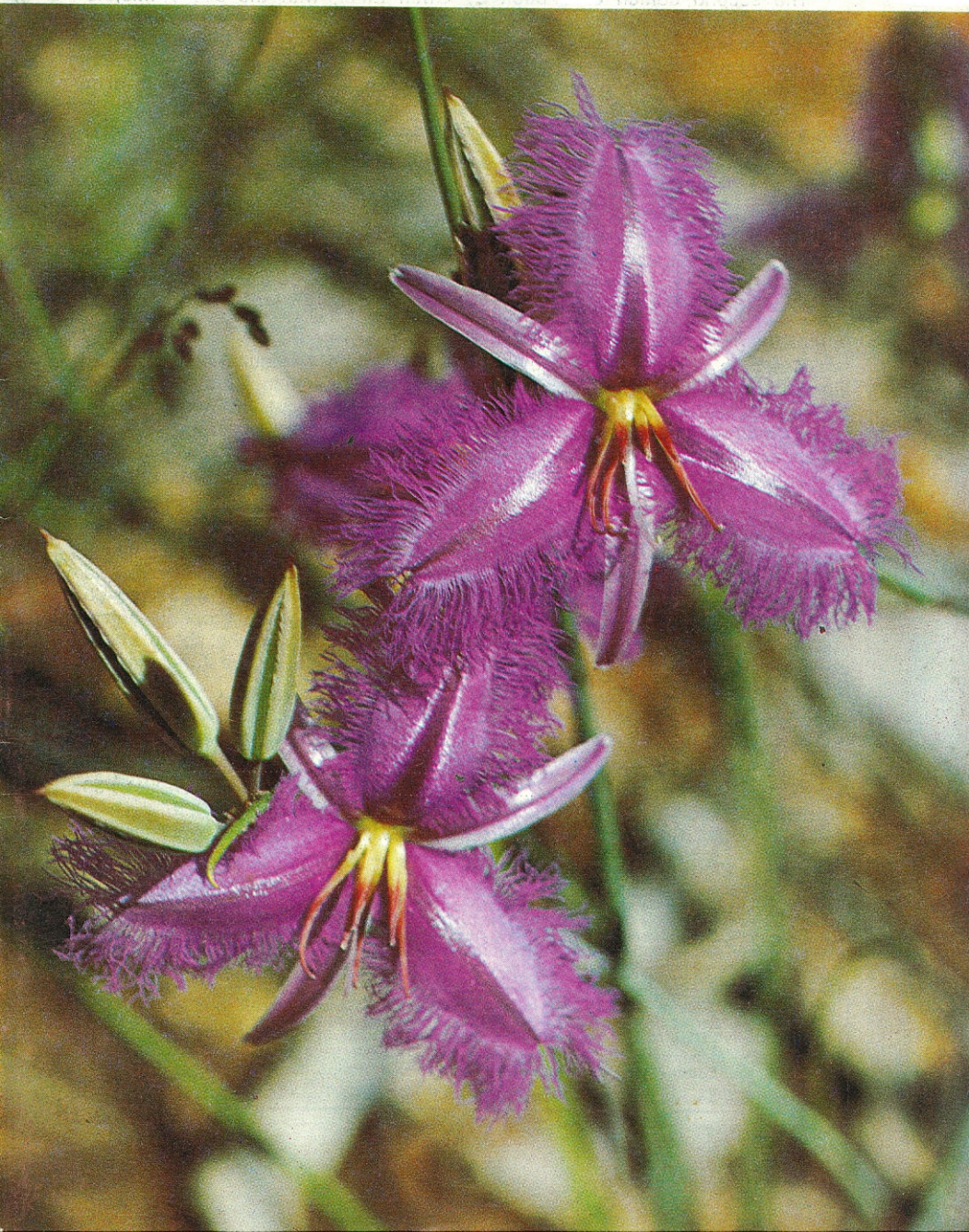


Australian Plants

Registered by Australia Post
Publication No. NBG 1592

March, 1983
Vol. 12, No. 94

\$1.50



As with most things, there is good news and there is bad news.

The good news is that the experienced horticulturalists are publishing their work.

Australian Plants For Containers

The second edition of a book by Gwen Elliot, with the above title, is certainly good news. It has been established that many Australian wildflowers may be grown in containers quite successfully. It is a well established show gardener's practice to prepare plants to a standard in the nursery and present them for viewing in the garden or as specimen pots. Many of our plants also have pleasing foliage. The trick is to keep the plants healthy and rewarding. The article by Gwen Elliot, on page 58 of this issue, is recommended for study.

Native Gardens — How to Create An Australian Landscape

A new book, with the above title, is reviewed on page 90. A more adequate review will be presented in our next issue. This book represents a major contribution to horticultural science at the practical level. Horticultural science? I do not regard this as an overstatement. There are many very serious problems to be overcome to successfully grow many of our wildflowers and this can only be achieved by scientific research and practical study programmes.

Scientific Research And The Home Gardener

Research must rest with qualified scientists and horticulturalists. This is the reason the Society has heavily supported The Australian Flora Foundation. A report from the Foundation is expected for our next issue. However, we, the home gardeners, can do much to assist this frontier of knowledge. Join a Study Group as mentioned on pages 57, 61, 66, 88 and 92.

The Bad News

The continued failures in cultivation of so many plants! If you have suffered similar frustrations as myself and watched so many apparently healthy plants die, then you will appreciate that the cultivation of our wildflowers is far from an exact science. A major cause is that we are lazy; many people blame it on lack of time or resources, but let us face the truth, we fail to do the job properly; we rush it. We do not prepare the garden properly, select suitable plants or provide essential maintenance. A study of the above books confirms that I have not been paying enough attention to the fundamentals of gardening! ■

CONTENTS

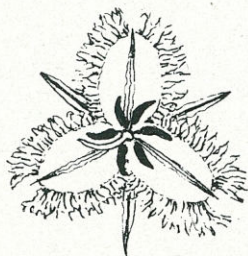
<i>Thysanotus</i> , The Genus	Dr. Norman H. Brittan	47
<i>Lechenaultia</i> For Pot Culture	Editor	57
Australian Plants In Containers	Gwen Elliot	58
Propagation And Cultivation Of <i>Thysanotus</i>	I. R. Dixon	67
Australian Plant Study Groups	Jo Walker	89

COVER PLATE: *Thysanotus tuberosus*

Photography by G. Chapman

The "Fringed Lily" of South-Eastern Australia, this dainty little plant causes comment in the garden or in the wild. The flowers are held in heads (one to five, occasionally eight flowers in a head) at the ends of a branched stalk. The leaves, 5 to 15, are thin, almost tube-like, 20-30 cm long and they grow in clumps on the ground. It is an annual, growing from tubers underground. Given reasonable conditions it will produce its heads of dainty flowers every year.

AUSTRALIAN PLANTS No. 94 issue of Volume 12, comprising issues 93-100.
International Series Index ISSN 0005-0008. A National publication in 15000 copies.
Published by The Society for Growing Australian Plants. For details see last page.
Available to members or by subscription of \$A6.50, including postage to your address.
Send to the Editor, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213.
Publication date of previous issue. No. 93 was 4th March, 1983.



Thysanotus

The Genus by Dr. Norman H. Brittan
Botany Department, University of Western
Australia, Nedlands, 6009

Introduction

The Australian "Fringed Lily", known botanically as *Thysanotus* attracts one's attention by the three delicately fringed parts of the flower. It is in fact the only widespread Australian relative of the lilies to possess this character. The attractive shade of mauve, sometimes more bluish, very occasionally white, of the flowers also serves to attract attention.

Thysanotus are unsatisfactory as a cut flower, since each flower opens for one day only, and under warm conditions may be closed by mid-afternoon. They are successful garden subjects, and are easily grown from seed. See the article on page 70.

There is a variety of form in the various species, leafy or leafless, twining or growing erect. They grow in open heath situations, in open forest, even in maritime situations, so that one is almost certain — the dry inland areas of the Macdonnell Ranges not excepted — to find one in flower, particularly in spring, some continuing to flower well into February.

The first collections of *Thysanotus* plants were made by Labillardière in 1792 when the French expedition, commanded by Captain Baudin, visited south-west Western Australia. At this time the two plants collected were given names in the genus *Ornithogalum* L. Banks and Solander, botanists with Captain Cook, collected a further *Thysanotus* from near the Endeavour River in Queensland. The major early collections were made by Robert Brown over the period 1801-1805, while he was the botanist with the Captain Matthew Flinders expedition. It is to Brown we owe the name *Thysanotus*, which, although published later than the name *Chlamysporum* of Salisbury, was conserved by vote of an International Botanical Congress in 1907.

Distribution of the Genus in Australia

Thysanotus is considered to consist of 47 species, all of which occur in Australia. One species extends outside Australia to China, Hong Kong, Thailand, the Philippines and New Guinea. A second extends to New Guinea.

Four areas of distribution can be recognised:—

(a) tropical — in which two species occur; (b) central — a single species; (c) extratropical eastern (southern Queensland to South Australia, including Tasmania) occupied by nine species; and (d) extratropical western — occupied by thirty-eight species, of which three are also found in area (c).

Geographical distribution on a State by State basis is:

(A) tropical areas of Western Australia, Northern Territory and Queensland — *Thysanotus banksii* and *T. chinensis*,

(B) the extratropical areas:—

(i) Western Aust. only — *T. acerosifolius*, *T. anceps*, *T. arbuscula*, *T. arenarius*, *T. asper*, *T. brachiatus*, *T. brachyantherus*, *T. brevifolius*, *T. cymosus*, *T. dichotomus*, *T. fastigiatus*, *T. formosus*, *T. gageoides*, *T. glaucifolius*, *T. glaucus*, *T. gracilis*, *T. isantherus*, *T. lavanduliflorus*, *T. multiflorus*, *T. parviflorus*, *T. pauciflorus*, *T. pseudo-juncus*, *T. pyramidalis*, *T. ramulosus*, *T. rectantherus*, *T. sabulosus*, *T. scaber*, *T. sparteus*, *T. speckii*, *T. spiniger*, *T. tenuis*, *T. teretifolius*, *T. thyrsoides*, *T. triandrus*, *T. vernalis*, and at the subspecific level *T. patersonii* ssp. *manglesianus*,

(ii) South Australia only — *T. fractiflexus* and *T. wangariensis*,

(iii) New South Wales only — *T. virgatus*,

(iv) Western Australia and South Australia — *T. nudicaulis* and *T. tenellus*,

(v) New South Wales, Victoria and South Australia — *T. baueri*, *T. juncifolius*,

(vi) Queensland, New South Wales, Victoria and South Australia — *T. tuberosus*,

(vii) "Central Australia" — *T. exiliflorus*.

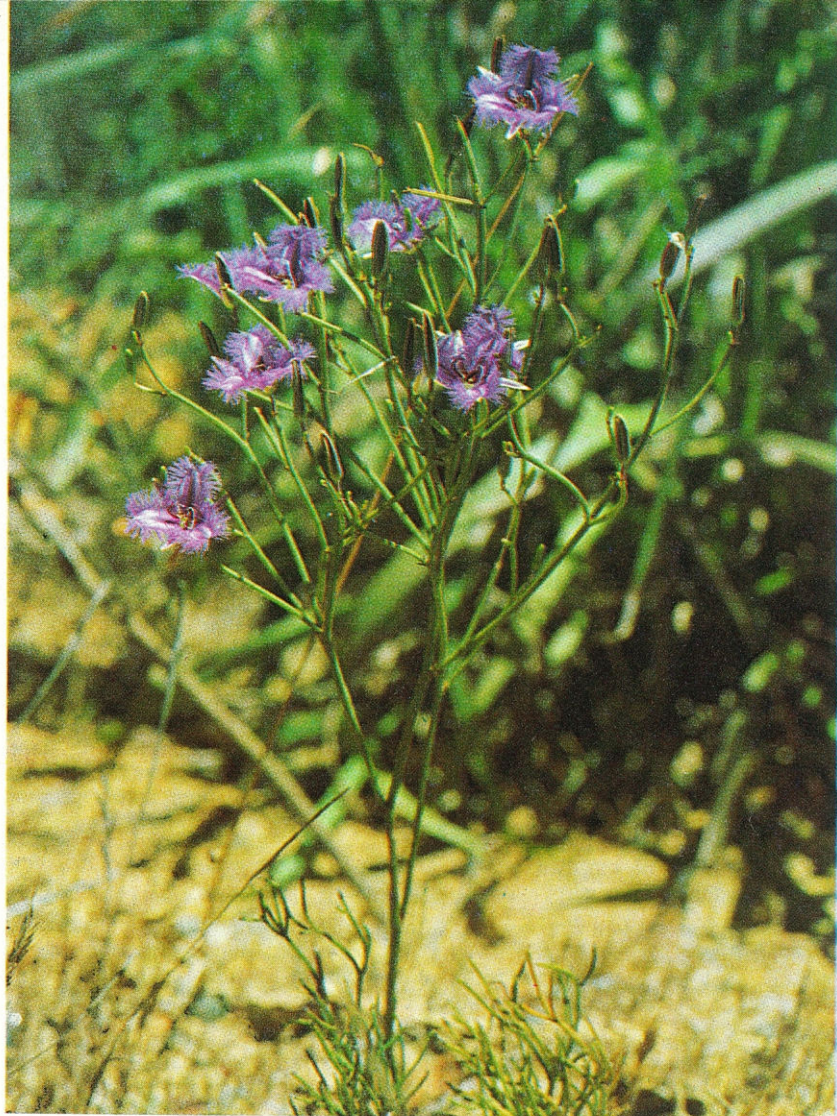
(viii) All States (except doubtfully Northern Territory) — *T. patersonii* ssp. *patersonii*.



Thysanotus sparteus △

▽ *Thysanotus triandrus*





Thysanotus arbuscula (above)

Photography by Greg Keighery

The many branched stems to 70 cm long are erect and hairy, each terminating in two to three flowers two centimetres across. It is found on heath and open forest areas of south-western Australia.

Thysanotus sparteus (top left)

Photography by J. Glass

The branched stems to one metre long are found in Jarrah/Marri forests in Western Australia. The flowers may be up to 4 cm across but are usually less. They mature from a cluster of 2-7 buds at the end of each of the branches of the stem. It is a leafless plant, the perennial stem arising from a rhizome below ground. It is assumed that the flower stem has been laid on the ground to aid photographic presentation. If, in fact, it is a normally prostrate plant, the species is *T. arenarius*.

Thysanotus triandrus (bottom left)

Photography by N. Brittan

This shows an alternative growth form characteristic also of *T. multiflorus* and *T. teretifolius*. The plant comprises a number of plantlets from a common rootstock. The 5-42 hairy leaves per plantlet varying almost flat, to grooved, to round, vary from 5 cm up to 40 cm long but are usually 22 cm. The flower buds are grouped at the end of the stem, usually 10-17 in number.

Relationships of the genus

In floral characters the genus is quite distinctive in the possession of fringed margins to the inner whorl of perianth segments, resulting in the common names of Fringed Lily, or the rather more rarely-used Fringed Violet. This fringed margin is only found elsewhere in Australian monocotyledons in *Murchisonia*, which differs in the possession of perianth segments fused at the base surrounding the superior ovary, and has a very restricted Western Australian distribution. *Thysanotus* is thought to be related to *Arthropodium* and *Dichopogon* (the latter genus sometimes included in *Arthropodium*), both possessing expanded inner perianth segments, which however are not fringed.

Arthropodium (c 7 Australian species, but also extending into New Zealand, New Caledonia and Madagascar) and *Dichopogon* (2 Australian species) are similar in that the flowers are pale mauve, the inner perianth segments expanded and entire, but unlike *Thysanotus* they are more frequently fully reflexed. These plants are described and illustrated in the next issue.

The inflorescence of *Arthropodium* is a loose panicle, sometimes as tall as 100 cm, its branches more or less horizontal, from which, in most Australian species, the flowers hang down, either singly, or in twos or threes. *Dichopogon*, on the other hand, has typically an unbranched raceme inflorescence; the flowers are held in a position similar to that found in *Thysanotus*. Each genus is characterised by having six stamens, all similar in size. In both genera, between the anther and the filament, there is found a mass of intertwined hairs, either purple, yellow, or sometimes a portion of each colour. The distinction between the two genera is that in *Arthropodium* (see fig. 2) the hairs extend towards the base of the stamen forming 'tails' which become obviously separate from the filament, whereas in *Dichopogon* (see fig. 3) the hairs form a compact mass, shorter in length and appressed to the filament.

The leaves of the two genera are flat, 0.5-1 cm wide, and quite often in *Arthropodium* form a rosette on the ground.

Murchisonia, in general aspect, with its fringed perianth segment margins, is similar to *Thysanotus*, the flowers are paler, but, unlike *Thysanotus*, the segments of the perianth are fused at the base (see fig. 4). The paniculate inflorescence is decumbent and much of it is prostrate on the ground.

Murchisonia is mainly known at present from an area north of the Murchison River, but has been seen in Kalbarri National Park. It and *Dichopogon* share the feature of fragrantly perfumed flowers, in both cases more obvious than in the few *Thysanotus* species which have a scent.

Morphology

Thysanotus is a genus of perennial herbs: in many the above-ground parts die back each year, in the remainder either stems — as in *T. dichotomus*, *T. juncifolius* or *T. sparteus*; or leaves — as in *T. asper*, *T. glaucus*, *T. multiflorus* or *T. triandrus*, are also perennial.

A. ROOT SYSTEMS — The genus can be divided into four groups:

A1. Those species with roots becoming swollen into tubers, in general associated with the annual production of leaves and inflorescences.

A1.1 Those where the tubers are virtually sessile and are therefore in a cluster close to the rootstock, e.g. *T. thyrsoides* and *T. tuberosus*.

A1.2 Those where the tubers occur at the end of roots and are therefore spaced away from each other, e.g. *T. rectantherus*, *T. scaber*.

