

## Studies in Euphorbiaceae *s.lat.* 7

### *Shonia* R.J.F.Hend. & Halford (*Ricinocarpeae*, *Ricinocarpinae*), a new Australian endemic genus

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#### Summary

Halford, D.A. & Henderson, R.J.F. (2005). Studies in Euphorbiaceae *s.lat.* 7. *Shonia* R.J.F.Hend. & Halford (*Ricinocarpeae*, *Ricinocarpinae*), a new Australian endemic genus. *Austrobaileya* 7(1): 215–228. The new, Australian endemic genus *Shonia* R.J.F.Hend. & Halford. is described and compared with *Beyeria* Miq. and *Ricinocarpos* Desf., to which it is closely allied, and *Bertya* Planch. Four species are recognised and a key is provided for their identification. Two species, *Shonia carinata* Halford & R.J.F.Hend. and *S. territorialis* Halford & R.J.F.Hend., are described as new, and the new combinations *S. tristigma* (F.Muell.) Halford & R.J.F.Hend. and *S. bickertonensis* (Specht) Halford & R.J.F.Hend., based on *Beyeria tristigma* F.Muell. and *Beyeria bickertonensis* Specht respectively, are made for the other two. Two new subspecies are recognised in *S. tristigma*, namely *S. tristigma* subsp. *parvifolia* Halford & R.J.F.Hend. and *S. tristigma* subsp. *borealis* Halford & R.J.F.Hend. All species are described, maps provided for their distribution, and information on their phenology and the habitat of their occurrence is given. The new species are illustrated and a lectotype is chosen for *Beyeria tristigma* F.Muell.

Key Words: Euphorbiaceae, *Ricinocarpeae*, *Ricinocarpinae*, *Shonia*, *Shonia bickertonensis*, *Shonia carinata*, *Shonia territorialis*, *Shonia tristigma*, *Shonia tristigma* subsp. *borealis*, *Shonia tristigma* subsp. *parvifolia*, *Beyeria* sect. *Oxygyne*, Australian flora, taxonomy

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#### Introduction

Following a review of the attributes of taxa included in the Australian endemic genus *Beyeria* Miq., it became clear that the taxon Ferdinand Mueller called *B. tristigma* in 1868, and included as the only species in his *Beyeria* sect. *Oxygyne*, differs significantly in attributes of its inflorescence and female flowers from those characteristic of *B. viscosa* Miq., which includes the type of the genus name *Beyeria* Miq. *Beyeria tristigma* agrees more with *Ricinocarpos* Desf. in respect to its female floral attributes than to *Beyeria* while still retaining attributes in common with the latter genus. Segregation of this taxon as a distinct genus seems warranted because of these fundamental differences, and the existence of other taxa possessing floral attributes similar to those of *B. tristigma*. This idea of segregation is not entirely new. Benthham (1873: 68) was clearly perplexed as to where to place *B. tristigma* for he noted “the racemose male flowers, the petals

much longer than the calyx, and the divided stigma or style bring this species near to *Ricinocarpos*, but the stamens are entirely those of *Beyeria*, and the stigmatic lobes are closely recurved as in that genus, to which on the whole it appears to be the nearest related”. However; Benthham, like Mueller (1868) before him, considered that it was sufficiently distinct from the other *Beyeria* species then recognised to accord it sole membership of a distinct section of this genus that Mueller had named *Beyeria* sect. *Oxygyne*. Benthham characterised this section as having “Anthers of *Beyeriopsis*”, which he had previously accepted (*op. cit.*: 63, 66) as *Beyeria* sect. *Beyeriopsis*, the “stigma deeply divided into 3 narrow lobes”, which he later described as flat and recurved, and “male flowers in a loose raceme”.

In his account of *Beyeria*, Gruning (1913) recognised the uniqueness of *B. tristigma* and accepted it as a “transition form” from *Ricinocarpos* to *Beyeria* but persisted in including it in *Beyeria*.

From their overall morphology as well as their porate pollen grains with a “crotonoid” pattern of polygonally arranged sexinous processes, *Beyeria tristigma* and its allies are clearly related to *Beyeria* and to *Ricinocarpos* and thus belong with them in Mueller Argovensis’s tribe *Ricinocarpeae*, and within that to subtribe *Ricinocarpinae* Webster (Webster 1994). We have come to the conclusion that these species would be as out of place in *Ricinocarpos*, as they are in *Beyeria*, and that they appear to occupy a morphological position between those two genera. We have, therefore, established the genus *Shonia* to accommodate them. The structure of their inflorescences and flowers provide the main characters to distinguish them from *Beyeria* and *Ricinocarpos*.

*Shonia* differs from *Beyeria* by the following combination of characters: inflorescences racemose with usually one or two female flowers basal on the axis with few to

several male flowers distal to them, the female flowers with styles with three horizontally spreading and entire stigmatic lobes sometimes becoming decurved or recurved with age. *Shonia* differs from *Ricinocarpos* by the following combination of characters: male flowers with anthers terminal and transverse on the filaments, an androecium on a flat or slightly convex receptacle, and female flowers with entire stigmatic lobes.

Recent molecular studies of the uniovulate Euphorbiaceae (Wurdack *et al.* 2005) suggest a close relationship between *Beyeria*, *Ricinocarpos* and *Bertya* Planch. (tribe *Ricinocarpeae*, subtribe *Bertyinae* Müll.Arg.), another endemic Australian Euphorbiaceae genus. For a complete revision of *Bertya* see Halford and Henderson (2002). A comparison of important diagnostic differences between *Bertya*, *Beyeria*, *Ricinocarpos* and *Shonia* is provided in **Table 1**.

#### Key to Australian genera of Euphorbiaceae tribe *Ricinocarpeae* based on female flowers

1. Stigma entire, dilated and forming a cap over the top of the ovary, discoid or rarely with 2 appressed entire limbs or shallowly 3-lobulate ..... **Beyeria**  
 Stigma with 3 horizontally spreading and divergent limbs sometimes becoming decurved or recurved with age; limbs entire or 2- to 5-lobed ..... 2
2. Stigmatic limbs entire ..... **Shonia**  
 Stigmatic limbs divided ..... 3
3. Disc present ..... **Ricinocarpos**  
 Disc absent ..... **Bertya**

#### Key to Australian genera of Euphorbiaceae tribe *Ricinocarpeae* based on male flowers

1. Flowers with staminal filaments erect to spreading from a central cylindrical column formed by fusion of the bases of filaments ..... 2  
 Flowers with staminal filaments erect to spreading on a flat or slightly convex to hemispherical receptacle, with filaments free ..... 3
2. Petals conspicuous, or if absent then calyx spreading at anthesis ..... **Ricinocarpos**  
 Petals absent or rudimentary, calyx strongly recurved at anthesis ..... **Bertya**
3. Flowers in racemes ..... **Shonia**  
 Flowers in few flowered fascicles or cymose clusters, or solitary ..... **Beyeria**

