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75c



A *Bossiaea* Flower

The *Bossiaea* flower has all the features of any flower of the flowering-plant order i.e. it has four whorls or sections. The two outer whorls are the sepals, called the calyx (a) in the sketch, and the petals, called the corolla (b) (c) and (d). These surround and protect the two inner sexual whorls, namely the male parts — the stamens (g) and the innermost female parts — the ovary (e). So the *Bossiaea* papilionaceous flower has:—

1. a calyx (a) of 5 sepals — joined at the base to form a cup or tube and having 5 teeth or lobes, usually arranged in two lips formed by the 2 broad upper lobes and the 3 shorter lower lobes.
2. a corolla of 5 petals specially arranged in the pea-flower shape
 - (b) a large back petal called the standard
 - (c) 2 side petals called the wings
 - (d) 2 front petals held together to form a keel, which covers the inner sexual parts
3. 10 stamens (g), each having a filament (stalk) and anther (pollen sac); the filaments are joined together to form a sheath open above and the anthers are similar in size and attachment.
4. the innermost female section consisting of an ovary (e) containing ovules, style (f) and stigma (the reception pad for the pollen on the end of the style).

Having had a look at the structure of the *Bossiaea* flower, we can now look at the other important features — the colour, size and function of its parts. First of all the calyx (a), with its tube-like base and five lobes folds its larger upper lip over the petals in young buds and gives protection. The corolla (the five special petals) has several functions to perform. Held out prominently on the plant and with its bright colouring, it attracts insects to help with pollination. Being a *Bossiaea*, it has a colour range of yellow/orange/red — which makes it a candidate for the label 'Bacon & Eggs'. As the flower opens, the standard (b) folds down around the other petals, but when the flower is fully open, the standard (b) is standing up or slightly bent backwards, openly displayed like a pennant. It is almost round, with an average of one cm across, and brightly-coloured in yellow or orange, often with a reddish back and with red markings at the lower centre. The other petals are spread in front of the standard; the wings (c) oblong and rounded at the end, cover the broader keel (d) petals, which are often red in colour. The whole flower is an effective guide to prospective insect pollinators — the standard providing attraction and direction, the wings and keel a suitable landing area, where the stamens (g) emerging from a depressed keel, can dust pollen on the insect's abdomen or underparts. The female part of the flower is innermost in position, well protected by the open-topped sheath of the stamens and the covering keel petals. The ovary (e) contains one compartment where seed will form from the ovules. The style (f) is tapering and in-curved towards the centre of the flower with the stigma on the end. When the stamens are ageing, the stigma usually protrudes through them, ready to receive the pollen from the underside of visiting insects, so that the ovules can be fertilised. The final stage of the *Bossiaea* flower's cycle is the growth of the ovary into the pod (its legume fruit).

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COVER PLATE: *Templetonia biloba*

Photography by J. Glass

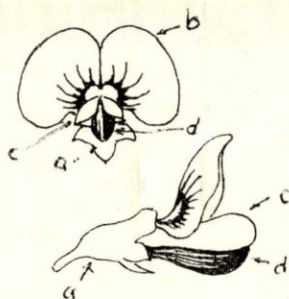
This W.A. shrublet has leaves with an unusual bilobed shape at the apex. Previously known as a *Bossiaea* this beautiful little plant increases to 10, the number of species in the genus *Templetonia* all of which are described in this issue.

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Bossiaea and Related Genera of the Pea-Flowered Family

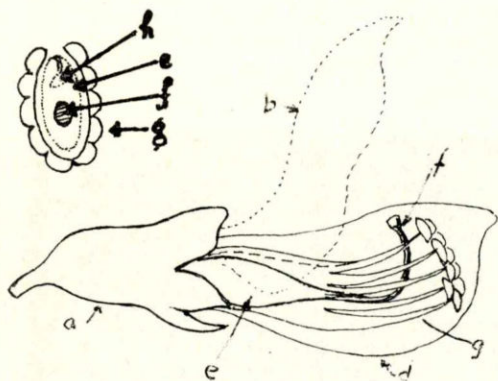
by D. T. Woolcock

and illustrated by C. E. Woolcock.



The Pea-flower family is important in Australia as many of the native pea-flowers are widespread throughout the continent — from coast to desert to mountain. All members of the family Papilionaceae have a unique flower shape — 'papilionaceous', as above, because of an apparent likeness to a butterfly (from Lat. papilio, a butterfly) as shown above. They also have a legume or pod as fruit, hence their second family name Fabaceae (from Lat. faba = bean). As many pea-flower species have bright yellow, orange or red flowers, they have been further held together and known by the blanket title "Bacon and Eggs" — and this does not help in trying to sort a very large number of species into groups easily recognisable in the field.

The previous issue described how this large family of plants can be divided into ten groups based largely on the arrangement of the flower parts. The characteristic pea-flower of the Bossiaeae Group is shown above and the arrangement of its reproductive parts is illustrated below.



- a — the calyx, usually green or greenish brown
- b — the standard, the large coloured upper petal
- c — two side petals resembling wings
- d — two petals united into a boat-shaped keel
- e — the ovary in the centre of the staminal tube where seeds will form
- f — the female organ, the stigma attached to the ovary by the style.
- g — the male organs, stamens, 10 in number, gathered together in a tube in the centre of the flower before they separate.
- h — the seed will form here, the ovary becoming the pod.

Group 1 plants have all ten stamens free. Bossiaeae of Group 2 have the stamens gathered together in a sheath or tube split along the top. The well known *Platylobium*, *Bossiaea*, *Templetonia* and *Hovea*, are shrubs or shrublets with simple, alternate or opposite leaves, mostly with stipules. The flowers grow in the leaf-axils and are usually solitary or in small clusters. The pods have two valves with 2 to many seeds, each with an aril.

The botanists' way to tell the difference between genera is by a key as follows:

1. Flowers axillary, solitary, in small clusters or occasionally in apparent racemes.

1.* Flowers terminal on stem and branches, or leaf-opposed. See page 130.

2. Leaves compound. See genera on page 130.

2.* Leaves simple or unifoliate.

Anthers more or less of equal size and shape, all versatile; leaves lanceolate to triangular or orbicular. Australian genera.

Fruits winged along upper suture; leaves opposite or rarely alternate. *Platylobium*.

Fruits not winged; leaves and branchlets usually alternate but leaves may be opposite in some species; fruit sessile or shortly stipitate. *Bossiaea*.

Anthers of two forms, alternately basifix and dorsifix and versatile. Ovules 2 or more. Claws of petals free from staminal sheath; Australian genera.

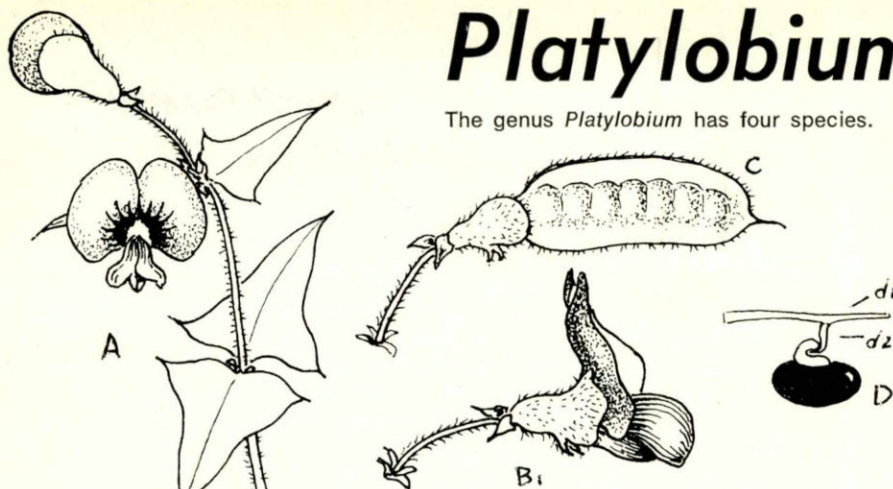
Stamens all connate into a sheath; leaves never prickly-toothed.

Fruit twice as long as broad or more; leaves sometimes completely reduced; stipules sometimes spiny. *Templetonia*.

Fruit not longer than broad; leaves various, linear to broad. *Hovea*.

Platylobium

The genus *Platylobium* has four species.

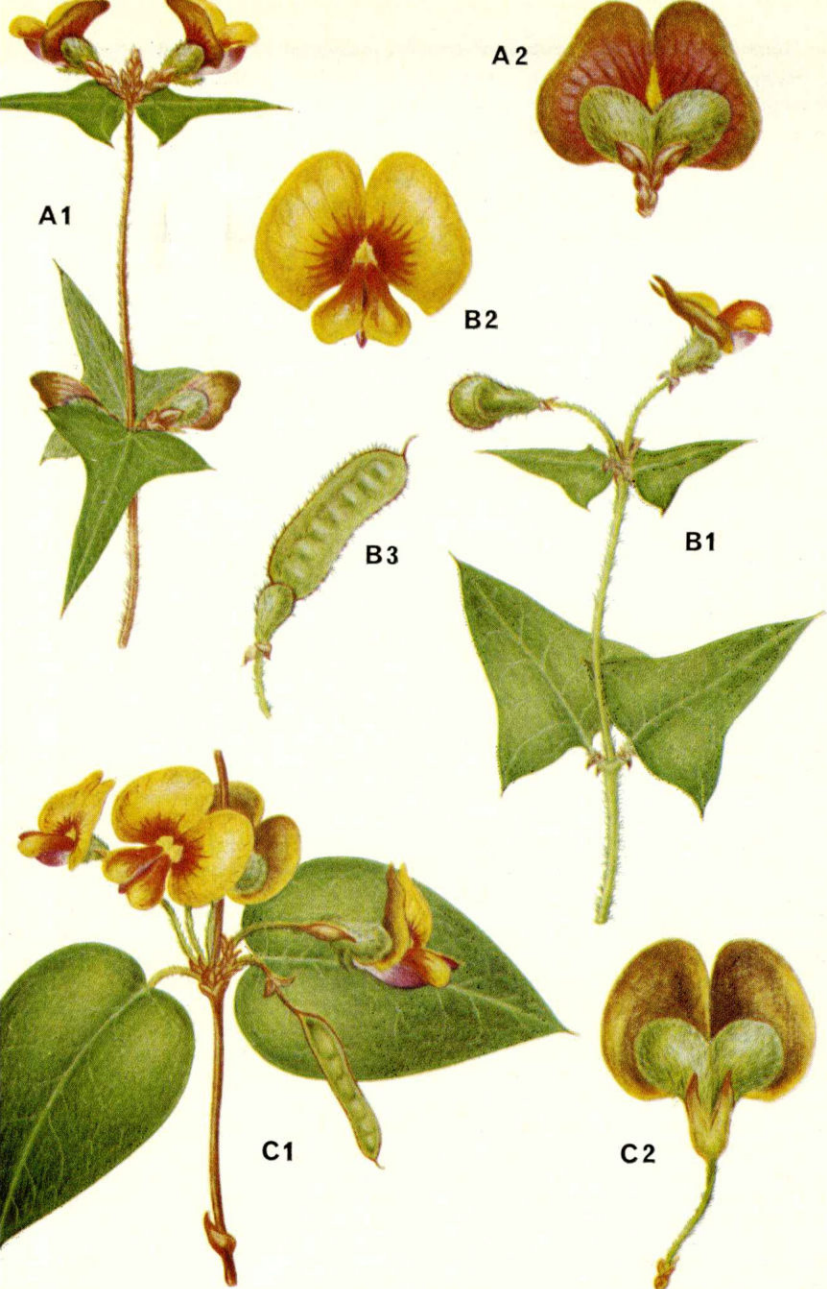


Platylobium triangulare (above and sketch B opposite)

- A — The characteristic triangular leaves are shown attached to the stem in pairs opposite each other, with tiny leaves (stipules) at the point. The flowers are on stalks, from the leaf axils towards the end of the branches.
- B — the flower from the side showing calyx (modified leaves that cup the flower) that has five lobes, the two upper ones being large, the lower ones almost nonexistent. The bracts, tiny leaves where the flower calyx attaches to its stem (pedicel), are small as are the stipules where the pedicel attaches to the axil of the leaf.
- C — the seed pod has numerous seed, is winged on the upper opening and hairy on the edges as shown.
- D — the seed has a characteristic aril, stalk and method of attachment in this pod, d1 being on the wall of the fruit and d2, the funicle, the attaching stalk.

Platylobium obtusangulum (below and opposite) Photography by C. E. Woolcock
 Fine brown stems, leaves dark-green, spear-shaped; flowers with kidney-shaped standard, yellow with red centre; wings broad, obovate, yellow, lower half red, shorter than standard, almost concealing red keel.





***Platylobium obtusangulum* — Common Flat Pea** Artwork by Colin Woolcock

- A 1. Habit showing opposite, spear- to lance-shaped leaves with sharp tips; flowers solitary or few in axils, with several brown bracts folded over short stalk.
 A 2. Rear view of flower — red-brown colour of back of standard; broad-ovate, hairy upper calyx-lobes; brown bracts at base. Usually solitary in upper axils.

***Platylobium triangulare* — Ivy Flat Pea**

- B 1. Habit showing opposite, broadly-triangular leaves with sharp tips; stalked flowers solitary in axils; bracteoles at base of calyx.
 B 2. Front view of flower — kidney-shaped standard yellow with red centre; wings and keel shorter. Flowers differ from *P. obtusangulum* in being conspicuously stalked.

***Platylobium formosum* — Handsome Flat Pea**

- C 1. Opposite heart-shaped leaves; stalked flowers axillary, a few together, with brown bracts at base of stalks, and bracteole at base of calyx.
 C 2. Rear view showing brownish back of standard, broad calyxlobes, long bracteoles.

The Bossiaea Group of Group 2 of the Pea-flowered Plant Family Fabaceae.

Having ascertained that the ten stamens are in a bundle as illustrated, the common genera in this group may be roughly defined as follows:

- Leaves — *Platylobium* has opposite leaves except for *P. alternifolium* shown opposite. *Bossiaea* mostly has alternate leaves with a few opposite and some winged stems.
Templetonia also has some species with leaves reduced but never prickly-toothed as in some *Bossiaea* species.
- Flowers — *Hovea* the flower colour is mauve/purple — the rest yellow/orange/red. *Platylobium* and *Bossiaea* have stamens with anthers more or less equal in size and shape and versatile.
Templetonia and *Hovea* have anthers of two forms, alternately fixed at the base (basifixed) and back (dorsifixed), and versatile.
- Seed Pods — *Platylobium* has pods winged along the upper opening (suture). *Bossiaea* has pods that are not winged.
Templetonia the pods (fruit) can be twice as long as broad or more.
- Seeds — See Fig. 2, page 133 for attachment of seed inside the pods.

What this means is illustrated in the following simple descriptions of the above genera, *Platylobium*, *Templetonia*, *Bossiaea* and *Hovea*, all of which are excellent garden shrubs.

In the Group 2 also comprises seven (7) genera which do not have the same horticultural potential but are described on page 130.

The Genus *Platylobium*

Platylobium is a small genus of four species and occurs in the eastern parts of Australia, mostly in the wetter areas of the south and east.

