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## Notes on *Hibbertia* subg. *Hemistemma* (Dilleniaceae) 9. The eastern Australian *H. vestita* group, including *H. pedunculata* and *H. serpyllifolia*

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### Abstract

A taxonomic treatment of *Hibbertia* §*Vestitae* Benth. is presented. The distributions of the species range from near Hobart in Tasmania to tropical Queensland, north of Rockhampton. A key and full descriptions of all recognised taxa as well as selected illustrations are provided. The following taxa are recognised (newly described taxa and new combinations in bold): *H. basaltica* A.M.Buchanan & Schah., *H. coloensis*, *H. demissa*, *H. dispar*, *H. ericifolia* Hook.f. subsp. *ericifolia*, subsp. *acutifolia*, *H. expansa*, *H. exponens*, *H. exposita*, *H. florida* subsp. *florida*, subsp. *angustinervis*, *H. fruticosa* subsp. *fruticosa*, subsp. *pilligaensis*, *H. horricomis*, *H. intermedia* (R.Br. ex DC.) Toelken, *H. marginata* B.J.Conn, *H. mediterranea*, *H. pachynemidium*, *H. pedunculata* R.Br. ex DC., *H. porcata*, *H. samaria*, *H. serpyllifolia* R.Br. ex DC., *H. singularis*, *H. stichodonta*, *H. vestita* A.Cunn. ex Benth. var. *vestita*, var. *thymifolia* Benth.

**Keywords:** Dilleniaceae, *Hibbertia*, new species, nomenclature, taxonomy, eastern Australia.

### Introduction

Bentham (1863) described *H. vestita* and placed it together with *H. serpyllifolia* R.Br. ex DC. and *H. pedunculata* R.Br. ex DC. in his §*Vestitae*, a validly published name without rank (cf. Toelken 2010, p.1). This concept of three species was retained until recently in spite of a call for a revision of *H. pedunculata* and *H. serpyllifolia* by Willis (1973). General use adapted the description of the species to fit local needs. Beadle (1976), for instance, described *H. pedunculata* as a “shrub to 2 m tall” but admits that “a prostrate form occurs south of the Hunter R.” referring presumably to the extremes, described here as *H. fruticosa* and true *H. pedunculata* respectively. Similarly his *H. serpyllifolia* growing on “shallow soils on granite” probably refers to *H. expansa*, while his inland form of *H. vestita* possibly also refers to *H. expansa*. He did not annotate any specimens, so that one can not be confident of his envisioned concepts, as the distinguishing characters used in the key were those used by Bentham.

The *H. vestita* group is here considered to be a natural group (cf. *Affinities*) and is easily distinguished from other groups in subg. *Hemistemma* (Touars) Horn, mainly by the stamens being arranged around the ovaries. Whilst it shares this characteristic with species of subg. *Hibbertia*, the *H. vestita* group differs in having hairy ovaries and narrow petiole bases not clasping the branches. The commonly occurring multiangular fascicled hairs in most species of subg. *Hemistemma* are here limited to a few species, and this separates the *H.*

*vestita* group from the *H. tomentosa* and *H. melhanioides* groups (Toelken 2010) with rosette-like fascicled hairs or scales. The *H. vestita* group is further distinguished from the very similar *H. hermanniifolia* group by the obvious protrusion of the central vein above the leaf apex, usually 3 ovaries instead of 2, and filaments are kinked below the anthers (Toelken 2012, cf. also *Affinities*) in spite of the similar staminal arrangement.

The arrangement of species in this work is alphabetical, as preliminary phenogenetic evaluations (Raheem 2012) indicate more complex relations within the group.

### Characters

Many of the following characters have previously been discussed in other groups of *Hibbertia* (Toelken 1998, 2000, 2010, 2012), but are here extended and/or adapted to suit specific complications/needs, e.g. the flower stalk (cf. *Flowers*, below), in defining species of this group.

*Habit.* The habit of most of the species varies according to the age of the plant. The majority of species usually start as tufts of more or less erect-spreading main branches, which are, however, weak-woody so that they become decumbent or procumbent as they elongate. Some become decumbent or procumbent as they elongate. Some become scrambling and others may form “cushions 2’–3’ across” (e.g. *H. expansa*: J.L.Boorman NSW85887), but they usually develop a woody rootstock from which they seem to be able to regenerate after fires. Others have slender scrambling branches from a thick woody rootstock. These in turn sometimes become

woody in, for instance, *H. serpyllifolia* (e.g. plants up to 1 m high in forest; *E.R.Anderson 3565*), while most plants are only up to 50 cm tall.

Taller shrubby plants are also found in other species throughout the group, especially in *H. marginata*, *H. florida*, *H. fruticosa* and *H. coloensis*. Although they develop distinctly rigid-woody branches they usually have a more spreading than erect habit, described here as erect-spreading.

**Vestiture.** Hairs are an important character in the *H. vestita* group as in other groups of subg. *Hemistemma*, and can provide a convenient, reliable identification independent from flowers and other gross morphology. Hair terminology follows Toelken (2010), although the vestiture is much simpler.

Hairs in this group are commonly simple, but among them there are often some **forked hairs**, i.e. with two subequal arms. Although these could constitute fascicled hairs, it could not always be determined whether these hairs are not merely two simple hairs of neighbouring epidermal cells, since they are usually associated with more or less dense stands of simple hairs. Forked hairs usually occur rather randomly on the branches, or seem to occur geographically at random on one plant and not on others of the same species. Multiangular **fascicled hairs** have, in contrast, usually more than two arms and are specific and constant to certain parts of the morphology of plants of *H. basaltica*, *H. demissa*, *H. dispar*, *H. horricomis*, *H. samara* and *H. singularis*. They have spreading subequal to/or unequal arms.

However, the hairs on leaves, especially on the flanks of their revolute margins, present a complication of concepts as they often have one, two or rarely three usually much shorter additional arms to the longer central arm, indicating that they are fascicled hairs. These additional or smaller arms are produced only on some random leaves or local forms of the species concerned and may weather more rapidly than other hair types, so that it might not be easy to discern them as fascicled hairs after only one observation. The case for fascicled hairs is further enhanced by a ring of special epidermal cells with thickened lateral walls surrounding their base; this is here called a pustule (cf. Toelken 2012, Fig. 1; Raheem 2012, Fig. 3 & 4). These pustules are missing from the base of simple and forked hairs. Since hairs with more arms are prevalent on leaves of lushly growing branches, hairs with a pustular base and a simple arm are here interpreted as reduced fascicular hairs. These pustulate fascicular hairs occur on leaves of all species of the *H. vestita* group. Tuberculate simple hairs occur in some other species, e.g. on the calyx lobes of *H. porcata*. These hairs usually have no additional epidermal cells with thickened cell walls at their base, rather a broadened base in contrast to the multicellular pustules in fascicular hairs.

**Leaves.** Leaves in this group have a narrow, but thickened petiole base, similar to other species of subg.



Fig. 1. *Hibbertia dispar*, abaxial leaf exhibiting teeth (arrows) on both sides of the hairy undersurface along the margins of the revolute margin and the central vein. — *A.C.Beaglehole 31150*.

*Hemistemma*, but the lamina exhibits a large range of variation in form from more or less flat to ericoid. The degree to which the central vein of the leaf is developed shows much greater variation than in other groups in the genus. For instance, in some species the central vein is scarcely thickened and the abaxial leaf surface is visible between the vein and the leaf margins, e.g. *H. marginata*, *H. serpyllifolia*, *H. vestita* and *H. coloensis*. Species with a very broad bulging central vein and the abaxial leaf surface not or barely visible are also common in the group, with extremes in *H. pachynemidium* and *H. stichodonta*. Visibility of the abaxial leaf surface between the central vein and leaf margins can sometimes be obscured or increased due to adverse environmental conditions or specimen processing. The range of variation is illustrated for *H. vestita* in Fig. 4B & C and for all species of the *H. sericea* group in Toelken (2000).

Characteristically the undersurface of the leaves is completely glabrous in most species, but in *H. basaltica*, *H. demissa*, *H. dispar*, *H. horricomis* and *H. samaria*, fascicular hairs are present. Scattered simple hairs may also occur, particularly in *H. vestita*. However, in the case of species with broad central veins and tightly revolute leaf margins, hairs on the margins of the central vein and leaf margins do not fully develop and these stumps appear (when leaves are reconstituted in herbarium specimens) as rows of 'teeth' (Fig. 1, 3O), and are referred to as such in the descriptions. They are usually more visible on less rolled leaves below flowers (see also additional bracts) than on cauline leaves, particularly in herbarium specimens. They probably maintain the gas exchange to and from the stomata, which are restricted to the undersurface.

Another characteristic of this group is that the central vein is more or less protruding beyond the apex of the leaves, and is recurved in most species, giving the leaves a typically rounded apex in surface view, except for *H. expansa* and *H. fruticosa*, which usually have pointed leaves. The recurved end of the vein may appear in extreme cases like a short tail, for instance in *H. stichodonta*, particularly if it is covered by a tuft of long

hairs, as in *H. intermedia*. As the pointed vein-end of leaves is commonly recurved and the leaf apex appears blunt in surface view terminology such as cuspidate and mucronate are not used to avoid possible confusion.

Leaves, especially older ones, of species of this group are notable for their more or less spotted upper leaf surface (including the revolute margins), due to the grey appearance of the pustules or special epidermal cells surrounding the base of each of the scattered hairs (cf. *Vestiture*).

*Flowers.* Single flowers are usually borne terminally on main branches and this is often the end of the season's growth. Occasionally growth may continue or new growth develops sympodially the next year from the axils of the often clustered leaves below the flowers.

Flowers vary from sessile to subsessile, but there is a group of species (*H. basaltica*, *H. dispar*, *H. expansa*, *H. exponens*, *H. exposita*, *H. florida*, *H. fruticosa*, *H. intermedia*, *H. pachynemidium*, *H. pedunculata*, *H. porcata*, *H. samaria*, *H. singularis*) with more or less distinctly stalked flowers. In these species the flower stalk becomes recurved and often thickened in the fruiting stage. With such wide variation in the *H. vestita* group, evidence for the presence or absence of flower stalks often need to be sought by examining retained flower stalks at the tip of previous growth flushes of several years to be able to identify plants without flowers. Such old flower stalks are often retained for several years. Even this additional aid does not solve all problems as some species, e.g. *H. porcata* and *H. expansa* have stalked to/and sessile flowers in different populations.

This **flower stalk** is, however, difficult to define. It is neither formed by elongation of only the ultimate internode (= 'anthopodium' as in Briggs & Johnson 1979, commonly referred to as the pedicel) or the penultimate internode (= 'propodium' as described by Conn 1995, often called the peduncle). Here it is commonly developed by elongation of both internodes, although rarely by the former in *H. pedunculata*, or the latter in *H. intermedia*. Measurements for the 'flower stalk', an arbitrary term used here, refer to the length of both terminal internodes, irrespective of the position of the primary bract or additional bracts (cf. *Bracts*, below).

*Bracts.* In *Hibbertia* bracts are the leaf-like organs on the ultimate nodes below the flowers, but they do not always subtend the calyx as in the *H. tomentosa* group (Toelken 2010) or *H. sericea* group (Toelken 2000). This primary bract in *H. pedunculata* does not even strictly subtend the calyx. Furthermore they are not necessarily morphologically distinguishable from the leaves below. Most of the bracts are dorsiventrally flattened and the margins are flat or only weakly revolute with the central vein clearly visible. However they, and the subtending leaves, usually form a range merging into the cauline leaves. Such intermediates or bract-like leaves are referred to as additional bracts, in contrast to the distal

primary bract, and are borne on the ultimate node below the flower. Bracts usually, but not always, merge into the cauline leaves when flowers are borne on abbreviated or axillary short shoots (e.g. *H. dispar*, particularly from the Furneaux Islands). In most cases these distal axillary branchlets appear to have numerous bracts, while similar proximal branches display the usual range of morphology from the bract to the leaves. In the case of a very short branch below the flower, the additional bracts are indistinguishable from the primary bract, i.e. more than one primary bract may occur, especially when the primary bract is distinct from the additional bracts, as in, for instance, *H. exponens*. Bracts are thus here defined as the one (rarely more) **primary bract**, the ultimate leaf-like organ below the flower, being often of distinct shape and merging into subtending **additional bracts** of slightly different shape, which then usually merge into the cauline leaves below. This applies to flowers with or without more than one elongated internode below.

The concept of bracts is further complicated by the development of broader leaf-like organs below the flower (= 'hypsophylls' in Briggs & Johnson 1979), which are often longer than cauline leaves, particularly in *H. vestita* var. *vestita* and var. *thymifolia*, and some species in the *H. sericea* group (Toelken 2000). As the hypsophylls are often less distinct in *H. serpyllifolia*, *H. ericifolia* and *H. expansa* and also grade from the primary bract into the cauline leaves, they are here included in the concept of additional bracts.

*Stamens and staminodes.* Number of stamens and anther size varies greatly within and between species in the *H. vestita* group. Sometimes even sterile anthers, which appear fully developed but do not dehisce, are observed. Intermediates were not observed between sterile stamens and the staminodes, which never develop rudimentary anthers. The number of staminodes also varies greatly within and between species. Staminodes are always the same shape as normal filaments, but have a pale apex, which is not seen in damaged filaments lacking anthers, as also described for the *H. tomentosa* group (Toelken 2010). The bases of the staminodes are usually appressed to the ovary, similar to the filaments. The distal part of the staminodes recurves more or less strongly from about half way, so that they are often hidden and consequently overlooked among the large anthers when flowers are viewed from above. They are best observed in side view.

Staminodes were not observed in all species and in some species, e.g. *H. expansa*, staminodes were found only in some populations of the species. Even their number per flower varies considerably and as they are often short and difficult to assess, they were not used in delimitations of taxa. No staminodes were recorded in *H. demissa*, *H. ericifolia* or *H. horricomis*, although the flowers are in all other respects similar to those of *H. vestita*.

The bases of the filaments are usually more or less broadened and connate; this is particularly pronounced

in *H. vestita* and *H. stichodonta*, resulting in the stamens forming a ring around the ovaries. In most species, the bases of the filaments are connate into five groups, which are more or less recognisable. For instance, in *H. florida* subsp. *florida* there are three stamens between carpels and two single stamens in front of the anterior carpels (with reference to the bract). Not all stamens are regularly arranged around the ovaries, as can be observed in *H. basaltica* and *H. dispar*, where at least one group of stamens has been lost (cf. variation in *H. dispar*).

Characteristic of the filaments of the *H. vestita* group is not only their obvious broadening towards the base, but also a kink below the anthers as they curve in along the upper surface of the ovaries, but reflex immediately again to expose the anthers. The filaments sometimes do not even straighten out under the stress of the developing fruit.

**Pistils.** Three pistils per flower have been recorded for most species of this group. Exceptions are two in *H. basaltica*, and four or two have also occasionally been observed in a number of species, e.g. *H. pedunculata* (C. Driscoll 14).

The styles are attached to the upper outer edge of the ovaries and then usually spread centrifugally. Stigmas are often displayed at the same level as, but well outside the range of, the anthers in species of the *H. vestita* subgroup. Other species, particularly of the *H. pedunculata* subgroup, have erect styles with stigmas well above the anthers.

**Fruit and seeds.** The fruits of species with stalked flowers, e.g. *H. pedunculata*, are more or less recurved.

The seeds of most species are obovate but sometimes, particularly in the *H. vestita* subgroup, the attachment is shifted sideways, so that the seeds appear comma-shaped. The membranous cup of the aril is short, lobed and usually more expanded to one side.

### Affinities

Bentham (1863), who was followed by most subsequent authors, placed his §*Vestitae* close to the §*Tomentosae*, which includes the *H. tomentosa* and *H. melhanioides* groups (Toelken 2010) as well as the *H. hermanniifolia* group (Toelken 2012). This was mainly based on the regular arrangement of the stamens often in five more or less distinct groups around the pistils, as opposed to a single cluster of stamens to one side of the flower. The separation of the above three groups, namely the *H. hermanniifolia* group from the *H. tomentosa* and *H. melhanioides* groups, originally shown in DNA analyses by Horn (2005, 2009), has been confirmed by different hair types. The rosette-like fascicled hairs and/or scales of the *H. tomentosa* and *H. melhanioides* groups (Toelken 2010) are distinct from multiangular fascicled hairs of the *H. hermanniifolia* group (Toelken 2012). The *H. vestita* group is here split from the former three (*H. tomentosa*, *H. melhanioides* and *H. hermanniifolia*

groups) because of its predominantly simple hairs, which are otherwise rare in subg. *Hemistemma*. Simple hairs are obviously the building blocks of fascicled hairs (Toelken 1998, Fig. 1A), which are in turn the basis of rosette-like fascicled hairs and scales, but no other connecting characters between the three groups were detected. In addition to bearing simple hairs, many species of the *H. vestita* group have a glabrous leaf undersurface, which is also unique in subg. *Hemistemma*.

Although the *H. vestita* group shares a significant character with the *H. hermanniifolia* group, i.e. apparently simple pustulate hairs on the upper leaf surface, the former group is further distinguished from the latter by predominantly glabrous undersurfaces of the leaves, the central vein obviously protruding beyond the leaf apex, filaments kinked below the anthers and broadened towards the base, the presence of staminodes and usually three ovaries instead of two.

Judging from these characters, which distinguish the *H. vestita* group not only from the *H. hermanniifolia* group, but also from other species of subg. *Hemistemma*, it is assumed here that the *H. vestita* group is a natural group of species. However, it is a group with such a widely divergent morphology that it is possible also to observe characteristics reminiscent of species in other groups in the genus. It is therefore tempting to see connections, particularly as it is obvious that in *Hibbertia*, the condition of flowers with a unilateral cluster of stamens is derived from flowers with stamens regularly arranged around the ovaries (Wilson 1965, Stebbins & Hoogland 1976, Tucker & Bernhardt 2000, Horn 2005, 2009). In fact, the change in the arrangement of the stamens to mainly on one side of the ovary, as well as the reduction of the number of pistils from three to two, is demonstrated in *H. basaltica* and *H. dispar*. Horn (2005) indicated several such changes, but due to a wide range of homoplasy in vegetative characters (Horn 2009), such apparent relationships (based on morphological observations) are not well supported in molecular analyses.

The main clusters of species within the *H. vestita* group are centred on the three species originally included by Bentham (1863) in §*Vestitae*, as outlined below, except that Bentham's concept of *H. serpyllifolia* is here referred to *H. ericifolia*:

- The ***Hibbertia vestita* subgroup** (*H. marginata*, *H. vestita*, *H. serpyllifolia*, *H. mediterranea*, *H. stichodonta*), characterised by sessile erect flowers and many staminodes, exhibits probably the most primitive characters, especially the first three species. These species have simple hairs only, more or less flat leaves (unless rolled) with glabrous undersurface and a narrow, scarcely thickened central vein, numerous stamens and staminodes, often with broadened filaments and often more than three pistils with six ovules each. *H. mediterranea* and *H. stichodonta* have ericoid leaves with much thickened central veins, but otherwise exhibit typical morphology for this group.

- The ***Hibbertia ericifolia* subgroup** (*H. coloensis*, *H. ericifolia*, *H. demissa*, *H. horricomis*) also has sessile erect flowers, but usually lacks staminodes. The margins of the leaves of *H. coloensis* and *H. ericifolia* subsp. *acutifolia* are scarcely to incompletely revolute so that the often thick central vein is quite exposed, while the other taxa have ericoid leaves. *Hibbertia demissa* and *H. horricomis*, both extremely localised, stand out in the whole *H. vestita* group by the widespread presence of fascicled hairs on most parts of the plant.
- All other species are included in the ***Hibbertia pedunculata* subgroup** (*H. basaltica*, *H. dispar*, *H. expansa*, *H. exponens*, *H. exposita*, *H. florida*, *H. fruticosa*, *H. intermedia*, *H. pachynemidium*, *H.*

*pedunculata*, *H. porcata*, *H. samaria*, *H. singularis*) and are distinguished by a more or less developed stalked flower, which recurves in the fruiting stage ('nodding'). This is often best observed by the curved stalk retained at the end of the previous year's growth. All species have more or less well developed ericoid leaves. Most of them are decumbent except for *H. florida* and especially *H. fruticosa*, which can form shrubs up to 1.2 m tall. Simple hairs are widespread, while fascicled hairs have only been recorded for *H. basaltica*, *H. dispar*, *H. samaria* and *H. singularis*. *Hibbertia humifusa*, particularly subsp. *erigens*, shows a close resemblance to *H. samaria* (except for unilateral stamens).

**Key to species and subspecies**

Some characters, although discussed earlier, are here defined for quick reference in the keys. **Flower stalk** refers to two internodes below the flower. The **primary bract** is attached to the first node below the flower, while one to several **additional bracts**, similar to the primary bract, are often found on nodes below and usually grade into the cauline leaves below. The **undersurface** of leaves refers to abaxial surface, excluding the central vein, and is often more or less covered by the revolute margins. **Forked hairs** are defined as those with two arms and **fascicled hairs** with three or more often unequal arms.

1. Stamens irregularly arranged around the ovaries, with often only one stamen, or rarely none, on one side of the ovary
  2. Undersurface of leaves usually visible between central vein and revolute margins; leaves smooth; Tas. (TSE) ..... *H. basaltica*
  - 2: Undersurface of leaves not visible between central vein and revolute margins; leaves with raised pustules; N.S.W. (CT); Vic. (GP, EG), Tas. (FU) ..... *H. dispar*
1. Stamens in regular groups arranged around the ovaries
  3. Flower stalks > 4 mm (rarely some shorter) and recurved to nodding in the fruiting stage (examine hooked flower stalks of previous year on lower branches)
    4. Outer calyx lobes obtuse to rounded and without distinct central ridge
      5. Spreading hairs on leaves (0.4–) 0.5–0.7 mm long; central vein ± flush with revolute margins, but undersurface of leaves often visible between them; Qld (DD), N.S.W. (NT) ..... *H. expansa*
      - 5: Spreading hairs on leaves (0.15–) 0.2–0.3 (–0.4) mm long; undersurface of leaves not visible and with blunt papillae on opposite margins; N.S.W. (NC, CC, ?CWS) ..... *H. pedunculata*
    - 4: Outer calyx lobes acute or pointed and with well developed central ridge towards the apex
      6. Branches covered with multiangulate fascicled hairs; simple hairs present or absent
        7. Anthers 0.9–1.2 mm long; central vein of leaves flush with or bulging above revolute margins; NSW (ST) ..... *H. singularis*
        - 7: Anthers 1.5–2 mm long; central vein of leaves recessed below revolute margins; Vic. (EHL) ..... *H. samaria*
      - 6: Branches covered with short and long simple, rarely forked hairs
        8. Primary bracts subtending or close to the calyx
          9. Simple hairs on branches porrect; leaves densely hairy; Qld (DD), N.S.W. (NT) ..... *H. expansa*
          - 9: Simple hairs on branches antrorse to ± appressed; leaves with scattered hairs often wearing off
            10. Shrublets 0.1–0.4 m high, with decumbent to prostrate wiry-woody branches; N.S.W. (NWS) ..... *H. florida* subsp. *florida*
            - 10: Shrubs 0.4–1.2 m tall, with erect-spreading branches becoming rigid-woody
              11. Leaf apex distinctly cuspidate; N.S.W. (NWS) ..... *H. fruticosa* subsp. *fruticosa*
              - 11: Leaf apex hardly mucronate
                12. Leaves glabrescent, undersurface not visible; N.S.W. (NWP) ..... *H. fruticosa* subsp. *pilligaensis*
                - 12: Leaves hairy (scabrid), undersurface usually visible between central vein and revolute margins; NSW (NWS) ..... *H. florida* subsp. *angustinervis*
    - 8: Primary bracts below the middle of the flower stalk
      13. Outer calyx lobes hirsute to strigose, distal margins usually recurved; N.S.W. (CT, ST, SWS), Vic. (MID) ..... *H. porcata*
      - 13: Outer calyx lobes glabrescent or rarely hairy (pubescent), distal margins not or scarcely recurved
        14. Central vein of leaves broader than, and bulging to flush with, revolute margins, with undersurface not visible between them
          15. Filaments strap-like; leaves with bulging pustules; flower stalk (2–) 3.5–5 (–9.5) mm long; N.S.W. (ST) ..... *H. pachynemidium*
          - 15: Filaments filiform; leaves smooth with flat pustules; flower stalk (5.6–) 8–15 (–18.5) mm long; Vic. (EHL) ..... *H. exposita*

- 14: Central vein of leaves  $\pm$  as broad as, and recessed from, the revolute margins, with under-surface often visible between them
- 16: Flower stalk 2–5 mm long; anthers 1.6–1.8 mm long; N.S.W. (CT, CC) . . . . . *H. intermedia*
- 16: Flower stalk (4.5–) 5–7.5 (–11.3) mm long; anthers 0.5–1.4 mm long; Vic. (EG) . . . . . *H. exponens*
- 3: Flowers sessile (flower stalk < 4 mm), remaining erect in the fruiting stage
- 17: Branches covered with multiangulate fascicled hairs, simple hairs present or absent
- 18: Leaf lamina (1.2–) 1.4–1.8 (–2.2) mm long; decumbent shrublet rarely to 15 cm tall; N.S.W. (NT) . . . . . *H. demissa*
- 18: Leaf lamina (2.4–) 3.5–6.5 (–9.2) mm long; erect-spreading shrublet to 30 cm tall; N.S.W. (ST) . . . . . *H. horricomis*
- 17: Branches covered with simple and rarely forked hairs
- 19: Leaf lamina  $\pm$  evenly recurved along its length, (1–) 2–3 (–3.5) times longer than broad; branches twisted and curved; Qld (MO), N.S.W. (NC) . . . . . *H. vestita* var. *thymifolia*
- 19: Leaf lamina straight or rarely petiole recurved, (3–) 5–8 (–12) times longer than broad, branches usually straight
- 20: Outer calyx with fine, often sparse hairs (sericeous)
- 21: Shrubs (0.5–) 0.8–2 m tall, few stemmed
- 22: Outer calyx lobes (9.7–) 10–12 (–13.8) mm long; leaf lamina (7.6–) 8–13 (–15.8) mm long; N.S.W. (CC) . . . . . *H. colensis*
- 22: Outer calyx lobes (4.2–) 5.5–7.5 (–8.4) mm long; leaf lamina (2.6–) 4–8 (–9.6) mm long
- 23: Anthers (1.8–) 2–2.2 mm long; undersurface of leaves usually visible between central vein and revolute margins unless leaf tightly rolled; Qld (PC) . . . . . *H. serpyllifolia*
- 23: Anthers 1.1–1.6 mm long; undersurface of leaves not visible between central vein and revolute margins; N.S.W. (NWP, NWS) . . . . . *H. fruticosa* (for subspecies see lead 11)
- 21: Shrubs 0.2–0.4 m tall, multistemmed
- 24: Anthers (1.8–) 2–2.2 mm long; Qld (PC) . . . . . *H. serpyllifolia*
- 24: Anthers 0.8–1.6 mm long
- 25: Stamines several to many; prostrate to mat-forming; N.S.W. (ST) . . . . . *H. pachynemidium*
- 25: Stamines absent; decumbent to erect-spreading
- 26: Primary bracts linear-lanceolate to linear-elliptic, (1.3–) 1.5–2.5 (–3.6)  $\times$  0.1–0.4 mm; leaf apex blunt with end of vein  $\pm$  reflexed; N.S.W. (CT, CC, ST, SC), Vic. (EHL, EG), Tas. . . . . *H. ericifolia* subsp. *ericifolia*
- 26: Primary bracts lanceolate to spatulate, (3.2–) 5.5–7 (–7.8)  $\times$  1.3–2.3 mm; leaf apex pointed to acute, rarely slightly recurving; N.S.W. (CC, ST, SC) . . . . . *H. ericifolia* subsp. *acutifolia*
- 20: Outer calyx with coarse, often dense hairs (hirsute to strigose)
- 27: Central vein at mid-leaf broader than, and usually tightly wedged in between, the revolute margins; if vein terminally protruding then with short tuft of hairs on young leaves; N.S.W. (CT, ST, SWS), Vic. (MID) . . . . . *H. porcata*
- 27: Central vein at mid-leaf narrower, or as broad as and separate from the revolute margins, unless tightly rolled; if vein terminally protruding then with long obvious tuft of hairs
- 28: Leaves usually pointed; central vein, if protruding beyond leaf apex, straight; inland Qld (DD), N.S.W. (NT) . . . . . *H. expansa*
- 28: Leaves obtuse to rounded; central vein, if protruding beyond leaf apex, recurved: coastal to eastern foothills of the Great Dividing Range
- 29: Calyx lobes (5.2–) 6–8 (–9.8) mm long; leaf lamina (2.2–) 3.5–8 (–11.4) mm long; Qld (MO, WB); N.S.W. (NC) . . . . . *H. vestita*
- 29: Calyx lobes 12–20 mm long; leaf lamina 10–40 mm long; N.S.W. (NC) . . . . . *H. marginata*

### Taxonomy

Species are arranged alphabetically as relations appear to be even more complex than the three subgroups of species cited under *Affinities* (above). Regional codes are the ones used in State floras of Qld, N.S.W., Vic. and Tas.

#### *Hibbertia basaltica* A.M.Buchanan & Schah.

Muelleria 22: 105 (2005); A.M.Gray, Fl. Tasman. Online, Dilleniaceae (version 2009: 2) 3 (2009). — **Type:** Tasmania, Ford Road, Pontville, *A.M.Buchanan s.n.*, 8.x.2004 (holo.: HO527774; iso.: AD – n.v.).

