Leiocarpa, a new Australian genus of the Asteraceae tribe Gnaphalieae

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Abstract

Paul G. Wilson, *Leiocarpa*, a new Australian genus of the Asteraceae tribe Gnaphalieae. *Nuytsia* 13(3): 595–605 (2001). A new genus *Leiocarpa* Paul G. Wilson (Gnaphalieae: Asteraceae) is described; it is circumscribed to include the species that have been placed in *Ixiolaena* Benth., other than the type, two of the species placed in *Leptorhynchos* Less., and two species currently in *Chrysocephalum* Walp. The characters that distinguish *Ixiolaena*, *Leiocarpa*, *Leptorhynchos*, and *Chrysocephalum* are discussed. The ten species recognized in the new genus are as follows: *L. brevicompta* (F. Muell.) Paul G. Wilson, *L. gatesii* (H.B. Will.) Paul G. Wilson, *L. leptolepis* (DC.) Paul G. Wilson, *L. panaetioides* (DC.) Paul G. Wilson, *L. pluriseta* (Haegi) Paul G. Wilson, *L. semicalva* (F. Muell.) Paul G. Wilson, *L. serpens* (Everett) Paul G. Wilson, *L. supina* (F. Muell.) Paul G. Wilson, and *L. tomentosa* (Sond.) Paul G. Wilson. One new subspecies is described: *L. semicalva* subsp. *tenuifolia* Paul G. Wilson, and one new subspecific combination, *Leiocarpa semicalva* subsp. *vinacea* (Haegi) Paul G. Wilson, is made. Lectotypes are chosen for *L. brevicompta*, *L. tomentosa*, *L. semicalva*, and *L. supina*.

Introduction

When investigating the anatomy of cypselas in Australian members of the tribe Gnaphalieae (Asteraceae), Short *et al.* (1989) noted that the cypsela of *Ixiolaena viscosa* Benth., the type of *Ixiolaena* Benth., was radically different from the cypselas of other species that had been placed in the genus. Subsequently Anderberg (1991), in a taxonomic treatment that covered the whole tribe, indicated that *Ixiolaena* was heterogeneous and that the type species differed in many characters from the other species in the genus (although he did not state in what manner it differed). In the process of preparing an account of *Ixiolaena* for the "Flora of Australia" it has become possible to confirm the comments of both Short *et al.* and of Anderberg, and it is apparent that all *Ixiolaena* species except for the type need to be reassigned.

The Australian genera in the Gnaphalieae *sensu* Anderberg (1991) were investigated to ascertain the correct placement of the non-typical species of *Ixiolaena*. In this regard the anatomy and indumentum of the cypselas was of particular interest. It was apparent that one species currently placed in *Chrysocephalum* Walp. and one in *Leptorhynchos* Less. (but not the types of these two genera) had similar characters to the excluded species of *Ixiolaena* and that these all belonged to a new genus, which is described here under the name *Leiocarpa*.

Three independent lines of investigation suggest that, taken together, *Leiocarpa* is generically distinct from all currently recognized genera. These are the chromosome numbers (where known), the mycorrhizal associations (where known), and the morphology of the involucral bracts, carpels and other organs.

Chromosome number

The chromosome number of *Ixiolaena s.str.* has not been recorded. The few chromosome counts that have been made in the other three genera under consideration suggest that the base number in *Leiocarpa* is different from that of *Chrysocephalum* and of *Leptorhynchos* (Table 1). *Leiocarpa* appears to have polyploid numbers on a base of x = 10, whereas both *Chrysocephalum* and *Leptorhynchos* appear to have mostly diploid numbers on the base of x = 12.

Table 1. Summary of chromosome number records in *Chrysocephalum*, *Leiocarpa* and *Leptorhynchos*. Taken from Watanabe *et al.* (1999) which includes those published by Turner (1970).