The three main species are widespread and seem to prefer a different area of dominance. *P. triangulare* does well in the damp cool forests of the Victorian coast and parts of Tasmania; *P. obtusangulum* prefers the sandy forests of medium rainfall areas and grows in Victoria, Tasmania and in the south-east half of South Australia; while *P. formosum* is spread along the coast and lower tablelands of N.S.W. and S.E. Queensland, extending to sub-montane regions of eastern Victoria, also Tasmania and A.C.T. *P. alternifolium* appears to be endemic in small areas of the central and western hills of Victoria. The four species are shrubs of temperate regions and all flower in the Spring, preferring forest to open country.

Platylobium obcordatum/*P. microphyllum* is synonymous with *Bossiaea microphylla* but is now correctly known as *Bossiaea obcordata*.

Platylobium formosum Sm.

Handsome Flat-pea

Habit: Erect shrub 1-2 metres high, but sometimes trailing.

Leaves: Simple, opposite, 2-6 cm long, cordate to ovate-lanceolate, strongly reticulate (veined), glabrous, leathery, lateral angles round.

Flowers: Axillary, solitary or 2-3 together, each stalk with dry, brown overlapping bracts; bracteoles similar, 6-7 mm long. Calyx 8-10 mm long, is hairy, with 2 upper lobes broad and about twice the length of narrow lower three. Corolla yellow and red, standard c. 18 mm long. Flowering in spring. Colour plate in last issue.

Pod: Flat, oblong, with stalk 2-4 cm, upper opening bordered with a narrow wing; shortly hairy on edges.

Distribution: Widespread in forests along the coast and lower tablelands of N.S.W. and S.E. Queensland and extending to sub-montane regions of eastern Victoria, also Tasmania and A.C.T.

Platylobium alternifolium F.Muell

Victorian Flat-pea

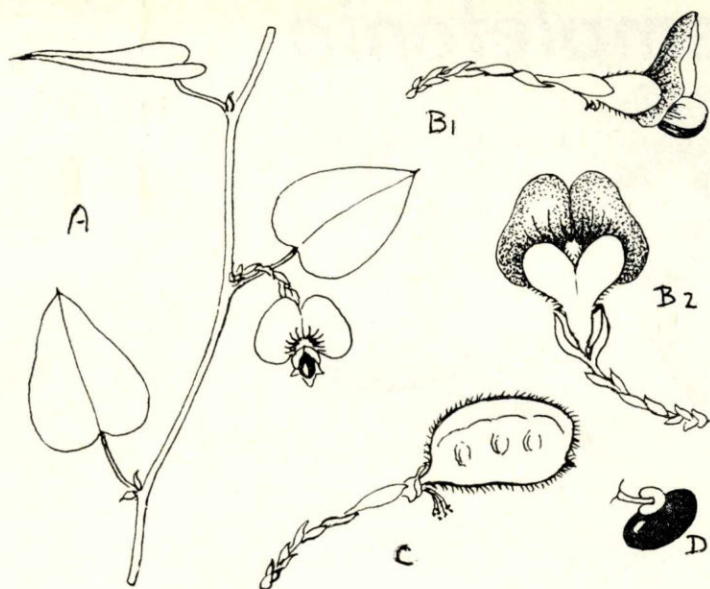
Habit: Prostrate shrub with trailing, wiry branches.

Leaves: Alternate, ovate to round, short pointed tip; petioles 1-2.5 cm long; leaf strongly reticulate.

Flowers: Solitary in leaf axil — occasionally 2. Peduncle 15-20 mm with brown bracts just overlapping along; bracteoles 6-8 mm. Standard 10-15 mm, yellow/orange and red. Calyx lobes edged with very fine short hairs. Flowering in spring.

Pod: Shortly stalked; edges shortly ciliate (very fine hairs).

Distribution: Rare plant of central and western hills, Victoria.



Platylobium alternifolium

A — Habit showing simple broad leaves alternate along the stem.

B — The flower from the side (B1) showing the stalk (peduncle) with numerous bracts along it, and the large two upper lobes of the calyx. B2 shows the flower from the rear.

C — The fruit or seed pod, oblong, flat, with a compressed wing along the upper suture.

D — The seed, the aril being shown in white.

***Platylobium triangulare* R.Br.**

Ivy Flat-pea

Habit: Wiry, sprawling shrub up to 1 m high. Photograph on page 11.

Leaves: Triangular often hastate (like spearhead), glabrous, rarely more than 20 mm long, lateral angles pungent.

Flowers: Solitary in upper axils, large, bright yellow/orange and red, standard scarcely $1\frac{1}{2}$ times length of calyx. Peduncle 10-12 mm. Bracteoles 3-4 mm long. Calyx hairy. Flowering in October-November.

Pod: Oblong, 25 mm x 10 mm, edged with short, fine hairs. Ovules several. Stalk 2-4 mm.

Distribution: Southern Victoria, also Tasmania.

***Platylobium obtusangulum* Hook**

Common Flat-pea

Habit: Slender, almost glabrous shrub about 1 m high.

Leaves: Sub-sessile, opposite, 15-30 mm long, reticulate, triangular with more or less cordate base or lanceolate/hastate, the three angles with fine terminal pungent tips. Colour photograph on page 11.

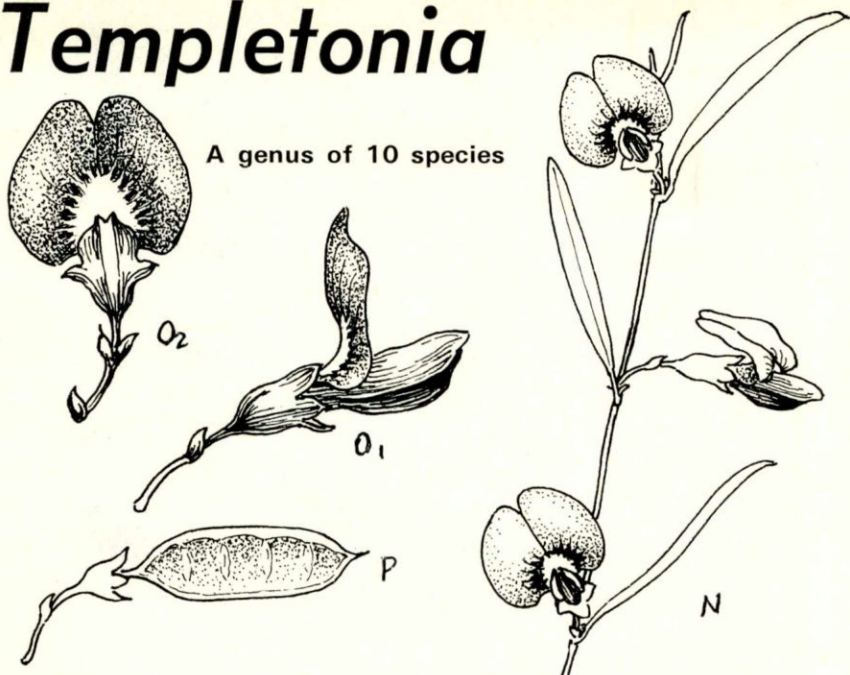
Flowers: 1-3 in upper axils, subsessile, short stalk concealed by conspicuous overlapping bracts. Bracteoles 6-7 mm long. Standard reniform (kidney-shaped) 15-20 mm; keel red. Stamens united in lower half, anthers equal. Flowering in spring. Colour photograph on page 96.

Pod: 20-30 mm x 12 mm, subsessile, flat, hairy at first.

Distribution: Widespread in Vic., S.A., Tas. in sandy forests in medium rainfall areas (400 mm-600 mm).

Templetonia

A genus of 10 species



Templetonia stenophylla (above and opposite — bottom left)

N — The habit showing the alternate leaves with a single axillary flower.

O — The flower from the side O1 and the rear of O2 showing also the calyx.

P — The stipitate seed pod containing several seeds.

Templetonia incana (below)

Photography by Alex George

A very similar plant to the well-known *T. retusa*, the differences are obvious in this colour plate. The stems, leaves, stipules, bracts, bracteoles and calyxes are densely clothed with greyish-white hairs. The leaves are a different shape and texture and the raised venation on the lower surface is clearly shown. The large red standard in this case, is not raised but remains folded over the other four petals of the wings and keel. The sketch on page 103 gives flower details.





Templetonia egena
Templetonia stenophylla

Templetonia aculeata
Templetonia sulcata
 Vol. 11—Page 101

***Templetonia retusa* (Vent.) R.Br.**

Common Templetonia/Parrot Bush

Habit: Showy shrub 1-3 m high, similar to *T. incana* opposite.

Leaves: Rigid, leathery, oblong-cuneate, obtuse/notched, 15-40 mm x 7-25 mm.

Flowers: Large (above 30 mm), numerous, showy, red (rarely yellow); petals all nearly equal; peduncle with obtuse bracteoles about middle; calyx 6-8 mm, lobes very broad and short. Flowers in August.

Pod: Stalked, linear-oblong 40-50 mm x 10-12 mm with several partitions.

Distribution: The southern parts of S.A., W.A.

***Templetonia stenophylla* (F.Muell.) J. M. Black**

Leafy Templetonia

Habit: Small glabrous shrub to 30 cm, straggling.

Leaves: Narrow-oblong to linear, 25-60 mm. Syn. *Bossiaea stenophylla* F. Muell.

Flowers: Solitary or in pairs in leaf-axils or a few in terminal clusters; calyx 4-5 mm, 2 upper lobes united; corolla orange/red, about 10 mm. Spring.

Pod: Stalked, oblong, 20 mm x c. 4 mm. Colour photograph on page 101.

Distribution: The drier parts of N.E. to N, central and S.W. slopes of N.S.W., to Vic., S.A.

***Templetonia egena* (F.Muell.) Benth**

Desert Broom Bush

Habit: Rather tall shrub to 2 m with erect, flexible, round, furrowed branches, leafless or leaves reduced to short broad, distant scales. See page 101.

Flowers: Small, brownish-yellow, petals c. 5 mm long, almost equal; very short stalks with round bracteoles close under calyx, which is 3 mm long with 5 short rounded teeth, lowest longer than the others. Spring.

Pod: Black or brown, almost sessile, ovoid-oblong, 12-20 mm, 1 oblong seed.

Distribution: The dry parts of Australia — Victoria (Mallee), S.A., N.S.W., Q., N.T. and Central Australia. Syn. *Daviesia egena*.

***Templetonia sulcata* (Meisn.) Benth.**

Flat Templetonia

Habit: Shrub with rigid, divaricate, flattened, faintly multi-ridged, leafless branches; stem about 4 mm broad often ending in a spine. See page 101.

Flowers: Small, subsessile, 1-2 in notches of branchlets; calyx 3-4 mm, lobes broad, acute, nearly as long as tube, 3-4 bracts at base. Spring.

Pod: Black, obliquely ovate, 12-20 mm, 1-2 seeded. Syn. *Bossiaea sulcata*.

Distribution: The temperate parts of Vic., S.A., N.S.W., W.A.

***Templetonia battii* (Tate) F.Muell.**

Habit: Shrub with rigid, round, intricate, leafless branches — ridged; branchlets ending in a short spine.

Flowers: Small, solitary on very short peduncles at notches along branches; calyx as in *T. egena*; standard yellow and red, 6 mm, wings and keel shorter; style broad, compressed. Flowers in late spring/summer.

Distribution: The drier parts of S.A. (Eyre Penin.), W.A.

***Templetonia aculeata* (F.Muell.) Benth.**

Habit: Low shrub with rigid, ridged, zig-zag, round branches. See page 101.

Leaves: Distant, linear-lanceolate, rigid, 10-20 mm, pungent-pointed, concave above, sometimes absent; stipules spiny spreading, 3-6 mm.

Flowers: Usually twin; calyx 5 mm with 4 obtuse lobes, conspicuous ovate bracteoles about middle of short peduncle; standard entire, rounded, yellow and brown/purple, 10 mm, wings and keel. Flowers in September.

Pod: Stalked, ovate-oblong, c. 20 mm.

Distribution: S.A., N.S.W. and W.A. Syn. *Bossiaea aculeata* F. Muell.

Templetonia hookeri

Habit: Graceful open shrub to 2 m; branches fine terete, slightly ridged with sparse appressed hairs.

Leaves: Long, very fine, linear-terete, pinnately 1-5-foliate (1-5 leaflets) with fine recurved tip on leaflets. stipules minute.

Flowers: Axillary on long fine peduncle, which is about 30 mm; bracteoles minute; calyx 4-lobed, mainly glabrous; standard yellow, 15-20 mm, wings shorter than keel, 6-10 mm obtuse. Flowers in May to June.

Pod: Dark-coloured, stalked, 30 x 10 mm, glabrous; fine tip 4-5 mm long.

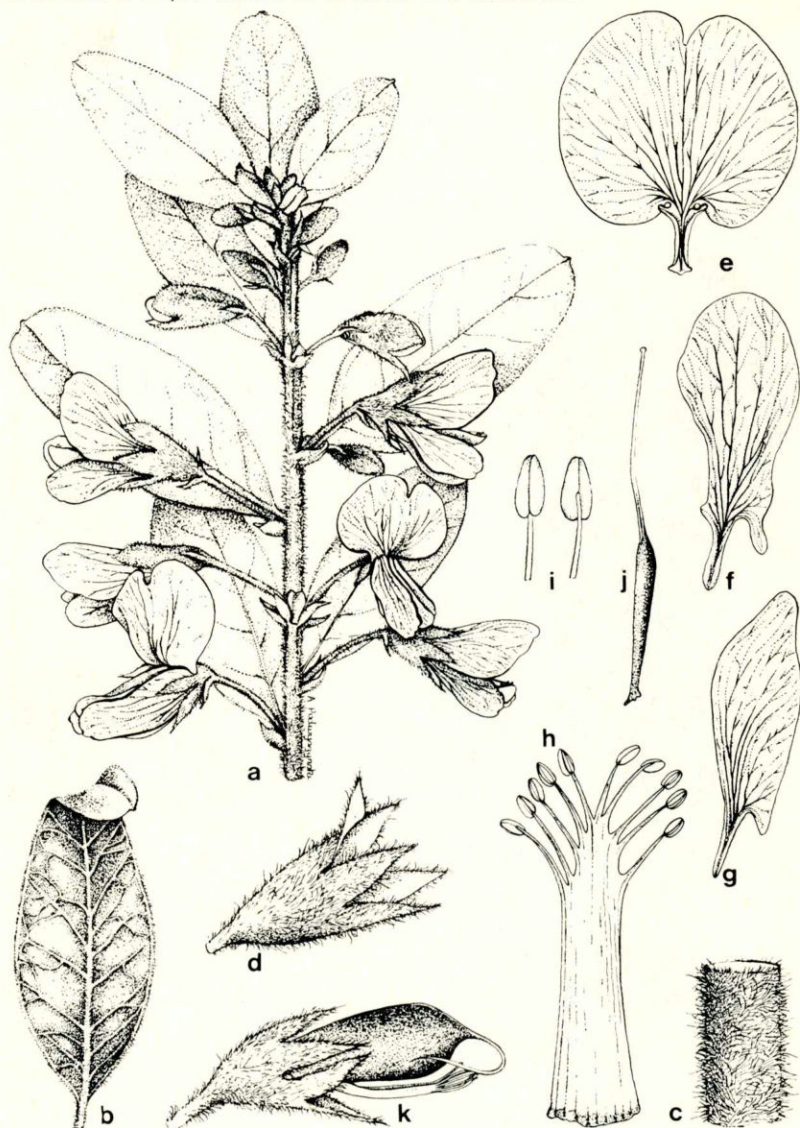
Distribution: Northern Australia (Edith Falls, Katherine Gorge, N.T.)

