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New combinations of *Hibbertia* (Dilleniaceae) segregated from *H. hibbertioides* and *H. glomerata*

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Abstract

Hammer, T.A. & Thiele, K.R. New combinations of *Hibbertia* (Dilleniaceae) segregated from *H. hibbertioides* and *H. glomerata*. *Nuytsia* 35: 31–45 (2024). Infraspecific taxa within the southwest Australian species *Hibbertia glomerata* Benth. and *H. hibbertioides* (Steud.) J.R.Wheeler are critically re-evaluated. Morphological evidence is presented to recognise *H. glomerata* subsp. *wandoo* J.R.Wheeler and *H. hibbertioides* var. *meridionalis* J.R.Wheeler at species rank, as *H. wandoo* (J.R.Wheeler) T.Hammer & K.R.Thiele and *H. meridionalis* (J.R.Wheeler) T.Hammer & K.R.Thiele respectively. *Hibbertia hibbertioides* var. *pedunculata* J.R.Wheeler is reduced to synonymy under *H. hibbertioides*. The remaining subspecies in *H. glomerata* are provisionally retained but are marginally distinct.

Introduction

Hibbertia Andrews (Dilleniaceae) comprises around 300 accepted species in Australia (Council of Heads of Australasian Herbaria 2006–) with approximately half of these occurring in south-west Western Australia. Judith R. Wheeler contributed substantially to advancing taxonomic knowledge of *Hibbertia* in Western Australia throughout the 1990s and early 2000s (e.g. Wheeler 1994, 2004). Among the species revised by her were *H. glomerata* Benth. and *H. hibbertioides* (Steud.) J.R.Wheeler (Wheeler 2002, 2004).

Wheeler (2002) evaluated specimens of *H. glomerata* and those known under the phrase names *H.* sp. Darling Range (R.D. Royce 5741) and *H.* sp. Wandoo (J. & F. Hort 456), resulting in the recognition of four subspecies: subsp. *darlingensis* J.R.Wheeler, subsp. *ginginensis* J.R.Wheeler, subsp. *glomerata*, and subsp. *wandoo* J.R.Wheeler. The subspecies were delimited mainly on the basis of leaf dimorphism and shape, sepal apex shape, and staminal filament freedom or connation (Wheeler 2002).

In Toelken and Wheeler (2002), Wheeler clarified the identity of *H. hibbertioides*, and subsequently (Wheeler 2004) recognised three varieties: var. *hibbertioides*, var. *pedunculata* J.R.Wheeler, and var. *meridionalis* J.R.Wheeler. *Hibbertia hibbertioides* var. *pedunculata* was discriminated from the typical variety by having distinctly stalked flowers, while var. *meridionalis* was distinguished from both by the combination of ecaudate sepals and having shorter stamens and anthers.

In this paper we critically re-evaluate the infraspecific taxonomy of *H. glomerata* and *H. hibbertioides*. We recognise *H. glomerata* subsp. *wandoo* J.R.Wheeler and *H. hibbertioides* var. *meridionalis* J.R.Wheeler at species rank as *H. wandoo* (J.R.Wheeler) T.Hammer & K.R.Thiele and *H. meridionalis* (J.R.Wheeler) T.Hammer & K.R.Thiele respectively, and reduce *H. hibbertioides* var. *pedunculata* J.R.Wheeler to synonymy under *H. hibbertioides*.

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Methods

All relevant specimens at AD, CANB and PERTH were examined, and images of type specimens viewed through JSTOR *Global Plants* (https://plants.jstor.org). Types examined in person are indicated with '!' while those examined through JSTOR are indicated with 'image!'.

Results and Discussion

Hibbertia glomerata

Wheeler (2002) segregated the subspecies of *H. glomerata* based on the degree of dimorphism of the leaves, the general shape and size of cauline and floral leaves (the former usually narrower and more elongated than the latter), and freedom or fusion of the staminal filaments. *Hibbertia glomerata* subsp. *glomerata*, which occurs in the south of the range, was differentiated from the other subspecies by having dimorphic leaves (the floral leaves ovate to elliptic or rarely obovate and the cauline leaves narrowly oblong, narrowly ovate or oblanceolate) and having all stamens free (Figure 1E, F). *Hibbertia glomerata* subsp. *ginginensis*, which occurs in the north of the range, was differentiated by sometimes having dimorphic leaves (the floral leaves ovate to elliptic and the cauline leaves narrowly ovate to narrowly elliptic) and having nine staminal filaments fused into three bundles, the remaining two being free (Figure 1C, D). *Hibbertia glomerata* subsp. *darlingensis* was distinguished by having all leaves similar (elliptic or oblong-elliptic), with stamens as for subsp. *ginginensis* (Figure 1A, B). *Hibbertia glomerata* subsp. *wandoo* was differentiated by having all leaves similar (narrowly obovate), apiculate sepal apices (the other subspecies having obtuse sepal apices) and all stamens free (Figure 2E, F). Wheeler (2002: 433) additionally noted some specimens that did not fit these concepts (e.g. *R. Davis* 4354, *D. Halford* 80724 and *J.R. Wheeler* 2208) due to their stamens being free or irregularly and basally fused and lacking distinctly dimorphic leaves. She called these specimens 'intermediate variants' of subsp. *darlingensis* (on the specimens as '*Hibbertia glomerata* aff. subsp. *darlingensis*'), presumably meaning intermediate between subsp. *glomerata* and subsp. *darlingensis*.

Our examination of specimens largely confirmed Wheeler's (2002) concepts, including the difficulty differentiating subsp. *darlingensis*, subsp. *ginginensis* and subsp. *glomerata* (Table 1). *Hibbertia glomerata* subsp. *wandoo*, however, is readily distinguished from all other subspecies based on multiple morphological characters (see below). The remaining subspecies of *H. glomerata* are geographically separated, except for those specimens that cannot be determined to infraspecific rank (Figure 3). However, there is much variation in leaf size and shape in these subspecies, leading to some grading of the diagnostic characters between subspecies. It is also difficult to determine in some specimens if the plants have dimorphic leaves or not due to the caducous tendency of the cauline leaves. There is a noticeable geographic split of the specimens with fused or free stamens, with the northern subsp. *darlingensis* and subsp. *ginginensis* having fused bundles of stamens, and the southern subsp. *glomerata* and 'intermediate variants' of subsp. *darlingensis* having free stamens or very shortly and irregularly fused staminal bundles.

Hibbertia glomerata subsp. *wandoo* occurs east of the other subspecies and is both geographically disjunct and morphologically distinct from all other subspecies, in several significant, discrete characters (Table 1). While Wheeler (2002) identified some differences in the leaves of subsp. *wandoo* from the other subspecies of *H. glomerata*, she appears to have overlooked others. As reported by Wheeler (2002), subsp. *wandoo* has leaves that are all similar and narrowly obovate with a more conspicuously rounded apex and gradually tapered base. Whether or not subsp. *darlingensis*, subsp. *ginginensis* and subsp. *glomerata* have distinctly dimorphic leaves, they all have leaves that subtend and cup the flowers (especially noticeable in bud) and are usually longitudinally folded (at least at the apex) so that there is a crease along the adaxial midrib. The leaves of these subspecies do not have a lamina base that tapers narrowly (in fact they often somewhat to distinctly broaden towards the base) and have an apex that is usually recurved (or at least with the minutely excurrent midrib recurved; Figure 1). The leaves of subsp. *wandoo*, by contrast, do not cup the flowers or buds and are not folded or recurved but are often incurved from the base and hence

