AUSTRALIAN DAISIES

for gardens and floral art

The Australian Daisy Study Group

Australian Daisies

ERRATA:

Page 100 under Similar Species: The last sentence should read C. longifolia can be distinguished by its achenes which are shorter than those of C. asteliifolia.

Page 172 Helipterum manglesii, line 3: 1756 should be 1786.

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Australian Daisies

for gardens and floral art

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of the Australian Daisy Study Group

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Dedicated to Evan Schaumann

Introduction

The Daisy family, botanically known as the Asteraceae or Compositae, is one of the largest families of flowering plants in the world and the third largest in Australia. There are more than 20,000 species worldwide of which nearly 1,000 are native to Australia.

The daisies introduced from other countries are very well known—from the little *Bellis perennis*, the English daisy seen everywhere in our lawns, to the equally ubiquitous *Chrysanthemum* in all its wide variety which is prized by both florist and gardener. Our Australian daisies have been largely neglected and many people are not even aware of the existence of daisies that are uniquely Australian.

Native daisies are widespread, growing almost everywhere except in true rainforests. Two contrasting regions in which they are seen at their best are the alpine herbfields and the arid sandplains. They may be annuals, perennials or shrubs, some of which are large enough to qualify as small trees, others so small they must be hunted on hands and knees. This great variety of form means that they may be used in the garden for innumerable purposes.

Australian daisies have many desirable qualities: they flower for long periods, make a great show when massed and the majority are small enough to be fitted into gardens of any size. They make charming container plants and the annual species provide brilliant colour in new gardens while the permanent plantings are establishing themselves. The numerous everlasting species have a loveliness, diversity and durability that are put to excellent use in floral art by both professional and amateur.

The aims of this book are:

- to encourage gardeners to grow and appreciate Australian daisies
- to extend the range of species available from nurseries
- to illustrate a broad range of everlastings for use in floral art
- to provide sufficient information for identification by amateur naturalists.

This book is not intended as a comprehensive guide, but as a source of information about species which have been raised, grown and used by members of the Study Group. It has been written in response to repeated requests from the audiences who have been addressed by the Group. Although much of the information has been gained in Victoria, the book includes valuable contributions from other states.

The treatment of species in the text differs from the usual botanical treatment. Where there are subspecies or varieties included in any one species, the one most familiar to the Study Group or the one with special horticultural attributes has been fully described. A brief description of other subspecies or varieties follows under a separate heading. The use of botanical terms is minimal, but a brief glossary of the terms employed has been

included. Flowering times and plant sizes and habits may vary with soil and climate.

Production of this volume has been the result of five years of exciting and enjoyable work by the members of the Study Group. We hope it will help our readers to share some of those pleasures.

Acknowledgements

The Study Group had to delve into a number of scientific papers in order to resolve problems of identification, germination and cultivation of certain species. We are most grateful for the help we have received from the authors we have contacted. Advice, encouragement and practical assistance were generously given.

Our sincere thanks to Philip Short, Ray Smith and Helen Cohn of the National Herbarium of Victoria, Bill Mulham of CSIRO (Division of Wildlife and Rangelands Research at Deniliquin), Laurie Haegi of the State Herbarium of South Australia, Paul Wilson and Nicholas Lander of the Western Australian Herbarium, Jack Warcup of the Waite Agricultural Research Institute, University of Adelaide, John Mott of CSIRO (Division of Tropical Crops and Pastures at St Lucia, Qld), Jim Willis (formerly Assistant Government Botanist, Vic), and Geoff Butler (Registrar of the Australian Cultivar Registration Authority).

We also wish to express our gratitude to all those who have collected seed for the Group, given us plant material, lent slides, recorded information, given advice, drawn or painted for us and generally borne with our obsession, especially our families.

The editorial committee thanks all members of the Study Group for their hard work and support, without which this book could not have been written. Special thanks go to our two major artists, Gloria Thomlinson and Kath Alcock, whose drawings are not only botanically accurate, but vividly capture the individual qualities of the plants. Thanks also to Betty Campbell for her illustrations. Finally we record our indebtedness to Joy Greig whose work on the word processor was invaluable and whose practical and tranquil approach was even more highly prized by her fellow committee members.

1

Growing daisies

There are too many Australian daisies to generalize about the growing conditions they enjoy. Some prefer full sun, others like shade; some like open conditions, others prefer overhead protection. However, they all appreciate group planting.

The factors to bear in mind when choosing and preparing a position for daisies will be discussed in broad terms, but for individual requirements the species' description should be consulted.

There is a daisy for every situation. As a rule they grow and flower better with a certain amount of sun and some protection from wind. A light canopy such as that provided by open shrubs seems to be ideal.

Soil factors

Soil type

Daisies will grow in all sorts of soils from clay to sand, but usually improved growth results if the soil is well drained, enriched with fertilizers and slightly acid.

Soil pH

Soil acidity or alkalinity is measured on a pH scale of 0–14, 7 being neutral and 1 extremely acid. The range of pH 6.0–7.0 allows the plant's roots to take up the widest range of minerals in the soil. If the soil is too acid magnesium becomes unavailable to the plant. Iron and manganese cannot be absorbed when the soil is too alkaline. A deficiency of minerals available to plants causes a lack of vigour and is indicated by yellowing leaves or other changes in the foliage. Simple soil testing kits or probes attached to pH meters can be used to do rough pH tests.

To reduce alkalinity add agricultural sulphur or aluminium sulphate. The effects of mild alkalinity can be overcome by applying soluble manganese and iron chelates (see page 10). To reduce acidity add garden lime or dolomite. Dolomite is less effective than lime, but has the advantage of supplying magnesium as well as calcium.

Drainage

While many species require good drainage there are some members of the Asteraceae which can make excellent bog plants, for example *Brachyscome scapigera, B. obovata, B. graminea.*

Good drainage is achieved in clay soil if organic matter and gypsum are dug in simultaneously. Clay is composed of countless tiny particles sticking together with very little space between them for water or air movement. Gypsum will not change the pH of the soil, but causes the particles to agglomerate into clumps which allow better penetration of air and water. It can be applied at the rate of 1–1.5 kg per square metre.

Organic matter is any animal or vegetable material capable of being broken down by the action of worms, fungi and other soil organisms. Examples are animal manures, peat moss (peat in WA), leaf mould and compost. Although adding organic matter and gypsum will improve clay soil the effect is not permanent and the process needs to be repeated every four or five years.

In sandy soils the problem is that drainage is too good. It dries out too quickly and the constant watering necessary will leach away the nutrients. In this case as much organic matter as possible must be dug into the sand so that the water-holding capacity is increased.

When dealing with large areas it is best to prepare the soil and remove the weeds some time before planting. Sprays which break down on contact with soil may be used for this purpose. These contain glyphosate and are of relatively low toxicity, but should be used with care. Blood and bone, manure, compost or a mixture of whatever is available may be dug in at this time. Cow manure is preferable to others because it contains the least phosphorus. Manures should be old because when fresh they burn roots. Some native plants, such as banksias, grevilleas and hakeas, are particularly sensitive to excess phosphorus in the soil, so the addition of this element should be kept to a minimum where other plantings may be affected. The area is allowed to lie fallow for at least three (preferably four to eight) weeks so that a second crop of weeds can appear and be removed.

Many gardeners are not far-sighted enough for this method, preferring instead to buy seeds or plants when they see them and get them into the garden at the first opportunity. Such enthusiasts will have to keep their young plants under careful observation and weed painstakingly and often.

When planting between plants or in small areas remove weeds by hand, dig to a spade's depth over an area of double the size of the container and use a slow-release fertilizer in the hole at the time of planting.

Many species grow naturally among rocks and boulders where their root systems are protected. If rocks can be partially or completely buried near the proposed planting site the more difficult species have a better chance of survival.

Planting out

This pleasurable task is ideally performed in autumn while the soil is warm and moist. This gives plants plenty of time to settle in before the vicissitudes of summer. Planting out may take place at any time of the year, however, if the plants are watered regularly during dry periods. It is best to wait until frosts are over before planting tender species.

Allow pots to soak in a bucket of water containing a root-stimulating hormone at least until bubbling ceases and longer if possible. Dig a hole 25–30 cm deep and twice the diameter of the pot. Fill it with water and allow it to drain away. Place organic or slow-release fertilizer in the bottom of the hole and cover with soil to prevent contact with the young roots. Knock the plant out, tease and if necessary trim the roots with sharp secateurs. Place in the hole so that the level of the plant soil is just below ground level. Water in thoroughly and mulch.

Most of the species are not large enough to warrant staking. Large-growing species in windy places should be cut back to half size at planting time and then tip pruned at frequent intervals until a sturdy root system has developed.

Group planting

Single species planted in groups of three or more not only look pleasing and seem to grow with more vigour and confidence, but gain the additional benefit that greater possibilities for cross-pollination will exist. Many of the species are self-infertile. This means that they will only produce fertile seed from cross-pollination between plants of the same species but different parentage. The chance of finding self-sown seedlings in various parts of the garden is increased if two or more seedlings (or cutting-grown plants from different parents) are grown in close proximity. These accidental seedlings are usually delightful surprises and appear in just the right places, but are easily removed or transplanted if unwanted.

Difficult species

Some species have proved difficult to grow in gardens. They grow in abundance and flower profusely in their natural habitats, often poor, sandy soils clearly lacking nutrients. When they are grown in rich garden soils with water at hand and every luxury provided they turn pale and die slowly but inexorably. This propensity has been a puzzle and a disappointment. It applies to such species as *Helichrysum obtusifolium, H. blandowskianum*, and *Helipterum stipitatum*. This is an advantage, however, to gardeners with nutrient poor soils.

Recently it has been demonstrated that members of the Asteraceae form associations with certain fungi in most soils, but especially in nutrient poor soils. These mycorrhizal associations, as they are called, result in a nutrient exchange system which is of mutual benefit to plant and fungus, and may be essential for growth in poor soils.

These difficult plants may not grow in enriched soils for three reasons:

- Mycorrhizal fungi do not flourish in areas with high available nutrients so are probably few in number in garden soils and may even be absent.
- Some species may be more dependent on these associations than others.
- Fertilizer balance may be important. Fertilizers in general use may not contain nutrients in the right proportions for some species.

Research is proceeding on this problem and the means of overcoming it. One possible method would involve importing soil containing the requisite fungi into the garden, but this would only be permissible from a privately owned source. Selection should provide a better answer. When plants are brought into cultivation for the first time cuttings are often hard to strike and seeds are hard to germinate. With each succeeding generation the percentage cutting strike and germination rate increase. By this process of selection it is hoped that plants which are dependent on the presence of certain fungi in the soil may become progressively less dependent. Finally they should be capable of growing in any garden situation.

2

Maintaining daisies

It is vital to the well-being of daisies that their root systems should not be allowed to dry out. This is the most important factor in their successful maintenance whether they are annuals, perennials or shrubs.

Annuals will extend their life cycles so long as there is adequate soil moisture, but will abruptly cease to flower when the moisture falls below a certain level. Perennials will die back to their perennial roots when there is insufficient water and shoot again when conditions are right. Shrubs will simply die when their roots dry out.

This means that any form of root protection is of prime importance, so mulching is essential. A system of watering should be established next, and then fertilizing, pruning, weeding and overcoming deficiencies follow as necessary, but secondary, parts of maintenance.

Moisture

Mulching

Mulching serves many purposes:

- It helps to conserve moisture in the soil.
- It helps to maintain the soil at a constant temperature.
- It discourages weeds.
- It helps to protect the root system.
- Some mulches add organic matter to the soil because the lower layers are continually broken down by soil organisms.
- If one mulching material is used throughout the garden it helps to unify the landscaping and a pleasing appearance results.

Many materials, both organic and inorganic, can be used for mulching. Organic materials include hardwood and softwood chips, pinebark, hardwood sawdust, casuarina needles, and machine shredded prunings from the garden. The sterile residue left after distillation of eucalyptus oil is commercially available now. This and shredded prunings are most suitable organic mulches for daisies and have the advantage that they do not break down too quickly. A layer at least 7 cm thick should be applied, but not too close to plants' stems as, if damage occurs, fungal attack will often follow. Coarse sand, which allows free movement of air and water, may be used to fill the space between the mulch and the stem. There are disadvantages in using some of the other organic materials. Sawdust tends to cake, preventing air and water from penetrating its surface. Some types of shavings contain toxic phenolic acids which may cause stunting of plants. Pinebark or pine chips may build up soil acidity if used too often.

Inorganic mulching materials include coarse sand, gravels and screen-

ings. These can be expensive, but have the advantage of remaining stable. A coarse sand mulch is an excellent medium for the germination of self-sown daisies, but must not be less than 5–7 cm deep; thick organic mulches inhibit germination.

Satisfactory mulches for container plants are peat or sphagnum moss and fine pebbles.

Watering

The system chosen will naturally depend on the size of the garden and the nature of the planting. Methods used range from trickle irrigation through fixed or movable sprinklers to hand held hoses or watering cans.

A suitable system for most gardens is drip watering. There are many advantages to be gained from this technique:

- Water is only delivered where it is needed, to the root system, and is not wasted on paths, etc.
- The amount of water for each plant can be regulated, so that every preference will be accommodated.
- Since only the root areas receive water, weed growth between plants is discouraged.
- If the feeder lines are covered by mulch to keep the water cool, the system can be turned on at any time of the day without fear of burning roots or foliage.
- No water will fall on the bracts of the everlasting daisies.

Overhead watering has its drawbacks. The everlastings respond to contact with water by closing their bracts. If this happens too often it creates a cosy environment for insects which ultimately reduce the seed to useless powder. The amount of viable seed for collection and the chance of self-regeneration will therefore be markedly decreased. If overhead watering is the only means available then there are two points to keep in mind:

- To reduce the chance of burning the foliage refrain from watering during the heat of the day. Early morning or evening are the best times. Mid-morning is the ideal time for everlastings, however, because as soon as watering ceases the bracts dry out and open rapidly.
- Soaking an area is generally the most beneficial as sprinkling lightly only encourages the growth of surface roots. Annuals growing in sandy soils respond to frequent light watering because they are shallow rooted.

Watering is unnecessary if the soil is moist to a depth of 2 cm below the surface.

Fertilizing

The majority of species respond to the application of fertilizer with a positive increase in growth and flowering. Some species from nutrient poor soils are exceptions, and these have been discussed on page 3.

Most daisies are not fussy about the type of fertilizer used. They flourish on either organic or inorganic fertilizers. Caution is only necessary where

neighbouring plants are concerned: some plants, such as banksias, hakeas and heaths, are sensitive to heavy fertilizing.

It is most important that the soil is thoroughly moist before application. Distribute the fertilizer evenly under the canopy of the plant and water it in. Apply at the recommended rate as excessive amounts can be more harmful than too little. One immediate application is made at planting time as described in Chapter 1.

For best results with annuals frequent applications of nitrogen and potassium will result in larger flower-heads, more vigorous growth and an extended flowering period. Late in the season, application of nitrogen should stop as it produces foliage at the expense of flowers. Nitrogen sources are ammonium salts, sodium or potassium nitrate, blood and bone, hoof and horn or IBDU. Potassium sources are potassium chloride (muriate of potash), and potassium sulphate or nitrate.

Perennials will often produce a second or even third flush of flowers if cut back, fertilized and watered as each burst of flowering wanes, for example, *Helichrysum apiculatum, H. bracteatum, H. semipapposum.* Shrubby daisies enjoy a spring and autumn dressing.

Pruning

Edna Walling, a mine of practical gardening lore, says, 'When a shoot begins to extend beyond the proportions you wish it to assume, pinch it back.' If this advice were heeded there would be no need for the harsh pruning that must take place when plants get completely out of hand. Unfortunately not everyone has the time to study every shoot in the garden, so an understanding of pruning will always be needed.

The reasons for pruning are:

- to produce healthy growth because it encourages development of lower buds
- to produce more flowers
- to remove dead or diseased wood
- to reduce top growth and promote a dense, compact habit, especially where wind is a concern
- to produce a desired shape.

In general, pruning is carried out after flowering is finished. This stimulates growth of new roots and foliage, especially if the plants are simultaneously fed and watered. Some daisies flower for so long, however, that it is difficult to pick a time for cutting them back. *Brachyscome multifida* is an example.

The only procedure necessary for annuals is to tip prune them when first planted to encourage growth of roots and shoots. This also promotes bushier plants which are more stable in the ground. *Cephalipterum drummondii* especially needs this action as it normally has a very small, weak root system.

Perennials invariably become untidy at some stage, usually after flowering. At this point they should be cut back, ruthlessly in the case of the more vigorous species. *Helichrysum apiculatum* and *Helipterum anthemoides* gain substantial benefit from pruning, as new growth immediately begins

to appear. Some perennials such as *H. anthemoides* can be shaped into cushions by clipping all over to the same length at frequent intervals.

Pruning of shrubs begins at the time of planting when they should be tip pruned if they are big enough. If this is repeated often, a dense healthy shrub will result. Once the buds begin to form, tip pruning should cease until flowering has finished. Plants actively produce new growth immediately after flowering. The sooner they are cut back, the less of this growth will be lost, so at this stage 10–20 cm can be cut off most branches. It is most important to keep olearias and the shrubby helichrysums pruned or they will become woody and untidy.

If seed is to be gathered, pruning may be delayed until after collection. Alternatively, one or two branches can be left unpruned until the seed has set and been removed.

Weeding

Weeds will compete with plants for water and nutrients, so it is necessary to remove them before planting (see page 2) and to keep them under control thereafter. The application of a mulch will always help to discourage their growth.

Weed sprays cannot be used with safety in garden beds for fear of harming the existing plants, but if weeds are removed as they appear, they are easy to pull out by hand and do not have a chance to go to seed. If difficult perennial weeds (like couch grass or sorrel which spread by underground runners) cannot be controlled manually, then glyphosate based sprays (such as Zero or Round-up) can be painted or dabbed on them. These herbicides are only absorbed by the foliage they touch and it is claimed that they break down on contact with the soil. Proper precautions should always be taken when handling these compounds as they are toxic to the user.

Other considerations

Baiting for snails and slugs

Members of the Asteraceae seem to be particularly attractive to snails and slugs. They can create such havoc in a short time that, although control is discussed in detail on page 12, mention must be made of the problem under maintenance. As soon as daisies are planted and mulch applied, snail and slug controls should be implemented.

Rejuvenation of perennials

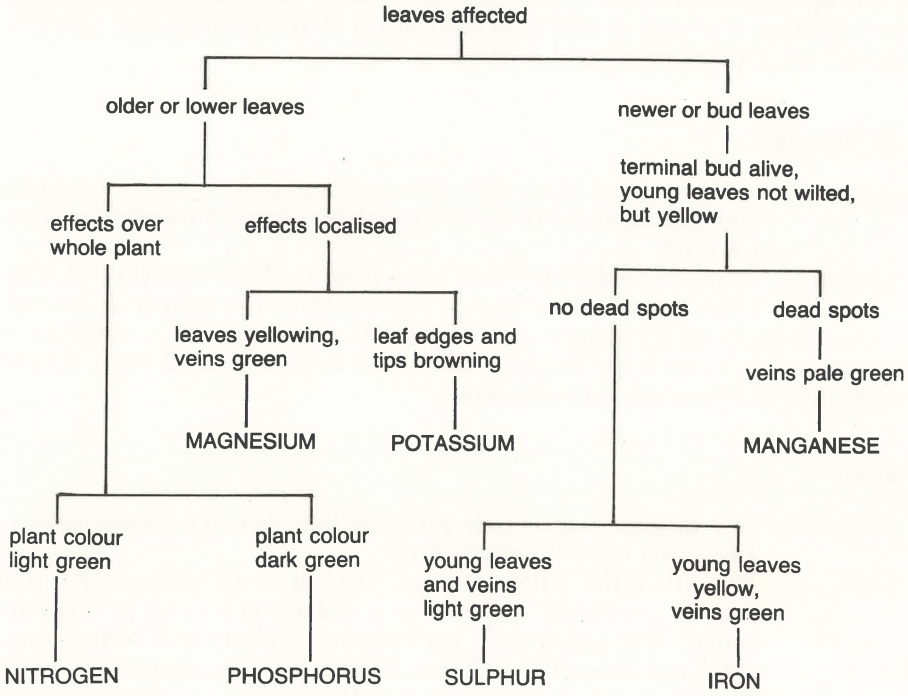
Herbaceous perennials grow and flower in their first year. In late autumn their shoots die back to the permanent root and then, at the end of winter, shoots and flowers are produced again. This process increases the size of the root clump, but vigorous growth may decline after some years. Rejuvenation is achieved either by cutting back, watering and feeding, or by lifting plants when they are dormant, dividing and replanting them in newly prepared soil.

Nutritional deficiencies

Abnormal patterns of growth result when some elements are absent or deficient in the soil. Using the simple key in Figure 1, which lists the most likely culprits, it should be possible to identify which element is deficient.

Addition of the deficient element in the correct quantity usually remedies the problem, but it is important to realise that it may cause toxic symptoms if added in excess.

Figure 1 Simple key to nutritional deficiencies



Nitrogen

Symptoms: The growth is stunted, the older leaves become pale green to yellow and may drop prematurely.

Correction: Foliar sprays act quickly—calcium nitrate (2 g per litre) or urea (1.5 g per litre).

Inorganic fertilizers such as ammonium nitrate, ammonium sulphate and sodium or potassium nitrate should be applied as small, regular dressings. In cold weather use sodium or potassium nitrate because the ammonium salts must first be converted by soil micro-organisms before they can be used by plants, and cold conditions slow this activity. Organic fertilizers supplying nitrogen are blood and bone, hoof and horn or animal manures, but their breakdown also relies on micro-organisms.

Nitrogen deficiency is not common; the main cause is the breakdown of mulch in the garden or of pinebark in potting mixes. In this case a slow-

release nitrogenous fertilizer called IBDU (sold as Grow-max Easigreen) is particularly useful.

Phosphorus

Symptoms: The plant's growth is slow or stunted, the leaves turn dark green and develop a purple or bronze tinge.

Correction: Superphosphate, blood and bone or hoof and horn can be applied to the soil in small amounts as a dressing.

Phosphorus deficiency is rare. As some plants, such as species of *Hakea* and *Banksia*, are very sensitive to high levels of phosphorus this element should be applied with great caution.

Potassium

Symptoms: Spots of dead tissue appear on the margins of the older leaves and spread to the tips, and growth is stunted. Flowering is often reduced.

Correction: Apply potassium sulphate or potassium chloride to the soil. The latter has the disadvantage that it adds to the salinity of the soil.

Compounds of potassium are very soluble in water. This element is therefore likely to be deficient in sandy soils in high rainfall areas, and is easily leached from soils in containers.

Iron

Symptoms: The new growth is pale green at first, later becoming yellow. The veins usually remain green.

Correction: The pH of the soil determines which iron salt to apply. For pH 5 to 6, use ferric sulphate as a soil drench (50 g per square metre). For pH 6 to 7, use ferrous sulphate as a foliar spray (30 g per litre). For pH 7 or higher, use iron chelates as a soil drench or a foliar spray (2–3 g dissolved in one litre of water per square metre).

Iron deficiency is usually seen in plants in alkaline soils where it is present in forms that are not available to the roots. In this case either the soil must be made more acid, or a soluble iron compound must be applied to the soil or sprayed on the foliage. One member of the Asteraceae which is quick to show iron deficiency is *Brachyscome angustifolia*.

Magnesium

Symptoms: Patchy yellowing of the old leaves, the margins later becoming reddish. Flowering and root growth are often poor.

Correction: Apply a dose of Epsom Salts (magnesium sulphate) to the soil or as a foliar spray (20 g per litre). A dressing of dolomite (a mixture of calcium and magnesium carbonates) is an alternative, but this tends to increase the alkalinity of the soil.

This deficiency is often seen in acid, sandy soils.

Manganese

Symptoms: Similar to those of iron deficiency, yellowing of leaves with pale green veins, but in this case it is the young leaves that are first to show the effects.

Correction: Small amounts of manganese sulphate applied as a soil drench or foliar spray (5 g per litre).

It is important to keep the soil pH to about 6.5 as in very acid conditions manganese becomes too available to plants and causes toxicity.

Sulphur

Symptoms: The leaves turn pale green at first, later the older leaves begin to die progressively from the base of the plant. In severe deficiency the young leaves are small and yellow.

Correction: If ammonium, potassium or magnesium sulphates are used to correct other deficiencies they will provide adequate sulphur. Otherwise gypsum, as crushed rock gypsum, can be sprinkled on the surface and watered into the soil at the rate of 2 g (half a teaspoon) per litre. This amount of sulphur will last the plant for six weeks. Some slow-release fertilizers contain sulphur which is not readily available to the plant.

Sulphur deficiency is not usually observed because sulphur is present in the water supply in most states, although the concentration varies from as low as 0.3 ppm in Melbourne's tapwater to 40 ppm or more in Perth. The deficiency is most likely to occur in pots where soil-less potting mixes are used because wood wastes and peat contain very little sulphur, either when fresh or after decomposition. Soil, on the other hand, contains sulphur released from organic matter by the action of micro-organisms.

In practice, the Study Group has only experienced evidence of lack of iron, and that in only a few of the species.

Pests and diseases

Members of the Asteraceae are relatively free from pests and diseases, but protection against snails and slugs is essential at all stages of growth. Otherwise, the most troublesome pests are aphids, especially root aphids.

In the bush a natural balance between pest, plant and predator has developed. Pests, using plants as a food source, in turn form the food of insects, birds or even animals, any of which may also act as pollinators for the plants. Most gardens are composed of plants assembled in artificial communities where no such equilibrium exists. In practice, this means that gardeners will be forced to eliminate pests which have built up to plague proportions in the absence of predators, and are doing great damage to plants as a result. This will involve spraying with pesticides as the need arises.

When deciding what steps to take against pests keep the following considerations in mind:

- Be prepared to overlook some damage to foliage. Take action only when the plant's life is threatened or if simple measures may prevent a severe infestation.
- Plants cope with insect attack more efficiently when they are healthy. Proper soil preparation and maintenance provide a sound basis for good health, but foliar sprays of fertilizer will often assist plants to overcome minor infestations.
- Protect insects which prey on pests. For example, lacewings and ladybirds are natural predators of aphids.
- If it is necessary to use a pesticide, choose one which is least toxic to the user as well as to other insects, birds or animals.
- Alternate the pesticides employed if possible, to prevent pests becoming resistant.

Precautions for use of pesticides

- Read and follow the instructions meticulously, being especially vigilant when dealing with the concentrated solution.
- Try to spray on cool, windless days, preferably in the morning.
- Do not spray on hot days (over 30°C), and ensure that plants are not drought affected before spraying.
- Do not keep diluted chemicals longer than two hours before using them.

Leaf and stem eating pests

Snails and slugs

The problems in gardens are mainly caused by species introduced from other countries. They rasp and swallow young tissues and can do irreparable harm to seedlings and small plants.

Metaldehyde or methiocarb are the stomach poisons usually employed and are available commercially as pelleted or powdered preparations. They are usually effective, but they may be attractive to children, pets and birds. The pellets should be hidden from sight under inverted pots with one rim held up on a stone, or placed in specially designed containers such as 'snail jails'.

Eucalyptus/pyrethrum sprays, which are not highly toxic to people, are said to be effective against snails. They would need to be applied frequently.

Caterpillars

The larvae of many butterflies and moths bite and chew foliage and stems. Caterpillars can completely defoliate a small plant if given the chance and, while they seldom kill it, they give it a nasty setback.

If plants are closely watched, caterpillars can be picked off as soon as they are seen. If there is a more serious infestation spray with pyrethrum. A specific spray against caterpillars, which contains bacteria, is available commercially. This should be applied every 10–14 days while caterpillars are active. Carbaryl is more toxic and should only be used when other methods fail.

Earwigs

The introduced earwig can bite and chew the growing tips of seedlings or flowers. Eucalyptus/pyrethrum spray is effective if it becomes necessary to reduce their numbers.

Sap sucking insects

Aphids

Aphids suck the sap from young stems and buds and excrete a sweet substance called honeydew which attracts ants. The ants protect the aphids and carry them to other plants to ensure a continuing food supply. Sooty mould may grow on the honeydew but it is not usually a problem with daisies. Sap loss caused by large colonies of aphids can have a severe effect on plants, resulting in damaged buds and retarded growth. In spring such annuals as *Helipterum chlorocephalum* and *H. roseum* may be damaged.

If there are only a few aphids they can be squashed between thumb and forefinger with vindictive force. Clensel or pyrethrum sprays are effective but must be used often.

Much more difficult to eradicate are the root aphids which live underground and feed on the roots. The species which attacks Asteraceae has been introduced from Europe and again its movements are linked to those of ants. Certain genera are more susceptible to attack. In particular, *Brachyscome*, *Olearia* and *Lagenifera* species seem prone to infestation whereas *Helipterum* and most *Helichrysum* species seem to be immune.

As root aphids live below the soil surface it is difficult to know when they are present, the only hint being that an infected plant lacks vigour. If the plant is in a pot it can be knocked out to look for the tell-tale white waxy secretion around the roots. A hand lens will confirm the presence of the oval greyish aphids actively enjoying the roots.

There are two stages for control of these troublesome pests:

1 Control of the root aphids. Pyrethrum drenches for 12–24 hours provide a measure of control for pots, but it is a cumbersome method which must be repeated at frequent intervals. Systemic insecticides which are absorbed into the sap stream and carried throughout the plant are more successful. Dimethoate or omethoate can be used as foliar sprays, but the effect does not last long. Vamidothion has proved the most effective insecticide against this pest. It should be applied when infestation is first observed, usually in November, as a foliar spray. One application should last for eight weeks and, if ants can be controlled also in this time, the problem should be solved. Note that every precaution should be taken when using vamidothion as it is quite toxic.
2 Control of ants. Ants may be sprayed with pyrethrum spray, pyrethrum can be poured into their nests (if they can be found), or a solution of honey and borax may be left in their path. Ant baits are now available from supermarkets. Alternatively diazinon may be applied to the infested area.

Red-legged earth mites

These tiny animals are about 1 mm long and 0.6 mm wide. They have black bodies and red legs and feed by lacerating plant tissue with their mouth parts to produce sap which they suck. They will attack all parts of young seedlings: stems, leaves and buds. Mites feed from autumn when they hatch, through winter and spring, but die at the beginning of summer. Eggs hatch within ten days of the autumn rains and the insects infest pastures and weeds. In plague proportions they may cause major losses to growers of cut flowers, but are not generally a great problem in home gardens.

The most effective control is spraying with dimethoate which is systemic.

Nematodes (eelworms)

These small worms are common in all soils, but comparatively few are parasitic species. They may be found on roots, but it is the leaf nematodes which attack the leaves of some Asteraceae. They cause small black patches to form on the leaves resulting in lack of vigour or even death. Fenaminiphos can be used as a foliar spray.

Diseases

Powdery mildew occasionally attacks olearias, which are more susceptible if they are not healthy plants. It is caused by a fungus and controlled by a fungicide such as benomyl.

Table 1 Control of pests and diseases

Target	Control	Proprietary name	Toxicity to people*
Snails and slugs	metaldehyde	Defender, Scatterbait	high
	methiocarb	Baysol	moderate
	pyrethrum		minimal
Caterpillars	pyrethrum		minimal
	carbaryl	Bugmaster	moderate
	bacterial	Dipel	minimal
Aphids	soap solution	Clensel	minimal
	pyrethrum		minimal
	maldison	Malathion	high
Root aphids	pyrethrum		minimal
	vamidothion	Kilval	high
	lindane	Lindane, Gamaphex	moderate
	dimethoate	Rogor	high
	omethoate	Folimat	high
Ants	pyrethrum		minimal
	borax/honey		minimal
	diazinon	Gesapon	moderate
Nematodes	fenaminiphos		moderate
Powdery mildew	benomyl	Benlate	moderate
		Karathane	moderate
	mancozeb	Dithane	moderate

*Ingestion of any chemical should be regarded as serious and medical advice sought.

4

Propagating daisies

Plants may be propagated from seed or vegetatively from cuttings (stem, root or leaf), by division, and by layering.

Propagation from seed results in progeny varying, sometimes markedly, from the parent. This can be seen as variation in flower colour, height of plant, foliage size and colour, and degree of vigour.

Vegetative propagation results in plants which have identical characteristics with the parent and with each other because they are of exactly the same genetic constitution. This method is used to reproduce special forms of species if they have better horticultural potential than the typical forms. Cultivars must be propagated in this manner to maintain their characteristics.

Choice of method depends on the attributes of the plant to be propagated, the availability of propagating material and the aim of the propagator.

Seed is often easier to gather and transport than cuttings when on a collecting trip. It is convenient to be able to store seed until required, whereas cuttings must be set as soon as possible after collection. Variation can be of benefit because plants with desired characteristics can be selected for introduction into cultivation. The majority of annuals are grown from seed.

Vegetative propagation is a useful method if seed is either not produced or not available at the time the collector is present. Cuttings can be taken at any time. One great advantage is that plants propagated from cuttings flower earlier than seedlings, although this does not usually apply to annuals.

Either method will be successful with daisies.

Propagation from seed

Commercial seed from reputable seed suppliers is always easier to germinate than that gathered straight from the bush. Seed suppliers usually grow a new species for several years before releasing it to the public. Over this period it is selected for ease of germination. After three or four years the rate of germination can be increased from 10 per cent to 90 per cent.

If the seed is gathered from the wild a number of difficulties may be encountered. It may have a very low germination rate, or may not germinate at all under the conditions used by the grower. In these circumstances it is necessary to consider conditions in the original habitat and adapt germinating techniques to suit.

Seed may be germinated by direct sowing or sowing in containers.

Direct sowing

This method is especially applicable to annuals.

If seed is available in abundance and is known to be easy to germinate,

it can be sown directly on the soil. Fewer seedlings will result since there are more possibilities for seed removal or destruction by birds, animals, bad weather, snails, etc., but many gardeners will find it a simpler procedure.

Select an open sunny site. In summer cultivate the soil; work gypsum into clay and humus into sand. Add sheep, cow or horse manure or other organic material such as blood and bone. In autumn remove weeds, incorporate a slow-release fertilizer and rake level. Broadcast the seed evenly and water immediately. Thereafter the area must be watered enough to keep the soil moist, but not water-logged or the seed will rot. Snails and slugs should be controlled with bait.

For small areas or heavy soils, a topping of sand or propagating mix may be used to aid germination.

Sowing in containers

Medium

The medium should be well drained, free of weed seeds, capable of aeration and of retaining moisture, and of a pH suitable for root initiation (4.5 to 5.5). A well-tried medium is composed of three parts of washed propagating sand (coarse river sand) and one part of peat moss.

Vermiculite can be used in place of peat moss and perlite instead of sand. It is possible to use pure sand, but in this case the bog method of germination should be followed in order to keep the surface of the medium moist (see page 18). These media can be roughly sterilized by pouring boiling water over them. There are also commercially produced seed raising mixes which are already sterile and which have proved successful.

Containers

Clean plastic pots should be used. Suitable dimensions are 10–13 cm in diameter and at least 5 cm (preferably 6–8 cm) deep. Margarine containers with drainage holes are quite suitable. Each container should be clearly labelled with the name of the species and the date.

Sowing method

Sow all small seed on the surface and immediately water gently and thoroughly with a fine spray. Many daisy seeds develop methods of keeping themselves in close contact with the soil surface when they are wet. *Helipterum* and *Cephalipterum* species produce a sticky layer which adheres to the surface. *Helichrysum* species with hairy seeds anchor themselves to the surface by spreading out their hairs. By these means they present a larger surface area for water uptake.

Most species of Asteraceae germinate better if they are not covered. It appears that light is a prerequisite for the germination of many of the arid or semi-arid region species.

Some of the larger seeds, like those of *Schoenia cassiniana*, prefer to be dropped into an indentation (about 5 mm deep) or a shallow scrape where a moist microclimate is created. Some growers add a thin layer of sand, gravel or blue-metal chips (2–5 mm in diameter) over the seed to prevent heavy rain dislodging it.

Sow thinly to allow more air movement around the seedlings, and so discourage fungal attack such as 'damping-off' (see page 21).

Some seed germinates more successfully if it is left in the seed head. For instance, *Cephalipterum drummondii* germinates much more readily if left in the cotton-wool environment of its head than when each seed is tediously removed from it.

Siting of pots

Germination can take place in a glass house under mist, on wet paper or cotton wool on a window ledge inside the house, but the Study Group recommends placing pots in the garden where they can benefit from sun and rain. Many complaints about the failure of seed to germinate have been overcome by advising the would-be grower to simply put the pots outside.

Best sowing times

The best sowing times will vary with the prevailing climate, and the occurrence and severity of frosts. In Melbourne it is advisable to plant out annuals in the garden in late winter to early spring before the weather becomes too hot. Since it takes about ten to fourteen weeks from sowing seed to planting out the seedlings, this means sowing in mid-autumn to early winter. This is the time for heavy rains which aid germination.

Frost susceptible species must either be sown later or the seedlings protected. Seed of perennials and shrubs may be sown in autumn or spring if care is taken to prevent drying out of roots over the hot period.

Watering

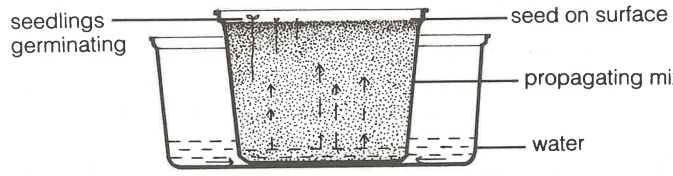
The surface of the medium must be kept moist for the seed to germinate. The easiest method is to use an automatic watering system. If it is necessary to water by hand, a fine nozzle should be used so that seed is not dislodged by the force of the jet.

Bog method

The bog method is a technique which takes its name from the permanently damp conditions created in the germinating medium and provides an alternative to watering. The pot containing sand and seed is placed in a larger container of water, the depth of the water level being a third to half the depth of the seed container. This allows the surface of the medium to remain wet at all times (by capillary action) without needing to water. Place the pots outside to allow a free flow of air and thus inhibit fungal growth. Rain may overfill the water container, but this is avoided if holes are punched in the sides at the desired height of the water level.

Heavy rain may bounce the seed out of the container, so it may be necessary to cover the pots with flywire.

There are two disadvantages to the bog method: algal growth may occur



The bog method of seed germination

which seems to hinder germination, and fungal growth may cause heavy losses.

The method is particularly useful for early sowing in hot weather, but a fungicide may be necessary. When the weather becomes cold the seed container should be removed from the water.

Germination times

The time taken for a seed to germinate from sowing varies with the species, some needing over twelve months. In the first flush of germination there is often a delay of three weeks or more between the appearance of the first seedling and the last. Thereafter there may be further bursts of germination when conditions are suitable. This applies particularly to seed gathered from the wild because it is apparently a survival strategy to ensure that if conditions are not good for survival, other seeds will germinate later when conditions may be better.

Fertilizing

Seeds contain their own food supply, which is adequate for a short period, but if there have been no nutrients included in the germinating mix, some form of food should be added after the seedlings have germinated. Osmocote or a liquid fertilizer can be used.

Poor germination

When seed does not germinate the gardener looks for a reason. It may be that the seed:

- is not mature
- is not viable
- has been damaged by insects
- has been attacked by fungi
- does not have optimal germinating conditions
- is dormant.

Mature seeds are reasonably easy to distinguish from immature ones. They are larger, plumper and heavier, characteristics which can usually be seen with the naked eye and certainly with a hand lens.

When applied to seeds 'viable' means able to live and develop. A simple method of finding if a seed is viable is to cut across it and look at the tissue inside the seed coat with a hand lens. Viable seed is white and healthy-looking, but dead seed is dark and shrunken. A more accurate test is the tetrazolium test (see *Encyclopaedia of Australian Plants* Vol 1), but this is beyond the scope of the home gardener. The length of time seed remains viable is largely dependent on the method of storing the seed. High humidity, temperature and moisture during storage all decrease viability.

The seed embryo is often attacked by insects. This damage can be seen under a hand lens as holes in the seed.

Fungi may have penetrated the seed coat and wetting the seed allows them to grow. Fungal attack is not always obvious, but may appear as a fur coat or bright colouration on the seed after sowing.

Many factors play a part in the provision of optimal conditions for germination, the three most important being warmth, moisture and oxygen. Light also has an influence on the germination of some members of the

Asteraceae. There is an optimum temperature for the germination of most species, for example, 20°C for *Schoenia cassiniana* and 15°C for *Helipterum craspedioides*, although they are capable of germinating over a wider range. This requirement means that the likelihood of these species germinating during summer rainfall is much reduced. Some species also need to experience wide fluctuations in day and night temperatures before they germinate.

An essential condition for germination is moisture at the soil surface where the seed lies. Water must be taken up by the seed to activate its biochemical systems. Under natural conditions in semi-arid regions at least 15–20 mm of rain must fall and the surface must remain moist for about five days. For this reason moisture retaining materials, such as peat moss and vermiculite, are used in the germinating medium. It also explains why the bog method works so well. When the seed has been activated by the uptake of water it needs sufficient oxygen in the atmosphere to provide for its markedly increased respiration. Seed of some species, such as *Helipterum craspedioides*, needs light for germination and remains dormant if buried. It is thought that many daisies have surface-germinating seed, especially the small seeded species. Those with relatively large seeds, like *Schoenia cassiniana*, can germinate in the presence or absence of light.

Dormancy in seeds is a regulatory mechanism to prevent germination in unfavourable conditions while retaining viability so that seed can germinate promptly when circumstances are advantageous. Many factors may be responsible for this dormancy, such as the immaturity of the embryo or the presence in the seed of chemical inhibitors to germination. The dormancy of some species can be overcome by storing for a period at certain temperatures, in which time breakdown of the inhibitors may have taken place. This is known as 'after-ripening' and may be essential for many daisy species before germination can begin. For instance, *Helichrysum obtusifolium* has been known to take twelve months to germinate (see page 142).

Dormancy and the factors discussed under germination conditions work together to ensure that the seed does not germinate unless it has a maximum chance of survival. If species still prove intractable, even though they are mature, viable and healthy, a study of conditions occurring in their natural habitats may provide a clue to the triggering of germination.

Seed pretreatment

It is sometimes necessary to pretreat the seed when first introducing native species into gardens. Seed which has been selected over a long period has usually adapted to its new environment and is rarely difficult to germinate. Successful strategies are storage and heating.

Seed of some species collected in spring needs to be stored for four to six months at temperatures of up to 70°C before any significant increase in percentage germination is seen. This parallels the period over summer when the seed is lying on the soil surface, where temperatures can be extremely high.

Ixodia achillaeoides always regenerates well after bushfires, but untreated seed has a low germination rate. Heating seed at 100°C for thirty seconds has improved germination from 0.5 per cent to 20 per cent. Further study on the effects of heating seed for short periods could prove useful.

Stratification is a treatment in which moist seed is kept at 2–4°C for six

to twelve weeks. It is used to break the dormancy of many seeds from alpine areas, especially eucalypt seeds. It was assumed that seed of alpine daisies would need stratification too, but the Study Group has found that mature seed will germinate readily if sown shortly after collection. This is especially necessary in the case of *Celmisia asteliifolia*, which germinates well if sown as soon as it is gathered, but percentage germination decreases with age.

Disease prevention and control

Damping-off is the main problem once the seedlings have germinated. Soil fungi, usually *Pythium* or *Rhizoctonia* species, cause this condition in which healthy-looking seedlings wilt and collapse. An entire pot of seedlings may be attacked and all may succumb. This problem is one reason why soil-less mixes are now being used, but it has been known to occur in any mix because fungi spores may be airborne. Warm, humid conditions aid the spread of damping-off. One way of minimising the problem is to sow thinly, another is to fill the pot to the brim with the medium to allow better air circulation around the seedlings.

Other means of control are:

- use clean pots and utensils
- sterilize the germinating mix; boiling water poured over it will deter most pathogens
- water in a fungicide after sowing.

Pests

Snail and slug bait should always be used as leaves of young daisy seedlings are particularly attractive to these pests (see page 12).

Collecting seed

There are laws protecting each state's rapidly diminishing flora. A licence to collect seed should be sought from the relevant government authority. Details of these are published in a guide by the Bureau of Flora and Fauna available from the Australian Government Publishing Service. No restriction is placed on collecting from private property, provided that the owner has given permission. Fortunately, small quantities of seed will usually suffice for the gardener's own needs as well as those of a number of his friends—a little seed goes a long way.

Ripe seed in a helichrysum head

Asteraceae seed is easy to collect when the pappus is conspicuous and there are no ray florets to confuse the innocent collector. (See Chapter 8 for an explanation of the botanical terms in this section.) In this instance the heads resemble thistledown, and the fruits in the central disc loosen and darken. Such is the case for the genera *Helichrysum*, *Helipterum*, *Craspedia* and *Vittadinia*.

In genera such as *Brachyscome* and *Ammobium*, where the pappus is very small or inconspicuous, the crumpled and dried ray florets may appear like seed to the unwary, but these must first fall off to reveal the mature seed on the receptacle.

1 Crumpled ray florets obscuring seed

2 Seed exposed

3 Seed mature and beginning to disperse

4 Seed dispersed to expose receptacle

Development of ripe seed in a brachyscome head

In all cases the mature seed is to be found around the periphery of the disc. As the flower-head matures, the florets at the periphery of the disc develop first, are pollinated first and reach maturity first. The central florets are often sterile. Collect seed when the weather is dry as fungal damage can quickly occur in wet seed. Collect from healthy, vigorous plants.

Treatment of seed

It is necessary to kill any lurking insect pests as the seed is a good source of food, and it can quickly be destroyed. The easiest method is to enclose absolutely dry seed in a jar with a piece of pest strip attached to the inside of the lid for at least forty-eight hours.

Storage of seed

Airtight glass or plastic containers are safe. Seed envelopes or paper bags may be used, but only for short term storage. Commercial seed suppliers often use sealed foil packets. The species name, the date and place of collection should be clearly written on each container.

The viability of individual seed varies with temperature, humidity and moisture content, but the life of seeds may be prolonged by storing in a cool dry place. The dryness prevents the activity of bacteria and fungi, some of which can function at low temperatures. In general the seed should be kept at 10–20°C in a dry atmosphere.

Propagation from cuttings

Daisies may be propagated from three types of cuttings:

- stem cuttings
- root cuttings
- leaf cuttings.

Stem cuttings

In general, stem cuttings strike easily and quickly even with the simplest of equipment. Although more complex techniques and structures will be described, the beginner will succeed using the most inexpensive methods. The single most important factor is cleanliness.

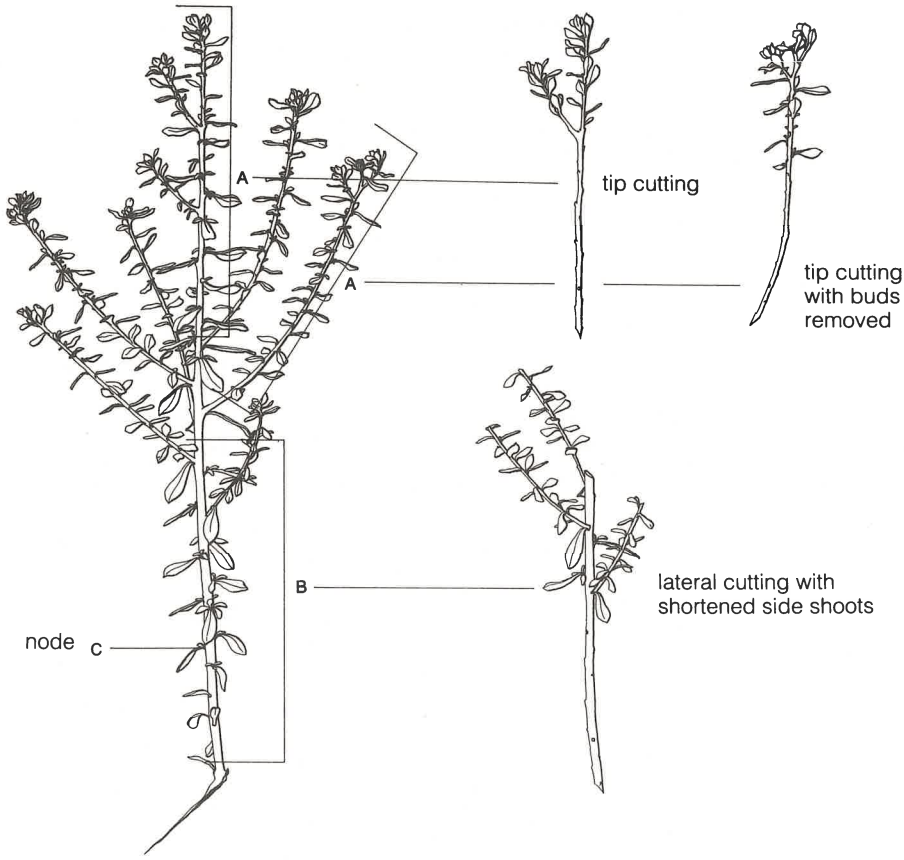
Select vigorous healthy growth from young plants. Collect the material before the sun strikes the plants as the sap will then be flowing freely. Cuttings taken from cultivated plants will usually strike better than cuttings from bush plants.

Prepare and set the cuttings as soon as possible after collection. The best method of keeping cutting material for a short time is in a plastic bag in a cool place. On collecting trips cuttings should be placed in an insulated container, but may be kept for longer periods in a moist plastic bag in the crisper section of the refrigerator.

Tip or lateral cuttings can be used. There is a wealth of information readily available on how to prepare cuttings. Basically, cuttings used are about 7–10 cm long. The lower cut is made with a clean, sharp instrument just below a node and the upper cut (if any) is made just above a node. The foliage on the bottom two-thirds of the stem is removed, the cutting is dipped in root-stimulating hormone and placed in the propagating medium to the level of the remaining leaves. The container is watered and placed in the propagating structure.

In practice, the gardener should be prepared to try as many methods as feasible, then choose the most suitable one. Methods range widely from use of the most sophisticated bottom heat and automatic misting systems in glasshouses, to crude pots of sand in saucers of water. Success is achievable at any of these levels, it is only a matter of degree. Some practical points are:

- If the basal cut is made at an angle there is a greater area available for absorption of hormone. If an apical cut is made to obtain more than one cutting from a shoot, there is less chance of infection if the cut is made at an angle. Although it is recommended that the basal cut be made immediately below a node, as roots are usually formed at nodes, herbaceous species can produce roots from between nodes.
- The foliage can be removed by stripping between the forefinger and thumb, but the bark or outer layer may be damaged and infection may result. To prevent this possibility, cut the leaves off cleanly, or dip the cuttings in a fungicidal solution before placing in the medium, or both.
- The leaves of some species are so large that too much water is lost by transpiration. Reduce the leaf area by cutting the leaf-blades in half.
- Flowering shoots should not be used for cuttings. If no other material is available remove the buds or flowers when preparing the cutting.



