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Hibbertia archeri (Dilleniaceae), a new and rare species from Western Australia with transcontinental affinities

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Abstract: *Hibbertia archeri* T.Hammer & K.R.Thiele is described here as new based on specimens from two populations north-east of Esperance, Western Australia. The species is closest morphologically to *H. devitata* Toelken in South Australia and Victoria, which is part of the *H. stricta* (R.Br. ex DC.) F.Muell. morphological species group in *H.* subg. *Hemistemma* (Juss. ex Thouars) J.W.Horn.

Keywords: Dilleniaceae, *Hibbertia*, new species, taxonomy, Western Australia

Introduction

During the course of determining *Hibbertia* specimens at AD for a *Flora of Australia* project on the genus, the primary author discovered an interesting specimen collected north-east of Esperance, Western Australia by W.R. Archer in 1990. Recollection efforts by E.D. Adams and M. Hoggart in the spring of 2021 were successful and uncovered a second population. This entity is clearly very distinct from all other Western Australian species and can be readily distinguished from its presumed relatives in eastern Australia (discussed below). It is formally described here as *H. archeri* T.Hammer & K.R.Thiele.

Materials and Methods

This study was based on examination of dried specimens at AD and PERTH.

Taxonomy

Hibbertia archeri T.Hammer & K.R.Thiele, ***sp. nov.***

Holotypus: [precise locality withheld for conservation reasons] c. 5 km S of Mt Buraminya, 14 Oct. 2021, *E.D. Adams & M. Hoggart EA 958* (PERTH 9389571). **Isotypi:** AD, CANB.

Erect *shrubs* to 0.4 m high; branchlets sparsely to moderately pubescent with spreading to antrorse fascicled hairs. *Leaves* erect and slightly incurved towards the apex, scattered; *petiole* 0.5–0.8 mm long, abaxially glabrous, adaxially shortly pubescent with antrorse 1–3-armed fascicled hairs, axils with a tuft of straight simple hairs to 0.4 mm long; *lamina* linear, 4–8.5 mm long, 0.9–1.5 mm wide, the margins strongly recurved and obscuring all but the midrib abaxially; adaxial surface flattened, ± smooth or obscurely pale-tuberculate, sparsely hairy with appressed and antrorse 1–3-armed fascicled hairs; abaxial surface hidden beneath the tightly recurved margins, densely hairy (seen by dissection); midrib prominent, with sparse antrorse fascicled hairs, becoming ± glabrous with age; apex obtuse to bluntly acute, terminated by a few minute hairs or papillae in young leaves. *Flowers* pedicellate, single, axillary near the apex of the stems; *pedicels* 5–10 mm long, with indumentum as for branchlets; *primary bract* immediately below the calyx, linear, 2–3 mm long, leaf-like with recurved margins, sparsely hairy with appressed and antrorse 1–3-armed fascicled hairs; *secondary bracts* absent. *Sepals* 5, ovate to obovate, acute to obtuse-apiculate, the inner sepals broader and more obtuse than the outer, 5.5–7.5 mm long, 3–3.5 mm wide, abaxially sparsely to moderately pubescent with short, retrorse, hooked hairs underlain by very small antrorse fascicled hairs, adaxially glabrous except for a few hairs towards the apex; midribs not prominent; margins pale. *Petals* 5, yellow, obovate, 8–8.5 mm long, emarginate. *Stamens* (12–) 14–19, all on one side of the gynoecium, ± erect; filaments ± free to base, 1.5–1.9 mm long; *anthers* narrowly oblong, 2.2–2.6 mm long, dehiscing by introrse, longitudinal slits; *staminodes* absent. *Carpels* 2; *ovaries* compressed-ovoid, 1.6–1.8 mm long, densely pubescent; *styles* 4.8–5 mm long, inserted almost horizontally below the carpel apex then ascending and protruding outside and above the stamens. *Ovules* 6 (–9) per carpel, marginal. *Fruiting carpels* and *seeds* not seen. **Fig. 1.**

