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Australia's unique flora is a vast horticultural treasure. The world's peoples are seeking to beautify their landscapes and to decorate living and work places. The demand for suitable plants is increasing and horticulturists throughout the world are prospecting our treasure. In this new volume of Australian Plants we will seek to explore our natural floral resources of plants for gardens and landscapes, plants for small spaces and containers, plants for cut flower and plants of economic value, to ensure our national prosperity into the future.

Australia's unique flora forms a critical part of the earth's store of biodiversity, that combination of natural life forms that will be needed to sustain the human race into the future. It needs protection from the thoughtless or greedy. See our recipe for survival in The Green and Goldies, page 35.

Australia's unique flora supports all the life forms on this vast continent of ours. Competent planned protection of the life forms on our land is crucial to the long term survival of all. Over the last five years we have repeatedly submitted a simple plan of action for adoption as an objective for the year 2001 and beyond to commemorate the 100 years of federal government in the year 2001 but as yet have not received a hearing. We shall try again with our political leaders.

"It's time we started managing this country as if we intend to stay"

Andrew Campbell at the Australian Rangelands Conference

Our simple plan has been presented in various forms in previous issues. We shall present it again over issues of this volume. My sincere thanks to those of you who have contacted their politicians on this matter. You have achieved an incredible breakthrough, our plan is being implemented in pilot projects as will also be described to you.

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COVER PLATE: Fairalls Honeysuckle *Lambertia* is a dwarf to small densely branched shrub, the bright yellow flowers usually in heads of 5–7 flowers, often in profusion. With a well drained soil and plenty of sunshine this unique plant has potential as a cut flower and as a container plant. All species of *Lambertia* were described in our last issue.

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Wildflowers in Art

SGAP Going Goannas?

by Bonni Reichelt

There are times when the plea of "temporary insanity" can be the only answer to the question "Why did you do it?" Such was the case when the Displays Committee decided to do a floral sculpture for the first "Brisbane Flower and Garden Show", at the Southbank Convention Centre, Aug. 29–Sept. 1, 1996. We were desperate for ideas when along came Antoinette Edmunds, artist, sculptress and new Gold Coast SGAP member. Because of Antoinette's previous work (including paperbark animals, grass people and the floral "Grand Piano" at Southbank's Springtopia), she was offered free space for a floral sculpture. However, Antoinette had plans to go overseas and suggested that SGAP might like to do a floral sculpture to gain some publicity. Undaunted by the fact that we had never done any sculpture before, we decided to DO IT!

We embarked on a series of ideas that evolved from rainbow serpents to dinosaurs and finally accepted Antoinette's suggestion of two dancing lizards made of dried floral material with a centrepiece of fresh flowers. The Committee was faced with difficult decisions, were the lizards skinks or geckos? No, by their size they had to be goannas. What was the centrepiece? Should there be a blowfly or a butterfly on the top? Displays Officer, Ian Inglis, had a brainwave — there would be a "Spring" in the middle, because this was after all, a Spring flower show. The others looked dubious, but Ian, with the help of a metal working friend, proceeded to construct a 4ft wide and 6ft high black and gold coil with 37 plates welded on to hold flower bowls. Voila, le Spring!

Meanwhile Antoinette was giving Bonni last minute instructions over the telephone — metal plates, steel rods, chicken mesh and buckets of glue. Antoinette left for India with some misgivings. Nevertheless, the goannas grew from steel rod skeletons to chicken-mesh covered forms. Wrapping the forms with hessian strips soaked in wallpaper paste seemed to require the skills of an Egyptian mummy-maker. Next the polyurethane foam was injected. Slight miscalculations resulted in empty cavities in places and fantastic foam shapes oozing out from the toes and chest. By now the goannas had assumed the personalities of reptilian Frankensteins.

Decoration of the goannas required two teams of 4–6 people, working 2–3 days (about 60 hours per goanna), about 5 kg of glue and buckets of materials. We used sheets of paperbark from *Melaleuca quinquinervia* for the underside. Southside Branch created the striking "diamondback" pattern on their goanna with cream and yellow everlasting daisies, bordered with white *Ixodia archillaeioides* from SA. Gumnuts of different sizes on the face, arms and back created a scaly texture and colour contrast. The Gold Coast Branch did the "striped" goanna using the unopened flowerhead of *Banksia* 'Giant Candles' as a central strip, flanked by white *Ixodia*, *Eucalyptus ptychocarpa* gumnuts, daisies and leaves of *Grevillea baileyana* turned upside down for a coppery "scale" pattern. *Banksia integrifolia* cobs made perfect "toes".

Other gumnuts used included *Eucalyptus torelliana*, *E. youngiana* (for the eyes), *E. kingsmillii* and *Eucalyptus (Corymbia) intermedia*.

The result is shown on the next two pages, our report continuing on page 30.



▽ The SGAP Qld. **Gold Coast goanna**. The sculpture is *Banksia* 'Giant Candles' with white everlasts, *Ixodia*, *Eucalyptus*, *Myrtocarpa* gumnuts, everlasting daisies and



△ The SGAP Qld. **Southside goanna**, see page 3 for details.

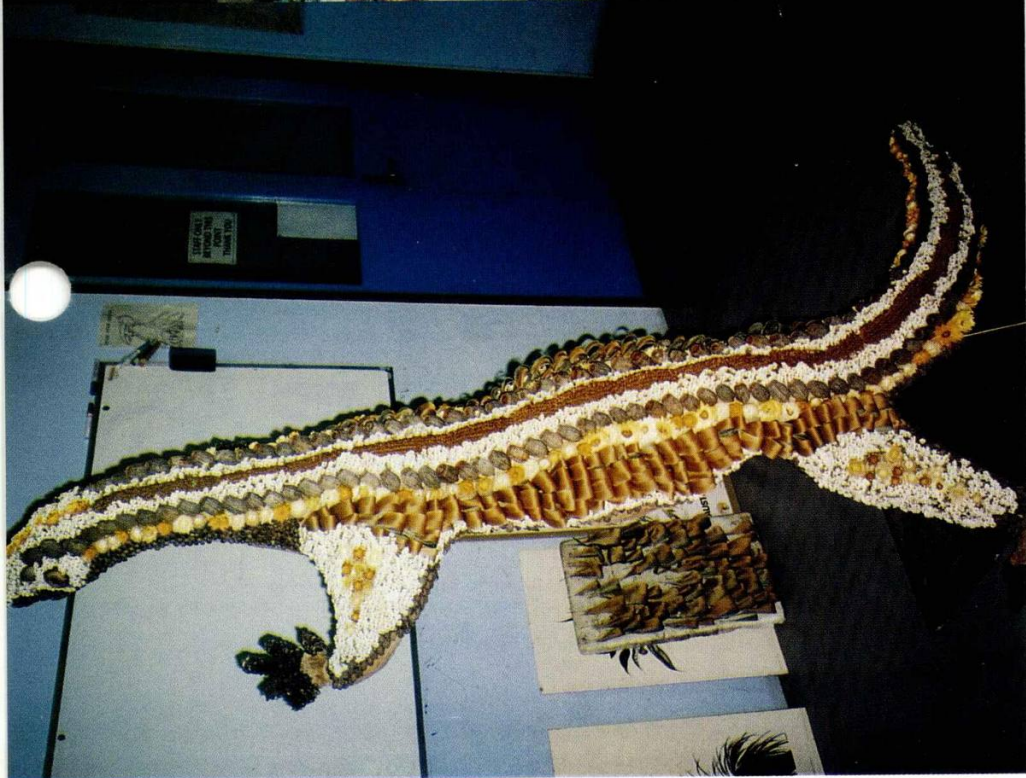




Figure 1

***Petrophile* with cylindrical (round in cross-section) or terete, undivided, smooth leaves.**

(Species with small terete leaves that have a rough surface are illustrated in Figures 2, 3 and 4)

A. *Petrophile longifolia*, a fruiting branch, the cone (fruiting head) terminal on the branch end.

B. *Petrophile teretifolia*, a flowering branch, the leaves shorter and also blunt on ends.

C. *Petrophile brevifolia*, a flowering branch, the leaves being shorter with a pungent point.

These are shown at one-third full size.

Characteristics of *Petrophile* flower and fruits as described opposite.

D. *Petrophile ericifolia* flower with four hairy tepals (petals) and the pollen presenter in centre.

E. *Petrophile misturata* flower with four tepals and pollen presenter (modified style).

F. *Petrophile cyathiliforma*, F1 an individual flower (in the bud F2) which will open to reveal the pollen presenter F3, F4 is a head of flower which in this species is cupped by persistent bracts which persist in the fruiting head F5, comprising nuts with a persistent hairy fringe, F6.

G. *Petrophile ericifolia*, a fruiting head where the involucral bracts do not persist, the nuts appearing to nestle in the persistent hairs fringing its fruits.

H. *Petrophile glauca*, a fruiting head where the nuts H2 are not as hairy but winged.

Petrophile, Conesticks

The genus

by D. B. Foreman*

Petrophile has its greatest development in heaths and shrublands in the south-west corner of Western Australia where 47 species occur the remaining six being a notable part of the eastern Australian flora. The name *Petrophile* (correctly pronounced **pet-ROFF-il-ee** not Petro-file as I hear many people say) refers to the rocky habitats (laterite) from where many of the early named species were collected. Unlike the closely related genus, *Isopogon* where the cone scales, which subtend each flower, fall off when the fruits are shed, those of *Petrophile* (along with the receptacle) become woody and persist for several years giving rise to the common name 'Conesticks'.

The leathery leaves of *Petrophile* species are highly variable and most species can be recognised using leaf characters alone. For this reason the sketches that follow show similar species to the same scale, grouped in accordance with a common leaf character and as outlined in the simple guide to species below.

The individual flowers are clustered together in globular or cylindrical heads commonly called cones which may or may not have a stalk. The flowers are cream or yellow (pink or mauve in a few species) In bud each is as in figure 1(F1), grouped in a bud as in F2, the four segments called tepals opening as shown in D and E. In the swollen end of each tepal is a single, sessile anther which releases pollen onto the modified style end called a pollen presenter. The pollen presenter is modified in various ornate ways as shown in B2, D, E and F3.

With so many species there has been an attempt to simplify it by grouping plants with similar leaf shapes as in the guide below and representing some of the species in each group in sketches on the one page. Those with cylindrical smooth undivided leaves as defined below are shown opposite. Others with similar leaves but rough to the touch are in figure 2 and 3 on pages 10 and 11, and those with similar leaves but divided or branched are in figures 4 and 5 on pages 14 and 15, etc.

A guide to *Petrophile* using easily recognised features

Leaves cylindrical (rounded in cross-section) and undivided

>Leaves smooth and spirally twisted (photo, page 24) *Petrophile helicophylla*

>Leaves smooth and straight (as in figure 1 opposite)

>>Flowering and fruiting cones with a distinct stalk

Petrophile teretifolia, *Petrophile stricta*

>>Flowering and fruiting cones without a distinct stalk,

>>>Most leaves more than 15 mm long with a very sharp needle-like point

Petrophile brevifolia, *Petrophile megalostigma*

>>> Most leaves more than 15 mm long, terminating in a blunt or sharp but not needle-like point

Petrophile teretifolia, *Petrophile acicularis*, *Petrophile media*,
Petrophile longifolia

>>> Most leaves 6-15 mm long

Petrophile phyllicoides, *Petrophile teretifolia*

*Based upon **Flora of Australia**, Volume 16, a CSIRO publication. Available as directed inside our rear cover for \$ 64.95. Permission to use this valuable scientific publication as a source for presentation in a way more easily read by those without a knowledge of botanical terms is appreciated by all. Readers are advised that, with a little perseverance, they can use the original work quite well and they are urged to purchase a copy of each volume in which they are interested, prices on application by mail to the address inside our rear cover. The author is Dr D. B. Foreman from the Royal Botanic Gardens, Melbourne. The sketches are by Ms A. Barley also from these gardens and Mr P. Cooper of Ballarat. Victoria, and are reproduced with permission.



Petrophile ericifolia, plant and flower.