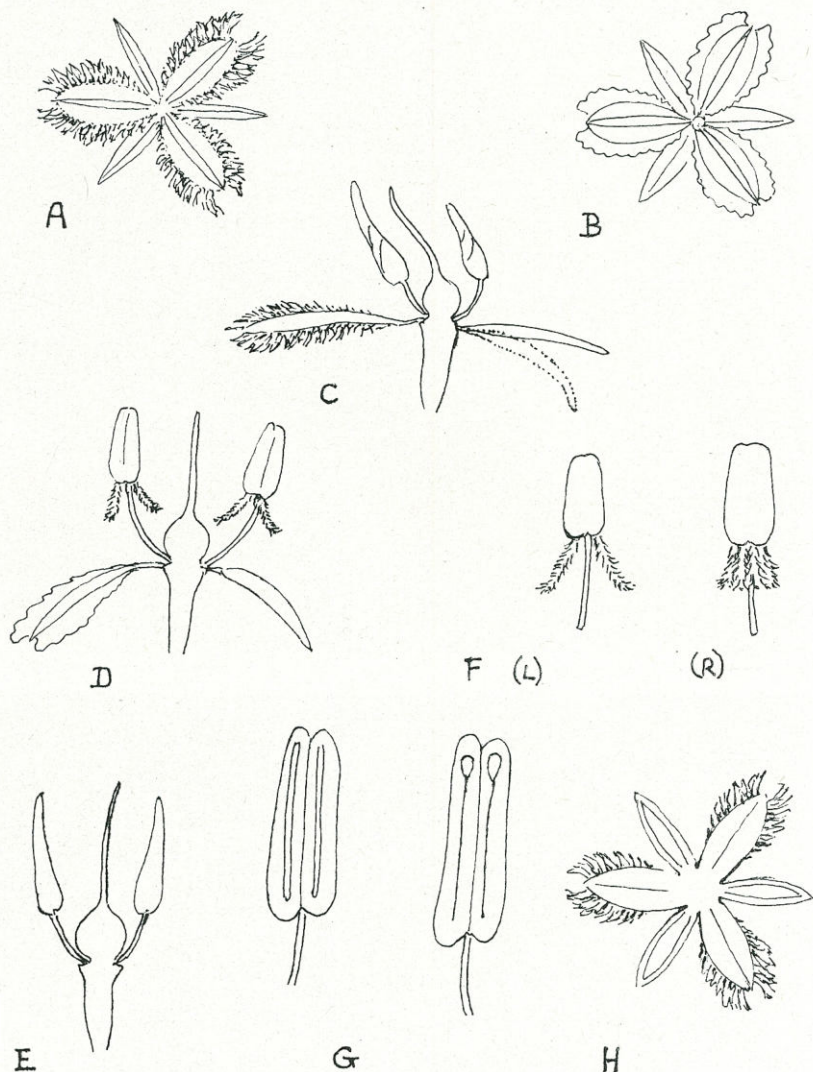
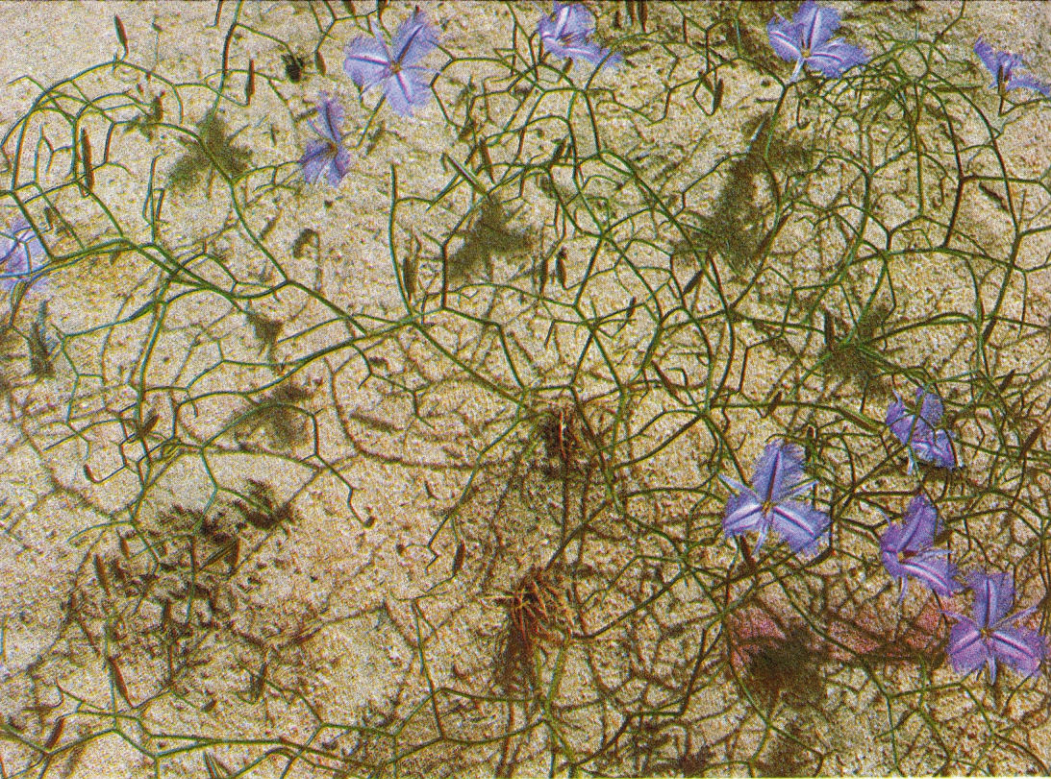


Fig. 1. *Thysanotus*

- A. The flower showing the fimbriate (feathered) margins to the whorl of larger perianth segments (to the three larger petals). There are 6 petals in all, the large three with fringed margins.
- C. *Thysanotus* anther and style. Six stamens (only two shown) not all equal in length. The dying perianth (petals) are shown becoming reflexed in some species as shown dotted.
- E. *Thysanotus* anther arrangement. Six stamens (only two shown) equal in length.
- G. *Thysanotus* anther dehiscence. Full length slits (left); Terminal pores (right).

Arthropodium* or *Dichopogon

- B. The flower, the perianth segments (petals), do not have divided or fimbriate margins.
- D. *Arthropodium* anther and style. The perianth segments (petals) are more usually reflexed.
- F. *Arthropodium* stamen on left (L); *Dichopogon* stamen on right (R).
- H. *Murchisonia* flower. Note that the perianth segments (petals) are fused (joined) at the base with fimbriate margins to the larger perianth segments.



Thysanotus dichotomus △

▽ *Thysanotus teretifolius*





Thysanotus rectantherus (above)

Photography by G. Chapman

This small annual has only a few flat hairless leaves 20-30 cm long. The flowers and the whole plant are shown full size as above. The fibrous roots expand into tubers about 6 cm from the rootstock to supply next season's crop of flowers.

Thysanotus dichotomus (top left)

Photography by J. Glass

The flower stems are many branched from quite near the base and interweave to give the appearance of a hemi-spherical fragile mass of branches to over one metre across. Equally delicate are the pale dainty flowers. The 5-10 leaves have usually withered before flowering. A beautiful form plant for the rockery.

Thysanotus teretifolius (bottom left)

Photography by N. Brittan

Similar to *Thysanotus triandrus* and *T. multiflorus*, the plant comprises a number of plantlets from a common rootstock. It may be distinguished from these by its smooth, cylindrical leaves.

A2. Those species, all but one confined to Western Australia, with fibrous roots showing no development of tubers. Most of the species in this group have perennial leaves and a simple to very slightly-branched scape (inflorescence stem), e.g. *T. multiflorus*, *T. glaucus* and *T. teretifolius*. The exception is the tropical *T. chinensis*, where the leaves are replaced annually.

A3. Those species which have a rhizome with fibrous roots. The rhizome size may vary and also the form, from more or less spherical to somewhat moniliform (resembling a string of beads). All species in this group possess a simple or divided stem, which is perennial, on which the flowers, singly or in small-numbered umbels, are borne directly, e.g. *T. anceps*, *T. dichotomus*, *T. juncifolius* and *T. sparteus*.

B. LEAVES

B1. Absent in the case of *T. anceps*, *T. arbuscula*, *T. juncifolius*, *T. patersonii* and *T. sparteus*.

B2. Linear, thin, flat, e.g. *T. multiflorus*.

B3. Terete, e.g. *T. formosus*, *T. glaucus*, *T. glaucifolius*, *T. teretifolius*.

C. FLOWER STEMS

Absent in one species — *T. patersonii*, which is a climbing plant, also (cf A.3 above) in *T. anceps*, *T. dichotomus*, *T. juncifolius*, *T. sparteus*, otherwise a simple or paniculately branched inflorescence.

D. FLOWERS

Have a perianth (or floral envelope) of six fringed (fimbriate) segments.

D1. Occur singly in *T. patersonii*.

D2. Occur in heads (umbels).

D2.1 Heads of flowers (6-50) on single stem — *T. multiflorus*, *T. triandrus*.

D2.2 Smaller heads of flower (2-6) on a simple to branched, perennial stem in *T. dichotomus*, *T. juncifolius*, *T. sparteus*, *T. wangariensis*.

D2.3 A flower head on an annual, branched inflorescence — *T. exiliflorus*, *T. tenuis*, *T. thyrsoides*, *T. tuberosus*.

E. STAMENS, Number

E1. Three — confined to some Western species — *T. glaucus*, *T. glaucifolius*, *T. multiflorus*, *T. pauciflorus*, *T. teretifolius*, *T. triandrus*.

E2. Six — with the distinction that the anthers may be either —

E2.1 Equal in length — e.g. *T. arbuscula*, *T. exiliflorus*, *T. isantherus*, *T. fastigiatus*, *T. gracilis*, *T. rectantherus*.

E2.2 Three longer than the other three, e.g. *T. dichotomus*, *T. juncifolius*, *T. sparteus*, *T. tuberosus*, *T. wangariensis*.

F. STAMENS, Form of anthers.

F1. Straight, not twisted, e.g. *T. acerosifolius*, *T. arbuscula*, *T. brevifolius*, *T. chinensis*, *T. cymosus*, *T. gageoides*, *T. isantherus*, *T. gracilis*, *T. parviflorus*, *T. scaber*, *T. speckii*, *T. spiniger*.

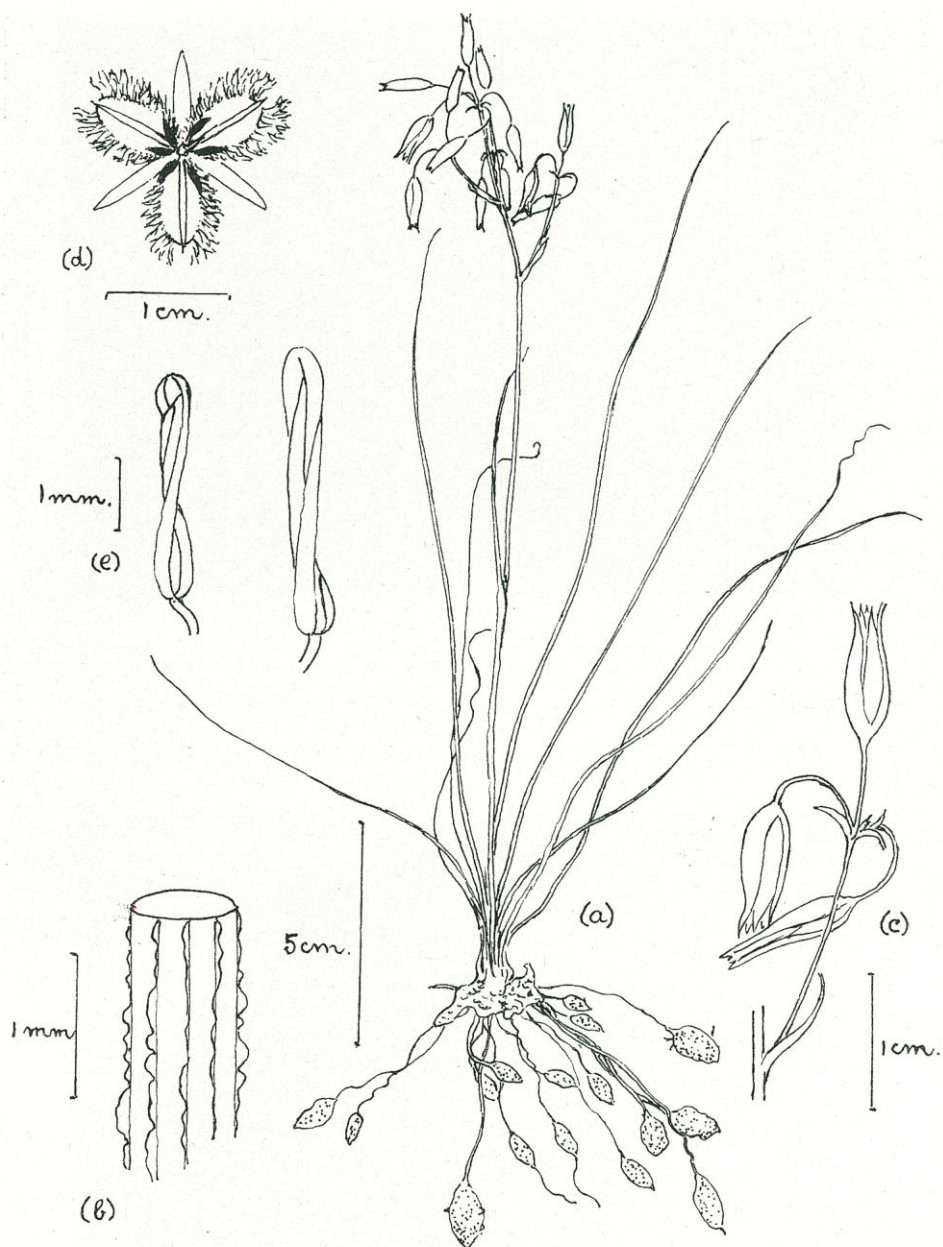
F2. Straight and twisted, e.g. *T. vernalis*.

F3. Curved and twisted, e.g. *T. anceps*, *T. banksii*, *T. dichotomus*, *T. formosus*, *T. fractiflexus*, *T. juncifolius*, *T. nudicaulis*, *T. pseudojunceus*, *T. sabulosus*, *T. sparteus*, *T. tuberosus*.

G. STAMENS, Anther colour

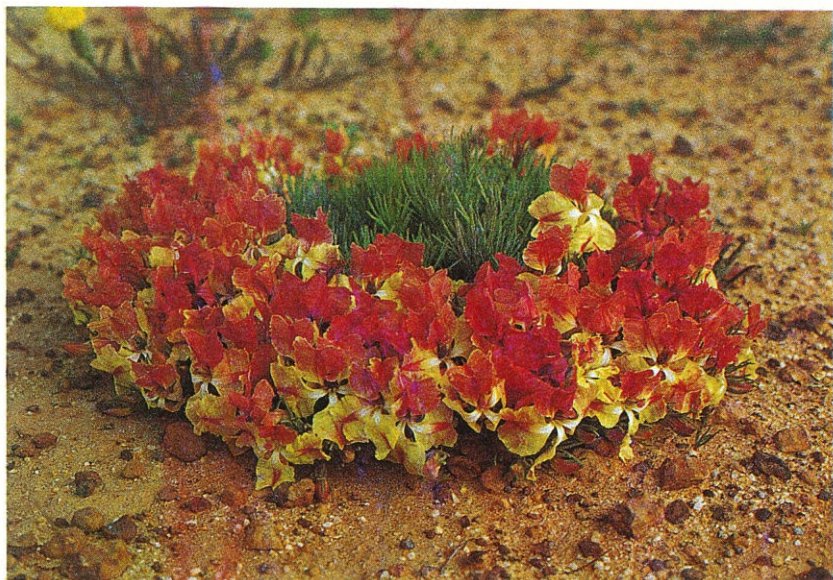
Typically of a similar colour to the perianth except in, e.g. *T. asper*, *T. baueri*, *T. brachiatus*, *T. pseudojunceus*, *T. sparteus* and in some specimens of *T. patersonii* and *T. tenuis*.

Continued on page 71



Thysanotus tenellus

- (a) the whole plant
- (b) detail of scape (floral stem)
- (c) the umbel (grouping of flower buds)
- (d) the flower showing three large fringed petals and three small petals with entire margins, cupping the stamens.
- (e) one of the three inner whorl anthers and one of the three anthers in the outer ring.



Lechenaultia macrantha △

▽ *Lechenaultia hirsuta*





***Lechenaultia* For Container Cultivation**

Species of *Lechenaultia* are rewarding plants when grown in containers. There is still much to learn. Who would like to join the *Lechenaultia* Study Group? See page 42 and page 89.

All species of *Lechenaultia* are ideal for cultivation in containers, the many colour forms of *Lechenaultia formosa* being widely grown. They all may be propagated from cuttings, pieces being exchanged by mail. If you are interested in small colourful plants or live in a gardenless situation such as a unit, the growing of *Lechenaultia* will surpass the pleasure given by African Violets. Why not join a *Lechenaultia* Study Group and join in the fun? —Editor.

***Lechenaultia longiloba* (above)**

Photography by B. Crafter

A prostrate plant that shows promise as a container or mat-forming plant.

***Lechenaultia macrantha* (top left)**

Photography by B. Crafter

The startling "Wreath *Lechenaultia*" so ideal for pot culture and rockeries of deep sand. It always grows displaying its flowers on the ground as a wreath about the foliage to 40 cm across.

***Lechenaultia hirsuta* (bottom left)**

Photography by B. Crafter

A scrambling to prostrate plant that is hardy and showy. Used in association with the world famous "Blue *Lechenaultia*," the display is spectacular.



AUSTRALIAN PLANTS IN CONTAINERS

by Gwen Elliot.

Notes based on her book "Australian Plants
for Small Gardens and Containers". See page 66

The use of containers makes it possible for us to have and enjoy a garden in even the smallest of areas. There is much enjoyment to be gained from the inclusion of container-grown plants in paved areas, or from a carefully planted and tended window box.

