



Four new species of Western Australian *Styphelia* (Ericaceae: Epacridoideae: Styphelieae) from the *S. marginata* subgroup

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Abstract: Four new species of *Styphelia* Sm., *S. brachygyna* Hislop, *S. browniae* Hislop, *S. howatharra* Hislop and *S. kalbarriensis* Hislop are described and illustrated. A previously described species, *S. marginata* (W.Fitzg.) Hislop, Crayn & Puente-Lel., from the same subgroup is also illustrated and given an updated description.

Keywords: Ericaceae, Epacridaceae, *Styphelia*, Western Australia, four new species

Introduction

The large and diverse Group X is one of 12 phylogenetic groups resolved in *Styphelia* Sm. by Puente-Lelièvre *et al.* (2016). Earlier papers (Hislop 2021b; Hislop & Nguyen 2022; Hislop 2023) have begun the process of formally describing the many unnamed Western Australian taxa within that group. This has so far proceeded on a subgroup-by-subgroup basis, with the subgroups corresponding to well-supported subclades within the published phylogenetic tree (Puente-Lelièvre *et al.* 2016). The current paper describes four new species from a very strongly supported subclade that includes *Styphelia marginata* (W.Fitzg.) Hislop, Crayn & Puente-Lel., and that will henceforth be referred to as the *S. marginata* subgroup. Three of these new species, *S. browniae* Hislop, *S. howatharra* Hislop and *S. kalbarriensis* Hislop & E.A.Br., were included in the published phylogeny (as *Leucopogon* sp. Forrestania, *L.* sp. Howatharra and *L.* sp. Kalbarri, respectively), while the placement of *S. brachygyna* Hislop in the subgroup is based on an extrapolation of critical morphological features.

The *S. marginata* subgroup almost certainly also includes the very widespread and variable *S. hamulosa* (E.Pritz.) Sleumer. Although that species was not included in the phylogeny of Puente-Lelièvre *et al.* (2016), three much more restricted taxa, *Leucopogon* sp. Howatharra, *L.* sp. Arrino and *L.* sp. Brookton, that are morphologically close to *S. hamulosa*, formed part of the *S. marginata* subclade as published. The first of these three is described below as *S. howatharra* Hislop, the other two need further research to more fully understand how they relate to *S. hamulosa* *s. lat.*

Preliminary investigation during the current research into the pattern of variation exhibited by *S. hamulosa* across its extensive range, indicates the presence of several geographical variants. I have referred in the text below to one of these variants, the ‘type variant’, which occupies the northern and western parts of the species’ range. Two of the new species described below, *S. brachygyna* and *S. howatharra*, have a somewhat similar morphology to this type variant of *S. hamulosa* and also occur in the northern part of the Geraldton Sandplains bioregion. It is convenient then, in the context of describing these species, to compare them to the local variant of *S. hamulosa* rather than to the species as a whole. The question of whether any of the variants are worthy of taxonomic recognition will require further study.

The species described below, all key out at the first lead of couplet 19 in the interim key to species groups (Hislop 2021a).

Methods

This study was based on an examination of dried specimens housed at the Western Australian Herbarium, together with field observations of all species treated. Details of the methods used to measure plant parts and make other morphological observations are the same as those described in a recent paper (Hislop & Nguyen 2022). The character of the nectary, whether annular or partite, is frequently important in the taxonomy of *Styphelia*, as it is elsewhere in tribe *Styphelieae*. While the character is often easily interpreted, in some groups of *Styphelia*, including elements of Group X, careful specimen examination is required before the true status of the nectary can be confirmed. This is because many

species with essentially annular nectaries (i.e. with continuous tissue between the lobes) have longitudinal grooves of varying depth extending for the full length of the nectary below the lobe sinuses. Without close inspection such grooves can give the impression that the nectary is partite.

Bioregions referred to in the text follow *Interim Biogeographic Regionalisation for Australia* (IBRA) v. 7 (DCCEEW 2021).

Taxonomy

Styphelia brachygyna Hislop, *sp. nov.*

Holotypus: north-east of Kalbarri, Western Australia [precise locality withheld for conservation reasons], 8 June 2005, *M. Hislop 3460* (PERTH07293267).
Isotypi: CANB, CNS, NSW.

Leucopogon sp. Murchison (*R.J. Cranfield 9224*)
Western Australian Herbarium, *Florabase*, <https://florabase.dpaw.wa.gov.au/> [accessed 21 July 2023].

Erect spreading *shrubs*, to c. 70 cm high and 70 cm wide, single-stemmed at ground level, with a fire-sensitive rootstock. Young *branchlets* with a sparse to moderately dense indumentum of straight or decurved hairs, to c. 0.1 mm long. *Leaves* spirally arranged, steeply antrorse and often stem-clasping; apex long-mucronate, pungent, the mucro strongly recurved, 0.3–0.6 mm long; base cuneate, rounded or occasionally subcordate; petiole well-defined, 0.3–0.7 mm long, glabrous on the abaxial surface, hairy on adaxial surface, glabrous on the margins; lamina ovate to obovate, often broadly so, 2.0–4.5 mm long, 1.2–3.6 mm wide, usually strongly concave adaxially to \pm folded and stem-clasping, longitudinal axis straight to shallowly incurved in the lower half, strongly recurved towards the apex (i.e. shallowly S-shaped); surfaces \pm concolorous, matt, or the abaxial surface \pm shiny; adaxial surface hairy, at least in the lower half, venation not, or barely evident; abaxial surface with 7–9 broad, primary veins, the midrib scarcely more prominent than the others, deeply and narrowly grooved between the veins (grooves \pm closed), glabrous on the exposed vein surfaces, very shortly hairy within the grooves; margins denticulate, the teeth often terminating in short coarse hairs, <0.05 mm long. *Inflorescence* axillary, erect, usually partially enclosed by the subtending leaves; axis 0.5–0.8 mm long, 1-flowered, with a sparse indumentum, \pm compressed below and above the fertile bract, terminating in a bud-rudiment; flowers erect, sessile. *Fertile bracts* depressed-ovate, broadly ovate to \pm orbicular, 0.5–0.6 mm long, 0.4–0.6 mm wide, and with 2–3 sterile bracts on the axis below. *Bracteoles* depressed-ovate, broadly ovate to \pm orbicular, 0.8–1.2 mm long, 0.8–1.2 mm wide, not, or scarcely keeled, obtuse (not mucronate); abaxial surface glabrous, not striate; margins minutely ciliolate. *Sepals* narrowly ovate, 2.0–2.5 mm long, 0.9–1.2 mm wide, acute; abaxial surface glabrous, straw-coloured,

or pale greenish at flowering but often becoming brown and necrotic, venation very obscure; adaxial surface with a discrete tuft of hairs towards the base; margins minutely ciliolate, with hairs <0.05 mm long, or \pm glabrous. *Corolla tube* white, obovoid or ellipsoid, usually broadly so, shorter than the sepals, 1.2–1.7 mm long, 1.3–1.5 mm wide, external surface glabrous, internal surface glabrous. *Corolla lobes* white, slightly longer than, to slightly shorter than the tube, 1.4–1.8 mm long, 0.8–1.0 mm wide at base, erect in basal $\frac{1}{2}$ – $\frac{2}{3}$ of their length and then spreading and recurved, external surface glabrous, internal surface with a dense, white indumentum of \pm terete to somewhat flattened, \pm straight, scarcely ornamented hairs. *Anthers* partially exerted from the tube (by $\frac{2}{3}$ – $\frac{3}{4}$ of their length), 0.7–1.1 mm long, apex shortly emarginate. *Filaments* terete, 0.3–0.5 mm long, attached to the anther $\frac{3}{4}$ – $\frac{7}{8}$ above the anther base, adnate to tube just below the sinuses. *Nectary* annular, 0.3–0.4 mm long, glabrous, lobed, with deep longitudinal grooves below the sinuses. *Ovary* ovoid to ellipsoid, 0.7–0.8 mm long, 0.5–0.6 mm wide, glabrous, 5-locular, straw-coloured to pale brown. *Style* 0.35–0.60 mm long, scabrous, included within the corolla tube, well-differentiated from ovary apex and not arising from a depression; stigma not, or barely, expanded. *Fruit* narrowly ellipsoid to ellipsoid, 3.6–4.2 mm long, 2.4–3.0 mm wide, much longer than the sepals, circular in section, gynophore absent; surface glabrous, \pm rugose (mesocarp weakly to moderately well-developed), sometimes irregularly grooved longitudinally; apex rounded; style usually persistent at maturity. **Fig. 1A, B.**

Diagnostic characters. Within Group X it is distinguished by the following character combination: lamina ovate to obovate, often broadly so, 2.0–4.5 mm long, 1.2–3.6 mm wide, usually strongly concave adaxially to \pm folded and stem-clasping; abaxial surface with deep \pm closed grooves, shortly hairy in the grooves; leaf apex strongly recurved, long-mucronate, pungent; inflorescence 1-flowered, axis 0.5–0.8 mm long, terminating in a bud-rudiment; abaxial surface of bracteoles and sepals glabrous, sepal margins minutely ciliolate, with hairs <0.05 mm long; corolla tube shorter than the sepals; corolla lobes slightly longer than, to slightly shorter than the tube; nectary annular with deep longitudinal grooves below the sinuses; ovary 5-locular, glabrous; style 0.35–0.60 mm long, scabrous, included in the corolla tube; style base not countersunk below the level of the ovary apex; fruit narrowly ellipsoid to ellipsoid, \pm rugose.