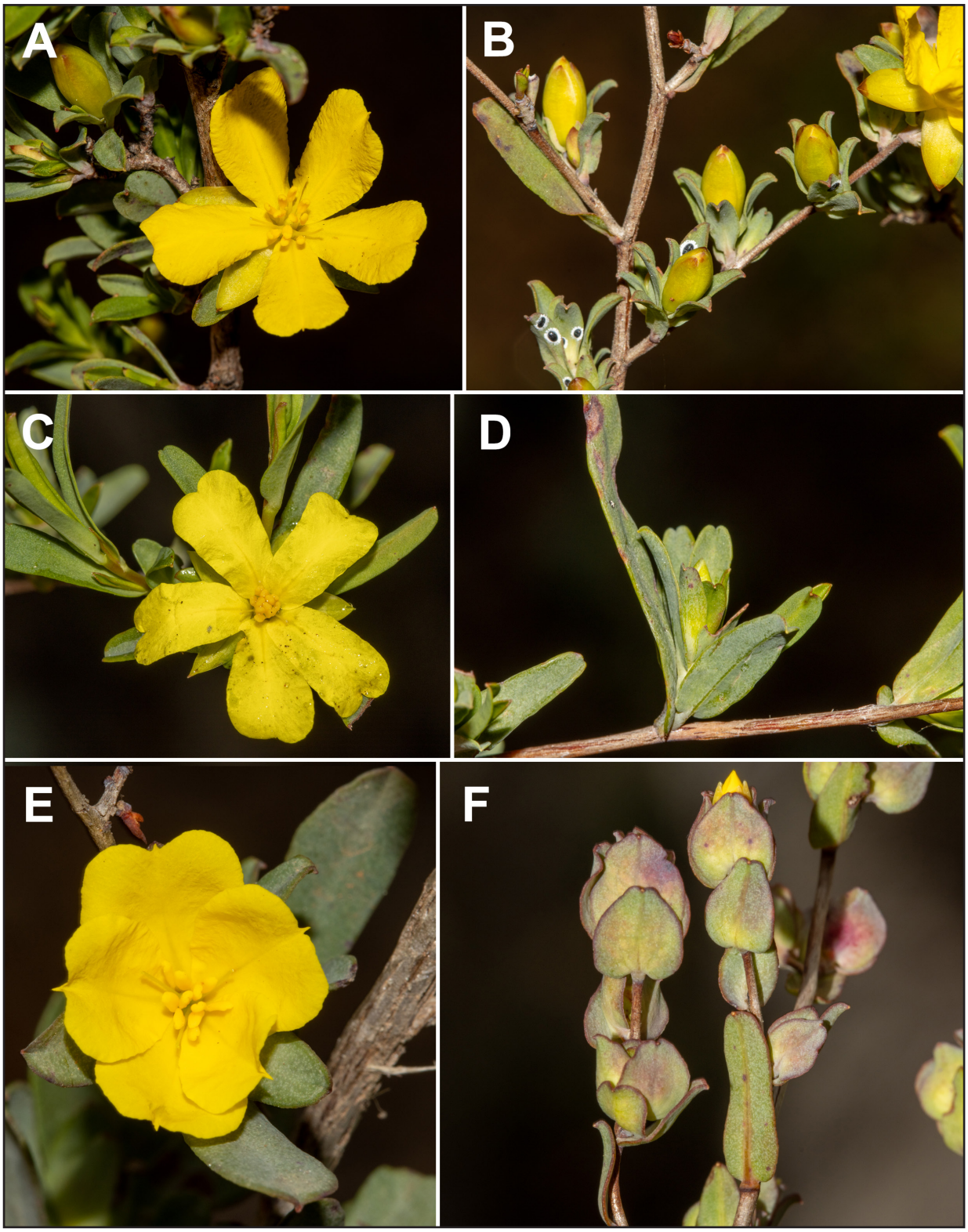

Figure 1. Flowering branches of *Hibbertia glomerata*. A, B – subsp. *darlingensis* (*T.A. Hammer* 237, *L.T. Williamson & R.W. Davis*). C, D – subsp. *ginginensis* (*T.A. Hammer* 262, *L.T. Williamson & R.W. Davis*). E, F – subsp. *glomerata* (*T.A. Hammer* 271, *L.T. Williamson & R.W. Davis*). Photos by T. Hammer.

antrorse (Figure 2F). They are also distinctly thickened so as to appear fleshy, and lack a visible midrib when fresh (sometimes scarcely visible on dried specimens as a raised vein; Figure 2E, F), contrasting with the other subspecies, which have thin-textured leaves with a visible midrib on the abaxial surface (Figure 1).

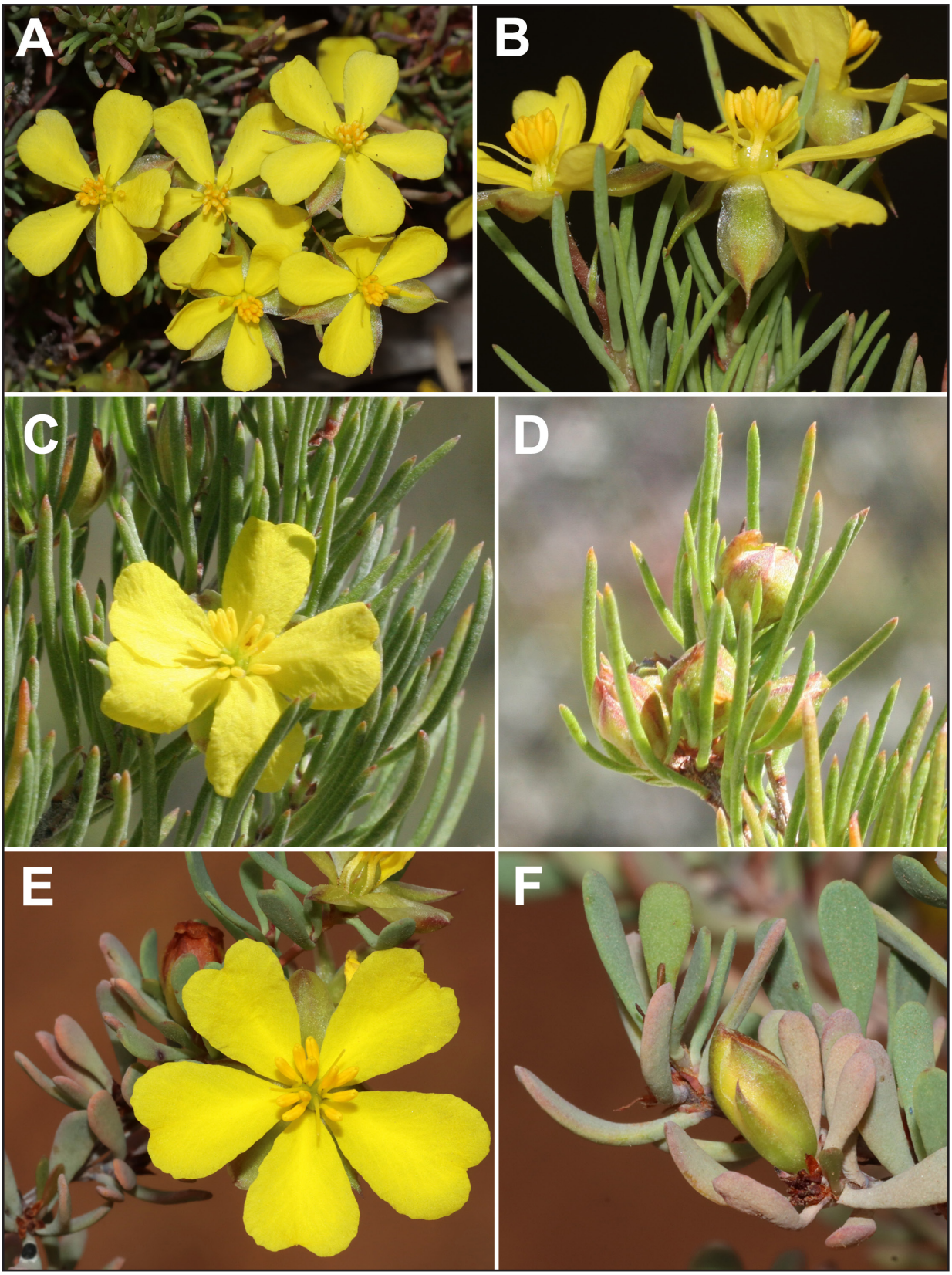

Figure 2. Flowering branches of *Hibbertia hibbertioides*, *H. meridionalis*, *H. wandoo*. A, B – pedicellate form of *H. hibbertioides* (*R. Davis & T. Hammer* RD 13929). C, D – *H. meridionalis* (*G. Byrne* 2558). E, F – *H. wandoo* (*R. Davis & T. Hammer* RD 13930). Photos by T. Hammer (A, B, E & F), and G. Byrne (C, D).

