

## Three new species of *Styphelia* (Ericaceae: Epacridoideae: Styphelieae) from the central south coast of Western Australia

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### SHORT COMMUNICATION

Three new morphologically similar species, *Styphelia halophila* Hislop, *S. lacsalaria* Hislop and *S. microcardia* Hislop, all with short, broad leaves, innocuous leaf tips and recurved sepals, are described and illustrated. *Styphelia lacsalaria* and *S. microcardia* previously known as *Leucopogon* sp. Mount Heywood (M.A. Burgman 1211) and *L.* sp. Bremer Bay (K.R. Newbey 4667) respectively (Western Australian Herbarium 2018–), grouped together as part of a very weakly supported subgroup of Group X in the phylogeny of Puente-Lelièvre *et al.* (2016). Based on morphological similarity, *S. halophila* is regarded as a close relative of *S. lacsalaria*.

***Styphelia halophila* Hislop, *sp. nov.***

*Typus*: upper reaches of Lort River, *c.* 7 km west of Belgian Road, along old survey track *c.* 20 km north of Rolland Road [north of Cascade], Western Australia, 14 March 2001, M. Golding 3 (*holo*: PERTH 05791049; *iso*: CANB, CNS, NSW).

*Leucopogon* sp. Lort River (M. Golding 3), Western Australian Herbarium, in *Florabase*, <https://florabase.dbca.wa.gov.au/> [accessed 17 November 2023].

Erect, compact *shrubs*, to *c.* 100 cm high and 150 cm wide, single-stemmed at ground level and most likely with a fire-sensitive rootstock. Young *branchlets* with a sparse to dense indumentum of straight or decurved hairs, to *c.* 0.2 mm long. *Leaves* helically arranged, shallowly to steeply antrorse; apex obtuse to subacute, mucro lacking; base rounded or cuneate; petiole usually 0.1–0.3 mm long, very occasionally to 0.5 mm, usually sparsely hairy on adaxial surface and margins, sometimes  $\pm$  glabrous throughout; lamina ovate, broadly ovate or depressed-ovate to obovate, broadly obovate or depressed-obovate, 0.8–2.0 mm long, 0.8–2.0 mm wide, slightly discoloured, planoconvex or adaxially concave, longitudinal axis slightly to moderately recurved; adaxial surface shiny, sparsely hairy throughout or sometimes hairs restricted to lower half only, venation not evident; abaxial surface paler, shiny, at least on the veins, glabrous throughout, or sparsely hairy on the veins, with 5–9 primary veins, usually distinctly grooved between the veins; margins usually with short, coarse hairs to 0.05 mm long, or  $\pm$  glabrous. *Inflorescence* axillary, erect, arising from the axils of regular, mature leaves; axis 1.1–1.5 mm long, 1(2)-flowered,  $\pm$  terete in the lower part, distinctly compressed above the fertile bract (or uppermost fertile bract if 2-flowered), with a dense indumentum, terminating in a bud-rudiment; flowers erect, sessile. *Fertile bracts* ovate to depressed-ovate, 0.7–1.2 mm long, 0.7–1.1 mm wide, subtended by 4–6 sterile bracts. *Bracteoles* broadly ovate to  $\pm$  orbicular, 1.5–2.0 mm long, 1.2–1.6 mm wide, obscurely keeled, obtuse, barely striate; abaxial surface usually sparsely hairy, occasionally  $\pm$  glabrous; margins ciliolate. *Sepals* narrowly ovate, (2.6)2.8–3.5 mm long, 1.2–1.5 mm wide, acute or subacute, distinctly recurved in the upper half; abaxial surface usually sparsely hairy in the upper half, occasionally  $\pm$  glabrous, straw-coloured (sometimes tinged purple), venation rather indistinct, with only the mid-vein evident; adaxial surface shortly hairy;

margins ciliolate with hairs to *c.* 0.1 mm long. *Corolla tube* white, obovoid, shorter than the sepals, 1.8–2.5 mm long, 1.5–2.0 mm wide, glabrous externally, internal surface glabrous throughout or with a narrow transverse band of hairs at the apex only. *Corolla lobes* white, *c.* equal to or more usually longer than the tube, 2.5–3.0 mm long, 0.7–1.0 mm wide at base, erect in basal 1/2–2/3 and then spreading and recurved, glabrous or sparsely hairy externally, internal surface with a dense indumentum of  $\pm$  terete, ornamented hairs. *Anthers* partially exerted from the tube by *c.* 7/8 of their length to fully exerted, 1.0–1.2 mm long, apex emarginate. *Filaments* terete, 0.8–1.0 mm long, attached to the anther 3/4–7/8 above anther base, adnate to the tube a little above the sinuses. *Nectary* annular, shallowly lobed, shallowly grooved below the sinuses, 0.3–0.5 mm long, glabrous. *Ovary* broadly obovoid or broadly ellipsoid, 0.8–1.0 mm long, 0.7–0.9 mm wide, glabrous, 2- or 3-locular, straw-coloured or pale green. *Style* straw-coloured, abruptly differentiated from ovary apex, (2.3)2.8–3.8 mm long, slightly scabrous towards the apex, exerted from the corolla tube but not beyond the erect bases of the corolla lobes, inserted in cylindrical depression that tightly envelops, but is free from, the style base; stigma slightly expanded. *Fruit* narrowly ellipsoid to oblongoid, 2.5–2.8 mm long, 1.3–1.6 mm wide, a little shorter than to  $\pm$  equal to the sepals, circular in transverse section, gynophore very indistinct; surface glabrous, green, smooth and  $\pm$  dry (mesocarp poorly developed); apex with well-defined subterminal shoulders, the surface then rising gently to a subacute style base; style shed before maturity. (Figure 1)

*Diagnostic characters.* Within Group X distinguished by the following character combination: habitat preference for surrounds of saline lakes and drainage lines; leaves planoconvex or adaxially concave, slightly to moderately recurved along longitudinal axis, with an obtuse to subacute, non-mucronate apex and a cuneate or rounded base; abaxial leaf surface glabrous or sparsely hairy on the veins, usually distinctly grooved between the veins; inflorescence 1(2)-flowered, terminating in a bud-rudiment; sepals (2.6)2.8–3.5 mm long, distinctly recurved distally, usually sparsely hairy; nectary annular; ovary 2- or 3-locular, glabrous; style base clearly free from ovary apex; fruit narrowly ellipsoid to oblongoid,  $\pm$  dry (mesocarp poorly developed), a little shorter than to  $\pm$  equal to the sepals, surface rising gently towards the apex from well-defined subterminal shoulders.

