



Two new cremnophilous *Hibbertia* (Dilleniaceae) species from the Northern Territory

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Abstract: *Hibbertia* sp. Mount Howship (C.R.Dunlop 6656) and *H.* sp. South Magela (K.G.Brennan 896) from the Northern Territory are formally described here as *Hibbertia scopulicola* T.Hammer and *Hibbertia pendula* T.Hammer, respectively. Their distinguishing characters and morphological affinities with species in eastern Australia are discussed. A key to the groups and species of *Hibbertia* in the Northern Territory is provided.

Keywords: Australia, Dilleniaceae, *Hibbertia*, new species, Northern Territory, taxonomy

Introduction

There are approximately 50 species of *Hibbertia* Andrews (Dilleniaceae) in the Northern Territory (N.T.), with most of these species belonging to *H.* subg. *Hemistemma* (Juss. ex Thouars) J.W.Horn, such as in the *H. melhanioides* and *H. tomentosa* groups (Toelken 2010). Eight species are members of *H.* subg. *Pachynema* (R.Br. ex DC.) J.W.Horn (Craven & Dunlop 1992; Horn 2009). There are only three species

in the N.T. that are members of *H.* subg. *Hibbertia*, two of which are the phrase names *Hibbertia* sp. Mount Howship (C.R.Dunlop 6656) and *Hibbertia* sp. South Magela (K.G.Brennan 896). The only other member of *H.* subg. *Hibbertia* in the N.T. is *H. glaberrima* F.Muell. As part of the *Flora of Australia* project on *Hibbertia*, I present the taxonomic status of these two phrase names in *H.* subg. *Hibbertia* and formally describe them as the new species *Hibbertia pendula* T.Hammer and *H. scopulicola* T.Hammer.

Key to species/groups of *Hibbertia* in the Northern Territory

1. Plants largely or completely leafless; petals white, yellow, pink or red *Hibbertia* subg. *Pachynema* [8 spp.]
- 1: Plants leafy; petals yellow
 2. Ovary (and often sepals) covered with peltate, silvery scales *Hibbertia* subg. *Hemistemma* p.p. [31 spp.; *H. tomentosa* and *H. melhanioides* groups]
 - 2: Ovary and sepals glabrous to hairy, lacking peltate scales
 3. Fertile stamens all on one side of the carpels *Hibbertia* subg. *Hemistemma* p.p. [7 spp.; *H. banksii*-*H. dealbata* group and *H.* sp. Chewings Range (P.K. Latz 10660)]
 - 3: Fertile stamens all around the carpels
 4. Flowers pedicellate; southern N.T. (e.g. MacDonnell Ranges) *Hibbertia glaberrima*
 - 4: Flowers sessile; northern N.T. (West Arnhem Land)
 5. Leaves (10–) 20–40 (–50) mm long, usually sparsely appressed-pubescent on both surfaces (rarely ± spreading-villous), ± concolorous, apex with a point 1–2 (–3) mm long; flowers 15–25 mm in diameter; two outermost sepals narrower than inner; anthers 1.5–2.5 (–3) mm long *Hibbertia scopulicola*
 - 5: Leaves 5–12 (–15) mm long, adaxially densely to moderately erect-pubescent, abaxially densely appressed-sericeous, discolorous, apex rounded or with a mucro to c. 0.5 mm long; flowers 10–15 mm in diameter; two outermost sepals wider than inner; anthers 1.1–1.4 mm long *Hibbertia pendula*

Taxonomy

Hibbertia pendula T.Hammer, *sp. nov.*

Holotypus: Northern Territory, South Magela Gorge, Kakadu National Park, 9 Nov. 2016, *K. Brennan 10717* (DNA D0273953).

Hibbertia sp. South Magela (*K.G. Brennan 896*) NT Herbarium in R.A.Kerrigan & Albr., *Checkl. N. Terr. Vasc. Pl.* [unnumbered page] (2007).