Wheeler (2002) also noted that subsp. *wandoo* had an apiculate sepal apex, while sepals in the other species are obtuse. We found that the outer sepals of subsp. *wandoo* have an acuminate apex that tapers to a tip 0.4–1 mm long (Figure 2F), while the inner sepals are obtuse-apiculate with a shorter point 0.1–0.6 mm long. The other subspecies all have acute to obtuse sepal apices (e.g. Figure 1B), without a tapering tip on the outer sepals or an apiculate point on the inner sepals.

We consider that the differences between subsp. *wandoo* and the other subspecies of *H. glomerata* are significant enough to warrant recognition of this taxon at species rank, and therefore make the new combination *Hibbertia wandoo* (J.R.Wheeler) T.Hammer & K.R.Thiele below.

Hibbertia hibbertioides

As currently circumscribed, *H. hibbertioides* includes two very similar varieties (var. *hibbertioides* and var. *pedunculata*), which overlap in distribution. The third variety (var. *meridionalis*; Figure 4A), is ecologically, geographically and morphologically divergent from the others.

Hibbertia hibbertioides var. *pedunculata* differs from the typical variety mainly in having pedicellate flowers ('pedunculate' in Wheeler 2004; see Figure 2B), the flowers in var. *hibbertioides* being sessile. In addition, var. *hibbertioides* are often more erect plants (e.g. *R. Davis 10108*), while plants of var. *pedunculata* are usually small and cushion-like (e.g. *R. Davis & T. Hammer RD 13929*). However, none of these differences is consistent, especially where the varieties overlap in distribution. Both occur in close proximity near Dryandra Woodland National Park, leading Wheeler (2004: 291) to speculate that the two taxa, and the similar species *H. hemignosta* (Steud.) J.R.Wheeler, may be hybridising in this area. We find no evidence that *H. hibbertioides* and *H. hemignosta* hybridise, specimens being readily separated on the basis of their sepal apices (see below).

Hibbertia hibbertioides var. *meridionalis* is more similar to *H. hemignosta* than it is to *H. hibbertioides* var. *hibbertioides* and var. *pedunculata*. Both *H. hibbertioides* var. *meridionalis* and *H. hemignosta* are distinguished from the other varieties of *H. hibbertioides* by having acute to apiculate sepals (with the acumen to 0.8 mm, but usually much less), rather than caudate sepals (with a tip 1.2–2.5(–3) mm long), especially on the outer sepals (Figure 2A–D; see also Figure 4C–E in Wheeler 2004). *Hibbertia hemignosta* can be distinguished from *H. hibbertioides* var. *meridionalis* by having shorter leaves ((3–)4–10(–12) mm long vs. (5–)10–25(–30) mm long), longer stamens (filaments 1–1.7 mm long vs. 0.8–1.1 mm long) with the filaments of the bundled stamens fused for more of their length (approximately two-thirds vs. approximately half), and longer anthers (1–1.5 mm long vs. 0.8–1 mm long) (Table 2). Although most of these measurements overlap slightly, the combination of features can be used to confidently assign all known specimens.

Hibbertia hemignosta and *H. hibbertioides* var. *meridionalis* are not known to overlap in distribution, with *H. hemignosta* recorded west and north of Fitzgerald River National Park (Figure 4B), while *H. hibbertioides* var. *meridionalis* occurs between Fitzgerald River National Park and Esperance (Figure 4A).

In addition to lacking caudate sepal apices, *H. hibbertioides var. meridionalis* differs from var. *hibbertioides* and var. *pedunculata* by having shorter staminal filaments (0.8–1.1 mm long vs. 1.3–2 mm long) and anthers (0.8–1 mm long vs. 1.3–1.7(–2) mm long) (Table 2).

In order to better clarify the taxonomic differences between *H. hibbertioides* and *H. hemignosta*, we propose raising *H. hibbertioides* var. *meridionalis* to species rank as *Hibbertia meridionalis* (J.R.Wheeler) T.Hammer & K.R.Thiele. *Hibbertia hibbertioides* is then more narrowly circumscribed and readily differentiated from both *H. hemignosta* and *H. meridionalis* based on the presence of caudate sepal apices. We also here reduce *H. hibbertioides* var. *pedunculata* to synonymy under *H. hibbertioides* due to the inconsistency in the presence of the flower stalk, particularly where the taxa overlap in distribution.

Table 1. Selected morphological characters for *Hibbertia wandoo* and the subspecies of *H. glomerata*.

Taxon	***H. glomerata* subsp. *glomerata***	***H. glomerata* subsp. *gingin-ensis***	***H. glomerata* subsp. *darlin-gensis***	***H. wandoo***
Leaf dimorphism	Dimorphic	Sometimes dimorphic	Monomorphic	Monomorphic
Cauline leaf shape	Narrowly oblong, narrowly ovate or oblanceolate	Narrowly ovate to narrowly elliptic	Elliptic or oblong-elliptic	Narrowly oblanceolate to narrowly obovate
Floral leaf shape	Ovate to elliptic or rarely obovate	Ovate to elliptic		
Leaf base	Broadening	Broadening	Broadening or slightly tapered	Distinctly taper-ing
Abaxial leaf midrib	Visible	Visible	Visible	Not or scarcely visible
Leaf orientation	Often longitudinally folded, at least apically	Often longitudinally folded, at least apically	Often longitudinally folded, at least apically	Flat, often in-curved to the base to appear antrorse
Leaf apex	Mucronate, ± recurved	Mucronate, ± recurved	Mucronate, ± recurved	Rounded, not recurved
Outer sepal apex	Obtuse to acute	Obtuse to acute	Obtuse to acute	Acuminate with a tip 0.4–0.6(–1) mm long
Stamen bundle fusion	Free	Fused	Fused	Free

Table 2. Selected morphological characters for *Hibbertia hemignosta*, *H. hibbertioides* and *H. meridionalis*. All measurements in millimetres.

Taxon	***H. hemignosta***	***H. hibbertioides***	***H. meridionalis***
Leaf length	(3–)4–10(–12)	(3–)5–15	(5–)10–25(–30)
Outer sepal tip shape	Mucronate to apiculate	Caudate	Apiculate
Outer sepal tip length	0.1–0.5	1.2–2.5(–3)	(0.3–)0.5–0.8
Staminal filament fusion	*c.* Two-thirds of length	Two-thirds to half of length	*c.* Half of length
Staminal filament length	1–1.7	1.3–2	0.8–1.1
Anther length	1–1.5	1.3–1.7(–2)	0.8–1

Taxonomy

Hibbertia glomerata Benth., *Fl. Austral.* 1: 34–35 (1863). *Type citation*: 'W. Australia. Swan River, Drummond, 1st Coll. n. 8 of 1843.' *Type*: Western Australia, 1843, *J. Drummond* 8 (*lecto* [designated by J.R. Wheeler, *Nuytsia* 14(3): 428 (2002)]: K000700171 image!; *isolecto*: K000700173 image!, LD1096708 image!, MEL 612823 image!).

