

Review of *Hibbertia mucronata* and its allies (Dilleniaceae)

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Abstract

Wheeler, J.R. Review of *Hibbertia mucronata* and its allies (Dilleniaceae). *Nuytsia* 13(2): 379–394 (2000). *Hibbertia mucronata* (Turcz.) Benth. and its close allies are described and illustrated. A new combination *H. ulicifolia* (Benth.) J.R. Wheeler is made and four new species, *H. axillibarba* J.R. Wheeler, *H. carinata* J.R. Wheeler, *H. hamulosa* J.R. Wheeler and *H. charlesii* J.R. Wheeler, are described. All six species occur in the South West Botanical Province of Western Australia and three of them have conservation priority.

Introduction

Hibbertia mucronata was originally described by Turczaninov in 1852 as *Pleurandra mucronata* and was transferred to the genus *Hibbertia* Andr. (Dilleniaceae) by Bentham in 1863. Detailed examination of the PERTH collections of *H. mucronata* revealed several additional, seemingly closely related, taxa. Examination of types revealed that one of the possible new species already had the name *H. stowardii* and a further taxon a name as a variety of *H. acerosa*. All occur in the South West Botanical Province of Western Australia. Three of the new species appear very restricted in distribution.

Hibbertia hamulosa, *H. carinata* and *H. ulicifolia*, appear to be very closely allied to *H. mucronata* and belong with it in the section *Pleurandra* (Labill.) Benth. *Hibbertia axillibarba*, is more closely allied to *H. stowardii*, and both of them also clearly belong to the section *Pleurandra*. *Hibbertia charlesii*, however, although superficially similar to the other species, does not appear to fit any of the currently recognized sections because of the presence and position of its staminodes (Bentham 1863 and Gilg & Werdermann 1925). The genus is badly in need of a revision which also reflects its sectional boundaries.

Terminology

Several characters used in distinguishing between taxa in this paper require some comment.

Hair types. Stellate hairs in some of the species of *Hibbertia* discussed below may sometimes be reduced to hairs with only one or two branches and so appear simple or v-shaped. These hairs, which usually

occur along with normal stellate hairs, are here termed 'semi-stellate' so as to reflect their relationship with normal 'stellate' hairs. Such hairs are known from a number of *Hibbertia* species and are not restricted to this group. They have also been noted in eastern Australia (Toelken 1998).

True simple hairs in the *Hibbertia* species dealt with in this paper are referred to as 'pilose' or 'woolly' hairs, which may be long or short, or as 'uncinate' hairs, which are short and (as implied by their name) hooked.

Leaf shape. Leaf shape is difficult to describe in the many *Hibbertia* species which have the leaf margins recurved to, or almost to, the midrib of the lower surface. The true margin between the adaxial (upper) and abaxial (lower) surfaces of the recurved leaf may be hidden on the lower surface of the leaf, leaving an 'apparent margin' at the edge of the leaf which is actually formed from part of the adaxial leaf surface. The true abaxial surface may be almost or completely hidden, often with only the midrib visible. In the species considered here the leaf is described in terms of the 'upper surface' referring to only the part of the true adaxial surface which remains uppermost, the 'apparent lower surface' which is really the outer edges of the original adaxial surface now recurved to the midrib, and the 'apparent margin' which is the new edge formed after the margins have been recurved. This apparent margin may be rounded or acute. The midrib in some of the species below is enlarged to such an extent that it protrudes beyond the apparent lower leaf surface.

Key to species

1. Young branchlets densely woolly
 2. Stamens 5; staminodes absent **1. *H. mucronata***
 2. Stamens 5; staminodes 5–20 **5. *H. charlesii***
1. Young branchlets glabrous or with minute stellate hairs
 3. Midrib of lower leaf surface protruding and prominent
 4. Outside of calyx with minute but fairly dense stellate hairs and also scattered uncinata hairs. Stamens 5–8 **2. *H. hamulosa***
 4. Outside of calyx almost glabrous. Stamens 9–11(12) **4. *H. carinata***
 3. Midrib of lower leaf surface either completely hidden or, if visible, then not protruding but level with to sunken between the revolute leaf margins
 5. Leaf surface smooth and shiny, tip of leaf tapered and long acute, with a pungent mucro. Flowers on a peduncle 4–8 mm long **3. *H. ulicifolia***
 5. Leaf surface dull and minutely papillose, tip of leaf more or less obtuse but with a pungent mucro. Flowers sessile or subsessile
 6. Leaf base with a dense tuft of pilose hairs; midrib of lower surface hidden. Sepals with long pilose hairs **7. *H. axillibarba***
 6. Leaf base glabrous; midrib of lower surface visible. Sepals almost glabrous **6. *H. stowardii***

Descriptions

1. *Hibbertia mucronata* (Turcz.) Benth., Fl. Austral. 1: 29 (1863). – *Pleurandra mucronata* Turcz., Bull. Soc. Nat. Mos. xxv (2): 139 (1852). Type: New Holland [Western Australia], J. Drummond 5th coll. 290 (iso: MEL 666871).

Shrub erect to 1 m high; branchlets woolly-hairy with long fine curled simple hairs and glabrescent ridges below each petiole. *Leaves* spirally arranged, crowded, ascending, usually not spreading beyond 30 degrees to the stem; petiole 1–1.5 mm long, glabrous abaxially and woolly-hairy adaxially; blade linear to subulate and gradually tapering apically but thick to almost semi-terete, 5–18 mm long, 0.9–1.5 mm wide, the margins tightly revolute to the enlarged midrib; upper surface initially with long spreading (woolly) hairs but glabrescent, smooth apart from very occasional minute protuberances particularly on the apparent margin; apparent lower surface glabrous; apparent margins thick and rounded; apex a pungent mucro 0.7–1.5 mm long. *Flowers* solitary, axillary, sessile or with a hairy peduncle to 2 mm long; bracts at base of peduncle few or absent; bract immediately below flower subulate, 2–3.5 mm long, harshly pungent, glabrous abaxially and woolly-hairy adaxially. *Sepals* 5, connate basally; outer sepals narrowly elliptic to elliptic, 6–8.5 mm long including a harsh mucro 2–4 mm long, the outer surface with short and sometimes very sparse stellate or semi-stellate hairs, the margin minutely ciliolate, the apex and margin woolly inside; inner sepals elliptic to broadly elliptic, 5–5.5 mm long including a short mucro c. 0.5 mm long, with short stellate and semi-stellate hairs sometimes sparse, with broad membranous margins which are glabrous apart from the minute cilia. *Petals* 5, golden yellow, obovate, 6–9 mm long, emarginate. *Stamens* 5, connate basally, all on one side of the carpels; anthers narrowly oblong, c. 2 mm long, opening by longitudinal slits; staminodes absent. *Carpels* 2, globular to broadly obovoid, loosely but densely hairy; ovules 2 per carpel. *Fruitlets* dry, often only one developing to maturity, obovoid to broadly obovoid, 3–3.5 x 2–2.5 mm, splitting apically and adaxially to release the seeds; seeds brown, broadly ellipsoid to globular, c. 3 x 2–2.5 mm, with a cream waxy aril. (Figure 1)

Selected specimens examined (all PERTH). WESTERN AUSTRALIA: Kundip, near Ravensthorpe, 27 Oct. 1963, T.E.H. Aplin 2697; 5.7 km W along track from Hopetoun Road turnoff, 20.6 km from Ravensthorpe, 3 June 1998, M. Bennett 168; 4 km WSW of Mt Maxwell, 12 Mar. 1996, R. Davis RD523; Daniels Rd, N of Hopetoun, 31 Aug. 1963, A.S. George 5732; Thumb Peak Range, SW of Ravensthorpe, 31 Oct. 1965, A.S. George 7151; 9 miles [15 km] NW of Mt Bland, 30 Sep. 1962, K. Newbey 493; along edge of firebreak E of Table Hill Lookout, Hopetoun, 5 Nov. 1997, H. Taylor 4; Fitzgerald River National Park, lower slopes of East Mt Barren, Hamersley Drive, 12 Sep. 1983, J. Taylor 1719 & P. Ollerenshaw; Fitzgerald River National Park, just W of East Mt Barren, c. 2 km W of walk trail up East Mt Barren, 23 Sep. 1986, J.R. Wheeler 2429; lower slopes of West Mt Barren, Fitzgerald River National Park, 23 Sep. 1986, J.R. Wheeler 2436.