Photography by John Simmons



A guide to species of *Petrophile*

continued from page 7

>Leaves, cylindrical, undivided and sand papery to touch, sometimes minutely so

>>Leaves 15–30 cm long

Petrophile aspera

>>Leaves to 2 cm long (ericoidie, short, cylindrical shaped leaves like those of *Erica*)

Petrophile ericifolia, *Petrophile wonganensis*, *Petrophile cyathiforma*, *Petrophile imbricata*, *Petrophile scabriuscula*, *Petrophile recurva*, *Petrophile merrallii*,
Petrophile misturata, *Petrophile arcuata*, *Petrophile trifurcata*

Sketches from this group are shown in figure 2 and 3 on page 10 and 11

Leaves cylindrical, variously divided

>Flowering and fruiting cones with a distinct stalk (fig. 4)

Petrophile shirleyae,

Petrophile pauciflora, *Petrophile serruriae*, *Petrophile pedunculata*,

Petrophile semifurcata

>Flowering and fruiting cones without a distinct stalk, see figure 5

>>Flowers without hairs

Petrophile fastigiata, *Petrophile seminuda*,

Petrophile crispata

>>Flowers variously hairy

>>>Nuts winged

Petrophile divaricata, *Petrophile chrysantha*

>>>Nuts not winged; leaves less than 20 mm long

Petrophile serruriae,

Petrophile misturata, *Petrophile trifurcata*

>>>Nuts not winged; leaves more than 20 mm long

Petrophile circinata,

Petrophile multisepta, *Petrophile rigida*, *Petrophile pulchella*, *Petrophile serruriae*,

Petrophile drummondii, *Petrophile sessilis*, *Petrophile conifera*,

Petrophile canescens

Leaves flattened

>Leaves undivided

>>Leaves undivided, margins entire (figure 6)

Petrophile plumosa,

Petrophile squamata, *Petrophile anceps*, *Petrophile heterophylla*,

Petrophile megalostigia

>>Leaves shortly lobed and/or the margins variously toothed,

Petrophile aculeata,

Petrophile plumosa, *Petrophile carduacea*, *Petrophile incurvata*

>Leaves pinnate or otherwise deeply divided, margins without distinct teeth (figure 7)

Petrophile glauca, *Petrophile diversifolia*, *Petrophile biternata*, *Petrophile biloba*,

Petrophile shuttleworthiana, *Petrophile macrostachya*, *Petrophile squamata*,

Petrophile striata, *Petrophile incurvata*, *Petrophile heterophylla*

Notes on all species of *Petrophile*

Petrophile acicularis is a low, tufted shrub to 80 cm tall. The leaves undivided, cylindrical, to 18 cm long, without a distinct petiole, tip blunt or ending in a short, straight or curved point. Cones are terminal, to 15 mm long in flower, to 20 mm long in fruit; sessile. Flowers are cream, to 10 mm long, densely hairy, appearing from September to October. This species is restricted to a narrow area from Denmark to Albany in Western Australia, growing in sand.

Petrophile aculeata (figure 6F) is a small shrub to 35 cm tall. The leaves are flattened, irregularly toothed in the upper half, to 9 cm long overall, slightly sand papery to touch, with no distinct petiole, up to 3 longitudinal veins visible on both surfaces. Cones are terminal or axillary, to 12 mm long in flower, to 12 mm diameter in fruit; sessile. Flowers (colour not known) are 11 mm long, hairy towards the tip, appearing in November. It is restricted to the Alexander Morrison National Park west of Coorow and near Eneabba in Western Australia. It grows in open heath in sand or laterite.

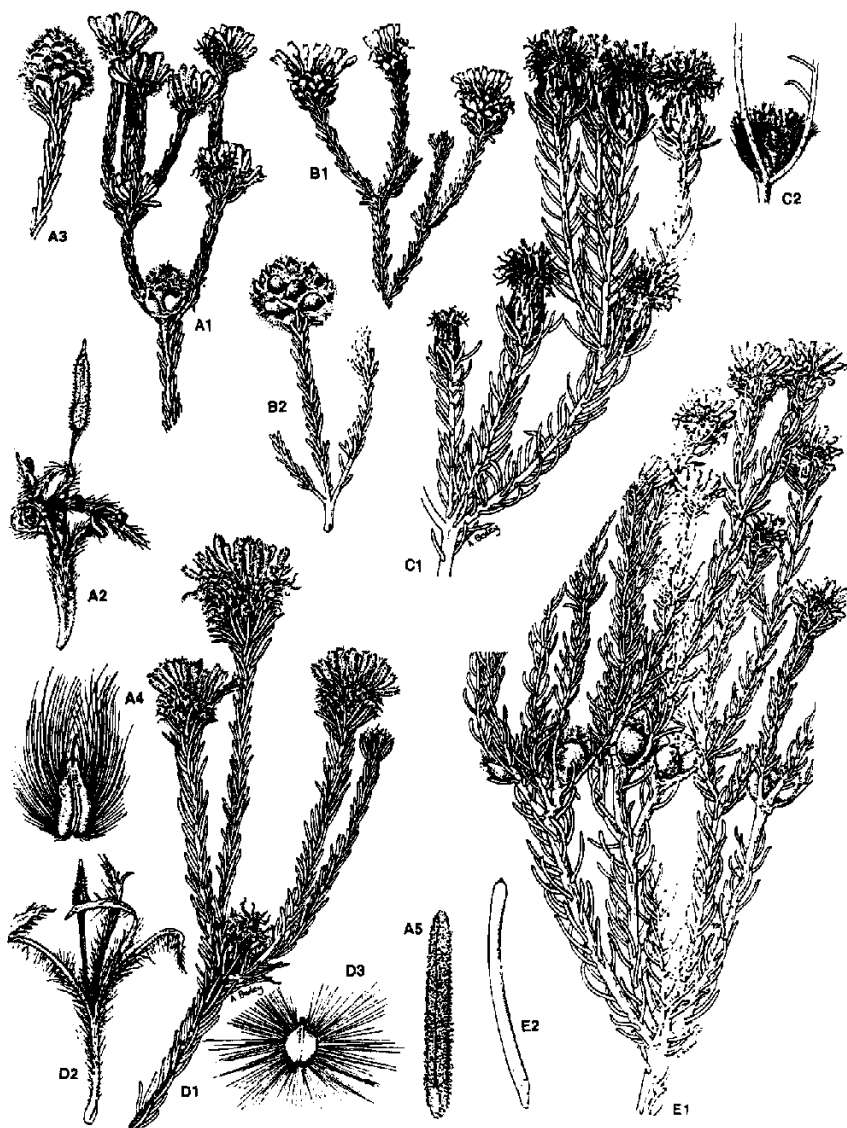


Figure 2

***Petrophile* with small terete leaves, undivided, with scabrous (rough) surface as in A5 except for E *Petrophile aculeata* where the leaves are smooth. Flowering branches, A1, B1, C1 and E1 are two-thirds full size.**

A. *Petrophile wonganensis*, A1 a flowering branch, A2 flower, A3 fruiting head, A4 nut.

B. *Petrophile ericifolia*, B1 a flowering branch, B2 a fruiting head, cone scales hairy at base.

C. *Petrophile cyathiforma*, showing characteristic persistent bracts, C2 fruiting head.

D. *Petrophile imbricata* also with persistent bracts, D2 flower, D3 nut.

E. *Petrophile aculeata* differing from above by its smooth leaves, E2.



Figure 3

Petrophile with terete leaves, undivided, more or less rough surfaced, F2 and G2. The bracts cupping the flowers drop off before fruit matures, flowers are not viscid (sticky). Details F1, G1, H1 and I1 are two-thirds full size.

F. *Petrophile merrallii*, F1 showing flowering and fruiting branches, F2 flower, F3 leaf.

G. *Petrophile recurva*, G1 with characteristic leaves curved at the end as in G2, nut G3.

H. *Petrophile misturata*, H1 a flowering branch, the leaves are silky, rough with lobes at ends.

I. *Petrophile trifurcata*, flowers are hirsute (with coarse hairs), leaves straight with 3 lobes.

Petrophile anceps (figure 6C) is a low shrub to 60 cm tall. The leaves are long and thin with a narrow winged margin, to 11 cm long overall, with no distinct petiole, tips needle-like. Cones are terminal, 20 mm long in flower, to 25 mm long in fruit; sessile. Flowers are yellow, to 15 mm long, hairy, appearing from September to October. Found only in the Stirling Range in Western Australia. in scrub or open heath growing on sandy soils.

Petrophile arcuata (figure 2E) is a spreading shrub to 1.2 m tall. The leaves are ericoid, undivided, cylindrical, slightly curved, slightly sandpapery to touch, to 15 mm long, tips sharp. Cones are terminal, 12 mm diameter in flower, to 15 mm diameter in fruit; sessile. Flowers are mostly deep creamy yellow, 12 mm long hairy, appearing from September to October. Mostly found between Southern Cross and Coolgardie in Western Australia, it grows in scrub on sand or sandy clays.

Petrophile aspera is a low set shrub to 1.3 m tall. The leaves are undivided, cylindrical, to 30 cm long, sandpapery to touch, often slightly twisted or curled, without a distinct petiole, tip ending in a short sharp point. Cones are terminal, to 30 mm long in flower, to 25 mm long in fruit; sessile. Flowers are pale pink, white or pale yellow, 20 mm long, hairy, appearing from August to November. Found in inland areas north of the Stirling Range, between Narrogin and Lake Grace in Western Australia, it grows in open woodland or shrubland on laterite or sandplains.

Petrophile blioba (figure 7N) is a shrub to 2 m tall. The leaves are rigid, spreading, to 4 cm long overall, deeply 3 lobed (lobes variously further divided), petiole to 20 mm long, leaf-blade flattened, prominently veined, tips needle-like. Cones are axillary, often crowded near the ends of the branchlets, to 22 mm long in flower, to 14 mm long in fruit; sessile. Flowers are mostly grey to pink, to 22 mm long, hairy, appearing from June to October. It occurs in the Darling Range in Western Australia, growing in granitic or lateritic soils in heath, often found with Jarrah or Marri.

Petrophile biternata is a shrub to 1.2 m tall. The leaves are variously divided, to 6.5 cm long overall, petiole to 28 mm long, leaf-blade flattened, thick, tips needle-like. Cones are terminal, to 25 mm long in flower, to 25 mm long in fruit; sessile. Flowers are yellow or creamy yellow, 10 mm long, sticky, hairless, appearing from August to October. Scattered in the Moora-Watheroo and Murchison River areas in Western Australia, it grows in shrubland or heath on laterite or sand.

Petrophile brevifolia (figure 1C, photograph on page 17) is a low multi-stemmed, spreading or erect shrub to 2 m tall. The leaves are undivided, cylindrical, to 10 cm long (usually less), without a distinct petiole, tip needle-like. Cones are terminal, 15 mm diameter in flower, to 20 mm diameter long in fruit; sessile. Flowers are yellow or cream to white, 20 mm long, hairy, appearing from June to December. Found in an area extending from the Kalbarri National Park to Ongerup in Western Australia, it is common in shrubland or heathland on sand or laterite.

Petrophile canescens (figure 5I) is an erect shrub to 3 m tall. The leaves are pinnately divided, to 11 cm long overall, petiole to 5 cm long, leaf-blade cylindrical, tips sharp or blunt. Cones are terminal, to 25 mm long in flower, to 40 mm long in fruit; sessile. Flowers are white to pale cream, 12 mm long, covered with silky hairs, appearing from September to January. A widespread species occurring from the Blackdown Tableland in Queensland to the southern tablelands of New South Wales, growing in dry sclerophyll forests and heathy areas on sandy soils.

Petrophile carduacea (figure 6G) is a shrub to 1.3 m tall. The leaves are deeply toothed, to 12 cm long, flattened, with no distinct petiole, to 5 cm wide, tip needle-pointed. Cones are axillary, 10 mm diameter in flower, 35 mm long in fruit, with a stalk to 15 mm long. Flowers are yellow, 8 mm long, covered with silky hairs, appearing from September to October. Found only in or near the Stirling Range in WA, it grows in scrub or heath on laterite or sandplain.

Petrophile chrysantha (figure 5B) is an erect shrub to 1 m tall. The leaves are crowded onto branchlets, to 20 mm long overall, petiole to 4 mm long, leaf-blade pinnately divided, cylindrical, tips needle-like. Cones are terminal, 10 mm long in flower, 10 mm long in fruit; sessile. Flowers are cream to dark yellow, 10 mm long, hairy, appearing from June to October. Found from around Regans Ford to around Eneabba and eastwards towards Marchagee in Western Australia, it grows in shrubland or woodland on sand or laterite.