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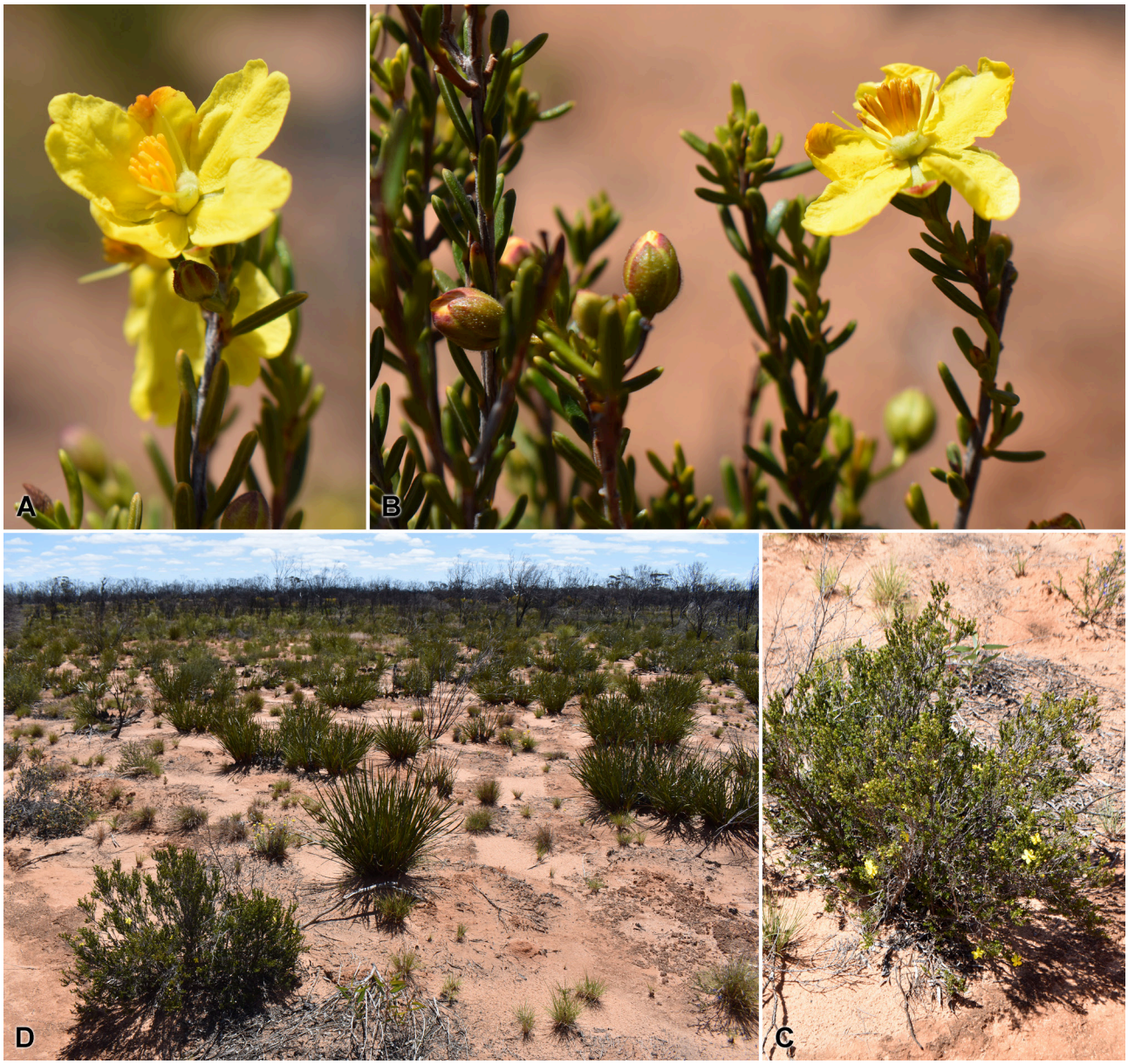

Fig. 1. *Hibbertia archeri*. **A**, **B** Flowering morphology; **C** habit; **D** habitat. Photos: E.D. Adams.