Distribution and habitat. Known from an area east and north-east of Kalbarri, with a single collection from north-west of Mullewa; in the north of the Geraldton Sandplains and far south of the Yalgoo bioregions. *Styphelia brachygyna* occurs on yellow sandplains in heathland communities. Associated species include *Banksia sceptrum*, *Allocasuarina campestris*, *Grevillea eriostachya*, *Conospermum microflorum*, *Ecdiocolea monostachya* and numerous species of *Melaleuca* and small-flowered myrtles.

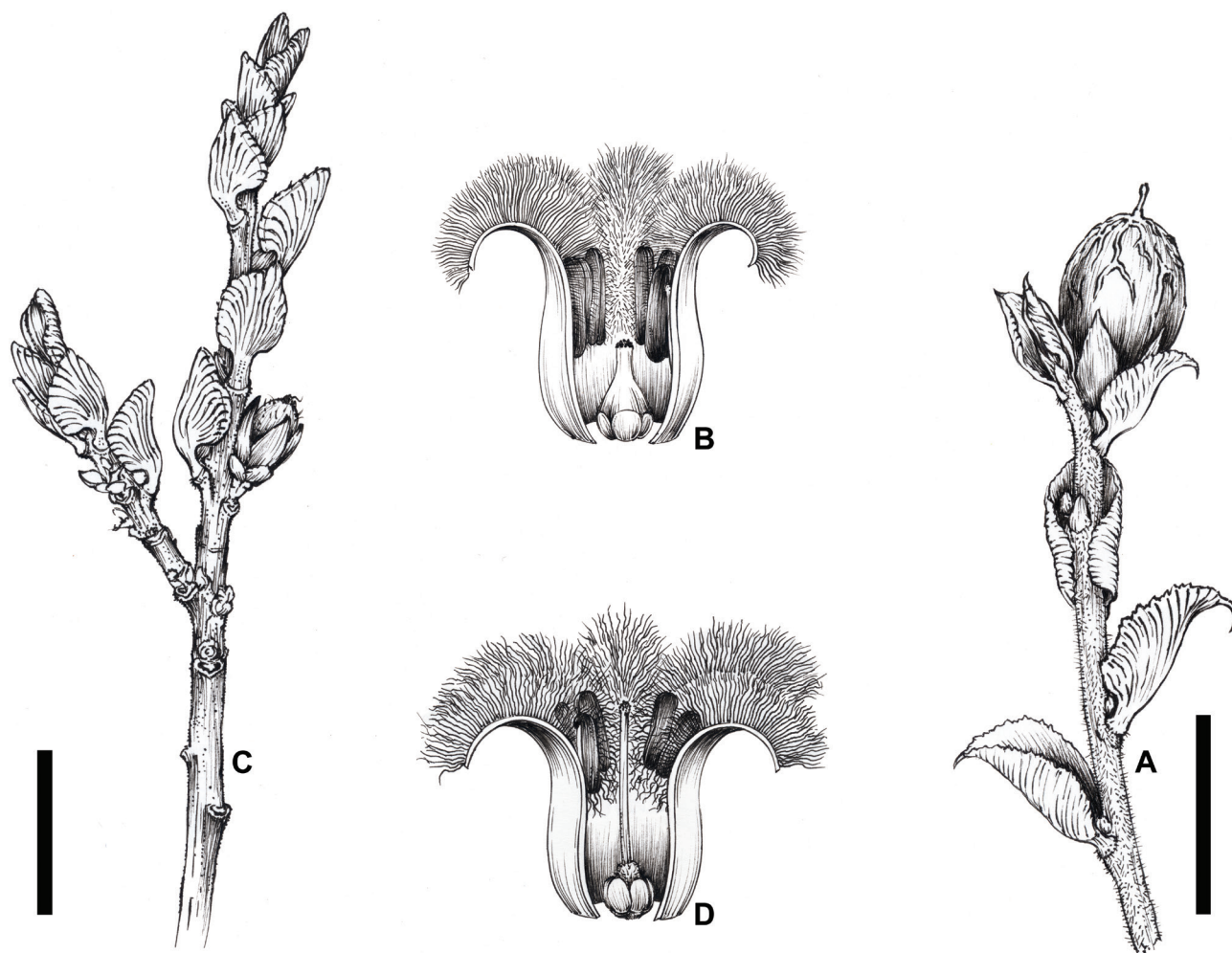


Fig. 1. *Styphelia brachygyna*: **A** Fruiting branchlet; **B** flower, internal view. *S. howatharra*: **C** Fruiting (immature) branchlet; **D** flower, internal view. Scale bars = 4 mm (A, C), 2 mm (B, D). — A M. Hislop 3453, B M. Hislop 3465, C A. Chant 601, D M. Hislop 4120. Drawings by Hung Ky Nguyen.

Phenology. Most flowering collections have been made between May and July. Interestingly the only collection with clearly mature fruit (R.J. Cranfield 1994) was also made in May. It may be the case that this apparent anomaly was caused by an unseasonably wet period in late spring or summer, causing the plants to come into flower and fruit earlier than normal. On the evidence of the other specimens at the Western Australian Herbarium the period between August and the end of the year is likely to be a more usual time for mature fruit to be present.

Etymology. From the Greek *brachy* (short) and *gynus* (pertaining to female organs), a reference to the short style of the new species.

Conservation status. Recently listed as Priority Two under Conservation Codes for Western Australian Flora (WAH 1998–), as *Leucopogon* sp. Murchison (R.J. Cranfield 9224). This species is currently known from just ten collections over a restricted area. The disjunct occurrence north-west of Mullewa is from a nature reserve and it is also known to be present at Eurardy Reserve (Res.), a privately owned conservation reserve.

The remaining collections are from unallocated Crown Land or pastoral lease. It is worth recording that most of the more recent collections were taken from plants that were in notably poor condition. At a time of accelerating climate change this may be an indication that the species is now at the edge of its climate tolerance.

Affinities. *Styphelia brachygyna* was not included in the phylogeny of Puente-Lelièvre *et al.* (2016) and is placed in the *S. marginata* subgroup by extrapolation of critical morphological features.

Within the subgroup the species is most likely to be confused with the variable *S. hamulosa*. Of the several variants of that species the most similar (and closest geographically) to *S. brachygyna* is the aforementioned type variant. The two share leaves that are distinctly recurved towards their long-mucronate, pungent apices and have abaxial leaf surfaces deeply and narrowly grooved with very short hairs present within the grooves. The most important distinguishing features are to be found in the gynoeceum and sepals.

In *S. brachygyna* the style is short (0.35–0.60 mm long) and included within the corolla tube and the style base arises directly from the ovary apex. *Styphelia hamulosa* by contrast has a much longer style (at least 1.5 mm long in the type variant), well-exserted from the corolla tube and arising from a depression which tightly envelops the base (i.e. the style base is countersunk below the level of the ovary apex).

There is usually also a more obvious difference. The type variant of *S. hamulosa* has hairy abaxial sepal surfaces, only very occasionally glabrous, whereas in *S. brachygyna* they are always glabrous. A further difference is to be found in the nectary. In *S. hamulosa* it is usually clearly partite or occasionally with the lobes very weakly cohering, whereas in *S. brachygyna* the nectary is always annular, although with deep longitudinal grooves below the sinuses.

The two taxa have allopatric distributions. The type variant of *S. hamulosa* mostly occurs from Mingenew and Dongara south to near Badgingarra and Moora, but with two collections further north from the Whicherina-Indarra Springs area, between Geraldton and Mullewa. The main centre of distribution for *S. brachygyna* is east and north-east of Kalbarri, well to the north of these locations, although the disjunct occurrence north-west of Mullewa is only about 40 km distant.

Two other related species from Group X also occur north of Geraldton, *S. howatharra* Hislop and *S. kalbarriensis* Hislop (both described below). These differ most obviously from *S. brachygyna* in having leaves that terminate in blunt callus tips (rather than pungent mucros, 0.3–0.6 mm long) and in having longer styles that are exserted from the corolla tubes.

Other specimens examined

WESTERN AUSTRALIA. [Localities withheld for conservation reasons] 23 June 2014, *A. Chant & J. Newell AC 1132* (PERTH); 25 May 1994, *R.J. Cranfield 1994* (CNS, PERTH); 8 June 2005, *M. Hislop 3453* (CANB, CNS, PERTH); 9 June 2005, *M. Hislop 3465* (MEL, PERTH); 25 Nov. 2022, *P. Jayasekara 1164(Pj)* (PERTH); 4 Aug. 1996, *G.J. Keighery & N. Gibson 1779* (PERTH); 2 Apr. 1994, *S. Patrick 1731* (PERTH); 7 July 1982, *J.M. Powell 1702* (CANB, K, NSW, PERTH); 7 July 1982, *J.M. Powell 1703* (CANB, K, MEL, NSW, PERTH); 23 Aug. 2015, *Wildflower Society of WA CREEK NORTH 4/30* (PERTH).

Styphelia browniae Hislop, *sp. nov.*

Holotypus: 1.5 km east along Middleton Road, from Whittington Road, south of Corrigin, Western Australia, 25 May 2000, *K. Kershaw KK 2092B* (PERTH 05614600). **Isotypi:** CANB, CNS, MEL, NSW.

Leucopogon sulcatus E.A.Br. ms, Western Australian Herbarium, *Florabase*, <https://florabase.dpaw.wa.gov.au/> [before December 2011].

Leucopogon sp. Forresteria (*G.F. Craig 2383*) Western Australian Herbarium, *Florabase*, <https://florabase.dpaw.wa.gov.au/> [accessed 21 July 2023].