Petrophile circinata (figure 5C, photograph on page 32) is a prickly, ground hugging shrub mostly to 80 cm tall. The leaves are much divided, to 20 cm long overall, petiole to 13 cm long, leaf blade cylindrical, tips needle-like. Cones are terminal, 25 mm diameter in flower, to 40 mm diameter in fruit; sessile. Flowers are white, yellow or cream, 40 mm long, hairy, appearing from June to November. Scattered from near Pingelly (south-east of Perth) to near Lake King in Western Australia, it grows in low shrubland or heath on sand or laterite.

Petrophile conferta (figure 5H) is a bushy much branched shrub to 1.5 m tall. The leaves are pinnately divided, to 11 cm long overall, petiole to 5 cm long, leaf-blade cylindrical, tips needle-like. Cones are terminal, to 30 mm long in flower, to 30 mm long in fruit; sessile. Flowers are cream to yellowish white, hairy, appearing from August to October. Commonly found from the Kalbarri, Murchison River area to near Mullewa in Western Australia, it grows on sandplain or in shrubby heath.

Petrophile crispata is a shrub to 80 cm tall. The leaves are pinnate, rigid, to 11 cm long overall, petiole to 4.5 cm long, leaf-blade cylindrical, tips needle-like. Cones are terminal, to 20 mm long in flower, to 25 mm long in fruit; sessile. Flowers are yellow, 10 mm long, hairless, appearing from September to November. Scattered in the south-west of Western Australia, it grows in shrubland or open woodland on laterite or sand.

Petrophile cyathiforma (figure 2C) is a small shrub to 65 cm tall. The leaves are ericoid, undivided, cylindrical, to 15 mm long, without a distinct petiole, tip needle-like. Cones are cup-shaped, terminal, to 15 mm diameter in flower, to 20 mm diameter in fruit; sessile. Flowers are bright yellow, 20 mm long, hairy except for the tips, appearing from September to December. Extending from near Corrigin to the Fitzgerald River National Park in Western Australia, it grows in low scrub and heath on sand or clayey sands.

Petrophile divaricata is a shrub to 2 m tall. The leaves are rigid, divided (bipinnate) to 11 cm long overall, petiole to 5 cm long, leaf-blade cylindrical, tips needle-like. Cones are axillary, 25 mm long in flower, 28 mm long in fruit; sessile. Flowers are yellow to pale creamy yellow, to 25 mm long, covered with silky hairs, appearing from August to December. Wide-spread in the south-western area of Western Australia, it grows in open woodland, Jarrah forest or in shrubland mostly on laterite or on sand overlying laterite.

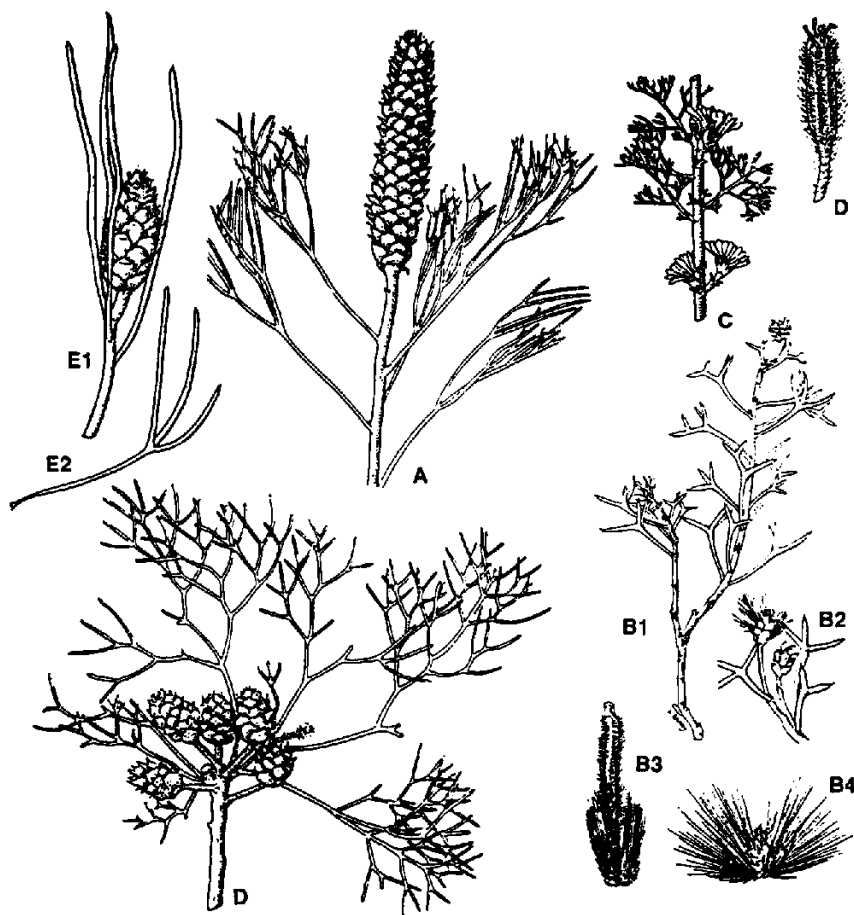


Figure 4

***Petrophile* with small terete leaves variously divided, inflorescence and cones pedunculate.** For species that are not pedunculate (the cones are on stalks) that is sessile, see figure 5. Details A1, B1, C1, D1 and E1 are one-third full size.

A. *Petrophile shirleyae* showing characteristic long fruiting cone.

B. *Petrophile pauciflora*, B1 flowering branch (few flowered), B2 fruiting cone.

C. *Petrophile serruriae*, C1 with numerous flowers along stem, C2 flower, C3 pollen presenter.

D. *Petrophile pedunculata*, a fruiting branch. Flowers are sparsely pubescent.

E. *Petrophile semifurcata*, a fruiting branch showing cone, E2 a leaf variation. Flowers silky.

***Petrophile diversifolia* (figure 7J)** is a shrub to 3 m tall. The juvenile leaves are often reddish and fernlike, adult leaves highly divided, to 11 cm long overall, with a well defined midrib, petiole to 26 mm long, leaf-blade flattened, tips needle-like. Cones are terminal or axillary, 17 mm long in flower, 30 mm long in fruit; with a stalk 20 mm long. Flowers are creamy white, rarely pink, to 12 mm long, densely hairy, appearing from September to December. Restricted to the southern part of the south-western corner of Western Australia from the Blackwood River to Bremer Bay, it grows in scrub or shrubland in sandy soils or laterite, sometimes in poorly drained areas.

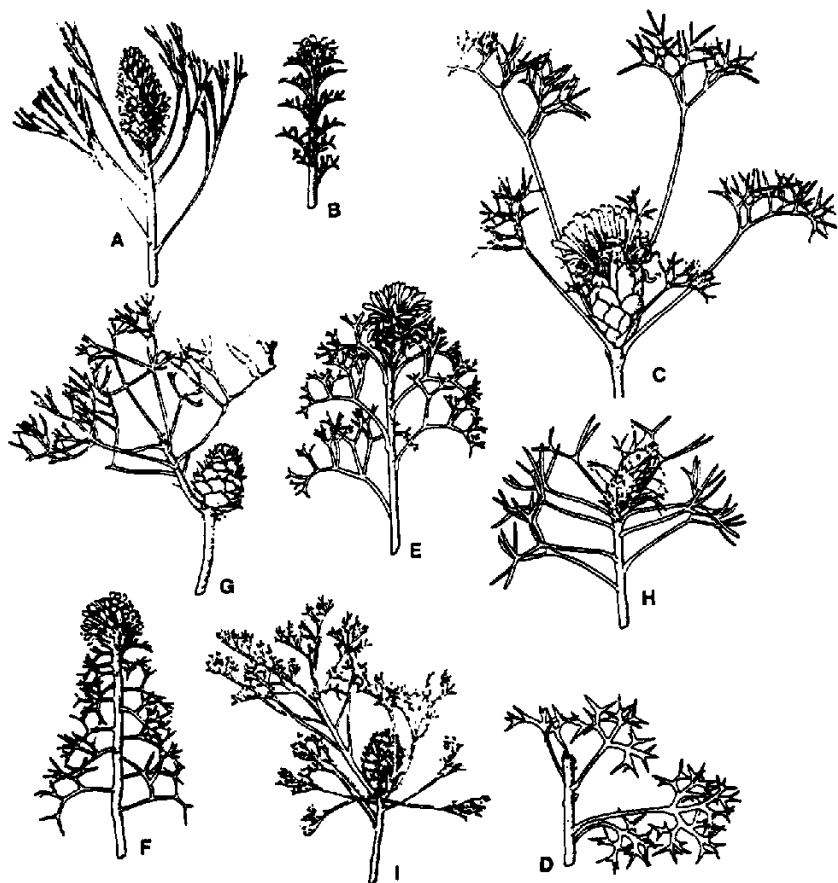


Figure 5

***Petrophile* with divided, terete leaves, inflorescence and cones are sessile (without stalks). Details above are at one-third full size.**

- A. *Petrophile fastigiata*, showing a flowering branch, flowers are glabrous (without hairs)
- B. *Petrophile chrysantha*, a flowering branch, flowers are hairy, the nuts are winged.
- C. *Petrophile circinata*, a flowering branch, flowers are hairy to 40 mm, leaves, glabrous.
- D. *Petrophile multisecta*, a flowering branch, flowers tomentose to 20 mm, leaves glabrous.
- E. *Petrophile rigida*, a flowering branch, flowers villous, leaves glabrous, rigid and pungent.
- F. *Petrophile drummondii*, the flower head is terminal, the leaves glabrous, rigid and pungent.
- G. *Petrophile sessilis*, the terminal fruiting habit is shown, flowers are silky yellow, leaves rigid.
- H. *Petrophile conifera*, terminal flower head, branchlets tomentose to woolly, flowers hirsute.
- I. *Petrophile canescens*, terminal fruiting head, leaves glabrous to silky, flowers silky.

Petrophile drummondii (figure 5F) is a shrub to 1.2 m tall. The leaves are much divided, to 5 cm long overall, petiole to 2.6 cm long, leaf-blade cylindrical, rigid, tips needle-like. Cones are terminal, to 40 mm long in flower, to 30 mm long in fruit; with a short stalk. Flowers are yellow, 20 mm long, hairy, sticky, appearing from August to December. Scattered throughout the Irwin and Avon botanical districts of Western Australia, roughly between the latitudes of Perth and Geraldton it grows in heaths on sand or laterite.

Petrophile ericifolia (figure 2B, photograph on page 8) is a shrub to 1.5 m tall. The leaves are ericoid (short and cylindrical like *Erica*), undivided, cylindrical, more or less sandpapery to touch, to 12 mm long, without a distinct petiole, tip sharp or blunt. Cones are terminal, to 20 mm diameter in flower, to 20 mm diameter in fruit; sessile. Flowers are yellow to 20 mm long, sometimes sticky, variously hairy, appearing from August to November. Two subspecies are recognised at the present time and they occur over a wide area in the drier, inland parts of the south west corner of Western Australia, growing in heathland or shrubland on sand.

Petrophile fastigiata (figure 5A, photograph on page 32) is an erect shrub to 1.5 m tall. The leaves are highly divided, held erect, to 11 cm long overall, petiole to 5 cm long, leaf-blade cylindrical, tip blunt. Cones are terminal, sticky, to 30 mm long in flower, to 40 mm long in fruit; sessile. Flowers are yellow to cream, 10 mm long, hairless, appearing from September to November. It occurs from Ravensthorpe to near Esperance in Western Australia, growing in scrub, shrubland or heath on laterite or sand.

Petrophile glauca (figure 7I, photograph on page 28) is an erect or low growing shrub to 1 m tall. The leaves are deeply lobed, to 19.5 cm long overall, bluish green with a white bloom (glaucous), petiole to 11 cm long, leaf blade flattened, tips needle-like. Cones are terminal or axillary, 14 mm diameter in flower, 15 mm diameter in fruit; sessile. Flowers are creamy yellow, yellow or creamy white, 14 mm long, covered with silky hairs, appearing mostly from August to November. Commonly found between Wagin and Lake King in Western Australia, but extending to nearby areas as well, it grows in a variety of shrubland or heathland habitats on laterite or sand.