Distribution. Western Australia, South West Botanical Province, Eyre District, occurring in Fitzgerald River National Park and east to near Ravensthorpe and just east of Hopetoun. (Figure 2A)

Habitat. Recorded from breakaways, rocky slopes, rock crevices, sand or sand over granite or quartzite, in coastal heath, scrub or mallee-scrub vegetation.

Flowering period. July to January, but some flowers also recorded for March and May.

Conservation status. Restricted but well conserved in a large national park and not considered endangered, although its response to attack by *Phytophthora* has not been documented.

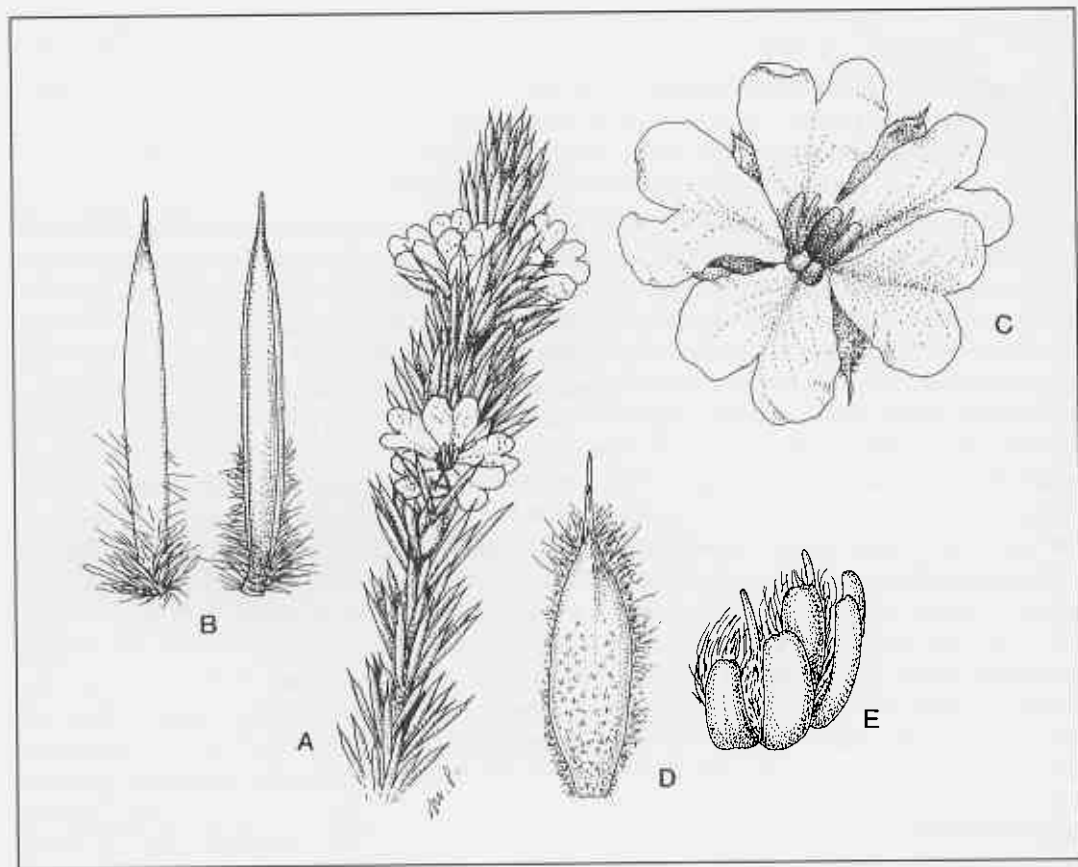


Figure 1. *Hibbertia mucronata* A – flowering branch (x1.5); B – leaf, upper and lower surface (x6); C – flower (x3); D – sepal (x6); E – stamens and carpels (x6). Drawn from J.R. Wheeler 2425.

2. *Hibbertia hamulosa* J.R. Wheeler, *sp. nov.*

Hibbertiae mucronatae affinis sed indumento lanoso caulium foliorumque juvenalium carenti; sepalis pilis parvis uncinatis ornatis differt.

Typus: south-east slope of East Mount Barren, Western Australia, 7 October 1971, R.D. Hoogland 12080 (*holo*: PERTH 04395239; *iso*: CANB, L, UC, HBG, K, US).

Shrub erect to 1 m high; branchlets minutely stellate-hairy sometimes sparsely so, ridged below each petiole. *Leaves* spirally arranged, fairly crowded, usually not spreading beyond 45 degrees to the stem; petiole 0.5–1 mm long, minutely stellate-hairy, less often glabrous; blade linear to subulate and gradually tapering apically but very thick to semi-terete, 7–18 mm long and 0.5–1 mm wide, the margins tightly revolute to the enlarged midrib, glabrous, more or less smooth, with occasional scabrous and apically directed protuberances particularly on the thick and rounded apparent margin; apex a pungent mucro 0.7–1.2 mm long. *Flowers* solitary, usually terminating short axillary shoots, rarely axillary; peduncle 2–4 mm long, thick, densely minutely stellate-hairy; bracts at base of peduncle absent (if flowers terminal) or few (if flowers axillary); bract immediately below flower subulate, 1.5–4 mm long, harshly pungent, minutely stellate-hairy towards base. *Sepals* 5, connate