Preparing material for stem cuttings

- Wounding, which is scraping a small section of the outer surface at the base of the cutting, is now suggested as a method of increasing the area for callusing and thus increasing root formation. This applies particularly to woody material.

Propagating medium

The propagating medium is a matter of individual choice. Any of the following formulations may be used:

three parts washed coarse sand : one part peat moss
three parts washed coarse sand : one part vermiculite
two parts perlite : one part peat moss
one part perlite : one part vermiculite
one part perlite : one part peat moss : one part sand

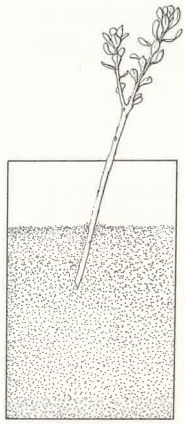
Quantities may be varied depending on the method of watering. For instance, less of the moisture retaining peat moss or vermiculite is needed if automatic watering is used.

The medium must not contain any pests, diseases or weed seeds. Perlite, vermiculite and peat moss are sterile, so combinations of these ingredients

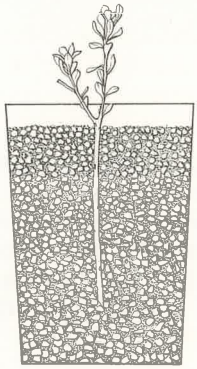
do not need treatment. Sand may contain weeds or fungal diseases, so if it is a constituent of the medium it should first be treated. For the home gardener the two easiest treatments are pouring boiling water over the medium, or placing the mix in oven bags and cooking for thirty minutes at 120°C.

Root stimulating hormones

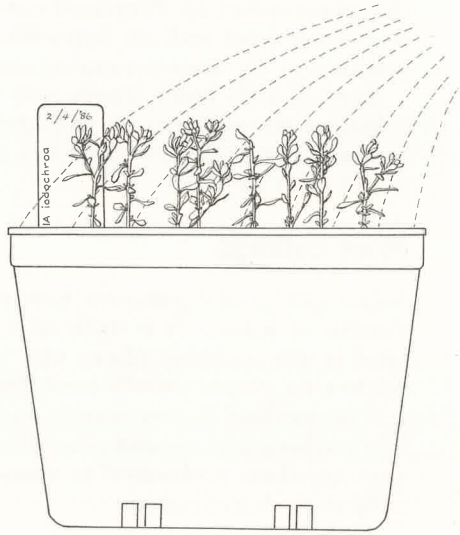
Cuttings can produce roots without hormone treatment, but it has been proved that hormones speed root formation, produce better root systems and increase the percentage strike. Many hormone powders and liquids are now on the market and may be used with advantage provided the instructions are followed.



1 Treatment with root stimulating hormone (according to manufacturer's instructions)



2 Cutting set in individual pot



3 Cuttings set in communal pot

Containers

The most important aspect about the container chosen is that it must be clean. All containers should be thoroughly washed and rinsed, and preferably soaked in 0.5 per cent sodium hypochlorite solution (available as household bleach which should be diluted one part in twenty before using).

Propagating structures

Propagating structures will depend on the gardener's preference. The simplest structure for a few cuttings is an inverted glass jar to maintain a high level of humidity. The same result can be achieved with a clear plastic bag tied over a pot, but in this case a supporting wire frame is needed to hold the bag away from the foliage. Place these primitive structures in a shaded or partly shaded position to prevent overheating.

A polystyrene box half filled with sand, sawdust or vermiculite can be used for more cuttings. The pots are firmed in and the box covered with a sheet of glass or clear plastic. The box should be covered with shade cloth on hot days, and the foliage should be sprayed at least once a day (two or three times in hot weather) to keep it moist.

More sophisticated systems are commercially available. They include small plastic propagating boxes, cold frames, glasshouses and polyhouses. Propagating boxes with controlled heating combined with automatic misting units speed the formation of roots to an amazing degree. Generally, ideal conditions for root production are obtained if the temperature at the rooting zone is 27°C and the temperature of the leaves is 4°C lower. The misting keeps the foliage cooler and stops it from drying out. These conditions are also ideal for fungal growth, so greater precautions should be taken with the plant material. Prepared cuttings should be soaked for a few minutes in 0.5 per cent sodium hypochlorite (see page 25), and then in fungicide solution at the recommended rate for five minutes.

Species with hairy leaves and stems are often difficult to propagate in a humid atmosphere. In this case a simple and most successful method is to stand the pot of cuttings in a saucer of water in a shaded situation and water each day.

Root cuttings

Some species of Asteraceae have naked flowering stems arising from a basal rosette of leaves. It is difficult to propagate them from stem cuttings. If seed is not available plants may be grown successfully from root cuttings. Suckering plants usually lend themselves to this sort of propagation.

The method is very similar to that used for stem cuttings. Pieces of root 3–8 cm long are cut and placed vertically in the medium, right way up. The pots are then positioned in shade and kept moist as they are particularly subject to dehydration.

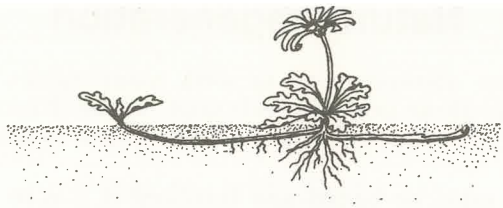
Leaf cuttings

Leaf cuttings are another alternative for use when stem cuttings are difficult and there is no seed. They are very slow to form roots and there are problems in keeping the plants alive after potting on, but they have been successful for *Brachyscome nivalis*, *B. uliginosa* and *B. spathulata*.

A mature leaf with the entire leaf stalk should be carefully removed from the basal rosette. The stalk and basal part of the leaf are inserted in the medium. This type of cutting needs warmth and humidity and is most successful when bottom heat and misting are employed. Root formation takes very much longer when less complex equipment is used.

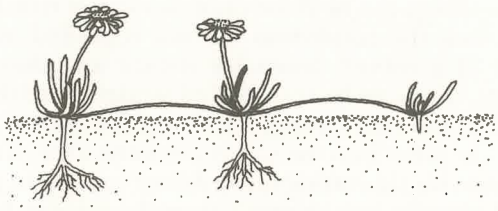
Propagation by division

Many species of perennial daisies produce suckers which may shoot at some distance from the plant. These may simply be cut off from the parent and established in other parts of the garden or in pots. Examples are *Brachyscome multifida*, *B. angustifolia*, *B. segmentosa* and *B.* sp. (Pilliga).



Suckering plants lend themselves to division

Other species such as *Brachyscome stolonifera* and *Senecio pectinatus* are stoloniferous. This means that they produce shoots which run along the surface and root at the leaf nodes. Again, these may be carefully removed for planting elsewhere.



Stoloniferous plants are easy to separate

These two types of division are easy to effect as the roots are hardly exposed in the process. There are other species, however, which neither sucker nor produce stolons, but which may be dug up and divided by cutting into three or four new plants. Each portion should be immediately replanted, or potted up, since the roots have been completely exposed in this procedure. The method has proved successful with *Brachyscome diversifolia* and many of the rosetted perennials such as *B. scapigera and B. nivalis*.

The best time to attempt this form of division is when the roots are growing strongly after a dormant period. In temperate regions late winter or early spring is a good time and it is best carried out on a cool, windless day. The soil should be drenched with a root-stimulating hormone and a soil fungicide. The divided portions should be kept out of direct sunlight during handling. After replanting or potting up they should be cut back, watered and kept relatively moist until they become established.

Layering

Many of the daisies layer themselves naturally, but it is easy for gardeners to layer species with branches low to the ground. Herbaceous species may simply be pegged to the soil, but woody species should be scraped and dusted with hormone powder before pegging down. Root formation may be slow.

Natural regeneration

If some heads are allowed to go to seed, many daisies will self-sow in gardens, especially those mulched with sand. These chance seedlings lend an air of naturalness to any garden and often appear in the most charming positions.

Each seedling must be baited and fertilized if it is to grow to its full potential, but this is very little work for an admirable result. *Helipterum roseum*, *H. manglesii* and *Helichrysum viscosum* are three species which regenerate readily in the garden.

Potting on

Seedlings

Pricking out of seedlings can be done once two sets of true leaves have been produced. (Note that the cotyledons are not regarded as true leaves.) If the seedlings are of a robust, amenable nature and they have formed a strong root system, they can be transferred straight into the garden at this stage. If they are so tall that cutting back would improve their chances of survival, pop the cut piece into the soil at the same time. At least in the case of *Helipterum roseum* this tip cutting is capable of rooting to produce another plant which is admittedly less vigorous than the parent, but is still money for jam.

It is much safer to pot seedlings of the correct size into individual plastic tubes, 3 cm in diameter. Potting on should be carried out in cool, still conditions as hot winds can easily damage seedlings beyond recall. Water in well and drench with a soil fungicide as an extra precaution.

Place the tubes in a sheltered position where they will not be exposed to too much heat and then gradually increase the amount of sunlight received.

Potting mixes

Most gardeners have their own preferred potting mixes, the ingredients being as varied as the individuals putting them together. A useful potting mix is formulated on page 37, but this should have equal parts of coarse sand or perlite added to facilitate rapid root penetration. The same applies to commercial mixes which are also most successful.

Rooted cuttings

Potting on rooted cuttings is a very similar procedure to that of potting on seedlings. When roots are showing at the base of the pots the individual cuttings are transplanted into potting mix as described above, watered in with a hormone solution and drenched with fungicide. Care must be taken to see that the cuttings do not dry out during this procedure. It is a good idea to completely immerse the pots in hormone solution before and after transplanting.

The cuttings must be hardened-off either before or after potting on, especially if they have been under mist spray. Warmth and humidity produce soft foliage which will certainly be harmed by exposure to sun or

wind. If the cuttings are potted straight from a misting unit the resultant pots should be replaced under mist for shorter periods and slowly moved into more exposed conditions. Alternatively the cuttings pot can be gradually moved from humid conditions to cold frame to shade house to sun before potting on takes place. Seasonal differences will moderate these procedures.

As a general rule, it takes about the same time to root a cutting and grow it to a suitable size for planting out, as it does to produce a seedling of comparable size.

5

Daisies in the garden and in containers

In the garden

The diversity of daisies, the extent of their flowering periods, the delicacy and charm of their flowers and their generally small dimensions all combine to ensure they find a place in every well-designed garden. They appear to advantage in so many situations that there is no excuse for their absence.

In view of the number of Australian species, about 980, it is surprising that relatively few have been commercially raised in nurseries in the past. They can be used in many ways in gardens: massed as bedding plants, in hanging baskets, as ground covers, as edging plants, in rockeries, lining pools, as bog plants, for grouping or for splashes of colour in pockets among existing shrubs. The larger plants are useful as specimen or background shrubs or for foliage contrast. These specific purposes will be briefly discussed and suggestions for species to comply with them listed. More detailed notes on the individual species are to be found in the species descriptions. Those species marked with an asterisk have horticultural potential but have not been included in the species' descriptions.

Bedding plants

Seeds of many annuals and perennials are available for use as bedding plants and are treated in exactly the same fashion as the introduced species. They are usually planted out at regular intervals and are of the same or similar species, their function being to provide masses of colour in gardens of formal design. Amongst the perennials, certain varieties of *Helipterum albicans* make attractive bedding plants. The tufted, silver foliage is set off by showy yellow or white heads.

Table 2 Bedding plants

Ammobium alatum
*Brachyscome ciliaris**
iberidifolia
multifida
Craspedia chrysantha
Helichrysum lindleyi
subulifolium
Helipterum albicans ssp. *albicans*
chlorocephalum
corymbiflorum
cotula
Helipterum floribundum
humboldtianum
manglesii
molle
praecox
roseum
splendidum
venustum
*Podolepis canescens**
Schoenia cassiniana
Waitzia acuminata

Ground covers

Ground covers include any plant covering the soil and spreading to at least 0.5 m. The definition embraces prostrate plants, such as many of the forms of *Helichrysum apiculatum*, as well as dense shrubs to one metre or more, like *Calocephalus brownii*. These plants have functional advantages: when established they suppress weed growth, keep the soil temperature more stable and help to retain soil moisture.

When mass planted, almost any of the smaller daisies can be used as ground cover, but annuals have an obvious short term effect, which in some applications is an advantage.

Table 3 Ground covers

Brachyscome angustifolia	*Helichrysum apiculatum* (some forms)
*ciliaris**	*bracteatum* 'Dargan Hill Monarch'
*graminea**	'Diamond Head'
multifida	*semipapposum* (some forms)
Calotis scabiosifolia	*Helipterum albicans* ssp. *albicans* (grouped)
*Cotula filicula**	

Edging plants

These could be described as small rambling plants of gentle habit. They soften the edges of paths, sleepers or beds and blend into the planting.

Table 4 Edging plants

Brachyscome angustifolia	*Calotis scabiosifolia*
*graminea**	*Helichrysum ambiguum*
heterodonta var. A*	*apiculatum*
multifida	*baxteri*
*rigidula**	*leucopsideum*
scapigera	*scorpioides*
sp. (Pilliga)	*Helipterum albicans*
Calocephalus citreus	*anthemoides*

Plants of regular habit and no taller than 30 cm can be aligned to provide a definite edge or border in a more formal garden. This is the sense in which 'border' plants have been recommended in this book.

Table 5 Border plants

Annual border	**Perennial border**
Brachyscome iberidifolia	*Brachyscome multifida* (cushion form)
Helichrysum subulifolium	*scapigera*
Helipterum chlorocephalum	*Calocephalus citreus*
cotula	*Helichrysum apiculatum* (compact form)
praecox	*baxteri*
roseum	*bracteatum* 'Diamond Head'
splendidum	*Helipterum albicans*
Schoenia cassiniana	

Rockeries

As many daisies have natural habitats among rocks they will grow very well in rockeries where their roots can find excellent protection from the sun and their foliage from the frost. It is easy to vary the soil mix in rockeries to meet the special needs of plants. Planting should be to scale; the size of the largest plant is dependent on the size of the rockery.

In periods of hot weather more frequent watering may be necessary. Annuals are seasonal and will leave gaps in the rockery, but they will provide a bonus with self-sown plants.

With very few exceptions, all of the daisies listed under the species descriptions are suitable for rockeries.

Plants for grouping

It is essential to group the smaller daisies together to make a visual impact, but it is a positive advantage for all daisies, regardless of size, to be planted in threes and fives (see page 3).

Pockets of colour

In the summer and autumn *Helichrysum bracteatum* in all its forms and shades is one of the best species for bold splashes of colour. It can be dotted about the garden and will brighten any dull spot, but must have sun or it becomes leggy. *Helichrysum viscosum* is another useful daisy for this purpose. The excellent *Brachyscome multifida* can be relied upon to furnish colour throughout the year.

Most of the annuals and perennials listed in the species descriptions can be used to provide pockets of colour throughout the garden. Alternating species grown each year will give a refreshing change of colour: pink and white *Helipterum roseum* one year, yellow *Helichrysum subulifolium* the next.

Shrubs

Some of the shrubby daisies require overhead protection, but are very useful under trees, for background or foliage contrast. The olearias, or daisy-bushes, are valuable shrubs of varying sizes which cover themselves with flowers in spring and early summer.

Table 6 Shrubs

Calocephalus brownii	*Olearia floribunda*
*Helichrysum alpinum**	*iodochroa*
diosmifolium	*phlogopappa*
ledifolium	*ramulosa*
Ixodia achillaeoides	*teretifolia*
Olearia asterotricha	*tomentosa*

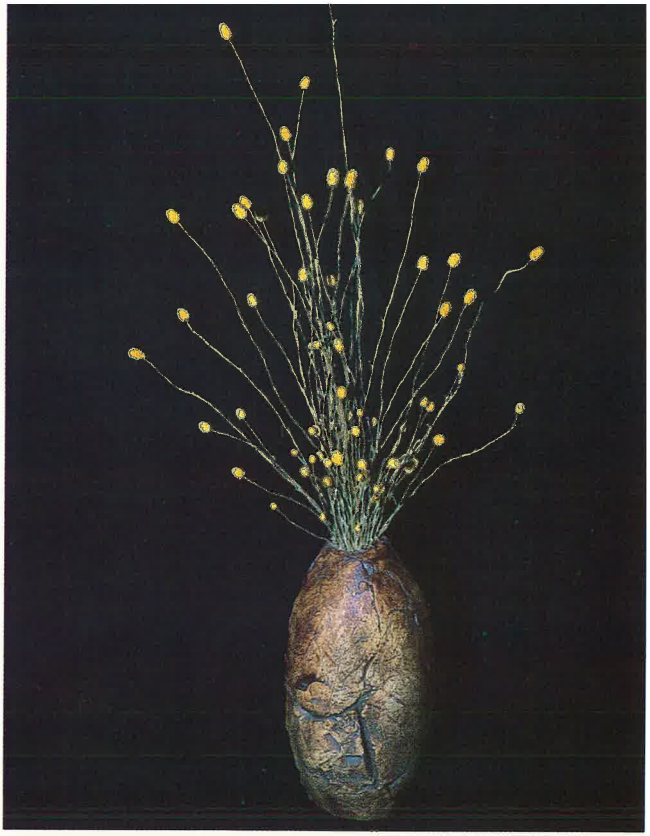
The unusual, globular heads of *Cephalipterum drummondii* are attractive in floral art arrangements. Other colours are white or cream, and there is a rare pink form. (*John Colwill*)

Helichrysum lindleyi is a dainty pink annual, seen at its best in groups. Each plant is capable of bearing up to one hundred heads. (*Bob Mylius*)

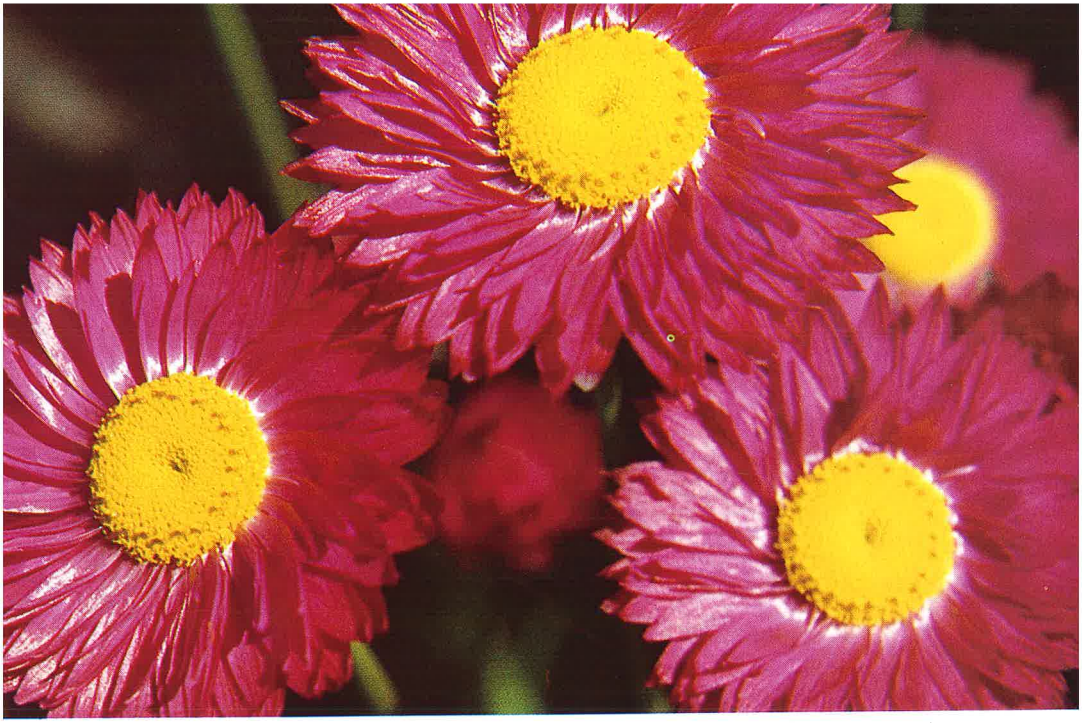
Brachyscome segmentosa (above) is an easily grown, long-flowering perennial, ideal for cut flowers. It is seen here in a simple arrangement with Maidenhair Fern. (*Joy Greig*)

The well known Swan River Daisy, *Brachyscome iberidifolia* (below), is an annual with many roles. It makes a vibrant carpeting plant and also looks superb in containers. (*John Colwill*)

The neat dainty heads of *Calocephalus citreus* are excellent for fresh or dried arrangements. It is an easily grown, long-flowering perennial for the garden and for containers. The silvery foliage is an added attraction. (*Lee Barker*)



This form of the Chamomile Sunray, *Helipterum anthemoides*, bears a profusion of snow-white, papery daisies in winter. Red buds and grey-green aromatic foliage are part of its charm. (*Judy Barker*)



Helipterum roseum is ideal for massed display or pockets in the garden. The flower-heads vary from white to deep pink and are excellent as cut or dried flowers. (*John Colwill*)

The showy little annual, *Schoenia cassiniana*, is easy to grow and bears a profusion of pink heads in clusters. (*John Colwill*)

Twiggy Daisy-bush, *Olearia ramulosa*, varies in colour and habit. Dainty white, lilac or blue flower-heads cover the bushes two or three times a year. (*Judy Barker*)

Olearia phlogopappa is another variable shrub. Masses of flower-heads in many colours are borne over a long period. (*Judy Barker*)

Helipterum albicans is a tufted perennial, equally attractive for its fine, silvery foliage as for its profusion of golden or white flower-heads. (*Judy Barker*)

This beautiful little annual, *Helipterum cotula*, is charming in gardens, containers or floral art. This new pink-tipped form is a recent development. (*John Colwill*)

A sea of the everlastings, *Helipterum craspedioides* (yellow) and *Helichrysum davenportii* (pink), carpets the ground in inland Western Australia. (*John Colwill*)

This handsome annual, *Helipterum splendidum*, has nodding pear-shaped buds opening to large, silky, white heads — outstanding for picking or drying. (*John Colwill*)

Brachyscome microcarpa is an attractive, small container plant which flowers for a long time. It can be white, mauve or pink. (*Judy Barker*)

Strawflowers (*Helichrysum bracteatum* hybrids) provide a colourful massed display throughout summer and autumn at the Canberra Botanic Gardens. (*Joy Greig*)

Special gardens

New gardens

Annuals (or fast growing perennials) can be used to fill the empty spaces between the permanent plantings in new gardens. In this way they supply colour while acting as a living mulch. If they are everlasting daisies there is the additional advantage of flowers for picking and drying.

Table 7 Fast growing daisies for new gardens

Ammobium alatum
*Brachyscome basaltica**
iberidifolia
Helichrysum bracteatum
subulifolium
viscosum
Helipterum chlorocephalum
Helipterum corymbiflorum
floribundum
humboldtianum
manglesii
roseum
venustum

Coastal gardens

In coastal gardens gale force winds and salt spray impose rigorous conditions which limit the type of plant that will grow. A windbreak of salt-resistant species should be planted as quickly as possible. The choice of plants to grow within this protection then becomes much wider. Use of local flora will always be successful, and plants with hairy foliage usually do well along the coast.

Table 8 Daisies for coastal gardens

Brachyscome diversifolia (coastal forms)
*graminea**
iberidifolia
multifida
*parvula**
segmentosa
Calocephalus brownii
citreus
Helichrysum apiculatum
baxteri
bracteatum
Helichrysum elatum
leucopsideum
obtusifolium
rupicola
scorpioides
semipapposum (some forms)
Helipterum albicans (some forms)
Ixodia achillaeoides
*Olearia glutinosa**
ramulosa
tomentosa
*Podolepis jaceoides**

Bog gardens or boggy conditions

Bog gardens may be constructed simply, either as adjuncts to pools or as shallow, boggy areas on their own. Some daisies are particularly suited to these conditions.

Table 9 Daisies for bog gardens

Brachyscome (most species)	*Helipterum albicans* ssp. *albicans*
Calocephalus citreus	*cotula*
Celmisia asteliifolia	*Olearia ciliata*
*Cotula filicula**	*glutinosa**
Craspedia chrysantha	*iodochroa*
glauca	*phlogopappa*
globosa	*ramulosa*
	tomentosa

Alpine gardens

Some alpine daisies are easier to grow than others. In ordinary garden conditions they usually only last for one season, although there are exceptions such as *Brachyscome scapigera* and *B. aculeata*. Certain alpine plants, which have been given up for dead, have shot again after autumn rains. In their natural habitat they grow in soaks or moist depressions and are usually found amongst rocks or boulders where their roots gain protection. Although summer temperatures can be quite high, cool nights keep the soil temperatures low.

One method for growing cushion plants described by W. R. Elliot and D. L. Jones in the *Encyclopaedia of Australian Plants* Vol 3 has proved quite successful for a number of alpine daisies. This involves excavating a hole about 2 m wide and 1 m deep. Heavy duty black plastic is used to line the hole and the centre is filled with peat moss to a depth of 0.5 m. Drainage holes are made in the plastic just below the peat moss level at 30 cm intervals. The hole is filled with a mix of equal parts of loam, sand and peat moss. The construction should keep the plant roots moist during dry spells until the roots increase to reasonable size. Rocks added to the soupy mix during construction help to anchor and protect roots. Dense planting and mulching further this aim.

The alpine garden should be in the sun for at least the morning, but hot afternoon sun may burn the foliage of some species beyond the point of resuscitation. Hot winds and insufficient root protection may also affect them.

Table 10 Daisies for alpine gardens

Brachyscome aculeata	*Helichrysum secundiflorum**
nivalis	*semipapposum* (alpine form)
*rigidula**	*stirlingii**
scapigera	*Helipterum albicans* (alpine forms)
spathulata	*anthemoides*
Celmisia asteliifolia	*Olearia algida**
Craspedia species (alpine forms)	*frostii**
Helichrysum acuminatum	*phlogopappa*
*alpinum**	*Podolepis robusta**

In gardens in true alpine conditions, such as are found in ski villages, it is best to plant only the local species.

Inland gardens

The limiting factors to successful plantings in inland gardens are the severity of the frosts and the availability of water. Frost damage is often allied to other conditions such as dryness of the soil or waterlogging, air moisture, the amount of overhead protection, aspect, and the amount of mulch (organic or inorganic). Some forms of species are more able to resist frost than others. This characteristic is usually related to the plant's original habitat.

Most of the annuals need protection from severe frosts and should not be planted until the danger is past. Some perennials may be tipped by frost, but recover quickly, for example *Helichrysum apiculatum* and *H. bracteatum* 'Diamond Head'. Plants usually tolerant of frost to –5°C are listed in Table 11.

Table 11 Daisies tolerant of frost

Ammobium alatum†
Brachyscome aculeata
*ciliaris**†
*graminea**
multifida
*rigidula**
scapigera
sp. (Pilliga)
spathulata
Calocephalus browniі†
citreus†
Calotis scabiosifolia†
Celmisia asteliifolia
Cephalipterum drummondii
Craspedia chrysantha†
glauca
globosa
Helichrysum acuminatum
*alpinum**
ambiguum†
apiculatum† (some forms)
bracteatum† (some forms)
Helichrysum diosmifolium
elatum
leucopsideum
scorpioides
semipapposum† (some forms)
viscosum†
Helipterum albicans
anthemoides
molle
Ixodia achillaeoides
Olearia asterotricha
ciliata
floribunda
*frostii**
*glutinosa**
iodochroa
phlogopappa
pimeleoides†*
ramulosa
tomentosa
*Podolepis robusta**
Schoenia cassiniana†

†denotes also suitable for inland in dry conditions.

Tropical and subtropical gardens

Two major problems confronting gardeners under these conditions are excessive humidity and the force of the tropical rain. A third problem is that root rot fungi in the soil are more active and can cause the death of plants. These troubles arise in autumn rather than winter or spring so it is suggested that some of the more difficult species be grown as annuals. Many of these daisies have been tested, but more research needs to be done on selecting plants for humid conditions.

Table 12 Daisies for tropical and subtropical gardens

Brachyscome angustifolia	*Helichrysum obcordatum**
*basaltica**	*rupicola*
*ciliaris**	*subulifolium*
*heterodonta**	*Helipterum anthemoides* (Qld form)
iberidifolia	*chlorocephalum*
microcarpa	*humboldtianum*
multifida	*manglesii*
segmentosa	*roseum*
Helichrysum apiculatum	*Olearia floribunda*
bracteatum	*teretifolia* (compact form)
elatum	*Schoenia cassiniana*

Alkaline gardens

Soils containing large amounts of limestone are common around Adelaide and many other areas of South Australia. It is often easier to grow plants which will cope with this alkalinity than to attempt to adjust the pH of the soil. Daisies which could be tried under alkaline conditions are:

Table 13 Daisies for alkaline gardens

Brachyscome iberidifolia	*Olearia floribunda*
multifida	*magniflora**
Calocephalus brownii	*muelleri**
Helichrysum bracteatum	*pimeleoides**
leucopsideum	*pteridifolia**
*Olearia axillaris**	*rudis**
ciliata	

Cottage gardens

In recent times there has been a revival of interest in cottage gardens, especially in the older suburbs of our cities where owners wish to recreate an original garden or design one in the cottage style. A formal garden would have had a central pathway and beds edged with brick, tile or wood in which edging plants and annuals were featured. In a less formal garden plants would be mixed in apparent confusion, with a riot of colour being the result. In this case a mixture of annuals, biennials and perennials would be seen against a backdrop of selected trees and shrubs. Australian daisies are perfect for the purpose and will suit either style.

Old catalogues list a number of daisies in many varieties and forms, particularly *Helichrysum bracteatum*, *Brachyscome iberidifolia*, *Helipterum roseum*, *Gnaphalium* species, *Helipterum manglesii* and *Celmisia asteliifolia*.

There is a wide choice of daisies described in this book which may be used in the design of a cottage garden. *B. multifida* is an ideal edging plant, and mixtures of *Helipterum roseum*, *Helichrysum subulifolium*, *Brachyscome angustifolia*, *B. basaltica* var. *gracilis** and *Podolepis* species would be attractive combinations for the informal style.

Daisies in containers

The small size and long flowering periods of daisies make them desirable subjects for containers. There are many benefits from growing plants in containers; the right soil type can be provided (which may be different from the garden soil), the containers can be moved about to find an advantageous position, and they will enliven dull areas. There are some disadvantages in that containers dry out quickly and require more frequent watering. This in turn results in leaching of nutrients which must be regularly replenished. Some containers have matching saucers which may be filled with water as an extra precaution against drying out and many daisies appreciate this.

There is a wide range of containers of all sizes and shapes from which to choose. Terracotta and ceramic pots, hollowed tree-fern sections, wooden or concrete tubs, agricultural pipes and hanging baskets of all types are available.

Unless the specimen to be grown has special requirements, the basic potting mix should be open, well drained yet capable of retaining a certain amount of moisture. A suitable mix is:

three parts friable soil
four parts organic material (peat moss, leaf mould or compost)
five parts coarse washed sand

Moisture retentive crystals or powders may be added to prevent rapid drying out. The pH should be adjusted to 6 and trace elements and fertilizers added. Slow-release organic or inorganic fertilizer can be used, but take care to add these and the trace elements only in the amounts recommended.

Prepared potting mixes are available and have the advantage that they are sterilized and should therefore be relatively weed and disease free. As some of them need added nutrients, the manufacturer should be asked for a recommendation.

The mix can be varied with the requirements of the species. For example, alpine species such as *Celmisia asteliifolia* benefit from the addition of extra peat moss.

After plants have been potted up a slow-release fertilizer should be added once or twice a year to maintain healthy growth. A mulch of coarse washed sand or gravel conserves moisture and looks neat.

In general, plants should be repotted every two years.

Table 14 Daisies recommended for containers

Brachyscome (most species)
Calocephalus (most species)
Calotis scabiosifolia
Celmisia asteliifolia
Craspedia chrysantha
glauca
Helichrysum (most species except tall forms)
Helipterum (most species)
Ixodia achillaeoides
Olearia (most species)
*Podolepis canescens**
*robusta**
Schoenia cassiniana
Waitzia (most species)

Hanging baskets

Daisies are used in hanging baskets with charming results. Species selected for this purpose should be of spreading or trailing habit so that the foliage and flowers can be seen to advantage from below. The disadvantage of drying out, especially in exposed conditions, means that watering must be frequent. Some baskets have bases attached to act as small water reservoirs. These reduce the need for watering quite as often but it is still necessary to ensure that the soil never dries out completely. Mulch with sphagnum or peat moss to conserve soil moisture.

Potting mixes can be the same as those used for containers but the addition of 10–50 per cent of peat moss, or one of the moisture retaining crystals or powders, is often helpful, especially with brachyscomes.

Table 15 Daisies for hanging baskets

Brachyscome angustifolia	*Brachyscome multifida*
*basaltica**	sp. (Pilliga)
*ciliaris**	*Helichrysum ambiguum*
*graminea**	*apiculatum*
iberidifolia	*bracteatum* 'Diamond Head'
microcarpa	*semipapposum*
	Helipterum anthemoides

6

Daisies in floral art

Daisies used for floral art fall into two categories—those capable of being dried and those used as fresh flowers for informal arrangements.

The first group includes the everlastings or paper daisies. They have stiff, papery, colourful bracts (which resemble the petals of a single flower) surrounding the flower-heads. These bracts retain their shape and colour when dried. Examples are *Ammobium*, *Cephalipterum*, *Helichrysum*, *Helipterum*, *Ixodia* and *Waitzia* species. Others which dry well but have small inconspicuous bracts include *Calocephalus* and some *Craspedia* species.

The second group, the typical 'daisy flowers', have shorter soft green bracts (like the calyx of a single flower) surrounding the flower-heads. In this case the so-called 'petals' are really strap-like extensions of one side of the outer ring of florets which surround the inner tubular florets of the disc. This means that each 'petal' represents one flower (see Chapter 8). This group cannot be dried as the soft florets become brown and shrivel with age. *Brachyscome*, *Olearia* and *Senecio* species are representatives of this second group.

Fresh flowers

The everlastings and other species capable of being dried can all be picked for use as fresh flowers in informal arrangements. They will last two to three weeks or longer in water. The second group will last two to five days in water, the length of time varying with the species and indoor conditions.

The usual methods for increasing the lasting qualities of cut flowers apply equally to daisies:

- Pick early in the morning or late in the evening.
- Pick flower-heads that have not fully developed, that is, in bud or when the outer bracts begin to unfold.
- Immediately after picking immerse the stems in water to within 5 cm of the flower-heads and leave for several hours.
- Cut flowering stems at an angle to prevent stem bases from resting flat on the bottom of the container. This allows more rapid absorption of water.
- Stems of 'woody' shrubs should be scraped and split at the base.

Brachyscome multifida in all its colour forms makes a delightful subject for a small vase. It has the advantage of being in flower for almost twelve months. *B. diversifolia* bears a great resemblance to the well-known Marguerite and can be used for the same purposes. It does not emit the strong flower smell usually produced by this introduced daisy. *Olearia* species also

make attractive cut flowers. *Olearia iodochroa*, *O. phlogopappa* (which is available in many colour forms), *O. ciliata* and *O. floribunda* have all been used with pleasing results.

Calomeria amaranthoides (previously known as *Humea elegans*) is a striking plume of innumerable, small pendulous flower-heads in colours ranging from pink and bronze to crimson. *Craspedia glauca* is a handsome cut flower when freshly picked.

Other suitable species for picking include *Celmisia asteliifolia*, *Myriocephalus stuartii* and some *Senecio* species such as *S. lautus* and *S. linearifolius*. Many more species will be found to be suitable as further trials are carried out.

Dried flowers

Many of the everlastings lend themselves to drying. It is even more important to pick flower-heads in bud if they are to be dried rather than used as fresh flowers. Simply hang loose bunches upside down in an airy cupboard or on a verandah out of direct sun during the summer months. The time taken for drying varies with the species and the season. Three weeks should suffice for most species, but test by holding the bunch upright. If the heads droop the stems require more drying time. Certain species, for example *Schoenia cassiniana* and *Helipterum roseum*, have a tendency to droop their heads after they have been in use for some time. They can be rejuvenated by dipping them in water and hanging them upside down again for a period.

The neck of *Helichrysum obtusifolium* is often weak. A degree of stiffening can be given by spraying with clear lacquer immediately after picking. The usual routine of hanging upside down is then followed. The best spray to use is a matt colour print lacquer, obtainable from photographic suppliers.

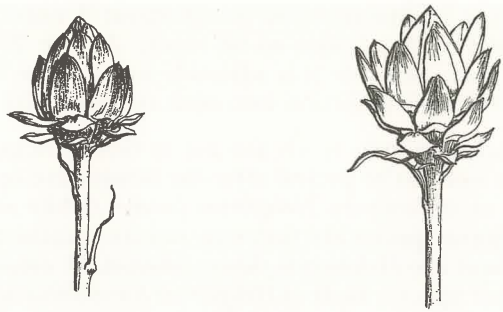
Species which dry well are *Helipterum anthemoides*, *H. manglesii*, *H. roseum*, and *H. venustum*; *Craspedia globosa* and *C. chrysantha*; all species of *Calocephalus*; *Helichrysum alpinum* (buds), *H. baxteri*, *H. obcordatum*, *H. diosmifolium*; *Ixodia achillaeoides*; *Waitzia acuminata*, *W. aurea*, and *W. citrina*.

Wired flowers

The heads of everlastings can be successfully wired if the stem is not too narrow. Wired flowers have many advantages: the heads never droop, the flowers remain perfect if picked at the right time, store better and last indefinitely. For instance, a properly wired *Helichrysum bracteatum* lasts much longer and looks much neater than a dried specimen which often displays a fluffy, untidy central disc.

Wiring is a simple procedure with a little practice. There are six steps:

1 Pick the heads on a 15 cm stem when the outer bracts are just beginning to open. The heads will always develop further, usually opening fully unless very tight buds have been selected. If the heads are already open when picked insects may have damaged the disc. Also the bracts may turn back towards the stem (an action known as reflexing), or seed may develop and drop. On hot days gather the heads in the early morning if possible. If it is inconvenient to wire them immediately, the stem bases



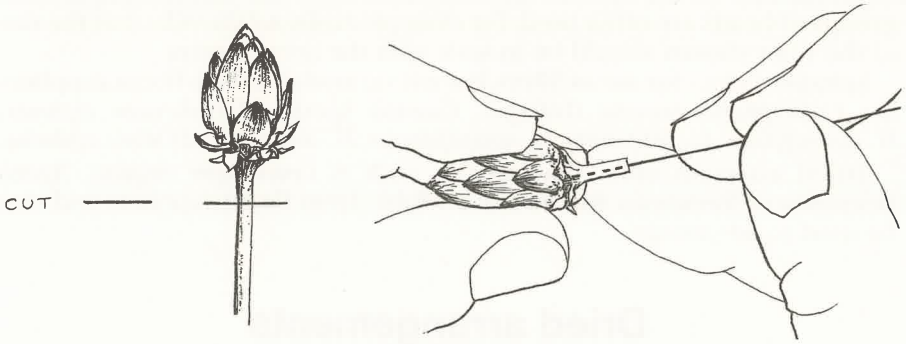
Pick heads at this stage for wiring and drying

may be kept in water for several hours or picked heads may be stored in a plastic bag in the refrigerator for several weeks.

2 Cut the stem about 0.5 cm behind the head.

3 Select a wire of suitable gauge for the size of the head. Fine wire (26 gauge) is recommended for small and dainty flowers like helipterums, and a heavier wire (20 or 22 gauge) for the larger heads of some of the helichrysums. Test whether the right gauge has been used by holding the wired flower upright. If the wire bends over, a heavier gauge is needed.

4 Push the wire up the centre of the stem until a slight obstruction is felt. At this point the wire is at the top of the stem. Push it fractionally further so that it just enters the receptacle, while ensuring that it does not penetrate the disc florets. Some flower-heads do not shrink onto the wire very well. To overcome this dip the end of the wire into an instant glue before inserting.



Wiring a flower-head

5 Stand upright until the stem has shrunk and grips the wire tightly. The time taken varies with the season, but two to three weeks should be adequate.

6 Tape the bare wires to make them neat and prevent rusting. Rolls of floral tape are available in different colours. Use tape of the same colour as the original stem to give the wire a natural appearance. The tape is 12 mm wide, but if used at this width the wires look too thick and

unsightly, so cut it into three strips of about 4 mm. The length will depend on the length of wire to be taped. A wire 23 cm long would require about 8 cm of tape. It is advisable to leave the bottom 10 cm of wire untaped for easy insertion into oasis or floral clay.

The wired heads are then ready for use in dried arrangements.

Certain species need to be picked after the heads have opened, otherwise the discs darken unattractively. *Helipterum praecox* (white and yellow forms) is one example. Some species are very easy to wire because they have hollow stems. Among these are *Helipterum chlorocephalum, H. cotula, H. praecox and H. venustum.* Other species such as *Helipterum humboldtianum* preserve their appearance better if they are hung upside down for some time after wiring.

Cut foliage

Foliage of some daisies can be used in floral art either fresh or dried. The following species have been found suitable: *Calocephalus brownii, Helichrysum ledifolium, H. alpinum and H. thyrsoideum.*

Foliage may also be glycerined to cause changes in the texture and colour (see page 45 for the method).

Fillers

'Filler' is a term used to describe the species suitable as the basis or background material of arrangements. The filler represents about 50–60 per cent of the area of an arrangement and helps to obscure the pad of oasis or floral clay in the base of the container. For this reason species with groups of heads are often used, for example *Ixodia achillaeoides*, but the size of the filler chosen should be in scale with the arrangement.

Suitable daisies for use as fillers, but not yet available from florist suppliers are *Calocephalus brownii* (foliage), *Cassinia* species, *Helichrysum alpinum, H. diosmifolium, H. ledifolium, H. semipapposum, H. stirlingii* and *Odixia achlaena.*

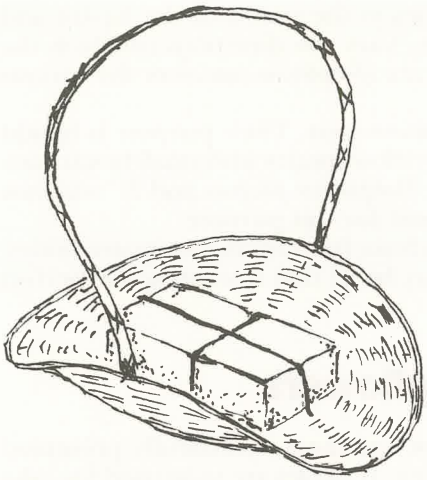
Dried materials other than daisies, such as *Leucopogon virgatus, Agonis juniperina* or *Verticordia* species are available from florist suppliers and may be used to advantage.

Dried arrangements

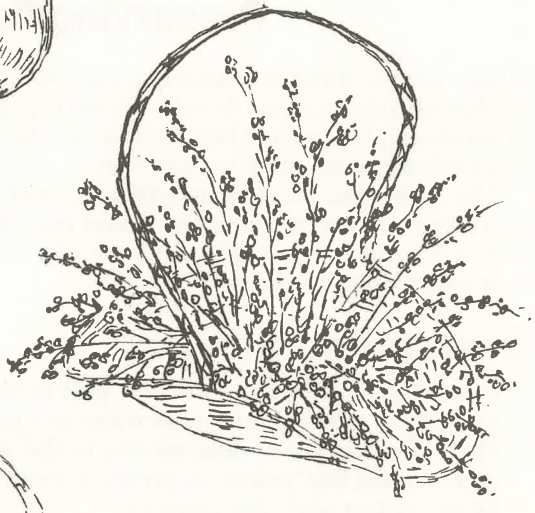
Anyone can produce arrangements of charm and colour when using dried or wired daisies. They seem to arrange themselves. Any sort of container is suitable, from baskets to metal, wooden and pottery vases or shells and pieces of driftwood. Some form of base material to hold the stems or wires in place is necessary, otherwise there are no hard and fast rules; in fact experimentation will give individuality.

The following steps are a guide for the novice in arranging a basket.

1 Choose the base material to be used, such as oasis or floral clay, available from craft or florist suppliers. Oasis may be cut to the required size and



1 Cut oasis to required size and fasten to the basket with a length of taped wire.



2 Arrange filler to cover oasis.

3 Place larger flowers in the centre of the basket, smaller flowers and buds to the outside.

wrapped in self-adhesive plastic to prevent crumbling, then fastened to the base of the basket with a length of taped wire (about 24 gauge).

2 Place the filler in position first, varying the heights of the stems. Soften the edges of the basket by allowing the filler to extend about 5 cm beyond the rim.

3 Arrange the main species, larger ones in the centre of the basket and buds or smaller flowers at the edge. Vary the directions in which the flowers face. Excellent species to use are *Helipterum roseum* or the various forms of *Helichrysum bracteatum*.
4 Place the highlighting species in position next. Their purpose is to add interest, contrast and colour. Dainty yellow species with small heads such as *Calocephalus citreus* and *C. sonderi*, *Helipterum praecox* and *H. venustum* or smaller helichrysums are often used for this purpose.
5 Pause for reflection. It is difficult to refrain from adding too many daisies. A sprinkling of tight, white buds may be all that is wanting for perfect balance.

Preserving flowers

Some daisies, notably *Ammobium alatum*, are more successfully preserved by chemical desiccation than by air-drying. If daisies are to be used for cake decorations, however, they should not be preserved in this way because residual chemicals may be harmful.

The best time to pick is either in bud or when the flowers open to perfection. Flowers, stems and leaves must be bone dry. Since quick drying makes for good colour preservation, the best time to attempt this method is in summer or autumn.

Semolina/borax method

1 In a plastic container, mix one part of borax with six parts of semolina by weight, making sure that there are no lumps in the borax.
2 Place the flowers in depressions in the mixture and work it gently into and around the 'petals' to preserve their shape. The entire surface must be in contact with the mixture.
3 When the container is filled to capacity without crowding, store in a warm, dry place. Do not disturb the flowers until the drying process is completed. Remove when the foliage is dry, firm, papery or crisp. If the leaves are still limp, further drying is required. The time varies from four days to two weeks.
4 To remove the flowers, lift out gently with the fingers. Brush all traces of the mixture off the flowers with a camel-hair brush.
5 Store the flowers between tissue paper in boxes until ready to use.

Using this method the central disc of *Ammobium alatum* remains more golden, and the colour of many species, which would otherwise fade quickly, is retained.

Sand method

Very fine, clean, dry sand may be used in a similar way to semolina/borax. It works well, is cheap and can be used again after drying in an oven.

Silica gel method

Another alternative is silica gel which is a drying agent obtainable from chemical supply houses. The procedure is the same, but the material may

need to be crushed. Better colour preservation results from this method because it is quicker. Silica gel is expensive, but it can also be used again after drying at 120°C for thirty minutes or until it returns to its original blue colour.

Preserving with glycerine

1 Remove damaged leaves.
2 Scrape or crush the base of stems, or make 2 cm splits in them.
3 In a tall, narrow jar (to conserve glycerine) mix two parts of boiling water to one part of glycerine. Insert the stems to a depth of about 10 cm. If the specimens are too long and heavy, stand the jar inside a larger one for support.
4 Allow to stand until the foliage just begins to change colour. Usually stems can be removed after five or six days if a lighter colour is required. Leave for two weeks to achieve a darker colour. The glycerine mixture will need to be replenished during this time. Some manipulation of colour is possible by adding coloured inks or food colouring to the glycerine mix.
5 Hang upside down in a dry place for three to four weeks. If the leaves become sticky wash in warm, soapy water and dry with a soft cloth.

Helichrysum secundiflorum is successfully preserved by this means. Flower-heads must be picked just as they open. If picked when in bud the heads never open. If picked some time later preserving is not effective as the heads then lose their disc florets. The leaves of this species turn dark green, the stems retain their grey, downy appearance and the lovely, heady scent is retained for a long time. Others such as *H. diosmifolium*, *H. stirlingii* and *Cassinia* species should also be tried. Better results may be achieved in summer or autumn.

Pressed flowers

Daisies are excellent subjects as pressed flowers and can later be glued to plain cards to make most attractive gift or greeting cards. Small species would be required for this purpose, for example *Helipterum cotula*, *H. corymbiflorum*, *H. praecox*, *H. venustum*, *H. jessenii*, *Helichrysum lindleyi*, *H. apiculatum* (small forms) and *Schoenia cassiniana*.

Pressed flowers of larger species such as *Helipterum manglesii* or *H. roseum*, and *Helichrysum bracteatum* may be used for wall plaques or pictures. The base of the flower-head can be carefully cut off with a sharp knife to produce a flatter result.

Miscellaneous uses

Preserved daisies embedded in fibreglass resins make attractive brooches, pendants and paperweights.

There are obvious advantages in using dried daisies in bridal bouquets; *Helipterum splendidum* would be a perfect choice for such an application. There is a good range of pastel shades for posies and floral baskets for

bridal attendants. Flower-girls look angelic wearing a garland of daisies in their hair.

Many small headed species which may be successfully air-dried can be used instead of artificial flowers in cake decorating.

Colourful bracts of everlastings are interesting additions to potpourri and the foliage of some daisies, for example *Helichrysum argophyllum* retains a delicate perfume when dried.

Table 16 Using daisies in floral art

All species listed can be used as fresh flowers. Species marked with an asterisk are not described in detail in this book, but may be available from florists.

