

Mr Peter Sharp, author of two books about begonias has kindly given his permission for the Australian Association of Begonia Societies (AABS) to publish his latest work on the internet. The AABS in turn have chosen this web site to be the host of this work titled 'Down to Earth - With Begonias'. The work is copyright Peter G. Sharp, 2011. We are indebted to Mr. Sharp and the AABS for giving us this opportunity to expand our database web site to include this publication. We invite all begonia lovers to take this opportunity and access this wonderful new book.

DOWN TO EARTH - WITH BEGONIAS

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*My garden is a slow work, pursued with love,
and I don't deny that I'm proud of it.*

Claude Monet (1840-1926)

Shirley, my late wife, and I became enamoured with begonias when, at her insistence, we bought a packet of seed labelled *Begonia* Tuberhybrida.

‘What are *Begonia* Tuberhybrida?’ I asked my wife, and she replied: ‘Just the most beautiful flowers in all the world’. Surprised, I asked how on earth she could be so sure and her smug reply informed me that she, too, read gardening books!

Those seeds grew and prospered and eventually presented us with a wondrous display of beautiful blooms.

A love affair thus begun became stronger as the years progressed and we discovered this incredible family of plants of which tuberous begonias are but one small part.

This book is dedicated to the memory of my wonderful wife.

Peter Sharp

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PART 1

A BACKGROUND TO BEGONIAS

CHAPTER 1

A GARDEN IN THE CITY

The Royal Botanic Gardens (RBG) in Sydney, Australia, is one of the most significant Botanic Gardens of the world, situated on the shores of Sydney Harbour within a short walk of the Central Business District and right beside our world-famous Opera House. Visitors marvel at the garden's proximity to the never-ending noise and bustle of this great city of the Antipodes, and yet it is a haven of peace and beauty. Thirty hectares (75 acres) of extremely valuable real estate dedicated to the study of the botanic sciences and the growing of rare and beautiful trees and plants from across the globe comprise this wonderland, freely open for people to enjoy. And enjoy it they do, for thousands of visitors, local and tourists alike, fill these gardens with happiness throughout the year and take full advantage of the welcoming signs which invite them to walk on the grass and hug the trees. Joggers and serious walkers in the early morn, followed by mothers with their young ones – babes in carriers, babes in prams and strollers and the older ones, riding or on foot, but each and every one enjoying the freedom of the out-of-doors. Come lunchtime and the joggers return, free from the office for a short and sweaty space, whilst the lawns and benches fill with picnickers. And all day long they come, visitors from everywhere, tour groups and backpackers, city and country folk, the old and the young, and especially the school groups to hopefully learn something of nature from the dedicated staff who daily talk to them about the wonders all around them in this magical garden.

It was not always thus – just 220 odd years ago it was unspoilt bushland seen but briefly *en passant* in 1769 by Captain James Cook during his momentous voyage of discovery, and becoming in 1788 a dumping ground for England's criminals sentenced to transportation. Despite this inauspicious beginning Sydney has become a great modern city of some four million people, but reminders of its heritage are to be seen in many places, not least of all in this Garden in the City.

Our experience of this, for my wife and I worked closely together for many years here, began when we were asked in 1996 to plant a garden of Begonias, for the garden bed we were allocated was exactly where the very first crops were planted all those years ago, a contemporary account describing a

small planting of cereal crops in that first year of settlement as '9 Acres in Corn'. We were thus following the earliest pioneers in attempting to establish a foreign planting in this ancient soil, with no doubt the same anticipation of success as our predecessors but fortunately without the added spur of the dire consequences of hunger should we fail. We were working land which was the first to be cultivated by the settlers in this new colony and we were properly in awe of the honour bestowed, perhaps unwittingly, upon us.

Our first contact with the RBG had been in the summer of 1990 when the New South Wales Begonia Society was asked for assistance with the RBG's begonia collection, and we were the fortunate nominees, thus beginning a close relationship with this most beautiful and scientifically important Botanic Gardens. For 22 years I have worked here as a horticultural volunteer developing the begonia collection and promoting this plant family by establishing it in landscape plantings. My late wife worked along with me in these endeavours until she passed away in 2005. And now, in 2011, I have reached a stage when I can no longer enjoy or undertake the physical input which has been my joy for so long and I now play but a small part indeed in the care of the begonia beds, occasionally offering a small piece of advice when called upon so to do.

Thus the Sydney Royal Botanic Gardens became, so far as I know, the only Australian Botanic Gardens to actively grow and display the *Begoniaceae* as most successful landscape plants; and maybe also the first in the world.

So when you come to Sydney, and I hope it's very soon, go down to Harbour's edge and gaze in awe at our Opera House, then come through the gateway into the Gardens – there's nothing to pay – walk round the harbour front or ride the trackless train, take your time exploring or simply sit in the sun and enjoy the Garden in the City.



The garden in the city

CHAPTER 2

WHERE IN THE WORLD...?

I have been growing Begonias for the better part of 35 years and during all that time I have puzzled over the questions of where they came from and how old they are. I have been amazed at the diversity of places which they call home, mostly in the tropic and sub-tropic regions of the world, including Africa, South and Central America, India, Southern China and southwards through Vietnam, Malaysia, the many islands which comprise Indonesia, to the Philippines and Papua New Guinea, but not, you will note, in the Island Continent of Australia. A few species have even penetrated as far north as Taiwan.

I noticed that many of these places had once been part of the Super Continent of Gondwana and others were today in contact with such places, and I fancied that Begonias were very, very old and had their beginnings there? How else, I reasoned, could they have reached their present habitats unless at one time they had had land contact one with another? How fools rush into the world of science that have no scientific training!

The answers to my questions were forthcoming when, at a recent Begonia Convention in Sydney, Australia, we were fortunate enough to be addressed by Dr Mark C. Tebbitt, professor of Botany at California University of Pennsylvania. He specialises in the systematics of Begonia and along with other scientists had investigated the very areas in which I had for so long been speculating. How very different are the facts from my wild theories!

Research has revealed that Begonias originated in Africa 50 to 64 million years ago, some time after the super continent of Gondwana began to break up. The problem of determining the age of the genus was made most difficult for the reason that no fossils have as yet been discovered of this family; perhaps, I reason, because begonias, being succulent by nature, would not readily fossilise. So another method of determining age had to be resorted to. Fossils of related families, including *Datisca* and *Cucumber* were used to provide rough dates when all these families were alive. Use of DNA sequencing then produced the answer, which it must be pointed out, is a minimum age. Subsequent molecular analyses determined that Begonia originated in Africa and from there spread gradually both westwards into the South and Central Americas and to the east through India to Asia and the lands and islands to the south east. Dating of present day species supports this determination, with those from Papua New Guinea being the most recent at a relatively young 2 million years old. I surmise that they spread through Central and South America in a similar gradual fashion.

Another fascinating aspect of this plant family is the diversity of their habitats, ranging from the tropical forest floor in South America to the summer snow line of the Andes Mountains, and all manner of climatic conditions in between. That they have been able to adjust to such great changes in habitat as they moved around the tropical world supports our findings that, far from being delicate indoor specimens, they are in fact most hardy plants, readily assimilated when introduced into the temperate climates and one of the best garden plants available. What a pity it is that the horticultural world knows so little of them and that most nurserymen neither grow nor stock them. The world-wide legions of garden lovers are missing out on one of the greatest gifts of nature – *the Begoniaceae*.



B. 'Silver Jewel' planted with Maiden Hair fern

CHAPTER 3

ROYAL ACCOLADES

OR HOW CHARLES PLUMIER DISCOVERED BEGONIAS.

Michel Begon, remembered in the name of the family *Begoniaceae*, was a distinguished French senior public administrator, a patron of the Arts and Sciences and greatly esteemed by King Louis XIV. He was, between 1682 and 1685, *Intendant* (or Governor) of the French Antilles, comprised of the Islands of Martinique, Guadeloupe and Saint Christophe. On his recall to France in 1682 he was, for a short time, *Intendant* of the Marseilles Galleys, a posting that he did not relish, and his appointment to the *Intendancy* of the important seaport and naval base of Rochefort in September of 1688 was no doubt a great relief, and indeed a significant promotion. It is to him that we are, indirectly, indebted for the discovery of the Begonia.

Louis XIV, the Sun King, reigned in France for 72 years from 1643 to 1715. He was, amongst many other things, an active patron of the Arts and Sciences. Botany was one of his many interests and in early 1688 he required Michel Begon, who at that point was *Intendant* of the Marseilles Galleys, to recommend a suitable person to undertake a plant collecting trip to the French Antilles.

The man Begon chose for the expedition was a physician and botanist, Francois Surian, who then selected as his assistant a Franciscan monk, Charles Plumier, who was skilled in botany and botanical illustration. They set out in 1690 and went about their botanical collecting in the plant-rich islands of the Caribbean. An unrecorded incident which strained the relationship beyond endurance resulted in Surian and Plumier parting company, but each carried on botanising. Surian's considerable manuscripts are held in the *Bibliothèque Nationale* in Paris, but it is Plumier who is best remembered for his discoveries, amongst which were six species of a hitherto unknown plant family which he called *Begonia* in honour of the man who had recommended Surian to King Louis XIV (see illustrations at the end of this chapter). It is reported that Plumier sent Begon many interesting plants during this first expedition, for Begon was an avid collector of items of a scientific or botanical nature. These gifts, and a continuing correspondence, resulted in Plumier coming under Begon's patronage for future expeditions. The *Begoniaceae* was officially recognised in 1700 by Joseph Pitton de Tournefort in his book '*Institutiones Rei Herbariae*' Vol I, and later by Carl Linnaeus in 1753 in his '*Species Plantarum*'.

Plumier made detailed notes and drawings of all his discoveries but alas, his plant specimens never reached Paris, for he was shipwrecked on the way home. His notes he managed to save and these are stored in the same National Library as Surian's. Plumier was awarded the accolade of '*Botaniste du Roi*' for the amazing work he carried out, for on this and two subsequent expeditions between 1690 and 1704 he discovered hundreds of new plant families in the Americas. In all he produced three major works and some 31 manuscript volumes of drawings and descriptions, a truly extraordinary achievement when one considers the dangers he faced, the difficulties under which he doubtless worked and the shipwrecks he survived. Plumier was a man of many talents who added immeasurably to our knowledge of the natural world and well and truly deserved the title of '*King's Botanist*'.

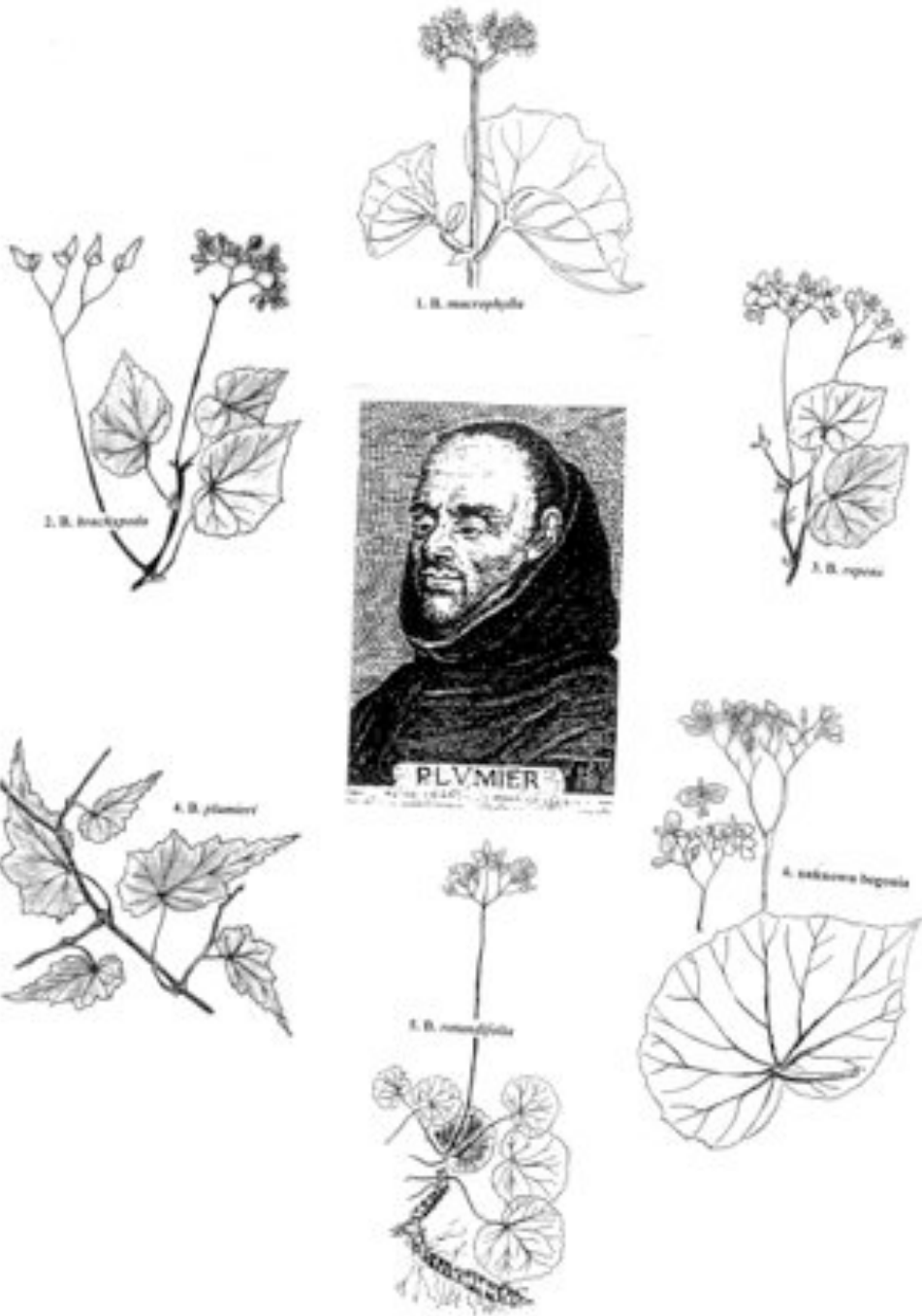
Plumier is credited with instituting the charming custom of naming new plant families after notable persons and amongst his discoveries he named *Magnolia* for Pierre Magnol, Director of the Montpellier Botanic Gardens, and *Fuchsia* for a noted German botanist Leonard Fuchs, and many more. His only mention in the floral pantheon is in the name *Plumeria* bestowed in his honour on the Frangapani, and in one species of begonia, the shrub-like *B. plumieri*.

The City of Rochefort maintains and operates a great conservatory housing a significant collection of the rarest species of the *Begoniaceae* in honour of Michel Begon who is greatly revered for his work as *Intendant* of Rochefort-sur-mer. In 1694 his *Intendancy* was extended to include the whole of the newly declared Province of La Rochelle (which included Rochefort), and he was virtually the absolute master of the area with the Naval Commandant filling a secondary role. As with Plumier, Louis XIV accorded him an accolade, describing him as "*le meilleur Intendant de Louis XIV*" (Louis XIV's best *Intendant*). He died in office in 1710 having spent 21 years administering the affairs of this great seaport and province.

So the begonia story began.....

(Note - I am indebted to Patrick Rose of the Rochefort Begonia Conservatory for much of the information regarding Michel Begon.)

THE FIRST SIX BEGONIAS DISCOVERED BY PLUMIER



CHAPTER 4

BEGONIAS IN THE MODERN WORLD

Begonias, along with many other exotic plants, did not become generally well known until the 1800s when leading European nurserymen realised that there were many beautiful and interesting plants yet to be found and exploited in distant parts of the world. So began a great period of discovery with plant hunters being commissioned by the important nurseries of Europe to search for the botanical riches of these foreign lands. Many new plants were discovered during this time and begonias featured amongst them, being found in the tropical and sub-tropical countries of Central and South America, Africa, the Indian sub-continent, China and the lands and islands of South East Asia. The search for new species continues to-day with a few hardy souls risking the dangers of tropical forests and foreign climes to increase our knowledge and stock of this incredible plant family. To them I doff my hat and express my thanks and admiration.

Begonias in their natural habitats generally occur in small and isolated pockets in areas ranging from the hot and humid lowlands of Brazil to the cool heights of the Tropics, from the dry areas of Mexico to tropical locations in peninsular Malaysia, and from the great river plains of southern Africa to the highlands of Papua New Guinea. No begonias have been discovered in Australia. So we see that begonias come from a great variety of habitats, which means that amongst them one can find plants that will be happy in many different locations. Couple this with their incredible ability to become acclimatised over a relatively short period and you have a most attractive family of plants suitable for many different climates, situations and applications. Consider *B. boliviensis*, a tuberous species whose habitat is the freezing heights of the Andes Mountains in Bolivia and Argentina but which grows readily in many temperate areas of the world as a summer flowering beauty, or again *B. socotrana* which is summer dormant in the scorching heat of the island of Socotra but has been used to produce the stunning indoor begonia hybrids called variously Elatior, Hiemalis and Cheimantha which decorate so many living rooms world-wide.

Begonias respond readily to cross pollination and many thousands of beautiful cultivars have been, and still are being, produced - so many in fact that the species themselves are at risk of being overlooked; the latest count shows some 1,600 species in cultivation to-day, with no count available of the cultivars apart from those already registered with the American Begonia Society. Preservation of species of all types is a most important aspect of all horticultural endeavours – do try to include them in your

plantings. There is just one problem: begonias will not tolerate heavy frosts or extremely cold winters and must, in such areas, be grown as potted plants either for indoor or outdoor display but needing winter shelter.

When begonias were introduced into Europe it was quickly realised that they were suitable mainly for indoor growing there due to unsuitable climates and these beautiful plants were relegated to the Botanical Garden hothouses and the conservatories of the wealthy. So began the myth that begonias are fussy plants which need to be grown under glass, except for a few hardier types which could be used to decorate an indoor corner; a myth which unfortunately persists to this day. Over the years so many gardeners have missed out on this source of beauty and delight simply because those who should have known better just didn't care to discover the truth.

The cultivation and development of the begonia family, and the production of new cultivars, is today mainly pursued in several of the world's great botanic gardens and by members of Begonia Societies in the USA, Canada, Great Britain, France, Belgium, Japan and Australia. However, despite being one of the world's favourite indoor plants, they have not been used to any degree, to the best of my knowledge, as landscape plants. To my delight begonias are now being discovered for this purpose by an increasing number of home gardeners who, once they have grown one begonia, clamour for more.