Erect *shrubs*, to c. 100 cm high and 100 cm wide, single-stemmed at ground level, with a fire sensitive rootstock. Young *branchlets* with a sparse to very sparse indumentum of very short hairs, <0.05 mm long. *Leaves* spirally arranged, steeply antorse, sometimes \pm appressed; apex long-mucronate, pungent, the mucro \pm straight to slightly inflexed, 0.5–1.2 mm long; base cuneate or rounded to occasionally cordate; petiole well-defined, 0.7–1.7 mm long, shortly hairy on the adaxial surface and sometimes the margins, glabrous abaxially; lamina ovate to elliptic, or broadly so (rarely narrowly so), 4–12 mm long, 2.4–6.5 mm wide, usually strongly concave adaxially, occasionally some leaves flat or convex, longitudinal axis gently incurved; surfaces discolourous, slightly shiny; adaxial surface \pm glabrous or with a few hairs close to the base and sometimes also towards the apex, venation not, or barely evident; abaxial surface paler, with 7–9 broad, primary veins, the midrib no more prominent than the others, deeply and narrowly grooved between the veins (the grooves usually \pm closed), glabrous on the exposed vein surfaces, shortly hairy within the grooves; margins entire to irregularly denticulate, often hyaline (refer under notes below for discussion of this character), minutely ciliolate with hairs <0.05 mm long, or \pm glabrous. *Inflorescence* axillary, erect; axis 1.4–2.8 mm long, 1- or 2 (4)-flowered, with a moderately dense to dense indumentum, \pm terete below the lowest fertile bract, sharply angular or \pm winged above, terminating in a bud-rudiment; flowers erect, sessile. *Fertile bracts* depressed-ovate, 0.6–1.0 mm long, 0.8–1.6 mm wide, with usually 4 sterile bracts on the axis below. *Bracteoles* broadly ovate, depressed-ovate to \pm orbicular, 1.1–1.7 mm long, 1.1–1.6 mm wide, usually obscurely keeled, obtuse (not or scarcely mucronulate); abaxial surface shortly and variably hairy, not or scarcely striate; margins minutely ciliolate or \pm glabrous. *Sepals* narrowly ovate, 3.0–3.8 mm long, 1.2–1.6 mm wide, acute or subacute; abaxial surface shortly hairy throughout or in part (often about the midline), occasionally \pm glabrous, straw-coloured, venation very obscure; adaxial surface with a discrete tuft of hairs towards the base and usually a few hairs below the apex; margins minutely ciliolate with hairs <0.05 mm long, or \pm glabrous. *Corolla tube* white, obovoid or narrowly obovoid, shorter than, to c. equal to the sepals, 2.2–3.0 mm long, 1.6–2.2 mm wide, external surface glabrous, internal surface glabrous. *Corolla lobes* white, longer than, to slightly shorter than the tube, 2.3–3.0 mm long, 0.8–1.0 mm wide at base, erect in basal $\frac{1}{2}$ – $\frac{2}{3}$ of their length and then spreading and recurved, external surface glabrous, internal surface with a dense, white indumentum of \pm terete, \pm straight or slightly wavy, scarcely ornamented hairs. *Anthers* shortly exserted from the tube, or partially exserted (by c. $\frac{7}{8}$ of their length), 0.8–1.5 mm long, apex shortly emarginate. *Filaments* terete, 1.0–1.3 mm long, attached to the anther $\frac{3}{4}$ – $\frac{7}{8}$ above the anther base, adnate to tube just below the sinuses. *Nectary*

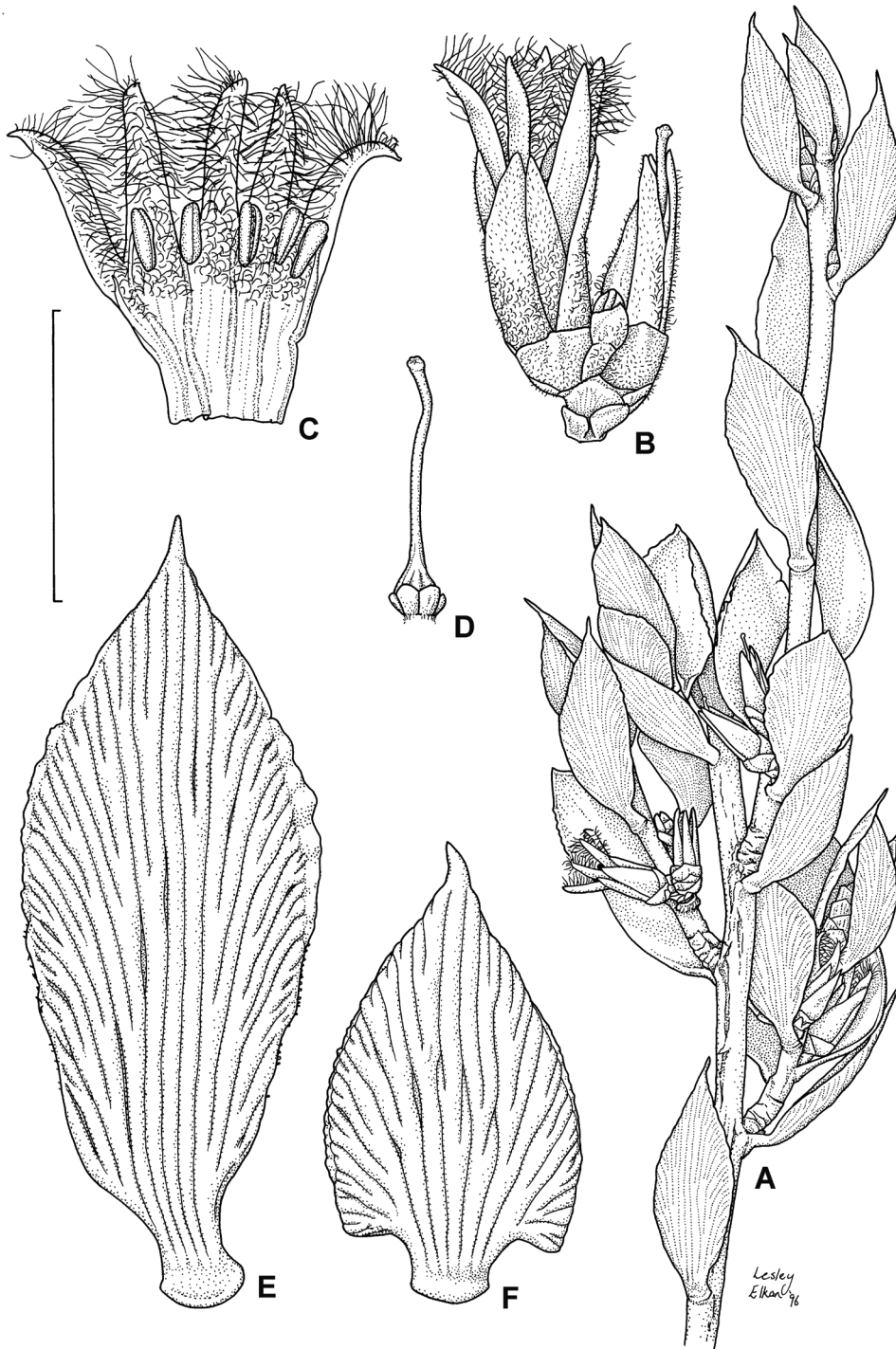


Fig. 2. *Styphelia browniae*: **A** Flowering branchlet; **B** flowering inflorescence; **C** corolla, internal surface; **D** gynoecium at flowering; **E** leaf; **F** leaf. Scale bars = 12 mm (A), 4 mm (B–F). — A–E F.H. Mollemans 2714, F F.H. & M.P. Mollemans 3133. Drawings by Lesley Elkan.

annular, 0.3–0.5 mm long, glabrous, \pm truncate or variously lobed, usually with rather deep longitudinal grooves below the sinuses. *Ovary* globose or broadly ellipsoid, 0.7–1.2 mm long, 0.6–1.1 mm wide, glabrous, 5-locular, straw-coloured. *Style* 2.6–3.4 mm long, scabrous, exerted from the corolla tube but not beyond the erect bases of the corolla lobes, well-differentiated from the ovary apex and not arising from a depression; stigma slightly expanded. *Fruit* narrowly ellipsoid to narrowly obovoid, 2.8–3.2 mm long, 1.5–1.7 mm wide, a little shorter than, to a little longer than the sepals, circular in section, gynophore absent; surface glabrous, longitudinally grooved (mesocarp

weakly developed); apex acute or subacute; style usually shed before maturity. **Figs 2, 3.**

Diagnostic characters. Within Group X distinguished by the following character combination: lamina ovate to elliptic, or broadly so (rarely narrowly so), 4–12 mm long, 2.4–6.5 mm wide, usually strongly concave adaxially; abaxial surface with deep, \pm closed grooves, shortly hairy in the grooves; leaf apex straight or slightly inflexed, long-mucronate, pungent; inflorescence 1- or 2 (4)-flowered, axis 1.4–2.8 mm long, terminating in a bud-rudiment; abaxial surface of bracteoles and sepals usually hairy to some degree (occasionally the sepals \pm



Fig. 3. *Styphelia browniae*. Flowering plant *in situ*. — M. Hislop & F. Hort 2589. Photograph by Michael Hislop.

glabrous); sepal margins \pm glabrous or minutely ciliolate, with hairs <0.05 mm long; corolla tube shorter than, to c. equal to the sepals; corolla lobes longer than, to slightly shorter than the tube; nectary annular, lobed or not; ovary 5-locular, glabrous; style 2.6–3.4 mm long, scabrous, exerted beyond the corolla tube; style base not countersunk below the level of ovary apex; fruit narrowly ellipsoid to narrowly obovoid, longitudinally grooved.