Shrublet prostrate to procumbent, moderate to much branched; branches wiry and up to 40 cm long, with shallow decurrent leaf bases, sparsely hirsute. *Vestiture* persistent, usually without obvious basal tubercles or pustules, with  $\pm$  dense fascicled hairs overtopped by

usually few longer antrorse simple hairs; *on branches* usually dense, with a range of longer and shorter multiangular fascicled hairs ((3–) 5–7 often unequal arms) overtopped by scattered to very few spreading simple hairs; *on leaves above* with scattered antrorse simple or rarely forked hairs without protruding pustules, sometimes longer and ciliate on the flanks of the revolute margins over smaller antrorse multiangular fascicled hairs (3 (–5) unequal arms) towards and on the margins; *on leaves below* with scattered antrorse simple over mainly shorter antrorse fascicled hairs on the revolute margins and the central vein but exposing between the two dense short multiangular fascicled hairs on the undersurface, with a tuft of simple hairs on the end; *on primary bracts* similar to leaves above and below with mainly fascicled hairs overtopped by

± simple hairs; *on outer calyx lobes* outside with few to many antrorse fascicled hairs overtopped by few scattered simple hairs mainly distally especially on terminal point, inside moderately dense mainly forked and fascicled antrorse appressed hairs; *on inner calyx lobes* outside dense, with mainly spreading multiangular fascicled hairs (5–12 subequal arms) overtopped by a few antrorse simple hairs along the central ridge, inside sparse, with a cluster of fine mainly forked hairs below the apex. *Leaves* with intrapetiolar tuft of hairs up to 0.7 mm long, extending laterally along the leaf bases; *petiole* up to 0.3 mm long, often indistinct; *lamina* linear to linear-elliptic, (2.4–) 3.5–6 (–7.4) × 1–1.4 (–1.6) mm, gradually constricted into petiole, acute to obtuse and with terminal tuft of hairs, above convex or slightly depressed along the central vein, puberulous to glabrescent, below with recessed broad central vein often not touching the puberulous revolute margins and thus exposing rows of teeth or the tomentose undersurface between them. *Flowers* single, terminal mainly on main branches; *flower stalk* (4–) 6–14 (–20) mm long, with primary bract below the middle; *buds* narrowly ellipsoidal; *primary bracts* linear-lanceolate, (2.3–) 2.5–3 (–3.6) × 0.3–0.5 mm, with tufted pointed apex usually recurved, dorsiventrally compressed but with revolute margins, sparsely tomentose, additional bracts absent. *Calyx lobes* unequal; *outer calyx lobes* lanceolate, rarely elliptic, 4.5–4.7 (–5.1) × 2.3–2.5 mm, slightly longer than the inner ones, pointed with terminal tuft, ± distinctively ridged, outside pubescent to sparsely hirsute, inside pubescent on distal half; *inner calyx lobes* ovate, 4.3–4.7 (–4.8) × 2.5–2.8 mm, pointed with terminal tuft, scarcely ridged, outside pubescent, inside glabrous. *Petals* obovate, up to 10 mm long, bilobed. *Stamens* (3–) 4 or 5 (–7) on one side and 1 in front of the ovaries, staminodes absent; *filaments* filiform, 1.4–1.6 mm long, slightly broadened basally and connate in groups; *anthers* narrowly obloid, 1–1.2 mm long, above abruptly constricted and below tapering into filament. *Pistils* 2; *ovaries* obovoid, each with 4 (–6) ovules, shortly pubescent to tomentose; *styles* attached to the outer upper margins of the ovaries then erect with stigmas above the anthers. *Fruit* recurved, fascicled-tomentose. *Seeds* obloid-obovoid, rarely obovoid, 1.6–2 × 1.2–1.5 mm, brown to dark brown; aril with fleshy attachment usually basal or slightly oblique, surmounted by a lobed membranous cup covering the lower third of the seed. *Flowering*: September–November.

*Common name*: Basalt guinea flower (Buchanan & Schahinger 2005; Gray 2009).

*Distribution and ecology*. Plants are “associated with rocky basalt outcrops on slopes above the Jordan River” where the “native grassland is dominated by *Themeda triandra* Forssk. and *Austrostipa* spp. with the occasional tall shrub of *Bursaria spinosa* Cav.” in southern Tasmania (TSE) (Buchanan & Schahinger 2005).

*Conservation status*. Buchanan & Schahinger (2005) after detailed observation of the eight known populations gave the species a 2ECi listing (Briggs & Leigh 1996).

*Diagnostic features*. Shares with the very similar *H. dispar* a zygomorphic arrangement of the stamens, which distinguishes them from other species of the *H. vestita* group. *H. basaltica* differs by its distinct flower stalk up to 20 mm long, the predominance of fascicled hairs on the outer calyx lobes, the leaves without obvious pustules to the hairs and the central vein not being wedged tightly between the revolute margins, so that the fascicled-tomentose undersurface is often visible. The earliest specimen of this species, collected in 1898, was identified as *H. empetrifolia*, but this record was never published. *H. basaltica* is distinguished by the absence of hooked simple hairs on the undersurface of leaves and the presence of an odd single stamen on the opposite side from the cluster of stamens on one side of the ovaries.

*Variation*. The number of simple hairs on branches and calyx vary much from one plant to another but the usually dense cover of longer and shorter fascicled hairs is diagnostic for the species.

#### *Specimens examined*

TASMANIA: *A.M. Buchanan* 5664, 2 km W Richmond, 17.ii.1985 (HO); *P. Collier* 5302, 2 km W Richmond, 10.xi.1991 (HO); *F.A. Rodway* NSW86687, Jordan River, ix.1898 (NSW).

#### *Hibbertia coloensis* Toelken, *sp. nov.*

*A speciebus turmae* *H. vestitae* foliis longioribus glabrescentibus quoque nervo centrali angusto late separato a marginibus revolutis differt.

**Type**: New South Wales, Wollemi National Park, Colo River, *P.H. Weston* 3392, 18.x.2008 (holo.: AD; iso.: NSW; NE – n.v.).

Shrubs up to 1.5 m tall and 2 m in diameter, much branched; branches with distinct decurrent leaf bases, but not flanged, hirsute to strigose mainly along the grooves between leaf bases. *Vestiture* persistent to glabrescent, longer usually over shorter simple hairs; *on branches* moderately dense with long straight antrorse ± appressed simple hairs mainly along the grooves overtopping short spreading simple or rarely forked ones; *on leaves above, below and on bracts* scattered short antrorse simple hairs but usually worn off when leaves are fully developed except for a few hairs on the adaxial petiole and adjoining proximal lamina, but some flat pustules may be visible particularly distally; *on outer calyx lobes* outside with scattered to sparse long antrorse-appressed simple hairs particularly along the central ridge and the margins, inside moderately dense with longer and shorter appressed simple, rarely forked hairs on at least the distal half; *on inner calyx lobes* outside, moderately dense to dense, mainly with long coarse hairs along the centre, becoming shorter towards the membranous margins, inside a cluster of fine, often forked hairs below the apex. *Leaves* with intrapetiolar

tufts of hairs up to 1 mm long and becoming denser and decurrent along the grooves on either side of the leaf bases; *petiole* 0.3–0.7 mm long, often indistinct; *lamina* linear to linear-oblongate, (7.6–) 8–13 (–15.8) × (0.8–) 1.2–1.6 mm, very gradually tapering into petiole, acute to cuspidate with ± straight, puberulous to glabrescent end of central vein overtopping the leaf apex, above flat and slightly grooved along the central vein, glabrous or proximally puberulous, below narrow revolute margins distinctly separated from raised but not broad central vein by the glabrous undersurface, which is becoming broader on leaves below the flowers, glabrescent except for puberulous vein apex. *Flowers* single, sessile or subsessile, terminal on terminal and axillary branches; *flower stalk* 0–4 mm long; *buds* obloid-ovoid; *primary bracts* oblong-elliptic to oblong-lanceolate, 7–7.8 × 1.7–2.2 mm, pointed to cuspidate, flat with scarcely recurved margins and faintly raised vein, glabrous; additional bracts 1–3, with ± revolute margins, merging into cauline leaves. *Calyx lobes* unequal; *outer calyx lobes* lanceolate, (9.7–) 10–12 (–13.8) × 4–4.6 mm, longer than inner ones, acute, slightly ridged towards the apex, outside sericeous particularly toward the base, inside with scattered hairs towards the distal margins; *inner calyx lobes* obovate to oblong-obovate, (6.5–) 6.8–7.5 × 5.5–6.2 mm, rounded to emarginate, outside shortly sericeous becoming pubescent towards the glabrous membranous margins, inside glabrous or puberulous subterminally. *Petals* obovate, up to 14 mm long, ± bilobed. *Stamens* 24–26 (–30), without staminodes, surrounding the ovaries; *filaments* filiform, 1.3–1.6 mm long, ± broadened and scarcely connate basally; *anthers* slender-obloid, 1.3–2.2 mm long, gradually tapering into petioles, abruptly constricted above. *Pistils* 3; *ovaries* ovoid, each with 6 ovules, hirsute; *style* attached to the outer upper apex of ovaries, erect, with stigmas well above the apex of the anthers. *Fruit* and *seed* not seen. *Flowering*: October.

*Distribution and ecology.* Apparently restricted to the Colo River, Wollemi National Park in New South Wales (CC) where it grows in sand among sandstone boulders along the creek, c. 1 m above the water level, but well into the flood zone, on edge of stunted *Tristaniopsis laurina* woodland.

*Conservation status.* Although the species is known only very locally and conserved in Wollemi National Park, it is described as “locally frequent” (A.N.Rodd 11203).

*Diagnostic features.* The long, stiffly-erect leaves, primary bracts and calyx lobes easily distinguish this species from others in this group. Although the scarcely recurved leaf margins expose much of the glabrous undersurface, reminiscent of those of species of the *H. vestita* subgroup, the usual absence of staminodes places this species into the *H. ericifolia* subgroup.

*Variation.* Fruiting specimens have distinctly accrescent calyx, which is unusual in the *H. ericifolia* subgroup.

*Etymology.* As the species was only found along the Colo River the Latin suffix “-ensis” part of the epithet “coloensis”, indicates the origin of the species.

*Specimens examined*

NEW SOUTH WALES: A.N.Rodd 11203, Colo River, 24.x.2004 (NSW).

***Hibbertia demissa* Toelken, sp. nov.**

*A speciebus turmae* H. *vestitae pilis radiale fasciculatis in ramis, habitu demisso, foliis brevissimis elliptico-oblongis nervis centralibus marginibus revolutis duplo latioribus differt.*

**Type:** New South Wales, top of range near Backwater, J.A.Blakeley, E.N.McKie & T.Boorman NSW85822, 30.x.1929 (holo.: NSW).

Shrublets up to 0.15 m tall, much branched, decumbent; branches wiry-woody becoming rigid-woody basally, with leaf bases shortly decurrent, sparsely tomentose. *Vestiture* ± persistent, with multiangulate fascicled and/ or simple hairs on different organs; *on branches* moderately dense, with spreading multiangulate fascicled hairs (3–6 subequal, rarely unequal arms) or antrorse simple hairs part of the decurrent intrapetiolar tufts; *on leaves above and below* with scattered stiff simple or forked (rarely fascicled with 3 or 4 arms) hairs each on a prominent pustule, often somewhat larger on the flanks of the revolute margins, but without pustules in dense tufts on adaxial petiole, with dense fine fascicled hairs from the undersurface often showing and very short hairs on short terminal end of central vein; *on primary bracts* sparse, with simple and forked hairs but without pustules; *on outer calyx lobes* outside sparse to moderately dense, with larger coarse antrorse simple or rarely forked hairs without pustules over very dense, almost erect simple hairs and often with marginal cilia, inside sparse, with few short appressed simple hairs; *on inner calyx lobes* outside moderately dense, with coarser antrorse-appressed simple hairs over few shorter ones extending towards the membranous margins, inside glabrous except for a cluster of short antrorse-appressed simple hairs below the apex. *Leaves* with dense intrapetiolar tufts up to 0.3 mm long and shortly decurrent on both sides of the leaf bases; *petiole* 0.05–0.4 mm long, usually distinct; *lamina* elliptic-oblong, (1.2–) 1.4–1.8 (–2.2) × 1.4–1.7 mm, usually abruptly constricted into petiole, obtuse, with central vein scarcely overtopping the apex and with very short terminal tuft of hairs, above ± flat with scattered prominently pustulated hairs, below with broad central vein flush with, c. twice as broad as, and tightly wedged in between, the revolute margins, covered with scattered tubercled hairs, erect to spreading at right angles to the branches when older. *Flowers* single, terminal on main branches; *flower stalk* absent, *buds* ellipsoidal; *primary bracts* lanceolate, c. 5.4 × 1.6 mm, pointed, scarcely ridged, sparsely pubescent; additional bracts absent. *Calyx lobes* unequal; *outer calyx lobes* lanceolate, 4.5–5.6 × 1.6–1.8 mm, acute, scarcely

ridged, outside pubescent, inside puberulous on distal third; *inner calyx lobes* oblanceolate to oblanceolate-elliptic, 5.6–6 × 2–2.3 mm, obtuse, not ridged, outside strigose-pubescent, inside puberulous below the apex. *Petals* broadly obovate, c. 7 mm long, bilobed. *Stamens* 9–12, without staminodes, around the ovary; *filaments* filiform, 1.4–1.6 mm long, scarcely connate basally; *anthers* slender obloid, 1.7–2 mm long, abruptly constricted above, gradually tapering into filaments. *Pistils* 3; *ovaries* obovate, each with 4 ovules, pubescent below and hirsute above; *style* attached to the outer upper edge of the ovary, then slightly curved and erect in between the anthers with stigmas well above them. *Fruit* and *seeds* not seen. *Flowering*: October.

*Distribution and ecology*. Grows localised on sandy soil above granite in forest of *Eucalyptus acaciiformis* and *E. dalrympleana* in north-central New South Wales (NT).

*Conservation status*. Of unknown frequency and the presently known localities are outside any conservation reserves.

*Diagnostic features*. The diminutive *H. demissa* resembles superficially another small and as yet undescribed *Hibbertia* species from the Warrumbungle Range, but differs by antrorse simple to fascicled hairs on the leaves and the stamens arranged around the ovaries.

*Etymology*. The habit of this shrublet is “low and humble”, Latin “demissa”, as reflected in the epithet.

#### *Specimens examined*

NEW SOUTH WALES: *D. Verdon* 261, Pheasant Mountain, 1.ix.1969 (CANB); *J.B. Williams* NE30603a, E Backwater, 11.iii.1971 (NE); *H.J. Wissmann* NE45216A, Pheasant Mountain, Backwater, 5.iii.1967 (NE).

#### *Hibbertia dispar* Toelken, *sp. nov.*

*Hibbertiae* basalticae *similis sed floribus pedunculatis, pilis praecipue simplicibus in lobis calicis foliisque pilis manifeste tuberculatis; a speciebus aliis turmae* *H. vestitae staminibus anterioribus deminutis differt.*

**Type**: Victoria, Valencia Creek Road, A.C. Beauglehole 43441, 30.x.1973 (holo.: CANB; iso.: MEL, NSW).

*Hibbertia pedunculata* auctt. non R.Br. ex DC.: J.H. Willis, Handb. Pl. Victoria 2: 386 (1973), p.p.; Toelken in N.G. Walsh & Entwisle, Fl. Victoria 3: 304 (1996), p.p.; N.G. Walsh & V. Stajsic, Census Vasc. Pl. Victoria ed. 8: 79 (2007), p.p.

Shrublets rarely taller than 0.2 m, prostrate to decumbent; moderately to much-branched; branches wiry or rarely becoming rigid-woody, up to 30 cm long, with leaf bases scarcely decurrent, hirsute to pubescent. *Vestiture* persistent, with usually distinctly longer spreading simple hairs overtopping short simple, forked and/or fascicled hairs; *on branches* ± dense with long spreading ± antrorse simple hairs overtopping short simple or forked and/or fascicled hairs, rarely only short fascicled hairs; *on leaves above* scattered, with antrorse simple hairs, usually obviously pustulate, becoming

longer on the flanks of the revolute margins; *on leaves below* scattered, with tubercled antrorse simple hairs on the revolute margins and the central vein and between the latter two ridges often with rows of teeth but undersurface not visible, with terminal point of central vein recurved and tufted; *on primary bracts* sparsely hairy similar to the leaves but mainly towards the apex; *on outer calyx lobes* outside, usually moderately dense, with spreading simple hairs overtopping few forked and/or fascicled hairs mainly proximally, inside sparse, with mainly appressed simple hairs on the distal third; *on inner calyx lobes* outside, with sparse shorter simple hairs mainly along the central ridge and with usually sparse to moderately dense, rarely few forked hairs towards the sides, inside with a cluster of very short simple hairs below the apex. *Leaves* with intrapetiolar tufts of hairs up to 0.6 mm long, scarcely elongating below flowers and usually decurrent along both sides of the leaf bases; *petiole* 0.2–0.6 mm long; *lamina* linear, (1.8–) 2.5–6.5 (–10.4) × (0.8–) 1–1.3 mm, ± abruptly constricted into the petiole, acute and with recurved tufted end of vein, becoming obtuse, above ± flat, sparsely pubescent to glabrescent but with obvious pustules, below with broader central vein flush or recessed to and tightly wedged between the revolute margins, similarly sparsely pubescent to glabrescent (but with pustules) as above and sometimes with a row of teeth between the revolute margins and the central vein. *Flowers* single, terminal on main as well as on short lateral branches, with narrow angular base; *flower stalk* (0–) 2–4 (–6) mm long, with primary bract on the lower third; *buds* narrowly ovoid to ellipsoidal; *primary bracts* linear to linear-lanceolate, (0.8–) 1.2–2.4 × 0.2–0.35 mm, long, flattened to leaf-like, with distinctly recurved margins, fleshy, usually with tuft of simple hairs towards the apex grading into cauline leaves, or with 1–4 additional bracts usually merging into cauline leaves but not at base of axillary short shoots. *Calyx* lobes subequal; *outer calyx lobes* lanceolate to lanceolate-elliptic, (5.2–) 5.4–5.8 (–6.1) × 1.8–2.6 mm, acute, with central ridge ± well developed, outside pubescent to puberulous, inside glabrous to puberulous on distal third; *inner calyx lobes* elliptic-obovate, (5–) 5.2–5.6 (–6) × 2.6–3.2 mm, rounded, outside pubescent to sparsely tomentose, rarely glabrescent, inside glabrous. *Petals* cuneate-oblanceolate to obovate, rarely longer than 7 mm, usually bilobed. *Stamens* (2–) 4–6 (–9), usually most of them on one side and (0) 1 (2) on the other side of the ovaries, without staminodes; *filaments* filiform, 1.2–1.5 mm long, not or scarcely connate basally; *anthers* broadly obloid, (1–) 1.1–1.4 mm long, verruculose-papillate, above abruptly constricted, below ± tapering into filaments. *Pistils* 2; *ovaries* obovoid, each with (2–) 4 ovules, tomentose, rarely hirsute; *style* attached to the outer edge of the apex of the ovaries, then curved outwards and up and then incurved with the terminal stigmas above the anthers. *Fruit* recurved, with fascicled hairs. *Seeds* obloid-obovoid to obloid-comma-shaped, 1.7–2 × 1.4–1.6,

brown; *aril* with fleshy oblique attachment surmounted by lobed membranous cup or only usually two lobes covering the lower third of the seed. *Flowering*: (July) September–November (January). **Fig. 1.**

*Distribution and ecology.* Grows in a wide range of habitats: usually found on rocky slopes often along creeks in sclerophyll vegetation in New South Wales (CT), Victoria (GP, EG), or grows on flats in scrub dominated by *Melaleuca gibbosa*, as recorded from Cape Barren Island, Tasmania (FU). Plants from Flinders and Clarke Island, Tasmania (FU) are recorded from wet areas near a lagoon or in sedgeland on marshy flats.

*Conservation status.* Known mainly from localised occurrences, some of them conserved in Croajingolong National Park, and recorded from Flinders Island (*P. Collier 4908*) as “locally common”.

*Diagnostic features.* *Hibbertia dispar* is very similar to *H. basaltica*, as it also has a zygomorphic androecium, but the former species differs by possessing distinctly pustulate fascicled hairs with a single arm on the leaves, by the undersurface of leaves not being visible, sessile flowers with a flowering stalk, usually less than 4 mm long, and the predominance of spreading simple hairs on the outer calyx. *Hibbertia dispar* and *H. basaltica* are also geographically well separated and occupy different habitats.

*Hibbertia dispar* closely resembles many other species of the *H. pedunculata* subgroup, in its decumbent habit, its production of most flowers on short lateral shoots and the characteristic hairs tufts at the end of young leaves and bracts. *Hibbertia dispar* and *H. basaltica* stand out in this group and are easily distinguished by their few and zygomorphically arranged stamens.

*Hibbertia dispar* is sometimes confused with *H. empetrifolia*, but can be distinguished by the strongly revolute leaf margins (usually touching the broad central vein, thereby obscuring the leaf undersurface) and its characteristic staminal arrangement.

*Variation.* The length of the anthers varies considerably as is often the case in other species of the *H. pedunculata* subgroup and occasionally vestigial (non-dehiscent) anthers occur, but staminodes were not observed in *H. dispar* or the related *H. basaltica*.

The gynoecium and especially the androecium of these two species have been much modified from the 5-merous condition. While the three ovaries common to other species in the *H. vestitata* group are more or less arranged in a triangle, the two ovaries of *H. dispar* and *H. basaltica* are aligned more or less opposite to one another with the styles attached to the upper outer opposite sides. The stamens, which are borne in fives and often more or less distinguishable around the ovaries in other species of the *H. vestitata* group, occur in these two species in two clusters on opposite sides of the gap between the two ovaries. On one side of the ovaries is a single stamen (rarely 0 or 2) and on the opposite

side of the same gap are (2) 3 or 4 (5) stamens closely grouped in *H. dispar*. This bigger cluster has commonly one separate single stamen on either side, but one or both are sometimes absent, so that at times only 1 out of 4 potential groups of stamens (or out of normally 5, as in other species of the *H. vestitata* group) are represented in *H. dispar*. In one flower of a specimen examined, *C. Burgess 12511*, three pistils were present and two single stamens were alternating with them on the one side and another single one on the one side of a group of two clustered occurred. These variations observed in *H. dispar* and a similar reduction known from *H. basaltica*, could present a developmental link from flowers of the *H. vestitata* group with usually 3 ovaries and 5 groups of stamens to 2 ovaries and 1 group of stamens in most species of the subg. *Hemistemma*.

*Hibbertia dispar* also shows some interesting local variation. The single stamen opposite the remaining stamens is missing from most flowers examined of plants from Flinders and Clarke Island, but it is regularly present on specimens from Cape Barren Island, the island situated between Flinders and Clarke Islands. All plants from the Furneaux Islands are distinguished from the mainland form, as well as from *H. basaltica*, by the absence of simple hairs on the internodes of the branches, but this is not an easy character to use as simple hairs usually wear off very soon. Although Buchanan & Schahinger (2005) state that simple hairs may be rare on branches in *H. basaltica*, the fascicled hairs on internodes in *H. dispar* from the Furneaux Islands are few and scattered. In addition *H. dispar* has always only simple hairs on the leaves.

The three known populations of *H. dispar* from the mainland, although disjunct, are remarkably uniform, except for longer simple hairs in New South Wales and central Gippsland as compared to plants from eastern Gippsland. However, the length of the simple hairs on leaves and calyces varies from up to 0.4 mm in East Gippsland to 0.7 mm in central Gippsland, with intermediates found in each population. The calyx hairs on some plants from Eastern Gippsland are noticeably long on flowers which have developed into galls (e.g. *D.E. Albrecht 4880*). Such plants have usually a number of sessile flowers in terminal clusters with a thickened stalk in between.

Flowers of specimens from the mainland are usually borne terminally on all well developed branches, but on plants from the Furneaux Island axillary branches are often so much reduced that they could be called fascicled and the lower leaves (= additional bracts) are not fully developed and often more or less compressed. This reduction does not seem to be a reflection of the condition under which the plants were growing, as flowers are sessile on *P. Collier 3582* and distinctly stalked on *J.S. Whinray 13243*. It is also important to note that all flowers, whether sessile or stalked, are nodding in the fruiting stage, similar to *H. expansa*. This is an important diagnostic character of the *H. pedunculata* subgroup.

*Etymology.* The frequent occurrence of fascicled hairs, subsessile flowers and, most importantly, the zygomorphic androecium of this species are more reminiscent of species of the *H. stricta* or *H. cistoidea* groups. The epithet “dispar”, Latin “unlike”, refers to these unusual characteristics within the *H. vestita* group.

*Specimens examined*

NEW SOUTH WALES: *C.Burgess CBG12511*, Paddys River, 11.xi.1961 (CANB); *P.Gilmour 1138*, Impressa Moor, Nadgee Nature Reserve, 10.ix.1983 (CANB); *R.T.Miller s.n.*, 0.5 km S of Penrose Rest area, along western boundary track, Penrose State Forest, 12.x.2010 (AD, NSW).

VICTORIA: *D.E.Albrecht 4880*, Genoa River, c. 1 km downstream from Tasker track crossing, 24.x.1991 (MEL); *R.J.Bates 10636*, Malacoota, x.1987 (AD); *A.C.Beauglehole 31150*, c. 8 miles [12.8 km] NNE Seal Creek Mouth, 10.x.1969 (CANB, MEL); *A.C.Beauglehole 33698*, near junction of Sarah Allens Track and Wangarabell Road, 10.viii.1970 (MEL); *A.C.Beauglehole 35020 & K.C.Rogers*, Upper Genoa River, 30.xi.1970 (MEL); *A.C.Beauglehole 37167*, Bowen Range, Mt Bowen area, 4.iii.1971 (CANB, MEL, NSW); *A.C.Beauglehole 37419*, Lizzie Ward Road, Nicholson River, 15.iii.1971 (CANB, MEL); *A.C.Beauglehole 37491*, Sandy Creek, Tabberabbera Road, 19.iii.1971 (MEL, NSW); *A.C.Beauglehole 67565*, 15 km S Tubbut PO, 22.i.1980 (MEL); *R.A.Kilgour 40*, Briagolong, junction of Freestone and George creeks, 12.ix.1981 (MEL); *R.A.Kilgour 319*, Mc Kinnon Point, c. 13 km NNE Briagolong, 25.x.1982 (MEL); *N.A.Wakefield 2509*, Genoa River, Wangarabell, iii.1948 (MEL); *N.A.Wakefield & J.H.Willis MEL35579*, Genoa Gorge, 23.x.1948 (MEL); *N.G.Walsh 6118*, Dartmouth Road, 3.75 km from Omeo Hwy, 13.x.2004 (MEL).

TASMANIA: *J.B.Cleland NSW230570*, Launceston, xi.1911 (NSW); *P.Collier 3582*, W Devils Chimney, Cape Barren Island, 9.x.1988 (HO); *P.Collier 4908*, 3 km NE Mt Leventhorpe, Flinders Island, 28.x.1990 (HO); *J.S.Whinray 66*, Clarke Island, 27.xii.1966 (MEL); *J.S.Whinray 306*, Cape Barren Island, 31.xii.1969 (MEL); *J.S.Whinray 357*, Cape Barren Island, 20.xi.1969 (MEL); *J.S.Whinray 1693*, Clarke Island, 26.ix.1976 (MEL); *J.S.Whinray 2264*, near McLaines Bay, Clarke Island, 7.xi.1979 (MEL); *J.S.Whinray 2305*, near Sandy Lagoon, Clarke Island, 9.xi.1979 (MEL); *J.S.Whinray 2354*, flat south of Sandy Lagoon, Clarke Island, 16.xi.1979 (MEL); *J.S.Whinray 2402*, c. 2.1 km ENE Green Hill, Clarke Island, 21.vi.1981 (MEL); *J.S.Whinray 2404*, c. 1.2 km E Bullock Hill, Clarke Island, 4.vii.1981 (MEL); *J.S.Whinray 13243*, Prickly Bottom Flat, Cape Barren Island, 30.x.2007 (AD, MEL).

***Hibbertia ericifolia* Hook.f.**

Fl. Tasmania 1: 14, plate 3 (1855), “*ericaefolia*”; F.Muell., Pl. Indig. Colony Victoria 1: 17 (1862); – non *Pleurandra ericifolia* DC. (1817). — **Type:** Tasmania, near Launceston, *Gunn 1022/1842*, 24.xii.1842 (holo.: K; iso.: BM).

