

## A revision of the *Hibbertia lineata* (Dilleniaceae) species group

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### Abstract

Thiele, K.R. A revision of the *Hibbertia lineata* (Dilleniaceae) species group. *Nuytsia* 28: 173–191 (2017). The *Hibbertia lineata* Steud. species group comprises six species endemic in south-western Western Australia. *Hibbertia lineata* is recircumscribed to include *H. recurvifolia* (Steud.) Benth., and *H. polyancistra* K.R. Thiele *sp. nov.*, *H. depilipes* K.R. Thiele *sp. nov.*, *H. verrucosa* (Turcz.) Benth., *H. microphylla* Steud. and *H. papillata* J.R. Wheeler are described and discussed. A key is provided to all taxa.

### Introduction

Five Western Australian species of *Hibbertia* Andrews (*H. lineata* Steud., *H. recurvifolia* (Steud.) Benth., *H. verrucosa* (Turcz.) Benth., *H. microphylla* Steud. and *H. papillata* J.R. Wheeler), and the phrase-named entity *H. sp.* Kojonup (C.M. Lewis 288), appear to be closely related and to form a natural group. These taxa share the following combination of characters: leaves ericoid (with strongly revolute margins meeting the midrib beneath); flowers pedicellate, with a single floral bract at the apex of the pedicel immediately below the flower; stamens arranged on one side of, and curving over, two densely pubescent carpels; staminodes present;  $\pm$  isodiametric leaf epidermal cells each with a minute, sharp, central process (giving the leaf lamina a minutely muriculate surface); obtuse to sub-acute leaf apices bearing a tuft of tiny hairs (usually visible only at high magnification on young leaves and sometimes reduced to one or two hairs or short papillae); and true leaf margins visible as a narrow, scarious, white strip of tissue adjacent to the midrib below, clearly visible in young leaves and usually so in mature leaves (the margin is very narrow and often obscure in older leaves of *H. papillata*).

No other ericoid-leaved taxa in Western Australia have the apical hair tuft, while in all but three (*H. ancistrophylla* J.R. Wheeler, *H. carinata* J.R. Wheeler and *H. stowardii* S. Moore) the margins are so tightly revolute that adaxial lamina tissue abuts the midrib and the true margin is hidden and ‘internal’ to the leaf. These three taxa all have pungent leaf apices, non-muriculate leaves and lack staminodes, and are probably not closely related to the *H. lineata* group. Wheeler (2004a), in an interim key to Western Australian species of *Hibbertia*, included *H. avonensis* J.R. Wheeler in a couplet that otherwise includes only members of the *H. lineata* group. This species also lacks the visible leaf margin, apical hair tuft and muriculate surface, and is not considered to belong in the group. Wheeler (2002) believed it to be close to *H. gracilipes* Benth. No eastern Australian species appear to be closely related to the group.

Horn (2005) provided a partial phylogeny of *Hibbertia* based on cpDNA and ITS sequences. Unfortunately, no members of the *H. lineata* species group are included in that phylogeny, so an assumption of close

relationship between these taxa is currently untested. Nevertheless, they are morphologically close and are regarded for the purpose of this paper to be closely related. The *H. lineata* species group may be related to the *H. hypericoides* (DC.) Benth. species group (Thiele & Cockerton 2015); these two groups share obtuse to subacute leaves with recurved margins, a pedicellate flower with the primary bract at the apex of the pedicel, and staminodes lateral to the stamen rows.

*Hibbertia recurvifolia* and *H. verrucosa* were described in the genus *Pleurandra* Labill., at a time when *Hibbertia* in the modern sense was divided into three or four genera on the basis of androecial arrangement (see e.g. de Candolle 1824). Taxa with stamens all on one side of the two carpels were placed in *Pleurandra* or *Hemistemma* Juss. ex Thouars (the latter recognised by some authors to accommodate species with staminodes); taxa with stamens arranged all around the 1–15 carpels were placed in *Candollea* Labill. or *Hibbertia sens. str.*, depending on whether the stamens were connate in bundles or free. Given that all members of the *H. lineata* group clearly have stamens on one side of the carpels, it is odd that Steudel described *H. lineata* and *H. microphylla* in *Hibbertia*. His protologues for these taxa make no mention of the androecium, and he may have overlooked this important feature (see also Thiele 2017). Several of Steudel's contributions to *Plantae Preissianae* were criticised as deficient by contemporaries and were revised in later parts of the same work (McGillivray 1975).

Several varieties of some taxa in the group were subsequently described by Bentham (1863). *Hibbertia lineata* var. *parviflora* Benth. is a nomenclatural synonym of *H. diamesogonos* (Steud.) J.R. Wheeler (Wheeler 2004b), while *H. recurvifolia* var. *virens* Benth. was erected for plants with slightly larger and greener leaves than the typical variety (see under *H. lineata* below for discussion).

*Hibbertia* sp. Kojonup (C.M. Lewis 288) was erected by J. Wheeler at the Western Australian Herbarium (PERTH) in 1998, to accommodate specimens from the western part of the range of the species group that were similar in leaf size and shape to *H. lineata* and *H. recurvifolia* but differed from those species in having moderately to densely pubescent rather than glabrous sepals, with mixed stellate and uncinata hairs. Assessment of specimens determined under this name at PERTH has uncovered several distinct entities, some of which are referable to existing species while others comprise new taxa. Taxonomic resolution of the entities in *H. sp. Kojonup* required an assessment of species boundaries throughout the group, leading to the present paper.

## Methods

Descriptions are based on all specimens held at PERTH. Vegetative features and sepals were measured dry; all other floral measurements were made after rehydration in boiling water with a little detergent. For morphometric analyses of leaves in *H. lineata*, *H. recurvifolia*, *H. microphylla* and *H. sp. Kojonup*, lengths of three well-developed, typical, mature leaves were measured to the nearest 0.5 mm. Degree of leaf apex recurvation was scored by eye using a qualitative scale of 0–5 (Figure 1 inset). Means for each specimen were calculated from the three measurements. The terms 'lateral' and 'behind', in reference to the position of staminodes relative to the rows of stamens, are used as in Thiele and Cockerton (2015).

Bioregions in distribution statements are based on IBRA7 (Department of the Environment 2013) and shown in grey on the distribution maps. The designation 'image!' in type citations indicates that I have viewed a high-resolution image of the specimen on Global Plants (<http://plants.jstor.org/>).

### Separation of *Hibbertia lineata* and *H. recurvifolia*

*Hibbertia lineata* and *H. recurvifolia* share very similar floral and indumentum characters, both having glabrous pedicels and outer sepals, the latter distinctively pale-margined and often with an unusually glistening surface when dry. Steudel (1845) described the former as having leaves 4–8 lines (c. 8–16 mm) long and with a shortly recurved apex, and the latter as having leaves 4 lines (c. 8 mm) long and with a distinctly recurved apex. These descriptions match the types. Wheeler (2004a), in an interim key to Western Australian species, used leaf length only to separate the taxa (leaves 8–25 mm long in *H. lineata* cf. 2.5–12 mm long in *H. recurvifolia*). The overlap of these ranges casts doubt on the discrimination of these two species.

The relationship between leaf length and apex recurvation for all specimens of *H. lineata* and *H. recurvifolia* at PERTH is shown in Figure 1, and mean leaf length mapped in Figure 2. In general, specimens determined as *H. recurvifolia* tend to have smaller leaves with slightly more strongly recurved apices and to occur in drier, more inland and eastern sites, while specimens determined as *H. lineata* tend to have longer leaves with slightly straighter apices and to occur in wetter, more south-western sites. However, there is substantial overlap, with most specimens falling in the broad overlap for leaf length (8–12 mm) given in Wheeler (2004a), no apparent clustering, and a clinal trend in distribution (Figure 2). In areas where both taxa are considered to occur (e.g. Stirling Range, Fitzgerald River National Park), no characters could be found to adequately separate them; field observations in the Stirling Range show that specimens attributable to each species co-occur and completely intergrade, with plants in sheltered, moister microhabitats (such as amongst other vegetation) having longer, straighter leaves and adjacent plants in exposed, drier sites having shorter, more recurved ones. Accordingly, *H. lineata* and *H. recurvifolia* are here combined, under *H. lineata*.