Petrophile helicophylla (photograph on page 24) is a prostrate, spreading shrub to 30 cm tall. The leaves are spirally twisted, cylindrical, to 30 cm long, with no distinct petiole, tip sharp. Cones are terminal, borne at ground level, to 40 mm long in flower, to 25 mm long in fruit; with or without a short stalk. Flowers are white, creamy-white to pale pink, 35 mm long, hairy, appearing from October to February. Restricted to an area from near Ravensthorpe to near Jerramungup in WA, it grows mostly in low heath or open woodland on clay or sand.

Petrophile heterophylla (figure 6D, photograph on page 29) is a spindly shrub to 2 m tall. The leaves are deeply lobed or undivided, to 14 cm long overall, leaf-blade flattened, finely veined, tip needle-like. Cones are mostly axillary, to 15 mm long in flower, to 12 mm diameter in fruit; sessile. Flowers are pale yellow, yellow or cream, to 15 mm long, covered with silky hairs, appearing from August to October. It occurs from the Stirling Range to midway between Ravensthorpe and Esperance and extending inland to around Narrogin in Western Australia. Grows in scrub, woodland or tall heath on sandy soils or laterite.

Petrophile imbricata (figure 2D) is a shrub to 2 m tall. The leaves are ericoid, undivided, cylindrical, to 15 mm long, covered with fine short hairs, tip blunt or with a short, sharp point. Cones are terminal, to 18 mm diameter in flower, 18 mm diameter in fruit; sessile. Flowers are cream, 20 mm long, hairy, appearing from August to September. This species is restricted to the Dryandra State Forest, the Boyagin Nature Reserve and around Katanning in Western Australia, growing in woodland, scrub or heath on laterite or sand.



△ *Petrophile brevifolia* Photography by John Simmons

▽ *Petrophile divaricata* Photography by Collin Woolcock



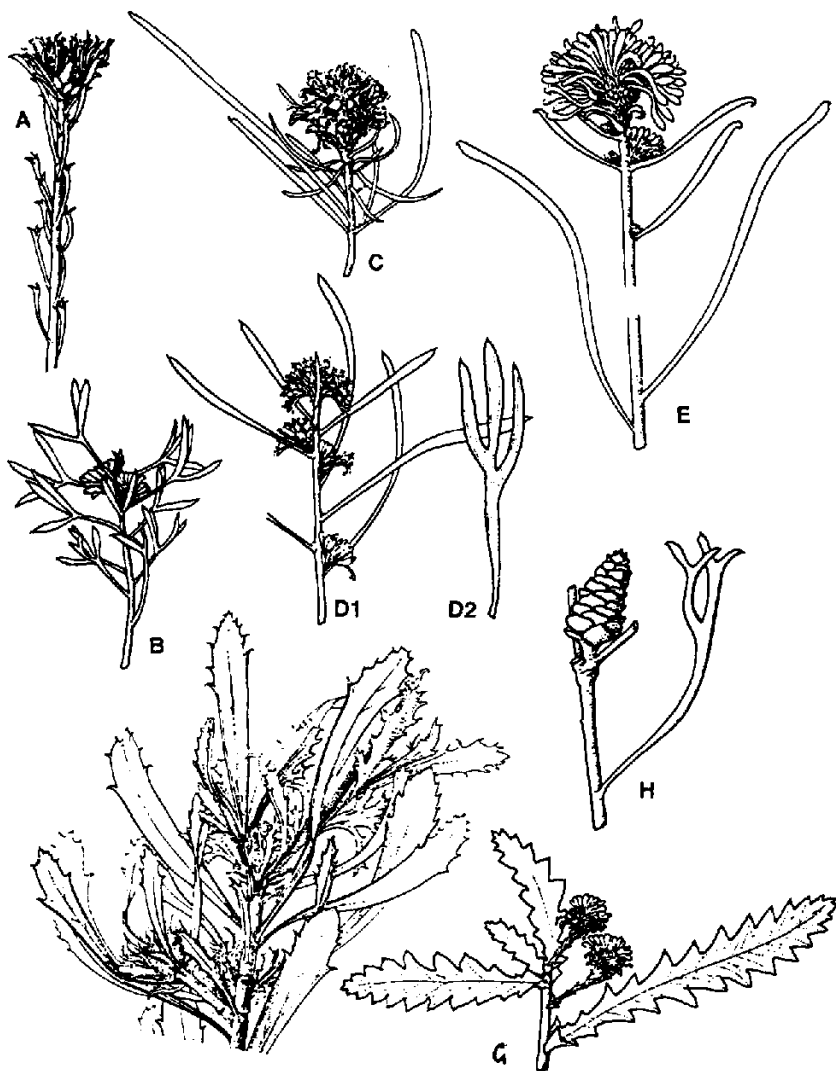


Figure 6

***Petrophile* with flattened leaves, undivided and with entire margins.**

- A. *Petrophile plumosa*. The leaves are plumose (feather-like) glabrescent with 2–3 short lobes.
 B. *Petrophile squamata*, a flowering branch, leaves glabrous and usually divided.
 C. *Petrophile anceps*, a flowering branch, leaves glabrous with winged margins.
 D. *Petrophile heterophylla*, leaves variable D1, rounded margins not extending to narrow wing.
 E. *Petrophile linearis*, leaves curved at apex, flowers grey-pink, mauve to white.

***Petrophile* with flattened leaves, undivided but with toothed margins.**

- F. *Petrophile aculeata*, leaves hirsute (coarse stiff longish hairs) teeth in curving back.
 G. *Petrophile carduacea*, the flower heads axillary and stalked, leaves glabrous and toothed.
 H. *Petrophile incurvata*, a fruiting branch with glabrous leaves 2–5 pungent incurved lobes.

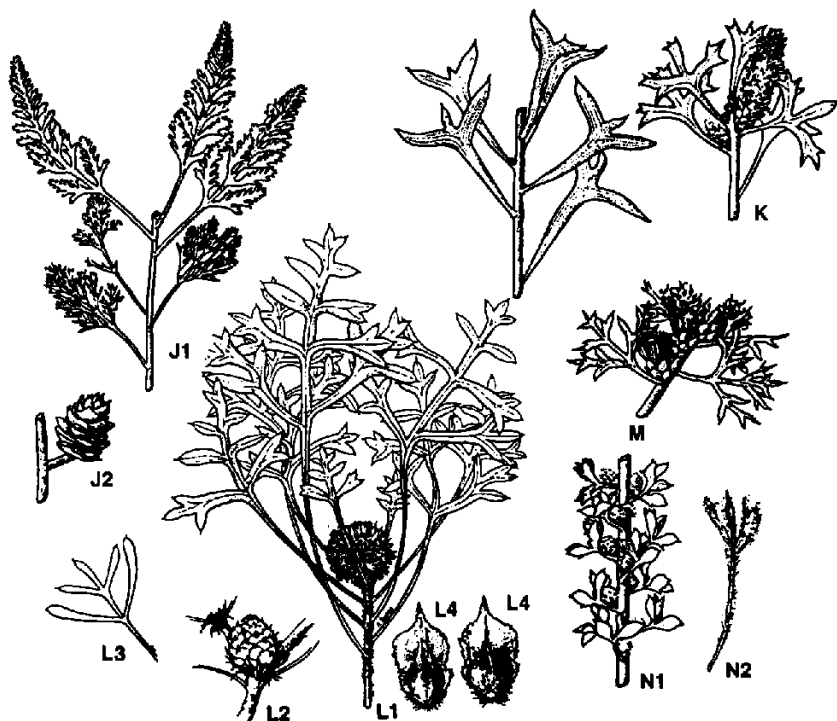


Figure 7

Petrophile with flattened leaves, divided, margins toothed and deeply divided.

I. *Petrophile glauca*, a flowering branch, the leaves glaucous. C2 a fruiting head, C3 a nut.

J. *Petrophile diversifolia*, leaves villous (soft and fern-like) when young, pinnate often $\times 2-3$.

K. *Petrophile macrostachya*, leaves tomentose, glabrescent with well defined midrib and veins.

L. *Petrophile shuttleworthiana*, leaves glabrous, faintly striated, pinnate or deeply trifid.

M. *Petrophile stricta*, leaves glabrescent with long fine hairs, pinnate or bipinnate.

N. *Petrophile biloba*, leaves hairy glabrescent, flowers villous (covered with long shaggy hairs).

O. *Petrophile squamata*, leaves glabrous or with fine hairs, flowers less villous than above.

Petrophile incurvata (figure 6H) is a much branched shrub to 1.2 m tall. The leaves are rigid, flattened, to 12 cm long overall, undivided or with up to 3 short incurved lobes, tips needle-like. Cones are terminal, axillary, to 35 mm long in flower, to 30 mm long in fruit; with or without a short stalk. Flowers are cream or yellowish white, to 14 mm long, covered with silky hairs, appearing in October. Restricted but locally common to the eastern side of Lake Moore and south to Wubin in Western Australia, it grows in shrubland on sand.

Petrophile linearis (figure 6E, photograph on page 25) is an erect shrub to 80 cm tall. The leaves, to 12 cm long overall, are flattened, thick, curved, without a distinct petiole, tip recurved, blunt or with a short sharp point. Cones are terminal or axillary, to 25 mm long in flower, to 25 mm long in fruit; sessile. Flowers are grey-pink to mauve to almost white, 35 mm long, hairy, appearing from August to November. Common on the coastal plain and Darling Range in Western Australia, it grows in woodland or heath on sand or laterite.



Petrophile macrostachya Photo by John Simmons



Petrophile amondii Photo by Collin Woolcock



Petrophile serruriae Photo by John Simmons



Petrophile squamata Photo by John Simmons

Petrophile longifolia (figure 1A, photograph on page 25) is a prostrate shrub to 50 cm tall. The leaves are undivided, cylindrical, to 30 cm long, without a distinct petiole, tip tapered into a point. Cones are terminal, to 30 mm long in flower, to 30 mm long in fruit; sessile. Flowers are yellow to cream, 25 mm long, hairy, appearing from July to March. Commonly found in the Cranbrook/Stirling Range area, it grows in woodland or heath in sandy to gravelly soils or in clay.

Petrophile macrostachya (figure 7K, photograph on page 20) is an erect, prickly shrub to 1 m tall. The leaves are rigid, divided, the segments often further divided, to 8 cm long overall, petiole more or less rounded, to 5 cm long, leaf-blade flattened, with conspicuous veins, tips needle-like. Cones are terminal or axillary, to 6 cm long in flower, to 6.5 cm long in fruit; sessile. Flowers are yellow to cream, 9 mm long, hairless, appearing from July to November. Occurring from Kalbarri National Park to near Gingin in Western Australia, it grows in heath, scrub or shrubland on sand.

Petrophile media (photograph on page 28) is a low spreading to erect under-shrub to 80 cm tall. The leaves are undivided, cylindrical, to 30 cm long, without a distinct stalk, tip sharp sometimes recurved. Cones are terminal, to 25 mm long in flower, to 25 mm long in fruit; sessile. Flowers are cream or yellow, to 20 mm long, hairy, appearing from August to February. It occurs from south of Perth to the Stirling Range, extending eastwards towards Ravensthorpe, growing in low shrubland or heath communities on laterite, sand or clay.

Petrophile megalostegia is an erect shrub to 1 m tall. The leaves are undivided, cylindrical or sometimes flattened, sometimes curved into an open S-shaped, to 8.5 cm long, without a distinct petiole, tip needle-pointed. Cones are terminal, up to 30 mm long in flower, to 15 mm long in fruit; sessile. Flowers are yellow to cream, 30 mm long, covered with silky hairs, appearing from August to October, from Mullewa to Watheroo in WA, in heath or shrubland on sand or laterite.

Petrophile merrallii (figure 3F) is an erect shrub to 1.1 m tall. The leaves are ericoid, spreading, undivided, cylindrical, very sand papery to touch, to 14 mm long, without a distinct petiole, tip blunt or with a sharp point. Cones are terminal, to 16 mm diameter in flower, to 20 mm diameter in fruit, sessile. Flowers are yellow, 15 mm long, hairy, appearing from August to October. Occurring from near Southern Cross to near Lake Grace in Western Australia it grows in heaths and shrublands in sandy soils.

Petrophile misturata (figure 3H) is a shrub to 1 m tall. The leaves are spreading, undivided or mostly divided into 3 short lobes towards the tips, to 16 mm long overall, petiole to 10 mm long, leaf-blade cylindrical, tips needle-pointed. Cones are terminal, sessile, to 10 mm diameter in flower, to 12 mm diameter in fruit. Flowers are dull yellow, 10 mm long, hairy, appearing from September to October. Mostly collected from Quairading (c.160 km east of Fremantle) in Western Australia, it is recorded as growing in sand.