Shrublet up to 0.5 m tall, usually much-branched, decumbent to spreading; branches wiry- to rigid-woody, with pronounced decurrent leaf bases, puberulous, pubescent to pilose. *Vestiture* often not persistent, with simple or rarely forked hairs, usually with longer over shorter ones, but generally sparse to glabrescent; *on branches* sparse to moderately dense, mainly with short spreading to antrorse-appressed simple hairs, or rarely

forked ones, usually overtopped by few to many longer spreading to appressed simple hairs; *on leaves above* scattered, with stout hairs on pustules, but often retaining only ± prominent pustules or ± smooth, but usually with some pustules or hairs on the flanks of the revolute margins; *on leaves below* with scattered stout hairs or their pustules, but rarely on the central vein, but often rows of teeth between them and the revolute margins; *on primary bracts* sparse with fine antrorse appressed simple hairs mainly distally; *on outer calyx lobes* outside, scattered or glabrous, with fine short simple hairs at the base and/or margins and with a denser cluster or usually a terminal tuft at the apex, rarely overtopped by few to many longer, spreading often coarser hairs along the central ridge, inside sparse, with fine antrorse-appressed simple, rarely forked hairs on the distal third or sometimes restricted to below the apex; *on inner calyx lobes* outside, usually moderately dense short antrorse-appressed simple or forked and/or fascicled hairs, rarely overtopped by usually few longer spreading simple hairs mainly along the central ridge, inside with a cluster of fine simple hairs below the apex. *Leaves* with intrapetiolar tufts of hairs up to 0.7 mm long but often much shorter and usually slightly decurrent along the margins of the leaf bases; *petiole* 0.2–0.5 mm long; *lamina* linear to narrowly elliptic, (1.3–) 3–6.5 (–14.2) × (0.4–) 0.5–0.7 (–1) mm, ± abruptly constricted into short petiole, acute or obtuse becoming rounded and with protruding tufted end of central vein at the apex being straight or becoming recurved, above convex to almost flat and puberulous to pilose, often becoming glabrous but then usually with, rarely without, prominent pustules particularly on the revolute margins, below with a broad usually ± recessed central vein separated from and exposing the undersurface or often rolled and ± wedged in, but often with rows of teeth between it and the revolute margins, puberulous usually becoming glabrous and often with long tuft of hairs on end of the central vein. *Flowers* single, terminal and ± sessile on main branches; *flower stalk* 2–5 mm long, with primary bract close to calyx; *buds* narrowly ovoid to obloid-ellipsoid; *primary bracts* linear to linear-triangular, (1.3–) 1.5–2 (–7.8) × 0.1–0.4 (–2.3) mm, acute, incurved to hooded, puberulous, particularly distally; additional bracts 0–3, ± dorsiventrally compressed but usually with distinct revolute margins, usually merging into cauline leaves or all bract-like on axillary short shoots. *Calyx lobes* unequal; *outer calyx lobes* narrowly elliptic, lanceolate or rarely ovate, (3.6–) 4.5–5.5 (–9.2) × 0.9–1.2 (–2.8) mm, often slightly longer or shorter than inner ones, acute to pointed or rarely obtuse, ridged at least distally, outside puberulous to proximally glabrescent and pubescent at the apex or rarely sparsely strigose with longer antrorse hairs overtopping, inside finely puberulous on the distal third; *inner calyx lobes* ovate-elliptic, rarely broadly elliptic, (3.4–) 4.2–5.5 (–8.7) × (1.2–) 1.5–2 (–4.2) mm, acute, cuspidate or mucronate, ± ridged, outside appressed-puberulous to sericeous or

glabrous but commonly pubescent at the apex, inside glabrous with a puberulous patch below the apex. *Petals* obovate, up to 15.8 mm long,  $\pm$  bilobed. *Stamens* 10–15 (–30), without staminodes, arranged around the ovaries; *filaments* filiform but slightly broadening towards the base, 1–1.5 mm long; *anthers* broadly obloid, 1–1.6 (–2.2) mm long, abruptly constricted above and below or gradually tapering into petiole. *Pistils* 3; *ovaries* obovoid, each with 4 ovules, hirsute; *style* attached to the upper outer margin, then spreading centrifugally with stigmas borne outside but  $\pm$  at the upper level of the anthers. *Fruit* erect, with accrescent calyx, hirsute. *Seeds* obovoid to narrowly ellipsoidal, 1.4–1.6  $\times$  1.1–1.3 mm, dark brown; *aril* with fleshy attachment surmounted by uneven membranous cup obliquely covering the lower third of the side of the seed.

**Diagnostic features.** *Hibbertia ericifolia* is so morphologically diverse that it can only be recognised by the combination of sessile flowers without staminodes and usually 8–16 stamens. The species has previously been confused with *H. serpyllifolia*, probably based on the scarcely recurved leaf margins that the two species at times exhibit. However, *H. ericifolia*, especially subsp. *acutifolia*, is distinguished by its acute leaf apex (rounded in *H. serpyllifolia*), a central vein about twice as broad as the revolute margins (narrower) and primary bracts being lanceolate to spatulate (linear to linear-triangular). *Hibbertia ericifolia* occurs mainly inland, south of the Sydney region, whereas *H. serpyllifolia* is restricted to a small area on the central coast of Queensland.

Subsp. *acutifolia* is distinguished by the size and shape of the leaf-like primary bracts. They are flattened so that the undersurface is visible between the central vein and the revolute margins (cf. hypsophylls in *H. vestita*). The small primary bracts of subsp. *ericoides* are incurved and the central vein and revolute margins are not strongly developed. These bracts are easily overlooked or misinterpreted, as they are caducous, and then additional bracts and/or subtending reduced leaves could be misinterpreted as the primary bract.

**Notes.** Mueller (1862) included a number of Victorian specimens of this species under *H. ericifolia*. It would seem that Bentham (1863) followed him, but with an even wider concept of the species, as he also included material from New South Wales, as well as Queensland under the earlier name *H. serpyllifolia*. *Hibbertia serpyllifolia* is now regarded as a distinct species in the *H. vestita* subgroup (cf. Note under *H. serpyllifolia*), while the synonymy of the misapplied name refers to both subspecies of *H. ericifolia*.

#### ***Hibbertia ericifolia* subsp. *ericifolia***

*Hibbertia serpyllifolia* R.Br. ex DC. var. *minutifolia* F.Muell. ex Benth., Fl. Austral. 1: 32 (1863). — *H. minutifolia* F.Muell., First Gen. Report 9 (1853), nom. inval., nom. nud. — **Type:** Victoria, Mt Aberdeen (= Mt Buffalo), 28.ii.1853 (lecto. – **selected here:** MEL35816A; syn.:

*F.Mueller MEL35816B*, Buffalo Ranges, 26.ii.1853; possible types: K, MEL 35585 and MEL1518879).

*Hibbertia serpyllifolia* R.Br. ex DC. var. *serpyllifolia* auctt. non Benth.: Benth., Fl. Austral. 1: 32 (1863), p.p. excl. type; F.Muell., Native Pl. Victoria: 17 (1879), “*serpillifolia*”, p.p.; F.Muell., Syst. Cens. 1: 2 (1882), p.p.; C.Moore, Cens. Pl. New South Wales: 1 (1884), p.p.; F.Muell., Key Syst. Victorian Pl. 1: 122 (1887), “*serpillifolia*”, p.p.; Gilg, Nat. Pflanzenfam. III(6): 117 (1893), p.p.; C.Moore & Betche, Handb. Fl. New South Wales: 10 (1893), p.p.; A.A.Hamilton, Proc. Linn. Soc. New South Wales 24: 354 (1899), p.p.; Rodway, Tasman. Fl. 4 (1903); W.M.Curtis, Stud. Fl. Tasmania 1: 22 (1956), p.p.; N.C.W.Beadle et al. Vasc. Pl. Sydney ed. 2: 230 (1972), p.p.; J.H.Willis, Handb. Pl. Victoria 2: 386 (1973), p.p.; N.C.W.Beadle, Stud. Fl. N.E. New South Wales 3: 255 (1976), p.p.; G.J.Harden & J.Everett in G.H.Harden, Fl. New South Wales 1: 300 (1990), p.p.; Toelken in N.G.Walsh & Entwisle, Fl. Victoria 3: 304(1996), p.p.; Pellow, Henwood & Carolin, Flora Sydney Region ed. 5: 126 (2009), p.p.; M.Gray, Tas. Fl. Online.

Leaf with abaxial central vein up to twice as broad as revolute margins; apex blunt with end of vein  $\pm$  reflexed. *Primary bract* linear-lanceolate to linear-elliptic, (1.3–) 1.5–2.5 (–3.6)  $\times$  0.1–0.4 mm, one-quarter to one-third of the length of outer calyx lobes, abaxially rarely with central vein visible and margins  $\pm$  incurved. *Inner calyx lobes* glabrescent to pubescent with simple, rarely forked hairs. *Flowering:* Mainly September–February, but often extended.

**Distribution and ecology.** Grows on sandy or gravelly soils on floodplains of rivers, rocky slopes or on shallow soil on granite, often in the understorey of eucalypt woodland in coastal to subalpine conditions in New South Wales (CT, CC, ST, SC), adjoining eastern Victoria (EHL, EG) and the tablelands of northern to mid-Tasmania.

**Conservation status.** Although sometimes infrequent, *H. ericifolia* subsp. *ericifolia* is widespread and has been recorded from many conservation reserves.

**Variation.** *Hibbertia ericifolia* subsp. *ericifolia* not only grows in a wide range of habitats, but also includes a number of extreme forms, which could not be adequately distinguished morphologically to justify infraspecific taxa. The leaves of the most widespread form have a broad central vein, with or without rows of teeth; the end of the vein becomes recurved, which gives the leaves a blunt appearance, although the recurved vein-end is usually accentuated by a distal tuft of long simple hairs.

The branches usually become rigid-woody and are covered with often antrorse-appressed short and long simple hairs, except in a subalpine form from the Mount Buffalo area, which was described by Mueller as *H. serpyllifolia* var. *minutifolia*, but is not recognised here. Its often slender branches have spreading to porrect hairs, and more characteristically longer hairs overtopping the usually short ones on the calyx. These characteristics are shared with some Tasmanian

specimens (e.g. *H.D.Gordon HO3265*, *F.H.Long 210*), but the hairs on the leaves are usually twice as long and ascending (not appressed) on these specimens. Very short leaves, typical of plants from the Mt Buffalo area, also occur in plants from East Gippsland, but a few of those specimens then have pubescent to glabrescent calyx lobes (e.g. *C.French MEL35815*, *T.B.Muir 633*), unlike the more sericeous calyx of plants from Mount Buffalo.

A single specimen (*C.P.Gibson et al. s.n.*, 29.x.2005) from the Windsor-Singleton area has leaves rarely longer than 3 mm and thread-like branches. This collection resembles *H. pedunculata* as the flowers are slightly stalked, but the primary bract is always at the base of the stalk. *Hibbertia pedunculata* occurs mainly north of the distribution of *H. ericifolia*, but is further distinguished by the glabrescent calyx and absence of staminodes.

Two specimens of *H. ericifolia* subsp. *ericifolia* (*J.H.Willis MEL695703*, *S.J.Forbes 54*) have flowers with more than 15 stamens. This morphology is usually associated with subsp. *acutifolia*; these specimens otherwise agree morphologically with subsp. *ericoides*.

The inner calyx lobes of plants from the Australian mainland often have some forked hairs in addition to small simple hairs.

*Typification.* Five specimens of the type of *H. serpyllifolia* var. *minutifolia*, collected in 1853 by F. Mueller on Mt Aberdeen, a name later replaced by the older name Mt Buffalo, exist, but the sheets MEL 35585 and MEL1518879 were probably not seen by Bentham, as they are not annotated by him. The other three specimens, viz. one in K and two at MEL, were signed by Bentham. The two specimens in Melbourne are each with an original collector's label and although mounted together on one sheet, MEL 35816, they were collected two days apart. While Bentham examined and signed each of the labels, he does not cite either of these different collecting dates. As these three examined specimens are very similar and display the very short leaves Bentham (1863) refers to in his protologue, the flowering specimen on the left of the sheet MEL35816 is here selected as the lectotype (MEL35816A). As the specimen MEL35816B is of a different collecting date, which Bentham did not acknowledge, it is here treated as a syntype. The specimen at K as well as MEL35585 and MEL1518879 can only be treated as possible types, because it cannot be ascertained whether they were collected on the same day as the lectotype, as only the year (1853) is cited on the labels.

#### *Selection of specimens examined (c. 180 seen)*

NEW SOUTH WALES: *E.P.Angst NSW85825*, Yambulla, xi. 1915 (NSW); *E.Ashby AD97815378*, Killara, Sydney, 25.ix.1915 (AD); *W.Bäuerlen NSW85828*, Batemans Bay, x.1890 (NSW); *C.Burgess CBG12755*, 9 miles [14.4 km] NE Marulan, 29.vii.1962 (CANB); *C.Burgess CBG10913*, Kings Tableland, 4.xi.1962 (CANB); *J.H.Camfield NSW85849*, Katoomba, 24.xii.1908 (NSW); *D.O.Cross NSW127213*, between Medlow Bath and Blackheath. 2.x.1938 (NSW);

*S.Donaldson 209*, *G.Corsini & R.J.Rudd*, 15 km W Tianjara Falls, 17.xi.1992 (AD); *N.C.Ford NSW85831*, plateau N Narabeen Lake, 18.ix.1057 (NSW); *E.Gauba CBG4717*, Cotter Dam, 12.ii.1959 (CANB); *E.Gauba CBG4759*, Mt Palarang, 16.v.1951 (CANB); *C.P.Gibson 62*, Kings Waterhole, Wollemi National Park, 22.ix.2000 (AD, NSW); *C.P.Gibson, G.W.Carr & R.T.Miller s.n.*, Stony Creek crossing, Windsor-Singleton road, 29.x.2005 (AD, NSW); *P.Gilmour 1138*, Impressa Moor, Nadgee Nature Reserve, 10.ix.1983 (CANB); *A.A.Hamilton NSW85836*, Cooks River, xi.1900 (NSW); *R.Helms NSW85832*, Flat Rock, vii.1900 (NSW); *P.Hind 5434 et al.*, Bargo River at the end of Yarran Road, 6.xi.1987 (NSW); *R.D.Hoogland 12447*, Mount Lowden, 12.xii.1973 (CANB, MEL); *L.A.S.Johnson & E.Constable NSW31038*, Big Plain, E Mt Werong, 24.x.1951 (CANB, NSW); *J.H.Maiden NSW85845*, Clarence to Wolgan, xi.1906 (NSW); *J.H.Maiden NSW85860*, Wentworth Falls, x.1898 (NSW); *R.T.Miller 14a-h*, Touga Road, 30.x.2010 (NSW); *R.T.Miller 16a-c*, Yarramunmun forest track, Morton National Park, 30.x.2010 (NSW); *R.T. & J.Miller s.n.*, Thirlmere Lakes, junction of Dry Lake Management Trail and Slade Road, 5.x.2008 (AD, NSW); *R.T. & J.Miller 23.x.2010*, Welby Forest Track (AD); *F.Mueller MEL35821*, Twofold Bay, ix.1860 (MEL); *M.E.Phillips CBG43727*, between Mongarlowe and Nerriga, 18.iv.1961 (CANB); *D.W.Shoobridge CBG13065*, 31 miles [44.6 km] Nerriga to Tomerong, 28.x.1962 (CANB).

VICTORIA: *R.Bates 3616*, Bogong High Plains, 23.i.1984 (AD); *A.C.Beauglehole 31911 & E.W.Fink*, Mueller River area, Cicada Trail, 20.xi.1969 (CANB, MEL); *A.C.Beauglehole 35204 & K.C.Rogers*, Bald Knob, c. 3.2 km S Mt Seldom Seen Tower, 6.xii.1970 (CANB, MEL); *A.C.Beauglehole 37489*, Blaze Road to Tabberabbera Road, 19.iii.1971 (MEL); *A.C.Beauglehole 41401*, Reedy track, Nunniong Plateau, 6.ii.1973 (CANB, MEL); *A.C.Beauglehole 89177 & L.W.Huebner*, Burrowa National Park, 23.x.1987 (MEL); *S.J.Forbes 54*, 4 km E Tamboon on Clinton Rocks Track, 31.v.1979 (MEL); *S.J.Forbes 2950*, c. 4 km S Cann River Post Office along Gauge Track, 18.ix.1985 (MEL); *C.French MEL35815*, Buffalo Ranges, xii.1904 (MEL); *R.D.Hoogland 11920*, near Lake Catani, Mt Buffalo National Park (CANB, K, MEL); *R.D.Hoogland 11923*, c. 6 miles [9.6 km] N Wulgulmerang, 29.xii.1973 (MEL, NSW); *T.B.Muir 633*, near Lake Catani, 1.i.1959 (MEL); *N.A.Wakefield 4033*, Cann River, 1946 (MEL); *N.G.Walsh 6333*, Burrowa-Pine Mountain National Park, 19.x.2005 (MEL); *J.H.Willis MEL35813*, near chalet, Mt Buffalo National Park, 21.ii.1963 (MEL); *J.H.Willis MEL695703*, Mid-tops of Mt Burrowa, 17.xi.1971 (MEL).

TASMANIA: *W.H.Archer NSW121128*, Tasmania [without precise locality] (NSW); *R.Brown s.n.*, Port Dalrymple, 1.1804 (BM); *F.E.Burbury HO3274*, St Patricks River, – (HO); *P.Collier 522*, ridge N of Cutoff Hill, 12.v.1985 (HO); *M.G.Corrick 2020*, near Prosser Forest, between Launceston and Lilydale, 17.xii.1969 (MEL); *W.M.Curtis HO29266*, Lilydale Road, Launceston, 12.xi.1952 (HO); *W.V.Fitzgerald HO3257*, St Patricks River, 15.xi.1892 (HO); *H.D.Gordon HO3265*, Epping Forest, 19.iv.1946 (HO); *H.D.Gordon HO3266*, Apsley River, S Bicheno, 19.xi.1942 (HO); *F.H.Long 210*, Railton, 24.x.1930 (HO); *J.H.Maiden NSW121125*, Range between Swansea & Campbelltown, i.1902 (NSW); *A.Moscal 12316*, Warners Sugarloaf, 100 m E Meander River, 19.ii.1986 (HO); *L.Rodway 17*, St Patricks River, 15.xi.1892 (HO); *J.Somerville HO3261*, Meander River flats south of Deloraine, 4.i.1959 (HO); *J.H.Wilson HO3263*, Lilydale Road, Launceston, 15.i.1943 (HO); *J.H.Wilson HO3264*, Lilydale Road, Launceston, 15.ii.1943 (HO); *J.H.Wilson HO116928*, Lilydale Road, i.1943 (HO).

***Hibbertia ericifolia* subsp. *acutifolia* Toelken, subsp. nov.**

*A subspecie typica bracteis magnioribus ((4.4–) 5.5–7 (–7.8) × 1.3–2.3 mm) et lobis calicis plerumque pilis fasciculatis differt.*

**Type:** New South Wales, Sarahs Knob, R. & J. Miller s.n., 21.x.2006 (holo.: AD; iso.: BRI, CANB, NSW, PERTH).

*Hibbertia serpyllifolia* R.Br. ex DC. var. *serpyllifolia* auct. non Benth.: Benth., Fl. Austral. 1: 32 (1863), p.p. excl. type; F.Muell., Native Pl. Victoria: 17 (1879), “*serpillifolia*”, p.p.; F.Muell., Syst. Cens. 1: 2 (1882), p.p.; C.Moore, Cens. Pl. New South Wales: 1 (1884), p.p.; F.Muell., Key Syst. Victorian Pl. 1: 122 (1887), “*serpillifolia*”, p.p.; Gilg, Nat. Pflanzenfam. III(6): 117 (1893), p.p.; C.Moore & Betche, Handb. Fl. New South Wales: 10 (1893), p.p.; A.A.Hamilton, Proc. Linn. Soc. New South Wales 24: 354 (1899), p.p.; Rodway, Tasmanian Flora: 4 (1903); N.C.W.Beadle et al. Vasc. Pl. Sydney ed. 2: 230 (1972), p.p.; J.H.Willis, Handb. Pl. Victoria 2: 386 (1973), p.p.; N.C.W.Beadle, Stud. Fl. N.E. New South Wales 3: 255 (1976), p.p.; G.J.Harden & J.Everett in G.H.Harden, Fl. New South Wales 1: 300 (1990), p.p.; Toelken in N.G.Walsh & Entwisle, Fl. Victoria 3: 304 (1996), p.p.; Pellow, Henwood & Carolin, Flora Sydney Region ed. 5: 126 (2009), p.p.

Leaf with abaxial central vein usually more than twice as broad as revolute margins; apex pointed to acute, rarely slightly recurving. *Primary bract* lanceolate to spatulate, (3.2–) 5.5–7 (–7.8) × 1.3–2.3 mm, half to three-quarters the length of outer calyx lobes, abaxially with broad undersurface exposed between the central vein and recurved margins. *Inner calyx lobes* glabrescent with forked to fascicled hairs especially towards the apex. *Flowering:* Mainly September–November.

*Distribution and ecology.* Grows on sandy soil usually associated with sandstone outcrops in heath-like vegetation usually as understory to eucalypt woodland to forest in the coastal foothills of New South Wales (CC, ST).

*Variation.* The critical character of this subspecies is the size and shape of the primary bract, which like the hypsophylls in *H. vestita* are enlarged and, although somewhat flattened, expose a broad part of the undersurface between the raised central vein and revolute margins. In the typical subspecies the margins of the bracts are more or less incurved and the central vein is indistinct, in addition to the size differences between the two subspecies. Acute leaves have also been, though rarely, recorded in the typical subspecies (e.g. *N.C.Ford NSW85831*), but those specimens are easily identified by the small incurved bracts below the flowers as subsp. *ericifolia*. Similarly remarkably obtuse to rounded leaves have been observed on plants with very short leaves, bracts and smaller flowers (R. & J. Miller s.n., 5.x.2009), but they still show a primary bract with an exposed undersurface between the central vein and revolute margins, typical of subsp. *acutifolia*. Fascicled hairs on the inner calyx lobes of subsp.

*acutifolia* are not always discernable because they are often so small.

This subspecies, although easily distinguished, can be divided into two extremes merging just south of Sydney. While the northern population around Sydney is more similar to the typical subspecies, a distinct form occurs to the south, mainly along the coastal foothills. It is distinguished by flowers with 18–30 stamens and larger anthers up to 2.2 mm long (typically 8–18 stamens with anthers up to 1.5 mm long). The southern form of this subspecies is in all respects much larger (leaves to 14.2 mm, outer calyx to 9.2 mm, inner calyx to 8.7 and petals to 15.8 mm long) and some of the specimens exhibit very rigid-woody branches of shrubs up to 50 cm tall, e.g. *J.W.Camfield NSW85841*. The two forms grade into each other, and some specimens (e.g. *R.T.Miller s.n.*, 10.ix.2010) even have branches of both types (cf. specimens examined).

An unusual similar increase in the number of stamens has also been recorded in two specimens from eastern-most Victoria (*J.H.Willis MEL695703* and *S.J. Forbes 54*), but they have the short narrow primary bracts characteristic of the typical subspecies. Also their narrow recessed central veins indicate that they are not part of subsp. *acutifolia*, of which no specimens have been recorded from the southern parts of the southern coast of New South Wales.

*Etymology.* The epithet “*acutifolia*”, Latin “pointed-leaved” refers to the usually straight pointed end of the central vein at the end of the leaves.

*Selection of specimens examined (45 seen).*

**Stamens (8–) 10–16 (–18).** NEW SOUTH WALES: *J.W. Camfield NSW85837*, Kogarah, xii.1893 (NSW); *J.W.Camfield NSW85841*, Loftus Park, x.1898 (NSW); *J.W.Camfield NSW85842*, Oatley, 10.xi.1903 (NSW); *A.A.Hamilton NSW 85840*, Yowie Bay, xi.1908 (NSW); *B.Hain CBG57605*, Wattamolla Rd, Royal National Park, 28.viii.1970 (CANB); *P.Hind 5434*, *P.Cuneo & G. D’Aubert*, Bargo river gorge at the end of Yarran Road, 6.xi.1987 (NSW); *H.K.Mair & E.F.Constable NSW16112*, Waterfall to Bulli Pass, 8.xi.1950 (NSW); *R.T. & J.Miller s.n.*, laterite track from Bundeena to Coast Track, Royal National Park, 11.ix.2007 (AD, NSW); *R.T. & J.Miller s.n.*, Wattle Ridge, Hill Top, 5.x.2008 (NSW); *R.T. & J.Miller s.n.*, Cave Creek Trail, 5.x.2008 (AD, NSW); *R.T. & J.Miller s.n.*, Old Coast Track, Curra Moors, Royal National Park, 5.x.2009 (NSW); *R.T.Miller s.n. & A.Henderson*, Appin to Wilton Road, under powerlines, 5.x.2008 (NSW); *R.T.Miller s.n.*, S Appin Rd (i), 17.xi.2010 (AD, NSW); *J.Pulley CBG43383*, near Windellama, 6.xi.1965 (CANB); *J.Rodway NSW85839*, west side of Yowie Bay, Port Hacking, 16.ii.1945 (NSW).

**Stamens (18–) 20–30.** NEW SOUTH WALES: *C.Bryant MEL35823*, Mt Keira, Wollongong, 1954 (MEL); *R.T. & J.Miller s.n.*, Brokers Nose, 28.x.2006 (AD, NSW); *R.T.Miller s.n.*, Sublime Point entrance, 30.ix.2009 (AD, NSW).

**Stamens of both types.** NEW SOUTH WALES: *R.T.Miller s.n.*, Dharawal National Park, 10.x.2006 (AD, NSW); *R.T.Miller s.n.*, Sebastapol Trig. Heathcote National Park, 12.x.2006 (AD, NSW); *R.T. & J.Miller s.n.*, S. Appin Road, 15.x.2006 (AD, NSW); *R.T.Miller s.n.*, S. Appin, upper Georges River, W Baden Powell Drive, 10.xi.2010 (NSW).

***Hibbertia expansa* Toelken, sp. nov.**

*A speciebibus aliis turmae H. vestitae nervis centralibus rectis protrudentibus apices foliorum et foliis calicibusque pilis patentibus differt.*

**Type:** New South Wales, 42 km E Glen Innes, H.R.Toelken 8533, 22.xi.1992 (holo.: AD; iso.: BRI, K, MO, NSW, PERTH).

*Hibbertia pedunculata* auctt. non R.Br. ex DC.: Stanley in Stanley & E.M.Ross, Fl. S.E. Queensl. 1: 188 (1983); G.J.Harden & J.Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p. p.; Jessup in Bostock & A.E.Holland, Census Queensland Fl. 63-64 (2007), p.p.

*Hibbertia vestita* auctt. non A.Cunn. ex Benth.: N.C.W. Beadle, Student's Fl. N.E. New South Wales 3: 256 (1976), p.p.; Stanley in Stanley & E.M.Ross, Fl. S.E. Queensland 1: 187 (1982), p.p.; G.J.Harden & J. Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p.p.; Jessup in Bostock & A.E.Holland, Census Queensland Fl. 63/64 (2007), p.p.

Shrublets to 0.35 m high, moderately to much-branched, spreading to decumbent; branches wiry becoming rigid-woody, with distinct decurrent leaf bases, sparsely hirsute, rarely pilose. *Vestiture* persistent, usually dense varying to sparse short spreading simple hairs overtopped by scattered spreading longer ones; *on branches* sparse to moderately dense, with short erect hairs (sometimes very short) overtopped by fine longer ones up to 1 mm long simple hairs often at right angles to stem; *on leaves above and below* with few shorter antrorse simple hairs overtopped by longer spreading ones becoming longer on proximal parts especially on the central vein and on petiole, with usually many reduced hairs varying from small fascicled, forked or simple hairs to teeth, particularly on the margin of the undersurface, which is often exposed between the central vein and revolute margins; *on primary bracts* scattered small antrorse simple hairs overtopped by longer hairs, becoming even longer on the abaxial surface especially on the central vein; *on outer calyx lobes* outside with scattered short simple hairs overtopped by few to many, often very much longer antrorse-spreading ones up to 1.4 mm long, inside with few smaller, sometimes forked appressed hairs overtopped by long to very long ones below the apex; *on inner calyx lobes* outside sparse with short antrorse simple hairs spreading to the glabrous membranous margins overtopped by dense, at least along the central strip, much longer  $\pm$  appressed ones, inside dense in a patch with very short antrorse-appressed simple hairs below the apex. *Leaves* with intrapetiolar tuft of hairs up to 0.7 mm long; *petiole* 0.1–0.6 mm long; lamina linear-lanceolate, rarely linear, (2.3–) 3.0–5.5 (–6.3)  $\times$  (0.8–) 0.9–1.1 (–1.3) mm, abruptly constricted into the petiole, usually pointed to acute or becoming slightly recurved, above convex or rarely flat with slight depression along the central vein and sparsely hirsute to finely pilose and usually without pustules, below with central vein  $\pm$  flush with and often about twice as wide as the revolute margins and sometimes showing the puberulous to smooth undersurface in the gap between the two, with central vein projecting beyond

the leaf apex and sparsely hirsute. *Flowers* single, sessile, subsessile or stalked, terminal on mainly major branches; *flower stalk* 0–6 (–8.4) mm long, with primary bract immediately subtending to close to the calyx; *buds* oblong-ovoid; *primary bracts* linear-lanceolate, (3.1–) 3.5–4.0 (–4.3)  $\times$  0.8–0.9 mm, leaf-like but with scarcely revolute margins and raised central vein mainly towards the apex, additional bracts (0) 1 or 2, merging into cauline leaves. *Calyx* lobes unequal; *outer calyx lobes* lanceolate, (4.4–) 4.5–5 (–5.3)  $\times$  (2.2–) 2.4–3.0 (–3.2) mm, often shorter than inner ones, acute to bluntly acute, rarely rounded, with scarcely raised central ridge and slightly revolute margins distally, outside hirsute to strigose, inside appressed-pubescent to sericeous on the distal half; *inner calyx lobes* ovate to ovate-oblong, (4.2–) 4.5–5.2 (–5.6)  $\times$  (2.8–) 3.4–4 (–4.2) mm, acute, with faint central ridge and broad membranous margins, outside pubescent to strigose at least along a central strip, inside puberulous below the apex. *Petals* obovate to broadly obovate, up to 10.4 mm long,  $\pm$  deeply bilobed. *Stamens* (14–) 20–30, without or with few thread-like staminodes, around the ovaries; *filaments* strap-like, 2.2–2.6 mm long,  $\pm$  broadened towards the base,  $\pm$  scarcely connate basally; *anthers* narrowly obloid, 1.3–2.4 (–2.7) mm long, above abruptly constricted and below  $\pm$  tapering into filaments. *Pistils* 3; *ovaries* obovoid, each with 4–6 ovules, pubescent to hirsute; *style* attached at apex and then spreading sideways with stigmas centrifugal to anthers. *Fruit* pilose to sparsely hirsute. *Seeds* obovoid but often attachment more or less curved to one side, 1.5–1.65  $\times$  1.1–1.3 mm, dark brown; *aril* with fleshy base and with broadly but shallowly lobed sheath covering one-third to two-thirds of seed. *Flowering*: Mainly October and November, but flowers have also been recorded from most months of the year. **Fig. 2A–E.**

*Distribution and ecology.* Grows on coarse sandy soil between granite in understory scrub in open eucalypt woodland in south-central Queensland (DD) and north-central New South Wales (NT).