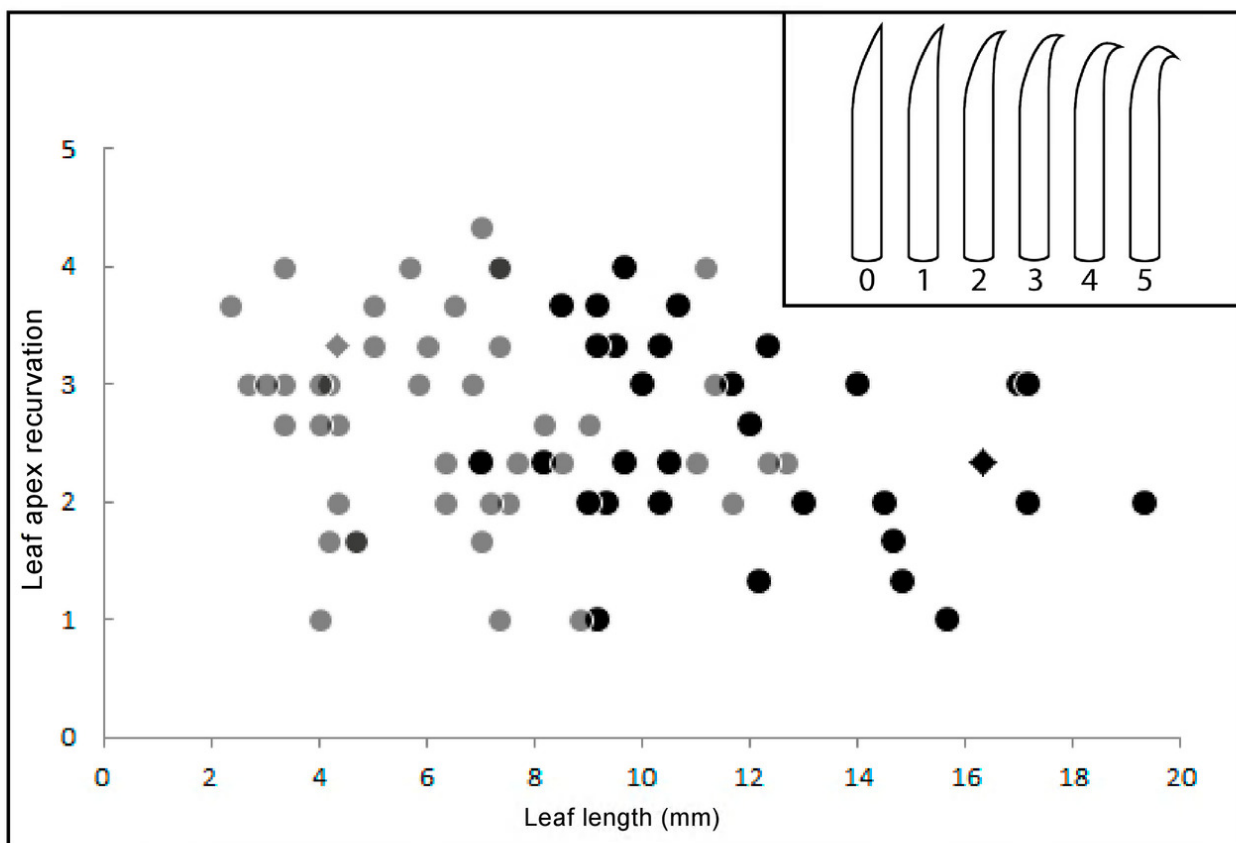


Figure 1. Leaf length and apex recurvation in *Hibbertia lineata* (black) and *H. recurvifolia* (grey). Circles are PERTH specimens; diamonds are type specimens (*H. lineata*: MEL 666865; *H. recurvifolia*: P 00682341). Inset – leaf apex recurvation score guide.



### Separation of *Hibbertia* sp. Kojonup and *H. microphylla*

Herbarium assessment of the 27 PERTH specimens assigned to *H. sp. Kojonup* showed that they could be separated into several discrete entities. A number of specimens were clearly referable on the basis of characters discussed under the species treatments below to *H. lineata*, *H. verrucosa* and a newly recognised species, *H. depilipes* K.R.Thiele. Eight specimens, including the reference specimen for the phrase name (*C.M. Lewis* 288), remained following this reassignment. These were similar to *H. microphylla* in habit, flower size, and leaf, pedicel and sepal indumentum but had substantially longer leaves than is typical for that species. They also occurred to the west and south-west of the range of typical *H. microphylla*. In general, leaf lengths in *H. microphylla* show a clinal trend with increasing lengths to the west and south-west (Figure 3). On this basis, *H. sp. Kojonup* is considered here to be an informal synonym of *H. microphylla*.

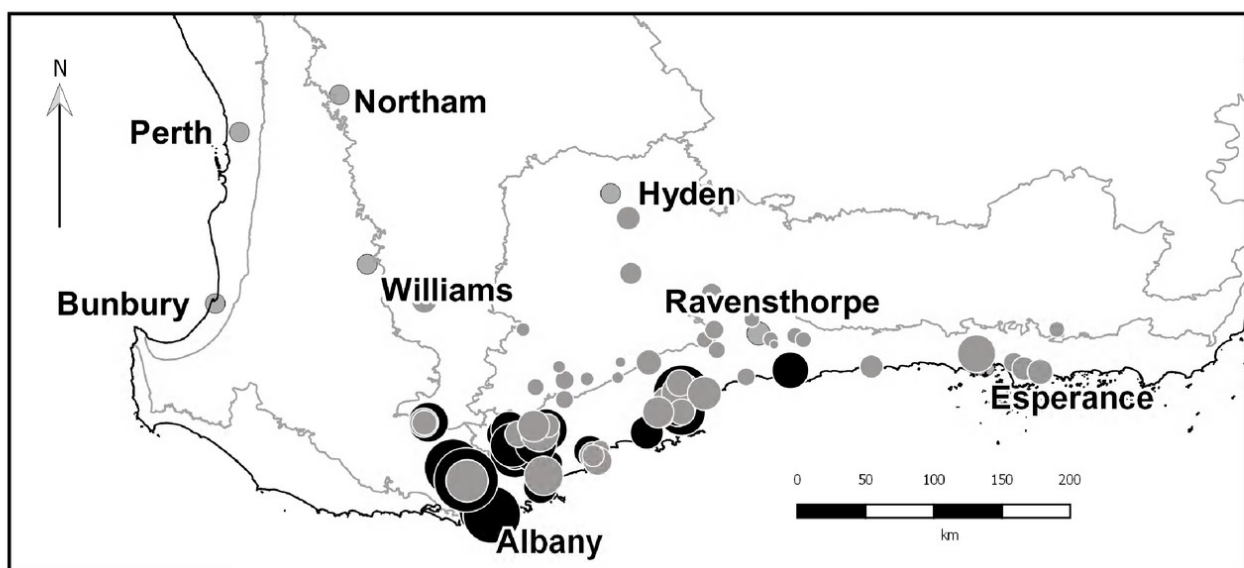


Figure 2. Geographic distribution of leaf lengths in *H. lineata* (black) and *H. recurvifolia* (grey). Symbol sizes are proportional to leaf length.

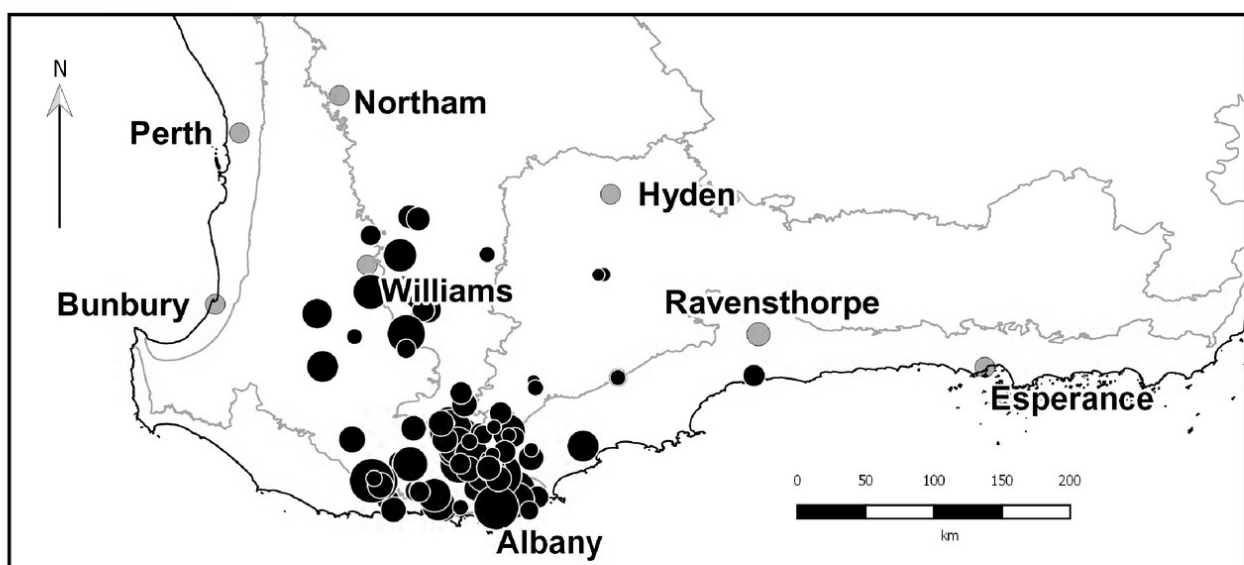


Figure 3. Geographic distribution of leaf lengths in *H. microphylla*. Symbol sizes are proportional to leaf length.



### Key to species of the *Hibbertia lineata* species group

1. Outer sepals and pedicels glabrous (except sometimes a minute ciliate fringe on the sepals); sepals prominently pale-margined (often glistening when dry) ..... **H. lineata**
- 1: Outer sepals moderately to densely pubescent usually with at least some hooked hairs, often also with stellate ones; pedicels glabrous or sparsely pubescent with stellate hairs; sepals not prominently pale-margined
  2. Young stems, abaxial surface of petioles, and pedicels glabrous ..... **H. depilipes**
  - 2: Young stems sparsely to moderately pubescent; abaxial surface of petioles moderately to densely and minutely stellate-hairy; pedicels sparsely to moderately stellate-hairy
    3. Leaves rounded in transverse section, usually distinctly tuberculate with evenly scattered tubercles bearing radially stellate hairs at least on young leaves; sepals with distinctly thickened midribs ..... **H. verrucosa**
    - 3: Leaves rounded or angled in transverse section ( $\pm$  flat-topped and with an angle at the apparent leaf margin), smooth or with a row of tubercles along the angle, these bearing forward-directed, simple or few-branched hairs when young; sepals with thickened bases but without distinctly thickened midribs
      4. Sepals lacking hooked hairs (sparsely and minutely stellate-hairy) ..... **H. papillata**
      - 4: Sepals with at least some hooked hairs
        5. Leaves (1.2–)2–4(–8) mm long, usually recurved and retrorse (occasionally longer, straighter and more spreading); usually weak plants often with slender stems ascending through other vegetation; sepals with short, hooked hairs usually restricted to or more common at the sepal bases ..... **H. microphylla**
        - 5: Leaves (5–)6–12 mm long, spreading,  $\pm$ straight except at the apex; erect plants with robust stems; sepals evenly covered with numerous hooked hairs throughout ..... **H. polyancistra**

### Taxonomy

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

*Type*: Foley Road, Orchard Valley, 9.2 km from Scotts Brook Road, Western Australia, 26 October 2013, K.R. Thiele 4777 (*holo*: PERTH 08775230; *iso*: AD, CANB, K).