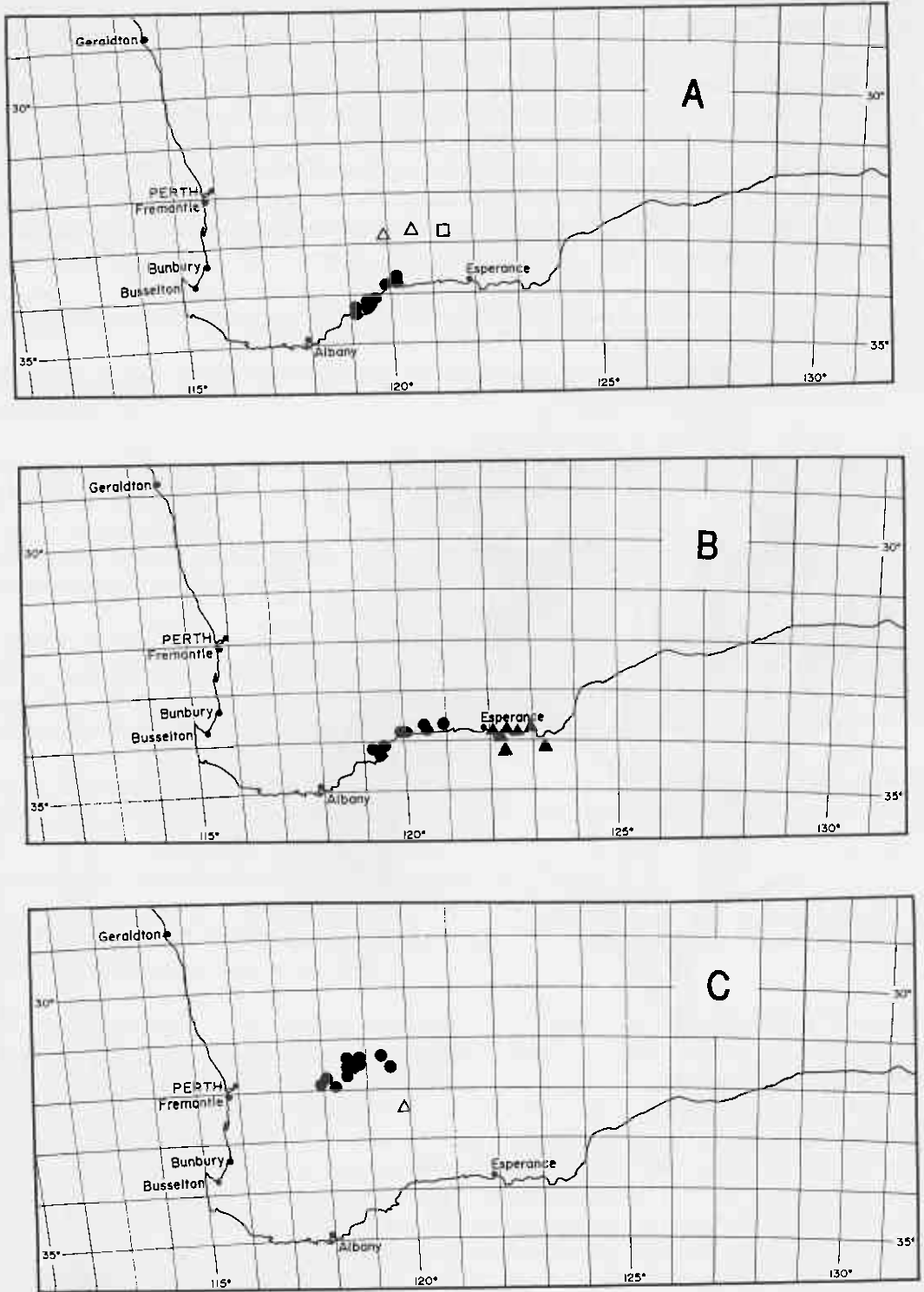


Figure 2. Distribution maps. A - *Hibbertia carinata* Δ , *H. charlesii* \square and *H. mucronulata* \bullet ; B - *H. hamulosa* \bullet and *H. ulicifolia* \blacktriangle ; C - *H. axillibarba* Δ and *H. stowardii* \bullet .

basally, the outer surface minutely and densely stellate-hairy and also with scattered uncinata hairs, the inner surface minutely woolly-hairy towards apex with short curled hairs, harshly mucronate; outer sepals narrowly elliptic, 5–6.5 mm long including a mucro up to 3 mm long; inner sepals a little broader, more obtuse, with sparser stellate and uncinata hairs, with also sometimes semi-stellate hairs, margins membranous and glabrous or minutely ciliolate. *Petals* 5, golden yellow, obovate, 4–7 mm long, emarginate. *Stamens* 5–8, connate basally, all on one side of the carpels; anthers narrowly oblong, 1–1.5 mm long, opening by longitudinal slits; staminodes absent. *Carpels* 2, obovoid to broadly obovoid, loosely but densely hairy; ovules 2 per carpel. *Fruitlets* dry, obovoid to broadly obovoid, 3–4 x c. 2.5 mm, splitting apically and adaxially to release the seeds; seeds brown, broadly ellipsoid to globular, with a cream waxy aril. (Figure 3)

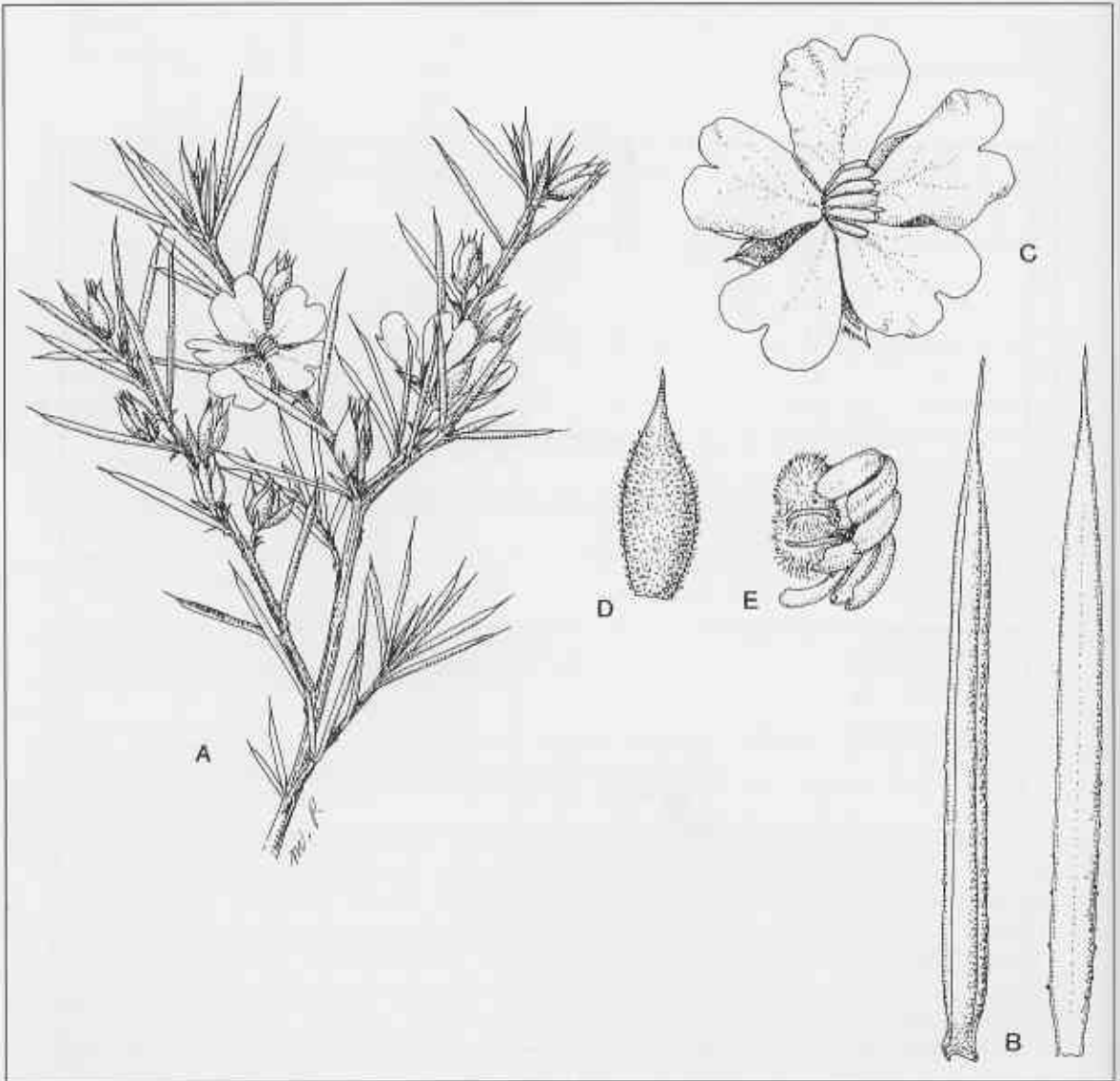


Figure 3. *Hibbertia hamulosa*. A – flowering branch (x1.5); B – leaf, upper and lower surface (x6); C – flower (x3); D – sepal (x6); E – stamens and carpels (x6). Drawn from J.R. Wheeler 2434.

Other specimens examined (all PERTH). WESTERN AUSTRALIA: Ravensthorpe–Esperance, 7–9 Mar. 1968, *L. Fell* S455; W side of Mt Bland, Reserve 24048, 15 July 1970, *A.S. George* 10052; Devils Creek Rd, East Gardiner River, 10 Aug. 1981, *B.E. Hall* 64 (ALB); along Ravensthorpe–Esperance road, c. 10 miles [16 km] W of Oldfield River, 5 Oct. 1971, *R.D. Hoogland* 12078; SE slopes of East Mt Barren, 7 Oct. 1971, *R.D. Hoogland* 12080; 1 mile [1.6 km] S of Mt Maxwell, 5 Sep. 1973, *K.R. Newbey* 3749; 50 km along Springdale Rd off Hopetoun–Ravensthorpe road, 2 Jan. 1983, *A. Strid* 21901; Fitzgerald River National Park, West Mt Barren, 23 Sep. 1986, *J.R. Wheeler* 2434.

