

## A synopsis of the genera *Pomaderris*, *Siegfriedia*, *Spyridium* and *Trymalium* (Rhamnaceae) in Western Australia

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### Abstract

Rye, B.L. A synopsis of the genera *Pomaderris*, *Siegfriedia*, *Spyridium* and *Trymalium* (Rhamnaceae) in Western Australia. Nuytsia 11 (1): 109-131 (1996). Keys and distribution maps are given for Western Australian Rhamnaceae in the genera *Pomaderris*, *Siegfriedia*, *Spyridium* and *Trymalium*, together with brief information on each taxon, including its habitat, flowering period, conservation status and synonyms. The new combination *Pomaderris rotundifolia* (F. Muell.) Rye is made, the new taxon *Trymalium myrtillus* subsp. *pungens* is described, and several taxa of conservation significance are illustrated.

### Introduction

As noted in earlier papers on Western Australian Rhamnaceae (Rye 1995a, 1995b), the total number of genera to be recognized in this State will depend upon the outcome of studies, still in progress, on the generic limits of the family throughout Australia. Of the south-western Australian taxa, the delimitation of five genera is now clear. One of these is the new genus *Granitites* described in Rye (1996), and the other four genera, *Pomaderris*, *Siegfriedia*, *Spyridium* and *Trymalium*, are dealt with here. This publication provides a complete list of the Western Australian members of these genera, with keys, distribution maps and other information to facilitate their identification. All synonyms are listed, including phrase names that were used to identify the taxa prior to the publication of their formal taxonomic names. Conservation priority codes are given for taxa on the Priority Flora List and illustrations provided for four priority taxa for which there are no previous illustrations. An explanation of the conservation codes used by the Department of Conservation and Land Management for Western Australian flora is given at the end of each issue of this journal.

### Formal taxonomy

*Pomaderris rotundifolia* (F. Muell.) Rye, *comb. nov.*

*Spyridium rotundifolium* F. Muell. (Mueller 1863: 25). - *Cryptandra rotundifolia* (F. Muell.) F. Muell. (Mueller 1883: 61). *Type*: Point Malcolm, [Western Australia], Maxwell (MEL 227042).

*Conservation status.* Included on the 1990 Priority Species List as *Spyridium rotundifolium* but now more populations are known and the species is no longer considered to be at risk.

*Notes.* Characteristics of *P. rotundifolium* that are typical of the genus *Pomaderris* include the conspicuous annular disc (common among Western Australian species but not among those from other states), long dense indumentum on the ovary summit, deeply divided style (sometimes almost split into 3 distinct styles) and half-inferior schizocarp with a basal valve on each fruitlet. *P. rotundifolium* has more prominent bracts and shorter pedicels than all or nearly all other members of the genus, giving its inflorescence a more head-like appearance. It also has very well developed petals with a hooded lamina enclosing an anther in bud, whereas most *Pomaderris* species either lack petals or have a reduced lamina. Uncertainty over the species' generic placement has resulted from these unusual characteristics and the dearth of fruits, with only one fruiting specimen known, and perhaps also from the admixture of an unrelated *Spyridium* species among the specimens.

Prior to recent work on the family, *Spyridium tricolor* specimens at PERTH were housed, together with those of *P. rotundifolium*, under the name *Spyridium rotundifolium*. Confusion between the two taxa was due to their overlapping geographical ranges and a superficial morphological similarity, both species having broad leaves and large bracts surrounding the flower clusters. A closer examination of the leaves, flowers and fruits revealed many differences, with each species having inflorescence, disc, fruit and aril characters indicative of the genus in which it is now placed.

***Trymalium myrtilloides* subsp. *pungens* Rye, subsp. nov.**

*A Trymalio myrtilloides* subsp. *myrtilloides* ramulis spinoscentibus, foliis parvioribus differt.

*Typus:* 34 km south-east of Ongerup, Western Australia, 28 October 1976, K. Newbey 5007 (*holo:* PERTH 0332414; *iso:* CANB).

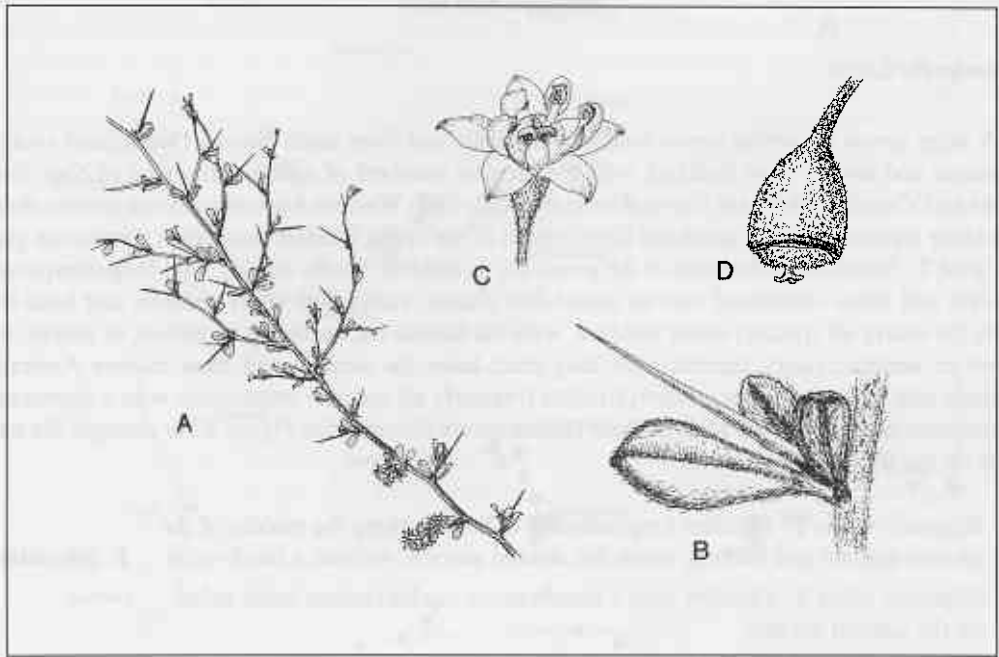
*Spinescent branchlets* numerous, stout, 3-11 mm long. *Petioles* 0.2-0.5 mm long. *Leaf blades* conduplicate at first, obovate, 2.3-4.0 mm long, approximately 1-1.5 mm wide, rather sparsely hairy on the recurved margins and midvein of undersurface and with a dense white indumentum between the midvein and recurved margins, the hairs simple, antrorse and 0.2-0.3 mm long; upper surface (not including recurved margins) with a sparse indumentum much shorter than that on undersurface, the hairs sometimes 2-branched to stellate. *Flowers* 1.8-2.3 mm in diameter. (Figure 1)

*Other specimen examined.* WESTERN AUSTRALIA: Near Lake Grace, 30/9/1933, W.E. Blackall 3198 (PERTH).

*Distribution and habitat.* Recorded from near Lake Grace and from south-east of Ongerup, the latter locality an exposed slight ridge with "well drained stoney, crumbly red clayey loam/clay/dolerite dyke".

*Flowering period.* Flowers recorded September-October and fruits recorded in late October.

*Conservation status.* Known from only two collections, neither of which appears to be from a conservation reserve. No attempt has been made to survey this taxon, which is now included on the Priority Flora List as a Priority 1 taxon.



**Figure 1.** *Trymalium myrtillus* subsp. *pungens* A - habit (x1), B - spinescent branchlet and leaves (x8), C - flower (x12), D - fruit (x8). Drawn from W.E. Blackall 3198 (A-C) and K. Newbey 5007 (D).

*Etymology.* From the Latin *pungens* - sharp, piercing, in reference to the spinescent branchlets.

*Notes.* Since the two known localities for subsp. *pungens* are east of the known range of subsp. *myrtillus*, the two taxa appear to be allopatric. At first sight, the new taxon appears to be a distinct species, as its numerous stout spinescent branchlets give it a very different appearance from the unarmed subsp. *myrtillus*, but there appear to be no other absolute differences. Apart from *T. myrtillus* subsp. *pungens*, the only *Trymalium* species exhibiting spinescence is *T. elachophyllum*, which has fewer, finer spinescent branchlets occurring on some but not all specimens. In *T. elachophyllum*, there is considerable overlap in the geographical ranges of spinescent and non-spinescent specimens, and this character probably varies within populations, with no correlating characters to suggest that the spinescent variant should be recognized formally.