Erect *shrubs* 0.15–0.5(–1) m high; young stems ± terete, glabrescent with sparse, erect to appressed, minute simple hairs, lacking distinct hair tufts in the leaf axils. *Leaves* dimorphic, with the leaves subtending the flowers (floral leaves) and cauline leaves distinctly different in size and shape, or all leaves similar in shape and/or size, sessile to subsessile; *cauline leaves* narrowly oblong to narrowly oblong-elliptic or rarely narrowly ovate to oblanceolate, (5–)8–25 mm long, 2.5–8 mm wide, glabrous or with very sparse minute simple hairs; base usually wider than the distal lamina, rounded and abruptly constricted on the stem; margins ± entire or very slightly undulate and minutely crenulate and often very slightly raised; midrib visible and slightly raised abaxially, often slightly grooved adaxially; apex obtuse to truncate or emarginate and with the midrib extending as a minute, recurved, blunt point; *floral leaves* broadly ovate to ovate, oblong or elliptic, (3.5–)6–11 mm long, 1.5–7 mm wide, usually folded inward longitudinally and sometimes with the lamina recurved apically, glabrous or with very sparse minute simple hairs, the base abruptly constricted, the midrib visible and slightly raised abaxially; apex acute to obtuse and with the midrib extending as a minute, recurved, blunt point. *Flowers* solitary, terminal or terminating lateral short-shoots, sessile. *Bracts* 2–4, glabrous; primary bract ovate-triangular or broadly ovate-triangular, 1.2–1.8 mm long, 0.7–2 mm wide, the apex acute to obtuse; secondary bracts similar in colour and shape to the primary bract but usually slightly smaller. *Sepals* unequal, glabrous; outer sepals narrowly elliptic, 4–6.5 mm long, 1.8–2.5 mm wide, the apex acute; inner sepals elliptic to broadly elliptic or obovate, 4.5–7 mm long, 2–4 mm wide, the apex obtuse. *Petals* yellow, obovate, (5.5–)6.5–9(–16) mm long, emarginate to truncate and shortly mucronate. *Stamens* (10)11(12), arranged around the gynoecium, in 3 bundles each of 3 stamens with filaments free or mostly fused and with the remaining (1)2(3) stamens solitary; filaments 1–2 mm long; anthers narrowly obloid, 1–2.3 mm long, dehiscing by introrse, longitudinal slits; *staminodes* absent. *Carpels* 3; ovaries globular to ovoid, 0.8–1.3 mm long, glabrous; styles 1.5–3.5 mm long, excentrically attached to the apex and spreading outward to ascending; *ovule* 1 per carpel. *Seeds* not seen. (Figure 1)

Diagnostic features. *Hibbertia glomerata* may be distinguished from all other members of the genus by the following combination of characters: glabrescent stems with minute simple hairs; glabrous (rarely sparsely and minutely hairy) and flattened leaves with a distinct midrib and usually a recurved apex, the leaves all similar or with cauline leaves distinctly longer and narrower than the leaves subtending the flowers; glabrous sepals with an acute to obtuse apex; and 11 stamens around 3 glabrous carpels with all stamens free or with 3 fused bundles of 3 stamens each and with the remaining 2 stamens solitary.

Phenology. Flowers recorded mostly July to November, with a peak in September.

Distribution and habitat. *Hibbertia glomerata* occurs in Western Australia in the Swan Coastal Plain, Jarrah Forest and Warren IBRA regions (DCCEEW 2023), with a main area of distribution from Boonanarring Nature Reserve north of Gingin to Milyeannup National Park south-west of Nannup. In the south of the range, extends as far west as Margaret River and disjunctly as far east as Mount Lindesay National Park north of Denmark (Figure 3). Recorded from jarrah-marri woodlands, often with an open heathy understory, on brown loam or sand with lateritic gravel.

Hibbertia glomerata Benth. subsp. ***glomerata***, *Nuytsia* 14(3): 429–431 (2002).

Leaves usually dimorphic; *cauline leaves* narrowly oblong, narrowly ovate or oblanceolate, 10–25 mm long. *Floral leaves* ovate to elliptic or rarely obovate, (3.5–)4–11 mm long, (2–)3–7 mm wide. *Stamens* 10–12, all free; filaments 1–1.5(–2) mm long; anthers (1–)1.2–1.5 mm long. (Figure 1E, F)

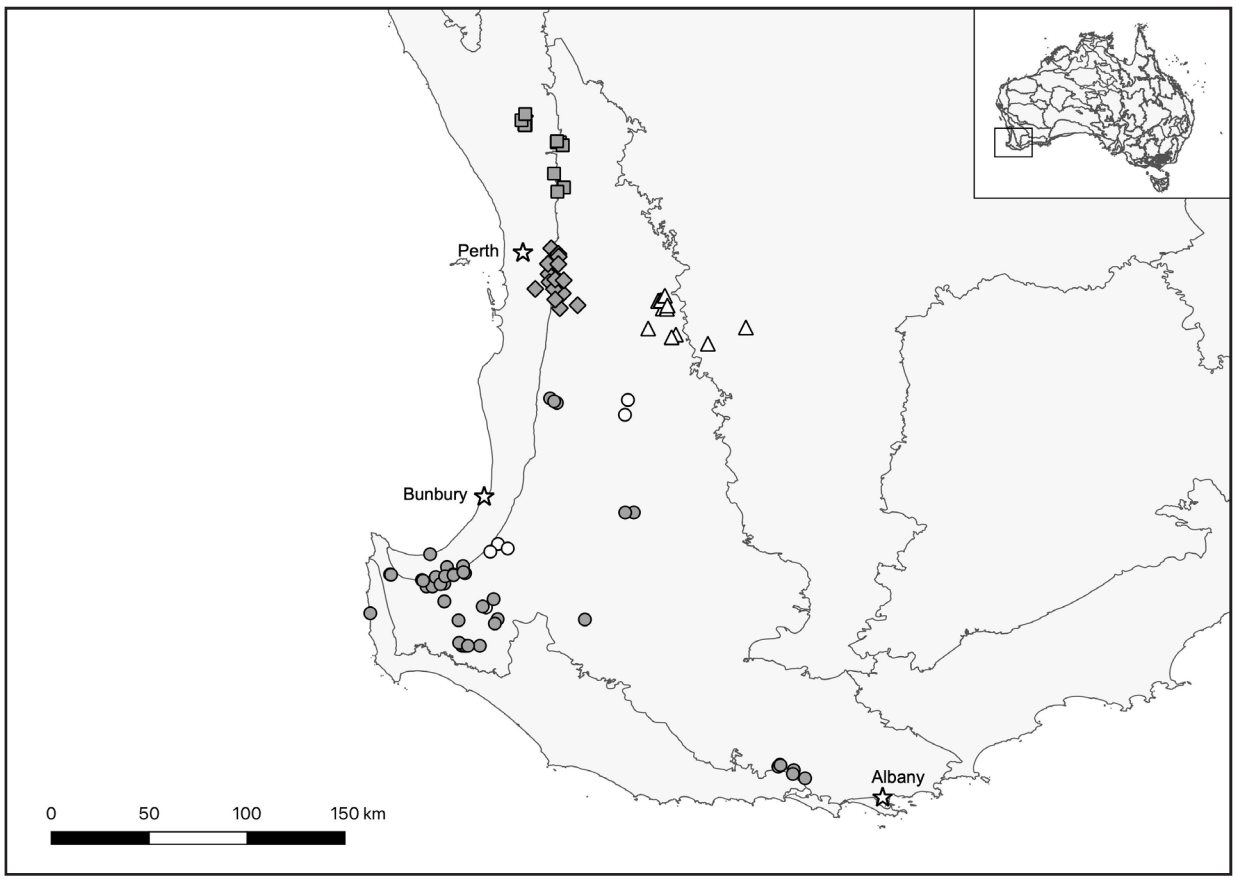

Figure 3. Distribution of *Hibbertia glomerata* and *H. wandoo* based on PERTH specimens: *H. glomerata* subsp. *glomerata* (grey circles), *H. glomerata* subsp. *darlingensis* (diamonds), *H. glomerata* subsp. *ginginensis* (squares), and *H. wandoo* (triangles). White circles are specimens of *H. glomerata* that do not readily fit the subspecies circumscriptions due to intermediate or inconsistent characters. Map boundaries are IBRA v7 regions (DCCEEW 2023).