Usually sprawling (occasionally  $\pm$ erect) *shrubs* (10–)20–40 cm high, the stems when prostrate sometimes with adventitious roots; young branchlets glabrous to sparsely stellate-hairy (and then glabrescent). *Leaves* erect to widely spreading, scattered; petioles 0.2–0.6 mm long, abaxially glabrous (very rarely with a line of dense hairs at the junction with the stem, but otherwise glabrous), adaxially shortly hairy and subtending a tuft of short hairs; blades linear (very narrowly ovate when short), (4–)5–10(–13) mm long, 0.7–1(–1.5) mm wide, the margins strongly recurved and obscuring all but the midrib abaxially, the true margin of the leaf visible as parallel, whitish, scarious strips either side of the midrib; adaxial surface smooth or with a line of sharp tubercles along an angle on the apparent margin, glabrous or with scattered hooked and/or simple and forward-directed hairs on the marginal tubercles; abaxial surface (midrib) glabrous; apex an obtuse, thickened point terminated by a tuft of minute hairs or papillae, slightly to distinctly recurved. *Flowers* long-pedicellate, borne singly in upper leaf axils; pedicels (10–)15–25(–40) mm long, glabrous (rarely very sparsely stellate-hairy); *primary bract* at the apex of the pedicel immediately below the calyx, herbaceous, 1–2.5 mm long,

narrowly triangular, acute, minutely and sparsely stellate-hairy; *secondary bracts* 2–4,  $\pm$ surrounding the pedicel base, *c.* 1 mm long, as for the primary bract in shape and indumentum but brown and scarious. *Sepals* 5, ovate, 3.5–6 mm long, sparsely to moderately pubescent with spreading to retrorse hooked hairs underlain by sparse to dense, minute, stellate hairs (parts of the inner sepals overlain by outer sepals in bud lacking the hooked hairs and with denser and more prominent stellate hairs); midribs not prominent but the sepal bases  $\pm$ thickened; outer sepals acute; inner sepals similar in size and shape to the outer but slightly less acute. *Petals* 5, yellow, broadly obovate, broadly and shallowly emarginate, 4.5–7 mm long. *Stamens* 10 (rarely fewer by abortion), all on one side of the gynoecium and curving over the carpels; filaments *c.* 0.5 mm long; anthers rectangular, 1.5–2 mm long, dehiscing by introrse, longitudinal slits; *staminodes* 2–3 either side of the stamens (occasionally with a few behind the stamens). *Carpels* 2, compressed-globular, densely pubescent; styles excentrically inserted below the carpel apex, erect and curved away from the stamens, *c.* 1.5–2 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen. (Figure 4A)

*Diagnostic features.* *Hibbertia depilipes* may be uniquely diagnosed within the *H. lineata* species group by its glabrous abaxial petiole surfaces; it also has glabrous pedicels contrasting with the sparsely to moderately pubescent sepals.

*Other specimens examined.* WESTERNAUSTRALIA: 27 km NE of Denmark, 13 Nov. 1991, *A.R. Annels* 1932 (PERTH); 27 km NE of Denmark, 17 Dec. 1991, *A.R. Annels* 2096 (PERTH); 12 km WSW of Narrikup, 16 Nov. 1993, *A.R. Annels* 4165 (PERTH); Lake Unicup area, 13 Nov. 2000, *R.J. Cranfield* 16036 (PERTH); Collie, Feb. 1968, *L.W.J. Dodd s.n.* (PERTH); 5.4 km W of junction of Crouch and Jalbarragup Road, 17 Jan. 1997, *P. Ellery & T. Annels* B 54.8 (PERTH); Cobertup Nature Reserve, 10 Dec. 1997, *G.J. Keighery* 15192 (PERTH); Kululinup [Kulunilup] Nature Reserve, 26 Oct. 1997, *G.J. Keighery & N. Gibson* 2179 (PERTH); Mettabinup Nature Reserve, *c.* 29 km NE of Tonebridge, 20 Oct. 1999, *G.J. Keighery & N. Gibson* 5357 (PERTH); Mettabinup Nature Reserve, *c.* 29 km NE of Tonebridge, 20 Oct. 1999, *G.J. Keighery & N. Gibson* 5358 (PERTH); Kojonup, 29 Oct. 1997, *C.M. Lewis* 310 (PERTH); 33 km direct SSW of Kojonup, 10 Oct. 1999, *C.M. Lewis* 420 (PERTH); 35 km WSW (direct) of Kojonup, 10 Oct. 1998, *C.M. Lewis* 430 (PERTH); 35 km (direct) SW of Kojonup, 22 Oct. 1998, *C.M. Lewis* 445 (PERTH); Milyeannup, 5 Dec. 1984, *G.S. McCutcheon* 1117 (PERTH); *c.* 5 km E of Lake Unicup, 11 Dec. 1974, *R. Pullen* 9980 (PERTH).

*Phenology.* Flowering plants have been collected between mid-October and mid-December. One specimen (*L.W.J. Dodd s.n.*, PERTH 03097781) is labelled as flowering in ‘?Feb.’ and it is possible that in some seasons it may extend that long.

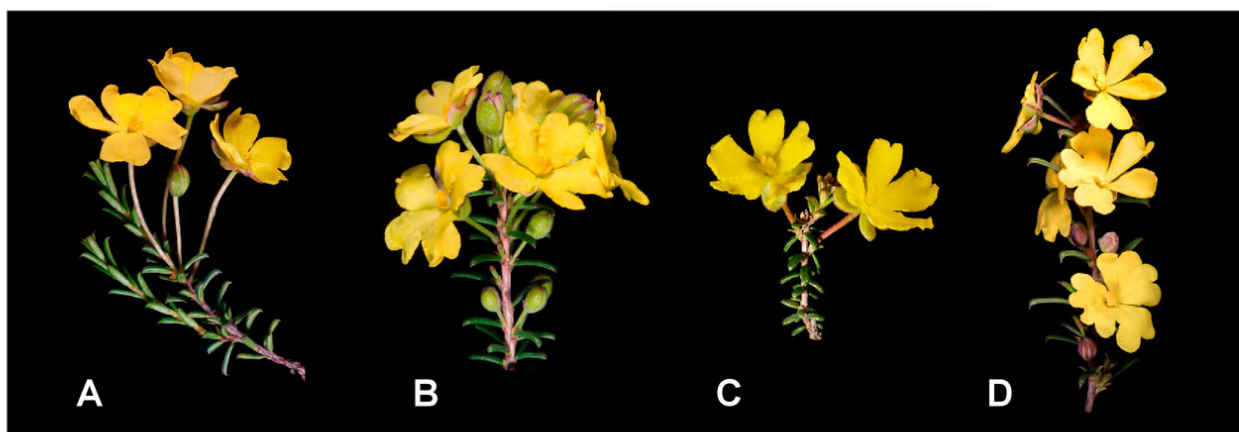


Figure 4. A – *Hibbertia depilipes* (K.R. Thiele 4777); B – *H. polyancistra* (K.R. Thiele 5139); C – *H. microphylla* (K.R. Thiele 4772); D – *H. lineata* (K.R. Thiele 5118).

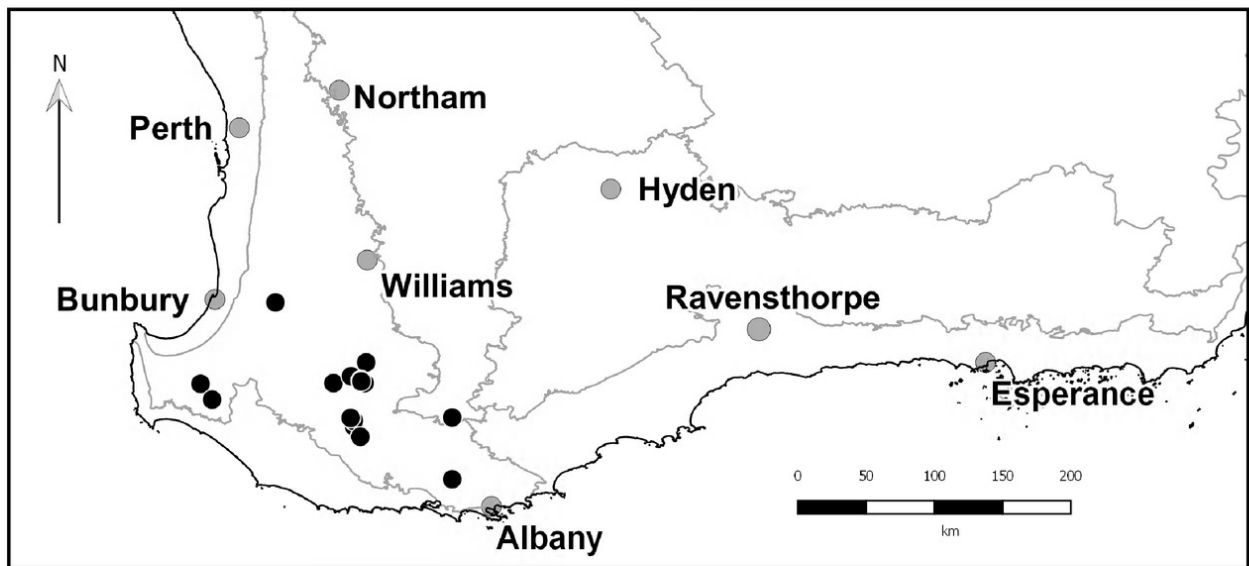


Figure 5. Distribution of *Hibbertia depilipes*.

**Distribution and habitat.** Widely distributed in the far south-west of Western Australia, mostly west of the Albany Highway and inland from the coast, in the Southern Jarrah Forest sub-bioregion with one specimen just across the boundary of the Avon Wheatbelt bioregion. Most specimens have been collected in an area from west of Kojonup south to near Lake Muir, with outliers at Collie, Nannup, Cranbrook and north-east of Denmark (Figure 5). It is the most westerly species in the group, and appears from current collections to be allopatric or narrowly sympatric with *H. microphylla* and *H. lineata*.

*Hibbertia depilipes* occurs in open woodland and forests dominated by *Corymbia calophylla*, *Eucalyptus wandoo*, *E. marginata* and *E. decipiens*, with open to shrubby understoreys, on slopes, flats and valley bottoms usually on or adjacent to rather moist sites, in sandy clay or clay soils over laterite. It differs in habitat from the related (and partially sympatric or allopatric) *H. lineata* and *H. microphylla*, both of which tend to occur in kwongan or mallee-heath in drier, more open sites on lighter, sandier soils.

**Conservation status.** *Hibbertia depilipes* is widespread, relatively common and not considered to be under threat.

**Etymology.** The epithet is from the Latin *depilis* (without hair) and *pes* (a foot), in reference to the glabrous petioles.