Distribution. Western Australia, South West Botanical Province, Eyre District, from near Bremer Bay to between Ravensthorpe and Esperance. (Figure 2B)

Habitat. Recorded from gravel or rocky slopes, sand or sand over quartzite, in heath or scrub vegetation.

Flowering period. Mostly July to October, but some flowers have been recorded for January; fruits recorded for March.

Conservation status. Restricted in distribution but occurs within a National Park and not considered endangered, although its response to attack by *Phytophthora* has not been documented.

Etymology. From the Latin *hamulosa*, armed with small hooks, referring to the tiny hooked hairs found on the outer surface of the sepals.

Affinities. Differs from *H. mucronata* chiefly in its indumentum and its smaller flowers. Differs from *H. ulicifolia* in its less spreading, almost semi-terete leaves with a more pronounced midrib, its thicker and shorter peduncles and subulate bract below the flowers, the more harshly pungent sepals which have an indumentum of both stellate and simple uncinata hairs and its fewer stamens.

Note. A collection from east of the Hopetoun to Ravensthorpe road (*A. Strid* 21901) is unusual in having sparse long simple hairs (instead of stellate hairs) on the stems and young shoots.

3. *Hibbertia ulicifolia* (Benth.) J.R. Wheeler, *comb. et stat. nov.*

Hibbertia acerosa (R. Br.) Benth. var. *ulicifolia* Benth., Fl. Austral. 1: 25 (1863). *Type:* King George Sound, [Western Australia], *Baxter* (*holo:* K)

Shrub to 1.2(2) m high; branchlets minutely stellate-hairy but soon glabrescent, somewhat angularly ridged below each petiole. *Leaves* spirally arranged, not usually crowded, spreading usually to 90 degrees to the stem; petiole 0.3–1 mm long; blade linear to subulate and gradually tapering apically but thick, 7–14(18) mm long and 0.6–1.5 mm wide, with the margins tightly revolute to the obvious but not protruding midrib, glabrous and more or less smooth; apparent margins thick, rounded and occasionally with very few scabrous hairs towards the leaf base; apex a pungent mucro 0.5–1.2(1.5) mm long. *Flowers* solitary, axillary; peduncle slender, 4–8 mm long, sparsely and minutely stellate-hairy; bracts at base of peduncle several, brown, narrowly ovate-elliptic to ovate-elliptic, sparsely and minutely stellate-hairy, ciliolate, mucronate; bract immediately below flower narrowly ovate-elliptic to ovate-elliptic, 1–3 mm long, sparsely and minutely stellate-hairy, ciliolate, mucronate. *Sepals* 5, connate basally, the outer surface minutely hairy with sparse stellate or semi-stellate hairs, the inner surface minutely woolly-hairy towards the apex with short curled simple hairs, long-acuminate to shortly mucronate; outer sepals narrowly ovate-elliptic, 4–6.5 mm long including

a mucro 0.2–0.8 mm long; inner sepals a little broader and more obtuse, a little more densely stellate-hairy outside, margins membranous and often minutely ciliate. *Petals* 5, golden yellow, obovate, 4–7 mm long, emarginate. *Stamens* 9, connate basally, all on one side of and curved over the carpels; anthers narrowly oblong to oblong, 1.5–2.5 mm long, opening by longitudinal slits; staminodes absent. *Carpels* 2, globular, densely shortly stellate-hairy; ovules 2 per carpel. *Fruitlets* dry, c. 3 x 2 mm, splitting apically and adaxially to release the seeds; seeds brown, globular, with a small white waxy aril (not seen mature). (Figure 4)

Other specimens examined (all PERTH). WESTERN AUSTRALIA: High Island, Duke of Orleans Bay, Oct. 1970, *T.E.H. Aplin* 4242; Lucky Bay (E of Esperance), 10 Sep. 1966, *E.M. Bennett* 895 B; Cape Le Grand National Park, between Rossiter Bay car park and the Bird Sanctuary, 24 Sep. 1985, *M. Carter* 190; Whistling Rock, 20 m W of Thistle Cove carpark, Cape Le Grand National Park, 19 Oct. 1989, *B.J. Conn* 3437 & *J.A. Scott*; [Cape] Le Grand National Park, SW of Lucky Bay, along walk to Thistle Cove, 14 Oct. 1991, *W. Greuter* 22824; Mondrain Island, Recherche Archipelago, 6 Feb. 1960, *R.D. Royce* 6221; Cape Le Grand National Park, 21 Oct. 1969, *R.D. Royce* 8691; inland from Lucky Bay, E of Esperance, 30 Sep. 1970, *R.A. Saffrey* 1219; c. 2 miles [3 km] S of Frenchman Peak, Cape Le Grand National Park, 10 Nov. 1971, *A.S. Weston* 7202; western quarter of Middle Island, Recherche Archipelago, 14 Nov. 1974, *A.S. Weston* 9878; Cape Le Grand, on hill c. 25 km SE of Esperance, 7 Oct. 1966, *P.G. Wilson* 5563; Mt Howick, c. 76 km E of Esperance and 18 km N of coast, 30 Sep. 1968, *P.G. Wilson* 8131.

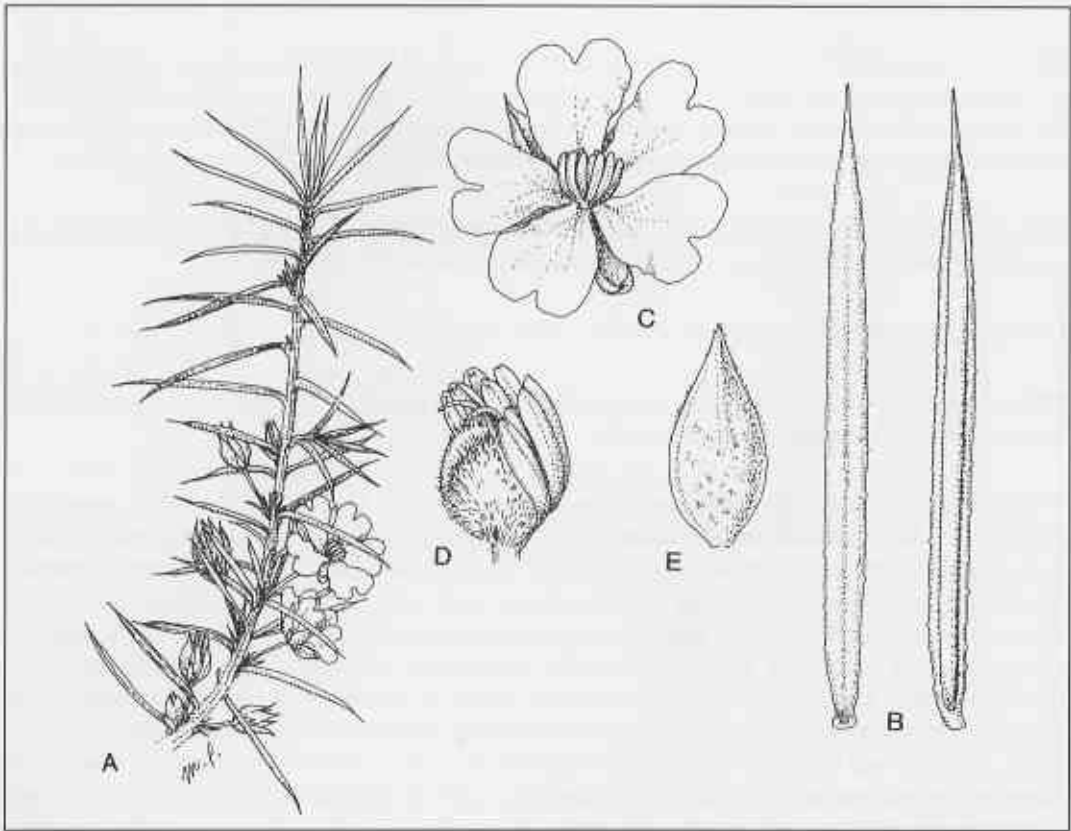


Figure 4. *Hibbertia ulicifolia*. A – flowering branch (x1.5); B – leaf, upper and lower surface (x6); C – flower (x3); D – sepal (x6); E – stamens and carpels (x6). Drawn from *P.G. Wilson* 8131.

