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Wayne's Words of Wisdom

Hi everybody. We hope everybody is well and if you are sick get well soon.
We wish your New Year is a better one than the year that has passed.
The begonias are growing quite well since the weather settled down. Your tubers will be in their final pots and you can take some cuttings. The plants should be staked and tied up to the stake. The stakes should be at the back of the plant with the leaves pointing to the front. The early flowers should be picked off to make the plants bigger. It is important to water in the morning because if you water in the afternoon you create mildew conditions. Keep an eye for grubs which can make a mess of your plants if not checked.
Take care. We hope to see you in the near future.

JANUARY MEETING CANCELLED

At this point in time the Ballarat City Council are still unable to say if the Robert Clark Centre will be open by Saturday, January 16th so Wayne and I have taken the step of cancelling this meeting.
Hopefully we will be able to meet on March 20th which would normally be our Competition Day as well as our late AGM!
While not passed at a meeting, those who were financial members in 2020 will have their membership extended to December 2021.

Ballarat Begonia Festival

Normally this would be held over the long weekend on March 6th to 8th. However things will be different this year! It will be held over the four weekends in March without the foodstalls , kids activities, etc in the gardens. There is the possibility of a "Gardeners' Market somewhere in the city centre. Since my earlier email prior to Christmas I have discussed our situation with the City Council Events organiser (Claudia) and she sees our difficulties with selling elsewhere apart from near the conservatory. I came away from my discussion with her feeling very positive that we may be able to have a site quite close to the conservatory for one weekend—possibly the long weekend. Crowds will be nothing like last year but there still will be those who come to view the tuberous begonias and want to purchase begonias of the same quality at the same time. I am to meet with Claudia again when she returns from holidays later this month.

On the possibility of the above happening could those who would have begonias for sale on the long weekend please let me know within the next week. Understand sales won't necessarily be as high as last year. This applies to tuberous and non-tuberous begonias.

Many thanks for your understanding and co-operation on this matter Peter Carter

The Challenge of Rex Begonias

Michael J. Kartuz, Vista, CA

The king of begonias, Rex Cultorum, is a frustrating challenge to many begonia lovers and growers. Understanding their special cultural requirements will make growing these beautiful begonias easier.

CULTURE

To bring out their lustrous colours, rex begonias require bright filtered light but not direct sun. Temperature is important, not below 10ºc. or above 32ºc. Provide as much humidity as possible.

Grouping plants together in a sheltered area, such as a shade house or greenhouse is recommended. Rex begonias respond to growing under fluorescent light very well. Lamps should be 30 to 35cm above the plants, and 12 hours of light provided.

GROWING MEDIA

Your regular begonia growing mix should work fine for rex begonias. We use a peat moss based potting medium with perlite added for extra drainage. Do not overpot as this might increase the danger of rot.

PESTS AND DISEASES

Like other begonias, rexes are relatively free of pests. Mealybug is probably the most common insect problem. A systemic pesticide containing imidacloprid is a recommended control.

The greatest problem many growers tell me is mildew. The best control is an old one, a light dusting of micronized sulphur applied monthly especially during periods of cool, damp weather.

PROPAGATION

Rex begonias are easy to propagate and reproduce from leaf cuttings or seed. Leaf cuttings can be rooted in moist perlite in an enclosed container covered with plastic film under fluorescent light. Every rex begonia grown from seed will be different as virtually all rex begonias are complex hybrids. The method is the same as for other begonias grown from seed.

WINTER DORMANCY

One of the greatest misunderstandings of rex begonias is their need for winter dormancy when grown under natural light. It is usually not a problem with plants grown under artificial light. When leaves start to go, keep plants almost dry. The rhizomatous stems will stay. In early spring cut back the stems about half way. New growth usually starts in late September or early October ■

*Adapted from **The Begonian,** September/October 2011*

Ray Tricket's photos from Begonia Australis December 2011

HOW TUBERHYBRIDA BEGONIAS WORK by Ian McNeur, Wanganui, N.Z.

Tuberhybrida begonias are those resulting from inter-breeding of five tuberous species from South America and include the large flowered (15 – 25cm approximately) standard varieties, the pendulas or basket types which may have flowers ranging up to 8 inches, single flowered ones such as Crispa Marginata, and small flowered multi-floras, as well as variations and blends of these.

Being derived from South American species these have one brown skinned tuber per plant, which survives, gradually enlarging, for an indefinite number of years. In contrast, the Mexican species (Hollihock begonia = *gracilis*) I have seen are white skinned and some have multiple short-lived tubers.