**Notes.** When well-grown *H. depilipes* is a sprawling shrub with stems producing adventitious roots where they contact the ground, and flowers held erect on long pedicels. This growth habit has not been observed in other members of the group. Young plants, or resprouts following fire, may be more erect.

Most specimens of *H. depilipes* were previously included in *H. sp. Kojonup*, but do not match the reference specimen for that phrase name (now referred to *H. microphylla*, see below) due to their distinctively glabrous petioles and pedicels. Others have been redetermined from *H. aff. recurvifolia* and *H. lineata*. It may be distinguished from typical *H. microphylla* by its longer, spreading rather than retrorse leaves and glabrous pedicels and petioles, and from *H. lineata* by its non-glabrous sepals.

A few specimens are slightly atypical. *A.R. Annels* 4165 from near Narrikup at the eastern end of the range of the species has virtually glabrous sepals, with a few uncinat hairs near the base. *G. Byrne* 4270 has



petioles that are glabrous except for a line of dense hairs along the junction with the stem. *G. Keighery* & *N. Gibson* 5358 has pedicels with few, tiny, widely scattered stellate hairs. All are typical in all other respects for *H. depilipes*, and do not break down the boundary between this and other species.

While the differences between *H. depilipes* and other members of the species group (the glabrous petioles and glabrous pedicel contrasting with pubescent sepals) may seem minor, they are (noting the few exceptions above) correlated and consistent, geographically distinct, and allow unambiguous determination of specimens. Petiole indumentum in the other taxa in the group (e.g. *H. microphylla*, *H. lineata*) shows no sign of becoming sparser in specimens collected close to the range of *H. depilipes*, indicating that the variation is not clinal in nature. *Hibbertia depilipes* occupies a different habitat from other taxa where they are allopatric or narrowly sympatric (woodland and forest *cf.* kwongan and heath), and there is no reason to regard these characters as expressions of these differing habitats. For these reasons, it is regarded here as a distinct species.

***Hibbertia lineata*** Steud., in Lehm. *Pl. Preiss.* 1(2): 272 (1845). *Type citation*: ‘In confragosis umbrosis sylvaticis ad latus septentrionale montis Wuljenup [Willyung Hill, near Albany], ditomis Plantagenet, 14 Oct. 1840. Herb. Preiss. No. 2151’ (*syn*: BR 13462529 image!, HBG 507144 image!, LD 1359557 image!, M 212899 image!, MEL 666865!, MEL 666866!, MEL 666867 (fragments)!, MO 279479 image!).

*Hibbertia recurvifolia* (Steud.) Benth., *Fl. Austral.* 1: 24 (1863); *Pleurandra recurvifolia* Steud., in Lehm. *Pl. Preiss.* 1(2): 264 (1845). *Type citation*: ‘In glareosis sterilibus ad radices collum Konkoberup [Mt Melville near Cape Riche], districtus Kent, 19. Nov. 1840. Herb. Preiss. No. 2170’ (*syn*: LD 1811633 image!, MEL 666666 (fragments)!).

*Hibbertia pullula* S.Moore, *J. Linn. Soc., Bot.* xlv. 162 (1920). *Type citation*: ‘Ongerup District; Stoward, 842, 843’ (*syn*: BM 915843 image!).

Spreading to erect *shrubs* (10–)30–60(–100) cm high, resprouting from a stout, woody rootstock after fire; young branchlets sparsely to moderately stellate-hairy when young,  $\pm$ glabrescent. *Leaves* erect to spreading, scattered; petioles 0.2–0.5 mm long, abaxially and adaxially moderately to densely stellate-hairy (very rarely glabrous), subtending a tuft of short hairs; blades linear (very narrowly ovate when short), (2–)5–15(–20) mm long, 0.6–1.0 mm wide, the margins strongly recurved and obscuring all but the midrib abaxially, the true margin of the leaf visible as parallel, whitish, scarious strips either side of the midrib; adaxial surface smooth or with scattered tubercles when young, usually with a line of sharp tubercles along an angle on the apparent margin, glabrous or with scattered hooked and/or simple and forward-directed hairs on the tubercles; abaxial surface (midrib) glabrous; apex an obtuse, thickened point terminated by a tuft of minute hairs or papillae, slightly to distinctly recurved. *Flowers* pedicellate, borne singly in upper leaf axils; pedicels (2.5–)5–20 mm long, glabrous; *primary bract* at the apex of the pedicel immediately below the calyx, herbaceous, 2–4 mm long, narrowly ovate to narrowly triangular, acute, glabrous to minutely and sparsely stellate-hairy, fimbriolate; *secondary bracts* 0–4, brown,  $\pm$ surrounding the base of the pedicel, *c.* 2–3 mm long, as for the primary bract in shape and indumentum but more scarious. *Sepals* 5, ovate, 5–6 mm long; outer sepals glabrous, often with a glistening, slightly crystalline surface appearance when dry, acute, the margins usually prominently pale and whitish (contrasting with the body) but not scarious, sometimes fimbriolate, the midribs not prominent but the sepal bases  $\pm$ thickened; inner sepals sparsely to moderately minutely stellate-hairy where covered by the outer sepals in bud, similar in size and shape to the outer but broader and slightly less acute. *Petals* 5, yellow, broadly obovate, broadly and shallowly emarginate, 5.5–9 mm long. *Stamens* (8–)10(11), all on one side of the gynoecium and curving over the carpels;

filaments 0.5–0.8 mm long; anthers rectangular, 1.8–2.2 mm long, dehiscing by introrse, longitudinal slits; *staminodes* 2–3 either side of the stamens or to 12 and forming a line behind the stamens. *Carpels* 2, compressed-globular, densely pubescent; styles excentrically inserted below the carpel apex, erect and curved away from the stamens, *c.* 1.5–2 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen. (Figure 4D)

*Diagnostic features.* *Hibbertia lineata* may be uniquely diagnosed within the *H. lineata* species group by its glabrous outer sepals and pedicels, and sepals that are usually whitish-margined.

*Selected specimens examined.* WESTERN AUSTRALIA: Dragon Rocks Nature Reserve, 23 Aug. 1991, *A.M. Coates* 2602 (PERTH); Narrikup, 15 Oct. 1999, *E. J. Croxford* 8215 (PERTH); 6 km N of Mount Manypeaks, 11 Dec. 1996, *R. Davis* 1785 (PERTH); Jerramungup, 17 Aug. 1988, *B. Dixon* 26/88 (PERTH); Wagin, 9 Oct. 1942, *C.A. Gardner* 6484 (PERTH); Mount Short, N of Ravensthorpe, 30 Aug. 1963, *A.S. George* 5704 (PERTH); 12 km NW of Cape Riche and 6 km SE of Wellstead, 20 Oct. 1991, *W. Greuter* 23036 (PERTH); N of Toolbrunup Peak, Stirling Range National Park, 22 Oct. 1971, *R.D. Hoogland* 12179 (PERTH); along Bremer Bay Road *c.* 43 miles from Albany, Green Range area, 16 Nov. 1974, *R.D. Hoogland & G.L. Stebbins* GLS 12541 (PERTH); S side of Springdale Road, 6.6 km W of its junction with Mason Bay Road, 25 Sep. 2001, *J.W. Horn* 4133 (PERTH); S side of Collets Road, 0.45 km W of Quaalup Homestead Road, Fitzgerald River National Park, 28 Sep. 1999, *J.W. Horn & R. Butcher* 2645 (PERTH); Fox Road 2.6 km S of Brockway Road, *c.* 16 km NNW of Esperance, 12 Oct. 2000, *G.J. Keighery & N. Gibson* 5077 (PERTH); Jerramungup, 14 Sep. 1994, *W.R. Lullfitz* 8 (PERTH); Jerramungup, 22 Aug. 1994, *W.R. Lullfitz* 60 (PERTH); 0.3 km along Kau Rock Road from Coolinup Road, 22 Sep. 1985, *L.J. Nunn* 219 (PERTH); *c.* 14 km E of the mouth of the Oldfield River, 12 Oct. 1969, *A.E. Orchard* 1498 (PERTH); South Stirling Road, 3.3 km N of Pfeiffer Road junction, 20 Oct. 1999, *E.M. Sandiford* 463 (PERTH); 12 km NNW of Ongerup, 15 Sep. 2004, *L. Strahan* 258 (PERTH); 73 km E of Jerramungup, 23 Sep. 1986, *J.R. Wheeler* 2430 (PERTH); West Mount Barren, 23 Sep. 1986, *J.R. Wheeler* 2431 (PERTH); *c.* 2 km W of track to West Mount Barren, Fitzgerald River National Park, 23 Sep. 1986, *J.R. Wheeler* 2439 (PERTH); lower slopes of Mount Melville, 24 Sep. 1986, *J.R. Wheeler* 2447 (PERTH); Collets Road at Mount Maxwell turnoff, 1.6 km from Devils Creek Road, Fitzgerald River National Park, 6 Sep. 2001, *J.R. Wheeler* 4073 (PERTH).

*Phenology.* Flowers mainly from early September to mid-November, but occasionally from as early as late May. In general, inland and easterly populations flower earlier than more westerly and coastal ones.

*Distribution and habitat.* Occurs widely in the Esperance Plains, southern Avon Wheatbelt and Mallee, and south-eastern Jarrah Forest bioregions, from near Narrikup east to the Oldfield River, and in scattered localities inland to Wagin and Dragon Rocks Nature Reserve (Figure 6), usually not close to the coast, in kwongan and mallee-heath on sandplains and gentle slopes in light-textured soils over laterite, spongolite or granite.

*Conservation status.* *Hibbertia lineata* is widespread, common and not considered to be at risk.

*Notes.* Plants in drier locations inland and to the east of the range tend to have shorter leaves with more distinctly recurved apices; these were previously ascribed to *H. recurvifolia*. The type of *H. lineata* is a relatively long-leaved plant as described in the protologue, and has relatively straight leaf apices, while that of *Pleurandra recurvifolia* has shorter leaves with more distinctly recurved apices. *Hibbertia pullula* has shorter leaves still (both syntypes). All three fall within the range of variation accepted here for *H. lineata*. Both *H. lineata* and *H. recurvifolia* were described by Steudel in the same work; the name *H. lineata* is preferred as it was originally described under *Hibbertia*.

