

New subspecies of *Leionema bilobum* (Rutaceae)

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Abstract

Morphological variation in *Leionema bilobum* (Lindl.) Paul G. Wilson is described taxonomically as four subspecies: viz. subsp. *bilobum*, which is restricted to the eastern ranges of Grampians National Park, Victoria; subsp. *thackerayense* Duretto & K.L.Durham *subsp. nov.*, which is restricted to the Victoria Range, Grampians National Park, and the nearby Black Range, Victoria; subsp. *truncatum* (Hook.f) Duretto & K.L.Durham *stat. et comb. nov.*, which is endemic to Tasmania; and subsp. *serrulatum* (F.Muell.) Duretto & K.L.Durham *stat. et comb. nov.*, which is restricted to the Eastern and Gippsland Highlands, Victoria. A key is provided and all subspecies are illustrated.

Introduction

Phebalium bilobum Lindl. was described by Lindley (in Mitchell 1838) from material collected by Major Thomas Mitchell on his third expedition into the interior of Eastern Australia. The type material came from Mt William, the Grampians Ranges, western Victoria. When describing *Eriostemon hillebrandii* F.Muell., Mueller (1854) included *P. bilobum* as a synonym, thus rendering *E. hillebrandii*, and the two varieties of *E. hillebrandii* he described in that publication, illegitimate. Mueller's varieties are *E. hillebrandii* var. *brevifolius* F.Muell. from the Mt Lofty Ranges (though he did state Victoria Ranges in error - see Willis 1957, Wilson 1970) and *E. hillebrandii* var. *longifolius* F.Muell. from Mt William. In 1855 Hooker described *P. truncatum* Hook.f. from material collected in Tasmania and later Mueller (1858), still adopting a broad view of *Eriostemon* Sm., described *E. serrulatus* F.Muell. from Gippsland (Victoria). *Eriostemon hillebrandii*, *P. truncatum* and *E. serrulatus* were placed under *P. bilobum* by Bentham (1863) who stated that the species was found in South Australia, Victoria and Tasmania. Engler (1931, p. 260) does cite a '*Ph. Hillebrandii* F.Müll.' under *P. bilobum* but this is not a legitimate combination. In the first half of the 20th Century most regional floras adopted a broad view of *P. bilobum*, following Bentham (1863). Willis (1957) considered *P. bilobum* to be too diverse and erected *P. hillebrandii* J.H.Willis (based on *E. hillebrandii* var. *brevifolius*) for the South Australian material and referred all Tasmanian and Victorian material to *P. bilobum*.

When revising *Phebalium* Vent., Wilson (1970) discussed variation found in *P. bilobum* and indicated that each of the three areas of distribution (viz. the Grampians Ranges, west Gippsland and Tasmania) had a morphologically distinctive race. With the limited material he had at hand, he concluded that these forms did not warrant recognition as subspecific taxa. Later Wilson (1998) transferred those species he had

placed in *Phebalium* section *Leionema* (F.Muell.) Benth. into the new genus *Leionema* (F.Muell.) Paul G.Wilson and made the new combination *L. bilobum* (Lindl.) Paul G.Wilson. *Leionema bilobum* is found in south-eastern Australia and has a particularly disjunct distribution: in Victoria it is found in the Grampians Ranges and nearby Black Range, the southern parts of the Eastern Highlands and the Gippsland Highlands, and in Tasmania it is found on Flinders and Cape Barren Islands (Furieux Group), in the northern and eastern areas of the island of Tasmania, and on some near shore islands on the east coast.

Durham (1998) analyzed the morphological and isozyme variation found in *L. bilobum*. In this study, four morphological groups were identified: group 1 from Mt William, Wonderland Range, and Serra Range from the Grampians; group 2 from Tasmania; group 3 from the Victoria Range of the Grampians Ranges; and group 4 from the Eastern and Gippsland Highlands. Durham (1998) concluded that the four groups deserve taxonomic recognition at the subspecific level but did not publish any formal nomenclature.

