Australian Journal of Taxonomy
Open-access, online, rapid taxonomy
https://doi.org/10.54102/ajt

Two new species of *Hibbertia* (Dilleniaceae) from the south coast of Western Australia

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Abstract

Two new species, *H. psilopoda* K.R.Thiele and *H. ammophila* K.R.Thiele, are described from the south coast of Western Australia, in and near Fitzgerald River National Park. Specimens of *H. psilopoda* were included in the circumscription of *H. hamulosa* by J. Wheeler, and for that reason a new description is provided for the latter. The two new species are phylogenetically distant from *H. hamulosa*. *Hibbertia ammophila* is currently known from a single location and is likely to be rare.

Cite this paper as: Thiele KR (2026). Two new species of *Hibbertia* (Dilleniaceae) from the south coast of Western Australia. *Australian Journal of Taxonomy* 145: 1–5. doi: https://doi.org/10.54102/ajt.os419

Introduction

Hibbertia hamulosa J.R.Wheeler was described by Wheeler (2000) after examination of specimens previously included at the Western Australian Herbarium in *H. mucronata* Turcz. Close scrutiny of specimens determined by Wheeler as *H. hamulosa* and cited in its protologue shows that they fall into two distinct morphotypes, most obviously separable by a significant and reliable character in *Hibbertia* subgen *Hemistemma* (Juss. ex Thouars) J.W.Horn, the indumentum on the abaxial surface of the epipetiole. In one morphotype (which includes the type of *H. hamulosa*) the epipetioles are abaxially densely covered in scale-like, appressed stellate hairs, while in the other they are quite glabrous. Once separated on epipetiole indumentum, the two morphotypes also differ significantly in stamen number. The morphotype with glabrous epipetioles is here described as *Hibbertia psilopoda* K.R.Thiele *sp. nov*.

Recent phylogenetic studies in the genus (Horn 2005; Hammer *et al*. 2025; T. Hammer pers. comm.) indicate with strong support that *Hibbertia hamulosa sens. str.* and *H. psilopoda* are not closely related. The former is a member of a clade that includes *H. turleyana* J.R.Wheeler, *H. ulicifolia* (Benth.) J.R.Wheeler, *H. eatoniae* Diels, *H. lepidocalyx* J.R.Wheeler and *H. arcuata* J.R.Wheeler (T. Hammer pers. comm.), all of which also have minute stellate hairs (often scale-like) on their epipetioles, while *H. psilopoda* is a member of a phylogenetically distant clade that includes *H. mucronata, H. abyssus* Wege & K.R.Thiele and *H. atrichosepala* Wege & K.R.Thiele, all of which have abaxially glabrous epipetioles.

A second new species dealt with here was first collected in 2011 and subsequently provided with the phrase-name *Hibbertia* sp. Hamersley River (D.A. Rathbone DAR 625) by the Western Australian Herbarium. Both morphologically and phylogenetically (T. Hammer pers.

This paper was submitted on 15 June 2025 and published on 13 November 2026 (2026-11-13T04:23:15.706Z). It was reviewed by Daniel Ohlsen and Juergen Kellermann, and edited by Tom May. Kevin Thiele is an Editor of the Australian Journal of Taxonomy. He did not at any stage have access to the manuscript while in peer review, and had no influence on its acceptance or handling, as is standard practice for manuscripts submitted by editors. Australian Journal of Taxonomy. ISSN: 2653-4649 (Online).

comm.) it belongs in the clade with *H. mucronata* and *H. psilopoda*, but is distinct from both and from all currently named *Hibbertia* species. It is accordingly described below as *Hibbertia ammophila* K.R.Thiele *sp. nov.*

Given the removal of *H. psilopoda* from *H. hamulosa* as originally circumscribed by Wheeler (2000), a revised description of *H. hamulosa* is provided.

Methods

All descriptions are based on material held at the Western Australian Herbarium (PERTH). Some descriptions include the terms *hypopetiole* and *epipetiole*, to deal with an unusual petiole morphology in *Hibbertia*. These terms are introduced, defined and discussed in Thiele & Hammer (2024). In brief, petioles in *Hibbertia* have a basal section (the hypopetiole) and a distal section (the epipetiole), separated by a line of dehiscence. The two sections often have strikingly different indumenta. The hypopetiole remains as a woody peg on the stem after the leaf has fallen.

