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Leucopogon kirupensis (Ericaceae: Styphelioideae: Styphelieae), a new, short-range endemic from the south-west corner of Western Australia

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SHORT COMMUNICATION

The genus *Leucopogon* R.Br. has been recently recircumscribed to include only those species with terminal inflorescences and (usually) sterile anther tips (Crayn *et al.* 2020). The transfer to *Styphelia* Sm. of the remaining species (i.e. those with strictly axillary inflorescences lacking sterile anther tips), together with all species previously placed in *Astroloma* R.Br., *Coleanthera* Stschegl. and *Croninia* J.M.Powell, means that *Styphelia* has now replaced *Leucopogon* as Australia's most speciose epacrid genus. However, *Leucopogon* remains a large genus, especially in Western Australia where 97 published taxa are currently accepted on the State's vascular plant census (Western Australian Herbarium 1998–), with the richest part of the State (and hence of Australia) being the Jarrah Forest bioregion (Department of the Environment 2013). The uncommon species described below brings to 52 the number of currently accepted, published *Leucopogon* taxa for this region, putting it narrowly ahead of the Esperance Plains bioregion, which has 46 (Western Australian Herbarium 1998–).

Leucopogon kirupensis Hislop, *sp. nov.*

Type: south-west of Kirup, Western Australia [precise locality withheld for conservation reasons], 21 September 2018, *M. Hislop* 4779 (*holo*: PERTH 09054162; *iso*: CANB, K, MEL, NSW).

Leucopogon sp. Kirup (M. Hislop 3919), Western Australian Herbarium, in *FloraBase* https://florabase.dpaw.wa.gov.au/ [accessed 19 September 2019].

Erect, open *shrubs* to *c.* 1.2 m high and 1.5 m wide, single-stemmed at ground level from a fire-sensitive rootstock. Young *branchlets* with a sparse to moderately dense indumentum of patent to slightly decurved hairs 0.05–0.10 mm long. *Leaves* helically arranged, usually variously antrorse with the lower leaves sometimes ± patent to shallowly retrorse; apex acute to obtuse; base attenuate to cuneate; petiole very short and poorly defined, to *c.* 0.2 mm long; lamina very narrowly ovate to very narrowly elliptic, 2.2–6.5 mm long, 0.4–1.0 mm wide, concave immediately above the petiole, the remainder flat or adaxially convex (most notably in the young leaves with recurved margins), longitudinal axis slightly incurved to distinctly recurved; surfaces ± concolorous or with the abaxial surface slightly paler; adaxial surface glabrous or sometimes with a few hairs towards the base,