Pendulous or rarely prostrate much-branched *shrubs* with slender branches to 0.5 m long; young stems densely sericeous to villous with white simple hairs, older stems with persistent leaf scars. *Leaves* subsessile, \pm spreading, obovate to elliptic, 5–12 (–15) mm long, 2–5 mm wide, \pm discolorous; base attenuate, gradually tapering to a shallow insertion on the stem; margins entire, flat or slightly recurved; adaxial surface greenish, grooved along the midrib, densely to moderately pubescent with short, erect, \pm semi-translucent simple hairs, becoming sericeous with longer and more appressed hairs near the base; abaxial surface whitish, midrib prominent and raised, densely sericeous with \pm appressed simple hairs; apex obtuse and sometimes mucronate, with the midrib flush with the apex or continued as a point to c. 0.5 mm long. *Flowers* single, terminal on short branches, sessile, 10–15 mm in diameter; primary bract leaf-like, oblong, 4.2–4.8 mm long, 1.2–1.5 mm wide, densely hairy as for the leaves but with longer marginal hairs, acute; secondary bracts absent. *Sepals* unequal, adaxial surface glabrous or with appressed simple hairs below the apex, abaxial surface densely villous with white to slightly rust-coloured simple hairs, the margins ciliolate; outer sepals broadly obovate to broadly elliptic, 5.5–7 mm long, 3–3.5 mm wide, apex shortly acuminate (by folding of the apical margin); inner sepals ovate to elliptic, 5.2–6.5 mm long, 2.3–2.6 mm wide, acute to shortly acuminate (by folding of the apical margin). *Petals* yellow, obovate, 7–8.5 mm long, emarginate. *Stamens* c. 70, arranged around the carpels; filaments filiform, scarcely connate basally, 2–2.5 mm long; anthers obloid, 1.1–1.4 mm long, dehiscing by short, introrse, apical slits. *Staminodes* absent. *Carpels* 3; ovaries ovoid, glabrous; styles eccentrically attached below the ovary apex and curving outwards and then erect to place the stigmas above the stamens, 2.7–3 mm long. *Ovules* 5 per carpel. *Seeds* not seen. **Fig. 1.**

Diagnostic features. *Hibbertia pendula* can be distinguished by the following combination of characters: a pendulous and cremnophilous shrub; leaves 5–12 (–15) mm long, 2–5 mm wide, discolorous, persistently hairy, adaxially green and densely to moderately pubescent with short and erect simple hairs, abaxially whitish and densely sericeous with appressed simple hairs; flowers sessile; sepals abaxially densely villous, whitish to slightly rust-coloured; stamens c. 70, arranged around the carpels, the anthers 1.1–1.4 mm long; carpels 3, glabrous.

Phenology. Flowering specimens have been collected in November and May. It is also likely to flower between these months, like other *Hibbertia* species in the region.

Distribution. The new species is only known from Magela Creek Gorge, c. 20 km SE of Jabiru near the eastern boundary of Kakadu National Park (N.P.). Most records are from within the National Park, but a couple occur just east of the park boundary in Western Arnhem Land.

Habitat. Occurs in sandstone gorges hanging from fissures in cliff faces.

Conservation status. *Hibbertia pendula* is listed as Vulnerable in the N.T. under the *Territory Parks and Wildlife Conservation Act 1976*.

Etymology. From the Latin *pendulus* (hanging), referring to the typical habit of the species hanging from fissures in cliff faces.

Proposed vernacular name. Magela Gorge guinea-flower.

Notes. *Hibbertia pendula* is one of the few members of *H.* subg. *Hibbertia* in the N.T., the others being *H. glaberrima* and *H. scopulicola*. The similarities and differences of *H. pendula* to *H. scopulicola* are discussed below in the notes under the latter species. *Hibbertia glaberrima* can be readily distinguished from *H. pendula* by having pedicellate flowers and usually glabrous linear to elliptic leaves (15–) 35–55 (–75) mm long. *Hibbertia glaberrima* is only known from ranges in arid central Australia (N.T. and S.A.) and the Pilbara (W.A.).

Hibbertia pendula is similar to *H. kaputarensis* B.J.Conn and *H. acuminata* B.J.Conn, both of which are restricted to northern New South Wales (Conn 1990). The three species are similar in having numerous stamens (c. 70 in *H. pendula*, c. 40 in *H. acuminata* and up to c. 100 in *H. kaputarensis*) around 3 glabrous carpels and sepals that are abaxially hairy. While the sepal hairs in *H. pendula* are mostly whitish, with sometimes slightly rusty hairs at the base, the sepal hairs in *H. kaputarensis* are mostly rust-coloured throughout. The sepal hairs of *H. acuminata* are moderately hairy with whitish, long, and spreading hairs in the central region. Both *H. acuminata* and *H. kaputarensis* have sepal margins that are membranous and glabrous, except for marginal cilia. The sepal margins in *H. pendula* are covered by dense, long, straight hairs except at the very base of the sepal. The sepal apex in *H. acuminata* varies from *H. pendula* in being distinctly folded or keeled as to appear long-acuminate. The three species also differ in leaf indumentum, which is very dense and of different textures on the two leaf surfaces in *H. pendula* (described above), while the leaf indumentum is uniform on both surfaces and pubescent or villous in *H. acuminata* and tomentose (sometimes also glabrescent) in *H. kaputarensis*.