Selected specimens examined. WESTERN AUSTRALIA: Brockman Hwy, W of Nannup, 8 Oct. 1990, *R. Bates* 23840 (AD); on Crouch Road, 500 m E of junction with Cul de Sac Road, Layman Forest Block, 19 Sep. 2005, *R.J. Cranfield & B.G. Ward* FC 895 (PERTH); 0.7 km off Mowen Road, NW of Nannup, 19 Oct. 1998, *R. Davis* 7324 (PERTH); walk trail between Greenbushes Pool and Schwenkes Dam, off Spring Gully Road, Greenbushes, 6 Nov. 2019, *C. Hamence* 1648 (PERTH); N of Scott Rd, *c.* 130 m NE of corner with Vasse Hwy, *c.* 23 km SE of Busselton, 4 Sep. 2022, *T.A. Hammer* 271 *& L.T. Williamson & R.W. Davis* (AD, PERTH); W side of Nutcracker Rd, *c.* 150 m NW of Denmark-Mount Barker Rd, 10 km N of South Coast Hwy, Mount Lindsay National Park, 5 Sep. 2022, *T.A. Hammer* 273 *& L.T. Williamson & R.W. Davis* (AD, PERTH); along Brockman Hwy, *c.* 1 mile W of Stewart Road turnoff, 18 Oct. 1971, *R.D. Hoogland* 12153 (CANB, K *n.v.*, L *n.v.*, PERTH); all sides of the junction of Jalbarragup Road and Sabina Road, Whicher Range, 12 Sep. 2001, *J.W.Horn* 4062 (CANB (2 sheets) *n.v.*, PERTH); Smith Rd, 20 km NE of Cowaramup, 11 Nov. 1993, *B.J. Keighery & N. Gibson* 631 (PERTH); Whicher National Park, approximately 15 m S of track E off Sues Road, 23 Oct. 2004, *G.J. Keighery & Wildflower Society of WA* SABI 10/8 (PERTH); Whicher Conservation Park, 24 Oct. 2003, *A. Webb* AW 2273 (PERTH); junction of Stewart Road and Brockman Hwy, 4 Sep. 1983, *J.R. Wheeler* 2113 (AD, K *n.v.*, MEL *n.v.*, NSW *n.v.*, PERTH); Whicher Range, Sabina Road, *c.* 1 km E of junction with Canebreak [Cane Brake] Road, 8 Sep. 1983, *J.R. Wheeler* 2169 (AD, K *n.v.*, PERTH); Stewart Road, 1.5 km from Nannup/Augusta Road, Canebreak Picnic Area, 7 Sep. 1985, *J.R. Wheeler* 2399 (AD, K *n.v.*, PERTH).

Phenology. Flowers from July–November, with a peak in September.

Distribution and habitat. Occurs from south of Mandurah to Nannup and with a disjunct population north of Denmark (Figure 3). Recorded from jarrah woodlands on flats or slopes on grey sand or clay over laterite.

Conservation status. Not conservation listed.

Hibbertia glomerata subsp. ***darlingensis*** J.R.Wheeler, *Nuytsia* 14(3): 431–433 (2002). *Type*: Jarrahdale scenic road, 8 km by road from South West Highway, Western Australia, 5 October 1983, *J.R. Wheeler* 2234 (*holo*: PERTH 03072703!; *iso*: K *n.v.*, PERTH 09602232 (spirit) *n.v.*).

Hibbertia sp. Darling Range (R.D. Royce 5741), Western Australian Herbarium, https://florabase.dbca.wa.gov.au [accessed 1 Aug. 2023].

Leaves usually all similar in shape; *cauline leaves* elliptic or oblong-elliptic, 8–17(–21) mm long; *floral leaves* elliptic or oblong-elliptic, 4–10 mm long and 1.5–4 mm wide. *Stamens* 11, in 3 fused bundles each of 3 stamens and with 2 stamens solitary; filaments (1.2–)1.5–2 mm long; anthers usually 1.5–2 mm long. (Figure 1A, B)

Selected specimens examined. WESTERN AUSTRALIA: Kalamunda, 19 km E of Perth, 7 Aug. 1985, *R. & M. Hamilton* 144 (AD, PERTH); reserve on Pomeroy Rd, *c.* 1.2 km E of Canning Rd, Bickley, 1 Sep. 2022, *T.A. Hammer* 237 *& L.T. Williamson & R.W. Davis* (AD); SE side of Brookton Hwy, 0.1–0.3 km SW of junction with Gilmour Rd, 4 Sep. 1999, *J.W. Horn* 2208 (AD, PERTH); Armadale Settlers Common, off Carradine Rd, to E of 4WD track, 14 Oct. 1996, *A. Markey* 359 (PERTH); Gooseberry Hill, Darling Range, 15 Sep. 1900, *A. Morrison s.n.* (AD, CANB); Gooseberry Hill, 8 Sep. 1957, *R.D. Royce* 5741 (PERTH); 5 km NE of Armadale, on Churchman Brook Rd, 1 Sep. 1974, *G.L. Stebbins & A. Weston* A 36 (CANB); corner Mofit and Francis roads, off Welshpool Rd, Carmel, 4 Dec. 2008, *L.S.J. Sweedman* 7621 (PERTH); Albany Hwy, *c.* 8 km from junction with South West Hwy near road train assembly area, 26 Sep. 1983, *J.R. Wheeler* 2195 (AD, DUKE *n.v.*, MEL *n.v.*, PERTH).

Phenology. Flowers mainly August–October, with a peak in October, occasionally also later in summer.

Distribution and habitat. *Hibbertia glomerata* subsp. *darlingensis* occurs east of Perth along the Darling Range from Gooseberry Hill to Karrakup (Figure 3). Recorded from jarrah-marri woodlands on flats or slopes on brown clay or loam over laterite.

Conservation status. Not conservation listed.

Hibbertia glomerata subsp. ***ginginensis*** J.R.Wheeler, *Nuytsia* 14(3): 433–434 (2002). *Type*: [precise locality withheld for conservation reasons] Gingin towards Bindoon, Western Australia, 5 September 1982, *J.R. Wheeler* 2035 (*holo*: PERTH 03072959 image!; *iso*: AD *n.v.*, CANB *n.v.*).

Leaves sometimes dimorphic; *cauline leaves* narrowly ovate to narrowly elliptic, 10–25 mm long; *floral leaves* ovate to elliptic, 3.5–10 mm long, 2.5–6.5 mm wide. *Stamens* 11, in 3 fused bundles each of 3 stamens and with 2 stamens solitary; filaments 1.5–2 mm long, the bundle filaments fused; anthers usually 1.5–2.3 mm long. (Figure 1C, D)

Selected specimens examined. WESTERN AUSTRALIA [localities withheld for conservation reasons]: 28 Sep. 1968, *E.M. Canning* WA/68 3575 (CANB, PERTH); 5 Jun. 2007, *D. Coultas & G. Woodman* Opp 2 (PERTH); 28 Jul. 1983, *J.R. Wheeler* 2047 (PERTH); 14 Sep. 1995, *R. Davis* 90 (PERTH); 3 Sep. 2022, *T.A. Hammer* 262 *& L.T. Williamson & K.R. Thiele* (AD); 3 Sep. 2022, *T.A. Hammer* 263 *& L.T. Williamson & K.R. Thiele* (AD); 25 Sep. 2006, *F. Hort & G. Thornett* 2889 (AD, PERTH); 11 Oct. 2012, *F. & J. Hort* 3747 (AD, MEL, PERTH); 14 Sep. 2001, *F. Hort* 1449 (AD, PERTH); 25 Aug. 1996, *S.J. Patrick* 2763 (PERTH).

Phenology. Flowers June–December, with a peak in September.

Distribution and habitat. *Hibbertia glomerata* subsp. *ginginensis* occurs from Boonanarring to Lower Chittering (Figure 3). Recorded from jarrah-marri woodlands on brown clay or loam over laterite.

Conservation status. Listed as Priority Two under Conservation Codes for Western Australian Flora (Western Australian Herbarium 1998–).