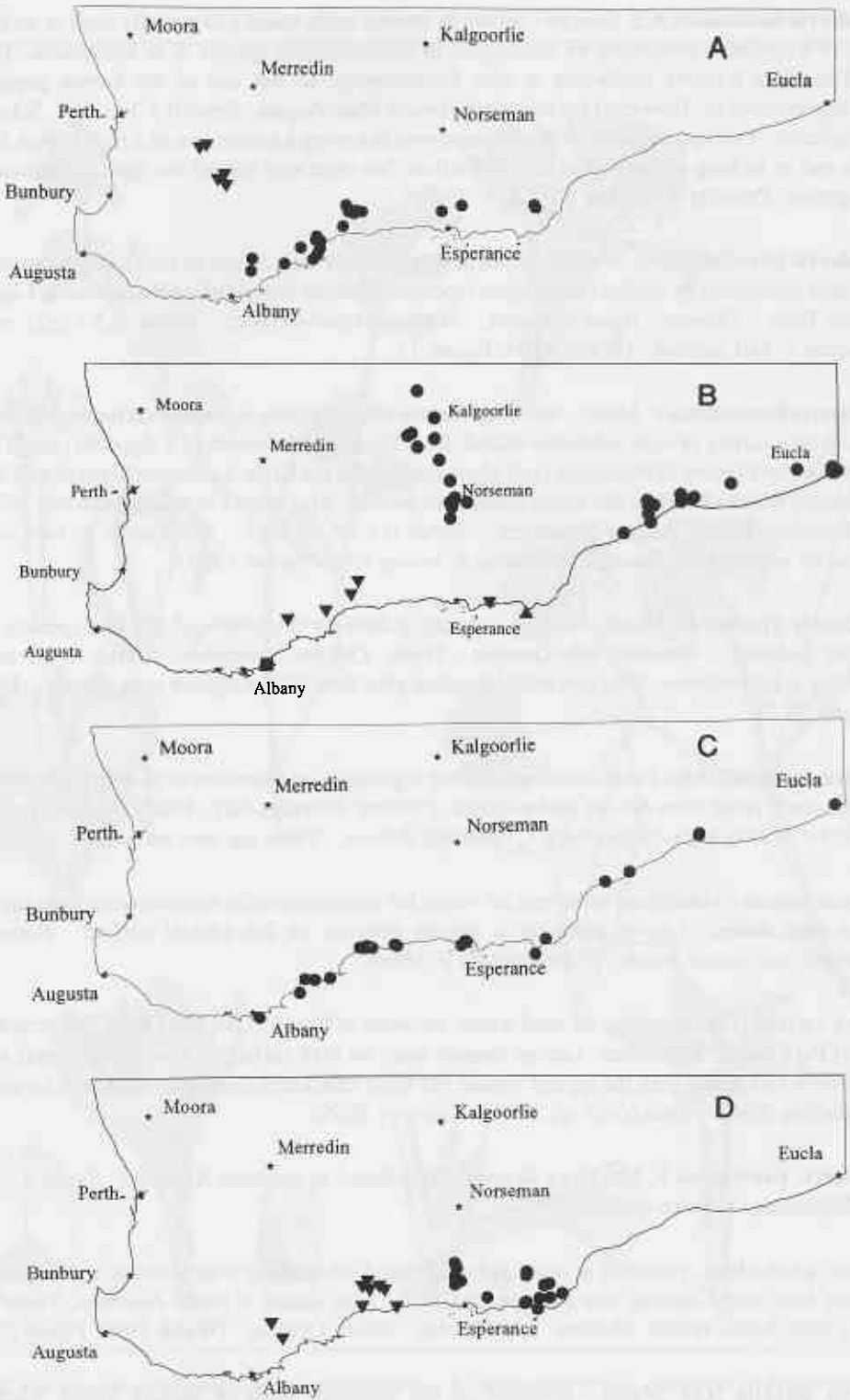
Of the two specimens of *T. myrtillus* subsp. *pungens*, one has the smallest leaves known in the species and the other has leaves equalling those of the smallest-leaved specimen of subsp. *myrtillus*. Subsp. *myrtillus* is a much more widespread and variable taxon, with leaf measurements of 4.5-12.5 x 1.5-4 mm compared with 2.5-4.5 x 1-1.5 mm in subsp. *pungens*. These measurements, which include the petiole length, were taken from the largest leaves occurring on each herbarium specimen. Specimens of subsp. *myrtillus* from the more arid parts of its geographical range tend to have larger leaves with the upper surface more hairy than those occurring in the more mesic areas closer to where subsp. *pungens* is found. Subsp. *pungens* also appears to have smaller flowers than the type subspecies but this may be partly due to the fact that the more spiky specimens are less well pressed, perhaps resulting in greater shrinkage of the flowers on drying.

## Synopsis and keys

### Pomaderris Labill.

A large genus occurring across southern Australia and from north-eastern Queensland south to Tasmania and also in New Zealand, with the greatest numbers of species occurring in New South Wales and Victoria. There are five species known only from Western Australia and two species shared with other regions. The geographical distributions of the seven Western Australian species are given in Figure 2. Some characteristics of the genus are as follows: cymes usually with long conspicuous pedicels and often condensed into an umbel-like cluster, rarely with short pedicels and head-like; petals (in nearly all species) either reduced, with the lamina not enclosing an anther, or absent; disc absent or annular; ovary summit with long erect hairs (in western and most eastern Australian species); schizocarp partially inferior; fruitlets (in nearly all species) crustaceous with a chartaceous to membranous basal valve. Most of these characters are illustrated in Figure 3, for example the basal valve on the fruitlet in Figure 3J.

1. Stigmatic lobes 2. Fruitlets longitudinally dehiscent along the middle of the adaxial surface and halfway down the abaxial surface, without a basal valve ... **P. bilocularis**
1. Stigmatic lobes 3. Fruitlets with a membranous to chartaceous basal valve on the adaxial surface
  2. Flowers either shortly pedicellate or lacking petals. Style deeply divided into 3 branches
    3. Pedicels short, hidden by bracts. Petals present. Disc conspicuous, annular ..... **P. rotundifolia**
    3. Pedicels long, conspicuous. Petals absent. Disc absent ..... **P. paniculosa**
      - 3a. Leaves stellate-hairy on upper surface. Recorded from sand and non-calcareous rocks on the mainland, usually inland ..... subsp. **paniculosa**
      - 3a. Leaves glabrous on upper surface. Recorded from coastal limestone on an island of Recherche Archipelago ..... subsp. **paralia**
  2. Flowers long-pedicellate, with petals. Style 3-lobed (lobes shorter than the entire portion of style)
    4. Leaves narrowly ovate or ovate, 45-150(200) mm long. Petal limb broad with a truncate base. Disc inconspicuous ..... **P. grandis**
    4. Leaves obovate or oblong-elliptic to circular or obcordate, 3-26 mm long. Petal limb either not expanded or tapering to a claw. Disc prominent, annular
      5. Petals spathulate with a broad, almost circular limb. Ovary summit with very long hairs surrounded by a region of very short hairs, sometimes also with a distinct outer glabrous border ..... **P. forrestiana**
      5. Petals linear to narrowly spathulate. Ovary summit with long hairs surrounded by the glabrous disc, without an area of short hairs
        6. Leaves 3-7 mm long. Sepals 1-1.5 mm long at anthesis, c. 2 mm long in fruit, persistent. Petals glabrous ..... **P. brevifolia**
        6. Leaves 8-26 mm long. Sepals 1.5-2.7 mm long at anthesis, 2-3 mm long in fruit, deciduous. Petals usually hairy outside ..... **P. myrtilloides**



**Figure 2.** Distribution of *Pomaderris* and *Siegfriedia* species in Western Australia. A - *Pomaderris bilocularis* ▼, *P. brevifolia* ●; B - *P. forrestiana* ●, *P. grandis* ■, *P. paniculosa* subsp. *paniculosa* ▼, *P. paniculosa* subsp. *paralia* ▲; C - *P. myrtilloides*; D - *P. rotundifolia* ●, *Siegfriedia darwinioides* ▼.

**Pomaderris bilocularis** A.S. George - occurs in lateritic soils, usually in gravelly sand or on lateritic ridges, in woodlands dominated by *Eucalyptus* or *Allocasuarina* species or in heathlands. Extends from Tutanning Reserve south-east to near Dumblebung, all but one of the known populations occurring on reserves. Flowers: October-April. Fruits: May, August. Shrub 0.4-1 m high. Schizocarp *c.* half inferior. This species is atypical of *Pomaderris* in having a gynoeceium of 2 (rather than 3) fused carpels and in lacking a basal valve on the fruitlets, but otherwise has all the typical characteristics of the genus. **Priority 4** (Figure 3A-B)

**Pomaderris brevifolia** N.G. Walsh - occurs in clay or sandy soils, often on rocky sites, commonly in woodlands dominated by mallee (*Eucalyptus*) species. Extends from Stirling Range east to Cape Arid National Park. Flowers: January-August. Fruits: August-October. Shrub 0.3-1.2(2) m high. Schizocarp *c.* half inferior. (Walsh 1994: Figure 1)

**Pomaderris forrestiana** F. Muell. - recorded mainly on rocky sites, occurring on limestone along the coast and on a variety of rock substrates inland, from Broad Arrow (north of Kalgoorlie) south to near McPherson Rock (south of Norseman) and along the coast of the Great Australian Bight from Toolinna Cove east to Wilson Bluff on the South Australian border. Also occurs in South Australia. Flowers: May-October. Fruits: August-November. Shrub 0.4-1.5 m high. Schizocarp *c.* half inferior. *Pomaderris mayeri* C.A. Gardner (Canning & Jessop 1986: Figure 428B)

**Pomaderris grandis** F. Muell. - occurs in rocky gullies on the slopes of Mt Manypeaks, a very restricted endemic. Flowers: July-October. Fruits: October-November. Shrub 1-4.5 m high. Schizocarp *c.* half inferior. This species is abundant after fires (G.J. Keighery pers. comm.). **Priority 4** (Figure 3F-J)

**Pomaderris myrtilloides** Fenzl - occurs in coastal vegetation, on limestone or in deep sand, extending along the south coast from Albany east to Eucla. Flowers: February-July. Fruits: August-November. Shrub 0.3-1.5(2) m high. Schizocarp *c.* one-third inferior. There are two variants.