Current name and recorded name	Chromosome number
Chrysocephalum aff. adpressum (W. Fitzg.) Anderb.	n = 24
C. apiculatum (Labill.) Steetz	n = 12, *c.* 38
C. semipapposum (Labill.) Steetz	n = 12
Chrysocephalum sp.	n = 12
Leiocarpa leptolepis [as *Ixiolaena chloroleuca*]	n = 20
Leiocarpa tomentosa [as *Ixiolaena tomentosa*]	n = 20
Leiocarpa semicalva [as *Leptorhynchos ambiguus*]	n = *c.* 38, *c.* 40
Leiocarpa websteri [as *Ixiolaena leptolepis*]	n = 20, *c.* 21, 30
Leptorhynchos baileyi F. Muell.	n = 12
Leptorhynchos scaber (Benth.) Haegi [as *L. medius*]	n = 12
Leptorhynchos squamatus (Labill.) Less.	n = 12
Leptorhynchos waitzia Sond.	n = 12

Mycorrhizal associations

Work by Warcup (1990) and McGee (1986) on mycorrhizal associations in the Australian Inuleae has shown that while those species of *Chrysocephalum* and *Leptorhynchos* that were studied (i.e. *C. apiculatum* (Labill.) Steetz, *C, semipapposum* (Labill.) Steetz, *C. pterochaetum* F. Muell., *Helichrysum ramosissimum* Hook. [= *Chrysocephalum* sp.], *L. squamatus* (Labill.) Less. and *L. waitzia* Sond.) form both ectomycorrhizal and vesicular-arbuscular mycorrhizal associations, those species that were examined that are here placed in *Leiocarpa* (i.e. *L. ambigua, L. brevicompta, L. leptolepis, and L. supina*) form only vesicular arbuscular mycorrhiza. Warcup observed that mycorrhizal relationship in general correlates with taxonomic relationship, which, if correct, suggests that those species studied that are here placed in *Leiocarpa* are generically distinct from those studied that are placed in the other two genera. The mycorrhizal relationship of *Ixiolaena viscosa* has not been recorded.

Comparative data

Chrysocephalum. The involucral bracts have a fenestrate stereome and are prominent and papery, with conspicuous stiff cilia. The anther tails are firm and long. The cypselas are not beaked and the pericarp is hyaline with two-celled papillae in which the lower cell over-tops the upper. The pappus bristles are individually deciduous. The plants are ecto- and vesicular-arbuscular mycorrhizal. Chromosome number x = 12.

Ixiolaena. The involucral bracts have an undivided stereome and are thin, linear and herbaceous. The anthers have delicate divided tails. The cypselas are hispid with slender twin hairs. The pappus is deciduous as a whole. The form of mycorrhizal association and the chromosome number are not recorded.

Leiocarpa. The involucral bracts have a fenestrate stereome and are entire to dentate, lacerate or woolly-ciliate. The anther tails are firm and long. The cypselas are not beaked and the pericarp is cartilaginous, glabrous and smooth, and has the appearance of many linear clear windows set into the translucent background; when mature the pericarp disintegrates into linear fragments of one to few cells. Short *et al.* (1989) noted the presence of paired myxogenic cells that are apparent in transverse section of the cypsela. These myxogenic cells probably correspond to the linear clear windows that are seen in surface view. The pappus bristles are persistent. The plants are vesicular-arbuscular mycorrhizal only. Chromosome number x = 10.

Leptorhynchos. The involucral bracts have a fenestrate stereome and are oblong to elliptic, hyaline and sometimes ciliate. The anther tails are delicate and branched. The cypselas are blunt or beaked and the pericarp is hyaline and has two-celled papillae in which the lower cell over-tops the upper. The pappus bristles are persistent. The plants are ecto- and vesicular-arbuscular mycorrhizal. Chromosome number x = 12.

Formal taxonomy

Leiocarpa Paul G. Wilson, *gen. nov.*

Herba perennis ramis lanatis. Folia linearia vel oblonga, integra. Capitula ad apices ramulorum pedunculata, homogama et discoidea, vel heterogama floribus in ambitu feminei 1-seriatis in disco bisexuales. Involucrum hemisphaericum vel turbinatum; bracteae multiseriatae, imbricatae, lineares vel lineari-acuminatae, scariosae, herbaceae, vel cartilaginaceae, laminis parvis, pallido bruneis, scariosis, non radiantibus. Corollae regulares 5-fidae (3-4-fidae in floribus femineis), tubulosae, plerumque flavidae, limbo ampliato anguste turbinato vel campanulato. Anthera longiuscule valido caudatae. Styli apice truncati vel rotundati. Achaenia subteretia vel leviter compressa, erostria, 2–4 costata; pericarpium cartilagineum, striatum, cellulae binatae translucens inter cellulae lineares dispersae, laevum vel sparse glandulosum. Pappi setae tenues, lineares vel filiformae, barbellatae, persistentes.