**Table 1. Morphological comparison of *Bertya*, *Beyeria*, *Ricinocarpos* and *Shonia***

| Character                                   | <i>Bertya</i>  | <i>Beyeria</i>   | <i>Ricinocarpos</i>   | <i>Shonia</i>  |
|---|--|--|---|--|
| arrangement of flowers                      | paired or in umbelliform clusters, or solitary                       | in fascicles or cymose clusters, or solitary                                     | in umbelliform clusters, or racemes, or solitary                              | in racemes   |
| male flowers:                               |  |  |   |  |
| petals                                      | absent or rudimentary  | present or absent  | present or absent   | present  |
| disc  | absent   | present or absent  | present   | present  |
| stamens                                     | spreading from central column formed by fusion of bases of filaments | erect on flat to hemispherical receptacle  | erect to spreading from central column formed by fusion of bases of filaments | erect on flat or slightly convex receptacle                |
| position of anthers in relation to filament | distal and longitudinal  | terminal and transverse or distal and longitudinal                               | distal and longitudinal   | terminal and transverse                                    |
| female flowers:                             |  |  |   |  |
| petals                                      | absent or rudimentary  | present or absent  | present or rarely absent  | present  |
| disc  | absent   | present or absent  | present   | present  |
| stigmatic limbs: degree of division         | deeply 2- to several-lobed   | elobate and calyptriform or discoid, or rarely bipartite or shallowly 3-lobulate | deeply 2(rarely 3 to 5)-lobed   | entire   |
| stigmatic limbs: orientation                | spreading to ascending rarely recurved distally                      | appressed  | spreading and divergent   | spreading sometimes becoming decurved or recurved with age |

## Materials and methods

The present study involved examination of herbarium specimens by the authors together with field investigations by the second author from 1988 to 1992. Altogether, approximately 80 specimens have been examined and annotated, comprising collections from the following herbaria: BRI, CANB, DNA, K, MEL. Acronyms used in the text to indicate herbaria holding particular specimens follow Holmgren *et al.* (1990). All specimens cited have been seen unless indicated as *n.v.* (*non visus*).

Descriptions of taxa were made from dried herbarium specimens, material preserved in 70% ethanol and glycerol, or dried material reconstituted by placing in boiling water for a few minutes. Colour of fresh vegetative and floral parts are either from herbarium label notes or from photographs taken by the second author during field studies. Plant size, habit, flowering and fruiting times and habitat data were obtained from herbarium labels. The distribution maps were produced with MapInfo Version 3 and were based on herbarium specimen locality data.

## Taxonomy

**Shonia** R.J.F.Hend. & Halford, gen. nov. affinis *Beyeriae* Miq. et *Ricinocarpi* Desf. Ab illa floribus in racemis apicalibus vel apparenter axillaribus dispositis floribus plerumque ambobus maribus femineisque in quoque racemo (non floribus solitariis vel fascicularibus vel cymosis in foliorum axillis), petalis bene evolutis plerumque quam sepala multo longioribus raro aequantibus (non petalis carentibus vel petalis sepala brevioribus), stylorum ramis stigmaticis 3 e columna brevi orientibus, linearibus integris dorsi-ventraliter complanatis (non stylis peltatis et inverse cupulatis vel inverse patelliformibus marginibus integris vel laceratis) differt. Ab hoc stylorum ramis stigmaticis integris dorsi-ventraliter complanatis (non distaliter bifidis vel raro ad 5-lobatis lobis teretibus vel dorsi-ventraliter complanatis sed abaxialiter sulcatis), staminalibus filamentis e basi liberis (non proximaliter diverse connatis) differt. **Typus:** *Shonia tristigma* (F.Muell.) Halford & R.J.F.Hend. (= *Beyeria tristigma* F.Muell.)

*Beyeria* sect. *Oxygyne* F.Muell., *Fragm.* 6: 1812 (1868), *nom. inval.*, F.Muell. ex Benth., *Fl. Australiensis* 6: 68 (1873). **Type:** *Beyeria tristigma* F.Muell. (= *Shonia tristigma* (F.Muell.) Halford & R.J.F.Hend.).

Monoecious or rarely dioecious shrubs or rarely small trees; stems erect or ascending, branching, the branches leafy throughout. Leaves spirally alternate, exstipulate, shortly petiolate, persistent, with laminae glabrous and smooth adaxially, stellate pubescent abaxially except for the glabrous surface of the raised midvein; secondary veins obscure; basi-laminar glands absent. Inflorescences racemose or rarely paniculate, terminal on stems or on axillary branches sometimes reduced so inflorescences

appear axillary, with one or two female flowers basal on the axis and with few to several male flowers distal to them, or rarely with all flowers male, bracteate. Flowers pedicellate with pedicels stouter in female flowers than those of male flowers; calyx deeply 5- or rarely 4-lobed, with margins of lobes entire; petals present; disc present. Male flowers with a disc of discrete alternipetalous glands or a continuous glandular ring; stamens 10–30, free and erect on a flat or slightly convex receptacle; anthers dorsifixed, extrorse, of two separate obloid, parallel but contiguous locules each transverse on a slightly swollen connective at the apex of filament, dehiscing by longitudinal slits; pistillodes absent. Female flowers with calyx lobes persistent and appressed to ovary, with a disc of a continuous glandular ring; ovary 3-locular with one pendant ovule in each locule; style short or  $\pm$  obsolete; stigma with 3 horizontally spreading and divergent limbs, sometimes becoming decurved or recurved with age; limbs entire,  $\pm$  dorsi-ventrally flattened, red, glabrous, persistent. Fruits capsular, trilobate, smooth, glabrous, separating septicidally into three 2-valved cocci leaving a persistent columella. Seeds obloid, smooth, carunculate; caruncle waxy-fleshy; endosperm copious; cotyledons narrower than the radicle.

The genus is endemic in Australia and contains four species distributed in tropical north eastern Northern Territory and central and north eastern Queensland.

**Etymology:** We have named this genus *Shonia* in memory of the second author's late wife, Enid Lynette 'Shoni' Henderson, accidentally killed when their car crashed on a holiday/fieldtrip in the Northern Territory in 1991 looking for 'Stenolobeae' taxa. The second author wishes to acknowledge with gratitude her support for him and his botanical work over more than 30 years. The name should be pronounced "SHOWN-ee-a".

