

Notes on *Hibbertia* (Dilleniaceae) 11. *Hibbertia spanantha*, a new species from the central coast of New South Wales

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Abstract

The species *Hibbertia* sp. Turramurra (*A.F. Robinson s.n. NSW981514*), discovered in 2007 and based on a few plants in South Turramurra bushland reserve, is described as *Hibbertia spanantha* Toelken & A.F. Rob. Since its discovery it has also been found at two additional localities nearby, but it is still considered a critically endangered species.

Keywords: Dilleniaceae, *Hibbertia*, Sydney area, taxonomy, new species.

Introduction

Plants of the vicinity of Sydney have been collected and studied for more than two hundred years. Finding, therefore, a species new to science is unusual, particularly in the genus *Hibbertia*, as Toelken & Miller (2012) had already described several new hibbertias from the area. The new species described here, *H. spanantha*, was first discovered in South Turramurra in 2007, the first herbarium specimens date from 2012. Extreme concern was expressed, when initially, only nine plants could be found, and in addition the vegetation around them was senescing. Two more localities, each with a few plants, were discovered nearby at Macquarie Park and Beecroft more recently.

Hibbertia spanantha resembles most closely species of the *H. strigosa* group (cf. Toelken & Miller 2012, p. 93) in characters, such as similar simple to sparsely fascicled or usually forked hairs, distinct intrapetiolar tufts, sessile flowers, each having more than 10 stamens with slender subequal anthers. It differs, however, from *H. strigosa* (Toelken & Miller 2012) and from most species belonging to this group, by its decumbent habit and smaller leaves, as well as specifically by its anthers being 1.4–1.6 mm long (2.1–2.4 mm long in *H. strigosa*).

Hibbertia spanantha Toelken & A.F. Rob., sp. nov.

Typus: New South Wales, South Turramurra, *A.F. Robinson s.n.*, ix.2012 (holo.: AD 265532; iso.: NSW 981514). [Detailed locality withheld].

Hibbertia sp. Turramurra (*A.F. Robinson s.n. NSW981514*)
NSW Herbarium

Shrublets up to 30 cm high, diffusely decumbent to sprawling with moderately branched main branches;

branches wiry-woody, with long decurrent leaf bases to almost flanged, finely hirsute. *Vestiture* ± persistent, predominantly simple, rarely forked hairs often on a tubercle particularly on leaves; *on branches* moderate to dense particularly along the groove to both sides of the decurrent leaf bases and then often forked or rarely fascicled, with mainly long fine simple hairs (1.4–1.8 mm long), antrorsely spreading and few shorter ones interspersed, without obvious tubercles; *on leaves above* scattered, with antrorse to usually erect, mainly longer simple hairs on raised tubercles, which remain when the hairs soon wear off; *on leaves below* sparse, with similar simple hairs as above but usually with less pronounced tubercles and with longer hairs mainly on the flanks of the recurved margins and the central vein, while the sparsely exposed undersurface has few short hairs towards the margins; *on bracts* like on leaves but often shorter; *on outer calyx lobes* outside sparse, with longer over shorter antrorse simple hairs without tubercles, inside largely glabrous except for appressed long and short hairs on the upper third; *on inner calyx lobes* outside sparse, with scattered smaller appressed simple hairs under longer ones mainly towards the margins, inside glabrous. *Leaves* with axillary tuft of hairs up to 1.8 mm long and continued along the grooves on both sides of the decurrent leaf bases; *petiole* 0.2–0.5 mm long; *lamina* linear to linear-oblongate, (2.8–) 4–7.5 (–8.6) × 0.6–0.9 mm, sparsely constricted into short petiole, obtuse to rounded with recurved apex with short hairs, above flat to convex with central vein not visible, sparsely pilose when young becoming tuberculate later, below with undersurface sometimes visible between the scarcely raised central vein and revolute margins, sparsely pilose and rarely tuberculate.



Fig. 1. Decumbent plant of *Hibbertia spanantha* in natural habitat. (Photo: A.F. Robinson).