Hibbertia hibbertioides (Steud.) J.R.Wheeler in H.R. Toelken & J.R. Wheeler, *J. Adelaide Bot. Gard.* 20: 1–4 (2002); *Pleurandra hibbertioides* Steud. in J.G.C. Lehman, *Pl. Preiss.* 1: 265 (1845). *Type*: Mt Bakewell, Western Australia, 8 September 1839, *L. Preiss* 2164 (*syn*: LD 1081540 image!, MEL 0666836 image!, MEL 0666837 image!, MO-279482 image!, S08-20128 image!).

Candollea teretifolia Turcz., *Bull. Soc. Natural. Moscou* 22(2): 6 (1849); *Hibbertia teretifolia* (Turcz.) F.Muell., *Fragm. Phyt. Austral.* 4: 117 (1864). *Type*: Western Australia, *J. Drummond* coll. IV. n. 124 (collection 4) (*holo*: KW 001000416 image!; *iso*: K000700336 image!, K000700337 image!, MEL 666838 image!, P 00682363 image!, PERTH 04430506 image!).

Hibbertia hibbertioides var. *pedunculata* J.R.Wheeler, *Nuytsia* 15(2): 290–291 (2004). *Type*: Catchment Rd, Talbot State Forest, York, 200 metres S of Deefor Rd T junction, Western Australia, 6 October 1999, *F. & J. Hort* 647 (*holo*: PERTH 05440300 image!; *iso*: AD 180931!, CANB 599358 image!, K 000700376 image!).

Compact cushion-like to erect *shrubs* 0.1–0.5(–0.7) m high; young stems terete, glabrescent with sparse to moderately dense, appressed, crisped to straight simple hairs, lacking distinct hair tufts in the leaf axils. *Leaves* monomorphic, sessile, erect to spreading, scattered or clustered on short-shoots, linear to very narrowly oblanceolate, (3–)5–15 mm long, 0.2–0.6(–0.9) mm wide, terete to slightly compressed, lacking a distinct midrib, green or glaucous, glabrous; base slightly broadened and flattened; apex acute to slightly acuminate. *Flowers* solitary, terminal or terminating lateral short-shoots, sessile to pedicellate; pedicels (if present) (0.5–)3–10(–18) mm long, glabrous or with crisped simple hairs. *Bracts* 2–4, glabrous; primary bract subtending the calyx (when flowers sessile) or at the base of the pedicel (when pedicellate), narrowly ovate or ovate to oblong, 0.9–2.3 mm long, (0.3–)0.5–0.6 mm wide, the apex acute to obtuse and mucronate with the tip to 0.3–0.5 mm long; secondary bracts similar to the primary bract in colour, indumentum and shape. *Sepals* unequal, glabrous; outer sepals narrowly ovate to ovate, (4.5–)5.2–6.4 mm long, (0.9–)1.8–2.4 mm wide, the margins ± membranous, the apex caudate with the tip 1.2–2.5 (–3) mm long; inner sepals oblong-elliptic to oblong-obovate, 4.5–6.8 mm long, (2–)2.6–3.5 mm wide, the apex apiculate to caudate with a tip 0.4–1.4 mm long. *Petals* yellow, obovate, (4–)5–9 mm long, entire to emarginate. *Stamens* (10)11(12), arranged around the gynoecium, in 3 bundles each of 3 stamens fused by their filaments and with (1)2(3) stamens solitary; filaments 1.3–2 mm long, those in bundles with the fused portion (0.3–)0.8–1.5 mm long and the free portion 0.3–0.8(–1) mm long; anthers narrowly obloid, 1.3–1.7(–2) mm long, dehiscing by introrse, longitudinal slits; *staminodes* absent. *Carpels* 3; ovaries obovoid, (0.8–)1–1.5 mm long, glabrous; styles 1.4–2.6 mm long, ascending and spreading outward; *ovule* 1 per carpel. *Seeds* glossy, orange-brown, compressed-globular, *c.* 2 mm long; aril membranous, irregularly lobed, restricted to the very base of the seed. (Figure 2A, B)

Diagnostic features. *Hibbertia hibbertioides* may be distinguished from all other members of the genus by the following combination of characters: linear to very narrowly oblanceolate and terete to slightly compressed glabrous leaves without a distinct midrib; outer sepals (4.5–)5.2–6.4 mm long and with a caudate tip 1.2–2.5(–3) mm long; (10)11(12) stamens around 3 glabrous carpels with 3 stamens fused by their filaments between each carpel and with the remaining (1)2(3) stamens solitary; and anthers 1.3–1.7(–2) mm long.

Selected specimens examined. WESTERN AUSTRALIA: site 1, Bindoon Army Camp, near gravel pit just N of Campsite 2, 5 km SW of Cachionalgo Hill, 14 Nov. 1996, *M.G. Allen* 1023 (PERTH); Marangup Reserve off Toodyay Rd, 8 Oct. 2006, *A. Blundell* MOR 3 (PERTH); 11 km SW of Hay Flat road along Head Rd, Wannamal, 20 Sep. 1983, *R.J. Cranfield* 4195 (PERTH); 35 km S of Arthur River, 20 Oct.

1983, *R.J. Cranfield* 4687 (PERTH); 7.1 km E along Julimar Rd from junction of Chittering Rd, 9 Oct. 2001, *R. Davis* 10108 (AD, PERTH); 5 km W along Brookton Hwy from junction of Beraking Pool Rd, 29 Nov. 2020, *R. Davis & T. Hammer* RD 13929 (PERTH); firebreak on Kawana Rd, Lol Gray, Dryandra, 6Oct. 2002, *J. Foss & P. Gurry* 210 (PERTH); on track to Mount Byroomanning, NE of Bindoon, 18 Oct. 1998, *M. Hislop* 1162 (PERTH); 71.5 miles [115 km] from Perth along Great Northern Hwy between Bindoon and New Norcia, *c.* 1 mile W of the hwy, 11 Nov. 1974, *R.D. Hoogland & G.L. Stebbins* 12491 (CANB, L *n.v.*, PERTH, UC *n.v.*); S terminus of Head Rd, Head Rd is located on the S side of Hay Flat Rd *c.* 5.9 km W of its junction with the Great Northern Hwy, Shire of Chittering, 5 Sep. 1999, *J.W. Horn* 2252 (DUKE *n.v.*, PERTH); Poison Paddock, New Norcia, 7 Oct. 2004, *K. Macey* 699 (PERTH); Coalara Road, 6.4 km S of Marchagee–Coomallo Road, 5 Sep. 1997, *W. O'Sullivan* 278 (PERTH); Mercer Rd, SW of York, 19 Nov. 1998, *H. Seeds* 120 (PERTH); Brookton Hwy 5.0 km W of Beraking Pool Rd, 5 Dec. 2020, *K.R. Thiele* 5669a (PERTH); Mercer Rd, 1.1 km W from Talbot Rd, SW of York, 9 Oct. 2001, *J.R. Wheeler* 4130 (MEL *n.v.*, PERTH).

Phenology. Flowers mostly September to December, with a peak in October.

Distribution and habitat. *Hibbertia hibbertioides* occurs east and north of the Darling Scarp in the Avon Wheatbelt, Geraldton Sandplains, Jarrah Forest and Swan Coastal Plain IBRA regions (DCCEEW 2023), with the main area of distribution from Lesueur National Park and Watheroo National Park (in the north) to around Dryandra and east of Pingelly (in the south), and with several sporadic records further south to around Nannup and Mobrup (Figure 4A). It commonly occurs in jarrah-marri or wandoo woodlands and *Allocasuarina*- or *Banksia*-dominated shrublands on grey or brown sand or loam, often with lateritic gravel.

Conservation status. Not of conservation concern.

Typification. Wheeler (2004) cited the holotype of *Pleurandra hibbertioides* Steud. as being a specimen from LD, but Steudel (1845) did not designate a holotype in the protologue or cite material at a specific herbarium, and therefore all specimens available to him at the time should be treated as syntypes (McNeill 2014). The citation of the specimen by Wheeler (2004) as holotype did not inadvertently lectotypify the name, because on or after 1 January 2001 the use of the terms 'lectotype' and 'here designated' is required for lectotypification (see Art. 7.11, 9.23 in Turland 2018).