## Key to species of *Shonia*

1. Calyx lobes prominently keeled abaxially ..... **4. *S. carinata***  
Calyx lobes evenly rounded abaxially, not prominently keeled ..... 2
2. Leaf laminae narrow-elliptic or narrow-oblongate to narrow-obovate, with  
a length/width ratio less than 6:1 ..... **1. *S. tristigma***  
Leaf laminae narrow-lanceolate or linear, with a length/width ratio of 6:1 or  
greater ..... 3

3. Leaf laminae 3–10 mm wide, with a length/width ratio of 15:1 or less . . . . . **2. *S. territorialis***  
 Leaf laminae less than 3 mm wide, with a length/width ratio greater than 15:1  
 . . . . . **3. *S. bickertonensis***

**Note:** A specimen apparently of this genus collected from Blackdown, WNW of Chillagoe in north Queensland, in 1997 (*Ford 1883* (BRI)) is from a shrub to 3 m tall which has leaves with laminae linear and less than 2 mm wide. Also, these leaves are obtuse and ultimately rounded at the apex. As the material is incomplete, lacking mature flowers and fruit, it is not possible to place it in any of the above species unequivocally. Further investigation may find it to represent yet another species of *Shonia* or perhaps another subspecies of *S. tristigma*.

- 1. *Shonia tristigma*** (F.Muell.) Halford & R.J.F.Hend., **comb. nov.**; *Beyeria tristigma* F.Muell., *Fragm.* 6:181 (1868). **Type:** Queensland. NORTH KENNEDY DISTRICT: Hinchinbrook Island, 8 November 1867, [*J. Dallachy s.n.*] (lecto [here chosen]: MEL 114230; isolecto: K).

Monoecious, erect to spreading shrubs or rarely small trees to 4 m high, thinly viscid on most parts; bark shallowly fissured, reddish brown. Branchlets somewhat angular, becoming  $\pm$  terete with age, glabrous. Leaves with petioles 1–2 mm long, flattened adaxially, rounded abaxially, glabrous and smooth; laminae narrow-elliptic, narrow-oblongate to narrow-obovate, 10–60 mm long, 2–15 mm wide, with a length/width ratio of 2–8:1, cuneate to attenuate at the base, rounded to obtuse or acute at the apex and recurved along the margins; adaxial surface green, with midvein impressed; abaxial surface white, with stellate hairs soft and up to *c.* 0.2 mm across, and with the raised midvein rounded in cross section. Inflorescences racemose, usually of one or two female flowers basal on the axis with 5–12 male flowers distal to them; primary axis 13–40 mm long, glabrous, smooth; bracts triangular, *c.* 0.5 mm long, glabrous, caducous. Flowers with calyx 5-lobed, of unknown colour when fresh, glabrous; tube *c.* 0.1 mm long; lobes  $\pm$  spreading; petals 5, of unknown colour when fresh, glabrous except for a tuft of hairs near the base on the adaxial surface. Male flowers with pedicels 5–25 mm long, angular, glabrous; calyx lobes oblong, 0.8–

1 mm long, 0.6–0.7 mm wide, obtuse to rounded at the apex; petals broadly ovate or suborbicular, 1.4–1.6 mm long, 1.3–1.5 mm wide, rounded to obtuse at the apex, recurved to revolute distally; disc a  $\pm$  continuous glandular ring, fleshy, lobed, glabrous; receptacle convex, 0.8–1 mm across, minutely hairy; stamens 20–25; filaments 0.3–0.5 mm long,  $\pm$  glabrous; anthers 0.3–0.4 mm long. Female flowers with pedicels 10–30 mm long, slender and circular in transverse section proximally, becoming stouter and 5-quetrous distally, glabrous or densely pubescent distally; calyx lobes oblong, 1–1.2 mm long, 0.7–0.8 mm wide, obtuse to rounded at the apex; petals suborbicular, *c.* 1.2 mm long and 1.2 mm wide, rounded at the apex, recurved distally; disc membranous, entire; ovary subglobose, trilobate, 1.3–1.5 mm across,  $\pm$  smooth, glabrous; style *c.* 0.2 mm long; stigmatic limbs 1–2 mm long. Fruits broadly ellipsoid or subglobose, 5.5–7 mm long, 5–7 mm across. Seeds 4.2–5.5 mm long (including caruncle), 3–3.2 mm wide, 2.5–2.7 mm across; testa smooth, dark brown; caruncle  $\pm$  hemispherical, *c.* 0.5 mm long and 1.2 mm across,  $\pm$  smooth, creamy-white.

**Distribution and habitat:** *Shonia tristigma* is confined to the east coast of north-eastern Queensland where it occurs in disjunct populations from Cape York southwards to Hinchinbrook Island, a little north of Ingham.

**Typification:** One collection is cited in the protologue of *Beyeria tristigma*, namely “In insula Hinchinbrook-Island prope Rockingham’s Bay, Dallachy”. Two apparently relevant sheets from this locality have been located in material on loan to BRI from MEL and K. The sheet in MEL [114230] is without information on the collector but is dated as collected on 8 November 1867, while the sheet in K has information on the collector but is without the date of collection. We considered both to be part of the original material and hence the MEL sheet is here selected as lectotype of Mueller’s name.

**Notes:** As circumscribed here, *S. tristigma* exhibits some variation in leaf shape and size as well as habitat differences. This variation is here

formally recognised by the establishment of three subspecies within this species.

### Key to the subspecies of *Shonia tristigma*

1. Leaf laminae narrow-elliptic, 30–60 mm long, 10–15 mm wide ..... **1a. *S. tristigma* subsp. *tristigma***  
 Leaf laminae narrow-oblongate to narrow-obovate, 10–40 mm long, 2–10 mm wide ..... **2**
2. Shrubs to 0.5 m high; leaf laminae less than 20 mm long, 2–5 mm wide ..... **1c. *S. tristigma* subsp. *parvifolia***  
 Shrubs (0.2–) 0.5–4 m high; leaf laminae 20 mm or more long, mostly more than 5 mm wide ..... **1b. *S. tristigma* subsp. *borealis***

#### **1a. *Shonia tristigma* (F.Muell.) Halford & R.J.F.Hend. subsp. *tristigma***

Slender shrubs to 2.5 m high. Leaf laminae narrow-elliptic, 30–60 mm long, 10–15 mm wide.

**Additional specimens examined:** **Queensland.** NORTH KENNEDY DISTRICT: Zoe Bay, Hinchinbrook Island, Aug 1951, *Blake 18859* (BRI); Mt Bowen, Hinchinbrook Island, Jun 1991, *Cumming 11222* (BRI); Mt Diamantina, Hinchinbrook Island, Jul 1991, *Cumming 11279* (BRI); Little Ramsay Bay, Hinchinbrook Island, Aug 1975, *Sharpe 1593* (BRI); *loc. cit.*, Aug 1975, *Sharpe 1666* (BRI); northern end of Little Ramsay Bay, Aug 1975, *Sharpe 1682* (BRI); Zoe Bay, Hinchinbrook Island, Oct 1982, *Tracey 15491* (BRI, CANB).