There is one exception to the general lack of awareness of the *Begoniaceae*, and that is with the Tuberous varieties. Hundreds of thousands of these floral beauties are grown both for public display in botanic gardens and for sale as indoor plants, Belgium being one of the largest producers, where many millions of euros are earned each year from the export market. In Australia tuberous begonias feature each year in truly magnificent displays in the Hobart and Ballarat Botanic Gardens and in some public parks, especially at Goulburn and Orange in New South Wales and in many places in Victoria.

Significant collections of begonia species are maintained in the Botanic Gardens at Fort Worth in the USA, Glasgow in Scotland, Montreal in Canada, Hiroshima in Japan, Kunming in the Chinese Peoples Republic and in Le Conservatoire du Begonia in Rochefort, France, amongst others. The species begonia collection in the Sydney Royal Botanic Garden is unique amongst these in that most of our begonias are grown in open gardens rather than being potted plants in traditional hothouse repositories. The collection, although small at this time, is being added to constantly. All such additions are grown on and tested for suitability for outdoor cultivation.

However, there is need for more public institutions to establish these so very important species banks and for more research to be carried out on this little known family of plants. Research is most

important - what potential do they hold for medicinal purposes? How much more can they offer gardeners and landscapers by way of new plants, new ideas and new horizons? Such work is being pursued in many of the places where begonia collections exist but I feel that more is required. The work that we have done at the Sydney Royal Botanic Gardens has in some small way advanced our knowledge of growing begonias as landscape plants, and only the wholehearted support of all levels of management in our endeavours has made this possible. To them I offer my very sincere thanks and admiration.



B. angularis one of the cane-like group

CHAPTER 5

WILL BEGONIAS GROW IN YOUR GARDEN?

Introduction

Having read thus far I take it that you are tempted to try begonias in your garden? They can play many parts in your garden scheme, from delightful border plants to spectacular garden specimens, from ever flowering massed displays to fascinating shows of most unusual and eye catching foliage plants which nonetheless will also flower in due season, and from climbers which will cover a garden arch to hardy ground covers.

However, before you make any firm decisions I must ask you to consider a few most important points:

1. **Light.** There are begonias suitable for all light conditions, from full sun to full shade, and the amount of light available to your garden will dictate which begonias will do best for you. The general rule of thumb is that the lighter the foliage colour the more light will that begonia require, and many of them will in fact be happy in full sun in all but the hottest climates. Some direct sun is beneficial to most begonias, except for those with the very darkest, well nigh black, foliage. This rule of thumb is of course only a general guide and experience is the best teacher as to what amount of light any particular begonia requires. A garden which is well lit with filtered sunlight will suit most begonias.

2. **Temperature.** Although begonia habitats are all in the tropical and semi-tropical regions, many of them are found growing at heights of up to 2,000 metres where the nights are cold and the days are pleasantly hot, whilst others have habitats in the tropical jungles of South America or the drier regions of Central America. I have found that begonias are remarkable in their ability to acclimatise in many different climates and this will take a quite short period of time. In the RBG it has been our practice to grow begonias new to our area in a protected shade house for their first season and then if they survive that, we try them in the garden. They do not all do well and we lose a number every time, but persistence will reveal those that will be suitable for any particular area. When you get a new begonia, always take cuttings so that you do not lose it completely if experimental plantings fail! A range of temperature from 5 to 25 degrees Celsius (40 to 79 Fahrenheit) is acceptable to most of the begonias, but they prefer that this range be somewhat narrower.

3. **Humidity.** An essential in growing begonias – a range between 40% and 80% is most suitable, 60% being the ideal, but they will tolerate humidity outside these limits for short periods. If your location is not suitable because of a lack of humidity then there are some things which can be done, but these are really only suitable for bush house growing (mind you, a garden in a bush house is a most satisfying way to grow begonias!):

- a. cover the bush house floor with sawdust or similar and keep this moist,
- b. plant ferns, ground covers and similar complementary plants with the begonias
as these will help keep the air moist,
- c. in hot weather, use an evaporative cooler which will not only cool the bush house but raise the humidity.

4. **Frost.** The one thing that begonias do not like is frost. They will tolerate a light frost or two which may make some or all the leaves fall, but will regenerate come the spring – heavy frosts are just not acceptable and will surely kill them. So, to grow begonias in frost prone areas they must have winter protection; but don't despair, for you can enjoy their beauty even there if you grow them in tubs in the outdoors and put them away in the bush house for the winter.

5. **Other factors.** I have dealt in detail with all the other requirements for garden growing of begonias in Chapter 8, however the above basic factors must be satisfied before they will grow satisfactorily.



B. juliana a shrub-like begonia

PART 2

MEET OUR FAMILY – the Begoniaceae

CHAPTER 6

TYPES OF BEGONIAS

The Language of Begonias

All plants within the Begonia family are described botanically as fibrous rooted. Because of the great diversity amongst these incredible plants, and for the sake of simplicity, begonia growers world-wide use a non-botanical system of classification that puts them into eight quite separate and distinctive groups according to their growth habits. In writing this book I have adopted this horticultural classification which was developed by Millie and Edward Thompson in their superb book, "*Begonias, the Complete Reference Guide*".

More than 1,600 species of *Begoniaceae* have been discovered to date with the hunt for new ones still going on. There are also thousands of cultivars, most of which have never been registered.

In referring to begonias by name I have abbreviated the word *Begonia* to *B.*, always in italics, with species names shown totally italicised and cultivars (hybrids) in inverted commas, thus:



B. minor – one of the showiest of the shrub-like species, and



B. 'Irene Nuss' – perhaps my favourite cane-like cultivar.

So many and so varied are these wonderful plants that in the classification system referred to above they are divided into eight quite distinct groups, as follows:

Cane-like, often referred to as tree or angel wing begonias,

Shrub-like, which as the name implies, have a many stemmed growth habit,

Rhizomatous, the largest group of begonias, much used for indoor growing, but proving to be excellent garden plants,

Semperflorens, one of the best of all bedding plants, often called wax flowers,

Trailing-scandent, a group which encompasses some of the very best plants available for hanging basket culture, as ground covers and as climbers,

Thick stemmed, most unusual begonias which have stems almost as thick at the tip as at the base,

Rex, one of the truly great indoor plants, and although rhizomatous in habit are separately listed because of their beautiful and distinctive foliage, and

Tuberous (arguably the most beautiful of all flowers), and **Semi-tuberous** (mostly from South Africa), included in the one grouping as growth habits are somewhat similar.

And I add a ninth group, **Elatior**, which are basically semi-tuberous cultivars which have been specially developed for indoor use, which flower in all seasons and are called variously Hiemalis, Cheimantha or Elatior.

Recognition

Begonias are readily recognisable by two characteristics:

1. The leaves are mostly asymmetric, and
2. each plant carries both male and female flowers, with the female having a prominent three winged ovary behind the flower. The flowers, except for the double flowered tuberous, have two to four tepals and yellow stamens and anthers. (There are, as usual, some exceptions to this general rule)

Life expectancy

Begonias, like all garden plants, eventually 'wear out' and need replacing. Some of course are longer lived than others and it is necessary to be aware of this 'life' when planning a replacement programme. I have given in each of the following sections an indication of the life expectancy of each group within the begonia family so that you will be sure to have new plants ready for the garden when the old ones retire. These suggested times are merely advisory but it's a good thing to have a start point when planning anything and I know that as your experience increases you will come to know exactly for how long each begonia in your collection will grow at its best.

CHAPTER 7

A CLOSE LOOK AT EACH BEGONIA GROUP

THE CANE-LIKE BEGONIAS

Cane-like begonias are eminently suitable for use as feature plants in any garden scheme, and both species and cultivars are readily available and ideally suited to open garden cultivation; in fact they often grow much better in the open garden than in the traditional pots and tubs to which they are usually consigned. They come in many shapes and sizes, from low growing sprawling or compact types through those of medium height to the very tall ones which grow to 1.8 metres (6 feet) or more, and in many leaf shapes and colours. They mostly like a position in which they receive at least a few hours sunshine each day as in less light they will not flower to perfection, however each plant may behave differently and experimentation is required before the ideal position is found. Don't hesitate to move a begonia many times before this ideal is achieved. Cane-likes need plenty of growing room so that new canes, which come from the root system on the outside of the plant, can develop properly, and because of their comparatively deep root system need a good depth of growing medium, be it in garden or tub. I recommend that when using cane-likes as feature garden plants you plant two or more of the one variety in a clump say 30 cms (or 12 inches) apart; the resulting very full and handsome display will reward you all year long with interesting foliage and beautiful flowers.

The flowering period extends from late spring well into winter, with some being ever-flowering in the right conditions, and the flowers, produced in large cymes, hold on the plant for a very long time, even throughout the winter in hot to mild climates or sheltered positions. They come in white and shades of pink and red, with the occasional orange. Cut foliage is often most suitable for indoor decoration.

Very cold temperatures and frosts will cause leaf drop and in some cases the loss of the upper portion of the plant. However the arrival of warmer spring weather will soon fix that and new growth, which comes both from the root system consisting of one or more new canes each year, and, usually, the topmost node after pruning, will delight you. They will benefit from annual pruning and this is best done in late winter before new growth begins. Shorten the canes to suit your garden scheme and cut above an outward facing node; heavy pruning is acceptable to these garden beauties and up to two thirds may be cut away with no ill effects. The rule of thumb is to prune the cane-likes to the size you want. The cuttings of

course can all be used for propagation. As the plant ages the older canes will turn brown and produce fewer flowers and they should be removed completely when pruning.

From the many cane-like begonias in this remarkable family I can recommend: *Bs. aconitifolia* (a tall growing, palmately leafed, white flowered beauty), *albo picta* and *albo picta rosea* (both lower growing compact plants with small, silver spotted foliage), *angularis* (a medium grower with distinctive foliage), *coccinea* (ever flowering, tall growing), *maculata* (white spotted leaves), and *undulata* (medium grower with a dense growth habit and an abundance of white flowers) amongst the species, and from a very long list of cultivars, *Bs.* ‘Irene Nuss’, ‘Sophie Cecile’ (ideal medium height feature plants with distinctive foliage), and ‘White Showers’(a sprawling habit and almost ever-flowering).

Cane-likes are heavy feeders and it is essential you adhere to a fertiliser program which ensures that the right level of controlled release fertiliser is always available and also provides the necessary special fertilisers at each stage of growth (see Chapter 11).

You will find that they have a long life span, especially when grown as garden plants, and will continue to perform well for up to ten years and more. Pot grown plants will however need regular re-potting to avoid them becoming root bound which will inhibit growth.

Propagation is from tip and stem cuttings best taken at pruning time when the tips are firm and growth buds are just filling out, and from seed.



B. ‘Sophie Cecile’ – a cane-like cultivar

THE SHRUB-LIKES

The shrub-like begonias are ideal garden plants. Each of them will form a well shaped and pleasing plant although some will happily grow in a straggling manner, a trait which may be controlled by regular pruning, and many of them are ever-flowering. They benefit from tip pruning in the early stages of growth and pruning for shape as required. They are mostly medium growers in the 30 to 60 cms (1 to 2 feet) range, but a few grow up to a metre (approx 3 feet) tall. Some very suitable shrub-likes for garden use include *Bs. acutifolia* (can be a bit straggly if not pruned regularly, but a wonderful begonia despite that), *cubensis* (a low growing, small leafed type), *listada* (a fabulous semi-shade lover), *venosa* (a sun lover with fascinating felted leaves), *sanguinea* (foliage of deep green with rich red undersides - magnificent!), *fuchsioides* (small leaves and fuchsia like, red flowers), and *foliosa* (the fern leaf begonia, a shade and water lover which looks just right when planted in shade beside a pond). Again I recommend that several of each type be planted in close clumps say 30cms (12 inches) apart to achieve a truly stunning effect in the garden. Keep them pruned to shape as desired, and this may be done at any time without harming the plant, except for *B. sanguinea* which I have found does not like the secateurs and is best left unpruned or only lightly trimmed.

Keep to a practical fertilising program which provides both controlled release fertiliser and dressings of special fertilisers according to the stage of growth (see Chapter 11).

Shrub-likes are reasonably long lived, but it is wise to plan on replacing your garden specimens at, say, five-year intervals. Propagation from tip cuttings is a simple matter but make sure that the cuttings are not too soft as they will quickly rot in the cutting medium.



the shrub-like *B. sanguinea*

THE RHIZOMATOUS GROUP

Rhizomatous begonias form the largest group in the family and although once considered to be merely indoor plants I have found that they are indeed very well suited for garden cultivation. There are three types of rhizomes to be found amongst the begonias:

- a. ground level plants whose rhizomes grow along the surface of the soil,
- b. those whose rhizomes grow in an upright fashion, and
- c. those whose rhizomes creep beneath the surface of the soil.

They make ideal under-plantings for shrubs such as azaleas, and being shallow rooted will not interfere with the root systems of other plants. Most of the rhizomatous need some degree of shade and many of them are very suitable for planting in that 'difficult' corner where the sun does not penetrate. I particularly like some of the species, such as *B. acetosa* with its large, hirsute, dark green leaves with the rich red undersides, *B. manicata* whose rhizomes grow upright and which produces a mass of pink flowers every spring, and *B. carolineifolia*, a large, sprawling and totally fascinating begonia which has light green compound leaves and huge rhizomes, producing pale pink flowers in profusion for the first two months of spring.

The ground level rhizomes are the most common, and as their rhizomes grow forward the back section dies, with the vigorous part being the growing tip. When garden planted these rhizomatous begonias have a 'life' of two to three years, after which time they are likely to become straggly and unattractive. They should then be replaced with newly propagated plants. If pot grown for a considerable time, say 4 or more years, the rhizomes grow in loops over the edge of the pot and form quite attractive looking plants. However if left in this state too long the plant will wilt and possibly die as there is insufficient rooted rhizome in contact with the soil. To avoid this it is advisable to repot every 2 or 3 years, cutting away the old back portion of the rhizome and replanting the vigorously growing tip.

The upright growing rhizomes should be tip pruned after each flowering (in late spring usually) and the growing tips thus removed can be used as cuttings. When pruning, remove as much of the rhizome as will leave a short plant which will very quickly grow once more into an attractive specimen. Again it is wise to replace these plants every two to three years.

Those begonias whose rhizomes grow beneath the soil surface may need the original plant removed completely as the newly forming growing tips will appear above the surface as new plants.

Tip pruning of rhizomes will result in the development of lateral rhizomes which will ensure that the planting becomes thicker and more attractive. Always wait until flowering has finished before taking secateurs in hand.

In late winter the grooming of rhizomatous begonias must include the removal of all old leaf growth, cutting or snapping them off at the rhizome. This will encourage the growth of new leaves before flowering commences in spring. Again, regular fertilising is essential for top performance.

As with all the other begonia types, mass planting is the way to go, and the multitude of flowers, followed by the carpet of beautiful and distinctive foliage will more than reward your work. Think perhaps of using suitable rhizomatous begonias as garden border plants, several rows deep and close planted when possible.

It is difficult to recommend particular begonias in this group as there are just so many cultivars available and all have something to recommend them. However I do like to see as many species as possible in cultivation, and would recommend the following as being proven garden subjects: *Bs. acetosa*, *hydrocotyfolia* (for that very shady spot), *heracleifolia*, *hypolipara*, *nelumbifolia*, *manicata* and *thiemi* (= *macdougallii*) to name but a few.



In the foreground *B. manicata*

THE TRAILING/SCANDENTS - Ground Covers and Climbers

The begonia family also includes plants most suitable as ground covers and climbers which also excel as basket subjects, and we classify these as trailing-scandent. Some are rampant growers such as *Bs. convolvulacea* and *lobata*, ideal for that tropical garden which you want to grow, be it in a tropical or temperate situation. These ground covers also have a yen for climbing and will move skywards when given the chance. They have no natural means of attachment to trees or fences but somehow manage to reach for the sun, although always grateful for a little help. At least one of the shrub-likes, *B. listada*, also makes a great ground cover in fully shaded locations and is one of my favourite begonias.

These climbers and ground covers are apt, in the right conditions, to grow rapidly and threaten to take over, so that pruning at least annually is necessary, but more often will do no harm.

Garden life-span varies greatly and those used as ground covers will take root at any node in contact with the soil, thus becoming virtually everlasting. Prune out old and superfluous growth as required. Used as climbers they will constantly produce new shoots from the root system and the old growth should be pruned out as necessary. If grown in a hanging basket routine pruning is necessary to keep the plant looking at its best and this will prolong its life to six or more years before replacement is advised.



this shrub-like *B. listada* grown as a ground cover

SEMPERFLORENS CULTORUM

Garden borders are well catered for in the Begonia family and the well known wax flower is the star, correctly referred to as *Begonia Semperflorens-Cultorum* which as the name implies are all cultivars. Growing these begonias to perfection requires some special effort and expertise and many gardeners, not being aware of the 'tricks of the trade', do not get the best from them. These floral beauties must be planted *en masse* in order to achieve the best result. I shudder whenever I see a garden with a border of semps, as they are fondly referred to, planted in a single row and a foot (30 cms) apart. They will not do well for they are gregarious beings and must have close company in order to thrive. So, plant close and plant many; if a border is required then make it at least 3 plants deep and 10 to 15 cms (4 to 6 inches) apart. Better still, if space allows and you have enough plants, plant them in a mass. What fun you can have with the colours! I have seen them in a solid colour to each garden bed, I have seen them planted in a variety of patterns, and I have seen them planted willy-nilly without regard to colour, and all those plantings looked superb.

Position is the next important element in growing wonderfully showy semps. Although we say that they will grow equally well in sun or shade, they will become leggy if the shade is too deep and will not do as well as expected if the sun is too hot for prolonged periods. Try for a spot which receives a good four hours or a little more of sunshine each day.

The growing medium is important with all garden plants, but especially so with these bedding beauties which are indeed gross feeders. Prepare a rich garden bed with plenty of humus and animal manures dug in and a good dressing of controlled release fertiliser, and once planted, maintain a feeding program throughout the year for they never stop growing in any but the coldest regions.

Don't just plant, feed and forget. They need ongoing care for best results, and this consists of regular tip pruning in the early stages of growth. Pinch off every flower and bud when first they appear, then repeat this treatment in two more weeks and again two weeks after that. Sounds drastic I know, and many gardeners just can't bear to do it, but the results will astonish and delight. Water regularly, fertilise as specified and you will soon see that the pruning was well worth while, for you will be rewarded with masses of blooms for many, many months. *Semperflorens* after all translates as 'ever flowering'.