***Templetonia biloba*, page 93 — *Templetonia neglecta*, page 133.**

Templetonia incana

Illustrated in colour on page 100, this newly described species is similar to the well-known and widely grown *Templetonia retusa*.

The features of *T. incana* differ from those of *T. retusa* in that the stems, leaves, stipules, pedicels, bracts, bracteoles and calyces are densely clothed with a greyish-white velvety spreading indumentum, the leaves are of a different shape and texture, the stipules are large and conspicuous and the corolla is a different shape. In *T. retusa* the standard is elliptic whereas in *T. incana* it is suborbicular.



The above sketch is reprinted with permission from the original description of this new species: J. H. Ross in Muelleria 4(3): 247-249 (1980).

- (a) a flowering branch full size, the conspicuous raised venation on the lower surface of the leaf shown in (b) and the indumentum (hairy) stem in (c) x 4.
 (d)-(j) the flower parts shown as (d) the hairy five lobed calyx x 2 — the flower petals (e) the standard x 2, (f) the wing petal x 2, (g) the keel petal x 2, — the stamens with the tube opened out (h) x 2 with the rear view of the anthers (i) showing their attachment to the filaments of the stamens x 5; and the female part, the gynoecium (j) 2, (k) following fertilization, the immature pod and persistent calyx staminal-tube and style is illustrated.

The Genus—An Introduction



H. A flowering branch, full size showing the long simple leaves to 7 cm long, alternate along a hairy stem with racemes of flowers axillary to the leaves.

- I. The filaments from the front 11, the side 12, and the rear 13 showing the hairy five lobed calyx, the two upper lobes being joined (connate) into truncate or emarginate lip, the lower three short. The flower corolla comprises the upright rounded standard, two wings obliquely obovate that cover the two petals forming the keel.
- J. The fruit (see pod) is hairy and carries two seeds.

A straggly little shrub but a dainty acquisition to the garden.

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This is a very attractive Australian genus of often graceful shrubby plants with deep rich colours in the flowers, ranging from pale mauves to royal purples. The *Hovea* genus has about 12 species, shared almost equally between Eastern and Western Australia, though they all have a liking for well-watered and well-drained areas and grow through mountains and coastal forests from S.E. Queensland to Tasmania and South Australia, while the western species like the wet forests and coast of the south-west. Research in progress will result in many name changes and new species to be more adequately presented in a future issue.

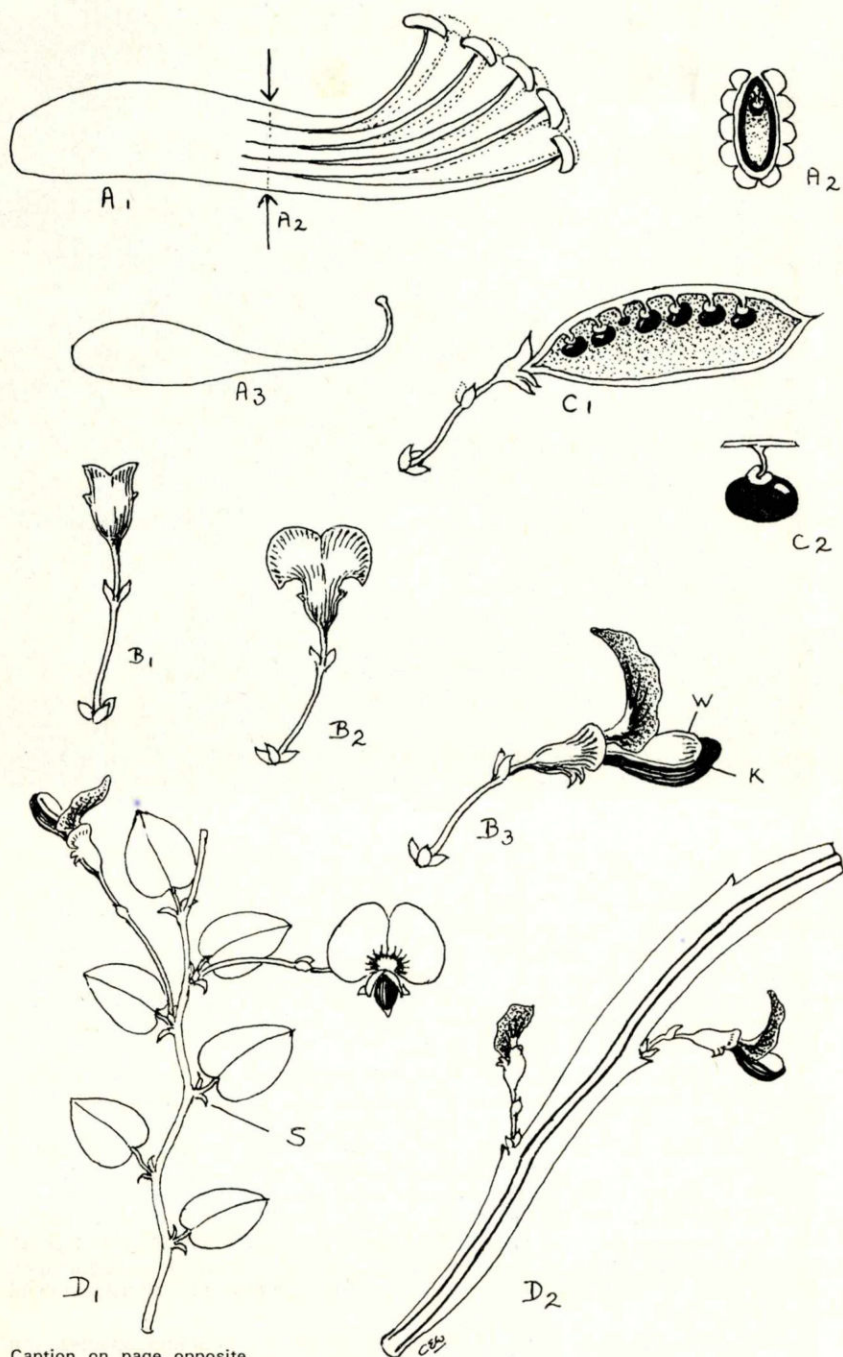
Their leaves are simple and alternate, often hairy on the lower surface but seldom with prickly-toothed edge or spiny tip, features of a few of the western group. The flowers are usually large and bright-coloured and grow in axillary clusters or sprays, even solitary. The calyx is two-lipped, the upper broader and notched or truncated, the lower shorter and narrower. The standard is almost orbicular, the wings oblong and the rounded keel shorter than the standard. The stamens are all joined into a sheath split above, occasionally above and below, and the anthers are alternately long and short. The pod is sessile or has a short stalk, is somewhat spherical or egg-shaped and has two rather leathery valves. The seeds, 2-many, are shortly stalked and have an aril.

Most of the *Hoveas* flower during spring and the mountain species can flower well into summer. Beautiful small garden shrubs.

Bossiaea

Introduction and South-east Australian
Species

by C. E. Woolcock and D. T. Woolcock.



Caption on page opposite

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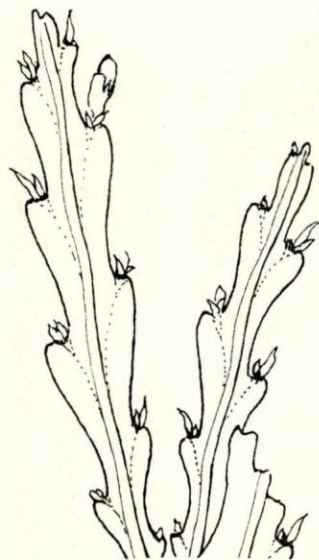
The Genus *Bossiaea*

The genus *Bossiaea* of the Papilionaceae (Fabaceae) family was put in the tribe Bossiadeae (ex Genisteae Benth. and Hook. f. 1864) by J. Hutchinson (1964). *Bossiaea* is an attractive genus, endemic in Australia and has about 45 species, most of which are shrubs, shrublets or prostrate plants. Most references usually state 'the genus is readily cultivated in a sunny well-drained position in the garden' and 'propagation is from scarified seed borne in flattened pods'. Most of the *Bossiaea* species have attractive yellow and brown or brownish-red pea-flowers, though a few have brilliant red flowers. The *Bossiaea* species are widely distributed, though, with a few exceptions, they favour the higher rainfall areas of the south and east coasts of Australia and the tablelands and higher parts of East Victoria and New South Wales.

General characteristics of the *Bossiaea* range of shrubs and prostrate plants include stems that are round or angular in cross-section, sometimes flattened into phyllodes and/or winged, sometimes spinescent. Leaves are simple, alternate or opposite, sometimes absent or reduced to scales. Stipules are small or absent. Flowers are axillary, solitary or in small clusters, usually 2-3. Bracts occur at the base of pedicels and are overlapping, usually 2-3. Bracteoles on the pedicels, often half-way along, are similar to the bracts. The calyx is 5-lobed, the 2 upper lobes generally broader and larger than the others and more or less united. The standard petal of the flower is round or kidney-shaped, about twice as long as the calyx. The keel is mostly broader than the wings and obtuse. The 10 stamens are all united in a sheath split above and are equal. Anthers are uniform, attached and freely hinged at the back. The style is slender and tapered, incurved with a terminal stigma. The pod is sessile or shortly stalked, flat, not winged and the two valves completely separate on dehiscence. Ovules are several to many — rarely 2-3, and seeds have distinct and peculiar (hooded) arils.

Bossiaea of South-East Australia

The following pages will illustrate most of the *Bossiaea* of south-eastern Australia showing details of the plants. For the botanist the group of plants that are assigned to the genus *Bossiaea* have certain characteristic botanical features which are illustrated opposite and defined in simple terms as follows:



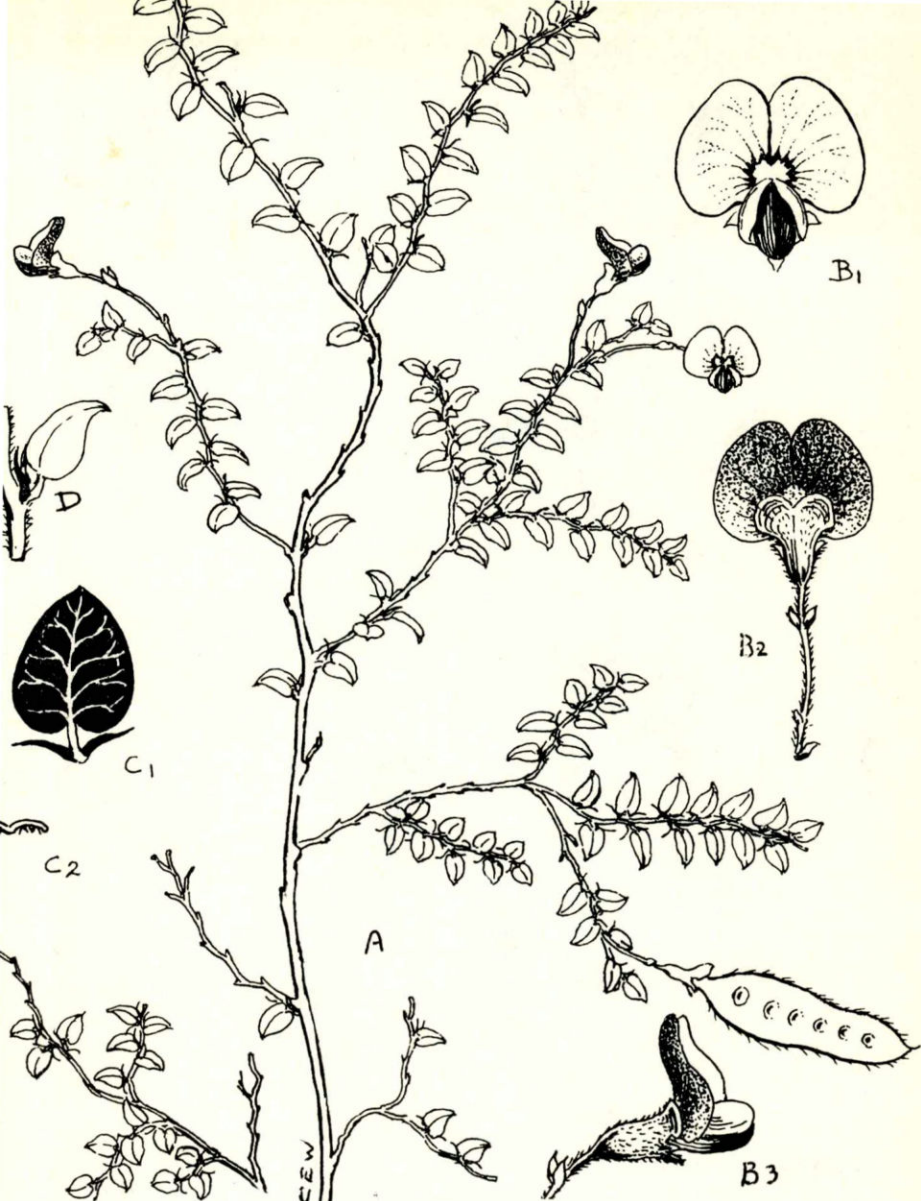
- A — some sexual parts of the flower, A1 showing the bundle of 10 uniform (equal) stamens joined (connate) together to form a tube or sheath, the cross section at A2 showing that the sheath is split along the upper side; A3 is of the female part of the flower comprising the ovary from within the stamen tube (at the lower end where on fertilization, seeds will form), the tapering, incurved (subulate) style, with the terminal stigma.
- B — the pea-flower, B1 the calyx from above showing the overlapping (imbricate) bracts (small modified leaves) at the base of the flower stalk (pedicel) and bracteoles on the pedicel and just below the calyx. The upper two calyx lobes are larger than the lower 3 and partly joined (connate) as shown from the side in B2. B3 shows the complete flower from the side, the petals emerging from the calyx with the upper large petal, the standard, erect, the two petals (w) known as the wings, and two lower petals forming the keel (k). In *Bossiaea* the keel is broader than the wing petals but the standard is not always erect but remains folded over the four lower petals as in *B. carinalis* shown in colour on page 104 and *B. walkeri* on page 125.
- C — The seed pod is large and flat (C1) with several seeds, each with an aril, shown in white on (C2).
- D — the leaves may be alternate with small petioles (stalks) and stipules(s), tiny leaves at the base of the leaf petiole, as shown for *B. buxifolia* (D1). However a number have minute or apparently non-existent leaves, the stems being flattened and winged as shown for *B. ensata*.

Bossiaea bracteosa F. Muell. ex Benth. Alpine Leafless or Mountain *Bossiaea*

This montane or sub-alpine shrub in eastern Victoria and southern N.S.W., grows 1-2 m high and has flattened winged branches and leaves are commonly absent. The flowers are solitary in the notches or shoulders of the stem; pedicels are short, covered by bracts and bracteoles. The calyx lobes are short, uniform in size and shape, slightly ciliate (with long fine hairs). Flowers are small, yellow or blotched; standard twice as long as calyx; keel darker than wings, shorter than standard. The pod is stalked, 25-35 mm long, usually 6-8 seeded; margins thickened. Habit is similar to that of *B. riparia* and *B. ensata*. Flowering is in spring.



