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# Two new species and a new combination in the Western Australian *Hibbertia glomerosa* (Dilleniaceae) species group

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## Abstract

The common and widespread *Hibbertia glomerosa* (Benth.) F.Muell. currently comprises two varieties, var. *glomerosa* and var. *bistrata* J.R.Wheeler. Field studies indicate that the latter is consistently different from the former, with no intermediates even when the two taxa grow in close proximity, and for this reason var. *bistrata* is here raised to species rank as *H. bistrata* (J.R.Wheeler) K.R.Thiele & T.Hammer. While assessing all material of *H. glomerosa* at the Western Australian Herbarium, two unusual specimens were found, each of which falls well outside the morphological range of either *H. glomerosa* or *H. bistrata.* Field visits to the locations of these specimens indicate that each comprises a distinct taxon, described here as *H. leptophylla* K.R.Thiele and *H. dracolithica* K.R.Thiele. The new species are almost certainly closely related to *H. glomerosa*, but differ consistently in leaf size and morphology, and, in the case of *H. dracolithica*, indumentum. They are likely to represent rare, narrow-range endemics.

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## Introduction

*Hibbertia glomerosa* (Benth.) F.Muell., as currently circumscribed, is a distinctive species in *Hibbertia* subgen. *Hibbertia* that is common in the Western Australian wheatbelt from the vicinity of Eurardy to Southern Cross and Kondinin, with outliers south of Kalgoorlie and near Dumbleyung and Norseman (Map 1). The species is uniquely diagnosed by its flowers having five glabrous carpels with 20-40 stamens in five bundles and fused by their filaments; relatively short, broad leaves usually without recurved margins and with a slightly to distinctly expanded, stem-clasping base; and sepals with long, white, spreading-hispid hairs.

Wheeler (2002) segregated plants from a small area east of Geraldton as *H. glomerosa* var. *bistrata* J.R.Wheeler on the basis of their shortly pubescent leaves and two-layered sepal indumentum, with a short, dense rusty pubescence beneath the long-hispid white hairs (in con-

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trast to the nominate variety which has glabrous leaves and sepals with long-hispid hairs only). Wheeler presumably used varietal rank due to the overall similarity of these two taxa in all respects other than indumentum. Some taxonomists at that time used variety, subspecies and species ranks to indicate degree of morphological difference between taxa. By contrast, we regard that species rank should be used whenever it is evident that there is a substantial degree of evolutionary separation between lineages, usually inferred by considering the pattern of morphological difference, irrespective of its degree.

The second species described here, *H. leptophylla*, was first segregated on the basis of a single specimen with unusually long, very narrow leaves. It is morphologically similar to *H. glomerosa* in other respects. The possibility that it represented an unusual (perhaps mutant) individual was rejected when field visits to the location showed that a discrete population of plants in an unusual habitat (the outwash of a large granite rock on the edge of a salt lake) was morphologically consistent and clearly different from typical *H. glomerosa* growing nearby. *Hibbertia leptophylla* remains known from that population only.

The third species, *H. dracolithica*, was again found initially in the herbarium collection, where it was represented by a single specimen collected in Dragon Rocks Nature Reserve in 1991. The specimen has a sepal indumentum like *H. bistrata* (with a dense layer of short, rusty hairs beneath the long, while hispid hairs), but has a very different leaf morphology from *H. bistrata* (it has leaves with the margins recurved to and tightly abutting the midrib, compared with flat leaves with scarcely recurved margins in both *H. bistrata* and *H. glomerosa*). Again, field visits have shown that the population is uniform and morphologically consistent. *Hibbertia dracolithica* is also likely to be narrowly endemic, although more extensive sampling in Dragon Rocks Nature Reserve is needed to determine its status there.

## Taxonomy

### *Hibbertia bistrata* (J.R.Wheeler) K.R.Thiele & T.Hammer, *comb. et stat. nov.*

Type: Western Australia: *c*. 10 miles SE of Mullewa along road to Morawa, 21 September 1971, *R.D. Hoogland* 11999 (holo: PERTH 03073688; iso: A, CANB, L, NSW).

*Hibbertia glomerosa* (Benth.) F.Muell. var. *bistrata* J.R.Wheeler, *Nuytsia* 14: 416 (2002).

See Wheeler (2002) for a description.

*Notes. Hibbertia glomerosa* var. *bistrata* was erected by Wheeler (2002) for plants occurring in the vicinity of Mullewa and Morawa, east of Geraldton (Map 1) that have short curled hairs on their leaves and bracts and underlying the long pilose hairs on the sepals (compared with var. *glomerosa*, which has leaves and bracts glabrous apart from ciliolate margins, and sepals with pilose hairs only; Fig. 1).