Finally, when the plants eventually get leggy and a bit unsightly, prune them hard, almost to ground level, fertilise at once, and new growth will spring from the roots in a few short weeks and the whole cycle is repeated. You should get at least two seasons of growth and certainly more if you really look after them. Their one failing is that they are prone to attack by powdery mildew and treatment with a preventative spray is recommended.



a splash of *B. Semperflorens-Cultorum*

OTHER BEGONIAS FOR THE GARDEN BORDER

Rhizomatous. Many of the rhizomatous group can be used as border plants with stunning results, providing a mass of flowers for a spring display and an evergreen border with fascinating foliage throughout the year. Try *B. manicata*, *B. 'Immense'*, *B. 'Erythrophylla'* (the Beefsteak Begonia) or *B. 'Cleopatra'* for something different and truly beautiful. *B. manicata aureo maculata* is well worth searching for as the cream blotched mid green leaves are quite spectacular.

Shrub-likes. The lower growing shrub-likes, for instance *B. cubensis* and *B. acutifolia* are also useful as border plants in larger gardens where a deep border is required.

Also included in this group are the semi-tuberous such as *B. dregei* and her various cousins from South Africa which will, with a bit of luck and careful husbandry, make good garden plants.

THE THICK STEMMED GROUP

Some of the begonias classified as 'Thick Stemmed' are not truly appealing as garden plants, being prone to growing rather tall and gangly, but with diligent care and frequent pruning they can take their place in the garden scheme with pleasing results. *Bs. reniformis* and *vitifolia* are like this. However, there are a number of thick stemmed begonias which make excellent garden feature plants and I include *Bs. egregia*, *parilis*, *ulmifolia* (even though the possums find it a delicacy), *alnifolia* and *multinervia* amongst these. Life expectancy varies greatly with these unusual begonias and I would recommend replacement every five years; however annual pruning will produce new growth from the root systems so a new plant grows every year.



B. egregia a thick-stem left centre and *B. foliosa* to the right

REX BEGONIAS

The Rexes are usually grown as indoor plants although I have seen them used in garden schemes with some success. They are treated as a separate group because they are so very distinctive due to leaf shape, pattern and colour. They are all cultivars having one common ancestor – *Begonia rex*, native to Assam, which has distinctive green leaves with silver banding. If used in the garden they need a brightly lit,

shaded position protected from cold conditions which will cause leaf loss. It's worth trying them if you don't mind failures and have spare plants in the glasshouse.

They excel as potted indoor plants, being one of the world's most popular for this purpose. They need a position with a high light level and do not like wet feet. Never stand them in saucers of water and do allow the potting mix to surface-dry between watering. When you do water them make sure the mix is saturated. Air conditioning is not enjoyed and they will enjoy the fresh air if put outside at bedtime on a protected porch.



some Rex begonias

ELATIOR BEGONIAS

The Elatior begonias are most certainly intended as indoor plants and that is where they are at their best. Originally developed as winter flowering plants, the latest developments have produced an all-year flowering habit. As with the rexes they do not really like an air-conditioned environment and putting them outside, or in a fresh-air area, each night is a good practice. Each plant will continue to flower for upwards of eight or ten weeks and may be pruned and fertilised at this stage to produce renewed growth and flowers.

I must admit to using them as indoor decoration only during the first flowering period and then buying a new one! I have heard of some people who have had success in planting them in the open garden.

Elatiors benefit from regular (say fortnightly) applications of a water soluble fertiliser. Keep them looking their best by removing any leaves which may turn yellow, although this should not happen if they are kept in a good light level and fertilised regularly. Otherwise they are virtually trouble-free during their long flowering period. Do not stand them in water. Drying out in a constantly air-conditioned or heated environment is not to their liking.

TUBEROUS AND SEMI-TUBEROUS BEGONIAS

Introduction

There's a begonia that has adapted to the coldest of winters by developing a tuber and becoming winter dormant - the fabulous tuberous begonia. This winter dormancy came about when the forebears of the modern day hybrids found their habitat in South America's hinterland being pushed higher and higher as the Andes Mountains were formed and the cold became unbearable. Evolution to the rescue - grow a tuber at the base of your stems to sustain you through the periods when your habitat is snow covered and your leaves and stems have fallen. *Voila* - a winter dormant begonia.

There is a widely held belief that tuberous begonias can only be grown by experts with glass-houses. Not so - the very fact that they are winter dormant makes them ideal plants for cultivation in those places where it is too cold for all the other begonias to survive the winter. The essential conditions are:

- a. summer heat in the 20° to 30°C range and which does not normally exceed 35°C for other than short periods, although simple cooling methods allow this maximum to be extended,
- b. humidity generally above 30% and preferably 10/20% higher although short periods of much drier conditions are acceptable, and
- c. a simple growing environment such as a shade-house where a high level of light is available but also in which the begonias may be protected from too much direct sunlight and strong winds. A translucent roof is desirable to protect the blooms from heavy rain but to admit the essential light. Some direct morning sunlight is beneficial.

You still want to grow them but haven't a shade-house? Well now, there is a range of tuberous begonias specially bred for you, dwarf plants but still bearing those large blooms so much in demand, and intended for use as bedding plants in semi-shaded gardens. They are called 'Non-stops' and are readily available from retail nurseries in spring. Expect them to bloom in profusion from mid-summer onwards

well into autumn when they too will become dormant. Mind you, the tall growing tuberous begonias are also grown in open gardens in many places where the conditions are suitable.

Types of Tuberous Begonias

There are several types of tuberous begonia to choose from depending on your requirements.

The large flowering varieties which include doubles and singles are available as seed, seedlings or developed tubers. The plants produced from seed may vary greatly in size and quality of bloom and in order to obtain guaranteed large blooming begonias it is necessary to purchase named varieties which are usually sold when two or more years old, either as flowering plants or as dormant tubers. Colour range includes white, red, pink, orange, yellow and picotee (pale coloured petals fringed with a darker shade). Named varieties are available from specialist suppliers, with the world's leading producer being Blackmore and Langdon of Bristol, England.

The pendula types are spectacular begonias grown in hanging baskets, and although the blooms are not as large as the large flowering doubles they make up for this in the quantity of blooms produced, with flower trails up to two metres long.

The Non-stops, dwarf plants bearing large blooms, are ideally suited for use as bedding plants and in all respects behave as the large variety. They require a rich, well drained soil in a semi-shaded location.



a typical un-named seedling tuberous begonia

The semi-tuberous begonias, mostly from South Africa, form an interesting group within the begonia family. They are suited to garden cultivation in tropical areas and do not relish cold winters, when they are prone to lose their leaves. However they will come back in spring if the winter has not been too harsh. I do not regard them as ideal garden subjects and the growing of them is best undertaken in controlled conditions in shade and glass-houses. They all produce small white flowers from summer through autumn and are prone to leaf fall when under stress, which may merely be a sudden change in weather conditions. All the South African species (*macbethii*, *natalensis*, *partita*, *homonyma* etc), are thought to be variations of *B. dregei*, whilst from Bolivia comes *B. wollnyi*.

Starting off

It is probably a very good idea to grow your first tuberous begonias from seed (see Part 4: Propagation). This way you will get a great many plants with which to gain experience and when you graduate to buying named tubers (an expensive business) you will not be likely to lose them. Tuberous begonias grown from seed will be a mixed lot as regards colour, type and size of bloom and amongst them you are more than likely to find one or more very good plants. After all, this is the way in which the large flowered named varieties are produced, with several thousand seedlings being raised to obtain, perhaps, just one show quality begonia. Sow seed in late winter. This may mean that you need bottom heat to ensure germination within a reasonable period and this may be found in the house on top of the refrigerator or the floor level storage water heater. Alternatively, simple heating pads are available from specialist gardening suppliers. You may also be able to find tuberous begonia seedlings in your local nursery at a reasonable price and these again are ideally suited for the first time grower.

The Growing Cycle

Tubers, which have been stored during dormancy, are potted into fresh growing medium in early spring, making sure that they are inserted concave side up and covered with potting medium to a depth of one or two centimetres, and watering is commenced. Choose a deep pot which just comfortably accommodates the tuber and ensure that the potting mix contains a controlled-release fertiliser which is labelled 'complete' (ie. contains all the necessary nutrients, including the micro-nutrients or trace elements).

Shoots appear as small pink swellings on the top of the tuber, often whilst they are still in winter storage, and these very quickly develop into strong plants. If there are more than one of these, the surplus shoots may be removed and put down as cuttings. Fertilise with a good water soluble fertiliser every two

weeks. The only problem that you may encounter during the growing period is powdery mildew and I recommend that preventative spraying be carried out as soon as conditions appear right for the onset of this fungus (refer to Chapter 12).

As the plant grows so the tuber increases in size and potting-on is necessary during the growing period. Select a pot one size larger each time you re-pot and use fresh mix. Tuberous begonias need to be staked and this is done as soon as the plant appears to need it. Make sure that you do not pierce the tuber with the stake, inserting it behind the plant and tying with a soft material to prevent damage to the stem. Grafting tape and florists' tape are both ideal for this purpose as they will stretch as the stem increases in size. If your non-stops are intended for the garden this is the time to plant them out.

The first buds will appear as the plant approaches maturity and these should be removed to ensure larger and better blooms later. Remove no more than the first half dozen buds then allow the others to develop and open. Tuberous begonias grown from seed may produce only very small blooms in their first year - do not despair but persist with them for another season when the blooms may well be bigger and better. However some of these seedling begonias may well produce large and colourful flowers in their first season. Tubers of named varieties should of course produce large and spectacular blooms, arguably the most beautiful of all the flowers. So large in fact can these blooms become that they may need to be supported so that their full beauty can be admired. A simple wire support is used for this purpose and should be available from specialist nursery suppliers. The large blooms are the male flowers whilst the small and rather insignificant ones are female. Many specialist growers remove the female flowers to encourage the males to grow even larger.

The growing cycle from planting the tuber to flowering takes some 4 to 5 months so that plantings made in late winter/early spring are at their best in late summer/early autumn.

Once flowering has finished the plants should be allowed to die back ready for dormancy and this is encouraged by a gradual lessening of the amount of water supplied and the cessation of fertilising. It is important that this dying back be allowed to take its natural course as at this time the tubers are storing up their reserves of strength for the next flowering season. Eventually the stems will fall away and the tuber should then be lifted, cleaned by rubbing away any soil adhering to it, dusted with sulphur powder to deter insect attack whilst in storage and then stored in a flat tray and covered with peat moss or similar material. Put the tray in a dark, cool place and leave until the following spring. Some growers leave the tubers in their pots which they turn on their sides for the winter, a practice I do not subscribe to as I think that cleaning the tuber and dusting with sulphur will ensure a sound tuber for the next season.

Further information

Readers who are interested in learning more about these wonderful tuberous begonias are advised to purchase one or other of the several specialist books available on the subject. Check with your bookseller or nearest Begonia Society.

BEGONIAS RECOMMENDED FOR THE GARDEN

Appendix A is a listing of individual begonias that I know will enhance your garden, which are available with persistent seeking and which I have grown successfully in the Sydney area. The list is by no means complete and there are many species and cultivars that I have not mentioned but which are also suitable for garden cultivation. I merely intend this list as a starting point for those new to begonia growing and as a guide for those who already have some in gardens or pots. I also hope that this book will encourage long time begonia growers to try them in the garden, for I know that so many growers regard them only as bush-house or indoor or conservatory plants, following the old time wisdom, now so thoroughly proven wrong.

You will see that I have included a great number of species in this list and I have done so for two reasons. Firstly they are all very beautiful plants, mostly very robust growers and perform extremely well in the landscape, and secondly and most importantly the preservation of species of all plants is of vital importance, for they are, of course, the source of all the characteristics which go to make up the many beautiful cultivars which we so admire in our gardens. I urge all gardeners to include, wherever possible, species in their plantings, no matter the type of plants which most interest them. This will help ensure their preservation.

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| <p style="text-align: center;">PART 3</p> <p style="text-align: center;">PLANTING AND</p> <p style="text-align: center;">PROBLEM SOLVING</p> |
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CHAPTER 8

PREPARING TO PLANT

The Garden Bed

Beauty is most often achieved only through hard work, as with the world's great works of art, grand monuments and imposing buildings. So too with gardens - work is needed to prepare the beds, and to plant, cultivate, feed, pamper and prune the plants. Begonias are no exception and before you reap the promised riches you must prepare the growing areas; not that begonias are so very fussy for I have seen them growing equally as well in heavy clay and sandy loam, in the well mulched and tended beds of the Royal Botanic Gardens and in the somewhat neglected gardens of those of us who have reached an age where hard physical work is just no longer possible. However, there can be no doubt that the better the preparation of the garden bed the better will the begonias grow.

Most prefer locations which are semi-shaded and provision must be made to provide this. A natural tree canopy is of course the most desirable, and suitable trees should be planted if not already existing. If this cover is not immediately available, or whilst waiting for trees to grow, a temporary canopy can be readily provided using shade cloth of 50% to 75% rating. Many, however, such as the cane-likes, prefer long periods of sunshine each day.

It is desirable first and foremost that, no matter the type of soil, the garden bed be well drained. Begonias abhor wet feet; come to think of it, what plants do not except waterlilies and rice? Neglect them if you must, forget on occasions to water them or feed them, but never let them stand in waterlogged growing media. The best and most effective way to achieve a well drained garden is to raise the beds, using borders if necessary, but simple heaping up of the bed is usually sufficient. Difficult gardens may require a drainage system which is in most cases a relatively simple task but one accomplished only with that hard

work I promised, or one can hire an experienced drainer to do the job. Whatever, it's a job that must be done.

Drainage fixed, it's now time to look at the soil. To be well drained the soil needs to be of open texture, so if you have a heavy soil that gets soggy in wet weather you must add something to open it up. Sharp sand (pea gravel perhaps) is best for this but perlite and such like will answer very well; supplement these with compost, either home made or commercial, spent mushroom compost if you can get it, or well rotted cow or horse manure. Dig these additives into the garden and marvel at the difference. Clay soils can of course be broken down by the application of a commercial 'clay breaker', or cheaper than that, use Gypsum to do the job. A liberal application will soon have the clay breaking down into a workable medium. If in any doubt as to the suitability of your garden soil then seek advice, perhaps your local nurseryman will help or you can contact your Agriculture Department or Botanic Garden.

Pots and Tubs, and Potting Mixes

Growing in the garden does not necessarily mean that plants must be in the ground, for many great garden designs include plantings in pots and tubs, and those who have but a small courtyard or patio can still grow out-of-doors, and even a window box may be considered to be a garden. A great advantage of pots in the outdoor setting is that they can be so easily re-located. Thus you can change positions as the seasons change to take advantage of the very best location for each particular begonia, or merely to vary the look of the garden, and pots in flower can be put where you want a colourful display. There are wheeled stands available which make the re-location of heavy tubs a breeze but remember to apply a coating of grease to the wheel bearings so that they won't rust.

The growing medium used in pots must be of good quality and open texture, and if a commercial mix is purchased ensure that it conforms to the Australian Standard (refer to Appendix B). This is indicated by a series of ticks on the package, black for standard and red for premium quality. These commercial mixes should contain controlled release fertiliser and trace elements so read the contents statement before adding more. However I do find that all the mixes I have so far tried are a bit too heavy for begonias, and to compensate I add up to a quarter by volume of perlite. Never use soil direct from the garden to fill your pots as it will compact very quickly and deny essential air to the plant roots. It is also a wise precaution to raise pots and tubs used outside so that worms and other soil dwellers cannot enter. Worms in particular, although so valuable in garden soils, are not welcome in pots for they help in the rapid compaction of the mix - and don't think they won't get into pots standing on brick or similar paving! Worms will find their

way between the pavers within days of the pots arriving. Ants are another problem and should be deterred from nesting in pots as they delight in burrowing around the root system.

Here I must add a note of warning - if using commercial potting mixes do not inhale the dust, as certain pathogens (eg Legionnaires' Disease) can dwell in timber refuse which forms a large part of that mix (sawdust, wood chips, pine bark etc). Make sure that you open the bag carefully, in the open air, and if it feels dry add water to dampen the mix before going any further. Good quality mixes are packed damp. It is also wise to wear a simple face mask when first opening the bag.

There are two main types of pots used for plants - plastic and terra cotta - with a few growers preferring ceramic, concrete or timber. Plastic pots are light in weight and therefore the larger ones are so much easier to handle, however they do heat up much more quickly than terra cotta and this can be a disadvantage in extremely hot climates. Terra cotta pots, on the other hand, whilst being heavy to handle do ensure cool roots in hot weather but also need more water than plastic as the material absorbs a great amount. Another plus for terra cotta is that the heavier pots make for better stability in windy conditions. Whatever pots you use it is essential that there are sufficient holes in the base to ensure free drainage and it may be necessary to make more holes than the manufacturer provides. If the drainage holes are so large that the potting mix escapes, the problem can be remedied by lining the inside of the pot base with a single thickness of shade cloth or plastic fly-wire. Don't use metal material as this will quickly rot and the problem returns. Raising the pots above the ground as recommended above will also ensure that the drainage holes are clear of soil or pavement so that free drainage is possible. Never stand the pots in saucers of water.

When selecting a suitable pot for any particular plant, consider the root system of that plant. Rhizomatous begonias have a shallow root system and therefore need a shallow pot, whilst the cane-like begonias have deep root systems and need a deep pot for best results. Generally speaking I recommend that squat pots be used for rhizomatous, rexes, semperflorens and the smaller shrub-like but some of the upright growing rhizomatous need a larger and deeper container. Deeper pots are also best for the cane-like, thick stemmed, tuberous and semi-tuberous varieties while some of the larger cane-like need quite large tubs for best results.

pH

This cryptic sign is used to denote the degree of acidity or alkalinity of a soil. The pH of your garden soil or potting mix must be within specific limits for best results. Once the soil becomes either too acid or too alkaline certain of the essential nutrients will become unavailable to your plants and poor

growth will result. A value of less than 7 indicates acidity, of over 7, alkalinity. Begonias like a growing medium with a pH between 5.5 and 6.5 but will tolerate, albeit unwillingly, a wider range than this. Simple pH test kits can be readily purchased, and I recommend that you buy the type which uses a liquid indicator and a powder reagent, for these are easy for the home gardener to use and sufficiently accurate for all general gardening purposes. To adjust the pH of your soil or potting mix is relatively simple - to raise it, add a dressing of dolomite or crushed limestone, to lower it treat with sulphur. It is wise to test your growing medium on a regular basis as the constant use of fertilisers will increase acidity. This is one good reason for re-potting potted plants every two or three years.

Here I must alert owners of new houses – gardens being established round a newly built home may often contain builders debris, often buried, and this will most certainly contain cement in one form or another, a substance which will raise the alkalinity of the soil to unacceptable levels. The same applies to newly made cement pots or planters. In both instances the adjustment of the pH before planting is a must.