**Distribution and habitat:** *Shonia tristigma* subsp. *tristigma* is endemic to Hinchinbrook Island. It is recorded as growing on steep south or south-east facing rocky slopes in heathland or *Banksia plagiocarpa* and *Allocasuarina littoralis* closed shrubland communities, on steep north facing rocky slopes in rainforest and on plains of alluvial soils in *Corymbia tessellaris* woodland. **Map 1.**

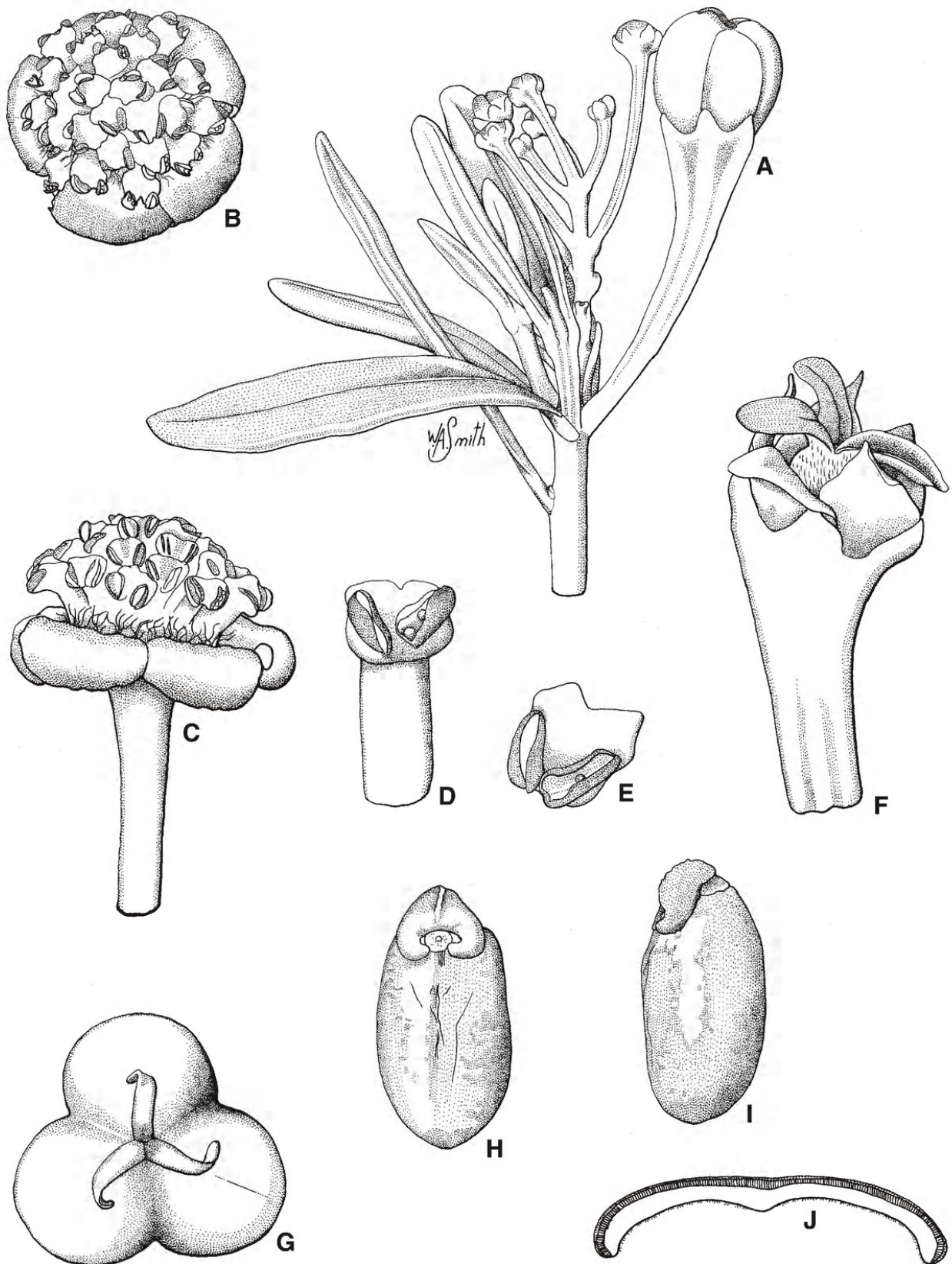
**Phenology:** Flowers have been collected in July, August and October, fruits in July and August.

**1b. *Shonia tristigma* subsp. *borealis* Halford & R.J.F.Hend., subsp. nov.** folii lamina angusta-oblongata usque angusta-obovata, 20–40 mm longa et (3–) 5–10 mm lata ab subspeciebus aliis *S. tristigmatidis* differt. **Typus:** Queensland. COOK DISTRICT: Tozers Gap, 30 June 1994, *P.I. Forster PIF15396* (holo: BRI; iso: K, MEL, NSW, QRS *distribuendi*).

Erect to spreading shrubs (0.2–) 0.5–4 m high or rarely a small tree. Leaf laminae narrow-oblongate to narrow-obovate, 20–40 mm long and (3–) 5–10 mm wide. **Fig. 1.**

**Selected specimens (from 36 examined):** **Queensland.** COOK DISTRICT: slopes of Mt Fraser, Apr 1932, *Brass 2430* (BRI); Newcastle Bay, 2.5 miles [c. 4 km] S of Somerset, May 1948, *Brass 18772* (BRI, CANB, K); Brown's Creek, Pascoe River, Jun 1948, *Brass 19170* (BRI, CANB, K); Tozer Range, Jun 1948, *Brass 19351* (BRI, CANB, K); beach dune S of Cape Bedford, Jul 1980, *Clarkson 3292* (BRI, CANB); between McIvor River and Cape Flattery, Nov 1972, *Dockrill 616* (BRI); c. 1 km upstream from Brown Creek crossing, Iron Range road, Apr 1988, *Forster PIF4161 & Liddle* (BRI); 16 km E of Maloney's Springs, Bromley station, Jul 1991, *Forster PIF8842* (BRI); Mt Tozer, Iron Range N.P., Jul 1994, *Forster PIF15431* (BRI); Silver Plains, 4 km WNW of Colmer Point, Jun 1999, *Forster PIF24645 & Booth* (BRI); Tozers Gap, Aug 1965, *Gittins 1082* (BRI); Olive River, Sep 1974, *Hyland 7444* (BRI, CANB); near Cape Bedford, Jun 1968, *Pedley 2617* (BRI); near McIvor River, Sep 1960, *Smith 11144* (BRI); Iron Range, along road between Browns Creek and Tozers Gap, Jul 1988, *Thomas 290* (BRI); Olive River, Sep 1974, *Webb & Tracey 13801* (BRI); between Starcke station homestead and Cape Flattery, Jul 1976, *Webb & Tracey 13833* (BRI).