Top: *Bossiaea foliosa* — see page 113. Bottom: *Bossiaea rhombifolia*
— see page 120



***Bossiaea buxifolia* A. Cunn.**

Matted *Bossiaea*

This spreading undershrub occurs in sub-montane and coastal sclerophyll forests from Victoria to Queensland. Its habit is procumbent, often mat-forming. The stipules are narrow-linear, longer than the short petiole of 1 mm. Leaves are ovate or round, obtuse, 3-10 mm long, pubescent on the under-surface at least when young, margins recurved. Flowers are few, axillary, solitary, on slender pedicels with bracteoles near middle. The pedicel exceeds the leaf in length. The calyx is slightly hairy, upper lobes broader and longer than lower. Standard is yellow within, brown on back; keel dark red. Pod is 2-3 cm long, about 6 mm wide; margins sparsely ciliate. Seeds 6-8.

Previously also known as *Bossiaea decumdens* F. Muell.

A. a flowering branch full size.

B. the flower, from the front B1, the rear B2 showing the larger two upper lobes of the calyx joined (connate) and, B3 from the side.

C. the leaf showing veins and the stipules (small leaves) at the base C1, the leaves being hairy (tomentose) underneath C2.

D. The branchlets are also hairy.



***Bossiaea cinerea* R.Br.**

Showy Bossiaea

This widespread shrub of southern (S.A., Vic., N.S.W., Tas.) sandy heathland and forest grows to about 1 metre high and displays showy flowers along the erect and spreading branches. The leaves are alternate or opposite, almost stalkless, lance-shaped, being wider at base and tapered toward the apex, terminating in an almost pungent mucro; minutely scabrid (rough) above, hairy beneath, with slightly recurved margins. Stipules are small and linear-lanceolate. Flowers are large and showy, 10-12 mm wide, numerous, axillary, solitary. The pedicel is shorter than the leaf, 5-10 mm long, with bracteoles below the calyx. The standard is yellow streaked at centre with red and reddish-brown outside. Keel is dark red and obtuse. The pod has a stalk as long as the calyx, is 15-20 mm long, 6 mm wide, glabrous several-seeded. Flowering is in August-September. Illustrated in colour in Vol. 10, page 101.

Previously known as *B. coccinea* Bonpl., *B. cordifolia* Sweet and *B. tenuicaulis* Grah.

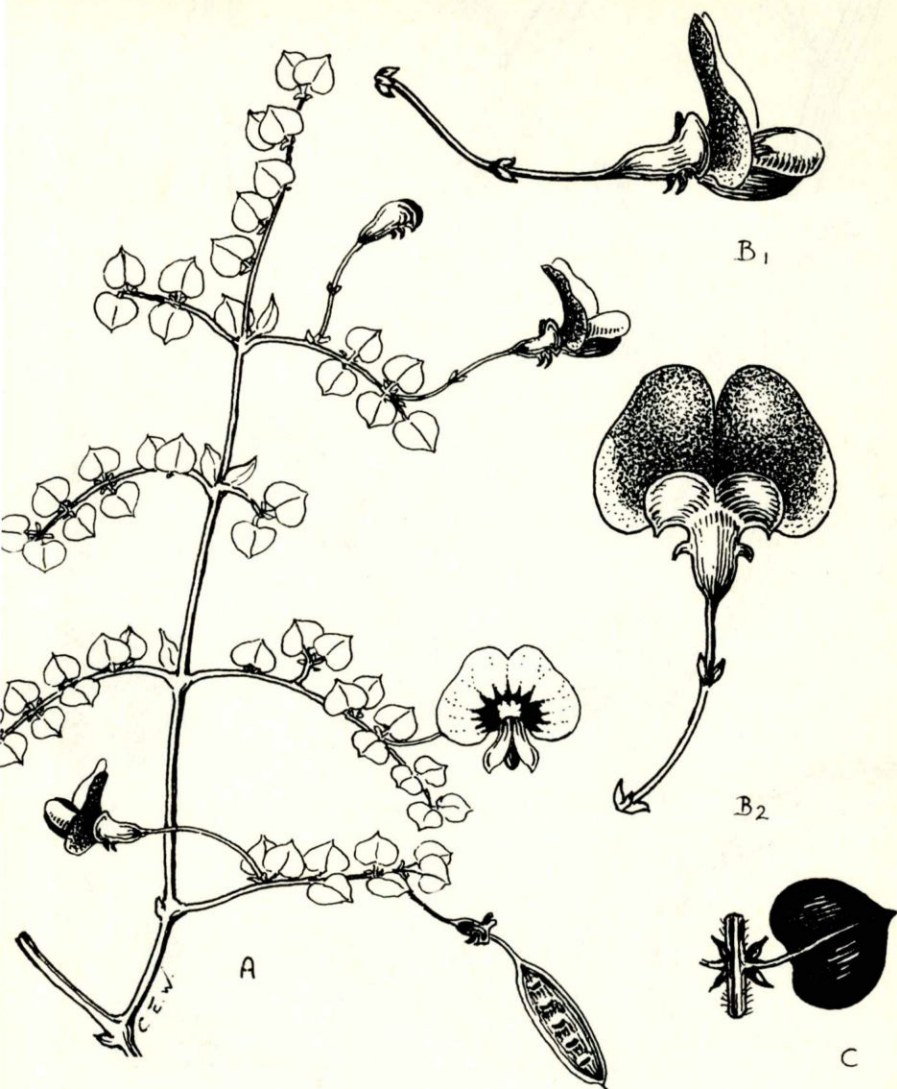
A. a flowering branch full size showing alternate leaves and axillary single flowers.

B. the flower from the front B1 and the side B2, bracteoles below the calyx.

C. the almost stalkless lance-shaped leaf to a pungent point, with stipules C1, rough above and hairy beneath with slightly recurved margins C2.

D. stems and branchlets hairy.

E. the seed pod, several seeded.



***Bossiaea cordigera* Benth. ex Hook.**

Wiry *Bossiaea*

Growing in damp localities in southern Victoria and Tasmania, this wiry, rather straggling shrub, 1-1.5 metres high, presents an attractive appearance with its many sprays of small rounded leaves and large scattered flowers. The leaves are opposite, orbicular-cordate with a small mucro at the apex; 3-6 mm long and 3-6 mm wide on a short slender petiole; stipulate. The flowers are solitary, axillary, on a fine pedicel 8-20 mm long and the small bracteoles are above midway along the pedicel. The flowers are large, about 12 mm wide and the standard is orange-yellow inside with red central streaks, brown outside; keel is red. The 2 upper lobes of the calyx are much larger than the lower 3 and each is orbicular and glabrous. The pod is 12-18 mm long on a stalk exceeding the calyx in length, is glabrous and has several seeds, usually 4-6. Flowering is in spring.

- A. flowering branch full size, with, in this case, opposite leaves.
 B. the flower from the side B₁, and the front B₂ showing the calyx shape with bracteoles.
 C. the leaf shape with stipules at point of attachment to a hairy branchlet.

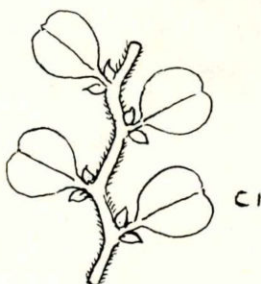
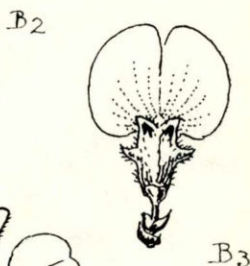
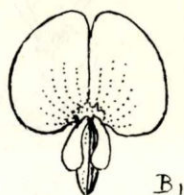


***Bossiaea ensata* Sieber ex DC**

Small Leafless Bossiaea

This small straggling shrub, to a metre high, grows in the coastal heath and adjacent forest of the east coast, from Victoria to Queensland. Stems are winged, flattened, elongated, little-branched, notched at nodes; leaves reduced to scales except on seedlings or new growth after fire. Habit like *B. scolopendria* but build smaller and more slender, flowers more scattered. Flowers, 7-10 mm, solitary, growing from the small shoulders. There are several bracts at the base of the pedicel and bracteoles more or less halfway along. The calyx is about 4 mm long. The standard is yellow inside, red outside and keel darker red. The pod has a stalk 2-4 mm long, is up to 25 mm long, 10 mm broad, is flat, glabrous with thickened margins. Seeds several. Flowers in spring.

- A. flowering branch, full size, showing leafless, winged branches.
 B. the flower from front B1, the rear B2 and the side B3.
 C. a section through the winged stem or branch of the plant.



***Bossiaea foliosa* A. Cunn.**

Leafy *Bossiaea*

Growing in the alpine and sub-alpine regions of N.S.W. and Vic., *B. foliosa* is an erect shrub to 2 m, with many spreading branches densely covered with small round leaves. Stipules are dark, persistent, small, ovate-acute; petioles very short. Leaves are 2-3 mm wide, broadly orbicular, close-set, alternate, glabrous above, pubescent below. Flowers are small, yellow, axillary on upper branchlets, numerous. Bracts and bracteoles conceal the short pedicels. The calyx is silky-pubescent with upper lobes falcate-acute (curved) but not larger than the lower three. The pod is flat, densely brown villous, shortly stalked, orbicular to oblong, 7-10 mm long. Seeds several. Flowers in early summer. A colour photograph on page 108 illustrates the plant well.

Previously known as *Bossiaea distichoclada* F. Muell.

A. flowering branch full size.

B. the flower from front B1, from side B2 and the rear B3.

C. the alternate leaves with stipules C1 with recurved apex C2 and slightly hairy underneath C3.

D. the hairy seed pod.



***Bossiaea heterophylla* Vent.**

Variable *Bossiaea*

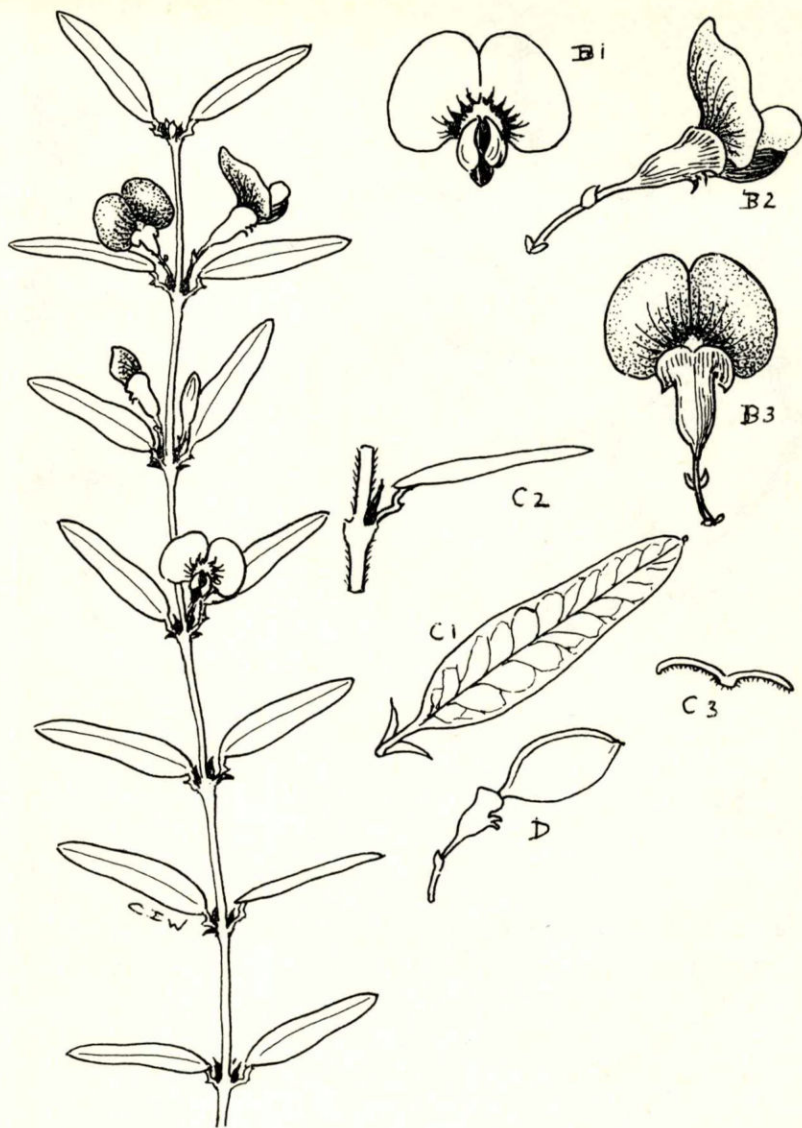
Widespread through sandy near-coastal heaths from Victoria to Queensland, this slender lightly-branched shrub, to about a metre high, has slightly flattened stems. The glabrous leaves, from linear-lanceolate to obovate lower down, are variable on the one plant, length being from 5-25 mm and width 2-4 mm. Flowers are rather large, 8-15 mm and are yellow and brownish-red. The pedicel is slightly longer than the calyx with bracts and bracteoles nearer the base. The glabrous calyx is about 5 mm and the upper lobes are wider and larger than the lower 3. The pod, 25 x 7 mm has a stalk longer than the calyx, is glabrous and several-seeded. *B. heterophylla* can be found in flower most times of the year.

Previously known as *Bossiaea lanceolata* (Andr.) Sims or *Platylobium lanceolata* and *Bossiaea ovata* or *Platylobium ovata*.

A. a flowering branch full size.

B. the flower from front B1, the side B2 and the rear B3.

C. the leaf attached to a glabrous branchlet C1, the shape and veining C2, and the concave hairless (glabrous) leaf in section C3.