Fertilise the Growing Medium

Finally give the garden bed a dressing of controlled release fertiliser. The best organics are Blood and Bone or Dynamic Lifter® (pelletised fowl manure), whilst there are a number of good non-organics like Osmocote® and Nutricote®. Whatever you use make sure that the necessary trace elements are included. If they are not mentioned in the analysis on the fertiliser package then they can be purchased and added separately, but they are essential for good plant performance. Commercial potting mixes may contain a ration of controlled release fertiliser and trace elements. If they conform to the Australian Standard (see Annex B) then they will do so; if not, the presence of fertilisers and other additives should be printed on the package. If the mix contains no fertiliser then add one of the controlled release types mentioned above. (See also chapter 10).

Toxicity

Sometimes a soil or potting mix may be toxic to plants due usually to incorrect composting of wood products such as sawdust or wood chips used in preparing the garden or making the mix, or to the presence of a toxic level of salts which have built up in the garden as a result of many years of fertiliser use or even in a bag of potting mix which perhaps contains too much fertiliser. If plants are not growing well or are otherwise distressed for no apparent reason when first planted, toxicity may well be suspected. A simple check for this is to test grow some radish seed. Put some of the suspect growing medium in one

container and some growing medium known to be non-toxic in another. Dampen the mix and sow a few radish seeds in each. Within two or three days germination should occur. If the test mix is toxic, root growth will be retarded, and this can be determined by comparing growth with the seed in the non-toxic mix. Severe toxicity may severely inhibit root growth or prevent germination entirely. Radish seed is used because it germinates very quickly and so the test results are available within a few days.



B. 'Amigo Pink'

CHAPTER 9

A PLANTING GUIDE -

MANY HINTS WHICH MAY BE OF USE.

Location, location!

Begonias are infinitely variable and come from many diverse regions of the world, so it is to be expected that they will grow in many different locations, and deciding just where to plant a particular one is often not easy. The general rule is that the lighter the leaf colour the more light will that begonia need or tolerate. This is not an infallible guide however, and you would be well advised to experiment to find the right spot for each plant. This is best done with the begonia still in its pot by placing it where you want it to grow and seeing how it tolerates that position. The begonia will soon let you know if it's not happy there. This is of course not only applicable to begonias – a similar search for the ideal location should be made for any plant new to your garden.

A great many begonias will tolerate and in fact benefit from some direct sun with morning exposure being less severe and therefore preferable. If a begonia is growing tall and lanky it may be that it requires more sunlight. I have often been surprised at the amount of sunlight many begonias need for I have always had it emphasised to me that they are succulents and as such need lots of shade. This is not so in very many cases.

In areas prone to frost begonias can be grown to advantage in containers which can be put under cover during winter. All the cover generally needed can be provided by a shade house, and I have seen huge tubs of bedding begonias (*semperflorens*) growing in the Southern Highlands of New South Wales where the protection of several conifers was sufficient to give the necessary protection from frost. I have also seen cane-like begonias growing in open gardens at Tamworth, an inland town subject to quite heavy frosts, where the growers quite happily informed me that, although their begonias lost leaves in winter this did not kill them, and when the frosts nipped off the top half of the plant this merely saved them the trouble of pruning! Severe frosts however will kill begonias and winter protection is essential in those areas.

Hot and Dry?

Begonias need humidity, the ideal being in the order of 60%. They will however tolerate a wide range above and below this and still perform extremely well. I have seen them growing in many inland areas where the grower has provided local humidity, often in the form of dampened sawdust floors in shade

houses or other growing areas. Water features such as ponds and waterfalls will also suffice to keep begonias planted nearby happy. Pot growing in dry areas is certainly possible by standing the pots over water in, for example, pebble filled trays or saucers of water that prevent 'wet feet'. Glass and shade houses can have humidity levels raised in hot conditions by the use of a simple evaporative type cooler where air is passed through water saturated straw.

I have found that begonias will tolerate a wide range of temperatures, being unaffected by frequent winter lows down to 5° C and highs up to 30° C. Outside these extremes it is necessary to provide heating or cooling as appropriate which of course means the provision of indoor growing conditions in some type of conservatory. However, as I have already observed, begonias are the most amazing plants and have the ability to acclimatise quite readily to local conditions. Experimentation is the way to go - try them out and be as astonished as I have been on so many occasions! Start with some of those which I describe in Annex A as they are all hardy and easy to grow, and go on from there.

Plant them close

Gregarious - *adj.* 1. *fond of company.* 2. *living in flocks or communities.* 3. *growing together in clusters.* (Concise Oxford Dictionary): a description wholly applicable to begonias. In their natural state begonias live in small communities and very few of them have shown an ability to spread beyond these confines; so too in cultivation I have found that begonias do best when planted in clusters. This is especially so with the *semperflorens*, those wonderfully useful bedding begonias which come in shades of pink and red and white with green or bronze foliage and are used to such good effect in many public plantings. Plant them singly and the result is poor, but plant a dozen or more in a mass and the results can be spectacular. All the other begonias, except the tuberous types which do well in single pots, also seem to do better when planted in company and I recommend that for garden use three at least of any variety be planted as a group for the very best results. All our plantings in the Royal Botanic Gardens have been done in this manner. It is often also preferable for pot culture to plant two or three of any one species or hybrid together or indeed to mix them with several types in the one container.

Seaside locations

I have seen begonias thriving in an open garden on the Central Coast of New South Wales within two hundred metres of an ocean beach where salt spray does not reach them, however I cannot from experience vouch for their behaviour in seaside locations where salt spray is a problem. I suspect that they

would give a good account of themselves for as I have already emphasised they are a very hardy lot. Proximity to water is of course beneficial as they require high humidity to grow to perfection.

Planting

When planting begonias whose rhizomes creep over the surface of the garden be extremely careful not to cover the whole of the rhizome as the upper surface should not be covered with soil. In fact I have been warned never to cover the rhizome at all but experience has shown that in the garden setting it is often very difficult to keep leaf litter clear of the rhizomes. We have given up trying to keep all the fallen leaves away from the begonias in the Royal Botanic Gardens and it seems that a light covering of leaf litter does no harm. However, it is wise to keep rhizomes uncovered whenever possible. In pot culture of course it is easy to keep the surface of the mix clear of all plant debris and this is extremely important, for dead plant material on pot surfaces will often attract botrytis, a damaging mildew growth which will attack live plants once established.

Cane-like, shrub-like and semperflorens begonias benefit when planted a little lower in the garden soil than they were in the delivery container. Planting like this will encourage root growth from the newly covered section of stem - remember, they are succulents? This applies at all stages of potting-up or potting-on and especially when first pricking out from the seed bed.

Tuberous types on the other hand, especially the non-stops, should be planted the same depth in the garden as they were in their pots - that is, with the tuber just lightly covered.

Fronts and backs

Many of the upright growing begonias have a front and a back. This is very evident with the tuberous types and the upright growing rhizomatous, and the cane-likes to some extent. Make sure the front is faced correctly when planting.

Staking and tying

Begonias are generally fast growing plants and many of the taller growing types (eg the cane-like begonias and some of the shrub-likes) may need staking in the early stages of development. Use a good quality bamboo or similar wooden stake set in firmly behind the plant. Do not use plastic covered wire twist ties as these will cut into the soft flesh of the begonia. It is better to use a soft tying material such as plastic grafting tape or florists' tape (but please not old nylon stockings - they do make the garden look

unsightly), and don't tie it too tightly as the stem will expand rapidly during initial growth. Florists' tape is particularly useful for tying tender young begonias - it stretches and is self adhering. To use it, take a piece of suitable length, stretch slightly and pass around stake and stem then twist the ends together. The tape will stretch as the stem grows and will fall away after several months. Florists' tape is readily available from wholesale and retail haberdashers and your local florist may oblige with a roll which will last a long time. Keep a watch on any staked begonias to make sure that the tie is not cutting into the plant stem. Remove the stake as soon as the natural growth is strong enough to support itself. Be extremely careful if staking *B. luxurians* in particular as it, like many begonias, has a brittle stem which will snap if tied at the base only with the top part free to sway in the wind.

Some of the ground covers (the trailing/scandent group) can be trained very successfully as climbers, and *B. convolvulacea* in particular makes a wonderful trellis cover; however it has no natural means of self-support and must be woven through its support and tied as necessary.

The tuberous begonias always need staking and the blooms, which can be up to 15 cms (6 inches) across or larger, also need support in the form of a specially made wire stake. Be most careful when inserting stakes near the base of the plant as it is quite easy to damage the tuber.



B. luxurians

What Begonia was that?

'*I'll remember that*' is an often used and seldom realised vow, but it is nice to be able to tell enquiring visitors the names of those beautiful plants in your garden. So, write the names down as soon as you plant them and in such a fashion that you can readily connect the name to the plant. This may entail a simple plan of the garden with plant locations clearly shown or some sort of plant labelling system that doesn't spoil the look of the garden. The use of aluminium tags buried next to the plant and loosely wired to it, together with permanent and attractive labels in the garden itself, is the system in use in the Royal Botanic Gardens and is mostly successful. However, it is strange how often those visible labels are moved by unthinking visitors.

Potted plants also need to be named and one good idea is to put a plastic label in the bottom of the pot before potting up, together with a label in the top of the pot. The top label is easily accessible but also easily lost and when this occurs it is a simple matter to refer to the buried label. Larger pots and tubs are more difficult to label permanently but I'm sure that any gardener can solve the problem.

If using plastic labels for plant names, especially in the open garden, it is best to use an ordinary soft lead pencil rather than a felt tipped pen. I have found that the pencil marking will last much longer.

Effect of light and temperature

The amount and intensity of light, and in some cases temperature, to which begonias are subjected has a marked effect on both leaf and flower colour. Black and very dark green foliage will, if exposed to too much light, fade to a lighter shade, often blotchy and unattractive. It is also apparent with some begonias that high temperatures seem to fade leaf colour, particularly in the Rex begonias. Conversely, the higher the light level, within reason, the brighter will be the colour of the flowers irrespective of the temperature (always remembering that many begonias will not tolerate high light levels). This is markedly so in the case of *B. acutifolia*, an ever-blooming shrub-like, which produces white flowers when grown in full shade but whose flowers become pink tinged in stronger light. When grown in full sun this pink tinge is so intense as to give the appearance of almost totally pink flowers. Again it is important to experiment until the ideal location is found for any particular begonia. This effect of light can lead to some confusion in plant recognition as a plant that according to the references has white flowers just cannot be that plant you are growing which has pink flowers! In fact, flower colour is the least significant factor in begonia recognition.

CHAPTER 10

COURTYARDS, BALCONIES AND WINDOW BOXES

Courtyards, balconies and window boxes are to-day's equivalent of the quarter acre block and can give as much pleasure. I find a great emphasis in modern day horticultural practice, as espoused by the many television and magazine experts, on the design of the courtyard as a geometric space containing a low growing box hedge, a mandatory water feature, several large leaved, non-flowering and often nondescript, plants and several terra cotta, or better still expensive ceramic, urns containing some sort of feature plant. All of this quite obviously intended to be 'easy care' gardening, so that the lucky owners can have time to enjoy their inner-city living. 'Low maintenance' seems to be the modern mantra for to-day's gardener! Gone are the joys of 'mucking about with plants', to paraphrase Toad of Toad Hall, no more the joy of getting one's hands dirty by delving into nature's storehouse, no longer the sheer pleasure of buying a plant and putting it in the garden or better still of growing a plant from seed or cutting. Let someone else plan it, and do it, and leave it forever in its sterile state, never to be touched by the owner's hands.

That's not for me - my garden, be it a five hectare estate, a minute courtyard in the inner city, or indeed a balcony of tubs or a simple window box must be a living, breathing entity subject to many changes as the seasons come and go, a cool and restful place filled with colour, a magnet for the myriad birds and insects which inhabit our land, a peaceful place in which one can find a few moments of solitude to refresh the mind and body and soul. Above all, it should be a place created by oneself, reflecting one's character and outlook; indeed one's very attitude to life itself. Claude Monet, the great impressionist painter, commenting upon his famous garden at Giverny, is reported to have said: *'my garden is a slow work, pursued with love, and I don't deny that I'm proud of it'*. A garden, be it ever so small, should indeed evoke such sentiments in all who create one.

No matter the size of your courtyard it can be turned into such an oasis as I envisage, a place filled with greenery and colour, *a work pursued with love*. Begonias have a part to play in such a place, indeed they can be the main attraction if you so desire, but first things first, and first in my opinion is a suitable environment. Is your courtyard too hot in summer? If so, shade is required, and first option is a tree or trees, perhaps deciduous if the area is cold in winter to let in the welcome winter sunshine, or evergreen if your year round climate makes that the ideal. Whatever the location of your courtyard, a tree (or trees) is usually most desirable. Consult your nursery experts as to the best for your requirements. Living in Sydney

I have found the ideal for our courtyard is a beautiful South American species, *Jacaranda mimosifolia*, whose delicate foliage provides just the right degree of shade in the hot summer months and which sheds its leaves so that I, and my many begonias and other plants, can enjoy the winter sun. There are alternatives, of course, and I recall one large garden area in a Queensland semi-tropical region totally covered with shadecloth to provide the required micro-climate for the many begonias grown there. Whilst your tree is growing it is possible to erect a temporary structure such as a shadecloth tent to protect the more delicate of your plantings, an alternative that with the available range of such items is both attractive and useful.

Courtyard gardening should be a mix of permanent plantings and plants in pots and tubs, so that the layout can be changed according to the seasons with those plants in flower having pride of place to show themselves off. Begonias are ideally suited to this type of gardening. Grow several of the cane-like in large, mobile tubs as feature plants and group smaller pots of shrub-like around them. Plant several wide but shallow tubs with bedding begonias at different times of the year so that one at least is always in bloom, thus ensuring a splash of brilliant colour no matter the season (prune them close to the roots when they become too leggy and they will go on and bloom again as perfect plants). Try pots of *B. acutifolia* for all year round flowering, fill hanging baskets with *Bs. listada*, *radicans*, *foliosa* or *convolvulacea* for delightful display plants on wall or trellis, plant pots and baskets with maiden hair and other ferns which will soften the display and add a pleasing contrast. Most of the rhizomatous begonias make great feature plants for the courtyard - try a tub of *B. 'Red Dragon'* for a dramatic effect, or use *B. 'Cleopatra'* for a beautiful year round foliage display. Let the eye wander over the list in Appendix A to select other suitable begonias for your requirements, but above all have lots and lots of begonias, both in the ground and in pots and tubs. You needn't, however, be as one-eyed as I - have a mix of plant types to suit your wishes, but do include begonias amongst them.

Many of the above mentioned begonias will also do extremely well on balconies and verandahs and here we can add tuberous and Elatior to the list. And don't forget those window boxes - ideal places to feature begonias, with the smaller shrub-like such as *B. cubensis* being ideal for this application.

Above all, have a living, breathing, beautiful garden, be it ever so small, in which you can get your hands dirty when you're so inclined!

CHAPTER 11

CULTIVATION

Watering

Many well meaning growers will warn you not to over-water your begonias, and in fact to let the surface of the growing medium dry out between waterings. Good advice indeed when applied to potted indoor plants but what if they are in the garden or the pots are in the outdoors? Torrential rain is the norm in many places and begonias in the garden must be able to accept this degree of over-watering. The answer lies in well drained garden beds where heavy and prolonged rain will drain away quickly and not affect the plants.

Being succulent by nature, begonias are capable of storing moisture and nutrients and this is especially so in the case of the rhizomatous group. They do not require daily watering in most situations, but when you do water them make sure to soak the garden bed, or the pot, rather than just the surface couple of centimetres. Such watering will only be required at weekly or, in very hot weather twice weekly, intervals.

So when do you know if your begonias need watering? Use the finger test - a sensitive finger tip pushed below the surface of the growing medium will quickly tell if the area below the surface is dry, and this is when to water. Once you start to grow begonias you will find that leaf colour fades slightly when they are thirsty and with experience you will have no trouble in knowing when watering is due.

Pots and tubs located out-of-doors need particular attention in your watering program as once the foliage becomes so thick as to shed the rain then you must be careful indeed to ensure that water reaches the potting mix. This is particularly so in rainy weather when it is tempting to think that all the garden plants have been well and truly watered by nature. This may not be so in the case of all your precious outdoor potted plants.

Over-watering is a real possibility with potted plants grown as indoor decoration and the surface of the potting mix should be allowed to dry out between waterings - wait until your finger detects just the slightest moisture some 3 cms below the surface, then take the plant outside and soak it thoroughly. Allow it to drain till no more water comes away then return it to its indoor location, being very sure not to let it stand in a saucer of water! Some indoor plants, including begonias, will benefit from regular exposure to the fresh air of the out-of-doors and watering day is the ideal time to give them an airing. This particularly applies to plants kept in an air-conditioned environment for the indoor air will quickly be dried out and that

essential humidity will no longer be present. In this case it is good practice to put these plants out of doors when you retire.

Soil or Mix Dried Out?

There may be times when garden soil or potting mix becomes so dry as to be difficult to re-wet and in such cases a wetting agent should be used in the water. In fact it is good practice to treat soil or mix with such an agent at the recommended intervals so that the problem does not arise. Do not confuse the term 'wetting agent' with water storage or retention crystals, and do not be tempted to use household detergents instead of the specially formulated products made for horticultural use.

Fertilising

I have already advised in chapter 8 that, when preparing garden beds for begonias, a dressing of controlled release fertiliser be applied. This can be an organic such as pelletised fowl manure or blood and bone, or one of the commercial products such as Osmocote® or Nutricote®. Make sure that you note when you applied this fertiliser and what its 'life' is so that you can re-apply when due. Whatever you use ensure that it contains all the necessary nutrients, ie Nitrogen, Phosphorus and Potassium (the primary nutrients - shown by their chemical symbols of N, P and K); Calcium, Magnesium and Sulphur (the secondary nutrients - Ca, Mg and S); and Boron, Copper, Manganese, Chlorine, Molybdenum and Zinc (the micro-nutrients or trace elements - B, Cu, Mn, Cl, Mo and Zn). The nutrient content of any fertiliser should be indicated on the package, shown as a percentage by volume. The trace elements can be purchased separately, as can all the other nutrients.

Begonias need a regular feeding program and I recommend a fortnightly application during the growing period of a suitable soluble fertiliser. This is particularly important for pot grown plants as modern potting mixes have little ability to store nutrients, whereas the period between fertilising garden grown begonias may be increased to perhaps four weeks. In the early stages of growth and after pruning this should be rich in Nitrogen but when the flowering period approaches you should use a fertiliser with less Nitrogen but increased Potassium. The flowering period of begonias will vary according to the particular type and the local growing conditions. There are winter flowering begonias which of course are still growing and needing fertiliser when other plants have slowed their growth for the cold weather. In our semi-tropical and tropical regions begonias go on growing all year round and the need for feeding does not

cease. Liquid fertiliser should **not** be applied to potted plants when the mix is very dry - this may result in over-fertilising which can lead to plant loss. Water lightly in these circumstances before fertiliser is applied.