**Distribution and habitat:** *Shonia tristigma* subsp. *borealis* occurs in coastal and subcoastal populations from Cape York southwards to Mt Fraser near Mossman. It is recorded as growing on coastal or near-coastal sand dunes, in sandy soils on rocky slopes and rocky headlands, in heathland, shrubland, woodland and open forest with heath understorey, and in vine thicket communities. **Map 2.**



**Fig. 1.** *Shonia tristigma* subsp. *borealis*. A. Flowering branchlet.  $\times 3$ . B. face view of male flower.  $\times 12$ . C. side view of female flower.  $\times 12$ . D. lateral view of stamen.  $\times 40$ . E. face view of anther.  $\times 40$ . F. side view of female flower.  $\times 12$ . G. face view of fruit.  $\times 6$ . H. ventral view of seed.  $\times 6$ . I. lateral view of seed.  $\times 6$ . J. transverse section of leaf.  $\times 12$ . A-J from Forster PIF15396 (BRI). Del. W.Smith.

**Phenology:** Flowers have been collected from February to October, fruits from May to September.

**Notes:** *Shonia tristigma* subsp. *borealis* is variable in its stature which to some degree appears to be related to habitat. Plants on exposed coastal sites or in heathland communities tend to be low shrubs 0.2–1 m high whereas plants in more sheltered sites such as woodland or forest communities tend to be larger shrubs or small trees 1–4 m high.

The collection *Brass* 2430 from the slopes of Mt Fraser (BRI) differs from all other collections of this subspecies by having an indumentum of stellate hairs on the branchlets as compared with glabrous branchlets in other collections seen. This collection is also markedly disjunct from the other collections cited for this subspecies.

**Etymology:** The subspecific epithet is from Latin *borealis*, north or northern, and refers to the northerly distribution of this subspecies compared with the remainder of this species.

**1c. *Shonia tristigma* subsp. *parvifolia*** Halford & R.J.F.Hend., **subsp. nov.** folii lamina angusta-oblongata, 2–5 mm lata et 10–17 mm longa ab subspeciebus aliis *S. tristigmatidis* differt. **Typus:** Queensland. COOK DISTRICT: 7 km W of Jowalbinna, 5 July 1990, *A.R. Bean* 1717 (holo: BRI).

Erect shrubs to 0.5 m high. Leaf laminae narrow-oblongate, 10–17 mm long, 2–5 mm wide.

**Additional specimens examined: Queensland.** COOK DISTRICT: 6 km S of Jowalbinna turnoff on Maytown track, Nov 1983, *Clarkson* 5053 (BRI, CANB); Sandy Creek, 6 km NE of Jowalbinna and 25 km SSE of Laura, Jul 1998, *Wannan* 908 et al. (BRI).

**Distribution and habitat:** *Shonia tristigma* subsp. *parvifolia* is known only from near Jowalbinna which is approximately 30 km SSW of Laura, on Cape York Peninsula. This taxon is recorded as growing in a small ravine in *Eucalyptus/Corymbia* woodland around large sandstone boulders, on sandy soil in *Corymbia/Eucalyptus* woodland and on skeletal soils on sandstone slopes with *Eucalyptus phoenicea*. **Map 3.**

**Phenology:** Flowers have been collected in July and November, fruits in July.

**Etymology:** The subspecific epithet is derived from Latin *parvus*, small, and *-folius*, -leaved, and refers to the relatively small leaves of this subspecies compared with those in other subspecies of this species.

**2. *Shonia territorialis*** Halford & R.J.F.Hend. **sp. nov.** *S. tristigmatidis* et *S. bickertonensis* ut videtur artissime affinis. Ab *S. tristigmatidis* folii lamina (40–) 60–80 mm non 10–60 mm longa et angusta-lanceolata vel lineari non angusta-elliptica vel angusta-oblongata ad angusta-ovata, floris maris pedicello 2–10 mm non 5–25 mm longo et flore femineo stylo 0.2–0.6 mm non circa 0.2 mm longo et limbis stigmaticis 1.3–2.5 mm non 1–2 mm longis differt. Ab *S. bickertonensis* folii lamina 3–10 mm non 0.7–2.5 mm lata et ratione longitudinis latitudinibus 15:1 vel minus non ultra 15:1 et inflorescentiis axe primario 20–60 mm non 10–30 mm longo differt. **Typus:** Northern Territory. Magela Creek upper catchment, 10 April 1995, *I.D. Cowie* 5737 & *K. Brennan* (holo: DNA).

Monoecious or rarely dioecious shrubs to 1 m high, thinly viscid on most parts; bark shallowly fissured, grey. Branchlets somewhat angular becoming ± terete with age, glabrous. Leaves with petioles 1–3.5 mm long, flattened or slightly grooved adaxially, rounded abaxially, glabrous and smooth; laminae narrow-lanceolate or linear, (40–) 60–80 mm long, (3–) 5–10 mm wide, with a length/width ratio of 8–15:1, cuneate to attenuate at the base, acute at the apex and recurved along the margins; adaxial surface green, with midvein impressed; abaxial surface white, with stellate hairs soft and up to 0.2 mm across, and with the raised midvein angular in cross section. Inflorescences racemose or rarely paniculate, usually of one or two female flowers basal on the axis with 7–10 male flowers distal to them or rarely of all male flowers; primary axis 20–60 mm long, glabrous, smooth; bracts triangular, c. 0.5 mm long, glabrous, caducous. Flowers with calyx 5-lobed, of unknown colour when fresh, glabrous; tube c. 0.1 mm long; lobes ± spreading; petals 5, of unknown colour when fresh, ± glabrous. Male flowers with pedicels

2–10 (–15) mm long,  $\pm$  terete, glabrous; calyx lobes triangular, 0.8–1.5 mm long, 0.6–0.7 mm wide, acute at the apex; petals broadly elliptic or suborbicular, 1.8–2 mm long, 1.4–1.6 mm wide, rounded to obtuse at the apex; disc a  $\pm$  continuous glandular ring, fleshy, lobed, glabrous; receptacle slightly convex, *c.* 0.8 mm across, tomentose; stamens *c.* 20; filaments 0.3–0.5 mm long,  $\pm$  glabrous; anthers 0.3–0.4 mm long. Female flowers with pedicels 25–50 mm long, slender proximally becoming stouter distally,  $\pm$  terete, glabrous; calyx lobes triangular, 0.8–1.5 mm long, 0.5–0.8 mm wide, acute at the apex; petals broadly elliptic or suborbicular, *c.* 1.2 mm long and 1 mm wide, rounded at the apex, recurved distally; disc a  $\pm$  continuous glandular ring, fleshy, lobed, glabrous; ovary subglobose, trilobate, 1–1.5 mm across,  $\pm$  smooth, glabrous; style 0.2–0.6 mm long; stigmatic limbs 1.3–2.5 mm long. Fruits broadly ellipsoid, 6–7 mm long, 5–6 mm across. Seeds *c.* 6.5 mm long (including caruncle), 3.5 mm wide and *c.* 3 mm across; testa dark brown; caruncle  $\pm$  hemispherical, *c.* 0.8 mm long and 1.7 mm across, smooth, creamy-white. **Fig. 2.**