The opportunity is taken here to publish an account of these taxa in anticipation of the forthcoming *Flora of Australia* treatment of the family. Group 1 (of Durham 1998) matches the type of the species and refers to *L. bilobum* subsp. *bilobum*. Group 2 corresponds to *E. truncatum* and so the new combination, *L. bilobum* subsp. *truncatum* (Hook.f.) Duretto & K.L.Durham is made. Group 3 is here described as *L. bilobum* subsp. *thackerayense* Duretto & K.L.Durham. Group 4 matches the type of *E. serrulatum* and so the new combination, *L. bilobum* subsp. *serrulatum* (F.Muell.) Duretto & K.L.Durham, is made.

Taxonomy

Leionema bilobum (Lindl.) Paul G.Wilson, *Nuytsia* 12: 271 (1998); *Phebalium bilobum* Lindl. in T. Mitch., *Three Exped. Australia* 2: 177 (1838); *Eriostemon hillebrandii* F.Muell. *Trans. Philos. Soc. Victoria* 1: 10 (1854), *nom. illeg.* [*P. bilobum* cited in synonymy]. Type: **VICTORIA:** GRAMPPIANS: Mt William, 15 July 1836, T. Mitchell 249 (holotype: CGE *n.v.*, photograph CANB *vide* Wilson, *Nuytsia* 1: 108 (1970); isotypes: K 278729, images HO 532028 & MEL, MEL 1599695). NOTE: MEL 1599695 has the collector's number '249' and J.H. Willis, on a determination slip dated 24 July 1963, noted that the specimen was a 'duplicate type' that was collected by John Richardson. K 278729 does not have collection details apart from 'Major Mitchell's Expedition' and is a good match of MEL 1599695.

Shrub or small tree to 4 m high; *branchlets* slender, terete or slightly angular when young, with a moderately dense to dense indumentum of stellate hairs. *Leaves* with petioles to 2.5 mm long; lamina chartaceous, shortly ovate-oblong and constricted below apex (Grampians, Tas.) or narrowly elliptic-oblong or oblong (Gippsland), 7–52 mm long, 2–10 mm wide, apex truncate to strongly retuse, minutely glandular punctate, sparsely stellate-hairy to glabrous, midrib slightly impressed above, margins flat or slightly recurved, entire to strongly serrate. *Inflorescence* a terminal cyme, 5–10-flowered; flowers in axils of small terminal bracts or in short pedunculate clusters; pedicels 2–8 mm long, green or red, glabrous or glabrescent or sparsely to densely minutely stellate-hairy. *Sepals* deltate, c. 0.5–0.75 mm long, sparsely stellate-hairy. *Petals* white, pink or red towards apex or sometimes red or pink on abaxial surface, narrowly elliptic, 3–5 mm long, glabrous. *Stamens* subequal to petals, anthers pale yellow. *Disc* short-cylindric, red or green. *Carpels* 2–3(–4), glabrous or rarely hirsute.

Cocci narrowed at apex with terminal rostrum c. 1 mm long, smooth, 4–7 mm long. Flowering May–Nov.; fruiting Oct.–Feb. **Notched Phebalium**. (Fig. 1)

Key to the subspecies of *Leionema bilobum*

1. Margin of leaves smooth, not serrate, nor bilobed at tip subsp. **2. thackerayense**
- 1: Margin of leaves serrate, sometimes only slightly so and then bilobed at the tip..... 2

2. Base of leaves usually truncate, sometimes slightly cordate or rounded; hairs on stem 0.5–1 mm long (Vic. - Grampians Ranges) subsp. **1. bilobum**
- 2: Base of leaves cuneate or attenuate; hairs on stem to 0.25 mm long (Vic. - Gippsland area; Tas.)..... 3

3. Leaves 12–25 mm long, leaf length: leaf width at the broadest point 1.2–4(–7); shrub, 0.5–2 m tall (Tas.) subsp. **3. truncatum**
- 3: Leaves 16–52 mm long (longest leaf > 30 mm long), leaf length: leaf width at the broadest point 4–7; tall bush or small tree, to 4 m tall (Vic. - Gippsland area)..... subsp. **4. serrulatum**

1. *Leionema bilobum* (Lindl.) Paul G. Wilson subsp. *bilobum*

Eriostemon hillebrandii var. *longifolius* F. Muell., *Trans. Philos. Soc. Victoria* 1: 10 (1854), *nom. illeg.* as *E. hillebrandii nom. illeg.* [see details under *L. bilobum* above]. Types: **VICTORIA**: GRAMPIANS: Mt William, November 1853, *F. Mueller* (syntypes: MEL 4616, 4611); Grampians, *F. Mueller* (possible syntype: MEL 4608).