Fig. 1. Holotype of *Hibbertia pendula* T.Hammer, K. Brennan 10717 (DNA D0273953).

Hibbertia acuminata and *H. kaputarensis* were split by Conn (1990) from the more widespread *H. obtusifolia* DC., which occurs from Victoria to Queensland. *Hibbertia obtusifolia* is less similar to *H. pendula* than either of these two species and can be easily separated from *H. pendula* by having nearly glabrous sepals (except marginal cilia) and fewer stamens (usually 30–40). The leaf indumentum of *H. obtusifolia* is similar to *H. kaputarensis*, being usually sparse and uniformly and shortly grey-tomentose. A dichotomous key for *Hibbertia*, including all species discussed above, can be found on KeyBase (<https://keybase.rbg.vic.gov.au/keys/show/11717>).

The habit and habitat of *H. pendula* differs from *H. acuminata*, *H. kaputarensis* and *H. obtusifolia* in being a typically pendulous shrub restricted to crevices of sandstone cliff faces, which is very distinctive within *Hibbertia*. Conn (1990: 290) described the habitat of *H. acuminata* as being “sandy to rocky soil overlying sandstone”, which could indicate a shared geology with *H. pendula* of occurring in habitats rich with sandstone.

Additional specimens examined

NORTHERN TERRITORY. 22 km SE of Jabiru Airstrip, 10 Apr. 1995, *K. Brennan & I.D. Cowie s.n.* (DNA); Gorge W of Magela Ck gorge, Kakadu N.P., 26 Aug. 2004, *I.D. Cowie & D.J. Liddle 10333* (DNA); Magela Ck gorge, Kakadu N.P., 5 Sep. 2016, *J. Westaway & B. Wirf 5172* (DNA); Magela Gorge, Kakadu N.P., 24 May 2016, *B. Wirf 1056* (DNA); South Magela Gorge, Kakadu N.P., 5 Sep. 2016, *B. Wirf 1126* (DNA).

***Hibbertia scopulicola* T.Hammer, sp. nov.**

Holotypus: Northern Territory, Wellington Range, 19 July 2009, *D.E. Murfet 6524* (AD234900). **Isotypus:** DNA.

Hibbertia sp. 7 (Mount Howship; *C.R. Dunlop 6656*) J.D. Briggs & J.H. Leigh, *Rare or Threat. Austral. Pl.* 50 (1996).

Hibbertia sp. Mount Howship (*C.R. Dunlop 6656*) NT Herbarium in R.A. Kerrigan & Albr., *Checkl. N. Terr. Vasc. Pl.* [unnumbered page] (2007).

Pendulous or spreading *shrubs* to 0.6 m long, branches to 1.2 m long; young stems moderately to densely pubescent to sericeous with appressed white simple hairs, older stems with persistent leaf scars. *Leaves* subsessile, ± spreading, elliptic to oblanceolate or obovate or narrowly elliptic to narrowly lanceolate, (10–) 20–40 (–50) mm long, (3–) 5–12 (–15) mm wide, ± concolorous; base attenuate, gradually tapering to a shallow insertion on the stem; margins entire, flat or slightly recurved; adaxial surface greenish, grooved along the midrib, glabrescent, very sparsely to sparsely pubescent with appressed white simple hairs or rarely sparsely to moderately villous with ± spreading white simple hairs; abaxial surface greenish, midrib prominent and raised, indumentum as for the adaxial surface; apex acute to obtuse, apiculate to cuspidate with the midrib continued to a point,

1–2 (–3) mm long. *Flowers* single, terminal on short branches, sessile, 15–25 mm in diameter; primary bract leaf-like, narrowly elliptic to linear, 5–7 mm long, c. 0.8–1.5 mm wide, indumentum as for the leaves, acute; secondary bracts absent. *Sepals* unequal, adaxial surface glabrous or with appressed simple hairs below the apex, abaxial surface sparsely to moderately sericeous with appressed simple hairs, the margins ciliate; outer sepals narrowly elliptic to elliptic, 6.5–13 mm long, 3–3.5 mm wide, apex acute to acuminate (by folding of the apical margin); inner sepals ovate to broadly elliptic, 6–11 mm long, 3.5–4.5 mm wide, acute to shortly acuminate (by folding of the apical margin). *Petals* yellow, obovate, 8–12 mm long, emarginate. *Stamens* 40–60, arranged around the carpels; filaments filiform, scarcely connate basally, unequal, 1–1.5 (–2) mm long; anthers obloid, unequal, 1.5–2.5 (–3) mm long, dehiscent by short, introrse, apical slits. *Staminodes* absent. *Carpels* 3; ovaries ovoid, glabrous; styles eccentrically attached below the ovary apex and curving outwards and then erect to place the stigmas above the stamens, 2.5–3 mm long. *Ovules* 3 or 4 per carpel. *Seeds* obloid to slightly reniform, c. 2 mm long, glossy, dark brown; aril membranous, ± basal to covering ½ of seed, margins lobed, white to cream-coloured (dried). **Fig. 2 & 3.**