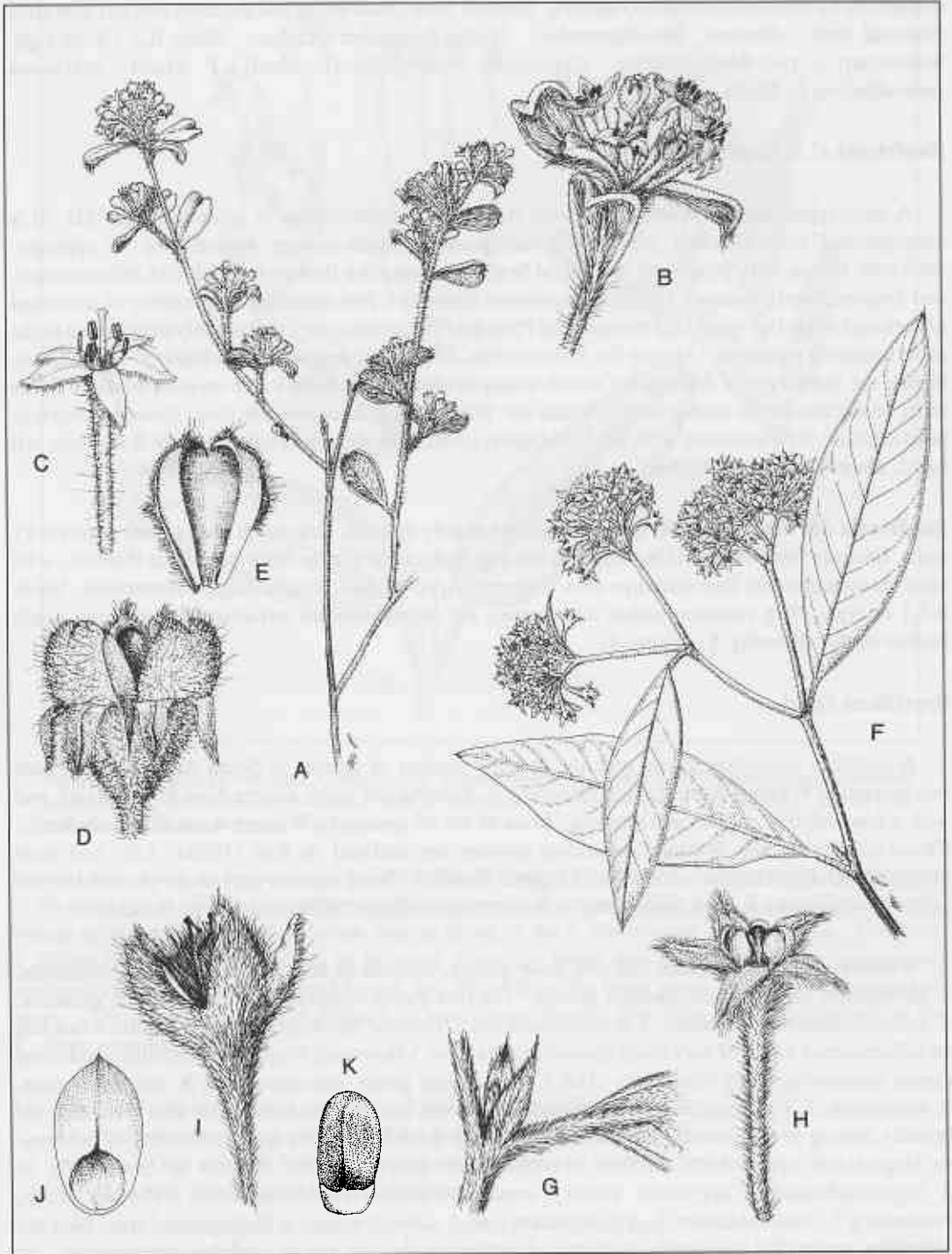
typical variant - widespread in the species' range but appears to occur more commonly on limestone than on sand dunes. Leaves glabrous or almost glabrous on the adaxial surface. *Pomaderris myrtilloides* var. *major* Benth., *P. stenopetala* F. Muell.

hairy variant - occurs mainly on sand dunes, recorded at Beaufort Inlet and from Fitzgerald River National Park east to Esperance. Leaves densely hairy on both surfaces. This variant tends to have larger leaves and sepals than the typical variant but these characters overlap too much to be useful in distinguishing them. *Pomaderris* sp. 2 (G.J. Keighery 6099)

**Pomaderris paniculosa** F. Muell. ex Reissek - distributed in southern Australia. Shrub 0.4-1.6 m high. Schizocarp *c.* three-quarters inferior.

subsp. **paniculosa** - recorded in stony soil and in sand, often along watercourses or drainage lines, extending from near Ongerup east to Cape Le Grand. Also occurs in South Australia, Victoria and possibly New South Wales. Flowers: July-October. Fruits: October. (Walsh 1990: Figure 3)

subsp. **paralia** N.G. Walsh - recorded on the limestone cliffs of Middle Island, Recherche Archipelago. Also occurs in South Australia, Victoria and Tasmania. Flowers: November. The name *Pomaderris oraria* F. Muell. has been misapplied to this subspecies. Subsp. *paralia* usually has larger leaves than subsp. *paniculosa*. **Priority 2** (Walsh 1990: Figure 4)



**Figure 3.** A-E - *Pomaderris bilocularis* A - flowering branch (x1), B - flower cluster (x3), C - flower (x6), D - dehiscent fruit (x8), E - dehiscent fruitlet (x8); F-K - *Pomaderris grandis* F - flowering branch (x1), G - stipules (x4), H - young flower (x6), I - dehiscent fruit (x6), J - adaxial view of fruitlet (x7.5), K - seed and aril (x7.5). Drawn from A.S. George 29/3/1969 (A-C), S. Patrick 394 (D,E), D. Davidson 1/10/1986 (F-H) and G.J. Keighery 8827 (I-K).

**Pomaderris rotundifolia** (F. Muell.) Rye - recorded in clayey or limestone soils, often in woodlands dominated by mallee (*Eucalyptus*) species. Extends from Grass Patch and Scadden east to Cape Arid National Park. Flowers: June-September. Fruits: September-October. Shrub 0.2-1.5 m high. Schizocarp c. two-thirds inferior. *Cryptandra rotundifolia* (F. Muell.) F. Muell., *Spyridium rotundifolium* F. Muell.

### **Siegfriedia** C.A. Gardner

A monotypic genus endemic to Western Australia. Its distribution is given in Figure 1D. It is distinguished from all other genera of Rhamnaceae in south-western Australia by its opposite-decussate leaves, very prominent involucre bracts enclosing the flowers in a bell-like inflorescence, and long-exserted stamens. These characters are found in a few members of a number of unrelated genera including *Darwinia* (Myrtaceae) and *Pimelea* (Thymelaeaceae), presumably in response to the same selection pressures. Among the Rhamnaceae, *Siegfriedia* appears to be closest to *Pomaderris*, having the same type of fruit with a membranous to chartaceous basal valve on each fruitlet. Some other characters worth noting in *Siegfriedia* are: bracts denticulate; pedicels long; flowers 4-merous; petals absent; style exserted, with a 3-lobed apex; schizocarp about half-inferior, with 3 fruitlets; aril basal, clear-translucent, 3-lobed.

**Siegfriedia darwinioides** C.A. Gardner - occurs mainly in sandy clay, often with gravel or on rocky sites. Extends from between Ongerup and Stirling Range east to near Starvation Boat Harbour, with most records from the Ravensthorpe area. Flowers: April-August. Fruits: August-November. Shrub 0.3-1 m high. The variation within this species, for example in the inflorescence structure, needs further study. **Priority 3** (Figure 4)

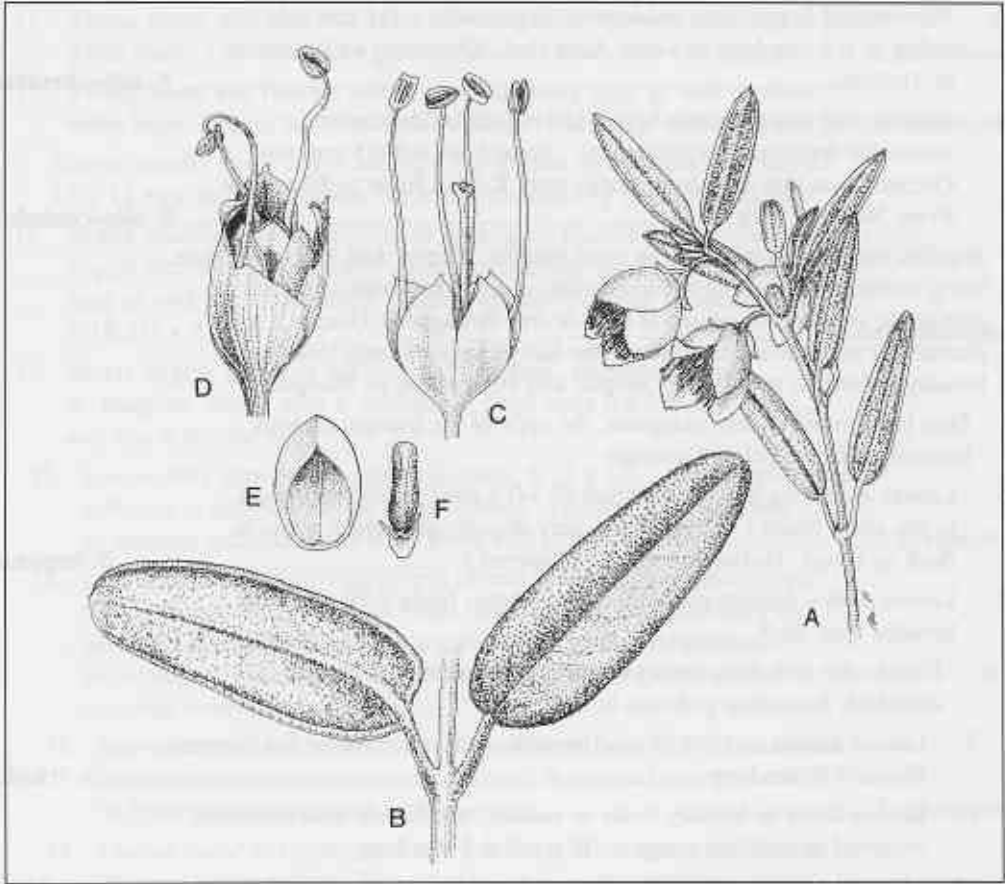
### **Spyridium** Fenzl

A southern Australian genus with the greatest number of species in South Australia, also well represented in Western Australia and extending to Victoria and south-eastern New South Wales, and with a few endemic species in Tasmania. Most of the 15 species in Western Australia are endemic. Characteristics of the Western Australian species are outlined in Rye (1995a: 120) and their geographical distributions are shown in Figures 5 and 6. Some species previously included in the genus *Spyridium* have been transferred to *Stenanthemum* (Rye 1995b) and one to *Pomaderris*.

Western Australian species fall into three groups, referred to here as the *Spyridium cordatum*, *S. globulosum* and *S. oligocephalum* groups. The first group, comprising *S. cordatum*, *S. glaucum*, *S. microcephalum*, *S. minutum*, *S. mucronatum* and *S. tricolor*, has discrete triangular disc lobes and an inflorescence either of very small cymes (usually 2- or 3-flowered) or of small head-like condensed cymes terminating leafy branchlets. The *S. globulosum* group, also containing *S. majoranifolium*, *S. montanum*, *S. riparium*, *S. spadiceum* and *S. villosum*, has discrete emarginate disc lobes that are broadly oblong to transversely elliptic. In this group the inflorescence usually consists of medium- to large-sized cymes with obvious branches each bearing a few flowers or (especially in *S. majoranifolium*) of apparently axillary, condensed cymes resembling heads. The last group, comprising *S. oligocephalum*, *S. polyecephalum*, and *S. subochreatum*, is distinguished from both the preceding groups by the stipule characters described in the key and its undulate annular disc. Its inflorescence is of head-like condensed cymes.