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venation not evident; abaxial surface glabrous, with 3 or 5 veins, usually distinctly grooved either side of the midvein which is strongly raised and produced into a keel at least in the upper half; margins glabrous or coarsely ciliolate with short, stiff, antrorse hairs to *c.* 0.05 mm long. *Inflorescences* erect, terminal and upper-axillary; axis 2–8 mm long, 2–11-flowered, with a dense indumentum of patent hairs, terminating in a bud-rudiment; lower flowers shortly pedicellate below the bracteoles, with pedicels to 0.5 mm long, upper flowers ± sessile. *Fertile bracts* narrowly ovate to ovate, lower bracts foliose on main axes (± indistinguishable from upper leaves), becoming progressively smaller and more bracteate distally; upper-axillary inflorescences often bracteate throughout. *Bracteoles* ovate to broadly ovate, 1.2–1.4 mm long, 0.9–1.1 mm wide, obtuse, keeled; abaxial surface shortly hairy; margins ciliolate. *Sepals* narrowly ovate, 2.0–2.5 mm long, 0.9–1.2 mm wide, obtuse; abaxial surface green in the lower half, becoming membranous distally and often flushed pink-purple, glabrous or shortly hairy with spreading, often ± recurved hairs, venation not evident or with the midvein visible towards the apex; margins ciliate with hairs to 0.15 mm long. *Corolla tube* white, campanulate, shorter than the sepals, 1.0–1.3 mm long, 1.1–1.4 mm wide, glabrous externally and internally. *Corolla lobes* white or ± flushed pink, longer than the tube, spreading from a point just above the sepal apices and recurved, 2.1–3.2 mm long, 0.5–0.7 mm wide at base; external surface glabrous, internal surface densely bearded, the hairs usually strongly curved; indumentum white, 0.6–1.0 mm long distally. *Anthers* partially exserted from the tube (by 3/4–7/8 of their length), 1.4–1.7 mm long including well-defined sterile tips, strongly recurved towards apex. *Filaments* terete, adnate to tube just below the sinuses, attached to the anther *c.* 2/3 above base, free portion 0.5–0.7 mm long. *Nectary* annular, 0.3–0.5 mm long, ± truncate, glabrous. *Ovary* globose to broadly obovoid, 0.50–0.65 mm long, 0.5–0.6 mm wide, shortly-hairy about the apex, glabrous below, 3(4)-locular. *Style* 0.25–0.35 mm long, well-differentiated from ovary apex, included within the corolla tube; stigma not or scarcely expanded. *Fruit* ovoid or narrowly ovoid, 1.8–2.4 mm long (including gynophore), 1.0–1.4 mm wide, slightly shorter than to distinctly longer than the calyx, bluntly angular in T.S.; surface shortly hairy about the apex, smooth above the gynophore (i.e. the mesocarp insignificant); apex truncate, the shoulders angular; surface between the shoulders and style base flat or descending gently; style persistent. (Figures 1, 2)

Diagnostic characters. Among members of the *L. pulchellus* group (*sensu* Hislop & Chapman 2007; Hislop 2014) from the south-west corner of Western Australia, *L. kirupensis* can be distinguished by the following character combination: leaves relatively short and narrow (to 6.5 mm long and 1.0 mm wide), with a prominent midvein produced into an abaxial keel distally and usually with distinct grooves either side; leaf curvature flat or adaxially convex, most notably in the young leaves with recurved margins; lowermost flowers of inflorescence shortly pedicellate; bracteoles and sepals obtuse; style very short, to 0.35 mm long; ovary 3(4)-locular; fruit with a truncate apex and angular shoulders, ovoid or narrowly ovoid, bluntly angular, shortly hairy on apical surfaces.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 14 Aug. 1984, *G.S. McCutcheon* 1078 (PERTH); 29 Aug. 1985, *G.S. McCutcheon* 1212 (PERTH); 30 Aug. 2009, *M. Hislop* 3919 (CANB, NSW, PERTH); 30 Aug. 2009, *M. Hislop* 3920 (PERTH); 15 Nov. 2009, *M. Hislop* 3986 (CANB, PERTH).

Distribution and habitat. Endemic to the Southern Jarrah Forest subregion of the Jarrah Forest bioregion where it is known only from a small area near Kirup. Grows in heath, with emergent marri, on a rocky, upland site, in shallow, sandy loam over granite. Associated species include *Darwinia citriodora*, *Dodonaea ceratocarpa*, *Grevillea bipinnatifida*, *Gastrolobium spinosum* and *Verticordia plumosa*.

Phenology. Peak flowering occurs during the months of August and September and mature fruit is likely to be present from the second half of October to early December.