*Conservation status.* Unknown. Collections from NSW are from before 1970 except for the type of the species.

*Diagnostic features.* A very variable species which has often been identified as *H. vestita* because of its frequently sessile or subsessile flowers and, particularly, as it has similar spreading hairs on the branches and more or less strigose hairs on the calyx. It is, however, distinguished from most of the taxa in the *H. vestita* group by its usually straight erect projection of the central vein above the leaf apex and the thicker, broad central vein, which is usually touching the revolute margins.

The presence of fascicled hairs and stalked flowers that are generally nodding in the fruiting stage are characteristics of the *H. pedunculata* subgroup. *Hibbertia expansa* shows closest affinity to *H. pedunculata*, but the latter is distinguished by its obtuse to rounded outer

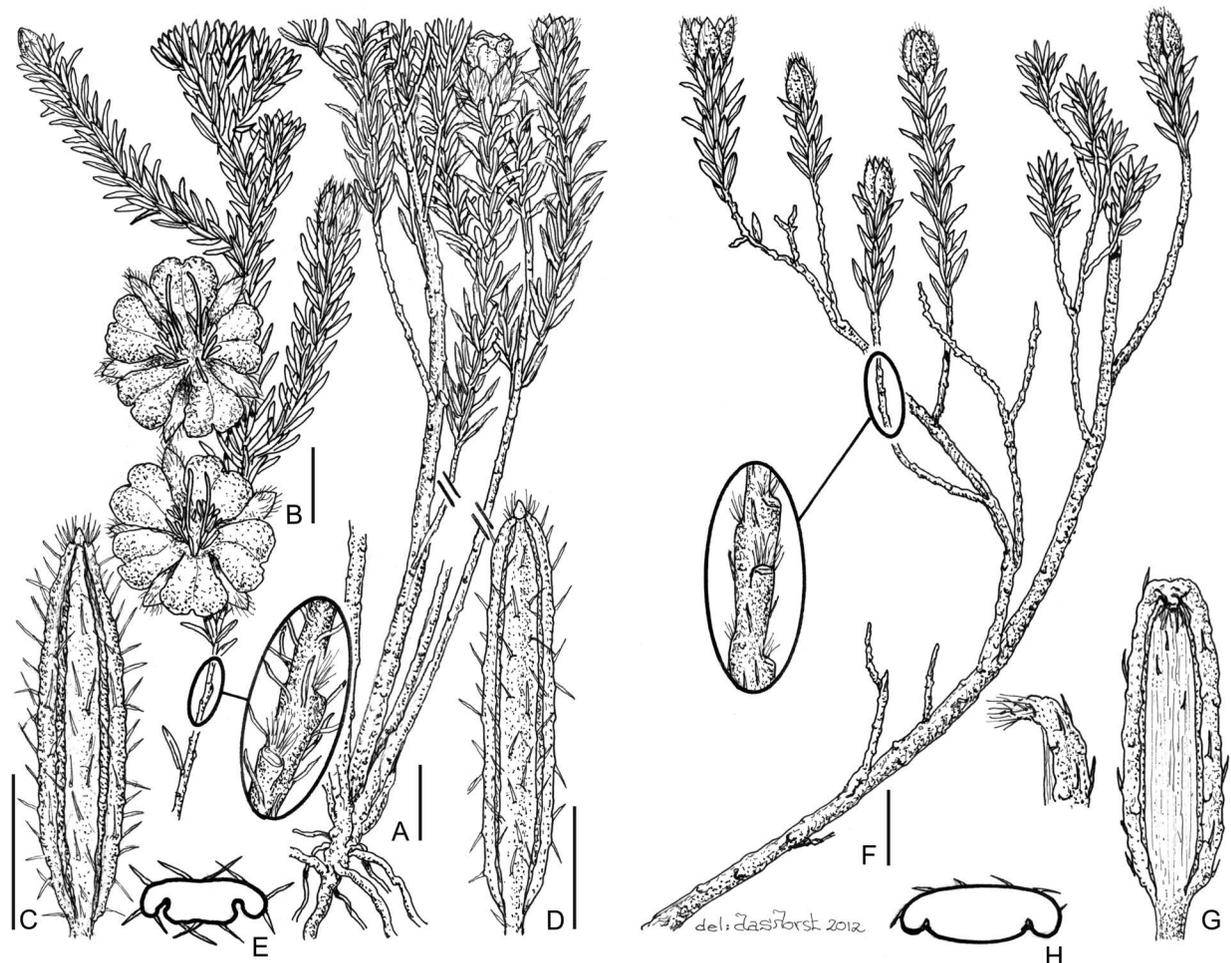


Fig. 2. A–E *H. expansa*: A much branched plant; B flowering branch; C abaxial view of flattened leaf with undersurface visible; D abaxial view of revolute leaf with undersurface scarcely visible; E transverse section through mid-leaf. F–H *H. pachynemidium*: F flowering branch with sessile flowers; G abaxial view of leaf with recurved apex; H transverse section through mid-leaf. — Scale bars: A, B, F 10 mm; C, D, G 2 mm — A, D R.W.Jessup & M.Gray 1940, B, C, E R.H.Cambage NSW85779, F–H J.D.Briggs & M.Parris 2078.

calyx lobes, without pronounced central ridge, and the absence of coarse spreading hairs.

**Variation.** *Hibbertia expansa* is a very variable species with a number of differing populations, usually associated with apparently disjunct granite outcrops. So far, it is not clear how this variability relates to geographical distribution. For example, some plants have a distinct flower stalk, e.g. *S.L.Everist & L.J.Webb 1293*, while the majority of specimens have sessile or subsessile flowers. A full range of intermediate sizes of the flower stalk had already been recorded by the end of the nineteenth century on the specimen *C.Stuart 565*. The recurved flowers in the fruiting stage are here taken as an indication that this species exhibits more characteristics of *H. pedunculata* subgroup rather than the *H. vestita* subgroup. *Hibbertia expansa* thus exhibits a similar range of variation of the flower stalk as in, for instance, *H. porcata*.

Another local variation is spreading simple hairs (0.4–) 0.5–0.7 mm long on leaves, which are often associated with long bristly hairs on the calyx, e.g. *R.Bates 10842*. Furthermore the central vein is usually

not firmly wedged in between the revolute margins, but, particularly on leaves below the flowers, this becomes less tight, so that sometimes the undersurface between margins and vein is visible: in different populations it is either glabrous or covered with fascicled or forked hairs (cf. Fig. 2C).

Although the central vein is more or less clearly projecting beyond the rest of the apex of the leaves, it usually remains straight or may be slightly recurved on older leaves, unlike the reflexed apex in other species of the *H. vestita* group.

Unusually variable are also the number of stamens and the presence or absence of a few staminodes. Remarkable differences in the length of anthers of plants from different localities have also been observed. The very small anthers in *W.McRae NSW85885* may be attributed to its immature flowers, as could be the very small petals, but the small number of stamens (11) are unusual. However, in the type specimen eleven or twelve stamens are developed, while others remain more or less rudimentary as staminodes. The number of staminodes

in each flower may vary on the same plant and between plants from different localities.

The sheath of the aril varies in covering one- to two-thirds of different seeds of the same fruit (*J.L.Boorman NSW86880*).

**Etymology.** The epithet “expansa”, Latin “expanded, spread out” refers to the long spreading hairs on all parts of the plant.

#### *Specimens examined*

QUEENSLAND: *R.Bates 10842*, Stanthorpe, 15.x.1987 (AD); *S.L.Everist & L.J.Webb 1293*, 1 mile [1.6 km] S Dalveen on Stanthorpe Road, 21.xi.1946 (BRI, CANB); *D.Halford 1995*, 15 km SE Inglewood, 7.x.1993 (BRI); *D.Halford 2733*, Mount Jabbinder, 34.3 km SW Stanford, 22.ix.1995 (BRI); *L.Hazelgrove 189*, Mount Jabbinder, xii.2000 (BRI); *?Leichhardt 129*, near a waterhole, 6.i.1847 (NSW85862).

NEW SOUTH WALES: *J.L.Boorman NSW85781*, Torrington, i.1911 (CANB, NSW); *J.L.Boorman NSW85784*, Torrington, xi.1919 (NSW); *J.L.Boorman NSW85785*, Emmaville, x.1901 (NSW); *J.L.Boorman NSW85886*, Willsons Downfall, xi.1904 (NSW); *J.L.Boorman NSW85887*, Boonoo Boonoo, xi.1904 (NSW); *R.H.Cabbage 1616A*, Torrington, 29.ix.1907 (CANB, NSW); *R.H.Cabbage 1757*, Torrington, ix.1907 (NSW85779); *E.F.Constable NSW55998*, 10 miles [16 km] E Deepwater, on Tent Hill – Torrington road, 13.v.1961 (K, NSW); *E.Gauga CBG 4806*, Torrington, 12.xii.1951 (CANB, NSW); *J.W.Haney 30*, Glen Elgin, 24.ii.1930 (CANB); *R.W.Jessup & M.Gray CANB126265*, 13 miles [20.8 km] S Emmaville, 11.iv.1953 (CANB); *C.Kusebysch MEL1009784*, Boonoo-Boonoo, xii.1884 (MEL); *W.McReadie NSW85885*, Dandarra Creek, E Glen Innes, 11.x.1967 (NSW); *Porter MEL1009670*, Glen Innes, iv.1885 (MEL); *C.Stuart MEL1009732*, New England, – (MEL); *C.Stuart 227*, Sandy Creek, xi. (MEL1009681); *C.Stuart 505*, Sandy Creek, xi. (MEL1009667); *C.Stuart 565*, Sandy Creek, xi. (MEL35573); *I.R.Telford 2547*, road to Boonoo Boonoo Falls, 29.xi.1970 (CANB).

#### *Hibbertia exponens* Toelken, sp. nov.

*Hibbertia expositae* et *H. pachynemidio similis* sed *foliis glabrescentibus nervis centralibus angustis, recessis et plerumque non continguis marginibus revolutis differt.*

**Type:** Victoria: Snowy River, c. 3 miles [4.8 km] SSW Willis, *R.D.Hoogland 11925*, 30.xii.1970 (holo.: NSW; iso.: CANB, MEL; A, K, L, M, OKLA – n. v.).

*Hibbertia pedunculata* auctt. non R.Br. ex DC: J.H.Willis, *Handb. Pl. Victoria* 2: 386 (1973), p.p.; Toelken in N.G.Walsh & Entwisle, *Fl. Victoria* 3: 304 (1996), p.p.; N.G.Walsh & V.Stajsic, *Census Vasc. Pl. Victoria* ed. 8: 79 (2007), p.p.

Shrublets up to 0.3 m tall, decumbent to straggling, sparsely branched; branches wiry, with leaf bases scarcely decurrent, sparsely sericeous, rarely pubescent. *Vestiture* not persistent, with scattered longer and shorter antrorse simple hairs usually without obvious pustules on the leaves. *Leaves* with sparse intrapetiolar tuft up to 0.4 mm long and scarcely decurrent; *petiole* 0.2–0.5 mm long; *lamina* linear-oblong to linear-elliptic, (2.6–) 4.5–6.5 (–8.6) × 0.5–0.8 (–1) mm, gradually tapering into petiole, acute to bluntly acute and recurved with few short hairs on the end of the vein but wearing off

soon, above flat to slightly depressed along the central vein, puberulous to glabrescent, below with recessed narrow central vein separate from the equally broad revolute margins, puberulous or glabrescent. *Flowers* single, terminal on main and axillary branches; *flower stalk* (4.5–) 5–7.5 (–11.3) mm long, with primary bracts towards the base; *buds* ovoid to broadly ellipsoidal; *primary bracts* linear-lanceolate, 2.4–4 × 0.3–0.5 mm, with recurved acute apex, with revolute margins, glabrescent; additional bracts 1–3, grading into cauline leaves. *Calyx* lobes unequal; *outer calyx lobes* ovate, 4.8–5.5 (–5.8) × 2.7–3.1 mm, acute, distinctly ridged, outside appressed-puberulous to glabrescent, inside appressed-puberulous on distal third; *inner calyx lobes* ovate-oblong to oblong-elliptic, (4.6–) 4.8–5.3 × 3–3.4 mm, cuspidate to rounded, rarely truncate or emarginate, scarcely or not ridged, with broad membranous margins, outside appressed puberulous to glabrescent, inside glabrescent below the apex. *Petals* obovate-cuneate, up to 8 mm long, bilobed. *Stamens* 18–26, with or without a few staminodes, arranged around the ovaries; *filaments* narrowly strap-like, 1.2–1.5 mm long, scarcely connate basally; *anthers* obloid, 0.5–1.4 mm long, variable, abruptly constricted above, tapering below. *Pistils* 3; *ovaries* obovoid, with 2 or 4 ovules, tomentose; *styles* attached to the upper outer edge, then curved out and up with the stigmas exposed above the anthers. *Fruit* recurved, pubescent. *Seeds* obloid, with attachment on side, 2–2.1 × 1.5–1.7 mm, dark brown; *aril* with slightly fleshy attachment surmounted by a membranous slightly lobed cup clasping the lower third of the side of the seed. *Flowering:* November–December (April).

**Distribution and ecology.** Growing on sandy or rocky riverbanks in riparian scrubland including *Acacia boormannii*, *A. floribunda*, *Bursaria spinosa*, *Kunzea ericoides*, *Phebalium glandulosum* and *Calytrix tetragona* (N.G.Walsh 2195 & K.C.Norris) along the Snowy River in Victoria (EG).

**Conservation status.** Frequency of occurrence of the species is unknown, but it is conserved in the Snowy River National Park.

**Diagnostic features.** Although *H. exponens* is obviously closely related to *H. exposita* and *H. pachynemidium*, it is a distinct species, not only because of the characteristic narrow central vein and thus an exposed glabrous undersurface of the leaves, but also because it grows on riverbanks unlike the latter two species, which were recorded from slopes or ridges or mountain tops.

The three species are distinguished from most of the other species of the *H. pedunculata* subgroup by their small flowers with short calyces and more or less broadened filaments in comparison to other species. Although *H. basaltica* and *H. dispar* have similar small flowers, they are readily distinguished by their few stamens, which are irregularly distributed around the ovaries.

*Variation.* A few staminodes were observed in some flowers on some specimens (e.g. *N.G.Walsh 2195* & *K.C.Norris*). The length of the flower stalk (two internodes long) is sometimes not easy to determine because the primary bract is leaf-like with revolute margins and grades into leaves below.

*Etymology.* The leaves of this species are persistently “exposing, displaying”, Latin “exponens” (present participle), the undersurface between the narrow central vein and revolute margins, as referred to in the epithet. The epithet is therefore derived from the same verb “exponere” as the epithet of the closely related species, *H. exposita* (past participle), although in the two cases applied for different reasons.

#### *Specimens examined*

VICTORIA: *A.C.Beauglehole 33205 et al.*, Snowy River Road, 4.1 miles [6.6 km] S New South Wales border, 6.i.1967 (MEL); *J.M.Bechervaise MEL35577*, Gorge tract of the Snowy River, near Deddick, 21.i.1948 (MEL); *E.J.Carroll CBG15689*, c. 5 miles [8 km] E Butchers Ridge, 10.iii.1966 (CANB); *A.W.Howitt 81*, Snowy River bank, 1884 (MEL); *N.G.Walsh 2195* & *K.C.Norris*, Tulach Ard Gorge, 1.9 km NNW helipad on Museum Spur, 15.xi.1988 (MEL); *J.H.Willis MEL119735*, Snowy River Gorge, E Butchers Ridge, 21.iv.1971 (MEL).

#### *Hibbertia exposita* Toelken, *sp. nov.*

*Hibbertiae* pachynemidio *similis sed tuberculis prominentibus in foliis, filamentis filiformibus et lobis calicis plus minusve pubescentibus; a H. intermedia et H. ericifolia calicibus brevioribus et antheris brevioribus differt.*

**Type:** Victoria, Mt Wellington, *R.H.Barley s.n.*, 20.xi.1980 (holo.: MEL627849; iso.: CANB343299).

*Hibbertia pedunculata* auctt. non R.Br. ex DC: Benth., Fl. Austral. 1: 32 (1863), p.p. quoad *F.Mueller MEL35580* (Austral. Alps); J.H.Willis, Handb. Pl. Victoria 2: 386 (1973), p.p.; Toelken in *N.G.Walsh & Entwisle*, Fl. Victoria 3: 304 (1996), p.p.; *N.G.Walsh & V.Stajsic*, Census Vasc. Pl. Victoria ed. 8: 79 (2007), p.p.

Shrublets up to 0.15 mm tall, much-branched, mat-forming; branches wiry but soon becoming rigid, with scarcely decurrent leaf bases, pubescent to puberulous or glabrescent. *Vestiture* rarely persistent, with simple or forked hairs; *on branches* sparse to moderately dense with short simple and/or forked hairs particularly on the flower stalk; *on leaves above* scattered, with longer and shorter antrorse simple hairs on ± pronounced pustules, becoming larger on the flanks of the revolute margins and a distinct tuft present on the terminal mucro of the central vein; *on leaves below* with pustulate antrorse simple hairs on the revolute margins and rarely with rows of teeth between the revolute margins and the central vein; *on primary bracts* with terminal tuft of simple hairs and some marginal cilia; *on outer calyx lobes* outside usually glabrous except for a few proximal and terminal appressed simple hairs, inside with few antrorse appressed simple and forked hairs below the apex; *on inner calyx lobes* outside glabrous except for few antrorse appressed simple hairs proximally

and terminally, or rarely on the distal half, sometimes with distal cilia, inside glabrous except for a cluster of short appressed hairs below the apex. *Leaves* with short intrapetiolar tufts up to 0.3 mm long; *petiole* 0.2–0.4 mm long; *lamina* narrowly oblong to linear, (1.4–) 2.5–3.5 (–4.4) × 0.6–0.8 (–1) mm, gradually tapering into petiole, obtuse to rounded but with recurved projection of vein with short terminal tuft, above convex to flat with a slight depression along the central vein, with scattered pustules with or without antrorse simple hairs, particularly well-developed on the flanks of the revolute margins, below with broad central vein flush to slightly recessed from and tightly wedged in between the revolute margins, sparsely tuberculate on revolute margins. *Flowers* single, terminal on main branches; *flower stalk* (5.6–) 8–15 (–18.5) mm long, with primary bract towards the base; *buds* ellipsoidal; *primary bracts* linear-triangular, 1.1–1.3 (–1.4) × c. 0.2 mm, acute, dorsiventrally compressed but ± incurved, ciliate on the distal half, grading into 1–4 fleshy additional bracts and the subtending cauline leaves. *Calyx* lobes unequal; *outer calyx lobes* lanceolate to lanceolate-elliptic, (3.1–) 3.3–4 (–4.5) × 1.4–1.7 (–2) mm, acute, with distinct central ridge, outside glabrescent to glabrous except terminally pubescent or sometimes with cilia towards the apex, inside puberulous on distal third; *inner calyx lobes* oblong-elliptic, (3.6–) 3.8–4.4 (–4.8) × (2.2–) 2.8–3.2 (–3.4) mm, ± ridged, outside glabrous or glabrescent, inside puberulous below the apex. *Petals* broadly obovate, up to 7.5 mm long, emarginate to slightly bilobed. *Stamens* 10–14, without staminodes, arranged around the ovaries; *filaments* filiform, 1.1–1.7 mm long, scarcely connate basally; *anthers* obloid, 0.6–0.8 mm long, abruptly constricted above and below tapering into filament. *Pistils* 3; *ovaries* obovate, each with 2 ovules, tomentose; *style* attached to the outside margin of the ovaries, then spreading out and up with the stigmas well above the anthers. *Fruit* and *seeds* not seen. *Flowering:* November–January.

*Distribution and ecology.* Grows on shallow soil on rocks or between rocks in sub-alpine woodland with *Eucalyptus pauciflora*, *Goodenia hederacea*, *Bossiaea alpina* (recorded as *B. foliosa*) and *Poa fawcettiae* (*D.E.Albrecht 2997* & *N.G.Walsh*) in Victoria (EHL).

*Conservation status.* The species is conserved in the Alpine National Park where it was described as “locally common” by *D.E.Albrecht 2997* & *N.G.Walsh*.

*Diagnostic features.* *Hibbertia exposita* differs from *H. intermedia* and *H. ericoides* by its smaller flowers and especially by its shorter anthers (0.6–0.8 mm long). It is very similar to *H. pachynemidium*, but easily distinguished by the prominent pustules of the hairs on the upper leaf surface and in particular on the revolute margins, by its more or less hairy outer calyx lobes and by filiform filaments, which are scarcely connate basally.

**Variation.** The specimens *F.Mueller* MEL35571 & MEL35572 are unusual as they have flowers slightly more hairy and the central vein of the leaves is only just broader than the revolute margins, but unfortunately no detailed locality or date of collection is available to possibly relocate and explore similar populations. The length of the leaves and calyx varies considerably.

**Etymology.** The epithet “*exposita*”, Latin “exposed”, refers to its habitat as the species has been recorded from the top of exposed rock outcrops.

**Specimens examined**

VICTORIA: *D.E.Albrecht* 2997 & *N.G.Walsh*, Mt Wellington summit ridge, 3.i.1987 (MEL); *R.H.Barley* MEL629688, Mt Wellington, – (MEL); *A.C.Beauglehole* 43473, c. 0.4 km SE Moroka Hut, 2.xi.1973 (CANB, MEL); *A.C.Beauglehole* 41144 & *E.H.Chesterfield*, near summit of Mt Wellington, 8.i.1973 (CANB, MEL); *F.Mueller* MEL35571, Australian Alps, – (MEL); *F.Mueller* MEL35572, lower parts of the Australian Alps, – (MEL); *F.Mueller* MEL35580, Mt Wellington, xi.1854 (MEL); *T.B.Muir* 1009, summit of Mt Wellington, 2.i.1960 (MEL).

***Hibbertia florida* Toelken, sp. nov.**

A *H. fruticosa* foliis oblongo-lanceolatis nervisque centralibus vix prudentibus super apicem et calycibus pilis patentibus differt.

**Type:** New South Wales, Mount Dowe, *H.R.Toelken* 8546, 24.xi.1993 (holo.: AD; iso.: B, BRI, CANB, G, K, MEL, MO, NSW, PERTH).

*Hibbertia pedunculata* auct. non R.Br. ex DC.: N.C.W. Beadle, Stud. Fl. New South Wales 3: 250 (1976), p.p.; G.J.Harden & J.Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p.p.

Shrublets up to 0.8 m high, decumbent to spreading, much branched; branches weak-woody to rigid-woody and spreading, with leaf bases shortly decurrent, sericeous, rarely sparsely hirsute. *Vestiture* ± persistent, with very long antrorse, often almost appressed simple hairs usually with obvious tubercles and/or pustules, overtopping a range of medium to very short spreading simple or forked hairs; *on branches* ± dense on leaf bases, with spreading to ± appressed long fine simple hairs similar to those of the intrapetiolar tufts but with basal tubercles; *on leaves above* scattered to glabrescent, often subequal simple hairs with prominent basal pustules, becoming denser and often longer towards the petiole; *on leaves below* sparse to glabrescent, with antrorse spreading simple hairs on revolute margins and central vein, sometimes exposing the glabrous undersurface between them or with rows of teeth along their touching margins, with a tuft of hairs on recurved end on the central vein; *on primary bracts* similar to leaves but sparser, finer and without pustules; *on outer calyx lobes* outside sparse to moderately dense with longer spreading antrorse simple hairs with distinct tubercles merging into fewer finer short simple hairs, inside with scattered short simple hairs along the distal margins; *on inner calyx lobes* outside, moderately dense antrorse appressed simple hairs becoming shorter and

sometimes forked towards the margins; inside glabrous. *Leaves* with sparse to dense intrapetiolar tufts of hairs 0.4–0.6 mm long and usually decurrent along both sides of the leaf base; *petiole* up to 0.7 mm long; *lamina* oblong to oblong-lanceolate, (2.1–) 2.5–5.0 (–5.4) × (0.85–) 1–1.4 (–1.6) mm, ± abruptly constricted into petiole, acute to mucronate, becoming obtuse and with tufted central vein shortly protruding and recurved, above ± flat, puberulous to glabrous, but persistently tuberculate, below with broad flush to recessed central vein ± tightly wedged in between the revolute margins, sometimes exposing the glabrous undersurface, point of contact with central vein with ± teeth along contacts, puberulous to glabrous, but with prominent pustules retained at least along the revolute margins and tufted to glabrous recurved apex of the central vein. *Flowers* single, terminal mainly on smaller lateral branches; *flower stalk* (2.1–) 3–5.5 (–8.4) mm long, with primary bracts subtending calyx or on distal half, rarely below the middle; *primary bracts* linear, linear-elliptic, 2.1–3.5 × 0.3–0.5 mm, flat, with scarcely recurved margins, acute to acuminate and recurved apex, puberulous to glabrescent; additional bracts 0–3, leaf-like and fleshy, merging into cauline leaves. *Calyx* lobes unequal; *outer calyx lobes* elliptic to elliptic-lanceolate, (5.1–) 5.3–5.8 (–6.1) × (2.2–) 2.3–2.8 (–3.3) mm, acute to pointed, with central ridge developed on distal third, outside pubescent to sparsely hirsute, inside puberulous to glabrescent on distal margins; *inner calyx lobes* broadly elliptic to elliptic-ovate, (5.2–) 5.4–6 (–6.6) × 3.7–4.4 mm, rounded, emarginate or mucronate, outside pubescent, inside glabrous. *Petals* broadly obovate, up to 9.6 mm long, bilobed. *Stamens* 12–28, without staminodes arranged around the ovaries; filaments filiform, 0.8–1.3 mm long, scarcely connate basally; *anthers* obloid, 1.1–1.7 mm, usually verruculose-papillate, abruptly constricted above and below tapering into petiole. *Pistils* 3; *ovaries* obovoid, each with 4 ovules, tomentose; *styles* attached to the outer apex then curved back and erect or with stigma ± incurved. *Fruit* recurved, hirsute to woolly with mainly simple hairs. *Seeds* not seen.

**Diagnostic features.** *Hibbertia florida*, and in particular subsp. *angustinervis*, is similar to *H. fruticosa*, because of its often shrubby habit, but it shares with typical *H. florida* the broader oblong-lanceolate leaves with mucronate apex.

**Variation.** The leaves of specimens from the Warrumbungle Range tend to be broader than those of the typical subspecies, but the central vein is usually scarcely swollen and distinctly recessed, so that the glabrous undersurface is usually visible between it and the revolute margins. The central vein of the typical subspecies is not only broader and thicker so that it is more or less flush with the revolute margins, but it also has rows of teeth; these are also present on the revolute margins of the leaves at the contact zone. The two forms of this species are distinct and geographically isolated,

in contrast to forms of *H. expansa*. They are therefore treated as subspecies.

Although the position of the bracts seems to be subtending the flower (or rarely on the distal half of the flower stalk) in subsp. *florida* and on the lower half on plants of subsp. *angustinervis*, this character might not be as distinctive, once a larger number of specimens is available for examination.

The number of stamens in each flower varies greatly and, although the typical subspecies has often fewer than 20 and subsp. *angustinervis* more than 24, a few intermediates have been recorded. Similarly the length of anthers shows much variation, but again this could not be used taxonomically.

*Etymology.* One will best appreciate the epithet “*florida*”, from the Latin “*floriferous*” when one has seen the carpets of yellow flowers of the typical subspecies covering rock shelves.

#### ***Hibbertia florida* subsp. *florida*.**

Shrublets up to 0.35 m high, with decumbent wiry-woody branches. *Central vein* of leaves flush or slightly recessed from and broader than revolute margins at mid-leaf, not exposing undersurface between them and with rows of marginal teeth. *Primary bract* usually subtending calyx or on the distal half of flower stalk. *Flowering:* October and November.

*Distribution and ecology.* Grows on shallow loamy soil on rocks in and around woodland on the Nandewar Range, New South Wales (NWS).

*Conservation status.* Locally common within Kaputar National Park (Toelken 8546).

*Variation.* Young growth often looks very distinct because the wiry branches usually have long internodes and few lateral branches; more intense branching will start in the second year. Slow growth will develop firmer branches, but they rarely become rigid-woody in this subspecies.

#### *Specimens examined*

NEW SOUTH WALES: *R.H.Cambage* NSW85823, Mt Lindsay, xi.1909 (NSW); *R.Coveny* 8950 & *S.K.Roy*, Eckfords Lookout track, 22.xi.1976 (CANB); *J.M.Fox* 87/125, Mt Dowe, 25.xi.1987 (CANB).

#### ***Hibbertia florida* subsp. *angustinervis* Toelken, subsp. nov.**

*A subspecies typica habitu patente ramis lignosis et venis centralibus angustioribus foliorum differt.*

**Type:** New South Wales, 34 km SW Coonabarabran, *H.Streimann* 767, 13.xii.1973 (holo.: AD; iso.: BRI 180742; A, CANB, L, K – n.v.)