Typus: Leiocarpa leptolepis (DC.) Paul G. Wilson

Perennial herbs; branches variably woolly, produced into slender sparsely bracteate peduncles. *Leaves* linear to oblong. *Involucre* hemispherical to turbinate; bracts linear or linear-acuminate,

scarious, herbaceous or cartilaginous, with a narrow scarious margin; stereome fenestrate; lamina pale brown, scarious, not radiating. *Receptacle* naked, convex or conical. *Florets* bisexual or the outer female; corolla tube slender below, narrowly turbinate to campanulate above, shortly exceeding the bracts, usually yellow; lobes 5 (3 or 4 in female), smooth within. *Anther tails* long and firm. *Style apex* truncate to rounded. *Cypselas* terete or somewhat compressed, 2–4-ribbed, not beaked; pericarp cartilaginous, striate, with scattered paired linear transparent cells among linear translucent cells, smooth or sparsely glandular and with a few minute unicellular hairs. *Pappus bristles* linear to filiform, barbellate, persistent.

An Australian endemic genus of ten species.

Etymology. The generic name is derived from the Greek words – *leios* smooth and *carpos* – fruit; it refers to the smooth cypselas that are typical of this genus.

Notes. The pericarp has the appearance of containing many linear clear windows set into a translucent background. When mature, the pericarp disintegrates into linear (and presumably one-celled) fragments. Details of these cells in transverse section are given by Short *et al.* (1989).

Unlike other members of the genus, the corolla lobes of *Ixiolaena supina* are slightly papillose within and the anther tails are weak and slightly branched.

Key to species of *Leiocarpa*

1 Erect plant, variably cottony or woolly; leaves mostly linear to oblong
2 Claw of involucral bracts narrowly linear (or narrowly oblong in inner bracts), almost equal in length in outer and inner bracts
3 Lamina of inner involucral bracts broadly ovate; pappus bristles almost equal to corolla; older branches covered with a dense woolly indumentum that forms a silvery sheen ..... **1. L. leptolepis**
3: Lamina of inner involucral bracts slender-attenuate; pappus bristles *c.* 2/3 length of corolla; older branches cottony or glabrous ..... **2. L. brevicompta**
2: Claw of involucral bracts linear to narrowly oblong or narrowly ovate, markedly shorter on outer than on inner bracts
4 Involucral bracts glabrous or minutely glandular-puberulous, cartilaginous ..... **3. L. websteri**
4: Involucral bracts variably cottony, scarious to herbaceous or cartilaginous
5 Involucre 5–10 mm high; pappus bristles *c.* 20 or fewer
6 Involucre campanulate; bracts scarious and wrinkled, with a slender, acuminate, curled lamina ..... **6. L. gatesii**
6: Involucre turbinate to hemispherical; bracts herbaceous or cartilaginous at least in lower half, with a blunt to acuminate flat lamina
7 Involucral bracts with upper half scarious and wrinkled, pale brown; female florets without pappus ..... **8. L. semicalva**
7: Involucral bracts cartilaginous or with a short scarious tip, not wrinkled, pale green; female florets with pappus

8 Involucre turbinate, cypsela glabrous ..... **4. L. tomentosa**

8: Involucre hemispherical; cypsela very sparsely puberulous ..... **7. L. panaetioides**

5: Involucre 12–15 mm high; pappus bristles *c.* 40 ..... **5. L pluriseta**

1: Sprawling villous plant; leaves obovate

9 Leaves fleshy, hirsute below ..... **9. L. supina**

9: Leaves papery, with sub-sessile globular glands and cottony hairs below ..... **10. L serpens**

1. Leiocarpa leptolepis (DC.) Paul G. Wilson, *comb. nov.*

Helichrysum leptolepis DC., Prod. 6: 194 (1838). – *Gnaphalium leptolepis* (DC.) Schultz-Bip., *Bot. Zeitung* 3: 171 (1845). – *Ixiolaena leptolepis* (DC.) Benth., Fl. Austral. 3: 597 (1867). *Type:* Molles Plains, Lachlan River, New South Wales, 22 July 1817, *A. Cunningham* 96 (*holo:* G-DC, fiche seen; *iso:* K).

Ixiolaena chloroleuca Haegi *in* J.P. Jessop & H.R. Toelken, Fl. South Australia 4th edn, 1551 (1986). *Type:* Andamooka, South Australia, 21 September 1978, *E. Brown* (*holo:* AD 97843431; *iso:* PERTH 0162104).