*Other specimens examined.* WESTERN AUSTRALIA: Lake Tay, 22 Apr. 2013, *W.R. Archer* 22041312 (CNS, PERTH); site 17 Lake Tay, 4 Aug. 2013, *W.R. Archer* 4081314 (CNS, PERTH); 11.5 km due S of Peak Charles, 6.36 km S of Peak Charles Rd on Fields Rd, 26 Sep. 1984, *M.A. Burgman* 3653 (PERTH); 13.6 km S of Peak Charles Rd on Fields Rd, Lort River crossing, 15 Jan. 1994, *A. Cochrane & K. Brown s.n.* (PERTH); 13.6 km S of Peak Charles Rd on Fields Rd (20.4 km N of Rolland Rd), SW of Peak Eleanor, Lort River crossing, 19 Sep. 1993, *G.F. Craig* 2958 A (PERTH); at Lort River crossing on Fields Rd, *c.* 4.8 km N of end of formed road to Peak Eleanor, 6 May 2003, *A. Crawford* ADC 381 (PERTH); upper reaches of Lort River, *c.* 7 km W of Belgian Rd, along old survey track, *c.* 20 km N of Rolland Rd, 29 Oct. 2000, *M. Golding* MRMG 2 (PERTH); Lort River crossing on Griggs Rd (S side), locality of Cascade, 17 May 2002, *M. Hislop & F. Hort* MH 2607 (PERTH); Lort River crossing on Grass Patch Rd, W of Grass Patch, 22 May 2004, *M. Hislop & F. Hort* MH 3223 (CNS, PERTH); Griffiths Rd, SLK 34.81, N section of road reserve [E of Cascade], 17 Apr. 2022, *K. Walkerden* KSW016-p (PERTH); UCL, 1.5 km W of endpoint of Pyramid Rd Reserve [N of Cascade], 28 May 2022, *K. Walkerden* KSW 044-p (CANB, CNS, PERTH); UCL, 1.5 km W of Cups Rd, 22 km NNE of Cups Rd and Rolland Rd intersection [NE of Cascade], 18 Feb. 2023, *K. Walkerden* KSW 240 (MEL, PERTH); UCL, 200 m W of Cups Rd, 28.3 km N of Cups Rd and Rolland Rd intersection [NE of Cascade], 18 Feb. 2023, *K. Walkerden* KSW 242 (PERTH); UCL, 1 km S of Recruit Hill, 5.7 km W of Peak Charles National Park [NE of Salmon Gums], 25 Feb. 2023, *K. Walkerden* KSW 243 (K, PERTH).

*Distribution and habitat.* Occurs on sandy rises in close proximity to the saline Lort River and around salt lakes to the north and west of the Lort River catchment, in the Mallee bioregion. Grows in halophytic heath, often in association with *Melaleuca thyoides*, *M. halmaturorum*, *Frankenia* spp. and samphires.

*Phenology.* Flowers over many months of the year, but apparently with a peak between February and May. Mature fruit has been collected in September and January but is most likely present for much of the second half of the year.





**Figure 1.** *Styphelia halophila*. A – flowering plant *in situ*; B – flowering branchlet *in situ*; C – scanned image of flowering branchlet. Scale bar C = 1 cm. Vouchers K. Walkerden 016-p (A, B), M. Golding 3 (C). Photographs by Katherine Walkerden.

*Etymology.* From the Greek *halo-* (salt-) and *philus* (loving), a reference to the preferred habitat of the species.



*Conservation status.* This species is locally common in the middle and upper reaches of the Lort River and also occurs around salt lakes in areas to the north and west of there. It is known from the south of Peak Charles National Park and is widespread in Unmanaged Reserve 2693. It therefore currently does not appear to be under conservation threat in this remote part of the state.

*Affinities.* Based on overall morphological similarity the closest relative of *S. halophila* is likely to be *S. lacsalaria*. The two have allopatric distributions with *S. halophila* occurring to the west of the more widespread *S. lacsalaria*, and both favouring similar saline or subsaline habitats. Differences between them are discussed below in the treatment of *S. lacsalaria*.

*Styphelia halophila* is especially close in general morphology to a widespread inland variant of the variable species *S. hamulosa* (E.Pritz.) Sleumer, as both have very similar-shaped leaves, a non-mucronate leaf tip and usually hairy sepals. At one locality east of Cascade, the two are known to grow in close proximity, i.e. *M. Hislop & F. Hort* MH 2607 (*S. halophila*) and *M. Hislop & F. Hort* MH 2610 (*S. hamulosa*). Critical differences between the two are as follows. Whereas *S. hamulosa* has straight sepals and shortly hairy, more or less closed, abaxial leaf grooves, in *S. halophila* the sepals are longitudinally recurved, the abaxial leaf grooves are open and if any hairs are present, they are scattered on the veins, rather than within the grooves. In addition, the fruit of *S. hamulosa* are always much longer than the sepals (vs. a little shorter than to  $\pm$  equal to the sepals) and the ovarian locule number is 5 rather than 2 or 3.