Diagnostic features. *Hibbertia archeri* can be diagnosed by the following combination of characters: leaves ericoid (with the margins strongly recurved to the midrib and the true abaxial surface hidden), the indumentum consisting of antrorse fascicled hairs with 1–3 arms; flowers pedicellate, the primary bract leaf-like and immediately below the calyx; sepals ovate to obovate, abaxially with retrorse hooked hairs; stamens 12–19, erect and arranged on one side of the gynoecium; carpels 2, densely pubescent, with styles 4.8–5 mm long.

Phenology. Flowers in October and November.

Distribution & habitat. *Hibbertia archeri* is known from two sites north-east of Esperance (Fig. 2), where it occurs in shrublands with *Melaleuca hamata*, *Halgania cyanea*, *Acacia bracteolata*, *Acacia cupularis*, *Coopernookia strophiolata*, *Lomandra collina*, *Pultenaea elachista*, *Eremophila psilocalyx* and *Triodia scariosa* on grey to red sandy loams over calcrete.

Conservation status. Currently known from only two populations c. 40 km apart. The region where the species occurs is largely uncleared but has very few tracks and is relatively sparsely collected. While much of the area has loamy woodland soils unsuitable for the species, there are likely to be other suitable patches of habitat (with lighter soils) in the area, and it may be locally widespread. We recommend that it be provisionally listed as Priority One under the Conservation Codes for Western Australian Flora (Smith & Jones 2021), and further surveys be conducted in suitable habitat to determine its true status.

Etymology. The epithet honours William R. Archer, a prolific plant collector from Esperance, W.A., who made the first collections of the species and recognised it as new.

Taxonomic notes. Although *Hibbertia archeri* has no close affinities in Western Australia, it is broadly similar to four other named Western Australian species (*H. psilocarpa* J.R.Wheeler, *H. andrewsiana* Diels, *H. oligantha* J.R.Wheeler and *H. tuberculata* K.R.Thiele) that have the same stamen and style arrangement and disposition as *H. archeri*, i.e., with stamens all on one side of the two carpels and with both stamens and styles erect, rather than curved over the short, curved styles (like a hand of bananas), as in most Western Australian species with a zygomorphic androecium. These four species, like *H. archeri*, occur along the Western Australian south coast and hinterland (Wheeler 2004; Thiele 2019). They have, however, strictly glabrous carpels, while the carpels in *H. archeri* are densely pubescent.

Hibbertia archeri is most similar to members of the *H. stricta* (R.Br. ex DC.) F.Muell. morphological species group from eastern Australia (Toelken 2010). Within this group, it is most similar to *H. devitata* Toelken, a common species that occurs from the Eyre Peninsula, South Australia, to western Victoria (Fig. 2). *Hibbertia devitata* is very similar in leaf morphology and indumentum to *H. archeri*, having linear ericoid leaves with a prominent midrib, an intrapetiolar tuft of hairs < 0.4 mm long (sometimes absent in *H. devitata*), and fascicled hairs on branchlets, leaves and sepals. *Hibbertia devitata* can be distinguished from *H. archeri* by its usually sessile flowers, outer sepals lanceolate with a distinct ridge for most of their length and typically longer than the inner sepals, 1–25-armed fascicled hairs on the branchlets, leaves and sepals, and (5) 6–8 (–12) stamens (Toelken 2010). Some populations of *H. devitata* lack hooked hairs on the sepals. Atypical populations of *H. devitata* noted by Toelken (2010) clearly lack other characters that define and are consistent for *H. archeri*. For instance, a robust form of *H. devitata* that occurs on higher parts of the Gawler Ranges near Scrubby Peak has up to 12 stamens, but this form lacks a pedicel and hooked hairs, and has much larger spreading fascicled hairs with 12–25 arms. Atypical pedicellate specimens of *H. devitata* (with pedicels to 14 mm long) have been recorded from southern Eyre and Yorke peninsulas and Kangaroo Island, but these typically have glabrous or glabrescent sepals without hooked hairs.