Leionema bilobum subsp. 1 (Grampians), *fide* Ross and Walsh (2003).

Shrub 0.1–0.6(–2.5) m high; rays of hairs 0.5–1 mm long. *Leaves* narrow-lanceolate, 9–19 mm long, 2–8 mm wide, longest leaf usually 14–18 mm long, leaf length : leaf width 1.5–5(–9), margins serrate, lamina constricted below apex, apex strongly obcordate or retuse, base usually truncate, sometimes slightly cordate or rounded. *Pedicels* 2–8 mm long, glabrous or glabrescent or sparsely to densely minutely stellate-hairy, *Sepals* 0.5–0.75 mm long, usually with a tuft of hairs at the tip or sparsely pubescent. *Petals* white, 3–5 mm long. *Carpels* glabrous to densely pilose. Flowering May–Nov.; fruiting Dec.–Feb. (Fig. 1a–c).

Selected specimens seen: **VICTORIA**: GRAMPIANS: Asses Ears, c. 3 km S along Wallaby Rocks road from its intersection with Asses Ears Road, 37°07'S 142°18'E, 14 Oct. 1986, *J. Westaway* 321 (MEL); beside track about 1.3 m below summit of Mt Rosea, 37°08'S 142°26'E, 10 Oct. 1962, *T.B. Muir* 2598 (HO, MEL); c. 2 km SW from Halls Gap at the Grand Canyon, 37°08'S 142°02'E, 11 May 1992, *V. Stajsic* (MEL 2011179); West of road between Tower Hill and Stony Cr., 37°12'S 142°29'E, 10 Nov. 1976, *P.K. Gullan* (MEL); upper western slopes of Boronia Peak, 25 Sept. 1959, *T.B. Muir* 841 (MEL, NSW); Redman road, 3 km S from Lake Bellfield, 37°13'S 142°35'E, 28 Sep. 1991, *V. Stajsic* 323 (MEL); A-top Mt Clung, E side of Serra Range, 9 Jun. 1968, *A.C. Beaglehole* 25270 (MEL); Wallaby Rocks, 1 Oct. 1967, *A.C. Beaglehole* 25270 and *Corricks* (MEL); On track to Reeds Lookout, 7 Oct. 1967, *D.J.E. Whibley* 2094 (MEL); on road to Mirranatwa Gap, 1.3 km W of main Grampians road, 37°26'S 142°27'E, 3 Sept. 1997, *P.G. Neish* 398 (MEL); Mt Difficult, among rocks above lookout point, 9 Nov. 1963, *J.H. Willis* (MEL 2101036); Kalyrna Falls, Mt William Creek, 11 Dec. 1967, *A.C. Beaglehole* 16571 (MEL); 1.5 miles NE of Silverband Falls, 28 Oct. 1952, *R. miles* (2 km)