Petrophile multisecta (figure 5D) is a densely branched shrub to 60 cm tall. The leaves are to 8 cm long overall, rigid, much divided, petiole to 4 cm long, leaf-blade terete, tip needle-like. Cones are axillary, to 25 mm long in flower, to 40 mm long in fruit; sessile. Flowers are cream, to 15 mm long, hairy, appearing from October to February. This species is endemic to Kangaroo Island in South Australia and grows on lateritic or calcareous sands.

Petrophile pauciflora (figure 4B) is a shrub to 1 m tall. The leaves are erect, sparse, cylindrical, mostly 3 forked, to 35 mm long overall, tips needle-like. Cones are axillary, few flowered, 8 mm diameter in flower, to 16 mm diameter in fruit; with a stalk to 6 mm long. Flowers are to 7 mm long, hairy, appearing in September, colour not known, probably yellow. This species occupies the extreme north-eastern range of the genus in W. A., only known from near Bimbij Station and south of Mulewa, growing in low very open heath on decaying granite.

Petrophile pedunculata (figure 4D, photograph on page 29) is an erect, spindly to bushy shrub to 2.5 m tall. The leaves are much branched, to 18.5 cm long overall, petiole to 9.5 cm long, leaf-blade cylindrical, tips sharp. Cones are axillary, to 15 mm long in flower, to 40 mm long in fruit; with a stalk to 20 mm long. Flowers are yellow to cream, to 10 mm long, sparsely hairy, appearing from October to January. Commonly found throughout the central and southern coastal and tablelands in NSW, in dry sclerophyll forest on sandstone or gravelly soils.

Petrophile phyllicoides is a shrub to 1.5 m tall. The leaves are ericoid, undivided, curving upwardly, cylindrical, to 15 mm long, tips sharp. Cones are terminal, 10 mm diameter, in flower, 28 mm diameter in fruit; sessile. Flowers are yellow, 12 mm long, hairless, appearing from September to December. Scattered over a wide area from the Stirling Range to Israelite Bay and inland to Tarin Rock and Newdegate in WA, growing in shrubland and heath on sand or laterite.

Petrophile plumosa (figure 6A) is a shrub to 1.3 m tall. The leaves are rigid, undivided or with up to 3 short lobes, to 32 mm long overall, petiole to 20 mm long overall, leaf-blade flattened, hairy, with a slight sand papery feel, tip needle-like. Cones are terminal, to 25 mm long in flower, 25 mm long in fruit; sessile. Flowers are pale yellow, 25 mm long, densely hairy, appearing from July to November. Scattered in the Moore River area north of Perth in Western Australia, growing in shrubland in sand and laterite.

Petrophile pulchella is a shrub to 3 m tall. The leaves are held more or less erectly, to 9 cm long overall, petiole to 5 cm long, leaf-blade cylindrical, pinnately divided, tips sharp. Cones are terminal or axillary, to 25 mm long in flower, to 65 mm long in fruit; sometimes with a short stalk. Flowers are cream, to 10 mm long, covered with silky hairs, appearing from August to March. Frequently found in coastal areas from southern New South Wales to south-east Queensland, growing in dry sclerophyll forests and heathlands on sandy or clay soils.

Petrophile recurva (figure 3G) is a much branched shrub to 2 m tall. The leaves are ericoid, undivided, cylindrical, to 13 mm long, tip recurved, needle-like. Cones are terminal, to 15 mm diameter in flower, to 15 mm diameter in fruit; sessile. Flowers are pale yellow to cream, 11 mm long, hairy, appearing from August to October. Restricted to north of Perth from near the coast at Jurien Bay, inland to Moora and north to Gingin in WA, in heath or shrubland on sand.

Petrophile rigida (figure 5E) is a shrub to 1.5 m tall. The leaves are rigid, much branched, to 8.5 cm long overall, petiole to 3.4 cm long, leaf-blade cylindrical, tips needle-like. Cones are terminal or axillary, to 25 mm long in flower, to 20 mm long in fruit; sessile. Flowers are cream with a yellow tip, 15 mm long, hairy, appearing from September to October. Scattered from Regans Ford (north of Perth) to around the Stirling Range and eastwards to the Fitzgerald National Park in Western Australia, growing in heath on sand.



Petrophile helicophylla plant and flowers, photography by E. A. George





△ *Petrophile linearis* Photography by R. Paynter ▽ *Petrophile longifolia* Photography by Brian Crafter



Petrophile scabriuscula is a dense spiny shrub to 1.2 m tall. The leaves are ericoid, undivided, cylindrical, sandpapery to touch, to 14 mm long, tip needle-like. Cones are terminal, slightly sticky, to 20 mm diameter in flower, to 20 mm long in fruit; sessile. Flowers are yellow to yellow-cream, to 14 mm long, hairy, appearing from May to October. It occurs in an area north of Perth, from near Moora to the Kalbarri National Park in Western Australia, growing in low heath or shrubland on sandy soils.

Petrophile semifurcata (figure 4E) is an erect, bushy shrub to 1.2 m tall. The leaves are rigid, cylindrical, to 14.5 cm long overall, divided into 2 or 3 main lobes, tips needle-like. Cones are terminal, to 4 cm long in flower, to 8 cm long in fruit; with a stalk to 20 mm long. Flowers are whitish, lemon-yellow to cream, 14 mm long, covered with silky hairs, appearing from September to November. Found mostly between Geraldton and Kalbarri in WA, in heath on sand.

Petrophile seminuda is a shrub to 1.2 m tall. The leaves are divided, to 12.8 cm long, overall, petiole to 4 cm long, leaf-blade, cylindrical, tips needle-like. Cones are terminal, to 20 mm long in flower, to 40 mm long in fruit; sessile. Flowers are yellow, to 12 mm long, hairless, appearing from September to November. Widely distributed in the south west of Western Australia, growing in woodland, shrubland and heathland on laterite or sandy soils.

Petrophile serruriae (figure 4C, photograph on page 21) is an erect or spreading shrub to 1.5 m tall. The leaves are crowded onto the branchlets, highly divided, to 35 mm long overall, petiole to 10 mm long, leaf-blade cylindrical, tip sharp to needle-like. Cones are in terminal clusters or upper leaf axils, 10 mm diameter in flower, to 12 mm diameter in fruit; sessile or with a short stalk. Flowers are yellowish or greyish mauve to pink (may indicate two subspecies), 16 mm long, covered with silky hairs, appearing from July to December. Commonly found in coastal limestone areas from Geraldton to near Albany in Western Australia, growing in woodland, shrubland or scrub heath in laterite or sand.

Petrophile sessilis (figure 5G) is an erect shrub to 3 m tall. The leaves are rigid, much divided, to 10 cm long overall, petiole 3 cm long, leaf-blade cylindrical, tips needle-like. Cones are terminal, to 25 mm long in flower, to 35 mm long in fruit; sessile. Flowers are creamy-yellow, to 14 mm long, covered with silky hairs, appearing from May to February. Scattered from the central coast to the central and southern tablelands of New South Wales, growing in dry sclerophyll forest, open woodland or heath on sandy or rocky soils.

Petrophile shirleyae (figure 4A) is an erect shrub to 1.2 m tall. The leaves are highly divided, to 20 cm long overall, petiole to 5 cm long, leaf-blade cylindrical, tips sharp to needle-like. Cones are terminal, to 5.5 cm long in flower, to 8 cm long in fruit; with a stalk to 4 cm long. Flowers are white to pale cream, to 12 mm long, covered with silky hairs, appearing from October to February. Restricted to the south-east coastal regions of Queensland, growing in heath or open sclerophyll forest on sandy soils.

Petrophile shuttleworthiana (figure 7L) is a shrub to 2 m tall. The leaves are rigid, divided, to 7 cm long overall, petiole to 4.5 cm long, leaf-blade flattened, tips needle-like. Cones are terminal or axillary, to 6 cm long in flower, to 6 cm long in fruit; sometimes with a short stalk to 14 mm long. Flowers are white to creamy white to yellow, to 12 mm long, hairless, appearing from September to October. Occurring from Moore River northwards to Kalbarri National Park and inland to Wongan Hills, in scrub, heath or shrubland on laterite or sandy soils.

Petrophile squamata (figure 6B, photograph on page 21) is an erect shrub to 1.5 m tall. The leaves are rigid, usually deeply divided, rarely undivided, to 6.5 cm long overall, petiole to 28 mm long, leaf-blade flattened, tips needle-like. Cones are axillary, to 10 mm long in flower, to 16 mm long in fruit; sessile. Flowers are creamy yellow to yellow, to 10 mm long, covered with longish silky hairs, appearing from July to December. A widespread and variable species extending from Perth to Israelite Bay in Western Australia, growing in a variety of shrubland, heathland or woodland habitats on sand, clay or gravelly soils.

Petrophile striata (figure 7M) is a multi-stemmed, often semi-prostrate shrub to 1 m tall. The leaves are highly divided, to 7.5 cm long overall, petiole to 22 mm long, leaf-blade flattened with a distinct midrib, tip needle-like. Cones are axillary, often clustered in upper leaf axils, to 15 mm diameter in flower, to 15 mm diameter in fruit; sessile. Flowers are yellow to cream, to 20 mm long, covered with silky hairs, appearing from August to December. It occurs in the Darling Range and nearby coastal plains, growing in woodland and shrubland on sandy soils sometimes with a high gravel content.

Petrophile stricta is an erect shrub to 1.6 m tall. The leaves are undivided, cylindrical, to 13.5 cm long, without a distinct petiole, tip with a short needle-like. Cones are terminal, to 20 mm long in flower, to 47 mm long in fruit; stalk to 12 mm long. Flowers are pink to cream, to 12 mm long, hairy, appearing from October to December. Occurring mainly in the drier, inland areas of south west Western Australia, growing in scrub and shrubland on sandy soils.

Petrophile teretifolia (figure 1B) is an erect or spreading shrub to 2 m tall. The leaves are undivided, cylindrical, to 20 cm long, without a distinct petiole, tip blunt or sharp. Cones are terminal or axillary, to 25 mm long in flower, to 25 mm long in fruit; sometimes with a short stalk. Flowers are pink to mauve, 25 mm long, hairy, appearing from September to January. Extending from the Stirling Range to Israelite Bay in WA, it grows in shrubland or heath on laterite or sand.

Petrophile trifurcata (figure 3I) is a shrub to 65 cm tall. The leaves are mostly divided into 3 short lobes towards the tips, cylindrical, to 16 mm long, tips sharp to needle-like. Cones are terminal, to 10 mm diameter in flower, to 12 mm diameter in fruit; sessile. Flowers are yellow, 10 mm long, hairy, appearing in September. Known from near Wongan Hills and from between Watheroo and Coorow in Western Australia, growing in sand.

Petrophile wonganensis (figure 2A) is a dense shrub to 1.5 m tall. The leaves are ericoid, undivided, cylindrical, with a slight sandpaper feel, to 9 mm long, tips blunt. Cones are terminal, to 15 mm diameter in flower, to 20 mm diameter in fruit; sessile. Flowers are yellow, 15 mm long, slightly sticky, hairy, appearing from August to January. Found mostly near Wongan Hills in Western Australia, growing in shrubland or heath on sandy soils. ■

Australian Native Plants

By John Wrigley and Murray Fagg

This excellent reference to the cultivated Australian flora has again been fully revised and reprinted for the fourth time following sales of 120,000 copies. It has proven to be the most valuable reference in a single volume and at and \$5.00 a copy it is excellent value. The authors are internationally known for their competence and valued opinion on all plants in the Australian flora that are likely to interest you. John Wrigley has contributed many articles to Australian Plants and his easily read concise style shown has no doubt led to the books outstanding success.



△ *Petrophile glauca*, photo N. Marriot

▽ *Petrophile media*, photo John Simmons





△ *Petrophile heterophylla* Photography by John Simmons

▽ *Petrophile pedunculata* Photography by M. O'Neill



Research on the Australia Flora

by Malcolm Reed, President, Australia Flora Foundation

Fourteen projects are in progress around Australia so we can expect some interesting reading in forthcoming reports. Six projects aim at domesticating native plants; *Conospermum*, *Dicksonia*, *Persoonia*, *Banksia*, *Stirlingia* and *Aponogeton*. Some will assist the cut flower and potted plant market.