***Styphelia lacsalaria* Hislop, *sp. nov.***

*Typus:* Uncleared Crown Land, 160 m west of Styles Road, 3.7 km north north-east of Styles Road and Lignite Road intersection, Grass Patch, Western Australia, 10 December 2022, *K.S. Walkerden* KSW 205 (*holo:* PERTH 09554475; *iso:* CANB, CNS, MEL, NSW).

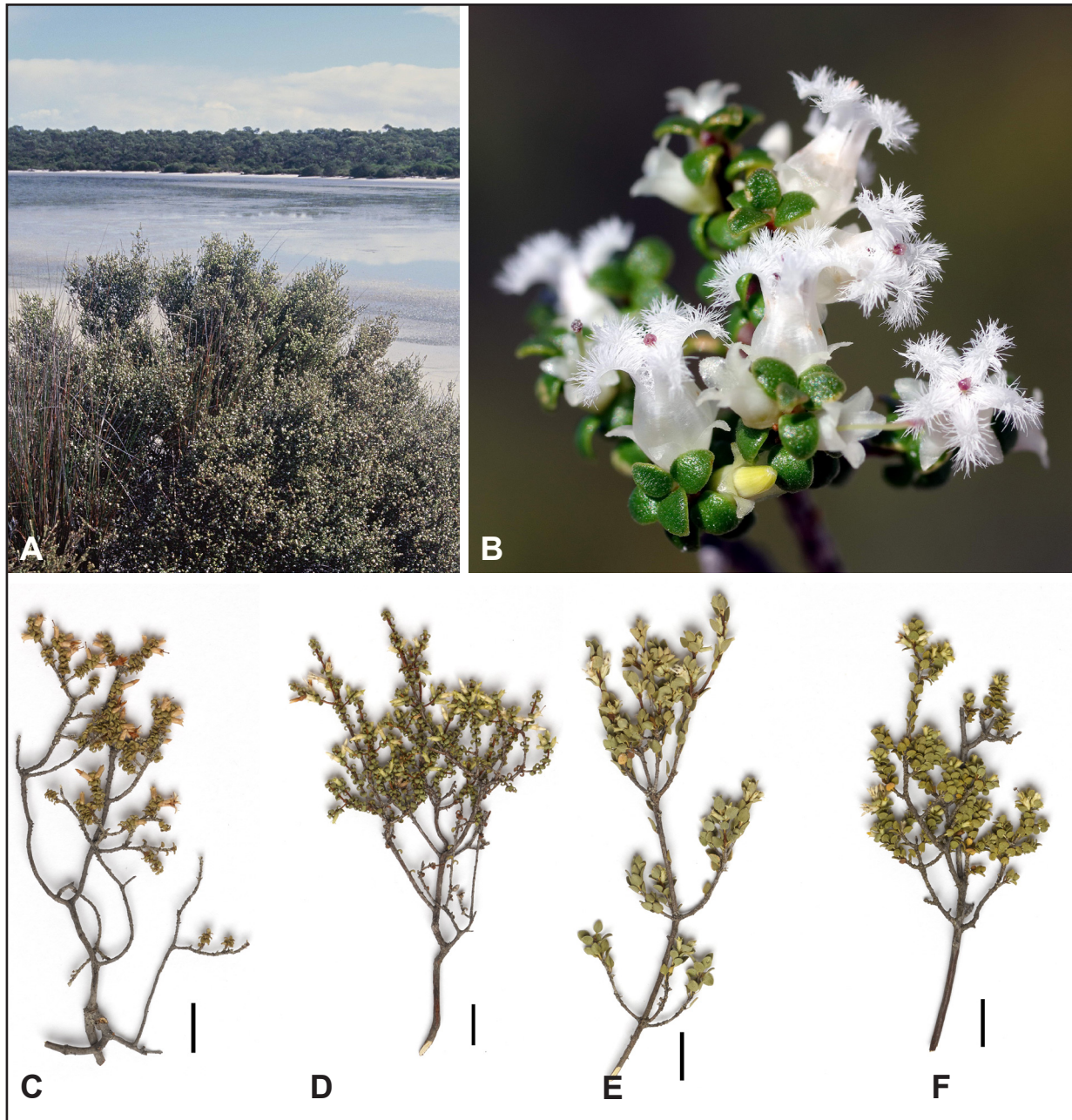
*Leucopogon* sp. Mount Heywood (M.A. Burgman 1211), Western Australian Herbarium, in *Florabase*, <https://florabase.dbca.wa.gov.au/> [accessed 17 November 2023]

Erect, compact *shrubs*, to *c.* 80 cm high and 90 cm wide, branching from close to the base, most likely with a fire-sensitive rootstock. Young *branchlets* with a sparse to dense indumentum of straight or decurved hairs to *c.* 0.3 mm long. *Leaves* helically arranged, shallowly antrorse to  $\pm$  patent; apex obtuse to acute, mucro lacking, but sometimes with a barely differentiated callus tip; base cordate, rounded, or cuneate; petiole usually well-defined, although often varying considerably in length on the same plant, 0.2–1.0 mm long, sparsely hairy on adaxial surface and margins, and sometimes also the abaxial surface or occasionally glabrous throughout; lamina rather variable in shape, even on the same plant, narrowly elliptic to transversely elliptic, or ovate to depressed-ovate, sometimes depressed-obovate, 0.8–2.3 mm long, 1.0–2.0 mm wide, usually markedly discolorous, rarely  $\pm$  concolorous, flat to adaxially convex, or sometimes slightly concave in the lower half, longitudinal axis strongly recurved to circinate; adaxial surface shiny, usually hairy with short, stiff hairs over all or part of the surface, occasionally  $\pm$  glabrous, often  $\pm$  rugose, the venation not evident; abaxial surface paler, matt, usually glabrous, sometimes very sparsely hairy, with 5–9 primary veins, flat to very shallowly grooved between the veins; margins usually with very short, coarse hairs to *c.* 0.05 mm long, or  $\pm$  glabrous. *Inflorescence* axillary, erect, arising from the axils of regular, mature leaves, 0.6–1.2 mm long, 1(2)-flowered,  $\pm$  terete in the lower part, distinctly compressed above the fertile bract, with a dense indumentum, terminating in a bud-rudiment; flowers erect, sessile. *Fertile bracts* broadly ovate to depressed-ovate, 0.5–0.8 mm long, 0.5–0.8 mm wide, subtended by 3–5 sterile bracts. *Bracteoles* broadly ovate to  $\pm$  orbicular, 0.9–1.2(1.5) mm long, 1.0–1.2 mm wide, keeled, but often obscurely so, obtuse,  $\pm$  striate; abaxial surface glabrous; margins ciliolate. *Sepals* narrowly ovate, 2.1–2.9 mm long, (0.8)1.0–1.3 wide, obtuse to acute, usually distinctly recurved in the upper half, occasionally not, or barely recurved in some flowers; abaxial surface glabrous, straw-coloured (sometimes tinged purple), venation usually rather indistinct, with only the mid-vein evident; adaxial surface shortly hairy at least in the upper half and sometimes throughout; margins ciliolate with hairs to *c.* 0.1 mm long. *Corolla tube* white, obovoid, or broadly obovoid, usually shorter than, or occasionally slightly longer than the sepals, 1.5–2.5 mm long, 1.2–1.7 mm wide, glabrous externally, internal surface