**Additional specimens examined:** Northern Territory. South Magela Gorge, 8 km SE of Mt Brockman, Jan 1991, *Brennan Bre892* (DNA); 12 miles [*c.* 19 km] S of Mt Brockman, Jul 1972, *Byrnes 2712* (BRI, CANB, NSW); 27 km SE of Jabiru, Feb 1973, *Craven 2418* (BRI, CANB, DNA); *c.* 10 miles (16 km) ESE of Noranda Mining Camp, Jun 1972, *Schodde AE40* (CANB, DNA).

**Distribution and habitat:** *Shonia territorialis* is confined to Mt Brockman and the nearby Arnhem Land Plateau, Northern Territory. It is recorded as growing in monsoon forest communities in sandy soils in gullies or gorges. **Map 4.**

**Phenology:** Flowers have been collected in January, February, April, June and July, fruits in January.

**Affinities:** *Shonia territorialis* seems most closely related to *S. tristigma* and *S. bickertonensis*. It can be distinguished from *S. tristigma* by having generally longer leaf laminae (which are (40–) 60–80 mm long compared with 10–60 mm long in *S. tristigma*) that are narrow-lanceolate or linear rather than narrow-elliptic or narrow-oblongate to narrow-obovate, male flowers with generally

shorter pedicels (which are 2–10 mm long compared with 5–25 mm long in *S. tristigma*) and female flowers with longer styles (which are 0.2–0.6 mm long compared with up to 0.2 mm long in *S. tristigma*). *Shonia territorialis* differs from *S. bickertonensis* by having leaf laminae wider (being 3–10 mm wide compared with 0.7–2.5 mm wide in *S. bickertonensis*) and proportionally shorter (having a length/width ratio equal to or less than 15:1 compared with more than 15:1 in *S. bickertonensis*) and generally longer inflorescences (with the primary axis being 20–60 mm long compared with 10–30 mm long in *S. bickertonensis*).

**Etymology:** The specific epithet is from Latin *territorium*, territory, and *-alis*, belonging to, and refers to the distribution of this species being wholly within Australia's Northern Territory.

**3. *Shonia bickertonensis* (Specht) Halford & R.J.F.Hend., **comb. nov.**; *Beyeria bickertonensis* Specht, *Rec. American-Australian Sci. Expedition Arnhem Land* 3: 249, fig. 8 (1958). **Type:** Northern Territory. South Bay, Bickerton Island, in gorge in sandstone hills, 21 June 1948, *R.L. Specht 641* (holo: BRI; iso: CANB, K, MEL).**

Monoecious, multi-stemmed shrubs to 3 m high, thinly viscid on most parts; bark smooth or shallowly fissured, grey or brown. Branchlets somewhat angular becoming  $\pm$  terete with age, glabrous. Leaves with petioles 1–2 mm long, flattened adaxially, rounded abaxially, glabrous; laminae linear, 30–50 (–70) mm long, 0.7–2.5 mm wide, with a length/width ratio of 18–55:1, cuneate at the base,  $\pm$  acute at the apex and with margins recurved to the midrib; adaxial surface green, with midrib impressed; abaxial surface white, with stellate hairs soft and up to *c.* 0.2 mm across, and with the raised midvein angular in cross section. Inflorescences racemose, usually of one or two female flowers basal on the axis with 5–15 male flowers distal to them; primary axis 10–30 mm long, glabrous, smooth; bracts triangular, *c.* 0.5 mm long, glabrous, caducous. Flowers with calyx 5-lobed, of unknown colour when fresh, glabrous; tube *c.* 0.1 mm long; lobes  $\pm$  spreading; petals 5, of unknown colour when fresh, glabrous. Male flowers with pedicels 1.5–10 mm long, terete,



**Fig. 2.** *Shonia territorialis*. A flowering branchlet.  $\times 2$ . B. male flower viewed from above.  $\times 12$ . C. male flower, oblique view.  $\times 12$ . D. female flowers, lateral view.  $\times 12$ . E. transverse section of leaf.  $\times 16$ . A from Craven 2418 (CANB); B & C from Cowie 5737 & Brennan (DNA); D & E from Brennan Bre892 (DNA). Del. W.Smith.

glabrous; calyx lobes oblong, 1.5–1.8 mm long, 0.4–0.6 mm wide, rounded to obtuse at the apex; petals broadly ovate, 2.3–2.5 mm long, 1.2–1.4 mm wide, acute to obtuse at the apex; disc a  $\pm$  continuous glandular ring, fleshy, lobed, glabrous; receptacle convex, *c.* 0.8 mm across, densely hairy; stamens 20–30; filaments 0.4–0.8 mm long,  $\pm$  glabrous; anthers 0.3–0.4 mm long. Female flowers with pedicels 15–40 mm long,  $\pm$  terete, slender proximally becoming stouter distally, glabrous; calyx lobes ovate, 0.5–1 mm long, 0.4–0.6 mm wide, acute at the apex; petals ovate or elliptic, 1.7–1.8 mm long, 1–1.2 mm wide, rounded at the apex; disc a  $\pm$  continuous glandular ring, fleshy, lobed, glabrous; ovary subglobose, trilobate, *c.* 1.2 mm across,  $\pm$  smooth, glabrous; style 0.1–0.5 mm long; stigmatic limbs 1.7–3 mm long. Fruits broadly ellipsoid, 5.5–7 mm long, 4.5–5 mm across. Seeds 4.8–5.2 mm long (including caruncle), 2.4–3 mm wide, 2–2.6 mm across; testa dark brown; caruncle  $\pm$  hemispherical, 0.8–1 mm long, 1.2–2 mm across,  $\pm$  smooth, creamy-white.