Shrubs up to 0.8 m high, with spreading branches becoming rigid-woody. *Central vein* of leaves scarcely thickened and very much recessed from and up to as broad as revolute margins at mid-leaf, exposing the glabrous undersurface between them and without rows of marginal

teeth. *Primary bract* usually situated on the lower half of the flower stalk. *Flowering:* October–December.

*Distribution and ecology.* Grows in wet depressions on rock shelves in and near the Warrumbungle Range in central New South Wales (NWS).

*Conservation status.* Rare in the Warrumbungle National Park.

*Variation.* Although young branches are wiry-woody, they soon become rigid-woody.

*Etymology.* The epithet “*angustinervis*”, Latin “*narrow-veined*”, refers to the narrow central vein of the leaves which is accentuated by the broader leaves of this subspecies.

#### *Specimens examined*

NEW SOUTH WALES: *G.W.Althofer* s.n., Fluted Mountain, Warrumbungle Ranges, 6.x.1946 (MEL, NSW); *A.G.Floyd* 651, Warrumbungle National Park, 14.x.1977 (CANB).

#### ***Hibbertia fruticosa* Toelken, sp. nov.**

*A speciebus aliis turmae H. vestitae, praecipue H. florida, bracteis subtentis calicem, ramis rigido-lignosis et foliis angustioribus nervis centralibus prudentibus super apicem calicibusque glabrescentibus differt.*

**Type:** New South Wales, Mount Kaputar Road, *R.D.Hoogland* 12304, 4.xi.1972 (holo.: BRI; iso.: CANB, NSW; HBG, K, L, UC, US – n. v.)

*Hibbertia pedunculata* auctt. non R.Br. ex DC.: N.C.W. Beadle, Stud. Fl. New South Wales 3: 250 (1976), p.p.; G.J.Harden & J.Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p.p.

Shrubs up to 1.2 m tall, with few to several erect stems, much branched: branches rigid-woody, with leaf bases shortly decurrent, sericeous to glabrescent. *Vestiture* usually not persistent, with ± appressed fine long simple hairs with a basal tubercle over short to very short erect ones; *on branches* ± dense or sparse on leaf bases, with ± appressed long fine simple hairs with fine basal tubercles overtopping very short erect simple hairs; *on leaves above and below* scattered, with very short antrorse simple hairs soon becoming glabrous except for distinct pustules and similar short-lived short simple hairs on the terminal end of the protruding vein; *on primary bracts* glabrous or almost so and with a few short marginal cilia; *on outer calyx lobes* outside, puberulous with very short simple hairs without pustules proximally and distally as well as on the margins but soon wearing off, inside with longer and shorter appressed simple hairs on the distal third; *on inner calyx lobes* outside, puberulous with very short simple, rarely forked hairs without tubercles mainly along the central ridge and apex; inside with a tuft of short simple hairs below the apex. *Leaves* with sparse intrapetiolar tufts of hairs up to 0.5 mm long and usually decurrent along both sides of the leaf bases; *petiole* up to 0.6 mm long; *lamina* linear to linear-lanceolate, rarely oblong, (2.8–) 3.8–5.5 (–7.9) × 0.5–0.7 (–0.85) mm,

often abruptly constricted into petiole, acute or pointed, with central vein overtopping apex, rarely recurved, above slightly convex to flat and usually glabrous but distally tubercled, below with recessed central vein usually narrower than but tightly wedged in between the revolute margins and both usually with rows of teeth at contact zone, usually glabrous but distantly tubercled. *Flowers* single, terminal mainly on short lateral shoots; *flower stalk* (1.5–) 2.5–4 (–6.7) mm long and often elongating when fruiting, with primary bract usually subtending or on distal third of the stalk; buds ovoid to broadly ovoid; *primary bract* 1, linear-elliptic, rarely linear-triangular, (1.3–) 1.4–1.7 (–1.9) × 0.2–0.3 (–0.45) mm, with scarcely recurved margins, acute to pointed, with apex ± recurved, merging into cauline leaves. *Calyx lobes* unequal; *outer calyx lobes* elliptic-oblong or lanceolate- to ovate-elliptic, (4.9–) 5.2–5.8 (–6.4) × (2.2–) 2.4–2.7 (–4.4) mm, acute and recurved, with central ridge developed in distal third, outside puberulous to glabrous, inside puberulous distally; *inner calyx lobes* broadly elliptic to elliptic-obovate, (5.8–) 6.0–6.6 (–7.05) × (3.4–) 3.6–4.2 (–4.4) mm, rounded rarely cuspidate, without ridge, outside puberulous to glabrescent; inside puberulous below apex. *Petals* broadly obovate, up to 9.1 mm long, bilobed. *Stamens* (15–) 18–35, with or without staminodes, arranged around the ovary; filaments filiform, 1.1–1.3 mm long, scarcely connate basally; *anthers* oblong, 1.1–1.6 mm, usually verruculose-papillate, ± abruptly constricted above and below. *Pistils* 3; *ovaries* obovoid, each with 4–6 ovules, tomentose to shortly hirsute; *style* arising laterally from below the apex of ovary and more or less erect or with stigma usually incurved. *Fruit* recurved, hirsute to tomentose with mainly simple hairs. *Seeds* obovoid, 1.7–1.9 × 1.5–1.8 mm, dark brown; *aril* off-white, with a fleshy attachment and surmounted by membranous scarcely lobed sheath clasping the lower third to half of the seed.

**Diagnostic features.** *Hibbertia fruticosa* is very similar to *H. florida*, but easily distinguished by its narrower and glabrescent leaves and calyx; unlike the latter it grows on dry rocky slopes. Although it has bracts subtending the calyx, as also found in *H. pedunculata*, it is distinguished by its robust woody habit, acute outer calyx lobes and flowers that are mainly borne on shorter lateral shoots.

**Variation.** Unusual in this species are young, slender almost unbranched stems next to senescent, short and much branched ones, sometimes on the same plant. Although this is not unusual in other species of *Hibbertia*, it is rarely observed in this group.

One to four staminodes are found laterally (in respect to the bract) in flowers of this species. In some of these no anther develops, but on others rudimentary anthers are found, but they do not dehisce.

**Etymology.** Unlike most other species in the *H. pedunculata* subgroup, *H. fruticosa* has rigid-woody stems which form shrubs up to 1.2 m tall. This explains the choice of the epithet “fruticosa”, Latin “shrubby”.

***Hibbertia fruticosa* subsp. *fruticosa*.**

Shrubs up to 1.2 m tall. *Leaf lamina* (4.3–) 5–8 (–10.7) mm long, pointed with central vein distinctly protruding, the leaf apex and adaxial leaf bases usually glabrous. *Outer calyx lobes* (2.2–) 2.4–2.7 (–3.5) mm broad. *Flowering*: October and November.

**Distribution and ecology.** Locally common on rocky slopes usually in open woodland, but restricted to the northern part of the Nandewar Range, N.S.W. (NWS).

**Conservation status.** Locally common, but restricted to Kaputar National Park.

***Specimens examined***

NEW SOUTH WALES: *R.Coveny 8877 & S.K.Roy*, towards Dawson Spring, 21.xi.1976 (CANB, NSW; K, L, RSA – n.v.); *R.Coveny 9029 & S.K.Roy*, Waa Gorge, 23.xi.1976 (CANB, NSW); *K.Hill 2769 et al.*, Waa Gorge, 20.x.1987 (NSW, BRI); *H.R.Toelken 8554*, Waa Gorge, 25.xi.1993 (AD, BRI, NSW, PERTH).

***Hibbertia fruticosa* subsp. *pilligaensis* Toelken, subsp. nov.**

*A subspecies typica foliis brevioribus et obtusis lobisque calicis latioribus differt.*

**Type:** New South Wales, Pilliga scrub, *R.Bates 10691*, 13.x.1987 (holo.: AD; iso.: NSW).

Shrubs up to 0.7 m tall. *Leaf lamina* (2.2–) 2.5–4 (–4.6) mm long, acute becoming obtuse, with central vein ± ending in leaf apex or slightly recurved and adaxial leaf bases pubescent to puberulous. *Outer calyx lobes* (3.8–) 4–4.4 mm broad. *Flowering*: October–December.

**Distribution and ecology.** Grows in shallow loamy sand in eucalypt woodland in central New South Wales (NWP).

**Conservation status.** Unknown frequency, but conserved in Pilliga Nature Reserve.

**Variation.** *H.Streimann 709* has several long branches with new growth, but the length of the leaf lamina still falls well into the normal range of this subspecies. The central vein of the young leaves of this specimen also does not protrude beyond the leaf apex, showing that this characteristic of the subspecies is not just found on specimens growing under more arid conditions.

**Etymology:** The epithet “pilliga-ensis”, Latin “belonging to the Pilliga region”, was chosen as the subspecies is known only from the Pilliga State Forest.

***Specimens examined***

NEW SOUTH WALES: *D.F.Mackay NSW413143*, Pilliga East State Forest, 25.x.1986 (NSW); *H.Streimann 709*, Pilliga scrub, 35 km SE Gwabegar, 10.xii.1973 (BRI).

***Hibbertia horricomis* Toelken, sp. nov.**

*A speciebus turmae* H. vestitae pilis radiale fascicularibus patentibus in foliis differt.

**Type:** New South Wales, Deua National Park, c. 3 km S Mt Donovan, P.Gilmour 4797, 14.x.1984 (holo.: CANB).

Shrubs up to 0.3 m tall, much-branched, erect-spreading; branches rigid-woody, with decurrent leaf bases but not flanged, shortly hispid. Vestiture persistent, fascicled hairs often on prominent pustules; on branches dense to very dense, with small fascicled hairs (2–5 usually unequally long arms) under larger spreading ones (6–10 usually unequally long arms); on leaves above dense, with spreading fascicled hairs (2–4 (5) often unequal arms) on prominent pustules, becoming denser and antrorse above the petiole; on leaves below sparse to scattered, with antrorse-spreading fascicled hairs ((1) 2 or 3 unequal arms) but smaller on recessed central vein; on bracts ± dense above and below, ± similar to but smaller and more antrorse than those fascicled hairs of the leaves; on outer calyx lobes outside dense, with a range of small to larger spreading fascicled hairs (2–12 often subequal arms), inside dense, with forked appressed hairs on the distal third; on inner calyx lobes dense, with larger antrorse-spreading hairs mainly along the central ridge over smaller fascicled hairs which continue to the membranous margins, inside with a small patch of antrorse forked hairs below the apex. Leaves with sparse intrapetiolar tufts of hair up to 0.3 mm long; petiole 0.3–0.7 mm long; lamina linear to linear-elliptic, (2.4–) 3.5–6.5 (–9.2) × (0.6–) 0.7–1.2 mm, gradually tapering into petiole, obtuse to rounded, above flat to convex, shortly hispid to bristly, below with prominent central vein ± flush with and broader than revolute margins, with undersurface not visible, shortly hispid to bristly. Flowers sessile, terminal on major branches; buds broadly ovoid; primary bract linear-oblongate, 1.8–2.5 × 0.4–0.5 mm, acute and with terminal tuft, with recurved margins, pubescent; additional bracts 3 or 4, merging into cauline leaves. Calyx lobes unequal; outer calyx lobes ovate, 6.8–7.3 × 1.5–2.2 mm, sometimes slightly longer than inner ones, acute and often with distal margins slightly recurved, slightly ridged towards the apex, outside shortly hirsute to rough pubescent, inside finely pubescent on the distal third; inner calyx lobes broadly ovate-elliptic, 6.7–7.3 × 3.2–4.3 mm, obtuse to rounded, usually ridged towards the apex, outside hirsute becoming puberulous to glabrous on the membranous margins, inside with fine tuft below the apex. Petals broadly obovate, 7.5–9.5 mm long, emarginate. Stamens 20–24, without staminodes, around the ovaries; filaments filiform, 1.2–1.4 mm long, scarcely broadened and barely connate at the base; anthers narrowly obloid, 0.9–1.2 mm long, abruptly constricted above and below. Pistils 2; ovaries obovoid, each with 4 ovules, hirsute; style attached to apex of ovaries, erect with stigmas well above the stamens. Fruit and seed not seen. Flowering: June–October.

**Distribution and ecology.** Grows on usually skeletal soil over rhyolite on ridge tops or ± steep slopes, often above cliffs in open eucalypt forest dominated by *E. sieberi*; apparently restricted to Mount Donovan, New South Wales (ST).

**Conservation status.** Rare, but conserved in Deua National Park.

**Diagnostic features.** The prominent pustules, together with the spreading large fascicled hairs on the leaves, are distinctive in the *H. vestita* group. *Hibbertia horricomis* therefore superficially resembles species of the *H. strigosa* group, but differs in staminal arrangement

**Etymology.** The epithet “horricomis”, Latin “bristly”, refers to the stiffly spreading hairs particularly on the leaves and branches.

***Specimens examined***

NEW SOUTH WALES: Mt Donovan, Deua National Park: P.Beasley 399 & D.Binns, 28.iii.1984 (CANB); P.Beasley 403 & D.Binns, 28.iii.1984 (CANB); P.Gilmour 4641, 15.v.1984 (CANB).

***Hibbertia intermedia* (DC.) Toelken**

J. Adelaide Bot. Gard. 25: 74, Fig. 1E–H (2012). — *Pleurandra intermedia* DC., Regn. Veg. Syst. Nat. 1: 420 (1817); Prodr. 1: 72 (1824); Spreng., Syst. Veg. ed. 16, 2: 462 (1825); G.Don, Gen. Hist. 1: 64 (1842). — **Type citation:** “in montibus Novae-Hollandiae. Caley” (holo.: G-DC). *Hibbertia pedunculata* auctt. non R.Br. ex DC.: Benth., Fl. Austral. 1: 32 (1863), p.p.; G.J.Harden & J.Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p.p.;

Shrubs to 0.5 m high, with spreading to procumbent branches; branches wiry becoming rigid-woody, with raised leaf bases decurrent and ± flanged, pubescent to glabrescent. Vestiture ± persistent, dense to sparse with mixed longer and shorter mainly simple hairs (rarely bifid) often on distinct tubercles; on branches moderately dense to denser between the decurrent leaf bases, with mainly long hairs over few shorter antrorse simple ones with basal tubercle; on leaves above not persistent, with scattered antrorse, ± appressed short hairs (subequal) on pustules particularly on the flanks of revolute margins; on leaves below not persistent, with very few hairs similar to upper surface, very rare on central vein except with persistent terminal tuft; on primary bracts like on leaves but often more spreading and without pustules; on outer calyx lobes outside glabrous or with scattered short hairs without tubercles mainly on distal central ridge, inside glabrous, rarely with few scattered hairs towards the apex; on inner calyx lobes outside glabrous to very finely hairy on distal central area, inside glabrous. Leaves with sparse intrapetiolar tufts up to 0.6 mm long and usually decurrent along both sides of the leaf bases; petiole 0.2–0.7 mm long; lamina linear to narrowly oblong, (1.8–) 2.3–3.0 (–4.6) × (0.45–) 0.6–0.8 (–1.1) mm, gradually constricted into the petiole, acute with recurved end of central vein covered with long terminal tuft of hairs wearing off and becoming obtuse, above

flat, puberulous soon glabrescent, with pustules usually flat or recessed, below with central vein recessed from, wedged, often with rows of teeth in between revolute margins which are glabrescent as above. *Flowers* single, terminal on main and lateral branches, rarely on short shoots, with narrow base; *flower stalk* (2–) 3–5 mm long, with primary bract towards base; *primary bracts* linear or linear-triangular, 1.8–2.8 × 0.1–0.2 mm, with scarcely recurved margins, almost membranous, often shortly ciliate; additional bracts few, grading into cauline leaves. *Calyx lobes* unequal; *outer calyx lobes* narrowly elliptic, elliptic-lanceolate, 4.5–5.1 × 1.9–2.2 mm, acute, with central ridge more or less developed, outside puberulous to glabrescent, inside glabrous or sometimes with few hairs distally; *inner calyx lobes* elliptic-obovate, 4.4–4.8 × 3.1–3.4 mm, rounded to mucronate, outside papillate to glabrous, inside glabrous. *Petals* obovate, up to 6.8 mm long, bilobed. *Stamens* 7–9 (–10) and without staminodes, surrounding ovaries; filaments filiform, 1.6–1.8 mm long, scarcely basally connate; *anthers* obloid to broadly obloid, 1.6–1.9 mm long, abruptly constricted above and below, smooth or almost so. *Pistils* 3 or 4 (5); *ovaries* obovoid, each with 2–4 ovules, hirsute with simple hairs; *style* attached to the somewhat flattened apex then recurved and finally flexed upwards to place the incurved stigmas just above the apex of the anthers. *Fruit* and *seeds* not seen. *Flowering*: October, November–March. (Toelken 2012a, Fig. E–H).

*Distribution and ecology.* Grows on sandy soil on sandstone formation, usually on wet often steep slopes in low heath, scrub or “low woodland with *Eucalyptus sieberi*, *E. piperita*, *Angophora costata*, in tall dense shrubbery of *Hakea dactyloides*, *H. pachyphylla*, *H. constablei*, *Ceratopetalum gummiferum* etc” (A.E.Orme 396 & R.Johnstone) in New South Wales (CT, CC). Noted at one small locale only within the riparian zone of the Grose River growing atop of large flat-topped sandstone boulders and rooting at some nodes (R.T. & J.Miller 73).

*Conservation status.* “Not common” (A.E.Orme 396 & R.Johnstone), but conserved in the Blue Mountains National Park.

*Diagnostic features.* Following Bentham (1863), *H. intermedia* has been included under *H. pedunculata* by subsequent authors, but it is readily distinguished from the latter by its glabrous or glabrescent calyx lobes, the outer of which are acute and more or less ridged, and the bract borne at the base of the flower stalk.

Although superficially similar to *H. ericoides*, *H. intermedia* differs by its stalked flowers with the primary bracts borne towards the base of the flower stalk, the generally exposed leaf undersurface and 7–10 stamens.

The length of the flower stalk varies, but is never as long as in *H. exposita*, a superficially similar species from the Moroka Range, Victoria (see Toelken & Miller 2012). That species also differs by a broad central vein and anthers 0.6–0.8 mm long.

*Notes.* MEL 35567, from “Parramatta, N.S.W.” agrees in all respects with *H. intermedia*, but the locality is very much outside of the presently known range of the species. This specimen is likely to have been collected by the Rev. Woolls who lived in Parramatta. The locality possibly refers to his residence rather than where the plant was collected.

#### *Specimens examined*

NEW SOUTH WALES: *Miss Atkinson MEL35569*, Blue Mountains (MEL); *E.F.Constable NSW85844*, Blackheath, 17.xi.1946 (NSW); *M.J.Fletcher NSW223148*, near Warragamba Dam, 31.i.1972 (NSW); *A.A.Hamilton NSW85843*, Blackheath, xi.1914 (NSW); *A.A.Hamilton NSW 85856*, Leura, 23.xi.1912 (NSW); *R.T. & J.Miller 73*, Grose River junction with Buralow Creek, 8.iii.2007 (AD, NSW); *A.E.Orme 396 & R.Johnstone*, c. 0.8 km along Kedumba Valley firetrail from Queen Victoria Hospital, 18.x.2003 (AD, NSW); *C.L.Wilson 502*, Erskine Creek Road, Kings Tableland, 25.iii.1957 (NSW 85853/4); *?Rev. Woolls MEL35567*, ?Parramatta, – (MEL).

#### *Hibbertia marginata* B.J.Conn

*Muelleria* 7: 294 (1990); G.J.Harden & J.Everett in G.J.Harden, Fl. New South Wales 1: 298 (1990). — **Type:** New South Wales: Mt Neville fire trail, Mt Marsh State Forest, Hill 2752, Johnson & Weston, 19.x.1987 (holo.: NSW206551).

Shrubs to 0.7 m tall, spreading, suckering; branches wiry becoming ± rigid-woody, with leaf bases scarcely decurrent, finely hirsute. *Vestiture* ± persistent, with longer over shorter, spreading to porrect simple hairs, those on the adaxial leaves pustulate. *Leaves* with intrapetiolar tuft up to 0.6 mm long; *petiole* 0.5–1 mm long; *lamina* oblong, oblong-elliptic, rarely oblong-lanceolate, (13–) 20–30 (–39.6) × (3.2–) 4–6.5 (–8.4) mm, ± abruptly constricted into petiole, obtuse to rounded with shortly recurved end of central vein, above ± flat but slightly depressed along the central vein with short pustulate simple hairs becoming longer and denser proximally and on the petiole, below almost flat with thin central vein and sparsely recurved margins exposing a broad undersurface between them, all sparsely hirsute with scattered fine erect longer and shorter simple hairs and with denser tuft of hairs on shortly recurved end of the central vein. *Flowers* sessile, single, terminal on main branches; *flower stalk* absent; *buds* ovoid; *primary bracts* oblong-lanceolate or rarely oblong, (4.3–) 5–8 (–11.2) × 1.8–3 (–4.2) mm, abruptly constricted apically and basally, leaf-like but flattened, with scarcely recurved margins, sparsely hirsute, additional bracts few, grading into cauline leaves. *Calyx lobes* unequal; *outer calyx lobes* ovate, rarely lanceolate, (10.3–) 12–15 (–20) × (5.5–) 6–7.5 mm, usually longer than inner ones, bluntly acute or obtuse, slightly ridged and with recurved margins distally, outside densely sericeous mainly proximally with many fine ± appressed simple hairs over few shorter ones, inside sericeous on distal half, dense proximally becoming sparser distally; *inner calyx lobes* oblong-ovate to broadly oblong,

(8.4–) 9–12(–13.8) × 5.6–7 mm, rounded to emarginate without ridge, outside densely sericeous except for broad membranous margins, inside glabrous. *Petals* oblong-obovate, 20–25 mm long, bilobed. *Stamens* 30–48, with many staminodes, surrounding ovaries; *filaments* strap-like, 4–4.9 mm long, distinctly broadened and basally connate into ring around the ovaries; *anthers* narrowly obloid, 1.8–3.8 mm long, abruptly constricted above and tapering into filaments. *Pistils* 3 (4); *ovaries* ovoid, each with 6 ovules, hirsute; *style* attached to apex and curved centrifugally outside the stamens and presenting the stigmas at level of but distant from anthers. *Fruit* and *seed* not seen. *Flowering*: September and October.

*Distribution and ecology*. Growing on sandy loam among sandstone outcrops in grassy understory of open eucalypt forest dominated by *Eucalyptus pilularis*, *E. intermedia* and *Angophora woodsiana* (Hill 2752), or *E. intermedia*, *E. microcorys*, *E. pilularis*, *Ceratopetalum gummiferum*, *Synoum glandulosum* (A.R.Bean 17939) in north-eastern New South Wales (NC).

*Conservation status*. “Locally frequent” (Hill 2752); “occasional at site” (A.R.Bean 17939).

*Diagnostic features*. *Hibbertia marginata* has close affinities to *H. vestita*, as unlike *H. saligna*, to which it has previously been compared (Conn 1990), it has densely hairy ovaries, numerous stamens with broadened filaments, many staminodes, spreading simple hairs on the branches and, significantly, pustulate hairs on the adaxial leaf surface. The leaf apex appears rounded, because the slightly protruding end of the central vein is somewhat recurved, as is typical of most species in the *H. vestita* subgroup. *Hibbertia marginata* is, however, easily distinguished from other species in that group by its long calyx lobes and leaves.

*Variation*. The number of stamens and staminodes varies considerably on different collections. The length of the anthers also varies greatly, even on the same flower. No intermediates between fertile stamens and the thread-like staminodes were observed.

The leaves and flower parts are much larger than any other species in this group and show an even larger range of variation than indicated in the description.

#### *Specimens examined*

NEW SOUTH WALES: A.R.Bean 17939, Range Road, Tabbinmobile State Forest, 15.ix.2001 (BRI); R.J.Fenshaw 4686, Mororo, NW Theka, 15.x.2001 (BRI); S.P.Phillips 1356 *et al.*, c. 5 km NNW Ashby, 24.ix.2001 (BRI).

#### *Hibbertia mediterranea* Toelken, *sp. nov.*

*Hibbertiae vestitae similis sed ramis rigide lignosis, bracteis primariis lineari-lanceolata, filamentis filiformibus vix connatis; a H. expansa ramis rigide lignosis, foliis nervis centralibus angustis et recessis differt.*

**Type**: Queensland, Mt Jibbinbar, Sundown National Park, WSW Stanthorpe, D.Halford Q2971, x.1996 (holo.: BRI-AQ654244).

*Hibbertia vestita* auct. non A.Cunn. ex Benth.: Jessup in Bostock & A.E.Holland, Census Queensl. Fl. 64 (2007), p.p.

Shrubs c. 0.4 m tall, much branched, stiffly erect-spreading; branches rigid-woody, with leaf bases scarcely decurrent, puberulous to pubescent, rarely pilose. *Vestiture* often wearing off, particularly on the leaves, with ± short erect simple hairs overtopped by longer simple ones. *Leaves* with sparse intrapetiolar tuft up to 0.3 mm long; *petiole* 0.2–0.5 mm long; *lamina* linear, (2.2–) 3.5–5 (–6.3) × 0.5–0.7 mm, abruptly constricted into petiole, acute to obtuse with end of central vein scarcely protruding, above convex puberulous to glabrescent even on the base and petiole and with insignificant pustules, below with broad revolute margins raised well above the narrow central vein so that the undersurface is not visible, puberulous on flanks of margins or sometimes with minute hairs on the central vein and its tip. *Flowers* sessile, single, terminal on main and shorter lateral branches; *flower stalk* absent; *buds* ovoid; *primary bracts* lanceolate, 2.8–3.2 × 0.6–0.8 mm, acute, leaf-like, flattened but without broadened undersurface, glabrescent, additional bracts 1 or 2, rarely grading into cauline leaves. *Calyx* lobes unequal; *outer calyx lobes* ovate, 7.2–8.2 × 4–4.4 mm, acute to pointed, with distinct central ridge and often with recurved margins distally, outside sparsely strigose to glabrescent, inside sparsely sericeous on distal third; *inner calyx lobes* ovate-oblong, 7.2–7.7 × 6.2–6.7 mm, acute to pointed, scarcely ridged, outside strigose along centre becoming sparsely sericeous towards the membranous margins, inside puberulous below the apex. *Petals* cuneate-obovate, up to 10.5 mm long, scarcely lobed. *Stamens* 30–38, staminodes present, loosely surrounding the ovaries; *filaments* filiform, 2–2.4 mm long, scarcely connate basally; *anthers* narrowly obloid, 1.8–2.6 mm long, abruptly constricted above, tapering into filaments. *Pistils* 3; *ovaries* obovoid, each with 4–6 ovules, hirsute to pubescent; *styles* attached to upper-edge of the ovaries and then erect with stigmas being presented well above the anthers. *Fruit* and *seed* not seen. *Flowering*: September and October.

*Distribution and ecology*. Grows “in Cypress sand” (B.C.Dodd *s.n.*) or in sandy loam, mid-slope, in the understory of eucalypt forest in southern mid-west Queensland (DD).

*Conservation status*. “Occasional” (D.Halford Q2971), but conserved in Sundown National Park.

*Diagnostic features*. *Hibbertia mediterranea*, although superficially similar to *H. vestita*, is easily distinguished by its rigid-woody spreading branches, densely rolled leaves, 1 or 2 small bracts without a broadened undersurface and, most importantly, thread-like filaments, which are scarcely connate basally. The protruding central vein at the tip of the leaves is usually not recurved, so that it resembles the condition in *H. expansa*. The leaves of that species have, however, a central vein

that is much broader than the revolute margins and more or less flush with them. The species also has wiry decumbent branches and long, more or less spreading hairs on the leaves; *H. expansa* was also recorded from Mount Jabbinder, cf. *D.Halford* 2733, *L.Hazelgrove* 189.

*Variation.* *B.C.Dodd s.n.* has many, longer antrorse appressed simple hairs on the branches, and hairs on the leaves are also longer and more like those of *H. expansa*, but the leaves as well as the bracts are tightly rolled.

When the revolute margins of the leaves, and especially the dorsiventrally compressed bracts, are drawn away from the central vein in herbarium specimens, they display fine rows of teeth or rudimentary hairs (cf. *H. stichodonta*). They are not tightly rolled leaves due to adverse environmental conditions as is found in some specimens of *H. vestita* (e.g. *S.T.Blake* 2676 & 3042), but even those specimens retain their expanded bracts (hypsophylls) typical of the species.

*Etymology.* The epithet of this species refers to it being found “inland, remote from the sea” Latin “mediterranea”.

*Specimen examined*

QUEENSLAND: *B.C.Dodd s.n.*, Inglewood Road (Tobacco Road), 7.x.1975 (BRI); *D.Halford Q1868*, 16.4 km S Inglewood, Tobacco Road, 12.xii.1992 (BRI).

