NUYTSIA

WESTERN AUSTRALIA'S JOURNAL OF SYSTEMATIC BOTANY

ISSN 0085-4417

Sage, L.W. Three new species of *Lechenaultia* (Goodeniaceae) from south-west Western Australia, and a new key to the genus

Nuytsia 16(1): 157–166 (2006)

All enquiries and manuscripts should be directed to:

The Editor – *NUYTSIA*
Western Australian Herbarium
Dept of Environment and Conservation
Locked Bag 104 Bentley Delivery Centre
Western Australia 6983
AUSTRALIA

Telephone: +61 8 9334 0500
Facsimile: +61 8 9334 0515
Email: nuytsia@dec.wa.gov.au
Web: science.calm.wa.gov.au/nuytsia/

Department of Environment and Conservation
Western Australian Herbarium

Three new species of *Lechenaultia* (Goodeniaceae) from south-west Western Australia, and a new key to the genus

Leigh Sage

Swan Coastal District, Regional Services Division, Department of Environment and Conservation, 5 Dundebar Road, Wanneroo, Western Australia, 6065

Abstract

Sage, L.W. Three new species of *Lechenaultia* (Goodeniaceae) from south-west Western Australia, and a new key to the genus. *Nuytsia* 16(1): 157–166 (2006). The new species, *Lechenaultia galactites* L.W. Sage, *L. magnifica* L.W. Sage and *L. hortii* L.W. Sage are described and illustrated. All three species are known from the South West Botanical province of Western Australia and all have conservation priority. A new key to *Lechenaultia* is provided.

Introduction

Lechenaultia R.Br. is an attractive genus in the Goodeniaceae that is predominantly Western Australian with approximately 90% endemic to the state (Morrison 1992; Western Australian Herbarium 2001). *Lechenaultia* are mostly perennial subshrubs or herbs commonly found on the sandplain heaths, woodlands or forests of the South West Botanical Province (Morrison 1987; George *et al.* 1979). Four species occur in the Eremaean Botanical Province and tropical regions of northern Australia with one species occurring also in New Guinea (Morrison 1992).

Robert Brown, naturalist with the Matthew Flinders expedition to Australia in the early 19th century, named the genus *Lechenaultia* from collections he made around King George Sound, Albany (Carolin 1992; Sage 2001). John Lindley described the most common species, *L. biloba,* in 1839 from material collected by the first colonial botanist James Drummond. This widespread species has a reasonable amount of variation in the flower and leaf size, with a number of workers attempting to recognize this in the publication of new taxa (Morrison 1986). Morrison's revisional work on *Lechenaultia* in 1986 reduced many of these to synonymy, which agrees with the authors current understanding of the genus.

Charles Gardner, Government Botanist with then State Herbarium 1929–1960, commented on one of his *Lechenaultia* collections from north of Wubin that was at the time identified as *L. biloba.* Gardner wrote "The type (no. J. Drumm. S.R.1839 P.4) has the long leaves of the Darling Range strain; but there are also specimens of Drummond's with short leaves, although not quite as thick as these". His collection is *L. galactites,* described as new in this paper.

This new species is distinguished from *L. biloba* by its large, mostly white flowers, erect and robust habit, appressed, thick, leaves and a mostly reseeding life history strategy. The 'Flora of the Perth

Region' also describes an entity attributable to the new species as "A variant…in the wheatbelt with small, narrowly elliptic, erect, appressed, obtuse leaves and flowers in more compact corymbs" (Marchant *et al* 1987).

L. biloba is widely available commercially for horticulture and *L. galactites* also has a high potential for this with large showy, white flowers and an erect, robust habit (Sage 2001).