**Additional specimens examined: Northern Territory.** 28 km NW of Oenpelli, Feb 1973, *Craven 2260* (CANB, DNA); Mount Permain, Arnhem Land, Oct 1987, *Dunlop 7034* (BRI, MEL); Bickerton Island, Apr 1993, *Dunlop 9323 & Leach* (BRI); Bickerton Island, North Bay, May 1993, *Egan 2368* (DNA); Umbakumba Road, Groote Eylandt, 6 May 1972, *Levitt s.n.* (CANB, DNA); Umbakumba Road, Groote Eylandt, 9 May 1972, *Levitt s.n.* (DNA); Douglas Springs, Eva Valley Station, Jun 1988, *Lucas 73* (BRI); Kakadu N.P., Douglas Springs, Jul 1991, *Menkhorst 1038* (DNA, MEL); Mt Borradaile, Arnhemland, Jul 1995, *Metcalfe s.n.* (DNA); Ruined City, 50 km NNE of Ngukurr, Nov 1987, *Russell-Smith 4194 & Lucas* (DNA); Upper East Alligator River, Arnhem Land, Apr 1988, *Russell-Smith 5229 & Lucas* (DNA); Eva Valley Station, 5 km E of Ranford Hill, Jun 1988, *Russell-Smith 5656 & Lucas* (DNA); 4.5 km SE of Mt Borradaile, Jun 1992, *Taylor 89* (DNA).

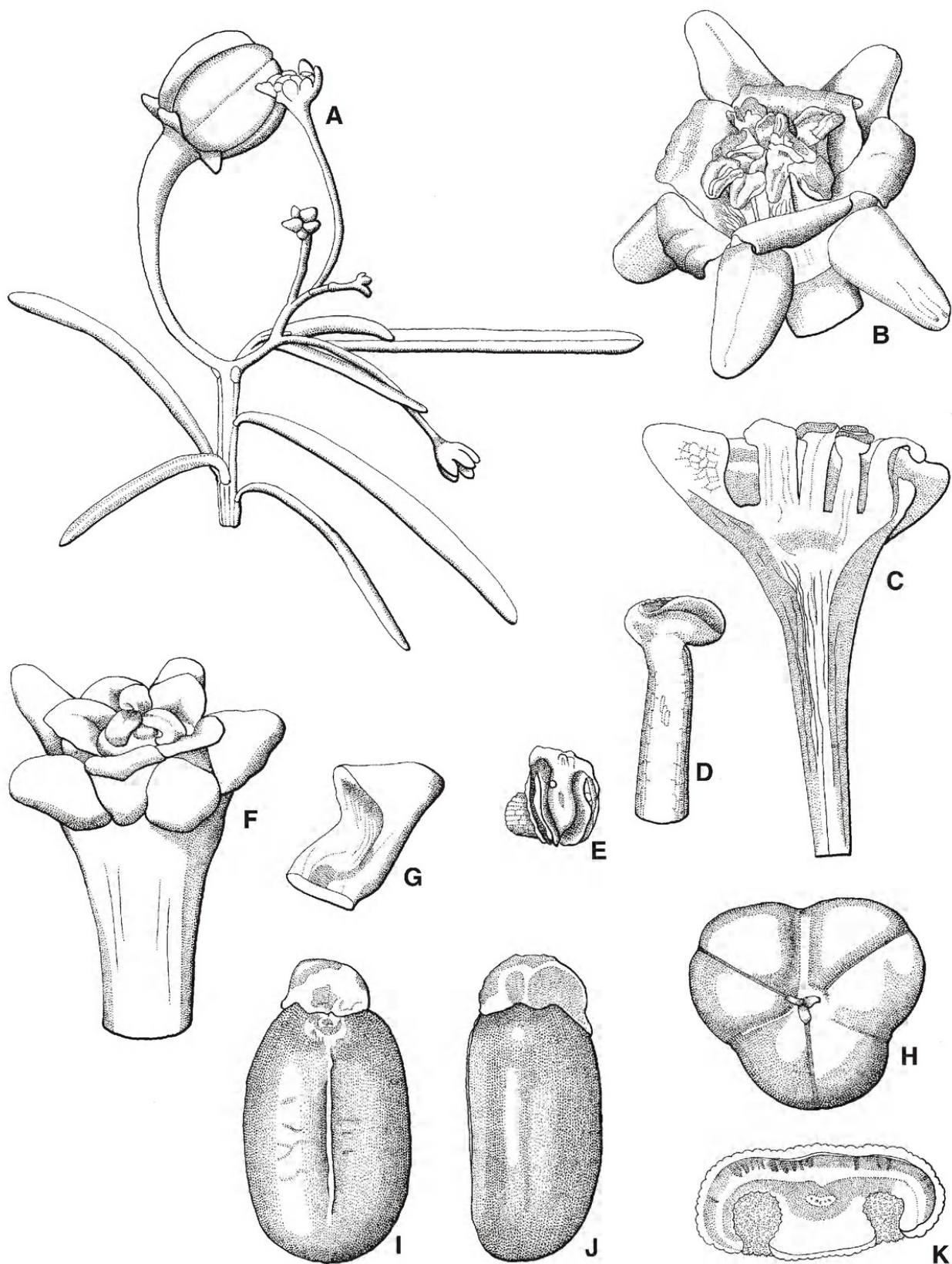
**Distribution and habitat:** *Shonia bickertonensis* is confined to Arnhem Land and eastern off-shore islands of the Northern Territory. It is recorded as growing in sandy soils on sandstone hills and in gorges. **Map 5.**

**Phenology:** Flowers have been collected in February, April to July and September to November, fruits in April, May, July and October.

**4. *Shonia carinata* Halford & R.J.F.Hend. sp. nov.** affinis *S. bickertonensis* Specht foliis linearis sed calycis lobis manifeste carinatis ab alter et speciebus omnibus aliis *Shoniae* differt. **Typus:** Queensland. MARANO DISTRICT: Summit of Junction Ridge, N of Marlong Arch, Mt Moffatt NP, 27 October 1998, *A.R. Bean 14305* (holo: BRI; iso: CANB, MEL, NSW *distribuendi*).

*Beyeria* sp. (Bull Creek Gorge B.O'Keeffe 573), in Forster & Halford (2002: 69).