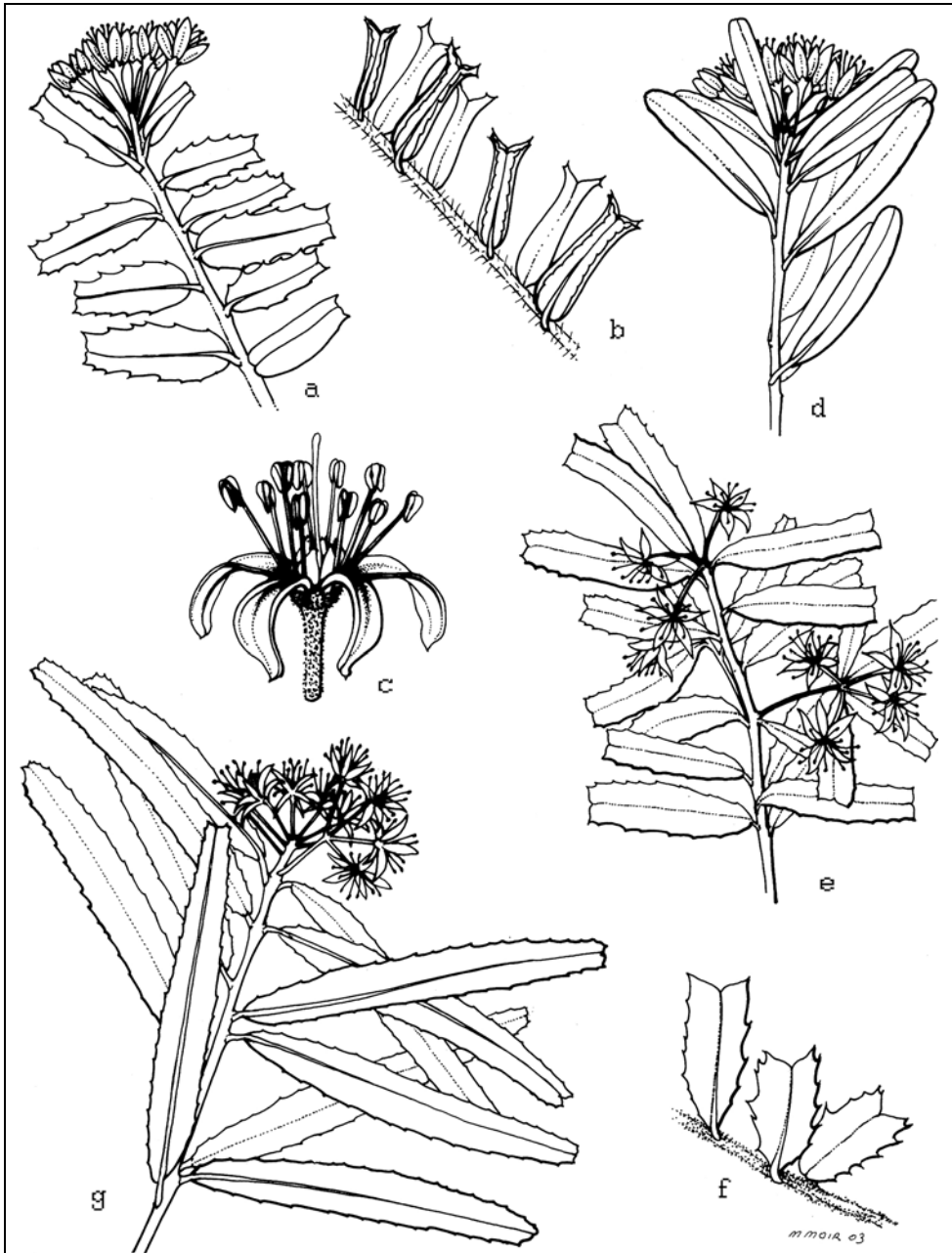


Figure 1. a-c, *Leonema bilobum* subsp. *bilobum*: a, b - habit, $\times 1.5$; c - flower, $\times 4$ (a, c - Neish 398 [MEL]; b - Melville 1791 [MEL]). d, *L. bilobum* subsp. *thackerayense*: habit, $\times 1.5$ (Filson 5293 [MEL]). e-f, *L. bilobum* subsp. *truncatum*: habit $\times 1.5$ (e - Moscal 451 [HO]; f - Milligan 619 [HO 4949]). g, *L. bilobum* subsp. *serrulatum*: habit $\times 1.5$ (Seebeck [MEL 693016]).

above Mafeking Huts, 30 Oct. 1971, J.H. Willis (MEL 501859, NSW); Wonderland Range, near car park, 17 Sep. 1955, A.C. Beauglehole 7226 (MEL).

Distribution and ecology: *Leionema bilobum* subsp. *bilobum* is restricted to the eastern parts of Grampians National Park including Mt William, Mt Difficult, and the Wonderland and Serra Ranges. The taxon is found in heath and *Eucalyptus* or *Banksia* woodland on sandstone.