glabrous throughout or occasionally with a few hairs towards the apex only. *Corolla lobes* white, longer than or  $\pm$  equal to the tube, 1.9–2.6 mm long, 0.5–1.0 mm wide at base, erect in basal 1/2–2.3 and then spreading and recurved, usually glabrous externally, or rarely with sparse, scattered hairs, internal surface with a dense indumentum of  $\pm$  terete, ornamented hairs. *Anthers* partially exerted from the tube by *c.* 7/8 of their length to fully exerted, 0.7–1.2 mm long, apex emarginate. *Filaments* terete, 0.6–0.9 mm long, attached to the anther 3/4–7/8 above anther base, adnate to the tube a little below the sinuses. *Nectary* annular, variously lobed, shallowly grooved below the sinuses, 0.2–0.4 mm long, glabrous, sometimes with faintly papillose margins. *Ovary* broadly obovoid, broadly ellipsoid to  $\pm$  globose, 0.5–0.7 mm long, 0.5–0.7 mm wide, glabrous, 2- or 3-locular, straw-coloured or green. *Style* straw-coloured, abruptly differentiated from ovary apex, 1.9–3.4 mm long, scabrous at least in the upper half, exerted from the corolla tube but not beyond the erect bases of the corolla lobes, inserted in a cylindrical depression that tightly envelops, but is free from, the style base; stigma slightly expanded. *Fruit* narrowly ellipsoid to oblongoid, 2.0–2.6 mm long, 1.2–1.4 mm wide, a little shorter than to a little longer than the sepals, circular in transverse section, with a usually rather indistinct gynophore; surface glabrous, shiny, dark green, smooth (mesocarp poorly developed) but sometimes with irregular, longitudinal ridges; apex with well-defined subterminal shoulders, the surface then rising gently to a subacute style base; style shed before maturity. (Figures 2A–D, 3B)

*Diagnostic characters.* Within Group X distinguished by the following character combination: habitat preference for surrounds of saline lakes and drainage lines; leaves often prominently petiolate (although petiole length often variable on the same plant), flat to adaxially convex, longitudinal axis strongly recurved to circinate, with an obtuse to acute, non-mucronate apex and a cordate, rounded or cuneate base; abaxial leaf surface usually glabrous, sometimes very sparsely hairy, flat to very shallowly grooved between the veins; inflorescence 0.6–1.2 mm long, 1(2)-flowered, terminating in a bud-rudiment; sepals 2.1–2.9 mm long, usually distinctly recurved distally, glabrous; ovary 2- or 3-locular, glabrous; style base clearly free from ovary apex; fruit narrowly ellipsoid to oblongoid, a little shorter than, to a little longer than, the sepals, with strongly defined shoulders and the surface above rising gently to the apex.

*Other specimens examined.* WESTERN AUSTRALIA: Mt Beaumont land release stage 2 [NE of Condingup], 31 Dec. 1982, *E.M. Bennett* BLR 25 (PERTH); Mount Ney Rd, 2.4 km SW of intersection with Kau Rock Rd [N of Condingup], 21 Oct. 1997, *E.A. Brown* 97/369, *P.G. Wilson & N. Lam* (CHR *n.v.*, MEL *n.v.*, NSW *n.v.*, NY *n.v.*, PERTH, UNSW *n.v.*); 24 km NW of Clyde Hill [NE of Condingup], 4 May 1983, *M.A. Burgman & S. McNee* 1211 (NSW *n.v.*, PERTH); 11.7 km NW of Mt Ney Rd on Clyde Rd [N of Condingup], 20 May 1993, *G.F. Craig & B. Haberley* 2766 (NSW *n.v.*, PERTH); 2.8 km along Gibson Dalyup West Rd from junction with Coolgardie–Esperance Hwy, *c.* 3 km SW of Gibson, 17 May 2005, *R. Davis* 10809 (NSW, PERTH); junction of Boydells Rd and Coolgardie–Esperance Hwy, *c.* 12 km NNW of Gibson, 17 May 2005, *R. Davis* 10815 (PERTH); 22 km NE of Scaddan, 6 km E along Truslove Rd from junction of Coolgardie–Esperance Hwy, Truslove Nature Reserve, 19 June 2006, *R. Davis* 11007 (PERTH); 12 km NW of Gibson, 1 km N along Yates Rd from junction of Fleming Grove Rd, 27 June 2006, *R. Davis* 11071 (PERTH); *c.* 11 miles [*c.* 17.6 km] N of Dalyup, W of Esperance, 25 Feb. 1966, *A.S. George* 7665 (CANB, CNS, MEL, PERTH); [Salmon Gums Nature Reserve] at eastern end of Salmon Gums East Rd, on western edge of salt lake, east of Salmon Gums, 20 May 2002, *M. Hislop & F. Hort* MH 2649 (CANB, CNS, MEL, PERTH); Kumarl–Lake King Rd, 8.4 km from Esperance–Norseman Rd, then 150 m N to shoreline of Lake Exclamation, 21 May 2002, *M. Hislop & F. Hort* MH 2656 (CNS, MEL, PERTH); *c.* 5 m from shore line at S end of salt lake, 16 km E of Grass Patch via Starceovich and Ridley roads, 21 May 2004, *M. Hislop & F. Hort* MH 3212 (NSW, PERTH); E side of Sassella Rd, 900 m S of Salmon Gums East Rd, E of Salmon Gums, 21 May 2004, *M. Hislop & F. Hort* MH 3216 (CANB, CNS, PERTH); Lagoon Rd, 200 m N of Kendall Rd, E of Scaddan, 22 May 2004, *M. Hislop & F. Hort* MH 3219 (K, PERTH); Norwood Rd, 2.4 km E of Dempster Rd, E of Scaddan, 22 May 2004, *M. Hislop & F. Hort* MH 3220 (NSW, PERTH); Bishops Road Nature Reserve (A29012), salt flats in S part of reserve, W of Grass Patch, 27 Apr. 2007, *M. Hislop* 3694 (CANB, CNS, PERTH); 6 km NE of Mt Ridley, *c.* 71 km NE of Esperance, 5 May 1981, *K.R. Newbey* 8283 (CANB, PERTH); Helms Arboretum [W of Esperance airport], 23 Apr. 2010, *C.D. Turley & R.M. Hoggart* 3/4-10 (PERTH);



