Bromeliaceae

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The Bromeliad Society of Queensland Inc.

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MONTHLY MEETINGS of the Society are held on the 3rd Thursday of each month except for December, at the Uniting Hall, 52 Merthyr Road, New Farm, Brisbane, commencing 7:30 pm.
ANNUAL GENERAL MEETING is held immediately before the March General Meeting

Front Cover: Tillandsia 'El Rancho'	By: J Olsen
Rear Cover: *Sculpture by Lloyd Godman*	By: J Olsen

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Orthophytum 'Roberto Menescal'

by Derek Butcher Oct 2017

It must have been over 30 years ago when my wife and I called on Keith Golinski at Palmwoods in Queensland and saw his display area for the first time. There was this large clump of plants cascading over a large rock. Keith informed us it was *Orthophytum vagans* BUT the leaves were variegated with whitish margins. We even brought a plant back to Adelaide, but it never grew as luxuriantly as at Palmwoods. It did not take long to realise that the taxonomists only recognised the non-variegated plant which I did find easier to grow.

It was only in the last few years that I have realised that taxonomists are not interested in variegation leaving them to be named as cultivars. In my current search for whether it had been named in the past but not recorded I found that Constantino Gastaldi in his 'Dyckia' website had coined the name 'Roberto Menescal' for such a plant in April 2017 but not registered. I am proposing that we register this name in the BCR for such a striking plant despite the fact that it has been in Australia for such a long time. It would seem that the plant called *Orthophytum vagans variegata* growing in the collection of Roberto Menescal had been found in the wild by an unknown collector about 2000 so we are probably talking about a separate sporting/mutation. The source of the Australian grown plant remains unknown but if anyone can advise details this will be added to the records.

It is disappointing that some Brazilian Bromeliad growers do not see the significance of the BCR.

PUYA

Barbara Murray

Puya belongs to the Pitcairnioideae family found in the high elevations of the Andes Mountains throughout South and Central America with two species only found in Costa Rica. It is considered the oldest and most primitive of the Bromeliaceae, retaining a grassy look. The name Puya comes from the Mapuche Indian word meaning 'point'.

Puya is a very large genus of bromeliad, both in number of species and in size of plant. The Taxon List records 226 species of Puya as of March 2018. Despite the large number of species in the wild only a dozen or so are ever seen in cultivation worldwide. This genus includes the world's largest species of bromeliad, *Puya raimondii*, which grows up to 9 metres tall and up to 3 metres across.

Puya raimondii (Photo M Romanowski)

Puya grows naturally in the high elevations of the Andes Mountains. The climate is typically dry, and temperatures can drop below freezing. Unlike most bromeliads, Puya are terrestrial, growing in the ground with roots that take up nutrients and water from the soil instead of growing as epiphytes in trees relying on the air for survival. They prefer average to rich well-drained soil. Puya adjust to arid conditions by suspending their growth.

Possibly the most interesting fact about Puya is that some are protocarnivorous. They have long, fleshy, stiff, spiked leaves with cruel barbs along the edges that form in a round, ball like rosette, so most leaves do not have a cup formation to catch water. Most like to grow in large clumps. This means that animals can become trapped and entangled in their extremely sharp marginal leaf barbs, unable to move forward or backward without ripping their bodies. They die, trapped, and whilst decomposing they provide nutrients for the plants through the soil. Many Puya also have spines that act as protection from grazing animals. Most other terrestrial arid-loving bromeliads like Dyckia and Bromelia species are similarly armed.

Puya grow best outside in sunny conditions. They like plenty of sun and water during the summer growing season and require dry soil during cold temperatures. In the ground, they require well drained areas for their dormant period. Puya survive desert conditions and mountain snow with temperatures as low as 7 degrees C for a time. However, young plants should be protected from frost. Many are excellent as container plants which gives the grower the advantage of moving the plant if the winter weather becomes too cold or hot.