Lechenaultia hortii, known from just east of Perth, is also related to *L. biloba* but distinguished by leaves that have a short mucro with a different stem attachment, fleshy rather than woody stems and a much later flowering period. This species was identified from collections made in the northern Jarrah Forest bioregion as part of threatened flora surveys by amateur botanists Fred and Jean Hort. *L. magnifica* was also discovered by the Hort's and is related to *L. stenosepala* but differs in having wings that are much narrower on the abaxial lobes rather than equal and a denser arrangement of leaves.

The description of the three new species brings the number of *Lechenaultia* species to 29 with 23 endemic to Western Australia.

Materials and methods

Descriptions were made from herbarium material and fresh material taped to A4 size sheets of cardboard (using a technique similar to that mentioned in Hopper & Brown 2001). All new taxa have been seen in the field by the author.

Nomenclature follows Morrison (1992) and the Western Australian Herbarium (2006). Vegetation classifications follow Muir (1977). Bioregions follow Thackway & Cresswell (1995).

New species descriptions

Lechenaultia galactites L.W. Sage, *sp. nov*.

A *Lechenaultia biloba* Lindley floribus plerumque albis, habitu robusto et erecto, foliis appressis, crassis, et plerumque seminiferis differt.

Typus: Kokardine area [precise locality withheld for conservation purposes], 19 October 1999, *L.W. Sage, F. Hort, C.A. Hollister* LWS 2317 (*holo*: PERTH 05503418; *iso*: AD, CANB, K, MEL, NSW, NY, PERTH 05503485, SYD).

Erect robust, perennial *subshrub* to *c.* 60 cm, mostly single stemmed at base, glabrous. *Bark* grey and rough lower down the stem. *Leaves* crowded lower on stems, becoming scattered towards inflorescence, narrowly oblong to ovate, 2.0–7.6 mm long, mostly *c.* 1 mm wide, antrorse to appressed, sessile with a distinct keel or ridge on the outside surface, obtuse, glabrous. *Inflorescence* a monochasium

or dichasium; bracts or inflorescence leaves slightly longer to *c.* 8 mm, flatter and wider than lower stem leaves. *Sepals* linear to very narrowly lanceolate, 4.5–9 mm long, narrowly acute, glabrous. *Corolla* to *c.* 25 mm long, white to creamy white to pale blue, throat sometimes yellow, slit on adaxial side to base; glabrous outside, with long soft, simple hairs inside, dense in the throat and becoming more restricted to lobe and wing margins above; lobes almost equal in length but adaxial lobe wings generally narrower giving a distinct two lipped appearance to corolla; adaxial lobe to *c.* 10 mm wide, abaxial lobe wings to *c.* 12 × 7 mm, abaxial lobe wings to *c.* 4 mm wide, margins entire to unevenly serrated. *Ovary* to *c.* 22 mm long, linear, glabrous; style to *c.* 8 mm long, bent, some scattered glandular hairs mostly lower down; indusium pilose above, short bristles on lips. *Mature fruit* not seen. (Figure 1)

Other specimens examined. WESTERN AUSTRALIA (all PERTH): Latham, 27 Aug. 1979, *P. Armstrong* 77; Kulja, 17 Oct. 1937, *W.E. Blackall* 3512; Wubin, 2 Oct. 1962, *F. Lullfitz* L1630; North Beacon 30 Oct. 1996, *M. Kirby* 214; Wubin, 1 Oct. 2001, *F. & J. Hort* 1500; Chiddarcooping Hill Nature Reserve, 9 Oct. 2001, *L.W. Sage* 2388; Kokardine area, 14 June 1982, *B.H. Smith* 177; Bunjil, 5 Sept. 1972, *C.I. Stacey* 172; Kokardine area, 3 Oct. 1979, *J. Taylor, M.D. Crisp & R. Jackson* JT 1078; Wubin, 9 Sept. 1962, *F.W. Went* 119.

Distribution. Known from the northern Avon Wheatbelt bioregion of the South West Botanical province of Western Australia. (Figure 2)

Habitat. The new species prefers the Kwongan heaths of the northern Avon Wheatbelt, predominantly on sandy soils, though it is also known from clay soils and roadside gravel or laterite.