**Figure 2.** *Styphelia lacsalaria*. A – flowering plant *in situ*; B – flowering branchlet *in situ*; C, D – scanned images of flowering branchlet. *Styphelia aff. lacsalaria*. E, F – scanned images of flowering branchlet highlighting larger leaves with a different curvature. Scale bars C–F = 1 cm. Vouchers *M. Hislop & F. Hort* MH 3222 (A), *M. Hislop & F. Hort* MH 2649 (C), *K.S. Walkerden* KSW 205 (D), *K.S. Walkerden* KSW 22022B (E), *K.S. Walkerden* KSW 218 (F). Photographs by Michael Hislop (A), Rob Davis (B, unvouchered).

Kau Rock Nature Reserve – R 32777, 1.5 km SE of Kau Rock Rd and Mt Ney Rd intersection, Neridup, 14 Jan. 2023, *K. Walkerden* KSW 217 (CNS, PERTH).

*Distribution and habitat.* Distributed from north of Salmon Gums southwards to about 40 km north-west of Esperance and sporadically eastwards, at least as far as Mount Beaumont, north-east of Condingup; in the Esperance Plains and Mallee bioregions. *Styphelia lacsalaria* is restricted to the close environs of salt lakes and saline drainage lines where it grows in sand or sandy loam soils in halophytic, low, open heath or open woodland.



*Phenology.* Appears to flower sporadically over many months of the years, at least from December to June. Similarly, mature fruit is likely to be present for an extended period, at least between June and October.

*Etymology.* From the Latin *lacus* (lake), *salsus* (salty) and *-arius* (pertaining to), a reference to the species' close association with salt lakes.

*Conservation status.* *Styphelia lacsalaria* is locally common and has a fairly wide distribution, which extends to the north and east of the agricultural districts of south-west Western Australia. No conservation coding is recommended here.

*Affinities.* As noted above, in the phylogeny of Puente-Lelièvre *et al.* (2016) *S. lacsalaria* (as *Leucopogon* sp. Mount Heywood) grouped with *S. microcardia* in a small, very weakly supported subclade of Group X. Differences between the two species are given below under *S. microcardia*.

*Styphelia lacsalaria* is morphologically close to *S. halophila* differing most notably in details of leaf curvature, transverse section of the leaf lamina, prominence of abaxial leaf veins and to some extent in the length of the petiole. In *S. lacsalaria* the lamina is flat to adaxially convex, sometimes becoming slightly concave towards the base, and with the abaxial surface flat to very shallowly grooved between the veins. In *S. halophila* by comparison the lamina is noticeably thicker and planoconvex or concave adaxially with the abaxial surface usually distinctly grooved. And whereas *S. lacsalaria* has leaves that are strongly recurved to circinate, in *S. halophila* they are slightly to moderately recurved. *Styphelia lacsalaria* can also mostly be distinguished by the presence of long-petiolate leaves with some or all petioles in the range 0.5–1.0 mm long (*cf.* petioles almost always in the range 0.1–0.3 mm long in *S. halophila*). There are also some useful differences between the two in their bracteole and sepal characters: *S. lacsalaria* has glabrous bracteoles and sepals (0.9–1.2(1.5) mm long and 2.1–2.9 mm long respectively), whereas in *S. halophila* they are usually sparsely hairy, and respectively 1.5–2.0 mm and (2.6)2.8–3.5 mm long. *Styphelia halophila* is also distributed to the west of *S. lacsalaria*.

*Notes.* Recent collections by Esperance-based botanist Katherine Walkerden of plants from the Mount Burdett–Kau Rock area (e.g. *K.S. Walkerden* KSW 22022B; *K.S. Walkerden* KSW 13122), have raised the question of whether, in addition to *S. halophila* and *S. lacsalaria*, a third member of this halophytic group should be recognised as a distinct taxon. The foliar character of this morphotype is remarkably similar to *Leucopogon bossiaea* (F.Muell.) Benth. and some variants of *L. diversifolius* Hislop and while this plant is closer in gross morphology to *S. lacsalaria*, it differs from that species in having generally larger leaves with consistently long petioles (to 1.8 mm long) and with a significantly different leaf curvature. Rather than having the lamina strongly recurved to circinate from a point immediate above the petiole, as in *S. lacsalaria*, it is either straight or inflexed above the petiole and then gently recurved in the upper half. There is also some tendency for the floral parts to be larger than in typical *S. lacsalaria*. These characters combine to give the plant a significantly different aspect.