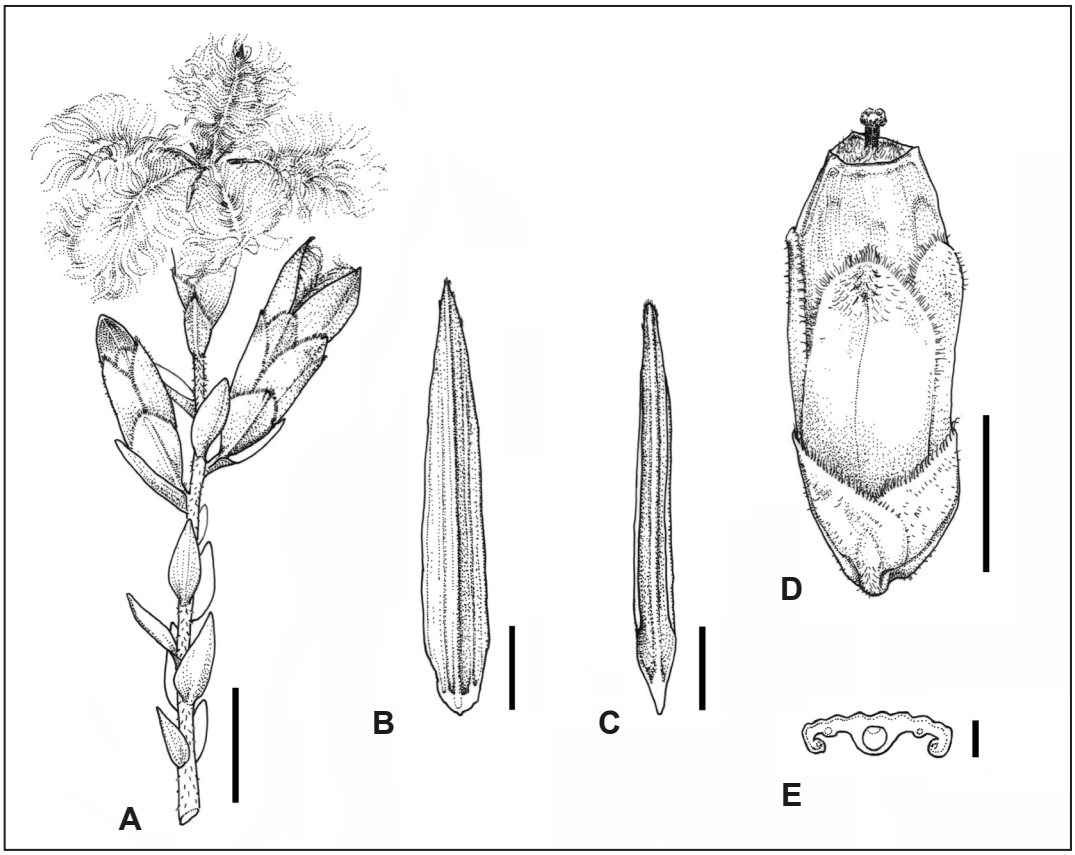

Figure 1. *Leucopogon kirupensis*. A – upper-axillary inflorescence with two flowers removed to reveal the short pedicels; B – mature leaf, abaxial surface; C – immature leaf, abaxial surface; D – leaf section, showing the prominent midvein; E – fruit, with short hairs about the apex. Scale bars = 2 mm (A); 1 mm (B, C); 0.1 mm (D); 1 mm (E). Drawn by Cielito Marbus from *M. Hislop* 4779 (A, B, C, D); *M. Hislop* 3986 (E).

Figure 2. *Leucopogon kirupensis in situ*. A – plants; B – flowering branchlet. Photographs by Michael Hislop at *M. Hislop* 4779.

Etymology. Named after the small town of Kirup, which is close to the only known population of this species, together with the Latin suffix *-ensis* (indicating origin or place).

Vernacular name. Kirup Beard-heath.

Conservation status. Listed by Smith and Jones (2018) as Priority Two under Conservation Codes for Western Australian flora, under the name *L.* sp. Kirup (M. Hislop 3919). Despite several searches conducted by the author and local Flora Conservation Officers, Andrew Webb and Ben Lullfitz, the species is still only known from one, fairly large population in a nature reserve.

Affinities. *Leucopogon kirupensis* is a member of the informal *L. pulchellus* group or Group C (*sensu* Hislop & Chapman 2007; Hislop 2014). Within that group, the species it is most likely to be confused with are *L. decrescens* Hislop, *L. gracillimus* DC., *L. pulchellus* Sond. and *L.* sp. Boyup Brook (A. Webb BNC 1025). It differs from these taxa by the presence of short but distinct pedicels below the bracteoles in the lower flowers of the inflorescences.