Four other projects study the relationship between a plant species and other organisms, pathogenic or mycorrhizal fungi, or ants. Two others are of a more fundamental physiology study and two are exploring the effects of fire on the boundaries between rainforest and dry forest. There is also an extensive study of the ignition of leaves of bush plants, under controlled conditions.

Dr David Murray is writing condensed articles about this work for sending to magazines. These and other reports are available annually for \$10.00 sent to The Australian Flora Foundation, GPO Box 205, Sydney 2001. I sincerely hope that some readers will forward a donation to this address as our work is severely curtailed by limited funds. A bequest will be frugally but productively used on scientific research that could make a significant contribution to our flora.

The availability of modern technology will have a large impact in our work in the future. A site on the WWW could provide information on cross breeding, germination, cultivation, flowering times, etc. There is so much information tucked away in theses, local bulletins, even old scientific literature, which nobody can find! To get this started and open up the world of science and applied science to everyone we need funding initially, a Site Supervisor and Site Assessor (editor). There must be people out there who have some scientific training who would enjoy the challenge of this interesting work operating from home and from facilities that would be made available at research institutions. Please contact me.

Wildflowers in art — SGAP going goannas

Continued from page 3

Pat Shaw did a meticulous check of all the goanna references. Yes, they did have 5 toes, brow ridges and nostrils. As none of the species matched the colour and patterns of ours, she declared them a new species: *Varanus sgapiensis*.

The two goannas and the Spring were set up under the title, "Going Goannas". The Spring was covered with diagonal swirls of grevilleas, Geraldton wax, thryptomene and other lovely flowers. It was probably the most photographed display at the Brisbane Flower and Garden Show. Both Channel 9 and 10 took footage and the goannas appeared in the Midday Show, Channel 9 evening news, and another entertainment segment. Vogue Magazine photographed them and they were in the newspaper. Many visitors to the Show said they had seen the Goannas on TV and had come especially to see them!

We thank the following people for collecting all the materials required for the Goannas: Merve and Olwyn Hodge, Bill and Eunice Clark, Claire Shackel, Irene Cullen, Bonni Reichelt, Christine Proud, Ian Waldron, Beth McDonald and Sue Morgan. Members of Southside Branch who contributed their labour and artistic talents were: Irene Cullen, Pat Shaw, Ian Inglis, Claire Shackel, Margaret Jensen and Bonni Reichelt. The Gold Coast SGAP team consisted of Desnee Campbell, Brian and Lorna Ewing, Nerida Silke, Dorothy Meadows, Beth McDonald, Christine Proud and family, Anita Nelson, Joy Pyle and Bonni Reichelt.

Conservation of Australia

W. H. Payne

If our prosperous life is to survive into the future we must learn to conserve our natural resources and use them to advantage on a sustainable basis. Our proposals to the Chair person for the Centenary of the Federation in the year 2001 are based upon leadership of our major resource, people, we all want to join in, nature's way, under a national survival strategy plan. The following reports from "Sustainable Agriculture" show that the segment of our community with the most to gain initially, the rural community, is becoming very conscious of the crisis.

Environment study — State of the Environment Advisory Council. "Australia has some serious environmental problems and unless these are tackled urgently, Australian's run the risk of losing forever, vital elements of their national heritage" — quote.

Sustainable Agriculture* is a magazine produced with the Australian Farm Journal among other periodicals to service the Australian rural/farming community. The editorial for the first edition reads "We know the consequences of the unbalanced approach to farming, when the soil, water, vegetation and native animals and insects were disregarded. An enormous amount of work still needs to be done to halt and prevent degradation and restore damaged land. That is what Sustainable Agriculture magazine is all about. We aim to provide farmers with the practical ideas, technical research and organisational contacts that will help make the farming resources viable for the long term."

Working for the future of our land by the Land and Water Resources Research and Development Corporation**. Their mission is to improve the long-term productive capacity, sustainable use, management and conservation of Australia's land, water and vegetation resources through a directed, integrated and focused research effort. They report "Nationally, farm forestry has the potential to diversify and increase annual farm income by \$2.7 billion, improve agricultural productivity, conserve land, maintain biodiversity, and contribute to the national timber supply. Around 40% of the projected potential increase in farm income from farm forestry would come from timber production and 60% from increases in yield from shelter and improved land management."

Trees boost butterfat and koalas, a report on a property where 15% of the farm was retired from grazing to grow trees. With appropriate management practices, butterfat production has risen 50% with an increase in the koala and bird population.

CSIRO fights tree dieback on farms. Field work has identified tree species more resistant to insect (such as Christmas Beetle) attack. Experimental eucalypt orchards have now been established to develop forms with a genetic resistance to insect attack. A growing number of land holders want to be actively involved in conservation of Australia's biological diversity. This is as well as an appreciation that well located trees will lead to increased productivity on the property and the extra dollars they will get from harvesting the trees on a planned basis.

***Australian Farm Journal, Sustainable Agriculture** published by Rural Press, Box 160, Port Melbourne.

****The Land and Water Resources Research and Development Corporation (LWRRDC)** exists to provide national leadership in using research and development to improve the long-term productive capacity, sustainable use, management and conservation of Australia's land water and vegetation resources. For information phone (06) 257 3379.



△ *Petrophile circinata* Photography by Neil Marriott

▽ *Petrophile fastigiata* Photography by John Simmons



Landcare success alongside cell grazing. A report on Stewart Archer of Tasmania who, because of good whole farm management practices has received recognition in the 1996 Landcare Primary Producers awards. He is now known locally as "greenie of the year".

Fast, thirsty eucalypts turn the water table. Eucalypt plantations now have a short rotation (20–25 years) producing a higher quality timber as much as 35–55 years earlier than could be achieved from native forests. As well as making the adjacent land more productive by lowering the salt water table, the **Trees for Profit** scheme is an economic proposition.

Soil types that best suit blue gum plantations. A review of experiences on 105 blue-gum plantations in Western Australia.

Drains and trees restore farm balance. While adjacent properties have increasing salinity degradation, "Wilgri Creek" at Mt Barker, WA, have restored their land by planting trees. The property is now productive, fresh water is now used to irrigate a 4.5 ha cherry orchard in summer and some trees are now ready for harvesting.

Central West NSW Conservation Farmers Association is the first formed in NSW following the lead from Victoria and Western Australia. Contact, Nigel Martin (068) 98 1688.

How the community can help native vegetation. A guiding principle is the participation of all Australians, with a sharing of both burdens and the environmental, economic and social benefits. Australians need to be effective and efficient with our limited resources, make sustainable vegetation pay through new land management and enterprise and change expenditure priorities to ensure vegetation, land and water resources are restored and conserved for future generations.

The Murray-Darling Basin Commission has contributed numerous pages with articles headed; "Protecting the Basin"; "Paying for the past-dryland salinity"; "Education for sustainability, the blue-green algae study", and "Instant wildlife havens, the ephemeral lakes and wetlands of the inland". "Flying the flagship" recommends the adoption by councils in rural areas of a native animal or bird to symbolise the native vegetation conservation and rehabilitation such as the Coonabarabran squirrel glider. "River health: everyone plays their part", an assessment of riverine environment health. "Direction on video" concerns a new 50 minute video "Links with the land" available for \$25 sent to GPO Box 409 Canberra City, 2601, phone (06) 279 0100.

WE ARE SUCCEEDING TO GET PILOT PROJECTS STARTED

National Vegetation Initiative. The federal government's environmental strategy includes an incentive-based remnant vegetation protection package and a native vegetation regeneration programme.

Farm forestry funding. The federal government has announced funding of almost \$15 million for more than 50 projects under the Farm Forestry Program. Any significant expansion of commercial timber plantations would have to occur on cleared agricultural land, mostly owned by farmers. This scheme provides an opportunity to diversify the economic base of a property while at the same time providing substantial environmental benefits and improving agricultural productivity.

Corridors of Green, Wildlife Corridors by W. H. Payne*

The National Corridors of Green Program (NCOG) has at last received a name and some funding. This is one of our recommendations in our plan for adoption as an objective for the year 2001 celebrations. Our agitation for this concept over the last five years is at last showing results. It is part of the governments National Vegetation Initiative (NVI) and is at least a start. The programme will concentrate on the revegetation of Australia's degraded lands eventually to the extent of 25,000 hectares annually, and will protect remnant vegetation at risk from clearing. **There is \$5 million for corridor projects** in all states and territories immediately available. Those who can have money just for the asking for a properly prepared plan are land holders, Landcare groups, schools, councils and service clubs for tree planting, direct seeding and fencing to protect, enlarge and connect remaining patches of bushland.

Groups receiving funds must include an incorporated body to be legally responsible for the contract. Groups are responsible for administering project funds and complying with conditions. Regional projects will attract funding of \$30,000 to \$80,000 over two years for community education and co-ordinating, and works such as tree planting, direct seeding and fencing. All this mumbo-jumbo means that there is no longer an excuse for talk without action. The society is an incorporated body working autonomously in each state. There are dozens of local groups each in effect being an "incorporated body".

Facilitators are needed and you could be one. They are regarded as skilled and experienced local people employed part-time (yes this could be you) in land care, agroforestry, agriculture, whole farm planning, revegetation and community education. If you are prepared to put the time in to preparing a sound scheme you could receive remuneration for the time spent in supervising the scheme, the organisation of the honorary labour we will find in abundance for you, and the ordering and preparation of essential materials nominated and approved to implement the scheme. The money is there for the asking \$5 million dollars so there is not the need to scrounge and jeopardise the programme because of lack of cash. If you do not use it on your pet scheme someone else will use it possibly on a project not as rewarding to the environment as your vision.

Facilitators will:

- (a) promote the programme to receive support of the society.
- (b) help groups prepare funding submissions, there could be a number.
- (c) co-ordinate NCOG activities on other projects in the area.
- (d) provide technical advice to interested groups, stir up others.
- (e) help others get the projects started, assist and monitor progress.

Greening Australia will make their services available as approved by:

- (f) providing secretarial services and specialist advice.
- (g) administer programme funding through community incentive contracts.
- (h) advice to ensure that projects meet the criteria for funding.
- (i) employ and train facilitators and assist supervision of programmes.
- (j) through facilitators they will help groups to develop projects.
- (k) manage project reporting to give assurance that management is good.
- (l) help publicise the project and see that participants feel rewarded.
- (m) help develop new projects so that expertise developed is utilised.

Corridors of Green supplements other schemes existing such as One Billion Trees, Urban Forests, Save the Bush and Grasslands Ecology programmes and complements the National Landcare Programme.

Green and Goldies

Australian's concerned for environment with prosperity

We are "greenies" with a difference. The very survival of mankind depends upon the care taken of the planet we have infested. Australians are entrusted with a vast part of the planet earth, our island/continent home. How we manage this vast natural resource could be a guide to other lands on the survival of us all.

Greenies with a difference? It is possible to conserve our natural resources at the same time nurturing them to ensure even greater prosperity for the future. Our plan submitted for adoption for the centenary of federal government in 2001 is for all concerned Australians to become "green and goldies", "greenie" for conservation of the environment and "goldie" for planned prosperity beyond the year 2001.

The authority to administer our celebrations has recently been proclaimed. For five years now we have been agitating for the early formation of this authority and for its adoption as a major objective, a master plan for the future management of our natural resources. I shall resubmit our plan for consideration.

What we want is leadership into the future, an imaginative plan for the competent conservation and development of this unique continent and a catalyst for inspiring the trustees of this land, the general public. The vast majority of Australian's are "green and goldies" at heart. They are concerned about the environment. They are concerned about the future. They are concerned about the waste and destruction of natural resources. If it can be shown that **the green and gold way** is the conservation and nurturing of natural resources such that it will lead to greater prosperity well into the future, the latent "green and goldie" concern would manifest itself as an upsurge in national pride, endeavour and comradeship to be a part of this prosperous "green and gold" future. ■

Desertification of the Australian Continent

by Mary E. White, D.sc, 34 Beatty St, Balgowlah, NSW 2093

I am currently writing a book on the desertification of the Australian continent. The format will be similar to my previous books* — scientific information presented in accessible form without jargon, lavishly illustrated in colour by photographs, maps, graphs and diagrams. Though there are many books and papers on the whole subject and on parts of it, they are either like text or reference books, or official reports, and do not have a wide appeal to general readers.