Distribution and habitat. Widely but sporadically distributed in an area roughly bounded by Wyalkatchem and Southern Cross in the north, and from Kulin to north-east of Lake King in the south; in the eastern Avon Wheatbelt, northern Mallee and far west of the Coolgardie bioregions.

Grows in deep sand or sand over laterite in heath or open mallee woodland. Common associated species include *Eucalyptus burracopinensis*, *Allocasuarina campestris*, *A. acutivalvis*, *Acacia heteroneura*, *Melaleuca cordata*, *Hakea erecta*, *Grevillea paradoxa* and *Beaufortia schaueri*.

Phenology. Peak flowering is between April and July, with the onset probably determined by the timing of the first significant rains of autumn and early winter. Specimens with mature fruit present have been collected between August and October.

Etymology. The new species is named for the late Elizabeth Anne Brown (1956–2013), botanist and bryologist at the National Herbarium of New South Wales. During her career, Elizabeth made important contributions towards an improved understanding of higher-level relationships in the tribe *Styphelieae*. She also had a good knowledge of the Western Australian members of the tribe and was the first to recognise the novel status of the species named here in her honour.

Conservation status. A relatively widespread and often locally common species that is known to occur in several nature reserves. No conservation coding is recommended here.

Affinities. Earlier collections of *S. browniae* were mostly referred to the superficially similar *S. marginata* (W.Fitzg.) Hislop, Crayn & Puente-Lel., a rare species from the Geraldton Sandplains bioregion and adjacent parts of the northern Avon Wheatbelt. The most significant distinguishing features between the two are associated with the gynoecium. In *S. browniae* the style base arises directly from the attenuate ovary apex, whereas in *S. marginata* it is countersunk below the level of the \pm truncate apex and is free from ovarian tissue at that point. The size and shape of the ovary and fruit also differ. *Styphelia browniae* has a globose or broadly ellipsoid ovary, 0.7–1.2 mm long and 0.6–1.1 mm wide, but in *S. marginata* it is ovoid, or sometimes ellipsoid, 0.5–0.8 mm long and 0.4–0.6 mm wide. The fruit of *S. browniae* is narrowly ellipsoid to narrowly obovoid, 2.8–3.2 mm long and 1.5–1.7 mm wide, compared to that of *S. marginata*, which is ellipsoid (sometimes narrowly ellipsoid), 1.8–2.6 mm long and 1.0–1.5 mm wide.

The two species can be further differentiated by a sepal difference. Whereas *S. browniae* has sepals 3.0–3.8 mm long and 1.2–1.6 mm wide that are usually hairy to some degree, in *S. marginata* these are smaller, 1.8–2.6 mm long, 0.8–1.3 mm wide, and always glabrous.

Notes. In many species of *Styphelia*, the ‘early seasonal leaves’ (*sensu* Powell *et al.* 1997: 16) produced during a flush of new growth look quite dissimilar to the typical adult leaves of the species. They often differ from the latter in shape (usually shorter and broader), curvature, and quite frequently in having distinct, hyaline margins. There is usually a transition over several nodes between these ‘early seasonal leaves’ and typical adult leaves. In some species however, including *S. browniae*, hyaline margins are often present on adult leaves.

Other specimens examined

WESTERN AUSTRALIA. Hatters Hill Rd, 9.5 km S of intersection of Broombush Rd and Diggers Rock–Hatters Hill Rd, 17 Oct. 1997, *E.A. Brown 97/316, P.G. Wilson & N. Lam* (NSW, NY, PERTH, UNSW); Flint’s farm, 50 km SE of Hyden, 1 km E, big breakaway by Williamson Rd, 7 May 2000, *J.M. Flint 165* (PERTH); quadrat 15, crown land old townsite, Wogarl Res., 22 km NNE of Narembeen,

[at junction of Wogarl–Graball Rd, Wogarl Rd West and Coverley Rd], 28 Aug. 2000, *A.G. Gunness et al. WOGL 15/34* (PERTH); Jilbadgie Nature Res., Forrestania–Southern Cross Rd, 16.7 km S of Dunbar Rd, 15 May 2002, *M. Hislop & F. Hort MH 2588* (PERTH); Forrestania–Southern Cross Rd, 43 km S of Dunbar Rd, locality of Forrestania, 15 May 2002, *M. Hislop & F. Hort MH 2589* (NSW, PERTH); Cox Rd, 2.2 km S of Cramphorne Rd, E of Bruce Rock, 27 July 2002, *M. Hislop 2710* (PERTH); remnant bushland on N side of Fuchsbichler Rd, 14.5 km E of Bruce Rock–Merredin Rd, NE of Bruce Rock, 11 July 2004, *M. Hislop 3261* (NSW, PERTH); Nature Res. 37289, at corner of Soldiers and Grays roads, E of Mt Walker, 24 Apr. 2006, *M. Hislop 3586* (PERTH); unnamed track between Hatters Hill and Mt Gibbs, 4.7 km S of intersection at Hatters Hill, 8 Oct. 2006, *M. Hislop 3657* (PERTH); Roach Nature Res., off Roach Rd, [N of Narembeen], 10 July 2015, *B. Hort NM 147* (CANB, PERTH); quadrat 20, Hutch's block, Cardiff Pastoral Co, Hammond Rd, [SE of Wyalkatchem], 19 Sep. 2000, *C. Keating et al. WYCH 20/42* (PERTH); 1.5 km east along Middleton Road, from Whittington Road, south of Corrigin, Western Australia, 25 May 2000, *K. Kershaw KK 2092A* (NSW, PERTH); 1.8 km N along Southern Cross South Rd from Sloss Rd in Welsh Nature Res. (30305), in rehabilitation pit, 8 Aug. 2001, *K. Kershaw & M. Golding KK 2261* (CNS, PERTH); c. 150 m E of Hatters Hill Trig Point [NE of Lake King], 22 Aug. 2001, *K. Kershaw & M. Golding KK 2282* (PERTH); Scott Rd, Koonadgin [SE of Merredin], 15 June 1994, *Merredin Herbarium BP 03* (PERTH); Hatter Hill area, c. 70 m NW of Hatter Hill trig, 80 km N of Ravensthorpe, 26 May 1990, *F.H. Mollemans 2714* (NSW, PERTH); Emu Fence Rd, 3.49 km S of junction with Parker Range–Moorine Rock Rd, 47.5 km SSE of Southern Cross, 14 July 1990, *F.H. & M.P. Mollemans 3133* (NSW, PERTH); 'Buckleys Breakaway', 56 km E of Kulin, 5 July 1997, *S. Murray 264* (NSW, PERTH); 27.9 km N of Narembeen on Wogarl–Muntagin Rd, 23 July 2002, *S. Patrick 4167* (PERTH); North Bungulla, 1 May 1951, *R.D. Royce 3437* (PERTH).

Styphelia howatharra* Hislop, *sp. nov.

Holotypus: north-east of Geraldton, Western Australia [precise locality withheld for conservation reasons], 12 June 2011, *M. Hislop 4120* (PERTH08366292).

Isotypi: CANB, CNS, K, MEL, NSW.

Leucopogon sp. Howatharra (*D. & N. McFarland 1046*) Western Australian Herbarium, *Florabase*, <https://florabase.dpaw.wa.gov.au/> [accessed 21 July 2023].

Erect, compact *shrubs*, to c. 90 cm high and 70 cm wide, single-stemmed at ground level, with a fire-sensitive rootstock. Young *branchlets* with a sparse to moderately dense indumentum of straight, patent hairs, to c. 0.05 mm long. *Leaves* spirally arranged, steeply antrorse and sometimes partially stem-clasping; apex obtuse or more often acute, with a blunt callus tip, to c. 0.1 mm long; base cuneate, rounded or cordate; petiole prominent, 0.5–1.2 mm long, ± glabrous throughout or sometimes with a few hairs on the adaxial surface and margins; lamina ovate, or more usually broadly

ovate, 2.0–4.2 mm long, 1.8–3.5 mm wide, usually distinctly inflexed immediately above the petiole, strongly concave adaxially, longitudinal axis usually shallowly incurved, or less often ± straight in the lower half, recurved towards the apex; surfaces discolorous, slightly shiny; adaxial surface glabrous, or with a few hairs towards the base, venation not, or barely evident; abaxial surface paler, with 7–9 broad, primary veins, the midrib scarcely more prominent than the others, deeply and narrowly grooved between the veins (the grooves open to ± closed), glabrous or sparsely hairy on the exposed vein surfaces, shortly hairy within the grooves, although sometimes very sparsely so; margins ± entire to strongly denticulate, the teeth often terminating in coarse hairs, to 0.2 mm long. *Inflorescence* axillary, erect; axis 0.6–1.0 mm long, 1–2-flowered, with a sparse indumentum, ± compressed below and above the fertile bract, terminating in a bud-rudiment; flowers erect, sessile. *Fertile bracts* depressed-ovate, 0.4–0.6 mm long, 0.6–0.7 mm wide, with 3 or 4 sterile bracts on the axis below. *Bracteoles* broadly ovate or depressed-ovate, 0.9–1.1 mm long, 1.1–1.3 mm wide, not, or scarcely keeled, obtuse (not mucronate); abaxial surface glabrous, not striate; margins minutely ciliolate or ± glabrous. *Sepals* narrowly ovate, 2.0–2.3 mm long, 0.8–1.2 mm wide, obtuse to subacute; abaxial surface glabrous, straw-coloured, or pale greenish, venation very obscure; adaxial surface glabrous or with a few hairs towards the base; margins minutely ciliolate, with hairs <0.05 mm long, or ± glabrous. *Corolla tube* white, ellipsoid or obovoid, or broadly so, slightly shorter than, to slightly longer than the sepals, 1.5–2.1 mm long, 1.4–1.7 mm wide, external surface glabrous, internal surface glabrous. *Corolla lobes* white, slightly shorter than, to slightly longer than the tube, 1.5–2.0 mm long, 0.7–0.9 mm wide at base, erect in basal ½–⅔ of their length and then spreading and recurved, external surface glabrous, internal surface with a dense, white indumentum of ± terete, ± straight or slightly wavy, scarcely ornamented hairs. *Anthers* partially exerted from the tube (by c. ¾ of their length), 0.7–1.0 mm long, apex shortly emarginate. *Filaments* terete, 0.5–0.7 mm long, attached to the anther just below the apex, adnate to tube just below the sinuses. *Nectary* partite, the scales 0.3–0.5 mm long, 0.25–0.35 mm wide, glabrous. *Ovary* ellipsoid, 0.5–0.7 mm long, 0.4–0.5 mm wide, hairy or glabrous, 5-locular, pale green. *Style* 1.4–2.2 mm long, scabrous, exerted from the corolla tube but not beyond the erect bases of the corolla lobes, arising from a depression at the ovary apex that tightly envelops, but is free from, the style base (i.e. the base is countersunk below the level of the ovary apex); stigma slightly expanded. *Fruit*¹ narrowly ellipsoid, 2.0–2.2 mm long, 1.0–1.1 mm wide, longer than the sepals, circular in section, gynophore absent; surface hairy or glabrous, irregularly grooved longitudinally (mesocarp weakly developed); apex subacute below a narrowly truncate rim; style shed before maturity. **Figs 1C, D, 4A.**