Hibbertia riparia (R.Br. ex DC.) Hoogland and *H. setifera* Toelken have been included with *H. devitata* in the past (Toelken 2010) and are readily distinguished from *H. archeri*. *Hibbertia riparia* has straight simple hairs on the branches, leaves and sepals, intrapetiolar tufts of hairs to 2 mm long, and leaf midribs that are not prominent. *Hibbertia setifera* has very densely hairy leaves and sepals with spreading fascicled hairs that are of two distinct sizes on the sepals, with robust larger hairs with up to 16 arms overtopping smaller hairs with up to 10 arms. Both species have sessile flowers and lack hooked hairs on the sepals. The *H. stricta* group is currently under revision by H.R. Toelken (AD) with many new species likely to be described from eastern Australia. *Hibbertia archeri* is distinct from these prospective species, which will be dealt with in a forthcoming publication (H.R. Toelken, pers. comm.).

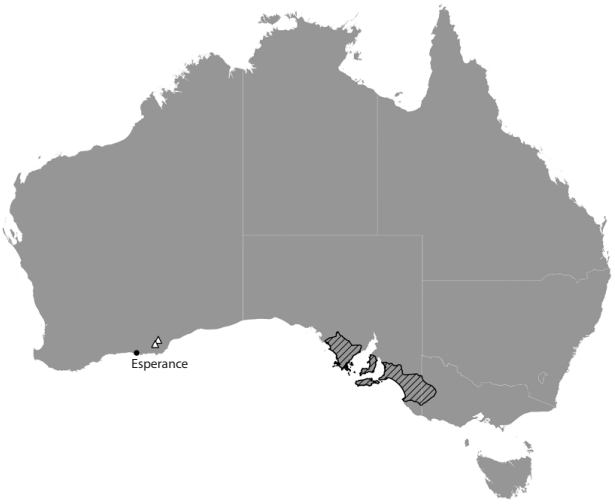

Fig. 2. Map of occurrences of *Hibbertia archeri* (triangles) and the distribution of *H. devitata* (diagonal shading) based on specimens at AD and PERTH.

Hibbertia is approximately equally diverse in south-western and eastern Australia. Taxonomic work hitherto has been divided, with J.R. Wheeler and subsequently K.R. Thiele at PERTH, and H.R. Toelken at AD, describing many new species from western and eastern Australia, respectively; there has been no consistent continental-scale account of the genus since that of Bentham (1863). A consequence of this geographic split in work has been that informal species-groups have been recognised in each area, with little understanding of relationships of species between the areas. *Hibbertia archeri* is one of the few species occurring in south-western Western Australia that is presumed to belong to what has been previously considered an 'eastern' species group (the '*H. stricta* group' of Toelken 2010). The other Western Australian species with ericoid leaves and erect stamens on one side of two carpels (*H. psilocarpa*, *H. andrewsiana*, *H. oligantha* and *H. tuberculata*) are also likely to be more closely related to eastern Australian species than they are to others in Western Australia (Thiele 2019). Future work on *Hibbertia* by the present authors, including the preparation of a complete *Flora of Australia* account and the development of a near-complete phylogeny, will allow a better assessment of relationships between eastern and western Australia in this important Australian genus and help resolve its biogeographic history across the continent.

Other specimens examined

WESTERN AUSTRALIA. [Precise localities withheld for conservation reasons] c. 5 km WSW of Mt Willgonarinya, 3 Nov. 1990, *W.R. Archer 3119017* (AD); c. 5 km WSW of Mt Willgonarinya, 14 Oct. 2021, *E.D. Adams & M. Hoggart EA 953* (PERTH).

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