Phenology. Collected in flower from June to October. Peak flowering most likely occurs in September and early October.

Conservation status. Conservation Codes for Western Australia Flora: Priority Three. Currently known from approximately 7 populations scattered throughout the Kwongan heath of the northern Avon Wheatbelt. Potentially under threat from agricultural clearing and road works.

Etymology. The name is taken from the Greek *gala* – 'milky', referring to the flower colour, white with a suffusion of blue. The suggested common name is 'White Leschenaultia' (Sage 2001).

Notes and affinities. This species has been previously recognised under the informal phrase–name '*Lechenaultia* sp. Kokardine (*B.H.Smith* 177)' at the Western Australian Herbarium.

Just over a year after fire at Chiddarcooping Hill Nature Reserve, plants of *Lechenaultia galactites* were observed to be in full flower and had become the dominant lower shrub layer (Sage 2003). Like *L. striata,* these plants were non-suckering (reproducing from seed), as opposed to the related species *L. biloba* which primarily reproduces from suckers (LWS unpublished data; Morrison 1992). This disturbance based life history strategy was also observed by the author at other *L. galactites* populations and appears to be a diagnostic character in identification.

Lechenaultia galactites is distinguished from its closest relative – *L. biloba*, by an erect and robust habit, a reseeding life history strategy, erect to appresses leaves and longer maximum lengths for sepals, corolla and ovary.

Figure 1. *Lechenaultia galactites*, collected from Chiddarcooping Nature Reserve (*Sage* LWS 2388, PERTH 05503485). As an indication of scale note that the label is 30 mm high and average corolla length is *c.* 20 mm.

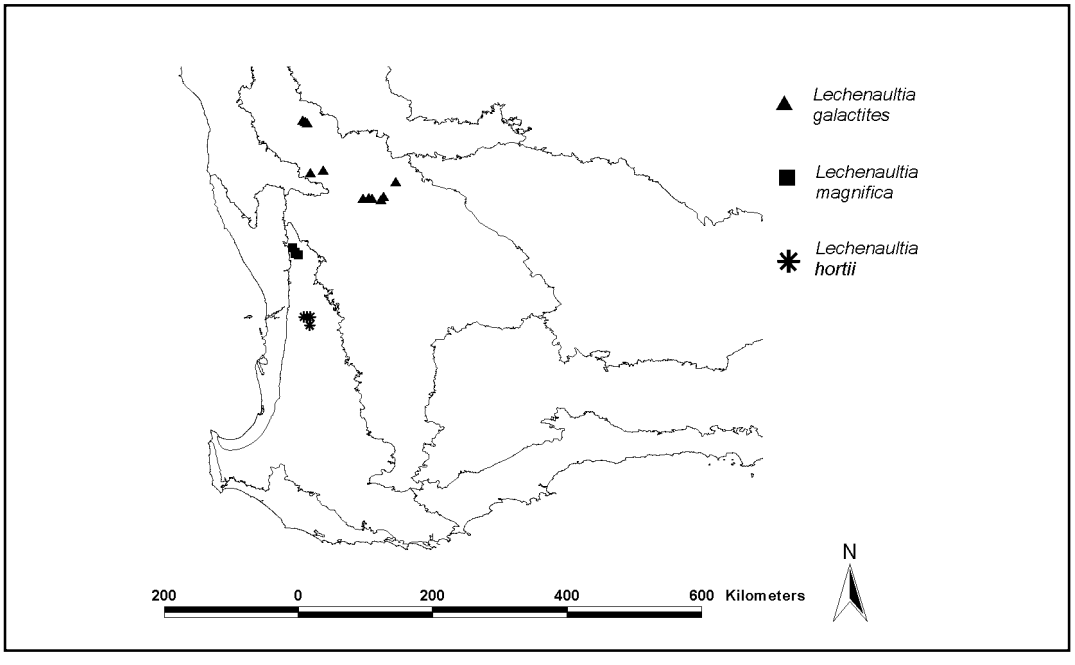

Figure 2. Distribution map for *Lechenaultia galactites* (▲), *L. magnifica* (■) and *L. hortii* (✱).