Selected specimens examined. NORTHERN TERRITORY: Huckitta Station, *M. Lazarides* 5945 (CANB).
SOUTH AUSTRALIA: Clayton Station, *F.J. Badman* 443 (CANB).
QUEENSLAND: 28 miles [*c.* 45 km] E of Eulo, 24 Sep. 1963, *M.E. Phillips* (CANB).
NEW SOUTH WALES: Cobham Station, *P. Martensz* 230 (CANB).

Distribution. Found in central and eastern South Australia, the Northern Territory, south-western Queensland, western New South Wales and far north-western Victoria.

Notes. When growing with *L. websteri* plants occur that are intermediate in morphology between the two species. These are presumably hybrids. For example sheet MEL 2037868, *S.W.L. Jacobs* 2116, from Fowlers Gap, New South Wales, consists of portions of *L. websteri*, *L. leptolepis* and the putative hybrid.

The circumscription by Bentham (1867) of this species [as *Ixiolaena leptolepis*] included material now referred to *L. websteri*. For further information see note under the latter name.

2. Leiocarpa brevicompta (F. Muell.) Paul G. Wilson, *comb. nov.*

Ixiolaena brevicompta F. Muell., Fragm. 1: 53 (1858). *Type:* Queensland, Peak Downs, *F. Mueller* (*lecto:* MEL 271239, here designated; *isolecto:* NSW 468205).

Selected specimens examined. SOUTH AUSTRALIA: Howica Dam, *L.D. Williams* 8223 (AD).
QUEENSLAND: Rayndah, *W. Jones* 2640 (CANB).
NEW SOUTH WALES: near Louth, *C.W.E. Moore* 6541 (CANB).

Distribution. Found in South Australia, Queensland and New South Wales.

Typification. Mueller cited the type locality as "In planitiebus basalticis a tractu Peak Range usque ad prata Darling's Downs". A field label attached to the lectotype chosen here has on it in pencil "*Ixiolaena*?/ Betw Dawson et Buruclt [?] / Basalt plains". A sheet label has written on it, apparently in Mueller's handwriting: "*Ixiolaena brevicompta* Ferd Muell. / a. *glabra* / Peak Downs / ferd Mueller". Mueller described the root and flowers, which are not present on this specimen, so presumably there is, or was, further syntype material that has not been seen.

3. Leiocarpa websteri (S. Moore) Paul G. Wilson, *comb. nov.*

Ixiolaena websteri S. Moore, *J. Bot.* 41: 98 (1903). *Type:* Coolgardie district, Western Australia, *L.C. Webster* (*holo:* BM, photo seen).

Ixiolaena tomentosa var. *glabrata* Sond., *Linnaea* 25: 504 (1853). *Type:* Crystall-brook [Crystal Brook], South Australia, October 1851, *F. Mueller* (*lecto:* MEL 271160 *p.pte.*, here designated).

Selected specimens examined. WESTERN AUSTRALIA: 15 km N of Kalgoorlie, *R.J. Cranfield* 9813 (PERTH).
NORTHERN TERRITORY: 32 miles [*c.* 51 km] N of Alice Springs, *D.J. Nelson* 2144 (HO).
SOUTH AUSTRALIA: Cariewerloo, *H.R. Toelken* 7298 (HO).
NEW SOUTH WALES: Nangara Homestead, *L. Haegi* 2136 (PERTH).
VICTORIA: 38 km NW of Underbool, *A.C. Beauglehole* 40467 (MEL).

Distribution. Found in all mainland states and territories.

Typification. The name *Ixiolaena tomentosa* var. *glabrata* Sond. is based on a collection made by Mueller at Crystal Brook. The type sheet, MEL 271160, has two labels in Mueller's handwriting which bear the name "*Leptorrhynchus tomentellus* [var.] *glabratus*" and the locality "Crystal-brook". There are two specimens on the sheet, the left-hand specimen has elliptic involucral bracts with prominent brown appendages; the right-hand specimen has narrowly oblong involucral bracts also with prominent brown appendages. I am lectotypifying on the left-hand specimen.

Bentham (1867) included *Ixiolaena tomentosa* var. *glabrata* in *I. leptolepis* along with material here referred to *L. websteri.* His circumscription was accepted by botanists until Haegi (1986) recognized that the element with densely woolly branches was specifically distinct from the remainder. Haegi therefore described *Ixiolaena chloroleuca*, but the type of this taxon unfortunately corresponds to the type of *I. leptolepis* which Haegi had not seen.