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

Hibbertia hibbertioides var. *meridionalis* J.R.Wheeler, *Nuytsia* 15(2): 289–290 (2004). *Type*: Springdale Rd, 3.7 km E of Fence Rd, Western Australia, 19 March 2002, *J.R. Wheeler* 4153 (*holo*: PERTH 06331092 image!; *iso*: AD 180929!, CANB 599365 image!, K *n.v.*, MEL 2283112 image!, NSW 536972 image!).

Compact low *shrubs* 0.1–0.3(–0.4) m high; young stems terete, glabrescent with appressed, crisped to straight simple hairs, lacking distinct hair tufts in the leaf axils. *Leaves* monomorphic, sessile, erect to spreading, scattered or clustered on short-shoots, linear to very narrowly oblanceolate, (5–)10–25(–30) mm long, 0.3–0.5 mm wide, terete, lacking a distinct midrib, usually green, glabrous; base slightly broadened and flattened; apex acuminate to acute. *Flowers* solitary, terminal or terminating lateral short-shoots, sessile. *Bracts* 2–4, glabrous; primary bract ovate to ovate-triangular, 0.5–1.2 mm long, 0.2–0.5 mm wide, the apex acute to obtuse and mucronate with the tip 0.2–0.4 mm long; secondary bracts similar to the primary bract in colour, indumentum and shape. *Sepals* unequal, glabrous; outer sepals ovate, (2.9–)3.3–4 mm long, 1.3–1.8 mm wide, the margins ± membranous, the apex acute to obtuse and apiculate with a tip (0.3–)0.5–0.8 mm long; inner sepals oblong-elliptic to oblong-obovate, 3.4–3.6 mm long, 2–2.5 mm wide, the apex obtuse and ± mucronate with the tip 0.1–0.4 mm long. *Petals* yellow, obovate, (3–)4–5 mm long, emarginate. *Stamens* 11, arranged around the gynoecium, in 3 bundles each of 3 stamens fused by their filaments and with 2 stamens solitary; filaments 0.8–1.1 mm long, the fused bundles with the fused portion 0.5–0.6 mm long and the free portion 0.4–0.6 mm long; anthers narrowly obloid, 0.8–1 mm long, dehiscing by introrse, longitudinal slits; *staminodes* absent. *Carpels* 3; ovaries

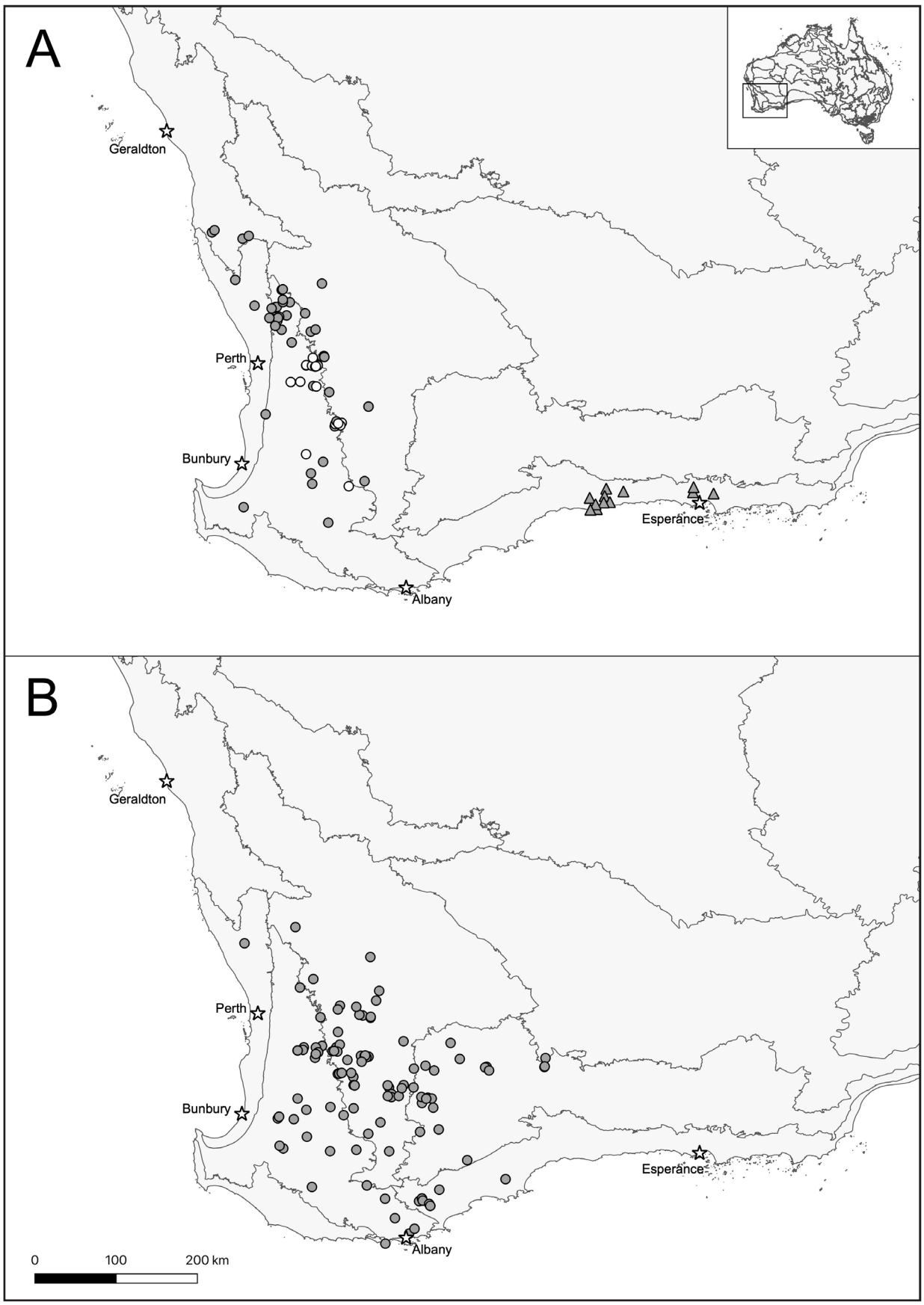

Figure 4. Distribution of *Hibbertia hibbertioides*, *H. meridionalis* and *H. hemignosta* based on PERTH specimens. A – *H. hibbertioides* with sessile flowers (grey circles), *H. hibbertioides* with pedicellate flowers (white circles) and *H. meridionalis* (triangles). B – *Hibbertia hemignosta*. Map boundaries are IBRA v7 regions (DCCEEW 2023).

obovoid, 0.8–1.1 mm long, glabrous; styles 1.4–1.8 mm long, ascending and spreading outward; *ovule* 1 per carpel. *Seeds* glossy, orange-brown, compressed-globular, *c.* 1–1.2 mm long; aril membranous, irregularly lobed, restricted to the very base of the seed. (Figure 2C, D)

Diagnostic features. *Hibbertia meridionalis* may be distinguished from all other members of the genus by the following combination of characters: linear to very narrowly oblanceolate and ± terete leaves without a distinct midrib; outer sepals (2.9–)3.3–4 mm long and with an apiculum (0.3–)0.5–0.8 mm long; 11 stamens around 3 glabrous carpels with 3 stamens fused by their filaments between each carpel and with the remaining 2 stamens solitary; and anthers 0.8–1 mm long.