This morphotype is currently known from several populations that are well within the distribution of *S. lacsalaria*. However, while it appears to be consistently morphologically distinct from that species in the Burdett Nature Reserve area, in the Kau Rock area the situation is more complicated as both populations of typical *S. lacsalaria* and the anomalous morphotype are present (Figure 2E), along with plants of somewhat intermediate morphology (Figure 2F). It is uncertain therefore, if *S. lacsalaria* is unusually variable in this area or if the intermediate plants represent hybrids between *S. lacsalaria* and an unrecognised species. It is evident that this group would benefit from a molecular study to help explain this pattern of variation. In the meantime, the author has left the status of this plant as an open question, and it is not included in the above description of *S. lacsalaria*. Pending further research, specimens of the anomalous morphotype will be referred to *S. aff. lacsalaria* at the Western Australian Herbarium.

***Styphelia microcardia* Hislop, *sp. nov.***

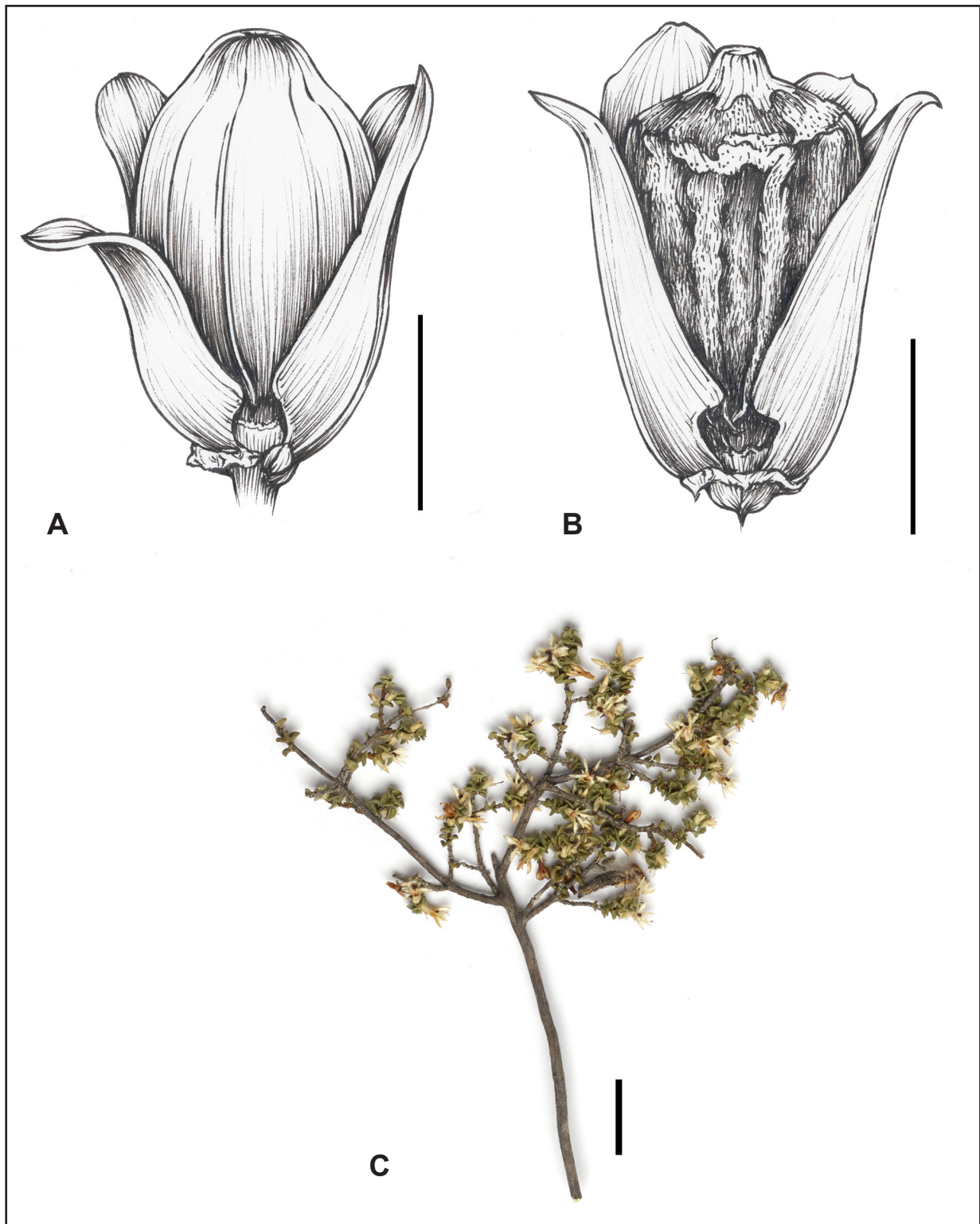
*Typus*: southern edge of Jerramungup townsite, adjacent to South Coast Highway, Western Australia, 1 April 2012, *M. Hislop* 4183 (*holo*: PERTH 08491038; *iso*: CANB, CNS, HO, K, MEL, NSW).