Haegi (1986) indicated that this species was very variable and that "more intensive examination may bring to light variants worthy of taxonomic recognition". I endorse these comments but I have not been able to circumscribe clearly definable taxa within the *L. websteri* complex.

Note. Very similar to *L. panaetioides* but this species has smaller heads and its involucral bracts are obviously woolly. In New South Wales the two species appear to intergrade.

4. Leiocarpa tomentosa (Sond.) Paul G. Wilson, *comb. nov.*

Ixiolaena tomentosa Sond. & F. Muell. ex Sond., *Linnaea* 25: 504 (1853). – *Helichrysum sonderi* F. Muell., *J. Bot. (Hooker)* 4: 121 (1866) *nom. illeg. Type:* Cudnaka [= Kanyaka], South Australia, *F. Mueller* (*lecto:* MEL 727558, here designated).

Selected specimens examined. WESTERN AUSTRALIA: Elder Creek, Warburton, *A.S. George* 3954 (PERTH).
NORTHERN TERRITORY: Serpentine Chalet, *P.K. Latz* 9873 (AD).
SOUTH AUSTRALIA: Nelshaby Reservoir Reserve, *R.J. Chinnock* 8723 (CANB).
NEW SOUTH WALES: 46 km SE of Broken Hill, *J. Palmer* 276 (CANB).
VICTORIA: Murray River, 2 km S of north-west corner of State, *M.D. Crisp* 6992 (CANB).

Distribution. Found in semi-arid areas of eastern Western Australia, southern Northern Territory, South Australia, western New South Wales, and western Victoria.

Typification. Sonder cited the Mueller collecting localities "Murray-scrub" and "Cudnaka" [= Kanyaka]. The lectotype cited above bears in Mueller's handwriting the name *Leptorrhynchus tomentellus* [*sic.*] and the locality "Cudnaka"; it agrees with the original description of *Ixiolaena tomentosa*.

Note. This species has been confused with *L. websteri* which differs in generally having smaller and and somewhat hemispherical (not turbinate) capitula, and in having non-cottony involucral bracts. The distinction between the two is not always clear and some collections from Eyre Peninsula appear to be intermediate in morphology.

5. Leiocarpa pluriseta (Haegi) Paul G. Wilson, *comb. nov.*

Ixiolaena pluriseta Haegi *in* J.P. Jessop & H.R. Toelken, Fl. South Australia 4th edn, 1552 (1986). *Type:* between the lakes north of Point Sinclair, South Australia, *H. Eichler* 21363 (*holo:* AD 98242439).

Selected specimens examined. SOUTH AUSTRALIA: Masillon Island, *N. Wace* 292 (CANB); Thevenard, *M.E. Phillips* (CANB 010709).

Distribution. Occurs near the Head of the Bight in South Australia eastwards to Eyre Peninsula and the adjacent islands with an isolated occurrence near Morgan in the Murray Region.

Notes. Some plants have capitula with only, or almost only, female florets, some have a mixture of female and bisexual florets, while others have almost entirely bisexual florets.

This species is similar to *L. tomentosa* from which it differs in having larger capitula and larger flowers with more numerous pappus bristles.

6. Leiocarpa gatesii (H.B. Will.) Paul G. Wilson, *comb. nov.*

Helichrysum gatesii H.B. Will., *Proc. Roy. Soc. Victoria* ser. 2, 35: 24 tab. 5 (1922). – *Leptorhynchos gatesii* (H.B. Will.) J.H. Willis, *Victorian Naturalist* 73: 200 (1957). *Type:* Lorne, Victoria, 7 December 1921, *A.C.F. Gates* (*holo:* MEL 1591145).

Selected specimen examined. VICTORIA: W of Anglesea, 5 July 1984, *S.J. Platt et al.* (CANB).

Distribution. Found in the Otway region of Victoria between Lorne and Anglesea.

Note. This species is a "fire ephemeral" (Gill 1993) and is apparently absent for long periods between fires. It was rediscovered, when thought to be extinct, by Mary White in 1984, after the bushfires of 1983 (see White 1984).