¹ Observations of fruit morphology were based on a single specimen and there may be some doubt as to whether the fruit examined was fully mature.

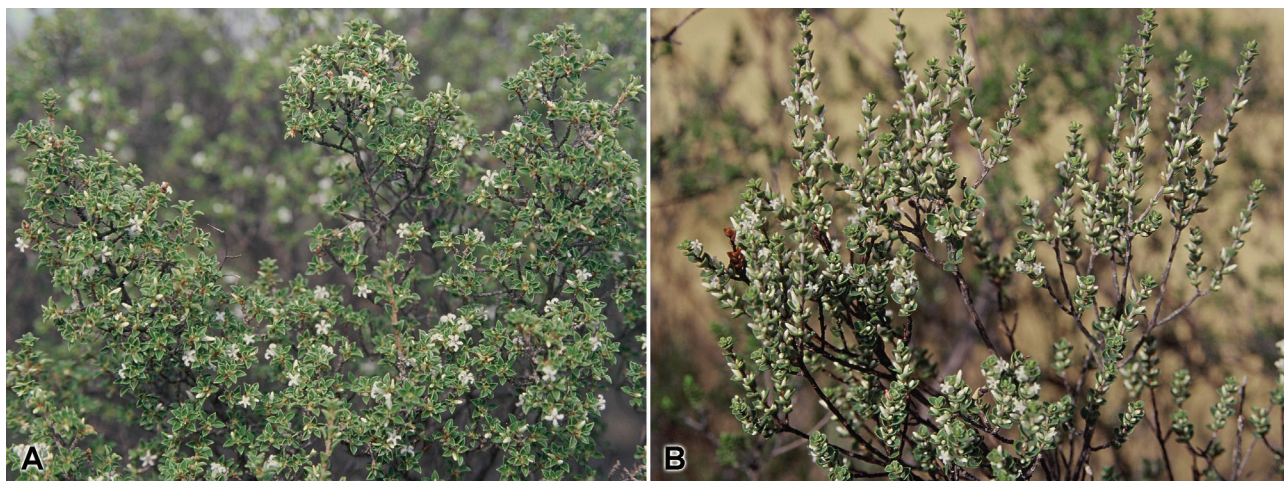


Fig. 4. Flowering plants *in situ*: **A** *Styphelia howatharra*; **B** *Styphelia kalbarriensis*. — A M. Hislop 2688; B M. Hislop 3458. Photographs by Michael Hislop.

Diagnostic characters. Within Group X distinguished by the following character combination: leaves prominently petiolate with petioles 0.5–1.2 mm long; lamina distinctly inflexed immediately above the petiole, ovate or broadly ovate, 2.0–4.2 mm long, 1.8–3.5 mm wide, strongly concave adaxially and sometimes partially stem-clasping; abaxial surface with deep \pm closed grooves, shortly hairy in the grooves; leaf apex recurved, obtuse or acute with a blunt callus tip, to c. 0.1 mm long; inflorescence 1- or 2-flowered, axis 0.6–1.0 mm long, terminating in a bud-rudiment; abaxial surface of bracteoles and sepals glabrous; sepal margins \pm glabrous or minutely ciliolate, with hairs < 0.05 mm long; corolla tube slightly longer than, to slightly shorter than the sepals; corolla lobes slightly longer than, to slightly shorter than the tube; nectary partite; ovary 5-locular, hairy or glabrous; style 1.4–2.2 mm long, scabrous, exserted beyond the corolla tube; style base countersunk below the level of the ovary apex.

Distribution and habitat. Restricted to the Moresby Range, between Geraldton and Northampton, in the Geraldton Sandplains bioregion. It grows in sandy loam soils over sandstone or laterite, mostly in heathland communities. Associated species include *Melaleuca megacephala*, *M. nematophylla*, *Hakea pycnoneura*, *Gastrolobium oxylobioides* and *Petrophile conifera*.

Phenology. Flowering collections have been made in June and July although these mostly also have immature fruit present suggesting that flowering probably began several months earlier, in common with other related species. The only specimen (*A. Chant 601*) that included fruit at least close to maturity was collected in July.

Etymology. Howatharra is an Aboriginal place name for a locality in the central Moresby Range where the species is locally common.

Conservation status. Currently listed under the phrase-name *Leucopogon* sp. Howatharra as Priority Two under

Conservation Codes for Western Australian Flora (State of Western Australia 2022). Known to occur in one nature reserve and a conservation park.

Affinities. Among the species of Group X that occur in the northern part of the Geraldton Sandplains bioregion, *S. howatharra* is probably only likely to be confused with the aforementioned type variant of *S. hamulosa* or with *S. kalbarriensis*. It differs from the former in frequently having a hairy ovary (vs. ovarian hairs very rare in all variants of *S. hamulosa*), in its glabrous sepals (mostly variously hairy in *S. hamulosa*, occasionally glabrous or almost so), in having longer petioles, a different leaf curvature and by its leaves terminating in blunt callus tips rather than long, pungent mucros. The long petioles (0.5–1.2 mm long) of *S. howatharra* are a distinctive feature of the species, as is the way in which the lamina is usually inflexed immediately above the petiole. In the type variant of *S. hamulosa* the petioles are obviously shorter (0.2–0.6 mm long) and the lamina is never inflexed above the petiole. In addition, in *S. howatharra* the longitudinal axis of the lamina is usually incurved (or less often \pm straight) in the lower half and then recurved towards the apex, whereas in the type variant of *S. hamulosa* it is \pm recurved across its entire length, or rarely straight in the lower half and recurved above. The nearest known populations of the type variant of *S. hamulosa* occur to the south-east of the Moresby Range in the Whicherina-Indarra Springs area, where the species is at the northernmost extent of its geographical range.

Styphelia howatharra shares with *S. kalbarriensis* non-pungent leaf tips. The two have allopatric distributions with the former restricted to the Moresby Range and *S. kalbarriensis* having a more widespread distribution to the north and east, between Kalbarri and East Yuna. Differences in leaf morphology provide the most obvious means of distinguishing between the two. The long petioles of *S. howatharra* (0.5–1.2 mm long) are generally noticeably longer than those of *S. kalbarriensis* (0.1–0.6 mm long) and leaf curvature

is significantly different. In *S. howatharra* the lamina is usually distinctly inflexed above the petiole and the longitudinal axis of the lamina is generally shallowly incurved, or less often \pm straight in the lower half and then recurved towards the apex. By contrast, in *S. kalbarriensis* the petiole and lamina are held on the same plane and the lamina axis is mostly straight but becoming incurved towards the apex, or else incurved throughout.

A difference in the nectary character represents a significant floral difference between the two. Whereas *S. howatharra* has a partite nectary, in *S. kalbarriensis* it is annular, although with longitudinal grooves below the lobe sinuses. Except for those populations towards the eastern edge of the range of *S. kalbarriensis* (as discussed under *Notes* for that species) the flowers of *S. howatharra* are also generally smaller in all their parts. In addition, where the usual flower number per inflorescence for *S. howatharra* is one or less often two, for *S. kalbarriensis* two or more flowered inflorescences are common.

Other specimens examined

WESTERN AUSTRALIA. [Localities withheld for conservation reasons] 1 Oct. 2008, *L. Atkins 423* (PERTH); 13 July 2016, *A. Chant 601* (PERTH); 8 June 2002, *M. Hislop 2688* (CANB, PERTH); 8 June 2002, *M. Hislop 2689* (CANB, K, MEL, NSW); 4 June 2006, *M. Hislop 3600* (CNS, PERTH); 7 July 1974, *D. & N. McFarland 1046* (PERTH).

***Styphelia kalbarriensis* Hislop & E.A.Br., sp. nov.**

Holotypus: 18 km north-east of Kalbarri on road to Murchison River, Kalbarri National Park, Western Australia, 6 July 1982, *J.M. Powell 1695* (PERTH 03011763). **Isotypi:** CANB, K, L, MEL, NSW.

Leucopogon sp. Kalbarri (*J.M. Powell 1695*) Western Australian Herbarium, *Florabase*, <https://florabase.dpaw.wa.gov.au/> [accessed 21 July 2023].