It is certainly the unavailability of large garden areas that leads some people to container gardening, but others choose this method of cultivation for the versatility it gives. It is possible to grow in containers plants that would not normally survive in local conditions, simply by adjusting the soil mix to suit the needs of the plant, and if necessary, by varying the position of the container from season to season.

A plant selected to grow in a container immediately becomes very special, in the same way as a feature or specimen plant in a garden. The use of containers allows plants to be singled out for individual display. The most attractive feature of a plant in many cases is the flower, but foliage, shape or form of the plant, buds, berries or fruits, and fragrance, are also aspects worth considering, and in many cases constitute the main attractive feature.

Container gardening never ceases to be full of interest and enjoyment to the keen gardener. Pots may be moved around to obtain maximum enjoyment of each plant at its best, and by a careful choice of species a small number of containers can give year-round beauty.

Soils and Potting Mixes

An open, friable mix is recommended for container-grown plants. Mountain soil and clay loams, which look ideal when freshly cultivated and slightly moist, can turn to a soggy, claggy mass when wet, and then become almost rock-hard after drying out. This is not a well drained mixture, but it can be adjusted to form an excellent potting mix by adding coarse sand. The particles of sand separate the soil particles and permit good drainage.

Plants require a certain amount of moisture, and as the roots of a container-grown plant cannot penetrate deep into the soil to obtain this, it is desirable that an amount of peat moss, or other moisture-retaining substance, be added to the mixture. Peat moss is a material that can absorb moisture, then be squeezed out in a similar way to a sponge. The addition of peat moss still permits good drainage, but retains moisture to assist the survival of the plant.

A basic potting mixture would therefore be about 3 parts friable soil, 5 parts coarse river sand and 4 parts peat moss or organic material.

Several other potting ingredients are used by nurseries and gardeners, and are worthy of consideration. They include vermiculite, perlite, exploded polystyrene, rice hulls, straw, pine chips (not from treated pine), aged or rotting sawdust, scoria, fern fibre and mushroom compost.

Prepared mixes are available from many nurseries and stores, and for small quantities it is often the easiest and cheapest way.

Potting of Plants

Small plants can be successfully potted directly into large containers if desired. It is not necessary to progressively re-pot plants from small to medium pots over a period of time before finally placing them in containers of larger size, although some growers prefer this method. It is often a matter of personal preference, and with adequate care and maintenance plants can be successfully cultivated by either method.

Suitable containers and step-by-step techniques in the preparation of pots and the planting of plants are described and illustrated in the book.

Watering Container-grown Plants

Incorrect watering is undoubtedly the major cause of fatalities with container-grown plants. First let's look at some DON'Ts.

DON'T water plants in the heat of the day. Water in the early morning, or wait until late evening.

DON'T leave pots standing permanently in saucers or dishes of water. A good soak for an hour or so can be beneficial, but waterlogging for days, or weeks, is detrimental to most plants.

DON'T use water from a hose that has been lying in the sun. The water will be warm, or even hot.

DON'T turn the tap on to full pressure when watering with a hose. A strong spurt of water can damage or uncover roots, with detrimental results.

DON'T just water the surface. Regular light spraying will result in the plant producing, and relying on, surface roots. If this frequent watering is then not possible for a period, the upper section of the pot dries out first, and the plant may not be able to cope. Aim at giving plants a thorough soak when watering is needed, rather than frequent light sprays.

Now, having looked at some of the pitfalls, let's take a positive look.

When to water? A reliable guide is to poke your finger into the potting mix. If it is dry and powdery as you scrape down a little, the plant almost certainly could benefit from some water. It is often important to actually scrape the potting mix in this way, as with several potting materials the upper surface can be deceiving, having a very dry appearance, while below the surface the mix is quite moist. Other signs that suggest a plant could be dry include unnatural weeping of foliage tips, and leaves that look dry and curly.

Different plant species have different needs for moisture. Some Australian plants grow best if kept fairly dry during the warmer months of the year, particularly those species that have adapted to these conditions through having grown naturally in low rainfall areas. This becomes a matter of particular importance if plants are being selected for grouping together in a large container.

Water should be applied gently, with a hose or watering can, until the potting mix is saturated. The plant will then absorb the moisture, while the container drains away the excess. This process could be repeated two or three times with small containers; with large tubs the hose could be allowed to run with a small trickle of water until the plant has been thoroughly soaked.

If the potting mix has not been pressed down correctly at the time of planting, or if the plant has been in the container for a long period, dry potting mix can leave the sides of the container, forming a ball. When this happens, water can run down between the soil and container and drain away without reaching the root area. If this happens, simply add additional potting mix, firming it down against the inside of the container with your fingers or a suitable gardening tool. Water well.



Beaufortia micrantha △

▽ *Beaufortia schaueri*

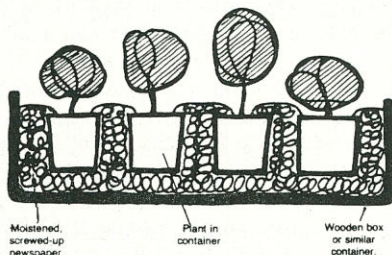


Although many Australian plants can survive on a minimum of water, once regular watering is commenced the plant often becomes accustomed to receiving this amount, and puts on new growth. It must then have continued watering for its survival.

It is not always easy to see when containers are too wet, and therefore it is a good idea to check from time to time that drainage holes are working adequately and are not clogged up. Sometimes, however, it is obvious that the soil is waterlogged. The top of the pot may contain a lush growth of moss or other small water-loving plants. It may become slimy or take on a sour smell. Re-potting may even be necessary. Check that you are not using too much peat moss or other moisture-retaining ingredient in your potting mix.

A highly successful method of watering, recently introduced, is known as trickle irrigation. This method is suitable for the home gardener, and involves the use of polythene pipe, from which small micro-tubes feed each individual plant with a very small trickle of water. In areas where limited water is available this method is ideal, as an absolute minimum of water is wasted. It is also extremely useful for gardeners who are planning a summer holiday, or for other reasons must be away from home for a period, since it can be used, in conjunction with a relatively inexpensive time switch, to turn the water on and off at selected times each day. One home gardener's kit available allows for forty micro tubes. Some could be used on container plants, while others may be placed in the vegetable garden or other selected areas.

If you are planning a holiday, or know that for a period you will not be able to water your plants regularly, avoid excessive watering or feeding in the preceding months. This will restrict the amount of lush new growth on the plants, and thus reduce the need for water. Pruning away any soft new growth will also reduce the moisture intake requirements of plants.



One method of storing containers during vacation.

If you are unable to secure the help of a neighbour or friend to water plants in your absence, and you do not have a trickle feed system, try to prevent the pots drying out as much as possible. Do not leave them in hot,

TYPICAL PLANTS FOR CONTAINER CULTURE PICTURED OPPOSITE

Beaufortia micrantha (above left)

Photography by B. Crafter

The smallest member of the genus *Beaufortia*, this plant rarely grows to one metre in height. In a container it could be restricted to 20 cm, shaped well and be relied upon for a showy flowering. The small stem-clasping leaves form a dense, much branched floriferous dome.

Beaufortia schaueri (bottom left)

Photography by B. Crafter

While this species may grow larger, although rarely above a metre in the garden, its weeping habit and delicate colour make an ideal container plant.

Beaufortia Study Group

The genus *Beaufortia* comprises 17 species of plant, all ideal for containers or small gardens. Brian Walters is leader of the *Beaufortia* and Related Genera Study Group, Lot 32, Wilchard Road, Castlereagh, N.S.W., 2750, and will welcome any reader keen to work with free seed and advice on cultivation.

open sunshine, or exposed to drying winds. They may, if you wish, be packed in boxes, and surrounded by moist peat moss, vermiculite or screwed-up newspaper. A mulch placed on the top of the pots will prevent surface drying, but don't pack it tightly against the stems. If you want plants to benefit from any natural rainfall, be sure the mulch will allow the rain to penetrate.



Feeding Container-grown Plants

Container-grown plants should not be forced by artificial feeding, unless you wish to replace them each year or two after striving for maximum growth and flowering in that period. This can be done with some Australian plants, including the large golden everlasting daisy *Helichrysum* 'Dargan Hill Monarch', Flannel Flowers — *Actinotus helianthi*, Kangaroo Paws — *Anigozanthos* species, and Fringe Lilies — *Thysanotus multiflorus*.

Excessive fertilizing can cause plants to become root bound, and species such as the Kangaroo Paws, which form extensive root systems, will need to be divided frequently.

On the other hand, plants grown in containers do not have access to the natural nutrients usually available in a garden, and therefore will possibly require some artificial feeding to maintain a healthy growth rate. Plants that are growing well are usually more attractive than those that are not, and in addition they are more resistant to disease and can cope better with garden pests.

As a general basic rule, if a plant is growing well it is neither necessary nor desirable to apply a fertilizer. If a plant is struggling, looking stunted or unhealthy, or failing to flower well, a fertilizer should be used.

Choose a cool morning or evening to apply the fertilizer, and use in accordance with the manufacturer's instructions.

Light top dressings of slow-release fertilizers can be applied at six-monthly intervals if desired. Care should be taken to ensure that the fertilizer is cultivated into the potting mix and then watered thoroughly.

Soluble fertilizers, which are dissolved or diluted in water before application, will usually promote a quick response in the plant. Their effectiveness is for a limited period only, as regular watering will leach out the soluble foods. Over-frequent use of these types, particularly if urea is the main component, can constitute force-feeding, and in some cases cause plant deaths. Liquid seaweed fertilizers do not produce this over-feeding problem, and most Australian plants respond well to their use. Best results are gained if the plants are not in a static growth stage.

Fertilizers in pill or tablet form are also now available, and may be suitable to your needs.

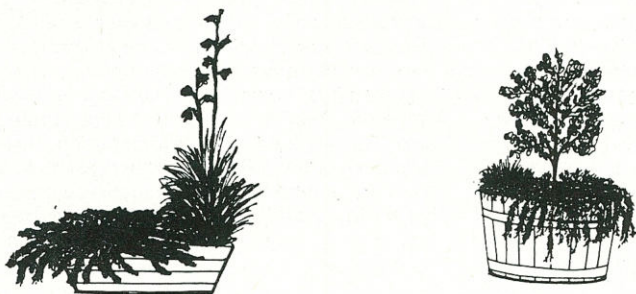
As a general rule, it would seem that short-term liquid fertilizers, or limited applications of a slow-release fertilizer, are the most suitable for maintaining healthy container-grown plants. In a garden quick growth is often desired, but this is not usually the case with plants in pots. Rather, a healthy and attractive plant is sought. Light fertilizing will usually achieve this, without causing the plant to double its size and become root-bound in the process.

Pruning Container-grown Plants

Some pruning of container-grown plants will almost certainly be desirable from time to time. Regular pinch pruning is, for many plants, the easiest and best method. Simply pinch out, with finger tips, the terminal growth on a branch. The branch will then no longer continue to grow in that direction. Side shoots will develop, and a generally more bushy plant results.

Spent flowers may be removed if desired, and the picking of a plant when in flower is another form of pruning.

Pruning should be carried out if a plant is re-potted, both to reduce the immediate demands on the root system, and to encourage subsequent new growth.



Re-potting Container-grown Plants

If a plant is not looking fresh and healthy it may be desirable to re-pot and return it to the same container. Some fresh potting mix, plus a light pruning of the roots of the plant as well as the upper growth, can add new life and vigour. Re-potting can also be desirable if a container becomes infested with weeds such as couch, oxalis or sorrel, which are difficult to eradicate by any other means.

Procedure

1. Remove the plant from the container. Light tapping with a hammer or mallet can help in the case of large tubs. A large knife inserted around the edge of the tub will not harm the root system. Immersing the plant in water, or inserting a hose in the base drainage hole, can also help. With large tubs, the help of a second person may make the task much easier.
2. Reduce the root size by about 25 to 30 percent. Fibrous roots can be removed with the fingers, but sharp secateurs should be used for the removal of any large roots. Tease out the outer roots in readiness for replanting.
3. Thoroughly wash the container, then rinse well.
4. Re-pot the plant taking care to maintain original soil level.
5. Water well, and lightly prune upper plant growth.

Table 1 — Plants For Pots Under 30 cm diameter

- A. Low, carpeting species for small pots and with other plants in larger containers or planter boxes. Their presence in large containers can help reduce weed growth and provide a living mulch, thus reducing temperature variation in the soil.
- B. Tufting and clump forming plants.
- C. Specimen plants for pots under 30 cm diameter.

A	B	C
<i>Claytonia australasica</i>	<i>Anigozanthos humilis</i>	<i>Astroloma ciliatum</i>
<i>Dampiera diversifolia</i>	<i>Anigozanthos manglesii</i>	<i>Blechnum minus</i>
<i>Frankenia pauciflora</i>	<i>Blancoa canescens</i>	<i>Boronia microphylla</i>
<i>Goodenia hederacea</i>	<i>Celmisia astelifolia</i>	<i>Boronia pinnata</i>
<i>Herpolirion</i>	<i>Conostylis aculeata</i>	<i>Boronia serrulata</i>
<i>novae-zealandiae</i>	<i>Conostylis candicans</i>	<i>Correa pulchella</i>
<i>Lechenaultia formosa</i>	<i>Dryandra nivea</i>	<i>Crowea exalata</i>
<i>Lechenaultia tubiflora</i>	<i>Glischrocaryon behrii</i>	<i>Crowea saligna</i>
<i>Mazus pumilio</i>	<i>Lomandra filiformis</i>	<i>Dampiera rosmarinifolia</i>
<i>Pratia pedunculata</i>	<i>Orthrosanthus laxus</i>	<i>Darwinia leiostyla</i>
<i>Pultenaea pedunculata</i>	<i>Patersonia fragilis</i>	<i>Darwinia squarrosa</i>
'Pyalong Pink'	<i>Sowerbaea juncea</i>	<i>Eriostemon australasius</i>
<i>Scleranthus biflorus</i>	<i>Stylidium graminifolium</i>	<i>Helichrysum baxteri</i>
<i>Stylidium bulbiferum</i>	<i>Stypandra caespitosa</i>	<i>Helichrysum bracteatum</i>
<i>Viola sieberana</i>	<i>Thysanotus multiflorus</i>	'Diamond Head'
<i>Wahlenbergia gloriosa</i>		<i>Mentha diemenica</i>

Table 2 — Container-grown Plants For All Seasons (containers 30-60 cm diameter)

There are very many spring flowering species one could choose from that include small *Acacia* such as *A. browniana*, *Baeckea*, *Boronia*, *Calectasia*, *Calytrix*, *Chorizema*, *Hibbertia*, *Lechenaultia*, *Micromyrtus* and small forms of *Eremophila*, *Eriostemon*, *Kunzea*, *Melaleuca*, *Olearia* and *Pimelea*. Hopefully readers will advise the editor of plants they have found successful.

The following plants will give pleasure at other times of the year.

Summer flowering	Autumn flowering	Winter flowering
<i>Actinotus helianthi</i>	<i>Astroloma epacridis</i>	<i>Acacia leptospermoides</i>
<i>Beaufortia purpurea</i>	<i>Banksia loricata</i>	<i>Acacia drummondii</i> ssp.
<i>Beaufortia schaueri</i>	<i>Banksia violacea</i>	<i>affinis</i>
<i>Cheiranthra cyanea</i>	<i>Bauera rubioides</i>	<i>Astroloma ciliatum</i>
<i>Dampiera linearis</i>	<i>Beaufortia sparsa</i>	<i>Astroloma</i>
<i>Epacris longiflora</i>	<i>Calytrix fraseri</i>	<i>conostephioides</i>
<i>Helichrysum bracteatum</i>	<i>Correa 'Dusky Bells'</i>	<i>Correa 'Mannii'</i>
'Dargan Hill Monarch'	<i>Crowea exalata</i>	<i>Correa pulchella</i>
<i>Helichrysum</i>	<i>Epacris impressa</i> (Bega)	<i>Correa reflexa</i>
<i>semipapposum</i>	<i>Homoranthus</i>	<i>Epacris reclinata</i>
<i>Hibbertia obtusifolia</i>	<i>darwiniioides</i>	<i>Grevillea brownii</i>
<i>Hibbertia stellaris</i>	<i>Hypocalymma strictum</i>	<i>Grevillea chrysophaea</i>
<i>Lechenaultia loricata</i>	<i>Platytheca verticillata</i>	<i>Grevillea glabella</i>
<i>Melaleuca pulchella</i>	<i>Rhododendron lochae</i>	<i>Grevillea pilulifera</i>
<i>Melaleuca thymifolia</i>	<i>Thryptomene baeckeeae</i>	<i>Hovea pungens</i>
<i>Olearia frostii</i>	<i>Viola hederacea</i>	<i>Lechenaultia formosa</i>
<i>Scholtzia involucreta</i>		<i>Thryptomene saxicola</i>

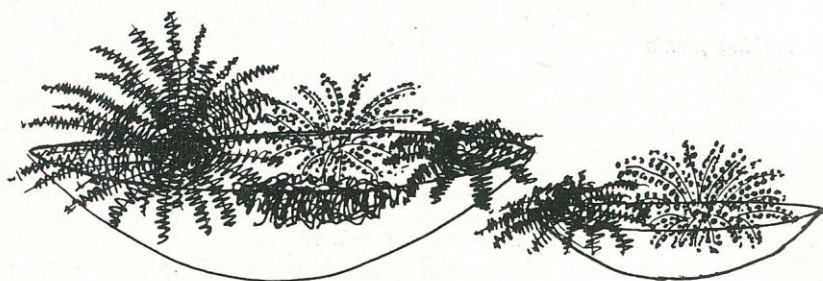


Table 3 — Container-grown Plants For Difficult Situations

A. Plants for medium to large containers in a very hot position

It is not always possible to place containers in a position that allows the most favourable conditions for plant growth. Often we have situations, such as on a patio at the front of a house, where we want to grow a plant in a container but realize that the area is in full sun for most of the day. The construction of containers for use under these conditions can be a significant feature. For example, planter boxes made of wood will not conduct the heat through to the soil and plant roots as readily as will ceramic containers. A light-coloured exterior will reflect the sun's rays, while darker colours absorb more heat.