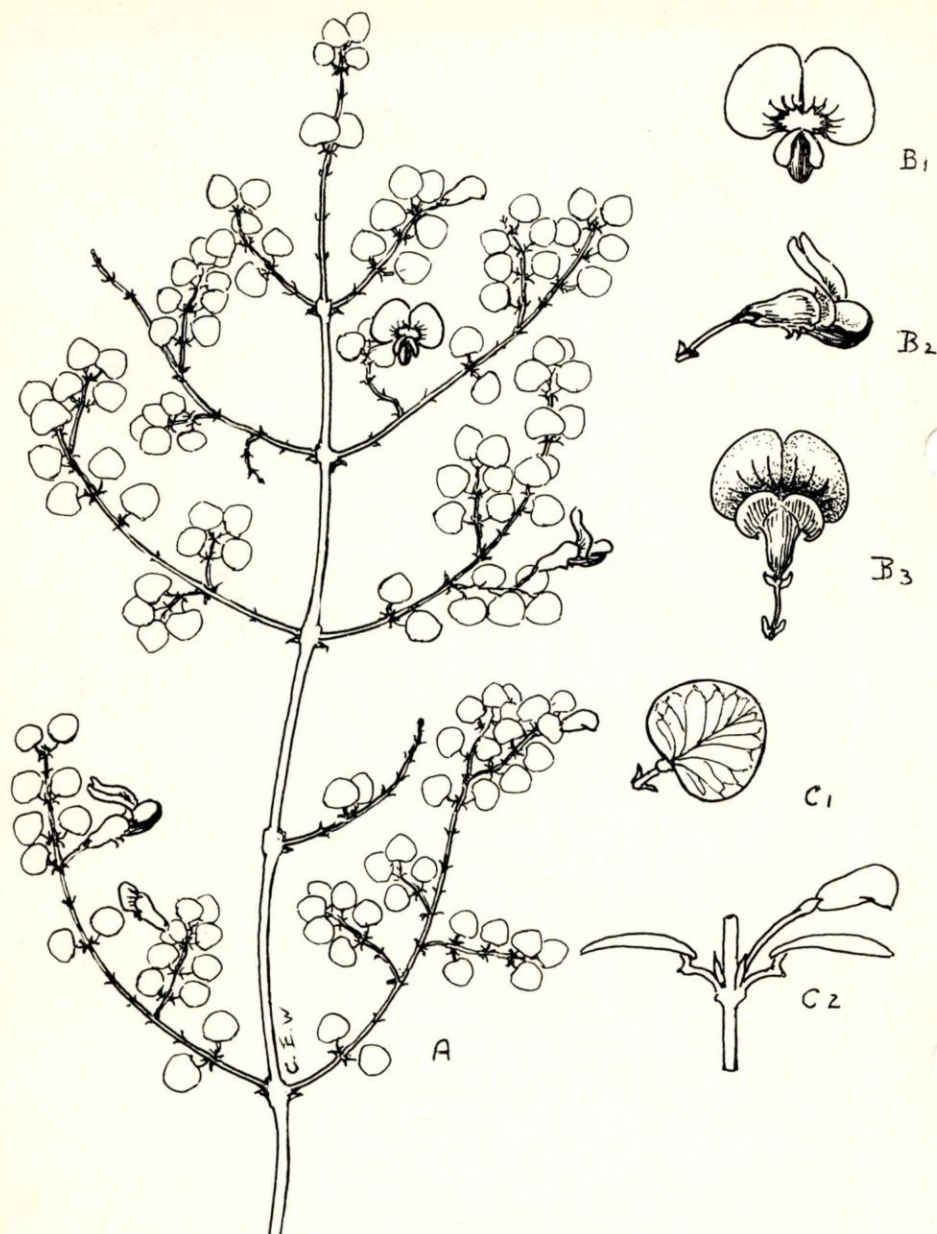


***Bossiaea kiamensis* Benth.**

Illawarra *Bossiaea*

This very attractive shrub, 1-1.5 metres high, flowers in spring on the rocky heaths of the tablelands or coastal eastern slopes of the Illawarra district, e.g. Pigeon House Range. The branches are hoary. Leaves, 1-2 cms. long, are simple, opposite, convex, oblong or elliptical, obtuse, shortly stalked, with small simple stipules. The under surface of the leaf is silky with short appressed hairs. Flowers, about 10 mm long, are orange with red shading and markings. The pod is glabrous and stalked.

- A. a flowering branch, full size, with opposite leaves and axillary flowers.
 B. the flower from the front B1, the side, B2 and the rear B3.
 C. the leaf shape and veining with a short stalk (petiole), stipules (modified leaves at the base) C1, attached to the branch C2 and with hairs underneath C3.
 D. the seed pod, a glabrous, stipitate fruit.



***Bossiaea lenticularis* Sieb ex DC.**

Blue Mountains Bossiaea

Widespread in dry sclerophyll forests on the eastern slopes of the Blue Mountains around Sydney, *B. lenticularis* is a somewhat diffuse glabrous shrub to 1 m high with slender wiry branches. It flowers in spring. Leaves are round, 3-7 mm in diameter opposite, with a short petiole, 1 mm long, and tiny stipules. Veining shows clearly on the undersurface of the leaf. Flowers, 8-10 mm long, are yellow with red shading and markings and are shortly stalked. The standard is broad, wings and keel small. The pod is ovate, about 15 mm long.

A. a flowering branch, full size.

B. the flower from the front B1, the side B2 and the rear B3.

C. the shape and veining of the leaves C1, attached opposite C2.



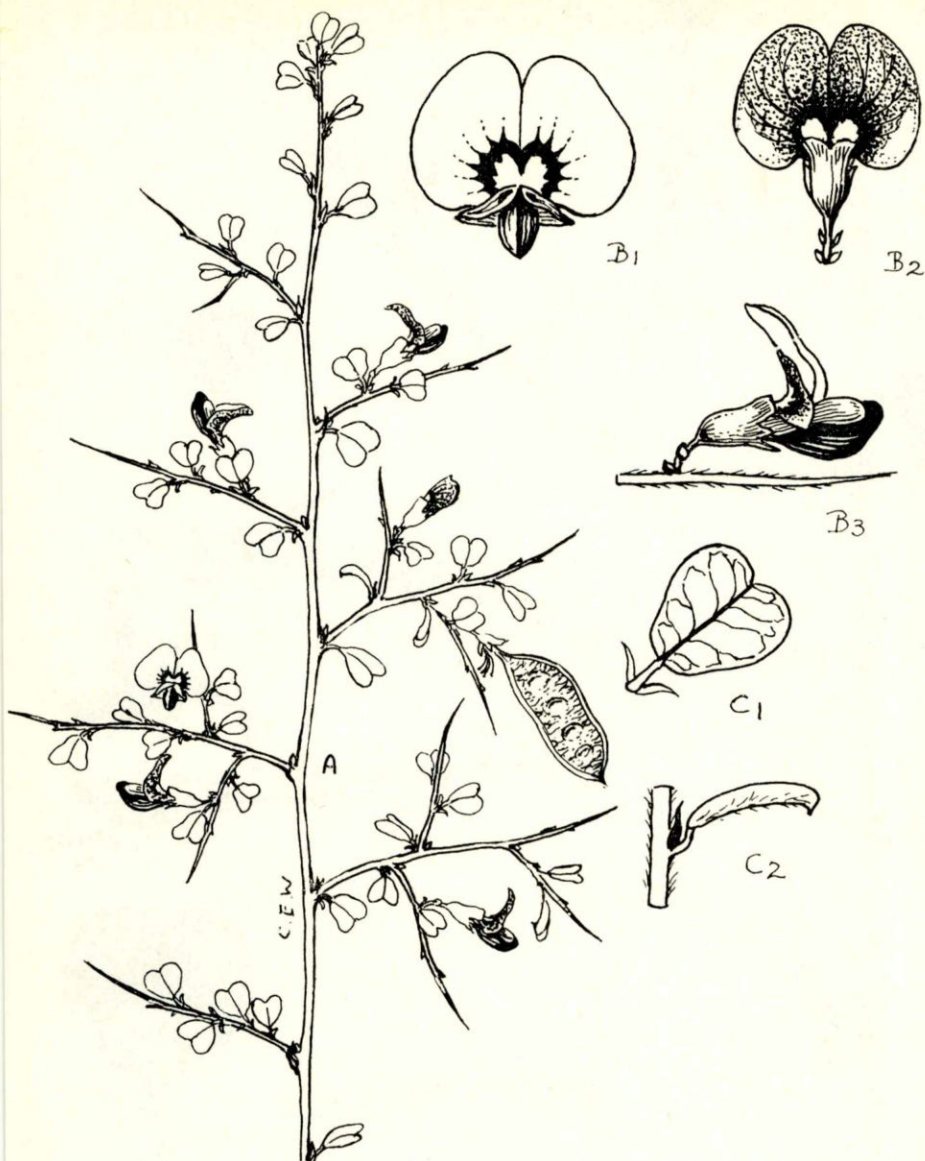
***Bossiaea neo-anglica* F. Muell.**

This prostrate or sprawling shrub, with stems to about 50 cm, grows in sandy or gravelly soils on acid rock on the central and northern tablelands of N.S.W. Branchlets are hairy. The leaves are 3-8 mm long and about 3 mm broad, ovate and often cordate at the base. Stipules are dark, linear-lanceolate, longer than the short petiole of 1 mm. Leaves are glabrous or nearly glabrous on top, slightly hairy below, and have a fine mucro, not pungent. Flowers are 6-10 mm long, axillary, solitary, scattered near the ends of branchlets, on a short pedicel shorter than the leaf. The glabrous or stiffly hairy calyx has large, almost orbicular upper lobes, larger than the three lower. The standard is yellow with red streaks inside, reddish-brown outside. The pod, glabrous or slightly ciliate, is flat, about 20 mm long and 5-7 mm broad. Seeds 6-8. Flowering time spring.

A. a flowering branch, full size.

B. the flower from the front B1, the side B2 and the rear B3.

C. the leaf shape and veining C1, hairy underside C2 with recurved stipules to a hairy branchlet, C3.



***Bossiaea obcordata* (Vent.) Druce**

Spiny Bossiaea

This is an erect rigid shrub, up to 1.5 metres high, twiggy, with branches spinescent and slightly pubescent. It is widespread and grows in various situations, often dry, hilly forests from Central Victoria, Tasmania, N.S.W. to Queensland. Leaves are obovate to obcordate with a small recurved point; 2-6 mm long, alternate, glabrous with prominent lateral veins and slightly hairy underneath. Stipules about 1 mm, same length as petiole. The flowers are solitary, axillary, about 8 mm long. Standard yellow with red, reddish back; dark keel. Pedicel about 2 mm long. Calyx is 3-4 mm long, glabrous; 2 upper lobes wider and larger than lower 3. The pod is 10-15 mm long, 5-7 mm wide, glabrous, has slightly thickened margins and is several-seeded.

Previously known as *Bossiaea microphylla*.

- A. a flowering branch full size.
- B. the flower from the front B1, the rear B2 and the side showing its attachment to hairy branchlets, B3.
- C. the leaf shape and veining with recurved apex, C1 and hairs on the underside and on branchlets, C2.



***Bossiaea prostrata* R.Br.**

Creeping *Bossiaea*

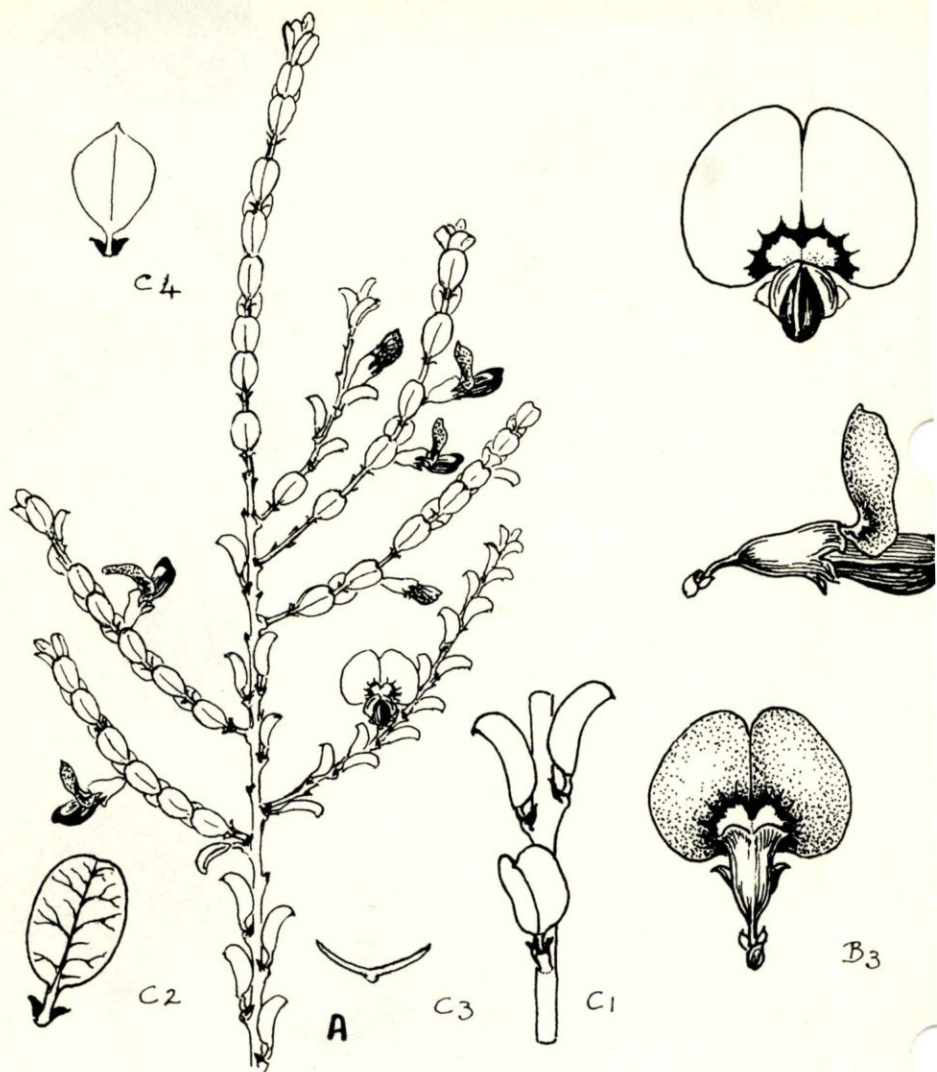
Widespread along the coast and tablelands of south-east and east Australia from S.A. to Q. and Tas. *B. prostrata* is a small, creeping, prostrate shrub and has stems that are procumbent but not mat-forming. The leaves are elliptical, ovate or oblong, 5-12 mm long, 3-7 mm wide; glabrous or with sparse appressed hairs obtuse or with a small tip, not pungent. Petiole is short, stipules minute. Flowers are axillary, solitary or clustered near ends of branchlets; on stalks as long as or sometimes longer than the leaves. Both pedicel and calyx are shortly hairy. The 2 upper lobes of the calyx are large and rounded. Standard is yellow and red inside, brown and red outside, the keel dark red. The pod is very shortly stalked, 15-25 mm long, 5 mm broad, has scanty hairs on the upper suture, and has about 8 seeds. Flowering period is winter and spring.

Previously known also as *Bossiaea linnaeoides* and *B. nummularis*.

A. a flowering branch full size.

B. the flower from the front B1, the side B2 and the rear B3 showing the calyx and pedicel (stalk) to be shortly hairy.

C. the leaf shape and veining with stipules C1, hairs on the undersurface C2 and a recurved apex C3.



***Bossiaea rhombifolia* Sieber ex DC.**

Appressed Bossiaea

There are two sub species, ssp. *rhombifolia* Sieber ex DC (leaf in c4 above) and ssp. *concolor* Maid, et Bêche as illustrated above.

This is a widespread erect shrub, up to a metre high, growing on sandstone and through dry sclerophyll forests of the tablelands, western slopes and ranges of the western plains in central and northern NSW to southern Qld. Branches are leafy and stems often slightly flattened or angular. Leaves, on a short petiole, are obovate, elliptical or rhomboidal, 5-10 mm long, 5-10 mm broad. They point upward against the stems and have a small tip. Stipules are small and persistent. Flowers are solitary, axillary, 8-10 mm long. Standard is yellow, slightly red-streaked inside, mainly yellow outside; keel dark red. Pedicel is glabrous, shorter than the calyx; bracts and bracteoles near base. Calyx is about 4 mm long; upper lobes obtuse, enlarged and longer than the lower 3. The pod is flat, 15-20 mm long, 7 mm broad. Seeds several.

A colour photograph on page 108 illustrates the beautiful plant.

Previously known as *Bossiaea rotundifolia* DC.

A. a flowering branch of *Bossiaea rhombifolia* ssp. *concolor*, full size.

B. the flower from the front B1, the side B2 and the rear B3.

C. the alternate leaves on a glabrous stem of *B. rhombifolia* ssp. *concolor*, C1 the shape and veining C2, and the concave hairless leaf surface C3.

C4. a leaf of *B. rhombifolia* ssp. *rhombifolia*.