Puya grow very large in clumps, but slowly, becoming an unassuming but thorny twisted leaf mass. It may be difficult to find a safe space within an average garden to house a mature plant. With their stiff leaves and sharp spines Puya are challenging to manage. Before they die they will produce many offsets and the plants usually grow in large colonies. This fact, along with their somewhat dull leaf colour and monotonous densely packed colonies, make them sound unappealing to grow.

Puya can take a few years or even decades to produce a flower, but the spectacular flowers are worth the effort. Many species of Puya produce giant flower spikes that grow very tall and produce hundreds of flowers. Flowers are usually tubular in appearance and consist of three main colours – green, lavender and blue, with a few having white flowers. The inflorescence has sterile bract-like spikes sticking out which are actually bird perches enabling the birds to drink the abundant nectar in the flowers and pollinate the plant. Their blooms contain dry capsules with small, wingless seeds. Collecting the seed and growing them on is not difficult. The seeds are quick to germinate and grow quickly at this stage. Unfortunately, the flowering season is a short one, usually in the spring. For the aficionado it is their unique form, attractive flowers and undemanding growing needs that makes Puya appealing.

Plants in my collection

Note: In 2017 I purchased seed from Universiteit Utrecht. This seed is still in seedling stage.

Puya alpestris (sometimes called the Sapphire Tower) is one of the more commonly grown Puyas, growing just over half a metre tall and almost as wide. The leaves are narrow, dark green, curled, with large, barbed teeth surrounding the leaf margin. It is a variable species with some forms having nearly white leaves. Although a very drought tolerant plant, *Puya alpestris* responds to water, particularly in summer. It is a slow growing plant but fortunately does not need to attain a huge size or colony before flowering. The inflorescences grow up to 10m tall and are covered with brilliant deep blue-green flowers with a metallic sheen, that look waxy. They are bizarre and beautiful with unusual colouring.

Puya chilensis, from the montane areas of Chile is a larger, slow growing plant with pale green leaves lined with large, sharp barbs. They take decades to flower but apparently the wait is worth while as the inflorescence has been noted as being extremely spectacular, rising nearly 5 metres high.

Puya clavaherculis is a recent seed raised Puya, native to Ecuador. The plant should grow to be Dyckia shaped about 1.2m tall with a large dense rosette of many strap like, thorny bluish green leaves topped with a long baton like inflorescence rising to 6m with pale blue flowers. It is a high altitude plant and requires a cool climate without extremes of frost or heat.

Puya coerulea (sometimes called the Aqua Sapphire Tower) is a medium sized Puya from Chile with pale grey-green leaves and forming large, impenetrable colonies of barbed foliage. The leaves are relatively straight with only a bit of recurving or twisting near the tips. The flowers are uniquely spectacular. The brilliant red stalks and branches rise up to 2.7m tall with nearly black-blue to violet flowers erupting from crimson bracts. The stamens and pistils contrast dramatically in bright gold and lime green.

Puya clockwise from Top L:

P alpestris, *P chilensis* (Photo PT), *P caerulea*(Photo DB), P *clavaherculus* (Photo JBS 244,1998)

There are several forms of this plant. The other form, ***Puya coerulea* var*. violacea***, is a smaller plant, with a relatively sparse inflorescence, still colourful and spectacular, but not as impressive.

Puya laxa is one of the more attractive species when not in flower having dramatic fuzzy-grey twisted leaves. If planted in the garden it should grow aggressively taking over larger areas in no time, but this has not happened in my garden. For the first five years, my three cuttings sulked and there was very little growth. Two were planted in pots and the third was planted in the rain forest area in the garden. Finally, the two in the pots began to grow twisting and contorting dramatically. The plant in the garden seems to have not grown at all. The two in the pots have flowered. The petite flowers themselves are an interesting and attractive dark blue-green arising in a tubular shape from fuzzy pale red bracts. but the entire branched inflorescence is very long, drooping and spindly looking.

Puya mirabilis has dense grass-like leaves. They are narrow and flexible but have very sharp spines. The leaves form a ball shaped clump. This plant is fast growing, typically reaching maturity between one and two years and will produce a flower stalk at that time. The flower stalk is tall and stands erect above the centre of the plant. The bracts are greyish blue. The flowers are spaced about an inch or two apart and are lime green and droop down from the stalk. This plant grows about 30 – 40cm in height and is suitable for growing in pots.