No field photographs of either of the species described here are available at the time of publication. High-resolution images of the type specimens will be made available by the Western Australian Herbarium (PERTH) shortly after publication; links to these are provided in the species treatments.

The key to Australian species of *Hibbertia* on KeyBase (https://keybase.rbg.vic.gov.au/keys/13127) has been updated to accommodate the species treated here.

Taxonomy

Hibbertia psilopoda K.R.Thiele *sp. nov.*

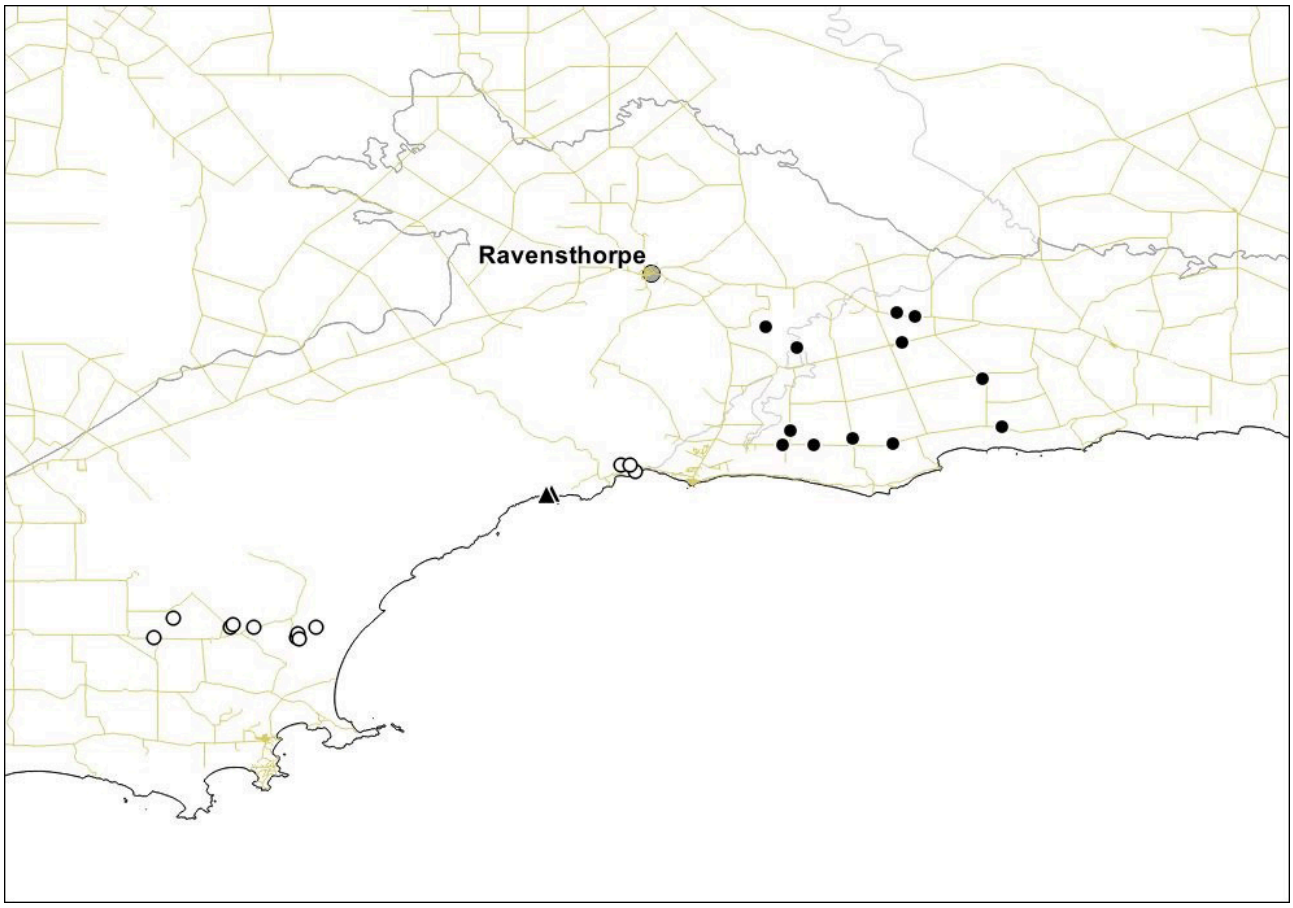
Type: Western Australia, Bedford Harbour Road 1.0 km from Middle Road, SW of Munglinup, WA, 13 Sept. 2021, *K.R. Thiele* 5738 (holo: PERTH 9368981; iso: AD, CANB).