Always consult the analysis on the fertiliser package to ensure that you are buying the correct balance of nutrients for your requirements. It is good practice to make a note of when you feed your plants and what you used - again the memory is not infallible - and a calendar hung in the garden shed is a handy note pad.

Foliar Feeding

Plants take in some nutrients through the leaf surfaces and the application of water soluble fertilisers to the leaves is termed *foliar feeding*, although there is much thought amongst many growers that the importance of this is greatly over-rated. When raising begonias from seed I apply water soluble fertiliser in a spray form from when the second leaf appears and continue this until the seedlings have become established as young plants. Whether this is truly foliar feeding or whether the seedlings are feeding from the fertiliser dripping on to the mix surface is a moot point. I feed begonia cuttings, including stem, leaf and rhizome cuttings, in a similar fashion about two weeks after putting them down and continue this until the plant is potted up and well established, but then I am working in ideal conditions where I have bottom heat and know that root formation begins as soon as the callus is formed. Your particular conditions may well be different and your start time of fertilising may well be later than mine.

Some growers believe that the soluble fertilisers used in foliar feeding should be mixed at half, or even quarter, the recommended strength.

Fertiliser Burn

One way in which plants take up nutrients is through their root hairs by a process called *osmosis*, which simply put is the movement of a liquid through a permeable membrane, in this case ground water in which nutrient salts have dissolved moving through the root hairs. The direction of movement is from an area of low dissolved-salt concentration (ie: the garden soil) to one of higher concentration (ie: the plant itself). *Fertiliser burn* is a term you often hear to explain unexpected wilting of a well watered plant. This may in fact be reverse osmosis brought about by the application of an excess amount of fertiliser that makes the garden soil an area of higher concentration than the plant and causes the moisture in the plant to flow outwards into the surrounding growing medium. Quick re-potting may save the plant or you may attempt to leach out the excess fertiliser by applying copious quantities of water. There may of course be other reasons for the sudden wilting of plants such as over-exposure to heat or wind.

Pruning

Most begonias benefit from pruning, whether it be tip pruning during growth or moderate to severe pruning after flowering. However, be warned that some begonias will react badly to pruning and this is only discovered from experience. One such is a shrub-like cultivar, *B. 'Red Cascade'*, developed from *B. fuchsioides*, the fuchsia begonia. This begonia grows into a well shaped shrub some one metre tall and nearly as wide but if pruned heavily it will die back quite markedly. Another shrub-like which does not tolerate light pruning is *B. macrocarpa*, a tall grower which will however produce new growth from the root system if pruned really hard (almost to ground level). However this intolerance to pruning is not common and occurs mainly in the shrub-like group. When first pruning a new begonia it is wise to do so by degrees so that any intolerance to pruning will be noted and lasting damage will not be done. *It is very good practice always to propagate extra plants when you get a new begonia so that you will not lose it during the process of getting used to its ways and needs!*



B. 'Red Cascade'

Removing the growing tip from rhizomatous begonias will cause the growth of lateral rhizomes thereby producing a much thicker and more pleasing plant, especially when they are growing in pots, however do not tip prune until the rhizome has grown to at least 10 cms (4 inches) long. In pot culture such

tip pruning will also prevent the rhizome from growing beyond the confines of the container. Those rhizomatous begonias whose rhizomes grow in an upright fashion should be tip pruned once a year, after flowering, to prevent the plant growing tall and ungainly and to encourage lateral rhizomes to form. All the tips removed in this pruning may of course be used as cuttings to produce new plants.

The rhizomatous begonias also need to have all the old leaves removed in late winter so that the spring flowering will be complemented by undamaged new foliage. It's wise to leave the old leaves on the plant during the cold weather as they will help protect the rhizome.

The bedding begonias or semperflorens will benefit from tip pruning in the early stages of growth to encourage laterals to develop, thus producing a more pleasing appearance. They also need severe pruning when they become too leggy, for tip pruning cannot prevent this in the long term. This entails cutting the plant back to within a few centimetres of the soil level, because all new growth will come from the root system and not from the old growth. This pruning is done when needed, but it's wise to avoid winter pruning when growth has slowed or ceased. Fertilise as soon as pruning is done and new growth will appear within a very short time.

Cane-like begonias should be pruned in late winter after flowering has finished. Up to two thirds of the height may be removed without any ill effects, so when you cut be mindful of the eventual height you want your plant to be. Make the cut just above an outward facing bud. Older cane-likes will also need to have all old brown canes removed completely and these will be found in the centre of the plant. Remember that new canes will develop from the root system on the outside of the plant. Tip pruning of cane-likes is not recommended as this will only in rare cases encourage lateral growth.

The shrub-like group mostly relish tip pruning during early growth and this encourages the formation of laterals and helps in the development of a pleasing shape when adulthood is reached. They will then become pleasing garden (or pot) subjects for many years but will eventually need to be pruned hard to rejuvenate. Do this by cutting to within several centimetres of the roots but be warned, there are some shrub-likes which will not recover from hard pruning and this is where it is essential to have available replacement plants grown from cuttings taken before hard pruning is contemplated. *B. sanguinea* is one such.

Thick stemmed begonias such as *B. egregia* which by the way is an excellent garden subject, will produce new growth from the root system so that pruning, when essential, involves removing the old stems just above the ground level. It is best to prune out just a few stems at a time which will allow new stems to

grow and not spoil the look of the plant. Tips may of course also be pruned and the topmost node should produce a new shoot to continue the upward growth of the stem.

The care of begonias throughout their growing season includes the removal of discoloured or diseased leaves and dead stems and branches and general tidying up to keep them looking their best.

Repotting

Begonias grown in pots, tubs, baskets or window boxes need to be repotted regularly and it is suggested that this is best done every second year. Generally the best time to repot is after flowering, or in the spring, so that new growth will quickly establish the plant in its new container. The reasons for repotting are twofold - on the one hand the modern potting mixes 'wear out' rather quickly with the mulch content breaking down to such an extent that it no longer does its job, and on the other hand the begonia itself may have outgrown the container so that it needs more room for its roots and better support for the plant itself. This is especially so in the case of cane-like begonias which need enough space to ensure that new growth from the root system has room to develop.

Turn the begonia out of its old container and remove as much of the mix as possible without damaging the root system. Begonias in small pots will need to go into one size larger at least to accommodate the roots but those in large pots or tubs may be repotted into the same container by trimming the root system so as to fit with room to spare. The plant needs to be firmed into its new mix but not heavily tamped down, and then watered in. Top up the mix if watering causes it to subside.

The rhizomatous types need special attention when repotted. If they have grown well beyond the edges of their old pots the growing tips should be removed and used as cuttings to produce a new pot of begonias. Quite often the remainder of the plant after this tip pruning should be discarded if the rhizomes are very old and worn out at the original start point, for rhizomes grow at the tip and die back at the rear. Use several of these tip cuttings to each new pot and plant them around the outer edge, facing inwards, so that they will grow across the pot towards the opposite side. When they reach that point their tips should be removed to encourage lateral growth. A well filled pot of begonias will result.

CHAPTER 12

PESTS AND DISEASES.

Begonias are remarkably free from disease and especially so when grown as garden plants where the free circulation of air usually prevents attack by their worst enemy, mildew. Insect pests on the other hand are as much a problem with begonias as with other garden plants and you can expect visits from aphids, snails, slugs and other assorted garden nasties. Possums too, in Australia at least, seem to take a liking to some of the begonias and will nibble at many of them till they find the one they really like. Mites will occasionally attack begonias, especially those grown in glass or shade houses. Thrips may at times attack your begonias, their onset being recognised by a brown residue appearing on the lower parts of the leaf veins.

The very best way of dealing with these problems is to prevent them occurring and to this end it is essential that indoor grown begonias have a free flow of air around the growing benches. This will do much to keep powdery mildew and botrytis away.

Good growing practices are the key to prevention of disease and insect attack, for a healthy and vigorously growing plant is able to rapidly generate its natural defences against predators, be they insects or disease. Keep to your fertilising program, water as recommended and prune correctly.

Powdery Mildew

You may occasionally hear reference to 'the mildew season'. This is not a specific season such as spring or winter but may occur at any time when the conditions are right and certainly more than once each year. When humidity is high and the days are warm to hot followed by cooler evenings then mildew is most likely to strike your plants. The mildew spores are floating free in the air at all times but will only develop on leaf surfaces that are slightly damp, and the cooler evenings will cause the humidity to condense as a very thin layer of moisture, virtually undetectable, on susceptible leaf surfaces. Powdery mildew will germinate on this layer of moisture in about 14 hours so that you are greeted in the morning with a sprinkling of white spots on the affected leaves.

This mildew will, if not treated, eventually do great damage to the plant, in the worst case causing the leaves to drop and in some cases killing the plant, and at best making the plant look most unsightly. Only a few of the begonia family are prone to mildew attack and chief among these are the bedding

begonias (semperflorens), the Rex begonias, some of the rhizomatous group and some of the cane-likes, especially on new-grown stems. Prevention is the best treatment and free circulation of air when growing indoors is essential. There are some very effective semi-systemic preventative fungicide sprays on the market, and these should be applied as soon as the 'mildew season' arrives and before the first sign of mildew attack. Organic methods of combating mildew include dusting with sulphur powder or spraying with wettable sulphur. I have it on good authority that another effective organic treatment is to spray with full cream milk, diluted 9 parts water to 1 part milk, although I have not personally tried this. There is another remedy I have heard of using bi-carbonate of soda diluted at the rate of a teaspoon to a litre of water. These organic treatments may leave a powdery residue on the foliage. Once mildew has taken hold it cannot be removed from leaf surfaces and affected foliage needs to be pruned out to restore the plant's good looks.

Botrytis

This is a greyish mildew which first attacks leaf litter and other dead plant matter, and if not dealt with will spread to living plants. It occurs mostly in potted plants kept indoors or in shade or glass houses. Again prevention is the best cure and to this end it is important to keep the surface of the soil or potting mix clear of all debris and to ensure free circulation of fresh air through the growing area. It can be treated with a suitable fungicide or by the use of organics such as sulphur powder or spray as for powdery mildew.

Mites and Thrips

Mites and thrips sometimes attack begonias, especially when they are grown in confined conditions such as shade or glass houses. The indications are leaves curled and crisp and a brownish effect along the main veins on the back of the leaf, whilst the tiny mites can be seen with a good magnifying glass on the backs of the leaves. Two treatments are available - either discard the plants entirely or spray with a suitable chemical which your nursery can recommend. Discarding and destroying the plants, if practicable, is the best way to go and they should be enclosed in a plastic bag and disposed of through the garbage system. Do not put them on the mulch heap.

Other Insect Pests

Begonias, along with most other garden plants, may at times be attacked by aphids and other sucking or chewing insects. The presence of aphids is readily seen because of small black ants which will

invade the plant. They are feeding on an exudation from the aphids and are an excellent indicator that this problem is present. Treatment is to spray with a suitable pesticide, and those based on the organic insecticide pyrethrum are both effective and user friendly. Other sprays are available and many gardeners have their own recipes such as soapy water sprays and other family remedies. Wherever possible apply these treatments at the time of day when bees are not active but avoid the evenings so that leaves are not left wet overnight.

Begonias are also attractive to the usual chewing insects which delight in making small holes in all the leaves rather than just eating one and leaving the rest for us to enjoy! Again, pyrethrum based sprays are effective so long as you catch the insects at work; there are other chemical sprays available with longer lasting effects and you may eventually be forced to seek these alternatives although I really don't like using them.

Nematodes

Nematodes are parasitic worms and are the most numerous multi-cellular animals on earth. A handful of garden soil will contain thousands, mostly beneficial. However some few are harmful to plants and will inhabit and feed upon both roots and leaves. Nematode feeding in plants will reduce the flow of water and nutrients into the plant, increasing its susceptibility to other stress factors such as over-watering and insufficient or incorrect nutrition. If you suspect that nematodes are attacking your plants examine the roots - nematode infestation will be indicated by cysts or knots on the roots. Treatment is available in the form of a chemical solution with which the area surrounding the plant is saturated. Ask your nursery to recommend a suitable product. The only other solution, and perhaps the best one, is to destroy the infected plant and avoid planting in that spot for several months. Take cuttings before destroying the plant if it is not too late.

Prevention

Again I stress that prevention is the best way to deal with likely pests or diseases. Keep your plants growing strongly by proper fertilising, watering and pruning and ensure a flow of fresh air round indoor and glass house grown pots.

CHAPTER 13

PROBLEM SOLVING

Plants are in many ways like people and one of these is reaction to stress. Wilting, leaf drop, burnt leaves, leggy growth or not growing at all are usually responses to some sort of stress and you, the grower, are in the best position to assess just what this is. Once the cause is known then remedial action is often a simple matter. A poor garden soil or potting mix can be a source of stress which is often overlooked, so if your begonias are not performing well consider in the first place whether you have provided a good growing medium for your plants. If you have done so then perhaps you may find the solution to your problem in the following:

Wilting

This is the most common reaction to stress and can be triggered by insufficient water, over-fertilising, excessive heat or cold, windy conditions, collar rot or the presence of nematodes or other pests.

Generally, wilting is a cry by the plant for water and is often preceded in begonias by a paling of foliage colour. Once you become well acquainted with your begonias you will become aware of this indicator. When you water ensure that the garden soil or potting mix is thoroughly soaked, and then wait until the soil or mix has a dry surface before watering again.

Over-fertilising is dealt with in Chapter 11 under the side heading 'Fertiliser Burn'.

On excessively hot days begonias may wilt to some degree, especially if they are subjected to direct sunlight. Watering is the obvious remedy and this, together with the arrival of a cooler evening, will generally fix the problem. It may be wise to consider relocating any affected plants to a less sunny position.

Nematodes do not cause immediate wilting but will slowly decrease the plant's growing vigour until wilting and subsequent death occur. This problem is dealt with in more detail in Chapter 12.

Leaf Drop

Leaf drop is another reaction by plants when subjected to undue stress. The onset of cold weather will often cause leaf drop. Cane-like are especially subject to this as are some of the shrub-like and rhizomatous begonias. Do not be overly concerned when this occurs as new leaves will quickly appear with the return of warmer weather. Some begonias are winter dormant and new growers are often concerned at leaf drop in these if they are not aware that it will inevitably occur. *B. crassicaulis* is one, as are all the

tuberous begonias. Many rhizomatous begonias grown in cold climates will also become winter dormant and shed their leaves. This is particularly true of the Rex begonias.

Collar Rot

Collar rot is a rotting of the stem at ground level and is rare in mature begonias which are grown in good conditions, but can be brought about if garden beds are over-enthusiastically dressed with mulch to such a state that wet plant material is heaped around the stems.

Damping off

Do not confuse collar rot in mature plants with '*damping off*' of seedlings in which the tiny new plants suddenly collapse; this is most likely a fungal problem and can be prevented by the use of a suitable fungicide. The best prevention however is in the observance of strict hygiene when sowing seeds - sterilise the seed raising mix and keep the seed trays or pots covered with glass or plastic in the early stages of germination and growth.

Burnt Leaf Margins

If the leaf margins of your begonias go brown, appearing to be burnt, and/or the leaf itself feels somewhat crisp, then the problem is most likely caused by lack of humidity over a period and is often the case with indoor grown begonias, especially where rooms are air conditioned or heated (both of which dry out the interior air). Begonias need humidity of ideally 60% but can survive on lower levels for quite a long time. However, when humidity drops to very low levels this problem is most likely to occur. Solution is to boost the humidity in the vicinity of the plant. Begonias grown indoors can be stood above (not in) water filled containers which may provide sufficient local humidity to remedy the problem. Similarly shade house or glass house humidity can be boosted by covering the floor with sawdust or similar material and keeping it damp. Growing ferns, especially maiden hairs, under the growing benches is another way to improve local humidity. In extremely dry conditions a misting system in the growing house can be of great benefit in raising humidity levels. I have mentioned evaporative coolers in Chapter 5 and these are most useful in hot weather not only to cool the growing house but also to boost the humidity.

Unsatisfactory Growth

Stress can cause the growth pattern of begonias to be unsatisfactory, most often causing the plant to grow 'leggy'. This is usually a result of the plant reaching for the light and is most noticeable in the semperflorens, or bedding, begonias. Solution is to provide more light for the plant, and for those growing in the garden may entail relocation. The bedding begonias in particular, as well as the cane-like and the shrub-like, will, after a time, grow leggy naturally despite the light levels and in this case pruning is the solution (see Chapter 11).

Unsatisfactory growth can often be caused by growing the plant in the wrong place so that it gets too much or too little light, or is subject to strong winds which it can't tolerate. Try it in another place which in many cases may be a matter of a few metres away. Or it may be that you are not feeding your begonias correctly - it is important to establish a feeding program and to stick to it. Remember to re-apply controlled release fertiliser when the time period for the one you have used has expired - another good reason for having a calendar in the garden shed and noting on it when you fertilise and what you use.



B. 'Erythrophylla'

PART 4

PROPAGATION

CHAPTER 14

AN INTRODUCTION TO PROPAGATION

General

It is a wise gardener who propagates replacement plants as soon as possible from those newly acquired so that losses in the early stages of settling them into their new home can be readily replaced. Besides this, one of the greatest pleasures in life is to give a friend a precious plant that you have brought to life from seed or cutting. This Part deals with propagation of all types of begonias.

Begonias are regarded as succulent plants although some, such as the cane-likes, have seemingly woody adult growth. This succulent nature makes for easy vegetative propagation (ie from cuttings) which ensures that the resulting plants, both species and cultivars, will be true to type; but there is one exception - leaf cuttings from *B.* 'Cathedral Window' will produce a miniature of the parent called *B.* 'Fiji Islands'! Species begonias propagate true to type from seed, whereas cultivars cannot be relied upon to do so.

As a general rule, rhizomatous begonias, including the rexes, propagate from either leaf cuttings or rhizome sections, tuberous begonias from basal and lateral shoots and leaf cuttings, whilst all the other begonias need to be propagated from tip or stem cuttings. There are exceptions to this where some shrub-like and cane-like begonias will propagate from leaf cuttings whilst the bedding begonias (*semperflorens*) do best from basal cuttings. Many of the shrub-like begonias and some others may also be propagated by simple layering.

Cuttings are best rooted in a suitable medium but some growers have success standing them in water until roots form. I prefer using a cutting medium as the roots which develop in water are very delicate and the cutting may die unless handled very carefully.