Seed and Day Length

Begonia seed is dust like, species seed ranging from 0.3 mm diameter to a giant of 2 mm and our tuberhybrida seed is not much larger than 0.3 mm. Under ideal conditions — moist, well lit and warm (20-25 °C) — the seed can germinate in about 8 days but under less ideal conditions may take 3-4 weeks. Like most, if not all, small seeds these need light to germinate. The first 1-2 days can be dark while the seed absorbs moisture but then light is needed to switch on the physiological changes needed for root and shoot development and emergence. It is at this emergent stage that day length becomes important, or more correctly night length, for it is the length of the night, not the day, that controls growth.

I do not know the exact number of hours governing growth but roughly, if the dark period is under 12 hours, growth continues but if it is over 12 hours top growth ceases. A seedling that emerges to long nights will develop the first small leaves, then a tiny tuber develops under them and it becomes dormant.

The easiest way to maintain growth in winter with tuberhybrida begonias is to break the long night into two short ones by turning the light on for about a quarter of an hour (perhaps as little as 5 minutes will do) to break the night, although this does not feed the plants as well as if a long light period of, say, 16 hours is provided.

For example, if your kitchen is warm enough and if you regularly have the light on for about a quarter of an hour near 8.30pm getting supper, begonia seedlings can germinate and grow on the window ledge but they will not grow as fast as they would if the light was on from dusk till bedtime, about 10.00pm.

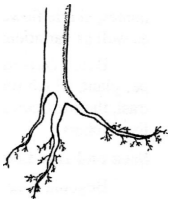
By late July in New Zealand, the nights are short enough for our begonia plants to keep growing without day length manipulation, so seed sown in mid-July is okay as long as other factors are suitable.

The largest seeds of any sample will normally germinate and grow faster than the rest but, in this case, bigger does not necessarily mean better, and seedling vigour does not necessarily mature to adult vigour. Although begonia seed is so small, it is unusual in the plant world in having a seed coat constructed of a complex arrangement of cells including a ring of collar cells topped by a cap, which is easily pushed off by the emerging root.

Plant Development

The germination root turns down to penetrate the medium it rests on, root hairs develop to suck up moisture and minerals, the green cotyledons spread, pushing off the seed coat, to commence photosynthesis and in another week or so the first leaf appears.

Plumbing



As plant growth starts the young stems consist of a mass of thin walled cells bounded by a green epidermis and moisture is pushed up through this to the leaves by root pressure (osmotic pressure) from the root hairs. These develop immediately behind the root's growing tip to slough off not very long after as they are consistently replaced at the tip. There are, however, a few cases where root hairs are retained clinging to solid objects in the medium. As the root wall ages it becomes impenetrable to water so that by far the greatest part of the plant's in-take of water is via the root hairs.

Osmotic pressure is due to the movement of water through the wall of the root hairs from the area of lowest chemical concentration towards the highest concentration, in the root. This is why too much fertiliser near the roots can cause a plant to wilt by reversing the water flow.

As the plant grows, water loss by transpiration from the leaves provides a pull on the water flow to aid the push from the roots. Gradually lines of special cells (xylem) develop in a ring in the stem, providing pipe lines from roots to leaves for water, and a reverse flow from leaves to roots and growing points (phloem cells or sieve tubes) to carry sugars from photosynthesis to where they are needed. If you cut a nearly mature stem across you will see this 'plumbing' as a circle of dots, each dot being a bundle of several tubes. As the stem matures these may coalesce into a solid ring.

HOW TUBERHYBRIDA BEGONIAS WORK continued

Photosynthesis

The plant itself is built almost entirely of carbohydrates manufactured by the miracle worker chlorophyll, which uses the energy of light to combine carbon and oxygen from carbon dioxide in the air with hydrogen from the water pushed up by the roots. It is this process we take for granted, it is and has always been with us, always providing our food, our clothing, our shelter and sustaining almost all life on earth.

Photosynthesis occurs in all green parts of the plant where light can reach but mainly the leaves. A few pores (stomata) occur in the upper leaf surface but most are in the protected under surface and air enters through these. The upper layers of the leaf are tightly packed with cells full of chloroplasts, giving the dark green colour and soaking up the light as the power source to manufacture sugars. The lower layers have cells more loosely arranged so the air can penetrate more freely to offer essential carbon dioxide.