Species	Colour	Dried	Wired	Filler	Posies	Remarks
Ammobium alatum	White	√	√		√	Centres darken, use buds
Brachyscome diversifolia	White				√	Large flower-heads
multifida	White, pink or mauve				√	Makes dainty fresh posies
segmentosa	White				√	Good cut flower
Calocephalus brownii	Silver	√		√		Unusual foliage
citreus	Yellow	√			√	Retains colour
*lacteus**	White	√			√	Dainty
*sonderi**	Yellow	√			√	Good colour
Calomeria amaranthoides	Pink/bronze	√				Heady perfume
*Cassinia aculeata**	Cream	√		√		Strong odour
Celmisia asteliifolia	White				√	Attractive foliage
Cephalipterum drummondii	Yellow or white	√	√			Showy heads
Craspedia chrysantha	Yellow	√			√	Retains colour
glauca	Yellow					Colour may fade
globosa	Yellow	√				Unusual globular heads
Helichrysum acuminatum	Gold	√	√		√	Vibrant colour
*adenophorum**	White, pink buds		√		√	Subtle colours
*alpinum**	Red buds	√		√		Spectacular buds
apiculatum	Yellow	√			√	Pick tight heads
baxteri	White	√	√		√	Lacquer stems before drying
*blandowskianum**	White, pink buds	√	√			Silver foliage
bracteatum	White, yellow or pink	√	√		√	Pick in bud, excellent for all uses
*cordatum**	White	√				Striking dried flower
diosmifolium	White, pink/ white buds	√		√		Unusual dried clusters

Species	Colour	Dried	Wired	Filler	Posies	Remarks
Helichrysum						
elatum	White		√		√	Pick in bud
ledifolium	Pink	√				Colourful plant
leucopsideum	White/pink		√		√	Pick in bud
lindleyi	Pink	√	√			Dried bracts are fragile
*obcordatum**	Yellow	√			√	Aromatic foliage
obtusifolium	White	√	√		√	Lacquer stems before drying
scorpioides	Yellow	√	√		√	Best when wired
*secundiflorum**	White					Can be glycerined
semipapposum	Yellow	√		√	√	Retains colour well
*stirlingii**	White	√		√		Foliage drops
subulifolium	Yellow	√	√		√	Fragile bracts reflex
viscosum	Yellow	√	√		√	Bright colour
Helipterum						
albicans	White or yellow	√	√		√	White form dries well. Lacquer stems before drying
anthemoides	White	√	√		√	Charming
chlorocephalum	White	√	√		√	Best when wired
corymbiflorum	White	√			√	Dainty clusters
cotula	White	√	√		√	Exquisite
floribundum	White	√		√	√	Showy small clusters
humboldtianum	Yellow	√	√	√	√	Wire and hang upside down
*jessenii**	Yellow	√			√	Pretty miniature
manglesii	White or pink	√	√		√	Colourful
molle	Yellow	√	√			Lacquer stems before drying
praecox	Yellow or white	√	√		√	Bright, pick when open
roseum	White or pink	√	√		√	Excellent for all uses
splendidum	White	√	√		√	Elegant
*stipitatum**	Yellow	√	√			Handsome
venustum	Yellow	√	√		√	Charming
Ixodia						
achillaeoides	White	√		√	√	Versatile
Myriocephalus						
*stuartii**	White/gold					Unusual head
Odixia						
*achlaena**	White	√		√		Clustered heads
Olearia						
ciliata	White, pink or mauve				√	Fresh posies
floribunda	Mauve					Beautiful sprays
iodochroa	Mauve				√	Subtle colours
phlogopappa	White, pink or mauve					Good cut flower
Olearia						
tomentosa	White or mauve				√	Showy

Species	Colour	Dried	Wired	Filler	Posies	Remarks
Schoenia						
cassiniana	Pink or white	✓			✓	Bracts fade, lacquer dried flowers
Waitzia						
acuminata	Yellow, orange or pink	✓			✓	Rich colours
*aurea**	Yellow	✓				Lacquer before drying
*citrina**	Yellow	✓				Attractive
*suaveolens**	White	✓			✓	Fragrant
sp. aff. *conica**	Yellow	✓				Handsome

7

History of Australian daisies

Australian daisies were well-known to collectors and nursery proprietors in Europe for many decades before appearing in Australian gardening catalogues. They were among the exotic flora eagerly sought by wealthy men studying natural history and by nursery proprietors anxious to be the first to bring new flowers into cultivation. Once the settlement at Sydney Cove was established a two-way trade in plants developed. Plants from Europe and elsewhere were sent to Australia, tried in unfamiliar conditions and acclimatized, while the native flora was collected and sent to Europe where skilled horticulturalists successfully propagated many plants.

The first Australian daisies known to science were collected by William Dampier when he landed in 1699 at Shark Bay in Western Australia. These were *Brachyscome ciliocarpa* and *Olearia axillaris*, a familiar daisy-bush of the coastal sand dunes. The next collections were made in 1770 by Sir Joseph Banks and Daniel Solander during Cook's landing at Botany Bay. The first substantial Australian Flora was published by French botanist, Labillardière, twenty-six years later.

Helichrysum bracteatum is believed to be the first Australian daisy cultivated and the first of our native plants hybridized. In 1791 it was grown in England. It was hybridized by German horticulturalists and released to European gardeners in the 1850s. Within a decade selected coloured varieties and double forms were listed in colonial catalogues.

From the early 1800s a number of daisies were grown in Europe during the first flush of excitement over the discovery of the unusual Australian flora. Among them were *Ammobium alatum, Helichrysum apiculatum, H. bracteatum* and *H. diosmifolium, Ixodia achillaeoides, Olearia glutinosa, O. lirata*, and *Waitzia acuminata* (known then as *W. corymbosa*). Many graced the glasshouses of nobility and royalty including Empress Josephine's garden at La Malmaison and the Royal Gardens at Kew. *Helichrysum bracteatum* (known as *Xeranthemum bracteatum*) was flowering in 1803 and *Calomeria amaranthoides* (*Humea elegans*) in the following year at La Malmaison.

By the 1850s *Brachyscome multifida, Helipterum manglesii* (known as *Rhodanthe manglesii*) and *H. roseum* (formerly *Acroclinium roseum*), *Olearia dentata* and *O. phlogopappa* were widely known and the Swan River Daisy, *Brachyscome iberidifolia*, was a favourite for the glasshouse or mass planting.

In the Australian colonies from the 1860s to the end of the century the everlastings *Ammobium alatum, Helichrysum bracteatum* forms and particularly *Helipterum manglesii* and *H. roseum* were growing in popularity. Colonial gardeners tended to follow overseas trends and grew Australian plants once they had been developed in Europe. They failed to exploit the variety of daisies on their own doorstep. Everlastings were cheap and versatile plants with many uses. Local seed merchants offered a large range at 3d per packet or 2/6 for a dozen varieties. They were usually sown direct into garden beds for display or for cut flowers and were highly prized as dried

flowers for wreaths and bouquets. One seed merchant's advertisement proclaimed, 'If carefully gathered, dried and preserved . . . they will retain their beauty for years. Their bright and useful colours will be found of great service in the decoration of the church or home, in Winter, when other flowers are scarce'. The charming and elegant varieties of *H. manglesii* were frequently used to trim ladies' hats.

Few additional daisies were brought into popular cultivation until well into this century. Hardly any daisies would have been known to horticulture without the systematic collection of species by botanists such as von Mueller in Victoria and Maiden in NSW, or by official collectors, explorers and amateurs. The development of botanic gardens and their herbaria during the nineteenth century was fundamental to our present knowledge, and their collections of plants were a focus for gardeners.

From the 1880s naturalists and horticulturalists experimented with the cultivation and promotion of species for gardens. *Helipterum corymbiflorum* was one of these new additions, but to one horticulturalist's regret the lovely *H. humboldtianum*, with its clump of bright terminal yellow flowers, was forgotten. The keen cottage gardener is reputed to have grown *Celmisia asteliifolia* (*C. longifolia*) in pink or white forms. This is surprising to many contemporary growers who are unable to get this plant to bloom. Has a good strain of this species been lost over the years ?

The Royal Botanic Gardens, Melbourne, in 1910 had a large collection of Australian daisies including many *Olearia* species, *Helichrysum dendroideum* (*H. ferrugineum*), but only one everlasting, *Ammobium alatum*. This last named perhaps earns the dubious honour of being an early garden escape. Fanny Charsley in her book *The Wild Flowers Around Melbourne* published in 1867 notes that this daisy, although not naturally occurring in Victoria, had disseminated throughout Melbourne bushland.

Popular appreciation of the native flora slowly gathered momentum from 1910, initiated by campaigns to reserve forests and protect wildflowers, and reinforced by the success of wildflower shows. Edward Pescott, naturalist and enthusiastic publicist for the cultivation of native plants, lamented their neglect and noted that seed of the graceful Incense Plant, *Calomeria amaranthoides* (found in Gippsland forests), could only be obtained from overseas, where it had been grown for nearly one hundred years. His advice on the garden requirements of many species was timely. He recommended growing shrubby helichrysums and olearias, especially *O. myrsinoides* which was highly regarded in England, and three brachyscomes, *B. diversifolia*, *B. graminea*, and *B. multifida*.

Throughout the 1920s and 1930s a few gardeners did have native gardens and this movement was given impetus with the advent of specialist native plant nurseries. George Althofer began his nursery and seed business in the late 1940s and brought new species on to the market. The daisies among his extensive list of native plants in his 1956 catalogue were primarily shrubs or perennials. He offered *Brachyscome melanocarpa*, *B. multifida*, *B. rigidula*, *B. scapiformis*, three species of *Cassinia*, *Helichrysum apiculatum*, *H. bracteatum*, *H. diosmifolium*, *H. obcordatum*, *H. paralium*, *H. rosmarinifolium*, *H. semipapposum* and the attractive floriferous shrublet, *Helipterum anthemoides*. This wide choice ushered in the present trend towards growing Australian daisies.

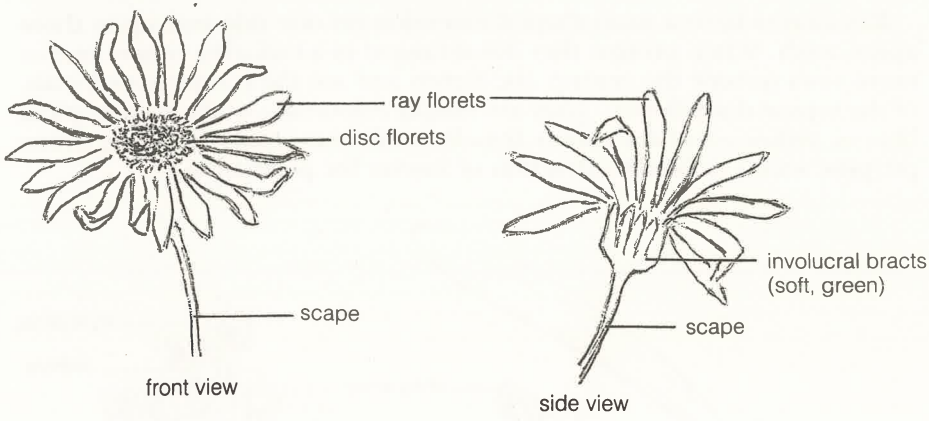
Today a much greater range of daisies is becoming commercially available in answer to the increasing interest displayed in them.

8

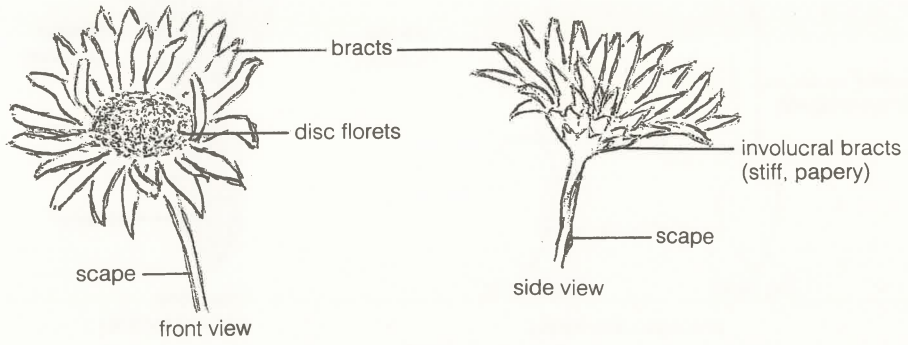
What is a daisy?

A 'daisy-flower' is really a collection of small individual flowers, called florets, grouped together in a head. The head is surrounded by a number of modified leaves or bracts which are either soft and green (as in the genera *Brachyscome* and *Olearia*) or stiff, papery and coloured (as in the everlastings *Helichrysum* and *Helipterum*).

The name 'composite' was derived from the compound nature of the head and the family was named Compositae. An alternative name, Asteraceae, has been introduced by botanists in recent years to bring uniformity to plant family name endings by ensuring that the name ends in 'aceae' and is based on an included genus (*Aster*).



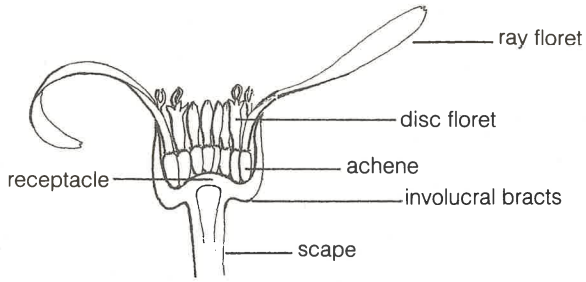
Head of *Brachyscome* species



Head of *Helichrysum* species

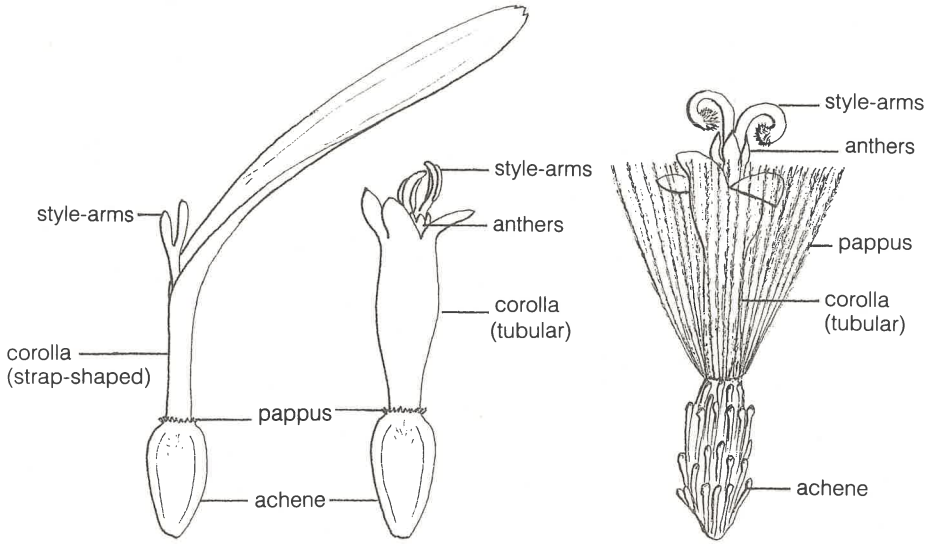
The florets are small, one-seeded, stalkless flowers, crowded on the enlarged top of the flowering stem which is known as the receptacle. The individual florets vary in appearance and function, the most common being

the disc floret. This has five petals (rarely four) fused into a tube. The number of petals is indicated by the number of lobes or teeth at the tip of the corolla. Disc florets are found in the centre of the head. They are usually yellow, rarely black or purplish, and are mainly bisexual, but sometimes male or sterile.



Section of flower-head (*Brachyscome* species)

Ray florets have a strap-shaped extension on one side and up to three apical teeth. When present they are arranged in a radiating ring of one or more rows outside the central disc florets and are the conspicuous 'petals' of the typical daisy flower. They are usually colourful—white, mauve, pink, blue or yellow—and are mainly female, sometimes sterile, but their prime purpose seems to be the attraction of insects for pollination.



Amongst the other types of floret are the ligulate florets which are also strap-shaped, but are bisexual and have five apical teeth, and the filiform florets which are female and have narrow corolla tubes.

These florets are present in composite heads either alone or in various combinations. For example, the head of *Microseris scapigera*, the Yam Daisy, is composed entirely of ligulate florets, *Brachyscome* and *Olearia* species have both ray and disc florets, while *Helipterum* species are composed mainly of bisexual disc florets with a few filiform florets on the periphery. In common usage, the central regular florets are often called the 'disc', and the outer irregular florets are termed the 'rays'. In the case of the everlastings the petal-like structures are bracts, not ray florets.

The heads are organized in various ways; they may occur singly as in *Helichrysum lindleyi*, in clusters as in *Helichrysum semipapposum*, or as a compound head as in *Craspedia* species.

compound head
(*Craspedia globosa*)

single head
(*Helichrysum lindleyi*)

heads in dense clusters
(*Helichrysum semipapposum*)

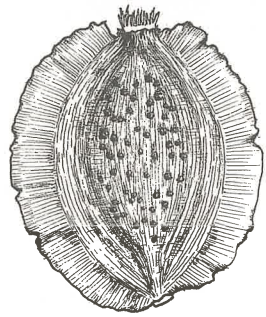
The anthers and style arms of the bisexual florets are arranged in such a fashion that, in self-compatible species, florets may be self-pollinated if cross-pollination has not taken place. In fact there is a diversity of pollinating systems within the family. For instance, many species of *Brachyscome* and *Olearia* are self-infertile and must be cross-pollinated by insects, whereas many *Helichrysum* and *Helipterum* species are capable of self-pollination.

The one-seeded fruit, commonly called an achene, develops at the base of the corolla. There is usually a ring of hairs, bristles or scales, called the pappus, at the apex of the achene. This pappus is often shed, but if present, it may act as a parachute in the wind dispersal of the seeds.

The criteria for identification are many. One of the most important is the appearance of the mature achene. Under the microscope or close focus monocular the achene often helps the amateur to place an unidentified species in a genus. The presence or absence of a pappus, whether it is feathery or barbed, the size, shape and colour of the achene, whether its body is smooth, hairy, warted or winged, all help in identification. Species of *Brachyscome* and *Calotis* are differentiated primarily on the appearance of the mature achene. *Helipterum* species have feathery or plumed pappus hairs compared with the barbed hairs of *Helichrysum* species.

Other criteria used in identification include the appearance of the receptacle, the bracts, anthers and style-arms as well as characteristics of habit, leaf, stem and arrangement of heads.

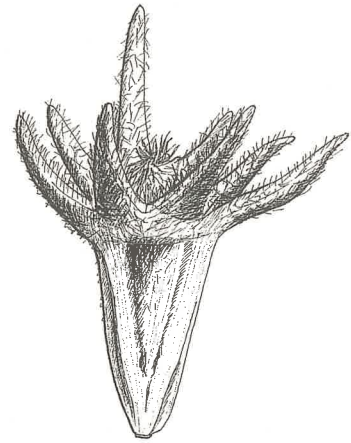
Ammobium alatum



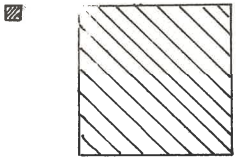
Brachyscome aculeata

Brachyscome diversifolia

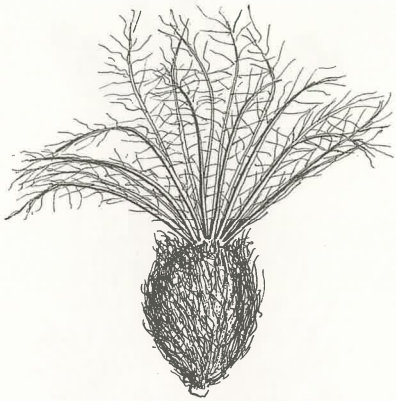
Brachyscome multifida



Calotis scabiosifolia
var. *scabiosifolia*

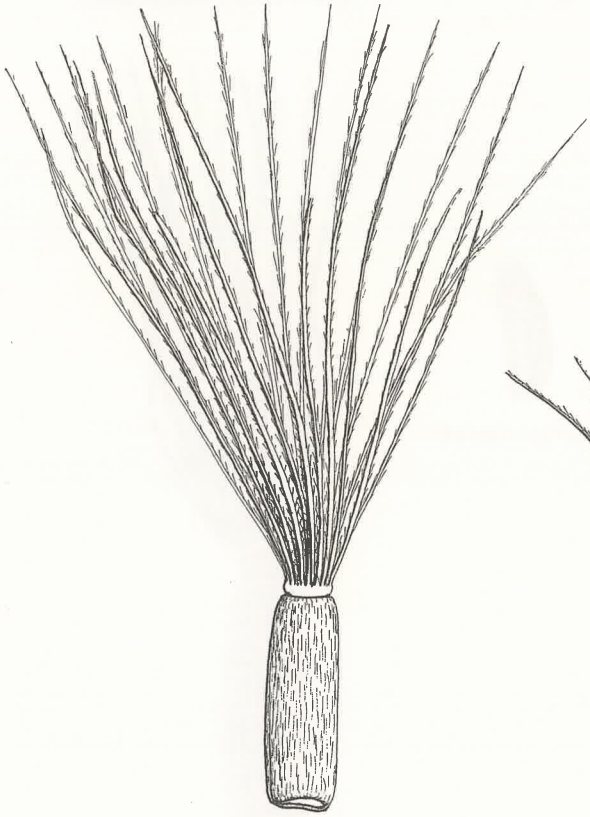


Achenes scale 1:10

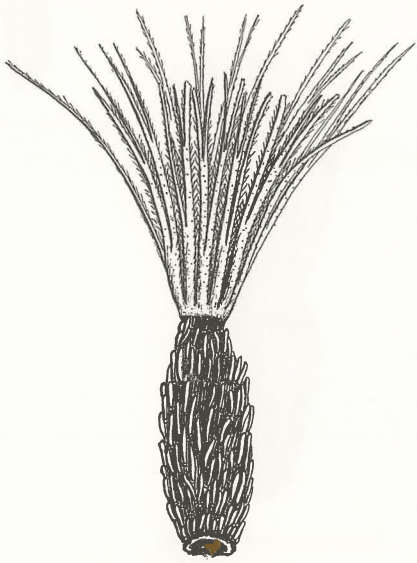


Craspedia glauca

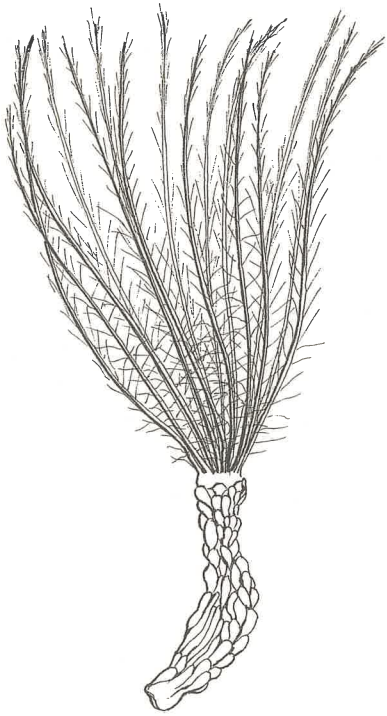
Helichrysum apiculatum



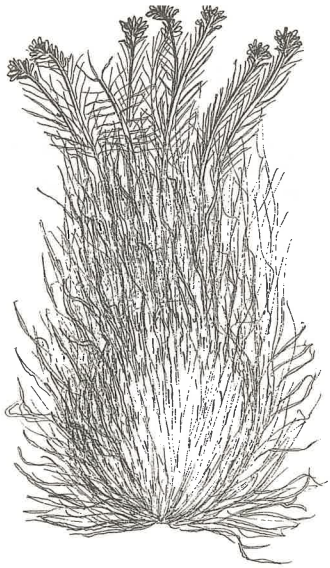
Helichrysum bracteatum



Helichrysum subulifolium

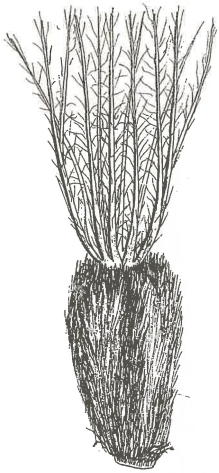


Helipterum albicans

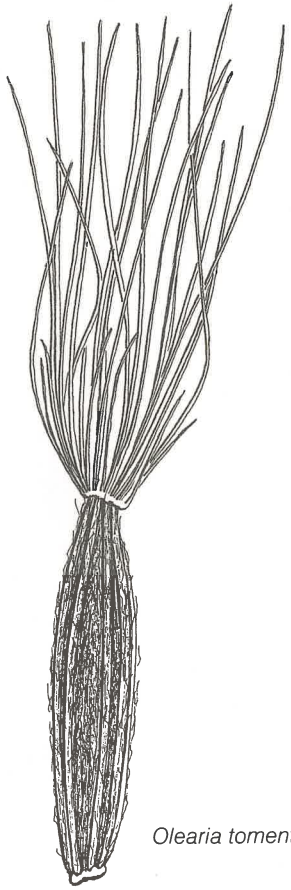


Helipterum chlorocephalum

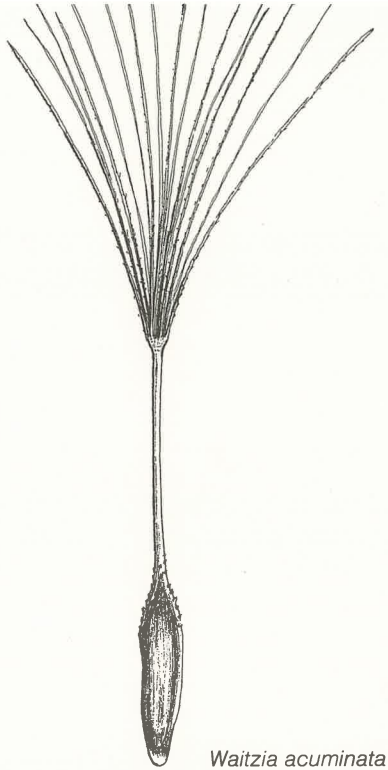
Ixodia achillaeoides



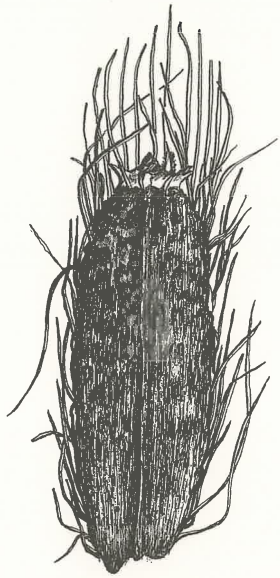
Helipterum anthemoides



Olearia tomentosa



Waitzia acuminata



Schoenia cassiniana

There are more than 20,000 species of Asteraceae in the world. Many are of economic and ornamental use, such as lettuce, globe artichokes, sunflowers and dahlias. Too many are widespread weeds, of which dandelions, flatweeds and thistles are the most well-known and disliked. In Australia there are about 980 indigenous species, but this number is constantly changing as new species are discovered and botanists make further revisions of genera and species. Major revisions within the family are currently being undertaken which may result in sweeping name changes.

The Australian species comprise shrubs, sub-shrubs, perennial herbs, annuals and even one biennial, *Calomeria amaranthoides*. It is generally believed that they evolved between 27 million and 10 million years ago. The various climatic and soil conditions peculiar to Australia have resulted in distinctive plant forms which are often very restricted in their distribution. Genera confined to Australia include *Ammobium, Calocephalus, Cephalipterum, Ixodia, Schoenia,* and *Waitzia.*

The daisy family is a vigorous and successful plant coloniser. This is due to the number of seeds in each head, their various methods of pollination, their ability to travel long distances on air currents and their development of a specific group of chemical insect repellents.

The identification of daisies is an intriguing pursuit. The information in this chapter is just an outline of the major characteristics of the family, but it should provide sufficient background for those who wish to enlarge their enjoyment of the many species found in the Australian countryside.

Daisies to grow

Ammobium

There are only two species in the genus *Ammobium*, *A. alatum* and *A. craspedioides*. The generic name is derived from the Greek *ammos* (sand) and *bios* (life) and refers to the fact that the first specimens collected were growing in sand. *A. craspedioides* is confined to a small area on the south-western slopes of NSW. It differs from *A. alatum* in having simple, unbranched stems and short straw-coloured bracts.

Ammobium alatum

(alatum = winged)

An erect, branching, somewhat untidy perennial growing vigorously from a basal rosette of large silvery lanceolate leaves, woolly beneath, 10–30 cm by 5 cm. The leaves decrease in size up the stem and become stalkless, the bases running down the stem to form wings. These silvery-white, winged stems are features of this unusual plant. White papery flower-heads, 2–2.5 cm in diameter, with orange-yellow centres are held in terminal clusters.

Flowering period: Summer. Under cultivation it flowers from late spring to autumn.

Propagation: Prolific germination from seed in four days. This species will self-sow with abandon and could become an environmental weed if grown adjacent to natural bushland. Propagate also by cuttings or division.

Cultivation and uses: Likes an open sunny aspect but adapts to a variety of soils and garden situations. It tolerates frost to –5°C.

It is a useful species for mass plantings in large gardens provided it can be kept within bounds. It is suitable for a tub, but is probably too vigorous for a rockery. *Ammobium alatum* is an excellent cut flower when fresh.

Flower preservation: The tendency of the central florets to darken with age may detract from the overall beauty of this everlasting when it is air-dried, but a reasonable result can be achieved by drying in borax/semolina (see page 44). A report by the Queensland Agricultural College, however, rated *A. alatum* highly as a dried flower. Tight buds dry and wire well and are useful in posies or cake decorating.

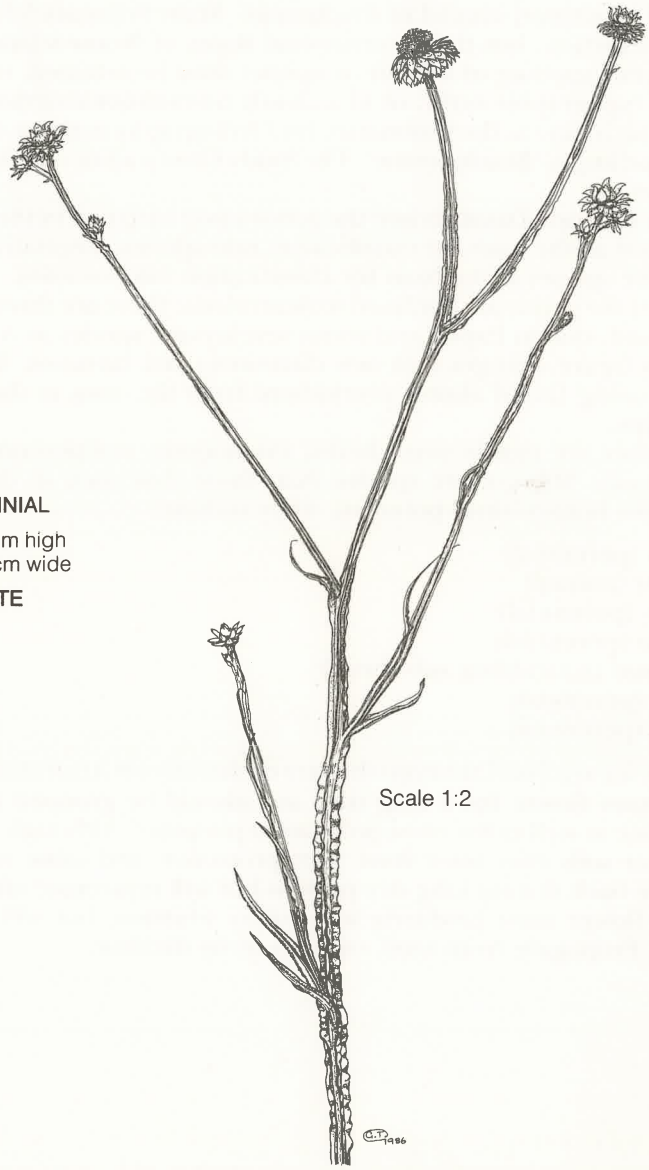
Special notes: *A. alatum* occurs around Jindabyne, where it may have been introduced, and it is mentioned as a garden escape colonizing railway embankments in Tasmania. There is no botanical record of this species in Victoria, but it was observed around Melbourne in the 1860s. It was probably grown in early gardens and, given its regenerative characteristics, soon spread itself further afield.

Distribution and habitat: NSW and Qld in grasslands, open woodlands and along roads, mainly in cooler areas. Naturalized in Tas and Vic.

PERENNIAL

60 cm–1 m high
up to 50 cm wide

WHITE



Scale 1:2

Ammobium alatum

Brachyscome

The generic name is derived from the Greek *brachys* (short) and *kome* (hair), referring to the short tuft of hairs (pappus) on the achene. In most other members of the family Asteraceae the pappus is much longer.

For a long time there has been dissension over whether the 's' should be retained or omitted in the spelling of *Brachyscome*. In 1817 Count Henri de Cassini, a French botanist who specialized in the Asteraceae, first published the generic name *Brachyscome*. In 1825 Cassini himself altered the generic name to *Brachycome* with the footnote 'it is thus that this generic name should be written instead of *Brachyscome*'. Many botanists follow Cassini's later correction, but the International Rules of Nomenclature state that 'the original spelling of a name or epithet must be retained, except in the case of a typographic error, or of a clearly unintentional orthographic error'. Until such time as the Committee for Orthography makes a decision, the official spelling is 'Brachyscome'. The Study Group abides by the International Rules.

In 1948 Dr Gwenda Davis revised the genus using variation in the mature fruits (achenes) as the basis for classification into species. Vegetative variation within the species is the basis for classification into varieties.

Members of the genus are confined to Australasia; there are three species in New Zealand, one in Papua and about seventy-one species in Australia, although this figure changes with new discoveries and revisions. They are widespread, being found almost everywhere from the coast to the inland and in the alps.

Brachyscomes are mostly small herbs; the majority are perennials, the rest are annuals. Many more species than those described in this book appear to have horticultural potential. They include:

- *B. basaltica* (perennial)
- *B. ciliocarpa* (annual)
- *B. decipiens* (perennial)
- *B. graminea* (perennial)
- *B. latisquamea* (scrambling sub-shrub)
- *B. parvula* (perennial)
- *B. rigidula* (perennial)

Eleven species are listed amongst the rare or threatened Australian plants.

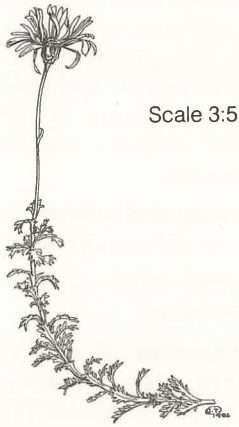
Brachyscomes flower for a long time and should be grouped together for appearance as well as for cross-pollination purposes. Although they will adapt to most soils they must have root protection and some moisture. Many will die back during long dry periods but will rejuvenate after good rains. They flower most profusely in a sunny situation, but will tolerate some shade. Propagate from seed, cuttings or by division.

Scale 3:5

Brachyscome basaltica var. *gracilis*

Scale 3:5

Brachyscome graminea



Scale 3:5

Brachyscome rigidula

Brachyscome aculeata

Hill Daisy
(aculeata = prickly)

A bushy perennial herb displaying a profusion of flowers over a long period. White flower-heads, 4 cm in diameter, are borne singly at the tips of the stems. Sometimes the ray florets are pinkish or mauve beneath, but this colour fades as the flower-heads age. Many branched stems rise from the rootstock which has a basal rosette of dark green, shiny leaves. This rosette is later lost. The stem leaves at the base are narrow, 4–6 cm long and irregularly toothed towards the tips. They decrease in length up the stem to about 1 cm and the margins become entire. Stems and leaves are sparsely sprinkled with short, transparent hairs.

This plant grows densely at first, later becoming quite open. It is not prickly so the vernacular name probably refers to the small teeth on the lower leaves.

Flowering period: In the garden this extends from late spring to late autumn, but judicious trimming results in several bursts of flowering rather than an extended period.

Propagation: Good germination from seed sown in autumn in 14–21 days. Also from cuttings or possibly by division.

Cultivation and uses: This species grows well in an open, partly shaded position in moist soil. Each flush of flowers should be followed by trimming, feeding and watering to stimulate a further flush. It is frost tolerant to –5°C, but is not proving suitable for tropical conditions.

Use as a container plant, in rockeries, as a bog plant or in pockets in the garden. Coastal forms should be satisfactory for coastal planting.

Special notes: The history of the study and classification of this species has been complicated. In 1948 Dr Gwenda Davis revised the genus *Brachyscome*. Her classification into species rested mainly on the basis of the characters of the achenes or one-seeded fruits. Dr Davis included several other previously recognized species with relatively similar achenes in the *B. aculeata* species complex and listed eleven synonyms for it. Studies on cell biology by Dr Helen Stace in 1981 led to the recognition of four separate species from the complex, namely *B. aculeata*, *B. cuneifolia*, *B. sieberi* var. *gunnii* and *B. spathulata*.

Distribution and habitat: Vic, ACT, NSW. Amongst rocks and in wet, mossy places on mountains and at the coast.

Synonyms: *Bellis aculeata, Brachyscome billardieri, Brachyscome stricta, Brachyscome sieberi.*

Similar species: *B. cuneifolia* (SA) has white rays but differs from *B. aculeata* in having a persistent basal rosette.

B. sieberi var. *gunnii* (Tas) also has white rays and basal leaves which are not persistent, but the bracts have long tapering points and plants only grow to about 20 cm in height. By contrast *B. aculeata* has obtuse bracts, a robust habit, and grows 50–80 cm high.

PERENNIAL

50–80 cm high
30–50 cm wide

WHITE

Scale 1:2

Brachyscome aculeata

B. spathulata (Vic, Tas, NSW) has mauve rays (rarely white) and the bracts are extremely acute and narrow.

Brachyscome angustifolia

Stiff Daisy, Grassland Daisy
(angustifolia = narrow leaf)

This cheerful dwarf perennial forms small clumps from slender underground rhizomes. Two varieties, var. *angustifolia* and var. *heterophylla*, have been described based on the appearance of the leaf. Var. *angustifolia* is available from many nurseries and is the variety seen most often in gardens. It has soft, hairless, light green leaves, 3–5 cm long, lance-shaped with entire margins. They are clustered at the base and decrease in size up the stem. Dainty heads of mauve, pink or blue, 1.5–2 cm across, are borne at the tips of short, leafless flowering stalks. The plant has many slender, branching stems and spreads by suckering.

Flowering period: Intermittently throughout the year, but flowering most profusely in autumn.

Propagation: May be propagated from mature seed, but this is not always available as the seed is often shed before it is fully mature. It will self-sow in the garden if plants of different genetic constitution are growing together. Very easy to propagate from cuttings or by division.

Cultivation and uses: Var. *angustifolia* is easy to grow in most garden situations provided that the soil remains moist. It will survive even in open clay loam which dries out in summer, but denser more vigorous clumps are produced in semi-shaded moist conditions. It is moderately frost resistant, grows at the coast in a protected position and flowers all through the year in subtropical conditions. This daisy benefits from occasional light feeding with blood and bone and potash. Yellowing of the leaves often occurs in this species and may be treated with an application of iron (see page 10).

This variety makes a neat rockery, edging or bog plant, and small ground cover. It is also excellent for hanging baskets and containers, especially pots standing in saucers of water. Suckers frequently cascade over the sides of the pot and are an additional feature. For best results in hanging baskets the soil mix should contain about 50 per cent peat moss.

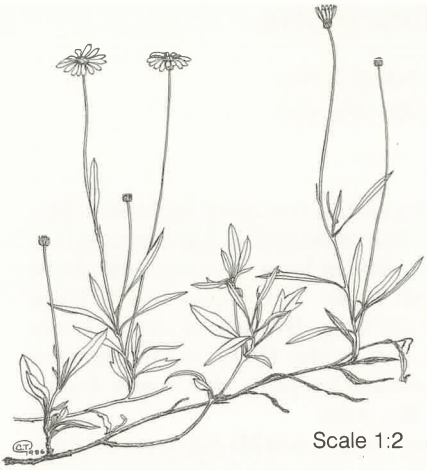
A very handy plant for the garden. Suckers are easy to transplant to any protected spot where they will discourage weeds while flowering modestly for most of the year.

Special notes: The Study Group has observed that some plants identified as *B. angustifolia* var. *angustifolia* produce a few leaves with up to three apical lobes at some times of the year. There is also a record in the literature of populations in the wild with both types of leaves and the firm suggestion has been made that the two varieties should not be maintained.

Distribution and habitat: SA, Vic, Tas and NSW. Widespread from sea level to about 1000 m in wet sandy places, grasslands, and open forests.

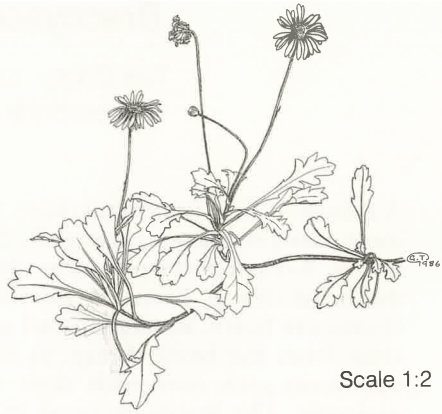
Synonyms: *B. linearifolia*.

Varieties: Var. *heterophylla* always has a lobed leaf, but the foliage is otherwise extremely variable. Its habit too varies from ascending (Port Stephens and Sydenham Inlet forms) to prostrate (Mt Drummer form). Although rarely found in nurseries this variety has the same cultivation needs as the



Scale 1:2

Brachyscome angustifolia var. *angustifolia*



Scale 1:2

Brachyscome angustifolia var. *heterophylla* (Mt Drummer form)

PERENNIAL

10–30 cm high
spreading

MAUVE, PINK or BLUE

Brachyscome angustifolia var. *heterophylla* (Pt Stephens form)

Scale 1:2

more common one, but will tolerate drier conditions. In general, it seems to be less vigorous. Var. *heterophylla* extends along the coast of NSW to far eastern Vic. (Syn. *B. heterophylla*, *B. linearifolia* var. *heterophylla*.)

Similar species: *B. angustifolia* var. *angustifolia* is very like some forms of *B. graminea*, but may be distinguished by its firmer leaves. The achenes also differ.

Brachyscome diversifolia

Tall Daisy, Large-headed Daisy
(diversifolia = variable leaves)

A robust, tufted perennial daisy, variable but attractive in all its forms. The most easily obtained variety, *B. diversifolia* var. *diversifolia*, has large, white heads, 3–7 cm across, on stout, leafy stems, 40 cm long, carried well above the basal clump. Some forms have pinkish buds. The leaves in the basal clump are hairy, strongly lobed and 5–10 cm long. Branching, hairy stems arise from the basal clump, at first erect, but as the flower-heads mature the stems arch over with their weight, always keeping the heads facing upwards. The leaves decrease in size up the stem.

This variety occurs in several forms. One form from Mt Samaria and the southern Grampians differs in its smaller leaves, more leafy flowering stems and pinkish buds. A small form from Flinders Island was previously called *B. diversifolia* var. *humilis*. It is simply smaller in all its parts.

Var. *diversifolia* bears a strong resemblance to the introduced Ox-eye Daisy, *Chrysanthemum leucanthemum*. Indeed, the latter has been propagated for sale under the name *B. diversifolia*, but it is a much coarser, more invasive plant and a poor substitute for the Australian species.

Flowering period: Spring to early summer and then intermittently throughout the year.

Propagation: Seed germinates in twenty to seventy days in autumn, but is not yet available to the home gardener. Propagate also from cuttings or by division of the rootstock.

Cultivation and uses: *B. diversifolia* tolerates a variety of conditions, but prefers a sandy, open, sunny position. The plant is slow to establish and needs to be well baited against slugs and snails. It is moderately frost tolerant and grows in exposed coastal sites where it bears the full blast of gale force winds and salt spray. Var. *diversifolia* has not proved suitable for subtropical conditions.

In the garden *B. diversifolia* makes an excellent focus alone or in a group, and is useful as an edging plant, in the rockery, in pots, tubs or bog gardens. Lasts well as a cut flower and it is odourless, unlike the European Marguerite.

Distribution and habitat: SA, Vic, NSW. Widespread across a range of soils and aspects from subalpine regions to the coast. Usually found on sandy soils and often among rocks.

Synonyms: *Pyrethrum diversifolium, Brachyscome diversifolia* var. *humilis*.

Varieties: There are two other named varieties. Var. *dissecta* has more branching stems and doubly divided leaves with acute tips on the leaf segments. It occurs mostly in sandy soils in Vic, NSW and Qld.

Var. *maritima* is hairless. The bright green, almost fleshy leaves are finely divided, with the tips of the leaf segments blunt and thick. It is easier to establish and has a more rounded habit to 50 cm tall and 60 cm wide. An attractive shrublet, covering the ground quite thickly and able to tolerate harsher conditions. It occurs in rocky sites on the Bass Strait Islands.

PERENNIAL

30–50 cm high
40–60 cm wide

WHITE

Scale 1:2

Brachyscome diversifolia var. *maritima*

Brachyscome iberidifolia

Swan River Daisy
(iberidifolia = leaves like those of *Iberis*)

A slender, colourful annual with branched stems and light green, finely divided foliage. The little plants are upright with bright flower-heads, 2.5 cm in diameter, held above the leaves. The colours vary from mauve, purple and white through all shades of blue, with contrasting centres in either black, yellow or brown circled with yellow. The plant is usually hairless, but sometimes glandular.

Flowering period: Spring to summer, and intermittently at other times of the year. If sown in spring the flowering period extends through summer and autumn.

Propagation: From seed which is readily available and germinates quickly, usually in two to four days. Cuttings will also strike quickly and easily if a particular form is desired, but may not be as vigorous.

Cultivation and uses: This undemanding little daisy is very easy to grow. It will do well in sun or shade, in clay or sand and responds to watering and fertilizing. Gardeners throughout Australia and overseas have planted it widely in the past and its popularity is increasing with the introduction of many colourful cultivars. Its charming habit of regenerating naturally from seed in the garden or in containers, even in hanging baskets, is an added reward.

It is prone to frost damage, but is suitable for tropical conditions, and exposed coastal situations.

Use as a bedding or border plant, in rockeries, bog gardens, hanging baskets or pots. If sown directly beneath trees it will carpet the ground softly and naturally.

Flower preservation: Flowers press beautifully.

Special notes: This attractive daisy is well-known in Europe. It was brought to prominence by Baron von Hügel who visited the Swan River colony in 1837 and whose collection of Australian plants was renowned throughout Europe.

Distribution and habitat: WA, SA, NT. Found in sandy or clay soils, on sandhills and plains, along water courses, on swampy ground, on chalky hills and among granite boulders.

Selected colour forms: Many named hybrids have been produced in Europe, among them 'Little Blue Star', 'Purple King', and 'Red Star'. Seed of *B. iberidifolia* 'Purple Splendour' is easily obtained. Flower-heads are a very striking deep purple with black or yellow disc centres. Its habit is upright to 40 cm and it looks superb in a hanging basket.

ANNUAL

10–40 cm high
up to 30 cm wide

BLUE, MAUVE, PURPLE, WHITE

Scale 1:1

Brachyscome iberidifolia

Brachyscome microcarpa

Forest Daisy
(microcarpa = with small fruits)

A long flowering perennial herb with delicate, pale mauve, pink or white flower-heads and dainty, lobed or toothed, light green leaves. *B. microcarpa* has many slender, branching, leafy stems, up to 20 cm long, usually lying along the ground. Heads, 1.5–2 cm across, are held singly at the tips of fine flowering stems, 6–10 cm long. The basal leaves are spoon-shaped with long stalks, 1–7 cm long and 1 cm wide. The stem leaves may be so different in shape that two different species seem to be growing in the same place. The plant spreads by forming mats of leafy stems.

It is thought that there may be more than one form; one disappears in summer and regenerates after rains, another grows into a much larger plant. Weakly erect plants to a height of about 50 cm have also been described.

Flowering period: Spring to autumn in the wild, but throughout the year under cultivation.

Propagation: Easily struck from cuttings. Seed is so small that it is difficult to collect, but once plants are established they will seed themselves in the garden.

Cultivation and uses: *B. microcarpa* seems happiest in semi-shade or partial sun, with its roots well protected and extra watering during dry periods. It is frost tolerant to −5°C.

Ideal as a hanging basket or container plant. Several planted together make an eye-catching display as the stems will quickly cascade over the sides of containers. The long flowering period makes it a good rockery plant.

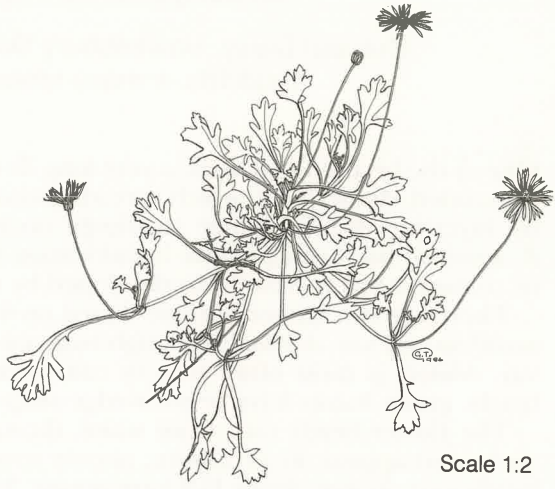
Distribution and habitat: NSW, Qld. Occurs along the coast and in the tablelands, usually in well drained situations. Found along rivers and among granite rocks.

Synonym: *B. discolor*.

PERENNIAL

15–20 cm high
30–50 cm wide

MAUVE, WHITE, PINK



Scale 1:2

Brachyscome microcarpa

Scale 1:2

Foliage of another form of *B. microcarpa*

Brachyscome multifida

Cut-leaf Daisy, Hawkesbury Daisy, Rocky Daisy
(multifida = many times divided)

One of the best of the daisies: a very long flowering, reliable perennial with a rounded, dense habit, which spreads mainly by suckering and sometimes by layering itself. Chance seedlings occasionally reward the grower. *B. multifida* has been popular in cultivation for many years and a number of coloured forms have been developed by the nursery trade.

There are two named varieties based on the appearance of the leaf, var. *multifida* and var. *dilatata*. Although both are widely planted in gardens the var. *dilatata* is most often seen in cultivation. Its finely divided, hairless, bright green leaves have broad wedge-shaped leaf segments.

The flower-heads vary from white, through many shades of mauve to pink, and appear in profusion, almost covering the plant at times. The heads vary in size, from 1–2.5 cm across. Var. *dilatata* also shows considerable variation in the size of the leaf segments. There is a small cushion form, prostrate and spreading to 50 cm across, with small heads and small leaves. Among the coloured forms the pink and white do not appear to be as robust as the mauve (either pale or dark). One beautiful, almost luminous, dark mauve form (known as *B. multifida* Breakoday form) was developed by Peg McAllister from a chance seedling in her garden in Victoria.

Flowering period: In cultivation it flowers throughout the year with flushes in spring and autumn. In its natural habitat it flowers mainly in spring.

Propagation: Very easily propagated from stem and root cuttings or by division. It will grow from seed more slowly, but seed is not generally available because few mature achenes are produced.

Cultivation and uses: This species adapts to most soils and situations. It tolerates drier conditions than most other brachyscomes, but needs extra watering during summer, although it can regenerate from the perennial root after autumn rains. Prune if the plant becomes straggly to encourage new growth. It will grow in shade, but it flowers better in sun or semi-shade.

It grows in exposed coastal positions where the leaves often turn dark red in summer and the habit becomes more compact. Heavy frosts burn the foliage, but it quickly recovers. It is the most reliable of all the brachyscomes under tropical conditions and is relatively pest free. Occasionally subject to attack by sap sucking insects which can be controlled by spraying (see page 13).