Erect, compact *shrubs* to c. 80 cm high and 80 cm wide, single-stemmed at ground level, with a fire-sensitive rootstock. Young *branchlets* with a moderately dense or dense indumentum of straight or curved, \pm patent to retrorse hairs, to c. 0.2 mm long. *Leaves* spirally arranged, steeply antrorse, sometimes antrorse-appressed, frequently stem-clasping at least in the basal half; apex obtuse to acute, with a blunt callus tip, to c. 0.2 mm long; base usually cordate or rounded, occasionally cuneate; petiole 0.1–0.6 mm long, glabrous, or with a few hairs on the adaxial surface and margins; lamina broadly ovate to depressed-ovate, 1.8–6.2 mm long, 2.0–6.0 mm wide, not distinctly inflexed above the petiole, strongly concave adaxially, longitudinal axis straight for most of its length but becoming incurved towards the apex or incurved throughout; surfaces discolorous, slightly shiny; adaxial surface usually \pm hairy towards the base, venation not, or barely evident; abaxial surface paler, with 7–11 broad, primary veins, the midrib scarcely more prominent than the others,

deeply and narrowly grooved between the veins (the grooves usually \pm closed), glabrous on the exposed vein surfaces, shortly hairy within the grooves; margins entire to irregularly denticulate, sometimes hyaline (as discussed under notes for *S. browniae*) and \pm undulate, glabrous or coarsely ciliolate, with hairs <0.05 mm long. *Inflorescence* axillary, erect; axis 1.0–2.2 mm long, 1–4-flowered, with a moderately dense indumentum, \pm compressed below the lowest fertile bract, angular above, terminating in a bud-rudiment; flowers erect, sessile. *Fertile bracts* depressed-ovate, 0.4–0.9 mm long, 0.5–1.0 mm wide, with (3) 4 sterile bracts on the axis below. *Bracteoles* ovate to depressed ovate, 1.0–1.3 mm long, 0.8–1.3 mm wide, keeled, obtuse (not mucronate); abaxial surface glabrous or sometimes with a few hairs about the keel, not striate; margins minutely ciliolate or \pm glabrous. *Sepals* narrowly ovate, 2.0–3.0 mm long, 0.9–1.2 mm wide, usually acute or subacute, occasionally obtuse; abaxial surface usually glabrous, or very occasionally with a few hairs, straw-coloured, venation very obscure; adaxial surface with a discrete tuft of hairs towards the base and usually a few hairs below the apex, otherwise glabrous; margins minutely ciliolate, with hairs <0.05 mm long, or \pm glabrous. *Corolla tube* white, ellipsoid to obovoid or narrowly so, usually shorter than, or occasionally c. equal to the sepals, 1.5–2.5 mm long, 1.3–1.8 mm wide, external surface glabrous, internal surface glabrous. *Corolla lobes* white, usually longer than, or sometimes slightly shorter than the tube, 1.6–2.6 mm long, 0.5–0.8 mm wide at base, erect in basal $\frac{1}{2}$ – $\frac{2}{3}$ of their length and then spreading and recurved, external surface glabrous, internal surface with a dense, white indumentum of \pm terete, \pm straight or slightly wavy, scarcely ornamented hairs. *Anthers* very shortly to partially (by c. $\frac{7}{8}$ of their length) exerted from tube, 0.6–1.2 mm long, apex shortly emarginate. *Filaments* terete, 0.5–0.9 mm long, attached to the anther just below the apex (at least $\frac{7}{8}$ above anther base), adnate to tube just below the sinuses. *Nectary* annular, 0.3–0.5 mm long, glabrous, lobed, with longitudinal grooves below the sinuses. *Ovary* ovate to ellipsoid or narrowly so, 0.6–0.8 mm long, 0.4–0.5 mm wide, glabrous, or very occasionally shortly hairy, 5-locular, pale green or straw-coloured. *Style* 1.6–2.5 mm long, scabrous, exerted from the corolla tube but not beyond the erect bases of the corolla lobes, arising from a depression at the ovary apex that tightly envelops, but is free from style base (i.e. the base is countersunk below the level of the ovary apex); stigma slightly expanded. *Fruit* narrowly ellipsoid to narrowly obovoid, 2.0–2.7 mm long, 1.3–1.5 mm wide, a little shorter than, to a little longer than the sepals, circular in section, gynophore absent; surface glabrous, longitudinally grooved (mesocarp weakly developed); apex subacute below a narrowly truncate rim; style shed before maturity. **Figs 4B, 5.**

Diagnostic characters. Within Group X distinguished by the following character combination: leaf petioles 0.1–0.6 mm long, held on the same plane as the lamina; lamina broadly ovate to depressed-ovate, 1.8–6.2 mm long, 2.0–6.0 mm wide, strongly concave adaxially and

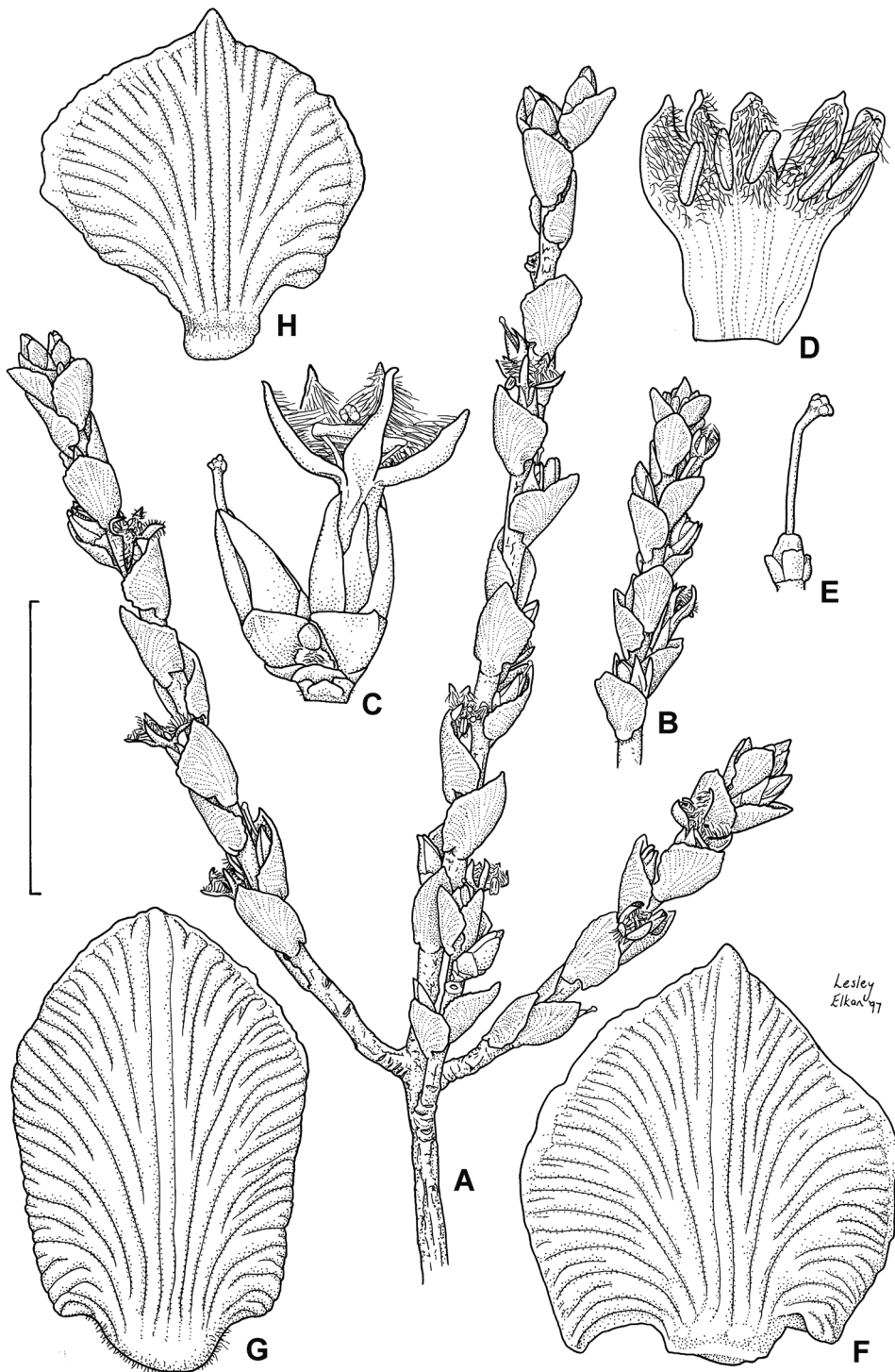


Fig. 5. *Styphelia kalbarriensis*: **A** Flowering branchlet; **B** flowering branchlet; **C** flowering inflorescence; **D** corolla, internal surface; **E** gynoecium at flowering; **F** leaf; **G** leaf; **H** leaf. Scale bars = 12 mm (A, B), 4 mm (C–E), 3 mm (F–H). — A, C–E A.S. George 9519, B, G C.H. Gittins 1596, F J.M. Powell 1695, H J.M. Powell 1384. Drawings by Lesley Elkan.

often stem-clasping; abaxial surface with deep, \pm closed grooves, shortly hairy in the grooves; leaf apex more or less straight, obtuse or acute with a blunt callus tip, to c. 0.2 mm long; inflorescence 1–4-flowered, axis 1.0–2.2 mm long, terminating in a bud-rudiment; abaxial surface of bracteoles and sepals usually glabrous or occasionally with a few hairs; sepal margins \pm glabrous or minutely ciliolate, with hairs < 0.05 mm long; corolla tube usually shorter than, or occasionally c. equal to the sepals; corolla lobes usually longer than, or sometimes slightly shorter than the tube; nectary annular with deep longitudinal grooves below the sinuses; ovary

5-locular, usually glabrous or occasionally shortly hairy; style 1.6–2.5 mm long, scabrous, exerted beyond the corolla tube; style base countersunk below the level of the ovary apex; fruit narrowly ellipsoid to narrowly obovoid, longitudinally grooved.