Cleanliness is essential when working with living plant material. Ensure, where possible, that all cutting medium is new and sterile. Sterility may be achieved to an acceptable degree by 'cooking' small quantities in a micro-wave oven or by pouring boiling water through it. All tools used should be newly

sharpened and sterilised by dipping in a disinfectant solution, not forgetting to wash your hands and disinfect the work bench.

Cuttings may be treated with a rooting hormone if you wish – use according to manufacturers' instructions. I find that most begonia cuttings do not need this treatment, but it is a form of added insurance and should be used if cuttings do not perform well.

Always handle cuttings carefully, insert into the cutting mix as soon as possible after taking from parent plant and always dibble the hole to accept them with a suitable clean stick or other implement.

Cutting media

An open textured medium is necessary for best results and there are many 'recipes' used in the horticultural world. One such is Perlite with the addition of 10% or more sharp river sand, another often used mixture consists of 50% each peat moss and sharp river sand, whilst some growers have success with Vermiculite, alone or with added sand, or just plain Perlite. The list goes on with growers the world over having their particular favourite. We use a 50/50 mix of Copra Peat and Perlite in all work at the Sydney RBG and enjoy very good results. The essential characteristic is an open, free-draining texture which allows for the rapid development of a strong root system.

When to take cuttings

Unless you have the facilities to put cuttings on bottom heat, only take them in warm to hot weather when optimum temperatures (20° to 25°C) exist. However, adequate accessible bottom heat can be found in most homes - the top of a refrigerator for instance is always warm to hot as is the top of any floor level storage water heater. Simple heating devices are also available and do the job admirably. With bottom heat, cuttings will strike indoors at most times. Cuttings put down in very hot weather will be under extreme stress and may not perform satisfactorily.

Tip cuttings are generally taken after flowering, in late spring through to autumn, and in winter if bottom heat is available, making sure that the plant material has hardened off. Avoid taking tip cuttings early in the growing cycle as these will be too soft and will more than likely rot in the cutting medium. Cuttings may be taken from the many ever-flowering varieties at any time, again providing the cutting material is not soft and by selecting tips which preferably have no flower buds. A growing tip must be present on all tip cuttings.

Leaves to be used as cuttings from rhizomatous begonias may be taken at any time, making sure that only healthy adult leaves are used.

Cuttings from tuberous begonias are taken at various stages of growth:

- a. basal cuttings (surplus shoots) are taken from the tuber early in the growing cycle,
- b. lateral shoots are taken when the plant is mature, and
- c. leaves may be taken as soon as suitable ones are mature.



B. domingensis propagated by stem tip cuttings

CHAPTER 15

VEGETATIVE PROPAGATION

Leaf cuttings.

Leaf cuttings may be used to propagate all the rhizomatous begonias, including the Rexes, whilst a few of the other types (ie the cane-likes) may propagate from leaves, but this is not certain and is not recommended as a general rule. Use as follows:

a. small leaves up to about 5 cms (2 inches) in length:

i) start with a healthy, undamaged adult leaf and shorten the petiole to about

2.5 cms (1 inch). (fig 1)

ii) dibble a hole in a suitable container of cutting medium and insert the leaf at a 45° angle so that the leaf blade lies on the surface of the mix. Firm in and water

sparingly. (fig 2)

iii) a callus will form over the cut end of the petiole which will then produce a root system followed by one or more plantlets. This process may take anywhere from 8 to 12 weeks. (fig 3)

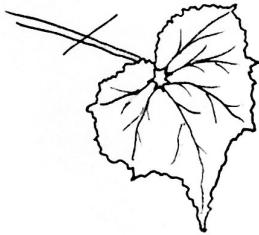


Figure 1

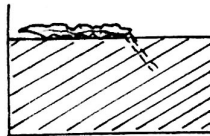


Figure 2

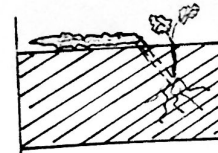


Figure 3

b. large leaves 5 cms (2 inches) or more in width and length can be used in two ways:

i) by cutting through the main veins in several places on the underside of the leaf and then lying it back down on the surface of the cutting medium, ensuring that the leaf remains in contact with it. This may entail the use of suitable weights such as small pebbles to keep the leaf flat. Root systems and new plantlets will eventually form from some of the cuts.

ii) by cutting the leaf into wedges, a method which I prefer, as follows:

- (1) start off with a healthy, undamaged mature leaf.
- (2) lie it face down on a suitable cutting surface and remove the petiole, cutting close to the leaf blade with a very sharp, sterilised blade. (fig 4)
- (3) cut from the outer edge of the leaf through the umbo (where the petiole joins the leaf) between each of the main veins. (fig 5)
- (4) take each leaf wedge thus formed and trim it to a suitable length - 4 cms (1.5 inches) is ample. (fig 6)
- (5) dibble a hole in the cutting medium and insert the leaf wedge for one third of its length at a 45° angle. Firm in and water. (fig7)
- (6) roots and plantlets will grow from the cut end of the main veins just as happens when using complete leaves.

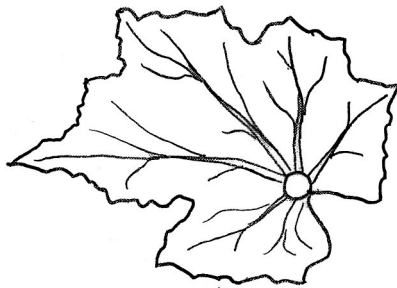


Figure 4

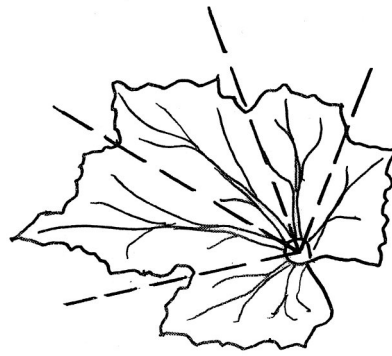


Figure 5

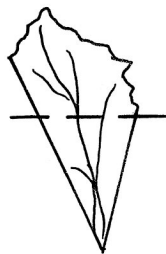


Figure 6

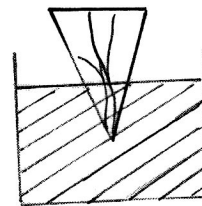


Figure 7

Rhizome cuttings

a. Those whose rhizomes creep across the surface of the soil may also be propagated using sections of the rhizome. Simply cut off the growing tip to a length of about 5 cms (2 inches), leave at least one leaf on the cutting if possible and half-bury it in cutting medium, root side down. If the leaf is very tall you may need to stake it to hold the cutting upright. Several more cuttings may be taken from the rhizome behind the tip cutting and treated in the same way: (figs 8 and 9))

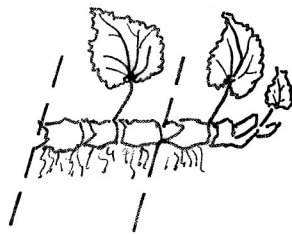


Figure 8

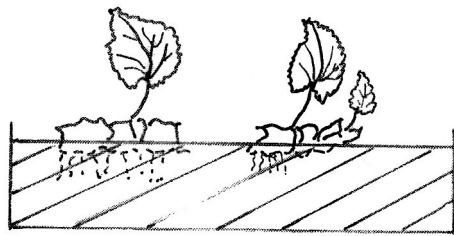


Figure 9

b. Those whose rhizomes have an upright growth habit, referred to as 'rhizome erect', may be propagated by simply cutting a length from the growing tip (say 10 cms or 4 inches) and inserting its cut end down into cutting medium. New roots will develop in a short space of time to produce a new plant.

Tip and Stem Cuttings

Tip or stem cuttings are used to propagate all begonias other than rhizomatous and tuberous types. When selecting tip cuttings make sure that at least one, and preferably two, nodes will be available to be inserted below the surface of the mix. Use only a very sharp blade or secateurs, which should be thoroughly cleaned and disinfected, so that a smooth cut is achieved. Reduce the amount of foliage by removing all but one or two of the topmost leaves, depending on size and state of development, then trim the remaining foliage to leave a small amount of leaf surface. Dibble a hole in the cutting mix to receive the cutting, insert it so that at least one node is below the surface, firm in with gentle finger pressure and water when all cuttings have been put down. Cuttings taken from further down the stem (stem cuttings) are

handled in the same way - it is important to ensure that these cuttings have a viable growth bud at the topmost node. (figs 10 and 11)

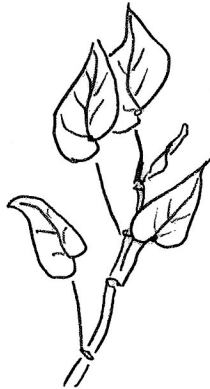


Figure 10

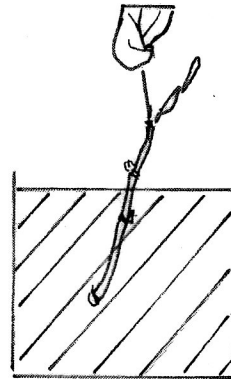


Figure 11

Tuberous Begonias

There are three ways in which tuberous begonias may be vegetatively propagated: from basal cuttings, lateral shoots or leaf cuttings.

a. Basal cuttings. When the tubers come out of dormancy they commence the new season's growing cycle by producing shoots from the surface of the tuber. Older tubers will produce more than one shoot and these surplus shoots may be taken as cuttings. When the shoot is sufficiently developed cut it from the tuber using a very sharp, sterile blade (a scalpel is ideal) so that a portion of the tuber itself remains on the base of the shoot. This portion will contain an 'eye' which is essential in forming the new tuber. Treat then as any other tip cutting as described previously.

b. lateral shoots. As the tuberous begonia develops, side shoots will grow from nodes on the main stem. These shoots may be used to propagate new plants. Cut the shoot from the stem ensuring that the 'eye' located against the stem is included by making two cuts, one downward against the stem and the second horizontally under the shoot. A wedge shaped piece of the main stem will now be attached to the base of the cutting. Again, treat this as you would any other tip cutting, being careful not to bury it too deeply. (fig 12)

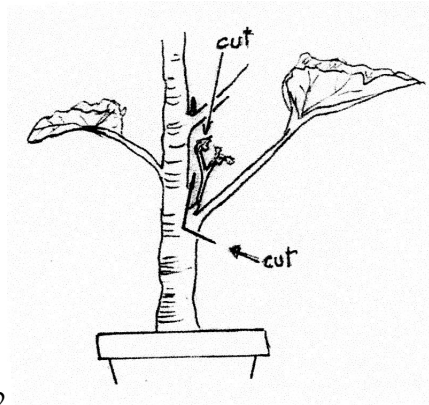


Figure 12

Elatior, Cheimanthus and Hiemalis Begonoias

These may all be propagated using tip cuttings taken from a healthy and strong growing parent plant. Ensure that there are at least three nodes on the cutting and treat as discussed above for tip cuttings.

Care during the rooting process

Begonia cuttings need to be kept in an atmosphere of high humidity during the initial rooting process. This reduces the volume of transpiration needed for the cutting to remain alive and thus keeps it as stress free as possible. It is also desirable to keep the leaf surfaces of cuttings as cool as possible and professional growers do this by putting cuttings in an enclosed space (ie a propagator) equipped with a misting system and a source of bottom heat. As has already been mentioned, the cutting medium also needs to be kept optimally at between 20° to 22°C (68° to 72°F), however temperatures outside this range are often tolerated by begonia cuttings. The home grower will have good success by enclosing the cuttings in a plastic 'tent' (ie a clear plastic bag over a simple wire frame) and keeping the containers in a suitable location out of direct sunlight.

The cutting medium should not be allowed to dry out nor should it become so wet as to encourage rotting of the cuttings. Daily attention is called for during these first critical two weeks.

After the first two weeks fertilising of both leaf and tip cuttings can commence. Use one of the many good complete water solubles (analysis in the order of 20:4:14) which are readily available and apply weekly as a foliar feed using a misting spray. This will encourage and speed up the rooting process. Some growers advise that this initial fertiliser be mixed at a half or even a quarter of the recommended rate but I have never subscribed to this theory. Mix according to the manufacturer's instructions and apply as common sense dictates.

Potting up

New plants should be potted into a normal potting mix that contains a ration of controlled release fertiliser. Always pot into small containers and increase their size as the plant grows. Resist the temptation to pot up initially to very large containers as 'over-potting' may result in the loss of the plant.

Leaf cuttings are ready to pot up when the new plants have reached a suitable size. The stress of potting up very small plants may endanger them so it is best to wait until the new plant is reasonably large and robust. Experience will tell you when the time is right.

Tip cuttings are ready for potting up when a good root system has developed and new foliage has grown to a reasonable size. The time taken may be anything from six to ten weeks or maybe more if conditions are not ideal. It is perfectly OK to inspect the roots by removing a cutting from the mix and returning it if it is not yet ready.

If the new plants are destined for garden planting it is recommended that they be hardened off in a shade house for a reasonable period and until they are of a good size. This period will usually be a complete winter season, especially if they have been potted on in autumn. Avoid whenever possible planting out in the open garden in autumn or winter - spring or early summer is the ideal time.



B. scharffiana in flower, a shrub-like type

CHAPTER 16

PROPAGATION FROM SEED

First find the seed – possibly the most difficult part of the operation! Some commercial seed merchants may carry a limited stock, especially of the bedding begonias (*semperflorens*) and the tuberous varieties, the American Begonia Society and the Association of Australian Begonia Societies each have a seed fund accessible by Begonia Society members, and of course there are usually friends who may grow begonias that have produced seed. If you are already growing begonias then you can quite easily produce your own. Pollination of the female flowers is of necessity the start point here and usually requires your help. Begonias do not produce nectar and the likely pollinators must be either foraging for pollen or delving, mistakenly, for nectar, and it is interesting to note that the anthers and stamens (the yellow central parts of the flowers) look very similar on both male and female flowers so that pollen seeking pollinators will be tempted to visit each sex and so spread the pollen where it is required; the other way is for the wind to disperse the pollen from the male flowers to the females. The surest method is to do it yourself and this has the added safeguard that you can control which pollen goes to which flowers. By using pollen from two plants of the same species (or just one plant if that is all that's available) you will of course produce seeds that come true to type, whereas by using parents of different species or cultivars you will be producing seed which will produce a variety of plants from the one seed batch. In the latter case you are in fact producing new begonias, termed cultivars, and what a fascinating experience this can be. Simply select a number of male flowers and gently rub the male anthers across the stigmas of the female flowers which you want to pollinate. If pollen is present on the anthers it is often seen as a fine golden dust cloud when you shake the flower. Repeat this process daily for some days to ensure it will work. If pollination has been successful the female flowers will close and the ovaries behind them will commence to swell. Leave these ovaries (the fruit, or you may prefer to call them seed pods) on the plant until they are brown and the stem attaching them is very thin and dry. Pick when ripe and place straightaway in a small paper bag as the seed will commence to separate as soon as agitated. Make a note of begonia name, the male and female parents and the date.

If you are pollinating plants which are growing as part of a group then there is always the risk that pollen from the 'wrong' male flower will access the females you are working with. To prevent this is no easy matter in the garden, but if pot grown the female can be isolated during the process. I have never

determined what pollinators (apart from the occasional bee) are at work in the Botanic Garden begonia beds and I have found few opinions written as to what those pollinators may be, especially bearing in mind that we are growing these plants so far away from their natural homelands and it is doubtful if their natural pollinators have followed them. I am inclined to the belief that our begonias are pollinated by agitation of the male flowers by wind or bird or animal, which may account for species seed from our gardens usually being true to type. We also find that hand pollination in garden grown begonias is most often successful and true to type.

The seed is extremely fine and is best used when freshly gathered. It may be stored for later use by sealing in a suitable container (aluminium foil is recommended) and kept in the lower part of the kitchen refrigerator – not the freezer.

It should be sown into a sterile, open medium similar to your normal cutting or potting mixes. Fill a suitable container with mix, firm it down and water thoroughly, preferably by standing the container in water (rain water if available), and allowing the mix to soak it up. Allow to drain for at least one hour and preferably overnight. Scatter the seed evenly over the surface - you may find it convenient to hold the seed in a folded sheet of paper and gently tap it to allow the seed to escape slowly. Do not be tempted to plant a lot of seed in a small container – it will be extremely difficult to separate the plants at a later stage. Do not cover the seed with additional mix as it requires light in addition to moisture and heat in order to germinate. Cover the container with a sheet of glass or plastic sheeting and place in a warm light place but out of direct sunlight. Ideally the container should be placed on bottom heat of about 22-24°C but this is not necessary if the air temperature is at this or a higher mark. During the germination period - usually from 2 to 4 weeks but longer in some cases - the surface of the mix must be kept damp, not wet - it should not be allowed to dry out. Prevent this by regular inspections and then water if necessary from the bottom by standing the container in a water bath. However, if the seed bed has been correctly prepared and covered after the seed is sown it should contain sufficient moisture to keep it damp during the whole of the germination period.

Initial germination will reveal a faint green bloom on the surface of the mix. Growth in the initial stages is usually slow, but don't be discouraged, the tiny seedlings will develop in due course. The glass or plastic cover should be kept in place for the first two weeks after germination and then removed in stages so that the seedlings are gradually 'hardened off'.

To hasten the growth process fertilising may commence when the small plants are about 7 days old, at first applying water soluble fertiliser from a hand held mister commencing with small applications only. When the first two true leaves are evident the plantlets should be pricked out into a container of your

regular potting mix which of course contains controlled release fertiliser, planting them about 2.5cms (one inch) apart. My experience is that small begonia seedlings planted out in separate pots, or too far apart in one pot, will not do well and will often die. Continue to use water soluble fertiliser regularly and growth will be quite rapid. The seedlings may be put into individual small pots when they have attained a reasonable size and thereafter 'potted on' into larger pots as they develop.

The one threat to small seedlings is 'damping off', which is a fungal disease causing the whole plant to rot away. This may be averted by the application of a suitable fungicide once the cover has been removed from the germination tray. Strict attention to hygiene should prevent this problem. I stress again the need for as near sterile conditions as possible throughout the process of raising plants from seed.



B. acetosa, a rhizomatous species that can be grown from seed

PART 5

APPENDICES

APPENDIX A to: *'Down to Earth - With Begonias'*

RECOMMENDED BEGONIAS FOR LANDSCAPE PLANTING.

The following list is intended as a guide to some of the better known begonias which I know will do well as landscape plants. There are hundreds more which diligent searching will locate for you. I have listed these begonias in the groups referred to in Chapter 6. To find a particular begonia consult the index of begonias.