Several sugars are manufactured in the photosynthetic process but the commonest is glucose. All are soluble and travel from the leaves to buds and roots in a reverse of the osmotic process, from the strongest concentration of sugars to the weakest via the sieve tubes. Much of this carbohydrate is used as structural material (cellulose) to build new cells of the stem, leaf, root and flower, much provides the energy needed for growth and also a considerable amount is combined with the minerals pushed up with water by the roots. These combinations of carbohydrate and minerals form the myriads of different proteins used by the plant to control its many and varied growth processes.

During the day when sunlight ensures a greater production of sugars than the transport system can shift, the surplus is stored in the cells of leaf, stem and root as starch for transport at night while the plant continues to grow.

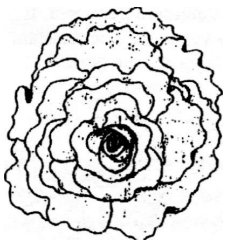
Growers of standard large flowered begonias often remove leaves where they hide a flower or otherwise spoil a display. Before you remove any leaf it pays to weigh up its value as a food factory for future growth against its nuisance in the display.

Both night and day plants must breathe, burning glucose and releasing carbon dioxide. During the day this is camouflaged by the much stronger reverse process of photosynthesis but in the dark hours it becomes obvious, enabling the plants to continue growth during the night.

Minerals

As we fertilise the pot in which our plant grows we tend to think of these minerals as the main food supply — nitrogen for top growth, especially foliage, phosphate for roots and potash for health plus flowers and fruit. In fact, although these and a number of other minerals are very necessary, by far the bulk of any plant's food supply is water from the roots and carbon dioxide from the air.

The minerals, especially nitrogen, combine with the sugars from photosynthesis to produce amino acids, enzymes, hormones and many other proteins, which direct and control the plant's many growth processes.



Flowering

As growth of the plant proceeds it will normally flower about or shortly after the summer solstice in New Zealand but I am not sure what the trigger is for this development. For some plants, eg Chrysanthemums, it is day length and that may apply here also. It could, however, be a change in the nitrogen-potash ratio or possibly something to do with the starch build up. Begonias have flowers in trusses ranging from two to many individual blooms. Male and female flowers are separate. With most begonias, a male flower opens first followed by females and the other males. The male flowers shed their pollen and fall while the females remain for some time and possibly ripen a seedpod.

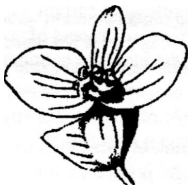
Most tuberhybrida begonias, on the other hand are bred to produce double male flowers where most or all of the stamens have become petals. The first flower of the truss is male with usually one or more female and/or male flowers on each side. If the plant is under stress — too hot, dry or hungry, as flower buds are developing — the number of female flowers may be considerably reduced.

Double male flowers may take a month to open fully and if there are any stamens amongst the petals, they will probably take about a week to ripen after the petals around them have opened, although I have seen pollen spilling from a flower before the stamens were fully exposed.

Some plants, which normally produce desirable fully double flowers, will give some stamens instead of

HOW TUBERHYBRIDA BEGONIAS WORK continued

petals when under stress due to heat, drought or starvation, especially at the end of the season and these are the most desirable pollen parents for breeding, although near double blooms with a small tuft of stamens near the centre or mixed with the petals, may be used.



The female flower is single and normally much smaller than the male. The stigma opens pale green gradually changing over a few days to golden yellow when it is recep-tive. The stigmatic surface is an almost invisible mass of hairs, which secrete a sticky substance when ripe, and this holds and feeds the pollen grains landing on the surface. These pollen grains germinate quickly, if warm enough, and the pollen tube enters the stigma then grows down to the ovary where it discharges the male germ cell into an ovule, which can then de-velop as a seed.

The stimulus of a number of seeds developing in the ovary causes the seedpod to grow while unfertil-ised pods fall. Ripening of a seedpod may range from 3 weeks in mid summer to 7 weeks in late autumn. Normally the larger the flower, the larger the pod and the more seed it can con-tain.

The ripening pod hangs from the stem and splits open near the stem end so that wind shakes the ripe, dust-like seed loose to be blown away from the parent.

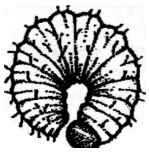
I do not know what insects pollinate the flowers in their native habitat in South America but 1 have had small single male flowers on some of my seedling plants in the garden with bumblebees collecting pollen from the tuft of stamens in the centre and then flying to a female flower and trying to do the same with a similar looking stigma. I have also seen bumblebees working around B. *micranthera* plants, visiting male flowers only.