Distribution and habitat. Occurs from Kalbarri National Park (N.P.) eastwards to an area north of Eurardy Station and then south and east to East Yuna, in the Geraldton Sandplains bioregion. Grows on yellow sandplain in heath or low, open woodland. Associated species include *Callitris arenaria*, *Banksia*

sceptrum, *Conospermum microflorum*, *Calothamnus blepharospermus*, *Beaufortia aestiva*, *Melaleuca* spp. and *Ecdeiocolea monostachya*.

Phenology. Flowering collections have been made between May and October, with the majority from June to August. Mature fruit has been collected in September and October but is likely to be present until the early summer.

Etymology. From the place name Kalbarri, and the Latin *-ensis* (native of). Kalbarri N.P. is the main centre of the species' distribution.

Conservation status. The species is locally common in Kalbarri N.P. and at Eurardy Res., a privately owned and managed conservation reserve. The fact that it has not been collected from East Yuna Nature Res. since the 1960's suggests that it may, at best, be localised in that area. No conservation coding is recommended here.

Affinities. *Styphelia kalbarriensis* is morphologically most similar to *S. howatharra* and the differences between the two are given above under the treatment of that species.

In the eastern part of the species range *S. kalbarriensis* is known to be sympatric with *S. brachygyna*. It can be readily distinguished from that species by its longer style (1.6–2.5 mm long vs. 0.35–0.6 mm long in *S. brachygyna*) that is always exerted from, rather than included within, the corolla tube. Leaf characters provide other differences. *Styphelia kalbarriensis* has longitudinal leaf axes that are mostly straight but becoming incurved towards the apices or incurved throughout, whereas in *S. brachygyna*, although the axes are straight to shallowly incurved in the lower half, they become strongly recurved towards the apices. And where *S. kalbarriensis* has leaf apices with straight, blunt callus tips to c. 0.2 mm long, in *S. brachygyna* they are recurved, pungent, long-mucronate and 0.3–0.6 mm long.

Notes. *Styphelia kalbarriensis* is a variable species regarding leaf and flower size. These differences appear to be clinal in nature with larger leaves and flowers in the west of the species' range and the smallest in the east. There is some correlation between the size of leaves and their orientation and curvature, so that in larger-leaved plants they are more likely to be stem-clasping and appressed to the branchlets. Such plants are also more likely to have adult leaves with hyaline margins (as discussed under notes for *S. browniae*), and these can look quite different from plants with smaller, more spreading leaves. However, the pattern of foliar variation across the species shows no consistent disjunctions in relation to these characters.

Other specimens examined

WESTERN AUSTRALIA. Firebreak in Kalbarri N.P., 4 Aug. 1998, *D. & B. Bellairs 5014* (PERTH); East Yuna Res., 1 June 1966, *A.C. Burns 2* (PERTH); East Yuna Res.,

NE of Geraldton, 5 June 1966, *A.C. Burns 21* (PERTH); Eurardy Station, southern boundary, 7 Aug. 2003, *A. Chant 506* (PERTH); Z Bend Rd, Kalbarri N.P., 0.5 km N of main track, 18 Aug. 1993, *R.J. Cranfield & D. Kabay 8750* (PERTH); N end of Balla Whelarra Rd, 35 km N of intersection with Ogilvie Rd, 24 June 1997, *R. Davis 3540* (PERTH); c. 70 km S of Billabong Roadhouse on North West Coastal Hwy, 19 June 1999, *R. Davis 8858* (CANB, NSW, PERTH); 2 miles [c. 3.2 km] W of Eurardy Homestead, 24 Aug. 1969, *A.S. George 9519* (NSW, PERTH); 11 miles [c. 17.7 km] from North West Coastal Hwy to Kalbarri, Aug. 1967, *C.H. Gittins 1596* (PERTH); Balla Whelarra Rd, 3.4 km N of Ogilvie Road East, NE of Northampton, 7 June 2005, *M. Hislop 3449* (CANB, CNS, MEL, NSW, PERTH); junction of North West Coastal Hwy and CS6R25 Rd (9.9 km N of Eurardy entrance), 8 June 2005, *M. Hislop 3454* (CNS, NSW, PERTH); CS6R25 Rd (9.9 km N of Eurardy entrance), 3.7 km E of North West Coastal Hwy, 8 June 2005, *M. Hislop 3458* (CNS, PERTH); Eurardy Station, along S boundary c. 400 m W of Bungabandi Creek corner, 9 June 2005, *M. Hislop 3464* (CNS, PERTH); on E boundary of the reserve, on S side of Ajana-Kalbarri Rd, c. 9 km NW of Eastough Rd junction, Kalbarri N.P., 14 Aug. 1999, *G.J. Keighery & N. Gibson 6524* (PERTH); Kalbarri N.P., 3 Oct. 1985, *E. & S. Pignatti 400* (PERTH); 21 km by road ENE of Kalbarri, on road to Ajana, 4 Sep. 1979, *J.M. Powell 1381* (CANB, HO, K, L, MEL, NSW, PERTH); c. 4 km WNW of Z Bend, Kalbarri N.P., 4 Sep. 1979, *J.M. Powell 1384* (CANB, K, L, MEL, NSW, PERTH); Kalbarri N.P., Ajana-Kalbarri Rd, 6.6 km SE of the road to Hawks Head lookout, 9 July 2010, *C. Puente-Lelièvre, M. Hislop & E.A. Brown CPL 69* (NSW, PERTH); Ajana-Kalbarri Rd, c. 500 m from E boundary of Kalbarri N.P., 7 Sep. 2017, *R. Simkin RS 1840* (PERTH).

Styphelia marginata (W.Fitzg.) Hislop, Crayn & Puente-Lel.

Austral. Syst. Bot. 33: 150 (2020). — *Leucopogon marginatus* W.Fitzg. *Journ. W. Austral. Nat. Hist. Soc.* 1: 27 (1904). — Syntypes: Arrino sandplains, Sep. 1903, *W.V. Fitzgerald s.n.* (NSW400786 image!, PERTH01163620!, PERTH09008470!, PERTH09008489!).

Erect *shrubs* to c. 100 cm high and 100 cm wide but usually smaller, single-stemmed at ground level, with a fire-sensitive rootstock. Young *branchlets* with a sparse to moderately dense indumentum of spreading hairs to c. 0.1 mm long. *Leaves* spirally arranged, mostly steeply antrorse, sometimes ± appressed and stem-clasping; apex long-mucronate, pungent, the mucro ± straight to slightly inflexed, 0.5–1.3 mm long; base cuneate, rounded or cordate; petiole usually well-defined, 0.6–1.2 mm long, shortly hairy on the adaxial surface and sometimes the margins, glabrous abaxially; lamina ovate to narrowly ovate, 5–15 mm long, 1.5–3.5 mm wide, strongly concave adaxially to ± involute, longitudinal axis usually gently incurved to gently recurved; surfaces discolourous, slightly shiny; adaxial surface ± glabrous or with a few hairs towards the base, venation not evident; abaxial surface paler, with 5–7 primary veins, the midrib no more prominent than the others, deeply