Monoecious, erect to spreading multi-stemmed shrubs to 2 m high, viscid on most parts; bark rough and scaly,  $\pm$  dark grey. Branchlets somewhat angular, becoming  $\pm$  terete with age, glabrous. Leaves with petioles 0.5–1.2 mm long,  $\pm$  terete, glabrous, smooth; laminae linear, 12–40 mm long, 0.8–1.4 mm wide, with a length/width ratio of 20–40:1, cuneate at the base, obtuse to rounded or acute at the apex and with the margins recurved to midrib; adaxial surface yellow-green, with midvein  $\pm$  obscure; abaxial surface white, with stellate hairs soft and up to *c.* 0.1 mm across, and with the raised midrib angular in cross section. Inflorescences racemose, usually of one or two female flowers basal on the axis with 3–5 male flowers distal to them; primary axis 3–10 mm long, glabrous; bracts ovate, up to 0.4 mm long, glabrous, caducous. Flowers with calyx 5 (rarely 4)-lobed, green, glabrous; tube *c.* 0.1 mm long; lobes  $\pm$  erect; petals 5 or rarely 4, of unknown colour when fresh, glabrous except for a tuft of hairs near the base on adaxial surface. Male flowers with pedicels 6–9 mm long,  $\pm$  terete, glabrous; calyx lobes oblong, 0.8–1.1 mm long, 0.5–0.8 mm wide, obtuse to rounded at the apex, prominently keeled abaxially; petals broadly obovate, 1.4–1.6 mm long, 0.6–1.2 mm wide, rounded at the apex, recurved to revolute distally; disc of 5 discrete glands; glands dorsiventrally compressed, truncate to obtuse, glabrous; receptacle  $\pm$  flat or slightly convex, 0.8–1 mm across, minutely hairy; stamens *c.* 10; filaments 0.7–0.8 mm long, glabrous; anthers 0.3–0.4 mm long. Female flowers with pedicels 12–17 mm long, slender and circular in transverse section proximally, becoming stouter and 5-quetrous distally, glabrous; calyx lobes



**Fig. 3. *Shonia carinata*.** A. flowering branchlet.  $\times 3$ . B. side view of male flower.  $\times 12$ . C. longitudinal section of male flower.  $\times 15$ . D. lateral view of stamen.  $\times 30$ . E. face view of anther.  $\times 30$ . F. side view of female flower.  $\times 12$ . G. calyx lobe.  $\times 15$ . H. face view of fruit.  $\times 6$ . I. ventral view of seed.  $\times 9$ . J. lateral view of seed.  $\times 9$ . K. transverse section of leaf.  $\times 30$ . A-H & K from *Henderson & Turpin H3562 (BRI)*; I & J from *Bean 15369 & McDonald (BRI)*. Del. W.Smith.

oblong, *c.* 1.2 mm long, 0.4–0.5 mm wide, obtuse to rounded at the apex, prominently keeled abaxially; petals suborbicular, *c.* 1.2 mm long and 1.2 mm wide, rounded at the apex, tumid abaxially, recurved distally; disc membranous, entire; ovary ellipsoid, trilobate, 1–1.3 mm across, smooth, glabrous; style *c.* 0.1 mm long; stigmatic limbs 0.3–0.4 mm long. Fruits broadly ellipsoid, 5–5.2 mm long, 5.2–5.4 mm across. Seeds *c.* 5 mm long (including caruncle), *c.* 2.5 mm wide and 2 mm across; testa dark brown; caruncle  $\pm$  hemispherical, *c.* 1 mm long and 1.2 mm across,  $\pm$  smooth, creamy-white. **Fig. 3.**

**Additional specimens examined: Queensland.** LEICHHARDT DISTRICT: Salvator Rosa N.P., S side of Cories Bluff, Sep 1990, *Ballingall* 2682 (BRI); Bull Creek Gorge S of Springsure – Tambo Road, Sep 1999, *Bean* 15365 & *McDonald* (BRI); *loc. cit.*, Sep 1999, *Bean* 15369 & *McDonald* (BRI); Bull Creek Gorge, *c.* 60 km NE of Tambo, Aug 1991, *Henderson & Turpin* H3558 (BRI); *loc. cit.*, Aug 1991, *Henderson & Turpin* H3562 (BRI); Bull Creek Gorge area, Sep 1984, *O’Keeffe* 573 (BRI); *loc. cit.*, Sep 1984, *O’Keeffe* 660 (BRI); near Mt Salvator, Sep 1992, *O’Keeffe* 991 (BRI); Salvator Rosa N.P., 170 km SW of Springsure, Sep 1987, *Thomas* 255 (BRI). MARANO DISTRICT: Mt Mobil Holding, 15–20 km W of Umberilla homestead, Nov 1990, *Grimshaw* CHR18 (BRI).

**Distribution and habitat:** *Shonia carinata* is confined to central Queensland in an area more or less bounded by Tambo, Springsure and Mitchell. It is recorded as growing in shallow sandy soils associated with rocky sandstone slopes and cliff lines in woodlands dominated by *Eucalyptus cloeziana* F.Muell. and/or *E. decorticans* (F.M.Bailey) Maiden and with a shrubby understorey. **Map 6.**

**Phenology:** Flowers have been collected from August to November, fruits in August and September.

**Affinities:** *Shonia carinata* is similar to *S. bickertonensis* in having linear leaves but can be distinguished from that and all other species of *Shonia* by its abaxially prominently keeled calyx lobes.

**Etymology:** The specific epithet is from the Latin *carinatus*, keeled, and refers to the prominent keeled calyx lobes in the flowers of this species.

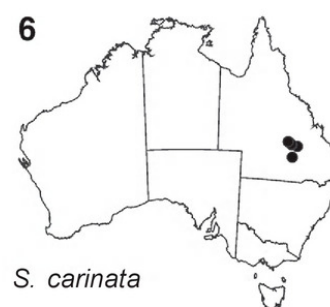
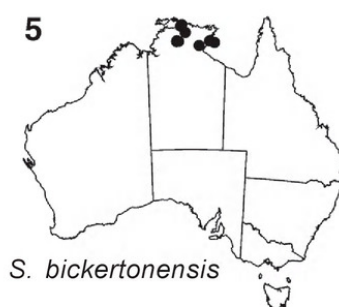
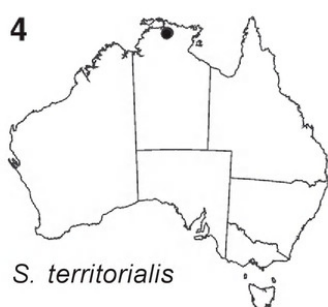
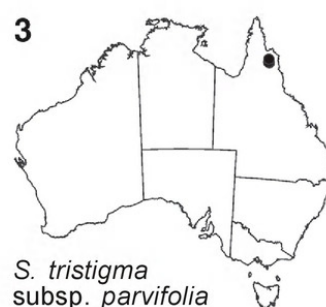
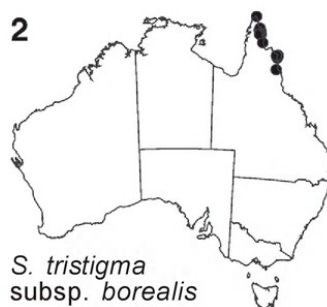
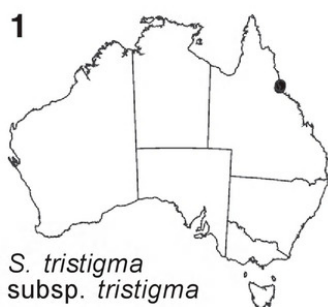
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**Maps 1-6.** Distribution of *Shonia* taxa.



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