Type image: https://herbarium.dbca.wa.gov.au/PERTH%2009368981.jpg

Erect, often virgate, openly branched *shrubs* (0.3–)0.4–0.8(–1.2) m high, single-stemmed at base and likely reseeding after fire; young branchlets sparsely to moderately greyish stellate-pubescent to cobwebby-hirsute (with simple hairs overtopping the stellate ones), glabrescent; axillary hair-tufts very short. *Leaves* scattered, erect to somewhat spreading, closely and densely investing the stems, not distinctly fascicled on short-shoots, linear to narrowly triangular, 7–10 mm long, 1–1.2 mm wide, the margins strongly recurved to a swollen midrib and obscuring the abaxial lamina; petiole to 1.5 mm long; hypopetiole with indumentum as for the stems, persistent as glabrescent woody pegs on the stems; epipetiole glabrous abaxially, moderately and shortly pubescent to pilose adaxially and on the margins; adaxial lamina smooth or with tubercles laterally, glossy, glabrous or sparsely pilose when very young; abaxial lamina (visible only by dissection) pubescent, the hairs filling the lacuna like cotton wool; abaxial midrib glabrous, raised with respect to the margins; apex gradually tapering to a straight pungent point. *Flowers* terminal and terminating axillary short-shoots, with short, robust pedicels 1–3 mm long, the pedicels densely pubescent as for the young stems; primary bract at the apex of the pedicel, *c.* 1.5 mm long, linear to narrowly triangular, scarious-indurate, pungent, densely pubescent at base, glabrous apically; secondary bracts 0–4 at the base of the pedicel, grading to the leaves. *Sepals* narrowly elliptic-ovate to ovate, 5–6 mm long, rigid and indurate, moderately to densely pubescent with mixed stellate hairs overtopped by short, hooked simple hairs; outer sepals long-pungent, the margins scarcely scarious; inner sepals similar to the outer but broader, acuminate to shortly pungent, with fewer hooked hairs and broad, scarious margins. *Petals* 5, yellow, broadly obovate, 8–9 mm long, shallowly emarginate. *Stamens* 5, all on one side of the gynoecium and curving over it like a hand of bananas; filaments *c*. 0.2 mm long; anthers rectangular, *c*. 2 mm long, dehiscing by introrse, longitudinal slits. *Staminodes* absent. *Carpels* 2; ovaries compressed-globular, densely pubescent; styles excentric from the carpel apex and curving beneath the stamens, *c*. 1.5 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen.

Other specimens examined. Ravensthorpe to Esperance, 12 Dec. 1951, N.H. Brittan 2840 (PERTH 3037568); Ravensthorpe - Esperance, 7 March 1968, L. Fell S 455 (PERTH 4395263); Along Ravensthorpe-Esperance road, ca 10 miles W of Oldfield River, 5 Oct. 1971, R.D. Hoogland 12078 (PERTH 4395247); 50 km along Springdale Road, off Hopetoun-Ravensthorpe road, 2 Jan. 1983, A. Strid 21901 (PERTH 4395255); 46 km E of Ravensthorpe on South Coast Highway, 25 Sept. 2001, J.R. Wheeler 4110 (PERTH 5627397); S side of Springdale Road, 6.6 km W of its junction with Mason Bay Road, 25 Sept. 2001, J.W. Horn 4132 (PERTH 6312861); Both sides of Tamarine Road, 2.9 km N of its junction with Springdale Road, 25 Sept. 2001, J.W. Horn 4127 (PERTH 6312845); Ravensthorpe Range, survey site R171, 21.1 km ESE of Ravensthorpe. Large unnamed hill E of Kundip. Approximately 2.8 km E of Road No. 8432, following an old track most of the way, 1 Oct. 2007, S. Kern, R. Jasper & H. Hughes LCH 17928 (PERTH 7996403); Hatfield track, 1 Sept. 2009, D. Rathbone 250 (PERTH 8181071); S side of Jerdacuttup Road, 10 Oct. 2014, M. Hoggart & J. Waters 6/1014 (PERTH 8712832); Springdale Road 4.1 km W of Southern Ocean Road, 13 Sept. 2021, K.R. Thiele 5737 (PERTH 9369023); Mason Bay Road, 1.4 km N of Springdale Road, 13 Sept. 2021, K.R. Thiele 5736 (PERTH 9368795); Springdale Road, 0.5 km W of Lakes Road, 13 Sept. 2021, K.R. Thiele 5735 (PERTH 9369007).