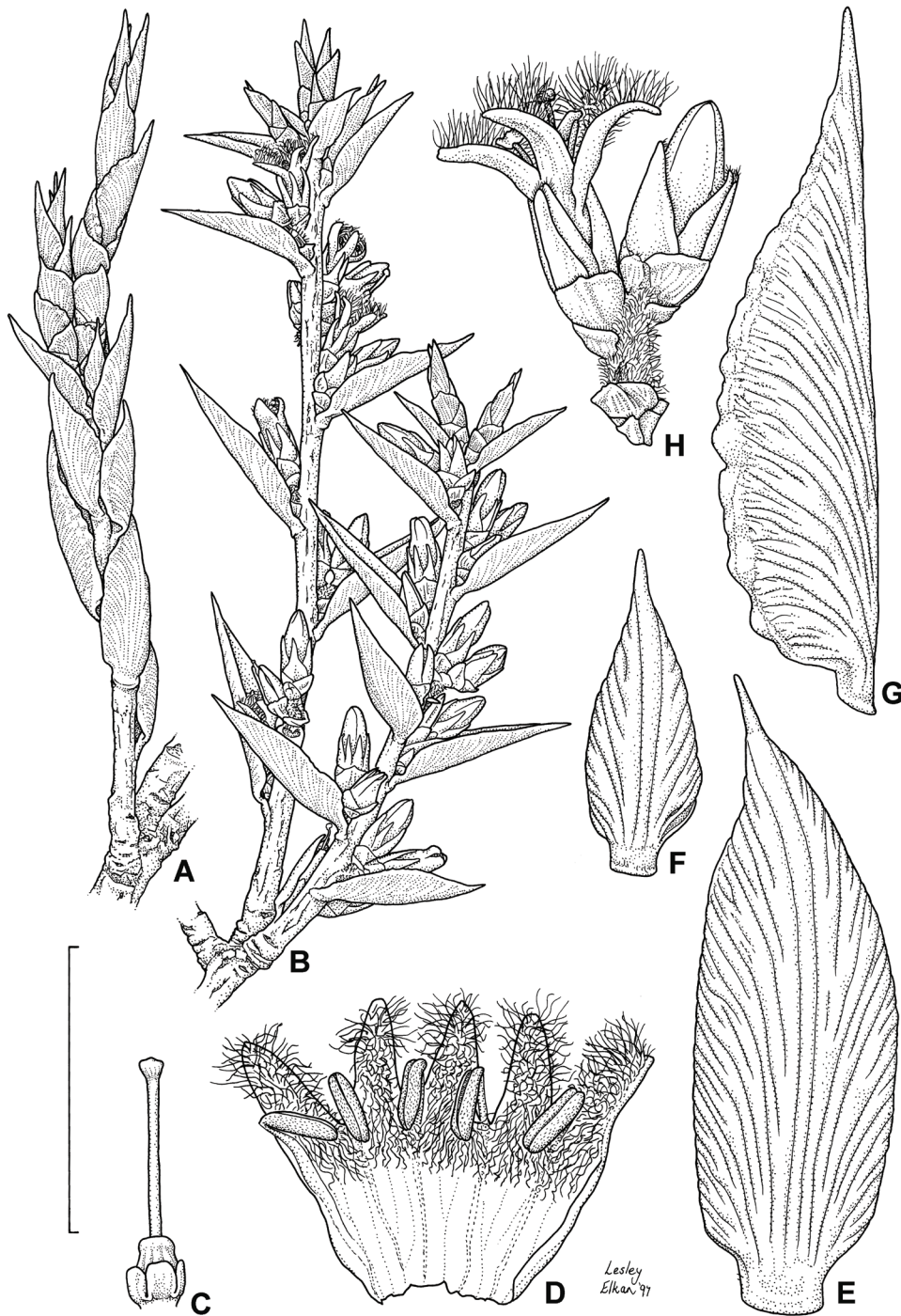


Fig. 6. *Styphelia marginata*: **A** Flowering branchlet; **B** flowering branchlet; **C** gynoecium at flowering; **D** corolla, internal surface; **E** leaf; **F** leaf; **G** leaf; **H** flowering inflorescence. Scale bars = 12 mm (A, B), 4 mm (C–H). — A, E–G W.V. Fitzgerald s.n. (NSW400786), B–D, H R. Crowden 8507-155. Drawings by Lesley Elkan.

and narrowly grooved between the veins (the grooves usually \pm closed), glabrous on the exposed vein surfaces, shortly hairy within the grooves; margins entire to \pm erose, often hyaline, \pm glabrous. *Inflorescence* axillary, erect; axis 1.5–2.6 mm long, (1) 2–5-flowered, with a moderately dense indumentum, \pm terete or slightly compressed below the lowest fertile bract, sharply angular above, terminating in a bud-rudiment; flowers erect, sessile. *Fertile bracts* depressed-ovate, 0.4–0.8 mm long, 0.6–1.0 mm wide, with usually 4 sterile bracts on the axis below. *Bracteoles* broadly ovate to \pm orbicular, 0.8–1.1 mm long, 0.8–1.1 mm wide, keeled, obtuse; abaxial surface glabrous, not or scarcely striate; margins minutely ciliolate or \pm glabrous. *Sepals* usually narrowly

ovate, less often ovate, 1.8–2.6 mm long, 0.8–1.3 mm wide, acute or subacute; abaxial surface glabrous, straw-coloured, venation very obscure; adaxial surface with a discrete tuft of hairs towards the base, otherwise glabrous; margins minutely ciliolate with hairs < 0.05 mm or \pm glabrous. *Corolla tube* white, narrowly ellipsoid to ellipsoid or narrowly obovoid to obovoid, equal to or more usually slightly longer than the sepals, 1.8–2.7 mm long, 1.4–2.0 mm wide, external surface glabrous, internal surface glabrous. *Corolla lobes* white, shorter than to longer than the tube, 2.0–3.0 mm long, 0.7–1.0 mm wide at base, erect in basal $\frac{1}{2}$ – $\frac{3}{4}$ of their length and then spreading and recurved, external surface glabrous, internal surface with a dense white

indumentum of \pm terete, \pm straight or slightly wavy, slightly ornamented hairs. *Anthers* exerted from the tube, or sometimes partially exerted (by c. $\frac{7}{8}$ of their length), 0.7–1.2 mm long, apex rounded to shortly emarginate. *Filaments* terete, 0.9–1.2 mm long, attached to the anther just below anther tip, adnate to tube just below the sinuses. *Nectary* partite, the scales 0.3–0.5 mm long, 0.2–0.4 mm wide, glabrous. *Ovary* ovoid or sometimes ellipsoid, 0.5–0.8 mm long, 0.4–0.6 mm wide, glabrous, 5-locular, straw-coloured to pale green. *Style* 2.5–3.5 mm long, slightly scabrous at least in the upper half, exerted from the corolla tube but not beyond the erect bases of the corolla lobes, well-differentiated from the \pm truncate ovary apex, arising from a depression at the ovary apex that tightly envelops, but is free from style base (i.e. the base is countersunk below the level of the ovary apex); stigma distinctly expanded. *Fruit* narrowly ellipsoid to narrowly obovoid, 1.8–2.6 mm long and 1.0–1.5 mm wide, c. equal to, or more usually a little longer than the sepals, circular in section, gynophore absent; surface glabrous, with shallow longitudinal grooves (mesocarp weakly developed); apex acute or subacute; style shed before maturity. **Fig. 6.**

Diagnostic characters. Within Group X distinguished by the following character combination: lamina ovate to narrowly ovate, 5–15 mm long, 1.5–3.5 mm wide, strongly concave adaxially to \pm involute; abaxial surface with deep, \pm closed grooves, shortly hairy in the grooves; leaf apex straight or slightly inflexed, long-mucronate, pungent; inflorescence (1) 2–5-flowered, axis 1.5–2.6 mm long, terminating in a bud-rudiment; abaxial surfaces of bracteoles and sepals glabrous; sepal margins \pm glabrous or minutely ciliolate, with hairs < 0.05 mm long; corolla tube equal to or more usually slightly longer than the sepals; corolla lobes shorter than to longer than the tube; nectary partite; ovary 5-locular, glabrous; style base countersunk below the level of the ovary apex; fruit narrowly ellipsoid to narrowly obovoid, with shallow longitudinal grooves.

Distribution and habitat. Has a rather scattered and disjunct distribution from the southern Moresby Range in the north, south and eastwards to the Arrino district, in the Geraldton Sandplains and far north of the Avon Wheatbelt bioregions. Grows in yellow or white sand, often over laterite, in various heathland communities.

Phenology. Most flowering collections have been made in the winter months between June and August. Mature fruit has been collected in October and November.

Conservation status. Listed as Threatened Flora under Conservation Codes for Western Australian Flora (State of Western Australia 2022).

Affinities. As noted in the introduction, *S. marginata* is one of six taxa that formed a strongly supported subclade within Group X in the phylogeny of Puente-Lelièvre *et al.* (2016). In gross morphology it is most similar to *S. browniae*. The two are geographically

disjunct and differences between them are given above under the affinities heading for *S. browniae*.

Of the other members of Group X that occur in the Geraldton Sandplains or northern Avon Wheatbelt bioregions, maybe the only species with which *S. marginata* could be confused is the type form of *S. hamulosa*. Foliar differences provide the easiest means of distinguishing between them, with *S. marginata* having significantly longer leaves overall (longest leaves per specimen, 7–15 mm long vs. 2.5–7 mm in the type form of *S. hamulosa*) and with longer mucros (0.5–1.3 mm long vs. 0.2–0.5 mm). In addition, whereas the leaves of *S. marginata* have longitudinal axes that are gently incurved to gently recurved, in *S. hamulosa* they are always strongly recurved. The abaxial sepal surfaces are another readily interpreted point of difference: glabrous in *S. marginata*, almost always hairy in *S. hamulosa*.

Notes. Not included in the above description is a specimen (*A. Chant 1114*) collected from a limestone substrate within the greater Geraldton metropolitan area. Aside from the anomalous habitat it differs from all other collections examined in its significantly shorter corolla tube (1.3 or 1.4 mm long) and style (c. 1.8 mm long) and in having an annular nectary albeit with deep, longitudinal grooves beneath the sinuses. The specimen could potentially represent a distinct, closely related taxon, but at this stage is referred to *S. aff. marginata* pending the availability of additional collections.

Other specimens examined

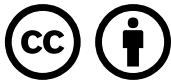
WESTERN AUSTRALIA. [Localities withheld for conservation reasons] 14 July 2005, *J. Borger DS 147-19* (PERTH); 10 Oct. 2005, *J. Borger DS 1010-4* (PERTH); 14 Oct. 2005, *J. Borger DS 1410-7* (PERTH); 8 Dec. 2008, *J. Borger SF 812-7* (PERTH); 11 July 2000, *A. Chant 10AC* (PERTH); 19 July 2008, *A. Chant SEW 9* (CANB, PERTH); July 2003, *A. Chant 500* (PERTH); 9 June 2014, *A. Chant 1123* (PERTH); 21 Sep. 2017, *A. Chant & A. Crawford AC 2012* (PERTH); 10 July 2008, *D. Coultas & K. Greenacre Opp 25* (PERTH); 19 Nov. 2012, *A. Crawford ADC 2195* (PERTH); 10 Oct. 2012, *A. Crawford ADC 2210* (PERTH); 29 July 1985, *R. Crowden 8507-155* (NSW, PERTH); 15 July 2000, *M. Hislop 2031* (NSW, PERTH); 15 July 2000, *M. Hislop 2033* (NSW, PERTH); 16 Nov. 2001, *G. Humphreys & K. McCreery s.n.* (PERTH); 19 July 2008, *C. Page SEW 2* (PERTH); 12 Aug. 1986, *J.M. Powell 2322* (NSW, PERTH).

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