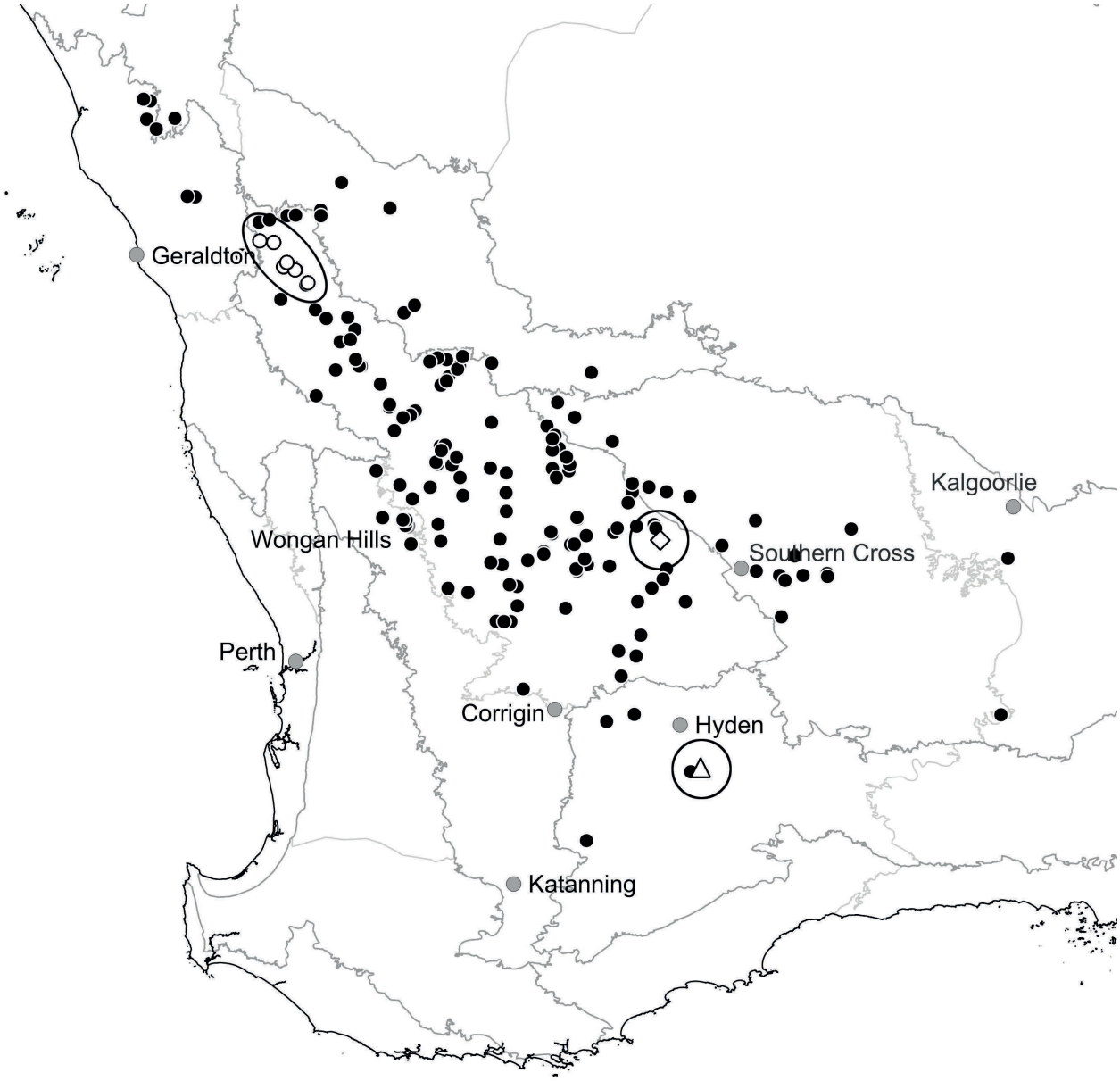
*Hibbertia bistrata* occurs within the range of *H. glomerosa*, and the morphological separation between them, though regarded by Wheeler as slight, is highly consistent. Plants in all populations of *H. bistrata* are uniform in having moderately to densely curled-pubescent leaves, while all populations of *H. glomerosa* occurring nearby, and elsewhere in its very wide range, have consistently glabrous leaves. In the field we have not found mixed populations comprising both species, because there appears to be a habitat difference between them (with *H. bistrata* occurring on heavier soils than *H. glomerosa*), but some populations of the two species are <1 km apart. Given this close proximity, I regard that there has been and remains opportunities for populations of the two taxa to exchange genes, and the consistent morphological differences between them indicate that they do not do so.