It is often used in massed plantings and as a colourful ground cover, border, edging, rockery, bog, or general garden plant. The suckering habit makes it excellent for suppressing weeds and binding clay banks, while the long flowering period recommends its use in hanging baskets and containers. A small posy of fresh flowers will last three to four days.

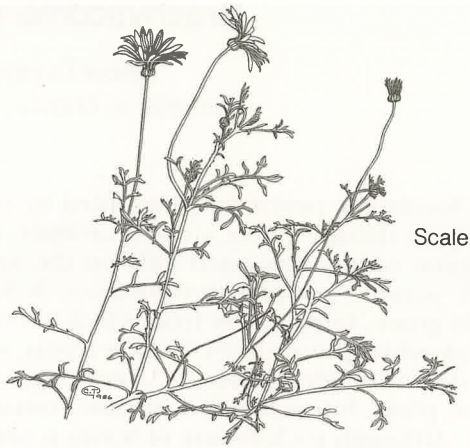
Distribution and habitat: Vic and NSW in open forest and grasslands.

Varieties: Var. *multifida* differs from var. *dilatata* in having long, narrow leaf segments with slender tips. It is available in white or mauve forms and

PERENNIAL

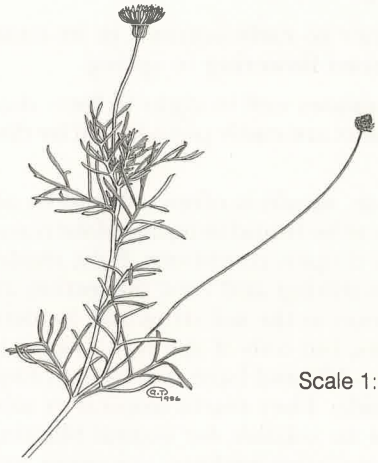
10–30 cm high
30 cm–1 m wide

MAUVE, WHITE, PINK



Scale 1:2

Brachyscome multifida var. *dilatata*



Scale 1:2

Brachyscome multifida var. *multifida*

is even more easily grown than var. *dilatata*. For example, it has been used in median strip planting in inland Victoria. This variety occurs in open forests and grasslands in Vic, NSW and Qld.

Similar species: *B. rigidula* has similar divided foliage, but can be distinguished by its glandular-hairy leaves and its winged achene.

Brachyscome nivalis

Snow Daisy
(nivalis = snowy, white)

This handsome perennial is regarded by some as the most spectacular of the alpine daisies. There are two varieties, var. *alpina* and var. *nivalis*, both of alpine origin, separated only on the appearance of their leaves. Var. *nivalis* is more popular in cultivation. It forms a tight clump of shining, bright green, ferny leaves from which strong stems arise, each one bearing a single white flower-head, 2–4 cm across, with a golden yellow disc centre. The doubly divided leaves, 5–15 cm long, are mostly in a rosette at the base of the plant, but sometimes smaller, usually linear leaves appear on the stem. Although each rosette of leaves is only 5–8 cm across, many rosettes together form clumps 30 cm or so in diameter.

A blue form of var. *nivalis* has been recorded near Blue Lake in the Kosciusko National Park.

Flowering period: Summer to early autumn in its natural habitat. In cultivation this daisy may start flowering in spring.

Propagation: Seed germinates well in eight to forty days in autumn, but is not readily available. Plants are easily propagated by division and also from stem cuttings.

Cultivation and uses: Var. *nivalis* is often stocked by alpine plant nursery proprietors, but is rarely to be found in native plant nurseries. Both varieties grow well in cultivation if open conditions, light shade and moist soil can be provided. Summer watering and root protection are essential because plants will die back as soon as the soil dries out. Sometimes they will shoot again after autumn rains, but only if the root system has remained cool.

Plants tolerate frost to –5°C and have survived an English winter in close-packed pots placed outside. They resent tropical or subtropical conditions, and would probably not be suitable for coastal planting.

Both varieties make attractive rockery, container or bog plants and are ideal for alpine gardens.

Distribution and habitat: Vic, ACT, NSW. Occurs in alpine and subalpine regions, in damp sites along streams, or in the deep soil of rock crevices.

Varieties: Var. *alpina* differs only in its leaves which are linear or spoon-shaped, 3–8 cm long, usually with entire margins, but sometimes with spur-like projections or irregular lobes. Some pink-budded forms of this variety have been seen, in which the opened heads have a pinkish tinge. It has the same distribution and habitat as var. *nivalis*. (Syn. *B. cardiocarpa* var. *alpina*, *B. tadgellii*.)

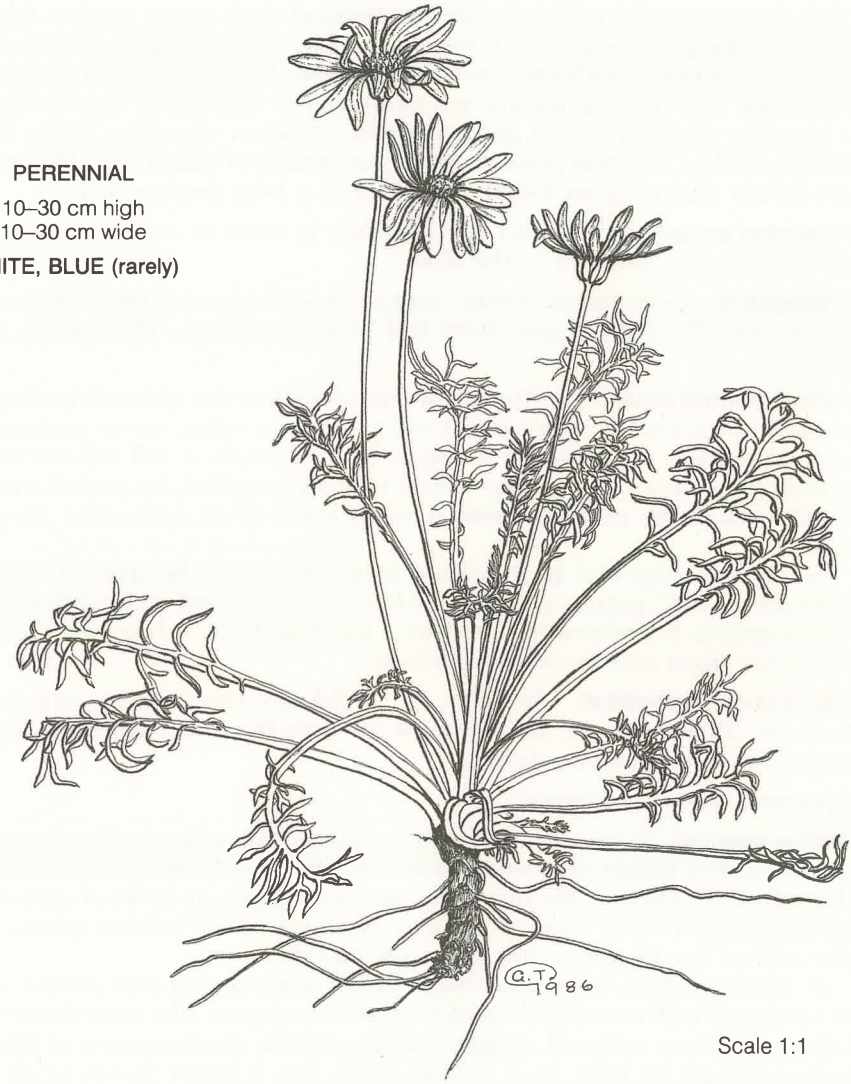
Similar species: *B. cardiocarpa* has a similar achene, but always occurs at lower altitudes and is readily distinguished by its narrow, grass-like leaves.

B. stolonifera is vegetatively similar to very small forms of *B. nivalis* var. *alpina*, but can be distinguished by its achene.

PERENNIAL

10–30 cm high
10–30 cm wide

WHITE, BLUE (rarely)



Scale 1:1

Brachyscome nivalis var. *nivalis*

Brachyscome scapigera

Tufted Daisy
(scapigera = having a leafless stem)

This neat perennial grows as a dense clump of dark green, smooth leaves, 8–12 cm long or longer, with strong flexible stems rising well above the foliage, each tipped with a mauve or white flower-head, 2.5–3 cm in diameter. Although flowering stems are not produced in abundance this species is a pleasing addition to the garden for its attractive clumping habit. Each stem is leafless, but may possess one or two small leaf-like bracts. The leaves are always entire, never lobed, and taper to a long slender stalk.

Flowering period: Spring, but intermittently in summer and autumn in the garden; usually summer in the alps.

Propagation: Germinates readily from fresh seed after ten days when sown in autumn. By division and from leaf or root cuttings. This species self-sows.

Cultivation and uses: Not often grown in cultivation, this species has adapted to garden conditions with ease. It will grow in an open, sunny position or in semi-shade and, although it responds to moisture, it will tolerate moderately dry conditions. If it has to deal with an extended dry period it tends to die back to the perennial root. Usually it will shoot again after autumn rains.

Snails and slugs love it, so control measures should be taken. It is frost tolerant to –5°C; pots in a cold frame have even survived an English winter.

B. scapigera is eminently suited to a small rockery, a bog garden, as a container plant and for alpine gardens.

Distribution and habitat: Vic, NSW, ACT, Qld. Occurs in a variety of habitats from the alps to the sea, but it is most common in swampy places in alpine herbfields and subalpine forests.

Synonym: *Senecio scapigera.*

Similar species: *B. nivalis* var. *alpina* is similar, with a basal tuft of smooth, usually entire leaves and white flower-heads. It may be distinguished by the soft, fine hairs on the flowering stem (or scape), its habit of spreading by stolons and by its winged achenes. *B. scapigera* has hairless scapes and the achene has no wing, only a narrow margin.

B. obovata, which has white flower-heads often tinged with mauve, may be confused with a narrow-leaved form of *B. scapigera*. The main difference between the two is that *B. scapigera* always has the dead remains of former leaves around its base. It is usually taller, has a larger flower-head and about twice as many petal-like ray florets.

PERENNIAL

10–30 cm high
10–30 cm wide

WHITE, MAUVE

Scale 1:1

Brachyscome scapigera

Brachyscome segmentosa

Lord Howe Island Daisy
(segmentum = to cut)

A robust, branching, almost hairless perennial, 30–40 cm tall, with bright green lobed leaves 3–6.5 cm long. Large white flower-heads, 2.5–4 cm in diameter, appear singly at the ends of stems 20 cm long.

Flowering period: In its natural habitat it flowers from spring to late autumn. Under cultivation it often flowers all year.

Propagation: From seed and cuttings, or by division. It germinates readily in seven to fourteen days and will self-sow in the garden. Cuttings strike easily, in two to three weeks with bottom heat and misting.

Cultivation and uses: If it has moderately moist soil this species is easily grown and will layer itself readily. It prefers a sunny position with part shade in summer, but will become leggy if not pruned regularly. Sap sucking insects may attack this species, but they may be controlled by spraying (see page 13).

Ideal as a low shrubby plant in the garden, and a worthy subject for containers. It may also be used in a rockery, as a bog plant and in exposed coastal conditions.

It is a good cut flower as it lasts up to two weeks and, unlike other brachyscomes, the bracts remain open at night. It is very similar to the European *Chrysanthemum*, with the advantage that the vase water remains sweet smelling.

Distribution and habitat: Endemic to Lord Howe Island (NSW) growing on moist, rocky ledges above 350 m.

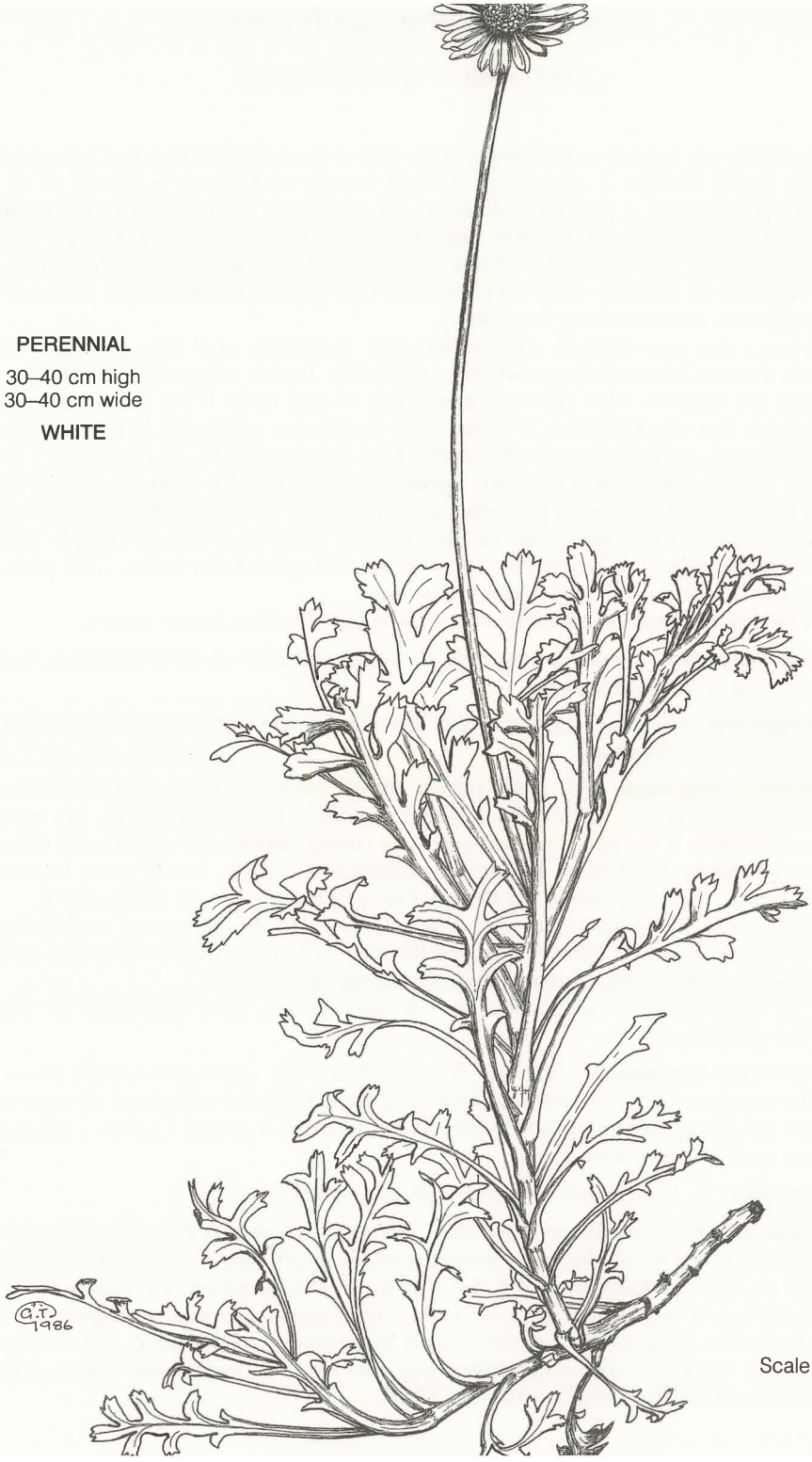
Similar species: *B. diversifolia* var. *maritima* is closest to *B. segmentosa* and both are found on islands. They are robust perennials with large white flower-heads and deeply lobed and divided leaves, but the former has thicker, fleshier leaves which are usually longer (to 12 cm). The achene of *B. segmentosa* is smaller (2 mm by 1 mm) and the pappus less obliquely placed.

Special notes: It has been speculated that seed of *B. diversifolia* may have been carried to Lord Howe Island on the feet of a bird originally, and that it has developed in isolation and now differs from the parent species.

PERENNIAL

30–40 cm high
30–40 cm wide

WHITE



Scale 1:1

Brachyscome spathulata

(spathulata = spoon-shaped)

A variable perennial with conspicuous mauve-blue flower-heads. This plant takes many forms; it may have a basal rosette and no stem leaves or no basal rosette and a number of leaves on the stem. Usually only one stem arises from each basal rosette, but there may be two or even three. The stems may be unbranched or have one or two branches, and the habit may be delicate or robust. The variability in this species is correlated with differences in chromosome number.

There are two named subspecies, ssp. *spathulata* and ssp. *glabra*. The Study Group has mainly grown ssp. *spathulata*. In this subspecies the flower-heads are mauve, with the rare exception of one form from Mt Kosciusko in which the ray florets are white. The heads are relatively large, 3–4 cm in diameter, and appear at the ends of stems usually 20–25 cm long. The lower leaves, 4–6 cm long, are spoon-shaped, usually stalked, lobed or toothed and often have a purplish undersurface, denoting the presence of anthocyanin. They decrease in size up the stem to 2 cm in length and become narrower. The stems are covered with glandular hairs. The plant spreads by means of underground stems.

The Mt Buffalo form differs in that it has stalkless lower leaves.

Flowering period: From late spring through summer to early autumn, but flowering is not continuous.

Propagation: Fresh seed germinates in fourteen days. Also propagate from cuttings or by division.

Cultivation and uses: For some time a robust form has been available from Victorian nurseries under the name *B. aculeata*, but other forms are new to cultivation. This plant grows best in a clump within the shelter of trees, grass or open shrubbery, preferring dappled sunlight. It will grow in sun if its roots are adequately protected, but will be smaller in all its parts.

All forms like moist peaty soil. They die back to the perennial root if the soil becomes too dry. They withstand frost to –5°C and will grow in protected coastal situations. Snails and slugs thrive on the foliage.

Use in pockets or in a rockery, for pot culture, as a bog plant or for alpine gardens.

Distribution and habitat: Vic, ACT and NSW. Ssp. *spathulata* occurs above 900 m and is widely distributed from the New England tableland along the Great Dividing Range to the Grampians in western Victoria. It grows among rocks and in open woodland.

Synonyms: *B. scapiformis* var. *puberula*, *B. aculeata*.

Special notes: *Brachyscome spathulata*, formerly known as *B. scapiformis*, was included in the *B. aculeata* complex for many years (see page 64). Following work on the cell biology of all the species in the complex, Dr Helen Stace removed it to specific status in 1981. This species is now recognized as *B. spathulata* because it had first been described by Charles Gaudichaud-Beaupré in 1826 and thus takes priority over *B. scapiformis* which had been described by De Candolle in 1836.

PERENNIAL

15–30 cm high
10–20 cm wide

MAUVE, WHITE (rarely)

Scale 1:2

Brachyscome spathulata

Subspecies: Ssp. *glabra* also has mauve (rarely white) ray florets and otherwise looks the same. A study of the cell biology has shown that the chromosomes of each subspecies are distinctly different in their physical appearance. This is the basis of the separation into subspecies. Ssp. *glabra* occurs only in Tasmania. It is found at the coast and inland up to 1500 m. (Syn. *B. scapiformis* var. *glabra*.)

Similar species: *B. spathulata* differs from *B. aculeata* in that it has mauve ray florets (with rare exceptions), the involucral bracts are narrow with acute, drawn out tips, the undersurfaces of the leaves are usually purplish and the plants are smaller.

Brachyscome tenuiscapa

Mountain Daisy
(tenuiscapa = with a slender stem)

A tufted perennial with mauve or white flower-heads, spreading by stolons to form large patches. There are two recognized varieties, one of which appears to have more horticultural potential than the other. *B. tenuiscapa* var. *pubescens* has mauve heads, 2–2.5 cm in diameter, at the tips of slender, upright stems to 15 cm in length. Each head has fifty or more mauve ray florets. The light green, spoon-shaped leaves, 7–13 cm long and 1.5–2.5 cm wide are quite stiff, with long, slender stalks, and have an easily visible sprinkling of short hairs on the upper surfaces and margins. The leaves are mostly in a basal clump. Only about three small leaves can be seen on the flowering stem, which also bears short, white hairs. The achenes are smooth and black.

Flowering period: Spring and summer.

Propagation: From seed or division of stolons. Seed is not yet on the market.

Cultivation and uses: Var. *pubescens* is still rare in cultivation, but it should become a very popular addition to the range of small ground covering plants because it spreads quickly. It should be planted where it receives full sun in winter and some shade in summer. Root protection and moisture in hot dry weather are also important. It is frost tolerant to –5°C.

Makes a good rockery or container plant and could be used as a ground cover.

Distribution and habitat: Vic, Tas, NSW and Qld. Occurs in open forest in well drained soils.

Varieties: Var. *tenuiscapa* differs from var. *pubescens* in that the slightly fleshy leaves are shorter, 1–3 cm long and 0.6–1 cm broad. The flower-head usually has thirty-three ray florets or less and the flowering period is mainly summer. This variety occurs in the highlands of Tas and the alpine herb-fields of Vic and NSW, where it grows in permanently damp seepage areas. (Syn. *B. alpina*, *B. scapiformis* var. *tenuiscapa*.)

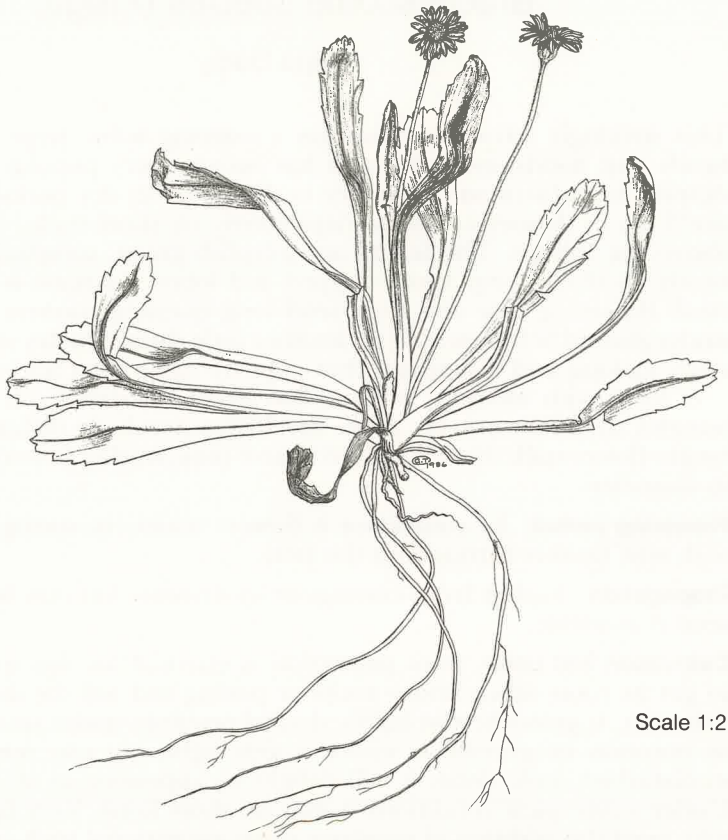
Similar species: Var. *tenuiscapa* may be confused with small forms of *B. spathulata*, but is distinguished by the achene which has no wing.

Var. *pubescens* is similar to *B. decipiens* and was thought to be a variety of the latter species. *B. decipiens* can be distinguished by its leaves which are hairless, flaccid and larger, up to 16 cm long and 3 cm broad. The dark brown achenes have long, straight hairs on both surfaces.

PERENNIAL

10–25 cm high
20–40 cm wide

MAUVE, WHITE



Scale 1:2

Brachyscome tenuiscapa var. *pubescens*

Brachyscome species (Pilliga)

Pilliga Daisy

This strikingly attractive daisy has a roaming habit, large cerise flower-heads and handsome foliage. It has become very popular in cultivation despite its unfortunate tendency to disappear in dry periods. The heads are 3 cm in diameter, held conspicuously on short stalks, 5–10 cm long, above the foliage. The leaves are purplish-green, sometimes purple beneath, 5–10 cm long, spoon-shaped and lobed. Its habit is to establish a small flowering base and then send long questing runners as far as 2 m underground before setting up another little clump. In dry weather it turns rusty looking and disappears, but pops up again after autumn rains.

A form with identical achenes has been collected from the Warrumbungles in NSW, not far from the Pilliga Scrub. It differs in having a longer flower stalk, 10–15 cm, and mauve-pink, smaller flower-heads, 2.5 cm in diameter.

Flowering period: In cultivation it flowers mainly in spring and autumn, with odd flowers throughout the year.

Propagation: Easiest from cuttings or by division, but may be grown from seed if available.

Cultivation and uses: Root protection is essential for this species. It loves to get its roots down under rocks or paving and will die down if the soil dries out. It grows best in lightly shaded positions under small plants, such as boronias or grevilleas, where it gets light, but can remain cool and undisturbed. Left alone, it will delight by appearing in all sorts of spots. Under subtropical conditions it may be short lived. Very light sandy soil may need the addition of moisture retaining material such as peat moss or leaf mould. It is frost resistant.

Use as a colonizing plant in the garden or rockery in the full expectation that it will wander and probably disappear from its original position. It is an excellent plant for a pot, hanging basket or wooden planter box and can be used in a bog garden.

A fresh posy lasts two to three days in water.

Special notes: This daisy was first collected from the Pilliga Scrub in the north-western slopes area of NSW. It was thought to be *B. melanocarpa*, perhaps because its achenes were very similar in appearance, but brown rather than black. It is now held to be a new species, as yet undescribed botanically, but suffering meanwhile from a rash of names such as *B.* species aff. *melanocarpa* (meaning 'like' or with an affinity for *B. melanocarpa*), *B.* 'Pilliga Posy', *B.* 'Rosy Morn'. (Some nurseries have sold this species under the name 'B. pilligaensis', but this name has never been published so it has no botanical validity and should never be used.)

In 1984 the Plant Promotion Group of the WA Association of Nurserymen chose the species as the 'Diamond Release' and dubbed it *Brachyscome* 'Tinker Bell'.

It still awaits a botanical description and suitable botanical name.

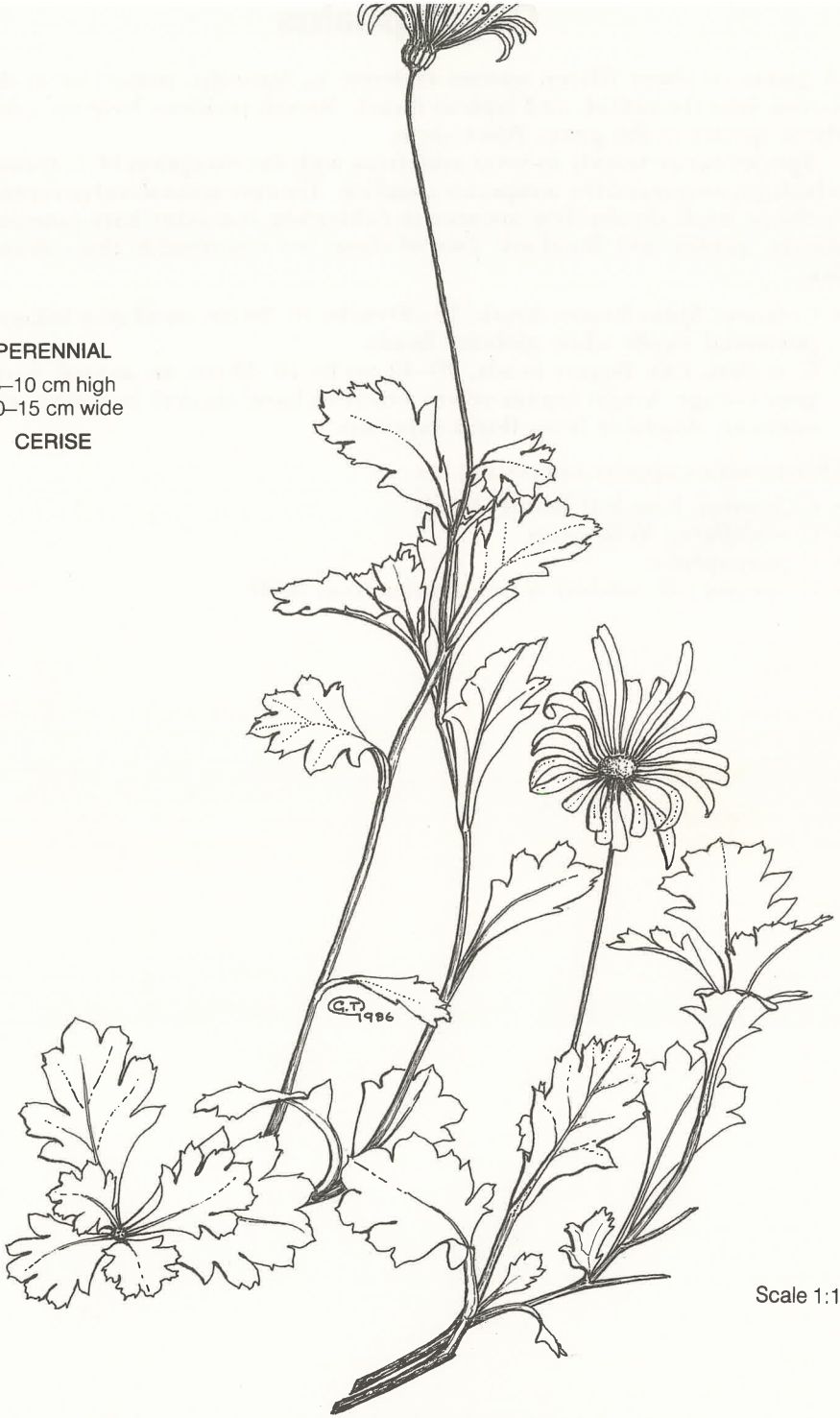
Distribution and habitat: NSW, apparently restricted to the Pilliga Scrub, and Warrumbungles.

Synonyms: See special notes.

PERENNIAL

5–10 cm high
10–15 cm wide

CERISE



Scale 1:1

Brachyscome species 'Pilliga'

Calocephalus

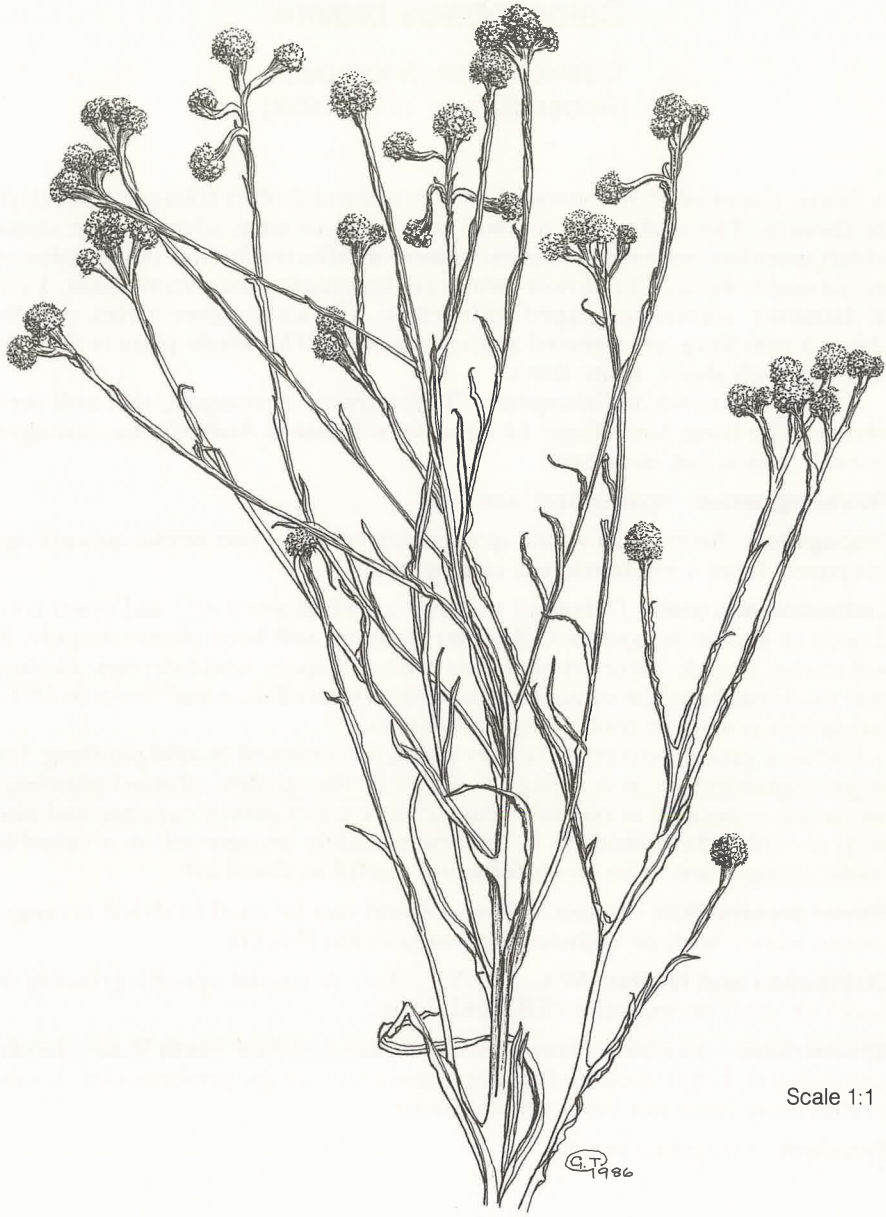
A genus of about fifteen species endemic to Australia, named from the Greek *kalos* (beautiful) and *kephala* (head). Recent revisions have included three species in the genus *Blennospora*.

Species occur mainly in semi-arid areas with the exception of *C. brownii* which grows around the temperate coastline. They are annual and perennial herbs or small shrubs. Few are seen in cultivation, but many have potential for the garden and floral art. Two of these, not described in this volume, are:

- *C. lacteus*, Milky Beauty-heads, 15–30 cm by 10–30 cm, small grey foliaged perennial, single white globular heads.
- *C. sonderi*, Pale Beauty-heads, 20–40 cm by 10–30 cm, an annual, furry grey foliage, bright lemon-yellow heads in loose clusters in spring and summer. Available from florist suppliers.

Others which appear interesting are:

- *C. francisii*, Fine-leaf Beauty-heads
- *C. multiflorus*, Yellow-top
- *C. platycephalus*
- *C.* species (aff. *sonderi*), a new species from NSW.



Scale 1:1

Calocephalus sonderi

Calocephalus brownii

Cushion-bush, Snow-bush
(Robert Brown, 1773–1858)

A dense, rounded shrub grown for its ornamental silver foliage rather than its flowers. The cushion is formed by a mass of wiry, silvery-white stems which interlace to form a compact dome unaffected by the fierce gales of its natural habitat. The flower-heads are inconspicuous creamy balls, 1 cm in diameter, sometimes tinged with yellow. The small, silver leaves, usually about 5 mm long, are pressed against the stem. The whole plant is densely covered with short, white hairs.

A cultivar known as *Calocephalus* 'White Dwarf' is compact, tidy and very silvery. The form from Cape Le Grande in Western Australia has stronger growth, but is not as dense.

Flowering period: Spring and summer.

Propagation: From seed which germinates in about two weeks, or cuttings prepared from semi-hardened new growth.

Cultivation and uses: *C. brownii* requires a well-drained soil and open conditions if it is to be compact. Regular pruning will keep plants shapely. It will thrive in gale force winds laden with salt spray and tolerates alkaline and moderately saline soils. It withstands dry conditions and frosts to –5°C, but grows poorly in cool, humid situations.

Use as a ground cover, a rockery plant, for exposed coastal planting, for large containers or as a foliage contrast in the garden. Massed plantings on banks, especially in coastal areas, achieve a soft silvery expanse and also help in soil stabilization. It is becoming widely recognized as a valuable landscaping plant. The fresh foliage is useful in floral art.

Flower preservation: Foliage dries well and can be used in dried arrangements, either with or without the insignificant flowers.

Distribution and habitat: WA, SA, Vic, Tas. A coastal species growing in rocks or sand on exposed cliffs and dunes.

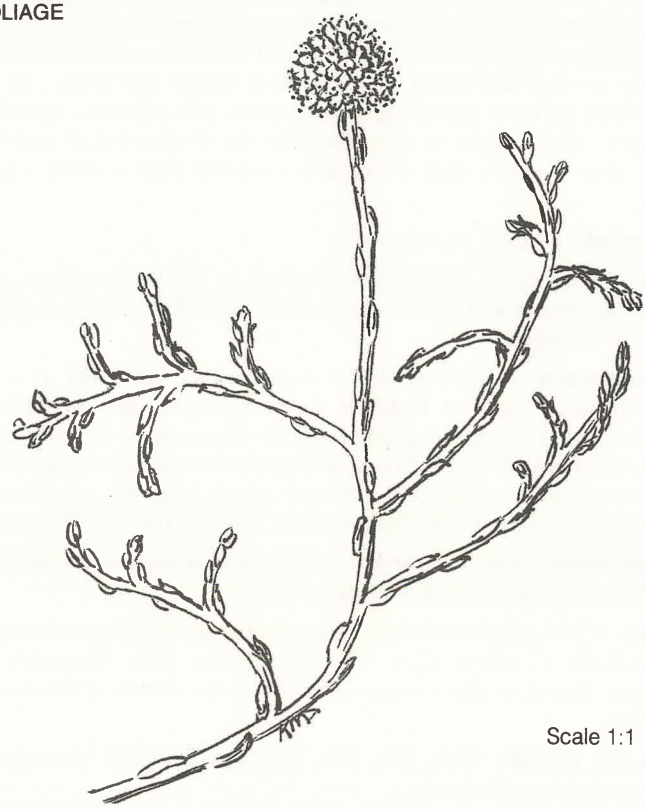
Special notes: The most recent census of plants of New South Wales (Jacobs and Pickard, 1981) observes that previous records of the presence of *C. brownii* in that state have not been substantiated.

Synonym: *Leucophyta brownii.*

SHRUB

0.5–1.5 m high
1.0–1.5 m wide

SILVER FOLIAGE



Scale 1:1

Calocephalus brownii

Calocephalus citreus

Lemon Beauty-heads
(citreus = lemon)

A tufted, long-flowering perennial with firm silver foliage and lemon-yellow heads. Slender stems arise from a basal clump, each bearing a single, small, globular or cylindrical flower-head, about 5 mm in diameter. The grey stems are usually erect, but tend to arch in cultivation. Since each plant can produce fifty to one hundred of these fine stems the effect of a mass of plants in flower is very pleasing. The leaves are narrow, usually 1–3 cm long or longer, decreasing in size towards the flower-head and held erect against the stem. Leaves and stems are covered with a close mat of short white hairs.

Flowering period: Spring to summer.

Propagation: From seed which germinates in six to fourteen days from autumn sowing, but is not yet commercially available. Also propagate from cuttings or by division.

Cultivation and uses: *C. citreus* likes a sunny, open position. It will tolerate most soils; in hard clay its habit is more upright. It will withstand dry conditions, but also seems to grow happily in pools of water during rainy periods. It is tolerant of –5°C of frost and grows in exposed coastal situations.

Use as an edging, border or rockery plant and for containers. Some forms could be tried in a hanging basket. Useful for cut flowers.

Flower preservation: The heads dry very well and look sweet in posies. Pick when the flower-heads develop their colour.

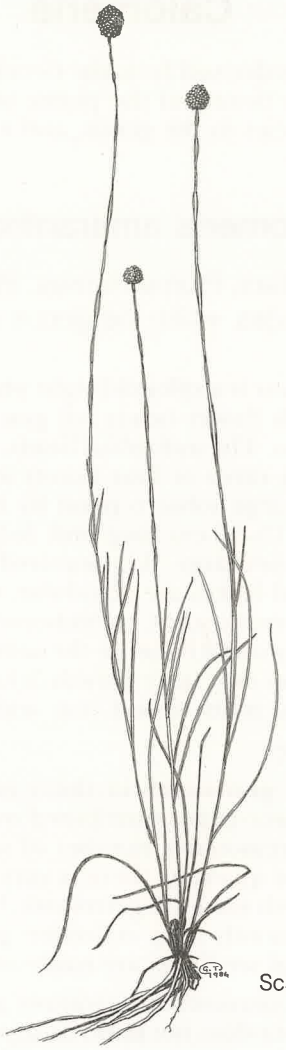
Special notes: *Calocephalus citreus* Lessing (which is the plant described here) does not include *C. citreus* C.A. Gardner from WA. However, *C. citreus* Lessing is now listed in the *Census of the Vascular Plants of Western Australia* (Green, 1985).

Distribution and habitat: WA, SA, Vic, Tas, ACT, NSW. Grasslands, open woodlands and dry tablelands.

PERENNIAL

20–30 cm high
20–50 cm wide

LEMON-YELLOW



Scale 1:2

Calocephalus citreus

Calomeria

The name of the genus is derived from the Greek *kalos* (beautiful) and *meris* (a part), referring to the beauty of the plume of flower-heads.

There is only one species in the genus, and it is endemic to Australia.

Calomeria amaranthoides

Incense Plant, Plume Humea, Plume Bush
(amaranthoides = like the genus *Amaranthus*)

This unusual, elegant plant is a splendid sight when tresses of dainty, satin-surfaced, pink or reddish flower-heads fall gracefully from the tip of the stem for a length of 1–2 m. The individual heads, 4–6 mm long, are narrow, pointed and contain only three or four florets within the colourful bracts. The plant resembles a large tobacco plant by reason of its large, bright green, wrinkled leaves, 15–30 cm long and 5–15 cm wide, decreasing in size up the stem. These very large, thin-textured leaves have stem-clasping bases and both stems and leaves are glandular, sticky to the touch.

A pervasive, heady aromatic scent, reminiscent of Red Cedar or hautbois strawberries, fills the air around it, hence the common name, Incense Plant. As it is biennial it produces only leafy growth in its first year, the spectacular plumes of flowers appear in its second year and then the plant dies.

Flowering period: Summer.

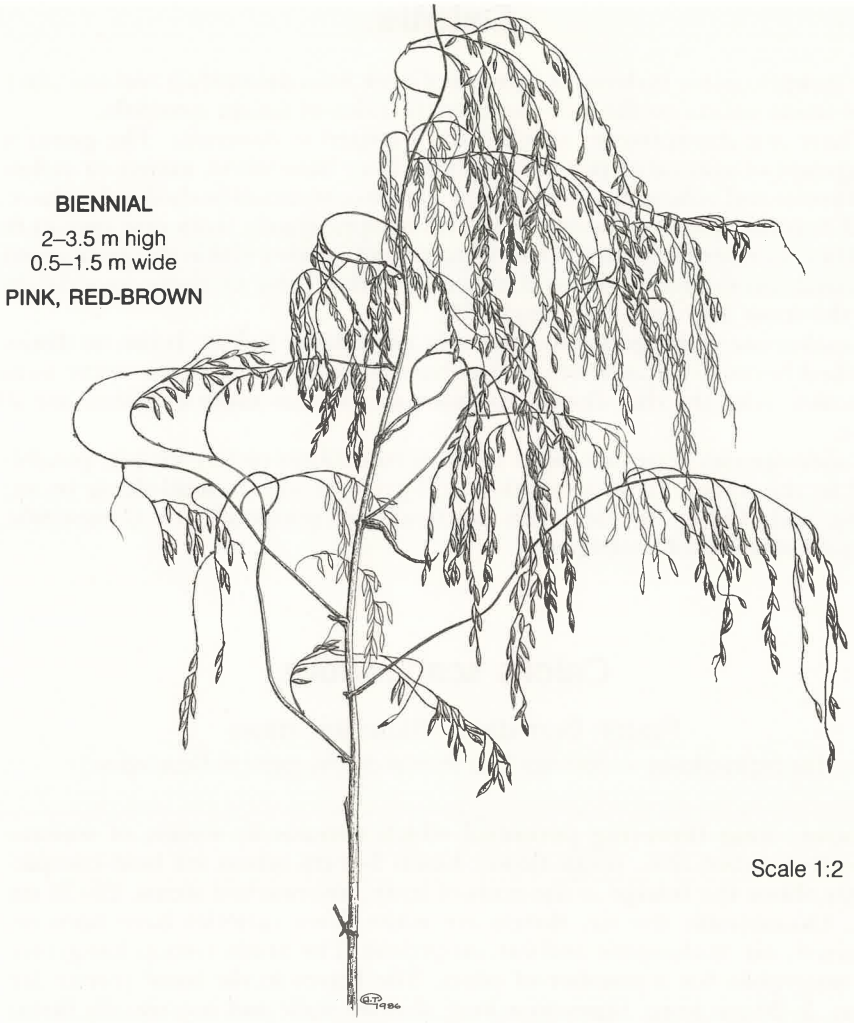
Propagation: Fresh seed germinates in thirty to fifty days in autumn. A generous handful of flower-heads distributed over the surface of the seed raising mix results in a reasonable number of seedlings. Although plants produce heads in prolific quantity, there is very little viable seed in them. It is claimed that only fresh seed will germinate, but seed sown by the Study Group more than one month after collection germinated successfully. It regenerates naturally and seedlings are easily transplanted.

Cultivation and uses: *C. amaranthoides* requires a cool, moist root run, especially in hot weather, but does not mind its superstructure in sun or semi-shade. Pruning induces branching and the production of multiple flowering panicles. It is frost tender but grows near the coast in well-protected positions.

This is a specialist plant for the keen collector or floral art expert. As its leaves are not particularly attractive, the plant should be positioned in the shrubbery where the beautiful flower-heads will be seen but the foliage hidden. A very showy cut flower.

Flower preservation: The heads of the Incense Plant dry very well and the plumes add magnificence to dried arrangements. The aromatic scent may be too powerful for potpourri.

Special notes: As *Humea elegans*, or Rose-coloured Humea, this plant was originally described from a plant growing in Empress Josephine's garden in 1804. Smith also described it in his *Exotic Botany* from a plant grown by Lady Hume in her large collection at Wormleybury, Herts. She was given the seed by Sir Joseph Banks and the species was named in her honour at



Calomeria amaranthoides

that time. It was a collector's item for European gardens early in the last century.

Calomeria plants in containers used to be placed in ballrooms because the scent was thought to be aphrodisiac.

Distribution and habitat: Vic, NSW. Moist rainforest, river flats and warm coastal valleys. It extends from the Blue Mountains to Orbost, with an isolated colony in the Grampians.

Synonym: *Humea elegans*

Calotis

The generic name is derived from the Greek *kalos* (beautiful) and *otos* (ear). This name refers to the two ear-shaped scales of *Calotis cuneifolia*.

There are about twenty species, all restricted to Australia. The genus is composed of annual or perennial herbs. They have white, mauve or yellow ray florets and yellow disc florets. The pappus consists of barbed or feathery, rigid bristles (awns) or scales. It differs in appearance from one species to another, as does the achene. Identification of species within the genus rests primarily on the form, size and structure of the fruits. Of these, awn details are the most important (see page 54).

Brachyscome is the genus most closely resembling *Calotis*. It can be distinguished because the achenes of *Brachyscome* have pappus hairs, never awns or scales. Also the disc florets are bisexual whereas those of *Calotis* are all male.

Calotis species have not been used in cultivation to any extent, possibly due to the burrs. In general, they will grow in sun or semi-shade in any moist soil. Other species with horticultural potential are *C. cuneifolia*, *C. multicaulis* and *C. scapigera*.

Calotis scabiosifolia

Rough Burr-daisy, Blue Burr-daisy
(scabiosifolia = leaves like those of the genus *Scabiosa*)

A showy, long flowering perennial which spreads by means of stolons. Attractive, satiny lilac, single flower-heads 3–4 cm across are held conspicuously above the foliage at the ends of leafy, unbranched stems, 20–30 cm long. Occasionally the ray florets are white. Two varieties have been recognized, var. *scabiosifolia* and var. *integrifolia*. The Study Group has grown var. *integrifolia* for a number of years. The leaves in the basal rosette are green, 5–20 cm long, taper to a long slender stalk and are usually linear with entire margins, but may have a few teeth towards the tip. The stem leaves are shorter, 1–3 cm long, stalkless and often sharply toothed. Stems and leaves are usually covered with short bristles, but may occasionally be completely smooth. As the plant gets older the stems may branch at the base. The achene is a burr with small stiff spines.

Flowering period: Mainly spring in the wild, but flowering can extend into autumn, especially in subalpine areas. Under cultivation flowering may begin in late winter. After the spring flush plants produce flowers intermittently.

Propagation: From cuttings or by division. No germination has resulted from seed collected from garden grown plants. It is probable that infertile fruits were produced in the absence of cross-pollination.

Cultivation and uses: Var. *integrifolia* is rarely seen in cultivation, but is so attractive that it deserves greater recognition despite the disadvantage that plants produce burrs. It grows in sun or semi-shade and is not fussy as to

PERENNIAL
30–50 cm high
30–80 cm wide
LILAC, WHITE

Calotis scabiosifolia var. *integrifolia*

soil. It tolerates frost and snow, and appreciates water during long dry spells.

Suitable for rockeries and containers and could be tried in a hanging basket. In the garden some lowland forms grow a trifle too enthusiastically and could overwhelm delicate plants growing nearby.

Distribution and habitat: Vic, NSW. Var. *integrifolia* occurs in grasslands and open forest from the highlands of Vic to the highlands and middle-western districts of NSW.

Varieties: Var. *scabiosifolia* differs from var. *integrifolia* in having broad, lance-shaped radical leaves with deep teeth or lobes. The achene is hairless on the central area whereas var. *integrifolia* has long white hairs pressed against the centre. Var. *scabiosifolia* is found in woodlands, grasslands and areas subject to periodic flooding, usually in clay soils (SA, Vic, ACT, NSW, Qld).

Scale 1:1

Helichrysum alpinum (above) and *Celmisia* species are both alpine plants

Celmisia

The generic name is derived from the Greek *Celmisios*, a son of the nymph, Alciope. The genus is closely related to the South African genus of the Asteraceae family known as *Alciope*. There are more than sixty species in the world, four are found in Australia, of which three are endemic, but the majority occur in New Zealand.

All the Australian species are perennial, rhizomatous herbs occurring in alpine areas. Their most notable feature is the basal tuft of silvery leaves. Single white flower-heads are held above the foliage. This genus is responsible for much of the breathtaking beauty of the alpine areas in summer.

Other Australian species are:

- *C. longifolia*, Snow Daisy, 10–30 cm by 20–40 cm, from high parts of the Blue Mountains, NSW.
- *C. saxifraga*, prostrate by 10–30 cm, from Tas.
- *C. sericophylla*, Silky Daisy, 10–20 cm by 20–40 cm, from Vic.

Celmisia asteliifolia

Snow Daisy, Silver Daisy
(asteliifolia = leaves like those of the genus *Astelia*)

A beautiful, tufted perennial with decorative silver foliage which alone makes it an asset in the garden. When crowned by large white flower-heads, sometimes flushed pink, standing aloft on strong white stems the effect is stunning. The heads, 4–6 cm across, have a yellow disc centre circled by crisp white, ray florets and are held erect on stems up to 30 cm long. The leaves are strap-shaped, 10–20 cm long and 2–8 mm wide, hairy on both surfaces when young, but becoming smooth, dull and silvery-green above, densely white beneath. Plants spread by forming more rosettes from underground stems. In alpine areas they form extensive mats which help to control erosion.