Conservation code: Ross and Walsh (2003) considered this taxon to be rare. All known populations are found in the Grampians National Park.

2. *Leionema bilobum* subsp. *thackerayense* Duretto & K.L. Durham, subsp. nov.

A subspecies typica foliis marginibus laevibus differt.

Type: **VICTORIA:** GRAMPIANS: Victoria Range Road, 25 Oct. 1976, P.G. Mathews (holotype: MEL 524253).

Leionema bilobum subsp. 2 (Victoria Range), *vide* Ross and Walsh (2003).

Shrub 0.2–1.5 m high; rays of hairs to 0.25(–0.5) mm long. *Leaves* narrowly elliptic-oblong to slightly lanceolate, 7–33 mm long, 2–6 mm wide, longest leaf usually 28–33 mm long, leaf length : leaf width 3.5–6.2, margins smooth, apex slightly truncate or retuse to obtuse, base more or less cuneate. *Pedicels* 3–7 mm long, glabrous or glabrescent. *Sepals* c. 0.5 mm long, glabrous or few hairs at tip. *Petals* white, 3–4 mm long. Carpels glabrous. Flowering Aug.–Nov.; fruiting material collected in Nov. (Fig. 1d)

Specimens seen: **VICTORIA:** GRAMPIANS: Victoria Range near Mt Thackeray, Deep Creek, 37°19'S 142°16'E, 20 Aug. 1986, J.A. Armstrong 5084 (MEL); Victoria Range, Castle Rock, 6 Nov. 1966, A.C. Beauglehole 15885 (MEL); Victoria Range, Castle Rock, 11 Nov. 1966, A.C. Beauglehole and J.H. Willis ACB16128 (MEL); Ridge near Kappa Cave, Victoria Range, 16 Sep. 1963, R. Filson 5293 (MEL, NSW); Victoria Range Rd, D/18/C/11d, 25 Oct. 1976, P.G. Mathews (MEL 524253); Goats Track, rocky outcrop near sharp bend on road, Victoria Ra., Grampians N.P., 37°17'S 142°21'E, 28 Feb. 1998, K.L. Durham 1–5, M.F. Duretto and P.Y. Ladiges (KLD 1, 3, 5 – MEL; KLD 2, 4 – HO, MEL).

Distribution and ecology: *Leionema bilobum* subsp. *thackerayense* is found in the western parts of the Grampians National Park, with most collections being made near and on Mt Thackeray, Victoria Range. Plants have been seen on the Black Range to the west of Grampians Ranges (MFD pers obs; at c. 37°10'S 142°0'E). The subspecies is found in rocky areas (usually sandstone) in or near eucalypt woodland. Sometimes it is found growing in boulder fields.

Conservation status: Ross and Walsh (2003) considered that there was insufficient information to formulate the conservation status of this subspecies, which unfortunately appears to be true. Populations seen during this study were isolated and small. Further detailed field surveys are required to ascertain the conservation status of *L. bilobum* subsp. *thackerayense*. Most populations are found in Grampians National Park.

Etymology: The subspecific epithet refers to Mount Thackeray, the peak near which the majority of collections have been made.

3. *Leionema bilobum* subsp. *truncatum* (Hook.f.) Duretto & K.L.Durham, *stat. & comb. nov.*; *Phebalium truncatum* Hook.f., Fl. Tasm. 1: 64, t 9 (1855). Type citation: "Flinder's Island, in Bass' Straits, and Schouten Island, East Coast, Gunn [1947]". Type: TASMANIA: EAST COAST: Schouten Island, East Coast, V.D.L. [Tasmania], Aug. 1844, [J. Milligan ?] Gunn 1947 (lectotype, here designated, K 278731, images HO 532027 & MEL); FURNEAUX: Flinders' Island & Cape Barren Island, Oct. 1844, J. Milligan 619 [Gunn 1947] (residual syntype: K 278732, images HO 532027 & MEL; residual isosyntype: HO 4944); Flinders' Island, J. Milligan 619 (possible residual isosyntype: MEL 4626).