Flowers with rounded receptacle base, sessile, terminal on all branches; buds ovoid-obloid; bracts subtending calyx, linear, $4.6\text{--}5.3 \times 0.7\text{--}0.8$ mm, fleshy and leaf-like, sparsely hirsute, merging into leaves. Calyx lobes unequal; outer calyx lobes lanceolate, rarely linear-lanceolate, $(5.5\text{--}) 5.8\text{--}6.6 \times 1.9\text{--}2.6$ mm, acute with recurved apex, with revolute margins and with central ridge becoming prominent on the upper half, outside pubescent, inside pubescent on upper third; inner calyx lobes obovate to broadly oblong-elliptic, $(4.7\text{--}) 5.2\text{--}6 \times 3.5\text{--}4.4$ mm, obtuse to often slightly split, scarcely ridged, outside pubescent and with glabrous membranous margins, inside glabrous. Petals $6.6\text{--}8.3$ mm long, obovate, \pm bilobed. Stamens 13 (-15), on one side of the ovaries; filaments $1\text{--}1.2$ mm long; anthers narrowly obloid, $1.4\text{--}1.6$ mm long, with back ones sometimes slightly shorter, \pm abruptly constricted above and below. Pistils 2; ovaries ovoid, each with 4 ovules, erect-hirsute to sericeous; style attached to apex, with style base \pm hairy, erect, stigmas well above anthers. Fruit and seeds not seen. Flowering: mainly September–November. Suggested vernacular name: Julian's hibbertia. Fig. 1–4.

Distribution and ecology. The species grows on sandy to light clay soils and is currently known from the Lucas Heights and Glenorie soil landscapes on the shale/sandstone transition (Chapman & Murphy 1989). It has at present been recorded from near the suburbs of Turramurra, Macquarie Park and Beecroft (NSW: Central Coast botanical region) within Ku-ring-gai, Ryde and Hornsby Local Government Areas. All known populations occur within the Lane Cove River catchment.

The altitudinal range of *H. spanantha* is between 50 and 120 metres above sea level, and the average annual rainfall in the species' distribution range is from 1,000 to 1,400 mm.

Vegetation mapping by the Office of Environment & Heritage and Sydney Metropolitan Catchment



Fig. 2. Close-up of flower of *Hibbertia spanantha*. (Photo: A.F. Robinson).

Management Authority (OEH 2013) identifies the vegetation communities at all known populations as Coastal Enriched Sandstone Dry Forest and or Coastal Shale Sandstone Forest within the broader vegetation classes of Sydney Coastal Dry Sclerophyll Forests and Northern Hinterland Wet Sclerophyll Forests (Keith 2004). Specht et al. (1995) describes both Tall Open-Forest and Open-Forest as the structural formations currently known for *H. spanantha* with all known populations occurring under a dominant tree canopy of *Eucalyptus pilularis*, *E. resinifera*, *Corymbia gummifera* and *Angophora costata*. The open understorey which supports a less diverse layer of shrubs than surrounding coastal communities includes dominant species like *Acacia linifolia*, *A. myrtifolia*, *Banksia spinulosa*, *Bossiaea obcordata*, *Hakea sericea*, *Olearia microphylla*, *Platylobium formosum*, *Persoonia laurina* subsp. *laurina*, and *Pultenaea hispidula*. Due to the richer soils that the species is associated with, a well-developed and diverse ground layer is supported and consists of species such as *Hibbertia aspera*, *Lomandra multiflora*, *Themeda australis* and *Xanthorrhoea minor*, as well as a relatively high representation from monocot families, such as Liliaceae, Orchidaceae and Poaceae.

Hibbertia spanantha has been observed growing most vigorously in sites exposed to greater sunlight and with limited competition from other mid and ground story species, or in places where light penetration has been increased through natural disturbance. Shaded plants seem to have fewer and shorter stems and leaves. It is therefore likely that fire, and possibly other physical disturbances that increase light levels without impacting upon the soil profile, play a role in providing for the recruitment and long term persistence of the species. Where desirable conditions are present, individuals have been observed as covering approximately 2 metres squared.

Conservation status. *Hibbertia spanantha* was listed as Critically Endangered on an emergency basis under the



Fig. 3. Plant of *Hibbertia spanantha* 12 month after being burnt, regenerating with erect resprouting branches and lateral suckers. (Photo: A.F. Robinson).



Fig. 4. Seedlings of *Hibbertia spanantha* 12 month after a fire, with short, almost appressed hairs on lower leaves and long spreading ones higher up. (Photo: A.F. Robinson).

name *Hibbertia* sp. Turramurra (A. Robinson s.n. NSW 981514) by the N.S.W. Scientific Committee (2014), due to the low number of mature individuals. The final determination of the Committee retained the listing as Critically Endangered (N.S.W. Scientific Committee 2015). At present it is only known from three small populations with about 20 adult plants. Importantly, more than 50 seedlings have been recently observed following fire at one location. A targeted strategy for managing this species will be developed under the 'Saving our species' conservation program by the N.S.W. Office of Environment and Heritage.