7. Leiocarpa panaetioides (DC.) Paul G. Wilson, *comb. nov.*

Helichrysum panaetioides DC., Prod. 6: 194 (1838); *Gnaphalium panaetioides* (DC.) Schultz-Bip., *Bot. Zeitung* 3: 171 (1845). – *Leptorhynchos panaetioides* (DC.) Benth., Fl. Austral. 3: 609 (1867). *Type:* wet plains of Lachlan River, New South Wales, May 1817, *A. Cunningham* 94 (*holo:* G-DC, fiche seen; *iso:* K).

Selected specimens examined. QUEENSLAND: Gilruth Plains Station, 15 Apr. 1967, *R. Barker* (CANB).
NEW SOUTH WALES: 20 miles [*c.* 32 km] W of Hay, *R. Schodde* 4197 (CANB); 9 miles [*c.* 14 km] N of Forbes, 26 Apr. 1965, *B. Whitehead* (CANB).
VICTORIA: Benjeroop State Forest, *A.C. Beauglehole* 83163 (CANB).

Distribution. Found in south-eastern Queensland, New South Wales, and Victoria.

Notes. This species is very similar to *Leiocarpa websteri* which typically has leaves that are broader than those of *L. panaetioides* while its involucral bracts are glandular puberulous (not woolly) and more rigid, however, the two taxa grade into each other and many specimens that belong to this complex cannot be confidently placed with either species.

8. Leiocarpa semicalva (F. Muell.) Paul G. Wilson, *comb. nov*

Helichrysum semicalvum F. Muell., Fragm. 2: 156 (1861). – *Leptorhynchos ambiguus* Benth. var. *semicalvus* (F. Muell.) Benth., Fl. Austral. 3: 609 (1867) *comb. illeg.* – *Chrysocephalum semicalvum* (F. Muell.) Paul G. Wilson, *Muelleria* 7: 520 (1992). *Type citation:* In rupibus tractus Barrier Range, Beckler; in montibus McDonnell Ranges Australiae centralis, J.M. Stuart. *Type:* Macdonnell Range, [Northern Territory], *J.M. Stuart*, (*lecto:* MEL 108093, here designated).

Typification. I have seen only the J.M. Stuart syntype of *Helichrysum semicalvum*; this has leaves that are entire, revolute on the margins, woolly beneath and prominently scabrid with glandular hispid hairs above, the female florets are epappose. In his original description, Mueller describes the female florets as having no, one, or few pappus bristles, whereas in material I have examined of this species, as lectotypified here, the female florets are without bristles, therefore it is possible that the other syntype represents a different taxon.

8a. Leiocarpa semicalva (F. Muell.) Paul G. Wilson subsp. **semicalva**

Helichrysum ambiguum Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 24(1): 195 (1851), *nom. illeg., non* (Ray) Presl (1826). – *Leptorhynchos ambiguus* Benth., Fl. Austral. 3: 609 (1867). – *Chrysocephalum ambiguum* (Benth.) Anderb., *Opera Bot.* 104: 119 (1991). *Type:* Nova hollandia [Western Australia], *J. Drummond* 3rd coll. n. 121 (*syn*: MEL 108096) and 4th coll. n. 220 (*syn*: MEL 108098).

Selected specimens examined. WESTERN AUSTRALIA: Tom Price, 19 Jan. 1968, *A.C. Robinson* (CANB).
NORTHERN TERRITORY: Ruby Gap, *R.W. Purdie* 2381 (CANB).
SOUTH AUSTRALIA: Bibliando Station, *D. Chinner* 4 (CANB).
NEW SOUTH WALES: 45 km from Broken Hill towards Tibooburra, *A.M. Lyne* 1835 (CANB).

Distribution. Widespread in arid and semi-arid Australia.

8b. Leiocarpa semicalva subsp. **tenuifolia** Paul G. Wilson, *subsp. nov.*

Ixiolaena sp. 1, T.D. Stanley & E.M. Ross, Fl. South-eastern Queensland 2: 542 (1986).

Subspecies haec ab. subsp. *semicalvo* differt foliis longis tenuibus, a quibus supra glabrescentibus, infra gossypinis.

Typus: Boatman Station, Queensland, 20 March 1947, *S.L. Everist* 2760 (*holo:* BRI 339534).