Note: many of the begonias listed are shown in the photographs included with this book.

Cane-like Begonias

B. aconitifolia, a species cane-like native to Brazil which has beautiful silver splotched palmate (deeply cleft) mid green leaves, making it a worthwhile feature plant for all seasons. The white flowers are pink tinged when the plant is grown in a position that receives at least two hours sunshine daily but it will grow in open shade. The long flowering period commences in late summer/early autumn although the flowers are not produced in the prolific quantities we normally associate with the cane-likes. Will grow to 1.5 metres (5 feet) or more. A most interesting begonia as it appears in the background of many of to-day's cultivars. Must be pruned annually to achieve and maintain a full and pleasing growth habit.

B. albo-picta. A delightful low growing cane-like Brazilian species which is always pleasing to the eye by virtue of its silver spotted foliage, and its slightly green tinged white flowers make it a worthwhile addition to any garden. Flowers appear from early summer and persist for many months and into winter in ideal locations. Grows to a metre in good conditions and with judicious pruning during the growing period will form a well shaped, thickly foliaged plant. Needs a well lit position with a few hours of morning sun for

best results. Plant several in a clump for a delightful feature especially in that sunny corner of the courtyard. Make sure when planting that the front of the plant faces correctly. Highly recommended.



B. albo-picta

B. albo-picta var *rosea*. A version of *B. albo-picta* but having mid-pink flowers. There is some dispute as to whether this is a species or a natural hybrid.



B. albo-picta var. *rosea*

B. angularis. A Brazilian cane-like species which deserves a place in any garden scheme, this begonia has beautiful and distinctive foliage and a growth habit in which the stems are angled at each node, hence the name. It grows to a medium height in a position which receives some two to three hours of morning sun and produces panicles of pure white flowers in autumn/winter, holding them well into spring, and beyond if conditions are right. Prune to shape after flowering, and don't be afraid to cut hard when necessary. Early growth habit can be somewhat sprawling and may need staking at this stage. Other begonias similar to this that grow somewhat lower are *Bs. compta* and *angulata*.

B. coccinea. A Brazilian species cane-like begonia which flowers profusely for most of the year, producing masses of reddish orange blossom. Tends to grow somewhat straggly but with hard pruning and shaping will eventually grow into a tall (to 2.5 metres or 8 feet) and well shaped plant. Produces many new canes from the root system on the outside of the plant so needs plenty of growing room. A recommended addition to any garden with enough room to accommodate it. Plant several in a clump if space allows for a truly rewarding landscape feature. There is also a pink flowered variety, *B. 'Rose'*, which is a seedling from *B. coccinea*; both are highly recommended.

B. dichroa. This is low growing Brazilian species which produces orange flowers throughout the year. Excellent garden plant for a lightly shaded spot. Benefits from pruning in late winter. Photo below.



B. 'Irene Nuss'. One of the very best of the many cane-like cultivars, this begonia can be relied upon to provide a spectacular feature plant under all conditions. Flowers are deep pink and produced in very large panicles. The dark green, almost bronze when grown in full shade, foliage is particularly beautiful making this a display plant for all seasons. Additionally, the leaves are excellent for use in floral arrangements. Propagates easily from tip cuttings which should be taken in late winter when the tips have hardened off and the plant is due for its annual pruning. For a spectacular garden display plant at least three together, and the really adventurous gardener might like to try this as a hedging plant with the great advantage of being pruned just once a year! Also does well in a large pot.

B. 'Pink Rubra'. If you want a tall growing background plant this is for you. A mass of pink flowers is produced on a 3 metre (10 foot) tall plant from late spring through into winter. Responds to heavy pruning in late winter if desired.



B. 'Pink Rubra'

B. 'Rose' (see *B. coccinea*)



B. 'Rose'

B. 'Sophie Cecile'. This beautiful begonia is worth growing just for its dark green, silver splashed foliage, which incidentally is ideal for flower arrangements, and the large panicles of deep pink flowers make it even more valuable as a garden plant. Grows to two metres (6 feet) and likes annual pruning late winter which encourages new growth and a pleasing shape. Needs several hours sunshine each day but not hot afternoon sun. May be shy to flower if conditions are not right.

B. undulata, a tall grower with masses of small white flowers. Foliage is plain mid green. Prune to keep the shape and size you want. Grows well in filtered sunlight or light shade. At its best when several are planted close together.



B. undulata

See also *Bs. luxurians* and *egregia*, which although described as shrub-like, strongly resemble the cane-like.

Shrub-like Begonias

B. acutifolia, a beautiful species shrub-like from Jamaica which will make a wonderful feature plant for any garden, thriving in full sun or part shade, but also doing very nicely in a fully shaded location, but I would suggest that you try for at least an hour of sunshine each day. This begonia will flower all year in either hot or temperate climates and the flower colour varies between pure white when grown in full shade to deeply tinged with pink in full sun. *B. acutifolia* will grow into a well shaped shrub some 2 metres across and at least a metre tall. Tip pruning in the early stages of growth will encourage the formation of a pleasing, rounded habit and pruning at any time will keep it to the shape and size you prefer. In the open garden it will spread gradually but will not become invasive. Propagate by tip cuttings, but make sure that these are not soft as they will quickly rot - wait till tips harden off in autumn.



B. acutifolia

B. arborescens var *oxyphylla*. A sprawling shrub if allowed to grow without restraint but responds to heavy pruning as witness our use of this begonia for a hedge in the plantings in the Sydney Royal Botanic Gardens. White flowers for a long period in spring/summer make it a valuable garden plant for many applications. Grows to about one metre (three feet) in bright shade.



B. arborescens var. *oxyphylla* hedged!

B. 'Concord' (was known as *B. 'Richmondensis Purpurea'*). A beautiful small shrub-like begonia which has bronze foliage. It loves a high light level and will be quite happy where it receives an hour or so of direct sun. It needs regular tip pruning to retain a good bushy habit. For best results this one should be mass planted – at least six plants in the one clump.



B. 'Concord'

B. cubensis. As the name indicates, this beautiful small growing shrub-like begonia is native to Cuba. Best used as a bedding plant with several planted in the one clump or can make a most attractive border plant or maybe try it in a window box where it will give a really effective display. Flowers pink, spring through summer into autumn. Grow in a well lit location which receives several hours of sunshine, but avoid that very hot afternoon sun. Needs annual pruning to avoid growing lanky.



B.cubensis

B. 'Decker's Select', a red flowering shrub-like which deserves a place in any begonia collection. Has small mid-green leaves and is a compact, low growing plant which responds to light tip pruning, especially early in the growing period. Flowers are produced for most of the year. Likes a well lit position which receives a few hours of morning sun. Is also a very good subject for a hanging basket.

B. domingensis, which as the name implies is a species from Santo Domingo. This low to medium growing shrub-like makes a superb garden subject with its year round red flowers always delighting the eye. Tolerates several hours of sunlight each day but will also do well in bright shade. Does not tolerate heavy pruning, but tip pruning in early stages of growth will help shape it into a pleasingly bushy plant.

B. 'Dragon Wings' or 'Amigo'. This red or pink flowering begonia is suitable for massed display work either in the open garden or in tubs. Grows to a medium height (up to 80 cms or 30 inches) and will give a reasonably long flower display in spring/summer. However, being related to the semperflorens group this plant is susceptible to powdery mildew and recommended preventative measures should be taken. Likes a lot of sunshine. Much used in public displays in large tubs and tiered designs. A real eye-pleaser and extremely hardy. A similar version with white flowers is also available.



B. 'Amigo Red'

B. fuchsioides. A low growing shrub-like begonia which likes a semi-shaded location. Produces red flowers resembling small fuchsias in winter. Leaves are a pleasing mid-green, small and rounded and carried in profusion. An excellent plant for the lightly shaded garden. Does not like to be pruned hard but tip pruning will help to shape it. See also *B.* 'Fuchsifoliosa'.



B. fuchsioides 'Red Cascade'

B. 'Fuchsifoliosa'. A hybrid which is very similar to *B. fuchsioides* but produces many soft pink flowers.

B. foliosa. A shrub like species native to Colombia with the common name of fern leaf begonia, this small leafed plant resembles the most beautiful of ferns and is totally happy when growing near a pond which it will overhang with the most charming effect. Small white flowers appear in spring growing from the upper face of the frond-like foliage. As a garden plant it will grow in a part sunny or shaded position to a height of half a metre or a little more and will spread to twice that width. Prune out the tall growing shoots which appear in spring to keep a compact shape. This is also one of the best basket subjects in the begonia family.



B. foliosa

B. juliana, a Mexican species shrub-like which can be used as feature plants in any landscape design when several are planted close together. The dark green narrow leaves are red tinted on the reverse and white flowers are produced each spring. Grows into a thickly foliated plant over a metre tall. Can be heavily pruned if necessary.

B. labordei (aka *polyantha*), a shrub for light shade where it will produce a mass of small pink tinged foliage year round and small white flowers in spring. Low growing to less than one metre (three feet). Pruning is beneficial when considered necessary to retain size and shape.

B. listada. Although regarded as a shrub-like due to its growth habit, this hardy species, which is native to Brazil, is more used as a ground cover than a specimen plant. It is a low growing, sprawling begonia with a mass of velvety, deep green leaves with central lime green stripes which are almost iridescent in low light. Prefers a well shaded location but will tolerate some sunlight, preferably well filtered. Flowers are pure white with yellow stamens and anthers held well above the foliage. Flowering commences in summer and

blooms are held well into winter. One of the very best begonias for that shaded area, especially when used as an underplanting for trees and shrubs. Shallow rooted so will not interfere with other garden plants. Will also do well as a pot subject. Use several plants together for best effect. Propagate from tip cuttings when flowering has finished. Sets seed readily. Should be tip pruned during early growing period (spring, early summer) but after this allow buds to form. Heavy pruning is recommended after flowering.

B. luxurians. Listed in the Thompson's book as a shrub-like species, this truly magnificent begonia, native to Brazil, is in my opinion, more cane-like in appearance, growing very tall, to over 2.5 metres (8 feet) with a multiplicity of thick stems with long internodes resembling bamboo. The leaves are palm-like in appearance, much like those of the hemp plant, and the creamy coloured flowers are produced in large clusters for most of the year in those areas of suitable climate. *B. luxurians* will do best in a well lit location, and a short period of early morning sunshine can be beneficial. Being shallow rooted you will find that very tall specimens may need staking in later life. They have a habit of snapping off in windy conditions and very careful tying is necessary. Plant several of these as a truly eye catching feature and such group planting will enable them to support one another. To propagate use tip cuttings, semi-hard or hard, not soft, as thick as a pencil and having at least 3 nodes, trim off excess foliage and strike in an open mix. *B. luxurians* needs annual pruning to keep it looking its best, removing straggly side growths, reducing the height of excessively tall stems and removing altogether old unsightly stems.

B. metallica. Red hairs on the base of the white sepals give this mid-summer flowering shrub-like a most pleasing appearance. The metallic looking foliage is an eye pleaser all the year. Growing to a medium height it will enhance any garden scheme where semi-shade lovers are needed. Plant together with *B. scharffii* or *B. scharffiana* for a pleasing contrast in foliage and to give year round flowers between them.



B. metallica

B. minor. A really spectacular begonia for the brightly lit garden where it will produce a mass of pink flowers through the year. Prune hard, especially in early stages, to curb a tendency toward rampant growth. Grows to a metre or more (three feet plus) if not restrained. Well worth the garden space.

B. peltata, sometimes mistakenly called *incana*, is a most attractive shrub-like begonia with felted, hairy leaves of a pleasing mid-green and growing to a metre high. Produces white flowers in moderate quantity from winter through spring. It is native to Mexico. A good feature plant for the open garden. Keep in shape by pruning after flowering.



B. peltata

B. 'Red Cascade'. A recent hybrid closely related to *B. fuchsioides* but producing deep red flowers through spring and summer. Makes a pleasing garden subject in a location that receives some morning sun. Grows to a metre or more (three feet plus) but does not seem to like heavy pruning.

B. sanguinea. This shrub-like species from Brazil is surely one of the best feature plants in the begonia family, showing off its distinctive dark green, glabrous leaves with their deep red undersides by forming a mid height plant of pleasing dimensions. Best when several are planted together. A hardy plant which does not require, and in fact does not like, heavy pruning; it can be kept in good shape with a light pruning after flowering. A mass of pink flowers held high above the foliage is produced each spring.

B. scharffiana. Dullish mid-green foliage covered in short hairs make a wonderful contrast in any garden scheme, especially if planted in company with *B. metallica*. This medium height shrub-like prefers a lightly shaded position and the flowers with their red hairs on the base of the white sepals provide a remarkably

beautiful display from mid summer through winter. Avoid direct sunlight as leaves will burn readily. See *B. scharffii*.



B. scharffiana

B. scharffii. A plant very similar to *B. scharffiana* (qv) but having pink hairs on ivory sepals and similar growth habits. These two begonias are good companion plants and the colour contrast of the flowers makes for a great garden feature. Flowering period is late winter through summer.

B. venosa. A most unusual Brazilian species, drought tolerant, and classified as a shrub-like, it has wonderful hairy, felted leaves and papery bracts and produces white flowers from late summer through into spring. New growth will come from the root system to ensure continuity and the old stems may be pruned out when this new growth has attained a suitable height. An eye catching plant and best grown where it will receive at least four hours of sunshine daily. Plant several of these together for best effect. Readily produces seed.



B. venosa

The Rhizomes

B. acetosa. This superb rhizomatous begonia is native to Brazil and features large, round, hirsute, dark green leaves which are rich red underneath. It has proven to be an excellent garden plant. Needs some sunshine for best results, up to 3 hours daily is not too much. Flowers from spring into early summer with pale pink blooms held high above the ground hugging foliage. Mass planting is recommended for a spectacular bedding display.



B. acetosa

B. carolineifolia. A large growing (to a metre tall) rhizomatous begonia from Brazil, this distinctive and dramatic plant features large, light green compound leaves and an upright growing habit. Needs plenty of garden space (or a large tub) as it will spread its very large rhizomes over a considerable area. Flowers pale pink in spring. Likes a well lit but shaded position. An excellent feature plant for any garden scheme.

B. 'Cathedral' or 'Cathedral Windows'. Both names are applied to this unusual rhizomatous begonia which has crinkled leaves with crested margins resembling the stained glass of a church window when the light shines through. Needs a shaded position in the open garden where it will delight all year with its beautiful foliage and this is complemented by a display of pink flowers in spring. If you propagate this one from leaf cuttings the result will be a miniature of the parent named *B.* 'Fiji Islands'. To propagate true to type you must use rhizome sections.

B. 'Cleopatra'. This profuse flowering rhizomatous cultivar is one of the old favourites and is equally at home in pot or garden bed. Use it as a border for that shady garden and it will reward you with a year-long display of beautiful foliage, small in size but patterned to make a spectacular showing. Flowers in spring

with a cloud of pink flowers held above the foliage. Will not tolerate direct sunlight for long periods although a short period of sunlight is beneficial.



B. 'Cleopatra'

B. diadema. One of a group of rhizomatous begonias which have erect stems jointed at or below the soil level. Likes a shaded position. The palmate leaves are a most pleasing feature and pink flowers grace this garden beauty in spring. Prune lightly.



B. diadema

B. 'Erythrophylla', Commonly called the Beefsteak begonia because its shiny, rounded, succulent leaves have a deep red underside. A low growing rhizomatous type, Beefsteak is ideally suited to the shade garden but will tolerate short periods of sunshine. Too much sun will cause the rich green of the leaves to fade. A mass of pink flowers held high above the foliage is produced in spring. An ideal bedding plant most suitable as a border or in a massed display.

B. 'Fiji Islands'. This is a miniature of *B. 'Cathedral Windows'*. See comments under that heading.

B. 'Green Luxury', a low growing rhizome with light green, deeply lobed palmate leaves and giving a mass of pale pink flowers in spring. An ideal border plant.

B. heracleifolia. An excellent plant for the garden, this rhizomatous begonia native to Mexico has deeply cleft dark green leaves with darker markings along the main veins. It will delight all year with its very pleasing foliage and in spring will reward you with deep pink flowers in abundance. Also look for *B. heracleifolia* var. *nigricans* whose leaves feature much darker green (almost black) between the main veins. The immature foliage has a velvety appearance. Grow this one in a shaded location otherwise it will lose the dark green colouration.

B. hydrocotyfolia is a low growing rhizomatous type with dark, fleshy, slightly patterned leaves and is most suitable for use as a border plant in the shady garden. If subjected to too much light the dark colour will fade and the leaf pattern will become more obvious. Produces small rose pink flowers from late winter through spring.

B. 'Immense'. As the name implies, this hardy cultivar grows very large leaves, but it does not grow to a great height, being a rhizomatous type. The mid green leaves are heavily indented whilst the pink flowers produced each spring stand well above the foliage. Use as an eye catching border plant or in a mass display where space is not a problem. Prefers a lightly shaded location.

B. 'Kara', is a superb rhizomatous garden plant having large crinkly edged leaves of a very dark green with red overtones somewhat reminiscent of rhubarb! Grows to perfection in a well shaded location and produces a mass of pink flowers above the foliage in spring. Recommended as a real eye-catcher.



B. 'Kara'

B. macrocarpa. A very large leafed begonia which grows well in a shaded position. White flowers appear throughout summer held high above the foliage. Makes a striking feature plant for any garden and is strongly recommended.

B. manicata. A worthwhile addition to any garden, this species from Mexico grows with its rhizome in an upright attitude and is strongly recommended as a garden plant in a well lit position where it will tolerate, and in fact enjoy, several hours of sunshine each day. Needs annual pruning after flowering to keep it in a good shape - cut off the growing tips of each rhizome to the height which you desire and use these tips to propagate new plants. A mass of pink flowers is produced each spring. Makes an excellent border plant.

B. manicata 'Aureo-maculata'. Same as above but has cream variegations on the leaves. A somewhat slower grower than *B. manicata* but nonetheless a good garden plant which looks great when mixed in with its plain green leafed namesake. Needs some daily sunshine in order to retain variegations.



B. manicata var. *aureo-maculata* with palmate leaved *B. carolineifolia* in rear

B. 'Oyster Leaf'. Grow a mass of these in a shady spot and be rewarded with a crop of pink flowers every spring, with the mid-green, cup-shaped leaves being always a garden feature. Likes some morning sunshine which will help produce a really dark pink in the blooms.

B. 'Red Dragon', another large leafed rhizomatous begonia which does well in the open garden. Leaves are light green with a pustular surface. Pink flowers appear in spring. Grow in filtered sun otherwise the flower colour will not be as deep as is desirable.