The watering of container-grown plants is also of prime importance if they are in a very hot position. Plants should not be watered while they are exposed to hot sunshine, even if they are seen to be wilting. All watering should be done very early in the morning or at least an hour after sunset. For successful cultivation in very hot positions plants will need to be carefully selected.

B. Plants for medium to large containers in a shaded position

Assessment of suitable conditions will vary greatly. This is intended to cover situations where some filtered sunlight gets to the plants sometime during the day.

C. Plants for indoors

The subject of plants for indoors is a larger subject than can be treated here. The list is of a selection of plants that have proved rewarding.

A	B	C
<i>Acacia gracilifolia</i>	<i>Bauera rubioides</i>	<i>Athrotaxis selaginoides</i>
<i>Banksia meisneri</i>	<i>Bauera sessiliflora</i>	<i>Brachychiton populneus</i>
<i>Banksia petiolaris</i>	<i>Boronia megastigma</i>	<i>Brachychiton rupestre</i>
<i>Beaufortia squarrosa</i>	<i>Boronia serrulata</i>	<i>Cardwellia sublimis</i>
<i>Calothamnus sanguineus</i>	<i>Correa lawrenciana</i>	<i>Castanospermum australe</i>
<i>Chamelaucium uncinatum</i>	<i>Correa reflexa</i>	<i>Cephalotus follicularis</i>
<i>Eremaea violacea</i>	<i>Eriostemon myoporoides</i>	<i>Cissus antarctica</i>
<i>Eremophila maculata</i>	<i>Indigofera australis</i>	<i>Cordyline stricta</i>
<i>Grevillea lavandulacea</i>	<i>Olearia tomentosa</i>	<i>Grevillea robusta</i>
<i>Hakea bucculenta</i>	<i>Phebalium lamprophyllum</i>	<i>Hovea forsterana</i>
<i>Lambertia ericifolia</i>	<i>Prostanthera cuneata</i>	<i>Lepidozamia peroffskyana</i>
<i>Petrophile biloba</i>	<i>Prostanthera melissifolia</i>	<i>Nothofagus cunninghamii</i>
<i>Phebalium bullatum</i>	<i>Prostanthera walteri</i>	<i>Rhaphidophora</i>
<i>Prost. aspalathoides</i>	<i>Pultenaea daphnoides</i>	<i>australasica</i>
<i>Regelia ciliata</i>	<i>Rhododendron lochae</i>	<i>Schefflera actinophylla</i>
<i>Verticordia monodelpha</i>	<i>Spyridium parvifolium</i>	<i>Stenocarpus sinuatus</i>

Table 4 — Container Plants of Special Interest

A. Trailing plants

Trailing plants may grace a suitable container or be used as ground-covers in large planters, in conjunction with taller shrubs or trees. Trailing plants can be used successfully in hanging baskets, the subject of a future article. Will readers advise the editor of their experiences?

The plants included grow to varying sizes, and this factor should, of course, be considered in relation to the size of the container being used.

B. Fragrant plants for medium to large containers

Plants with fragrant foliage can give pleasure throughout the year. Those with perfumed flowers are fragrant only when in bloom. These are therefore ideally suited to container cultivation, as they can be moved to desired positions for the flowering period, then perhaps grown-on in another area during the non-flowering months.

C. Orchids suitable for containers

The cultivation of orchids in containers is the most widely used method of cultivation and is the subject of many articles and books. The list below gives just a few that are not difficult to grow and are generally regarded as hardy and reliable.

A	B	C
<i>Brachysema praemorsum</i>	<i>Backhousia citriodora</i>	<i>Chiloglottis trapeziformis</i>
<i>Dampiera cauloptera</i>	<i>Boronia anemonifolia</i>	<i>Corybas dilatatus</i>
<i>Dampiera diversifolia</i>	<i>Boronia megastigma</i>	<i>Cymbidium madidum</i>
<i>Grevillea juniperina</i> (prostrate forms)	<i>Boronia purdieana</i>	<i>Dendrobium x delicatum</i>
<i>Grevillea repens</i>	<i>Boronia serrulata</i>	<i>Dendrobium falciforme</i>
<i>Grevillea thelemanniana</i> (grey leaf form)	<i>Calytrix aurea</i>	<i>Dendrobium x gracilimum</i>
<i>Hemianandra pungens</i>	<i>Cymbidium madidum</i>	<i>Dendrobium kingianum</i>
<i>Hibbertia dentata</i>	<i>Darwinia citriodora</i>	<i>Dendrobium speciosum</i>
<i>Hoya australis</i>	<i>Dendrobium falciforme</i>	<i>Diuris longifolia</i>
<i>Kennedia eximia</i>	<i>Hymenosporum flavum</i>	<i>Diuris maculata</i>
<i>Kennedia microphylla</i>	<i>Indigofera australis</i>	<i>Liparis reflexa</i>
<i>Kennedia prostrata</i>	<i>Jacksonia scoparia</i>	<i>Pterostylis concinna</i>
<i>Oxylobium tricuspidatum</i>	<i>Kennedia glabrata</i>	<i>Pterostylis curta</i>
<i>Scaevola aemula</i>	<i>Prostanthera melissifolia</i>	<i>Pterostylis nutans</i>
<i>Scaevola phlebotopetala</i>	<i>Prostanthera rotundifolia</i>	<i>Pterostylis pedunculata</i>

Australian Plants For Small Gardens and Containers

by Gwen Elliot

Now in its second edition this 110 page book is available from the Editor, Australian Plants for \$14.95 plus \$1.00 postage. The above article must reassure readers that this book is exactly what they need if they wish to engage in the fascinating interest of growing plants in containers or in small gardens. Well illustrated it has proven a very practical guide for thousands of home gardeners and certainly the best available on the subject. Why not join a study group for the cultivation of our dainty wildflowers in containers? See pages 42 and 89.

Australian Plants In Containers

The cultivation of Australia's wildflowers in containers is one area where considerable success has been achieved. With the recommendations in this issue it is hoped that many readers will undertake to grow a number of plants in containers and report on results. Would those readers who have had experience in this area please contact me.

—Editor.

Thysanotus

THEIR PROPAGATION AND CULTIVATION

by I. R. Dixon, Horticultural Advisory Officer, Kings Park and Botanic Garden,
West Perth, W.A. 6005

A recent revision of the genus *Thysanotus* by Dr. N. H. Brittan, described 47 species, 41 of which occur naturally in Western Australia. Unfortunately this genus has been sadly neglected despite its horticultural potential. The only species commonly grown in Western Australia is *Thysanotus multiflorus*, but despite its ease of propagation and cultivation plants are rarely available in nurseries in Western Australia.

SEED COLLECTING

Several species often produce a high number of infertile seeds which shrivel up just before maturity. This may in part be due to the moisture level in the soil being insufficient during dry seasons or poor pollination. The harvesting of immature seed will also cause this condition. Seed from several species, e.g. *T. multiflorus* and *T. triandrus* is quickly dehiscent during hot weather. Therefore it is best to bag the seed heads, after all the flowers have faded, with small paper bags, unless you can regularly check the developing seed.

Seed of *T. sparteus* is easier to collect. Due to its long flowering season the seed matures gradually over a longer period without the sudden seed drop you get with *T. multiflorus*. After collecting the seed it should be dried; place it in a paper bag and hang it in a dry, airy position for a couple of weeks. Now clean the seed, dust it with an insecticide and store it in an airtight container, e.g. glass screw topped jar, in a dark but cool position.

PROPAGATION

Seed in Western Australia is best sown in the autumn, however spring sowing would be best in cooler districts.

Choose a free draining, preferably sandy seed mix which is slightly acid e.g. pH 6.3. The mix which I recommend and which will not require sterilising is as follows.

7 parts clean grey bush sand	Parts by bulk
1 part compost (a local sedge-like peat)	

This mix is fairly free draining yet moisture retentive and contains enough nutrients to grow on seedlings. The seed pots should be prepared in the usual way, that is, with crock or stones over the drainage holes. The mix should be moist (not too wet or too dry) and pressed down to give a flat, firm, but not hard, sowing surface. Sow the seed and cover with a thin layer of blue-metal dust (crushed granite) 2-3 mm grist. This topping should be about the same thickness as the seed, too thin a layer will allow the seed to wash off the surface. If the topping is too deep, e.g. more than 3 times the depth of the seed, germination may not take place. This topping allows water and air to penetrate the seed pot.

Watering

The initial watering should be by capillary action to make sure you soak the mix. Stand the pot in a container of water up to two thirds the depth of the pot. After a few minutes the water will have passed through the drainage holes and thoroughly soaked the mix. Now remove the pot and allow the excess water to drain away.

Successive waterings can be by this method or by using a fine spray on the end of a watering can or hose pipe so as not to wash out the seed or damage seedlings.

Germination Area

The seed pots can be left out in the full sun until germination takes place. With this method you must check the seed pots every day to make sure they have not dried out.

Alternatively you can cover the seed pots with clear polythene or glass, with a sheet of newspaper on the top and place the pot in a shed or on a verandah in an area away from direct sunlight. The polythene will keep in the moisture and the newspaper will reduce the light and risk of any sunlight heating up the seed pot and killing germinating seedlings.

With this method you only need to start checking the seed pot a few days before germination is due. Check them every 2 days otherwise the seedlings will become drawn or may be killed.

Pricking Out

As soon as the seedlings germinate prick them out (transplant) into tubes or small pots, that is, when they are only 1 day old and place the seed pot back under the polythene/newspaper for further germination. Alternatively you can leave the seed pot out in a lightly shaded area and prick out the seedlings when a few days old.

Young seedlings during the autumn and winter, can be grown on in a glasshouse, frame, or in full sun out in the elements as long as they are protected from frost and wet, cold conditions. The pricking out potting mix should be the same as the seed mix. I do not incorporate any fertiliser but if you wish you can add a little slow releasing fertiliser.

Planting Out

I prefer to plant out young seedlings from the small pots or tubes during the heavy winter rains to establish them before the onset of the hot weather. However they can be grown on in pots for 1 year and planted out in the following autumn/winter.

Although there are species in Western Australia which grow in swampy areas, most of our species prefer a sandy, well-drained soil in either broken sunlight or amongst shrubs which offer protection from strong drying winds.

Young seedlings are susceptible to slugs and snails and are occasionally attacked by caterpillars. Plants are also susceptible to nematodes (eelworm).

Watering

Plants grown on in pots need to be kept moist but not wet. After planting out they will require watering once a week — twice a week during long hot spells for the first spring, summer and autumn after planting. Some species which are not drought tolerant under your conditions will require regular seasonal watering even when they are established. Overwatering, especially in poorly drained soils, causes rotting of the roots and eventual death of the plant.

PROPAGATION AND CULTURAL NOTES FOR SELECTED SPECIES

This list is restricted due to the lack of specific knowledge on most species. Most of the germination times quoted are from Kings Park nursery records and represent the time taken from sowing to first emergence of the seedlings. It should be noted the germination times are intended only as a general guide. You may find, under perfect growing conditions, some species will germinate quicker. The seedlings are grown on in our nursery for 1 year and then planted out during the late autumn after the first heavy rains.

Thysanotus asper

Seed germinates in 35 days. The germination rate is low and the seedlings are prone to damping off disease. During the winter the seedlings are

best grown in full sun, but from early spring onwards they require light broken shade.

This species has been difficult to grow on in our botanic garden. Although it was planted in broken shade it survived only one or two years after planting out. Plants grown in the home garden should last a lot longer given the right growing conditions. Flowers usually close by about 11.00 a.m. in Western Australia when the plants are grown in bright sunlight. Transplants from cleared bushland areas can survive for at least 3 years in the home garden as long as they are grown in a protected area in broken sunlight. This is a good indication we need to modify our cultural treatment.

Thysanotus dichotomus

Seed germinates in 28 days. The germination rate is usually very good indicating a large number of viable seeds are produced. Seedlings transplant well from the seed pot and grow on well in the nursery situation. During the summer and early autumn they require broken sunlight otherwise their foliage burns. A colour photograph is on page 52.

Although plants grow well under the protective nursery situation, they tend to die out quickly in our botanic garden, even when they are planted in sheltered positions with broken sunlight.

In the home garden plants tend to last about 3 years before they expire.

Thysanotus multiflorus

Seed germinates in 19 days. This is the easiest of all the species to grow — seedlings transplant well from the seed pot and grow easily in the nursery situation in full sun or broken sunlight. Colour photograph on page 77.

You can grow on the plants in pots for 1 year or plant out small seedlings during the heavy winter rains. Plant out in broken sunlight or full early morning and late afternoon sun. When planted in full sun in Western Australia the flowers will close up by about 10.00 to 11.00 a.m. on bright days.

Flowers vary in colour — the deeper colour forms in the Perth area grow in lateritic soils. Plants produce a good flowering display in their first season when about 18 months old. As long as you do not use a hoe or cultivate your garden and keep down the snails, seedlings will germinate naturally around your parent plants. During the late autumn, before the new root growth starts the plants can be divided. Just lift the plants, pull the divisions apart and replant in situ or pot up the divisions. During dry hot periods it is best to reduce the leaf length by two thirds to reduce transpiration.

Thysanotus patersonii

Seed germinates in 15 days. The germination rate is usually good, again indicating this species produces good viable seed. Seedlings transplant well and are fairly easy to grow on in the nursery situation, where they require broken sunlight during the summer and autumn.

This straggly climber is best planted next to a shrub it can climb through and over. This may give added protection in the form of shade to the plant's root system. They can also be grown up wire mesh fences, but lack protection unless there is ample surrounding vegetation. Colour plate on page 80.

Although this species is fairly easy to grow on it generally only lasts 3 or 4 years in cultivation and therefore should be regularly repropagated. Flowers occasionally occur in the first late spring or early summer only a few months after germination, however the plant's first flowering period is usually about 18 months after germination.

We believe one reason for the short life span of the tuberous rooted species may be due to growing them on in pots. When these are planted out the tubers will be much shallower than normal and more prone to water stress leading to a gradual dehydration of the plant.

Thysanotus sparteus

Seed germinates in 24 days. The germination rate is usually very high. Seedlings transplant well from the seed pot and are very easy to grow on in the nursery situation under broken shade.

Seedlings are best planted out directly from the small pots or tubes during the heavy winter rains. This species forms a large tuber in its natural habitat and may take several years to flower. Colour photograph on page 48.

In cultivation it is slow growing, plants over two years old in my garden are only 6-7 cm high. They have received no added fertiliser but get an occasional summer watering. They are planted in sandy soil, receive full sun, but are protected from strong winds by surrounding vegetation.

Mature plants which were transplanted from cleared bushland are now in their second summer after being transplanted — as yet few flowers have been produced. Unfortunately these plants are in an area which receives some summer watering from adjacent lawned areas. This summer watering may have an effect on the flowering as plants flower during our hot dry summer.

Thysanotus spiniger

Seed germinates in 26 days. The percentage germination rate is usually poor and high losses occur in the young seedling state due to damping off disease. This species has been extremely difficult to grow on in the nursery situation and to date has not been successfully grown on in our botanic garden.

Thysanotus tenellus

Seed germinates in 62 days. This is the only germination record we have for this species, which indicates the seeds were sown at a time not suitable for germination to take place, e.g. very early during a hot autumn or during a very cold period. Unfortunately we do not know what the germination rate was, but I assume it was quite low. Colour photograph on page 80.

It was difficult to grow on in the nursery situation and when planted out in our botanic garden.

Thysanotus triandrus

Seed germinates in 30 days. The percentage germination rate is poor, seedlings tend to damp off and it is difficult to grow on in the nursery situation. Although this species grows naturally in Kings Park bushland in broken sunlight and protected by surrounding vegetation, we have found it is very difficult to grow in our botanic garden. Colour photograph on page 48.

This species, to the home gardener, looks almost identical to *T. multiflorus*, so I suggest you grow the latter as it is so much easier to establish.

Grow *Thysanotus*

I hope the above contribution will stimulate an interest in the cultivation of *Thysanotus*. We should remember practice makes perfect, therefore we cannot expect to successfully cultivate plants until we know their cultural requirements. Unfortunately one factor limiting their cultivation is the availability of seed — the only species I have seen in seed catalogues is *T. multiflorus*.

***Thysanotus* — The Fringed Lily**

This is a group of plants that can be readily grown. They are ideal for cultivation in containers and as garden border plants. Who will join a *Thysanotus* Study Group and exchange seed and notes on these dainty little plants? Everyone has room for a few pots, a window box, a sunny indoor spot or a small garden. —Editor.

***Thysanotus* — The Genus — Continued from page 54**

H. ANther DEHISCENCE

By terminal pore (see fig. G) except the following which have dehiscence by longitudinal slits (see fig. G) *T. pauciflorus*, *T. patersonii* ssp. *patersonii*, *T. pyramidalis*, *T. speckii*, *T. tenellus*, *T. tenuis*.

I. OVARY

Cylindrical to spherical. Ovules 6, except for *T. brachyantherus*, *T. lavanduliflorus*, *T. nudicaulis*.

J. SEED CAPSULE

Enclosed within the dried flower parts.

K. SEEDS

Black and shiny, more or less spherical to cylindrical, except for the three species mentioned under 1 above, where the seeds become flattened.

L. GERMINATION

Has been found to occur readily, with normally a high percentage of success, if seed is planted in May, just below the surface of sand.

SPECIES IN THE GENUS *THYSANOTUS*

1. *Thysanotus acerosifolius* (W.A.)

Plant with small rootstock, enclosed by bracts and persistent leaf bases. Roots fibrous with glabrous, yellowish, spherical to ellipsoid tubers, 4-9 cm from rootstock. Leaves 10-15, annual, filiform, glabrous, 9-24 cm long. Inflorescence paniculate, 15-30 cm tall. Scape erect, terete, glabrous. Umbels 3-4 flowered. Pedicels 6-7 mm long, bending downward in fruit. Perianth segments 10 mm long. Stamens 6: anthers uniformly purple, straight, not twisted, three anthers 3 mm long, three 4 mm long. Style straight, erect.

