banks & D. Solander s.n. (BM\*, BRI\*); 28 km S of Coen, 19 July 2008, A.R. Bean 13570 (BRI, n.v., CANB, MEL, n.v.); Lockerbie, 10 miles WSW of Somerset, 3 May 1948, L.J. Brass 18624 (L\*); 5.1 km W of the Weipa to Mapoon road on the track to the Pennefather River, 5 Aug. 1983,

J.R. Clarkson 4903 (BRI, *n.v.*, MBA, *n.v.*, NSW, QRS, *n.v.*, PERTH); 1.6 km S of The Wenlock River on The Peninsula Development Road, 20 Apr. 1990, J.R. Clarkson 8400 & V.J. Nelder (BRI, *n.v.*, L\*, MBA, *n.v.*, NSW, QRS, *n.v.*); Nicholson Road, Cardwell, North Queensland, 25 April 2017, R.A. Fryer 6093 (CNS\*); Cape Bedford Rd, Hopevale, North Queensland, 30 March 2015, R.A. Fryer & J. Newland 3059 (CNS\*); Track into N Jardine River campsites, c. 42 km S of Injinoo, 10 June 2016, R.A. Fryer 2133 (CNS\*); c. 4.3 km S of Cape York tip, 43 m, 21 July 2019, R.W. Jobson 3775 & P.C. Baleeiro (BRI, NSW); N of Cholmondeley Creek Crossing on Telegraph Line road, 6 Mar. 1992, R.W. Johnson 5140 (AD, *n.v.*, BRI, *n.v.*, DNA, *n.v.*, MEL, *n.v.*, NSW); Bruce Highway - Nicholson Road junction at start of old track on road verge, 21 Sept. 2016, R.W. Purdie 10892 (CANB); Moa Island, Torres Strait, 14 May 2003, B.S. Wannan, 2922 & I.T. Toh (BRI, *n.v.*, NSW).

NORTHERN TERRITORY: Gove, Lethram River, 20 May 2008, K.G. Brennan 7684 (DNA\*).

PAPUA NEW GUINEA: West Poit, Sudest Island, Milne Bay District, 8 Nov. 1965, E.E. Henty NGF 27117 (BRI, *n.v.*, L\*); Sibidiri, Mai Kussa River, Morehead subdist., Western District, Papua, 11 July 1968, E.E. Henty & P. Katik, NGF 38778 (A, *n.v.*, BRI, *n.v.*, CANB, L\*); c. 15 miles N. of Morehead Patrol Post, Western District, 19 Aug. 1967, R. Pullen 7108 (CANB, L\*); c. 1 mile S. of Morehead Patrol Post along track to Tonda, Western District, 23 Aug. 1967, R. Pullen 7137 (CANB, L\*).

INDONESIA: North East Kepala Burung, Irian Jaya, Kabupaten Manokwari; Kecamatan Kebar. Bukit Sintiri, between Sungai Apriri, between Sungai Apriri and Sungai Aremi, 11 May 1994, M.J.S. Sands & M. Jitmau 6545 (A, AA, BISH, BO, CANB, K, L\*, LAE, MAN, P, SING [all *n.v.* except L]); New Guinea; Singgi, District Jafi Afd, Hollandia, 13 Feb. 1957, F.A.W. Schram 2867 (L\*); Aru Islands: Palau Trangan, Meme, 15 Apr. 1993, M. M.J. van Balgooy & J.A.B. Mamesah 6299 (L\*, NSW); Aru Islands: Palau Trangan, between Sia and Beltubun, 27 Oct. 1994, M.M.J. van Balgooy 6712 (L\*); Vogelkop Peninsula, Kebar valley, above Aremi village, opposite Andjai, 13 Dec. 1961, P. van Royen 8248 (A, BO, CANB, K, L\*, LAE, RSA [all *n.v.* except L]).

**Etymology:** The specific epithet is from the Latin *peregrinus* (from foreign parts, foreign, or exotic; also used by Brown (1956) for ‘travelling about’, but probably derived from *peregrinor*) and refers to the disjunct distribution of this species, which is the only *Lechenaultia* to have dispersed outside of Australia.

**Distribution and Ecology:** Reasonably widespread on the eastern side of Cape York Peninsula, from Townsville north to Badu and Moa Islands in the Torres Strait, and the Mibini District in southern Papua New Guinea. Also recorded from Indonesian New Guinea (Wassi Kussa, Kebar Valley) and in the southern Moluccas (Aru and Trangan Islands) (Leenhouts 1957). Commonly grows on plains where it is usually associated with seasonally waterlogged soils, especially sands or sandy loam. Grows in open woodlands or swampy sedgeland. Recorded in association with *Acacia crassicaarpa*, *Allocasuarina littoralis*, *Alyxia spicata*, *Asteromyrtus brassii*, *Asteromyrtus lysicephala*, *Banksia dentata*, *Breynia stipitata*, *Byblis liniflora*, *Corymbia clarksoniana*, *Cyperus* sp., *Drosera lanata*, *Eriachne* sp., *Eriocaulon* sp., *Eucalyptus brassiana*, *Eucalyptus tetradonta*, *Exocarpos latifolius*, *Goodenia mystrophylla*, *Goodenia pilosa*, *Grevillea pteridifolia*, *Ischaemum australe* var. *australe*, *Leptocarpus schultzii*, *Leucopogon yorkensis*, *Livistona muelleri*, *Lomandra banksii*, *Lophostemon suaveolens*, *Melaleuca quinquenervia*, *Melaleuca viridiflora*, *Mitrasacme pygmaea*, *Pandanus solms-laubachii*, *Pandanus tectorius*, *Rhynchospora* spp., *Schoenus melanostachys*, *Stylidium alsinoides*, *Tricoryne anceps*, *Utricularia caerulea*, *Xanthorrhoea johnsonii* and *Xyris* sp.

**Phenology:** Flowering and fruiting recorded for March to July in Australia, but as early as November in New Guinea.

**Conservation status:** *Lechenaultia peregrina* is relatively widespread and is not considered threatened, though it is relatively poorly collected outside of Queensland.

**Notes:** This species has been well-collected, but its taxonomic status has been overlooked due to minimal regional comparative studies in tropical Australian herbs with localised species often going unrecognised (e.g. Baleeiro *et al.* 2020). The small sepals are similar to *L. mimica*, suggesting that these species may be more closely related to each other than to *L. filiformis* s. str.

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