Distribution. Western Australia, South West Botanical Province, Eyre District, occurring east of Esperance, from Mt Le Grand to Duke of Orleans Bay, also recorded from slightly north-east at Howick Hill and also from islands of the Recherche Archipelago. (Figure 2B)

Habitat. Recorded mostly in coastal heath on granitic sands or granitic scree slopes.

Flowering period. Flowers mostly September to November, but occasional flowers recorded for February and April.

Conservation status. Occurs within a National Park and not considered endangered, although its response to attack by *Phytophthora* has not been documented.

Affinities. Differs from both *H. mucronata* and *H. hamulosa* in several ways. *H. ulicifolia* has less crowded and greatly spreading leaves in which the lower midrib is not as prominently swollen, an indumentum of only minute stellate hairs (apart from the minute simple hairs on inner surface of the sepals), more numerous stamens, and longer more slender peduncles.

Notes. Originally described by Bentham (1863) as a variety of *H. acerosa*, however it clearly differs in a number of characters. *Hibbertia acerosa* has more slender foliage usually with occasional uncinatate hairs, longer peduncles, a linear bract below each flower, smaller acute to obtuse sepals with uncinatate hairs and is also distinguished by the presence of staminodes on each side of the stamens.

A collection from Mondrain Island (Royce 6221), has unusually long slender leaves 12–18 mm long with a longer mucro 1–1.5 mm long.

4. *Hibbertia carinata* J.R. Wheeler, *sp. nov.*

Hibbertiae mucronatae affinis sed foliis parvioribus, gracilioribus, indumento lanoso carenti, sepalis exterioribus glabrescentibus et carinatis differt.

Typus: south side of the north-west running grid at 2.46 km from Hatter Hill Mine, c. 1.2 km north-west of Hatter Hill, 32°49'4"S, 119°58'13"E, Western Australia, 5 September 1996, N. Gibson & K. Brown 3059 (*holo:* PERTH 05291631).

Shrub to 0.4 m, somewhat spreading; branchlets with sparse minute stellate hairs, ridged below each petiole. *Leaves* spirally arranged, crowded, ascending, usually not spreading beyond 30 degrees to the stem, subsessile or with a very short and broad glabrous petiole up to 0.5 mm long; blade linear and slightly tapering apically, thick to almost semi-terete, 3.5–8 mm long and 0.7–1.2(1.7) mm wide, the margins tightly revolute to an enlarged pale midrib; upper surface shiny and usually more or less glabrous, somewhat roughened with minute protuberances and sometimes with very sparse, minute semi-stellate hairs; apparent lower surface more or less glabrous, shiny; midrib shiny with very occasional minute hairs, apparent margin acute and distinctly but often sparsely scabrous; apex a pungent mucro (0.2)0.5–1.3 mm long. *Flowers* solitary, terminating short shoots and somewhat hidden in bud by the crowded leaves, sessile; bract below flower linear, leaf-like, 3–4 mm long, pungent, glabrous or with a few minute scabrous hairs towards the tip of the midrib and on the margin. *Sepals* 5, connate basally, elliptic and with a prominent pale yellowish keel, usually shiny; outer sepals 4.5–6.5 mm long including a pungent mucro 0.3–1 mm long, usually glabrous; inner sepals broader and often with minute semi-stellate hairs, the margins membranous and glabrous. *Petals* 5, yellow,

obovate, 4.5–6.5 mm long, deeply emarginate. *Stamens* 9–11(12), connate basally, all on one side of the carpels; anthers narrowly oblong, 1.5–2 mm long, truncate, opening by longitudinal slits; staminodes absent. *Carpels* 2, globular to obovoid, densely hairy; ovules 4(5) per carpel. Mature *fruitlets* not seen. (Figure 5)

Other specimens examined (all PERTH). WESTERN AUSTRALIA: Esperance, May 1974, *R. Edmiston* E727; to the N of the track, c. 1.4 km SW of Hatter Hill, 32 49' 46" S, 119 58' 0" E, 4 Sep. 1996, *N. Gibson & K. Brown* 3060; to the W of cleared strip c. 50 m E of Hatter Hill, 32 49' 29" S, 119 58' 51" E, 3 Sep. 1996, *N. Gibson & K. Brown* 3061; c. 115.7 km E of Lake King, 18 Sep. 1976, *R.J. Hnatiuk* 760876; 0.5 km NW of Hatter Hill, c. 40 km NE of Lake King, 9 Aug. 1979, *K. Newbey* 5468; 9 km S of Mt Gibbs, 33 km ENE of Lake King, 10 Aug. 1979, *K. Newbey* 5493.

Distribution. Western Australia, South West Botanical Province, Roe District, being recorded from only a few locations between Lake King and Salmon Gums and a probably generalised locality of Esperance. (Figure 2A)

Habitat. Recorded from scrub or open scrub on well-drained gravelly sand or yellow sand with some gravel.

Flowering period. Flowers recorded for August and September.

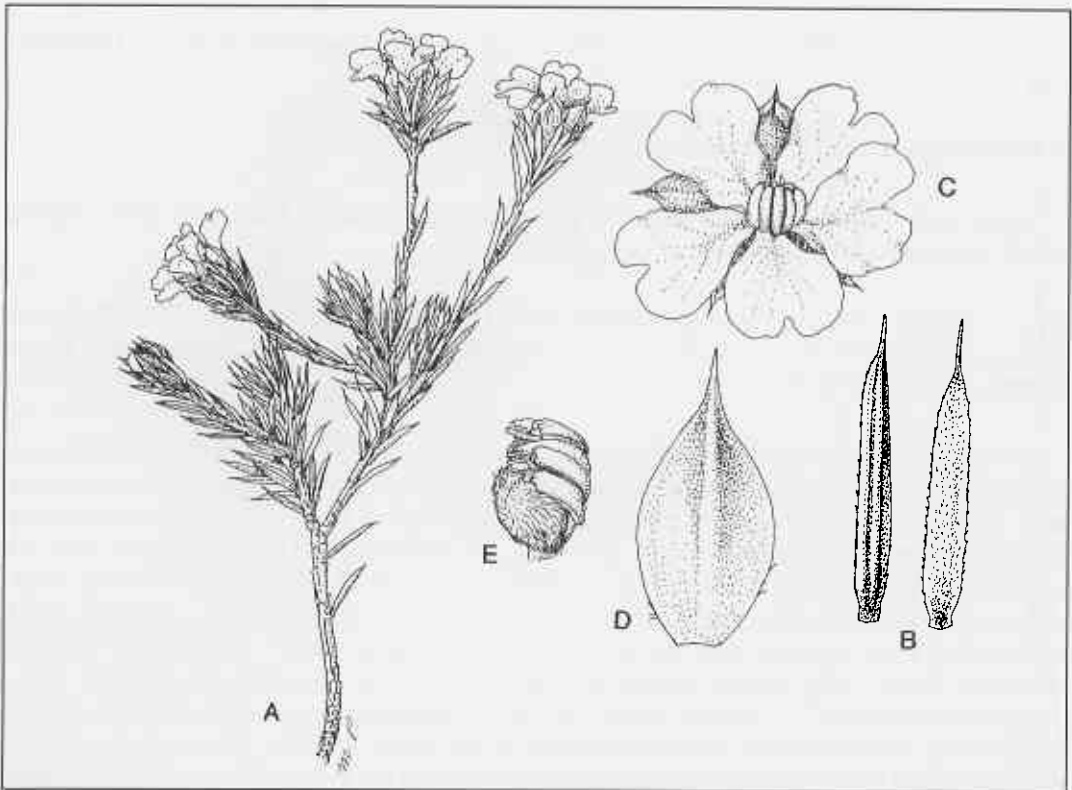


Figure 5. *Hibbertia carinata*. A – flowering branch (x1.5); B – leaf, upper and lower surface (x6); C – flower (x3); D – sepal (x6); E – stamens and carpels (x6). Drawn from *K. Newbey* 5468.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority One. Apparently restricted in distribution and in need of surveying. Currently known from less than five populations but possibly not under immediate threat. Possibly under-collected as the species was recorded as being "frequent" at one locality. Its response to attack by *Phytophthora* has not been documented.