Flowering period: Summer in the alps, but under cultivation it may start flowering in spring.

Propagation: By division of rosettes or from seed. Fresh seed sown on the surface germinates in twenty to forty-five days in autumn. Viability seems to decrease with age, although seed has been found still viable at least six weeks after collection. Plants self-sow in sand mulches. Commercial seed is not available.

Cultivation and uses: Plants may be grown in sun or semi-shade in gritty or peaty soil. The roots should be protected by rocks and close planting of other small species and should never be allowed to dry out. Too much fertilizer leads to increased foliage development and decreased flowering. Unfortunately, plants tend to be short-lived in cultivation at lower altitudes, but are so beautiful that perseverance and patience are recommended. In England plants have survived and flowered for at least three years. It is frost and snow tolerant, will grow in protected coastal situations and is worth trying in exposed positions. An important future use may be for erosion control in alpine resorts where this daisy would be eminently more suitable than introduced grasses.

It is a handsome foliage plant. The bold white flower-heads make it an ideal choice for the rockery, for grouping or wherever a focus is required. It is a lovely container plant and can be stood in a saucer of water over the summer to prevent drying out. Plant in bog or alpine gardens.

Fresh flowers lend themselves to artistic arrangements.

Distribution and habitat: Vic, Tas, NSW. Alpine herbfields and grassy slopes above 1200 m, also in the Grampians on the higher peaks.

Synonym: *C. longifolia*.

Varieties: A Victorian population with longer, broader leaves, up to 30 cm long and 1–2 cm wide, is now known as *C. asteliifolia* var. *latifolia*.

Similar species: *C. asteliifolia* was formerly known as *C. longifolia* although the latter name now refers to the species endemic to the Blue Mountains, NSW. *C. longifolia* can be distinguished by its achenes which are longer than those of *C. asteliifolia*.

PERENNIAL

10–30 cm high
15–40 cm wide

WHITE

Scale 1:2

Celmisia asteliifolia

Special notes: Celmisias were common plants in cottage gardens last century, particularly *C. longifolia*, but are now not widely grown. They are available from specialist alpine plant nurseries and occasionally stocked by native plant nurseries.

Cephalipterum

Cephalipterum is a name derived from the Greek *kephale* (head) and *pteron* (wing). The genus is distinguished from other genera with compound heads by the conspicuous petal-like bracts on each individual flower-head. *Cephalipterum drummondii* is the only species in the genus.

Cephalipterum drummondii

(James Drummond, 1784–1863)

An erect annual with attractive pom-pom heads. Stems are unbranched, woolly at the top, and bear a cluster of individual stalkless heads grouped together to form a large, almost globular compound head, 4–5 cm in diameter. The bracts of each small head may be short or long (up to 1.8 cm long), but are very conspicuous. They vary from yellow to cream or white, and even pink has been recorded.

The leaves are green, 1–6 cm long, and sprinkled with short transparent hairs. Although the plants appear sturdy, stems and leaves are easily broken off or damaged.

Flowering period: July to October where it grows naturally; under cultivation it flowers in October to November from autumn sowing.

Propagation: From seed which germinates in ten to thirty days. The germination rate is not always good, but is improved by sowing the whole seed head. The flowers are sufficiently attractive and unusual to make the effort worthwhile. Yellow, cream and white forms are available from specialist seed merchants, and the pink form may be available in the near future.

Cultivation and uses: This species likes full sun and well-drained soils enriched with fertilizers. It will grow in a protected coastal situation.

The germination rate is not good enough to use it as a bedding plant despite the fact that it is magnificent when massed in the wild. It is hoped that the rate of germination can be increased by selection in the future.

Attractive as a rockery plant, in groups or pockets in the garden. Good cut flower.

Flower preservation: *C. drummondii* is very good for drying. Pick as soon as all the heads in the pom-pom have opened. Wiring is not so successful. This daisy is sometimes available as a dried flower from florist suppliers.

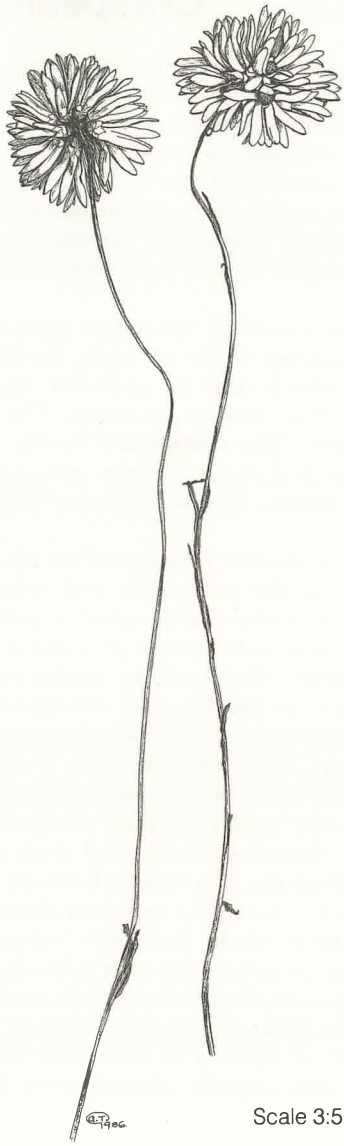
Distribution and habitat: WA, SA. Widespread in the mulga and wattle scrub in the west and in the plains, gullies and tree belt inland from the Bight. May be seen in masses along the North West Coastal Highway.

Yellow and white forms tend to occur in separate patches—the yellow on higher, drier land than the white.

ANNUAL

20–50 cm high
15–30 cm wide

LEMON, CREAM, WHITE, PINK (rarely)



Scale 3:5

Cephalipterum drummondii

Craspedia

The generic name is derived from the Greek *kraspedon* (a border or hem). It refers to the woolly fringe on the leaf margins of some forms of the New Zealand species, *Craspedia uniflora*.

The genus is confined to New Zealand and Australia. There is some doubt about the number of species occurring in Australia. Botanists put the figure at about twelve, but until a critical revision is completed numbers will remain uncertain. There are six species (designated *Craspedia* sp. A. to F.) in the Kosciusko alpine area alone which probably deserve specific rank.

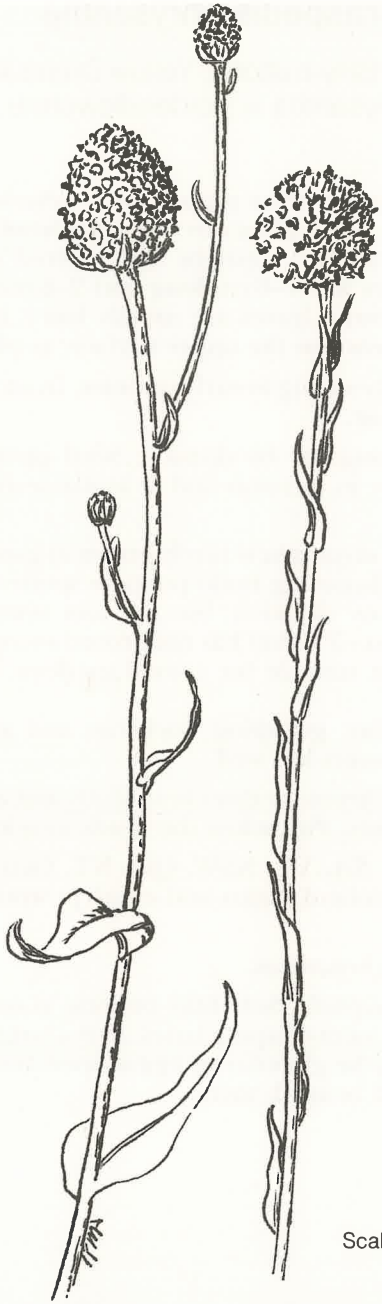
The genus is composed of annual or perennial herbs. Numerous partial heads (each containing three to eight florets) are clustered in a dense, compound head which may be globular, egg-shaped or cylindrical, and coloured bright yellow, orange or cream. The receptacle bears chaffy scales between each floret. The compound heads appear singly at the ends of quite stiff, unbranched stems. Leaves are usually in basal clumps and may also occur on the stems. The achenes are silky hairy with feathery pappus hairs.

Calocephalus have similar compound heads, but differ from *Craspedia* in having no scales on the receptacle and achenes which are covered with small pimple-like protuberances called papillae.

Craspedias are not well-known in cultivation, but can add colour and character to gardens. The lowland forms are not hard to grow, but the alpine forms appear to need special conditions. In general, craspedias prefer to grow in sun or semi-shade, adapt to most soils and benefit from extra moisture. In nature most species begin to develop after heavy rain when they sit in pools of water in low-lying areas or poorly drained soils. They often die back to the perennial root when the soil finally dries out. Craspedias are bright, cheerful plants, and their common names attest to their characters: Billy-buttons, Bachelor's Buttons and Drumsticks.

At least one more craspedia not described in this book should be tried in cultivation, *C. pleiocephala*, Soft Billy-buttons, 15–20 cm by 20–30 cm. It is a greyish annual or perennial with spherical heads, about 1.5 cm across, sometimes with two or three tiny heads nestled beneath them. It flowers from late winter to summer, but is at its best in spring. This species occurs inland in a variety of soils in all mainland states.

Propagation of all *Craspedia* species is easy from fresh seed or by division.



Scale 1:1

Craspedia pleiocephala (form from Roxby Downs Station, S.A.)

Craspedia pleiocephala (form from Gawler Ranges, S.A.)

Craspedia chrysantha

Golden Billy-buttons, Yellow Drumsticks
(chrysantha = golden-flowered)

A perennial clump of leafy stems topped with spherical, golden flower-heads, 10–14 mm across. Each plant can carry fifty heads or more at a time. Stems are usually unbranched, upright and covered with white cottony hairs. The narrow leaves are 1–6 cm long and 2–8 mm wide, decreasing in size up the stems. Young leaves are usually hairy, but the firm, white hairs are often lost, at least on the upper surface, as plants age.

Flowering period: Usually spring to early summer. In warmer climates flowering may start in August.

Propagation: From cuttings or by division. Seed germinates in eight to twenty days when sown in autumn and is available from specialist seed stockists.

Cultivation and uses: *C. chrysantha* is rarely grown in gardens, but is gaining a reputation as a long-flowering multi-purpose species. It adapts to most soils and prefers a sunny situation, but the root system should be kept moist. It tolerates frost to –5°C, but has not proved successful in subtropical conditions. It should be suitable for coastal gardens. Bait for snails and slugs.

Use for massed display, grouping, rockeries and as a bog garden or container plant. Cut flowers last well.

Flower preservation: *C. chrysantha* dries beautifully and adds interest to posies or dried arrangements. Pick when the heads develop their colour.

Distribution and habitat: SA, Vic, NSW, Qld, NT. Occurs on basalt plains near Melbourne, open inland plains and eucalypt woodlands, on clays or sandy loams.

Synonym: *Calocephalus chrysanthus.*

Similar species: *C. pleiocephala*, Soft Billy-buttons, is usually an annual. It has greener leaves with stem-clasping bases, and a larger head, 15–20 mm in diameter. Heads may be globular or egg-shaped and often have two or three tiny heads nestled beneath them.

PERENNIAL

25–45 cm high
30–50 cm wide

YELLOW

Scale 1:1

Craspedia chrysantha

Craspedia glauca

Common Billy-buttons, Bachelor's Buttons
(glauca = with white or grey bloom)

A bright perennial, generally regarded with great affection, as suggested by its common names. *Craspedia glauca* is an extremely variable species. Many forms grow in diverse habitats and differ markedly, one from another.

The easiest form to grow is probably a lowland coastal form. Straight stems, about 60 cm long, arise from a basal clump of soft, green, hairy leaves. Each stem bears a single, bright golden head, 2–2.5 cm across, usually flattened, not spherical, more like a sphere cut in half. The stem leaves are 7 cm long and 0.6 cm wide, decreasing in size up the stem, with stem-clasping bases. Leaves and stems have a few scattered, short, white hairs.

Many other forms have been described from alpine areas, differing in size and colour of the heads, leaves and degree and type of hairiness of the plant. One very ornamental form has orange heads and glandular hairs on the leaves and bracts. Some of these forms may deserve specific rank, but until the *C. glauca* group is revised by botanists the situation remains confused.

Flowering period: Usually spring and summer, but in some areas flowering begins in winter.

Propagation: By division or from seed which germinates in fourteen to thirty days from autumn sowings. Seed is not yet available commercially.

Cultivation and uses: *C. glauca* adapts to most soils and prefers semi-shade. If it is grown in full sun it needs protection for its roots, such as that provided by close planting of other small herbs. Although good drainage is an advantage, it benefits from regular watering in hot dry periods, and grows happily in soils which are water-logged in winter. Plants may die back after flowering, but spring up again after good autumn rains. It is tolerant of frost to –5°C, and grows at the coast in protected situations. Plants need constant baiting for snails and slugs.

Scatter Billy-buttons in the garden, and plant in rockeries or in containers. Good cut flowers.

Flower preservation: Flower-heads tend to lose their colour when dried and would need to be tinted for floral art work. Other species in the genus are more successfully preserved.

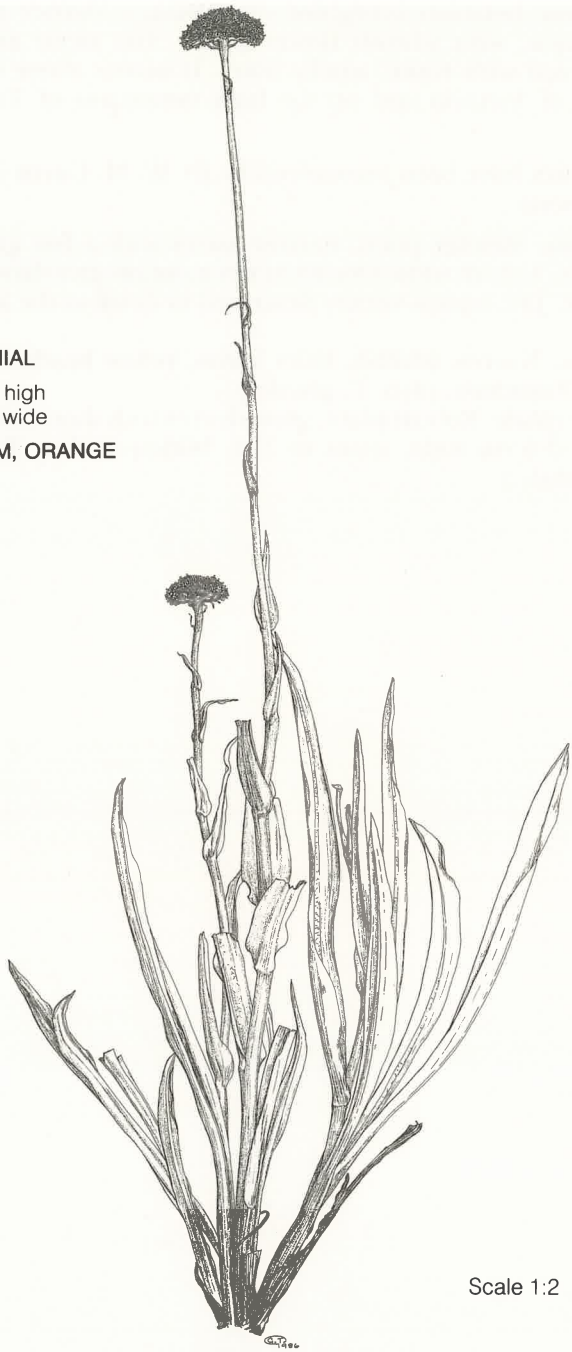
Distribution and habitat: WA, SA, Vic, Tas, NSW, ACT, Qld. Widespread from the coast to alpine regions and inland. Occurs in damp grasslands, in forest, in alpine herbfields among rocks and at the margins of pools. In the drier inland it occurs on clay soils subject to periodic flooding and is usually associated with eucalypt woodland.

Special notes: Some authors have referred the Australian forms to *C. uniflora* Forst. f., a New Zealand species with a fringe of cottony white hairs on the leaf margins. Australian forms generally lack this character, so the species is now recognized by most authors as *Craspedia glauca*.

PERENNIAL

30–80 cm high
30–60 cm wide

YELLOW, CREAM, ORANGE



Scale 1:2

Craspedia glauca (inland form)

Varieties: Some botanists recognize var. *alpina*, a shorter plant than the typical *C. glauca*, with whitish flower-heads. The stems and foliage are densely covered with white, woolly hairs. It occurs above the treeline in alpine areas of Victoria and on the high mountains of Tasmania. (Syn. *C. alpina*.)

Four varieties have been recognized by Dr W. M. Curtis in *The Student's Flora of Tasmania*:

- Var. *glabrata*. Slender plant, narrow leaves with a few glandular hairs, white heads, 1–2 cm wide. Occurs in wet montane grassland in Tasmania.
- Var. *glauca*. The typical variety described in detail as the lowland coastal form.
- Var. *gracilis*. Narrow whitish, hairy leaves, yellow heads, 1.5–2 cm wide. Occurs in Tasmania. (Syn. *C. gracilis*.)
- Var. *macrocephala*. Robust plant, green leaves with short, stiff hairs, yellow heads, 2.5–3.5 cm wide, stems to 1 m. Widespread in Tasmania. (Syn. *C. macrocephala*.)

Scale 1:2

Craspedia globosa foliage

Craspedia globosa

Drumsticks
(globosa = globe-shaped)

A tufted perennial with silver foliage and strikingly large globular heads on long, stiff stems, 1–1.5 m long. The hard golden heads are 2.5–3.5 cm in diameter, shaped exactly like drumsticks, a shape which is retained when dried. Long strap-like leaves, 15–30 cm long and 0.3–2 cm wide, are densely hairy and occur mainly in a basal clump, with some small ones on the stems. Stems are woolly, unbranched and mostly leafless.

Flowering period: Late spring to summer.

Propagation: By division or from seed which germinates in five to twenty days in autumn. Seed is stocked by specialist seed merchants.

Cultivation and uses: Plant *C. globosa* in sun or semi-shade in an open position. It is easily grown in most soils and appreciates moisture to such an extent that it thrives in boggy conditions. It tolerates frost to –5°C but is not suitable for tropical or subtropical areas. In some places, such as Bendigo, Victoria, it is very long flowering. Cutting the flowers encourages new growth and usually produces a second flowering. Snails and slugs love craspedias.

This species has been grown commercially for the cut flower trade. It is suitable for bog and inland gardens, but its habit seems too untidy for containers. Planted closely in the garden or rockery the flowers are spectacular, and will last indefinitely when picked.

Flower preservation: *C. globosa* dries beautifully and looks magnificent in dried arrangements. Pick when the flower-head turns bright yellow and hang upside down for about three weeks until the stems have dried.

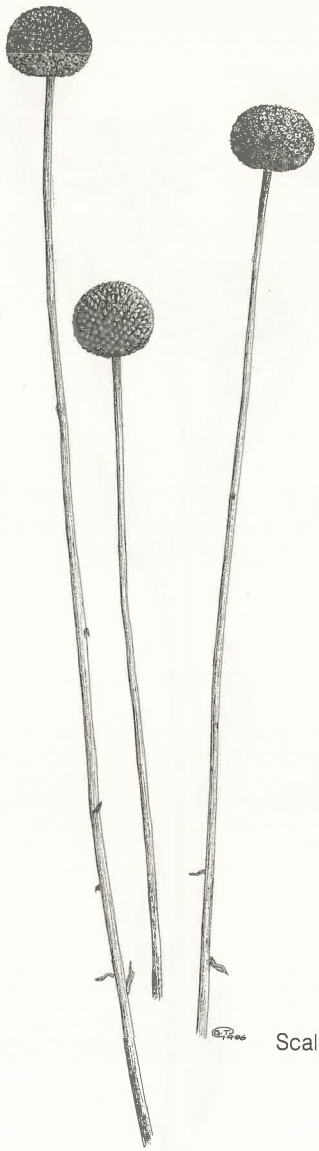
Distribution and habitat: SA, Vic, NSW, Qld. Usually occurs on clay soils in open grasslands or eucalypt woodlands.

Similar species: In general appearance some inland forms of *C. glauca* bear a resemblance to *C. globosa*. The heads of the former are usually softer and more flattened, the stems are shorter and the leaves less silky and silver. Under a hand lens, the pappus hairs on the achene are seen to be all white, whereas those of *C. globosa* have golden tips.

PERENNIAL

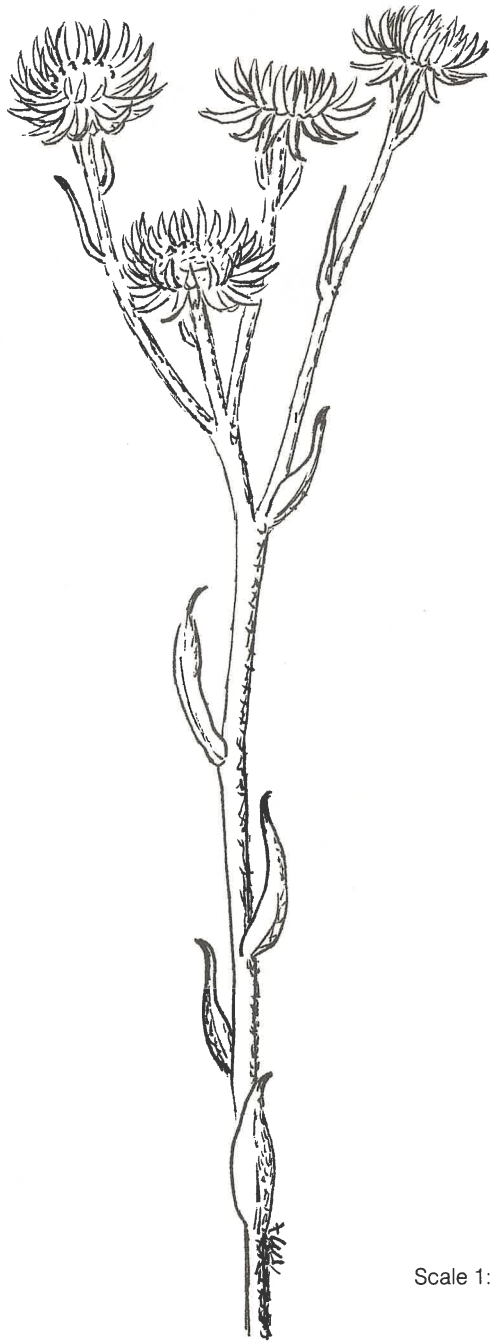
0.3–1.5 m high
0.3–0.5 m wide

YELLOW



Scale 1:2

Craspedia globosa heads



Scale 1:1

Helichrysum blandowskianum

Helichrysum

The generic name is derived from the Greek *helios* (sun) and *chrysos* (golden) which refers to the yellow-gold colour and sun-like appearance of the first species to be described. This generic name may be changed in the future.

Helichrysums are very like helipterums, the most notable distinguishing character being the barbed nature of the pappus hairs as opposed to the feathery hairs of the pappus in helipterums. The genus *Cassinia* is also very similar, but *Cassinia* species have scales on the receptacle between the disc florets and *Helichrysum* species do not.

There are about five hundred species of *Helichrysum* in the world, occurring in all continents except America. Approximately one hundred species are restricted to Australia and fourteen of these are listed as rare or threatened Australian species. The genus is composed of annual and perennial herbs and shrubs, some large enough to be regarded as small trees.

Relatively few helichrysums have been used for ornamental purposes, but it is obvious that the majority have great potential for floral art and horticulture.

Helichrysum species are known as everlastings because the bracts encircling the disc florets are papery, stiff and brightly coloured. Helichrysums are identified primarily on the basis of vegetative characteristics.

Many attractive helichrysums, not described in this book, are proving worthy of cultivation. These include:

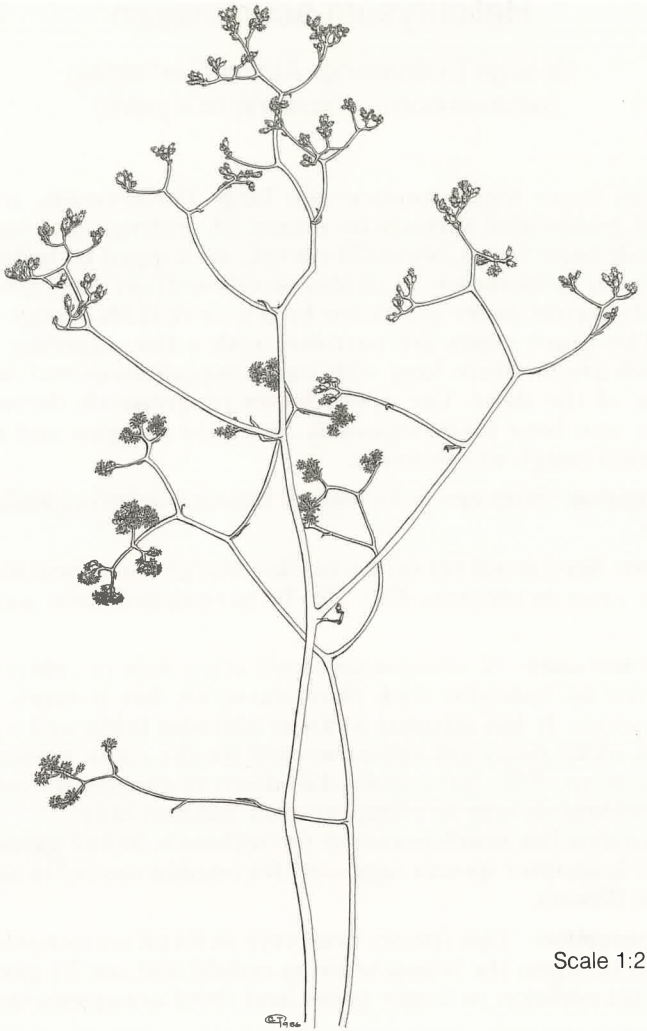
- *H. blandowskianum*, Woolly Everlasting, 40–60 cm tall, perennial (SA, Vic, NSW). Thick, soft, grey-woolly foliage, pink buds, white heads, 1.5–2.5 cm across, in terminal clusters. It flowers in spring and early summer, and grows in poor sandy soils.
- *H. cordatum*, Heart-leaved Everlasting, to 1 m tall, woody perennial (WA). Heart-shaped leaves, green above and white-woolly below, startlingly white, flexible stems and loose clusters of small white heads at the ends of branchlets. It flowers in summer and is excellent for floral art.
- *H. diotophyllum*, Curry Everlasting, to 1 m tall, shrub (NSW, Qld). Short scale-like leaves, white-cottony stems and small yellow heads in terminal clusters. Flowers from spring to autumn.
- *H. secundiflorum*, Downy Cascade Everlasting, 1.5–2 m, large shrub (Vic, ACT, NSW). Narrow leaves, usually hairy, arching white cottony branches bearing profuse sprays of small, white heads on upright branchlets in summer. Spicy scent.

Helichrysums are usually easy to grow. In general, they like a sunny position and well-drained soil with plenty of protection for their roots. Dappled shade suits some of the shrubby species, such as *H. obcordatum* and *H. secundiflorum*. A certain amount of soil moisture is necessary in hot, dry periods.

The annuals and some of the perennials germinate readily from seed. Other perennials and the shrubs are generally easier to strike from cuttings. Division is a simple means of propagation if species sucker or layer themselves.

Scale 3:5

Helichrysum semipapposum (coastal form)



Scale 1:2

Helichrysum cordatum

Helichrysum acuminatum

Orange Everlasting, Alpine Everlasting
(acuminatum = tapering to a point)

A perennial from high altitudes with large flower-heads, which forms rosettes of leaves and spreads by means of underground stems. Erect, unbranched, hairy stems, about 20 cm tall, are topped by brilliant flower-heads, 3–5 cm in diameter, in shades of yellow from deep gold to almost orange. The broad outer bracts are brown or reddish-orange with a dull surface. The inner bracts are narrower with a fine, tapering point. The lower leaves are 6–10 cm long with stem-clasping bases and are crowded at the base of the stem. The upper leaves progressively decrease in size. The leaves also have hairs, especially along the margins and the midrib, and are often rough to the touch.

Flowering period: Summer in its natural habitat but spring and summer in cultivation.

Propagation: Seed is not yet on the market, but germinates in ten to twenty days when sown in autumn. May also be propagated from cuttings or by division.

Cultivation and uses: *H. acuminatum* is not often seen in cultivation. It has been offered by specialist rock plant nurseries, but is rarely stocked in native nurseries. It has adapted to lower altitudes fairly well when grown in sun with moist peaty soil and protection for the roots, preferably rocks. It resists frost to –5°C, but usually dies down or disappears completely in hot, dry conditions, only to reappear after autumn rain.

H. acuminatum has much potential for rockeries, alpine gardens or containers and is another species suggested for erosion control in alpine areas. Superb cut flowers.

Flower preservation: This species dries very well and is amenable to wiring. Pick in bud or when the bracts begin to unfold and use 22 gauge wire. It is a colourful addition to larger posies and dried arrangements.

Similar species: *Helichrysum bracteatum* has a very similar flower-head at first glance. Closer scrutiny reveals that the outer bracts always have a shining undersurface and the intermediate bracts are blunt, whereas *H. acuminatum* has dull-surfaced outer bracts and the intermediate bracts are always tapered to a point. Other distinguishing features are that *H. bracteatum* has a tap root and branched flowering stems.

Distribution and habitat: Vic, Tas, ACT, NSW usually in alpine and sub-alpine herbfields in the open or at the edges of open forest.

PERENNIAL

10–25 cm high
spreading

ORANGE-YELLOW

Scale 1:2

Helichrysum acuminatum

Helichrysum ambiguum

Hill Everlasting
(ambiguum = doubtful, uncertain)

A long flowering, variable perennial with strongly aromatic foliage. The specific name refers to the fact that it looks like a *Leptorhynchos*. Two varieties have been recognized, var. *ambiguum* and var. *paucisetum*. Var. *ambiguum* has been in cultivation for some years. It has bright yellow button flower-heads, 1 cm across, held singly at the ends of short stalks. In this species the yellow, papery bracts are inconspicuous as they are short and do not radiate away from the head-like petals. When the disc florets have fallen the empty heads have a pretty, silvery appearance. The bright green leaves are linear or narrowly lance-shaped, 1–6 cm long, with wavy margins, a small point at the tip and slightly stem-clasping bases. The stems and leaves vary in the degree and type of hairiness, sometimes having no hairs at all. The main stem can be 60 cm long, weak, branching and almost horizontal. New growth arises from the base or at a distance from the parent plant because *H. ambiguum* has a creeping rhizome.

Flowering period: Under natural conditions *H. ambiguum* flowers in mid-spring in WA, late winter to summer in western NSW, and most of the year in cultivation.

Propagation: Easily grown from cuttings or by division. Seed germinates in twenty to forty days, but is not yet on the market. This species does not self-sow if there is only one plant in the garden. Cross-fertilization may be necessary for viable seed.

Cultivation and uses: *H. ambiguum* has been sold in nurseries for many years as 'Leptorhynchos species'. It is a popular small plant because the bright heads are borne in profusion for many months. It prefers dappled shade and well-drained soil and for this reason establishes itself happily under native trees. Although it can tolerate dry periods, regular summer watering is of benefit. Prune in winter or when the growth becomes straggly. It tolerates frost to –5°C, and should grow at the coast.

Effective as a rockery plant, trailing over walls, for colourful pockets in the garden or as a container plant. The habit of growth should suit a hanging basket. Flowers last at least five days in water and the foliage could be used in potpourri although it may be so strong as to overcome other delicate fragrances.

Flower preservation: Pick as the heads begin to develop. Can be dried by hanging upside down in small bunches but the colour tends to darken. A better result is achieved using the borax or silica gel method.

Distribution and habitat: WA, SA, NSW, NT. Usually occurs in shallow, stony soils scattered along slopes in eucalypt or callitris woodland. Can be found in the Flinders, Barrier, Musgrave, Barrow and MacDonnell Ranges.

Synonyms: *Helichrysum semicalvum, Leptorhynchos ambiguus.*

Varieties: Var. *paucisetum* has larger flower-heads (to 1.5 cm) and a more shrubby habit. It occurs in WA, SA and NT.

PERENNIAL

20–40 cm high
50–80 cm wide

YELLOW

Scale 1:1

Helichrysum ambiguum var. *ambiguum*

Helichrysum apiculatum

Yellow Buttons, Common Everlasting
(apiculatum = a short, pointed tip)

A highly variable and extremely useful perennial with grey-green or silver foliage and bright yellow heads in small loose clusters. The form most often offered for sale in nurseries is a robust plant with thick, soft, grey-green leaves and several flower-heads, 1–1.5 cm wide, in clusters at the ends of erect stems, 60 cm long. Each head is held on its own short stalk, 3–10 mm long. Short bracts, less than 10 mm long, have fringed margins and are yellow or golden. The leaves are oblanceolate, about 4 cm long and 0.5 cm wide, with a small point at the tip. Stems and leaves are covered with a webbing of white hairs. This form will spread by layering itself. The origin of this particular form has been lost but it looks similar to plants found growing on top of Mt William in the Victorian Grampians.

The *Helichrysum apiculatum* complex stands in urgent need of revision. At present there are so many widely differing forms that it is hard for gardeners to make an informed choice when buying for a particular purpose. Some of the forms grown by the Study Group are described as follows:

- A compact form collected originally by Adelaide Botanic Gardens. Prostrate by 1 m, with lemon-yellow heads in small, dense clusters and greenish-grey foliage. It suckers lightly to form a tight mat and is less tolerant of frost than most forms. This form makes a good border plant.
- A form with golden-orange flower-heads from south-east Qld, 25–30 cm tall by 40 cm across. The heads are 1 cm wide and the leaves are green above, very white woolly below and 1–2.5 cm long. It flowers almost all year; its only bad habit being a tendency for whole branching stems to die back from time to time. (This form is sometimes sold in nurseries labelled 'Helichrysum amplexans', but this name should not be used as it has never been published and has no botanical validity.)
- Victorian coastal form. 15–25 cm tall by 50 cm across. Deep golden flower-heads, 12 mm wide, have honey-brown outer bracts. Leaves, 2.5 cm long, are grey-cottony both sides. Soft grey stems lie along the ground then bend upwards. This form is not so much a ground cover as a pleasing foliage contrast.
- Mallee form. 15–20 cm by 20 cm, with golden heads in relatively large clusters and grey-green foliage on slender, upright stems. This form has a rounded habit and does not seem to sucker.

Many other forms are being tested.

Flowering period: *H. apiculatum* has its largest clusters in spring; a summer flush usually produces smaller and fewer heads per cluster and it may continue to produce a few heads in autumn and winter.

Propagation: Cuttings strike very easily and suckering forms can be divided. Cuttings set in the ground after autumn rains are also successful. Seed germinates in seven to twenty days when sown in autumn and is available from specialist seed stockists.

PERENNIAL

10–60 cm high
0.5–2 m wide

YELLOW

Scale 1:2

Helichrysum apiculatum
(Grampians form)

Scale 1:2

Helichrysum apiculatum (form from S.E. Qld)

Cultivation and uses: This daisy is easy to grow. It is amenable to most soils and flowers most profusely and longest in the sun. It should be pruned after flowering to stimulate new growth and a second crop. If stems are cut for fresh or dried flowers the same purpose is achieved. Most forms are frost tolerant to –5°C and grow vigorously in exposed coastal conditions, but have failed in subtropical regions.

H. apiculatum is an excellent ground cover, especially useful as a binder for banks. It is attractive for edging, trailing, rockeries, containers or hanging baskets and as a long lasting cut flower.

Flower preservation: In general, dried *H. apiculatum* keeps its colour well but may not hold its form as long as other dried species. Pick as tight heads and use in posies, dried arrangements or as a filler. Fresh and dried specimens of the tall-stemmed form have been exported to the west coast of the USA where they have been very favourably received.

Distribution and habitat: WA, SA, Vic, Tas, ACT, Qld, NT. Revision may alter the distribution. A very widespread species found in many plant communities on many soil types. It occurs in grassland, savannah woodland and along the coast.

Synonyms: *Gnaphalium apiculatum, Helichrysum odoratum* var. *odoratum, H. odoratum* var. *arachnoideum, H. semiamplexicaule* var. *semiamplexicaule.*

Similar species: *H. ramosissimum,* formerly regarded as a member of the *H. apiculatum* complex, has recently been given specific status. Its common name is also Yellow Buttons. It occurs in south-eastern Qld and has inner involucral bracts less than 5 mm long, whereas those of *H. apiculatum* are 5–7 mm long. The orange-yellow heads, 6 mm across, are in small clusters. The grey-green leaves, 1–2.5 cm long, are hairy both sides. It suckers vigorously and grows as a dense mat.

Certain forms of *H. semipapposum* are difficult to distinguish from *H. apiculatum* and both species will probably be revised together. In general, the heads of *H. semipapposum* are smaller and a greater number of them are grouped in larger, flatter clusters. Also the stems are more upright and woody, to 1 m tall, and the leaves are often narrow, sometimes quite hairless.

Helichrysum baxteri

Fringed, or White Everlasting
(William Baxter, 19th century botanical collector)

A charming perennial growing as a soft mound of shiny dark green leaves with woolly-white reverses. In late spring slender white stems are sent up, 15–40 cm long, bearing beautiful single flower-heads, 2–4 cm wide. The heads are usually white or cream, but may be buff-coloured or even pinkish. The outer bracts are brown and the central discs are soft, clear yellow. The numerous bracts look and feel feathery and under a hand lens they are seen to be fringed.

The leaves are narrow-linear, 15–20 mm long, with margins rolled under. As they age the upper surface loses the hairs and becomes smooth. The young, hairy leaves, the white undersurface of the foliage and the white stems all combine to give the plant a silvery appearance when in flower.

A single plant may carry as many as fifty heads simultaneously which makes it a spectacular addition to the garden, especially when massed. An additional appeal is its attraction for butterflies and insect-eating birds.

The form usually offered for sale at nurseries is of soft habit with short, branching stems at the base, but coastal forms are often more wiry and sometimes taller. One form growing in East Gippsland, Victoria, is 60 cm tall. A buff-coloured form occurs in the Little Desert and Grampians in Victoria and a pinkish one has also been recorded.

Flowering period: Usually from October to December.

Propagation: Cuttings strike so easily that it is not customary to propagate from seed. Seed will germinate in fourteen to twenty-one days, however, although sometimes with limited success.

Cultivation and uses: *H. baxteri* prefers an open, sunny position, adapts to most soils and will grow in soils that are moist for extended periods. Cut back after flowering to encourage new growth. It tolerates frost to –5°C and thrives in exposed coastal situations, but does not seem to cope with humid conditions. Flower-heads are apt to be targets for caterpillars, but otherwise plants are relatively pest-free.

It is a most amenable plant which fulfils many purposes admirably. Grow as a border or edging plant, for massed display, in rockeries, pockets and containers. Certain vigorous forms make good ground covers. An excellent cut flower.

Flower preservation: A handsome dried flower although fresh stems may need lacquering before drying to prevent the heads drooping. Heads may also be wired.

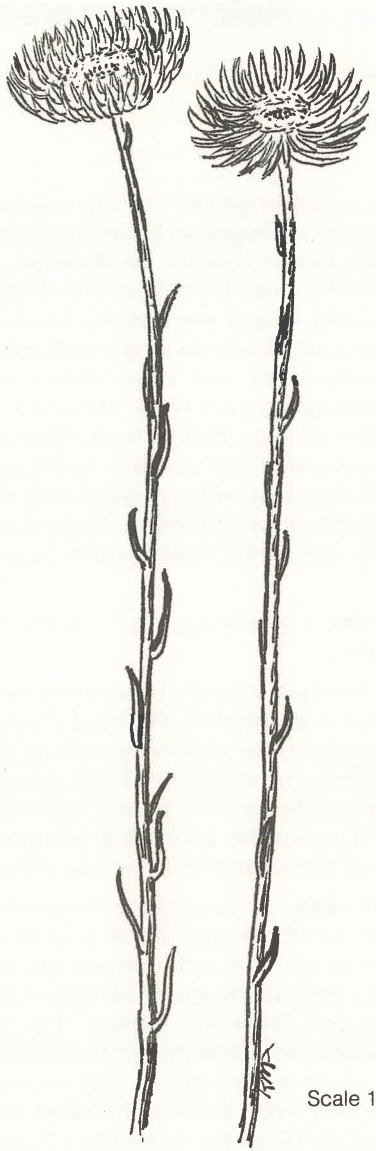
Distribution and habitat: SA, Vic, Bass Strait Islands, NSW. Widespread but not commonly found. It occurs on sandy soils in heathlands along the coast, inland and in the Murray basin.

Similar species: *Helichrysum obtusifolium* is similar but can be easily distinguished because its bracts are not fringed (see page 142).

PERENNIAL

20–40 cm high
30–60 cm wide

WHITE, BUFF, PINK (rarely)



Scale 1:1

Helichrysum baxteri

Helichrysum bracteatum

Golden Everlasting, Yellow Paper-daisy, Strawflower
(bracteatum = bearing bracts)

An extremely variable species with spectacular flower-heads of all sizes and colours. The most widespread form occurring in nature is a yellow-flowered perennial with heads 2–6 cm in diameter. The intermediate bracts are various shades of yellow, from lemon to deep gold, broad, glossy and usually obtuse. The outer bracts are usually brown and shiny. The leaves, up to 10 cm long, vary markedly in shape and colour (from green to silvery), and are often shortly hairy, but never sticky to the touch. It has an upright branching habit and grows from 30 cm to 1.5 m tall.

A form collected near Kenilworth, Queensland, is a valuable acquisition for horticulture and floral art. It is easily grown and has an open habit to 1 m tall and 0.5 to 1 m wide. A profusion of deep golden, cupped heads, 2.5–3.5 cm across, is produced in summer and autumn. The shape of the heads, with the tips of the outer bracts turned up all round, is unusual and pleasing.

Flowering period: Usually spring to autumn, but throughout the year in warmer climates.

Propagation: Seed germinates in seven to twenty days from autumn sowing. Many nurseries stock seed of the brightly coloured forms known as Straw-flowers, but seeds of the yellow perennial form and the white var. *albidum* are only available commercially from specialist seed stockists. It is easily collected from garden grown plants. Cuttings strike quickly and easily and will also root if set in the ground in autumn. It is necessary to propagate from cuttings if the characteristics of cultivars are to be retained.

Cultivation and uses: *H. bracteatum* is one of the most easily grown daisies, with the handy attribute that it will regenerate from seed. It grows in sun or semi-shade in all soils (alkaline included), although it needs watering during hot, dry periods. Regular picking of flowers or pruning will prolong the plant's life and flowering period. The perennials are frost tolerant to –5°C, but annuals are often prone to damage. All forms can be planted at the coast in a protected position. They attract butterflies and insect eating birds. Aphids may need to be controlled and a susceptibility to eelworms has been noted in Western Australia where *H. bracteatum* may best be regarded as an annual.

Use in rockeries, for summer colour, in containers or as a source of long-lasting cut flowers.

Flower preservation: One of the best species for floral art work if the heads are wired. All forms wire very well, larger heads need heavier gauge wire (No 20 or 22). Pick in full bud or when the bracts begin to unfold. The size of the wired head can be varied by picking buds at different stages of development. A single plant can produce up to five hundred heads before exhausting itself. 'Double' or 'single-flowered' forms are available and the colours (with the exception of some pinks) do not fade. The bracts are strong so the shape of the head is retained.

ANNUAL or PERENNIAL

0.3–1.5 m high
0.5–1.5 m wide

YELLOW, PINK, WHITE, ORANGE, RED

Scale 1:2

Helichrysum bracteatum

Flower-heads may be air-dried, but are not as successful because they lose their freshness quickly, often puff their discs and droop their heads.

Special notes: *H. bracteatum* was probably one of the first of the Australian plants to be cultivated in England. German hybridists crossed it with South African helichrysums in the 1850s to produce an amazing range of colour forms, mostly annuals or short-lived perennials known as Strawflowers.

Distribution and habitat: WA, SA, Vic, Tas, NSW, Qld, NT. *H. bracteatum* has a wide distribution in its perennial, yellow-flowered form. It is found from coastal cliffs to subalpine regions, from wet or dry inland forests to mallee communities, occurring on sands, loams and shales. This wide range of natural environments is responsible for the variety of growth forms and is related to the ease of cultivation.

Synonym: *Xeranthemum bracteatum.*

Varieties and cultivars: It seems to be universally agreed that a critical revision within this species is long overdue.

One variety has been described, *H. bracteatum* var. *albidum.* This is an annual or perennial with white or sometimes rose tinted bracts and is usually less than 1 m tall. It is found in south-western WA growing on lateritic soils. A white-flowered form is also found in Tas, on coastal cliffs and the islands off the coast, where it is known as *H. papillosum.* It is uncertain whether this is the same as *H. bracteatum* var. *albidum.*

A number of cultivars have been registered, all of which are very effective as bedding plants:

- *H. bracteatum* 'Dargan Hill Monarch'. Perennial, 0.5–1 m, with silvery foliage, large yellow flower-heads, 5–8 cm across, flowering all year. A compact habit makes this a good ground cover. It was originally collected from Cunningham's Gap, Qld.
- *H. bracteatum* 'Diamond Head'. Perennial, 20 cm by 60 cm, with deep green slightly hairy foliage, yellow-brown heads with pointed bracts, 3 cm across, flowering from spring to autumn. The outstanding feature of this cultivar is its compact, cushion habit. Unfortunately, it is usually short-lived, but cuttings strike readily. Especially recommended for exposed coastal planting. Collected originally from the NSW coast at Diamond Head.
- *H. bracteatum* 'Hastings Gold'. Perennial, 50 cm by 70 cm, with leaves green above, grey hairy beneath, yellow heads, 5 cm across, flowering most of the year.
- *H. bracteatum* 'Cockatoo'. Perennial, 1 m by 1 m, with greyish foliage, pale lemon to cream heads, 7 cm across, flowering from spring to autumn. It has a neat dense habit but is often short-lived. This cultivar arose spontaneously as a hybrid between *H. bracteatum* 'Dargan Hill Monarch' and a white flowered perennial form from Ocean Grove, Victoria.
- *H. bracteatum* 'Golden Bowerbird'. Perennial, 50 cm by 70 cm, with greyish foliage, very large, bright gold flower-heads, 9–10 cm across with many bracts, giving rise to a 'double-flowered' appearance. It flowers from spring to autumn. This cultivar is the result of a manipulated backcross between *H. bracteatum* 'Cockatoo' and one of its parents, *H. bracteatum* 'Dargan Hill Monarch'.

- *H. bracteatum* 'Princess of Wales'. Perennial, 60 cm by 60 cm, with a profusion of rich gold flower-heads, 5–6 cm across. The leaves are mostly hairless, but the midribs and margins are sprinkled with fine, silky hairs. The flowering period extends from spring to autumn, but occasional flowers may be found throughout the year. This cultivar arose in the Australian National Botanic Gardens in Canberra and is a presumed hybrid between two forms of *H. bracteatum*, the annual multicoloured form, and the perennial *H. bracteatum* 'Dargan Hill Monarch'. It is moderately frost tolerant and displays an unusual and valuable flowering habit. As flowers die the stem withers and both stems and dead heads disappear into the lower foliage of the plant. Simultaneously, new heads appear and extend above the foliage.

Similar species: *H. acuminatum* has a similar flower-head (see page 118).

H. viscosum looks like a small version of *H. bracteatum*, with bright yellow heads, 2–3 cm wide. The distinguishing characteristic is that it has sticky leaves, whereas those of *H. bracteatum* are never sticky.

Helichrysum diosmifolium

Pill Flower, Sago Flower
(diosmifolium = leaves like *Diosma*)

An erect, open shrub to 2.5 m tall with neat foliage and large, handsome clusters of flower-heads. In its natural habitat it has been recorded as growing to 4 or 5 m, but under cultivation it is unlikely to reach such a size. The individual heads are small, 2–5 mm across, held in dense clusters, 3–7 cm in diameter, at the ends of the branchlets. The buds are white, or pink fading slowly to white. The leaves are somewhat variable, from blue-green and narrow to dark green and elliptical. Leaves of all forms are stalkless, have rough upper surfaces, are woolly beneath, have margins rolled under and measure 1.5–2 cm in length. The stems are branching and slightly woolly, and the foliage smells aromatic when crushed.

Flowering period: Spring and summer in NSW, late winter and spring in eastern Qld with occasional flowers in autumn. Under cultivation in Melbourne it flowers during summer.

Propagation: Seed germinates in ten to forty days in autumn and is expected to be available shortly. Cuttings strike quite easily.

Cultivation and uses: *H. diosmifolium* has excellent horticultural potential, but is only stocked by a few discerning nursery proprietors. This situation should change as the plant becomes more widely known. It will grow in most soils in sun or shade and likes some root protection and summer watering. It tolerates frost to –5°C, and should be tried in coastal gardens.

Grow as a specimen or background shrub, in the rockery, or as a container plant. Unusual and long lasting cut flower.

Flower preservation: Excellent dried flower if picked in bud. Use in dried arrangements and as a filler. Preservation in glycerine should be tried with this species.

Special notes: It is ironic that *H. diosmifolium* was grown in Europe early in the nineteenth century. One hundred and fifty years later it is becoming popular in Australia.

Distribution and habitat: NSW, Qld. Extending from the coast to the western slopes and western plains of NSW and into south-eastern Qld, it occurs mostly in open forests on a variety of soils.

Synonyms: *Ozothamnus diosmaefolius*, *Gnaphalium diosmaefolium*.

SHRUB

2–2.5 m high
1–1.5 m wide

WHITE, PALE PINK

Scale 1:1

Helichrysum diosmifolium

Helichrysum elatum

Tall White Everlasting, White Paper-daisy
(elatum = tall)

A tall, slender perennial herb or sub-shrub growing 1–2 m high. White cottony stems and large lanceolate leaves, 6–12 cm by 1–3 cm, woolly beneath, give this plant a silvery appearance. Satiny, white or cream everlastings, 2–4 cm in diameter, appear singly or in loose clusters at the tips of quite thick stems. Buds may be white or pink and are produced at the apex of the plant first.

A form from higher altitudes has been described which is said to be more shrubby, the leaves more crowded and woollier, and the stems slightly sticky. It was originally called var. *fraseri*, but is now regarded as only a form of this species.

Flowering period: Spring. Under garden conditions it will often continue flowering into summer.

Propagation: From seed or cuttings. Seed is available.