I believe the situation regarding land and water degradation in Australia is so serious that the sort of synthesis which I propose will be useful. As many people as possible need to know about the problems, and to see them against the background of the geological history, and in a global as well as Australian context. The book will not only be about the state of over-grazed rangelands, soil erosion and decline in fertility, salinisation, catchment and river degradation, weed and animal invasion, extinctions, loss of biodiversity and destruction of forests. It will present alternative land-use options, Landcare projects, rehabilitation schemes and methods. A selection of case studies will be used to illustrate the sorts of situations which occur in different parts of Australia, how they are being dealt with and, where possible, how individuals can become involved in the community programmes which are tackling environmental problems from a "bottom up" perspective. Initiatives by Government departments and agencies are also relevant, and I would like to know about specific areas of expertise in which Australia leads the world because I am tired of the cynicism that is prevalent.

I need information on sustainable land-use projects and experiments completed or in hand. Any help readers can give me will be greatly appreciated and will be acknowledged. ■

*Editor. Please respond direct to Mary at the above address if you can help. Her previous well known books are **The Greening of Gondwana**, **The Nature of Hidden Worlds**, **Time on our Hands** and **After the Greening** and **The Browning of Australia**.

A.N.F.G.A.

Australian Native Flower Growers and Promoters Inc. Report by W. H. Payne

A new organisation of commercial flower growers has been formed. The concern has been that the unique Australian flora has not been adequately exploited for commercial horticulture and that the growers concerns were not properly represented. There has been a vast increase in the world wide demand for cut flowers and the export earnings from flowers based upon Australia's wildflowers could become a significant contribution to Australia's economy.

A major impediment to development of export flowers is the small volume of a particular flower for which there is already a demand, over the minimum period required of 6-8 weeks. One objective of the new growers group is to encourage more wildflower farms to boost or diversify rural economy and to meet demand.

Quality of the product and reliability of supply is the major concern in establishing a world wide market. The demand has been met in the past by wild bush picking but this needs to be supplemented and eventually replaced by wildflower farms producing a superior product over a longer production period. In many instances the devastation of the bush by bush picking of wildflowers for sale is leading to the virtual extinction of some species. Commercial farming of Waratah has now reached the stage where bush picking should cease. The same position will soon be reached with Christmas Bells and NSW Christmas Bush.

Southern African flowers such as *Protea* have been marketed with Australian flowers promoting the impression that *Protea* and its allies are Australian flowers. This impression has been given to the florist trade and it is widely held throughout Australia. South African wildflowers are beautiful flowers worthy of marketing in their own right. The present marketing practices, supported by Australian government agencies, are having serious consequences on the marketing of Australian flowers.

There are a number of Australian flower growers in various areas of Australia working largely in isolation. The local autonomy and intimate knowledge of local growing conditions has assisted in the prosperity of these groups. The new growers group is hoping to maintain this local autonomy but as well, to offer an opportunity for an exchange of experiences, assist in market promotion and provide a much needed voice in the local and international industry.

It is proposed to have a series of seminars in country areas of New South Wales to advise prospective local growers of plants they can produce to meet the existing market demand and how they should proceed if they wished to commence commercial wildflower production. The experiences including problems met by already established commercial growers are freely aired. The important warning is given is that this is not a get rich quick scheme but rather a commercial undertaking with all the risks of a new venture.

The first of these country seminars was at Coffs Harbour in 1996 to be followed in 1997 by gatherings of growers at Batemans Bay in March and Wagga Wagga in June. For information write to The Secretary, A.N.F.G.A. Australian Native Flower Growers and Promoters Inc., P.O. Box 9 Kariong, NSW, 2250. ■

Acacia from Seed

Wattles as Container Plants

by Colleen Keena

I have only raised wattles from seed. I pour almost boiling water on seeds and leave overnight. Seeds are placed in seedling trays and pricked out when true leaves appear. I use brand-names of potting mix and add a small quantity of slow-release fertilizer for natives to the mix. Plants are watered with an automatic watering system that comes on for 10 minutes daily in summer and less often in winter. Seedlings are kept in a fully enclosed shade-house with 30% shade cloth and brought into full sun once I see roots emerge from the pots. Plants are potted on gradually until the desired size of pot is reached.

Species raised from seed include *Acacia conferta*, *A. juncifolia*, *A. macradenia*, *A. fimbriata*, *A. perangusta*, *A. podalyriifolia*, *A. spectabilis* and *A. suaveolens*. Self sown species that have been potted up include *Acacia complanta*, *A. concurrens* and *A. fimbriata*. Some species, e.g., *Acacia amblygona* have been purchased when in flower.

The time the plants are attractive as container plants varies, especially as so far I have not pruned them. Some such as *Acacia suaveolens* with large bluish-green seedpods have extended the time that they are attractive as a pot plant.

Flowers would be the main feature of *Acacia amblygona*, *A. juncifolia*, *A. fimbriata* and *A. complanta* although all have attractive dark-green foliage. *Acacia amblygona* has almost triangular leaves, *A. juncifolia* has needle-like foliage, *A. complanta* has glossy oval-shaped leaves and the Brisbane wattle, *A. fimbriata* has pendulous foliage which complements the foliage of the other three species.

Acacia conferta is perhaps the most promising wattle that I have so far grown in a pot. The narrow, dense foliage on arching branches makes an attractive pot plant. The dark-green form from the Forestry nursery in Brisbane, is a 3 m bush (when planted in the ground) which flowers over an extended period of at least six months during the hottest part of the year. It is easily raised from seed. Contained to a 1 metre in 6 inch pot it would be an ideal flowering pot plant.

Eco Echo — The Green Voice of the Sunshine Coast

A quarterly magazine published by the Sunshine Coast Environment Council in south-eastern Queensland, this very creditable magazine sets a desirable standard for all regional groups concerned about the environment. Apart from its exceptional standard of presentation, 44 large pages, it will be of interest only to the residents of the area where it can be obtained for \$3 per copy, P.O. Box 269, Nambour, Qld 4560. A very commendable effort indeed by all concerned.

Kuranga Handbook of Australian Plants

by Gwen and Rodger Elliott et al.

Melbourne residents are fortunate to have the world's best Australian plant nursery in easy reach. The range of plants is very impressive and the envy of all in the trade. This has presented a dilemma, how to assist the customer with features they want to know. With their usual attention to accurate detail, the team at Kuranga Nursery, led by Gwen Elliott, have produced this 176 page small book that groups the plants under ground covers, grasses and clumping plants, small, medium and large shrubs and trees. Each factor that affects reliable cultivation such as sun and shade, soil type and conditions, etc., are given for every plant. The introduction has a crash course on how to plant and grow them. A valuable reference for not only Melbourne residents, but for all who hope to grow natives in temperate areas. A steal at \$19.95.

New Australian Cutflowers?

The Queensland experience

by David Hockings

Some Queensland plants have been bush harvested for local sale for well over 100 years. I can remember 60 years ago, buckets of Christmas Bells, *Boronia falcifolia*, *Boronia saffrolifera* and *Conospermum taxifolium* offered for sale at the road side. Butcher shops in those days were decorated with the very long-lasting waxy green fronds of Byfield Fern. Some, such as *Persoonia virgata*, *Caustis blakeri* (Foxtail or Koala Fern) and the leaves of *Xanthorrhoea* (Grass Trees) are still picked in large quantities from roadsides or leases. They are potential crop plants but as long as they are available from the wild, there is no incentive for development.

The first actual farming of native plants for cut flowers took place near Gosford, NSW, towards the end of the first World War. The area is naturally, very rich in showy wildflowers and the farming took advantage of natural stands and further developed areas of Waratah, Christmas Bells, Christmas Bush and *Boronia serrulata* (Native Rose). Other plants such as Kangaroo Paw and paper daisies such as *Helipterum roseum* from Western Australia were added.

Attempts to capitalise on the growing international popularity of Australian cut wildflowers, have almost exclusively involved growing Western Australian plants. This is a very sad reflection on the generally poor knowledge of eastern native species and the lack of interest in them. Each region of Queensland has plants with good potential for development as commercial crops. I believe there is the opportunity for virtually each district to develop a distinct new commercial crop of cut flower or foliage. New cut-flowers developed from local species would be better suited to the district's climate and soils having due regard to the quality of water available.

Following a life time of field study looking at wildflowers, photographing wildflowers and growing wildflowers, I am attempting to develop new commercial varieties concentrating of course, on plants native to the eastern and northern part of the continent.

The first commercially developed species is *Stenanthemum* syn. *Cryptandra* which I patented as Corroboree Flower in 1986 with another PVR variety in 1992. Work on several other different plants is in hand.

Other workers on local native plants have been Graham and Esther Cook who have selected some showy varieties of Rice Flower. The Redlands Horticulture Research Station has also worked on Rice Flower and produced good varieties as well as working on improving the vase-life of grevilleas. Margaret Johnson of University of Queensland — Gatton has done some interesting work with *Caustis blakeri* — the Koala Fern.

A Queensland growers group, The Wax and Native Flower Association has been growing and marketing Geraldton Wax varieties, Kangaroo Paws, Rice Flower and Corroboree Flower, *Stenanthemum* since 1989. Another group, Ausbud has specialised more in eucalyptus buds and foliage and will need to developing clonal material because of the great variability obvious in seedlings.

To develop a wildflower as a cut flower crop

The first basic steps anyone can take to develop their local wildflowers are to simply test them for cut life. If a plant lasts a week or so, it is interesting; if it lasts two weeks or more it is very interesting. However, you must give the cut samples a fair test. The cut branches should be in the water within half an hour and the stems recut. You will need to be quite particular about the water. Both the water and the container must be clean. A major reason for cut-flowers wilting, is from bacteria clogging the microscopic water tubes in the stem.

Wash the containers with water containing chlorine, household bleach will do, and also add a few drops to each half bucket of water. The water may also need to be acidified and this is easy to achieve by adding $\frac{1}{4}$ to $\frac{1}{2}$ teaspoon of citric acid per half bucket of water. It is possible that some post-harvest treatment such as STS used for Geraldton Wax may improve an otherwise marginally useful flower or one that tends to drop flowers readily.

Following are ideal qualities you should search for when trialing a new cut-flower. I am sure virtually each district has plants worth putting to these tests.

1. At least 2 weeks vase-life.
2. Leaves generally smaller than the flowers or not more conspicuous.
3. Stems long, thin wiry, erect.
4. No tendency to wilt or flop even as they age.
5. Only 5 to 10 stems necessary to make a suitable bunch.
6. Easy to grow.
7. At least relatively free of major pests and diseases.
8. Early or late production to avoid markets already heavily supplied.

Do not confine your efforts to just one individual plant in a group or colony. Species variation is very important and it is not uncommon to find just one individual plant in a patch that is inferior or superior in vase life or ease of propagation. I start with 5 seedlings of any plant that shows possibilities. I will next plant 20 to 100 seedlings or if seed is hard to raise, cuttings of individual plants. You are looking at species variability and for plants that show some advantage such as more flowers, smaller leaves or straighter stems.

The selected forms, are then propagated from cuttings and grown in plots of 10 to 20 plants for comparison. Remember, this is probably year 3 or 4. You may need to grow seedlings again from your best forms or you may need to locate other wild provenances seeking greater variability. As you can see there is a great deal of work to be done in selection, propagation, nutrition, post-harvest treatment before the potential of many species can be realised.

If bush-picked material is acceptable in the trade, the species has potential to become a cultivated crop. Cultivated plants produce higher quality flowers than bush-picked material, but while the bush-picked product is available cultivated flowers may not realise a better price. Adequate marketing will improve this.

You can help the flower industry of Australia to produce cut flowers in Australia rather than overseas such as in Israel. You can also make a significant blow to **bush picking** and a worthwhile contribution to the **survival of the natural flora** by trialing wildflowers as above for their cut flower potential. There are many flowers in the wild that have a vast potential on the export flower market. They need not be a flamboyant waratah, the demand for filler flowers appears insatiable and cash returns are often greater. Editor.

If you live in NSW west of the divide please see the request on page 40

Corroboree Flower

by David Hockings

Stenanthemum scortechenii 'Corroboree' was patented in 1987 by David Hockings in Queensland. It is also marketed as 'Snowballs' and 'Cotton Bush'. It is a woody perennial shrub that grows to about 1.5 metres in height. The branches bear a heavy crop of woolly flowerheads that are used as filler flowers. The flowers are sold as fresh natural, fresh dyed and also make an excellent dried and dyed product. Fresh blooms are produced mainly from June to October.