One taxon excluded from this account is *Spyridium pauciflorum* (Turcz.) Benth., based on *Cryptandra pauciflora* Turcz. The type collection, probably from the Stirling Range-Albany-Mt





**Figure 4.** *Siegfriedia darwinioides* A - habit (x1), B - pair of leaves (x2), C - flower (x6), D - dehiscing fruit surrounded by remnants of the flower (x6), E - abaxial view of fruitlet (x6), F - shrivelled seed with aril (x6). Drawn from E.M. Bennett 2315 (A, D-F) and M.A. Burgman 1570 & S. McNee (B,C).

Barrens area, needs to be examined to determine the status of this taxon. Judging from a photograph of the holotype at KW and from the description given by Bentham (1863: 432), *S. pauciflorum* would belong either in the *S. oligocephalum* species group or the *S. globulosum* species group. However, it differs from the former group in its more discretely lobed disc and its more discolorous and apparently less prominently veined leaves, and differs from the latter group in its more attenuate leaf bases. *Spyridium pauciflorum* appears to have large stipules like those of *S. spadiceum* or the *S. oligocephalum* group.

1. Stipules large and papery, acute or sometimes with a short deciduous point, readily torn, each pair united for some distance but free at the summit. Disc annular, continuing under the stamens to form an undulate or lobed ring above the hairy ovary summit
2. Flowers very hairy, the largest hairs on sepals 0.7-1.3 mm long. Seeds orange-brown (above a dark base), without obvious darker markings ..... ***S. polycephalum***
2. Flowers with a short to medium-sized indumentum outside, the largest hairs on sepals 0.1-0.5 mm long. Seeds yellow-brown with obvious dark spots or other dark markings

3. Stipules and bracts deep red-brown. Sepal hairs *c.* 0.1 mm long (often *c.* 0.2 mm long in South Australia). Occurring on limestone at Toolinna ..... **S. subochreatum**
3. Stipules and bracts orange-brown (giving the inflorescence a somewhat ferruginous appearance). Sepal hairs 0.3-0.5 mm long. Occurring on non-calcareous rocks from Kalgan River to Fitzgerald River National Park..... **S. oligocephalum**
1. Stipules small and coriaceous in most species, if large then long-acuminate, fairly resilient but tending to loose point or distal half with age, each pair either very shortly united at base or free throughout. Disc of 5 lobes alternating with the stamens above the hairy ovary summit; lobes either broadly oblong to transversely elliptic and emarginate, or triangular
4. Disc lobes more or less triangular, the apex of the triangle midway between adjacent pairs of stamens
5. Leaves appearing sessile, the short (0.3-0.5 mm) petiole appressed to the stem; blade 1-2.5 mm long, very dorsally thickened, about as thick as broad. (Inflorescence *c.* 2-flowered.) ..... **S. minutum**
5. Leaves with a distinct petiole 0.5-5 mm long; blade 2-80 mm long, broader than thick
6. Floral tube with long erect (antrorse) hairs which are easily detached, becoming glabrous in fruit
7. Leaves almost circular, folded inwards, with incurved or flat margins. Bracts 4-6 mm long ..... **S. tricolor**
7. Leaves linear to broadly ovate or cordate, not folded, with distinctly recurved or revolute margins. Bracts 1.5-3 mm long
8. Leaves cordate or broadly ovate, 2-5 mm long ..... **S. cordatum**
8. Leaves usually linear to oblong, sometimes elliptic or ovate, 4-9 mm long ..... **S. microcephalum**
6. Floral tube with short and/or long spreading hairs, which persist in fruit
9. Leaves 2-4(4.5) x 0.8-1.5 mm, with a glabrous mucro. Bracts 1-2 mm long, ciliate; outer surface glabrous or with minute hairs concentrated along midvein ..... **S. mucronatum**
- 9a. Leaves 1.4-1.6 mm wide. Flowers usually *c.* 10 per head ..... subsp. **multiflorum**
- 9a. Leaves 0.6-1.2 mm wide. Flowers usually 3-6 per head
- 9b. Leaves slightly recurved at apex; mucro 0.1-0.3 mm long. Sepals with hairs 0.2-0.4 mm long. Occurring from Frank Hann National Park east to near Cape Arid National Park ..... subsp. **mucronatum**
- 9b. Leaves distinctly recurved at apex; mucro up to 0.1 mm long. Sepals with hairs 0.1-0.2 mm long. Occurring from Borden east to Ravensthorpe ..... subsp. **recurvum**
9. Leaves 12-16 x 5-9 mm, with a hairy mucro. Bracts *c.* 3 mm long; outer surface uniformly covered by short appressed hairs ..... **S. glaucum**
4. Disc lobes broadly oblong to transversely elliptic and emarginate
10. Leaves large, usually (20)25-80 x 10-37 mm but sometimes smaller on Abrolhos Islands, subtended by small thick stipules. (Bracts hairy outside over most of surface.)

11. Young stems with short white or off-white hairs; flowers with long or short white hairs. Leaves usually glabrous above. Restricted to the coast ..... **S. globulosum**
11. Young stems and flowers with long ferruginous hairs as well as short white hairs. Leaves hairy on both surfaces. Occurring in Stirling Range .. **S. montanum**
10. Leaves usually small and 4-18(23) x 1.5-11 mm, sometimes large (up to 45 x 15 mm) in *S. spadicum* but then subtended by large thin stipules
12. Bracts usually hairy throughout or over more than half the surface. Sepals with a combination of short and medium-sized hairs c. 0.2 mm long or with short hairs only. (Leaves narrowly oblong to almost circular, 4-18(23) x 2.5-11 mm.) ..... **S. majoranifolium**
12. Bracts largely glabrous but with hairs at base, along midrib and or margins. Sepals with a mixture of large hairs 0.4-0.6 mm long and much shorter hairs
13. Leaves very narrowly or narrowly ovate, 8-17 x 1.5-2.5(3.5) mm, acute, glabrous or subglabrous on upper surface. Occurring along rivers or streams, recorded from Kent River east to Mitchell River ..... **S. riparium**
13. Leaves either linear to elliptic and obtuse or narrowly ovate to ovate and 5-15 mm wide, (12)14-45 mm long, densely minutely hairy on upper surface when young but sometimes becoming subglabrous. Occurring on hills or possibly sometimes on lower ground from Ongerup south to Albany
14. Leaves narrowly ovate or ovate, up to 45 mm long, (5)7-15 mm wide, becoming subglabrous on upper surface. Restricted to granitic hills in Porongurup Range and at Albany ..... **S. spadicum**
14. Leaves linear to elliptic, up to 22 mm long, 1.5-6 mm wide, densely hairy on upper surface. Recorded in sandy soils, sometimes over sandstone, from Ongerup to Stirling Range..... **S. villosum**

**Spyridium cordatum** (Turcz.) Benth. - mainly recorded in gravelly or stony to rocky sites, usually in shrublands or woodlands dominated by *Eucalyptus* species with a mallee habit. Extends from west of Lake King east to Mt Ragged, but most records are from the western part of the distribution, with disjunct occurrences at Esperance (one record) and the vicinity of Mt Ragged in Cape Arid National Park (several populations). Flowers: August-December, March-May. Fruits: recorded September-October. Shrub 0.05-0.45 m high. Closely related to *Spyridium microcephalum* and intermediates between the two species, having more or less ovate leaves, occur from near Bremer River east to near Howick Hill. The intermediates are keyed and mapped with typical *S. microcephalum*. Both species are very variable and need further study. A specimen of *S. cordatum* from Frank Hann National Park (*K.R. Newbey* 5512) has more or less sessile leaves like those of another close relative *S. minutum*, but in other characters is typical of *S. cordatum*. *Cryptandra cordata* Turcz.

**Spyridium glaucum** Rye - recorded in clay, known only from the range of hills north-east of Ravensthorpe. Flowers and fruits: September-November. Shrub 0.5-1 m high. *Spyridium* sp. Ravensthorpe (*E.M. Bennett s.n.*) **Priority 1** (Rye 1995a: Figure 1A-F)

**Spyridium globulosum** (Labill.) Benth. - occurs in sand close to the coast, usually on sand dunes or on limestone, sometimes dominant in low exposed coastal vegetation, often in woodlands dominated