Lechenaultia hortii L.W. Sage, *sp. nov.*

A *Lechenaultia biloba* lindley corollae lobis adaxialibus a lobis abaxialibus distinctis, erectis, super axe dissimili, apice folii graciliter mucronato, et florescentia postea differt.

Typus: SW of York [precise locality withheld for conservation purposes], 17 November 2003, *L.W. Sage, F. Hort, J. Hort, S. Krauss, P. Nikulinsky & M. Parent* LWS 2631 (*holo*: PERTH; *iso*: CANB).

Erect to spreading perennial *subshrub or herb* to *c.* 40 cm, glabrous, stems fleshy. *Bark* light and flaky only at the very lowest section of the main stem. *Leaves* crowded below and becoming scattered towards inflorescence, thick, linear to very narrowly ovate, 1.4–10 mm long, 0.5–1.0 mm wide, mucronate point, articulation at stem attachment, glabrous, slightly glaucous. *Inflorescence* a monochasium; bracts or inflorescence leaves slightly longer and flatter than stem leaves, very narrowly ovate. *Sepals* linear to very narrowly ovate, 5–10 mm long, mucronate, glabrous. *Corolla* blue to pale blue and white, thick, centre lines and margins of lobes darker, throat yellowish, 10.5–24.0 mm long, slit to base on adaxial side; dense long simple, soft hairs in throat and becoming more restricted to lobe and wing margins above, glabrous outside; lobes almost equal in length but adaxial lobes upheld away from axis of abaxial lobes and with narrower wings giving a distinct two-lipped corolla; adaxial corolla lobes 4–10 mm long, abaxial corolla lobes 4–10.5 mm long, apex of lobes acute and exceeding wings; adaxial corolla lobe wings absent to 2.2 mm wide, abaxial corolla lobe wings 1–4 mm wide. *Ovary* to *c.* 22 mm long, linear, glabrous; style slightly bent, 5–9 mm long, ± glabrous; indusium with some simple, soft, erect hairs above and with very short bristles on lips. *Fruit* not seen. (Figure 3)

Other specimens examined. WESTERN AUSTRALIA [precise locality withheld for conservation purposes] (all PERTH): W of York, 9 Dec. 1998, *F. Hort* 326; W of York, 2 Dec. 1998, *F. Hort* 327; York area, 21 Nov. 2002, *F. Hort & A. Lowrie* 1918; SW of York, 9 Jan. 1999, *L.W. Sage, F. & J. Hort* LWS 1460.

Distribution and habitat. Currently known only from three locations west and southwest of York in the Jarrah Forest bioregion of Western Australia. The new species occurs on white-cream sandy soils under *Eucalyptus wandoo* open woodland. Associated species include *Eucalyptus patens, Banksia* sp., *Corymbia calophylla, Stirlingia latifolia, Conospermum stoechadis* and *Hakea prostrata.*(Figure 2)

Phenology. Collected in flower from November to January. Peak flowering seems to occur in very late spring (November) and early summer (December).

Conservation status. Conservation Codes for Western Australia Flora: Priority Two. The new species is known from only three locations, all within a National Park. Potential threats include road works and weeds.

Etymology. The name honours Fred Hort, Threatened Flora volunteer for DEC who brought this species to my attention, recognising his tireless efforts in Western Australian flora conservation. The suggested common name is 'Hort's Leschenaultia'.