Cultivation and uses: This species needs moisture and the shade and shelter of the overhang of other trees. Its natural habitat indicates that root protection is essential. It may be best to regard it as an annual or two year plant as it becomes woody with age and indeed often dies after one year. Tip prune when young if a bushy plant is required.

A good background shrub with its dense outline of leaves, and a useful contrast among other shrubs. It will grow in exposed coastal conditions and makes an unusual large container plant for light shade.

Good cut flowers.

Flower preservation: The heads should be wired in bud to prevent the outer bracts from reflexing but the colour of the immature disc is grey. This grey-white colour combination may not be attractive to the floral artist.

Distribution and habitat: Vic, NSW and Qld. Tablelands and coast, foothills of mountains, usually to about 1200 m in open forest. Generally found in shade among rocks in rich soils.

Synonym: *Helichrysum albicans*.

PERENNIAL

1–2 m high
0.6–1 m wide

WHITE or CREAM

Scale 1:1

Helichrysum elatum

Helichrysum ledifolium

Kerosene Bush
(ledifolium = leaves like those of *Ledum*,
a genus of aromatic shrubs)

A colourful foliage shrub with a distinctly yellow appearance due to a yellow exudate which covers the sparsely woolly stems and undersurfaces of the leaves. The small linear leaves, about 1 cm long, are glossy green above, woolly and yellowish below, with bases continuing down the stem for a short distance (decurrent). When old leaves drop they leave a scar on the bark where the decurrent leaf base had been attached. The margins are rolled under and the leaves are neatly arranged on the stem, almost at right angles to it. A sweet aromatic smell is sometimes apparent which may be stronger at certain times of the year, perhaps in warm weather. The habit is open, rigid and branching.

An extra highlight is provided by the bright yellow growing tips all over the plant. In spring the whole plant becomes suffused with terracotta, then, as the buds swell, white, fluffy flower-heads appear in clusters at the ends of the branchlets.

Flowering period: Usually late spring to early summer.

Propagation: From cuttings. Seed has been tried by members of the Study Group but has not germinated.

Cultivation and uses: *H. ledifolium* is a slow growing, tough shrub. It grows steadily in clay or sandy loam, in sun or partial shade, in dry conditions or wet. It is frost and snow tolerant, and looks as though it would cope with exposed coastal conditions. It has not been tested in tropical areas, although it grows slowly but surely in moderately humid conditions at Newcastle, NSW. A long-lived plant in England.

It makes an unusual foliage plant for the shrubbery, rockery or containers. Pick fresh foliage for floral arrangements.

Flower preservation: This species dries well if picked as the bracts begin to open. Preserve the foliage with glycerine for use in dried arrangements.

Distribution and habitat: Endemic to Tas, where it is found in harsh environments at high altitudes (above 750 m) in mountain habitats.

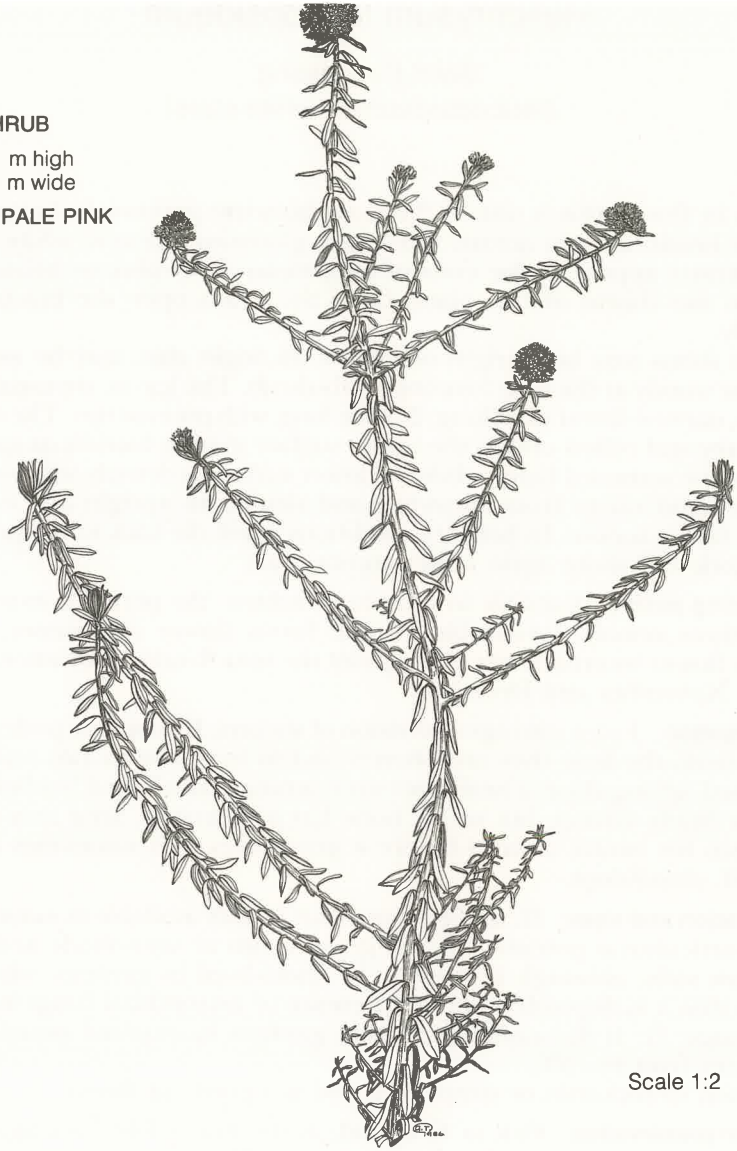
Synonyms: *Cassinia ledifolia*, *Ozothamnus ledifolius*.

Special notes: In 1958 Dr N. T. Burbidge described four subspecies of *H. ledifolium*: ssp. *ericifolium*, ssp. *ledifolium*, ssp. *purpurascens* and ssp. *reflexum*. In 1963 ssp. *purpurascens* was given specific rank by Dr W. M. Curtis as *Helichrysum purpurascens*, and ssp. *ericifolium* as *H. ericetum*. Subspecies *reflexum* was included with *H. purpurascens*.

SHRUB

0.5–1 m high
0.5–1 m wide

CREAM, PALE PINK



Scale 1:2

Helichrysum ledifolium

Helichrysum leucopsideum

Satin Everlasting
(leucopsideum = white stars)

When in flower this is one of the most attractive perennials. Large single flower-heads, 2–5 cm across, with many glistening, narrow, white or pale pink bracts appear at the ends of long stems. Rosy-pink or bronze buds add to the charm of this plant. Once the heads open the bracts reflex quickly.

The stems may be upright or held at an angle, they may be weak and soft, or woody at the base forming a sub-shrub. The leaves are usually dark green, narrow-linear or oblong, 2–4 cm long, with pointed tips. The margins are wavy and rolled under, the upper surface may be hairless or sprinkled with a few scattered hairs, while the lower surface is densely white-cottony.

The habit varies from sprawling and slender to upright and compact. Some forms sucker. In hot, dry conditions it will die back to the perennial rootstock and shoot again after autumn rains.

Flowering period: Variable in its natural habitat, the period is extended if conditions remain favourable. Alpine forms flower in summer, coastal forms flower intermittently throughout the year. Under cultivation it flowers in November and December.

Propagation: From cuttings or division of suckers. If stems are pulled gently away from the base they are often found to have one or two small roots attached, giving them a head start over cuttings. Much seed has been sown by the Study Group, but so far none has germinated. Seed may need to be sown for twelve months before it germinates as is sometimes the case with *H. obtusifolium*.

Cultivation and uses: *H. leucopsideum* is not readily available in nurseries but has horticultural potential. It will grow in sun or semi-shade and adapts to most soils, although it tends to be short-lived in gardens, which may mean that it is dependent on the presence of mycorrhizal fungi in the soil (see page 3). It flourishes in coastal gardens in exposed positions and tolerates frost to –5°C.

Suited to rockeries or containers, and is a good cut flower.

Flower preservation: Pick in firm bud, as the bracts fold back against the stem very quickly once they begin to open. Heads wire very successfully and will dry reasonably well if picked early. The satin sheen of the bracts adds a freshness to arrangements.

Special notes: There is a specimen of Satin Everlasting in the Melbourne Herbarium which was collected by Baron von Mueller on 16 December 1847, the day after he landed in Australia at Port Adelaide. It must be one of the first Australian plants he collected himself.

Distribution and habitat: WA, SA, Vic, Tas, NSW. Widespread from the coast to mallee areas, from foothills to subalpine regions but usually not above 1200 m. It occurs on sands behind coastal dunes, in deep red sandy soils, on coastal hills and in open forests.

PERENNIAL

20 –60 cm high
30– 50 cm wide

WHITE, PALE PINK

Helichrysum leucopsideum

Similar species: *Helichrysum adenophorum*, the Mallee Everlasting is found on both sides of the Victorian–South Australian border. It too has large white or pale pink flower-heads and pink buds but the leaf surface is rough to the touch and sticky, and the undersurface is not cottony. The subalpine form known as Waddell's Everlasting, *H. adenophorum* var. *waddelliae*, had formerly been regarded as a narrow-leaved form of the Satin Everlasting. It has leaves with white cottony undersurfaces, like those of *H. leucopsideum*, but the stems are glandular rather than cottony.

Helichrysum lindleyi

Lindley's Everlasting
(Prof. J. Lindley, 1799-1865)

A dainty, branching annual, with many fragile, pink, papery heads borne singly at the tips of the branchlets. Up to a hundred heads, 2–3 cm in diameter, may be produced by each plant. At the beginning of the flowering period the heads may be as large as 3.5–4 cm across. The almost hairless stems and foliage are usually green, but will turn a reddish bronze in hot conditions. The habit is rounded and open.

A more robust form with deeper pink heads has been grown. The leaves are shorter and wider, the stem is very glandular and the heads are larger and much easier to wire.

Flowering period: August to October from March to April sowings.

Propagation: Seed is available from specialist seed stockists and germinates readily in five to seven days when sown in April. Germination is much improved when the seed is sown on the surface.

Cultivation and uses: Easily grown in fertilized soil and full sun. It prefers good drainage, but flowers longer and more profusely if the soil is not allowed to dry out. It is frost tender and subject to attack by aphids and green grubs which can be controlled with pyrethrum.

Effective as a border, rockery, or bedding plant and when grouped in the garden. This daisy needs protection from the wind. Good cut flowers.

Flower preservation: The bracts of this species are very fragile. It can be successfully wired, using 26 gauge wire, if picked in bud. Heads can be air-dried if picked when the bracts first open, but often droop after inverting. It may be necessary to spray the necks of the stems with clear lacquer immediately after picking. Dried flowers can be used for cake decorating.

Distribution and habitat: WA. Usually occurs in light shade in mulga scrub, inland savannah woodland and along rivers of the south-western regions.

Similar species: *Helichrysum davenportii* has a similar pink flower-head, but is easily distinguished by its habit; it has simple, leafless stems rising from a basal tuft of quite broad leaves. Germination from seed is poor.

ANNUAL

20–25 cm high
up to 25 cm wide

PINK

Scale 1:1

Helichrysum lindleyi

Helichrysum obtusifolium

Blunt Everlasting
(obtusifolium = blunt leaf)

A small, shrubby, much-branched perennial with brown buds, sometimes tinged pink, and single white heads, 1–3 cm in diameter, at the ends of the branchlets. It has short, blunt, dark green leaves, 0.5–1.5 cm long, with white-cottony reverses and stems which lend it a silvery appearance.

At the height of its flowering season it transforms much of the coastal heath into a white and silver carpet, but becomes quite inconspicuous once the flowering period is over.

Flowering period: Mainly winter to spring, but it can extend into December in more southerly latitudes.

Propagation: Best from cuttings. Rough cuttings set in the ground in autumn will usually root and flower in the following spring. Seed is sometimes difficult and slow to germinate, but as a great increase of seedling growth follows bushfires, it is probable that some form of heat treatment will break dormancy. Seed sown on the surface in the autumn of one year (and left out in the weather) has been known to germinate after rains in the following autumn.

Cultivation and uses: *H. obtusifolium* has not been used much in gardens. Cutting grown plants do not live longer than one or two years, but it is such an attractive small species that its performance should be improved by selection.

It is probable that this is one of the species that depends on mycorrhizal fungi in the soil for its nutrition (see page 3). It seems to prefer an open sunny situation and well-drained, moist soil. It is moderately frost resistant and will grow in exposed coastal conditions. Plants need to be grouped for best effect. It is an excellent cut flower.

Flower preservation: May be wired for use in arrangements. The flowers dry well, but the stems below the heads often bend over after some time. This may be rectified by hanging in loose bunches, spraying with clear lacquer, and then drying in the usual way.

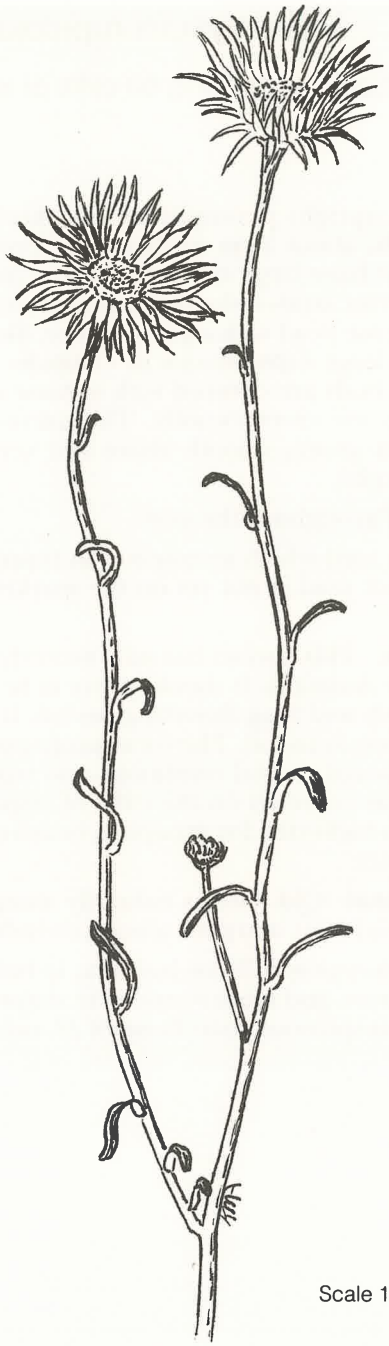
Distribution and habitat: WA, SA, Vic, Tas, NSW. Sandy coastal heaths and mallee sands.

Similar species: *Helichrysum baxteri* also has terminal, single white heads, brownish bracts, white stems and linear green leaves. The main difference is that it has fringed bracts which can be easily seen with a hand lens. Its leaves are usually narrower and more crowded than those of *H. obtusifolium*.

PERENNIAL

10–40 cm high
10–40 cm wide

WHITE



Scale 1:1

Helichrysum obtusifolium

Helichrysum rupicola

(rupicola = growing on cliffs or ledges)

A small, shrubby, upright perennial or sub-shrub with single, terminal yellow flower-heads, about 2 cm in diameter. Unlike most helichrysums, *H. rupicola* does not have large colourful bracts. Instead there is a ring of inconspicuous, narrow straw-coloured bracts around the disc. The florets are crowded in a dense head with a green centre, like a button, which makes it look more like a large *Leptorhynchos* or *Craspedia* (Billy-button).

The urn-shaped buds are covered with a dense coat of long white hairs and the new stems are silvery-woolly. The narrow, lance-shaped leaves, 5 cm long, are light green, smooth above and very woolly beneath, with wavy, revolute margins.

Flowering period: Throughout the year.

Propagation: From seed which germinates in fourteen to forty days when sown in autumn, but seed is not yet on the market. Also propagate from cuttings.

Cultivation and uses: This species has only recently been brought into cultivation in southern Australia. It should prove to be a popular garden plant due to its large heads and long flowering period. It likes full sun or partial shade and is not fussy as to soil. The form propagated by the Study Group should grow in exposed coastal conditions and tropical areas because the original material was collected on the cliffs of coastal north Qld.

Should be tried in rockeries, for grouping, or as a container plant. Flowers last five days in water.

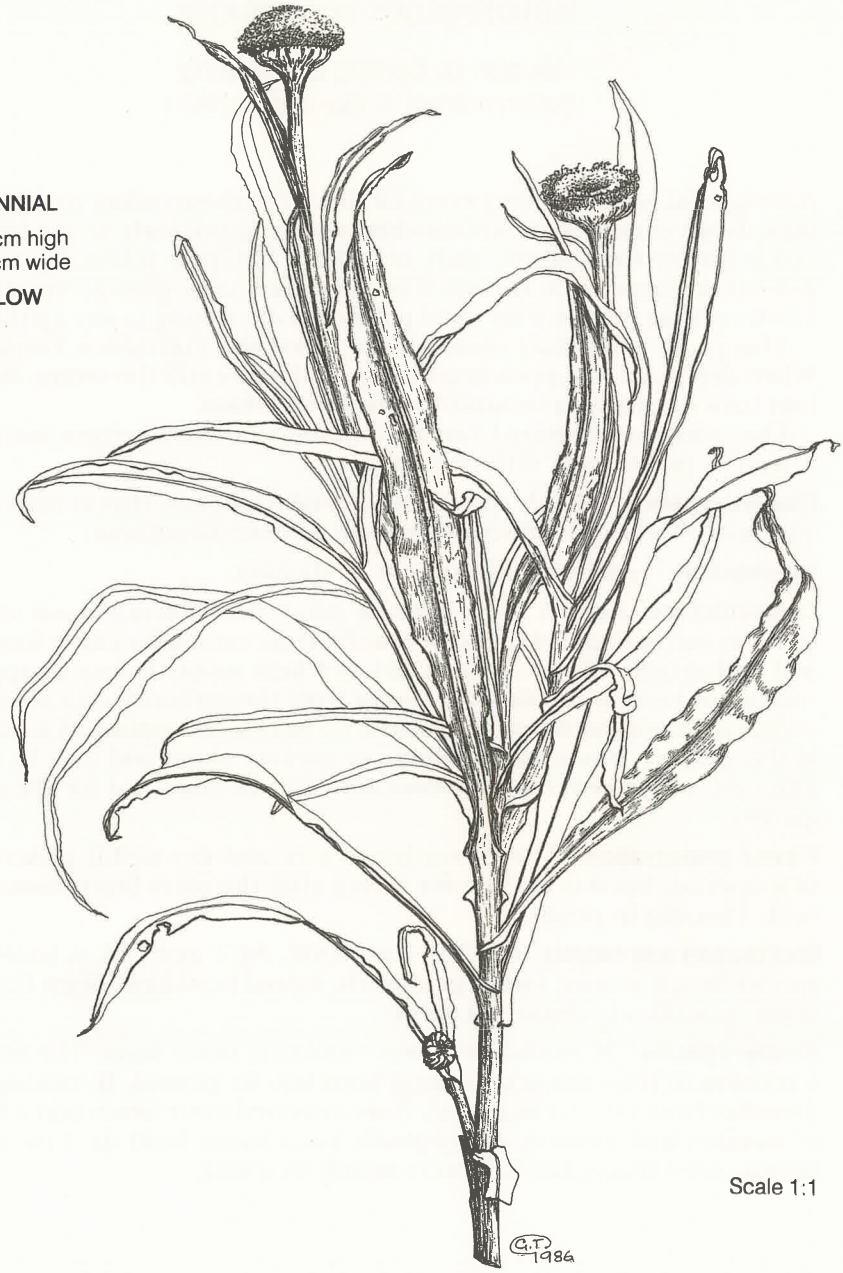
Distribution and habitat: Qld. Grows naturally along the rocky coastline of northern Qld in rainforest margins, along roadsides and in clearings.

Similar species: *Helichrysum collinum* is similar in habit, but the flower-head is larger, to 3 cm across, and more rounded in shape. The bracts are yellow-brown and more conspicuous than those of *H. rupicola*.

PERENNIAL

30–80 cm high
20–50 cm wide

YELLOW



Scale 1:1

Helichrysum rupicola

Helichrysum scorpioides

Button or Curling Everlasting
(scorpioides = like a scorpion)

A delightful, small, silvery perennial which forms spreading clumps. From these basal clumps arise unbranched woolly stems, leafy at the base and rarely longer than 30 cm, each carrying a flat, pale yellow flower-head, 2–3 cm in diameter, at the tip. The leaves are hairy, grey-green, stalkless, 2.5–6 cm long, tipped with small points and decreasing in size up the stem.

This pretty little plant could also be called the 'Pincushion Everlasting'. When the heads first open small bracts curl in towards the centre, but later fold back to display a beautiful velvety pincushion.

There are no recognized varieties but some variation in form and foliage is seen in plants from differing habitats.

Flowering period: Mainly spring, but coastal forms may start as early as July and then flower intermittently through summer to autumn.

Propagation: From seed, cuttings or by division.

Cultivation and uses: A very adaptable plant which tolerates most soils and grows in sun or dappled shade. It benefits from cutting back after flowering, and will usually flower again if fed and kept moist. It may disappear if conditions become too dry, but shoots from the perennial root after rains.

Although not commonly available in nurseries, *H. scorpioides* has potential in the garden. It is a useful edging or rockery plant, and may be tucked into odd, sunny pockets. Recommended for the coast and for the cottage garden.

Flower preservation: The flower-heads wire and dry well if picked when first opened, but it is too late for wiring after the outer bracts have folded back. Pleasing in posies.

Distribution and habitat: SA, Vic, Tas, NSW, ACT and Qld. A widespread species found in open forest, grasslands, coastal heathland, often flowering along roadsides in disturbed earth.

Similar species: *H. rutidolepis* is very similar in many ways. The need for a revision of this complex has long been felt. In general, *H. rutidolepis* has a smaller head (to 1.5 cm across), straw-coloured outer bracts and it flowers in summer and autumn. *H. scorpioides* has a larger head (to 3 cm across), brown outer bracts and it flowers mainly in spring.

PERENNIAL

10–40 cm high
10–20 cm wide

YELLOW

Scale 1:1

Helichrysum scorpioides

Helichrysum semipapposum

Clustered Everlasting
(semipapposum = half or nearly covered with fine down)

Another variable species with many forms: all bright, attractive plants with excellent potential for cultivation. The narrow-leaved coastal form grows to 60 cm on upright, woody stems with a fine white cottony coat of hairs. The small yellow heads, 5 mm across, are grouped in dense terminal clusters, fifty to a hundred heads per cluster. The threadlike leaves, 5–35 mm long, are crowded along the stem, and are green and hairless above, white woolly beneath, with margins rolled under. The second flush of flowering clusters appear at the tips of branchlets produced from the leaf axils. These clusters are much smaller and appear along the length of the stems. At this stage of growth the stems start to bend towards the ground so that the habit is no longer upright. Plants can spread by suckering.

A number of other forms have been grown, all of which appear to be desirable garden plants:

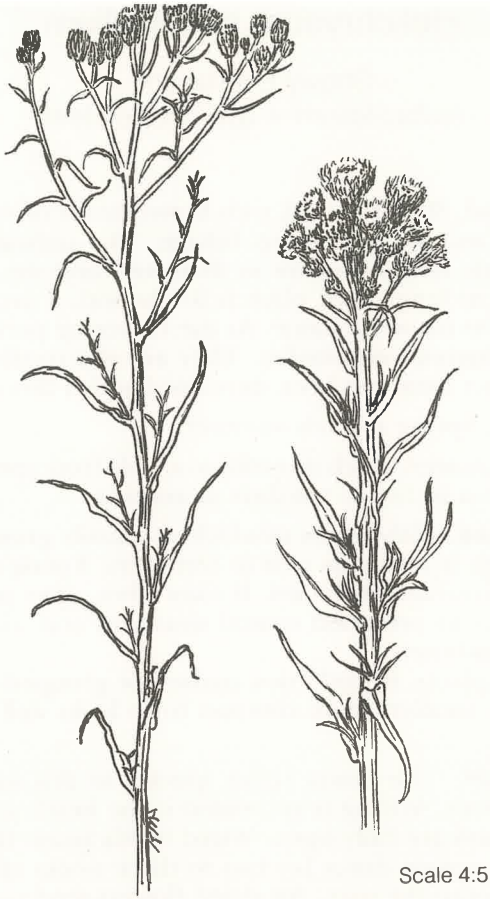
- A silver-leaved form from inland Victoria, 0.8–1 m by 0.5 m. A stiff form of open habit with large, lemon-yellow clusters. The small heads are 5 mm wide. Leaves are narrow, 2 cm long and 1 mm wide, with short, stiff, white hairs on the upper surfaces, woolly reverses and rolled-under margins. Young leaves are so hairy as to appear white.
- An alpine form, 0.5–1 m by 0.5 m. A handsome form with yellow heads, 6 mm across, in showy clusters. The leaves are grey-green, broad-linear, to 3.5 cm long, up to 3 mm wide, and covered with soft white hairs on both surfaces.
- Wyangala form from inland NSW, 40–60 cm by 60 cm. A stiff, upright form with clusters of buff-yellow heads and sticky foliage. The bright green leaves, 2–10 mm long and 0.3 mm wide, are very narrow and hairless.
- Grampians form, 40–60 cm by 50 cm. A sturdy upright plant with bright yellow heads, 8 mm across, in dense clusters. Narrow grey-green leaves, to 3 cm long and up to 2.5 mm wide, have short, white glandular hairs above and woolly reverses.

Flowering period: Late spring into summer, with occasional flowers in autumn. Alpine forms flower from summer to autumn in their natural habitat.

Propagation: From seed which germinates in ten to thirty days in autumn and is available commercially. Cuttings taken from semi-hardened new growth will strike in a few weeks and division could also be tried.

Cultivation and uses: *H. semipapposum* is rarely seen in cultivation but deserves to be more widely grown. It adapts to most soils and prefers full sun, but grows in semi-shade. It should be pruned hard in winter. Garden plants may regenerate naturally. Most forms grow in exposed coastal situations, tolerate dry conditions and frost to –5°C.

Grow for summer colour in gardens and rockeries and as a container plant. As a cut flower this species has excited favourable comment when exported fresh to the west coast of the USA.



PERENNIAL
0.5–1 m high
0.5–1.5 m wide
YELLOW

Scale 4:5

Helichrysum semipapposum (inland form)

Helichrysum semipapposum (Grampians form)

Flower preservation: Pick in bud just before the bracts open and dry by hanging upside down. The coastal and inland forms dry better than the alpine form. This species retains its colour well and may be used in posies or as filler in dried arrangements.

Distribution and habitat: WA, SA, Vic, Tas, ACT, NSW, Qld. Widespread from subalpine areas to the coast, from open dry forests to inland mallee sands.

Synonym: *Gnaphalium semipapposum.*

Special notes: The variety *brevifolium* was described by Sonder as being glabrous and sometimes glutinous with many small leaves, often clustered. Bentham suspected it was a state of growth, induced by circumstances, rather than a variety and the epithet seems to have fallen into disuse. This description seems to apply to the Wyangala form.

Similar species: Some forms of *Helichrysum apiculatum* are similar in many respects (see page 122).

Helichrysum subulifolium

Showy Everlasting
(subulifolium = awl-shaped leaf)

An upright annual, 30–50 cm tall, with flower-heads of strong, almost fluorescent yellow and shining green foliage. The unbranched stems are topped with single heads, 2–4 cm in diameter, and the narrow, hairless leaves are 8–12 cm long. Each plant is bright with a profusion of heads, thus confirming its common name. As the flowering period continues the heads become progressively smaller. They are also smaller in summer.

A more compact form has been developed which flowers profusely.

Flowering period: Spring to early summer.

Propagation: From seed which is readily available from specialist seed stockists and germinates in five to ten days in autumn.

Cultivation and uses: *Helichrysum subulifolium* is easily grown. It is not fussy as to soil although it responds well to fertilizers. Young plants should be tip pruned to encourage bushiness. It likes a hot, open position, tolerates mild frosts, grows in protected coastal situations and withstands tropical or subtropical conditions.

Use as border plants, in rockeries, massed or grouped in gardens for a bright show. The smaller, more compact form looks well in containers. A good cut flower.

Flower preservation: The bracts reflex quickly in this species, but retain their unusual colour. Wiring is successful if the heads are picked in bud or before the bracts are fully open. Wired heads retain their shape better if they are hung upside down for two to three weeks after the stem has begun to shrink onto the wire. Air-dried flowers tend to lose their shape more easily.

Distribution and habitat: WA. Coastal and near coastal areas from Geraldton to south of Perth, spreading inland.

ANNUAL

30–50 cm high
20–25 cm wide

YELLOW

Scale 1:2

Helichrysum subulifolium

Helichrysum viscosum

Sticky Everlasting, Yellow Paper-daisy
(viscosum = sticky)

An attractive everlasting with an array of bright yellow flower-heads, 2–3 cm wide, at the ends of branching stems. The heads look exactly like those of *H. bracteatum*, but are smaller and daintier, and appear singly or a few together on short stalks. The linear or elliptic leaves are 3–9 cm long, bright green, sticky and have their margins rolled under. The habit is open, sprawling or upright, and the plant may be single stemmed or have many stems arising from the base. *H. viscosum* germinates thickly after fire, colonizing large areas.

Flowering period: Spring and summer in its natural habitat. Under cultivation the flowering period extends into autumn.

Propagation: Seed germinates in seven to thirty days in autumn, but is not yet on the market. Cuttings strike quickly and easily.

Cultivation and uses: *H. viscosum* has not been widely grown in gardens, but deserves to be more popular. It is easy to grow, very colourful and smaller than *H. bracteatum* which it otherwise resembles. Once established, it has a laudable tendency towards natural regeneration. The sheer number of heads produced on any one plant may exhaust it to the point of death after one season, but cutting back in winter will sometimes cause rejuvenation. Alternatively, treat as an annual and be pleasantly surprised if it acts as a perennial. It grows in most soils in sun or semi-shade, is frost resistant to –5°C, and will succeed in protected coastal positions. Grows well in the fairly humid conditions of Newcastle. It will probably cope with tropical conditions too, but may need to be treated as an annual. Subject to aphid attack.

An ideal everlasting for the dry inland, especially on heavy soils, where it is most suited to massed planting. Also suitable for rockeries and containers if kept small. Scatter it in the garden for summer colour and as a source of cut flowers.

Flower preservation: Like *H. bracteatum*, this species retains its colour and shape for a long time when wired or dried. Pick in bud or when the bracts begin to open and use as dainty additions to posies and dried arrangements.

Distribution and habitat: Vic, ACT, NSW. Occurs along roadsides, on plains and in sparse eucalypt woodland. Widespread in the goldfields area of Victoria.

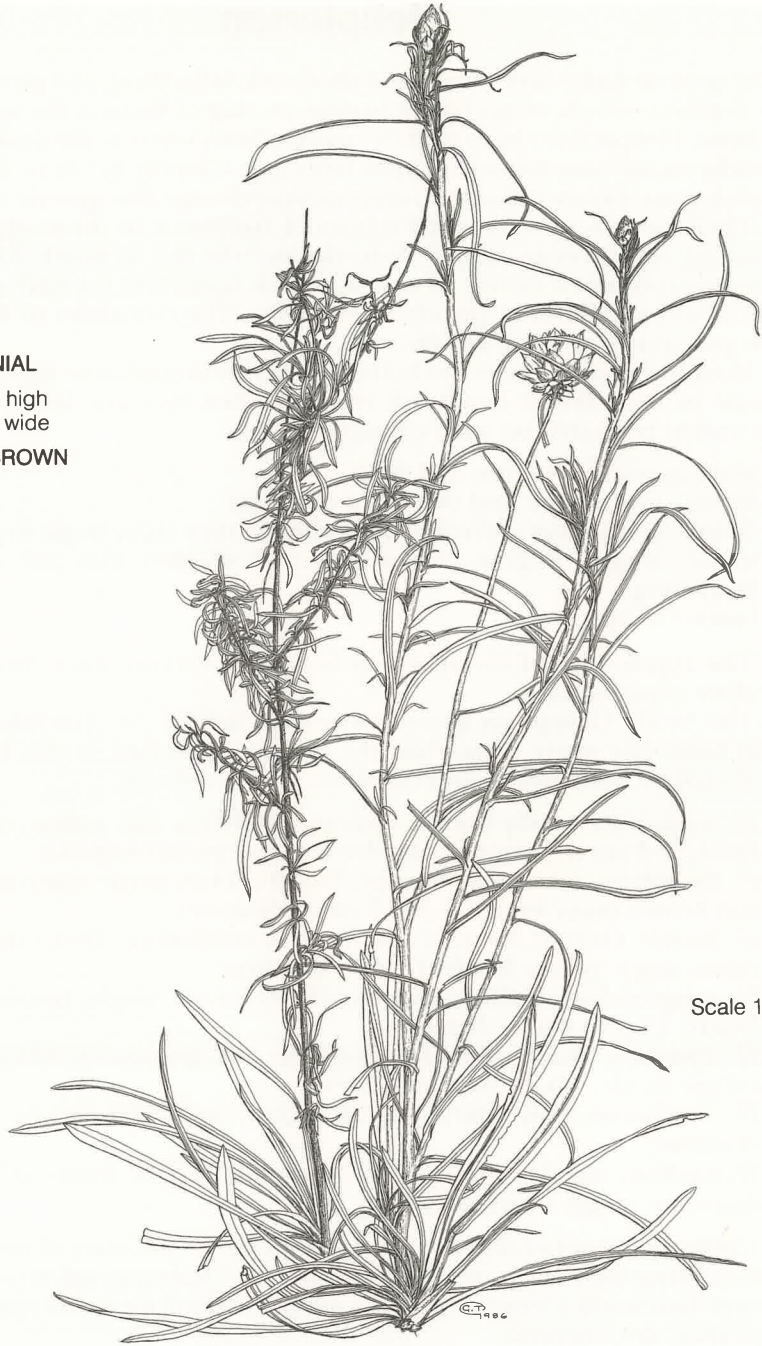
Synonym: *H. bracteatum* var. *viscosum*.

Similar species: *H. bracteatum*. See page 131 for distinguishing features.

PERENNIAL

30–50 cm high
30–50 cm wide

YELLOW, BROWN



Scale 1:2

Helichrysum viscosum old and new foliage

Helipterum

The generic name is derived from the Greek *helios* (sun), and *pteron* (a wing or feather), which refers to the pappus or ring of hairs at the apex of the achene. Helipterums have feathery pappus hairs whereas the closely related helichrysums have barbed pappus hairs (see Chapter 8). As in the case of *Helichrysum*, future botanical revisions may change this generic name.

There are about a hundred species of *Helipterum* in the world, sixty or more of which occur only in Australia and the rest in South Africa. The genus is composed mainly of annuals which transform the bare ground of the inland to a floral carpet after good rains. The remainder of the species are perennials or small shrubs.

Most *Helipterum* species are known as everlastings because the colour and shape of their flower-heads are retained when they are dried. They are identified primarily on such characteristics as:

- plant appearance—size and habit
- leaves—size, shape and degree of hairiness
- flower-heads—size and colour and whether they occur singly or in clusters
- stems—length, degree of hairiness and whether they are simple or branching
- bracts—shape.

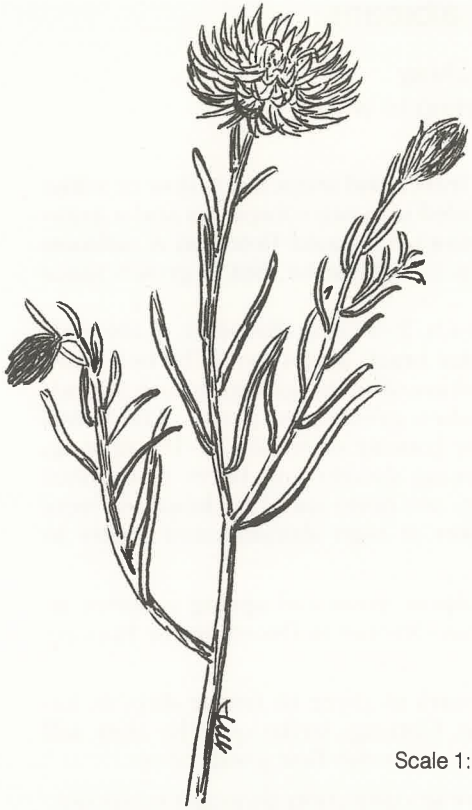
The appearance of the achene is helpful in identification, but is of secondary importance.

The Study Group has grown more than half of the Australian species and feels that many more than the thirteen described in this book have potential in horticulture and floral art. These include:

- *H. craspedioides*, Billy-button Sunray, 20–40 cm tall, yellow compound head, 2–3 cm in diameter, similar to a species of *Craspedia*.
- *H. fitzgibbonii*, Glandular Sunray, 20–30 cm tall, single white heads with red-brown outer bracts, 1.5–2.5 cm in diameter.
- *H. jessenii*, Orange Sunray, a diminutive everlasting, 10–15 cm tall with many single yellow heads, 1 cm in diameter.
- *H. polygalifolium*, Brilliant Sunray, 10–40 cm tall, single, terminal yellow heads, 1.5–3.5 cm in diameter.
- *H. stipitatum*, Woolly Sunray, 30–50 cm tall, grey-green foliage, showy yellow heads, 1.5–3 cm in diameter.
- *H. stuartianum*, Clay Sunray, 10–20 cm tall, single white heads, 2–4 cm in diameter.
- *H. tenellum*, Slender Sunray, 10–30 cm tall, golden heads, 0.5–2 cm in diameter, singly or in clusters.

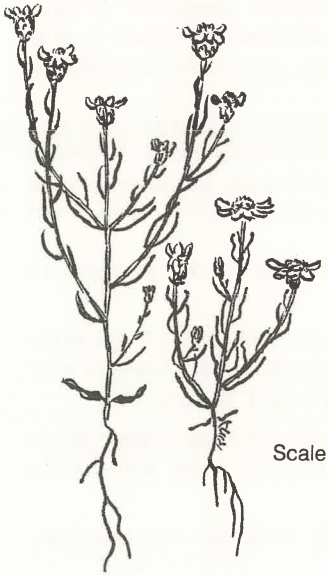
Cultivation is generally easy. Most species prefer full sun and well drained soil. Cutting the flowers, regular fertilizing and watering will result in more flower-heads and a longer flowering period. Control measures against snails and slugs are essential.

Propagation of annuals is usually quick and easy from seed. Perennials and shrubs strike readily from cuttings or may be propagated from seed.



Scale 1:1

Helipterum fitzgibbonii



Scale 1:1

Helipterum jessenii

Scale 1:1

Helipterum polygalifolium

Helipterum albicans

Hoary Sunray
(albicans = tending to white)

A variable, tufted perennial with silver leaves and attractive yellow or white flower-heads. The species has been divided into two subspecies and a number of varieties and forms (detailed below). The gold flowered *H. albicans* ssp. *albicans* var. *albicans* is seldom seen in cultivation, but is grown more widely than the other varieties.

It has single, golden-yellow flower-heads, 2–3 cm in diameter, at the ends of silver stems, 10–30 cm long. The outer bracts are brown. The heads are held conspicuously above the foliage and are often produced in such abundance that they resemble a golden sea when growing en masse. The leaves are usually narrow, linear, silvery, very cottony or woolly, 2–10 cm long, usually crowded at the base and becoming shorter and fewer in number up the stem. The leaves of this variety are quite variable, however, very narrow in some areas, becoming thicker at high altitudes and flatter in western NSW.

Flowering period: Usually summer in alpine areas and spring at lower altitudes. Under cultivation it flowers from October to December or January and sometimes again in autumn.

Propagation: From seed which germinates in three to twelve days in autumn. Seed is not yet readily available. Cuttings strike quickly; they will also root if set in garden soil in autumn after the first good rains.

Cultivation and uses: Var. *albicans* is rare in cultivation although many horticultural writers have suggested its use. It has been short-lived in gardens in the past so perhaps it should be regarded as an annual. The silver foliage, the brilliance of the flowers, the tufted habit and its propensity to self-sow are valuable characteristics which will reward growers prepared to persevere. As with most new species, its cultivation will become easier as it is 'tamed' by growers. Lowland forms seem to be more amenable than alpine ones.

It grows in most soils, prefers full sun and summer moisture, but will often die down over summer and shoot again after autumn rains. It resists frost to –5°C and will grow in protected coastal conditions, but does not do well in tropical climates. Snails, slugs and caterpillars love it. Good cut flower.

Effective as a bedding or border plant, for pockets in the garden, in rockeries and containers.

Flower preservation: Pick in bud or when the heads first open. Even after hanging upside down the necks will droop, but all forms of this species wire well. Recommended for dried arrangements and larger posies.

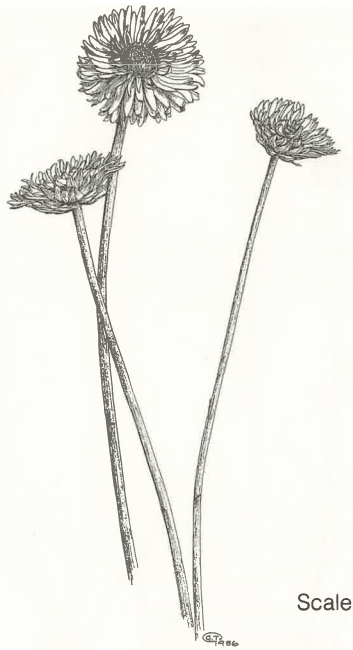
Distribution and habitat: Vic, NSW and Qld. Widespread from alpine areas where it occurs in moist peaty soils among rocks to poor stony soils in the goldfields of Victoria and inland sands.

Synonyms: *Helipterum incanum* var. *flavidiceps*, *H. incanum* var. *auriceps*, *H. incanum* var. *filifolium*.

PERENNIAL

10–45 cm high
20–40 cm wide

WHITE, YELLOW



Scale 1:2

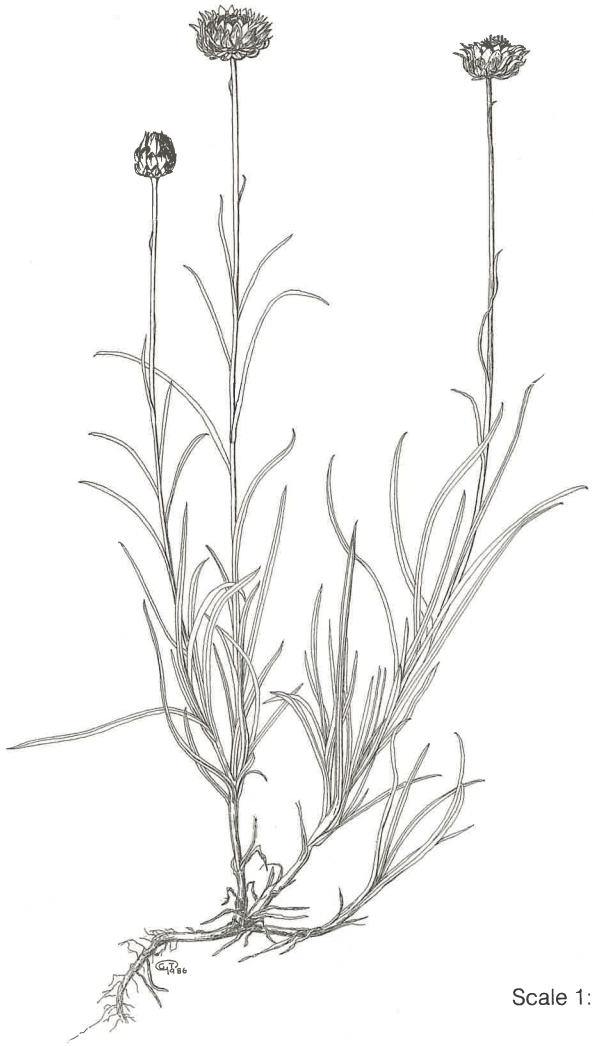
Helipterum albicans ssp. *alpinum*
(flower-heads)

Scale 1:2

Helipterum albicans ssp. *alpinum* (foliage)

Subspecies, varieties and forms: In 1960 P. G. Wilson published a taxonomic survey of this species and divided it into two subspecies, namely ssp. *alpinum* and ssp. *albicans*. The latter is further divided into four varieties and one of these has three recognized forms (see Figure 2).

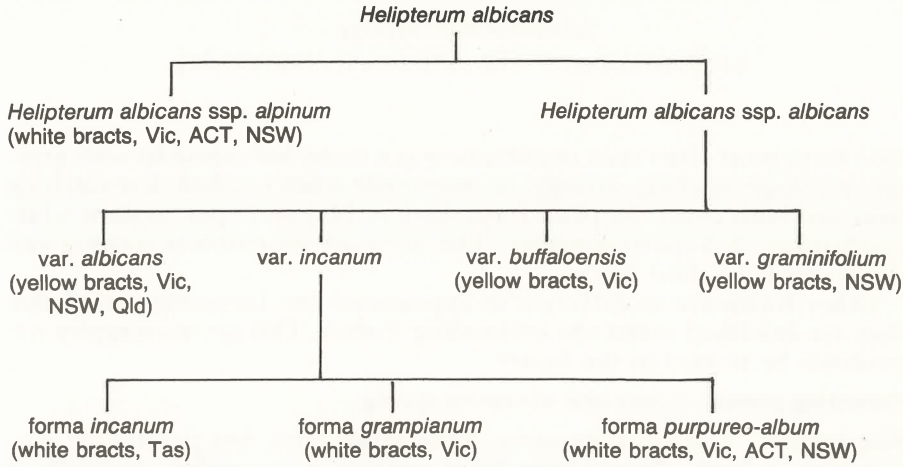
These subspecies, varieties and forms are differentiated mainly on the basis of variations in the foliage and in the shape of the involucral bracts. They are as follows:



Helipterum albicans ssp. *albicans* var. *buffaloensis*

- *H. albicans* ssp. *alpinum*, Alpine Sunray. A small plant, 10–25 cm tall, growing as a silvery cushion in the alpine herbfields and feldmark. In summer it bears solitary, glistening white flower-heads, 2.5–4 cm in diameter, at the tips of short, thick woolly stems. The buds are bronze or dark rose-pink, and the flowers are strongly perfumed. It is distinguished from ssp. *albicans* by its thick, felted leaves. A difficult subject in cultivation but will survive in a container of rich peaty soil standing in water. Found among rocks in the alps in Vic, ACT and NSW. (Syn. *Helipterum incanum* var. *alpinum*.)

Figure 2 Subspecies, varieties and forms of *Helipterum albicans*



- *H. albicans* ssp. *albicans* var. *incanum*. This attractive variety has narrow, silver hairy leaves to 12 cm long, with dainty red or brown buds on stems 10–30 cm long. The flower-heads, 2–3 cm in diameter, open pale yellow and fade to white which makes it very colourful at the beginning of the flowering period. It usually flowers from spring to early summer and is much easier to grow than ssp. *alpinum*, but will also sometimes disconcert the grower by dying suddenly. Seed germinates promptly within three to six days and cuttings strike quickly. Use as a bedding or container plant, in pockets and rockeries. Three forms of this variety are recognized, all with white bracts (see Figure 2). (Syn. *Helichrysum incanum*, *Helipterum incanum*, *Aphelexis incana* f. *incanum*, *Helipterum incanum* var. *tricolor*.)
- *H. albicans* ssp. *albicans* var. *buffaloensis*, Buffalo Daisy. This variety is larger in all its parts than the previous two. It grows up to 45 cm tall, the stems are much branched and leafier, the flower-heads are larger and the leaves longer. The outer bracts are reddish-brown, often streaked. Var. *buffaloensis* germinates readily from seed in seven to ten days but plants usually collapse with the onset of hot weather. Endemic to Mt Buffalo, Victoria where it grows among rocks.
- *H. albicans* ssp. *albicans* var. *graminifolium*. A much branched perennial to 30 cm tall. The threadlike leaves, up to 12 cm long, have revolute margins and are hairless above, woolly below. The old stems have hard scale-like leaf bases. Slender stems, 8–15 cm long, are tipped with yellow flower-heads, 2–2.5 cm in diameter. Little is known about its cultivation. Restricted to one area about 100 km north-west of Sydney.

Helipterum anthemoides

Chamomile Sunray
(anthemoides = like *Anthemis*, chamomile)

The form most often seen in cultivation is a bushy little shrublet with grey-green foliage smelling strongly of chamomile when crushed. Eye-catching wine-red buds cover the plant from April or May and open to snow-white everlastings, 2–3 cm in diameter. The stems are invariably branching and the leaves have short hairs.

Other forms are so different in appearance and flowering period that they are described under the subheading 'Forms'. This species complex will probably be revised in the future.

Flowering period: From late winter to spring.

Propagation: This form produces little viable seed, but percentage germination is high. Propagation from cuttings is successful, especially if bottom heat and misting are available. Cuttings put straight into the garden after autumn rains will often root well.

Cultivation and uses: Likes a rich peaty soil, good drainage and some shade during summer in hot climates. Protect the roots with rocks or mulch. Prune after flowering has finished, feed and water well to stimulate new growth. A beautiful, soft cushion may be produced by regularly clipping to shape, but this activity must be suspended when buds begin to form in about mid-March. *H. anthemoides* is tolerant of frost to –5°C, but this form does not seem suitable for cultivation in tropical conditions. The species is usually pest free but may be attacked by a small grub.

An ideal plant for rockery, hanging basket or container, where the flower stems, normally ascending, cascade over the rim and show to great advantage. It can be planted in drifts throughout the garden. Excellent cut or dried flower.

Flower preservation: For drying the flowers should be picked in their prime and wired, or hung upside down in small bunches to prevent stems from becoming tangled. The fragrant leaves can be added to potpourri.

Distribution and habitat: NSW. The red-budded form, first obtained from a Tasmanian nursery, has been difficult to trace to its original habitat. It is now thought to occur among rocks in dry sclerophyll forest in the Armidale–Walcha area of north-eastern New South Wales.

Synonym: *Helichrysum anthemoides.*

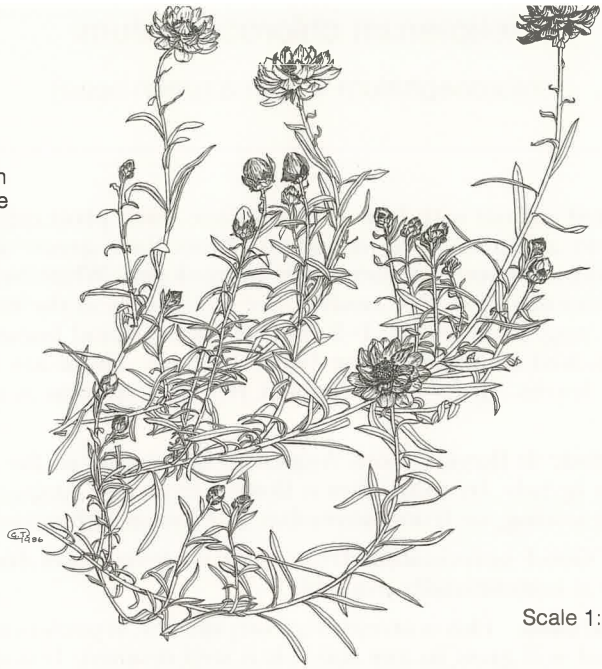
Forms: Other forms of this widespread species have been observed. Although much more common in nature than the red-budded form described above they have not been widely cultivated.