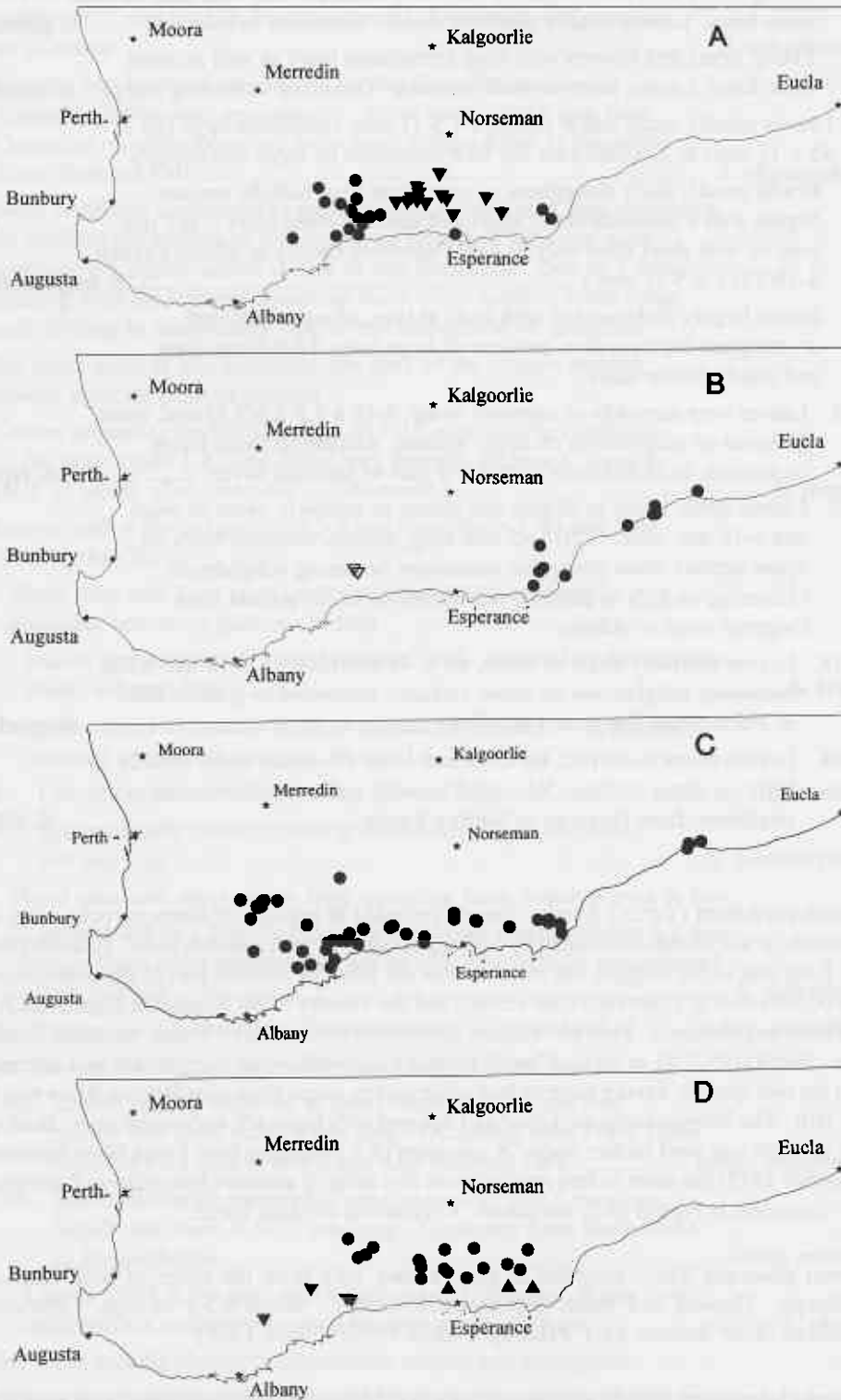


Figure 5. Distribution of the *Spyridium cordatum* group in Western Australia. A - *Spyridium cordatum* ●, *S. minutum* ▼; B - *S. glaucum* ▽, *S. tricolor* ●; C - *S. microcephalum*; D - *S. mucronatum* subsp. *mucronatum* ●, *S. mucronatum* subsp. *multiflorum* ▲, *S. mucronatum* subsp. *recurvum* ▼.

by a variety of species including *Acacia* species, Peppermint (*Agonis flexuosa*) Tuart (*Eucalyptus gomphocephala*) and other *Eucalyptus* species. Extends around the coast from Abrolhos Islands and Geraldton to Israelite Bay, also recorded from Eyre. Although the species occurs close to the South Australian border, there are no records from that State (Canning & Jessup 1986). Flowers and fruits: June-November. Shrub (0.4)0.6-5 m high. Two varieties have been named but are not recognized here because they are merely infra-populational variants. **Basket Flower**

typical variant - throughout the species range. Leaves glabrous and green on the upper surface. *Ceanothus globulosus* Labill., *Cryptandra globulosa* (Labill.) F. Muell., *Pomaderris aemula* Steud., *P. globulosa* (Labill.) G. Don, *P. phyllirifolia* Steud., *P. polyantha* Steud., *P. pyrrophylla* Steud., *Spyridium globulosum* var. *globulosum*, *Trymalium globulosum* (Labill.) Fenzl (Powell 1990: Figure on pp. 198-199).

hairy variant - known only from populations in Perth suburbs along the Swan River estuary, between Peppermint Grove and Kings Park, and on the lower Canning River at Aquinas Bay, occurring in mixed populations with the typical variant. Hairy on both surfaces of the leaves, which are therefore whitish. *Cryptandra albicans* (Steud.) F. Muell., *Pomaderris albicans* Steud., *Spyridium globulosum* var. *albicans* (Steud.) Diels, *Trymalium albicans* (Steud.) Reissek

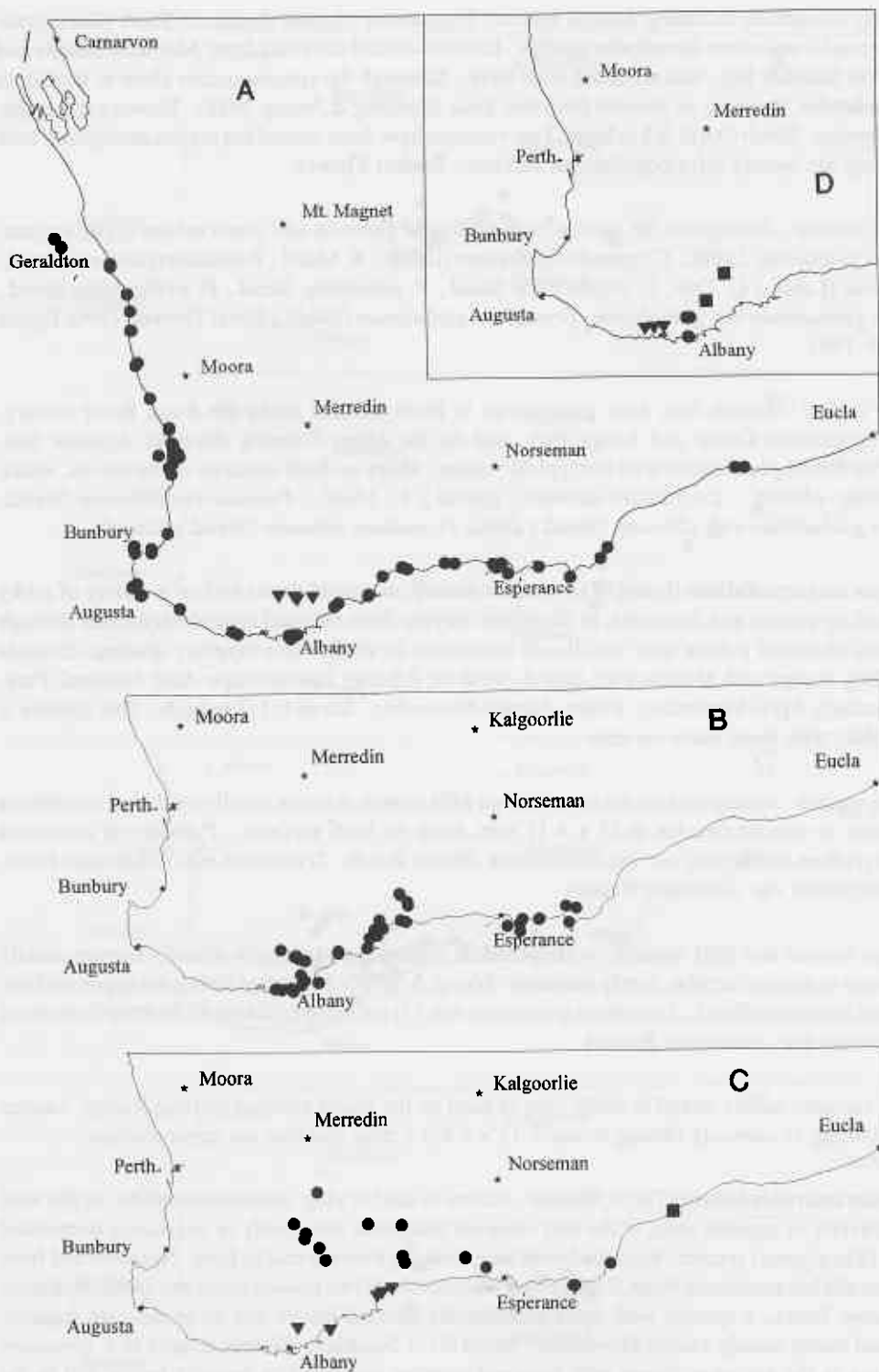
***Spyridium majoranifolium*** (Fenzl) Rye - occurs mainly on coastal dunes and on a variety of rocky sites, including granite and limestone, in situations varying from exposed coastal heathlands through to relatively sheltered gullies with woodlands dominated by mallee (*Eucalyptus*) species. Extends from Stirling Range and Mutton Bird Island (west of Albany) east to Cape Arid National Park. Flowers: mainly April-September. Fruits: August-November. Shrub 0.1-2 m high. This species is very variable, with three main variants.

typical variant - widespread on the coast and on hills inland. Leaves usually ovate but sometimes oblong-ovate or almost circular, 6-23 x 4-11 mm, hairy on both surfaces. *Pomaderris commixta* Steud., *Spyridium spadiceum* var. *majoranifolium* (Fenzl) Benth., *Trymalium majoranifolium* Fenzl, *T. majoranifolium* var. *velutinum* Reissek

atypical coastal and hills variant - widespread on the coast and on hills inland. Leaves usually oblong-ovate to almost circular, rarely narrowly oblong, 5-18 x 3-10 mm, glabrous on upper surface. *Pomaderris subretusa* Steud., *Spyridium spadiceum* var. (?) *calvescens* (Reissek) Benth., *Trymalium majoranifolium* var. *calvescens* Reissek

plains variant - occurs inland in sandy clay or sand on the plains south of Stirling Range. Leaves narrowly oblong to narrowly oblong-ovate, 7-12 x 2.5-3.5 mm, glabrous on upper surface.

***Spyridium microcephalum*** (Turcz.) Benth. - occurs in sand or clay, sometimes on hills, in the west often in gravelly or granitic soils, in the east often on limestone, commonly in vegetation dominated by mallee (*Eucalyptus*) species. Extends from Dongolocking Reserve east to Eyre. Not recorded from South Australia but specimens there, if they exist, would probably be housed under the name *Spyridium eriocephalum* Fenzl., a species with more prominently pointed leaves and more delicate stipules. Flowers and fruits: mainly March-November. Shrub 0.1-1.5 m high. Closely related to *S. cordatum* but differing in the narrower leaves with recurved margins more or less meeting below and in the usually larger disc, but there are intermediate specimens as described under *S. cordatum*. *Spyridium microcephalum* has two intergrading variants.