Notes and affinities. The new species is related to *Lechenaultia biloba* but distinguished by fleshy rather than woody stems, a longer maximum sepal length, a corolla texture that is thick and artificial in appearance, adaxial lobes that are held differently and a flowering period that peaks in late spring or early summer rather than late winter or early spring. The new species is similar to *L. biloba* in that it seems to reproduce asexually from adventitious roots. New plants arise from shallow spreading roots that are attached to a vertical taproot (*F. Hort & A. Lowrie* 1918).

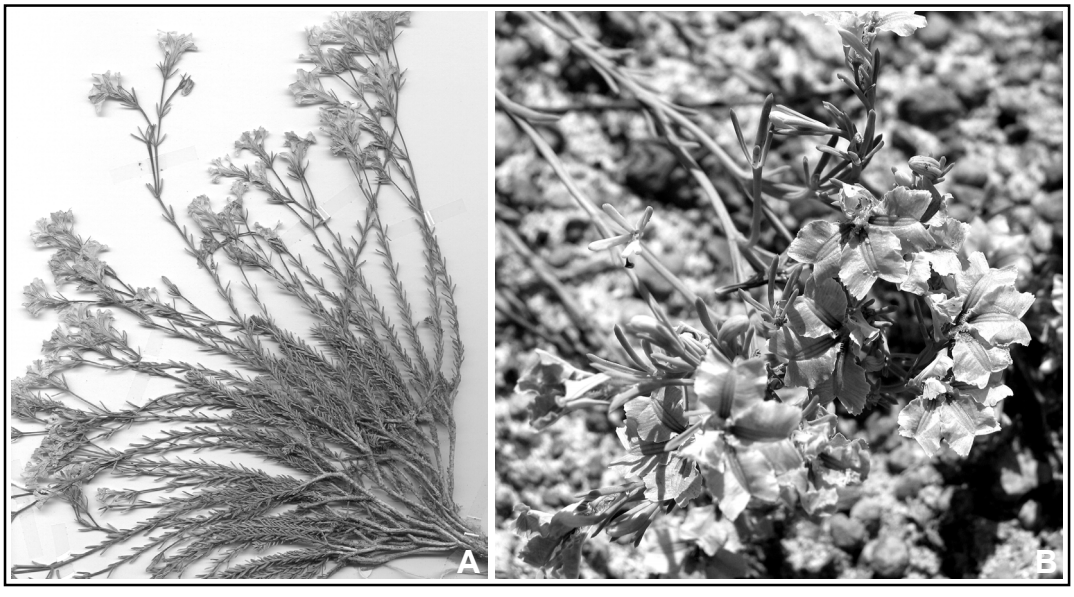

Figure 3. *Lechenaultia hortii.* A – specimen collected from south-west of York (*Hort & Lowrie* 1918, PERTH 06280552); as an indication of scale note the average corolla length is *c.* 18 mm. B – habit of living specimen from south-west of York; photo L.W. Sage.