Shrub 0.5–2 m high; hairs with rays to 0.25 mm long. *Leaves* ovate-oblong to narrow oblong-ovate, 12–25 mm long, 3–10 mm wide, longest leaf usually 11–24 mm long, leaf length : leaf width 1.2–4(–7), margins serrate, serrations often prominent, rarely with only a few small serrations, apex truncate to strongly obcordate, base usually cuneate. *Pedicels* 2.5–5 mm long, glabrescent. *Sepals* c. 0.5 mm long, with a dense tuft of hairs at tip. *Petals* white, 3–4 mm long. *Carpels* glabrous. Flowering (Aug.) Sep.–Nov.; fruiting Oct.–Jan. (Fig. 1e, f).

Selected specimens seen: TASMANIA: FURNEAUX GROUP: Top of Mt Killiecrankie, Flinders Island, 39°49'S 147°51'E, May 1877, A. Simson 622 (HO); Mount Tanner, Flinders Island, 39°53'S 147°49'E, 10 Dec. 1975, M.P. Cameron and W.M. Curtis (HO 29727); Upper reaches of Pats River, 40°03'S 148°02'E, 19 Oct. 1985, P. Collier 904 (HO); c. 1 km N of Mount Leventhorpe, Flinders Island, 40°04'S 148°05'E, 24 Sep. 1989, P. Collier 4139 (HO); Devils Chimney, Cape Barren Island, 40°20'S 148°8'E, 9 Oct. 1988, P. Collier 3588 (HO); Cape Barren Island, 40°25'S 148°15'E, 22 Oct. 1844, J. Milligan 619 (HO 4949); NORTH WEST: Machinery Creek, Cethana, 41°29'S 146°9'E, 13 Sep. 1992, A.M. Buchanan 12639 (HO); Gog Range, near top of range, 41°30'S 146°23'E, 26 Oct. 1997, A. Aliano (HO 322892); MIDLANDS: Dazzler Range, Kerrisons Road, 1.5 km SE from junction with Asbestos Road, 41°10'S 146°42'E, 19 Jan. 1989, F.E. Davies 1069 and P. Ollerenshaw (AD, HO, MEL); NORTH EAST: Road from Diddleum Plains to Ringarooma, 41°20'S 147°38'E, Dec. 1968, M. Burns 704 and T.E. Burns (HO); Near Sloop Lagoon, Bay of Fires [c. 14km N of St Helens], 41°12'S 148°16'E, Sep. 1990, E.B. Clayton (HO 127095); BEN LOMOND: Blue River, Blue Tier 41°13'S 147°57'E, Oct. 1879, A. Simson 1571 (HO); EAST COAST: Organ Hill, near Bicheno, 41°47'S 148°11'E, 20 Mar. 1980, A. Moscal 193 (CANB, HO); Snow Hill (SH 041 E) plateau, 41°55'S 147°50'E, 06 Oct. 1999, B. French 323 (HO); Mt Amos, 42°10'S 148°18'E, 19 Sep, W.M. Curtis (HO); Gates Bluff heaths, Freycinet Peninsula, 42°13'S 148°20'E, 29 Dec. 1987, A.M. Buchanan 10670 (HO); Southern end of Freycinet Peninsula, 42°17'S 148°18'E, 06 Jul. 1985, P. Collier 625 (HO); Schouten Island, 42°18'S 148°18'E, Apr. 1925, L. Rodway 117 (HO); CENTRAL HIGHLANDS: Mount Roland, S of Sheffield, 41°28'S 146°16'E, 27 Oct. 1974, D.A. Ratkovsky 1307 and A.V. Ratkovsky (CANB, HO, MEL); Mount Vandyke, 41°30'S, 146°13'E, 21 Apr. 1985, P. Collier 411 (HO).

Typification: The labels for the sheets K 278731 and K 278732 do not include information on the collector though they are in Gunn's handwriting. Gunn did not collect from either Cape Barren Island or Schouten Island (Buchanan 1988, 1990). Milligan did collect from Schouten Island (Buchanan 1988) and it is probable that the lectotype chosen here was made by Milligan. Milligan also collected on both Flinders and Cape Barren Islands in October and November of 1844 (Buchanan 1988, 1990; HO 4944) and it is probable that the specimens K 278732, HO 4944 and MEL 4626 are part of that gathering.