**Figure 6.** Distribution of the *Spyridium globulosum* and *S. oligocephalum* groups in Western Australia. A - *Spyridium globulosum* ●, *S. montanum* ▼; B - *S. majoranifolium*; C - *S. oligocephalum* ▼, *S. polycephalum* ●, *S. subochreatum* var. *subochreatum* ■; D - *S. riparium* ▼, *S. spadiceum* ●, *S. villosum* ■.

typical variant - extends from Boxwood Hill south to Munglinup. Leaves 1-1.4 mm wide, the margins usually meeting. Sepals with short, often ferruginous, hairs 0.2-0.3 mm long. *Cryptandra microcephala* Turcz., *Spyridium denticuliferum* Diels

hairy variant - extends from Dongolocking Reserve east to Eyre, but rare in the area where the typical variant occurs. Leaves up to 3.3 mm wide but usually less than 3 mm, the margins often separated. Sepals with white hairs up to 0.7 mm long but occasionally only c. 0.3 mm long.

**Spyridium minutum** Rye - occurs on plains, recorded mainly in sandy clay or sand over clay, usually in open shrublands dominated by *Eucalyptus* species with a mallee habit. Extends from near Salmon Gums south to near Gibson and from near the upper Young River east to near Mt Beaumont. Flowers and fruits: March-May, September-November. Shrub 0.1-0.25 m high. Closely related to *Spyridium cordatum* but, in addition to the characters used in the key, it is distinguished by its more persistent indumentum on the fruit. *Spyridium* sp. Mt Beaumont (K.R. Newbey 6718) (Rye 1995a: Figure 1G-K)

**Spyridium montanum** Rye - recorded from sandstone and shale on mountains, often in high gullies, in the central and eastern parts of Stirling Range. Flowers and fruits: April-July, October. Shrub 1-2.5 m high. **Priority 2** (Rye 1995a: Figure 1L-O)

**Spyridium mucronatum** Rye - occurs on sandy soils or sand with clay, in vegetation dominated by *Eucalyptus* species with a mallee habit, often in the shade beneath the mallees. Distributed in inland areas from Borden east to Cape Arid National Park, the northernmost locality being Frank Hann National Park. Shrub 0.15-0.6 m high. Flowers and fruits: September-March.

subsp. **mucronatum** - extends from Frank Hann National Park east to near Mt Buraminy (north of Cape Arid National Park). *Spyridium* sp. Frank Hann (K.R. Newbey 6688) (Rye 1995a: Figure 2A-C)

subsp. **multiflorum** Rye - extends from north of Gibson east to near Mt Ragged in Cape Arid National Park. **Priority 2** (Rye 1995a: Figure 2D,E)

subsp. **recurvum** Rye - occurs from Borden east to the Ravensthorpe area. **Priority 3** (Rye 1995a: Figure 2F-H)

**Spyridium oligocephalum** (Turcz.) Benth. - occurs in sandy soils, recorded either in heathlands or in shrublands dominated by *Eucalyptus* species with a mallee habit. Extends from near Kalgan River east to Fitzgerald River National Park. Flowers and fruits: March, July-October. Shrub 0.6-1.2 m high. Very closely related to *S. subochreatum* but, in addition to the characters described in the key, appears to differ in its more silvery leaves and less discrete or more elongate markings on the seed. *Spyridium kalganense* Diels, *Trymalium oligocephalum* Turcz. **Priority 3** (Rye 1995a: Figure 2I-N)

**Spyridium polycephalum** (Turcz.) Rye - occurs mainly in sandy soils, often on rocky hills, recorded in heathlands or shrublands, the latter commonly dominated by mallee (*Eucalyptus*) species. Extends from near Harrismith east to Mt Arid in Cape Arid National Park. Flowers and fruits: April-November. Shrub 0.3-1 m high. *Trymalium polycephalum* Turcz.

**Spyridium riparium** Rye - occurs along rivers and streams, in sandy or gravelly soil overlying lateritic soil, extending from Kent River east to Mitchell River. Flowers and fruits: July-November. Shrub 1-1.5 m high. **Priority 1** (Rye 1995a: Figure 20-S)

**Spyridium spadiceum** (Fenzl) Benth. - occurs on granitic hills in Porongurup Range and at Albany, one record giving the vegetation as a thicket and another as *Eucalyptus megacarpa* woodland. Flowers and fruits: October-February. Shrub 0.5-3 m high, usually with a prominent ferruginous indumentum on the young shoots. *Cryptandra spadicea* (Fenzl) F. Muell., *Pomaderris hirsuta* Steud., *Spyridium spadiceum* var. *spadiceum*, *Trymalium spadiceum* Fenzl, *T. thomasioides* Turcz. **Priority 2** (Rye 1995a: Figure 3A-D)

**Spyridium subochreatum** (F. Muell.) Reissek var. **subochreatum** - recorded from Toolinna, in limestone habitats with *Banksia* shrublands or *Eucalyptus* species with a mallee habit. Also occurs in South Australia, Victoria and possibly New South Wales. (A second variety, *Spyridium subochreatum* var. *laxiusculum* J.M. Black, distinguished by its less compact inflorescences, is restricted to South Australia.) Flowers and fruits: April-May, October. Fruits recorded October. Shrub 0.1-0.3 m high. The few Western Australian specimens can be readily distinguished from related species by the very short indumentum on the flowers and have large greyish green leaves 10-16 x 2-6 mm. However, if additional western populations are located, the indumentum length and leaf size may prove to overlap more with those of the closely related species *S. oligocephalum* and *S. polycephalum*. Certainly South Australian specimens of *S. subochreatum* are much more variable in leaf size and they occasionally have leaves becoming glabrous above. *Cryptandra subochreata* (F. Muell.) F. Muell., *Pomaderris subochreata* Reissek *nom. illeg.*, *Trymalium behrii* F. Muell. *ex Reissek*, *T. subochreatum* F. Muell. **Priority 2** (Canning & Jessop 1986: Figure 430D)

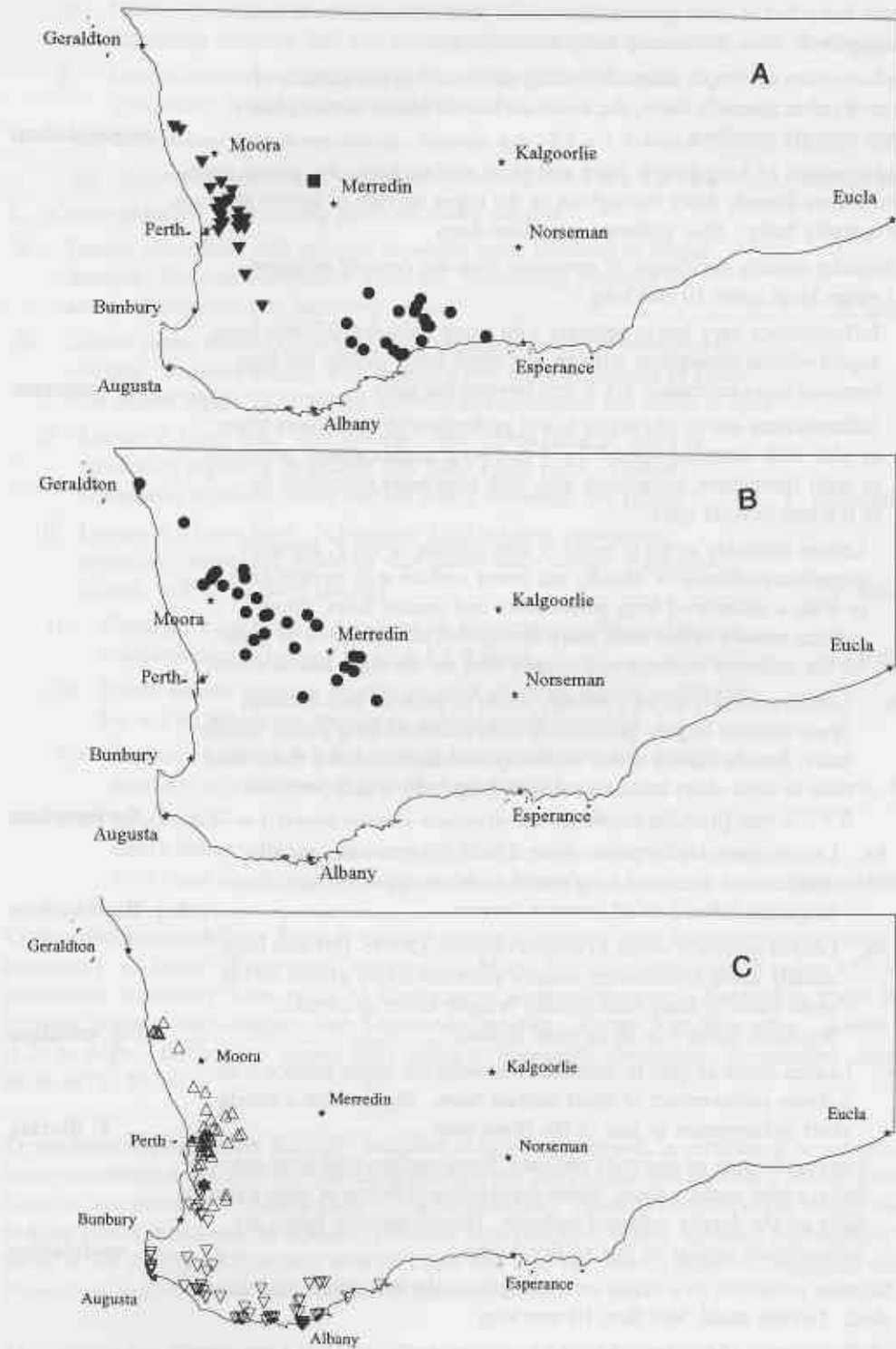
**Spyridium tricolor** W.R. Barker & Rye - occurs in sandy soil with limestone, often in shrublands dominated by mallee (*Eucalyptus*) species. Extends from Cape Arid National Park north-east to near Eyre. Also occurs in South Australia. Flowers: all year. Fruits: recorded July. Shrub 0.3-1.5(3) m high. (Barker & Rye 1993: Figure 1)

**Spyridium villosum** (Turcz.) Benth. - known from one location in the eastern part of Stirling Range, occurring in sand over sandstone, with an atypical specimen recorded from Ongerup in sandy soil. Flowers: October-November. Shrub 0.1-0.4 m high. Although the atypical specimen (*E.J. Croxford* 6644) has broader leaves and longer hairs on the sepals like *Spyridium spadiceum*, it appears to match *S. villosum* more closely. More collections are needed to determine how distinct the two taxa are. *Cryptandra villosa* Turcz. **Priority 2** (Rye 1995a: Figure 3E-H)

### **Trymalium** Fenzl

A primarily Western Australian genus, comprising 11 species endemic to Western Australia, a single species endemic to South Australia and two endemic to Victoria. Geographical distributions for the Western Australian taxa are given in Figures 7 and 8. Characteristics of the genus as a whole are outlined in Rye (1995a: 131). Most species have an unusual dehiscence of the schizocarp, which splits around the base in an irregular manner to release the fruitlets. Excluded from the genus is the Western Australian species that has been known either as *Trymalium wichurae* Nees *ex Reissek* or *Cryptandra wichurae* (Nees *ex Reissek*) C.A. Gardner. This species is atypical of both genera and Kevin Thiele (*pers. comm.*) intends to circumscribe a new genus incorporating this and an eastern Australian species, both originally described under the genus *Trymalium*.