Occurs near Newdegate (c 300 km SE of Perth) in sand plain vegetation, one locality in association with a granite rock.

2. *Thysanotus anceps* (W.A.)

Plant with rhizome. May be up to 5 by 3 cm, roots fibrous. Leaves small, in juvenile state only. Stem perennial, 37-50 cm tall, quadrangular towards base, flattened above. A few branches with terminal 2-3-flowered umbels, occasionally a few umbels below the terminal one. Pedicels c 7 mm long. Perianth segments 13-14 mm long. Stamens 6: anthers purple, shorter ones becoming paler towards apex, twisted, three anthers straight, 3.5-4 mm, three curved, 7-8 mm long. Style curved. Seeds 2 by 1.5 mm with orange aril.

Occurs in the Darling Range, c 75 km north-north-east to c 50 km south-east of Perth. It grows in Jarrah/Marri (*Eucalyptus marginata*/*E. calophylla*) forest on lateritic soils.

3. *Thysanotus arbuscula* (W.A.)

Plant with rhizome, moniliform, roots fibrous. Leaves rarely present. Stem perennial, 28-93 cm tall, ridged, densely shortly hairy on the ridges. Umbels terminal, 4-6-flowered. Pedicels 3-4 mm long. Perianth segments 10 mm long. Stamens 6: anthers equal in length, straight, not twisted, 7-8 mm long. Style slightly curved.

Occurs from c 160 km north of Perth to c 260 km south-south-east of Perth in a variety of habitats — *Banksia* low forest, Jarrah/Marri (*Eucalyptus marginata*/*E. calophylla*) forest or stunted forest, and sand plain, usually on deep sand.

4. *Thysanotus arenarius* (W.A.)

Plant with small (c 1 cm diam.) rhizome, with few fibrous roots. Leaves several, annual, up to 23 cm long. Stem perennial, prostrate to somewhat erect, 50-70 cm long, ridged, the ridges with short, stiff hairs. The stem may be almost glabrous towards the apex, or rarely the whole plant is glabrous. A tendency is noted for the production of leaves and roots from nodes on the stem. Umbels terminal, 2-3-flowered. Pedicels 10 mm long, recurved in fruit. Perianth segments 15 mm long. Stamens 6: anthers three straight, non-twisted, 5.5 mm long, three curved, twisted, 9 mm long. Style curved, 11 mm long. Seeds more or less spherical, 2-2.5 mm diam., arillate.

Occurs in coastal areas, from Shark Bay (c 740 km north-north-west of Perth) to Salt River (c 110 km north-east of Albany). It grows in vegetation typically dominated by *Agonis* spp., on sand. Colour plate on page 49.

5. *Thysanotus asper* (W.A.)

Plant with many fibrous roots. Leaves numerous, from about 10 to 50 per plant, perennial, 10-21 cm long, hirsute. Scapes perennial, often several per plant, 30-41 cm long, with single terminal umbel. Umbels 4-5-flowered. Pedicels c 10 mm long. Perianth segments c 20 mm long. Stamens 6: anthers twisted, three purple, straight, 5-6 mm long, three yellow, curved, c 12 mm long. Style curved, 13 mm long. Seeds more or less globular, c 1.5-2.0 mm diam., with dark, almost black, aril.

Occurs as far north as Dongara (c 310 km north of Perth) to 160 km east and 60 km south-east of Perth and also in the vicinity of Perth.

6. *Thysanotus banksii* (Southern Papua-New Guinea, tropical Queensland, Northern Territory and Western Australia)

Plant with small rhizome, many tuberous roots clustered near the rhizome. Leaves 3-5 (occasionally up to 15), annual, 20-40 cm long. Inflorescence annual, either unbranched or very slightly branched, 22-40 cm tall. Umbels terminal, or there may be some sessile below the terminal one when the inflorescence is unbranched. Umbels usually 1-2- (occasionally up to 15-) flowered. Pedicels 5-10 mm long. Perianth segments 7-13 mm long. Stamens 6: anthers all twisted, three straight 2-3 mm long, three curved, 3.5-6 mm long. Style straight, c 5 mm long. Seeds 1.5-2.0 mm long, arillate.

Occurs in a variety of habitats from savannah eucalypt forest, low altitude tea-tree flats or lateritic ridges.

7. *Thysanotus baueri* (New South Wales, Victoria, South Australia, doubtfully far south-east of Western Australia)

Plant with small rhizome, with numerous fibrous roots expanding into tubers c 7.5-10 cm from the rhizome. Leaves 3-5, annual, 6-13 cm long, usually withered at or just before flowering. Inflorescence annual, unbranched to occasionally once to four times branched, 8-24 cm tall. Umbels, one terminal and others sessile below this, 1-4-flowered. Pedicels 6-10 mm long. Perianth segments 7.5-12 mm long, typically pale blue. Stamens 6: three anthers yellow, straight, hardly twisted, 3.5 mm long, three anthers purple, curved, twisted, 6.5 mm long. Style almost straight, 7 mm long.

Occurs in open grassy to saltbush communities in the drier inland areas, typically on heavier soils, although a collection from near the Trans-Australia railway is from sand. Some 19th century collections from the South Australia/Western Australia border were coastal and on sand. These areas have not yielded any recent collections.

8. *Thysanotus brachiatus* (W.A.)

Plant with rhizome varying in form from more or less spherical, c 7 mm diam., to horizontal and cylindrical, 3-4 cm long by 1 cm diameter. Roots fibrous. Plant leafless. Stems 19-25 cm tall, divaricately branched. The stems may persist for more than one season, if so, more branches are produced in the second year. Umbels terminating branches, up to 8-flowered. Pedicels c 4 mm long. Perianth segments 7-8 mm long. Stamens 6: anthers yellowish with pale purple tips, three straight, slightly twisted, 3 mm long, three curved, twisted, c 5 mm long. Style curved, c 4 mm long.

This species may be confused with some specimens of *T. juncifolius* from eastern Australia, but the distribution serves to separate them, together with some critical floral features.

Occurs in the vicinity of Ravensthorpe (c 450 km south-east of Perth), in sand plain vegetation dominated by mallee *Eucalyptus* spp.

9. *Thysanotus brachyantherus* (W.A.)

Plant with a small rootstock bearing fibrous roots becoming swollen into ellipsoidal tubers at 5-7 cm from the stock. Leaves 4-5, c 15 cm long, withering, usually before flowering takes place. Inflorescence annual, typically a panicle, occasionally unbranched, 9-26 cm tall. Umbels 1-4-flowered. Pedicels 5-7 mm long. Perianth segments 9 mm long. Stamens 6: anthers slightly curved, three slightly twisted, 3 mm long, three markedly twisted, 2 mm long. Ovary with 6-8 ovules per loculus. Style straight, 3 mm long.

Occurs in the vicinity of the Russell Range, c 160-180 km east of Esperance. It grows in sand plain country dominated by mallee *Eucalyptus* species.

10. *Thysanotus brevifolius* (W.A.)

Plant with a small rootstock with many fibrous roots — in comparison with related species it is thought likely that there may be development of tubers at a distance greater than it has been possible to check by excavation. Leaves (?) annual, c 20-25, up to 8 cm long. Inflorescence annual, a scape, 18-24 cm tall, with a single terminal umbel. Umbel many-flowered, 20- c 50. Pedicels 8-10 mm long, bending downward in fruit. Perianth segments 6-7 mm long. Stamens 6: anthers straight, not twisted, three 2.5 mm long, three 4 mm long. Style straight, 5 mm long.

Occurs to the south and north-west of the Stirling Ranges, c 75 km north-north-east of Albany (c 340 km south-south-east of Perth). It grows in open heath dominated by mallee *Eucalyptus* species.

11. *Thysanotus chinensis* (China, Hong Kong, Philippines, Thailand, New Guinea, tropical parts of Queensland, Northern Territory and Western Australia)

Plant with small, c 1 cm diam., rhizome with fibrous roots. Leaves 3-20, annual, usually shorter than the scape, but occasionally equal to, or longer. Inflorescence annual, a simple scape, more or less decumbent, 7-47 cm tall, with a single terminal umbel. Umbel 3-6-flowered, occasionally with as many as 15 flowers. Pedicels 10-25 mm long, bending downward in fruit. Perianth segments 5.5-10 mm long. Stamens 6: anthers straight, non-twisted, three anthers 1.5-2.5 mm long, three 2.75-3.5 mm long. Style 2.75-4 mm long.

Occurs in Australia near Kununurra, Darwin and the Gulf of Carpentaria. It grows in open grassy situations, open savannah forest, on the edges of moist depressions, in swamp seepage areas on soils ranging from alluvium, clay loam to bauxite.

12. *Thysanotus cymosus* (W.A.)

Plant with small rootstock, with fibrous roots becoming swollen into ellipsoidal tubers at a distance of c 5-7 cm. Leaves 2-3, annual, 20-30 cm tall. Inflorescence annual, branched, cymose. Umbels terminal, 4-6-flowered. Pedicels 10 mm long, bending downward in fruit. Perianth segments 9-10 mm long. Stamens 6: anthers straight, not twisted, three 3 mm long, three 4.5 mm long. Style straight, 4 mm long.

Occurs north of Lake Grace (c 300 km south-east of Perth) and north to Muntadgin (c 260 km east of Perth). It grows in sand plain with mallee *Eucalyptus* species. In one locality it grows in the vicinity of a granite outcrop.

13. *Thysanotus dichotomus* (W.A.)

Plant with a rhizome, more or less spherical, up to c 5 cm in diameter. Roots many, fibrous. Leaves 5-10, usually withered before flowering, 8-14 cm long. Stems perennial, many times dichotomously branched from quite near the base and interwoven, this gives the mature plant the appearance of a more or less hemispherical mass of branches, up to 60 cm radius. Umbels terminate the branches, typically 1-3-flowered. Pedicels 6-10 mm long. Perianth segments 10-18 mm long. Stamens 6: anthers twisted, three straight, 4-6 mm long, three curved, 6-8 mm long. Style curved, 6-9 mm long. Seeds more or less cylindrical, c 2 by 1 mm, with yellowish aril. Colour plate on page 52.

Occurs in the south-west of Western Australia from a northernmost locality near Geraldton (c 480 km north of Perth) to east of Esperance (c 600 km east-south-east of Perth). It is mainly found where the annual rainfall is in excess of 380 mm. It does, however, grow near granite rocks in drier areas, where a locally wetter habitat is found. It grows mainly on laterite or laterite-derived soils, typically found in the Jarrah/Marri (*Eucalyptus marginata*/*E. calophylla*) forest of the Darling Range, just east of Perth.

14. *Thysanotus exiliflorus* (dry inland areas of W.A., N.T., S.A.)

Plant with small rootstock. Roots many, fibrous, becoming swollen into fusiform tubers at a distance of 6-10 cm. Leaves 4-20, withering before flowering takes place, 15-20 cm long. Inflorescence a panicle, annual, with rather rigid branches. Umbels terminal, 1-2-flowered. Pedicels c 5 mm long. Perianth segments 7-8 (rarely to 12) mm long. Stamens 6: anthers straight, equal in length, 2.5-3 mm long. Seeds c 2 mm diam., arillate.

Occurs in scattered localities from near Wiluna and Sandstone (c 570 km north-east of Perth) to Hamilton Downs Station (N.T.) and Maralinga (S.A.). Most localities appear to be in Mulga (*Acacia aneura*) country.

15. *Thysanotus fastigiatus* (W.A.)

Plant with spherical rhizome, c 8-10 mm diam. Roots fibrous. Leaves only found in young plants, withering before flowering takes place, 5-9 cm long. Stems perennial, main stem more or less straight, c 30-40 cm tall, branches dichotomously branched. Flowers terminal, solitary. Pedicels c 2 mm long. Perianth segments c 8 mm long. Stamens 6: anthers straight, equal in length, c 4 mm long. Style erect, c 4 mm long. Seeds 2 by 1.5 mm, with pale aril.

Occurs in the Darling Range, in *Eucalyptus/Banksia* woodland.

16. *Thysanotus formosus* (W.A.)

Plant with small rootstock. Roots fleshy, not tuberous, more or less horizontal. Leaves 3-4, annual, c 40 cm long, terete, glaucous. Inflorescence annual, racemose, occasionally branched, c 30 cm tall. Umbels 2-3-flowered. Pedicels 2-2.5 cm long. Perianth segments c 19 mm long. Stamens 6: anthers and filaments dark purple, anthers twisted, three straight, 4 mm long, three twisted, 10 mm long. Style straight, 10 mm long. Seeds 1.5 by 1 mm.

Occurs in an area c 42 km south-west of Nannup, which is 240 km south of Perth in low Jarrah (*Eucalyptus marginata*) forest, often inundated in winter.

17. *Thysanotus fractiflexus* (S.A.)

Plant with more or less horizontal rhizome, c 8-10 mm diam. Roots fibrous. Leaves few, annual, produced with new shoots, withering before flowering. Stems perennial, zigzag in appearance, c 30 cm tall, with short stiff hairs on ridges. Umbels terminal, 2-3-flowered. Pedicels c 7 mm long. Perianth segments 10-11 mm long. Stamens 6: anthers twisted, three straight 4 mm long, three curved 6 mm long. Style c 6 mm long. Seeds subcylindrical, 1.5 by 1 mm, with orange aril.

Occurs on Kangaroo Island and southern Eyre Peninsula. It grows in open heath or mallee *Eucalyptus* woodland on lateritic soils and sandy loams.

18. *Thysanotus gageoides* (W.A.)

Plant with small rootstock, c 1-1.5 cm diam. Roots many, fibrous, expanding into cylindrical tubers c 3-4 cm from rootstock. Leaves 1 or 2, annual, 10-17 cm tall, terete, somewhat fleshy, glabrous to glaucous. Inflorescence annual, a single terminal umbel, scape 10-17 cm tall. Umbel 5-20-flowered. Pedicels c 12-16 mm long. Perianth segments 9-10 mm long. Stamens 6: anthers straight, not twisted, three anthers 3 mm long, three anthers 4 mm long. Style straight, 3-4 mm long. Seeds 1.5 by 1 mm, with pale yellow aril.

Occurs near Tenterden (c 320 km south-south-east of Perth) and then in a south-easterly direction to Mt. Melville, near Cape Riche, a distance of c 120 km. It grows in open mallee (*Eucalyptus* spp.) on gravelly and sandy loams.

19. *Thysanotus glaucifolius* (W.A.)

Plant with small rootstock with fibrous roots. Leaves many, perennial, somewhat glaucous, typically somewhat reddish below, terete, 5-12 cm tall. Inflorescence annual, a single terminal umbel, scape occasionally branched once. Umbels c 4-6-flowered. Pedicels c 10 mm long. Perianth segments 8-12 mm long. Stamens 3: anthers equal, 4-5 mm long. Style straight, c 5 mm long. Seeds cylindrical, 2 by 1 mm, with pale yellow aril on funicle 1 mm long.

Occurs near Nannarup (20 km east of Albany) and east to c 145 km east of Esperance. It grows in sand plain vegetation and in coastal low *Eucalyptus* spp. woodland on loamy sand.

20. *Thysanotus glaucus* (W.A.)

Plant with very small rhizome. Roots fibrous. Leaves perennial, 20-30 per plantlet, 5-10 cm long, linear, terete, glaucous at the base. Inflorescence annual, a branched structure with 3-5 branches, 17-21 cm tall. Umbels terminal, up to 10-flowered. Pedicels 6-7 mm long. Perianth segments 12-13 mm long. Stamens 3: anthers 7 mm long, one filament 5 mm long, the other two c 1.5 mm long. Style terminal, c 6 mm long.

Occurs within an area from near Jurien Bay (c 200 km north of Perth) to 13 km south-east of Busselton, which is c 200 km south-west of Perth. It grows in sand plain heath and in coastal low *Eucalyptus* spp. woodland.

21. *Thysanotus gracilis* (W.A.)

Plant with small (c 1-2 cm diam.) rhizome. Roots fibrous. Leaves few, annual, 5-9 cm long, glabrous. Stems perennial, dichotomously branched, up to 40 cm long, glabrous, with long (c 13-15 cm) internodes. Umbels terminal, 1-2-, rarely 4-flowered. Pedicels 7 mm long. Perianth segments c 10 mm long. Stamens 6: anthers straight, non-twisted, equal in length, 5-6 mm long. Style c 5 mm long. Seeds 2 by 1.5 mm, with pale yellow aril.

Occurs from near Wongan Hills (c 150 km north-east of Perth) to the Albany area (c 400 km south-south-east of Perth). It grows mainly in more or less open *Eucalyptus* spp. woodland on lateritic to loamy soils, occasionally over granite.

22. *Thysanotus isantherus* (W.A.)

Plant with small rootstock. Roots fibrous, becoming expanded into ellipsoidal tubers at c 10-15 mm from the stock. Leaves few, annual, up to c 6, filiform, glabrous, 10-15 cm tall. Inflorescence annual, usually a simple, occasionally once-branched scape, usually shorter than the leaves, occasionally more or less equal. Umbels terminal, 1-5-flowered. Pedicels 8-10 mm long, bending downward in fruit. Perianth segments c 7 mm long. Stamens 6: anthers straight, not twisted, equal in length, 2.5-3 mm long, dehiscing by longitudinal slits. Style straight, 3 mm long. Seeds c 1.5 mm, with pale straw-coloured aril.

Occurs on Mts. Clarence and Melville, Albany, in moss swards.

23. *Thysanotus juncifolius* (Qld., N.S.W., Vic., S.A.)