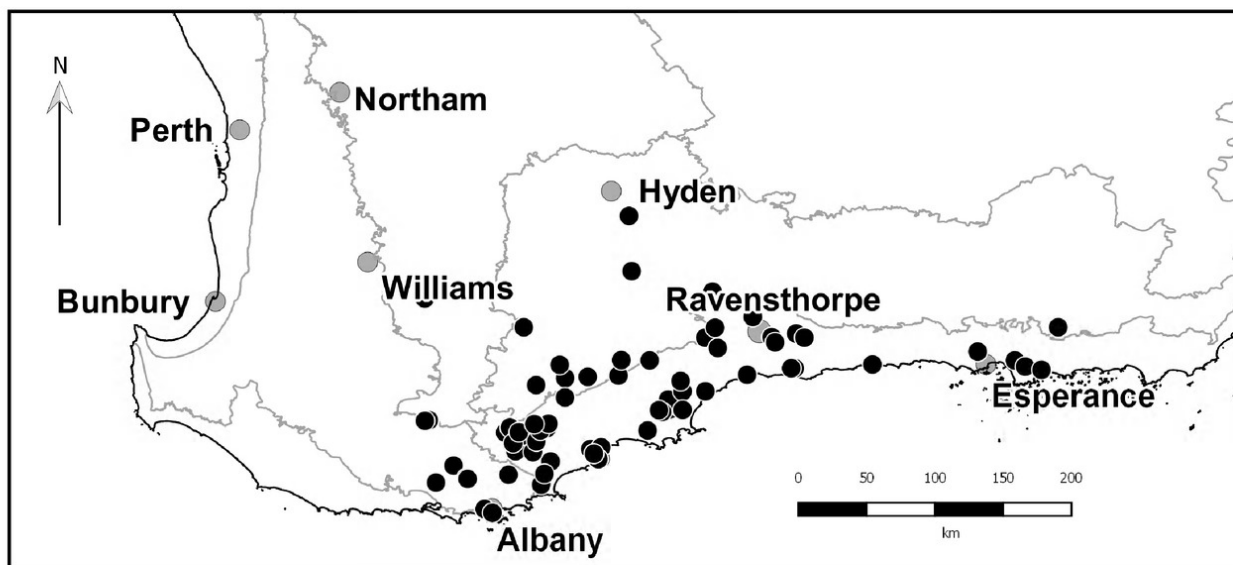


Figure 6. Distribution of *Hibbertia lineata*.

Two specimens from a population near Jerramungup (*W.R. Lullfitz* 8, *W.R. Lullfitz* 60) have very short leaves *c.* 2 mm long (as short as many specimens of *H. microphylla*), but the glabrous, pale-margined outer sepals (glistening when dry) of *H. lineata*. Sepal indumentum in this group appears to be a more reliable character than leaf length, which in all species is very variable depending on growth conditions.

Plants have a robust, woody rootstock and resprout abundantly after fire to form small, dense, compact shrubs. In long-unburnt areas they become taller and more openly-branched, with the elongate branches sometimes spreading widely.

In addition to the glabrous outer sepals that are diagnostic within the species group, *H. lineata* may be distinguished from *H. depilipes* by its densely stellate-hairy petioles (but see below), from *H. verrucosa* by its leaves which tend to be flat-topped with a distinct lateral angle bearing a row of tubercles with forward-directed hairs (rounded and with scattered tubercles bearing stellate hairs in *H. verrucosa*), and from *H. microphylla* by its generally longer, spreading-erect rather than retrorse leaves. The outer sepals of *H. lineata* almost always have distinctively pale margins differing in colour but not texture from the body of the sepal. In dried specimens there is also often a striking glistening appearance to the sepals when viewed under the strong light of a dissecting microscope, apparently caused by flattened, reflective cell walls; it is not known whether the cell structure differs from other taxa in the group, or whether the glistening is only apparent in this species because the sepals are glabrous.

In the field, *H. lineata* is superficially similar to *H. gracilipes*. The latter differs in having acute leaves without the small apical hair tuft, in lacking staminodes, and in having carpels that are glabrous except for an apical line of short hairs.

Two specimens, both from the western end of Fitzgerald River National Park near Mount Maxwell (*J.W. Horn & R. Butcher* 2645, *J.R. Wheeler* 4073), are unusual in having glabrous young stems and abaxial petiole surfaces, like *H. depilipes*. In all other respects including habit, habitat and floral characters they are typical for *H. lineata*. A further specimen (*J.W. Horn & R. Butcher* 2642) collected at the same location as *J.W. Horn & R. Butcher* 2645 has small, dense patches of hairs on an otherwise glabrous petiole on most leaves, and is thus intermediate with typical *H. lineata*. Field work is required to assess the significance of these specimens.



***Hibbertia microphylla*** Steud., in Lehm. *Pl. Preiss.* 1(2): 273 (1845). *Type citation*: ‘In glareosis prope montem Wuljenup districtus Plantagenet, Nov. 1840. Herb. Preiss. No. 2154 et 2180’ (*syn*: *Preiss* 2154: BR 13462505 image!, HBG 507143 image!, LD 1359437 image!, M 212897 image!, MEL 666868!, MEL 666869!, MEL 666870!, MO 279478 image!, P 682333 image!, P 682336 image!, S 8-20151 image!; *Preiss* 2180: LD 1359497 image!, P 682335 image!).

*Hemistemma revolutum* Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 22(2): 4 (1849). *Type citation*: ‘Drumm. coll. III. n. 1’ (*holo*: KW 1000424 image!; *iso*: MEL 2227664 image!)

*Hibbertia lepidophylla* F.Muell., *Fragm.* 1(10): 217 (1859). *Type citation*: ‘In collibus glareosis ad Kojonurup [Kojaneerup] Australiae occidentalis. Mx.’ (*holo*: MEL 2283221!).

*Hibbertia* sp. Kojonup (C.M. Lewis 288), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 31 October 2014].

Low *shrubs* (10–)20–50 cm high, often with elongate, weakly ascending stems but sometimes compact and spreading, resprouting from the rootstock after fire; young branchlets sparsely to moderately stellate-hairy, glabrescent. *Leaves* retrorse to spreading, scattered; petioles 0.1–0.4 mm long, sparsely stellate-hairy abaxially and adaxially and subtending a tuft of short hairs; blades broadly ovate to elliptic or obovate, sometimes almost circular, rarely  $\pm$ linear, (1.2–)2–4(–8) mm long, 1–1.8 mm wide, the margins strongly recurved and obscuring all but the midrib abaxially, the true margin of the leaf visible as parallel, whitish, scarious strips either side of the midrib; adaxial surface smooth or (especially when young) with a line of sharp tubercles along an angle on the apparent margin (the tubercles sometimes more widespread and scattered), glabrous or with scattered hooked and/or simple and forward-directed hairs on the tubercles; abaxial surface (midrib) glabrous; apex an obtuse, thickened point terminated (at least in young leaves) by a tuft of minute hairs or papillae, distinctly recurved. *Flowers* pedicellate, borne singly in upper leaf axils; pedicels 5–15(–30) mm long, moderately to sparsely and minutely stellate-hairy; *primary bract* at the apex of the pedicel immediately below the calyx, herbaceous, 0.5–1.5 mm long, narrowly triangular to linear, acute, minutely stellate-hairy; *secondary bracts* 2–4,  $\pm$ surrounding the base of the pedicel, 1–2 mm long, as for the primary bract in shape and indumentum but often more scarious. *Sepals* 5, ovate, 3.5–5(–6) mm long, sparsely pubescent with spreading to retrorse, hooked hairs *c.* 0.1–0.2 mm long overtopping stellate hairs (the hooked hairs sometimes absent), the indumentum more dense at the sepal bases; midribs often prominent near the  $\pm$ thickened sepal bases but not continuing to the apex; outer sepals acute; inner sepals similar in size and shape to the outer but slightly less acute. *Petals* 5, yellow, broadly obovate, broadly and shallowly emarginate, 5.5–7.5 mm long. *Stamens* (9–)10(–15), all on one side of the gynoecium and curving over the carpels; filaments 0.5–1 mm long; anthers rectangular, 1.2–1.8 mm long, dehiscent by introrse, longitudinal slits; *staminodes* 4–9, lateral to and often also behind the stamens. *Carpels* 2, compressed-globular, densely pubescent; styles excentrically inserted below the carpel apex, erect and curved away from the stamens, *c.* 1.2–1.6 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen. (Figure 4C)

*Diagnostic features.* *Hibbertia microphylla* may usually be uniquely diagnosed within the *H. lineata* species group by its very short (2–4 mm long) leaves which are retrorse on the straggling stems. Specimens with longer leaves may be discriminated by their stellate-hairy pedicels and sepals with uncinat hairs denser towards the base.

*Selected specimens examined.* WESTERN AUSTRALIA: Watershed Road, 5.5 km from Biro Road, 19.5 km ESE of Rocky Gully, 24 Nov. 1993, *A.R. Annels* ARA 4378 B (PERTH); Mount Many Peaks, 30 Oct. 1971, *A.M. Ashby* 4367 (PERTH); corner Lake Grace/Newdegate Station, Burngup Road, 12 Sep.

2003, *E. Bishop* 195 (PERTH); South Coast Highway, on SE side of Hay River crossing, 28 Nov. 1990, *N. Gibson & M. Lyons* 864 (PERTH); along Millenup Road (S of Porongurup Range) near Chester Pass Road, 20 Oct. 1971, *R.D. Hoogland* 12160 (PERTH); Great Southern Highway, c. 1.1 km S of junction with Gnowangerup-Tambellup Road in Tambellup, 1 Oct. 1999, *J.W. Horn & R. Butcher* 2712 (PERTH); Lupton Conservation Park, Brookton, 10 Aug. 2005, *F. Hort* 2548 (PERTH); East Mount Barren, S of Ravensthorpe, Sep. 1924, *A. Johnston s.n.* (PERTH); Boyup Brook Road, 12 km W of Kojonup, 12 Oct. 1998, *C.M. Lewis* 368 (PERTH); 2 km SSE of Mount Lindesay, 20 Aug. 1997, *K.A. Redwood* 043 (PERTH); Dryandra State Forest, 3 Dec. 1987, *D.M. Rose* 560 (PERTH); 21 km W of Newdegate, 26 Sep. 1983, *J. Taylor & P. Ollerenshaw* JT 2279 (PERTH); North Bannister, 20 Oct. 2008, *G. Turner* 407 (PERTH); Red Gum Pass c. 1 km N of Red Gum Springs, Stirling Range, 30 Sep. 1986, *J.R. Wheeler* 2501 (PERTH).