### *Hibbertia dracolithica* K.R.Thiele, *sp. nov.*

Type: Western Australia: Dragon Rocks Nature Reserve No. 36128. Southern section of the Reserve adjacent to the central fire break, 19 Sept. 1991, *A.M. Coates* 2875 (holo*:* PERTH 5154855, iso: CANB).

*Hibbertia* sp. Dragon Rocks (A.M. Coates 2875), Western Australian Herbarium.

Erect *shrubs* to 0.4 m high, single-stemmed at base and likely resprouting after fire. *Young stems* greyish-arachnose with minute, simple hairs. *Leaves* scattered, sessile, linear, 15–25 mm long, 1–1.5 mm wide, slightly dilated at the base especially near the flowers, greyish-arachnose like the stems when young, glabrescent (though with the indumentum persisting longer on the abaxial midrib); margins tightly recurved to the midrib and obscuring the abaxial lamina surface, which is greyish-pubescent on dissection; apex obtuse. *Flowers* single, terminating main stems and lateral short-shoots, sessile, sometimes in few-flowered clusters. *Bracts* 2–4; primary bract broadly ovate, acute, 4–5 mm long, herbaceous, densely pubescent abaxially with rusty simple hairs; secondary bracts grading into leaves. *Sepals* ovate to broadly triangular, *c.* 8 mm long, with abundant coarse, spreading, white, tubercle-based simple hairs overlying short, rusty simple hairs especially towards the apex; outer sepals acuminate; inner sepals broader and usually obtuse-apiculate, with membranous, minutely ciliolate margins. *Petals* 5, yellow, obovate, 9–10 mm long, emarginate. *Stamens* 20, in 5 bundles each of 4 stamens; filaments fused in the lower half, *c.* 1 mm long; anthers *c.* 1.8 mm long, narrowly oblong and dehiscing by introrse longitudinal slits; staminodes absent. *Carpels* 5; ovaries globular, glabrous; styles radiating outward, *c.* 1 mm long. *Ovules* 1 per carpel. *Mature seeds* not seen.




**Map 1.** Distributions of *Hibbertia glomerosa* (closed circles), *H. bistrata* (open circles, outlined), *H. leptophylla* (open diamond, circled) and *H. dracolithica* (open triangle, circled). Note that some collections of *H. glomerosa* fall within the range of *H. bistrata* but their symbols are occluded.

*Diagnostic features. Hibbertia dracolithica* can be distinguished from all other Western Australian taxa by the combination of linear leaves with the margins tightly recurved and abutting the midrib below; expanded, almost sheathing leaf bases especially close to the flowers; greyish-arachnose indumentum on stems and leaves when young (with the indumentum persistent on the abaxial midrib); sessile flowers with abundant spreading, white, tubercle-based hairs; stamens in 5 bundles united by their filaments; and 5 glabrous carpels.

*Phenology.* The type was collected flowering in September.

*Distribution & habitat.* Currently known only from a single location within Dragon Rocks Nature Reserve (Map 1), where it grows on the edge of a firebreak in open shrub-mallee with *Eucalyptus albida*, *Melaleuca ?leptospermoides*, *Banksia sphaerocarpa*, *Beaufortia* spp., *Dryandra* spp, *Isopogon teretifolius*, and *Daviesia* spp., on gravelly sandy soil.

*Conservation status.* Likely to be highly localised given the lack of other collections; the conservation status of *H. dracolithica* should be assessed through field surveys.

*Etymology.* From the Greek *drakon* (a dragon) and *lithos* (a stone or rock), in reference to the nature reserve from which the type specimen was collected.

*Notes. Hibbertia dracolithica* shares floral characters with *H. glomerosa* and is presumably closely related to it. It differs from that species in having linear leaves with the