Erect *perennial* to 45 cm high. *Stems* slender, woolly. *Leaves* linear-acuminate, margins revolute, *c.* 5 cm long, diminishing upwards, glabrescent above, cottony below. *Capitula* terminal to slender peduncles. *Involucre* hemispherical, *c.* 6 mm high; bracts *c.* 4 seriate, narrowly oblong to linear, somewhat woolly, the outer largely scarious and straw-coloured, the inner with herbaceous claw and weak, acuminate and somewhat lacerate scarious lamina. *Outer florets* female with slender corolla; pappus absent. *Bisexual florets* numerous; corolla *c.* 5 mm long, narrowly campanulate above, almost glabrous. *Cypsela c.* 1.5 mm long, smooth. *Pappus bristles* numerous, capillary, almost equal to corolla, barbellate, the barbs longer at apex.

Selected specimens examined. QUEENSLAND: Glenoie, *S.L. Everist* 1747 (BRI); Tatala, *S.L. Everist* 3419 (BRI); Ambathala Range, 9 km E of Miles, *D. Halford* Q2065A (BRI); 50 km E of Adavale, Ambathala Range area, *C. Sandercoe* A315 (BRI).

Distribution. Found in south-east Queensland; occurring in *Eucalyptus–Acacia* woodland in sandy loams.

Etymology. The epithet is derived from the Latin – *tenuis* slender and *folium* – leaf, with reference to the slender leaves of this subspecies.

Notes. Subspecies *tenuifolia* differs from subsp. *semicalva* in having long, linear leaves which are smooth and glabrescent above and cottony below. A collection from "between Bourke and Cobar", New South Wales (MEL 600854) agrees with subsp. *tenuifolia* except for for the presence of both glandular and cottony hairs on the leaves and stems; it may represent a southern variant of this taxon.

8c. Leiocarpa semicalva subsp. **vinacea** (Haegi) Paul G. Wilson, *comb. nov.*

Helichrysum ambiguum Turcz. subsp. *vinaceum* Haegi, Fl. South Austral. 3: 1535 (1986). – *Chrysocephalum semicalvum* subsp. *vinaceum* (Haegi) P.S. Short, *Muelleria* 7: 520 (1992). *Type:* Amoorinyinna Hill, *c.* 26 km south-west of Everard Park Homestead, South Australia, 13 September 1963, *Hj. Eichler* 17479 (*holo:* AD, *n.v.*).

Distribution. Found in the far north of South Australia.

Notes. This subspecies was described from a plant collected in the far north of South Australia. Much of the material of *L. semicalva* collected in the mountain ranges of the southern portion of the Northern Territory and in the Rawlinson Range district of Western Australia agrees with the brief original description of subsp. *vinacea* except for the branches which do not have the vinaceous coloration mentioned by Haegi.

9. Leiocarpa supina (F. Muell.) Paul G. Wilson, *comb. nov.*

Ixiolaena supina F. Muell., *Trans. Proc. Victorian Inst. Adv. Sci.* 37 (1855). *Type:* Insula halmaturorum [Kangaroo Island], South Australia, *F. Mueller* (*lecto:* MEL 271180, here designated).

Selected specimens examined. SOUTH AUSTRALIA: Flinders Chase Conservation Park, Kangaroo Island, *L. Haegi* 2304 (CANB).
TASMANIA: Dover Island, *J.S. Whinray* 1110 (CANB); Deal Island, *J.S. Whinray* 1243 (CANB).

Distribution. This species occurs on the south coast and off-shore islands of South Australia, and on the islands of Bass Strait, Tasmania.

Typification. Mueller gave the following locality and habitat details for the species: "Amongst rocks on the south coast of Kangaroo Island". The lectotype bears a label with a note in Mueller's handwriting: "Inter rupus litoris australis arenosi insulae halmaturorum promineus, frequens".

Note. Leiocarpa supina varies considerably in morphology between the disjunct localities both in the size of the capitula and in their indumentum, but there is no clear suggestion of separation into distinct species or subspecies.

10. Leiocarpa serpens (Everett) Paul G. Wilson, *comb. nov.*

Chrysocephalum serpens Everett, *Telopea* 8: 311 f. 1 (1999). *Type:* Carrae State Forest, New South Wales, 7 December 1987, *J. Everett* 1014 & *D. Binns* (*holo:* NSW, *n.v.*).

Selected specimen examined. NEW SOUTH WALES: Hillgrove Gorge, *G.L. Davis* (NSW 470087).

Distribution. Found in the coastal ranges of New South Wales north of Taree where growing on skeletal soils of metamorphosed sedementary rock (*fide* Everett *op. cit.*).

Note. This species differs from other members of the genus in having a conic, not convex, receptacle.

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