*Leucopogon* sp. Bremer Bay (K.R. Newbey 4667), Western Australian Herbarium, in *Florabase*, <https://florabase.dbca.wa.gov.au/> [accessed 17 November 2023]

Erect, compact *shrubs*, to *c.* 40 cm high and 40 cm wide, but usually smaller, single-stemmed at ground level and most likely with a fire-sensitive rootstock. Young *branchlets* with a sparse to moderately dense indumentum of  $\pm$  straight hairs to *c.* 0.1 mm long. *Leaves* helically arranged, shallowly antrorse to shallowly retrorse; apex obtuse to acute, mucro lacking; base cordate, often with deep basal lobes; petiole well-defined, 0.4–0.8 mm long, glabrous throughout or occasionally with a few hairs, mostly on the distal portion of the adaxial surface; lamina, usually wider than long, depressed-ovate, shallowly triangular or broadly ovate, 1.2–2.1 mm long, 1.4–2.5 mm wide, slightly discoloured, strongly concave adaxially, longitudinal axis recurved, often strongly so; adaxial surface shiny, with a few basal hairs or  $\pm$  glabrous, sometimes slightly rugose, the venation not evident; abaxial surface paler, shiny, glabrous, with 7–11 primary veins,  $\pm$  flat or very shallowly and openly grooved between the veins; margins  $\pm$  glabrous or sometimes with minute coarse hairs,  $<$  0.05 mm long. *Inflorescence* axillary, erect, very reduced, arising from the axils of regular, mature leaves; axis 0.2–0.3 mm long, 1-flowered,  $\pm$  terete, terminating at the flower, bud-rudiment absent; flowers erect, sessile. *Fertile bracts* broadly ovate, 0.6–0.9 mm long, 0.5–0.9 mm wide, subtended by 2 sterile bracts. *Bracteoles* broadly ovate to  $\pm$  orbicular, 1.0–1.3 mm long, 0.9–1.2 mm wide, not, or obscurely keeled, obtuse,  $\pm$  striate; abaxial surface glabrous; margins minutely ciliate. *Sepals* narrowly ovate, 1.9–2.3 mm long, 0.8–1.1 mm wide, obtuse to acute, usually distinctly recurved in the upper half, occasionally  $\pm$  straight; abaxial surface glabrous, straw-coloured or sometimes pale green (rarely tinged purple towards the margins), venation variably expressed, from rather obscure to quite well-developed with several raised veins evident; adaxial surface hairy throughout with longer hairs towards the base or occasionally with sparse hairs restricted to the distal half; margins minutely ciliate, with hairs  $<$  0.05 mm long, or  $\pm$  glabrous. *Corolla tube* white, obovoid, broadly obovoid or sometimes ellipsoid, usually shorter than (rarely slightly longer than) the sepals, 1.7–2.3(2.6) mm long, 1.0–1.5 mm wide, glabrous externally, internal surface with a transverse band of hairs towards the apex only. *Corolla lobes* white, usually longer than, sometimes  $\pm$  equal to the tube, 2.2–2.5 mm long, 0.5–0.8 mm wide at base, erect in basal 1/2–2/3 and then spreading and recurved, glabrous externally, internal surface with a dense indumentum of  $\pm$  terete, distinctly ornamented hairs that are often retrorse, at least in the distal half. *Anthers* either partially exerted from the tube by *c.* 7/8 of their length or  $\pm$  fully exerted, 0.9–1.1 mm long, apex shallowly emarginate. *Filaments* terete, 0.6–1.0 mm long, attached to the anther *c.* 3/4 above anther base or a little above, adnate to the tube a little below the sinuses. *Nectary* annular, shallowly lobed to  $\pm$  truncate, 0.2–0.3 mm long, glabrous with the margin papillose. *Ovary* broadly obovoid, depressed-obovoid or broadly ellipsoid, usually distinctly constricted behind the nectary, 0.5–0.6 mm long, 0.5–0.6 mm wide, glabrous, 5-locular, straw-coloured or pale green. *Style* usually pale pink, abruptly differentiated from ovary apex, 2.2–3.1 mm long, faintly scabrous in the upper half, exerted from the corolla tube but usually not beyond the erect bases of the corolla lobes, inserted in a cylindrical depression that envelops, but is free from, the narrow style base; stigma slightly expanded. *Fruit* narrowly ellipsoid, tapering steeply towards the apex above obscurely defined shoulders, 2.0–2.5 mm long, 1.0–1.4 mm wide, a little shorter than, to a little longer than, the sepals, circular in transverse section, with a short gynophore; surface glabrous, shiny, pale green with a cream-coloured apex, smooth and  $\pm$  dry (mesocarp poorly developed); apex obtuse to subacute; style shed before maturity. (Figure 3A, C)

*Diagnostic characters.* Within Group X distinguished by the following character combination: leaves prominently petiolate, strongly concave adaxially, usually wider than long, distinctly recurved longitudinally, with an obtuse to acute non-mucronate apex and a cordate base; abaxial leaf surface, glabrous, flat or shallowly and openly grooved between the veins; inflorescence very short, 0.2–0.3 mm long, 1-flowered, terminating at the flower (bud-rudiment lacking); sepals usually distinctly recurved distally; nectary annular; ovary 5-locular, glabrous; style base clearly free from ovary apex; fruit narrowly





**Figure 3.** *Styphelia microcardia*. A – fruit, with one sepal removed; C – scanned image of flowering branchlet. *Styphelia laesalaria*. B – fruit, with one sepal removed. Scale bars A, B = 1 mm; C = 1 cm. Vouchers *M. Hislop* 4219 (A), *R. Davis* 11071 (B), *M. Hislop* 4183 (C).

ellipsoid,  $\pm$  dry (mesocarp poorly developed), a little shorter than, to a little longer than, the sepals, surface tapering steeply towards the apex from obscurely defined shoulders.

*Other specimens examined.* WESTERN AUSTRALIA: 6 May 1996, *R. Davis* RD 653 (PERTH); 30 Nov. 1960, *A.S. George* 1862 (PERTH); 23 May 2004, *M. Hislop* & *F. Hort* MH 3229 (CANB, K, MEL,

PERTH); 27 Apr. 2007, *M. Hislop* 3702 (CANB, CNS, MEL, PERTH); 2 April 2012, *M. Hislop* 4185 (CANB, CNS, MEL, NSW, PERTH); 18 Aug. 2012, *M. Hislop* 4219 (PERTH); 7 Apr. 1976, *K.R. Newbey* 4667 (CANB, CNS, PERTH); 2 Aug. 1986, *J.M. Powell* 2410A (NSW *n.v.*, PERTH); 17 Nov. 1985, *J.M. Powell* 3300 (NSW *n.v.*, PERTH); 26 Mar. 2003, *E.M. Sandiford* EMS 689 (PERTH).