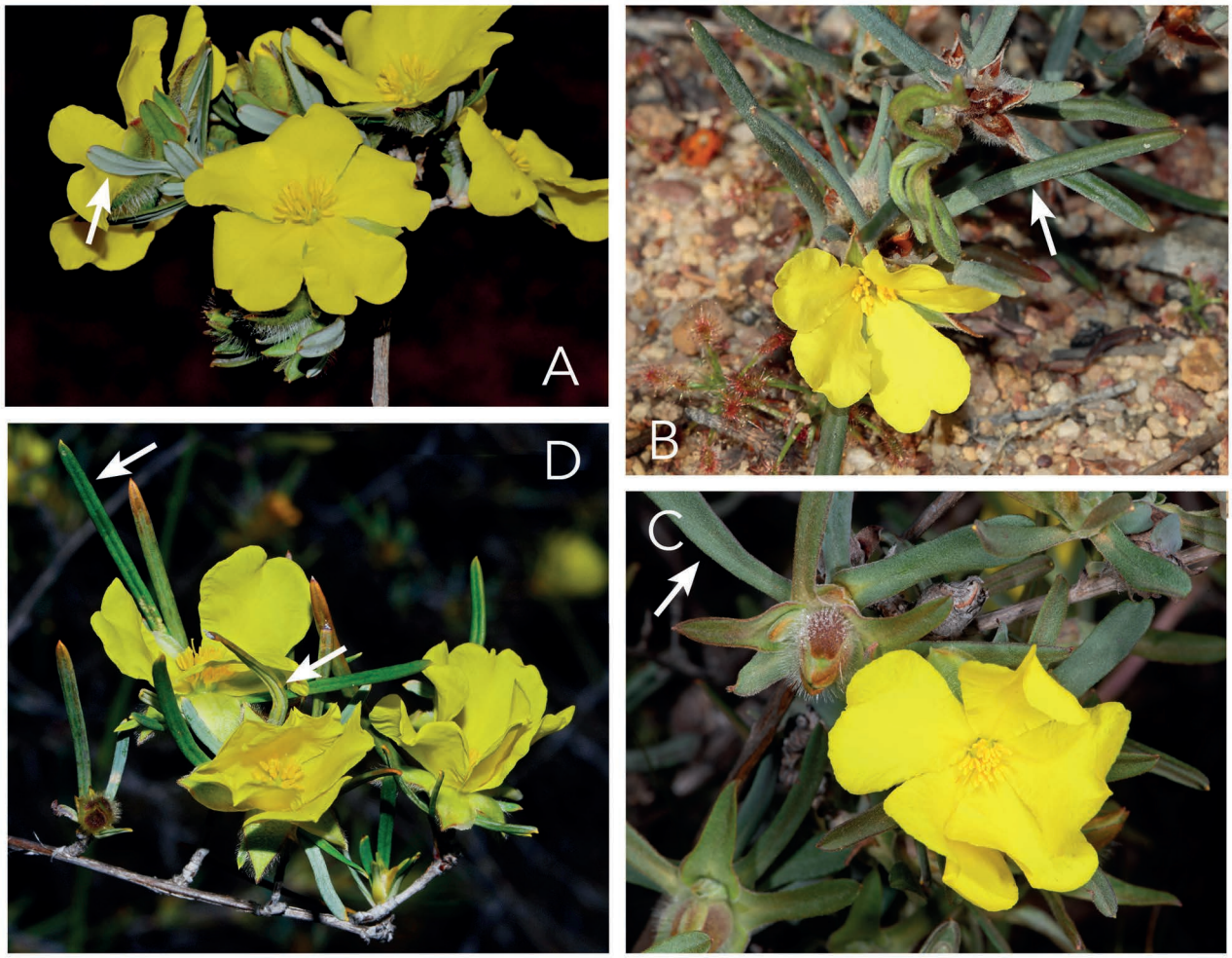



**Figure 1**. Species in the *Hibbertia glomerosa* species group. A—*H. glomerosa*. Note the relatively wide, glabrous leaves (arrowed) without recurved margins. B—*H. dracolithica*. Note the narrow, greyish-pubescent leaves (arrowed) with margins tightly recurved to the midribs (not visible). C—*H. bistrata*. Note the wide, greyish-tomentose leaves (arrowed) without recurved margins. D—*H. leptophylla*. Note the very narrow, glabrous leaves (arrowed) with margins recurved but not tightly abutting the margins. Photographs: A—Tim Hammer, B—Rob Davis; C, D—Kevin Thiele.

margins recurved to and tightly abutting the midrib (vs. oblong with ± flat margins so that the abaxial lamina is clearly visible, at least when fresh) and young leaves greyish-arachnose (vs. glabrous). The leaf indumentum is reminiscent of *H. bistrata*, but that species has flat leaves without strongly recurved margins, similar to *H. glomerosa*. In *H. glomerosa* and *H. bistrata*, specimens with relatively narrow leaves may dry with the margins somewhat recurved, but they are flat when fresh and the margins when dried do not tightly abut the midrib. The very narrow leaves of *H. leptophylla* dry with recurved margins, but these usually recurve to each other rather than tightly abutting the midrib, and are only slightly recurved when fresh.