The leaves of *L. kirupensis* differ from those of *L. decrescens* in being generally narrower (0.4–1.0 mm wide *cf.* 0.9–1.6 mm in *L. decrescens*), flat or adaxially convex (*cf.* adaxially concave), keeled abaxially towards the apex (*cf.* keel lacking) and in being more or less glabrous on the adaxial surfaces (*cf.* moderately dense to densely hairy). Whereas the fruit of *L. kirupensis* are ovoid or narrowly ovoid with short hairs restricted to the apical surfaces, they are cylindrical or obloid in *L. decrescens* and usually rather densely hairy everywhere except the apical surfaces, or very occasionally entirely glabrous.

Leucopogon kirupensis and *L. gracillimus* are superficially similar in that both have very narrow leaves, but while the leaf orientation in *L. kirupensis* is usually variably antrorse (and often steeply so), they are never consistently antrorse-appressed as they are in *L. gracillimus*. The leaves are also usually wider in *L. kirupensis* (0.4–1.0 mm *cf.* rarely more than 0.6 mm in *L. gracillimus*), and flat to adaxially convex with a well-developed keel abaxially (*cf.* adaxially concave or plano-convex in section (i.e. the abaxial surface is always convex) and without a keel). The two species share a 3-locular ovary, but in *L. kirupensis* it is apically hairy while in *L. gracillimus* it is always glabrous.

Leucopogon pulchellus is a particularly variable species as currently accepted and further research is likely to lead to the recognition of segregate taxa. The geographically disjunct southern variant of this species is the only one that occurs in the south-west corner of the State and the one with which *L. kirupensis* is compared here (the other variants are distributed in the Darling Range from north of Bindoon to a little south of Collie). Of the four taxa compared here with *L. kirupensis*, only *L. pulchellus* is known from the same nature reserve: the two species occur within 200–300 m of each other but have not been observed growing together. While the two species share abaxially keeled leaves, both the flowers and leaves of *L. kirupensis* are significantly smaller than those of *L. pulchellus*, for example: leaves to 6.5 mm long and 1.0 mm wide (*cf.* more than 7 mm long and 1.2 mm wide); sepals to 1.2 mm wide (*cf.* at least 1.4 mm); corolla lobe bases to 0.7 mm wide (*cf.* at least 0.9 mm); and style to 0.35 mm long (*cf.* at least 0.5 mm). In addition, the leaf margins of *L. kirupensis* are glabrous or coarsely ciliolate with antrorse hairs to 0.05 mm long (*cf.* almost always sparsely long-ciliate, the longer hairs at least 0.5 mm long) and the ovary 3(4)-locular with a shortly hairy apex (*cf.* (4)5-locular and completely glabrous).

As currently recognised, *L.* sp. Boyup Brook includes two geographically and potentially taxonomically distinct entities separated by about 60 km on a south-west to north-east axis. Both entities can be

distinguished from *L. kirupensis* by the presence of short, appressed hairs on the sides of the ovary and fruit (*cf.* hairs restricted to apical surfaces) and by their wider leaves (1–2.2 mm wide *cf.* 0.4–1 mm). The variant that occurs closest to *L. kirupensis* (the nearest known population is *c.* 36 km to the south) can also be distinguished by its (4)5-locular ovary (*cf.* 3(4)-locular). While the second, more geographically distant variant of *L.* sp. Boyup Brook shares a 3(4)-locular ovary with *L. kirupensis*, its sharply (rather than bluntly) angular fruits are distinct.

Notes. A noteworthy feature of the new species is the relative persistence of the old corollas during fruit development. Whereas in most species of *Leucopogon* the corolla is shed shortly after the onset of fruit development, in *L. kirupensis* the corolla lobes are reflexed onto the sepals post-anthesis. This effectively keeps the drying corollas in place, potentially forming a protective cap that is shed at or close to fruit maturity.

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