Plant with small (c 1 cm diam., 2-3 cm long) rhizome. Roots fibrous. Leaves annual, up to c 3, withering before flowering commences, more or less terete, 6-8 cm long. Stems perennial, 25-62 cm tall, may be hirsute at the base, or entirely glabrous. Umbels terminal, 1-5-flowered, occasionally one or more umbels sessile below the terminal one. Pedicel 6-11.5 mm long. Perianth segments 10-14 mm long. Stamens 6: anthers twisted, three straight, 3-4 mm long, three curved, 6-9 mm long. Style 8-9 mm long. Seeds 1.5 by 1 mm.

Occurs from Moreton Bay (South-east Queensland) to coastal localities near Sydney and inland to the Blue Mountains, southern coastal and Grampians, Victoria: Ninety Mile Desert, Fleurieu Peninsula, Eyre Peninsula and Kangaroo Island, South Australia. It grows in tall *Eucalyptus* forest (Blue Mountains), mallee *Eucalyptus* spp. scrub in New South Wales and Kangaroo Island, and more open, but similar, vegetation in the Ninety Mile Desert (S.A.) and Little Desert (Vic.). It is found on a variety of soil types varying from sands, gravels, sandy-gravels to shallow loamy soils.

24. *Thysanotus lavanduliflorus* (W.A.)

Plant with small rootstock. Fibrous roots expanding into narrow ellipsoidal tubers 4-4.5 cm long at 4-5 cm from the rootstock. Leaves 2-3, usually withering before flowering, narrow-linear, 6-7 cm long. Inflorescence annual, an elongated loose panicle, 11-25 cm tall. Umbels terminal, 4-5-flowered. Pedicels 8-10 mm long. Perianth segments more bluish than other species, except *T. baueri*, 11-12 mm long. Stamens 6: three anthers straight, not twisted, 2.5-3 mm long, three anthers curved, twisted, c 5 mm long. Ovary with 4-6 ovules per loculus. Style 6-8 mm long. Colour plate on page 84.

Occurs in the vicinity of Hyden and Newdegate, c 300 km south-east of Perth. It grows in open mallee to low woodland, dominated by *Eucalyptus* spp., with usually little or no ground flora.

25. *Thysanotus multiflorus* (W.A.)

Plant made up of a compact series of plantlets from a common rootstock. Roots fibrous. Leaves perennial, 3-30 per plantlet, linear, flat to slightly channelled, glabrous, mostly 20-30 cm tall, although extremes of 7 and 57 cm are found. Inflorescence annual, a terminal umbel on an unbranched scape, with occasionally a sessile umbel below the terminal one. Umbel up to 60-flowered, usually in the range 6-20. Pedicels usually about 13 mm long, extremes of 6 and 28 mm are found. Perianth typically about 11 mm long, a range of 7 to 17 mm is found. Stamens 3: lying close together, anthers curved, twisted to some extent, 5 mm long. Style curved. Seeds more or less cylindrical, 2 by 1.5 mm, with stalked yellow aril.

Occurs in an area to the south-west of a line from the Avon River valley (c 25 km north-east of Perth) to Cape Riche on the south coast (c 100 km east-north-east of Albany). It grows in coastal *Banksia* scrub on white sand, Jarrah/Marri (*Eucalyptus marginata*/*E. calophylla*) forest on lateritic soils and *E. staeri* low forest on dark, humus-rich soils.



Thysanotus multiflorus

Photography by Ivan Holliday

A plant that should be in everybody's garden. The plant is really a clump of plantlets from a common rootstock. The perennial leaves 3-30 per plant are smooth, usually 20 to 30 cm long and flat to slightly channelled. The flowers unfold from heads of 6-20, often up to 60 buds. The easiest of all the "Fringed Lilies" to grow from seed and to care for to spectacular flowering.

26. *Thysanotus nudicaulis* (W.A., S.A.)

Plant with small, more or less erect rhizome. Roots fibrous, swollen at 3-8 cm from the stock into ellipsoidal tubers. Leaves annual, 1 or 2, usually withering before flowering, more or less terete, 12-30 cm long. Inflorescence annual, a single scape, 12-50 cm tall, unbranched with a single terminal umbel, rarely paniculate. Umbels terminal, 1-4-flowered. Pedicels 7-10 mm long. Perianth segments 13-17 mm long. Stamens 6: anthers twisted, three straight, 3-4 mm long, three curved 7.5-10 mm long. Ovary with 10-17 ovules per loculus. Style curved, as long as longer stamens. Seeds flat, 1 by 1 by 0.75 mm.

Occurs in W.A. between Ravensthorpe (c 450 km south-east of Perth) and the Head of the Bight, in S.A. at the southern tip of the Eyre Peninsula. In W.A. it grows in open sand heath with mallee *Eucalyptus* spp., in S.A. it grows in low scrub on limestone.

27. *Thysanotus parviflorus* (W.A.)

Plant with small rootstock. Roots fleshy, showing no signs of enlargement into tubers. Leaves annual, 1 or 2, terete, glabrous, 10-25 cm tall. Inflorescence annual, unbranched, or up to 4-branched, 14-25 cm tall. Umbels terminal, in pairs, 4-6-flowered. Pedicels c 8 mm long, bending downward in fruit. Perianth segments c 7 mm long. Stamens 6: anthers straight, not twisted, three anthers 2 mm long, three anthers 3 mm long. Style erect, straight, 3 mm long. Seeds 1.5 by 1 mm, with erect funicle and yellow aril c 1.5 mm long.

Occurs on slopes of West Mt. Barren (c 80 km south-west of Ravensthorpe) and on the southern slopes of Bluff Knoll, Stirling Range. It grows in low mallee *Eucalyptus* spp. sand plain on sandy loam soils.

28. *Thysanotus patersonii* (all States and Territories south of the Tropic)

Plant with small rootstock. Roots of ellipsoidal tubers, either sessile or else up to 5-6 cm distant from the stock. Leaves produced infrequently, 1 or 2, linear, terete, 10-20 cm tall. Stems annual, twining, tending to be quadrangular in shape above, 10-100 cm long. In the absence of a support on which to twine, the stem is prostrate on the ground. Branches arise along most of its length, simple to many times dichotomously branched. Flowers produced singly at ends of branches. Pedicels 1-5 mm long. Perianth segments, occasionally without the typical fimbriate margin, 6-14 mm long. The lack of fimbriate margins appears to be associated with growth in drier habitats. Stamens 6: anthers purple, occasionally greenish, dehiscence by terminal pores or longitudinal slits, only one type being found in any particular plant. Anthers equal or sub-equal, associated with slit dehiscence; markedly different in length associated with pore dehiscence. Style curved, 3-8 mm long. Seeds with light-coloured aril. See the colour plate on page 80.

Within this geographically wide-ranging species, it has been possible to obtain correlation of characters of perianth length, anther and capsule morphology, so as to distinguish two subspecies. These are keyed out as follows.

Perianth segments shorter than 11 mm (c 8-10.5 mm); anther length ratio (inner: outer whorl) less than 1.4:1; anther dehiscence by longitudinal slits; capsule filling the persistent perianth segments. ssp. *patersonii*.

Perianth segments longer than 10 mm (c 10.5-16 mm); anther length ratio greater than 1.4:1; anther dehiscence by terminal pore; capsule occupying only the lower part of the persistent perianth segments. ssp. *manglesianus*.

The two subspecies show differences in distribution, ssp. *patersonii* is found over the entire range of the species, ssp. *manglesianus* is only found in the south-western corner of W.A. from about Meekatharra (c 575 km north-north-east of Perth) to Balladonia (c 680 km east of Perth).

In keeping with the wide distribution of the species, it grows in almost any habitat, apart from the wet rainforest habitats in Queensland and N.S.W.

29. *Thysanotus pauciflorus* (W.A.)

Plant with a cluster of plantlets forming a compact 'cushion'. Roots fibrous. Leaves perennial, linear, flat, glabrous, c 5-7 cm long. Inflorescence annual, a single terminal umbel on an unbranched scape, of similar length to leaves. Umbels 2-4-flowered. Pedicels 5-8 mm long. Perianth segments c 11 mm long. Stamens 3: anthers dehiscing by full-length longitudinal slits, slightly curved, c 3 mm long. Seeds with pale yellowish aril.

Occurs on the southern slopes of the Stirling Ranges (c 75 km north-north-east of Albany) and in the vicinity of Hopetoun (c 450 km south-east of Perth). It is possible that, in view of its small size, many occurrences may not have been noticed. It grows in mallee *Eucalyptus* scrub or in coastal low scrub. There are indications that a slightly wetter habitat than that usual for most *Thysanotus* spp. may be typical of this species.

30. *Thysanotus pseudojunceus* (W.A.)

Plant with very small or no rootstock. Roots many, fine, fibrous. Leaves mostly absent, occasionally 4-5, annual, terete, 3-5.5 cm long. Stems perennial, decumbent, 30-36 cm long, terete, occasionally purplish at the base, branched. Umbels terminal, 2-5-flowered. Pedicels 8-9 mm long, bending downward in fruit. Perianth segments 10-12 mm long, outer three dark purplish above and below. Stamens 6: anthers twisted, three straight, yellow, 3 mm long, three curved, pale purple, 6 mm long. Style curved, 7 mm long. Seeds 2 by 1 by 1.5 mm with dull orange aril.

Occurs from near Albany and towards the mouth of the Blackwood River (c 260 km south-south-west of Perth). To the present no collections have been made in intervening localities. It grows in low forest dominated by *Eucalyptus marginata* on sandy loamy soils. The westerly sites may be inundated in winter.

31. *Thysanotus pyramidalis* (W.A.)

Plant with ellipsoidal tuberous roots, close to the rootstock. Leaves 6-8, annual, withering near flowering time, linear, flat, glabrous. Inflorescence annual, a much-branched pyramidal panicle, 18-30 cm tall. Umbels terminal, 1-2-flowered. Pedicels 3-4 mm long. Perianth segments 9-10 mm long. Stamens 6: anthers dehiscing by longitudinal slits, not twisted, three straight, 3.5 mm long, three slightly curved, c 4 mm long. Style straight, c 5 mm long. Seeds 1.5 by 1 mm. See the colour plate on page 81.

Occurs from 35 km north of Geraldton (c 380 km north of Perth) to the area around Three Springs (c 260 km north of Perth) and eastward to the original collection locality, north-east of Wubin (c 320 km north-east of Perth). It grows in sand plain communities and on red sandy soils in mulga (*Acacia aneura*) communities.

32. *Thysanotus ramulosus* (W.A.)

Plant with small rootstock, usually 5-18 cm below ground level. Roots tuberous, slightly stalked. Leaves absent. Stem, probably annual, c 10 cm tall, with dichotomously-branched branches. Upper ones c 6-8 cm long, bearing terminal umbels. Umbels 1- occasionally 2-flowered. Pedicels c 3 mm long. Perianth segments 10-11 mm long. Stamens 6: anthers not twisted, slightly curved, three anthers 3.5 mm long, three anthers 4.5 mm long. Style straight, 5 mm long. Seeds angular, 1 by 1 by 1 mm, arillate.

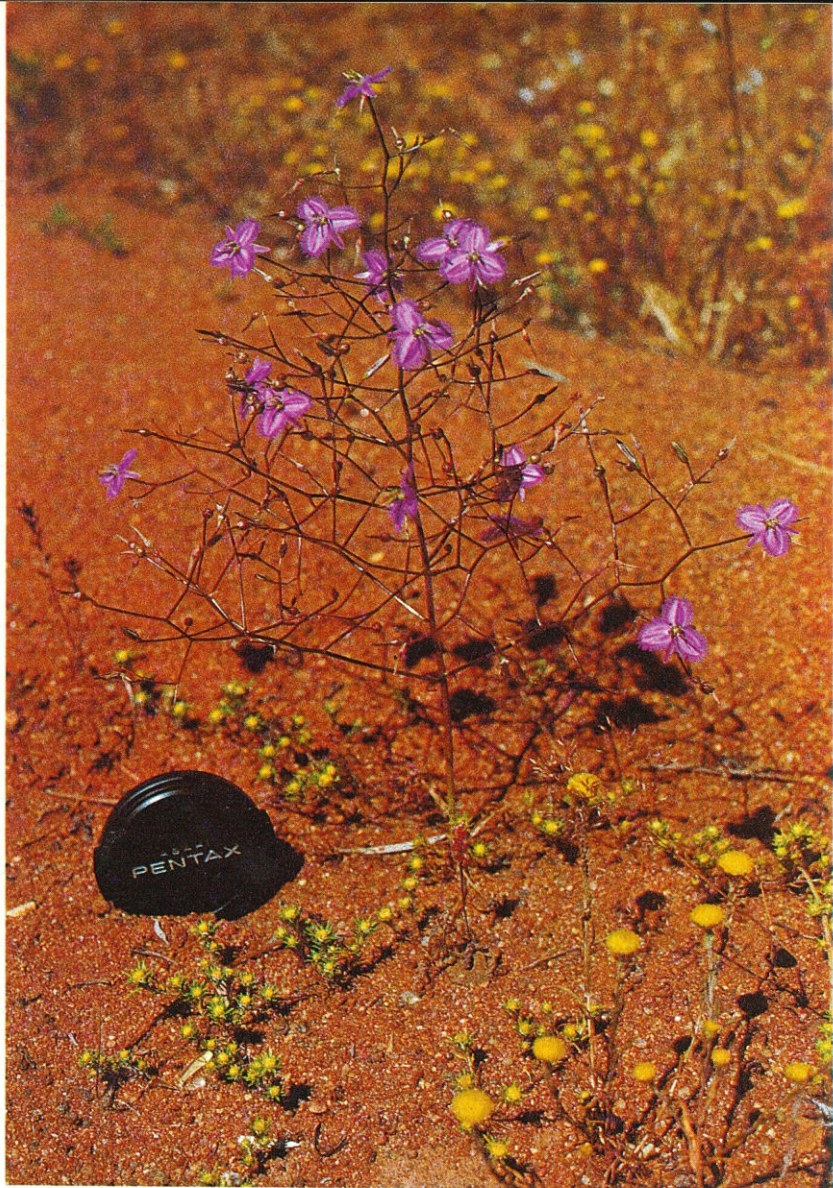
Occurs near the Murchison River crossing by the North West Coastal Highway (c 480 km north of Perth) and in localities c 290 km eastward. The vegetation is dominated by *Acacia* spp., and the soil may vary from river-carried loamy silt to red, sandy loams.



Thysanotus patersonii △

▽ *Thysanotus tenellus*





Thysanotus pyramidalis (above)

Photography by N. Brittan

The photograph reveals all you need to know about this floral gem. The 6-8 leaves have withered as flowering has progressed. The plant develops tubercular roots close to the rootstock for next season's display.

Thysanotus patersonii* ssp. *manglesianus (top left)

Photography by J. Glass

The twining stems are supported on other plants. This species, particularly the other form, sub species *patersonii*, extends across the entire continent and is the only *Thysanotus* found in Tasmania.

Thysanotus tenellus (bottom left)

Photography by N. Brittan

A species with many leaves present at flowering time. Typically, it has a single group of flowers at the top of each stalk. It has fairly commonly been found with white or very pale mauve flowers.

33. *Thysanotus rectantherus* (W.A.)

Plant with a short, erect rootstock. Roots fibrous expanding into tubers c 6 cm from the rootstock. Leaves annual, 2-3, flat, glabrous, 20-30 cm long. Inflorescence annual, a panicle, simple to compound, 14-17 cm tall. Umbels terminal, 1-2-flowered. Pedicels expanding imperceptibly into the flower. Perianth segments c 11 mm long. Stamens 6: anthers equal in length, 5.5-6 mm long, not twisted, straight to slightly curved, dark purple. Style straight, 6 mm long. Seeds 2 by 1 mm, with pale yellow aril. Photograph on page 53.

Occurs within a roughly triangular area from the Sandstone-Wiluna area (c 570 km north-east of Perth), south-easterly to the Pingelly area (c 150 km south-east of Perth) and east-north-easterly to the Southern Cross area (c 330 km east of Perth). It grows in open mallee *Eucalyptus* spp. sand plain, most often with shrubby species of *Casuarina* dominant.

34. *Thysanotus sabulosus* (W.A.)

Plant with small rootstock, c 5 mm diam. Roots fibrous at least as far as 13 cm from the rootstock. Leaves doubtfully perennial, terete, 4-5 cm long. Inflorescence annual, a panicle, c 20 cm tall. Umbels terminating branches, 1-3-flowered. Pedicels 3-6 mm long. Perianth segments 10-12 mm long. Stamens 6: anthers twisted, three straight 4 mm long, three slightly curved, 5 mm long. Style erect, straight, 5-6 mm long. Seeds 1.5 by 1 by 1 mm, with yellow aril.

Occurs in the vicinity of Lake Grace and Newdegate (c 300 km south-east of Perth). It grows in sand plain vegetation with mallee *Eucalyptus* spp.

35. *Thysanotus scaber* (W.A.)

Plant with rootstock covered with remains of old leaf bases. Roots fibrous, occasionally found with tubers at c 15-18 cm from the stock. Leaves annual, 4-6, scabrous, 20-30 cm tall. Inflorescence annual, a panicle, 35-40 cm tall. Umbels terminating branches, 4-8-flowered. Pedicels 10-12 mm long, bending downward in fruit. Perianth segments 7.5-11 mm long. Stamens 6: anthers straight, not twisted, slight difference in length between the two sets of 3; 3-4 and 4-5 mm long. Seeds more or less spherical, 1-1.5 mm diam., pale aril.

Occurs in the Darling Range from the vicinity of Perth, eastward to York (c 90 km east of Perth) and then about 120 km south-south-east of Perth. It grows mostly in Jarrah/Marri (*Eucalyptus marginata*/*E. calophylla*) forest on laterite or heavy loamy soils, one locality is in *E. calophylla*/*E. wandoo* forest.

36. *Thysanotus sparteus* (W.A.)