Distribution and ecology: *Leionema bilobum* subsp. *truncatum* is found on Flinders and Cape Barren Islands (Furneaux Group) and in northern and eastern regions (including some near shore islands) of the island of Tasmania. It is found in rocky, usually granitic, areas in woodland, shrubland and heath.

Conservation status: This subspecies is widespread, found in several reserves (eg. Dazzler Range and Freycinet National Parks) and appears to be secure.

4. *Leionema bilobum* subsp. *serrulatum* (F.Muell.) Duretto & K.L.Durham, *stat. & comb. nov.*; *Eriostemon serrulatus* F.Muell., *Fragm.* 1: 4 (1858). Type: **VICTORIA:** EASTERN HIGHLANDS: Bunip-Bunip Creek, Victoria, *F.Mueller* (holo: MEL 4620; iso: K 278728, images HO 532029 & MEL, MEL 4622).

Leionema bilobum subsp. 3 (West Gippsland), *vide* Ross and Walsh (2003).

Dense *shrub* or small tree to 4 m high, often suckering from roots; hairs with rays to 0.25 mm long. *Leaves* narrowly elliptic-oblong or oblong, 16–52 mm long, 4–8 mm wide, longest leaf (30–)36–52 mm long, leaf length : leaf width 4–7, margins serrate, apex slightly truncate or retuse, base more or less cuneate or attenuate. *Pedicels* 2–7 mm long, with a sparse to moderately dense pubescence. *Sepals* c. 0.5 mm long, abaxial surface with scattered stellate hairs. *Petals* white, sometimes with a faint pink blush, 4–5 mm long. Flowering Sept.-Nov.; fruiting Nov.-Jan. (Fig. 1g).

Selected specimens seen: **VICTORIA:** EASTERN HIGHLANDS: O'Shannessy Catchment, Track #5. 6.5 km due S from Mt Grant, 37°36'S 145°49'E, S29, 6 Nov. 1985, *N.G. Walsh 1493* (CANB *n.v.*, MEL); Upper Yarra Water Catchment, S40, 24 Nov. 1982, *A.C. Beauglehole 71720 and C.M. Beauglehole* (MEL); 3 miles W of Mt Gregory, upper Yarra Catchment, Fehring Ck area, S40, 37°42'S 146°05'E, 21 Oct. 1980, *S.J. Forbes 947* (MEL); E of Warburton on Lay Track at its crossing of Mississippi Creek, S38, 37°46'S 145°47'E, 22 Sep. 1983, *M.G. Corrick 8635* (HO, MEL, NSW); near Mt Baw Baw, 1 Apr. 1958, *J. Galbraith ACB7232* (MEL); Seven Acre Creek, 4.5km SSE of Powelltown, 37°52'S 154°45'E, 16 Oct. 1987, *D.E. Albrecht 3312* (BRI *n.v.*, CANB *n.v.*, HO, MEL); Bunyip State Park, Tomahawke Gap, 37°54'S 145°40'E, 20 Nov. 1997, *C.M. Edwards 31* (MEL); Rysons Creek, N of Labertouche, Oct. 1973, *J.H. Seebeck* (MEL 693016); c. 5 miles [8 km] N of Labertouche, on Tea Tree Road, 2 Oct. 1960, *T.B. Muir 1283* (HO, MEL, NSW); GIPPSLAND HIGHLANDS: Grand Ridge Road, 1 km W of Dingoes Creek Road, 19 km NNE of Foster P.O., T33, 21 Dec. 1978, *A.C. Beauglehole 63003* (MEL).

Distribution and ecology: *Leionema bilobum* subsp. *serrulatum* is found in southern parts of the Eastern Highlands and the Gippsland Highlands, Victoria. It usually grows in wet sclerophyll forest or riparian open forest, often on steep slopes. The taxon actively reproduces from suckering and can form dense stands.

Conservation status: Ross and Walsh (2003) considered this taxon to be rare.

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