**Figure 7.** Distribution of *Trymalium* species in Western Australia. A - *Trymalium angustifolium* ▼, *T. densiflorum* ■, *T. elachophyllum* ●; B - *T. daphnifolium*; C - *T. floribundum* subsp. *floribundum* ▲, *T. floribundum* subsp. *trifidum* ▼, intermediate between the two subspecies of *T. floribundum* ★.

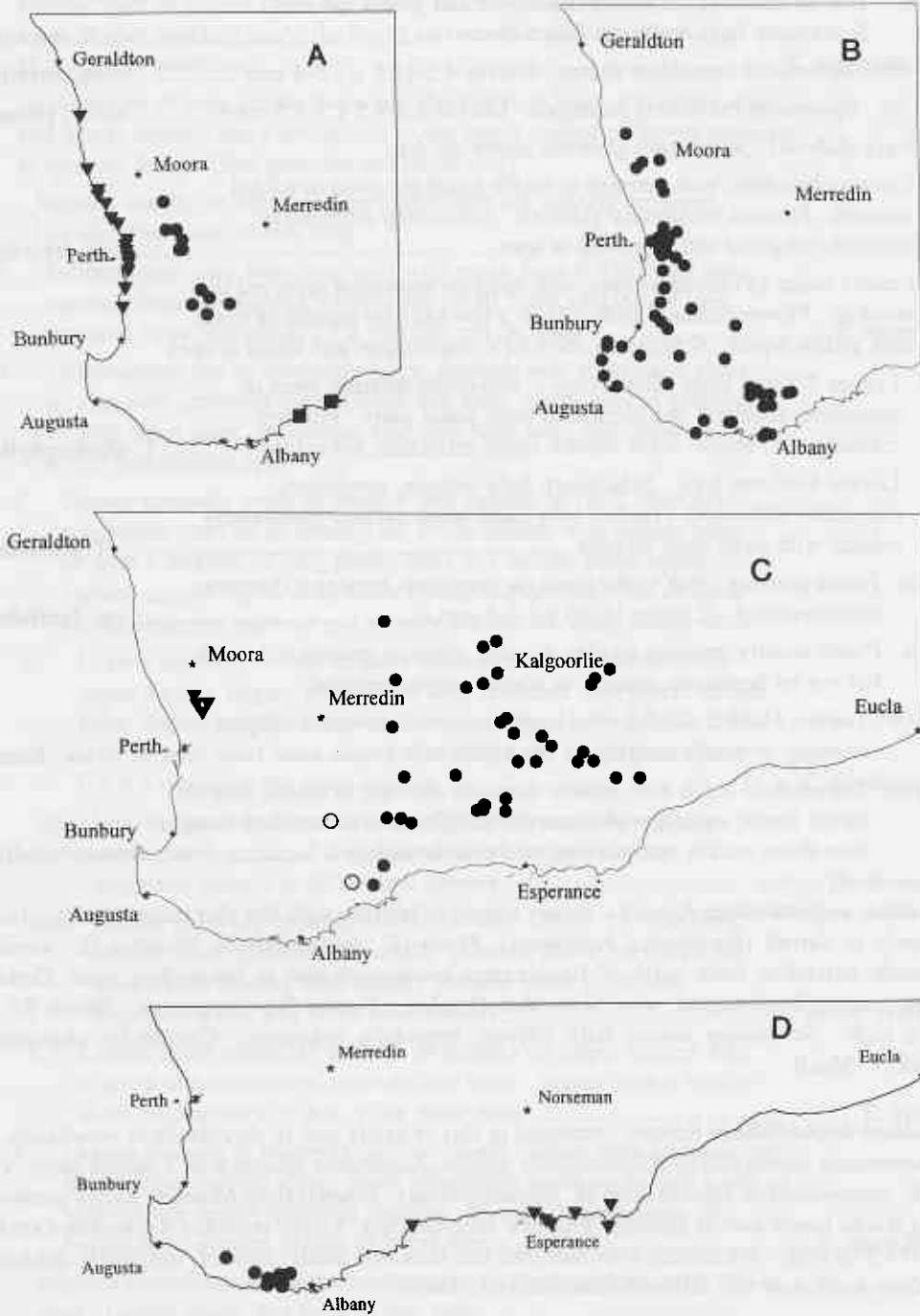
1. Ovary hairy but in most species surrounded (and often hidden at first) by a glabrous disc. Schizocarp hairy above the disc
2. Indumentum of simple hairs, the young stems and upper surface of leaves rather sparsely hairy, the lower surface of leaves densely hairy. Disc densely papillose ..... **T. angustifolium**
2. Indumentum of long simple hairs and short stellate hairs, the young stems and leaves densely hairy throughout or the upper surface of leaves glabrous to sparsely hairy. Disc glabrous or stellate-hairy
3. Stipules usually deciduous, if persistent then not densely arranged. Leaves large, over 10 mm long
4. Inflorescence very hairy; pedicels with many hairs 0.4-0.7 mm long; sepals villous throughout without any small hairs visible, the long terminal hairs extending 1-1.5 mm beyond the apex ..... **T. venustum**
4. Inflorescence not so obviously hairy; pedicels with short hairs alone or also with scattered hairs 0.2-0.4 mm long; sepals almost glabrous or with short hairs, sometimes also with long hairs extending up to 0.6 mm beyond apex
5. Leaves narrowly ovate to more or less circular or (in *T. litorale*) sometimes obovate or broadly so; lower surface with minute hairs or with a mixture of long patent hairs and minute hairs; upper surface usually rather dull, hairy throughout or with rows of hairs on the indented midvein and usually also on the main lateral veins
6. Leaves narrowly to very broadly ovate or more or less circular; upper surface largely glabrous or with scattered long patent simple hairs. Sepals usually either distinctly less densely hairy than floral tube or with short hairs mixed with long hairs which protrude 0.3-0.6 mm from the sepal apex ..... **T. floribundum**
  - 6a. Leaves narrowly ovate or ovate, 12-50(95) mm long, usually obtuse, with scattered long patent hairs on upper surface. Stigmatic lobes 2 in all or most flowers ..... subsp. **floribundum**
  - 6a. Leaves narrowly ovate to almost circular, (20)35-130 mm long, usually acute to attenuate, usually glabrous above except on the main veins, if hairy then usually broadly ovate to circular. Stigmatic lobes 3 in all or most flowers ..... subsp. **trifidum**
6. Leaves ovate-elliptic to obovate or broadly so; upper surface with a dense indumentum of short stellate hairs. Sepals with a similar short indumentum to that of the floral tube ..... **T. litorale**
5. Leaves obovate or narrowly obovate; lower surface with long antrorse hairs; upper surface shiny, either completely glabrous or with a row of hairs on the deeply indented midvein. (Sepals densely hairy, the indumentum similar to that of floral tube.) ..... **T. spatulatum**
3. Stipules persistent in a dense arrangement on the branchlets after leaves shed. Leaves small, less than 10 mm long
7. Inflorescence of condensed head-like cymes; pedicels 0.2-0.3 mm long at anthesis. Disc stellate-hairy ..... **T. densiflorum**
7. Inflorescence of elongate cymes; pedicels 0.5-2 mm long at anthesis. Disc glabrous

8. Leaves linear to narrowly obovate and with revolute margins.  
Schizocarp between half and three-quarters inferior ..... **T. daphnifolium**
8. Leaves narrowly obovate to obovate and folded inwards.  
Schizocarp fully or almost fully inferior ..... **T. myrtillus**
- 8a. Spinescent branchlets absent. Leaves 4.5-12.5 x 1.5-4 mm ..... subsp. **myrtillus**
- 8a. Spinescent branchlets numerous. Leaves 2.5-4.5 x 1-1.5 mm ..... subsp. **pungens**
1. Ovary glabrous. Schizocarp glabrous above the disc
9. Leaves obovate, with margins or whole blade incurved or folded inwards. Flowers completely glabrous. Schizocarp ellipsoid or narrowly ellipsoid and narrowed at apex ..... **T. urceolare**
9. Leaves linear to oblong-elliptic, with margins somewhat recurved to revolute. Flowers usually with at least a few hairs on outside of floral tube and/or sepals. Schizocarp obovoid to cup-shaped and broad at apex
10. Leaves 2-5 mm long. Schizocarp c. two-thirds inferior, erect or spreading, regularly dehiscent into three equal parts. Fruitlets coriaceous to brittle; inner surface finely reticulate, not ridged ..... **T. elachophyllum**
10. Leaves 8-40 mm long. Schizocarp fully inferior, pendulous, irregularly dehiscent. Fruitlets very hard; inner surface prominently ridged, with large deep lacunae ..... **T. ledifolium**
- 10a. Plants growing close to the coast on limestone, tending to become multistemmed. (Leaves 18-40 x 1.5-8 mm.) ..... var. **ledifolium**
- 10a. Plants usually growing on clay or sand, often on granite or laterite but not on limestone, usually or always single-stemmed
- 10b. Leaves 14-38 x 0.7-2.5 mm, long-linear, with revolute margins meeting or nearly meeting on the undersurface ..... var. **lineare**
- 10b. Leaves 8-37 x 1-6 mm, usually narrowly obovate to almost elliptic, rarely linear, usually with recurved margins, if with revolute margins then these usually not meeting on the undersurface ..... var. **rosmarinifolium**

**Trymalium angustifolium** Reissek - occurs mainly in lateritic soils but also recorded near granite, commonly in Jarrah (*Eucalyptus marginata*), Marri (*E. calophylla*) or Wandoo (*E. wandoo*) woodlands, extending from north of Badgingarra south-south-east to Boolarding (near Darkan). Flowers: mainly May-August, also September-October. Fruits: July-September. Shrub 0.1-0.6 (1.2) m high. Schizocarp almost fully inferior, irregularly dehiscent. *Cryptandra angustifolia* (Reissek) F. Muell.