Diagnostic features. May be discriminated from all other species of *Hibbertia* in Western Australia by the combination of greyish stellate-pubescent to cobwebby stems, erect to sub-spreading, glabrous (or sparsely pilose



Map 1. Distributions of *Hibbertia hamulosa* (open circles), *H. psilopoda* (closed circles) and *H. ammophila* (triangles) in south-coastal Western Australia, based on specimens at PERTH. The grey line is the boundary between the Esperance Plains and Mallee IBRA bioregions; roads are shown as pale lines.

when young), glossy, pungent leaves with glabrous epipetioles, flowers with short, robust, densely stellate-pubescent pedicels 1–3 mm long, pungent sepals with an indumentum of mixed stellate and short hooked hairs, and 5 stamens.

Phenology. Flowering specimens have been collected from September to March.

Distribution & habitat. Occurs in southern, near-coastal Western Australia east of the Ravensthorpe to Hopetoun road and west of Munglinup, in mallee shrub-heath with *Eucalyptus pleurocarpa, E. tetraptera, Banksia* spp., *Melaleuca* spp., *Lambertia inermis* and *Allocasuarina humilis*, on white to brown, gravelly sand over laterite.

Conservation status. Hibbertia psilopoda is relatively common in the area where it occurs. It often grows on graded roadsides, where it appears to be an obligate reseeder following disturbance. It is not considered to be under immediate threat.

Etymology. From the Greek *psilos* (bare, smooth) and *podos* (a foot), in reference to the smooth epipetioles.

Notes. Hibbertia psilopoda was included in the circumscription of *H. hamulosa* by Wheeler (2000). While the two species are superficially quite similar, the principle differences (glabrous epipetioles and 5 stamens in *H. psilopoda* vs. scurfy-scaly epipetioles and 8–10 stamens in *H. hamulosa*) allow them to be readily separated, and there are no intermediates. In an unpublished, nearly species-complete phylogeny for the genus (T. Hammer pers. comm.), an accession of *H. psilopoda* is resolved in a clade with *H. mucronata*, *H. ammophila*, *H. atrichosepala* and *H. abyssus*, this clade being distant from one that includes *H. hamulosa sens. str*.

In some specimens relatively close to the coast (e.g. Thiele 5735, Horn 4127, Horn 4132), very young leaves are sparsely pilose, while on plants further from the coast (e.g. Hoogland 12078, Rathbone 250) they are quite glabrous. However, the distinction between these is not clear and they are all treated as a single species for now.

Hibbertia ammophila K.R.Thiele, *sp. nov.*

Type: Western Australia, Whalebone Beach, Fitzgerald River National Park, WA, 25 April 2012, *D.A. Rathbone* 625 (holo: PERTH 08415676; iso: CANB, AD).

Type image: https://herbarium.dbca.wa.gov.au/PERTH%2008415676.jpg

Hibbertia sp. Hamersley River (D.A Rathbone DAR 625), Western Australian Herbarium.