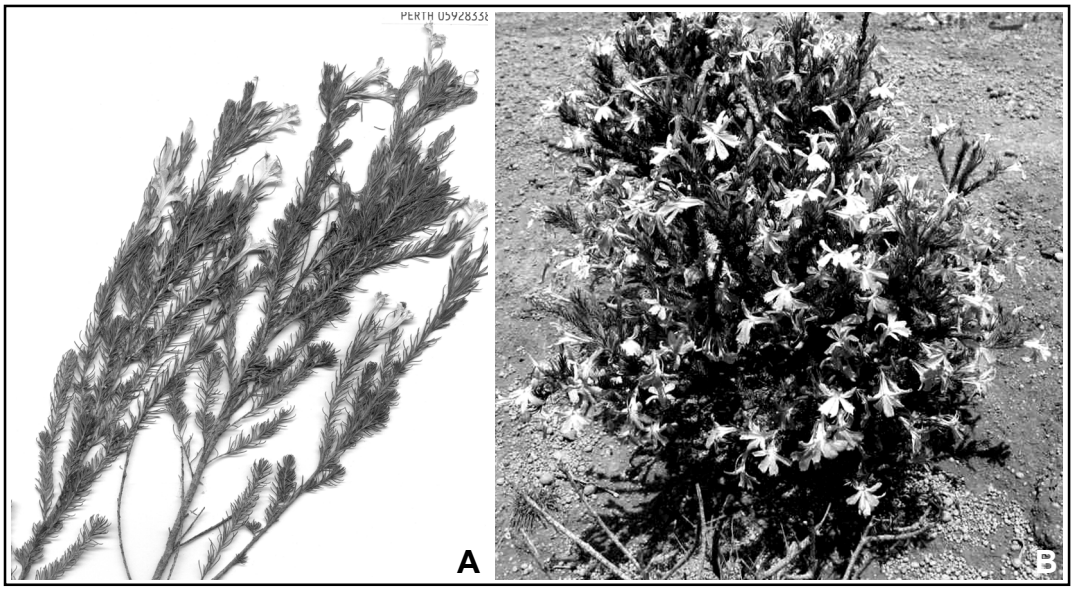

Figure 4. *Lechenaultia magnifica.* A – specimen collected from the Bindoon area (*Hislop & Hort* MH 2484, PERTH 05928338); as an indication of scale note the average corolla length is *c.* 23 mm. B – detail from living specimen at Bindoon, north-east of Perth; photo L.W. Sage.

Lechenaultia magnifica L.W. Sage, *sp. nov.*

A *Lechenaultia floribunda* Benth. foliis et sepalis papillatis, sepalis longioribus, corolla longiore differt.

Typus: Bindoon area, Victoria Plains [precise locality withheld for conservation purposes], 6 November 2002, *F. Hort* 1906 (*holo*: PERTH 06230695; *iso*: CANB, K).

Erect perennial *subshrub* to *c.* 60 cm, papillate on leaves, ovary and often on stem. Bark lower down on stems rough and flaky, light grey, lower stems woody. *Leaves* alternate, papillate, linear to narrowly lanceolate, incurved, crowded right to base of leafy inflorescence, 2.5–12.0 mm long, becoming longer towards infloresence, very acute to mucronate; attachment to stem on new growth not distinct but with a contriction on older stems. *Inflorescence* a compact, axillary monochasium or dichasium; bracts not distinct from leaves. *Sepals* ± linear, narrowing to a fine point, 6–8.5 mm long, to *c.* 0.8 mm wide, ± equal, glabrous. *Corolla* 16–30 mm long, pink to mauve and/or purple, long, slit on adaxial side to base; glabrous outside, with dense long soft, simple hairs inside throat, becoming more restricted above to lobe and wing margins; lobes almost equal in length, 5–9 mm long, adaxial lobes upheld and with narrower wings; abaxial lobe wings 6–10 mm long, 1.5–4 mm wide, very acute to apiculate, margins undulate to unevenly serrated; adaxial lobe wings 0.5–2 mm wide, margins undulate to unevenly serrated. *Ovary* 6–11 mm long, ± linear, glabrous; style 14–18 mm long, some scattered glandular hairs lower down; indusium with soft multicellular, non-appressed hairs above, short bristles on lips and often with a purplish tinge, mouth gaping. *Fruit* 17–28 mm long (not including retainted sepals), articles 12–19 pairs. (Figure 4)

Other specimens examined. WESTERN AUSTRALIA [precise locality withheld for conservation purposes] (all PERTH): Bindoon area, Victoria Plains, 11 Nov. 2002, *F. Hort* 1907; Bindoon area, Victoria Plains, 25 Nov. 2001, *M. Hislop & F. Hort* MH 2484.

Distribution. This species is currently only known from near Bindoon in the northern Jarrah Forest bioregion of Western Australia. (Figure 2)

Habitat. The new species has been collected from upland, flat, dry lateritic soils in open woodlands of *Corymbia calophylla*, *Eucalyptus wandoo / C. calophylla* or *E. marginata / C. calophylla*. Associated species included *Hakea trifurcata* and *Calothamnus sanguineus.*

Phenology. Collected in flower early November.