Plant with large (c 1.5-6 cm diam.) irregular-shaped rhizome with fibrous roots. Leaves absent. Stems in young plants much branched, stems ridged with hairs on ridges. Mature plants, stems perennial, 39-100 cm tall, glabrous, terete to somewhat ridged to quadrangular in upper parts, with either rather few short branches or several in a somewhat dichotomous fashion leading to a somewhat corymbose appearance. Umbels terminal, occasionally one or more sessile or shortly pedunculate below the terminal one. Umbels 2-7-flowered. Pedicels 4-7 mm long, tending to elongate to 11 mm in fruit. Perianth segments 10-15 (occasionally 20) mm long. Stamens 6: anthers twisted, three straight, 2.5-5.5 mm long, three curved, 7-10 mm long. Style curved, 8-11 mm long. Seeds c 2 by 1 mm, arilate. See colour plate on page 48.

Occurs from a northernmost locality near Minginew (c 315 km north of Perth) to the extreme south-west corner near Cape Leeuwin, then eastward along the south coast to Albany and on towards Israelite Bay (c 750 km east-south-east of Perth). There occur also a number of isolated inland localities. It grows mainly in Jarrah/Marri (*Eucalyptus marginata*/*E. calophylla*) forest or woodland on lateritic or loamy soils. In inland areas and in the eastern portion of the south coast it grows in sand plain communities with mallee *Eucalyptus* spp. on yellowish sandy soils.

37. *Thysanotus speckii* (W.A.)

Plant with a small rootstock. Roots tuberous, cylindrical, clustered close to the stock. Leaves annual, linear, flat, c 12.5-25 cm long. Inflorescence annual, a loose panicle, c 10-15 cm tall. Umbels terminal, 4-6-flowered. Pedicels 5-12 mm long, bending downward in fruit. Perianth segments 5-12 mm long. Stamens 6: anthers straight, not twisted, dehiscing by full-length slits, three anthers 4 mm long, three anthers 5 mm long. Style curved, c 4-5 mm long. See the colour plate on page 84.

Occurs in an area from Geraldton (c 380 km north of Perth) to Exmouth — including some off-shore islands — eastwards towards Meekatharra (c 575 km north-north-east of Perth) and as far as Bullfinch (c 330 km east-north-east of Perth). It grows in scattered Mulga (*Acacia aneura*) in open shrub steppe, in *Triodia* steppe and in broken ground on mesa slopes. The soils include dune sand, red sand, red sandy loam and loose gravelly sand.

38. *Thysanotus spiniger* (W.A.)

Plant with rhizome c 3-4 cm long and 1.5-2 cm diameter. Roots fibrous. Leaves annual, withering before flowering, flat, shortly hairy on margins, up to 15 cm long. Stems perennial, up to 40 cm tall. Leafless, mainly dichotomously branched, ridged, short hairs on ridges, branches not terminating in umbels end in a cone-like prickles. Umbels terminal, 1-2-flowered. Pedicels 4-6 mm long. Perianth segments c 13 mm long. Stamens 6: anthers straight, not twisted, equal in length, c 8 mm long. Style curved.

Occurs in a relatively narrow area c 45 km from the coast from south of Dongara (c 310 km north of Perth) to the Moore River (c 112 km north of Perth). It grows in sand plain with mallee *Eucalyptus* spp. or in *Eucalyptus* woodland, usually on sandy or sandy-loamy soils.

39. *Thysanotus tenellus* (W.A. and S.A.)

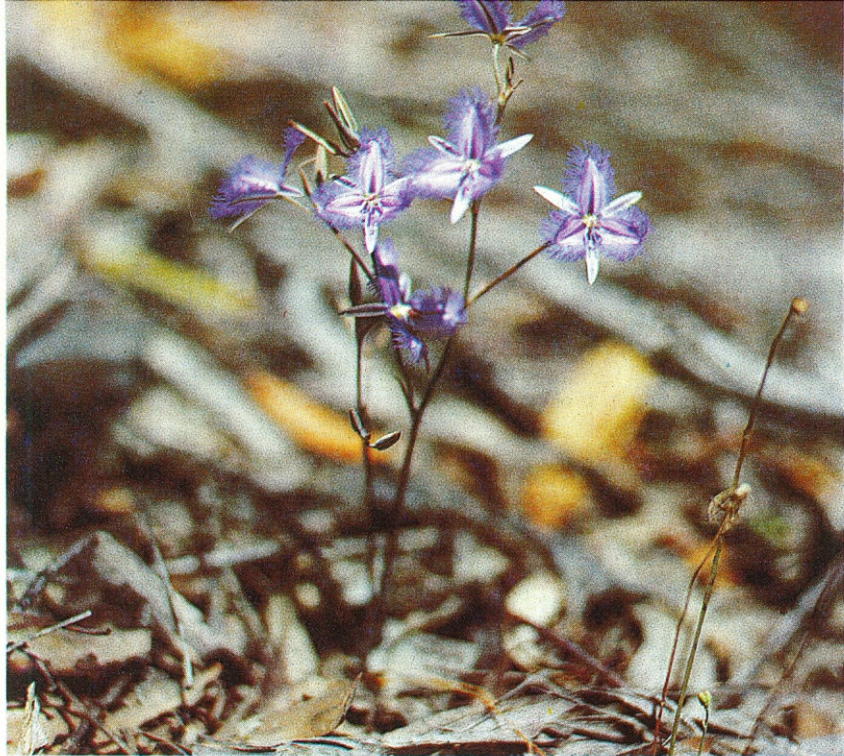
Plant with clustered roots becoming swollen into tubers some distance from the rootstock. Leaves annual, 5-27, ridged on lower surface, ridges with tuberculate hairs, 10-28 cm long. Inflorescence annual, a little-branched panicle, 7-44 cm tall, scape ridged with tuberculate hairs on the ridges. Umbels terminal, 1-4-flowered. Pedicels 8-17 mm long, bending downward in fruit. Perianth segments 6.5-13 mm long. Stamens 6: anthers curved, not at all to slightly twisted, dehiscing by full-length slits, equal to sub-equal, three anthers 2-4 mm long, three anthers 2.5-5 mm long. Style erect, c 4 mm long. Seeds c 1.5 mm diam., with yellow aril.

Occurs in W.A. in localities south-west of a line from Perth to Albany; in S.A. in the Yorke Peninsula and the Flinders Ranges. It grows in W.A. in open low forest dominated by Jarrah/Marri (*Eucalyptus marginata*/*E. calophylla*), Wandoo (*E. wandoo*) or *Acacia* spp., mostly on heavier sandy loam soils; in S.A. reported from among rocks in association with *Casuarina stricta*.

40. *Thysanotus tenuis* (W.A.)

Plant with shortly pedicellate tuberous roots, clustered near the rootstock. Leaves 3-4, annual, almost terete in upper parts, 15-18 cm long. Inflorescence annual, a dichotomously-branched panicle, c 20-24 cm tall. Umbels terminal, 1-2-flowered. Pedicels 6-7 mm long. Perianth segments c 10 mm long. Stamens 6: anthers dark to light green, not twisted, dehiscing by full-length slits, three anthers straight, c 3 mm long, three anthers slightly curved, c 4 mm long. Style erect, c 4 mm long. Seeds c 1 mm diam.

Occurs in the area near Wagin and Wickepin, c 190 km south-east of Perth. It grows usually in depressions in low woodland, dominated by *Eucalyptus* spp. with occasional *Acacia* spp., or in *Acacia*/*Casuarina* scrub. The soils range from clayey to sandy-loam. See colour plate on page 80.



Thysanotus lavanduliflorus △

▽ *Thysanotus speckii*





Thysanotus thyrsoides (above)

Photography by Greg Keighery

Somewhat similar to the Eastern *Thysanotus tuberosus*, but it has only one (possibly two) leaves and the six anthers are all equal in length. When in fruit the capsules hang downward.

Thysanotus lavanduliflorus (top left)

Photography by N. Brittan

A species of limited distribution. Typically, as in the photograph, the plant appears leafless at flowering time. The flowers are more blueish than other species in the genus.

Thysanotus speckii (bottom left)

Photography by Greg Keighery

A plant of the semi-desert of Western Australia. The smallest *Thysanotus*, as small as 5 cm tall, this unique little plant has its fringed petals more narrow and oblong rather than the more typically elliptical shape of the other species.

41. *Thysanotus teretifolius* (W.A.)

Plant with a small rootstock. Roots fibrous. Plant consists of a number of plantlets derived from a common rootstock. Leaves perennial, terete, although becoming striate on drying, c 12-20 cm long. Inflorescence annual, an unbranched, to rarely once or twice-branched scape with terminal umbels. Umbels 10-15-flowered. Pedicels 11-12 mm long, bending downward in fruit. Perianth segments 11-12 mm long. Stamens 3: anthers curved, slightly twisted. Style curved c 5-6 mm long. See colour plate on page 52.

Occurs in an area from near Northampton (c 405 km north of Perth) in the north, to the vicinity of Mt. Lesueur (c 185 km north of Perth) and south-east to Wongan Hills (c 150 km north-east of Perth) in the south. It grows in sand plain vegetation with mallee *Eucalyptus* spp., mainly on deep sandy soils.

42. *Thysanotus thyrsoides* (W.A.)

Plant with small rootstock. Roots swollen into hirsute, ellipsoidal tubers c 3-4 cm from the stock. Leaves annual, 1-5, tending terete above, glabrous, 15-60 cm tall. Inflorescence annual, a pyramidal panicle, branched in the upper quarter of the total height of 14-64 cm. Umbels terminal, 1-3- (occasionally 5-) flowered. Pedicels 7-14 mm long, bending downward in fruit. Perianth segments 6-14 mm long. Stamens 6: anthers twisted, equal to slightly unequal in length, three straight, 2.5-5 mm long, three curved, 3.75-9 mm long. Style 4-7 mm long. Seeds c 1.5 by 1 mm long. See colour plate on page 85.

Occurs from a northernmost locality c 160 km north of Perth to York (c 90 km east of Perth), southwards to the south coast and east as far as Cape Riche (c 100 km east-north-east of Albany). It grows in wooded habitats, usually in areas with an average annual rainfall in excess of 380 mm. It may be associated with Jarrah/Marri (*Eucalyptus marginata*/*E. calophylla*) or with Wandoo (*E. wandoo*) forest or woodland. Soils vary from sandy laterite to sandy loam, infrequently it occurs on pure sand.

43. *Thysanotus triandrus* (W.A.)

Plant consisting of a number of plantlets from a common rootstock. Roots fibrous. Leaves perennial, 5-42 per plantlet, lamina varying from almost flat, through channelled to terete, typically c 22 cm long, although extremes from 5-43 cm are found. Leaves hairy, the size and density of the hair covering variable. Inflorescence annual, an unbranched scape with single terminal umbel. The scape may be glabrous or hairy to some extent. Umbels typically 10-17-flowered, extremes of 4 and 50 found. Pedicels 5-35 mm long. Perianth segments 9-15 mm long. Stamens 3: anthers slightly curved and slightly twisted, c 5 mm long. Style curved, c 6 mm long. Seeds cylindrical, 2 by 1 mm, with stalked yellow aril.

Occurs in localities from a northernmost one near Cockleshell Gully (c 210 km north of Perth) to a southern and easterly one in the Esperance and Israelite Bay areas (c 675 km east-south-east of Perth). It grows in *Banksia* low forest, in sand plain dominated by mallee *Eucalyptus* spp., and in the low Jarrah (*E. marginata*) woodlands near the south coast. Soils vary from lateritic to deep sand to humus-rich dark sands.

44. *Thysanotus tuberosus* (Qld., N.S.W., A.C.T., Vic. and eastern S.A.)

Plant with small rootstock. Roots fibrous expanding into glabrous tubers 3.5-5 cm from stock. Leaves 5-15, annual, glabrous, linear, almost terete at apex, 20-30 cm tall. Inflorescence annual, a panicle, 20-60 cm tall. Umbels terminal, 1-5- (occasionally to 8-) flowered. Pedicels 8-22 mm long. Perianth segments 7-19 mm long. Stamens 6: anthers twisted. The two whorls of three anthers may be more or less equal in length to definitely unequal. This relates to the actual length, the smaller anther length tending to be associated with

equality between the two whorls. Three anthers straight, 1.5-6 mm long, three 3-11.5 mm long, straight (shorter) to curved (longer). Style 4-9 mm long, straight when short, becoming curved if longer.

On account of the variability shown in floral morphology two subspecies have been recognised, separated according to the following key.

Perianth segments usually less than 10 mm long, mucrone 0.5 mm long, all anthers deflexed and more or less parallel to the open perianth, longer anthers, or all anthers if equal, less than 5 mm long — ssp. *parviflorus*.

Perianth segments more than 10 mm long, mucrone c 1 mm long, longer anthers erect and longer than 5 mm — ssp. *tuberosus*.

The two subspecies are widely distributed and can be found in localities in southern Queensland growing in adjacent habitats. The species is distributed, with the exception of very dry areas, over southern Queensland, N.S.W., A.C.T., Victoria and south-eastern South Australia. It grows in most soil types with the exception of very light soils, mostly in wooded or forested country dominated by *Eucalyptus* spp.

45. *Thysanotus vernalis* (W.A.)

Plant with clustered, glabrous, tuberous roots. Leaves annual, 1 or 2, 10-25 cm long. Inflorescence annual, a dichotomously-branched panicle, 14-35 cm tall. Umbels terminal, 2-6-flowered. Pedicels 4-5 mm long, bending downward in fruit. Perianth segments c 10 mm long. Stamens 6: anthers straight and twisted, three anthers 2.5-3 mm long, three anthers 4 mm long. Style straight, c 3.5 mm long.

Occurs in the vicinity of Mt. Lesueur (c 200 km north of Perth). It grows mainly in sand plain vegetation dominated by *Eucalyptus* spp., it has also been recorded from Wandoo (*E. wandoo*) woodland on sandy clay soil over heavy clay subsoil.

46. *Thysanotus virgatus* (N.S.W.)

Plant with a rhizome, more or less horizontal, c 3 cm long, 8-10 mm diam. Roots fibrous. Leaves absent. Stem perennial, dichotomously to monopodially branched, 28-30 cm tall, ridged, with short dense hairs on the ridges. Umbels terminal, usually 2-flowered. Pedicels 6-8 mm long. Perianth segments 10-11 mm long. Stamens 6: anthers twisted, dark purple, three anthers straight, 3 mm long, three anthers curved, 6 mm long. Style erect, 5 mm long. Seeds 2 by 1.5 mm with yellow aril.

Occurs in several localities in Royal National Park, south of Sydney and near Mt. Keira (c 65 km south of Sydney). It grows in *Eucalyptus/Banksia* forest in sandy soils, or in heath vegetation on poorly-drained sandstone plateau.

47. *Thysanotus wangariensis* (S.A.)

Plant with small (5-10 mm diam.) rhizome. Roots fibrous. Leaves annual, only found in association with new stems, withering before flowering, 5-7 cm long, ciliate-margined. Stems perennial, monopodially or pseudo-dichotomously branched, ridged, with tuberculate hairs on the ridges, leafless, 20-40 (occasionally to 50) cm tall. Umbels terminal, 1-3-flowered. Pedicels 8-10 mm long. Perianth segments 11-12.5 mm long. Stamens 6: anthers twisted, three straight 3 mm long, three curved 6-7 mm long. Style curved, 10 mm long.

Occurs in the southern part of the Eyre Peninsula near Wangary and Port Lincoln. It grows in low heath vegetation on a sandy loamy soil.

Excluded species — A species formerly included in *Thysanotus*, now recognised as *Corynotheca micrantha*, may, in its vegetative state, be confused in W.A. with *T. dichotomus*, whose leafless, dichotomously-branched habit it shares. ■

Australian Plant Study Groups

Jo Walker, Study Group Co-ordinator

The following study groups have recently been formed:

CALOTHAMNUS — Barbara Graham, Nundle Road, WOOLLOMIN 2340.

VERTICORDIA — Max Hewett, 47 Railway Street, MOUNT KURING-GAI 2080.

DODONAEA — Jeanette Closs, 7 Vyella Court, AUSTINS FERRY 7011.

BIRDS AND NATIVE PLANTS — Judy Smith, 20 Catherine Cres. EAST BLAXLAND 2774.

The *Calothamnus*, *Verticordia* and *Dodonaea* studies will be undertaken to gain an increased knowledge of the horticultural requirements of these plants and to develop methods of propagation (Max Hewett has already published some of the results of his research in the September, 1982 issue of 'Australian Plants'). Judy Smith's group will study the uses birds make of native plants.

No subscription is necessary at present for members joining the *Verticordia* group — subscriptions for the other groups are \$2.00

If anyone, prospective member or otherwise, could supply Jeanette or Barbara with seed for their groups it would be most welcome. — Jo Walker.

A "Plants In Containers" Study Group (see page 66) or a *Lechenaultia* Study Group (see page 57) or a *Darwinia* Study Group (see page 92). There is much to be done. Most contact is by correspondence. All we need is enthusiasm and a desire to grow our wildflowers to their best advantage. Contact Jo Walker, 16 Blundell St., Queanbeyan, N.S.W. 2620.

Calothamnus From Seed

Jean Konkes, Warrandyte, Victoria

My experience with *Calothamnus* may be of interest. I have a special affection for them, not only because they are fairly easy to grow, but because they are less susceptible than other species to fungal attack.

I started with a few seed pods gathered from *Calothamnus quadrifidus*. The seeds split from their cases after a few days and were planted in unsterilized soil in punnets and left on a window ledge in a garden shed. Germination took place ten days later, and the seedlings were transferred to 5 cm tubes and later to 15 cm pots.

When these plants were about 25 cm tall I took tip cuttings — 10 cm long, stripped the lower half of leaves and planted them in sand/peat moss after dipping the ends in rooting powder. This was done in early January and the cuttings were kept in a hot-house and sprayed twice a day from a hose. Four weeks later they had developed exceptional root growth and were then potted into 15 cm pots. Only 2 out of 12 had failed to strike. I repeated the process in February with more cuttings from these and from *C. villosus* with exactly the same results. In the meantime the original plants had responded well to tip pruning and have developed into bushy plants despite spasmodic watering during summer. They are the most rewarding of all the plants I have grown and I would recommend them for those just starting out.