***Hibbertia pachynemidium* Toelken, sp. nov.**

*Hibbertiae expositae similis sed filis brevioribus et semiconnatis foliisque sine tuberculis pilorum; a H. exponente foliis brevioribus ad 4.2 mm longis, nervis centralibus latis, protuberantibus et continguis marginibus revolutis differt.*

**Type:** New South Wales, *R.Pullen* 8557, S Big Badja Mountain, 31.x.1973 (holo.: CANB; iso.: MEL, NSW).

Shrublets up to 0.15 m tall, moderately branched, mat-forming; branches wiry, with scarcely decurrent leaf bases, pubescent to puberulous. *Vestiture* usually not persisting, with simple long and short hairs or long simple hairs over shorter forked ones; *on branches* moderately dense, with scattered longer antrorse simple hairs partly continued from the decurrent intrapetiolar tufts over denser but shorter forked hairs; *on leaves above* soon glabrescent, scattered antrorse simple hairs on  $\pm$  well developed basal pustules, becoming longer towards the margins and  $\pm$  spreading on the proximal flanks; *on leaves below* scattered antrorse simple hairs on the revolute margins but not on the central vein, usually with some (or rows of) teeth between the revolute margins and central vein; *on primary bracts* glabrous except for often incomplete marginal cilia and a dense tuft of simple hairs terminally; *on outer calyx lobes* outside glabrous to puberulous with scattered short appressed simple hairs mainly distally and often with a terminal tuft of often twisted or coiled hairs, inside denser, with mainly twisted antrorse simple over even finer forked hairs; *on inner calyx lobes* outside glabrous except marginal cilia or with scattered short appressed

mainly simple hairs especially dense on the mucronate apex, inside glabrous except for moderately dense antrorse appressed or twisted simple and some forked hairs on the distal third. *Leaves* with intrapetiolar tufts up to 0.6 mm long and  $\pm$  decurrent on sides of the leaf bases; *petiole* ca 0.2 mm long; *lamina* oblong-lanceolate to oblong-elliptic or rarely linear, (2.1–) 2.5–3.8 (–4.2)  $\times$  (0.5–) 0.6–0.8 (–1) mm, scarcely constricted into petiole, acute but projected into recurved end of vein with short tuft of hairs, above flat to slightly depressed along the central vein, with scattered pustulate simple hairs particularly along the flanks of the revolute margins, below with broad central vein protruding to flush with and tightly wedged between the revolute margins, with single hairs on the revolute margins and often few teeth or rows of teeth between the central vein and revolute margins. *Flowers* single, terminal on all branches, including the short axillary branches, which are not fascicled; *flower stalk* (2–) 3.5–5 (–9.5) mm long, with primary bracts towards the base; *buds* ellipsoidal; *primary bracts* linear-triangular, 1.8–2.3  $\times$  c. 0.2 mm, acute with terminal tuft of hairs, dorsiventrally compressed and without revolute margins, incurved, glabrescent and margins ciliate, additional bracts 1–4 usually with fleshy revolute margins, grading into cauline leaves. *Calyx* lobes unequal; *outer calyx lobes* lanceolate, (3–) 4.5–5.8 (–6.1)  $\times$  (1.5–) 1.8–2.7 (–3.2) mm, acute or pointed and with terminal tuft, ridged, outside glabrous to puberulous, inside puberulous to pubescent below the apex; *inner calyx lobes* oblong-ovate to oblong-elliptic, (3–) 5.2–5.8 (–6.2)  $\times$  (1.5–) 1.9–3.3 mm, obtuse or cuspidate, rarely acute, scarcely ridged, outside glabrous or puberulous but terminally pubescent and with cilia, inside pubescent below apex. *Petals* oblong-obovate, (3–) 6–8 mm long, bilobed. *Stamens* 8–17, with staminodes, arranged around the ovaries; *filaments* strap-like, 1–1.2 mm long, broadened and connate basally; *anthers* broadly obloid, 0.5–1 mm long, abruptly constricted above but tapering below. *Pistils* 3; *ovaries* obovoid, each with 2 to 4 ovules, tomentose; *styles* attached to outer upper edge of ovaries, then curved out- and upwards with stigmas well above the anthers. *Fruit* and *seed* not seen. *Flowering:* October–November. **Fig. 2F–H.**

*Distribution and ecology.* Grows in eucalypt woodland with *Eucalyptus dives*, *Rytidosperma pallidum*, *Persoonia chamaepeuce*, *Allocasuarina nana* (*S.J.Forbes* 742) or *Eucalyptus pauciflora* and *E. dalrympleana* (*R.Pullen* 8557) in New South Wales (ST).

*Conservation status.* Unknown.

*Diagnostic features.* *Hibbertia pachynemidium* is similar to *H. exposita* particularly in habit and habitat, but distinguished by the shorter flower stalk, pronounced pustules on the leaves, glabrous outer calyx lobes (except for a tuft at the apex), and, most importantly, the broad-based connate filaments. Both these species differ

from *H. ericoides* and *H. intermedia* by their smaller flowers and shorter anthers.

The species is also similar to *H. vestita*, because of a similar androecium. The stamens are scarcely arranged in groups and the broadened filaments are often connate into a ring for more than half their length. The large number of staminodes is reminiscent of *H. vestita*, as well. The very broad central vein of the leaves and the generally smaller flowers without flat additional bracts, however, clearly distinguish *H. pachynemidium*.

**Variation.** Although the stalks of most flowers are longer than 10 mm, a few are very short and less than 4 mm. The buds are nodding, but, as no fruits have been seen, it is not known whether they too are recurved. One specimen, *J.D.Briggs & M.Parris 2078*, has all flowers sessile, but the very broad filaments and the many staminodes place it within this species.

A slightly more delicate form with glabrescent branches and smaller flowers has been recorded from near Bombala, but without detailed locality information (*W.Bauerlen 305*). The flowers display the broadened filaments and a central vein that is broader than the revolute margins of the leaves.

**Etymology.** The epithet “pachy-nem-idium”, Greek, “diminutive broad thread” (a noun in apposition) refers to the unusually broadened filaments of the flowers of this species. This name bears no reference to the genus *Pachynema* R.Br. or *Hibbertia* subg. *Pachynema* (R.Br.) Horn.

#### *Specimen examined*

NEW SOUTH WALES: *W.Bauerlen 305*, Bombala, – (MEL); *J.D.Briggs & M.Parris 2078*, Wadbilliga Natl Park, 28.x.1986 (CANB, MEL, NSW); *R.H.Cambage NSW85880*, near Kybean Trig station, 4.xi.1908 (NSW); *S.J.Forbes 742*, 4.8 km NE Merriangaah Peak, 31.x.1981 (MEL); *M.Parris CBG8604644*, Kybean River gorge, x.1971 (CANB); *J.H. Willis MEL119764*, Kydra Peak, 20.x.1948 (MEL).

#### *Hibbertia pedunculata* R.Br. ex DC.

Regn. Veg. Syst. Nat. 1: 430 (1817); Prodr. 1: 74 (1824); Lindl., Edwards’s Bot. Reg. 12, pl. 1001 (1826); Benth., Fl. Austral. 1: 32 (1863), p.p.; Gilg, Nat. Pflanzenfam. 3(6): 117 (1893), p.p.; C.Moore & Betche, Handb. Fl. New South Wales 10 (1893), p.p.; N.C.W.Beadle et al., Vasc. Pl. Sydney ed. 1, 195 (1963); G.J.Harden & J.Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p.p.; Pellow, Henwood & Carolin, Fl. Sydney Region ed. 5: 126 (2009), p.p. — *H. pedunculata* R.Br. ex DC. var. *pedunculata*. Benth., Fl. Austral. 1: 32 (1863). — **Type:** New South Wales, near Port Jackson, *R.Brown s.n.* [J.J.Bennett 4865] (lecto. – **selected here:** G-DC; isolecto.: BM, K); “in Nova-Hollandia, *Caley*” (syn.: not located, see typification).

*Hibbertia corifolia* Sims, Curtis’s Bot. Mag. 53, pl. 2672 (1826); Spach, Hist. Nat. Vég. Phan. 7: 421 (1839); Walp. Rep. Bot. Syst. 1: 64 (1842). — *H. pedunculata* var. *corifolia* (Sims) Benth., Fl. Austral. 1: 32 (1863). —

**Type:** “We were favoured with the plant from which our drawing was taken, by our friend Robert Barclay, Esq. of Bury-Hill, who informs us that he received it from

Mrs. Marryatt of Wimbledon House. It was supposed to be from Nepal; but this is uncertain, and it seems more probably that its native country is New Holland.”, Curtis’s Bot. Mag. 53, pl. 2672 (lectotype – **selected here**; see typification).

Shrublets to 0.2 m high, spreading to decumbent, often with stout rootstock; branches wiry and up to 40 cm long, leaf bases decurrent, hirsute to scabrous when long hairs wear off. *Vestiture* largely persistent, with longer, often coarse simple hairs usually with basal tubercle over many to few short erect simple hairs often very dense on the calyx (rarely including a few forked hairs), often also with some hairs on the central vein of the leaves. *Leaves* with intrapetiolar tuft of hairs up to 0.6 mm long and usually decurrent along both sides of the leaf bases; *petiole* 0.2–0.6 mm long; *lamina* linear to linear-lanceolate, (1.8–) 3–7 (–9.8) × 0.4–0.6 mm, scarcely but abruptly constricted into petiole, acute becoming obtuse as end of vein with short tuft of hairs recurves, above convex, puberulous, pilose to glabrescent, below with moderately broad and recessed central vein proximally and usually touching the revolute margins and with rows of teeth along the interface, with undersurface not visible, puberulous to glabrescent. *Flowers* single, terminal mainly on larger branches; *flower stalk* 3–10 (–13.7) mm long, with primary bract usually subtending the calyx; buds broadly ellipsoidal to almost spherical; *primary bracts* linear, (1.2–) 1.4–1.8 (–2.2) × 0.2–0.4 (–0.5) mm, with ± recurved margins, acute to bluntly acute, rarely with few additional leaf-like bracts when flowers are born on short axillary shoots. *Calyx* lobes unequal; *outer calyx lobes* elliptic to elliptic-oblong, (3.8–) 4.3–4.8 (–5.3) × 1.8–2.6 mm, rounded, rarely bluntly obtuse, without distal central ridge, outside sparsely pilose, pubescent or puberulous, inside puberulous to glabrescent on distal third; *inner calyx lobes* broadly elliptic-oblong to elliptic-obovate, (4.2–) 4.5–5.3 × 2.8–3.3 mm, rounded to emarginate, scarcely ridged, outside scabrid-puberulous along the centre becoming appressed puberulous towards the membranous margins, inside scarcely puberulous below the apex. *Petals* obovate to oblong-obovate, up to 10 mm, bilobed. *Stamens* (14–) 18–35 (–43) and with ± staminodes, surrounding the ovaries; *filaments* filiform, 1.2–1.5 mm long, usually scarcely connate basally; *anthers* narrowly oblong, (0.8–) 1.2–1.6 mm long, papillate, abruptly constricted above and ± so below. *Pistils* (2) 3 (4); *ovaries* obovoid, each with 4 ovules, pubescent to hirsute; *style* recurved then erect and with erect to incurved stigmas well above the apex of the anthers. *Fruit* recurved, pubescent with mainly simple hairs. *Seeds* often obovoid, 1.4–1.5 × 1.2–1.3 mm, dark brown; aril with fleshy base surmounted by shallowly lobed membranous cup covering at least half of seed. **Flowering:** Mainly September–November.

**Distribution and ecology.** Grows in a wide range of habitats, but predominantly in clay soils with grassland understory under a wide range of eucalypt woodland and

recorded mainly from the central coast of New South Wales: mainly CC, but also NC (near Newcastle), CWS (?Rylstone).

*Conservation status.* Locally abundant (*C.Driscoll* 14, 17, 18), but generally infrequent to rare.

*Diagnostic features.* *Hibbertia pedunculata* is characterised by the presence of a range of mainly simple hairs (rarely some forked ones on the inner calyx lobes), primary bracts subtending the calyx and rounded outer calyx lobes with an indistinct central ridge in the distal portion.

*Variation.* Candolle (1817) recorded “stamens 12–13” for this species. This was queried by Sims (1826) in the discussion accompanying the description of *H. corifolia*. The lowest number of fourteen stamens found in this study was recorded in *J.Boorman* NSW85898 from Bankstown, NSW. Most specimens seen of this species have distinctly more stamens, i.e. (14–) 18–35 (–43), and there are always a varying number of staminodes among them.

Plants are either multistemmed and sometimes, when older, they produce a few long wiry branches up to 40 cm long. Each branch has numerous axillary branches, but rarely these are so short that one might refer to them as short shoots with terminal flowers (e.g. see *M.Futter* 304). The leaves have a distinctly broadened central vein at least proximally, but in some extreme specimens the revolute margins are so strongly in-rolled that the central vein is no longer visible (e.g. *Mitchell* NSW243238).

*Typification.* *Hibbertia pedunculata* was based on Robert Brown’s unpublished concept as well as a specimen collected by George Caley. There are two specimens on the type sheet in G-DC, but the second specimen is inscribed “*Hibbertia thymifolia*” with “*pedunculata*” written across it. However more important is the inscription “m. Lambert 1818”, which could indicate that it is a Caley specimen received after publication of the species in 1817. No other Caley specimen identifiable as *Hibbertia pedunculata* has been located at G or G-DC. The Brown specimen agrees with de Candolle’s (1817) description, except that no modern specimen with less than 14 stamens has been seen (cf. variation). Label data on Robert Brown’s specimen (BM574315) at the National History Museum, London, gives the locality as “between Sydney + Parramatta / Sept 1803”, which agrees with Vallance et al. (2001).

A specimen at K inscribed “*Hibbertia corifolia* Sims Bot Mag t. 2672 — Hort Barclay 15.7.30” could be part of the type material, but was deposited at Kew at least four years after that species was described. The detailed illustration, with more than 13 stamens, in *Botanical Magazine* t. 2672 is preferable and is therefore selected as the lectotype of *H. corifolia*.

#### *Specimens examined*

NEW SOUTH WALES: *J.L.Boorman* NSW85869, Cundletown, x.1909 (NSW); *J.L.Boorman* NSW85873,

Wallsend, x.1899 (NSW); *J.L.Boorman* NSW85891, St Marys, ix.1920 (NSW); *J.L.Boorman* NSW85898, Bankstown, ix.1914 (AD, CANB, NSW); *R.H.Cambage* 828, Peakhurst, xii.1902 (NSW); *J.H.Camfield* NSW85889, near Kogarah, x.1893 (NSW); *J.H.Camfield* NSW85892, Bexley, x.1893 (NSW); *E.Cheel* NSW85870, Manning River, xii.1899 (NSW); *C.Driscoll* 13–18, near Beresfield on Donaldson Coal mining lease, iv/v. 2002 (NSW); *R.W.Earp* NSW85875, Kilaben Bay, Lake Macquarie, iii.1956 (NSW); *O.D.Evans* NSW85863, Yennora, 13.x.1961 (NSW); *J.J.Fletcher* NSW85893/4/5, Cabramatta, 9.xi.1889 (NSW); *W.Forsyth* NSW85876, Wyong, 3.vi.1897 (AD, MEL, NSW); *M.Fuller* 304, Chester Hill, x.1927 (CANB); *C.P.Gibson* s.n., Deverall Park at Condell Park, 26.x.2005 (AD, NSW); *C.P.Gibson* 61, Walshaw Park, Bass Hill, 12.x.2000 (AD, NSW); *C.P.Gibson* 81, Chullora Rail Yards, 9.x.2006 (NSW); *C.P.Gibson* & *R.T.Miller* 24, Smith Park, East Hills, xi.1988 (NSW); *C.P.Gibson* & *R.T.Miller* 26, Shaddock Ave, Villawood (extinct), 26.ix.1990 (AD, NSW); *A.A.Hamilton* NSW85877, Wyong, x.1913 (NSW); *A.A.Hamilton* NSW85888, Duck River, Clyde, 9.1914 (NSW); *J.King* NSW85867, Rylstone, 1953 (NSW); *N.King* NSW243235, Homebush, 1.ix.1891 (NSW); *S.King* MEL1009762, near Blue Mountains, 1893 (MEL); *J.H.Maiden* NSW243239, Homebush, x.1893 (NSW); *J.H.Maiden* NSW243240, St Marys Station, South Creek, 24.ix.1887 (NSW); *R.T.Miller* s.n., Rookwood Cemetery, 16.x.2007 (AD, NSW); *R.T.Miller* & *C.P.Gibson* 25, Chullora Railway Yards, Muston site 3, 24.x.1990 (NSW); *R.T. & J.Miller*, A. & *A.Peters* s.n., Woodlands Cottages, Cessnock, 24.iv.2010 (AD, NSW); *J.Mitchell* NSW243238, Newcastle, x.1904 (NSW); *H.Salasoo* 1810, Branxton to Cessnock, 4.x.1959 (NSW); *Dr. Woolls* NSW85879, Kiandra, – (NSW); *W.Woolls* MEL35562 & 35565, Parramatta, – (MEL).

#### *Hibbertia porcata* Toelken, sp. nov.

A *H. samaria* et *H. singulari absentia pilorum stellatorum in ramis et lobis interioribus calicis et pagina infera foliorum glabra*; a *H. pedunculata calycis lobis externis acutis et porcatis bracteisque ad basim pediceli differt*.

**Type:** New South Wales, Lake George, *E.Gauba* CBG4751, 30.11.1949 (holo.: CANB; iso.: NSW).

*Hibbertia pedunculata* auctt. non R.Br. ex DC.: Benth., Fl. Austral. 1: 32 (1863), p.p.; F.Muell., Syst. Cens. 1: 2 (1882), p.p.; F.Muell., Key Syst. Victoria Pl. 2: 5 (1885), p.p.; F.Muell., Second. Syst. Cens. 1: 2 (1889); A.A.Hamilton, Proc. Linn. Soc. New South Wales ser. 2, 2: 264 (1887); Ewart, Fl. Victoria 767 (1930), p.p.; N.T.Burb. & M.Gray, Fl. Australian Capital Territory 256 (1970); J.H.Willis, Handb. Pl. Victoria 2: 386 (1973), p.p.; G.J.Harden & J.Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p.p.; Toelken in N.G.Walsh & Entwisle, Fl. Victoria 3: 304 (1996), p.p.

Shrublets often 0.25 (–0.45) m high, decumbent to prostrate; branches several, wiry- to rigid-woody, with decurrent leaf bases, pubescent to hirsute. *Vestiture on branches, leaves, flower stalk and calyx* persistent, with ± dense longer spreading simple hairs (pustulate on leaves) over short simple ones. *Leaves* with dense intrapetiolar tufts of hairs up to 1 mm and usually decurrent on both sides of the leaf bases; *petiole* 0.3–1.2 mm long; *lamina* linear-lanceolate to linear, (1.3–) 4–6 (–7.4) × 0.5–0.7 (–0.8) mm, usually scarcely constricted into petiole, acute often becoming obtuse, with apex of central vein

usually scarcely protruding, recurved and with short tuft of hairs, above flat, sparsely hirsute to glabrescent, rarely pilose, but scattered basal pustules visible, below with slender recessed central vein overtopped by revolute margins and rarely with rows of teeth between them, with glabrous undersurface rarely visible, similarly hirsute to glabrescent as above. *Flowers* single, terminal on main and lateral branches, with rounded base; *flower stalk* (2–) 4–10 (–16.8) mm long, with primary bracts usually towards the base or rarely up to the middle; *buds* broadly ovoid to ellipsoidal; *primary bracts* linear, linear-lanceolate, (1.3–) 4–6 (–7.8) × (0.4–) 0.5–0.8 (–1) mm, acute, leaf-like with distinctly revolute margins at least distally, usually glabrescent; additional bracts (0) 1–3, with more pronounced revolute margins, grading into cauline leaves. *Calyx* lobes unequal; *outer calyx lobes* lanceolate to lanceolate-elliptic, (5–) 6–7 (–7.8) × (1.2–) 1.4–1.8 mm, often ± longer than inner ones, acute, with central ridge usually well developed usually along the full length, outside hirsute to strigose, inside pubescent to puberulous on distal third; *inner calyx lobes* broadly ovate to oblong-elliptic, (4.6–) 5.5–6.8 (–7.3) × (2.6–) 2.8–3.3 mm, rounded to mucronate or emarginate, slightly ridged, outside strigose along the central ridge and pubescent to puberulous towards the membranous margins. *Petals* broadly obovate, up to 11.7 mm long, bilobed. *Stamens* 15–25, rarely with few staminodes, arranged around the ovaries; *filaments* filiform to strap-like, 1.6–3 mm long, broadened but usually scarcely connate basally; *anthers* obloid, 1.1–1.6 mm long, above abruptly constricted, below tapering into the filaments. *Pistils* 3; *ovaries* obovoid, each with 4–6 ovules, hirsute; *style* attached to the upper outer margin of the ovaries, then curved upwards and ± erect and with stigmas above the anthers. *Fruit* recurved, hirsute. *Seeds* obloid-obovoid to comma-shaped, 2.6 × 1.8 mm, dark brown; *aril* with oblique fleshy attachment surmounted by a membranous cup covering more than a third of one side of the seed. *Flowering*: October–December (April, May).

*Distribution and ecology.* Recorded from various substrates, but usually on sandstone or other rock types, often associated with heath-like understory in eucalypt woodland in New South Wales (CT, ST, SWS) with a single record from Victoria (MID).

*Conservation status.* Widespread but apparently never common. Recently described as “locally rare” (A.R.Bean 15798, R.Johnstone 1717 & A.E.Orme).

*Diagnostic features.* *Hibbertia porcata* is a very variable species known from many isolated populations. It is easily recognised by the usually pronounced ridge along the length of the outer calyx lobes, accentuated by recurved distal margins. The long simple hairs on the calyx, especially on the outer calyx lobes usually have pronounced basal tubercles. It has a glabrous, usually granulate leaf undersurface, mainly visible on bracts and on prophylls at the base of lateral branches, and the anthers are usually longer than 1.5 mm. The ± linear

leaves with long simple hairs resemble those of *H. samaria*, but *H. porcata* differs by having only simple hairs on all parts of the plants (or rarely the odd forked hair on the inner calyx lobes) and the undersurface of the leaves is glabrous or rarely with a few fine teeth on the (revolute) leaf margins. *Hibbertia porcata* shares vestiture and the large flowers with many stamens with *H. pedunculata*, but is distinguished by its acute to pointed outer calyx lobes with a pronounced central ridge. It also usually has a very much broader central vein than the revolute margins at mid-leaf, and occurs mainly in inland localities more or less skirting the northern and north-western subalpine regions, whereas *H. pedunculata* is mainly restricted to the coastal regions of central and northern New South Wales. Similarly, sessile-flowered specimens of *H. porcata* from, for instance, Tumut (cf. *Variation* below) have sometimes been identified as *H. vestita*, a species from the coast of northern New South Wales and southern Queensland. These are mainly distinguished by their broader central vein, which is more or less tightly wedged in between the revolute margins.

*Variation.* The length of leaves and hairs varies greatly in different populations in this species, as is commonly found in species of this group. The most noteworthy variation, sessile or subsessile flowers found in three specimens from the vicinity of Tumut (e.g. J.L.Boorman NSW85881), also affects the concept of the *H. pedunculata* subgroup, which is mainly distinguished by stalked flowers. Specimens from further south, viz. Tumberumba (e.g. E.J.McBarron 787) and Khancoban (E.Dakin MEL695441), however, have stalked flowers. Furthermore, records from the northern parts of the distribution, especially from north of Orange (e.g. A.R.Bean 15798) also have subsessile flowers, as well as a more erect habit (in one case up “to 45 cm high, apparently decumbent on other plants”, R.Johnstone 1717 & A.E.Orme). Some of these specimens also have a larger number of stamens or finer hairs on the whole plant, but all these extreme characters occur in plants from populations peripheral to the main distribution of the species.

Most astonishing is the only collection of this species from Victoria, viz. from Christmas Hills, north-east of Melbourne (D.Rouse 1). More collections of this species throughout its range are needed in order to evaluate the morphological variation discussed above.

*Etymology.* The apex of the outer calyx lobes is distinctly ridged and usually this ridge is accentuated by two grooves on either side due to the somewhat recurved distal margins. The epithet “porcata” Latin “ridged”, from “porca” “the ridge between two furrows made in plowing” refers to this resemblance of the distal outer calyx lobes.

#### *Voucher specimens*

NEW SOUTH WALES: A.R.Bean 15798, 3 km W Mullion Creek, N Orange, 19.xi.1999 (BRI, NSW); J.L.Boorman

NSW85881, Gilmore near Tumut, x.1916 (NSW); *C.Burgess* CBG56281, Napoleon Reefs, 16.1 km E Bathurst, 19.xi.1970 (CANB); *E.Dakin* MEL695441, Khancoban, 30.x.1949 (MEL); *R.G.Garland* MEL1009778, Tumut River, 1887 (MEL); *W.Hunter* MEL35584, spur near Berrima River, v.1939 (MEL); *R.Johnstone* 1717 & *A.E.Orme*, near Pagoda Lookout, Wollemi National Park, 16.xii.2005 (NSW); *B.Lane* NSW85864, Mullion Range State Forest, c. 14 km N Orange, 29.xi.1960 (NSW); *MacGillivray* AD98587233, Hill End, 3.i.1925 (AD); *J.H.Maiden* & *J.L.Boorman* NSW85884, Tumut, viii.1903 (NSW); *E.J.McBarron* 787, Tumberumba, 5.iv.1947 (NSW); *E.J.McBarron* 5342, Munderoo South, Tumberumba, 12.xi.1950 (NSW); *A.Morris* NSW85866, Hill End, 3.i.1925 (NSW); *F.Mueller* MEL1009677, Towong, 1874 (MEL); *R.J.Norland* NSW85882, Tumut to Tumberumba, xii.1947 (NSW); *L.Pryor* CANB256221, Tumut, 1937 (CANB); *R.Pullen* 1313, SE Greenwood Trig., Sutton to Queanbeyan Road, 26.iv.1959 (CANB); *s. coll.* 57, Wagga Wagga, i.1896 (NSW); *Walker* ANU1215, west of Sutton Road, near ACT Border, xii.1963 (CANB, NSW); *N.G.Walsh* 7402 & *K.L.McDougall*, c. 1 km S Murray Jackson Drive from Talbingo turnoff, 16.xi.2011 (MEL); *J.E.Ward* 173, 30 km from Yass to Bevendale, between Blakney Creek and Blomfield homestead, 14.xi.1985 (CANB).

VICTORIA: *D.Rouse* 1, Christmas Hills (AD, MEL).

### *Hibbertia samaria* Toelken, sp. nov.

*Hibbertia* porcatae similis sed pilis fasciculatis in ramis et lobis interioribus calicis et pagina infera foliorum glabra; a *H. singulari* foliis longioribus et pilis longis effusis nervisque centralibus recessis; a *H. humilis* subsp. erigens staminibus circum ovaria dispositis differt.

**Type:** Victoria, Mt Samaria Road, c. 5 km NW Bridge Creek, *I.C.Clarke* 2737, 12.xi.1996 (holo.: AD; iso.: BRI; CANB, MEL2037060 – n.v.).

*Hibbertia serpyllifolia* auctt. non R.Br. ex DC.: Benth., Fl. Austral. 1: 32 (1863), p.p. quoad *F.Mueller* MEL35583, ranges on the McAlister River; *F.Muell.*, Native Pl. Victoria: 17 (1879), “*serpyllifolia*”, p.p.; *F.Muell.*, Syst. Cens. 1: 2 (1882), p.p.; *F.Muell.*, Key Syst. Victorian Pl. 1: 122 (1887), “*serpyllifolia*”, p.p.; *Ewart*, Fl. Victoria 767 (1930), p.p.

*Hibbertia pedunculata* auctt. non R.Br. ex DC.: *J.H.Willis*, Handb. Pl. Victoria 2: 386 (1973), p.p., quoad *F.Mueller* MEL35583, ranges on the McAlister River; *Toelken* in *N.G.Walsh* & *Entwisle*, Fl. Victoria 3: 304 (1996), p.p.

*Hibbertia* sp. 1 (*Eastern Highlands*) *N.G.Walsh* & *V.Stajsic* (2007), Census Vasc. Pl. Victoria ed. 8: 80 (2007).

Shrublets up to 0.15 m tall, multi-stemmed, decumbent or mat-forming, rarely tufted; branches wiry, becoming rigid towards the base, up to 30 cm long and with many short axillary branches each usually with a terminal flower, with leaf bases scarcely decurrent, hirsute. *Vestiture* persistent, with spreading long, usually antrorse simple hairs often over fascicled hairs on all parts; *on branches* moderately dense, with  $\pm$  spreading long antrorse simple hairs over multiangular fascicled hairs (3–5 often unequal arms); *on leaves above and below* sparse, with longer and shorter antrorse simple hairs on usually scarcely pronounced basal pustules and becoming dense on the terminal end of the vein; *on bracts* similar to leaves but much sparser and without pustules; *on outer calyx lobes* outside moderately dense,

with coarse long simple hairs mainly along the central ridge and distally over scattered shorter ones, inside moderately dense, with fine antrorse fascicled hairs (3–5 often unequally long arms) on the distal half; *inner calyx lobes* outside dense, with scattered coarse antrorse simple hairs mainly along the central ridge overtopping usually multiangular fascicled hairs (2–6 subequal arms) covering much of the surface up to the membranous margins, inside a cluster of fine short fascicled hair below the apex. *Leaves* with intrapetiolar tufts up to 0.6 mm long, often unequally long and shortly decurrent along the leaf bases; *petiole* 0.2–0.6 (–1) mm long; *lamina* linear, rarely linear-elliptic, (2.8–) 4–7 (–13.6)  $\times$  (0.8–) 1–2 (–2.3) mm, gradually tapering into petiole, acute with short straight end of vein rarely recurved and with tuft of hairs, above flat to slightly depressed along the central vein, sparsely pubescent to almost pilose, below with recessed moderately broad central vein often separate from revolute margins and displaying the fascicled-tomentose undersurface, sparsely pilose. *Flowers* single, terminal on main branches but also common on short axillary branches along the main ones; *flower stalk* (3–) 5–12 (–20.4) mm long, with primary bracts towards the base; *buds* broadly ovoid; *primary bracts* linear-lanceolate to linear-elliptic, 1.5–2 (–3.8)  $\times$  0.4–0.6 mm, acute and sometimes with recurved apex, dorsiventrally compressed and with recurved margins, puberulous except for tufted apex; additional bracts 1 or 2, small, leaf-like and on short shoots often not merging into cauline leaves. *Calyx lobes* unequal; *outer calyx lobes* ovate, (5.2–) 5.8–6.5 (–7.7)  $\times$  2.6–2.8 (–3.1) mm, acute to pointed, with central ridge  $\pm$  obscured by strigose vestiture on outside, inside sericeous; *inner calyx lobes* ovate-oblong to oblong-elliptic, (5.2–) 5.8–6.2 (–7.2)  $\times$  3.5–4 (–4.5) mm, acute to cuspidate, scarcely ridged, outside pubescent, inside finely tomentose below the apex. *Petals* obovate, up to 15.8 mm long, bilobed. *Stamens* 10–15, without staminodes, arranged around the ovaries; *filaments* filiform, 1.4–1.6 mm long, scarcely basally broadened and connate; *anthers* obloid, 1.5–2 mm long, abruptly constricted above, tapering into filament below. *Pistils* 3; *ovaries* obovoid, each with 4–6 ovules, fascicled-hirsute; *styles* attached to outer upper edge of ovaries, then curved up and exposing the stigmas well above the anthers. *Fruit* recurved, shortly fascicled-hirsute. *Seeds* obloid-obovoid, 2–2.2  $\times$  1.4–1.7 mm, brown; *aril* with somewhat lateral attachment slightly fleshy and surmounted by scarcely lobed membranous cup covering less than a third of the seed. *Flowering:* October and November (May).