B. 'Silver Jewel', a low growing rhizomatous begonia having pustular surfaced silver marked leaves and a good basket subject but will grow well in the right garden location which is shaded and relatively cool. Try growing small ferns (eg maidenhair) with this beauty to produce a stunning effect, especially if planted on a rocky slope. White flowers are borne close above the foliage from autumn into winter. There are a number

of begonias with basic silver leaves patterned with green and they are all most attractive and well worth growing.

Rex begonias

As noted in chapter 6, the rexes are usually regarded as indoor plants, but by all means try them in your garden scheme in a brightly lit position which does not receive direct sunshine. Perhaps you will find them to be a most attractive planting for a rockery or similar situation, especially if grown amongst ferns. Do not be disappointed if they lose their leaves in cold winters – they will come again in the spring.

Thick stemmed begonias

B. egregia. Classed as thick-stemmed, this truly amazing species native to Brazil develops into a small tree which will grow well in gardens not subject to heavy frost. The large, 30 cms (12 ins) by 8 cms (3 ins), mid-green leaves are quite rough in texture and certainly make for an eye-catching feature plant which grows up to 2 metres or more with a pleasing, many stemmed habit. White flowers appear in winter and are borne in large clusters well into spring. Cold winters and hot summers do not adversely affect this spectacular begonia. Does best in filtered sunlight but will tolerate higher amounts and still look good. Needs a well drained open growing medium and a large tub if not garden grown. Fertilise regularly for best results. Old leaves yellow and eventually fall but remove these to keep the plant looking its best. New foliage grows quickly. Prune as required, removing old stems at ground level and cutting others back as appropriate. Propagate from tip cuttings taken after flowering. A perfect plant for that tropical garden and recommended as a feature garden plant in any frost free area.

B. ulmifolia. As the name suggests this Venezuelan species from the thick stemmed group has leaves shaped like those of the elm tree. A medium growing begonia which produces large numbers of white flowers from winter through spring. The light green foliage makes a delightful contrast amongst darker leafed plants. Likes plenty of light and tolerates several hours of sunshine each day. Tends to grow straggly but this can be controlled by routine tip pruning.

Semperflorens - The Wax Flowers – border plants

B. ‘Semperflorens-Cultorum’. This is a group name which embraces all the semperflorens cultivars, of which there are a great number. Seed of the most popular is usually available and is probably the best, and certainly the cheapest, way to propagate the number required to make a good display, but seedlings are readily available for most of the year. The semperflorens are often referred to as wax flowers and are best grown *en masse* for the most stunning effect although they are usually used as border plants. Borders look best when the plants are close together and at least three rows deep. They also look wonderfully showy when planted in shallow tubs and window boxes. They come in colours of white, red, various shades of pink and as pink/white bi-colours and with both green and bronze foliage.

The many species from which this group has been developed include the best known *Bs. cucullata* vars *cucullata*, *arenosicola* and *spatulata* and *B. hirtella*.

B. lachaoensis is another excellent border plant, being a low growing shrub-like species. Small mid-green leaves and pinkish white flowers all year make it a valuable garden plant. Needs tip pruning as an ongoing attention to retain shape and bushiness.

Trailing/Scandent Begonias.

B. convolvulacea. A species whose natural home is on the forest floors in Brazil, this begonia can be used with equally stunning effect as a climber, a ground cover or a hanging basket plant. Its small white flowers appear in large panicles from late winter through spring. I have grown this begonia to cover a garden arch some 2 metres tall planting one to each side. Although it has no natural means of attachment such as tendrils, it will twist through a lattice or other support but may need some assistance in the early stages of growth. Use a soft plastic tie such as grafting or florists' tape which will stretch as the stems thicken. It is a rampant grower – do not hesitate to prune hard when necessary.

B. radicans (aka *B. limmingheana*). One of the best for a hanging basket, will produce very long trailers covered with a mass of red flowers in spring. Also makes a good ground cover. Best grown in bright shade with some morning sunshine where possible. Keep well fed and prune to maintain good shape – use tips for propagation.

THE AUSTRALIAN STANDARD FOR POTTING MIXES.

Potting Mixes conform to the Australian Standard if the package is marked with a series of ticks, Black for a Regular Mix and Red for a Premium Mix. This marking is your assurance that the mix will have the following properties:

1. An air filled porosity of at least 10% (see note A).
2. Is reasonably easy to re-wet (see note B).
3. Has a Ph between 5.3 and 6.5.
4. Its salinity level is not harmful.
5. It is not toxic to plant roots.
6. It contains trace elements sufficient for at least 12 months.
7. It contains a balanced supply of Calcium and Magnesium.
8. The worst of the Nitrogen drawdown has been overcome and this property is more stringent for Premium Mixes. (see note C).
9. Premium Mixes will contain minimum specified concentrations of Nitrogen, Potassium and Phosphorus. Regular Mixes will contain some Potassium but no Nitrogen or Phosphorus.

Note A. Air filled porosity is the percentage of space in the mix occupied by air when the soil is drained of free water but no drying has taken place.

Note B. Although this attribute is specified, it is recommended that a wetting agent (not a water retention product) be used at the intervals recommended on the package.

Note C. *Nitrogen drawdown* is the term used to describe the action of vegetable matter in or on the soil in extracting available Nitrogen from it for use in the breaking down (composting) process. Untreated additives such as fresh wood chips, sawdust or green waste spread on the surface of or dug into the soil are very demanding of Nitrogen and additional nitrogenous fertiliser, such as urea, must be applied to compensate. It is recommended that only well composted material be used on the garden or in potting mixes.

APPENDIX C to 'Down to Earth - With Begonias'.

CONTACTS IN THE BEGONIA WORLD.

There are Begonia Societies in many parts of the world, notably USA, Canada, Australia, Japan, United Kingdom, France and Belgium. It is not possible to publish in a book such as this contact addresses for each of these Societies as such detail frequently changes, however it is easy to find this information on the internet. Simply ask your search engine for 'Begonias' and many contacts will be revealed.

The American Begonia Society is the premier Society. A bi-monthly journal, "*The Begonian*", is distributed to members. There are branches of the ABS in many American States. The current (2008) web site is:

www.begonias.org

The Association of Australian Begonia Societies is the contact point for Begonia Societies located in each of the mainland states. A quarterly journal, "*Begonia Australis*" is distributed to members. The current (2008) web site is:

www.vicnet.net.au/~aabs

I would recommend that all those who are growing begonias should take out a membership in the appropriate Society as this will bring you into contact with so many fellow enthusiasts. Obtaining begonias is perhaps the hardest part of growing them and a Society membership will help immensely when you want to expand your collection.

APPENDIX D to 'Down to Earth – With Begonias'

THE THINGS I HAVE LEARNT – USEFUL FACTS AND TIPS WORTH REMEMBERING

Keep your garden disease free

Vigorously growing plants are able to resist diseases (and pests) so the first and most important part of any garden management plan is to encourage this by correct and timely fertilising, watering, pruning and weeding.

Secondly, isolate all new plants and plant material coming into your garden area until you are sure that they are disease free, and always select strong, healthy looking plants when buying new ones.

Acclimatise

When you buy a plant you would be well advised to ask your nurserymen where it was propagated as this will determine whether it will be immediately happy in your garden. A local product will most often be suitable for immediate planting whereas one from any distance (and this may include imported plants in some countries) may require a period of acclimatisation. Even plants originating just a few kilometres away may come from an entirely different micro-climate to that in your own garden.

Planting

Begonias look best when several are planted together. Plant them closer than you think they should be. Mass planting of the one type is the best way to produce an eye catching garden feature, but bear in mind the size they will achieve at maturity. Always ask your supplier for this important information.

Folklore

As with many things to do with gardening a great volume of folklore has grown up over the years regarding begonias – 'they are very fussy plants', 'must be grown in a glasshouse', 'they are all shade lovers', 'don't over-water them', 'only for the experts', 'won't grow in the garden' and so on and so on. Forget all this, ignore it completely and start growing them as garden plants with an open mind! The folklore, most often fallacious, refers to pot-grown specimens in Europe (where it was generated), not to my concept of begonias as landscape plants *par excellence*.

Sun and Shade

Most begonias like a high light level. Very many of them, when garden-grown, welcome, or at least tolerate, some direct sun at some time during the day. More sun is better than less. If unsure, go for the better lit location. Very dark foliage will lose its colour in bright light - locate these begonias in shade.

Indoor potted begonias benefit greatly by regular exposure to the out-of-doors.

Water

The admonition not to over-water begonias is right for indoor grown ones, but in the open garden they will, and indeed must, accept all that nature provides – but it is so important that the garden beds be well drained. Over-watering is not the same as being waterlogged. Begonia foliage will go a shade or two paler when watering is necessary. For indoor grown potted begonias allow the surface of the mix to dry out between waterings - then water well when you do. Never allow potted begonias to stand in water.

Soil

Begonias are not too fussy as to the type of garden soil they are grown in provided it is well drained and the pH is within acceptable limits, but do enrich garden beds with annual applications of good compost. Pot-grown begonias must have an open and free draining potting mix.

pH

Try to regulate the pH of all growing media to around 5.5 to 6. Check annually as regular use of non-organic fertiliser will, over-time, change it. This particularly applies to potted plants and I recommend re-potting these every two years into new mix.

Fertilising

Begonias are hungry plants. They are fast growing succulents and semi-succulents and a correct feeding program is most important. This is particularly so with pot-grown specimens as modern potting mixes are not good at holding nutrients. When garden planting we add a ration of controlled-release to each planting hole.

Pruning

In order to keep begonias looking spectacular it is important to prune as required to maintain a pleasing shape and plant size. Never hesitate to use those secateurs – especially on the shrub-likes!

Temperature

Although Begonias come from tropical and semi-tropical areas, the natural habitats of very many of them are in the cooler high country. Rule of thumb is that if you are comfortable then your begonias will be too. This is especially true of indoor grown begonias.

Humidity

Remember that begonias are succulent or semi-succulent plants originating in humid tropical habitats and treat them accordingly. The ideal humidity level is 60% so aim for something 20% either side of this.

Replace

Begonias, like so many garden plants, wear out over-time. Be aware of the optimum life of your begonias and plan a re-propagation program so that you will have mature plants ready when needed.

Experiment

Don't be afraid to experiment with your garden plantings. We used one (*B. arborescens* var. *oxyphylla*) in hedge planting, very much tongue-in-cheek, and it worked amazingly well, so much so that it is one of the show pieces in the RBG begonia beds!

Final word

I have learnt to love begonias for their beauty, their variety and their obvious desire to please the grower. I feel sure that they will have a similar effect upon my readers.



Begonia 'Shirley Sharp' named by the NSW Begonia Society in honour of my late wife

Appendix E to 'Down to Earth – With Begonias.'

PLANNING THE GARDEN.

So you are thinking of planning a garden, or giving your present one a make-over? Let me tell you how we did this in the Sydney Botanic Gardens, us being a group of volunteers without a garden architect or a landscape gardener amongst us, just people who love gardens and begonias in particular. I feel sure that the principles that we embraced would apply to any garden, anywhere.

Take a garden bed – in our case a large garden bed some 30 metres (100 feet) x 10 metres (35 feet) - in fact Bed 31 in the Royal Botanic Gardens, Sydney - and take a long look at what we have. Check the soil for suitability – is the drainage right? Is the pH acceptable? Will begonias grow here? In fact we have found that begonias will grow well in most soils, and Bed 31 seems to be OK if maybe a little on the heavy side. Put in hand work by the Garden's experts on an irrigation system, settling for overhead sprays.

There are no shrubs of any moment, in fact just a few weeds instead, but some beautiful trees throwing a variety of shadows. Spend some days studying these shadow patterns and working out how they will vary through the seasons, for these patterns will govern the begonia types we use in each area of the garden. Produce a list of suitable begonias of which we can obtain seeds or cuttings and commence the task of propagation in readiness for planting – in this case we raise some 2,000 plants comprising about 90 species and 48 cultivars.

Decide on the theme for the garden. After much discussion we settle for a number of areas, not garden rooms in the accepted sense but areas of suitable plants according to aspect and the depth, or lack of, shade. We want more than begonias – we need to show them in a normal garden setting with other plants which will complement them. Discussion with the Senior Hort (Gardens-speak for Horticulturist) who is our Gardens liaison and available to us throughout this formative stage ensures his complete co-operation and he undertakes to select and obtain a range of suitable plants.

The shade patterns led us to select areas for a Shrubbery, a Shade Garden, a Full-sun Garden, a Foliage Garden and our version of a begonia based Cottage Garden and our Senior Hort agrees with our concept. Now we can start to form our garden areas and consultation with him reveals that there is enough money available for some rockwork to give the gardens shape and character. An internal path is laid out through the centre of the garden, winding between the trees, to be eventually surfaced with those

indispensable bark and wood chips, and giving visitors ready access to view all the plantings. Finally the rocks are emplaced, a dressing of compost is dug in and the garden is ready for planting. It is October 2006, a little later in the season for planting than I would like but satisfactory nonetheless.

* * *

Bed 31 is home to some beautiful trees, the oldest being a venerable flowering ash, *Fraxinus ornus*, which we thought was nearly dead, but which has now taken a new lease on life and is playing a full part in providing summer shade. A huge Chilean wine palm, *Jubea Chilensis*, is a source of great interest to all our visitors, soaring many metres upwards on its vast trunk which resembles the foreleg of some gigantic elephant; it stands adjacent to one of the most popular of the Garden's trees, *Backhousia citridora*, whilst several *Crepe Myrtles* make interesting patterns with their fascinating trunks and branches.

In such a setting we began to plant our gardens, being mindful throughout to balance eventual growth habits with foliage shape and size and colour, together with flower colours and flowering seasons. We wanted to ensure that there would be begonias in flower in every one of the garden areas throughout the year.

The Shrubbery is in full and part sun and here we planted cane-like begonias including *Bs. aconitifolia*, *angularis*, *coccinea*, *undulata* and 'Sophie Cecile', the unusual rhizomatous, *B. diadema*, together with such beautiful garden gems as *canna lilies*, *tree dahlias*, *vireya rhododendrons*, 'Red Tower' *gingers* and *philodendrons*. All these cane-likes are planted in clumps of like types, interspersed with the other plants mentioned and the result a year later is most pleasing indeed. Begonias seem to thrive on close company. The provision of a ration of controlled release fertilizer in each planting hole has no doubt helped with the very strong growth of everything we have planted.

The Shrubbery abuts our version of the Cottage Garden – a delightful collection of this and that including *Bs. polyantha*, *lobata* (climbing on a frame), 'Coral West', 'Yorke's Delight', 'Hitomi', 'Shirayuki' and many more, together with a few old favourites from traditional Cottage Garden plantings. There is also a garden seat dedicated to me courtesy of the RBG – a gesture very much appreciated.

The Cottage Garden is divided from the Foliage Garden by a hedge of *B. arborescens* var. *oxyphylla* which is doing very well indeed. A begonia hedge? Yes indeed, and after several years of growth it certainly resembles traditional hedges, being kept in shape by liberal use of garden shears. I really do believe that this is a 'first' among begonia plantings anywhere.

Our Foliage Garden stretches for some twelve metres along the eastern edge and is filled with many plants having unusual, interesting or colourful leaves. The Begonias in this garden include such eye

catchers as *carolineifolia*, *luxurians*, *megaptera*, *scharffiana*, *fernando costae*, *manicata aureo-maculata*, ‘Silver Sal’, ‘Green Luxury’ and ‘Caloundra Coast’ together with bromeliads around the base of the *Chilean wine palm*, and *fruticosa*, *cordyline* hybrids ‘Negra’ and ‘Pink Diamond’, and *hosta* providing interesting contrasts. *Pisonia umbellifera variegata*, several *coleus* and some *aspleniums* (Bird’s Nest ferns) help to make a most effective planting.

The central walk runs from the Shrubbery and traverses the Shade Garden which also takes in the western edge of the bed. The walk is bordered by spring flowering rhizomatous: *Bs. manicata*, U054, ‘Erythrophylla’ (Beefsteak begonia), ‘Oyster Leaf’, and ‘Immense’, a bed of *B. listada* sheltering under a tree fern with a large planting of *impatiens hianiamensis* beneath a *brunfelsia australis* providing a beautiful contrast. Others in the Shade Garden include *Bs. acutifolia*, *scharffii* and *scharffiana*, *parilis*, *paranaensis*, and *sanguina* with ‘Silver Jewel’ looking quite stunning set amongst *maidenhair fern*. Other plants such as *cycads*, *blechnums*, *Eucharis grandiflora*, Chinese ground orchids, *bletilla striatus*, *philodendron* ‘Raja Congo’ and many, many more shade lovers complete this spectacular gathering of plants which grow in the depths of the forests and on the cooler heights.

Finally we have the Full Sun Garden across the southern end which we are still using as a test bed for begonias which may like more sun than we are aware of – the results are proving quite remarkable. There’s currently a massed border of *B. ‘Island Gem’*, with plantings of *Bs. acutifolia*, *coccinea*, *minor*, *venosa* and ‘Titan’ complemented by *wisterias*, *agapanthus*, a large *lonicera fragrantissima* and a spectacular *poinsettia*. A number of cane-like begonias are being trialled here and most are responding favourably to direct sun exposure, with old favourites like *Bs. ‘Irene Nuss’* and ‘White Showers’ thriving in the heat, much to our amazement.

Our begonia gardens are by no means finished works, nor are they ever likely to be. New plants arrive and demand garden space, old plants wear out and are replaced, perhaps with something different, our ideas change or are refined and the gardens with them; change is constant but gradual and we strive to keep the gardens in as perfect a condition as the season, the predatory insects, the possums and the ever-present Ibis allow.

Our experience over the past sixteen years in growing begonias both indoors and out in the RBG has shown that they are adaptable, easily grown and drought resistant plants ideal for many gardens, be they small suburban, large estate, local park or botanic gardens in the many regions of the world where heavy frosts do not occur. Frosts are their nemesis for they are succulent by nature and in areas of heavy frost they need winter protection. Their wonderful diversity of form and size, of shape and growth habit, of

foliage in its many guises, and their ability to grow in sun and shade with flowering seasons which ensure that there will always be a begonia in bloom make them ideal plants for any garden layout or design. Mix and match the elegant cane-like and the entrancing shrub-like begonias, the rhizomatous beauties with their fascinating foliage and the ever blooming wax flowers which never cease to please. All of these, and more besides, will feature in this book.

Beds 30 and 31 are indeed a wonderful example of the versatility of begonias as landscape plants and it is most satisfying that they have now taken their place amongst the many wonders of the Sydney Royal Botanic Gardens.



B. 'Peter Sharp' named in honour of the author by the NSW Begonia Society

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