**Trymalium daphnifolium** Reissek - recorded in clay or sandy soil, in shrublands or woodlands, the latter sometimes dominated by *Allocasuarina* species, *Eucalyptus* species with a mallee habit, York Gum (*E. loxophleba*) or Salmon Gum (*E. salmonophloia*). Extends from Moresby Range south-east to King Rocks (north-east of Hyden). Flowers: June-October. Fruits: recorded September-October. Shrub 0.4-3 m high. Schizocarp over half (but less than two-thirds) inferior, irregularly dehiscent. *Trymalium ledifolium* var. *daphnifolium* (Reissek) Benth.

**Trymalium densiflorum** Rye - known only from one specimen, collected in red soil near Trayning, in vegetation dominated by a *Eucalyptus* species with a mallee habit. Flowers: August. Shrub c. 1 m high. Schizocarp not seen. **Priority 1** (Rye 1995a: Figure 4A-C)



**Figure 8.** Distribution of *Trymalium* species in Western Australia. A - *T. ledifolium* var. *ledifolium* ▼, *T. ledifolium* var. *lineare* ●, *T. litorale* ■; B - *T. ledifolium* var. *rosmarinifolium*; C - *T. myrtilloides* subsp. *myrtilloides* ●, *T. myrtilloides* subsp. *pungens* ○, *T. urceolare* ▼; D - *T. spatulatum* ▼, *T. venustum* ●.

**Trymalium elachophyllum** Rye - recorded mainly in clay, sandy clay or gravelly soils, commonly dominated by small *Eucalyptus* species with a mallee habit, extending from Pingrup east to Young River. Flowers: mainly July-September. Fruits: August-October. Shrub 0.3-1.5 m high. Schizocarp c. two-thirds inferior, regularly dehiscent. (Rye 1995a: Figure 4D-G)

**Trymalium floribundum** Steud. - occurs mainly in clay, sandy clay or gravelly soils, often over laterite or other rock substrates, often in gullies or bordering watercourses and swamps, in woodlands or forests, extending from near Mt Lesueur south to Augusta and from there east to Mt Manypeaks. Shrub or tree 1-9 m high. Schizocarp less than half inferior, irregularly dehiscent. Closely related to *Trymalium venustum*, *T. litoralis* and *T. spatulatum*, all of which have been included in this species. A specimen intermediate between the two subspecies (*A.P. Hansen* 4/10/1984) occurs at Dwellingup on the border of their parapatric ranges.

subsp. **floribundum** - extends from near Mt Lesueur south to the Mt Saddleback area (west of Quindanning). Flowers: July-October. Fruits: September-December. Sepals glabrous or with short hairs only. *Trymalium billardierei* var. *calvescens* Reissek, *T. billardierei* var. *hirsutum* Reissek ex Benth. *nom. illeg.*, *T. billardierei* var. *dense-tomentosum* Fenzl, *T. billardierei* var. *tomentoso-hirsutum* Fenzl, *T. billardierei* var. *tomentosum* Reissek, *T. expansum* Steud., *T. ledifolium* var. (?) *obovatum* Benth., *T. odoratissimum* Lindl., *T. spatulatum* var. *tomentosum* (Reissek) Ostenf. (Diels & Pritzel 1905: Figure 44A-D)

subsp. **trifidum** Rye - commonly occurs in *Eucalyptus* forests, often along watercourses, sometimes forming an understorey in Karri (*E. diversicolor*) forest. Extends from Waroona Dam south to Augusta and Mt Manypeaks. Flowers: mainly August-November. Fruits: mainly October-January. Sepals sparsely to densely hairy, often with long hairs, which may extend up to 0.6 mm beyond apex. **Karri Hazel** (Rye 1995a: Figure 4H,I)

**Trymalium ledifolium** Fenzl - extends from near Illawong (north of Leeman) south to Albany. Flowers: mainly June-October. Fruits: mainly August-December. Shrub 0.3-2.5 m high. Schizocarp inferior, irregularly dehiscent. (Wheeler 1987: Figure 173)

var. **ledifolium** - occurs in coastal shrublands on limestone ridges, hills or outcrops, extending along the west coast from Illawong south to Yalgorup National Park. The name *Trymalium albicans* (a synonym of *Spyridium globulosum*) was misapplied to this taxon by Bentham (1863: 423) and treated as a separate species from the other (atypical) variants of *T. ledifolium*. Var. *ledifolium* appears to differ from the two varieties listed below only in minor characters, tending to be multi- rather than single-stemmed, have broader leaves and possibly more colourful flowers. *Cryptandra floribunda* Steud., *C. ledifolia* (Fenzl) F. Muell.

var. **rosmarinifolium** (Steud.) Benth. - occurs in clay or less commonly in sand, widespread in lateritic and granitic areas, in situations varying from low coastal heathlands to *Eucalyptus* forests. Extends from Coomallo Creek south to the far south-west of Western Australia and south-east to King George Sound. A very variable taxon in need of further study. It usually has shorter, flatter leaves than the other two variants, especially in the region from Yallingup east to Stirling Range. In the Wagin-Boyup Brook-Kojonup area, the leaves are narrow and almost linear, but still flat. In the Darling Range and northwards, it often has longer more elongate leaves with more revolute margins; some of the elongate-leaved specimens in the Darling Range have the leaves hairy on the upper surface and they also tend to have more hairy sepals than all the other variants. Specimens from the southern part of the Darling Range to the extreme south-west tend to have scattered stellate hairs (sometimes

also scattered simple hairs) on the schizocarps, which are glabrous on other specimens. *Cryptandra anomala* Steud., *C. glaucophylla* Steud., *C. westringiifolia* (Steud.) F. Muell., *Pomaderris rosmarinifolia* Steud., *P. westringiifolia* Steud., *Spyridium westringiifolium* (Steud.) Benth., ?*Trymalium ledifolium* var. *platyphyllum* Diels (type not located), *T. rosmarinifolium* (Steud.) Reissek, ?*T. vaccinioides* Suesseng. (type not located), *T. westringiifolium* (Steud.) Reissek

var. **lineare** Rye - mainly recorded in gravelly soils or on lateritic ridges but sometimes associated with granite, in woodlands (usually dominated by *Eucalyptus* species) or in shrublands, extending from near Calingiri south to near Wickiepin. (Rye 1995a: Figure 4J,K)

**Trymalium litorale** (Diels) Domin - known only from Cape Riche and Bremer Bay, recorded on coastal granite. Flowers and young fruits: July-September. Shrub height unknown. Mature schizocarp not seen. A poorly known taxon closely related to *Trymalium venustum*, *T. floribundum* and *T. spatulatum* but readily identified by the whitish, minutely stellate-hairy upper surface on its leaves. *Trymalium billardierei* var. *litorale* Diels **Priority 1** (Rye 1995a: Figure 5A)

**Trymalium myrtilus** S. Moore - occurs mainly in clay or sandy clay, sometimes associated with granite or other types of rocks, commonly in low to tall shrublands. Extends from Die Hardy Range south to near Bremer Bay and from near Lake Grace east to Balladonia. Flowers: July-October. Fruits: August-November. Shrub 0.5-3 m high. Schizocarp largely to fully inferior, regularly dehiscent.

subsp. **myrtilus** - extends from Die Hardy Range south to near Bremer Bay and south-east to Balladonia. One specimen from Bremer River (K.R. Newbey 4359), in the far south-west of the taxon's distribution, is unique in having many of the leaves 3-toothed at the apex. (Diels & Pritzel 1905: Figure 44E-G)

subsp. **pungens** Rye - see earlier description. **Priority 1**

**Trymalium spatulatum** (Labill.) Ostenf. - occurs on granitic hills and other elevated rocky sites, apparently often in rock crevices. An isolated record from Fitzgerald River National Park, otherwise extending from Esperance east to Mt Baring (Cape Arid National Park) and Middle Island. Flowers: July-September. Fruits: September-October. Shrub 1.2-3 m high. Schizocarp over half to almost two-thirds inferior, irregularly dehiscent. The use of the name *Trymalium spatulatum* is in doubt because it possibly should be regarded as a later homonym of a taxonomic synonym of *Spyridium spathulatum* F. Muell., a species occurring in South Australia and Victoria. *Ceanothus spatulatus* Labill., *Cryptandra billardierei* (Fenzl) F. Muell., *Pomaderris spatulata* (Labill.) G. Don, *Trymalium billardierei* Fenzl *nom. illeg.*

**Trymalium urceolare** (F. Muell.) Diels - occurs in reddish or brown clayey soils, often with lateritic gravel, usually in woodlands, often dominated by Wandoo (*Eucalyptus wandoo*). Extends from Moora south to the Bindoon area. Flowers: July-September. Fruits: September-November. Shrub c. 1 m high. Schizocarp inferior, irregularly dehiscent. *Trymalium billardierei* var. *urceolare* F. Muell. **Priority 2** (Diels & Pritzel 1905: Figure 44H,J; Rye 1995a: Figure 6)

**Trymalium venustum** Rye - occurs in sandy soil, often on laterite or with lateritic gravel, in Jarrah (*Eucalyptus marginata*) forest, sometimes also with Karri (*Eucalyptus diversicolor*) trees. Extends from north-east of Northcliffe east to Mitchell River and Denmark. Flowers: July-September, also recorded January-February. Young fruits: August. Shrub 1.5-4(6) m high. Mature schizocarp not seen. (Rye 1995a: Figure 5B-D)

### Acknowledgements

I would like to thank Amanda Spooner for devoting many hours to generating computer-assisted distribution maps for the taxa and Terena Lally for assisting in bringing the maps up to date. The diagnosis for the new subspecies was translated into Latin by Paul Wilson and the line illustrations were drawn by Margaret Pieroni.

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