In the type specimen, the stamens are consistently in bundles of four, giving a count of 20 stamens per flower. *Hibbertia glomerosa*, *H. bistrata* and *H. leptophylla* usually have more stamens per bundle. Further material is needed to determine whether this is a consistent difference.

At the type locality, a small number of plants were growing along the cleared edge of a firebreak. Further plants were noted further north along the firebreak in 2021 (A. Ricks *pers. comm*.). A survey by Rob Davis in 2023 relocated the plants at the type locality but failed to locate other plants elsewhere in the vicinity.

## *Hibbertia leptophylla* K.R.Thiele, *sp. nov.*

Type: Western Australia: Between Warrachuppin Rock and Lake Baladjie, near the intersection of the Koorda-Bullfinch Road and Warrachuppin Road, 19 Sept. 2021, *K.R. Thiele* 5766 (holo: PERTH 9369120; iso: AD, CANB).

Spreading *shrubs* to 0.6 m high. *Young stems* sparsely to moderately sericeous with white, crisped, simple hairs. *Leaves* scattered, sessile, linear, 20–50 mm long, 1–1.5 mm wide, glabrous except at the dilated and slightly stem-clasping base where there are moderately dense simple white hairs on the margins and adaxial surface; margins recurved (when dried, to the midrib or to each

other); apex acute with a short, callus point. *Flowers* single, terminating main stems and lateral short-shoots, sessile, sometimes in few-flowered clusters. *Bracts* 3–5, pale fawn to whitish; primary bract ovate to elliptic, acute, 5–6 mm long, herbaceous, pubescent abaxially and ciliate-margined; secondary bracts successively more glabrous except for the ciliate margins, the lowermost grading into leaves. *Sepals* ovate, *c.* 8 mm long, with abundant coarse, spreading, white, tubercle-based, simple hairs; outer sepals acuminate; inner sepals broader and usually obtuse-apiculate, with membranous, minutely ciliolate margins. *Petals* 5, yellow, obovate, *c.* 10 mm long, emarginate. *Stamens* 32–35, in 5 bundles each of 5–7 stamens; filaments fused in the lower half (the innermost stamen almost free), *c.* 1.8 mm long; anthers *c.* 1.5 mm long, narrowly oblong and dehiscing by introrse longitudinal slits; staminodes absent. *Carpels* 5; ovaries globular, glabrous; styles radiating outward, 2–2.5 mm long. *Ovules* 1 or 2 per carpel. *Mature seeds* not seen.

*Diagnostic features. Hibbertia leptophylla* can be distinguished from all other Western Australian taxa by the combination of very narrow, linear, largely glabrous leaves with expanded, almost sheathing bases; sessile flowers with abundant spreading, white, tubercle-based hairs; stamens in 5 bundles united by their filaments; and 5 glabrous carpels.

*Phenology.* Has been collected flowering in mid-September.

*Distribution & habitat.* Known only from a single locality (Map 1), in a narrow strip of vegetation on the outwash flanks of Warrachuppin Rock, between the rock edge and the adjacent (salt) Lake Baladjie, growing in gritty, yellow, sandy soils beneath *Eucalyptus loxophleba, Acacia acuminata and A. tetragonophylla.*

*Conservation status.* Known at present from one site, in an unusual habitat.

*Etymology.* From the Greek *leptos* (thin, narrow) and *phyllon* (a leaf), in reference to the distinctively long, narrow leaves.

*Notes. Hibbertia leptophylla* is clearly closely related to *H. glomerosa*, sharing with that species leaves with expanded, somewhat sheathing bases; sepals with abundant spreading, white, tubercle-based, simple hairs; sessile flowers with numerous stamens in five bundles fused by their filaments; and 5 glabrous carpels. It differs in having very narrow, almost filiform, leaves.

When the first specimen of *H. leptophylla* was found amongst sheets of *H. glomerosa* at PERTH, it was considered that it may represent an unusual, mutated individual. Assessment of all *c.* 180 sheets of *H. glomerosa* showed that the specimen was morphologically a wide outlier from the usual range of variation in that species. A visit to the locality of the specimen in spring 2021, however, revealed a population of plants with consistent morphology, all clearly distinct from *H. glomerosa* populations found less than 1 km away.

Wheeler (2002) described *H. glomerosa* as having 1-ovulate carpels, while carpels in *H. leptophylla* may be 1- or 2-ovulate within the same flower. Closer examination of *H. glomerosa* shows that this applies to that species as well.

## Disclosures

We have no financial or other conflicts of interest to disclose.

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