Diagnostic features. *Hibbertia scopulicola* can be distinguished by the following combination of characters: a pendulous and cremnophilous shrub; leaves (10–) 20–40 (–50) mm long, (3–) 5–12 (–15) mm wide, ± concolorous, both surfaces green with sparse appressed simple hairs (rarely moderately dense with spreading hairs), glabrescent; flowers sessile; sepals abaxially sparsely to moderately sericeous with appressed, whitish hairs; stamens 40–60, arranged around the carpels, the anthers 1.5–2.5 (–3) mm long; carpels 3, glabrous, 3- or 4-ovulate.

Phenology. Flowering specimens recorded from March, April, July and August.

Distribution. Occurs in West Arnhem and Kakadu N.P., east of Jabiru, N.T. It is found from the Wellington Range (*D.E. Murfet 6524*), in the north, to Upper Deaf Adder Creek (*K. Brennan 7927*), in the south, and as far east as Upper Liverpool River (*K. Brennan 8003*).

Habitat. Occurs in sandstone gorges hanging from fissures in cliff faces.

Conservation status. The species is not conservation listed, but classified as Near Threatened (<http://eflora.nt.gov.au>; as *Hibbertia* sp. Mount Howship).

Etymology. The epithet is from the Latin *scopulus* (cliff) and *-cola* (dweller), referring to the habitat of the species.

Proposed vernacular name. Cliff guinea-flower.

Notes. *Hibbertia scopulicola* has been considered to be quite close in morphology to *H. scandens* (Willd.)



Fig. 2. Holotype of *Hibbertia scopulicola* T.Hammer, D.E. Murfet 6524 (AD234900).

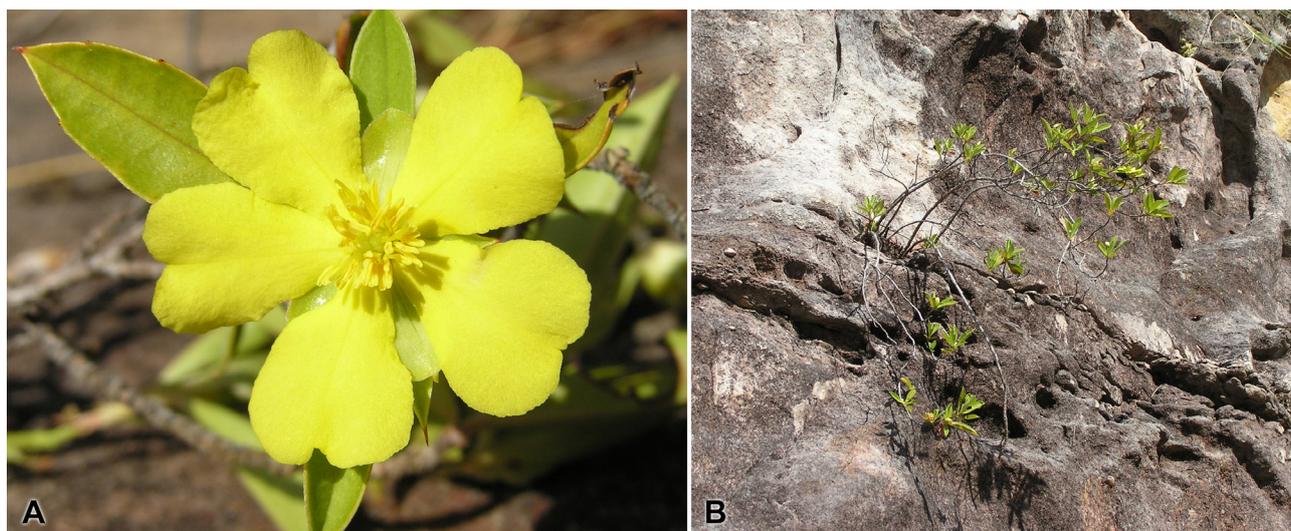


Fig. 3. *Hibbertia scopulicola* at the type locality, Wellington Range. **A** Flower; **B** plant growing on cliff face. — A, B D.E. Murfet 6524 (AD). Photos by D.E. Murfet.