*Distribution and ecology.* Growing in usually rocky situations or on rock slabs and/or in sparse grassy understory in dry sclerophyll forest of *Eucalyptus macrorhyncha* and *E. goniocalyx* (*I.C.Clarke* 2737) in the south-western part of the Eastern Highlands (EHL), Victoria.

*Conservation status.* Widespread through Mt Samaria State Park (A.D.J.Piessse 268).

*Diagnostic features.* Although this species is very similar to *H. porcata*, it is easily distinguished by the presence of multiangular fascicled hairs on the inner calyx lobes, but also often on the branches and, significantly, on the undersurface of leaves, wherever exposed. The large flowers and the occurrence of fascicled hairs on the branches and on inner calyx lobes resemble those of *H. singularis*, from which *H. samaria* differs by its longer leaves covered with spreading simple hairs.

*Variation.* The size of the flowers, i.e. the calyx and corolla, varies considerably from larger ones on terminal main branches to smaller ones on the axillary branches and especially on fascicled axillary branches (A.C.Beauglehole 91076 & N.J.Rossiter). Often the length of the flower stalk and of the accompanying bracts varies accordingly.

The central vein varies from narrow and almost as thick as the revolute margins to distinctly broader than the revolute margins but scarcely raised above the undersurface (I.C.Clark 2737).

*Note.* Bentham (1863) did not specifically cite the specimen “F.Mueller, ranges of the Mc Alister River”, although he had examined it and signed the collector’s label. The specimen at K is signed “*H. serpyllifolia* R.Br.” in red by Bentham. A second specimen collected by F.Mueller from Mt Ligar was not annotated by him. The two specimens may indicate a wider distribution of the species.

*Etymology.* The epithet “samaria” (a noun in apposition) is derived from Mt Samaria State Park in Victoria, from where several specimens of the species were recorded. It bears no reference to the biblical origin of the name.

#### *Specimens examined*

VICTORIA: A.C.Beauglehole 91076 & N.J.Rossiter, Mt Samaria State Forest, 7.xi.1987 (CANB, MEL119768); W.Cane sub A.C.Beauglehole 9933, Heyfield, 1960 (MEL); E.A.Chesterfield 1301, Long Hill, McAlister River catchment, 6.xii.1973 (MEL); E.A.Chesterfield 1320, Breakfast Creek, Wellington River catchment, 16.xii.1973 (MEL); I.C.Clark 2737, c. 5 km NW Bridge Creek, Mt Samaria Road, 12.xi.1996 (MEL); J.A.Jeanes 2541, Mt Samaria Road, c. 4.1 km from Blue Range Creek, 24.1.2011 (MEL); F.Mueller MEL35581, Mt Ligar, – (MEL); F.Mueller MEL35583, ranges on the MacAlister River, – (K, MEL); A.D.J.Piessse 268, 19 km N Mansfield to West Track, Mt Samaria State Park, 28.v.1986 (MEL); P.G.Smith MEL574738, Mt Samaria State Park, 25.x.1978 (MEL).

#### *Hibbertia serpyllifolia* R.Br. ex DC.

Regn. Veg. Syst. Nat. 1: 430 (1817); DC., Prodr. 1: 74 (1824); Spreng., Linn. Syst. Veg. ed. 16, 2: 614 (1825); G.Don., Gen. Hist. 1: 76 (1831); Steud., Nomencl. Bot. ed. 2, 1: 757 (1840); Benth., Fl. Austral. 1: 32 (1863), p.p. quoad typum; F.Muell., Native Pl. Victoria: 17 (1879), “*serpyllifolia*”, p.p.; F.Muell., Syst. Cens. 1: 2 (1882), p.p.; C.Moore, Cens. Pl. New South Wales: 1 (1884), p.p.; F.Muell., Key Syst. Victorian Pl. 1: 122 (1887),

“*serpyllifolia*”, p. p.; Gilg, Nat. Pflanzenfam. III(6): 117 (1893), p.p.; C.Moore & Betche, Handb. Fl. New South Wales 10 (1893), p.p.; A.Hamilton, Proc. Linn. Soc. New South Wales 24: 354 (1899), p.p.; Rodway, Tasmanian Fl. 4 (1903); N.C.W.Beadle et al., Vasc. Pl. Sydney ed. 2: 230 (1972), p.p.; J.H.Willis, Handb. Pl. Victoria 2: 386 (1973), p.p.; N.C.W.Beadle, Stud. Fl. N.E. New South Wales 3: 253 (1976), p.p.; G.J.Harden & J.Everett in G.H.Harden, Fl. New South Wales 1: 300 (1990), p.p.; Toelken in N.G.Walsh & Entwisle, Fl. Victoria 3: 304 (1996), p.p.; Pellow, Henwood & Carolin, Flora Sydney Region ed. 5: 126 (2009), p.p. — **Type:** Queensland, Shoalwater Bay Passage [Westall Hill], R.Brown [J.J.Bennett 4866], 26.viii.1802 (holo.: G-DC; iso.: BM, K).

*Hibbertia vestita* auct. non A.Cunn. ex Benth.: Jessup in Bostock & A.E.Holland, Census Queensland Fl. 64 (2007).

Shrublet usually to 0.5 m, but also up to 1 m tall, multi-stemmed from woody rootstock, moderately branched, erect-spreading to decumbent; branches wiry- becoming rigid-woody, with decurrent leaf bases, pubescent to hirsute. *Vestiture* usually a mixture of short and longer simple hairs without tubercles or obvious pustules on leaves, often wearing off; *on branches* sparse to dense, with antrorse and often  $\pm$  appressed longer over more erect shorter simple hairs; *on leaves above* scattered, with very short antrorse simple hairs particularly on the proximal adaxial surface and flanks of the revolute margins, often wearing off; *on leaves below* sparse, with shorter and longer short  $\pm$  antrorse-appressed simple hairs mainly along the central vein but sometimes also on the revolute margins, with exposed glabrous undersurface; *on bracts* above and below sparse, with scabrid to appressed very short antrorse hairs; *on outer calyx lobes* outside sparse to scattered, with longer over shorter spreading simple hairs up to 0.3 mm long mainly on the proximal parts, inside glabrous or with few scattered simple hairs below the apex; *on inner calyx lobes* outside sparse with short antrorse  $\pm$  appressed hairs mainly along the centre, inside glabrous except for few distal hairs. *Leaves* with sparse intrapetiolar tufts of hairs up to 0.5 mm long; *petiole* 0.2–0.5 mm long; *lamina* oblong to oblong-elliptic, (2.6–) 4–8 (–9.6)  $\times$  (0.7–) 1–2 (–2.7) mm, abruptly constricted into petiole, obtuse to rounded with recurved mucro bearing shortly tufted hairs, above convex but often with  $\pm$  slight depression along the central vein and puberulous, glabrescent or glabrous, below with prominent but narrow puberulous revolute margins well above the scarcely raised and narrow puberulous central vein exposing between them much of the glabrous undersurface. *Flowers* single,  $\pm$  sessile, terminal on main and lateral branches; *flower stalk* up to 4 mm, with primary bracts usually subtending the calyx; *buds* ovoid; *primary bracts* oblong-elliptic to oblong-oblancheolate or spatulate, (1.2–) 2.5–3 (–3.4)  $\times$  (0.2–) 0.4–0.5 mm, acute, flat and leaf-like with central vein and revolute margins  $\pm$  developed; additional bracts 2–4, usually not merging into cauline leaves. *Calyx lobes* unequal; *outer calyx lobes* lanceolate, (4.2–) 5.5–7.5 (–8.4)  $\times$  (1.8–)

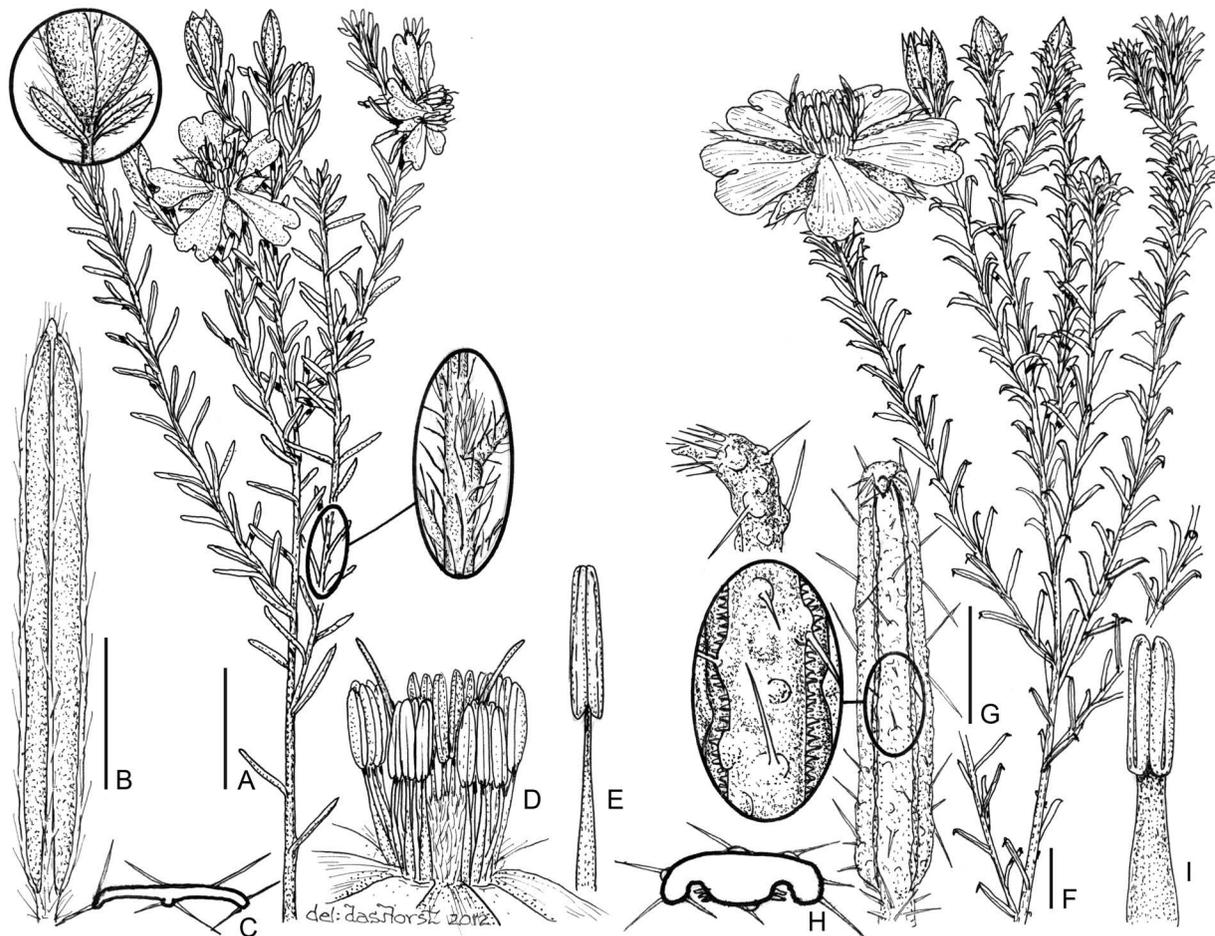


Fig. 3. A–E *H. serpyllifolia*: A flowering branch; B abaxial view of flat leaf; C transverse section through mid-leaf; D flower without calyx and corolla; E stamen with filament slightly broadened basally. F–I *H. stichodonta*: F flowering branch; G abaxial view of leaf with recurved apex and rows of teeth between the central vein and revolute margins; H transverse section through mid-leaf; I stamen with filament much broadened basally. — Scale bars: A, F 10 mm; B, G 2 mm. — A–E G.H.Gittins 1207, F–I R.Grant-Newman s.n.

2.6–3.7 mm, acute and apex usually  $\pm$  recurved, with central ridge, outside sparsely pubescent to puberulous, inside puberulous to glabrous distally; *inner calyx lobes* ovate to oblong-ovate, (5.3–) 5.5–7 (–7.6)  $\times$  3–4 (–4.6) mm, bluntly acute to obtuse, scarcely ridged, with membranous margins, outside puberulous to glabrous, inside glabrescent. *Petals* obovate, up to 12 mm long,  $\pm$  bilobed. *Stamens* (8–) 12–20 (–24), without staminodes, in groups around ovaries; *filaments* filiform, 1.3–1.6 mm long, broadened towards the base but scarcely basally connate in groups; *anthers* slender obloid, (1.8–) 2–2.2 mm long, subequal, abruptly constricted above and below. *Pistils* 3; *ovaries* obovoid, with 4 ovules, hirsute; *style* attached to the outer upper apex then curved outward and spreading with stigmas borne at  $\pm$  same level but centrifugally distant from anthers. *Fruit* erect, hirsute with simple hairs. *Seeds* broadly obovoid, 1.6–1.8  $\times$  1.7–2 mm, black to dark brown; aril with fleshy attachment surmounted by an irregularly lobed membranous cup covering the lower third to half of the seed. *Flowering*: (May) July–October. **Fig. 3A–F.**

*Distribution and ecology.* Grows usually on sandy soils mainly in heath in wallum country but also in grassland

or as undercover in coastal forests in mid-northern Queensland (PC).

*Conservation status.* Localised, but conserved on North Keppel Island and in Byfield National Park.

*Diagnostic features.* *Hibbertia serpyllifolia* is usually easily distinguished from *H. vestita* by the glabrescent outer calyx, absence of staminodes, large variation in anther length, commonly shrubby habit, and by the antrorse and often more or less appressed hairs on the branches. The usually broadly oblong to elliptic leaves, each with scarcely revolute margins and a narrow, scarcely raised central vein, are also distinctive, but, as they sometimes roll as tightly as in the very similar *H. vestita*, this character can generally not be observed on herbarium specimens.

The glabrous undersurface of the leaves is usually widely exposed between the narrow central vein and scarcely revolute margins, as in *H. ericifolia* subsp. *acutifolia*. *Hibbertia serpyllifolia* is distinguished by leaves with a scarcely broadened central vein, rounded leaf apices, linear to linear-triangular primary bracts

(linear-oblongate to spatulate in *H. ericifolia*) and longer anthers.

*Variation.* On several specimens the habit is described as spreading shrubs to 50 cm high, but *E.R.Anderson* 3565 mentions plants reaching 1 m tall in a young pine plantation. In coastal localities plants tend to have a decumbent habit (*G.N.Batianoff* 708 & *T.J.McDonald*; *P.R.Sharpe* 4720 & *R.Leggatt*). Similar large variation for the shape and size of leaves is presumably largely due to the amount they have rolled in extreme environmental conditions (as has been recorded in *M.M.Davis* 6). On “wind shorn heath” the size of the flowers is very much smaller and they produce only eight stamens (*P.R.Sharpe* 4720 & *R.Leggatt*).

The central vein on the abaxial leaf surface is scarcely raised, similar to leaves of *H. vestita*, but the whole leaf of *H. serpyllifolia* is usually broader, as the lamina rarely rolls as tightly as in *H. vestita*. The margins of leaves of *H. serpyllifolia* are often scarcely revolute, so that the difference between extreme specimens with rolled and unrolled leaves is quite spectacular (e.g. see *M.M.Davis* 6).

*Note.* Bentham (1863) combined *H. serpyllifolia* with *H. ericifolia*. Although the holotype of *H. serpyllifolia* (G-DC) is very small, it can easily be distinguished from the very similar *H. ericifolia* by the small spatulate bracts with an obtuse to rounded apex and the central vein protruding from the obtuse apex of leaves. The specimen of this collection at BM bears a label reading “*Cistoides serpyllifolia* desc. [...] Shoalwater bay passage / Aug 26.1802”, indicating it refers to the tropical species, which is restricted to a small area along the central coast of Queensland.

#### *Specimens examined*

QUEENSLAND: *E.R.Anderson* 3029, Upper Stony Creek, Byfield State Forest, 9.v.1982 (BRI); *E.R.Anderson* 3565 & 3566, c. 4 km N Byfield, 5.x.1983 (BRI); *G.N.Batianoff* 708 & *T.J.McDonald*, Water Park Creek, 24 km N Yeppoon, 10.ix.1977 (BRI, CANB, K); *A.M.Buchanon* 6890, Upper Stony Creek, BSF, 31.v.1985 (BRI); *J.R.Clarkson* 695 & *T.D.Stanley*, Shoalwater Military reserve, 6.vii.1977 (BRI); *M.M.Davis* 6, roadside near Byfield, viii.1970 (BRI, CANB); *C.H.Gittins* 1207, 22 miles [35.2 km] N Yeppoon, viii.1966 (BRI); *P.Hind* 2401, Water Park Creek, 23.vii.1979 (NSW); *P.Hind* 2647 & *J.Forlonge*, Water Park Creek before picnic area, Bowen State Forest, 27.viii.1980 (NSW); *A.C.Robinson s.n.*, Waterpark Creek, 6.i.1975 (BRI); *P.R.Sharpe* 4720 & *R.Leggatt*, c. 2 km N Monkey Point, North Keppel Island, 2.ix.1988 (BRI); *N.H.Speck* 1764, 18 miles [28.8 km] N Yeppoon, 2.ix.1963 (AD, K, MEL, NSW); *M.B.Thomas* 176, headland above Monkey Point, North Keppel Island, 3.ix.1987 (BRI); *C.T.White* 8043, Byfield, 23.ix.1931 (BRI).

#### *Hibbertia singularis* Toelken, *sp. nov.*

*Hibbertiae porcatae* et *H. samaria similis sed foliis brevioribus et nervo centrali latiore et protuberanti; a H. pachynemidio lobis calicis longioribus staminibusque 22–25 et staminodiis multis differt.*

**Type:** New South Wales, Kydra Peaks, *J.H.Willis* MEL119765, 11.i.1970 (holo.: MEL).

Shrublet to 0.15 m tall, decumbent, much branched; branches wiry but soon becoming rigid, with leaf bases shortly decurrent, pubescent. *Vestiture* soon wearing off, sparse with mainly fine simple hairs except for some fascicled hairs on the branches; *on branches* sparse and wearing off soon, scattered short antrorse simple hairs mainly decurrent from the intrapetiolar tufts, over minute fascicled hairs (2–4 subequal branches) mainly restricted to the grooves between the leaf bases; *on leaves above and below* rarely with very short antrorse simple hairs on or only with pustules mainly along the flanks of the revolute margins, and a short tuft of simple hairs on distal end of central vein; *on primary bracts* sparse but usually persisting, with fine antrorse simple hairs without pustules usually appressed except along the flanks of the revolute margins, and with distal tuft; *on outer calyx lobes* outside, sparse to moderately dense distally, with fine usually appressed antrorse simple hairs and  $\pm$  ciliate or often slightly crisped on and around the apex, inside with fine appressed antrorse simple hairs on the distal third; *on inner calyx lobes* outside with scattered short antrorse simple hairs becoming forked to fascicled hairs towards the apex except for a row of longer  $\pm$  spreading simple hairs on the distal ridge and apex, inside a cluster of very short forked or fascicled hairs below the apex. *Leaves* with intrapetiolar tufts up to 0.6 mm long and  $\pm$  decurrent on both sides of the leaf bases; *petiole* 0.2–0.4 mm long, often indistinct; *lamina* oblong-elliptic, rarely oblong-lanceolate, (1.5–) 2–3.5 (–4.2)  $\times$  (0.6–) 0.7–1 mm, scarcely tapering into petiole, obtuse, with apex scarcely recurved and sparsely hairy, above flat, sparsely sericeous but soon wearing off leaving pustules mainly on the revolute margins, below with very broad central vein usually flush with and wedged tightly in between the revolute margins, sparsely sericeous soon wearing off. *Flowers* single, terminal mainly on major branches; *flower stalk* (9.8–) 10.5–16 (–22.4) mm long, with primary bracts towards the base; *buds* broadly ellipsoidal, rarely broadly ovoid; *primary bracts* linear-lanceolate, 2.5–2.8  $\times$  0.4–0.55 mm, acute, without revolute margins,  $\pm$  incurved, puberulous; additional bracts (0) 1–3, leaf-like, grading into cauline leaves. *Calyx lobes* subequal; *outer calyx lobes* ovate, (5.5–) 6–7.5 (–9.3)  $\times$  (2.6–) 3–4.2 mm, acute to pointed, slightly ridged, outside sparsely pubescent or puberulous, inside pubescent on distal half; *inner calyx lobes* broadly oblong-ovate, (5.6–) 6–7.5 (–8.8)  $\times$  3.5–4.8 mm, acute to cuspidate, scarcely ridged, outside puberulous to pubescent distally, inside shortly tomentose below the apex. *Petals* obovate, up to 9.8 mm long, bilobed. *Stamens* 22–25, with as many staminodes, arranged around the ovaries; filaments filiform, 1.8–2.1 mm long, scarcely connate basally; *anthers* obloid, 0.9–1.2 mm long, above abruptly constricted, below gradually tapering into filaments. *Pistils* 3; *ovaries* obovoid, each with 4 ovules, sparsely hirsute; *styles* attached to the upper outer end of the ovaries, then curved upwards and bearing the stigmas well above the anthers. *Fruit*

recurved, sparsely hirsute with simple hairs. *Seeds* obovoid, 2–2.3 × 1.8–2 mm, dark brown; *aril* attachment fleshy and slightly to one side and surmounted by a ± lobed membranous cup covering about one-third of the seed. *Flowering*: January.

*Distribution and ecology*. Known only from Kydra Peaks in New South Wales (ST).

*Conservation status*. Unknown.

*Diagnostic features*. Although superficially similar to *H. porcata* and especially *H. samaria*, the small, usually glabrous (except for pustules) leaves with a very broad central vein flush with or protruding above the revolute margins, shorter anthers, as well as the numerous staminodes, easily distinguish *H. singularis*. Its leaves and the tomentum of the branches also closely resemble those of *H. pachynemidium*, which occurs on nearby mountains, but *H. singularis* is distinguished by much larger flowers (outer calyx lobes (5.5–) 6–7.5 (–9.3) × (2.6–) 3–4.2 mm), more stamens and numerous staminodes, the anthers being more uniform and longer (0.9–1.2 mm) and by filaments that are scarcely connate basally and less widened towards the base than is commonly found in the *H. vestita* group.

*Variation*. The specimen examined shows an exceptionally wide range in the length of the calyx lobes, possibly because the collection, with only one flower and several in various stages of fruiting, exhibits a strongly accrescent habit common in the *H. pedunculata* subgroup. The effect is probably accentuated here because the specimen was collected late in the flowering season. This, however, does not mean that *H. singularis* is merely a well grown mature plant of *H. pachynemidium*, as larger leaves would be the first indicator of such a change, but the size and shape of the leaves are remarkably similar in the two species. Critical for distinguishing the two species are the number of stamens and staminodes as well as the shape and size of the filaments.

*Etymology*. Although only a single collection of this species was examined, it is so different from the closest species, *H. pachynemidium* and *H. porcata*, that it is considered “alone of its kind”, Latin “singularis”.

*Specimens examined*.

Known only from the type specimen.

***Hibbertia stichodonta* Toelken, sp. nov.**

*Hibbertiae vestitae similis sed dentibus serialibus inter nervos centrales et margines revolutos in foliis distalibus vel bracteis, lobis calicis interioribus pilis brevis simplicibus vel furcatis differt.*

**Type**: New South Wales (CC), San Remo, Budgewoi, R. Grant-Newman s.n., ix.1993 (holo.: AD; iso.: NSW). *Hibbertia vestita* auctt. non A.Cunn. ex Benth.: N.C.W. Beadle, Student’s Fl. N.E. New South Wales 3: 256 (1976), p.p.; G.J.Harden & J. Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p.p.; Pellow, Henwood & Carolin, Flora Sydney Region ed. 5: 126 (2009), p.p.

Shrublets up to 0.3 m tall, spreading, little branched; branches wiry becoming rigid-woody, with prominent decurrent leaf bases, pubescent to hirsute. *Vestiture* persistent, usually with very short spreading simple hairs overtopped by very much longer and often coarse hairs; *on branches* sparse with very short erect hairs overtopped by distinctly longer, often ± antrorse hairs up to 1.8 mm long mainly restricted to the grooves along the decurrent leaf bases; *on leaves above and below* scattered, with a mixture of short to longer spreading to erect simple hairs, each usually with a flat basal pustule; *on bracts* above and below, similar to leaves but smaller and without pustules; *on outer calyx lobes* outside with few short spreading simple hairs overtopped by scattered much longer often almost erect hairs with basal tubercle concentrated along the central ridge, inside very dense short simple hairs (some forked) on the distal two-thirds; *on inner calyx lobes* outside densely covered with short erect simple hairs (few to many forked and/or fascicled) with scattered longer ones along the central ridge, inside similarly densely covered with very short erect simple hairs (some forked) on the distal half. *Leaves* with intrapetiolar tufts of hair up to 0.1–0.3 mm long and usually shorter than the long hairs on the internodes above and below; *petioles* 0.2–0.5 mm long; *lamina* linear to oblong-lanceolate, (2.6–) 4.5–7.5 (–9.2) × (0.5–) 0.7–1 (–1.2) mm, scarcely but gradually tapering into the petiole, acute to becoming rounded with pronounced reflexed end of vein, above convex and sparsely pilose, below with broad central vein recessed to rarely flush with, and tightly wedged in between, the revolute margins and frequently exposing rows of teeth, sparsely pilose. *Flowers* single, sessile, terminal mainly on main branches; *flower stalk* absent; *buds* broadly ovoid; *primary bracts* linear to linear-elliptic, (2.2–) 3–4.5 (–5.3) × (0.3–) 0.4–0.6 mm, dorsiventrally compressed and leaf-like, with acute apex usually slightly recurved, with central vein and revolute margins though reduced touching one another and without exposing the undersurface, pilose to pubescent; additional bracts (0–) 2 or 3, merging into cauline leaves. *Calyx* lobes unequal; *outer calyx lobes* broadly ovate, (6.8–) 7–8 (–9.4) × 3–3.3 (–3.5) mm, longer than inner ones, pointed to acuminate, scarcely ridged distally, outside sparsely hirsute to tomentose overtopped by scattered longer simple hairs, inside shortly pubescent on distal two-thirds; *inner calyx lobes* broadly ovate to oblong-ovate, (6.6–) 7–7.7 (–8) × (4–) 4.5–5 (5.3) mm, rounded to emarginate, not ridged, outside tomentose with ± strigose centre and glabrous membranous margins, inside with a finely tomentose patch on the distal third. *Petals* broadly obovate, up to 10.4 mm long, bilobed. *Stamens* 22–30 (–40), without or with few staminodes, tightly surrounding the ovaries; *filaments* strap-like, 1.8–2.4 mm long, broadening basally, ± connate; *anthers* narrowly obloid, (1.7–) 2.4 (–3) mm long, abruptly constricted above and below. *Pistils* 3; *ovaries* obovoid, each with 4 ovules, hirsute;

*styles* attached to the apex of the ovaries and then spreading centrifugally with the terminal stigmas erect at or just above the level of the anthers. *Fruit* erect, shortly hirsute. *Seeds* narrowly obovoid to comma-shaped, 1.6–1.8 × 1.1–1.3 mm, attachment ± lateral, dark brown; *aril* with fleshy attachment to one side surmounted by a membranous cup with short lobes to the other side covering the lower third of the seed. *Flowering*: September–November. **Fig. 3F–I.**

*Distribution and ecology.* Grows on low sandstone hills of the coastal foothills in sclerophyll forest in the central coastal foothills of New South Wales (NC, CC). Although not specified, the specimen *P. Sharpe 759A* from Queensland is presumably of cultivated origin.

*Conservation status.* Frequency unknown and not known from any conservation reserves.

*Diagnostic features.* *Hibbertia stichodonta* is also unusual among species of the *H. vestita* group by having usually a very dense cover of short hairs on the outside of the inner calyx lobes and some of these are forked (rarely fascicled, e.g. *Telford 2225*) from the base. It closely resembles *H. vestita*, but is distinguished by the well developed raised central vein of the leaves, which is wedged in between the revolute margins. However, because the vein is more or less recessed it might not be easy to distinguish leaves of *H. stichodonta* from rolled leaves of *H. vestita*, as the revolute margins may also be touching the central vein. The broadened flat bracts of *H. vestita* are never so strongly inrolled so as not to expose some part of the undersurface, while in *H. stichodonta* the undersurface of the bracts is not visible. Bracts and (usually) leaves with strongly inrolled margins will show rows of small teeth between the revolute margins and the central vein.