Diagnostic features. Among *Hibbertia* species with stamens to one side of the ovaries, this species is distinguished by the combination of: decumbent habit; mixed longer and shorter fine simple hairs, which have pronounced basal tubercles particularly on the upper surface of leaves; bracts indistinguishable from the leaves; single sessile flowers borne terminally on larger branches; and, most importantly, 13–15 stamens bear slender subequal anthers (1.4–1.6 mm long) overtopping the hirsute to sericeous ovaries.

Hibbertia spanantha closely resembles *H. puberula*, as they have a similar habit, leaves and mainly simple hairs in common. The former is, however, distinguished by the erect hairs of the intrapetiolar tufts being continued along the decurrent grooves on the sides of the leaf bases, by the absence of hooked hairs on the calyx and, in particular, the ovaries are ovoid and hirsute to sericeous, while *H. puberula* has puberulous obovoid ovaries with an almost truncate apex.

Notes. Little is known about the growth habits of *H. spanantha*, although a fire to part of the original population made the following observations possible: recruitment was noted approximately 3 months following a fire in summer, which achieved a moderate intensity of burning. All burnt mature individuals responded and re-established through vigorous re-sprouting via either

coppicing or suckering from rootstock or both. All above ground stems were killed by the fire. Additionally, fire triggered germination from the soil stored seed bank, indicating a persistent soil seed bank. Similar responses to fire or smoke treatment to promote seed germination have variously been reported, e.g. Allen et al. (2004) and Bell et al. (1993) found resprouting of some hibbertias after fires. Consistent post fire rainfall resulting in prolonged soil moisture availability is assumed to have assisted these recruitment responses.

This suggests that fire is required to provide the right conditions for germination and seedling growth and that seedlings are not likely to establish at any time other than after fire, i.e. populations appear to be maintained by fire. This point is also supported by observations (by the second author), which indicate that seedlings or young plant recruitment has only taken place in burnt areas.

The age at which the species flowers and fruits is unknown. One population has not received fire for more than 50 years, indicating that *H. spanantha* is a long-lived species. Flowering has been observed to be infrequent, inconsistent, with relatively few flowers produced and some flowers not fully opening. Nor is it known how the species is pollinated. Little is known in relation to seed production and dispersal, although seedlings appear to have germinated in clusters, suggesting minimal seed migration from parent plants. It is also possible that ants deposited the seeds here after they had harvested the aril, for which they originally collect the diaspores, as Rice & Westoby (1981) suggested for hibbertias from nearby West Head. The extent of flowering appears to be directly related to environmental conditions, such as rainfall, as successful flowering and seed production have been evident following good post fire autumn and winter rainfall.

Morphological variation. The simple hairs in the grooves on either side of the decurrent leaf base are often so dense that some of them could also be determined

as forked or rarely clustered, as in fascicled hairs. The hairs on lower branches and leaves of coppice shoots (*A.F.Robinson s.n.*, as held at AD) are fewer, distinctly shorter and simple, but they become larger after the third leaf, denser (cf. Fig. 4) and especially more frequently forked. A similar development from simple to forked hairs was also observed on seedlings (*A.F.Robinson s.n.*, as held at NSW), as compared to compound hairs being reduced to simple ones in some species of the *H. hermannifolia* group (Toelken 2012, Fig. 1).

Etymology. As specimens examined at present were “few-flowered”, Greek “span-antha” was chosen as the epithet of this species. The vernacular name “Julian’s hibbertia”, was proposed in honour of Julian Poulton, who inspired the second author to pursue conservation as a career.

Specimens examined [detailed localities withheld for conservation reasons]:

NEW SOUTH WALES. **Central Coast:** *L.Jerofke s.n.*, Macquarie Park, 12.ix.2014 (NSW 859349); *R.L.Johnstone 3344 & M.Viler*, Beecroft, 29.x.2013 (NSW); *B.J.Pellow & J.Bevon s.n.*, Beecroft, 4.x.2013 (NSW 859342); *A.F.Robinson s.n.*, South Turrumurra [coppicing branches], xi.2014 (AD); *A.F.Robinson s.n.*, South Turrumurra [seedling], xii. 2014 (NSW 883772).

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