***Bossiaea riparia* A. Cunn. ex Benth.**

River Leafless Bossiaea

This small shrub, to 1 m high, is much branched, erect or spreading and sprawling, with narrow flattened stems with wings. *B. riparia* grows in damp areas in hilly country in Victoria (Grampians and N.E.), Tasmania, NSW and the ACT. Leaves are commonly absent. Flowers are scattered, 8-10 mm long, on slender stalks at shoulders on the stem. Pedicels are longer than the bracts and bracteoles, the latter attached midway along the pedicel. The calyx is glabrous, the 2 upper lobes enlarged and obtuse, the 3 lower acute. The standard is yellow inside, purplish-red on back; keel dark. The pod, 15-20 mm long, 5 mm wide, is 4-6 seeded. Flowers in late spring.

A colour photograph on page 125 illustrates the plant well.

- A. a flowering branch, full size.
- B. the flower from the front B1, from the side as attached to the leafless winged stem B2 and from the rear B3.
- C. a cross section of the flattened leafless stem.
- D. the seed capsule, an immature pod D1, and a mature pod D2.



***Bossiaea rosmarinifolia* Lindl. in Mitch.**

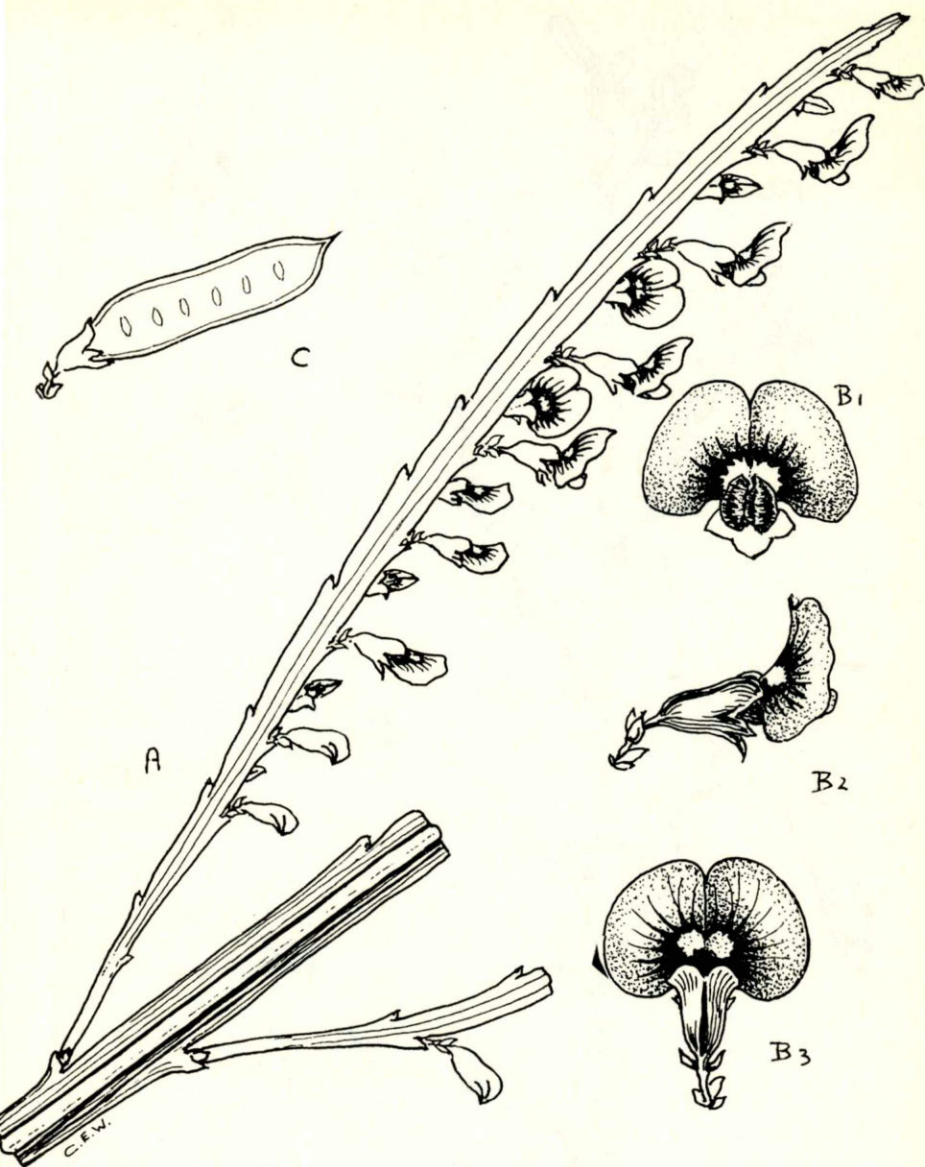
Grampians *Bossiaea*

This erect densely-leaved shrub, 1 to 1.5 m high, is endemic in the Grampians, Victoria. The leaves are narrow linear, 15-25 mm long, 1-2 mm broad and have a short petiole and dark linear stipules longer than the petiole. Leaves have an acute tip, not pungent, edges recurved and prominent midrib on under surface. Flowers, about 10 mm long, slightly smaller than those of *B. cinerea*, have a shortly hairy slender pedicel 5-10 mm long, tiny bracteoles halfway along this and minute bracts at base. Calyx is glabrous, upper lobes enlarged and turning out with a short tip, lower lobes acute. The standard is orange-yellow inside with red streaks at centre, red outside; keel dark. The pod is shortly stalked, ovate-elliptical with thickened margins. Several seeds. Flowers in spring.

A. a flowering branch, full size.

B. the flower from the front B1, the side B2 and rear B3.

C. the leaf with stipules and short petiole on a slightly hairy branch C1, with recurved margins C2, pointed and narrow with stipules C3.

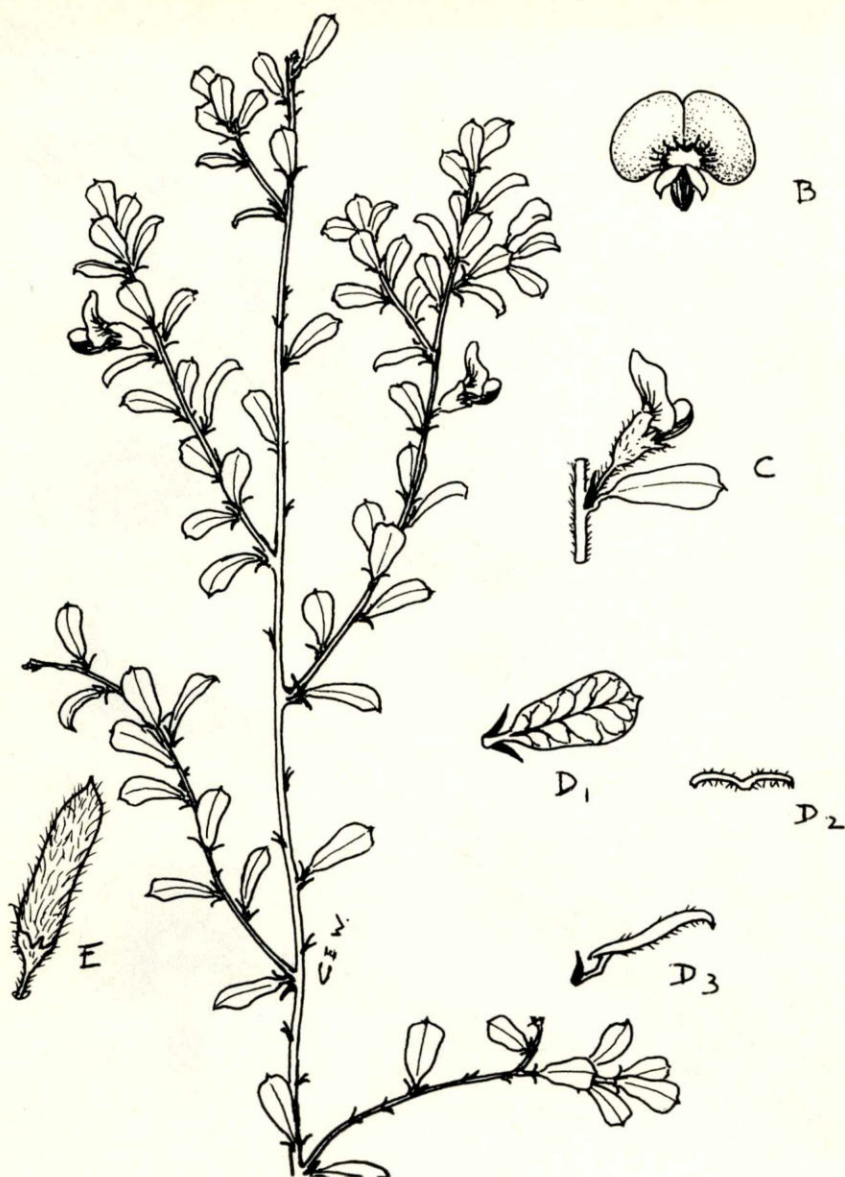


***Bossiaea scolopendria* (Andr.) Sm.**

Broom Bossiaea

A shrub to about 1 m high, with strong, erect, flattened almost leafless stems, *B. scolopendria* flowers in spring and is widespread through the heaths and dry sclerophyll forests of the coast and adjacent plateaus around Sydney. Stems are stout, to 1 cm wide, broader than *B. ensata*. Flowers, 10-15 mm, are solitary, growing from small shoulders along the stem, and are shortly stalked. The colour is yellow with dark red markings. The pod is almost sessile and about 10 mm broad.

- A. a flowering branch, full size showing flattened winged leafless stems.
 B. the flower from the front B1, the side B2 and the rear B3.
 C. the seed pod.



***Bossiaea scortechinii* F. Muell.**

Spreading Bossiaea

This prostrate shrub, with stems about 50 cms long, grows in sandy or gravel soils near acid rocks on the New England tablelands and flowers in late spring. Leaves, 4-8 mm long, 2-5 mm wide, are obovate to rounded-triangular, broader in the upper half, slightly hairy, and the petiole is 1 mm long. The flowers, on stalks shorter than the leaves, are about 8 mm long, mainly yellow. The calyx is hairy. Pods are hairy, 15-18 mm long.

A. a flowering branch, full size.

B. the flower.

C. the flower axillary to the leaf with a pedicel (stalk) shorter than the leaf.

D. the leaf showing veining, petiole and stipules D1, hairy above and below D2 and D3.

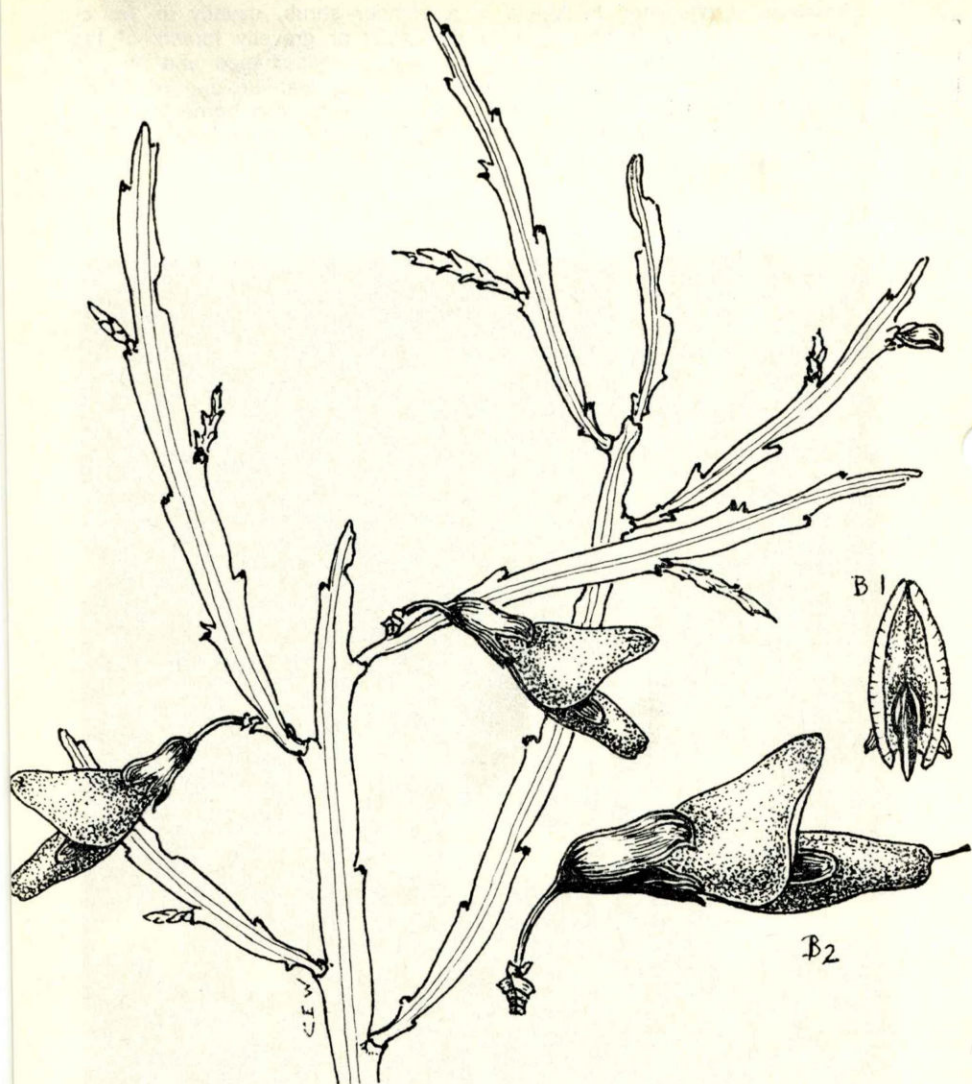
Bossiaea stephensonii F. Muell. is a slender shrub, usually to 1m or less high, appears to confine itself to the rocky or gravelly forests of the Sydney region. The leaves are oblong or almost lance-shaped and have a small soft mucro at the tip. The stipules are large, leaf-like and triangular in shape. The branches are flattened and the flowers are borne singly in the axils of the well-spaced leaves; the flower colours red and yellow. This species flowers in spring.



Bossiaea riparia

Photography by C. Woolcock.

This plant is illustrated and described on page 121. It is superficially similar to *B. scolopendria* on page 123, *B. ensata* on page 112.



***Bossiaea walkeri* F. Muell.**

Cactus Bossiaea

This glabrous, usually leafless shrub, a spreading bush to 3 m high, occurs in the semi-arid areas of the Murray Mallee in Victoria, the Gawler Ranges to Ooldea in S.A., the mallee districts of W.A. Cocoparra Range, NSW, and in Western NSW. Branches are glaucous, flattened, rigid, narrowly winged, 4-7 mm broad, much branched and notched at nodes. Flowers are red, usually solitary at nodes, on pedicels about 6-8 mm long. The glabrous pedicel is dark-coloured with imbricate (overlapping) bracts at base, about 8 in number, and bracteole just above bracts. The large red keel, 18-20 mm, is much longer than the red standard of 10-12 mm. The calyx, about 10 mm long, is edged with short fine hairs, the upper lobes rounded and connate high up, the lower lobes acute and as long as the upper. Calyx, like the pedicel, is dark-coloured. The glabrous pod is shortly stalked and is about 6 cm long, 1 cm wide. The ovary contains 18-20 ovules. Flowering time is late winter.

A. a flowering branch, full size.

B. the flower from the front B1 and the side B2.

Bossiaea Of Queensland — See page 128

Bossiaea — Western Australia — See page 129.

Flora Of Central Australia

The Australian Systematic Botany Society comprising Australia's leading botanists engaged in the study of the Australian flora, have combined to produce this outstanding book. This will be the only botanical reference to the Central Australian flora, a long awaited publication. It is essentially a botanical work but using the 1200 line drawings and a little patience any reader should be able to identify most plants in the area. In 528 pages (26 x 18.4 cm) this book is good value at the price of \$35.00. For orders received by the Editor of Australian Plants, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213, in 1981, you can receive this book post free for \$33.00.