Etymology. From the Latin *carinata*, keeled, referring to the keeled sepals.

Affinities. Probably most closely allied to *H. mucronata* and *H. ulicifolia*. *Hibbertia mucronata* differs in its woolly indumentum, larger flowers, the sepal indumentum, its fewer larger stamens and the presence of only 2 ovules per carpel. *Hibbertia ulicifolia* differs in its longer leaves, shortly pedunculate flowers a denser indumentum on its larger sepals, fewer stamens and carpels with only 2 ovules.

Note. A collection, with a probably rather general collecting locality of "Esperance", (*R. Edmiston* E727) may also be referable to this species, but has duller sepals less strongly keeled and with a greater number of minute semi-stellate hairs. A further collection (*K. Newbey* 5493) may also be referable to this species but has shorter broad leaves 3–5 mm long and 1.2–1.7 mm wide with shorter mucro 0.2–0.5 mm long and larger flowers with petals up to 7.5 mm long.

5. *Hibbertia charlesii* J.R. Wheeler, *sp. nov.*

Hibbertiae mucronatae affinis sed seriei staminodiorum staminis exteriorum posita differt.

Typus: Peak Charles, 25 miles [40 km] west of Dowak, Western Australia, 24 October 1964, *J.S. Beard* 3814 (*holo:* PERTH 04395344; *iso:* AD)

Shrub to 1 m, spreading; branchlets with dense grey to white woolly hairs when young and with glabrescent ridges below the petioles. *Leaves* spirally arranged, crowded, ascending, usually not spreading beyond 45 degrees from the stem; petiole 0.5–2 mm long, the adaxial surface somewhat hairy; blade linear and slightly tapering apically, thick, 6–16 mm long, 1–1.5 mm wide, the margins closely revolute to an enlarged midrib, all surfaces roughened with minute protuberances but otherwise glabrous and shiny; apparent margin thick and rounded; apex a pungent mucro 1–2 mm long. *Flowers* solitary, terminal or terminating short shoots, subsessile; bracts few and leaf-like hidden amongst woolly hairs. *Sepals* 5, connate basally, elliptic; outer sepals somewhat asymmetric, 7–9 mm long, woolly outside and also towards the apex inside, tapered into a leaf-like pungent apex with a mucro 1–1.5 mm long; inner sepals more or less symmetric, broader, margins membranous and almost glabrous, apex more obtuse but with a pungent mucro. *Petals* 5, golden yellow, obovate and deeply emarginate, 6–9 mm long. *Stamens* 5 fertile, basally connate and all on one side of the carpels; anthers narrowly oblong, *c.* 2.5 mm long, opening by longitudinal slits; staminodes 5–20 arranged outside the fertile stamens, varying in size up to 1.5 mm long. *Carpels* 2, obovoid, *c.* 2 x 1–1.3 mm, densely white-hairy; ovules 4 per carpel, sometimes only one developing. Mature *fruitlets* not seen. (Figure 6)

Other specimens examined (all PERTH). WESTERN AUSTRALIA: Peak Charles, Q225, 11 Oct. 1995, *S. Barrett* 608; Peak Charles National Park, *c.* 45 km W of Salmon Gums, 10 Nov. 1979, *K. Newbey* 6445; Peak Charles, 28 Nov. 1973, *A.S. Weston* 8988.

Distribution. Western Australia, South West Botanical Province, Roe District, being recorded only from Peak Charles National Park. (Figure 2A)

Habitat. Recorded from scrub on exposed mountain slopes on granite or skeletal loamy sand over granite.

Flowering period. Flowers recorded October and November.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Two. Apparently restricted in distribution and in need of surveying. Currently known from one or few populations but not believed to be under immediate threat as it occurs in a national park. Its response to attack by *Phytophthora* has not been documented.

Etymology. This species is named after Peak Charles, the only place so far that it has been collected.

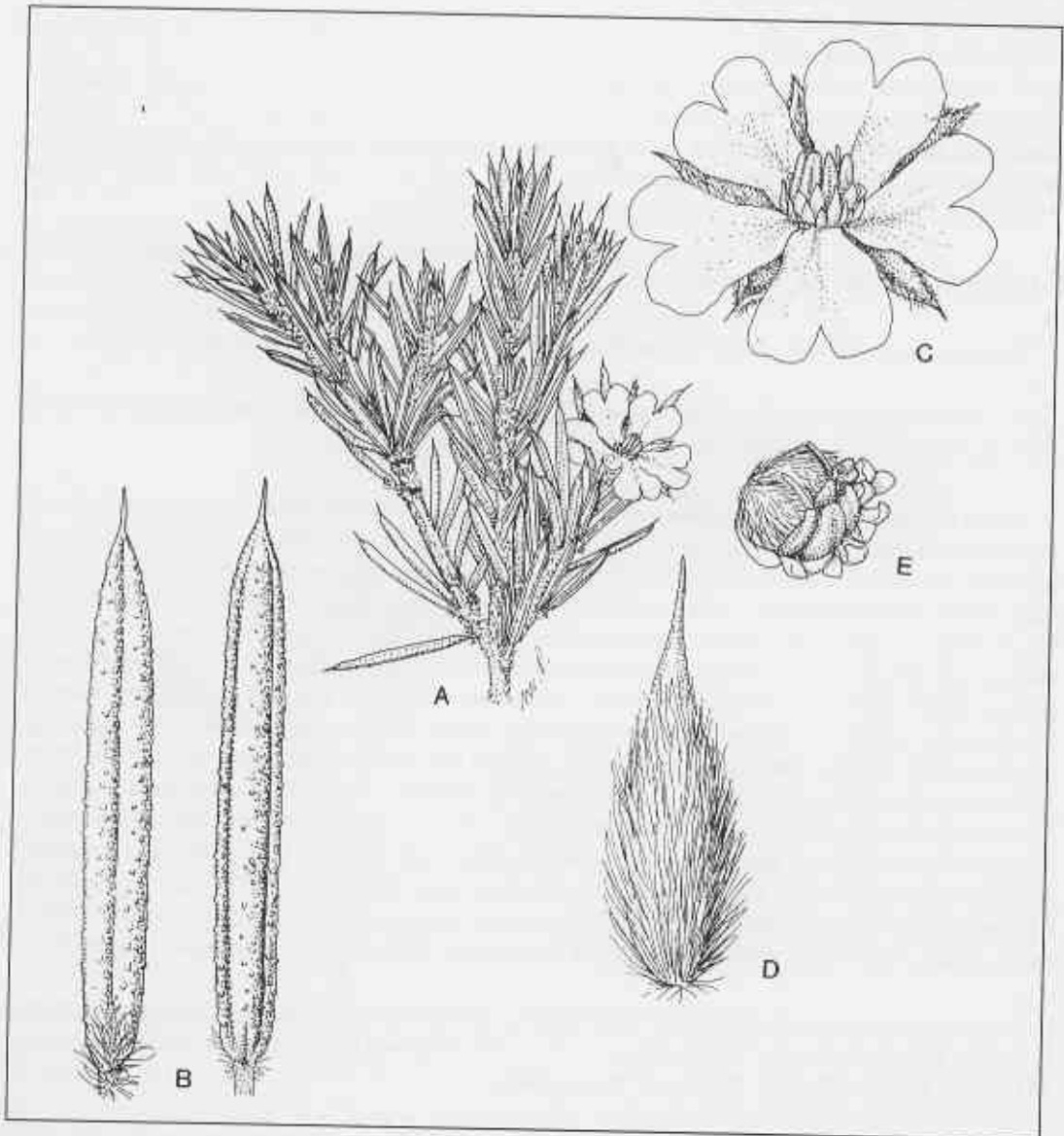


Figure 6. *Hibbertia charlesii*. A - flowering branch (x1.5); B - leaf, upper and lower surface (x6); C - flower (x3); D - sepal (x6); E - stamens and carpels (x6). Drawn from A.S. Weston 8988.