*Phenology.* Flowers mostly from mid-September to early December, occasionally as early as August.

*Distribution and habitat.* Widely distributed in the Avon Wheatbelt, eastern part of the Jarrah Forest, far eastern part of the Warren, and western end of the Esperance Plains and Mallee bioregions, as far north as near Brookton and with outliers near Newdegate and Ravensthorpe (Figure 7). Occurs in kwongan and mallee-heath, and in woodland and forest dominated by *Corymbia calophylla*, *Eucalyptus wandoo* and *E. marginata* often in or adjacent to small kwongan patches on laterite, in sandy, clay or clay-loam soils, sometimes in winter-wet areas.

*Conservation status.* *Hibbertia microphylla* is common and widespread and is not considered to be at risk.

*Notes.* Steudel (1845) cites two syntypes (*L. Preiss* 2154 & 2180) but gives a locality only for the second in the protologue. LD 1359437 (*L. Preiss* 2154) bears a label with the locality “In solo torfoso-arenoso prope urbiculam ‘Albany’ (Plantagenet)”.

Typical *H. microphylla* are very small-leaved plants (leaves 1–4 mm long) with the leaves distinctively retrorse on the stems. In general, plants from drier sites have shorter leaves. Two specimens (*J. Taylor & P. Ollerenshaw* JT 2279, *E. Bishop* 195) from an outlying population near Newdegate (the lowest rainfall within the range) have very small (c. 1 mm long), almost globular leaves. These match the type of *H. lepidophylla* F.Muell. from Kojaneerup (at higher but still relatively low rainfall). Longer-leaved

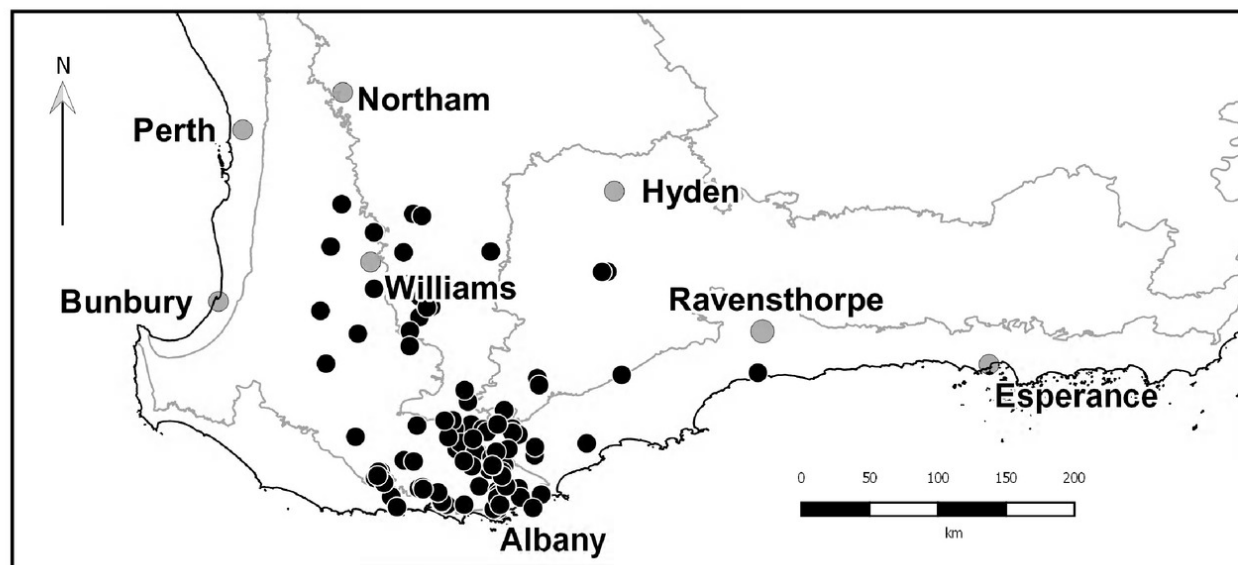


Figure 7. Distribution of *Hibbertia microphylla*.

plants, with leaves to 8 mm long, occur in the western and south-western parts of the range. These superficially approach *H. lineata* and *H. depilipes* in overall appearance. They may be discriminated from the former by the hairy sepals and from the latter by the hairy petioles and pedicels.

A specimen from North Bannister (*G. Turner* 407) is anomalous in having strongly scattered-verrucose leaves and sepals with a very dense indumentum of mixed uncinata and stellate hairs.

***Hibbertia papillata*** J.R. Wheeler, *Nuytsia* 15(2): 304–305 (2004). *Type*: Fitzgerald River National Park, south-east slopes of East Mt Barren, Western Australia, 23 September 1986, *J.R. Wheeler* 2428 (*holo*: PERTH 03034275!; *iso*: AD 181982!, CANB 591931!, K 700360 image!, MEL 2283113!, NSW 536974!).

Erect *shrubs* 30–40 cm high; young branchlets sparsely to moderately and minutely stellate-hairy, glabrescent. *Leaves* erect to spreading, rather crowded; petioles 0.5–1 mm long, abaxially and adaxially stellate-hairy; blades linear, 6–12 mm long, *c.* 1 mm wide, the margins strongly recurved and obscuring all but the midrib abaxially; adaxial surface non-tuberculate, papillate at high magnification, glabrous; abaxial surface (midrib) glabrous; apex an obtuse, thickened, slightly recurved point terminated in young leaves by a few short hairs or papillae. *Flowers* pedicellate, borne singly in upper leaf axils; pedicels 3–8 mm long, sparsely and minutely stellate-hairy; *primary bract* at the apex of the pedicel immediately below the calyx, herbaceous, 1.5–4 mm long, narrowly triangular, acute, minutely stellate-hairy; *secondary bracts* 2–4,  $\pm$ surrounding the base of the pedicel, 1–3 mm long, as for the primary bract in shape and indumentum but scarious. *Sepals* 5, ovate, 3.5–6 mm long, sparsely to moderately pubescent with minute, stellate hairs; midribs not prominent but the sepal bases  $\pm$ thickened; outer sepals acute; inner sepals similar in size and shape to the outer but slightly less acute. *Petals* 5, yellow, broadly obovate, broadly and shallowly emarginate, 4–7.5 mm long. *Stamens* (8–)10, all on one side of the gynoecium and curving over the carpels; filaments *c.* 0.5–1.5 mm long; anthers rectangular, 1–1.5 mm long, dehiscing by introrse, longitudinal slits; *staminodes* 2–4 either side of the stamens (occasionally with a few behind the stamens). *Carpels* 2, compressed-globular, densely pubescent; styles excentrically inserted below the carpel apex, erect and curved away from the stamens, *c.* 1.5–2 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen.

*Diagnostic features.* *Hibbertia papillata* may be uniquely diagnosed within the *H. lineata* species group by the combination of  $\pm$ crowded, non-tuberculate, glabrous leaves and sepals with minute, stellate hairs only; the leaf surface is more coarsely papillate or muricate than in other members of the group.

*Other specimens examined.* WESTERN AUSTRALIA [localities withheld for conservation reasons]: 2 Nov. 1965, *A.S. George* 7262 (PERTH); 7 Oct. 1971, *R.D. Hoogland* 12079 (PERTH); 29 Sep. 1999, *J.W. Horn & R. Butcher* 2676 (PERTH); 1 Oct. 1970, *B.R. Maslin* 905 A (PERTH); 3 Sep. 1986, *K. Newbey* 1110 (PERTH); 22 Sep. 1986, *J.R. Wheeler* 2426 (PERTH); 8 Sep. 2001, *J.R. Wheeler* 4099 (PERTH); 4 Oct. 1966, *P.G. Wilson* 5447 (PERTH); 4 Oct. 1966, *P.G. Wilson* 5469 (PERTH).

*Phenology.* Flowers in September and October.

*Distribution and habitat.* *Hibbertia papillata* is narrowly endemic in Fitzgerald River National Park, occurring in the immediate vicinity of East Mount Barren with an inland outlier in the Eyre Range *c.* 8 km to the north-west (Figure 8). It grows in kwongan in shallow soils over quartzite, on rocky terraces and lower hillslopes.



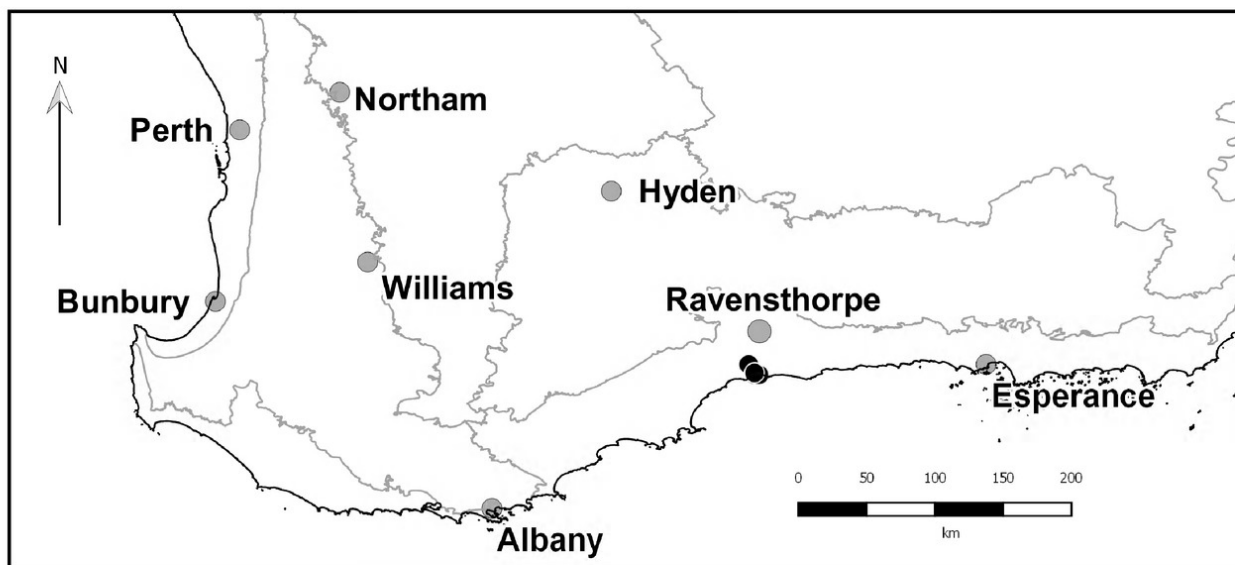


Figure 8. Distribution of *Hibbertia papillata*.