Puya raimondii (known as the Queen of the Andes). is the largest of all bromeliads, coming from Peru and Bolivia, where it's considered endangered. The leaf rosette grows up to three and a half metres tall, and the flower stalk is another nine metres. The Queen can take 75 years or more to flower. The inflorescence consists of a stem holding about thirty thousand individual flowers. Andean hummingbirds feed at its greenish-white flowers.

Puya venusta comes from Chile. The name means ‘handsome’. My plants are seed raised and only small at this stage. The inflorescence is a pink spherical head on each branch with metallic teal waxlike flowers with yellowy green stamens protruding from the flowers. This rises majestically about 9cm above a silver mass of leaves.

Puya berteronia (sometimes called the Turquoise Puya) is known for its beautiful tall flower spike that has clusters of large brilliant turquoise flowers, with the outer part of the sepal bright green, and bright orange anthers. The plant grows just over a metre high and a metre wide, taking up to eight years to reach flowering size. The leaves are arching with stout, hooked marginal spines.

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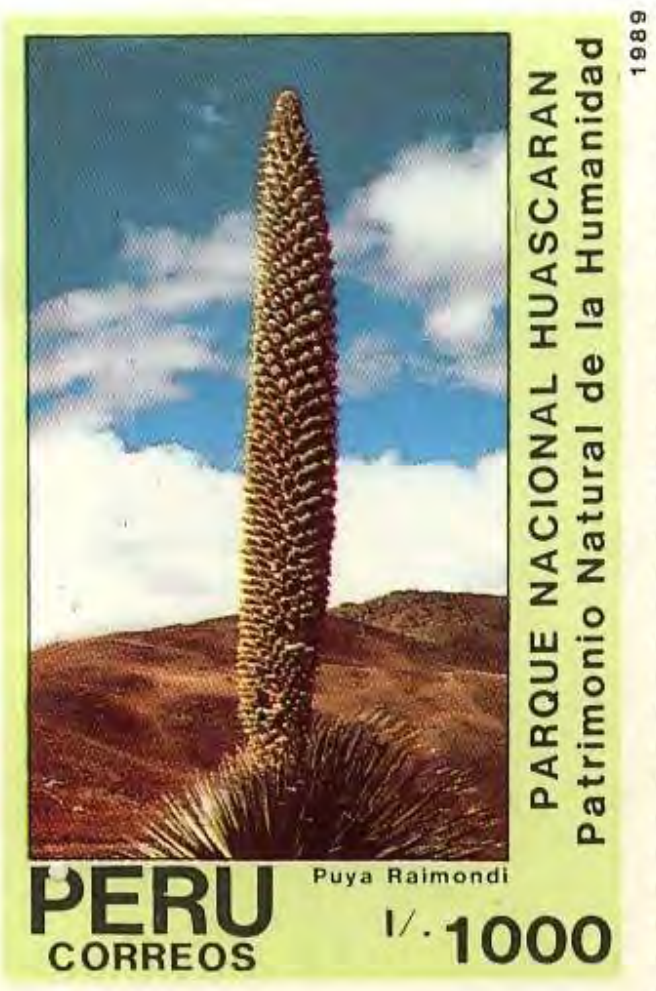
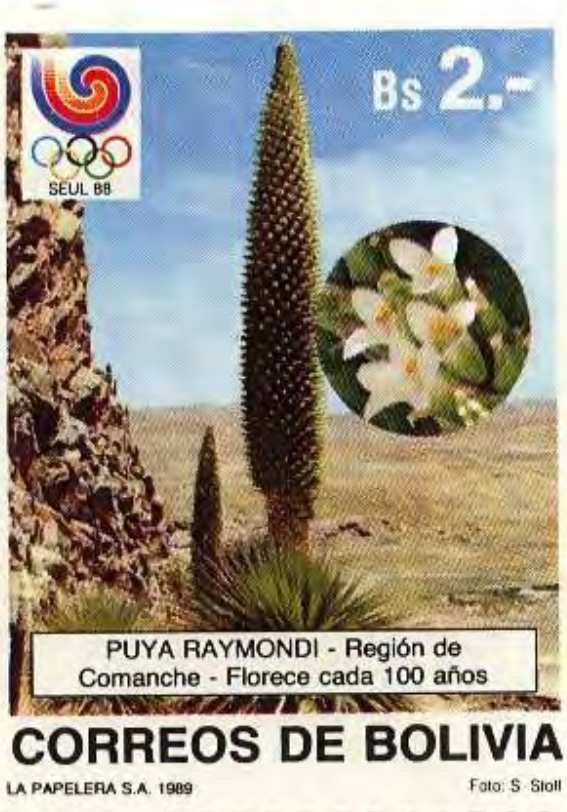