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- Austraflora** — The nursery with the "Native Know How" — Belfast Rd., Montrose 3765. Tel. 728-1353. Mon.-Sat. 9-5.30 p.m. Sun. 10-5.30 p.m.
- Belbra Nursery** — Box 12, Halls Gap, 3881. In the heart of the Grampians. Large range of Australian natives. Closed Wednesday only.
- Grass Tree Native Plant Nursery** — Brown's Rd., Rosebud S. 3939 (opposite Hyslops Rd.) 10 a.m.-5 p.m. Wed. to Sun. inc. In natural setting.
- Flora Terra Australis** — Cnr. Bellevue Cres. and Seaford Rd., Seaford 3198. Kevin Reed — Native Plants specialist, a collectors nursery. Huge selection from ground cover to trees, rare and the common, sizes large or small. Closed Mon. & Tues.

Wildflower Nurseries in Queensland

- Fairhill Nurseries** — Fairhill Rd., Yandina 4561. Tel. (071) 46-9193. P.O. Box 100. Trees, shrubs, ground covers, climbers, ferns, palms and orchids for the sub-tropical and tropical east coast. Extensive display gardens 8.30 a.m. to 5 p.m. anyday. Catalogue \$1.50.
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- Utingu Native Plant Nursery** — Wholesale and retail. — 37 Sorbiston St., Wellers Hill, 4121. Tel. (07) 397-5706. Open 7 days. Trees, shrubs, ground covers, ferns, hanging baskets.

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- Nindethana Seed Service** — Largest selection of native seed in Australia. Nindethana, Narrikup, W.A. 6326. Available in 50c pks. gram lots or kgs. Send 24c stamp for free catalogue.
- H. Grant** — 2 Sandra Pl., Dubbo, 2830. West N.S.W. a speciality. Two stamps for a catalogue posted.



Bossiaea carinalis (above)

Photography by F. D. Hockings

A plant of the Burra Range and Blackdown Tablelands of Queensland.

***Bossiaea* Of Queensland**

The species of *Bossiaea* recorded for Queensland are: *B. armittii* (details ?) *B. bossiaeoides*, a species from right across the north, illustrated on page 52 of our last issue, described opposite for W.A.; *B. brownii*, see below; *B. buxifolia*, page 109; *B. carinalis*, see below; *B. ensata*, page 112; *B. heterophylla*, page 114; *B. neo-anglica*, page 117; *B. obcordata*, page 118; *B. prostrata*, 119; *B. rhombifolia*, 120; *B. rupicola*, and *B. scortechinii*, 124.

Bossiaea rupicola A. Cunn. likes the rocky slopes of the hills edging the Queensland south-east border. It is a leafy shrub with narrow, alternate leaves, which are lanceolate and upward-pointing. Two bracts unite to form a cup near the base of the flower stalk. It flowers in late September-October.

Bossiaea brownii Benth grows in the south-east of Queensland. It is a shrub with stout, hairy stems and the leaves are dull green, spreading, broad-ovate in shape and up to 12mm long.

Western Australian *Bossiaea*

by G. Keighery,
Kings Park

Pending a much needed revision of the western species the following brief notes will serve as a reference:

Bosseaea aquifolium Benth. A shrub to 3m with yellow/brown flowers in spring, growing on lateritic sands and loams. The rather unusual *Bossiaea* has opposite, prickly-toothed leaves. South West-Darling and Warren Districts.

B. bossiaeoides (A. Cunn. ex Benth.) Court. A leafless erect shrub to 1.5m with yellow flowers in summer and winter, growing on lateritic sands, quartzite, and sandstone. Kimberlies general. Colour plate on page 52.



Bossiaea preissii — See page 132

Photography by John Simmons

B. concinna Benth. A low shrub, often nearly leafless, to 40-60cm, with reddish/yellow flowers in winter and spring, growing on lateritic sands and granite areas. Ereman-Austin, Coolgardie. South West-Irwin, Avon and Stirling.

B. dentata (R. Br.) Benth. A spreading shrub 1m x 1m with dull red or purple, yellow to brown or yellow to green flowers in spring, growing on peaty loam, quartzite clay by streams, granitic sand, coastal swamps or red loam. The typical form of the species has oval serrated leaves. A form near Albany has narrow lance shaped leaves and larger flowers. South West-Stirling and Eyre.

B. distichia Lindl. A spreading shrub 1m x 1m with yellow flowers in spring, growing on peaty sands. South West-Warren.

B. divaricata Turez is an erect shrub to 60cm, growing on lateritic sands. South West-Stirling.

Bossiaeeae — The Uncommon Genera from notes by Alan T. Lee

The Australian species of Fabaceae may be grouped as described previously. Group 2 comprises those species with ten stamens joined in a sheath open along the top. The key on page 95 is extended to include seven genera not widely known.

1. Flowers axillary, solitary or in small clusters or occasionally in (? apparent) racemes.
2. Leaves simple or unifoliate (exceptionally: pinnately 1-5-foliate in *Templetonia hookeri*) *Platylobium*, *Bossiaea*, *Hovea* and *Templetonia*
- 2.* Leaves compound.
3. Leaves pinnately 1-7 foliate *Lamprolobium*
- 3.* Leaves digitately trifoliate.
4. Style upturned; Australian genus *Plagiocarpus*
- 4.* Style straight or downturned; doubtfully Australian *Rothia*
- 1.* Flowers terminal on stem and branches, or leaf-opposed, solitary, racemose or paniculate.
5. Anthers nearly equal in length; keel not beaked; seeds ovoid to spherical without a marked radicular lobe.
6. Flowers in extended racemes or panicles, terminal on stems and branches; seeds arillate; shrubs, usually above 50 cm high.
7. Leaves pinnately trifoliate; seeds with a large hooded aril (Fig. 22) *Goodia*
- 7.* Leaves unifoliate; seeds with a small hooded aril (Figs. 15, 29) *Aenictophyton*
- 6.* Flowers few or solitary, leaf-opposed or in small terminal racemes; seeds not arillate; small plants with prostrate stems or erect to c. 15 cm.
8. Leaves digitately trifoliate; stems prostrate; flowers 1-few in leaf-opposed racemes *Muelleranthus*
- 8.* Leaves pinnate; stems erect; flowers 1-few in terminal racemes *Ptychosema*
- 5.* Anthers strongly dimorphic, 5 long and 5 short; keel beaked; seeds oblique-cordiform to oblong-reniform, often with a well developed radicular lobe *Crotalaria*

These features are shown diagrammatically opposite.

The Genus *Ptychosema*

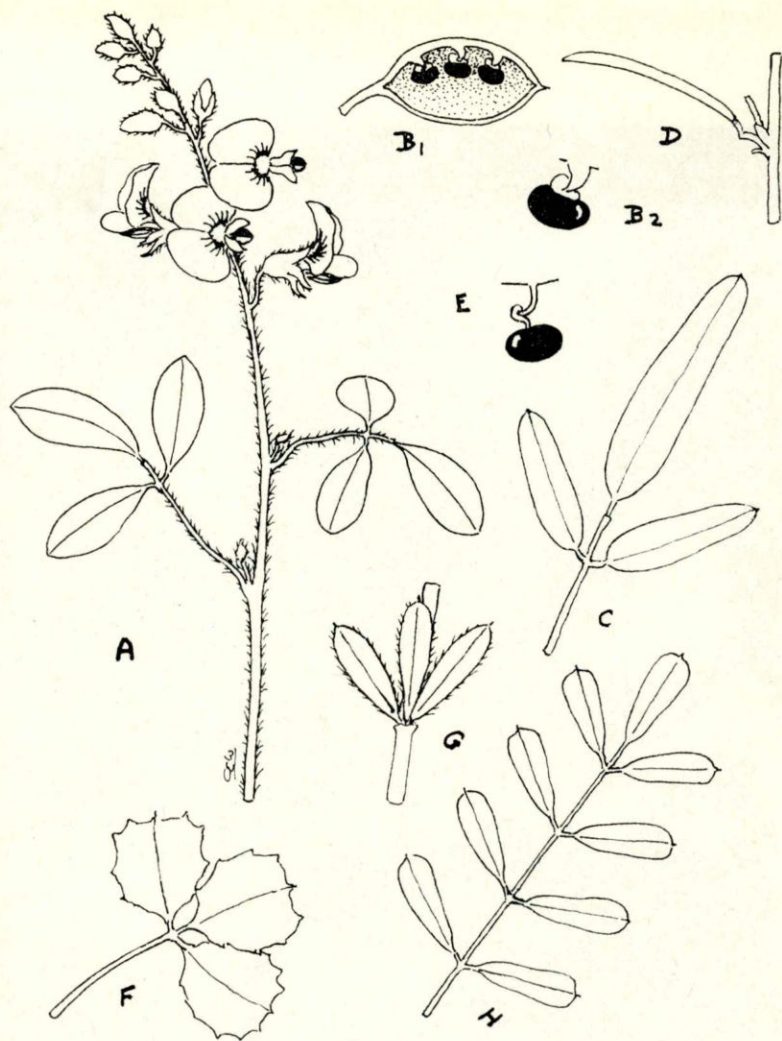
The two species have characteristic pea-flowers, yellow with red or brownish parts, borne singly at the end of a slender peduncle about 4 cm long, terminal on the stems. *P. pusillum* was first described last century by Drummond from the "Swan R. colony"; it was later collected by J. B. Cleland while resident in Western Australia between 1902 and 1913. It was "rediscovered" in 1971, when Alex George of the Western Australian Herbarium was able to give the first precise location: head of Gingin Brook, N. of Gingin. The second species *P. anomalum* was also little known until Central Australia became relatively accessible. A flourishing colony on a sand dune near Ayer's Rock is now known, and there are occurrences around Cumborah in New South Wales. It differs from *P. pusillum* chiefly in having several (5-9) flowers in a raceme on the peduncle, and its stems are usually a little taller, to 20 cm high.

The Genus *Muelleranthus*

The three species have flowers with $\pm$ yellow and purplish red parts, solitary or in a few flowered raceme, *opposite* the leaves. Leaves have 3 ovate or obovate leaflets and the stems are fine, usually quite prostrate, several radiating from a central tap-root. *M. trifoliolatus* is $\pm$ glabrous, with small stipules and larger flowers with more yellow in the petals than *M. stipularis* (with spreading pubescence, large stipules, small, dark-coloured flowers); both of these have entire leaflets and are so distinguished from *M. crenulatus* (with toothed leaflets in which the veinlets end in the shallow teeth). The first two species occur in the dry interior, from W.A., Qld., N.S.W. *M. crenulatus* is known only from near Mt. Holland, W.A.

The Genus *Aenictophyton*

The single species *A. reconditum* is a small perennial shrub to 60 cm with wiry, finely ribbed, terete stems and few leaves. The few flowers occur in a raceme on the ends of the stems, being yellow or orange with some brown markings. It is found on eremean sites along the W.A.-N.T. border.



- A *Goodia lotifolia* — habit.
 B¹, B² *Goodia lotifolia* stalked ovary with 2-4 arillate seed.
 C Diagrammatic leaf of *Lamprolobium fruticosum* (pinnately 3 foliolate).
 D Diagrammatic leaflet of *Aenictophyton reconditum*.
 E Diagrammatic arillate seed of *Aenictophyton reconditum*.
 F Diagrammatic leaf of *Muelleraanthus crenulatus* (digitately trifoliolate).
 G Diagrammatic leaf of *Plagiocarpus axillaris* (sessile digitately trifoliolate).
 H Diagrammatic leaf of *Ptychosema* sp. (pinnate leaves, imparipinnate).

The Genus *Plagiocarpus*

The single species, *P. axillaris* is a many-stemmed subshrub with densely hairy stems growing from a woody rootstock, c. 50 cm high. Leaves are trifoliolate and sessile, with narrow-elliptical leaflets about 1-2cm long, and tend to hide the nearly sessile yellow flowers which are borne in the axils. From the north of Australia (e.g. Katherine Gorge and the Kimberleys).

Continued on page 134.



***Bossiaea eriocarpa* Benth.**

Photography by R. Paynter

A woody shrub to 30 cm, the yellow/brown flowers are showy from winter to summer. It grows on lateritic sands, sand dunes and limestone areas of the south-west of Western Australia, Irwin, Darling, Avon and Stirlings.

B. laidlawiana Tovey et Morris is a shrub or tree to 8m, with yellow/red flowers in spring, growing on clay loams, along stream banks and in peaty sands. South West-Warren, Stirling.

B. leptacantha E. Pritzel, is a leafless shrub, 1-2 m with yellow flowers in spring, growing on clay, sand dunes and around salt lakes. Ereman-Coolgardie, South West-Stirling, Eyre.

B. linophylla R. Br. is an erect shrub, 1-2m, with yellow/red or yellow flowers from winter to summer, growing on granite areas, brown sandy loam lateritic sand or rocky humic sand areas. South West-Warren and Stirling.

B. ornata (Lindl.) Benth. Is an erect shrub, 1-2m with brown/yellow flowers in winter to early summer. The leaves are large, broad-ovate or lanceolate 1-4cm in length. It grows on gravel or gravelly loam. The northern populations have much narrower leaves than the southern populations. South West-Darling and Warren.

B. peduncularis Turez. Is an erect shrub to 1m, with reduced leaves, flowers yellow/brown or yellow/red in spring and growing on lateritic sands. South West-Avon and Eyre.

B. preissii Meisn. Is a low shrub to 50cm, with red flowers in winter and spring, growing in white sand, gravel loam and dunes. South West-Stirling and Eyre. See page 129 for colour plate.

B. pulchella Meisn. Is an erect shrub to 1m, with yellow/purple flowers in spring growing on gravel. South West-Darling and Warren.

B. rufa R. Br. is a low spreading shrub or erect shrub to 2m with red flowers in winter to summer, growing on sand, granitic areas, dunal swamps, coastal dunes, lateritic sand and salt lakes. A variety *foliosa* Benth, is smaller, to 60cm, with yellow/brown flowers. South West-Darling, Warren, Stirling, Eyre and Ereman-Coolgardie.

B. spinosa (Turez) Domin is a low twiggy glaucous shrub to 40cm, with red or yellow flowers in spring growing on lateritic sands. South West-Irwin, Darling and Avon.

B. strigillosa Benth. Is a spreading shrub, to 25cm 60cm, with yellow flowers in spring, growing on stony clay. South West-Eyre.

B. walkeri F. Muell. is a twiggy leafless glaucous shrub to 1m with red/orange flowers in winter and spring, growing on red sand, clay, limestone or yellow sand. South West-Irwin and Eyre. Ereman-Austin and Coolgardie. See sketch and description on page 126.

B. webbii F. Muell. Is an erect shrub, to 2m with yellow/red flowers in spring growing on granitic sands, swampy sands and loam. South West-Warren and Stirling. ■

Templetonia neglecta J. H. Ross

—continued from page 102

Publication of the recent description of this new species (Muelleria 4:4: May, 1981) gave the following interesting notes: *T. neglecta* is a rare species with a restricted distribution in the south west of W.A. where it has been recorded for loam, loamy clay and rocky sand (quartzite). Plants are in conspicuous especially not in flower, and have the appearance of straggly specimens of *Gastrolobium crassifolium* with only a few leaves. Flowers are produced from early June to early September and individual plants flower for long periods. Regeneration is mainly by suckering after fire or earth disturbance.