Stenanthemum scortechenii (syn. *Cryptandra scortechenii*) is found on acidic soils from Queensland's granite belt south into New South Wales. It will tolerate temperatures from below -6°C to occasional summer extremes to 40°C. At any age it will suffer no damage from heavy frost but it is intolerant of salty and alkaline water and like other natives, is sensitive to phosphorous fertilisers.

Provided the soil and water are suitable, 'Corroboree Flower' is an easy plant to grow and under suitable cultural conditions makes rapid growth. The dense basal growth provides many harvestable stems. With suitable conditions following harvesting, plants re-shoot strongly from the base for the following years crop. Some 12 year old plants are still producing. It has few pest and disease problems.

Stenanthemum scortechenii 'White Mischief' was accepted under Plant Variety Rights in 1993 and is marketed for landscape use. It makes an attractive easy-care hedge or a feature plant. This cultivar differs from 'Corroboree Flower' in its more arching to prostrate habit

Planting Corroboree Flower for cut flowers

When planted by August a crop will be produced the following season. The flowers are produced mainly from June to October, and are in demand in the fresh filler market. They are also excellent for drying and dyeing as described below and surplus crop may be stored for sale when other fresh flowers have waned.

Acidic free-draining loamy or sandy soils are recommended. Growers have produced market quality bunches in areas from southern NSW to central Queensland as this is a hardy crop with few problems. Plants of all ages planted in the open without protection have been unaffected by frosts as low as -6°. Drip irrigation is recommended particularly following harvest to assist regrowth. Check water quality as salty and alkaline water is detrimental. ▷

Wildflower farming in the Riverina of New South Wales

There will be a workshop weekend in Wagga Wagga in June, 1997, to promote the establishment of commercial wildflower farms on the western slopes but principally the Riverina area north from the Murray and west to South Australia. We need advice from anyone who has grown wildflowers in this area, in fact all the western slopes north to Emerald, Queensland. You do not have to be an expert, just advise of any plant grown that could have potential as a cut flower crop. The above article is an excellent example of how to produce a commercial crop from a plant without any obvious potential. There are thousands of wildflowers in isolated pockets in the above area many of them waiting to be discovered. You may not be a gardener but a bush lover and may have noticed a wild plant of potential interest. I want to hear from you. Please if you can help as above, do not leave it to someone else. **Editor awaits!**



The **Corroboree Flower** used in dried arrangements
Fresh flowers, see insert, are in demand as filler plants.



Planting Corroboree Flower

Single rows 1.8 to 2 metres apart with 60 to 100 cm between plants is satisfactory. This spacing will give a plant density of about 2 500 to 3 000 plants per acre. Plants should be planted without disturbance to the root ball. Young plants tend to grow to about 30 cm before branching from the base. Shortening of this initial stem after the lower shoots are well developed is desirable. Stems of 40–50 cm in length may be taken progressively over the season.

Following harvest the remaining growth should be trimmed to about 30–40 cm. A later pruning of any bent or down-turned branches may be necessary. The rows can be maintained weed-free by the use of glyphosate or weedmat. The inter-row space may be mown or provided with a mulch cover which appears beneficial.

Under good conditions, planting by September, the plants should attain one metre in height and yield 4–5 bunches the first season, June to mid-October, with 12–15 bunches per season over the following ten years. The income has varied considerably from \$4–\$6 or more per bunch. There are reports of a considerably higher price. A farm gate price of \$2.50 would appear to be a viable crop.

Drying Treatment using Ethylene Glycol

- Avoid cutting young sappy growth.
- Harvest quickly to Glycol solution.
- Re-cut stems before placing in solution.
- Place stems in an illuminated position, as absorption is slower in the dark.
- Glycol concentration in solution increases with time due to evaporation, etc.
- Solution should be checked regularly with a hydrometer to ensure correct strength.
- Rate of absorption will be slower with a low temperature, a higher humidity, and darker conditions and increase with a heated solution.
- Solution for *Stenanthemum* is one part glycol to one part water.
- Solution for *Stirlingia* is one part glycol to two parts water.
- Either Alginox at 5 ml/litre or copper sulphate at 0.2 grams/litre need to be added to the solution to avoid contamination by mould and fungus, etc.
- The solution should be stirred thoroughly before using and tested regularly.
- The duration of exposure to the Glycol solution should be from three to five days depending on conditions (humidity, temperature, light etc.).
- The foliage will take on a totally brown appearance upon completion.

Dried and Fresh dyed flowers using Permacol Food Dyes

The procedures are as above, the finished product ending in the colours:

Colour	Dosage
Red	8 grams/litre
Blue	1 gram/litre
Yellow	8 grams/litre
Pink	3.5–4 grams/litre
Green	4 grams yellow + 1.75–2 grams blue

- Dosages include surfactant at 5 ml/litre, which is added to hot water, then mix in.
- The dyeing process should consist of a dip in the solution for 20 seconds.
- Dyes for fresh dyed generally need to be double the strength used for the dried.
- The strength of the dye solution may be varied depending on the required colour.

Stenanthemum Plantation Management Calendar

January	• Trim where necessary. • Fertigate using calcium nitrate at 450 grams/150 plant (15 grams/litre) OR urea at 225 grams/150 plants (or 7 grams/litre) or foliage spray. • Spray for grasshoppers etc using Thiodan at 1.5 ml/litre.
February	• Trim faulty branches. • Fertigate using calcium nitrate at 450 grams/150 plants (15 grams/litre as foliar spray) and iron chelates at 50 grams/150 plants (1 gram/litre) OR urea at 225 grams/150 plants and iron chelates at 50 grams/150 plants.
March	• Trim. • Fertigate using calcium nitrate at 450 grams/150 plants (15 grams/litre as foliar spray) OR urea at 225 grams/150 plants (7 grams/litre as spray).
April	• Soil application using Osmocote (low phosphorus, 1.6%) 1 heaped teaspoon per plant.
May	• Harvest as flowers become fully open. • Foliage insecticide using Supracide 1.25 ml/litre. • Foliage spray using calcium nitrate at 15 grams/litre or urea at 7 grams/litre.
June	• Harvest as necessary. • Spray foliage with Thiodan insecticide at 1.5 ml/litre.
July	• Harvest as necessary.
August	• Harvest. • Soil application via irrigation Lorsban at 25 ml/150 plants or granules of Suscon Blue at 2.5 grams/square metre (1 rounded teaspoon/square metre).
September	• Harvest. • Soil application via irrigation Lorsban at 25 ml/150 plants or granules of Suscon Blue at 2.5 grams/square metre (1 rounded teaspoon/square metre) if not applied in August. Note application lasts up to 3 years. • Fertigate using calcium nitrate at 450 grams/150 plants (foliage application at 15 grams/litre) or urea at 225 grams/150 plants (at 7 grams/litre as spray). • As well as iron chelates at 25 grams/150 plants (foliage spray at 1 gram/litre).
October	• Harvest. • Prune away old growth as season ends. • Soil application of Osmocote (low phosphorus, 1.6%) heaped teaspoon/plant.
November	• Prune. • Foliage application of calcium nitrate at 15 grams/litre OR urea at 7 grams/litre and spray boron at 2 grams/litre.
December	• Prune. • Soil application 50/50 lime/gypsum at 1 dessertspoon/plant. • Fertigate using calcium nitrate at 450 grams/150 plants (15 grams/litre on foliage) OR urea at 225 grams/150 plants (foliage application at 7 grams/litre).

The management of a wildflower farm. The above procedures may easily be translated to a wide range of wildflower crops. Develop a similar strategy for crops you plan to establish. The Plantation Chemical Management Details on the next page will be particularly useful. Be assured that a determined attempt to establish a commercial crop will be supported by the Agricultural Department of your state, the wildflower growers group in your area or the Australian Native Flower Growers mentioned on page 36 —Editor

Stenanthemum Troubleshooting Guide

Problem: Seedlings, wilt or die slowly, with the tips browning and dying first.

- Cause:** (a) Possible over fertilizing
(b) Possible water problems

- Solution:** (a) Have a water sample done to ensure water quality is okay.
(b) Check back over procedures, and dosages, during most recent fertilizing.

Problem: Plants tend to die for no apparent reason.

- Cause:** (a) Possible poisoning by incorrect dosage of herbicide or fertilizer.
(b) Ring barking by grub just below ground level, remove plant and check.
(c) Possible water source problems, especially if water is out of a bore.
(d) Possible lack of water, during hotter periods.

- Solution:** (a) Use Lorsban at 0.7 ml/litre or Suscon Blue at 2.5 grams/square metre on and around plants affected.
(b) Adhere to proposed dosage levels, reduce if necessary.
(c) Have a water sample test done. Consult chemist for possible solution.
(d) Ensure water is kept up to the plants during hotter periods.

Problem: Plants grow and appear healthy but lack the usual vigour and deeper green colour.

- Cause:** Plants may be deficient in nitrogen based fertilizers or lacking in trace elements.

Solution: Check over fertilizing notes to see if you are on schedule, e.g. was gypsum lime applied as recommended.

Apply calcium nitrate or urea at recommended dosages.

Apply iron chelates as recommended, and monitor results.

A soil sample may be needed in the more extreme cases.

Note: the use of wood chips as mulch may tend to rob the ground faster than usual of nitrogen, dosages may need to be made on a slightly more regular basis than recommended.

Stenanthemum Plantation Chemical Management Details

Chemical	Dosage	Usage/Application
Glyphosphate	4 ml/litre	Herbicide to combat grass/weeds
Fusilade	4 ml/litre	Herbicide to combat grass
Simazine	1.2 ml/litre	Pre-emergence herbicide
Lorsban	0.7 ml/litre	Insecticide spray - Aug/Sept.
Supracide	1.25 ml/litre	Insecticide spray (pre-harvest) — May
Thiodan	1.5 ml/litre	Insecticide spray as required
Cislin	2.5 ml/litre	Post harvest insecticide (for export)
Rovral	1 ml/litre	Post harvest fungicide (for export)
Surfactant	0.25 ml/litre	Added to fusilade fungicide (fl., dip, dyes)
Chlorine (bleach)	6-9 drops/5 litres	Bactericide to sterilise water buckets
Ethylene glycol	1:1 water dilution	Drying agent used in drying process
Gypsum/lime	50 grams/sq. mt.	Soil application, annually
Calcium nitrate	15 grams/litre	Foliage fertiliser to promote new growth
Urea	7 grams/litre	Foliage fertilizer to promote new growth
Suscon blue	2.5 grams/sq. mt.	Caterpillar control/soil application
Osmocote	1 teaspoon/plant	Slow release fertilizer, twice annually
Boron	2 grams/litre	Foliage fertilizer (trace elements)



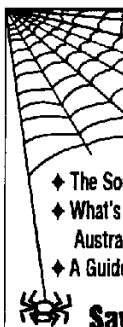
Coastal tea-tree, *Leptospermum laevigatum*, in a three-tree group. Regular leaf trimming has produced dense layers of foliage. Photograph by Ted Poynton.

Bonsai — Art and Technique

by Jennifer Wilkinson, published by Lothian Books

Bonsai, a name given by Chinese and Japanese artists to their potted, styled trees. These are dwarfed trees but artificially created that way to portray an aged tree, in miniature. Each tree is shaped to a particular style, is perfectly balanced, and expresses its own character. A book titled as above, describes and illustrates the various styles.

Creating an ancient tree in miniature requires skill in horticultural technique and an eye for artistic design. It involves training and manipulation of the tree's growth and patience to achieve the desired effect. This is an art form any reader can achieve simply by referring to the detailed instructions in the book. It starts from first finding suitable plants or with specific advice on propagation. There are numerous associations or groups of Bonsai enthusiasts and specialist bonsai nurseries that can help you get started or supply you with plants. But! you can start and work all on your own simply by purchasing a copy of this well illustrated book widely available for just \$16.95, or by mail as advised inside our rear cover with \$6 additional postage.



JOIN US ON THE WEB!

The Society now has a World Wide Web site on the Internet.
Discover information about:

- ◆ The Society and its activities
- ◆ What's on (plant sales, wildflower shows)
Australia wide
- ◆ A Guide to Simple Plant Propagation
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- ◆ All about *Banksia*, *Acacia*, *Melaleuca*,
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A Bonsai specimen of **Apple Gum**, *Angophora costata*
For advice on how to create bonsai specimens see page 45.