Top Left: *P laxa* (Photo B Murray); Top R : *P mirabilis* and below Chilean stamps feature *P raimondii.*

Tillandsia Workshop

Barbara Murray

On the 3 March 2018 at Newmarket State School, over a hundred tillandsia aficionados from Australia and overseas gathered for a day of information, plant sales and friendship. It was past successes that resulted in this largest participation to date.

The day started promptly with a link to **Paolo Michieli** from Italy on a SKYPE link. After a long wait whilst the technology was sorted out, Paulo explained that he had inherited the company from his father and made significant changes. Within the company *Michieli Floricoltura,* a multidisciplinary team follows the development of a Tillandsia Wall from its conception, to the choice and supply of plants, up to the realization and installation.

Paulo studied science, attending plant biotechnology studies at the University of Padua and abroad at Radbout Univeristeit Nijmegen in the Netherlands. He preferred the research units. He studied trichomes – there are 250 types. This study assists with identification of plants such as gathering the information from the numbers on leaves and the different shapes of the trichomes.

He then did some studies on tillandsias in their natural habitats. These habitats have inspired Paulo's creative Tillandsia Walls. Paulo showed pictures to exhibit his art work. He explained that those Tillandsia that are harder to germinate are harder to keep alive in the walls so therefore he concentrates on using those species that are fast growing and reliable. His company grow all the plants. Some of the walls are temporary and others permanent. Most are inside buildings as climates are changing and are not completely understood.

The slides of his Tillandsia Walls were inspiring and captivating. Further details can be seen on the business website http://www.tillandsia.it/. It is in Italian but can be translated by your browser.

Lloyd Godman was the next speaker. He too was inspiring. He is a photographer studying light intensity in relation to the camera. Born in Dunedin, New Zealand and now living in Australia he has been exploring environmental issues through photography (in combination with sculpture, painting and installations) since the early1980s. He became interested in the light changes in Bromeliad leaves. He is inspired with the idea that Tillandsias can clean the environment through the trichomes in their leaves. He used them around the Melbourne airport to clean metal fibres from the air.

Lloyd Godman in full swing – Note the T shirt one of which he donated for the auction

Lloyd is now focusing on the Swarm Project, which was inspired by German Joseph Beuys 7000 Oaks project which planted oak trees in the city of Kassel. The Swarm Project involves putting Tillandsias into the community without risking the environment as there is no need for watering systems or substrate nutrients. The tillandsias are held within mesh cages, called cells, to link back to the bees and hence to the 'swarm'. They are then placed in challenging places such as the roofs of buildings or suspended in the air. There is minimal infrastructure and maintenance to the installations.

Lloyd's work can be seen by visiting his website http://www.lloydgodman.net/.

Peter Tristram then took the audience on a look through the Botanical Gardens of Europe. He contrasted the gardens in America which are mass produced, do not maintain data on the plants, and do not seek variation of plants to the European gardens which have collections begun when the gardens were first opened and still maintained today.

Utrecht Botanic Gardens was originally laid out in 1639 as a teaching garden for Students of Medicine. In 1723 the university moved to a larger site and in 1726 a greenhouse for a collection of tropical plants was added. By 1987 – 3 collections existed. They were all moved to the current site Fort Hoofddijk. This data is studied today and available for all scientists to study. Peter mentioned Eric Gouda from Utrecht and urged any travellers to visit the Gardens of Europe. He also illustrated plants at Heidelberg BG and Gottingen BG.