**Conservation status.** *Hibbertia papillata* is listed by Smith (2017) as Priority Two under Department of Parks and Wildlife Conservation Codes for Western Australian Flora, on account of its narrow range within Fitzgerald River National Park.

**Notes.** *Hibbertia papillata* differs from other species in the *H. lineata* species group in having the leaf margins so strongly recurved that the true margin is not visible, except in the youngest of leaves and sometimes towards the leaf apex of older leaves. It is considered to be a member of the group on the basis of its staminodes, leaf apex and muriculate leaves; this latter feature is particularly well-developed in *H. papillata* (providing the etymology for the name). Its leaves, as in all species in the group, have more or less isodiametric epidermal cells, each cell with a single, blunt to sharp papilla at its centre. In other taxa in the group the cells and their papillae are smaller and less obvious.

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

**Type:** [south-east of Karragullen] Western Australia [precise locality withheld for conservation reasons], 26 October 2014, K.R. Thiele 5139 (*holo*: PERTH 08775222; *iso*: AD, CANB).

Erect *shrubs* 30–45(–60) cm high, resprouting from a stout, woody rootstock after fire; young branchlets sparsely to moderately stellate-hairy,  $\pm$ glabrescent. *Leaves* spreading, scattered; petioles 0.2–0.7 mm long, abaxially densely and minutely pubescent with stellate hairs, adaxially shortly pubescent and subtending a tuft of short hairs; blades linear (narrowly ovate when short), (5–)6–12 mm long, 1.8–2.5 mm wide, the margins strongly recurved and obscuring all but the midrib abaxially, the true margin of the leaf visible as parallel, whitish, scarious strips either side of the midrib; adaxial surface smooth or sparsely blunt-tuberculate, the tubercles usually concentrated on the rounded shoulders of the apparent margin, glabrous (young leaves sometimes with very sparse, hooked hairs); abaxial surface (midrib) glabrous; apex an obtuse, thickened point which in very young leaves is terminated by a few minute hairs or papillae, slightly (rarely distinctly) recurved. *Flowers* long-pedicellate, borne singly in upper leaf axils; pedicels (10–)12–25 mm long, moderately stellate-hairy; *primary bract* at the apex of the pedicel immediately below the calyx, narrowly triangular, obtuse, minutely stellate-hairy, 2–3 mm long; *secondary bracts* 2–4,  $\pm$ surrounding the base of the pedicel, 2–3 mm long, as for the primary bract in shape and indumentum but more scarious. *Sepals* 5, ovate, (6–)7–8(–9) mm long, pubescent with moderately dense, evenly spaced, spreading to retrorse, hooked hairs 0.2–0.4 mm long underlain

by sparse to moderate, minute, stellate hairs, the hooked hairs borne on minute tubercles that are often purple at least when dry; midribs not prominent but the sepal bases distinctly thickened; outer sepals acute to slightly acuminate; inner sepals similar in size and shape to the outer. *Petals* 5, yellow, broadly obovate, broadly and shallowly emarginate, (5.5–)8–9 mm long. *Stamens* 10 (rarely fewer by abortion), all on one side of the gynoecium and curving over the carpels; filaments 0.5–1.0 mm long; anthers rectangular, 1.6–2.5 mm long, dehiscing by introrse, longitudinal slits; *staminodes* 2 or 3 either side of the stamens, sometimes with more forming a row behind the stamens. *Carpels* 2, compressed-globular, densely pubescent; styles excentrically inserted below the carpel apex, erect and curved away from the stamens, c. 1.5–2 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen. (Figure 4B)

*Diagnostic features.* *Hibbertia polyancistra* may be uniquely diagnosed within the *H. lineata* species group by the combination of ±erect habit and large flowers (sepals (6–)7–8(–9) mm long) with the sepals thickly and evenly beset with hooked hairs.

*Other specimens examined.* WESTERN AUSTRALIA: [localities withheld for conservation reasons]: 13 Nov. 2000, *F. Hort* 1233 (PERTH); 27 Nov. 2000, *F. Hort* 1234 (PERTH); 30 Nov. 2000, *F. Hort* 1235 (PERTH); 30 Nov. 2000, *F. Hort* 1236 (PERTH); 18 Jan. 2001, *F. Hort* 1269 (PERTH); 1 Dec. 2003, *F. Hort* 2134 (PERTH); 30 Dec. 2005, *F. Hort & J. Hort* 2755 (PERTH).

*Phenology.* Collected flowering in November and December.

*Distribution and habitat.* Occurs in a restricted area of the Jarrah Forest bioregion in state forests south of the Brookton Highway east of Armadale (Figure 9), in kwongan patches on shallow soil over granite within a matrix of *Corymbia calophylla*-*Eucalyptus marginata* forest. Known populations are spread over an area of approximately 25 × 5 km.

*Conservation status.* To be listed as Priority One under Department of Parks and Wildlife Conservation Codes for Western Australian Flora (M. Smith pers. comm.).

*Etymology.* The epithet is from the Greek *poly-* (many-), and *ankistron* (a fishhook), in reference to the numerous uncinata (hooked) hairs evenly covering the outer sepals.

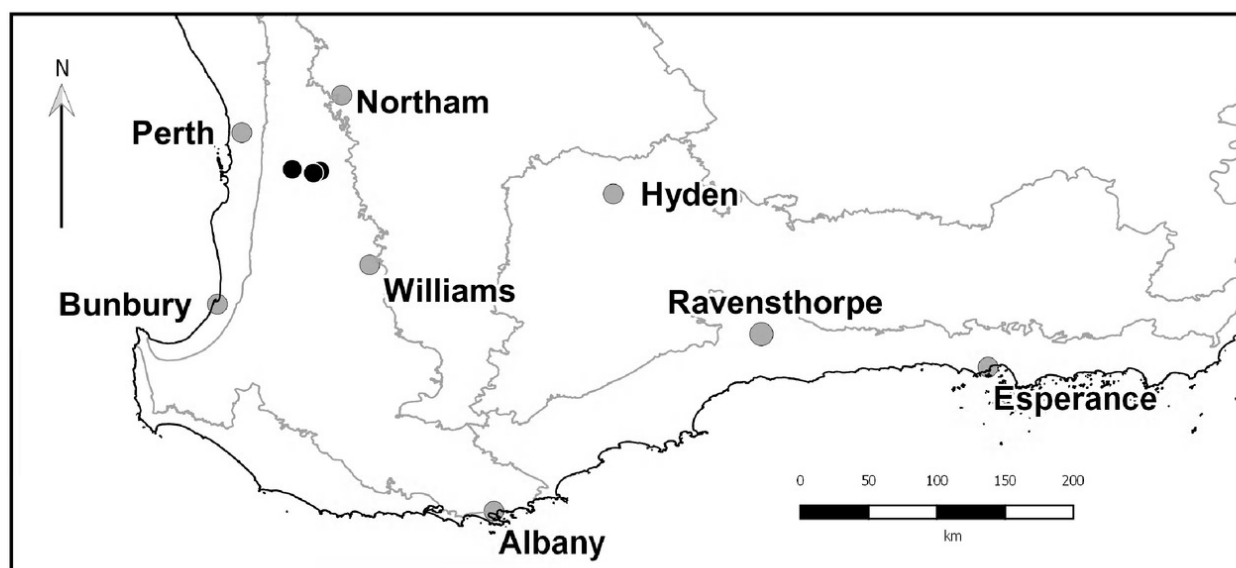


Figure 9. Distribution of *Hibbertia polyancistra*.

*Notes.* Morphologically and in habitat, *H. polyancistra* appears most similar to *H. microphylla*, the northernmost collections of which (e.g. *F. Hort* 2548, Lupton Conservation Park near Brookton) grow close to populations of *H. polyancistra* and have longer leaves than is typical for the species. It may be readily separated by its larger flowers (sepals (6–)7–8(–9) mm long *cf.* 3.5–5(–6) mm in *H. microphylla*) and sepal indumentum. In both species the outer sepals bear retrorse, uncinat hairs over minute stellate ones; in *H. polyancistra* the uncinat hairs are evenly dispersed on the sepals, while in *H. microphylla* they are more concentrated towards the sepal bases. *Hibbertia polyancistra* tends to be an upright shrub with spreading to erect leaves, while *H. microphylla* is usually more diffuse, with rather weak branches often supported by other vegetation and bearing spreading to retrorse leaves.

***Hibbertia verrucosa*** (Turcz.) Benth., *Fl. Austral.* 1: 22 (1863); *Pleurandra verrucosa* Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 25 (2): 139 (1852). *Type citation:* ‘Nova Hollandia. Drum. coll. V. n. 289’ (*holo:* KW 1000419 image!; *iso:* K 687451 image!, MEL 35978!, P 682347 image!, PERTH 06797857!).

*Hibbertia virens* (Benth.) Domin, *Věstn. Král. České Společn. Nauk. Tř. Mat.-Přir.* 2: 68 (1923); *Hibbertia recurvifolia* (Steud.) Benth. var. *virens* Benth., *Fl. Austral.* 1: 24 (1863). *Type citation:* ‘Point Henry, Oldfield’ (*syn:* MEL 666667!).

*Hibbertia* sp. Fitzgerald River (D.A. Rathbone 622), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 31 October 2014].