*Distribution and habitat.* *Styphelia microcardia* has an apparently very disjunct distribution in the Mallee and Esperance Plains bioregions. The western population-cluster has a narrow east-west axis from Ongerup to a little east of Jerramungup. The eastern cluster is known only from a handful of collections made within a few kilometres of each other north-west of Cascade, about 160 kilometres distant from the nearest known occurrence in the western cluster. It is found growing in sand or loam soils over laterite or clay. Associated vegetation is usually open mallee woodland with an often dense understorey dominated by *Melaleuca* species.

*Phenology.* Peak flowering is apparently between March and May. Mature fruit has been collected in August but is likely to be present until the middle of spring.

*Etymology.* From the Greek *micro-* (small-) and *cardia* (a heart), a reference to the distinctive leaf shape of the species.

*Conservation status.* Recently listed as Priority Three under Conservation Codes for Western Australian Flora (Western Australian Herbarium 1998–), as *Leucopogon* sp. Bremer Bay (K.R. Newbey 4667). Although often locally common, *S. microcardia* has a restricted and apparently disjunct distribution. The better-known western population-cluster is less than 60 kilometres long and 30 km wide. Within this area it has been recorded from one nature reserve and one unmanaged reserve. On the basis of current knowledge, the eastern cluster appears much smaller. However, because there is more uncleared land in that general area and it is less well-known botanically, there may be greater potential for the discovery of new populations in this eastern part of its range.

*Affinities.* As discussed in a recent paper (Hislop 2023), *S. microcardia* (as *Leucopogon* sp. Bremer Bay) was strongly supported as sister to *S. lacsalaria*, and together they were placed within a very weakly supported subclade along with *S. corynocarpa* (Sond.) F.Muell., *S. cylindrica* Hislop, and *Leucopogon* sp. ‘Koolyanobbing’.

*Styphelia microcardia* is most likely to be confused with *S. lacsalaria*, both having similar leaves that are relatively short and broad, distinctly recurved longitudinally, and usually prominently petiolate. There is also a strong similarity in their sepal morphology, with both having glabrous, straw-coloured (in the dried condition, cream-coloured when live) and recurved sepals that are a little shorter than, to a little longer than, the mature fruit.

*Styphelia microcardia* can be distinguished from both *S. lacsalaria* and *S. halophila* in the following ways: leaves glabrous throughout or with a few hairs towards the base on the adaxial surface (*cf.* leaves usually hairy with short, stiff hairs on the adaxial surface); inflorescence axis very short, 0.2–0.3 mm long, terminating at the flower (*cf.* inflorescence axis 0.6–1.5 mm long, terminating in a bud-rudiment); ovary 5-locular (*cf.* 2- or 3-locular). There is also a difference in the fruit. Whereas in *S. microcardia* the fruit surface tapers steeply towards the apex from obscurely defined shoulders, in *S. lacsalaria* and *S. halophila* the shoulders are more strongly defined with the surface then rising more shallowly to the apex (Figure 3A, B). A further foliar difference distinguishes *S. microcardia* from *S. lacsalaria*. In the former the leaves are always strongly concave adaxially but in *S. lacsalaria* they are usually flat or adaxially convex, sometimes slightly concave towards the base. *Styphelia microcardia* has an allopatric distribution relative to those of *S. lacsalaria* and *S. halophila*, which both occur to the east of *S. microcardia*. It also differs from those two species in not being associated with saline or subsaline habitats.

Presumably because *S. microcardia* has somewhat similar, relatively short and longitudinally recurved leaves, it has been confused at times with the widespread and variable *S. hamulosa*. Although *S. hamulosa*



was not included in the phylogeny of Puente-Lelièvre *et al.* (2016), it is morphologically similar to several taxa that were sampled and which grouped with *S. marginata* (W.Fitzg.) Hislop, Crayn & Puente-Lel. in another strongly supported subclade of Group X. Hence the relationship between *S. hamulosa* and the species described in this paper is unlikely to be a particularly close one. In any case, all variants of *S. hamulosa* can be distinguished from *S. microcardia* by their shortly hairy, more or less closed, abaxial leaf grooves (*cf.* glabrous and openly grooved or un-grooved in *S. microcardia*) and sepals that are always straight and never recurved. In addition, the inflorescence axis of *S. hamulosa* is of the common kind that terminates in a bud-rudiment (*cf.* terminating at the flower with the bud-rudiment absent), and the fruit is always much longer than the sepals.

Perhaps surprisingly in view of the large disjunction between the two population-clusters of *S. microcardia*, no significant morphological differences were identified in this study that might indicate taxonomic divergence.

*Notes.* *Styphelia microcardia* has long been recognised as a probable new species. A collection made in the mid 1960s by the renowned collector, Ken Newbey (*K.R. Newbey* 2407), is annotated in his hand, '*Leucopogon* sp. nov. *aff. hamulosus*'. Notable epacrid researcher, Jocelyn Powell, who was active in the 1980s and 1990s, applied the manuscript name '*Leucopogon stemonocryptus*' to one of her own collections of the species housed at the Western Australian Herbarium. Since 2000 it has been known by the phrase name *Leucopogon* sp. Bremer Bay (*K.R. Newbey* 4667). That choice of place name has turned out to be misleading as the species is not known to grow close to the coast. Although the reference specimen, *K.R. Newbey* 4667, until recently had 'Bremer Bay' as the collection locality, this has turned out to be a probable transcription error. Referral to Newbey's relevant collecting book indicates clearly that it was collected from the 'same locality as [*K.R. Newbey*] 2407', i.e. north of Ongerup.

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