Conservation status. Conservation Codes for Western Australia Flora: Priority One. This species is currently known from only three populations with none known from the conservation estate. Potential threats include road works and weeds. A full survey of this species is required to assess its true status and implement possible remedial action if required.

Etymology. From the Latin, referring to the magnificent floral display produced by this species. The suggested common name is 'Magnificent Leschenaultia'.

Notes and affinities. This species has affinities to *Lechenaultia stenosepala* and *L. floribunda.* The new species can be distinguished from *L. stenosepala* by wings that are much narrower on the abaxial lobes rather than equal and a denser arrangement of leaves. The new species is distinguished from *L. floribunda* by having leaves and sepals that are papillate, a longer corolla, a much longer style and longer sepals.

New key to *Lechenaultia*

1. Plants with reduced, scattered leaves with a maximum length under 2 mm
2. Fruit not woody or persistent; leaves to 1 mm long ..... **L. aphylla**
2. Fruit woody, persistent; leaves >1.5 mm long ..... **L. divaricata**
1. Plants with obvious leaves that are usually crowded and longer than 2 mm
3. Corolla tube forming a complete, erect cylinder
4. Corolla tube gibbous on adaxial side
5. Sepals greater than 7.5 mm long ..... **L. chlorantha**
5. Sepals less than 6.5 mm long
6. Stems with curved downs tips; tangled, shrubby habit ..... **L. linarioides**
6. Stems without curved down tips; prostrate or shortly erect habit ..... **L. formosa**
4. Corolla tube not gibbous
7. Plants hispid ..... **L. hirsuta**
7. Plants glabrous
8. Plants wreath-like, procumbent herbs; corolla lobe wing 4.5–8.5 mm wide .... **L. macrantha**
8. Plants not wreath-like or procumbent; corolla lobe wings <4.5 mm wide
9. Sepals >16.5 mm long ..... **L. longiloba**
9. Sepals usually <7.5 mm long
10. Fruit <7 mm; corolla ≤17 mm long ..... **L. tubiflora**
10. Fruit >12 mm long; corolla ≥17 mm long
11. Corolla lobe wings 0.1–0.2 mm wide; sepals <5 mm long ..... **L. acutiloba**
11. Corolla lobe wings >0.9 mm wide; sepals >5 mm long
12. Articles 5–8 pairs ..... **L. superba**
12. Articles 10–20 pairs ..... **L. laricina**
3. Corolla tube open to base on the adaxial side
13. Plants papillate (leaves, sepals and ovary)
14. Sepals <5mm long; corolla <14 mm long ..... **L. papillata**
14. Sepals >6mm long; corolla >16 mm long ..... **L. magnifica**
13. Plants not papillate
15. Plants grass-like herbs
16. Central sepal longer than others
17. Leaves ovate ..... **L. ovata**
17. Leaves narrow ..... **L. filiformis**
16. Sepals all of equal length ..... **L. juncea**
15. Plants sub-shrubs or non grass-like herbs
18. Leaves hairy ..... **L. pulvinaris**
18. Leaves glabrous
19. Sepals <2.5 mm long ..... **L. subcymosa**
19. Sepals >3 mm long