Erect shrubs 0.4–0.6 m high; young branchlets sparsely and minutely pubescent between the leaf bases, soon glabrescent; axillary hair-tufts very short. *Leaves* scattered, crowded and densely investing the stems distally, erect to somewhat spreading, not distinctly fascicled on short-shoots, linear (often slightly incurved), 8–12 mm long, 1–1.4 mm wide, the margins strongly recurved to a swollen midrib and obscuring the abaxial lamina; petiole to 1.5 mm long; hypopetiole and epipetiole glabrous abaxially, sparsely and minutely pubescent adaxially, the hypopetioles persistent as woody pegs on the stems; adaxial lamina smooth, glossy, glabrous; abaxial lamina (visible only by dissection) pubescent, the hairs filling the lacuna like cotton wool; abaxial midrib glabrous, raised with respect to the margins; apex rather abruptly tapering to a straight pungent point. *Flowers* terminal and terminating axillary short-shoots, on short, robust pedicels *c.* 1 mm long, the pedicels minutely pubescent; primary bract at the apex of the pedicel, *c.* 2.5 mm long, linear to narrowly triangular, scarious-indurate, pungent, glabrous except for minute marginal cilia; secondary bracts absent. *Sepals* ovate, 6–7 mm long, glabrous; outer sepals long-pungent, the margins scarcely scarious; inner sepals similar to the outer but broader, acuminate to shortly pungent or obtuse and with broad scarious margins. *Petals* 5, yellow, broadly obovate, 8–9 mm long, shallowly emarginate. *Stamens* 5, all on one side of the gynoecium and curving over it like a hand of bananas; filaments *c*. 0.2 mm long; anthers rectangular, *c*. 2 mm long, dehiscing by introrse, longitudinal slits. *Staminodes* absent. *Carpels* 2; ovaries compressed-globular, densely pubescent; styles excentric from the carpel apex and curving beneath the stamens, *c*. 1.5 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen.

Other specimens examined. Whalebone Beach, Fitzgerald River National Park, 13 Oct. 2011, D.A Rathbone 623 (PERTH 8415692); Whalebone Beach, Fitzgerald River National Park, 13 Oct. 2011, D.A Rathbone 624 (PERTH 8415684)

Diagnostic features. May be discriminated from all other species of *Hibbertia* in Western Australia by the combination of erect to sub-spreading, glabrous, glossy, pungent leaves with glabrous epipetioles, and flowers with short, robust, pedicels *c.* 1 mm long, glabrous, pungent sepals, and 5 stamens.

Phenology. Flowering specimens have been collected in October and April.

Distribution & habitat. Known only from behind Whalebone Beach, Fitzgerald River National Park, where it grows in deep sand on primary dunes over limestone and schist. This is an unusual habitat for *Hibbertia*.

Conservation status. Known only from a single location and likely to be restricted in range, but *H. ammophila* is nonetheless protected in Fitzgerald River National Park. Similar habitats along the coastlines adjacent to Whalebone Beach should be surveyed to assess its range.

Etymology. From the Latin *ammophilus* (sand-loving, dwelling on sand).

Notes. Hibbertia ammophila was first collected in 2011, after Wheeler had dealt with the '*H. mucronata* species group', and no specimens of it were seen by her.

Hibbertia hamulosa J.R.Wheeler, *Nuytsia* 13(2): 382-385 (2000).

South-east slope of East Mount Barren, Western Australia, 7 October 1971, *R.D. Hoogland* 12080 (*holo*: PERTH 04395239; *iso*: CANB, L, UC, HBG, K, US).

Type image: https://herbarium.dbca.wa.gov.au/PERTH%2004395239.jpg

Erect to spreading, usually open shrubs to 0.6(–1) m high; young branchlets finely and minutely brownish-scurfy with stellate hairs that are sometimes scale-like, soon glabrous; axillary hair-tufts absent. *Leaves* scattered, erect to somewhat spreading, rather densely investing the stems, fascicled on short-shoots, linear, 9–15 mm long, 0.8–1 mm wide, the margins strongly recurved to a swollen midrib and obscuring the abaxial lamina; petiole to 1 mm long; hypopetiole and epipetiole both covered by a dense, persistent, scurfy, brownish indumentum of scale-like stellate hairs, the hypopetioles persistent as glabrescent woody pegs on the stems; adaxial lamina smooth or with tubercles laterally, glossy, glabrous even when very young; abaxial lamina (visible only by dissection) pubescent with long hairs that fill the lacuna like cotton wool; abaxial midrib glabrous, raised with respect to the margins; apex gradually tapering to a straight pungent point. *Flowers* terminal and terminating axillary short-shoots, on short, robust pedicels 2–4 mm long, the pedicels densely scurfy-pubescent as for the young stems; primary bract at the apex of the pedicel, 2–3 mm long, linear to narrowly triangular, scarious-indurate, pungent, densely stellate-pubescent at base, glabrous apically; secondary bracts 0–4 at the base of the pedicel, grading to the leaves. *Sepals* ovate, 4–6 mm long, rigid and indurate, moderately to densely pubescent with mixed stellate and short, hooked hairs; outer sepals pungent, the margins scarcely scarious; inner sepals similar to the outer but broader, acuminate to shortly pungent, with fewer hooked hairs and wide scarious margins. *Petals* 5, yellow, broadly obovate, 5–7 mm long, shallowly emarginate. *Stamens* 8–10, all on one side of the gynoecium and curving over it like a hand of bananas; filaments *c*. 0.2 mm long; anthers rectangular, *c*. 2 mm long, dehiscing by introrse, longitudinal slits. *Staminodes* absent. *Carpels* 2; ovaries compressed-globular, densely pubescent; styles excentric from the carpel apex and curving beneath the stamens, *c*. 1.5 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen.