Selected specimens examined. WESTERN AUSTRALIA: 26.1 km from Hopetoun on South Coast Rd, *c.* 1 km to the S along unnamed track, 19 Apr. 1998, *M. Bennett* 113 (PERTH); Southern Ocean Rd 2.1 km E of the Mason Bay campsite turnoff, 14 Mar. 2007, *G. Byrne* 2558 (PERTH); 1.3 km N along Mason Bay Rd from junction of Middle Rd, 21 Feb. 2002, *R. Davis* 10291 (PERTH); 30.5 km SW of Munglinup, 15 May 1996, *R. Davis* RD 764 (PERTH); Oxall Rd (Munglinup), 8 Feb. 1987, *H. Demarz* 11703 (AD, PERTH); power line right of way on the W side of Coolgardie–Esperance Hwy at the SW corner of its junction with Jenkins Street in Gibson, 26 Sep. 2001, *J.W. Horn* 4135 (CANB *n.v.*, DUKE *n.v.*, PERTH); Helms Forestry Reserve 23527, Gibson, 2 Nov. 2011, *C.D. Turley & R.M. Hoggart* 13/11-11 (PERTH); Southern Ocean Rd, *c.* 27 km along from junction with Hopetoun–Ravensthorpe Rd, 19 Mar. 2002, *J.R. Wheeler* 4151 (AD, PERTH); Jerdacuttup Rd, 6 miles [*c.* 9.7 km] from Hopetoun, 28 Oct. 1968, *J.W. Wrigley s.n.* (CANB).

Phenology. Flowers recorded throughout the year, with most records in March.

Distribution and habitat. *Hibbertia meridionalis* is restricted to the Esperance Plains IBRA region of Western Australia (DCCEEW 2023), occurring mainly from Jerdacuttup to Munglinup and north of Esperance (Figure 4A). It is recorded from heathlands, shrublands and mallee woodlands on grey sand.

Conservation status. Not of conservation concern.

Typification. In the protologue, Wheeler (2004) reported the location of the type as 'Springdale Rd, 4.7 km E of Fence Rd, 33°51'S, 120°34'E, Western Australia'. However, the distance reported on the label of the type specimen is '3.7 km E of Fence Road'. The coordinates included in the protologue indicate the true location was closer to 3.7 km from Fence Road, therefore we have chosen here to treat the distance reported in the protologue as an error.

Notes. *Hibbertia meridionalis* slightly overlaps in distribution with the somewhat similar *H. glaucophylla* (Steud.) K.R.Thiele & T.Hammer (previously *H. rupicola* (S.Moore) C.A.Gardner; see Thiele & Hammer 2023) and *H. hamata* (F.Muell.) F.Muell., which were also included in the *H. hemignosta* group by Wheeler (2004). *Hibbertia meridionalis* can be readily differentiated from these species by having ± terete leaves (the others having leaves with two distinct narrow grooves on the abaxial surface either side of a distinct midrib; see Figure 4A, B & G in Wheeler 2004). Leaves in *H. hamata* are also sigmoid in shape and usually narrowly clavate with a distinctly recurved apex.

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

Hibbertia glomerata subsp. *wandoo* J.R.Wheeler, *Nuytsia* 14(3): 434–435 (2002). *Type*: [precise locality withheld for conservation reasons] Beverley, Western Australia, 22 February 2000, *F. Hort* 944 (*holo*: PERTH 05604591 image!; *iso*: AD 156485!, CANB 577640 image!, K 000700169 image!, L *n.v.*, MEL 2282388 image!, NSW 537551 image!, PERTH 09352023 *n.v.*, US *n.v.*).

Hibbertia sp. Wandoo (J. & F. Hort 456), Western Australian Herbarium, https://florabase.dbca.wa.gov.au [accessed 1 Aug. 2023].

Erect *shrubs* 0.25–0.6 m high; young stems ± terete, glabrescent with sparse appressed, crisped, simple hairs, lacking distinct hair tufts in the leaf axils. *Leaves* monomorphic, sessile, spreading, ± scattered or crowded near the stem apex, narrowly oblanceolate to narrowly obovate, (4–)7–13 mm long, 1–2.5(–3.3) mm wide, ± flat, usually glaucous, glabrous; base gradually and narrowly tapering to a flattened insertion on the stem; midrib indistinct, sometimes darkened and very slightly raised abaxially; apex obtuse, minutely mucronate, rarely truncate or emarginate. *Flowers* solitary, terminal or terminating lateral short-shoots, sessile. *Bracts* 2–4, glabrous; primary bract ovate-triangular, 1.2–1.4 mm long, 0.8–1 mm wide, the apex acute to obtuse and apiculate with the tip 0.2–0.3 mm long; secondary bracts similar to the primary bract in colour and shape. *Sepals* unequal, glabrous; outer sepals narrowly ovate-elliptic to ovate, (4.2–)5–6 mm long, 0.9–2.6 mm wide, the apex acuminate and with a distinct tip 0.4–0.6(–1) mm long; inner sepals broadly oblong-elliptic to oblong-obovate, 5–6.6 mm long, 2.8–3.8 mm wide, the apex obtuse and apiculate with a tip 0.1–0.6 mm long. *Petals* yellow, obovate, 6.2–8.8 mm long, ± entire to emarginate. *Stamens* (10)11(12), arranged around the gynoecium, in 3 bundles each of 3(4) ± free stamens with (1)2(3) stamens solitary; filaments 1.4–2.2 mm long, ± free or shortly and irregularly fused; anthers narrowly obloid, 1.2–2.2 mm long, dehiscing by introrse, longitudinal slits; *staminodes* absent. *Carpels* 3; ovaries globular to obovoid, 1.2–1.4 mm long, glabrous; styles 2–3.3 mm long, ascending and spreading outward; *ovule* 1 per carpel. *Seeds* not seen. (Figure 2E, F)

Diagnostic features. *Hibbertia wandoo* may be distinguished from all other members of the genus by the following combination of characters: glabrous leaves that are all similar and narrowly oblanceolate to narrowly obovate and lack a distinct midrib; primary bract ovate-triangular, 1.2–1.4 mm long, 0.8–1 mm wide; outer sepals (4.2–)5–6 mm long with the apex acute to acuminate and the tip 0.4–0.6(–1) mm long; and (10)11(12) free stamens around 3 glabrous carpels.

Selected specimens examined. WESTERN AUSTRALIA [localities withheld for conservation reasons]: 8 Oct. 1997, *R. Davis* 4245 (PERTH); 29 Nov. 2020, *R. Davis & T. Hammer* RD 13930 (PERTH); 6 Feb. 2008, *T. Erickson* TEE 361 (PERTH); 11 Aug. 2005, *F. Hort* 2569 (PERTH); 26 Aug. 2005, *F. Hort & J. Hort* 2598 (PERTH); 5 Jun. 2006, *F. Hort & J. Hort* 2799 (PERTH); 4 Oct. 2016, *F. Hort & J. Hort* FH 4077 (PERTH); 28 Apr. 1999, *J. & F. Hort* 456 (AD, CANB *n.v.*, NSW *n.v.*, PERTH); 9 Oct. 2001, *J.R. Wheeler* 4126 (PERTH); 9 Oct. 2001, *J.R. Wheeler* 4127 (AD, PERTH); 9 Oct. 2001, *J.R. Wheeler* 4128 (PERTH).

Phenology. Flowering recorded throughout the year but mostly from August to November, with a peak in October.

Distribution and habitat. *Hibbertia wandoo* occurs in the Jarrah Forest and Avon Wheatbelt IBRA regions (DCCEEW 2023), mostly southwest of Beverley and west and southwest of Brookton (one record east of Brookton), Western Australia (Figure 3). Recorded from wandoo woodlands and jarrah-marri woodlands, often with an open heathy understory, on brown loam or sand with lateritic gravel.

Conservation status. Listed as Priority Three under Conservation Codes for Western Australian Flora (Western Australian Herbarium 1998–), as *Hibbertia glomerata* subsp. *wandoo*. Conserved in Wandoo National Park and a few smaller conservation parks and nature reserves.

Notes. *Hibbertia wandoo* may be potentially confused with *H. inclusa* Benth., which has a scattered distribution across southwest W.A. *Hibbertia inclusa* is most similar to *H. crispula* J.M.Black and other species in the *H. virgata* R.Br. ex DC. group from south-eastern Australia, which share with *H. wandoo* free stamens and leaves without a distinct midrib. The leaves of *H. inclusa* are similar in shape to *H. wandoo*, which can be narrowly oblanceolate with a rounded apex. However, *H. inclusa* can be readily differentiated by the leaves being covered in minute, crisped, simple hairs, while the leaves of *H. wandoo* are glabrous (often also glaucous).

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