One form (thought to have originated in Queensland) appears to have great horticultural potential. It has white flower-heads, to 3 cm across, at the tips of erect, unbranched stems. The pointed buds may be purplish or straw-coloured and the outermost bracts usually possess a brown or purple midrib. The inner bracts are longer and narrower than those of the red-budded form and have more acute tips. The blue-green leaves are narrow,

PERENNIAL

15–30 cm high
30–60 cm wide

WHITE



Scale 1:2

Helipterum anthemoides (red-budded form)

1.5 cm long and 2 mm wide, with pitted surfaces and slightly wavy margins. The stems and leaves are hairy and not so aromatic when crushed. This form flowers continuously, but has flowering peaks in late June and July, October and February. These peaks are probably induced by hard pruning and could perhaps be manipulated to coincide with times when there is a special demand for flowers. Plants regenerate naturally in the garden. Cuttings are not easy to strike, but seed germinates readily.

A similar form to the Queensland one has been found growing along disturbed road margins at Whitlands in north-eastern Victoria. It forms an upright clump of unbranched stems to 30 cm high when growing naturally, but is taller and more sprawling in cultivation. It also has white heads to 3 cm across, but the tips of the inner bracts are quite obtuse. The outer bracts are straw-coloured with a purple or brown midrib. The narrow, bluish leaves are pitted, but not hairy and the stems are only hairy for a short distance below the head.

Another form has unbranched stems, 20–40 cm long, small white heads, 1–1.5 cm across, with straw-coloured outer bracts and narrow, slightly pitted leaves. This form flowers in summer, usually from December, and is found in alpine or subalpine herbfields in Vic, Tas, ACT and NSW.

Helipterum chlorocephalum

(chlorocephalum = with a green head)

A dainty tufted annual with blue-green foliage, each plant capable of producing fifty to a hundred flower-heads. Buds have green outer bracts, hence the common name, but later develop pink tips. White heads, 1–2 cm across, with lemon-yellow disc centres, are held singly at the ends of stems about 30 cm long. Neat leaves, 1–2 cm long, narrow and linear, clothe the many unbranched stems that arise from the base. There are no hairs on the stems or leaves. In its native habitat *H. chlorocephalum* is usually only 5–10 cm tall.

Flowering period: It flowers from August to September in the wild, sometimes starting in July. In cultivation it flowers from late August to October after autumn sowing, or from November to February after spring sowing.

Propagation: Good germination from seed in seven days from autumn sowing. Seed is commercially available.

Cultivation and uses: This is an easily grown species. It prefers sun for most of the day and will grow in any soil if it is well drained. It is damaged by frost, but will grow at the coast in a protected position and is suitable for subtropical conditions. Autumn sowing produces larger plants with larger heads. It will regenerate naturally in the garden, but should be baited for snails and slugs.

Use as a bedding or border plant, for pockets or groups in the garden or rockery and as a container plant. It is a long-lasting cut flower.

Flower preservation: Pick as the buds are opening. The disc centres tend to darken with age so that it is not as useful as *H. roseum* or *H. splendidum* when dried or wired.

Distribution and habitat: WA, SA. Occurs in eucalypt woodlands in the south-western regions of WA and around Ooldea in SA.

Similar species: *H. roseum* looks very similar in form, but *H. chlorocephalum* is smaller in all its parts and produces only white flowers. *H. chlorocephalum* also has a pointed receptacle and vertical scarring below the leaf nodes, whereas *H. roseum* has a flat receptacle and no scarring.

H. splendidum is more graceful than *H. chlorocephalum* and has very slender, less leafy stems.

ANNUAL

25–35 cm high
20–50 cm wide

WHITE

Scale 1:2

Helipterum chlorocephalum

Helipterum corymbiflorum

Grey Sunray, Small White Paper-daisy
(corymbiflorum = flowers arranged in a corymb)

A slender, upright, silver foliaged annual, 10–30 cm tall, with soft woolly, grey-green leaves, 1–4 cm long. White everlastings are held in loose flat-topped clusters of three to ten heads at the tips of the stems, each head being 1–2.5 cm in diameter.

Flowering period: Flowers from June to October in its natural habitat, but under cultivation this period may be extended until at least November.

Propagation: Good germination if sown in autumn. Direct sowing should be successful if enough seed is available. This species will regenerate naturally in the garden.

Cultivation and uses: These annuals need sun and prefer clay or loam soils enriched with fertilizer. They flower longer and more profusely if the soil is not allowed to dry out. Aphids may be controlled with pyrethrum sprays.

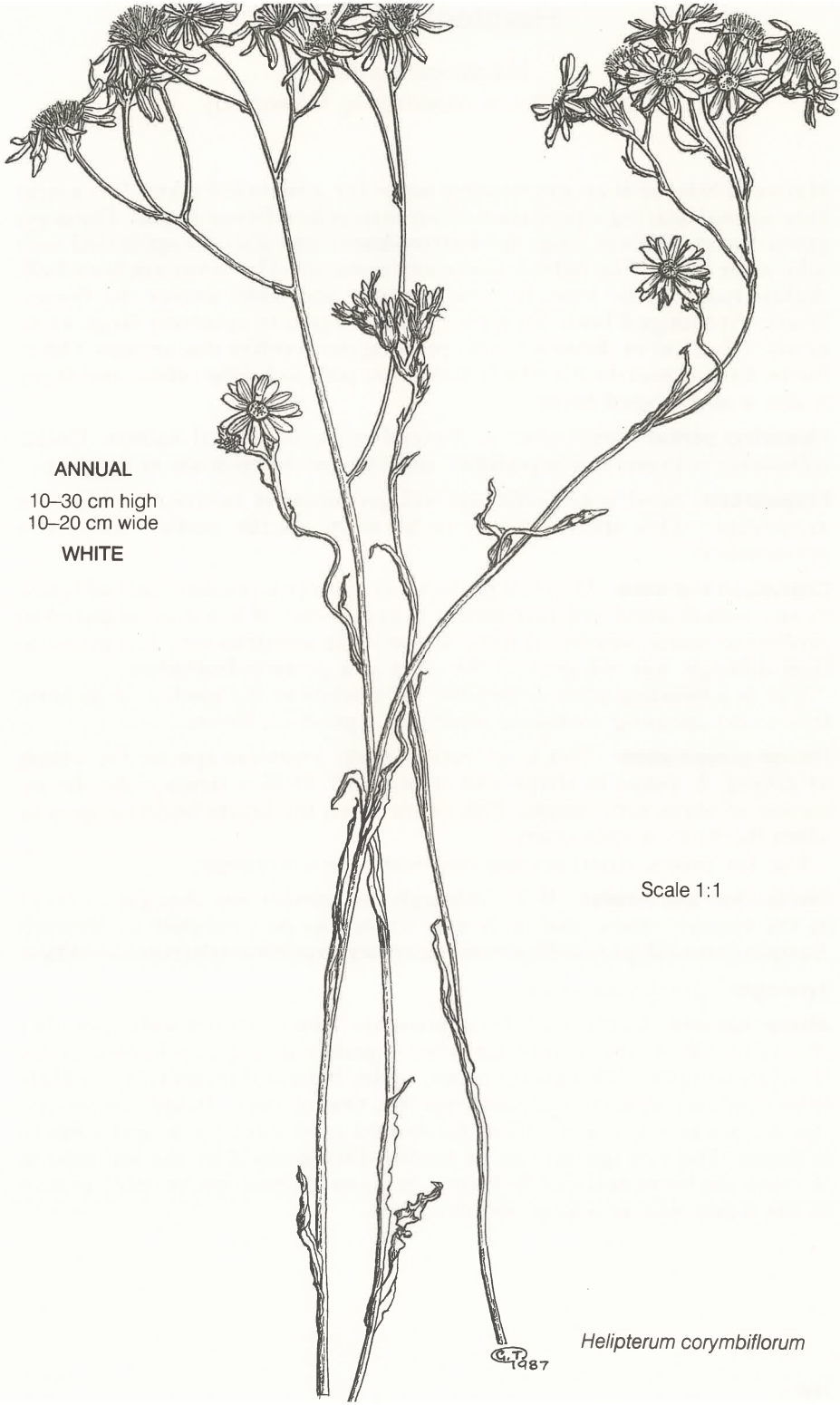
Mass plant to create a carpet. Plant singly or in groups for splashes of colour in the garden or rockery. It makes a good container plant and grows at the coast in a protected situation.

Good cut flower.

Flower preservation: This species dries quite well. Pick when the flowers first open and hang upside down in loose bunches. It may be necessary to spray with clear lacquer immediately the stems are picked in order to keep the individual heads from drooping.

Special notes: *H. corymbiflorum* may be regarded as a weed by graziers as it is indigestible to cattle.

Distribution and habitat: SA, Vic, NSW, Qld and NT. Widespread on clay or loam soils on open plains, in grasslands, woodlands and river flood plains. Especially abundant in years of high winter rainfall.



ANNUAL

10–30 cm high
10–20 cm wide

WHITE

Scale 1:1

Helipterum corymbiflorum

Helipterum cotula

Mayweed Sunray
(cotuloides = resembling Mayweed)

Mayweed Sunray is an unattractive name for a beautiful plant. It is a neat little annual bearing a profusion of white or yellow flower-heads. The grey-green leaves, 1–2 cm long, are narrow-linear and liberally sprinkled with silky white hairs. The habit is dense and compact. The stems are branched, slightly hairy at the base, becoming woolly and white nearer the flower-heads. Pink-tinged buds tip each stem and open to relatively large white heads, 1.5–2 cm in diameter, with pleasing deep yellow disc centres. Other forms have flower-heads which vary from pale to bright yellow and there is also a pink-tipped form.

Flowering period: September to December in its natural habitat. Under cultivation it flowers in September and October when sown in autumn.

Propagation: Seed is available and will germinate in twelve to thirty days in autumn. This species needs to be sown on the surface for better germination.

Cultivation and uses: *H. cotula* prefers a sunny, open position, and will grow in any well-drained soil provided it is kept moist. When it is subjected to prolonged warm weather it will collapse if the soil dries out. It is prone to frost damage, but will grow at the coast in a protected situation.

Use as a bedding plant or border, for pockets in the garden or rockery. It is a very pleasing container plant and a good cut flower.

Flower preservation: This is an exceptionally attractive species for wiring or drying. It keeps its shape and colour well. Hollow stems make the insertion of wires very simple. Pick either when the bracts begin to open or when the head is fully open.

Use for posies, dried arrangements or cake decorations.

Distribution and habitat: WA. Although this species was thought to occur in the eastern states also, it is now known to be restricted to Western Australia in eucalypt woodlands and heath scrub southwards from Geraldton.

Synonym: *Helichrysum cotula.*

Similar species: In the past this species has been confused with a number of others, all of which were gathered together in a group known as the *H. cotula* complex. This group is now under botanical revision and is likely to be split into about five separate species. One of these, *Helipterum praecox*, also occurs in white and yellow forms and is of similar size and habit to *H. cotula*. The two species can be readily distinguished by the leaf tips; in *H. cotula* the lower and middle leaves always have blunt tips, but in *H. praecox* all the leaves end in a long, slender point.

ANNUAL

10–15 cm high
10–15 cm wide

WHITE, YELLOW

Scale 1:1

Helipterum cotula

Helipterum floribundum

Common White Sunray, Flowery Sunray, Large White Paper-daisy, Many-flowered Sun Wing
(floribundum = flowering abundantly)

A very attractive annual with a profusion of white flower-heads over a long period. It has been suggested that *H. floribundum* may be a perennial if given the right conditions. The heads, 1–2 cm in diameter, appear singly at the tips of the branchlets, but are usually arranged in loose clusters. They have pure white outer bracts in several rows which gives the buds a silky appearance. The egg-yolk yellow disc centres add pleasing colour. The narrow grey-green, linear leaves are 0.5–3 cm long. The plant has a stiff, bushy habit with many branching, slightly hairy stems, prostrate to upright, often woody at the base.

In the inland against a red earth background, this species has a stunning effect.

Flowering period: In its natural habitat it is most profuse in spring, but flowering may extend from August to November.

Propagation: Seed germinates in seven to fourteen days in autumn. It is hoped that seed stockists will recognize the potential of this species and produce seed for the home gardener in the near future.

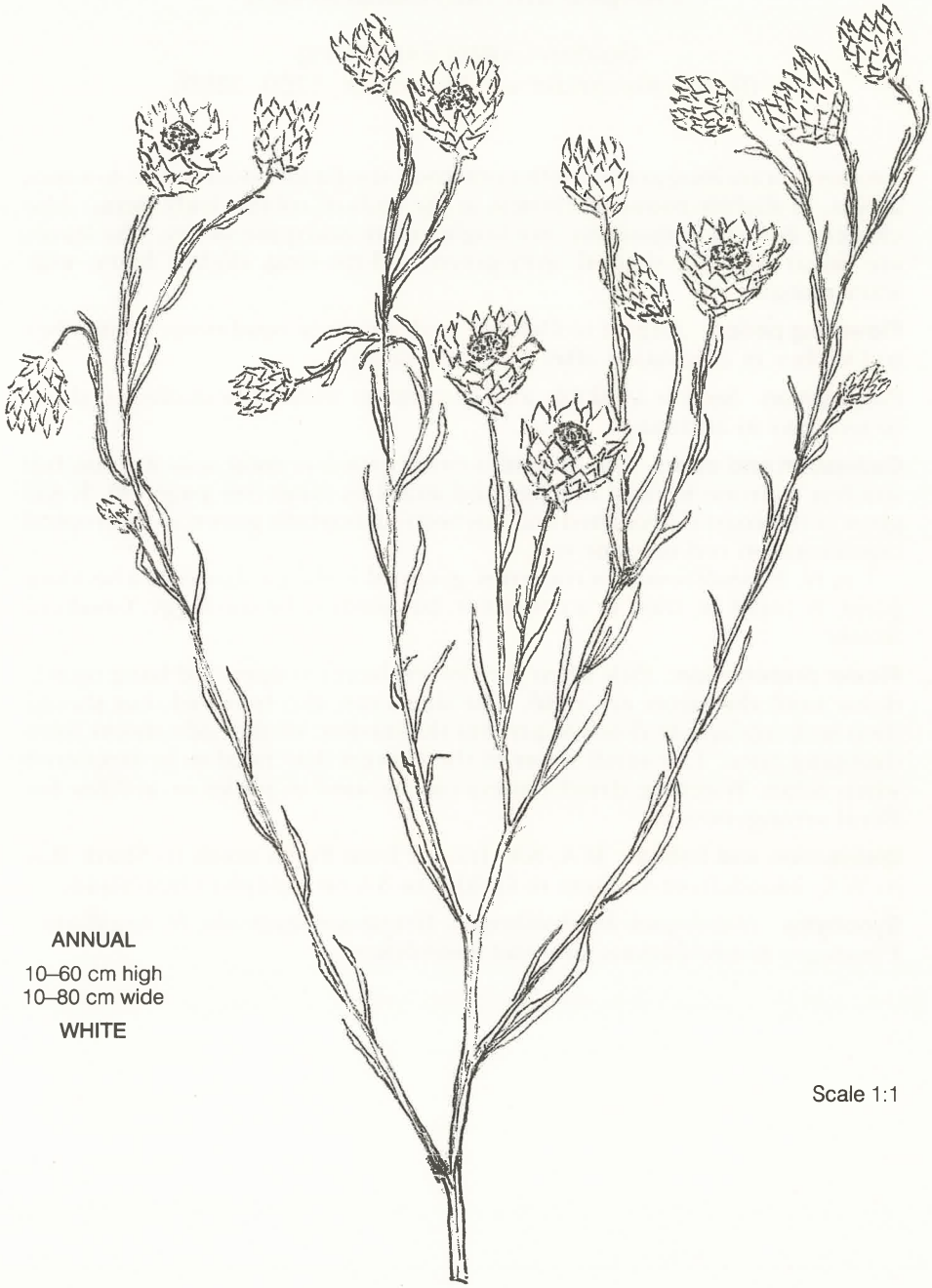
Cultivation and uses: *H. floribundum* has been hitherto neglected as a garden subject, but its ease of germination and cultivation should assure its success. It grows in any well-drained soil and responds to fertilizers with enthusiasm. It will grow in tropical conditions and should be tried in coastal situations. Plant in full sun at 20 cm intervals.

Ideal as a bedding plant, for pockets, in rockeries or containers. Excellent cut flower.

Flower preservation: This species air-dries very well, but the stems appear too narrow for successful wiring. Pick when the flowers first open.

Distribution and habitat: WA, SA, NT, NSW, Qld. Widespread and plentiful in semi-arid areas on all soil types. Larger plants occur near watercourses.

Similar species: *Helipterum stuartianum* is similar, but its outer bracts are golden-brown and it is almost hairless. *H. floribundum* has pure white outer bracts, is sparsely woolly all over and is more robust, rounded and dense in habit. *H. stuartianum* was previously thought to be a variety of *H. floribundum*.



ANNUAL

10–60 cm high
10–80 cm wide

WHITE

Scale 1:1

B C.

Helipterum floribundum

Helipterum humboldtianum

Golden Cluster Everlasting
(Baron Alexander von Humboldt, 1769–1859)

An erect, branching annual with numerous, small individual heads, 4–8 mm across, in slightly rounded clusters at the ends of robust, leafy stems. The clusters, 2–6 cm in diameter, are bright yellow and quite showy. The leaves are linear or lance-shaped, grey-green, 1–3 cm long, slightly hairy, with wavy margins.

Flowering period: August to October under natural conditions, September to October in cultivation after autumn sowing.

Propagation: Seed is available and germinates without hesitation in three to ten days in autumn.

Cultivation and uses: This annual is easily grown in most soils if it has full sun but is prone to frost damage and attack by mites (see page 14). It will grow at the coast if protected and has been successfully grown in subtropical conditions on red volcanic soil.

Use *H. humboldtianum* in rockeries, grouped in the garden or as a bedding plant. It could be tried in a container, but tends to be too leggy. Good cut flower.

Flower preservation: Pick when the clusters begin to open and hang upside down until the stems are rigid. The stems can also be wired, but should then be hung upside down to prevent the smaller, weaker side shoots from drooping later. The small stems of the clusters may need to be lacquered when fresh. Wired or dried flowers can be used in posies or as filler for floral arrangements.

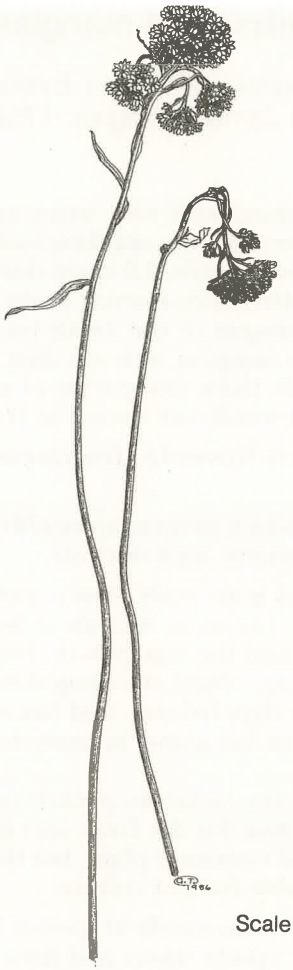
Distribution and habitat: WA, SA. Inland from Perth north to Shark Bay in WA, inland from Ceduna to Ooldea in SA on sandplain heathland.

Synonyms: *Helichrysum humboldtianum*, *Helipterum sandfordii*, *H. largiflorens*, *Pteropogon humboldtianum*, *Schoenia humboldtiana*.

ANNUAL

30–60 cm high
10–30 cm wide

YELLOW



Scale 1:2

Helipterum humboldtianum

Helipterum manglesii

Pink Sunray, Mangles' Everlasting
(Captain James Mangles, 1756–1867)

A slender, branching annual with wiry stems and heart-shaped, greyish green, stem-clasping leaves. Dainty, nodding buds like silver bells open to delicate pink or white flower-heads, 2.5 cm in diameter. A darker pink ring circling the yellow disc often adds interest to the pink heads.

A Melbourne seed catalogue of the 1880s listed many double and coloured forms of *Rhodanthe manglesii*, as it was then known. These days many coloured forms will result from one packet of seed, but the only special form being offered is the small one known as *H. manglesii* 'Silver Bells'.

Flowering period: August to November from autumn sowing, usually spring in the wild.

Propagation: From seed which germinates readily in seven to fourteen days and is available from specialist seed stockists.

Cultivation and uses: This is an easily grown annual. It does not have the neat, upright habit of *H. roseum* as it tends to bend over with the weight of the maturing flowers and the top growth, but the beauty of the heads outweighs this disadvantage. Plant close together for mutual support.

It grows best in full or dappled sun, and has no special preferences for soil. It is damaged by frost but grows in protected coastal and subtropical conditions.

Use as a bedding plant, for rockeries, pockets or groups. It is an excellent cut flower and widely grown for the fresh and dried flower trade. It may be too untidy to be a good container plant, but the small form, *H. manglesii* 'Silver Bells', is very suitable for pot culture.

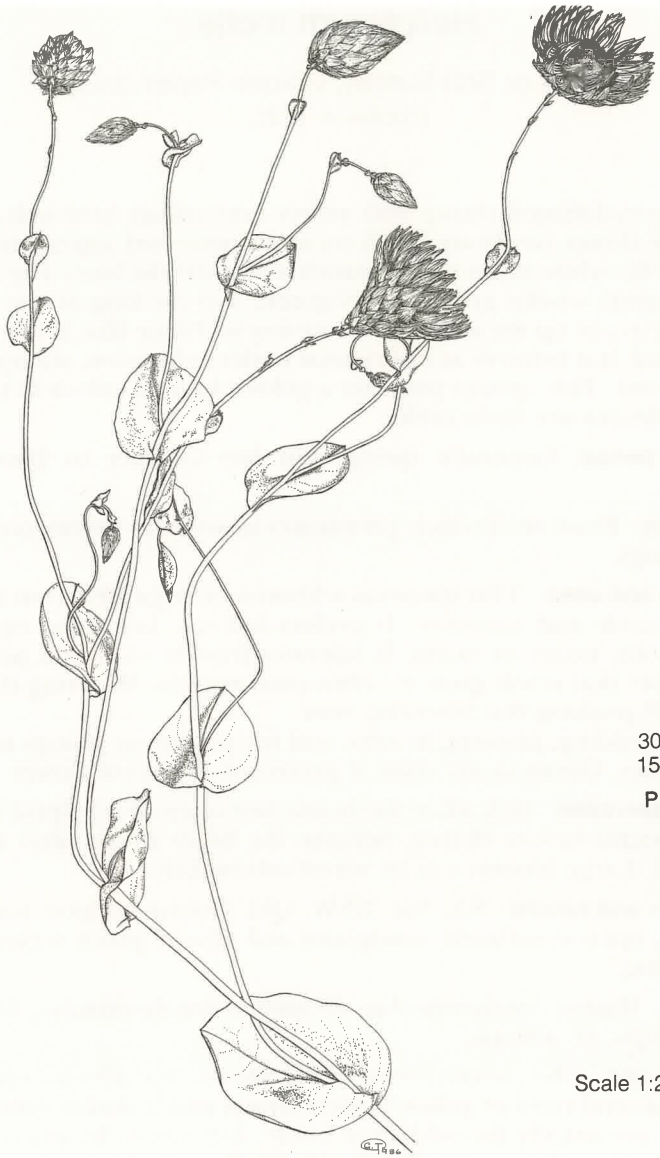
Flower preservation: This is an excellent species for drying. Pick when the flowers first open, hang upside down and leave hanging until ready for use. The brightness of the colours fades a little with time. The stems are too narrow to insert even fine wire into them, but if a wire is pushed gently into the base of the V-shaped head beside the stem, it can be taped to the stem with floral tape. The character of the species is altered by this technique, but it does extend the range of wired flowers.

H. manglesii can be used in posies.

Special notes: Along with *H. roseum* this was one of the earliest everlastings sent back to England where it excited enthusiastic comment from horticulturalist and botanist alike. It was introduced from the Swan River colony by Captain Mangles in 1833, grown by his brother Robert and distributed widely amongst his horticultural friends, botanists and nurseries. It became a favourite plant for the glasshouse.

Distribution and habitat: WA. Widespread in south-western WA in the wheatbelt and mulga country.

Synonym: *Rhodanthe manglesii.*



ANNUAL

30–50 cm high
15–20 cm wide

PINK, WHITE

Scale 1:2

Helipterum manglesii

Helipterum molle

Hoary or Soft Sunray, Golden Paper-daisy
(molle = soft)

A showy grey-foliaged clump with yellow everlastings held well above the leaves. The flower-heads are 2–2.5 cm in diameter and appear singly at the tips of woolly, white stalks which branch at or near the base. The leaves are broadly linear, woolly grey or grey-green, 4–8 cm long at the base and decreasing in size up the stem to become tiny and scale-like. It was regarded as an annual, but behaves as a perennial under cultivation, although it may be short-lived. This species provides a golden haze of colour in the inland when conditions are favourable.

Flowering period: Generally spring, but late October to December in cultivation.

Propagation: From seed which germinates in seven to twenty-one days, or from cuttings.

Cultivation and uses: This species is seldom seen in gardens, but is proving to be adaptable and attractive. It prefers full sun, but grows equally well in heavy soils, loams or sands. It tolerates frost to –5°C and preliminary tests indicate that it will grow in subtropical regions. Watering during dry periods will prolong the flowering time.

Use for bedding, planting in tubs, and for pockets or groups in gardens and rockeries. Grows at the coast if protected. Good cut flower.

Flower preservation: Pick when the bracts first open. It is helpful to lacquer the fresh stems before drying, because the heads droop after they have been dried. Large blooms can be wired successfully.

Distribution and habitat: SA, Vic, NSW, Qld. Occurs on most soil types in grasslands, open woodlands, sandplains and alluvial plains subject to periodic flooding.

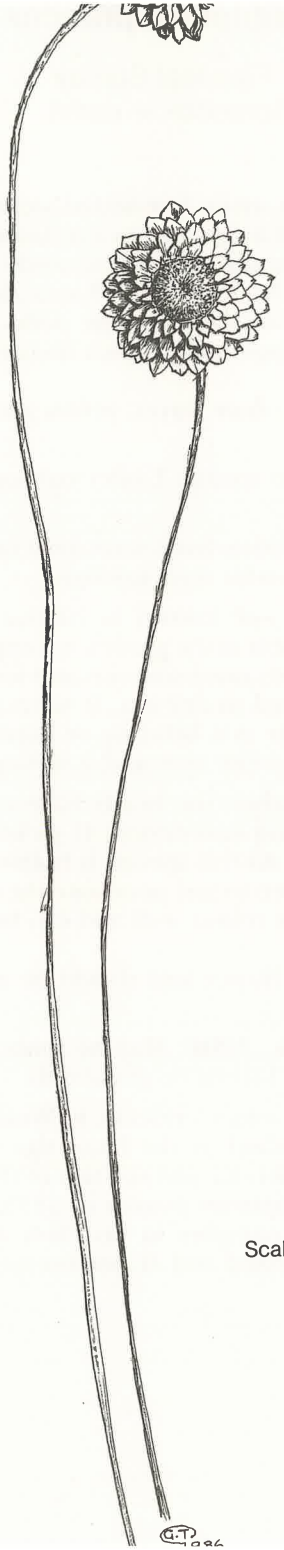
Synonyms: *Waitzia brachyrrhynchus*, *Helipterum brachyrrhynchus*, *H. incanum* var. *brachylepis*, *H. albicans*.

Similar species: The yellow forms of *H. albicans* ssp. *albicans* var. *albicans* also have several rows of yellow papery bracts and a similar growth habit. The leaves are usually thread-like or linear, 1–2 mm wide, and the achene varies from smooth to coarsely warted. In *H. molle* the leaves are softer, broadly linear or oblanceolate, 2–4 mm wide, and the achene is densely and conspicuously warted.

ANNUAL or PERENNIAL

30–40 cm high
20–25 cm wide

YELLOW



Scale 1:1

Helipterum molle

Helipterum praecox

Fine-leaf Sunray
(praecox = early)

A pretty, little annual with many fine-leafed stems arising from the base, each stem tipped with small bright yellow everlastings, 1–2 cm in diameter. The hollow stems branch at the base, are sparsely hairy and some have an attractive reddish tinge. The leaves, 5–40 mm decreasing in size up the stem, are narrow, green and taper to a fine point. Each leaf is tipped with a papery straw-coloured appendage which increases in length as the leaf size diminishes.

There are only the two colour forms, yellow and white. The white form is more rounded in habit.

Flowering period: Winter to spring. Under cultivation this species flowers right through spring.

Propagation: Good germination from seed sown on the surface in autumn. Seed is available from specialist seed stockists.

Cultivation and uses: Not well known in cultivation, this little annual is proving easy to grow. Its habit in the garden is compact, whereas it is spindly in its natural habitat. Well-drained soil, sun and food are all it requires, but its roots must not be allowed to dry out. It will tolerate mild frosts.

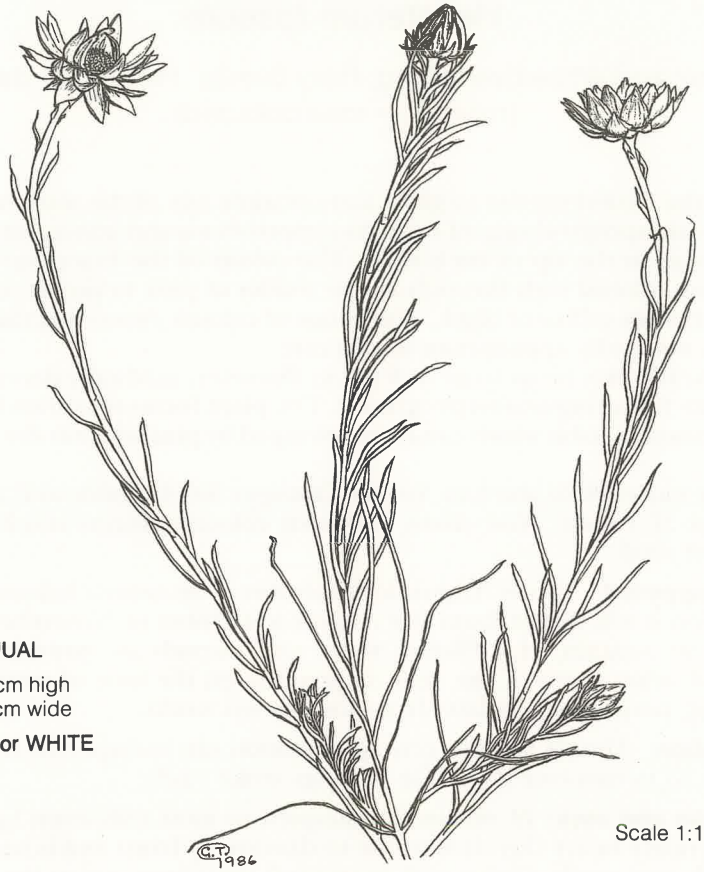
Plant singly, in groups or as a bedding or border plant. An ideal daisy for a small container in a sunny spot and it is long lasting as a cut flower.

Flower preservation: Pick when the bracts have opened and the disc has matured to yellow for wiring and drying. If picked at an earlier stage the discs will darken with age. As this species is hollow stemmed, it wires very easily, but care must be taken to just penetrate the receptacle with the wire. The flower-head retains its colour well and can be used to brighten small posies or arrangements.

It makes a neat pressed flower and should be tried in floral cake decorations when air-dried.

Distribution and habitat: Vic, NSW. May be found infrequently on sandy or loamy red soils in open forests or grasslands.

Similar species: *Helipterum cotula*, endemic to Western Australia, is similar, but can be easily distinguished by the blunt tips of its lower and middle leaves compared with the slender pointed tips of those of *H. praecox*. Baron von Mueller described *Helipterum praecox* in 1855, but Bentham included it in the *Helipterum cotula* complex in his *Flora Australiensis* (1866). This complex has since been revised and *H. praecox* reinstated as a species.



ANNUAL

12–16 cm high
12–16 cm wide

YELLOW or WHITE

Scale 1:1

Helipterum praecox

Helipterum roseum

Pink and White Everlasting, Rosy Sunray, Pink Paper-daisy
(roseum = rose coloured)

One of the easiest species to grow and certainly one of the most beautiful. It forms an upright clump of neat grey-green stems and leaves, with a large single head at the tip of each stem. The colour of the bracts varies from deep pink (almost red) through all the shades of pink to purest white and the centres are yellow or black. This range of colours means that the specific name is not really appropriate in this case.

The heads may be as large as 6 cm in diameter, gradually decreasing in size as the flowering season progresses. The plant forms side branches early in the season, a habit which can be encouraged by pinching out the growing tips.

In the early 1890s the *Law Somner Catalogue* listed double and coloured forms of *H. roseum*. Now many different coloured forms result from a packet of seed.

Flowering period: Mostly August to November in its natural habitat. Under cultivation it will flower from late August to October or November if seed is sown in autumn. If sufficient water and warmth are provided it will flower at other times of the year, depending on the time of sowing. The flowering period usually lasts from four to ten weeks.

Propagation: Almost 100 per cent germination can be expected from seed in seven to twenty-one days. Tip cuttings strike easily.

Cultivation and uses: *H. roseum* has adapted to most soils from light sand to moderately heavy clay. It is prone to damage by frosts and is susceptible to aphids and snails. Grows well in tropical conditions and at the coast in a protected position.

Use in massed displays, in pockets or grouped, in rockeries and as a border or container plant. The effect of growth regulating substances on this species is now the subject of experiment. It is hoped that vigorous plants with shorter stems will be produced which may be even more suitable for containers. It is a first-rate cut flower and is grown extensively for the fresh and dried flower trade.

Flower preservation: Dries and wires well with excellent lasting qualities. Pick in bud or when the heads first open. Wired flowers are better for use in floral arrangements.

Special notes: In August 1854 *Curtis's Botanical Magazine* carried a report of the successful flowering of *H. roseum* (then called *Acroclinium roseum*) in the Royal Gardens at Kew. It has been one of the most popular of the everlastings ever since.

Distribution and habitat: WA. In its natural habitat *H. roseum* is only half the size of plants produced under cultivation. It occurs in sandy loams in a wide area of south-western WA, usually inland from the coast.

Synonym: *Acroclinium roseum*.

ANNUAL

20–60 cm high
15–30 cm wide

PINK, WHITE

Scale 1:1

Helipterum roseum

Varieties: The only named variety is *H. roseum* var. *nigropapposum* in which the terminal tufts of pappus hairs are black and the plant is smaller.

Similar species: *H. chlorocephalum* (see page 162) and *H. splendidum* (see page 180).

Helipterum splendidum

Splendid or Silky White Everlasting, Showy Sunray
(splendidum = splendid)

A beautiful annual with handsome creamy-white flower-heads. The stems branch at the base to form a neat upright or arching tuft. Each stem is tipped with a nodding pear-shaped bud which opens to a large flower-head, 3–6 cm in diameter. This species has one of the largest heads of any of the helipterums. The white bracts look and feel like silk, hence one of the vernacular names.

The inner bracts often have bands of deep purple at their bases, forming a dark ring around the central yellow disc. The narrow, smooth leaves are grey-green, 1–3 cm long, decreasing in size and number up the stem. In mulga country, where they grow naturally, they carpet vast areas like fresh snow.

Flowering period: Winter to spring in its natural habitat, but usually September to October if sown in autumn. Spring sown plants have flowered in December and January in Melbourne, but the heads are smaller than usual and the plants lack vigour.

Propagation: From seed which is available from specialist seed stockists. Successful germination depends on the quality of the seed which seems to lose viability with age. Germination time is usually seven to twenty-one days.

Cultivation and uses: *H. splendidum* is easily grown in most soils in sun or part shade. It responds well to fertilizers, but is subject to aphid attack. It is not frost tolerant. Plant at 5–10 cm spacings and bait for snails and slugs.

As a bedding plant it produces a spectacular display. Use also for borders, in rockeries, groups, in pots or hanging baskets. It grows at the coast if protected. A beautiful cut flower.

Flower preservation: Excellent for wiring and drying. Pick just before the buds open.

Distribution and habitat: WA. On red loams, sands and clays in mulga and wattle scrub in a broad band between Geraldton and Kalgoorlie. It often occurs with *Cephalipterum drummondii*.

Similar species: *H. splendidum* resembles *H. roseum* in many respects. The bracts of *H. splendidum* are always white, however, and it is more delicate.

ANNUAL

30–50 cm high
15–30 cm wide

WHITE

Scale 1:2

Helipterum splendidum

Helipterum venustum

Charming Sunray
(venustum = handsome, charming)

An aptly named everlasting, this small annual is very rewarding for its size. Small brown buds develop to relatively large flower-heads, 2–2.5 cm in diameter, with bright yellow pointed bracts and orange-yellow discs. Each plant can produce about fifty heads during its flowering season, but they become smaller as the season progresses. Smooth bright green stems, branching near the base, form an open, tufted plant. The leaves, 1.5–2 cm long, are narrow-linear.

Flowering period: In Western Australia it flowers from August to November. In cultivation it flowers from September to November after autumn sowing.

Propagation: From seed which is available from specialist seed stockists. In temperate climates this species grows much larger and has bigger flowers when it is sown in autumn rather than in spring.

Cultivation and uses: Easily grown in full sun, in heavy or sandy soils. It grows at the coast in a protected position.

Use as a rockery plant, for grouping or pockets and for containers. It is a good cut flower.

Flower preservation: Flowers wire and dry very successfully. They are lovely in posies or small dried arrangements and dainty for cake decoration. Pick when the bracts begin to open. This is one of the hollow-stemmed species.

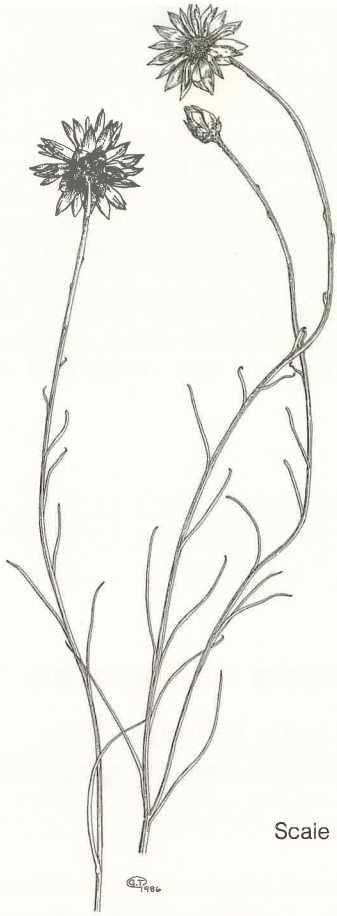
Distribution and habitat: WA. Arid or semi-arid sandplains inland from Shark Bay, usually occurring in small communities in light shade.

Similar species: The yellow form of *H. praecox* might be confused with *H. venustum*, but the former has sparsely hairy leaves, whereas those of *H. venustum* are smooth. The natural occurrences of the two species are markedly different.

ANNUAL

15–20 cm high
10–15 cm wide

YELLOW



Scale 1:2

Helipterum venustum

Ixodia

The generic name is derived from the Greek *ixodes* (like birdlime) which refers to the plant's stickiness.

There are only two species in the genus, both endemic to Australia, *I. achillaeoides*, and *I. flindersica*. The latter, recently described, is restricted to a small area in the northern Flinders Ranges, SA. Both species are upright shrubs with clusters of small, white everlasting flower-heads. The receptacle has chaffy scales which surround each floret. The achene is oblong and has no pappus.

Two species in Tasmania, previously thought to belong to the genus *Ixodia* and known as *Ixodia achlaena* and *I. angusta*, have been placed in a new genus, *Odixia*. They are now recognized as *Odixia achlaena* and *O. angusta*.

Ixodia achillaeoides

Ixodia, Mountain Daisy
(achillaeoides = like the genus *Achillea*)

An erect shrub with sprays of papery white everlastings, glossy green, sticky leaves and angled stems. *I. achillaeoides* has always been regarded as a variable species. Following a recent revision three subspecies have been recognized which has brought more order to the situation. Subspecies *alata* is described here because it is seen most often in cultivation, but there is still much variation within it.

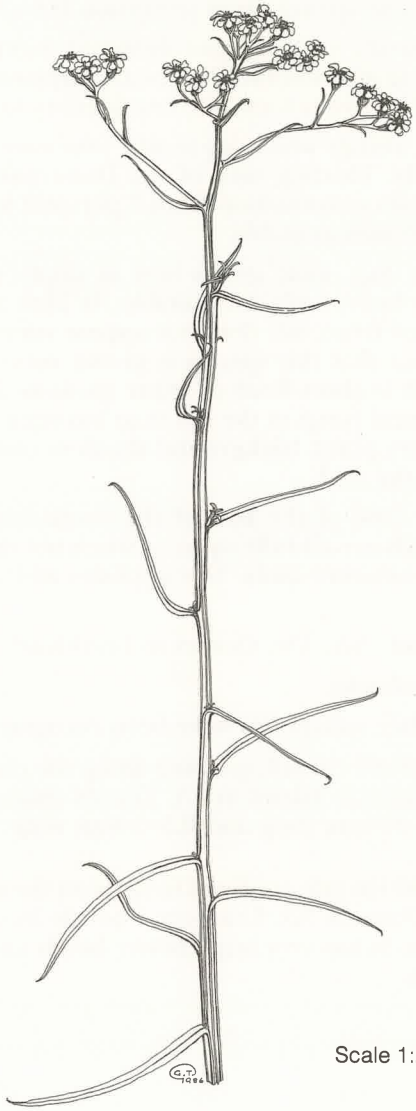
I. achillaeoides ssp. *alata* usually grows to 2 m tall with an upright, open habit. Plants growing in open, exposed conditions are usually shorter and more dense while some forest forms may reach 4.5 m after eight to ten years. Flower-heads vary in size from 5–15 mm in diameter; the rounded inner bracts are white (or occasionally pale shell pink), with yellow, lemon, white or mauve disc centres. Heads in clusters of varying sizes are held on short stalks at the ends of branchlets. Leaves, 0.5–10 cm long, have bases which run down the stem to form wings. Leaf shape is usually linear, but may be lanceolate.

A very good form from Donovans, SA, near Nelson, Vic, grows into a neat pyramid. It has sparse, light green leaves and is smothered in flowers which dry beautifully. By contrast, the form from the Adelaide Hills has very thick, winged stems with fewer clusters of smaller flower-heads. The Grampians form has an open and slightly straggly habit, with moderately large heads.

SHRUB

1–2 m high
0.5–1 m wide

WHITE



Scale 1:2

Ixodia achillaeoides ssp. *alata*

Seedlings of ssp. *alata* spring up in profusion following bushfires.

Flowering period: Usually summer, but different forms seem to flower at different times: spring and summer for the Grampians form, mid-January to February for the Donovans form and late January to March at Anglesea.

Propagation: From cuttings which are mostly very easy to strike. Seed does not germinate readily. Heating seed of the Donovans form to 100°C for thirty seconds increases germination from 1 per cent to 20 per cent. Commercial seed is sometimes available.

Cultivation and uses: Ssp. *alata* grows best in sandy soils although well-drained medium to heavy soils are suitable. It likes a sunny position, is reasonably tolerant of frost, but does not appear suited to tropical conditions. Despite the fact that this species is grown very successfully for the dried flower trade, it is short-lived in many gardens. It may be more dependent on mycorrhizal fungi in the soil than has been previously realized.

Suitable as a rockery plant, background shrub or container plant and an ideal cut flower for the vase.

Flower preservation: One of the best of the everlastings for drying. Pick when the flower-heads are all fully open or when not more than 5 per cent of the clusters are immature buds. Use in posies and dried arrangements or as filler.

Distribution and habitat: SA, Vic. Occurs in heathland and open forest.

Synonym: *Ixodia achilleoides*.

Subspecies: Two other subspecies have been recognized:

- Ssp. *achillaeoides*, 10–80 cm tall, growing along the coastline of the Yorke Peninsula and Kangaroo Island in SA. Leaves oblanceolate or narrowly obovate, fleshy, 4–35 mm long and 0.5–5 mm wide. It maintains a neat domed shape.
- Ssp. *arenicola*, 35–50 cm tall, confined to cliffs on the coast near Portland, Vic and Port MacDonnell, SA. Leathery, obovate leaves, 10–30 mm long and 6–10 mm wide. It has very large flower-heads and is more open and taller in cultivation.

Scale 1:1

Ixodia achillaeoides ssp. *arenicola*

Olearia

The generic name is thought to commemorate Adam Olearius, 1603–71, a German botanical author. The genus contains about a hundred species, occurring in Australia, New Guinea and New Zealand. Approximately eighty species are endemic to Australia.

The genus is composed of shrubs or small trees. The flower-heads are pink, blue, mauve or white, and the bracts are arranged in three to five rows. The achenes are mostly cylindrical, with numerous pappus hairs minutely notched, but never feathery.

The cultivation of olearias is not always easy. It is difficult to generalize on conditions for cultivation because there are so many species in the genus and they occur over a wide range of habitats. The single most important factor seems to be root protection, closely followed by good drainage. Most species need extra moisture for their roots in hot, dry periods, but do not appreciate overhead watering at this time. Other factors are pruning, which encourages new growth and prevents woodiness, group planting and in some cases overhead protection.

Many growers have found them to be short-lived plants in the garden. Inland growers in Victoria, however, have had some species growing for five years or more in built up clay beds in a sunny situation, with extra water about every ten days over summer. Species thriving under these conditions are *O. glutinosa*, *O. iodochroa*, *O. phlogopappa*, *O. ramulosa*, and *O. teretifolia*. If growers repeatedly fail with olearias it may be best to treat them as one or two year plants. Cuttings, which are easily struck, could be taken regularly to keep a supply of plants on hand as replacements. Not much time would be lost as olearias grow quickly. Some Queensland growers are experimenting with grafts of olearias on to rootstocks of *Olearia* species which grow easily in their area. The Study Group intends to develop this field.

Fresh seed usually germinates but the percentage germination may be low. *Olearia* species probably need cross-pollination to produce fertile seed.

Species not described in detail but worth growing are:

- *O. adenophora*, Scented or Forest Daisy-bush, 1–1.5 m high and 1.5 m wide (Vic). White or blue-purple heads, 3 cm across, linear leaves, 3 cm long, aromatic.
- *O. axillaris*, Coast Daisy-bush, 1–2 m high and 1.5 m wide (WA, SA, Vic, Tas, NSW). Cream heads in the leaf axils, grey linear leaves, 1–2 cm long. Foliage and coastal plant.
- *O. erubescens*, Moth Daisy-bush, 1–1.5 m high and 0.5–1 m wide (SA, Vic, Tas, ACT, NSW). White heads, leaves oblong, toothed, thick, 2–4 cm. Prune regularly.
- *O. glandulosa*, Swamp Daisy-bush, 1.5 m high and 1.5 m wide (Vic, Tas, NSW). White or blue heads, fine leaves to 4 cm long.
- *O. pannosa*, Velvet Daisy-bush, 1.5 m high and 1.5 m wide (SA, Vic). White heads, 4–6 cm wide, large leaves, 5–12 cm long.
- *O. pimeleoides*, Pimelea Daisy-bush, 1 m high and 1 m wide (WA, SA, Vic, NSW, Qld). White flowers in profusion, neat leaves, 1 cm long.

Many Australian species have been grown successfully in England.

Scale 9:10

Olearia axillaris

Scale 9:10

Olearia pannosa

Olearia pimeleoides

Scale 9:10

Olearia asterotricha

Rough Daisy-bush
(asterotricha = starry hair)

A showy shrub, about 1 m tall, of open habit, bearing many attractive mauve-blue flower-heads with bright yellow centres. The heads, 2–3 cm in diameter, are shown to advantage at the ends of upright woody stems on short stalks, longer than the leaves. The heads may be solitary or in small clusters. The dark green leaves, 1.5–4 cm long, broad-linear or oblong, are slightly rough on the upper surface, densely woolly beneath, with their wavy margins rolled under. Long hairs shaped like stars cover the leaves and stems, hence the specific name.

Flowering period: Spring and summer.

Propagation: Cuttings strike easily. Seed collected from gardens has not germinated, probably because *Olearia* species need cross-pollination to produce fertile seeds.

Cultivation and uses: *O. asterotricha* prefers a cool, moist root run and the support and protection of surrounding plants. Light to medium soils suit it best. Judicious pruning while young results in plants of bushier habit. This species is moderately frost resistant and will grow at the coast in protected situations.

Suitable as a specimen shrub for the garden or tub, for planting in a bog garden, or a shady, wet position. Small sprays last well in water.

Distribution and habitat: Vic, NSW. Occurs on damp heathlands and in cool forests.

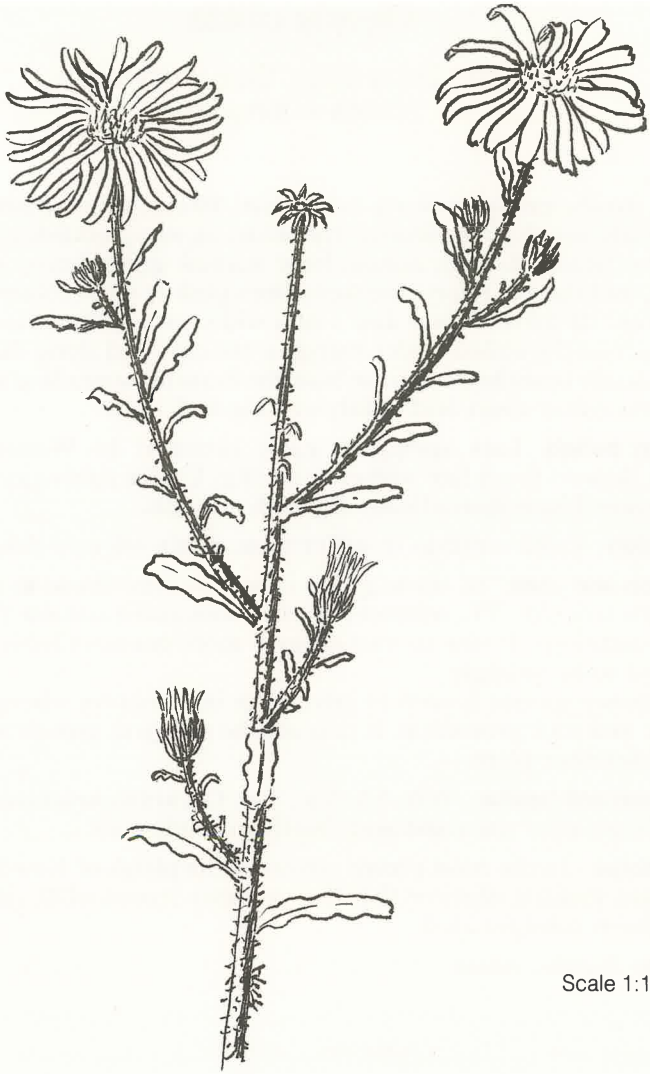
Synonym: *Eurybia asterotricha.*

Varieties: Only one variety has been described, var. *parvifolium*. It differs from the typical form only in the size of the leaves which are mostly less than 1.5 cm long. This variety is found in south-west Victoria around Portland and Nelson.