Dryand. by *Hibbertia* experts R.D. Hoogland and J.R. Wheeler, who determined the specimens *L.A. Craven 2408* (DNA) and *M. Lazarides 9005* (DNA), respectively, as *H. scandens*. *Hibbertia scandens* is quite variable but can be distinguished from *H. scopulicola* by being a twining climber that occurs in a variety of habitats, including on beach dunes, in rainforests and wet sclerophyll forests, but not growing pendulous in the fissures of sandstone cliff faces. Flowers of *H. scandens* are c. 4–6 cm in diameter (cf. 1.5–2.5 cm in diameter in *H. scopulicola*) and have short pedicels 2–6 (–15) mm long (cf. sessile flowers), 3–5 (–7) carpels (cf. 3 carpels), usually more than 100 stamens (cf. 40–60 stamens) and with anthers 3–4.5 mm long (cf. 1.5–2.5 (–3)). The seeds of *H. scandens* have a distinctive bright, red–orange, fleshy aril that encloses the entire seed; in older dried specimens the aril is often yellowish in colour. The arils of *H. scopulicola* are mostly restricted to the base of the seed, but occasionally cover up to ½ of the seed, have lobed margins, and are white to cream-coloured in dried specimens.

Within the N.T., *H. scopulicola* is most similar to *H. pendula*, with which it shares the habitat and habit, i.e. both are pendulous shrubs occurring on sandstone cliffs. In sterile specimens, *H. scopulicola* can be readily distinguished from *H. pendula* by having leaves (10–) 20–40 (–50) mm long and (3–) 5–12 (–15) mm wide (cf. 5–12 (–15) mm long and 2–5 mm wide in *H. pendula*), a leaf apex that is apiculate to cuspidate (cf. apex rounded or occasionally mucronate), and a leaf indumentum that is usually sparsely appressed-hairy on both surfaces. *Hibbertia pendula* has a much denser indumentum throughout the plant and has different textures of hairs on the leaf surfaces, being erect-pubescent with short semi-translucent hairs adaxially and appressed-sericeous with white hairs abaxially.

There are additional floral characters to distinguish *H. pendula* from *H. scopulicola*. Most specimens of

H. scopulicola have outer sepals that are distinctly narrower than the inner sepals, while *H. pendula* has outer sepals that are wider than the inner sepals. Despite *H. scopulicola* consistently having larger flowers (15–25 mm in diameter) than *H. pendula* (10–15 mm in diameter), *H. scopulicola* has fewer stamens (40–60) than *H. pendula* (c. 70) in the specimens examined. Though there are fewer stamens in the flowers of *H. scopulicola*, the anthers are consistently longer (1.5–2.5 (–3) mm long), than those of *H. pendula* (1.1–1.4 mm long).

While *H. scopulicola* is typically very sparsely to sparsely hairy with short appressed hairs, the specimen *K.G. Brennan 7927* is more unusual in having spreading-villous hairs. This specimen can nevertheless be readily segregated from *H. pendula* by the leaves being concolorous, >15 mm long, having the same indumentum type on both sides of the leaves, and a long-apiculate apex to c. 2 mm long. The flowers and anthers of *K.G. Brennan 7927* have lengths that are typical for *H. scopulicola*.

Additional specimens examined

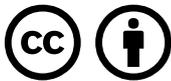
NORTHERN TERRITORY. Upper Deaf Adder Ck, escarpment opposite Kakadu Fire Plot 064, 20 Mar. 2009, *K.G. Brennan 7927* (DNA); upper Liverpool River, Mirbik area, 21 Apr. 2009, *K.G. Brennan 8003* (DNA); above fire plot 062, Deaf Adder, Kakadu N.P., 12 Mar. 2014, *K. Brennan 10268* (DNA); sandstone bluff, East Alligator area, 25 Feb. 1973, *L.A. Craven 2408* (DNA); Hill 253, Northern Outliers, Kakadu, 21 Feb. 2005, *J.L. Egan & J. Russell-Smith 5572* (DNA); 11.5 km NE of Jabiru East, Kakadu N.P., 26 May 1980, *M. Lazarides 9005* (DNA); 10 km SE of Mt Howship, 30 Oct. 1987, *Russell-Smith 3892 & Lucas* (DNA); Upper Magela Ck area, Western Arnhem Land, 24 Apr. 2007, *J. Westaway 2276* (AD, DNA); Kakadu, northern sandstone outlier, 12.6 km NE of Jabiru airfield western heli[pad], 10 Aug. 2015, *B. Wirf 930 & T. North* (DNA); Kakadu, northern sandstone outlier, 12.6 km NE of Jabiru airfield, western heli[pad], 12 Aug. 2015, *B. Wirf 946 & T. North* (DNA).

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