Affinities. The woolly indumentum makes this species superficially similar to *H. mucronata*. However *H. charlesii* clearly differs in the presence of a row of staminodes outside the fertile stamens and the presence of 4 rather than 2 ovules in each carpel. The presence and position of the staminodes makes this species difficult to place within the sectional framework traditionally used for the genus (Bentham 1863 and Gilg & Werdermann 1925). Section *Pleurandra* (Labill.) Benth. includes those species with all stamens on one side of two carpels and *H. mucronata* belongs to this section. Section *Hemipleurandra* Benth. includes those species with all stamens on one side of two carpels but which also have either a few staminodes on each side of the stamens or opposite the stamens forming an almost continuous circle. Section *Hemistemma* (Juss. ex Thouars) Benth. includes those species which, like *H. charlesii*, have staminodia all on one side of and outside the fertile stamens, but which, unlike *H. charlesii*, also have peduncles which bear two or more flowers. Further studies are clearly needed on the sectional framework of the genus *Hibbertia*.

6. *Hibbertia stowardii* S. Moore, *J. Linn. Soc. Bot.* xlv: 163 (1920). *Type:* Kununoppin, Western Australia, *F. Stoward* 727 (*holo:* BM).

Shrub erect to 0.3 m high; branchlets glabrous with smooth greyish bark, with glabrous ridges below the petioles. *Leaves* alternate or in alternate clusters, crowded, ascending, usually spreading to 60 degrees to the stem; petiole less than 0.5 mm long, glabrous; blade narrowly oblong to linear and not or scarcely tapering apically, thick, 4–12 mm long, 1–1.5 mm wide, the margins closely revolute to the midrib; upper surface glabrous, dull and microscopically papillose; apparent margin rounded; midrib not enlarged; apex rounded and with a pungent mucro 0.3–1 mm long. *Flowers* solitary, terminating short axillary shoots, subsessile; bracts subtending flower usually 3, narrowly triangular to narrowly ovate, 1.5–4 mm long, pungent. *Sepals* 5, connate basally, elliptic to broadly elliptic or obovate, mucronate; outer sepals 4–6 mm long including a mucro c. 0.5 mm long, almost glabrous; inner sepals 5–7 mm long, broader and more obtuse, with very minute appressed semi-stellate hairs, and with membranous margins. *Petals* 5, golden yellow, obovate and deeply emarginate, 6.5–10 mm long. *Stamens* usually 10, occasionally 8 or 9, connate basally, all on one side of the carpels; anthers narrowly oblong, 1.2–2 mm long, opening by longitudinal slits; staminodes absent. *Carpels* 2, more or less globular, densely white-hairy; ovules 2 per carpel. *Fruitlets* dry, obovoid, 2.5–3 x c. 2 mm, splitting apically and adaxially to release the seeds; seeds brown, subglobular, 1.5–2 mm across, with a small translucent waxy aril. (Figure 7)

Selected specimens examined (all PERTH). WESTERN AUSTRALIA: E of Carrabin, 4 July 1965, A.M. Ashby 1468; Muntadgin, Oct. 1945, E.T. Bailey 2; Carrabin, between Merredin and Southern Cross, 22 Aug. 1939, W.E. Blackall 4036; ?Bruce Rock, Sep. 1928, C.A. Gardner s.n.; 5 miles [8 km] E of Walgoolan, 22 Aug. 1939, W.E. Blackall 4014; Muntadgin, Sep. 1947, T.W. Stone & E.T. Bailey 818; 7.5 km W of Bodallin on Great Eastern Highway, 22 Sep. 1988, J.R. Wheeler 2609; c. 50 km SW of Burracoppin along Burracoppin South Rd, 22 Sep. 1988, J.R. Wheeler 2616; near Southern Cross, Anon.

Distribution. Western Australia, South West Botanical Province, Avon District, recorded between Kellerberrin and Southern Cross, extending south to North Tarin Rock and Muntadgin. (Figure 2C)

Habitat. Recorded from shrubland or heath on lateritic loam or sand.

Flowering period. Flowers recorded from July to October.

Conservation status. Restricted but not considered endangered, although its response to attack by *Phytophthora* has not been documented.

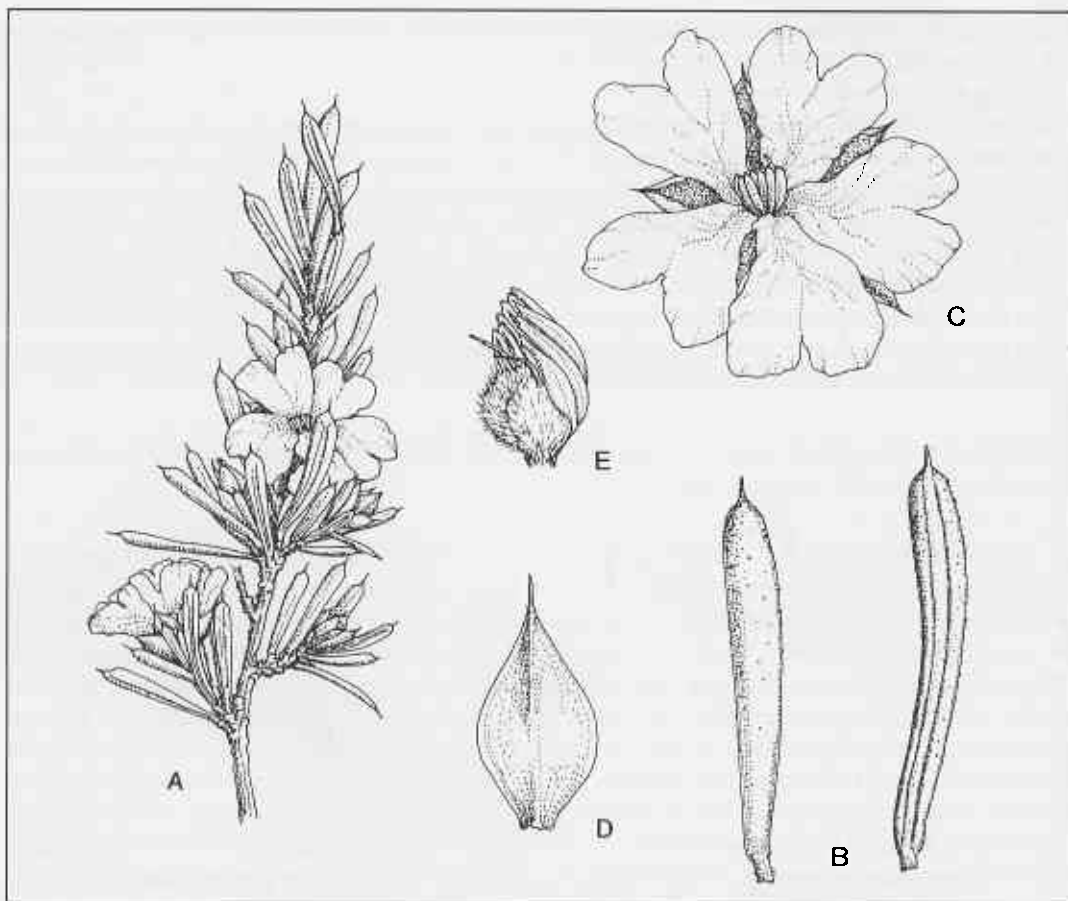


Figure 7. *Hibbertia stowardii*. A – flowering branch (x1.5); B – leaf, upper and lower surface (x6); C – flower (x3); D – sepal (x6); E – stamens and carpels (x6). Drawn from J.R. Wheeler 2617 and C.A. Gardner s.n. ?Bruce Rock.