The central vein of leaves of *H. stichodonta* often also protrudes well beyond the apex. Leaves of *H. stichodonta* can be distinguished from those of *H. expansa* by an usually recurved apex, similar to that of *H. vestita*.

*Variation.* The central vein on the leaves is ± raised and wherever the undersurface is exposed, both the central vein and the revolute margins are, in contrast to *H. vestita*, well defined. Although the central vein rarely becomes flush with the revolute margins, its protrusion beyond the apex is variable, but at times up to 1.4 mm long, and the tip of the vein is usually reflexed.

The outer calyx lobes are usually acute to pointed but in the type specimen they are drawn into acuminate points.

The number of fertile stamens is very variable, as is the number of staminodes. Staminode number varies from, for instance, none on the type specimen, which has about 35 fertile anthers to up to 20 fertile anthers and many staminodes on *I.R. Telford 2225*.

*Etymology.* The epithet “stich-odonta”, Latinised Greek, “in-rows-toothed” refers to the rows of teeth found

between the central vein and the revolute margins of bracts and leaves, which is one of the characters distinguishing this species from *H. vestita*.

#### *Specimens examined*

?QUEENSLAND: *P. Sharpe 759A*, Griffith University site, Kassels Road, Mt Gravatt, 20.ix.1973 (BRI).

NEW SOUTH WALES: *R. Bates AD98753120A*, 20 km SW Newcastle, 10.x.1987 (AD); *J.L. Boorman NSW 85814*, Morisset, x.1899 (NSW); *R.H. Cabbage 529*, Newcastle, 4.x.1901 (NSW); *L.H. Johnson NSW85815*, Kanwal, 11.x.1953 (CANB, NSW); *M.E. Phillips 493*, near Wyong, 23.ix.1972 (CBG 56619); *H. Salasoo 2393*, Doyalson to Wyee, 29.ix.1962 (NSW); *I.R. Telford 2225*, Pacific Hwy - Freemans Park Track, 24.xi.1970 (CANB).

#### *Hibbertia vestita* A.Cunn. ex Benth.

Fl. Austral. 1: 31 (1863); F.Muell., Syst. Cens. 1: 2 (1882); F.M.Bailey, Syn. Queensland Fl.: 4 (1883); C.Moore, Cens. Pl. New South Wales: 1 (1884); F.Muell., Second Syst. Cens. 1: 2 (1889); Gilg, Nat. Pflanzenfam.III(6): 117 (1893); C.Moore & Betche, Handb. Fl. New South Wales: 10 (1893); F.M.Bailey, Queensland Fl. 1: 14 (1899); F.M.Bailey, Compr. Catal. Queensland Pl.: 13 (1913); Domin, Biblioth. Bot. 89: 422 [976] (1928); N.C.W.Beadle, Student's Fl. N.E. New South Wales 3: 255, Fig. 17E (1976), p. p.; Stanley in Stanley & E.M.Ross, Fl. S.E. Queensland 1: 187 (1982); G.J.Harden & J.Everett in G.J.Harden, Fl. New South Wales 1: 300 (1990), p.p.; Jessup in Bostock & A.E.Holland, Cens. Queensland Fl. 63/64 (2007); Pellow, Henwood & Carolin, Flora Sydney Region ed. 5: 126 (2009), p.p. — **Type:** Queensland, near Moreton Bay, *A. Cunningham s.n.*, ix.1824 (lecto.: — **here selected** — K\*; presumed iso.: K-partly, BM 2×, MEL35991; syn.: *Beckler s.n.*, Clarence River (MEL35986\*, MEL35987, MEL35988\*, NSW85797); *A. Cunningham 53*, Moreton Bay (K, MEL35989); *Fraser 93\** & *Frazer 94\**, Stradbroke Island (K); *Fraser*, Moreton Bay, 1828, (BM); *F.Mueller\**, Glasshouse Mountains, 1837 (K); *Leichhardt\**, swamps towards Duval (MEL35992, NSW121134) — see typification; an asterisk (\*) indicates that Bentham signed the specimen.

Shrublets up 0.3 m tall, multi-stemmed from a rootstock, moderately to much branched, spreading to prostrate; branches wiry becoming rigid at the base, hirsute to pilose. *Vestiture* persistent, with usually a range of shorter to longer spreading simple hairs; *on branches* dense to sparse, with short porrect simple hairs overtopped by longer erect ones up to 1.2 mm long; *on leaves above and below* excluding the glabrous undersurface, sparse to scattered, with scarcely longer and shorter antrorse spreading simple hairs with flat often not distinct basal pustules becoming denser proximally particularly adaxially, end of central vein with usually very short tuft of hairs to glabrescent; *on bracts* similar but usually sparser than leaves (without pustules) and sometimes with few short hairs on the undersurface; *on outer calyx lobes* outside sparse to dense with usually few short spreading simple hairs, particularly proximally, overtopped by longer coarse mainly proximally and along the margins, often sparser between distal ridge and revolute margins, inside with mainly long coarse antrorse-appressed simple hairs on

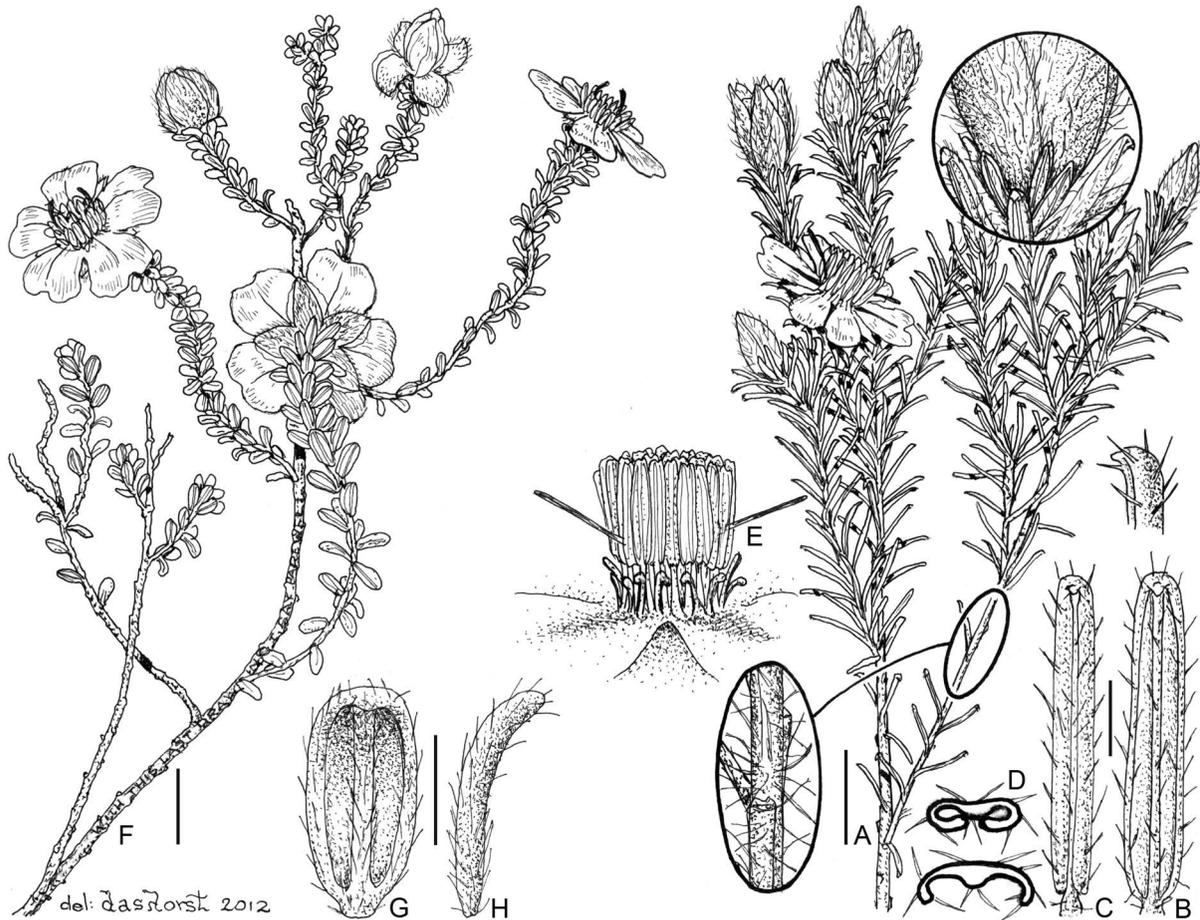


Fig. 4. A–E *H. vestita* var. *vestita*: A flowering branch; B abaxial view of leaf, flattened to expose the undersurface; C abaxial view of rolled leaf with undersurface not visible; D transverse section (mid-leaf) of revolute and flat leaf; E androecium with many staminodes. F–H *H. vestita* var. *thymifolia*: F flowering branch; G abaxial view of leaf; H side view of leaf. — Scale bars: A, F 10 mm; B, C, G, H 2 mm. — A–E F.M.Isaac 1095, F C.L.Wilson 574, G, H E.F.Constable 6383.

distal half to third; *on inner calyx lobes* outside usually dense, with mainly longer antrorse, ± appressed coarse simple hairs becoming shorter towards the glabrous membranous margins, inside with few very short appressed simple hairs aggregated in a patch below the apex. *Leaves* with intrapetiolar tuft of hairs often sparse, up to 0.6 mm long; *petioles* 0.2–0.6 mm long; *lamina* linear, linear-lanceolate, rarely oblong or ovate-oblong to almost orbicular, (2.1–) 3.5–8 (–11.4) × (0.5–) 0.6–1 (–3.4) mm, abruptly tapering into petiole or cordate, but often obscured on rolled leaves, acute or rounded with very short terminal mucro or end of central vein reflexed with short tuft of hairs or glabrescent, above convex or rarely with a slight depression along the central vein and pilose, puberulous or glabrescent, below with narrow central vein slightly more raised proximally, but rarely to the level of the revolute margins and then rarely touching midvein when leaves are rolled, both pilose to glabrescent, but exposed undersurface between them glabrous. *Flowers* single, sessile or subsessile, terminal on main and lateral branches or occasionally on short shoots below a terminal flower; *flower stalk* 0–4 mm long; *buds* ovoid; *primary bracts* oblong-elliptic, (1.6–) 2.5–4 (–5.2) × (0.7–) 1–1.4 (–1.6) mm, acute, flat and

leaf-like, with apex usually recurved, with central vein and revolute margins scarcely developed, pilose; additional bracts 3 or 4, of varying shapes and often not merging into cauline leaves. *Calyx lobes* unequal; *outer calyx lobes* lanceolate to ovate, (5.2–) 6–8 (–9.8) × (2.8–) 3–4.5 (–5.6) mm, usually longer than inner ones, acute, with distinct central ridge and often slightly recurved distal margins, outside hirsute to strigose, inside strigose to pubescent on distal half; *inner calyx lobes* obovate to oblong-obovate, (5.4–) 5.8–7.5 (–8.4) × (3.6–) 3.8–4.5 (–6.6) mm, obtuse to rounded or sometimes emarginate, without central ridge, outside dense but finer strigose, inside glabrous or with subterminal hairs. *Petals* broadly obovate, up to 12.5 mm long, usually bilobed. *Stamens* 22–43 and staminodes numerous, rarely few, surrounding the ovaries; *filaments* strap-like or rarely filiform above becoming broader and often connate towards the base, 0.8–2.2 mm long; *anthers* narrowly obloid, 1.2–2.6 mm long, scarcely tapering into filaments below, abruptly constricted above. *Pistils* 3; *ovaries* obovoid, each with 4–6 ovules, hirsute rarely pubescent; *style* attached to the apex of ovaries then curved outwards and spreading centrifugally, with stigmas borne at level with but distant from anthers. *Fruit* erect, hirsute with simple

hairs. *Seeds* obovoid to comma-shaped,  $2\text{--}2.2 \times 1.5\text{--}1.8$  mm, dark brown to black; aril attachment  $\pm$  lateral and fleshy but extended into a slightly lobed membranous cup reaching the apex of the seeds on one side and only about half of the other side.

*Diagnostic features.* The most obvious character of *H. vestita* is the usually scarcely raised central vein, which is only slightly broadened at the base of the lamina. The undersurface is usually more or less visible, unless the leaves are tightly rolled, but it can still be distinguished from similar species (e.g. *H. expansa*, *H. mediterranea* and *H. stichodonta*) by leaves with broad central vein, the absence of teeth between the vein and the revolute leaf margins, and by bracts below the flowers, which are never fully in-rolled. Specimens of *H. porcata* with sessile/subsessile flowers from the Central and Southern Tableland of New South Wales are often referred to *H. vestita*, but are usually recognizable by their broader central vein, which is more or less wedged-in between the revolute leaf margins.

*Hibbertia serpyllifolia* has a similar, or in some cases less well developed, central leaf vein, but is distinguished by its smaller flowers with fewer stamens, more or less arranged in groups around the ovaries, thread-like filaments and the absence of staminodes. The bracts of *H. vestita* var. *vestita*, which are more or less petiolate and/or flattened, are long, c. half to as long as the calyx, and usually appressed to the flowers, while in *H. serpyllifolia* at least the primary bracts are more or less spatulate with a short lamina, usually less than a third of the length of the calyx and spreading to recurved. They are also recurved in *H. vestita* var. *thymifolia*.

Some specimens of *H. humifusa* with short-stalked flowers resemble *H. vestita* superficially, but are easily distinguished by many multiangular fasciated hairs on most parts and stamens only on one side of the ovary.

*Typification.* Bentham (1863) refers to five collections by Beckler, Cunningham, Fraser, Leichhardt and Mueller and at least one of each of them is annotated by him (cf. type citation). All the cited specimens represent *H. vestita*, but, as Bentham quotes the species as being based on a name from the Cunningham herbarium, preference is given to the Cunningham collections. The specimen labelled “Moreton Bay, Sept. 1824” in K is also accompanied by a short description of the plant by the collector. Accordingly, the lower central branch with a flower on that sheet is here selected as the lectotype. This sheet and three others in K were annotated by Bentham in red pencil as “*Hibb. vestita* A.C.” Among them there are two specimens, *Fraser 93* and *Fraser 94*, both from Stradbroke Island, and one by *F.Mueller*, from the Glasshouse Mountains. The sheet of *Fraser 93* includes a specimen of *A.Cunningham 53*, but without date or locality. Since Cunningham visited the Moreton Bay with Fraser in 1828 (Curry et al. 2002) one might assume it to be a later collection. A sheet of *A.Cunningham 53* (MEL35989) is, however, inscribed

“Moreton Bay, 1824” on the collector’s label. Both these collections of Cunningham’s no 53 are treated here as syntypes, similar to the two Fraser specimens, which are both from the same expedition. Two Cunningham collections at BM, from “Moreton Bay, 1825” are treated as possible isolectotypes, as the date probably reflects when the specimens were deposited in that herbarium and do not represent a later collection. No specimens by Cunningham of this species from his later expeditions to the area in 1828 and 1829 (Curry et al. 2002) are known.

***Hibbertia vestita* var. *vestita*.**

Benth., Fl. Austral. 1: 31 (1863).

*Hibbertia vestita* var. *genuina* Domin, Biblioth. Bot. 89: 423 [977] (1928), *nom. inval.*

Shrublets decumbent, spreading, with wiry branches straight and erect-spreading ends. *Leaves* linear to rarely oblong, (2.2–) 3.5–8 (–11.4)  $\times$  (0.5–) 0.6–1 (–1.4) mm, straight or apex only slightly recurved, with varying long and short antrose hairs persistent or often wearing off, with broad pustules rarely raised. *Flowering*: Mainly September–December, but also some records throughout the year. **Fig. 4A–D.**

*Distribution and ecology.* Grows in sandy soil on coastal dunes, often associated with rock outcrops of various substrates (e.g. sandstone, rhyolite, shale), in coastal heath or shrub vegetation in open woodland in the foothills east of the Great Divide in south-eastern Queensland (WB, MO) and north-eastern New South Wales (NC). Records of the species from “coast north of Botany Bay” (Pellow et al. 2009) probably refer to specimens of *H. stichodonta*.

*Conservation status.* Not considered at risk. Widespread and locally common.

*Variation.* The shape of the leaves largely depends on the degree of rolling of the leaf margins, presumably under adverse conditions. This might obscure the identity of the species, which is usually easily recognised by its narrow recessed central vein exposing the leaf undersurface on both sides. It is therefore useful to examine also the flat bracts (including additional bracts), which, in contrast to those of the very similar *H. stichodonta*, clearly exhibit the narrow central vein and exposed undersurfaces. However, *C.Burgess CBG28111* from Barcoongere State Forest has very fleshy leaves with a somewhat broader central vein and rigid-woody stems. Viewed on its own this might seem significantly different, but compared to a range found in other specimens from northern New South Wales (e.g. *R.D.Hoogland 11787*) shows that this is merely an extreme form.

The size of the leaves also varies considerably from well into the range of var. *thymifolia* to twice that size on, for instance, *H.M.R.Rupp NSW85826* and *R.D.Hoogland 11787*, but these specimens have straight branches and leaves. Other plants have slightly curved or twisted branches (e.g. *M.Harris NE13988A*), and are reminiscent to but distinguished from var. *thymifolia* by

their leaves and bracts not being alike or recurved (cf. Fig. 4G, H). Although leaves are usually not densely hairy, they are also rarely almost glabrous as in *B. Lebler* & *P. Baxter BRI84991A*.

*Selection of specimens examined (c. 170 seen)*

QUEENSLAND: *L.G. Adams 3478*, Wide Bay Military Training Area, 16.ix.1980 (BRI, CANB, NSW); *E.W. Bick BRI10906*, Redcliffe, x.1911 (BRI); *S.T. Blake 2676*, Petrie, 18 miles [28.8 km] N Brisbane, ix.1931 (BRI, K); *S.T. Blake 3042*, Lawnton, 17 miles [28.2 km] N Brisbane, 18.xii.1931 (BRI); *N.T. Burbidge 3636*, Stradbroke Island, 27.v.1951 (CANB); *H. Dillewaard 89 & M. Olson*, Beerwah State Forest, 26.ix.1980 (BRI); *D.A. Goy 44*, Stradbroke Island, near Brown Lake, 1.ix.1935 (BRI); *D.A. Goy BRI10890*, Cruickneck, Glasshouse Mts, 24.v.1935 (BRI); *D.A. Goy BRI10912*, Lookout Point, Stradbroke Island, 21.iv.1935 (BRI); *C.E. Hubbard 3416*, between Palmswood and Landsborough, 21.vii.1930 (BRI, K); *C.E. Hubbard 3694*, Oxenford, S Brisbane, 17.viii.1930 (BRI); *C.E. Hubbard 3780*, hills near Plunkett, 31.viii.1930 (BRI, K); *C.E. Hubbard 4331*, Broadwater near Brisbane, 5.x.1930 (BRI); *F.H. Kenny BRI10888*, Caloundra, viii.1908 (BRI); *B. Lebler & Baxter s.n.*, Sunshine Beach near Noosa Heads, 21.v.1968 (BRI); *W.J. McDonald BRI375462*, Toorbul Point, 13.xi.1975 (BRI); *N. Michael BRI 10909*, Woodridge, 17.ix.1931 (BRI); *P.R. Sharpe 759B*, Griffith University site, Kassels Road, Mt Gravatt, 20.ix.1973 (BRI); *P.R. Sharpe 1279*, 2 km N Coolum Beach, 8.ix.1975 (BRI); *P.R. Sharpe 2994*, Mt Coolum, 17.ix.1981 (BRI); *P.R. Sharpe 3001 & G. Batianoff*, Mt Coolum, 18.ix.1981 (BRI); *A.V. Slee 3417 & B.J. Lepschi*, Mt Beerwah, 21.x.1993 (CANB); *T. Stanley 32 & J. Clarkson*, Saddleback Mt in Glasshouse Mountains 7.ix.1974 (BRI); *C.T. White 6162*, Rochedale Road near Brisbane, 24.viii.1929 (BRI); *C.T. White 6709*, Amity Point, Stradbroke Island, 18.iv.1930 (BRI); *C.T. White 9199*, Southport, 1.ix.1933 (BRI); *C.T. White BRI10891*, Candle Mt, v.1918 (BRI); *C.L. Wilson 688*, slopes of Mt Gun Gun, 29.v.1957 (BRI).

NEW SOUTH WALES: *B. Auld 120474*, Angourie Bay, 5.x.1984 (NSW); *R. Bates 12849*, Yuragin National Park, 23.xi.1987 (AD); *R. Bates 12877*, Coffs Harbour Airport, 23.xi.1987 (AD); *R. Bates s.n.*, Myall Lakes, x.1987 (AD); *J.L. Boorman s.n.*, Port Stephens, ix.1911 (AD, BRI, NSW); *C. Burgess 219*, Moonee, 23.viii.1973 (CANB, NSW); *C. Burgess CBG18325B*, Coffs Harbour, 26.x.1966 (CANB, MEL119831); *J.B. Cleland AD98142014*, Byron Bay, 30.ix.1912 (AD); *B.J. Conn 3477*, Jerusalem Creek Track, Bundjalong National Park, 20.ii.1990 (AD, NSW); *E.F. Constable NSW41749*, c. 6 miles [9.6 km] N Corindi, 2.xi.1956 (NSW); *L.M. Copeland 1779*, Candole Forest, – Minnie Waters roads junction, 1999 (NSW); *M. Harris NE13988a*, Sawtell, iii.1958 (NE); *P. Hinds 3094*, Woolgoolga headland, 31.iii.1982 (NSW); *R.D. Hoogland 11787*, along Macauley Lead, c. 10 miles [16 km] SSW Evans Head, 11.x.1970 (BRI, CANB, MEL, NSW); *L.A.S. Johnson NSW85816*, 2 miles [3.2 km] W Karuah, 12.x.1953 (CANB, NSW); *R. Johnstone 2451 & A.E. Orme*, 0.3 km S Arthurs Gap, 24.xi.2008 (NSW); *B. Lebler BRI63034*, Yamba Point on Clarence River Mouth, 23.viii.1966 (BRI); *J.H. Maiden & J.L. Boorman NSW85803*, Coffs Harbour to Grafton, xi.1903 (NSW); *D.J. McGillivray 2090*, 4 miles [6.4 km] S Yamba, 30.vi.1966 (NSW); *A. Meebold 3494*, Coffs Harbour, iii.1929 (AD); *A. Richards CBG17870*, 5.4 miles [8.6 km] E Ebor on Ebor-Grafton road, 15.vii.1966 (CANB); *H.M.R. Rupp MEL35985*, Copmanshurst, x.1911 (MEL); *H.M.R. Rupp NSW85826*, Byron Bay, 12.viii.1915 (NSW); *K. Thurtell & R. Coveny 3837*, 21.6 km N Macksville, 8.xii.1971 (CANB); *H.R. Toelken 7999*, 0.5 km N turnoff to Kingala, on

Glenreagh–Grafton road, 23.x.1989 (AD, NSW); *H.R. Toelken 8476*, S. Red Rock, 9.xi.1993 (AD, NSW, BRI).

***Hibbertia vestita* var. *thymifolia* Benth.**

Fl. Austral. 1: 32 (1863); F. Muell., Syst. Cens. 1: 2 (1882); F.M. Bailey, Syn. Queensland Fl.: 4 (1883); C. Moore, Cens. Pl. New South Wales: 1 (1884); F. Muell., Second Syst. Cens. 1: 2 (1889); Gilg, Nat. Pflanzenfam. III(6): 117 (1893); C. Moore & Betche, Handb. Fl. New South Wales: 10 (1893); F.M. Bailey, Queensland Fl. 1: 14 (1899); F.M. Bailey, Compr. Catal. Queensland Pl.: 13 (1913); Domin, Biblioth. Bot. 89: 422 [976] (1928). — **Type:** Queensland, near Moreton Bay, *A. Cunningham s.n.*, s.d. (holo.: K; iso.: BM, MEL).

*Hibbertia vestita* auctt. non A. Cunn. ex Benth: N.C.W. Beadle, Student's Fl. N.E. New South Wales 3: 256 (1976), p.p.; Stanley in Stanley & E.M. Ross, Fl. S.E. Queensland 1: 187 (1982), p.p.; G.J. Harden & J. Everett in G.J. Harden, Fl. New South Wales 1: 300 (1990), p.p.

Shrublets prostrate, with wiry branches ± bent or twisted, mat-forming. *Leaves* oval to almost orbiculate, (2–) 3–4.5 (–5.2) × (1.2–) 2.2–3 (–3.4) mm, ± recurved lengthwise, with uniformly short, persistent antrorse-spreading hairs each with small pustules. *Flowering:* mainly October–December but also into April. **Fig. 4F–H.**

*Distribution and ecology.* Growing in exposed, often windshorn grassland on headlands with *Themeda triandra*, *Banksia integrifolia*, *Acacia longifolia* subsp. *sophorae*, *Zieria prostrata* and *Hibbertia vestita* (*R. Johnstone 2161 & A.E. Orme*), rare in southern Queensland (WB, MO) and northern New South Wales (NC).

*Conservation status.* “Locally abundant” in Moonee Beach State Conservation Area (*R. Johnstone 2161 & A.E. Orme*), but no recent specimens from Queensland have been seen.

*Diagnostic features.* *Hibbertia vestita* var. *thymifolia* is distinguished from the very similar var. *vestita*, with which it often grows sympatrically (e.g. *C. Burgess CBG18325A & B*), by a prostrate and usually mat-forming habit with most branches twisted or curved (not ± straight as in var. *vestita*), the leaf lamina being only (1–) 2–3.5 times longer than broad and recurved for the whole length (straight and reflexed at petiole in var. *vestita*), and by a recurved and leaf-like primary bract not clasping the flowers. Other characteristics by which *H. vestita* var. *thymifolia* differs, but which sometimes show some overlap with those of var. *vestita*, include hairs on the proximal adaxial leaf surface that are denser just above the petiole, cauline leaves with the margin never strongly revolute, so that the undersurface is always at least partly visible (commonly strongly revolute in var. *vestita*), the outer calyx lobes about as long as the inner ones, and usually rounded or rarely obtuse (usually outermost longer and acute to acuminate in var. *vestita*).

*Variation.* Plants recorded from northern New South Wales (e.g. *J.L.Boorman* NSW85819, *F.Robbins* sub *A.C.Beauglehole* 8672) have even narrower leaves and the outermost calyx lobes longer than the inner ones similar to those of var. *vestita*, but as the branches are twisted and leaves and bracts are recurved they are included in var. *thymifolia*.

Several sheets of the mixed collection (*C.Burgess* CBG18325A & B) show always two distinct varieties, so that the characteristics of *H. vestita* var. *thymifolia* seem to be neither determined by its habitat nor are the two varieties separated by different habits. Significant in this respect is that a collection from a garden near Toowoomba (*L.A.Boyce* 2) far away from sea spray on coastal headlands, still retained its broad recurved leaves. The specimen also still displays twisted branches, although the plant is described as small shrub 12–15 cm high and 20–40 cm across and not mat-forming, as is often recorded for coastal plants.

Leaves vary greatly in width and in density of the vestiture as, for instance *K.Grieves* NSW85817 is practically glabrous except for intrapetiolar tufts of hair. Although the leaves of *H. vestita* var. *thymifolia* are generally broader than those of the typical variety, some overlap in this character has been observed. Some leaves, for instance *B.Lebler* BRI63034 (Clarence River Mouth), may display a degree of recurvature, but the laminas and branches are generally straight in this taxon. Erect bracts, which more or less clasp the flowers are another important distinguishing feature of this taxon.

Despite considerable morphological similarities and a marginally overlapping range of most of the distinguishing characters, all specimens examined could be placed in either variety. Although the varieties seem to occur sympatrically no convincing evidence of hybridization between the two has been observed.

The occurrence of var. *thymifolia* in Queensland has not been confirmed by recent collections. *R.Bates* 16586, collected from near Stanthorpe represents a disjunct locality from an unlikely (non-coastal) habitat for this species.

#### *Specimens examined*

QUEENSLAND: *R.Bates* 16586, ?Stanthorpe, 31.xii.1988 (AD); *L.A.Boyce* 2, 6 Range Street, Toowoomba, 9.xi.1979 (BRI cult.); *R.L.Higgins* BRI11150, Noosa, iii.1919 (BRI).

NEW SOUTH WALES: *R.Bates* 12840, Coffs Harbour headlands, 23.xi.1987 (AD); *D.F.Blaxell* 144, Bare Point, N Woolie, 8.ii.1969 (NSW); *J.L.Boorman* NSW85819, Coffs Harbour, v.1909 (NSW); *J.L.Boorman* NSW85820, Coffs Harbour, vi.1911 (NSW); *C.Burgess* CBG18325A, Coffs Harbour, 26.x.1966 (CANB, MEL119831); *E.F.Constable* 6382, Green Bluff, Woolgoolga, 20.xi.1965 (K, NSW); *R.Crawford* CBG43390, 0.8 km N Coffs Harbour, i.1969 (CANB); *K.Grieves* NSW85817, Diamond Head, S Woolgoolga, 26.ii.1967 (NSW); *R.Johnstone* 2161 & *A.E.Orme*, Moonee Beach State Conservation Area, 5.xi.2007 (NSW); *M.Kennedy* 636 & *B.Rann*, Dammerels Head, S Emerald Bay, 17.x.1993 (NSW); *F.Robbins* sub *A.C.Beauglehole* 8672, Angourie Point near Yamba, 1945 (MEL); *T. & J.Whaite* 3463, S.Woolgoolga, 9.i.1971 (NSW);

*C.L.Wilson* 574, 4 miles (6.4 km) N Woolgoolga, 15.iv.1957 (BRI, NSW).

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