Selected specimens examined. East Mount Barren, 25 Aug. 1964, F. Lullfitz 3607 (PERTH 4395204); W side of Mount Bland, Reserve 24048, 15 July 1970, A.S. George 10052 (PERTH 4395220); S face of East Mount Barren, 25 Aug. 1971, N.M. Pritchard 84 (PERTH 6337627); 1 mile S of Mount Maxwell, 5 Sept. 1973, K.R. Newbey 3749 (PERTH 3091619); Devils Creek Road, E Gairdner River, 6 July 1981, B.E. Hall 54 (PERTH 4395212); Devils Creek Road, E Gairdner River, 10 Aug. 1981, B.E. Hall 64 (PERTH 4142365); Fitzgerald River National Park, West Mount Barren, 23 Sept. 1986, J.R. Wheeler 2434 (PERTH 4395190); N facing slope of West Mount Barren, Fitzgerald River National Park, 28 Sept. 1999, J.W. Horn & R. Butcher 2659 (PERTH 5683475); N side of Collets Road, ca 3.15 km E of junction with Quaalup Homestead Road, Fitzgerald River National Park, 28 Sept. 1999, J.W. Horn & R. Butcher 2641 (PERTH 5683513); Mount Maxwell, near carpark, Fitzgerald River National Park, 6 Sept. 2001, J.R. Wheeler 4078 (PERTH 5627400); Fitzgerald River National Park, S side of East Mt Barren, 16 Oct. 2009, G.F. Craig 8642 (PERTH 8951004); Quadrat No. F069, southern peak of West Mount Barren, Fitzgerald River National Park, 11 Nov. 2011, D.A. Rathbone DAR 787 (PERTH 9036830).

Diagnostic features. May be discriminated from all other species of *Hibbertia* in Western Australia by the following combination of characters: leaves erect to subspreading, glabrous, glossy, straight-pungent; petioles densely scurfy-pubescent with brownish stellate to scale-like hairs; flowers with short, robust, densely scurfy-pubescent pedicels 2–4 mm long; sepals pungent with an indumentum of mixed stellate and short, hooked hairs; and 8–10 stamens.

Phenology. Flowering specimens have been collected from July to November.

Distribution & habitat. Occurs in and immediately west of Fitzgerald River National Park, apparently in two disjunct localities, one at East Mount Barren and the other in the vicinity of West Mount Barren, Mount Bland and Mount Maxwell, in near-coastal and mountain heath with *Eucalyptus preissiana*, *E. tetraptera*, *Regelia velutina* and *Banksia* spp., in shallow sand over quartzite.

Conservation status. Well-protected in Fitzgerald River Nature Reserve and not considered to be under immediate threat.

Notes. In the protologue for *H. hamulosa*, Wheeler (2000) indicated 5–8 stamens. No specimens examined for this study had 5 stamens; all had two staminal rows, the outer row with 5 stamens and the inner row with variable loss of one or a few stamens by abortion. The new species *H. psilopoda*, described here, consistently has 5 stamens, and these account for the low stamen numbers in Wheeler's protologue, as she did not discriminate these two species.

Although long considered to be closely related to *Hibbertia mucronata* (on account of the pungent leaves and sepals), an unpublished, nearly species-complete phylogeny of *Hibbertia* (T. Hammer pers. comm.) places *H. hamulosa* in a clade with *H. turleyeana*, *H. ulicifolia*, *H. eatoniae, H. lepidocalyx*, *H. arcuata* and *H. graniticola*. These species also have dense, scale-like stellate hairs on their petioles, almost identical to those that characterise *H. hamulosa*.

Acknowledgments

I thank the staff of the Western Australian Herbarium (PERTH) for access to the collections, and Damien Rathbone for collecting excellent material of *Hibbertia ammophila*.

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