Affinities. Sometimes previously confused with *H. mucronata*. However *H. mucronata* has woolly hairs on the young shoots and sepals, its leaves are more gradually tapered to a longer mucro and the leaves have more acute edges, the midrib is much more pronounced, the outer sepals also have a longer pungent mucro and there are only 5 stamens. *H. stowardii* appears quite distinct but most closely related to *H. axillibarba*. *Hibbertia axillibarba* however has tufts of pilose hairs inside the leaf bases and smaller flowers with pilose hairs on the sepals, also the leaves are more crowded with their margins revolute so as to hide the midrib.

Note. A collection from North Tarin Rock Nature Reserve (M.S. Graham 765) has short leaves with an indistinct tuft or hairs on the adaxial petiole surface and sepals with a few short appressed simple hairs. Further study is needed to ascertain its relationship with both *H. stowardii* and *H. axillibarba*.

7. *Hibbertia axillibarba* J.R. Wheeler, *sp. nov.*

Hibbertiae stowardii affinis sed foliis gracilioribus aggregatis, axillis foliorum pilis simplicibus ornatis differt.

Typus: South Ironcap, 200 metres east of the benchmark on summit, 32°40'43"S, 119°46'37"E, Western Australia, 7 September 1999, J.R. Wheeler 3963 (*holo*: PERTH; *iso*: AD, K, CANB).

Shrub to 0.7 m high; branchlets somewhat pilose in leaf axils with long simple hairs, ridged below each petiole, the young shoots somewhat pilose. *Leaves* alternate, crowded, somewhat spreading to 60 degrees from the stem, subsessile or with a petiole less than 0.5 mm long, the adaxial petiole surface with a basal tuft of pilose hairs; blade narrowly oblong to linear and not or scarcely tapering apically, thick, 2.5–9 mm long and 0.7–1 mm wide, the margins closely revolute to hide the midrib of the lower surface; upper surface dull, glabrous and microscopically papillose, very occasionally with sparse retrorse uncinuate hairs; apparent margins rounded; apex a pungent mucro 0.5–1 mm long. *Flowers* solitary, terminating short axillary shoots, subsessile; bracts subtending flower 1–3, subulate to linear, 3–4 mm long, hairy, pungent. *Sepals* 5, connate basally, narrowly elliptic to elliptic, tapered apically to a soft recurved mucro, outer surface and margin pilose, inner surface with a few pilose hairs towards the apex and often with scattered minute semi-stellate hairs; outer sepals 6–6.5 mm long; inner sepals slightly broader, the margins membranous with fewer hairs. *Petals* 5, yellow, obovate and deeply emarginate, 5–6 mm long, usually shorter than the sepals. *Stamens* 10 or 11, connate basally, all on one side of the carpels; anthers narrowly oblong, c. 1.5 mm long, opening by longitudinal slits; staminodes absent. *Carpels* 2, globular to obovoid, densely white-hairy; ovules 2 per carpel. Mature *fruitlets* not seen. (Figure 8)

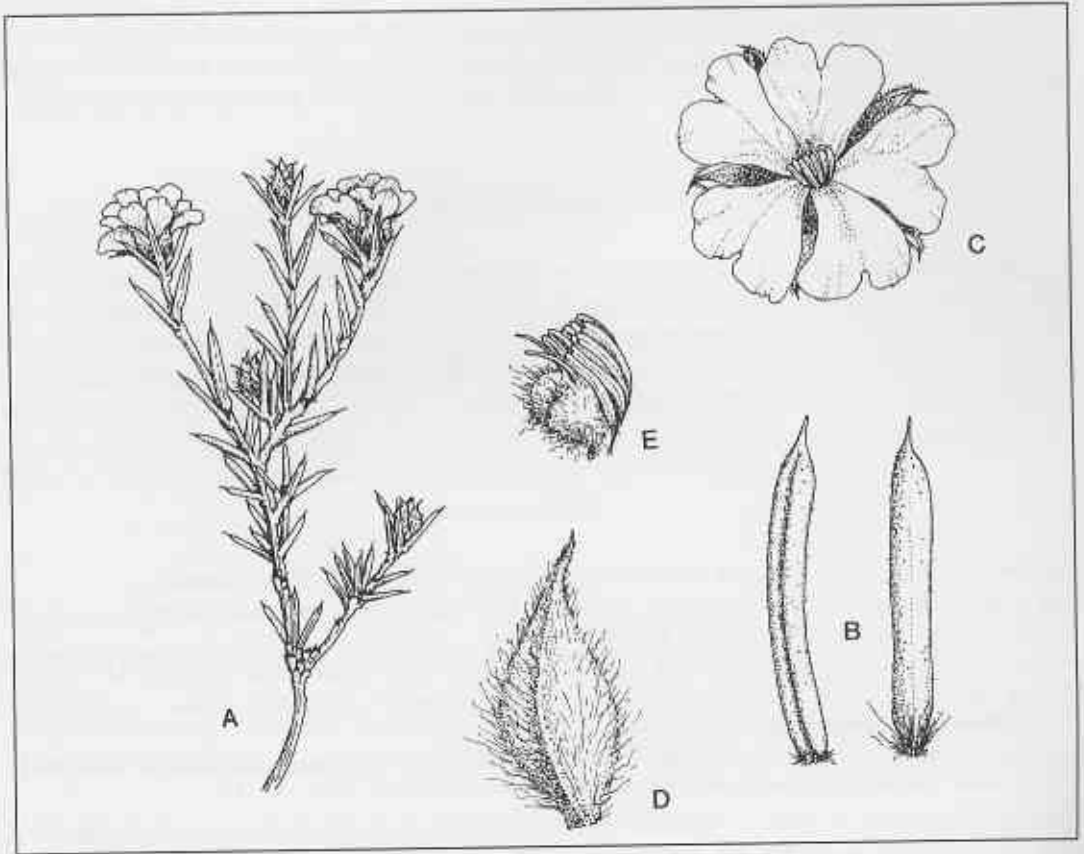


Figure 8. *Hibbertia axillibarba*. A – flowering branch (x1.5); B – leaf, upper and lower surface (x6); C – flower (x3); D – sepal (x6); E – stamens and carpels (x6). Drawn from J.R. Wheeler 3963.

Other specimens examined (all PERTH). WESTERN AUSTRALIA: South Ironcap Hill, 16 miles [26 km] N of Hatters Hill (NE of Lake King), 20 Oct. 1964, *J.S. Beard* 3730; South Ironcap, 14 Oct. 1994, *M.D. Carter* 551; on the southern side of gridline, c. 100 m S of South Ironcap, 7 Sep. 1996, *N. Gibson & K. Brown* 2524.

Distribution. Western Australia, South West Botanical Province, Roe District, recorded only from South Ironcap. (Figure 2C)

Habitat. Recorded from heath shrubland on ironstone laterites.

Flowering period. Flowers recorded September and October.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority One. Apparently restricted in distribution and in need of surveying, although apparently quite common at South Ironcap. Currently known from less than five populations but possibly not under immediate threat. Its response to attack by *Phytophthora* has not been documented.

Etymology. From the Latin *axilla*, the axils, and *barba*, bearded, referring to the presence of hairs in the leaf axils.

Affinities. Apparently more closely related to *H. stowardii* than to *H. mucronata*. *Hibbertia stowardii* however has leaves in which the revolute margins do not hide the midrib, larger flowers with sepals which are glabrous or have minute semi-stellate hairs and petals which are longer than the sepals.

Acknowledgements

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