Calothamnus In My Garden

H. C. Jeavons, Gosford, N.S.W.

I have a young *Calothamnus asper* which, despite some quite extreme weather during its life, is growing happily in an exposed situation. It is well watered infrequently but must be bone dry in between. It survived a heavy hail storm and flowered when only 12 cm high. It is growing in our "Somersby sand" plus leaf mould.

Calothamnus And Frost

A. McKern, Griffith, N.S.W.

My *Calothamnus quadrifidus* was three years old, about 1.5 m x 1.5 m and thriving. It received full sun in the afternoon only. However the heaviest frost for 20 years in July 1982 finished it. This frost also accounted for many other plants that survive normal frosts so one could not classify it as frost-tender.

Prostrate *Banksia*

Correction

The colour plate on page 368 Issue 82 of Australian Plants is incorrectly labelled as *Banksia chamaephyton*. It is in fact *Banksia gardneri* var *gardneri* as shown by the red-brown colour of the flower and the broad more-or-less triangular leaf lobes with V-shaped sinuses between. *B. chamaephyton* has much longer, narrower leaf lobes that almost reach the midrib and have broad sinuses between; its flowers are pale orange-brown or brownish cream. Characters not evident in the photograph are the stems which are underground for *B. chamaephyton* but lie on the surface (other than the lignotuber, for *B. gardneri*). —Alex George.

One reader has also suggested that the photograph on page 365 is in fact *B. chamaephyton* and not *B. blechnifolia*. The photograph is correctly named but as the differences between the species is of interest to others, I have requested Trevor Blake to comment. —Editor.

I am satisfied that the species illustrated on page 365 is *Banksia blechnifolia*. The flower colour and the blue-grey of the leaves as shown is enough to distinguish it although one can never be certain without a careful examination of all botanical characters. From my observations, the juvenile leaves of *B. chamaephyton* can have much broader lobes. —Trevor Blake.

Propagation Study

Stephen Popple

I am studying the propagation of *Prostanthera incisa*, *Boronia ledifolia*, *Boronia pinnata*, *Tetratheca ericifolia* and *Comesperma ericinum*. Will readers who can assist by reporting experiences, type of material used, time of the year, hormones if used, time to strike, etc., please write to me, Stephen Popple, 34 Adeline Street, Faulconbridge, N.S.W., 2776.

Wildflower Nurseries in Queensland

Fairhill Nurseries — Fairhill Rd., Yandina, 4561. Tel. (071) 46-7193, P.O. Box 100. Large range of 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. New comprehensive catalogue now available \$2.00 posted.

Lakkari Native Plant Nursery — Specialist growers of Australian Plants, retail & wholesale. Large range available. Browse through our display gardens. Many selected natives unique to Queensland as well as new cultivars and hybrids. Grevilleas, and rainforest species our speciality. Catalogue \$1.50 posted. Open 7 days. 477 Redland Bay Road, Capalaba, Queensland. Tel. (07) 206-4119.

Utingu Native Plant Nursery — (Bob and Glynis Dawson) — 37 Sorbiston St., Wellers Hill, 4121. Tel. (07) 397-5706. Open 7 days. Wholesale and retail, specialising in Australian native plants with a large variety of Grevilleas and other indoor and outdoor species.

Australian Wildflower Seed Suppliers

Nindethana Seed Service — Largest selection of native seed in Australia. Nindethana, Narrikup, W.A. 6326. Available in 50c pks. gram lots or kgs. Send 27c stamp for free catalogue. Tel. (098) 46-2205 in business hours.

H. Grant — 2 Sandra Pl., Dubbo, 2830. West N.S.W. a speciality. Two stamps for a catalogue posted.

Wildflower Nurseries in New South Wales

Bundara Native Nursery — 37 Carters Road, Dural, Sydney, 2158. Tel. 651-1962. Specialising in *Grevillea*. Open weekends. Weekdays please ring first.

Cranebrook Native Nursery — R23 Cranebrook Road, Cranebrook, N.S.W. Tel. (047) 77-4256. Four miles north of Penrith, between Tadmore and Taylor Roads. Open 10.00 a.m.-8 p.m. Closed Sundays.

Denovans Nursery — 188 Marco Ave., Panania, 2213. Tel. 77-8891.

Sydney Wildflower Nursery — (part of the Forest Native Nursery Group) — 9 Namba Road, Duffy's Forest. Tel. (02) 450-1785. We specialise in a wide range of native plants. Catalogue \$4.50 posted. Open 7 days.

Floralands — Parry's Nurseries Pty. Ltd. Kariong via Gosford, 2250. Tel. (043) 40-1142. Preservation by cultivation. Send \$1.50 for descriptive catalogue.

Kentlyn Native Plants — 96c George's River Rd., Campbelltown, 2560. Tel. (046) 25-1583. Open 7 days.

Telopea Valley Nursery — George Downes Drive, Kulnura, 2250, 1.5 km past Kyola Road. Rare and unusual natives. Phone: (043) 76-1318 (best at 9.00 a.m.). Send S.A.E. (230 x 100 mm) for list. Mail orders taken. Closed Tuesdays.

Wirrimbirra Native Nursery — Hume Hwy, between Bargo and Tahmoor, 2574 (3 km N. from Freeway entry on E. side). Wide range. Tel. (046) 84-1112.

Wirreanda Nursery — end of Wirreanda Rd., Ingleside, 2101. Tel. (02) 450-1400. Growers of advanced and semi-advanced native trees and shrubs. Open 7 days.

Deanes Orchid Nursery — Specialist in Australian Native Orchids, 29 Hemers Rd., Dural, 2158. Tel. (weekdays) (02) 651-1798. Nursery closed Friday. Plants sent anywhere. Please send for descriptive list.

Wildflower Nurseries in Tasmania

Banksia Nurseries P/L — Waratah Hwy., Elliot 7325. Tel. (004) 36-3128. Open 7 days, 9-5. Grower of rare and common Australian native plants. Available in most sizes at certain times of the year. Advanced and tube lines a speciality. Send S.A.E. for list.

Wildflower Nurseries in Victoria

Austriflora — The nursery with the "Native Know How" — Belfast Rd., Montrose 3765. Tel. 728-1222. Mon.-Sat. 9-5.00 p.m. Sun. 10-5.00 p.m.

Native Gardens — How To Create An Australian Landscape

A new 192 page book by Bill Molyneux and Ross Macdonald available from the Editor — Australian Plants for \$25.00 plus \$1.00 postage. "Good Gardens with minimal maintenance do not happen but are planned, developed and maintained. This book should enable you to achieve that elusive goal "a good wildflower garden." This is not a book of vague statements but a precise detailed treated well illustrated and entirely practical. With any creative work, such as a landscape or garden there must be the human element but it is nice to have practical guidelines.

BOOKS ON WILDFLOWERS

This is a mail order service of books, the price including a discount of 10% plus postage. 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.

Books On The Flora (Some including fauna) of Discrete Areas

Flora Of Australia — Vol. 1, Introduction....	\$15.00	Vol. 8....	\$35.00	Vol. 29	\$25.00
Australian Plant Genera — The only botanical reference to all genera					\$11.30
For N.S.W.					
"Flora of the Sydney Region" — The well known Beadle Student's Flora					\$45.00
"Plants of Western N.S.W." — 752 pages, colour illustrated					\$60.00
"Plants of N.S.W." — A census of Cycads, Conifers and Angiosperms					\$20.00
"Kosciusko Alpine Flora" — Costin, Gray, Totterdell and Wimbush					\$29.00
"Native Trees & Shrubs of S.E. Australia" — Leon Costermans					\$35.00
For Queensland					
"Native Plants Of Queensland" by Keith Williams					\$32.00
"Wildflowers Of Tropical Queensland" — A Wilderness in Bloom by Hinton					\$9.00
"National Parks of Southern Queensland" by Mackness					\$15.00
For Victoria					
"Native Trees & Shrubs of S.E. Australia" — Leon Costermans					\$35.00
"Flowers and Plants of Victoria and Tasmania"					\$26.00
For South Australia					
"Flora of South Australia", Black — Part 1, \$20.00. Parts 2-3 and 4 each					\$9.00
For Northern Territory					
"Flora Of Central Australia" Aust. Systematic Bot. Soc.					\$37.00
For Western Australia					
"West Australian Plants For Horticulture" — Part 1 and Part 2					\$10.00
For Tasmania					
"A Guide To Flowers and Plants Of Tasmania", Ed. M. Cameron					\$25.00

On The Cultivation Of Australian Plants For All States

Australian Plants—The best reference. Bound volumes 2-9, @ \$15.00 plus \$1.00 post.	
For details of previous issues see inside the rear cover.	
"A Horticultural Guide To Australian Plants" — Sets 1-6 @ \$3.00 each; Set 7	\$6.00
Native Gardens — Create An Australian Landscape — Molyneux & Macdonald	\$26.00
Australian Plants For Small Gardens & Containers — Gwen Elliott	\$16.00
"Encyclopaedia Of Australian Plants" — Elliott & Jones Vol. 1, \$36.00, Vol. 2	\$45.00
"Australian Native Plants" — Wrigley & Fagg	\$37.00
"Grow What Wet" — Aust. Plants Study Group	\$13.00
Eco-Gardening — The Six Priorities — Coralie Whitby	\$12.00

About Specific Groups of Plants

Ferns — "Australian Ferns & Fern Allies". Revised & Enlarged. Jones & Clemesha	\$22.00
Eucalypts — "Eucalypts" Vol. 1 and Vol. 2, by Stan Kelly	\$32.00
"A Gardener's Guide to Eucalypts" by Ivan Holliday	\$20.00
Mint Bush — "Prostanthera" — "The Cradle of Incense" — Althofer	\$16.40
Wattles — "Acacias of N.S.W." — Armitage	\$10.00
"Acacias Of South Australia" — Whibley	\$12.00
"Acacias of Australia" — Marion Simmons	\$34.00
"Aquatic Plants Of Australia" — H. Aston	\$25.00
"Useful Wild Plants In Australia" — A. B. & J. W. Cribb	\$16.00
Darwinia and Homoranthus — A Guide to — T. L. Blake	\$8.00
"Seaweeds of Australia", Ed. 1; Christianson	\$20.00
Carnivorous Plants — Slack	\$23.00
Trigger plants — Erickson — Insectivorous plants of W.A.	\$22.00

On The Australian Scene

"Birds Of Australia"	\$23.95	plus \$1.65	postage
"Birds For Beginners"	\$12.95	plus \$1.25	postage
"Field Guide To Australian Shells"	\$16.95	plus \$1.25	postage
"Australian Shells"	\$19.95	plus \$1.60	postage
"Gemstones In Australia"	\$15.95	plus \$1.25	postage
"Australian Mammals in the Wild"			\$11.95
"Birdscaping Your Garden", by C. M. Adams			\$12.95
"Complete Birds Of The World"			\$34.95
"Spiders of Australia — A Field Guide", by Mascord			\$16.95
"Handbook Of Insect Collecting", by Dr. C. Smithers			\$15.00

Past Issues of "Australian Plants"

Because of the vast wealth of our flora there is very little repetition, each volume becoming a valuable reference book in itself. Each volume has a separate abridged index. A composite index of volumes 1-8 is available for \$2.00 plus 60c postage. Bound in hard-cover form, beautifully presented with gold-lettered green vinyl covering, each volume has bound with it another Society book as indicated below and is available for \$15 plus \$1.50 per volume postage.

- VOLUME Nos. 1 and 2, out of print.
- VOLUME No. 3. Issues 21-28, bound with "Catalogue of Cultivated Australian Plants".
- VOLUME No. 4. Issues 29-36, bound with "W.A. Plants For Horticulture—Part I".
- VOLUME No. 5. Issues 37-44, bound with "The Language of Botany".
- VOLUME No. 6. Issues 45-52, with "West. Aust. Plants for Horticulture—Part II".
- VOLUME No. 7. Issues 53-60, bound with "North Australian Plants".
- VOLUME No. 8. Issues 61-68, bound with "The Cradle of Incense".
- VOLUME No. 9. Issues 68-76, bound with Australian Plant Genera.
- VOLUME No. 10. Issues 77-84. Individual issues only available at \$2.00 post free.
- VOLUME No. 11. Issues 85-92. Each issue to date available at \$2.00 post free.

Binders for separate issues of Australian Plants are now available either the old style with screws or the new with D-rings, at \$4.00 each plus \$0.60 postage.

Other Books Published by the Society:

- "WEST AUSTRALIAN PLANTS FOR HORTICULTURE", Parts 1 & 2, by K. Newby, each \$9.00 plus \$1.00 postage. A valuable guide to the plants with horticultural potential.
- "CRADLE OF INCENSE", The Genus *Prostanthera* by G. W. Althofer, \$15.00 plus \$1.40 postage. The only reference to our Mint Bushes, the genus *Prostanthera*.
- "THE LANGUAGE OF BOTANY", by C. N. Debenham, \$7.20 plus \$1.00 postage. An outstanding reference to botanical terms with examples from Australian flora.
- "AUSTRALIAN PLANT GENERA", by J. A. Baines, \$9.90 plus \$1.40 postage. The only reference to the whole of the flowering plant flora of Australia.
- "AUSTRALIAN PLANTS INDEX—Vols. 1-8". A comprehensive index to all species authors, etc. \$2.00 plus 60c postage.
- "A HORTICULTURAL GUIDE TO AUSTRALIAN PLANTS" — Single sheets with a large colour plate on the front, desc. on rear. Sets 4 & 5 @ \$3, sets 6 & 7 @ \$6 ea.
- "ACACIAS OF NEW SOUTH WALES", by I. Armitage. All N.S.W. wattles described and illustrated by sketches and colour. \$10.00 plus \$1.00 postage.
- "FRIENDS AND FOES IN YOUR GARDEN" — D. Hocking, \$24.95, post free.
- The best guide on pest and disease control of plants in your garden.
- "GROW WHAT WET" — The Australian Plants Study Group — \$16.95 post free. A guide to the use of water or for wet areas in the garden.

The Society for Growing Australian Plants

The Society is for people interested in the Australian flora, its preservation and cultivation in the wild, in parks, and in public and private gardens. Preservation of our magnificent flora will, in the long term, depend on the knowledge accumulated, on its cultivation under a wide range of conditions. We hope to learn more about this by cultivating wildflowers in the garden, encouraging research on this aspect, and to record this in "Australian Plants". Enquiries for membership should be directed to:

- SOCIETY FOR GROWING AUSTRALIAN PLANTS—N.S.W. REGION:**
President: Mr. Ray Page, 2 Edgar Street, Baulkham Hills, 2153.
Secretary: Mrs. Glen Harvey, 5 Ellesmere Road, Gympie Bay, 2227.
- SOCIETY FOR GROWING AUSTRALIAN PLANTS—CANBERRA REGION:**
President: Dr. Carmel Statham, 128 Kalgourlie Street, Fisher, A.C.T. 2611.
Secretary: Ms Marylyn Board, P.O. Box 207, Civic Square, A.C.T. 2608.
- SOCIETY FOR GROWING AUSTRALIAN PLANTS—QUEENSLAND REGION:**
President: Mr. Glen Thomas, 922 South Pine Road, Everton Park, 4053.
Secretary: Mrs. Eunice Clark, P.O. Box 809, Fortitude Valley, 4006.
- SOCIETY FOR GROWING AUSTRALIAN PLANTS—SOUTH AUSTRALIAN REGION:**
President: Mrs. Linda Niemann, 12 Banksia Crescent, Blackwood, 5051.
Secretary: Mr. John Porter, 3 Barcroft Street, Pasadena, S.A. 5042.
- SOCIETY FOR GROWING AUSTRALIAN PLANTS—TASMANIAN REGION:**
President: Mrs. Jeanelle Closs, 7 Vyella Court, Austins Ferry, 7011.
Secretary: Mrs. J. C. Wilcox, G.P.O. Box 1353P, Hobart, 7001.
- SOCIETY FOR GROWING AUSTRALIAN PLANTS—VICTORIAN REGION:**
President: Mr. David Davie, 29 Pope Avenue, Boronia, 3155.
Secretary: Miss E. R. Bowman, P.O. Box 393, Hawthorn, 3122.
- WEST AUSTRALIAN WILDFLOWER SOCIETY (Inc.)**
President: Mrs. Clare Welsh, P.O. Box 64, Nedlands, W.A. 6009.
Secretary: Mr. Wayne Clarke, P.O. Box 64, Nedlands, W.A. 6009.

PUBLISHED AS THE OFFICIAL JOURNAL OF THE ABOVE SOCIETIES

Published by the N.S.W. Region, Society For Growing Australian Plants.

Managing Editor: W. H. Payne, assisted by Ray Page, P. D. Leak, B. Kennedy, P. Owens, J. Aston. Do not telephone or call private home. Enquiries by mail only.

NON-MEMBERS: You may receive the next 4 issues direct to your home by forwarding an annual subscription to The Editor, "Australian Plants" 860 Henry Lawson Drive, Picnic Point, N.S.W., 2213. For 1983 it will be \$6.50 for despatch within Australia and \$8.00 for overseas.

COPYRIGHT — All material copyright as directed by authors.



Darwinia macrostegia

Photography by Ron Hill

Often called "Tulip Bells" with its colourful bells to 6 cm long, this plant will grow up to two metres high in protected scrub. However as a specimen shrub it can easily be kept to less than a metre making it an excellent plant for the rockery or for container cultivation. There are 45 species of *Darwinia*, most of which are excellent garden and display subjects. There is available from the Editor, a small book describing these plants and seven species of *Homoranthus* that is well illustrated and styled for the home gardener. Send \$8.00 for your copy.

***Darwinia* For Container Cultivation**

Most species of *Darwinia* are beautiful small plants rewarding when cultivated in rockeries or in containers. See "Australian Plants In Containers" on page 58 for detailed instructions. Why not join a study group as there is much to learn about these dainty plants while they grace your home? See pages 42 and 89.