T. neglecta shows no obvious affinity with any other *Templetonia* species WA although some sterile small-leaved specimens of *T. retusa* show a fairly close superficial resemblance. *T. neglecta* appears more closely related to *T. stenophylla* of the cast. (See page 100 for a line sketch of *T. stenophylla* and page 101 for a colour plate). *T. stenophylla* differs in that the plants are sometimes weak-stemmed and straggling, the leaves tend to be larger, not congested on the stems and of a different shape (narrower) and texture.

T. neglecta is a glabrous shrub to 0.9m high with several stems arising from a woody rootstock, leaves simple, oblong to slightly obovate-oblong, upper surface usually somewhat concave, 0.45 x 0.7cm average, glabrous, midrib raises a conspicuous beneath. The flowers are similar to those of *T. stenophylla* on page 101 except that the orbicular standard 9-15mm long including a 3.5mm claw, is dullish brown outside with yellow venation and dull yellow inside and a darker yellow throat. ■

A genus often "lumped" into one species *G. lotifolia*, but divisible into 2 on the mainland, while a third is recognized in Tasmania. The plants are shrubs, tall and graceful in *G. lotifolia*, to short and condensed in *G. medicaginea* but often 1-2 m high in both species. Leaves are pinnately trifoliate (the terminal leaflet distant from the others) and flowers are borne in a terminal raceme. *G. lotifolia* is often larger, with smoother, lighter coloured bark, larger flowers, fruits (often > 2.5 cm) and inflorescences, a longer base to the aril, and longer calyx teeth (equal to the tube) than *G. medicaginea*. *G. medicaginea* is usually condensed, shorter in stature, with darker, rougher bark, smaller flowers and fruits (often 2 cm or less), with a more condensed inflorescence, a short base to the aril, and calyx teeth shorter than the tubes. The Tasmanian form known as *G. pubescens* has densely pubescent stems, leaves and calyces, and a condensed habit. *G. lotifolia* occurs in eastern Australia, from Queensland to Victoria, Tasmania and eastern S.A. *G. medicaginea* occurs from W.A. to N.S.W. and Vic.

The Genus *Lamprolobium*

Lamprolobium fruticosum, the only species, is not uncommon in north Queensland. It is a shrub to c. 2 m. high with sparse and graceful branches, and leaves with 1-7 narrow-ovate leaflets which are 2-5 cm long. The flowers are (mostly) yellow, single or several of different ages on pedicels from the leaf axils. The seed aril is conspicuous, and the calyx breaks off in a ring where its base joins the receptacle.

Crotalaria and *Rothia* are included here in Bossiaeeae as their stamens are also joined in a sheath open on the upper side. Although they have species endemic and/or native in Australia they belong to an essentially African group (extending into the Mediterranean region, India and Australia).

Attachment Of Seed In The Pod Of The Bossiaea Group

An interesting feature of the endemic Australian members of this Group 2 of plants is the manner of attachment of the seed inside the pod as illustrated in Figure 2. However, the conspicuous lipped-collar or hooded aril, of *Lamprolobium*, *Plagiocarpus*, *Templetonia* and *Hovea*, and *Bossiaea*, *Platyllobium*, *Goodia* and *Aenictophyton* respectively, is reduced in the last genus and absent from *Muelleranthus* and *Ptychosema*. *Crotalaria* and *Rothia* have endemic and/or native species in Australia but are not endemic genera, and the aril, if present at all, has a different form.

NEW BOOKS ON WILDFLOWERS

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Flora of Central Australia — See page 127 \$33.00 post free from Editor

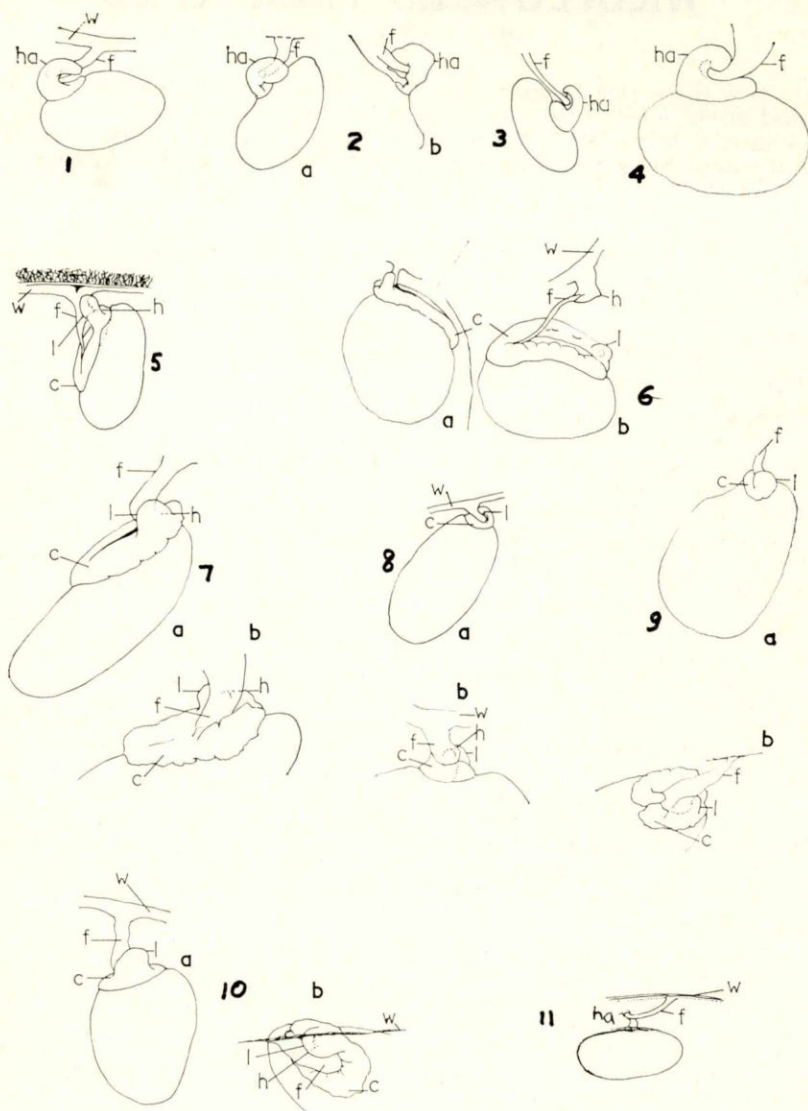


Fig. 2. Arillar structure in seeds of *Bossiaea* and related genera — 1. *Bossiaea heterophylla*, $\times 5$. 2. *B. walkeri*, a, $\times 5$, b, funicular attachment, $\times 5$. 3. *Platylobium formosum*, $\times 5$. 4. *Goodia lotifolia*, $\times 5$. 5. *Hovea* sp. var. *montana* (this taxon, generally recognised as var. *montana*, is variously referred to *H. longifolia* or *H. purpurea*), $\times 5$. 6. *H. linearis*, a, $\times 5$, b, showing the funicle partly pulled away, $\times 5$. 7. *Templetonia retusa*, a, and b, from different sides, $\times 5$. 8. *T. sulcata*, a, $\times 5$, b, funicular attachment, $\times 10$. 9. *T. hookeri*, a, $\times 5$, b, funicular attachment from different angle, $\times 10$. 10. *Lamprolobium fruticosum*, a, $\times 5$, b, funicular attachment from other side, $\times 10$. 11. *Aenictophyton reconditum*, $\times 5$. c collar, f funicle, h heel, ha hooded aril, l lobe, w wall of pod (sometimes only a thin shred pulled off).

WILDFLOWERS FROM SEED

Part 3 — by W. H. Payne

Now is the time to plant seed. Seed is readily available from seedsmen listed in this issue or from the Society. A huge range of wildflowers may be grown from seed. Part 1 of this series describes how to sow the fine seed of the plant family Myrtaceae which includes the bottle brushes, *Callistemon*, the ti-trees *Melaleuca*, the many gum trees *Eucalyptus*, etc. with nothing more sophisticated than some small plastic pots, coarse sand and an ice cream container in a plastic bag.

Part 2 of this series describes my method of pre-germinating seed in egg cartons and in this part I will describe how I shall plant them out.

Previous issues have described many methods used to germinate a wide range of seed. We have had advice and more advice so why is it that we sometimes have trouble in growing them on to healthy plants? The secret is in hygiene and in watering.

Hygiene?

Notes from John Scarvelis, opposite, are important. Careful attention to hygiene will give good results. John works professionally with plant raising and all the measures he recommends are essential in these circumstances.

Fortunately for those as lazy as I am there are some simple methods of achieving a reasonable standard of hygiene. Use the sun. My work bench is in the full sun and it and everything on it gets sun-blasted. I work in the mornings when it is pleasant. My little pots filled with potting sand are left in trays to dry out in the sun. As I will be planting out one pre-germinated seed per pot I have a large number of three centimetre diameter pots (72) in a tray used by nurserymen as seed trays for germinating exotic annuals or vegetable plants. You can get 14 of these small plastic pots into a two litre ice cream plastic carton which will do just as well. It will need holes in the bottom if used as a tray only or no holes if used as a mini hot-house as described in Part 1 of this series. As a further precaution I water the tray of pots with boiling water some hours before planting the seed.

Potting soil may be sterilised by the sun as described on page 127.

By using well washed plastic pots and sterilised contents the seed and small seedlings are now safe from the hordes of wogs, fungi, bacteria, mites, etc., for a few hours. Keep the trays away from the ground in a wog-free area. I had my trays in rows on a plank supported above the ground.

Watering!

The pots with germinating seed now need moisture and clean air, warmth from the sun but no direct sunlight. Wogs will not flourish if the air is fresh so do not put the pots in an enclosed space where humidity will build up, but keep them out of the wind. I had a roof of green plastic sheet over mine, in a sheltered position but with room for fresh air to circulate over the pots. On a bench in a shade-house, if you have one, is often ideal provided you also have air movement.

Watering, that is the trick. Overhead watering could be a disaster unless you have very well-controlled conditions and use a fungicide in the water. Previous issues describe ways of watering the pots by standing them in water that is maintained at a constant level automatically. Without special facilities watering can be a lot of work.

The mini hot-house described in Part 1 comprising the pots in a plastic ice cream container sealed in a plastic bag, works very well in the winter. For a wide range of plants it is the method I shall use next winter until the seedlings first appear. There is water in the bottom of the container and this, by the action of the sun, builds up a humid automatically controlled seed raising situation. The trouble is that it can quickly build up the wog situation and except in winter, can rarely be used for plants other than the water lovers such as *Callistemon* and *Melaleuca*, without the use of fungicides.

Bottom watering appears essential. In my case I made a large tray that accommodated three seedling trays each containing 72 pots, side by side. Each day the seedling trays in this container were changed so that with 12 trays each pot was watered every four days. When the seeds were first sown they had to be watered in this way each day. Watering was from the bottom as the level of fresh water, 20 centimetres deep, was replenished each day. The sand on top in the pots got slightly damp from capillary moisture after the pot stood soaking for an hour. More care was needed in maintaining this moisture when the seed was first sown as the seed must not dry out. As the seedlings grew, less frequent watering encouraged the root to go down.

What You Should Do?

Decide what species would interest you and purchase seed.

Read previously published articles on propagation of the species or genus of your interest and follow the expert. Take my advice as a last resort.

Carry out trials germinating the seed by different methods.

Grow on a large number of plants with various treatments such as pot mixture and fertiliser. The next article in this series will give results.

Do something! ■

HYGIENE IN THE NURSERY

From notes forwarded by John Scarvelis.

The growing medium is the foundation for the development of a good healthy plant so that extra effort to make sure that it is disease-free is well worthwhile. Small lots of soil can be sterilised by heating in the kitchen oven to 180°F for 30 minutes. The soil should be moistened but not wet, and charring should be avoided. Another method is to light a fire under a 44-gallon drum with about 8-10" of water in it. Suspend a muslin bag of soil just above the water allowing the steam to pasturise the soil in the bag. Use a thermometer. Both of these methods are limited by inadequate temperature control. Volume 6, page 116, describes a method with greater control.

Soil may also be sterilised by chemical means. This gives "a total kill" which is not as desirable as pasturisation. Methyl bromide gas is commonly used and a small can and applicator are relatively cheap to obtain, and easy to use. Care must be taken to use the gas within a given temperature range otherwise the sterilisation is ineffective. The depth of soil should allow adequate penetration of the gas and the soil should be covered with plastic sheeting for twenty four hours to allow total gas penetration. Another useful chemical sterilant is formaldehyde which can be used as a soil drench at the rate of 1 pint of commercial formaldehyde (37-40%) in 6¼ gallons of water. The diluted mixture is then used at the rate of ½ gallon per square foot of soil, after which the soil is covered for 24 hours with plastic sheeting, to confine the fumes and allow them to penetrate the soil. A warning is required here that the fumes are toxic to living plants and highly irritating to animals.

Disinfection of benches, floors, pots, flats, soil bins, tools, other equipment and general cleanliness are *also* necessary to avoid *recontamination*. ■

STERILIZING POTTING SOIL

Research indicates that soil may be safely sterilized by Solar energy.

Soak a plot of bare soil thoroughly with water, then cover it with a sheet of clear plastic. Two to four weeks of summer sun, "solarizes" the soil to 30 cm. deep to be almost 100% free of fungi and other harmful organisms.

The Horticulture Department of the University of Georgia has a large A-frame covered with a double layer of 4-mil clear polyethylene, with black polyethylene on the floor. Soil in metal food cans, set 8 cm apart and raised 8 cm above the floor, heated up to 150°. After four days, the soil was found to be free of insects and weed seeds. ■

BOOKS ON WILDFLOWERS

This is a mail order service of books, postage free with, in some cases, a discount. You may be able to buy the following books a little cheaper and some groups in the society are offering certain books at a bigger discount so if you want to shop around after reading my reviews, then do so. However the service we offer will be convenient and any small profit made is reinvested in the production of Australian Plants. You may pay a little more through this service but the donation will be well used.

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Books On The Flora (Some including fauna) Of Discreet Areas

For N.S.W.

"National Parks of N.S.W." — Mullins, Martin, Baglin \$12.95
 "The Cradle Of Incense", The Wellington Dubbo Area \$15.00
 "Kosciusko Alpine Flora" — Costin, Gray, Totterdell & Wimbush \$25.00

For Queensland

"Native Plants Of Queensland" by Keith Williams \$30.00
 "National Parks of Southern Queensland" by Mackness \$13.00

For Victoria

"Handbook to Plants in Victoria", Willis — Vol. 1 \$18.80; Vol. 2 \$30.00
 "Flowers and Plants of Victoria and Tasmania" \$24.95

For South Australia

"Flora of South Australia" — Part 1, Black \$16.90
 "Flora of South Australia" — Parts 2 & 3, B/red \$6.50

For Northern Territory

"North Australian Plants", Harmer \$8.00
 "Flora Of Central Australia" Aust. Systematic Bot. Soc. \$35.00

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 "West Australian Plants — A Descriptive Catalogue", Beard \$8.00
 "West Australian Plants For Horticulture" — Part 1 \$8.00
 "West Australian Plants For Horticulture" — Part 2 \$8.00
 "How To Know West. Australian Wildflowers". Fresh supplies in August, '81 \$10.50

For Tasmania

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