Chris Larson talked briefly on the Tillnuts Participation Event (TPE). As the name says it involves participation with each attendee giving a 30minute presentation. They are limited to 25 persons. They meet every two years in Albury, with the next in September 2018.

George Stamatis from *Elimbah Tropicals* (http://www.elimbahtropicals.com/)spoke on *Tillandsia xerographica* and its hybrids. *T. xerographica* is native from Central America to Southern Mexico. There are many forms due to the wide range – in Mexico they have a thinner leaf and are more ball shaped. The pink edged types are Mexican. Around Guatemala the plants are broader and have a twirl on the leaves at the bottom.

The plant takes 12 to 18 years to grow from seed to maturity - faster if grown from offsets.

Wild populations are threatened due to overcollection and the pockets of habitat are too far apart due to land clearing such that pollinators cannot travel from one to the next. Researchers have established that in any area of habitat between 2000-30000 is a viable population.

Tillandsia tomasellii (now changed to *T xerographica*) and *T kuntzeana* are both close relatives of *T xerographica*. They are not for beginners. The plants need a solid roof as they do not like to be wet, they prefer more sun than shade.

T xerographica enjoy warmth, humidity, bright light and regular feeding.

Hybrids available In Australia for *T xerographica* include: *T* 'Silver Queen' – keep dry in winter, hates cold and wet; *T* 'Silverado' – smaller variety; *T* 'Betty' – great variety in the population as the whole grex was sold; *T* 'Fireworks' – similar to *T* 'Silver Queen' but has a pink flush and a taller spike; *T* 'Lady Luck' – uniform, smaller, with a pink flush to the leaves and a red spike*; T* x*wisdomiana* – slow growing; *T* 'Best in Class' – Margaret Patterson did a remake; *T* 'Upper Class' – smaller; *T* 'Dimmit's Prodigy' – a cross between *xerographica x rolandgosselini x chiapensis*.

George then did a session on Seed Raising. He suggested using mosquito mesh over a frame (an alternative is to stretch 70% shade cloth over a wire bench), placing the frame over a basin of rain water (it must be rain water), and then creating a wet/dry cycle by watering then allowing the seed to dry out before rewatering. He suggested drenching the seeds in the late afternoon. After 1 -2 months reduce the watering. After 1-3 years remove the seedlings from the mesh and spread them over orchid bark. The process works best in spring and summer. Be aware of heat waves and hot wet spells. Leaving the seeds/seedings too dry for too long will kill them. A solid roof over the working area is the best alternative.

Nigel Thomson then discussed tissue culture as a way of dealing with import restrictions and reproducing plants by tissue culture. He referred to Anil Ghodke who is doing a combination of seed and tissue culture through Plant Biotech at Palmwood. *T mooreana* and *T* 'Samantha' are plants produced from tissue culture.

Bruce Dunstan then demonstrated mounting tillandsia. Bruce uses champagne corks for small plants. He prepares the corks by zapping them for 40 seconds in the microwave and then cutting them in half longitudinally and mounting on the flat surface. For larger plants Bruce uses aluminium wire. He obtains his wire from Inspire with Wire at Narangba or buys from China on eBay.

Barry Genn demonstrated removing difficult pups – eg. from *T straminea* or *T duratii* caulescent forms. His tools consisted of a paring knife and a scalpel. He advised against ripping the pups off and damaging the mother as this reduces the chance of more pups being produced. Caulescent type plants do not cope with pulling the offsets away. Find the pup and then go down a couple of leaves and then cut into the edge of the stem and wiggle the pup until it lifts off. Remove hair pups carefully from the base and place horizontally on sphagnum or treat as seedlings.

An important component of the Tillandsia Day is the “Show and Tell’ session which allows for plant identification and the display of plants which many have not seen in flower. Photos below show some of this session.