SHRUB

1–2 m high
1–1.5 m wide

BLUE, MAUVE



Scale 1:1

Olearia asterotricha

Olearia ciliata

Fringed Daisy-bush, Blue Daisy-bush
(ciliata = fringed)

A small shrub, rarely growing taller than 30 cm, with surprisingly large, single heads, usually a brilliant purple-blue, on wiry, reddish stems 6–12 cm long. The heads, 2–3 cm across, have narrow green bracts with fringed margins, and the ray florets are sometimes pink or white. Narrow, pointed, stiff leaves, 10–20 mm long and 1 mm wide, each with obvious fringes of white hairs on the rolled under margins, are crowded along the stems. The plant is usually branched from the base, the branches spreading and sprinkled with hairs, either short and bristly or long and white.

Flowering period: Late spring to early summer. In Western Australia *O. ciliata* flowers from late winter to spring. Under cultivation it also produces flower-heads sporadically through autumn.

Propagation: From cuttings in order to maintain selected colour forms.

Cultivation and uses: *O. ciliata* grows in sun or semi-shade in most soils. It withstands frost to –5°C, tolerates alkaline soils and is suitable for protected coastal conditions. Prune to encourage a more compact habit as the plant is inclined to be straggly.

This showy species is seen to advantage in a rockery where it has good drainage and root protection. It may also be grown in groups in the garden or as a container plant.

Distribution and habitat: WA, SA, Vic, Tas. Occurs in heathlands and open forests, often near the coast and chiefly in sandy soils.

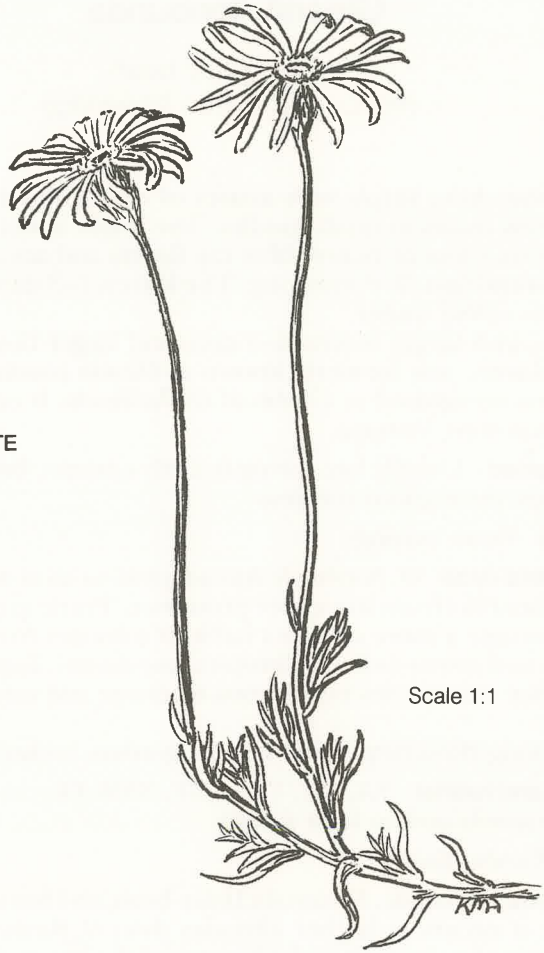
Special notes: In the most recent census of the plants of New South Wales, Jacobs and Pickard observe that the previous record of *O. ciliata* in NSW has not been substantiated.

Synonym: *Eurybia ciliata*.

SHRUB

20–50 cm high
20–30 cm wide

PURPLE, PINK, WHITE



Scale 1:1

Olearia ciliata

Olearia floribunda

Heath Daisy-bush
(floribunda = free flowering)

An erect, branching shrub with masses of dainty flower-heads along the stems, and tiny leaves in small bundles. The heads, about 1 cm in diameter, have five to six white or mauve-blue ray florets and are almost stalkless on very short branchlets, 2–8 mm long. The leaves, 1–3 mm long, are hairless with margins rolled under.

One form with larger leaves (3–5 mm) and larger flower-heads with six to ten ray florets, was formerly known as *Olearia pimeleoides* var. *minor*. It has now been recognized as a form of *O. floribunda*. It occurs in the heath-lands of south-west Victoria.

Flowering period: Usually late spring to early autumn, but flowering occurs intermittently throughout the year.

Propagation: From cuttings.

Cultivation and uses: *O. floribunda* has adapted to most soils and situations although it benefits from some root protection. Prune to prevent woodiness and to encourage a more compact habit. It tolerates frost and moderately alkaline soil and grows well in subtropical conditions. Experience is tending to suggest that this species needs good drainage and cannot cope with wet conditions.

A useful long-flowering shrub for the garden, rockery or container.

Distribution and habitat: SA, Vic, Tas, ACT, NSW. Occurs along river banks, drainage channels and in light forests.

Synonym: *Eurybia floribunda*.

Similar species: *O. algida*, Mountain Daisy-bush, also has tiny leaves in dense clusters but it occurs at higher altitudes than *O. floribunda*. *O. algida* has more triangular leaves, with wider bases, and the bracts do not have a hairy patch near the tip as do the bracts of *O. floribunda*.

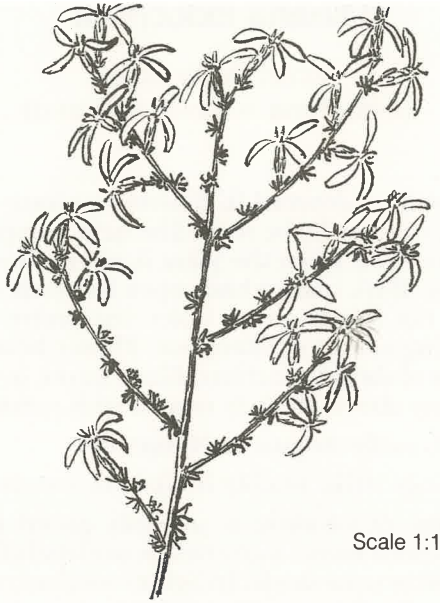
O. lepidophylla, Club-moss Daisy-bush, has tiny leaves in clusters, but in this case the leaves are bubble-like, smaller than those of *O. floribunda* (less than 1 mm long), and pressed back against the stem. The flower-heads are at the ends of longer branchlets.

Blue or mauve varieties of *O. ramulosa* (var. *stricta* and var. *longisetosa*) are often mistaken for mauve forms of *O. floribunda*. These varieties have conspicuous bristles or glandular hairs on the stems and the leaves are 8–15 mm long, not in bundles. The bracts have acute tips. On the other hand, *O. floribunda* has white cottony hairs on the stems and the leaves are 2–3 mm long, in bundles. The bracts are obtuse with a hairy or gummy patch near the tip.

SHRUB

0.5–2 m high
1–1.5 m wide

MAUVE, WHITE



Scale 1:1

Olearia floribunda

Olearia iodochroa

Violet Daisy-bush
(iodochroa = violet coloured)

A lovely, small shrub, so covered in flowers in winter and spring that the dark green foliage can hardly be seen. The neat, compact habit and bright leaves are attractive even when the plant is not in flower. The foliage has a slight curry scent. Dark mauve buds open to heads, 1–2 cm across, with mauve (or white) ray florets and a violet disc centre. This makes a very subtle and appealing colour combination. Flower-heads are solitary or in clusters at the ends of short branchlets. Blunt leaves, oval or wedge-shaped, 1 cm long, are shiny above, densely matted with cream hairs beneath.

Flowering period: Usually August to November.

Propagation: Cuttings strike readily if taken in autumn and spring.

Cultivation and uses: *O. iodochroa* is an easily grown species and is often available from specialist native nurseries. It prefers full sun and heavy soil, but grows quite well in semi-shade. In lighter soils increased root protection is necessary. It benefits from some extra water over long dry periods, but wetting the foliage during the heat of the day has a deleterious effect. This species is frost tolerant to –5°C and grows at the coast in protected positions.

Grow as a rockery plant, a specimen shrub, a low screening plant, for inland gardens or containers.

Distribution and habitat: Vic, NSW. A common shrub on dry, rocky hillsides, barren outcrops and ledges above gorges.

Synonym: *Eurybia iodochroa*.

SHRUB

1–1.5 m high
1–1.5 m wide

MAUVE, WHITE

Scale 1:1

Olearia iodochroa

Olearia phlogopappa

Dusty Daisy-bush, Alpine Daisy-bush
(phlogopappa = with bright red feathers)

A variable, fast growing shrub with a profusion of flower-heads over a long period. The form most often offered by nurseries is easily grown, reaching 2 m in two to three years. The heads, 1–2 cm across, are held on short stalks in clusters along the branches. Although the heads are usually white or pale mauve in the bush, the forms propagated for sale are usually in shades of mauve or bright pink, all with yellow disc centres. The oblong or elliptical leaves are usually less than 5 cm long, but vary markedly in size on any one plant. They are flat, with entire or wavy margins, the upper surface a dusty grey-green (especially the young leaves), cream, felted beneath. All the leaves and flower-heads face upwards.

Flowering period: Flowering takes place mainly over the period from September to January, but some forms begin as early as July. Individual plants may only flower for about ten weeks.

Propagation: Particular colour forms must be propagated from cuttings which strike readily. Has been known to seed itself in gardens.

Cultivation and uses: *Olearia phlogopappa* will grow in morning sun, semi-shade and shade in most soils. Plants appreciate extra moisture in hot weather, but although they wilt, they can survive the summer in temperate climates without water providing they have overhead protection. Tip pruning will keep plants shapely, otherwise the habit may become leggy or untidy. This species is frost and snow tolerant, and will grow at the coast in a protected position. Provided it has excellent drainage it has been known to withstand strong winds and –18°C in England. In Queensland *O. phlogopappa* succumbs to grasshopper attack. It adapts to very sandy soils or shady wet situations.

The species is useful as a background shrub, for planting under trees, as a fast growing screen and for inland or bog gardens. Sprays of cut flowers last for about five days.

Distribution and habitat: Vic, Tas, ACT, NSW. Widespread in the eastern ranges, usually in montane forests.

Synonyms: *Aster phlogopappus*, *Eurybia gunniana*, *Olearia gunniana*.

Varieties: Two subalpine or alpine forms are sufficiently distinct to warrant recognition as varieties:

- Var. *flavescens*, has thick, crowded, silver-grey leaves, 2–4 cm long, white heads, 2 cm in diameter, in clusters on long, robust stalks. The leaves dry yellow beneath. Occurs in heaths and granite outcrops in the Australian Alps. (Syn. *O. flavescens*, *O. gunniana* var. *flavescens*.)
- Var. *subrepanda*, has shorter leaves, less than 1.5 cm long, usually obovate, and white heads, 2 cm or more across, often solitary on short, leafy stalks. Occurs in rocky areas and heaths in the Australian Alps, also in ACT and mountains of Tas. (Syn. *O. subrepanda*, *O. gunniana* var. *subrepanda*.)

SHRUB

1.5–2.5 m high
1–2 m wide

LILAC, PURPLE, PINK, WHITE

Scale 1:2

Olearia phlogopappa

In Tasmania four other varieties have been described:

- Var. *angustifolia*, in which the leaves are linear-oblong and narrow, 1.5–2.5 cm long and 2–3 mm wide, and the flower stalks are short and leafy. (Syn. *O. gunniana* var. *angustifolia.*)
- Var. *brevipes*, has such short flower stalks that the heads are hidden among the leaves. (Syn. *O. gunniana* var. *brevipes.*)
- Var. *microcephala*, in which the heads are smaller, usually only 1 cm wide. (Syn. *O. gunniana* var. *microcephala.*)
- Var. *salicifolia*, which has narrow lanceolate leaves with fine, tapered tips (up to 6.5 cm long) and long, leafless flowering stalks. (Syn. *O. gunniana* var. *salicifolia.*)

Similar species: *O. stellulata*, Starry Daisy-bush, is very like *O. phlogopappa*. The leaf surface of *O. stellulata* is rougher and more furrowed above and covered with coarse, yellowish, star-shaped hairs beneath. *O. stellulata* may be included within *O. phlogopappa* after botanical revision.

O. lirata, Snowy Daisy-bush, grows 2–5 m tall. It has longer and broader leaves than *O. phlogopappa*, up to 12.5 cm long and 2.5 cm wide, with the upper surfaces smooth, shiny green. Numerous white or cream heads (rarely blue or purple) with cream or greyish disc centres appear in erect clusters at the ends of branches. Some hybrid forms between *O. lirata* and *O. phlogopappa* have been offered by nurseries.

Olearia ramulosa

Twiggy Daisy-bush
(ramulosa = having many small branches)

Another highly variable shrub appearing in many forms, from a compact cushion on the wind blown coast to a tall, open shrub in sheltered forests (sometimes to 3 m). Six varieties have been described, the var. *ramulosa* being the one most usually found in cultivation. The ray florets are white or pale lilac, and the disc florets are yellow. The heads are small, usually less than 1 cm wide, but can completely cover the bush when it flowers. They are held singly at the tips of short branchlets or leafy stalks along the stem. The leaves, 2–10 mm long, are crowded along the stems, usually held at right angles, and are of varying shapes. They are rough-surfaced, woolly below, with margins slightly rolled under and often aromatic when crushed. The stems are covered with bristles and woolly hairs, but no glandular hairs. Some low growing forms have a suckering habit.

Flowering period: Varies widely with habitat. It flowers usually between August and February and intermittently from March to May, but in western NSW it flowers in the cooler months, from autumn to winter. Garden plants may have two or three flushes a year.

Propagation: From cuttings or division of suckers. Seed germinates in sixteen to twenty-one days in autumn, but percentage germination may be low.

Cultivation and uses: *O. ramulosa* is one of the most easily grown olearias, and may be planted in almost any situation or aspect. It grows quickly and should be regularly pruned to maintain a good shape. If it is cut back when the flower-heads fade more heads will appear. Plants can tolerate fairly dry conditions, but need extra water to prolong the summer flowering period. This species is frost tolerant to –5°C and some forms grow in the most exposed of coastal situations. It is suited to shady, moist conditions and permanently boggy soils but tropical conditions are not to its taste. It has proved susceptible to fungal disease in wet weather in subtropical climates.

O. ramulosa is a worthy species for the shrubbery, for inland or bog gardens, and for rockeries. The blue forms are the most attractive.

Distribution and habitat: WA, SA, Vic, Tas, NSW, Qld. Widespread from rocky coastal slopes to mountainous terrain, from wet sclerophyll forests, along rivers and creeks to inland plains, occurring in most soil types.

Synonym: *Aster ramulosus*.

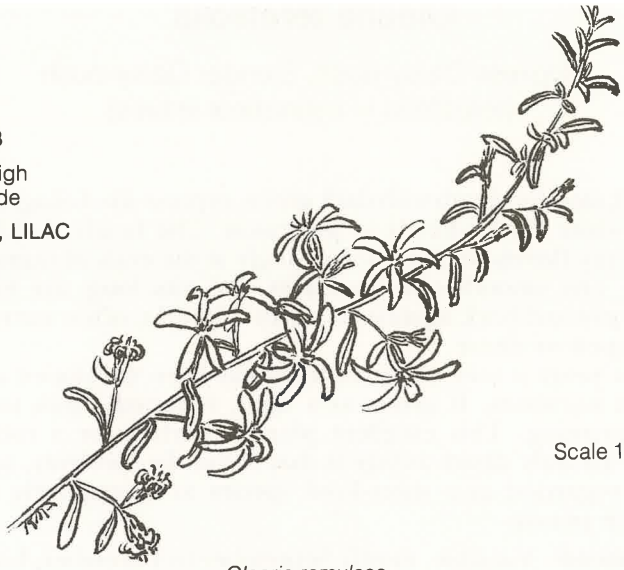
Varieties: Dr J. H. Willis has described five other varieties found in Victoria:

- Var. *longisetosa*. Leaves 8–15 mm long, heads bright blue, stems covered mainly with long, bristly hairs. Occurs only in the Victorian Grampians.
- Var. *microcephala*. Leaves 1–2 mm long, heads white or pale lilac, stems covered with woolly hairs and a few glandular hairs. No bristles. It is rare, but occurs along the Murray River in north-west Vic. (Syn. *O. hookeri* var. *microcephala*.)

SHRUB

0.3–2 m high
1–2 m wide

WHITE, BLUE, LILAC



Scale 1:1

Olearia ramulosa

- Var. *rigida*. Leaves 8–15 mm long, heads white, stems covered mainly with bristles, a few glandular or woolly hairs. Rare, found only amongst granite rocks in northern Vic.
- Var. *stricta*. Leaves 8–15 mm long, bright blue heads, stems mostly covered with glandular hairs. Found in the Victorian Alps and the Grampians. (Syn. *O. stricta*.)
- Var. *tomentosa*. Leaves 8–15 mm long, heads lilac, stems covered with white, woolly hairs. Rare, restricted to central-western Victoria between Daylesford and Heathcote.

Similar species: *O. microphylla*, Bridal Daisy-bush, was formerly known as *O. ramulosa* var. *microphylla*. It is found only in NSW and Qld where it is distinguished from *O. ramulosa* mostly by the size of the leaves, 2–4 mm long. In those states *O. ramulosa* has leaves 8–15 mm long, but is otherwise very similar.

Olearia teretifolia

Cypress Daisy-bush, Slender Daisy-bush
(teretifolia = cylindrical leaves)

An unusual, slender shrub with dark green, cypress-like foliage, sticky stems and small white flower-heads in profusion. The heads, 1–1.5 cm across, have white ray florets and are borne singly at the ends of numerous, short branchlets. The smooth rod-like leaves, 2–5 mm long, are held erect or sometimes pressed back against the stem. Upright, often narrow of habit, it may be open or dense.

In recent years a very compact form has been developed and is often available in nurseries. It grows as a tight, rounded shrub to 50 cm and needs no pruning. This excellent plant is perfect for a rockery or for containers. Its only disadvantage is that it can die suddenly, so perhaps it should be regarded as a short-lived species to be regularly replaced by home-grown plants.

Flowering period: Variable, mostly September to December, but extending over the summer months in SA. Oddly, a shrub grown from a cutting of a coastal form, which flowers between September and November in its natural habitat, flowers in July and August in gardens about 300 km inland.

Propagation: Strikes readily from cuttings.

Cultivation and uses: *O. teretifolia* performs at its best in a sunny situation in any sort of soil. It will cope with long dry periods, and should be pruned to the required shape after flowering, which helps to prevent woodiness. This species is frost tolerant to –5°C, grows in moderately exposed coastal situations and in subtropical conditions where it makes slow, steady progress.

The plant resembles a miniature cypress and is more suited to a patio tub than an informal native garden, but it is a good subject for inland or coastal gardens.

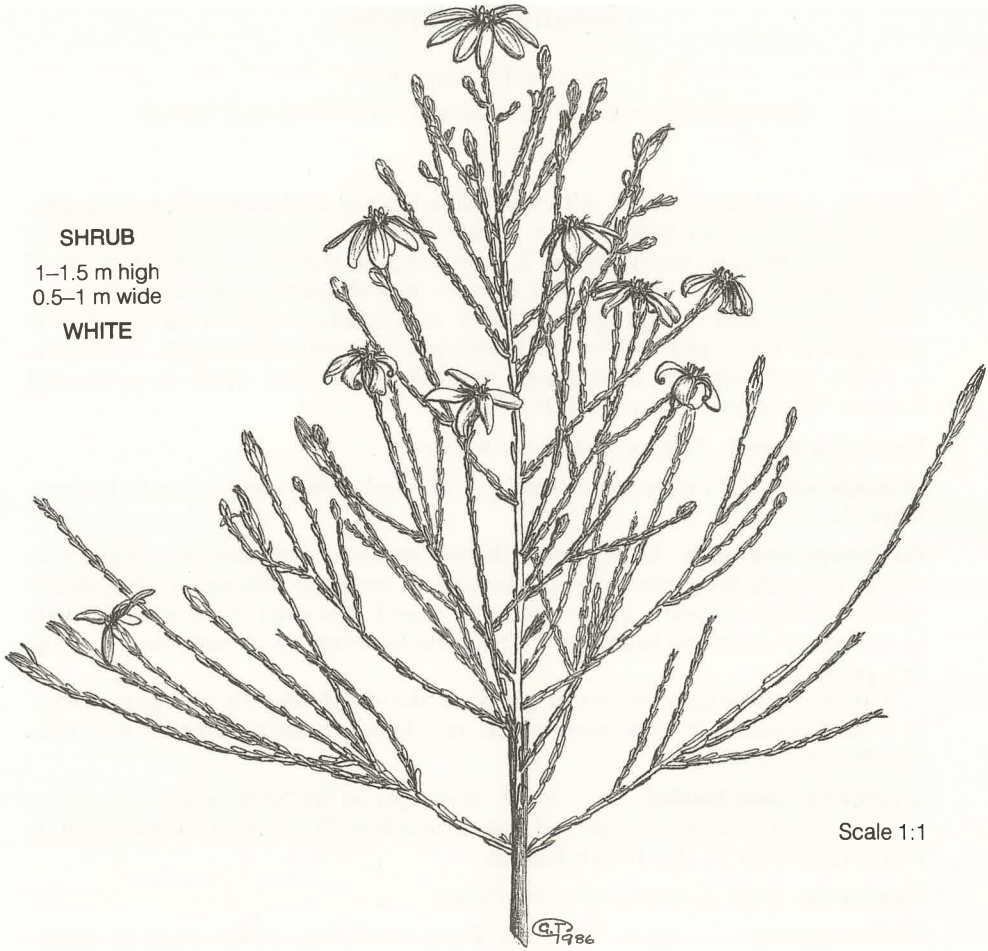
Distribution and habitat: SA, Vic. Occurs mostly on sandy soils from the coast at the eastern end of the Otways, inland through western Victoria to the Mt Lofty Range in SA and across to Kangaroo Island.

Synonym: *Eurybia teretifolia*.

SHRUB

1–1.5 m high
0.5–1 m wide

WHITE



Scale 1:1

Olearia teretifolia

Olearia tomentosa

Toothed Daisy-bush
(tomentosa = densely covered with fine, soft hairs)

A large, handsome shrub with attractive foliage and showy flower-heads. The heads, 3–5 cm across, have mauve or white ray florets and are held on strong, brown, furry stalks, 2.5 cm long, at the ends of the branches. One feature of this shrub is the foliage; egg-shaped leaves, 2–6 cm long, are green, veined on the upper surface and faintly rough to the touch, but pale green, furry and soft beneath with bluntly toothed margins. The habit is dense and compact in exposed conditions, tall and open in protected forests. The flowers attract butterflies.

Flowering period: Spring and early summer.

Propagation: Very easy from cuttings, but seed germinates in ten to twenty-eight days.

Cultivation and uses: *O. tomentosa* thrives on rich, well-drained soil in sun where its roots have plenty of protection. It seems to manage in dry, shady spots although it never grows with any speed, nor puts on healthy growth in the same carefree manner. Plants benefit from extra watering in long dry periods.

This adaptable species may be grown in the shrubbery for foliage contrast, as a background or specimen plant, as a large rockery plant or in a tub. Cut flowers last well.

Distribution and habitat: Vic, NSW. Widespread in NSW where it can be found in forests and on exposed coastal heathlands. Rare in Victoria where it is found only in the Howe Range.

Synonyms: *Aster dentatus, Olearia dentata.*

Similar species: *O. rugosa*, Wrinkled Daisy-bush, has similar ovate or ovate-lanceolate leaves, 3–6 cm long, with lobed or toothed margins. The leaves are more deeply wrinkled on the upper surface and rougher to the touch than those of *O. tomentosa*, the ray florets are always white and the heads are smaller (about 2–2.5 cm in diameter). *O. rugosa* occurs only in Victoria.

Olearia tomentosa

Schoenia

S. cassiniana is the only species in the genus. It derives its name from Johann Schoen, an ophthalmologist and botanical artist. Opinion is divided on the nomenclature of this species and some botanists still recognize it as *Helichrysum cassinianum*.

Schoenia cassiniana

Pink Cluster Everlasting, Pink Everlasting, Cassini's Everlasting
(Count Henri de Cassini, 1781–1832)

A showy little annual producing many stems from a leafy base, each stem carrying clusters of small pink heads, four to eight per cluster. The stalked heads, 1.5–2 cm in diameter, vary from pale to deep pink or sometimes white. The pink bracts fade some time after the flowers have opened. The leaves are mainly basal, hairy, oblong and 3–7 cm long. There are a few short leaves on the stem, sometimes opposite, sometimes alternate.

Flowering period: Usually spring.

Propagation: Seed is commercially available and germinates well in four to six days after sowing in autumn.

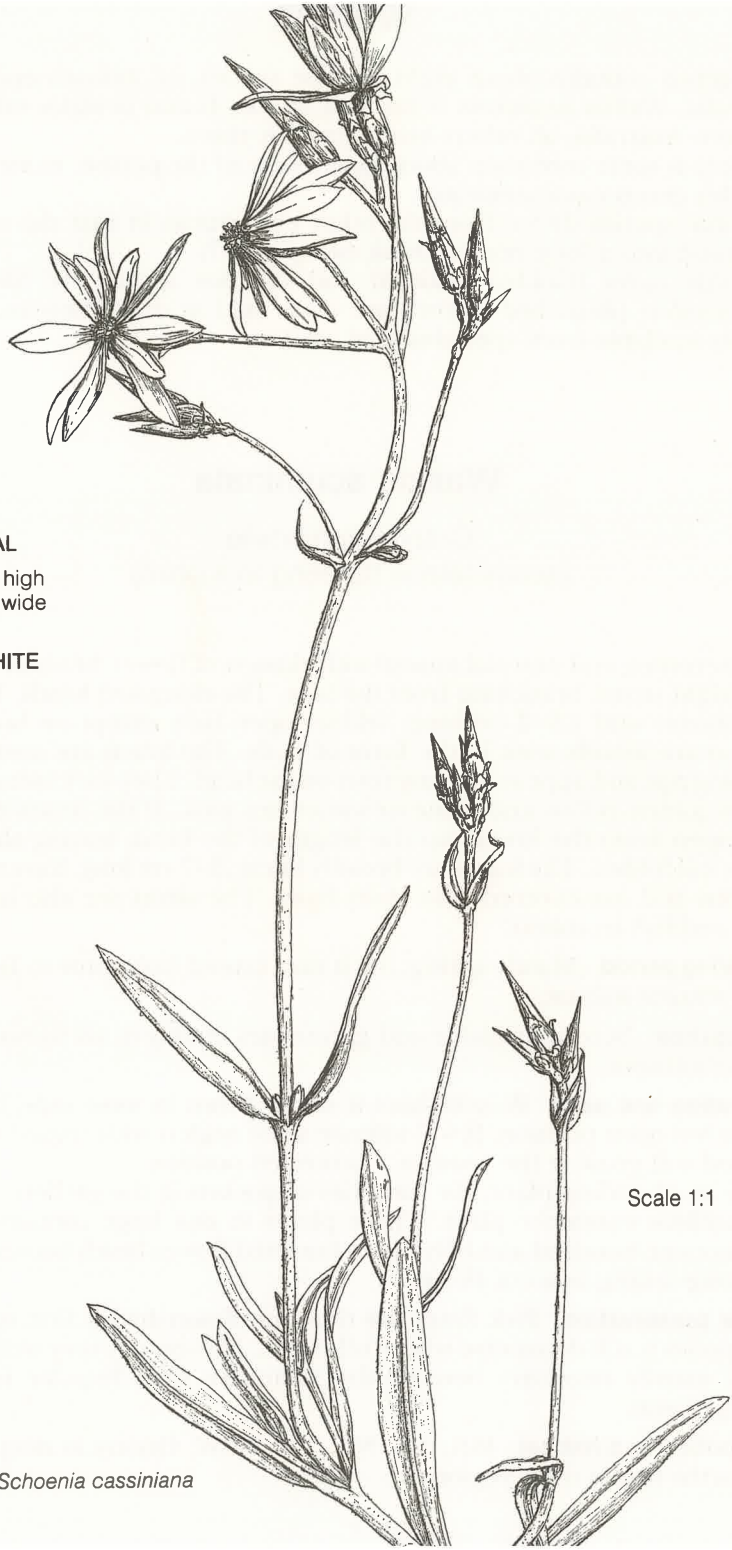
Cultivation and uses: *Schoenia cassiniana* grows easily. It adapts to any soil, but needs full sun for the best results. It tolerates frost to –5°C, and will grow in protected coastal gardens or subtropical conditions. Susceptible to snails and slugs.

It is one of the best annuals to use as a bedding or border plant and gives a splash of colour to the rockery or garden when planted in groups. May be used as a container plant and for cut flowers.

Flower preservation: Pick just before the buds open and hang upside down to dry. Unfortunately the pink bracts usually fade with age to pale pink or white. It may be necessary to spray with clear lacquer to prevent the heads from drooping. Not a good subject for dried posies because the colour fades.

Distribution and habitat: It has a wide range in WA from Shark Bay southwards and eastwards, west of Lake Torrens in SA, and in NT. Grows as a brilliant carpet under wattle scrub and on the heavy soils of mulga scrub. Often found in association with *Cephalipterum drummondii*.

Synonym: *Helichrysum cassinianum*.



ANNUAL

20–40 cm high
20–30 cm wide

PINK, WHITE

Scale 1:1

Schoenia cassiniana

Waitzia

The genus contains about eight or nine species, all annuals endemic to Australia. *Waitzia acuminata* is the only species found in states other than Western Australia, all others being endemic there.

There is some confusion about the identity of the person, named Waitz, that this genus commemorates.

Waitzia species differ from the other everlastings in that the achene is narrowed into a long neck or beak (see page 57).

Waitzia aurea (Golden Waitzia) and the two species, *W. citrina* and *W. suaveolens* (described below), are often sold as dried flowers. Seed is usually available from specialist seed stockists.

Waitzia acuminata

Orange Immortelle
(acuminata = tapering to a point)

An interesting and unusual annual with clusters of flower-heads at the ends of upright stems, branching from the base. The elongated heads, 1–1.5 cm in diameter and 1.5–2 cm long, seldom open fully except on hot, sunny days so are usually seen in the form of buds. The bracts are narrow with tapering tips and appear in many rows on the head. They vary from orange-red to golden-yellow and white or sometimes pink. If the bracts do reflex they open from the lowest up the length of the head, leaving the upper bracts still folded. The leaves are broadly linear, 2–7 cm long, have recurved margins and are covered with short hairs. The stems are also hairy and often reddish in colour.

Flowering period: Mainly spring, but it may extend from June to December in its natural habitat.

Propagation: Seed is available and germinates readily in six to twelve days during autumn.

Cultivation and uses: *W. acuminata* is easily grown in most soils, but must have a hot open position. It will tolerate some neglect with regard to watering and will grow at the coast in a protected position.

Use as a bedding plant, for rockeries or pockets in the garden. It makes an excellent container plant. Three plants in one large container could produce one hundred and fifty to two hundred flower-heads between them. It is long-lasting as a cut flower.

Flower preservation: Pick from the time the flower-heads first open, but this species is still decorative when full-blown. Flowers dry very well. Wiring is not usually necessary because the stems are stiff. Popular for dried arrangements.

Distribution and habitat: WA, SA, NT, Vic, NSW. Occurs in deep, sandy, red earths in the drier regions.

ANNUAL

10–50 cm high
10–30 cm wide

YELLOW, ORANGE-RED, PINK, WHITE

Scale 9:10

Waitzia acuminata

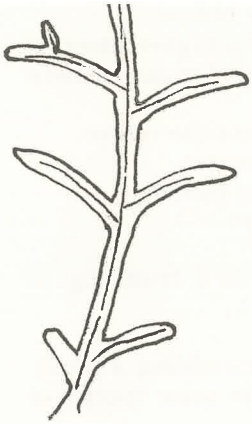
Synonym: *W. corymbosa*. Recent revision has reinstated *W. corymbosa* as a separate species.

Similar species: *Waitzia citrina*, Pale Immortelle, always has yellow bracts, is usually shorter, 10–20 cm tall, and the flower-head is more rounded.

W. suaveolens is also very similar in habit, but normally it has fragrant white flowers, fewer in number. The bracts are obtuse.

Glossary

Achene: a dry, one-seeded fruit which does not open to disperse its contents, e.g. the fruit of Asteraceae.
Annual: a plant which completes its life cycle within twelve months.
Anther: that part of the flower which produces pollen.
Anthocyanin: a sap-soluble pigment.
Ascending: curving upwards.
Biennial: a plant which completes its life cycle in two years.
Bract: a modified leaf at the base of a flower stalk or flowering structure.
Chromosome: a thread-like structure in the nucleus of cells which carries genetic information.
Corolla: the collective term for the petals of a flower, whether they are fused together or separate.
Cross-fertilization: fertilization by pollen from the flower of a different plant of the same species.
Cross-pollination: transfer of pollen from one plant to another of the same species.
Cultivar: a cultivated variety. This may be a hybrid or a selected form of a species (such as a colour form).
Disc centre: the central area of a composite flower-head, containing all the disc florets.
Disc floret: a small, one-seeded tubular flower in the centre of the flower-head of Asteraceae.
Endemic: confined to a particular geographical area in its natural occurrence.
Ephemeral: a plant with a short life cycle that may be completed several times within twelve months.
Exotic: introduced from outside Australia.
Feldmark: an association of plants with mat or cushion habits, adapted to the stoniest, most exposed sites in alpine regions.
Flora: the population of plants in a particular area and the name given to a book dealing with the plant species in a certain region.
Genus: (pl. genera) a group of closely related species.
Habit: the appearance of a plant with regard to size, shape and form.
Habitat: the area or environment in which a plant grows naturally.
Head: a collection of flowers.
Herb: a plant which does not produce a woody stem.
Herbaceous: describing a perennial plant which dies down each year after flowering, but shoots again the following year from underground structures.
Inorganic: describing matter of non-living, mineral origin, e.g. ammonium sulphate.
Involucre: (adj. involucral) the ring of bracts surrounding the head of a flower, e.g. in Asteraceae.
Lanceolate: lance-shaped.



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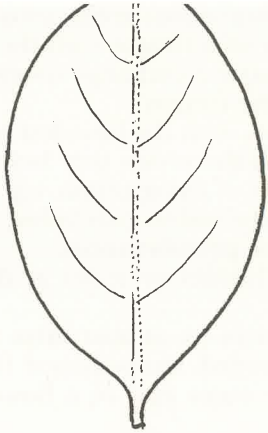

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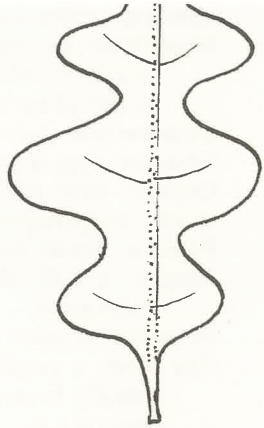
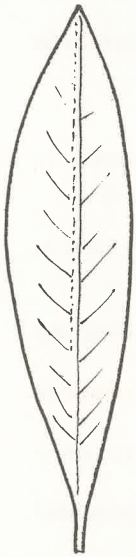
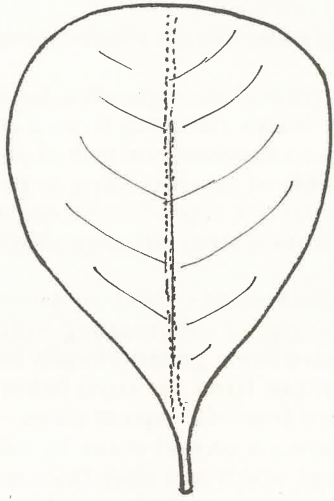


strongly lobed

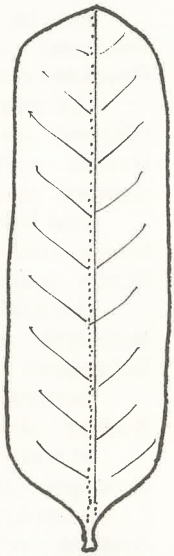


lanceolate

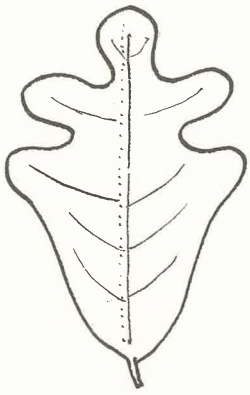
linear

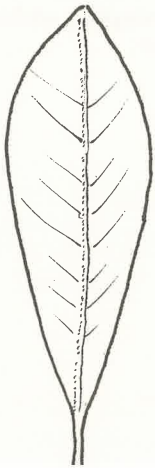


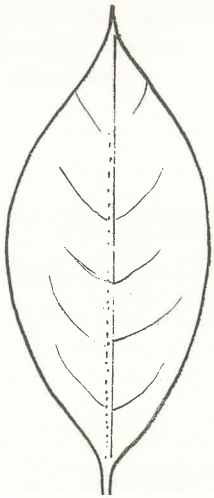
spoonshaped or obovate



oblong







Montane: referring to mountainous areas, usually above 900 m.
Mycorrhiza: an association of a fungus with the roots of a higher plant. It usually results in a nutrient exchange system which is of mutual benefit to the plant and to the fungus.
Oblanceolate: lance-shaped, with the broadest part beyond the centre.
Obovate: egg-shaped, with the widest part beyond the centre.
Organic: describing matter of living origin, e.g. decaying plants.
Ovate: egg-shaped, with the widest part below the centre.
Papillae: small, pimple-like protuberances.
Pappus: a tuft of hairs, bristles or scales at the apex of a fruit, e.g. in Asteraceae.
Perennial: a plant which lives for at least three years.
Ray floret: a small, one-seeded, strap-shaped flower (resembling a petal), usually found in the outer ring of a flower-head in some species of Asteraceae.
Receptacle: the expanded tip of a flowering stem to which the florets are attached, which is surrounded by a ring of bracts.
Recurved: curved downwards.
Revolute: describing a leaf margin when it turns down and rolls back towards the midrib.
Rhizome: an underground stem growing horizontally.
Rosette: a group of leaves radiating from a central point.
Species: (abbrev. sp.) a fundamental unit of plants having similar characters and being capable of interbreeding to produce fertile offspring.
Sterile: having no effective reproductive organs.
Stolon: a long, horizontal stem running above the ground, able to root at the nodes.
Sub-shrub: a small, half-woody shrub or perennial.
Subspecies: (abbrev. ssp.) a subgrouping within a species used to describe variants that have been geographically isolated.
Suckers: shoots sent out from the roots below the soil which often appear at some distance from the parent plant.
Synonym: (abbrev. syn.) a second name by which a species may have once been known, but which has since been superseded.
Systemic: referring to sprays which are absorbed into the sap system and carried throughout the plant.
Taxonomy: (adj. taxonomic) the system of classification of plants and animals.
Variety: (abbrev. var.) a subgrouping within a species used to describe variants with different forms.

References
and further reading

Australian Plant Study Group (1980), *Grow What Where*, Thomas Nelson Australia Ltd, Melbourne.

Australian Systematic Botany Society (1981), *Flora of Central Australia*, (Ed. J. Jessop), A.H. & A.W. Reed, Sydney.

Baines, J.A. (1981), *Australian Plant Genera*, Society for Growing Australian Plants, Sydney.

Beadle, N.C.W. (1980), *Students Flora of North Eastern New South Wales*, Part 4, University of New England, Armidale.

Bentham, G. (1863–1878), *Flora Australiensis*, Vol. 3, Lovell Reeve and Company, London.

Black, J.M. (1965), *Flora of South Australia*, Part 4, Government Printer, SA.

Burbidge, N.T. (1958), 'A monographic study of *Helichrysum* subgenus *Ozothamnus* (Compositae) and of two related genera formerly included therein', *Aust. J. Bot.*, **6** (3) : 229–84.

Burbidge, N.T. and Gray, M. (1970), *Flora of the Australian Capital Territory*, Australian National University Press, Canberra.

Canberra Botanic Gardens (1971–), *Growing Native Plants* (series), Australian Government Publishing Service, Canberra.

Charsley, F.A. (1867), *The Wildflowers Around Melbourne*, Day and Son (Ltd) London.

Copley, P.B. (1982), 'A Taxonomic Revision of the genus *Ixodia* (Asteraceae)', *J. Adelaide Bot. Gard.* **6** (1) : 41–54.

Costermans, L. (1981), *Native Trees and Shrubs of South-Eastern Australia*, Rigby, Adelaide.

Costin, A.B., Gray, M., Totterdell, C.J. and Wimbush, D.J. (1979), *Kosciusko Alpine Flora*, CSIRO, Melbourne, and William Collins, Sydney.

Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. and Leigh, J.H. (1981), *Plants of Western New South Wales*, Soil Conservation Service of NSW.

Curtis, W.M. (1963), *The Student's Flora of Tasmania*, Part 2, Government Printer, Tasmania.

Davis, G.L. (1948), 'Revision of the genus *Brachycome* Cass. I. Australian Species', *Proc. Linn. Soc. NSW*, **73** : 142–241.

Davis, G.L. (1952), 'Revision of the genus *Calotis* R.Br.', *Proc. Linn. Soc. NSW*, **77** : 146–88.

Eichler, H. (1965), *Supplement to J.M. Black's Flora of South Australia*, 2nd edition, Government Printer, Adelaide.

Elliot, W.R. and Jones D.L. (1980–), *Encyclopaedia of Australian Plants suitable for cultivation*, Vols 1, 2 and 3, Lothian, Melbourne.

Forbes, S.J., Gullan, P.K., Kilgour, R.A. and Powell, M.A. (1984), *A Census of the Vascular Plants of Victoria*, National Herbarium of Victoria, Department of Conservation, Forests and Lands, Melbourne.

Green, J.W. (1985), *Census of the Vascular Plants of Western Australia*, Western Australian Herbarium, Department of Agriculture, Perth.

Grieve, B.J. and Blackall, W.E. (1975), *How to Know Western Australian Wildflowers*, Part 4, University of Western Australia Press, Perth.

Handreck, K. (1986), 'Where has all the Sulphur gone? And how to get it back', *Aust. Hort.*, June, 38–47.
Harris, T.Y. (1977), *Gardening with Australian Plants—Shrubs*, Thomas Nelson Australia Ltd, Melbourne.
Harris, T.Y. (1979), *Gardening with Australian Plants—Small Plants and Climbers*, Thomas Nelson Australia Ltd, Melbourne.
Jacobs, S.W.L. and Pickard, J. (1981), *Plants of New South Wales. A census of the Cycads, Conifers and Angiosperms*, Government Printer, Sydney.
James, H.A. (1890), *Handbook of Australian Horticulture*, Turner and Henderson, Sydney.
Jeffrey, C. (1978), 'Asterales', in *Flowering Plants of the World* (Ed. Heywood V.H.), Mayflower Books.
Law, Somner & Co. (1864), *General Catalogue with Calendar of Gardening Operations*, Melbourne and Sydney.
Law, Somner & Co. (1880–81, 1883–84, 1891–92), *General Catalogue of Garden, Agriculture & Flower Seeds*, Melbourne and Sydney.
Leigh, J., Briggs, J. and Hartley, W. (1981), *Rare or Threatened Australian Plants*, Australian National Parks and Wildlife Service, Special Publication No 7, Canberra.
Mott, J.J. and Groves, R.H. (1981), 'Germination Strategies', in *The Biology of Australian Plants* (Ed. Pate J.S. & McComb A.J.), University of Western Australia Press.
Mullett, J.H. (1981), 'Germinating Seeds and the Environment', *Aust. Hort.*, 51–58.
Mullett, J.H. (1981), 'Germinating those Problem Seeds', *Aust. Hort.*, 61–67.
Pescott, E.E. (1914), *The Native Flowers of Victoria*, George Robertson & Co., Pty Ltd, Sydney.
Pitcher, F. (1910), 'Victorian vegetation in the Melbourne Botanic Gardens', *Vic. Nat.*, **16** : 174–9.
Richards, O. (1980), 'Interactions and Origins in the Nineteenth Century', *Journal of the Australian Garden History Society*, **1** (1) : 19–28.
Society for Growing Australian Plants, *Australian Plants*, Quarterly, Society for Growing Australian Plants, Sydney.
Stace, H.M. (1981), 'Biosystematics of the *Brachyscome aculeata* (Labill.) Less. Sensu G.L. Davis Species Complex (Compositae : Astereae)', *Aust. J. Bot.*, **29** : 425–40.
Stanley, T.D. and Ross, E.M. (1986), *Flora of South-eastern Queensland*, Vol. 2, Queensland Department of Primary Industries, Brisbane.
Ventenat, E.P. (1803-4), *Jardin de la Malmaison*, 2 Vols, Paris.
Waddell, W. (1976), *Wildflower Diary*, Native Plants Preservation Society of Victoria.
Walling, E. (1969, reissued 1985), *A Gardener's Log*, O'Donovan.
Warcup, J.H. and McGee, P.A. (1983), 'The Mycorrhizal Associations of some Australian Asteraceae', *New Phytol.*, **95** : 667-72.
Willis, J.H. (1972), *A Handbook to Plants in Victoria*, Vol. 2, Melbourne University Press.
Wilson, P.G. (1960), 'A consideration of the species previously included within *Helipterum albicans* (A. Cunn.) DC', *Trans. R. Soc. S. Aust.*, **83** : 163–77.
Wrigley, J.W. and Fagg, M. (1979), *Australian Native Plants*, William Collins, Sydney.

Australian Daisy Study Group

The Australian Daisy Study Group is one of a number of Study Groups formed from members of the Association of Societies for Growing Australian Plants (ASGAP). Each group exists to investigate a genus, or closely related group of genera, particularly with regard to their propagation and garden cultivation. In June 1981 Maureen Schaumann founded the Brachyscome/Helipterum Study Group. At that time she was advised to choose only two genera as the family, Asteraceae, was considered too large for comprehensive study. The genus *Brachyscome* was chosen because the majority of the species are perennial, and *Helipterum* for its importance to floral art and because, in contrast, the species are mainly annuals.

These aims were formulated:

- to collect all species in the two genera for study
- to identify the species correctly
- to evaluate the horticultural potential of each species
- to determine optimal conditions for cultivation
- to study seed dormancy and the means of overcoming it
- to study seed viability and life span
- to determine the best methods of propagation
- to promote the growth of rare and endangered species in the Asteraceae
- to extend the range of everlasting species for floral art.

After some years of work, the enthusiasm of the members increased to the point where they pressed for the inclusion of a number of other genera such as *Celmisia*, *Craspedia*, *Helichrysum*, *Olearia*, and *Waitzia*. Many species within these genera have since proved their merit in the garden or for floral art. The emphasis, however, remains on the two original genera since it has not yet been possible for the Study Group to cover 980 species in detail.

The name of the Group has been altered to the Australian Daisy Study Group to embrace this wider field of study. The Group comprises seventy-five members, all of whom have contributed in some way to this book.

The Study Group editorial committee

Judy Barker B.Sc. Editor of *Australian Daisies*. Past president of the Waverley District Group of the Society for Growing Australian Plants Victoria (SGAP Waverley). Enjoys lecturing, gardening and propagating from seed.

Barbara Buchanan B.Sc. Former lecturer in biology and aspects of Australian ecology, member SGAP Foothills. Has a general interest in all Australian plants and a special interest in boronias and daisies.

John Colwill Proprietor of Harper Seed Company, Perth. Past president of ASGAP, and of the WA Wildflower Society. Well known to many television viewers in WA as 'Mr Greenfingers'.

Joy Cook A foundation member of SGAP Springvale and District, actively involved in painting, gardening and bush walking.

Joy Greig Dip. App. Chem. Former Secretary and treasurer of SGAP Waverley. Ardent plant propagator, photographer and gardener.

Alf Salkin M.Sc. Former teacher of environmental science, foundation president of SGAP Waverley, Honorary Life Member of SGAP Vic. Enthusiastic conservationist, bushwalker, photographer, lecturer, propagator, gardener, and deeply involved in all aspects of banksias.

Esma Salkin B.A. (Hons.) Honorary Life Member of SGAP Vic, joint author with Alf of a booklet on the history, flora and birds of the Waverley Valley Reserve. Shares Alf's enthusiasm for conservation and gardening. Her special interest is the history of the cultivation of Australian plants.

Maureen Schaumann Leader of the Australian Daisy Study Group, past secretary of SGAP Waverley. Keenly interested in propagation, gardening and floral art, especially drying and preserving Australian plant material.

The botanical artists

Kath Alcock Field naturalist for many years, lives in Naracoorte, SA and has an intense interest in botany, botanical drawing and painting.

Gloria Thomlinson Past president of SGAP Shepparton and Districts. Avid propagator whose artistic interests cover a very wide range including drawing, floral art and landscaping.

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AUSTRALIAN DAISIES

for gardens and floral art

The Daisy family (Asteraceae or Compositae) is one of the largest families of flowering plants in the world. Nearly 1,000 species are native to Australia. Introduced daisies are very well known – from the little English daisy, *Bellis perennis,* in all our lawns to the *Chrysanthemum,* but the Australian daisies have been largely neglected and many people are only just becoming aware of the attractions of those daisies that are uniquely Australian.

This practical book includes all the best and most useful native daisies. Over 150 plants are described and illustrated, with notes on their flowering periods, propagation, cultivation, uses and habitat. They are annuals, perennials, shrubs – some large enough to qualify as small trees, some so small they must be hunted on hands and knees. Very many are excellent for the garden as they flower for long periods, make a great show when massed, and are very suitable for picking and for fresh and dried flower arrangements.

The Australian Daisy Study Group was formed in 1981 under the leadership of Maureen Schaumann, and helped by Judy Barker and Joy Greig, as one of the many study groups run by the Society for Growing Australian Plants. The group has been working to identify, collect, research, propagate and dry Australian daisies, and in every way to test them for practical use. This book is the result of their pioneering work.

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