Erect *shrubs* 20–40(–70) cm high, resprouting from a stout, woody rootstock after fire; young branchlets moderately to densely stellate-hairy. *Leaves* spreading, scattered; petioles 0.2–0.5 mm long, densely stellate-hairy; blades narrowly rectangular to linear, (6–)8–12(–14) mm long, (0.8–)1–2 mm wide, the margins strongly recurved and obscuring all but the midrib abaxially, the true margin of the leaf usually visible as parallel, whitish, scarious strips either side of the midrib; adaxial surface with scattered, rounded tubercles each usually bearing a coarse, stellate hair at least when young (occasionally with few-branched, forward-directed hairs, or the leaves almost smooth), sometimes also with scattered, simple or hooked hairs between the tubercles when young; abaxial surface (midrib) when visible coarsely stellate-hairy; apex an obtuse, thickened point terminated when young by a tuft of minute hairs or papillae, slightly to moderately recurved. *Flowers* pedicellate, borne singly in upper leaf axils; pedicels 2–6 mm long, stellate-hairy; *primary bract* at the apex of the pedicel immediately below the calyx, herbaceous, 2–3 mm long, narrowly triangular, acute, stellate-hairy; *secondary bracts* 2–4 at the base of the pedicel, 2–3 mm long, as for the primary bract in shape and indumentum but scarious. *Sepals* 5, ovate, 5–6 mm long, moderately to densely pubescent with coarse, tubercle-based stellate hairs usually mixed with short, often retrorse, uncinat hairs; midribs at least on the outer sepals thick and prominent from the prominently thickened sepal bases to the apex; outer sepals acute; inner sepals similar in size and shape to the outer but slightly less acute. *Petals* 5, yellow, broadly obovate, broadly and shallowly emarginate, 7–9 mm long. *Stamens* (8–)10(–11), all on one side of the gynoeceum and curving over the carpels; filaments *c.* 0.5 mm long; anthers rectangular, 1.6–2 mm long, dehiscing by introrse, longitudinal slits; *staminodes* present, 3–5 either side of the stamens, sometimes also with several behind the stamens. *Carpels* 2, compressed-globular, densely pubescent; styles excentrically inserted below the carpel apex, erect and curved away from the stamens, *c.* 1.5–2 mm long. *Ovules* 2 per carpel. *Fruiting carpels* and seeds not seen.

*Diagnostic features.* *Hibbertia verrucosa* may be uniquely diagnosed within the *H. lineata* species group by the combination of leaves with scattered tubercles each usually bearing a coarse, stellate hair at least when young, and sepals with a distinctly thickened midrib to the apex.



*Selected specimens.* WESTERN AUSTRALIA: Quoin Head, 25 Sep. 1970, *K.M. Allan* 510 (PERTH); Thumb Peak, Barren Range, 17 Oct. 1995, *S. Barrett* 542 (PERTH); 20 miles [32 km] N of Lake Biddy, 19 Nov. 1931, *W.E. Blackall* 1374 (PERTH); Bendering (east), Nature Reserve 18 km E of Bendering, 4 Sep. 1984, *J.M. Brown* 76 (PERTH); Twertup, Fitzgerald River National Park, 19 Aug. 1995, *G.F. Craig* 3345 (PERTH); Whoogarup Range, 2 Dec. 1960, *A.S. George* 1956 (PERTH); Fitzgerald River National Park, 1–2 km N of Quaalup homestead, 19 Oct. 1991, *W. Greuter* 22973 (PERTH); 16 km S of Condingup on E side of Duke of Orleans Bay Road, 19 Aug. 2006, *M. Hoggart* 7/0806 (PERTH); 2 km S of Thumb Peak, 8 Oct. 1975, *K.R. Newbey* 4844 (PERTH); 6 km NE of Boyatup Hill, 11 Oct. 1983, *K.R. Newbey* 9793 (PERTH); far south-western ridge of Mid[dle] Mount Barren, Fitzgerald River National Park State, 25 Sep. 2011, *D.A. Rathbone* 622 (PERTH); 4.8 km west of junction of Telegraph and Drummond tracks, Fitzgerald River National Park, 21 Nov. 2012, *D.A. Rathbone* 626 (PERTH); Fitzgerald River Reserve, 13 July 1970, *R.D. Royce* 8953 (PERTH); Archer Drive, 3/4 way to Lookout, Ravensthorpe Range, 30 June 1998, *E. Tink* 214 (PERTH); 32 km E of Newdegate, on Tarco Road near turnoff to Lake Varley, 21 Sep. 1986, *J.R. Wheeler* 2412 (PERTH); Pabelup Drive, 14 km NW of Point Ann turnoff, Fitzgerald River National Park, 8 Sep. 2001, *J.R. Wheeler* 4097 (PERTH); West Point Road, 13.3 km N of South Coast Highway, 25 Sep. 2001, *J.R. Wheeler* 4111 (PERTH); Parmango Road, 1 km N of Howick Road, Beaumont, 16 Oct. 1984, *S. Wheeler* 9 (PERTH); Ravensthorpe Range, 27 Sep. 1968, *P.G. Wilson* 7988 (PERTH).

*Phenology.* Flowers mostly between mid-August and mid-November, occasionally as early as July or as late as December.

*Distribution and habitat.* *Hibbertia verrucosa* is widespread in the Esperance Plains bioregion between Two Peoples Bay and Cape Arid, with scattered occurrences in adjacent parts of the Mallee bioregion in the vicinity of Newdegate and Lake Biddy and the Avon Wheatbelt bioregion near Bendering (Figure 10). It is common in Fitzgerald River National Park. Occurs in kwongan and mallee-heath, on sandplains and hillslopes in sandy soils over granite, quartzite and spongolite.

*Conservation status.* *Hibbertia verrucosa* is common, widespread and not considered to be at risk.

*Notes.* Two specimens (*D.A. Rathbone* 622, *D.A. Rathbone* 626), both from the vicinity of Middle Mount Barren in Fitzgerald River National Park, bear a remarkable indumentum on the sepals. The tubercles that bear the stellate hairs in these specimens are elongated, dark purplish and robustly bristle-like to 1 mm long, bearing the stellate hair at the apex and giving the sepals a very distinctive appearance unique in the genus. Tubercles on the leaves in these specimens are also slightly elongate (but not bristle-like). These two specimens were segregated at PERTH in 2014 under the phrase-name *H. sp.* Fitzgerald River (*D.A. Rathbone* 622). The type (*Drummond* V: 289) matches these two specimens, having the same bristle-like tubercles on the sepals. Drummond collected from the vicinity of Middle Mount Barren in late 1848 (George 2009).

Elsewhere within the range of the species the sepals have abundant tubercle-based stellate hairs, but the tubercles are rounded and not elongate. All these specimens are regarded here as belonging to the same species, with the Middle Mount Barren plants merely representing a florid over-development of the tubercles. If future field work at Middle Mount Barren indicates that they represent a distinct taxon, then this would be the true *H. verrucosa*, requiring a new name for all other material. Note that a number of specimens collected from Thumb Peak (e.g. *S. Barrett* 542, *K.R. Newbey* 4844), less than 10 km east of Middle Mount Barren and part of the same range, have sepal indumentum more usual for the species, lacking the elongate bristles (although their leaves are abundantly and robustly tuberculate, and the stellate hairs on the sepals arise from particularly robust tubercles).

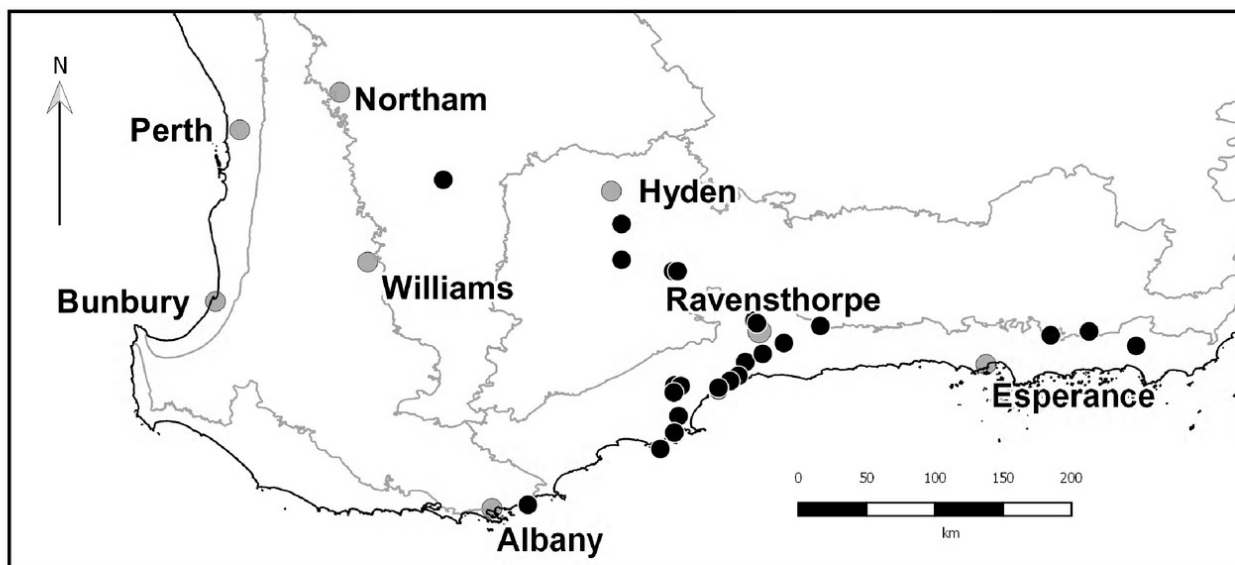


Figure 10. Distribution of *Hibbertia verrucosa*.

The syntype at K appears to be a mixed collection. It comprises two specimens, both mounted beneath a gummed label with an ink inscription ‘289 Swan River to Cape Riche (5<sup>th</sup> coll<sup>n</sup>) Drummond’ and with, in a different hand, a pencil annotation ‘?Pleurandra (*Hibbertia trachyphylla* Steud. [illegible]?)’. The pencil annotation is in error, *H. trachyphylla* (based on *Preiss* 2132) being a probable synonym of *H. hypericoides*. The two specimens are clearly different gatherings, though both are referable to *H. verrucosa*. The right-hand specimen matches the other syntypes, while the left-hand specimen has longer leaves and a sepal indumentum without the elongate tubercles. It is possible that Drummond collected both during the same expedition and placed them under the same collecting number.

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