Pests & Diseases

During the flowering season in New Zealand, these begonias are subject to two main diseases; pow-dery mildew and stem rot (botrytis); and a third problem is Vine Weevil.

Powdery mildew is worst when the plant is under stress, such as heat, drought or starvation, but it can be prevented by previous sprayings with a fungicide. The easiest prevention however is to grow only resis-tant varieties.

Botrytis is prevented by hygiene, constant removal of fallen petals, leaves and stem bases and surgical removal of any infected tissue, followed by fungicide treatment. It appears likely that the older varieties, having survived so many years, may be resistant to botrytis.



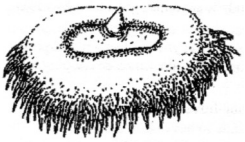
Vine Weevil grubs drill holes in the underside of the tuber and can be very severe in some localities. Infestations can be quite local due to alternative hosts nearby, perhaps in your own or the neighbour's garden. These could be cyclamen, grape vines, ferns, and, I believe, even the green ma-nure plant, mustard.

Dormancy

In late summer and early autumn, as the nights are lengthening towards 12 hours, the carbohydrates from photosynthesis are diverted from growth to storage in the tuber in preparation for dormancy.

Spread throughout all parts of all plants is a blue pigment called phytochrome, which acts as both clock and time switch. Phytochrome rings the alarm and the plant is programmed for the correct reaction. Before the dormancy switch is thrown, the dormancy preparation switch cuts in and stocks up the larder.

When the length of the dark period reaches 12 hours or thereabouts (each individual plant appears to have its own setting) protein or other foods are moved from the plant to the tuber and abscission layers (seals built at the base of each leaf and at each stem joint so that when leaves and stems drop, no wound is left for disease to enter). Finally the plant falls apart and the tuber only is left.



This tuber, a dirty looking brown lump, comprises the whole past seedling and the whole future plant. The lower part is root tissue and the top is stem tissue. Roots de-velop from the bottom and the Vine Weevils drill holes in it. The upper stem tissue gives rise to stems and a few roots and cutworms dig trenches in it.Tuber size is very variable and bears little relation to the quality of the plant and it increases annually.

In the native habitat of the ancestral species, winters are cold, which reduces the chance of tubers rot

HOW TUBERHYBRIDA BEGONIAS WORK continued

ting and the high concentration of carbohydrates in the cell sap re-duces the chance of freezing. It is logical to assume, therefore, that the colder climate zones here will offer a higher survival rate, especially if tubers are left in the ground.

As the begonia plant grows it, like most living things, passes through three growth stages:

1. juvenile is pre-flowering

2. adolescent is the first flowering season

3. adulthood is from the second flowering season onwards.

The first two stages can be expected, but changes that take place in the over-wintering tuber after the first flowering can be a surprise, especially if it has a heritage of fragrance.

During adolescence both plant and flower improve steadily in size and quality and if fragrance is present it may increase a little. Following dormancy the now adult plant is usually a little bigger, brighter and better in plant, flower and fragrance but not always. Flower quality may decline but fragrance will often double or vanish, or a non-fragrant plant may become fragrant.

What alchemy is wrought in that so-called dormant tuber I do not know but we cannot be sure of a new plant until adulthood.

Propagation

Dispersal by seed is nature's method of propagation but for most growers of tuber-hybrida begonias, vegetative propagation is needed to give more copies of their best plants and as insurance against loss.

Tubers are sometimes cut in half when they become too large and that is usually acceptable with fast growing varieties like 'Le Flamboyant' but this should not be over done. A cut tuber has a reduced rooting surface and still contains all the contaminants accumulated by the original tuber. Cuttings are by far the best way of increasing stocks of a good plant.

The best cuttings are basal cuttings, that is, spare shoots removed from the tuber when it is starting growth in late spring/early summer. Alternatively, stem cuttings may be taken, that is, side shoots, but these are not as likely to produce a good tuber by winter.

Leaf cuttings are also a possibility but not as reliable. A recently matured healthy leaf is chosen early in the season, with 2- 4 cm of its stem. If you are lucky it will produce a callus at the stem base from which plantlets arise with the callus developing as a tuber.

For tissue culturing in the laboratory, very young leaves and their stems are used, as this is tissue that is still developing and will continue to develop in the laboratory.

Sourced from Canterbury Begonia Circle October/November 2002

Two of Ralph Willsmore's hybrids