20. Leaves adpressed to strongly upheld ..... **L. galactites**
20. Leaves not adpressed or only incurved
21. Style >11 mm long ..... **L. stenosepala**
21. Style <10 mm long
22. Corolla predominantly blue
23. Sepals to 4.5 mm long or less
24. Leaves on non-flowering stems crowded and scattered on flowering stems; fruit to 22–29 mm ..... **L. brevifolia**
24. Leaves all crowded; fruit 11–18 mm long ..... **L. floribunda**
23. Sepals 4.5 mm long or greater
25. Style >9.5 mm long ..... **L. heteromera**
25. Style <9 mm long
26. Ovary <6.5 mm long ..... **L. expansa**
26. Ovary >11 mm long
27. Virgate, few branched herb; interior arid distribution ..... **L. striata**
27. Weakly erect to spreading, moderately branched shrub or subshrub; south-west distribution
28. Stems fleshy; corolla thick and artificial in appearance; flowering late spring or early summer ..... **L. hortii**
28. Stems mostly woody; corolla thin; flowering peak in later winter or early spring ..... **L. biloba**
22. Corolla pale yellow to orange–yellow to white
29. Articles 10–13 pairs; sepals to 4.5 mm long or less ..... **L. lutescens**
29. Articles 16–20 pairs; sepals 4.5 mm long or greater ..... **L. striata**

Notes. A new taxon, recently discovered in the Gibson Desert and known by the informal phrase-name '*Lechenaultia* sp. Gibson Desert (C.P. Campbell 2056)' at PERTH, was not included in the key above due to its probable hybrid origins. Both parent taxa for this probable hybrid are currently un-collected or determined.

Acknowledgements

Special thanks to Roberta Cowan, while Australian Botanical Liaison Officer at Kew, and Alex George for arranging and providing images of *Lechenaultia* types in Europe. Many thanks to Paul Wilson for again providing the Latin diagnosis for each taxa, Fred Hort for persisting with his efforts to bring *L. hortii* to my attention, Mike Hislop for bringing *L. magnifica* to my attention, and Ryonen Butcher for her comments on the manuscript.

References

Carolin, R.C. (1992). "Flora of Australia. Volume 35, Brunoniaceae, Goodeniaceae", pp. 149–281. (Australian Government Publishing Service, Canberra.)

George, A.S., Hopkins, A.J.M. & Marchant, N.G. (1979). The heathlands of Western Australia. *In*: "Ecosystems of the World" Volume 9A, pp. 211–230. Heathlands & Related Shrublands. Descriptive Studies. *ed.* Specht, R.L. (Elsevier: Amsterdam.)

Hopper, S.D. & Brown. A.P. (2001). Contributions to Western Australian orchidology: 1. History of early collections, taxonomic concepts and key to genera. *Nuytsia* 13: 1–26.

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. & MacFarlane, T.D. (1987). "Flora of the Perth Region". (Western Australian Herbarium: Perth).

Morrison, D.A. (1986). Taxonomic and Nomenclatural Notes on *Lechenaultia* R.Br. (Goodeniaceae). *Brunonia* 9:1–28.

Morrison, D.A. (1987). The phytogeography, ecology and conservation status of *Lechenaultia* R.Br. (Goodeniaceae). *Kingia* 1 (1):85–133.

Morrison, D.A. (1992). *Lechenaultia. In:* "Flora of Australia." Vol. 35, pp. 17–34. (Australian Government Publishing Service: Canberra.)

Muir, B.G. (1977). Biological survey of the Western Australian wheatbelt. Part 2. Vegetation and habitat of Bendering Reserve. *Records of the Western Australian Museum.* Supplement. –No. 3. (Western Australian Museum: PERTH)

Sage, L.W. (2001) Leschenaultias: true blue Australians. *Landscope* 17(1): 23–27.

Sage, L.W. (2003) *Lechenaultia aphylla* (Goodeniaceae), a disturbance opportunist from the Great Victoria Desert, Australia. *Pacific Conservation Biology* 9: 152–156.

Thackway, R. & Cresswell, I.D. (1995). "An interim biogeographic regionalisation for Australia: a framework for setting priorities in the National Reserves System Cooperative Program, version 4." (Australian Nature Conservation Agency: Canberra).

Western Australian Herbarium (2006). FloraBase – the Western Australian Flora. Department of Environment and Conservation. http://florabase.calm.wa.gov.au/.