Greg Aizlewood was the last speaker and his topic was Pests. Grasshoppers are active in the summer months. Catching them and killing them is the best treatment. Caterpillars cause physical damage chewing on old dead foliage so keep plants clean. If you have organic mounts then dunk them in garlic or spray with a milk spray (recipe available online). Mealy bugs like warm moist conditions, roots of leaf axils. Plants lacking vigour or a tip die back may be noticeable symptoms. Use methylated spirits with cotton buds or try a soapy water spray.

Cockroaches damage foliage in summer so put a nylon bag over the inflorescence. Slugs and snails are active at night and on rainy days, resting in leaf axils during the day. They target pups and seedlings and are introduced through garden mulch. Diatomaceous earth is a deterrent.

There are two types of scale. The armoured (black) scale and the waxy scale which is soft and farmed by ants for honey dew. They grow in spring is all shapes and sizes with a three-week hatching period. Treat all plants or isolate the infected plants and treat with an appropriate product such as eco oil or neem oil, wait for pups and then discard the mother. Fungus gnats come from compost. The signs are sudden wilting, loss of vigour and yellowing. Glossy clear larvae come from overwatering. Ants are found in potted plants and media. Store plants off the ground or on concrete, tarmac or black plastic. Sprinkle granular insecticide in the pots. Commercial products available for controlling some of these pests may be dangerous so if deciding to use these agents read the instructions carefully and take safety precautions.

After hours of conversation, plenty of food, lots of Tillandsia buying, a successful Auction was held by John Olsen and Rob Murray and the day was over.

Price leaping under the watchful eyes of scrutineer, “Did we hear right?”

Part of the Sales area in the "Calm before the storm" above, awaiting the influx of buyers right.

Nidularium 'Rutilan Regel'

Derek Butcher Oct 2017

To the *Nidularium* grower these two words will sound familiar and will be the registered name for an old survivor which went by the illegal name of *Nid regelioides variegata* or *Nid rutilans variegata*. It has been around for over 40 years but nobody has reported when or where it sported/mutated.

The Taxonomist needs to know who collected a plant in the wild and where, before he considers it worthwhile to make a herbarium specimen and formally describe it. The Cultonomist also likes to know where a plant originated! And recorded. The Grower in many cases, takes the easy way out by using quasi-botanical names.

Plants evolve in the wild where it is mostly, survival of the fittest. Plants in cultivation face a different sort of survival depending on the whims and fancies of growers. When the BCR was first published in 1998 there were a few *Neoregelia* names published with the comment "Grace Goode indicated that she felt this plant was not still in cultivation". The problem here was that when I was Registrar after 1998 I came across some that had survived. In other words, nobody knows where or how selected plants survive in captivity. The more you read the BCR entries the more you realise that some of them are seemingly extinct after only a short space of time i.e. 5 years whereas others have survived. In this case it has survived since the 1980's. In fact, it got a mention in New Standardized Cultivar Names by Nat De Leon, BSI Hybrid Registrar in Journ Brom Soc 35(1): 34-37. 1985 but regrettably not according to the ICNCP rules on variegated plants. I quote "Nidularium regelioides 'Variegata' (syn. rutilans variegata)"

I put my query to Ross Little and he confirmed he had this plant alive and had been popular with the Buchanan's when they owned Pinegrove nursery. Their records showed they had received the plant from various sources as follows BBK #350, Nidularium rutilans variegated, 4/83 Schaefer, 4/85 Sax, 8/85 Goode, Schaefer, 1/86 Wasley, 6/86 Gleeson. None had claimed being the first to notice the variegation so it would appear it originated in either Europe or the USA. I did consider Brazil, but Seidel does not have it in their catalogues. It is in Kent's 1979 catalogue under *Nid rutilans variegata* and in 1981 Tropiflora under *Nid regelioides variegata*. Sometimes the primary bracts can be variegated too. As for the name, you can thank Ross Little for that.

Nidularium ‘Rutilans Regel’ as N. rutilans variegated Photo above PAF2124, below Rehak

2018 Spring Show at BTTC. BSQ Display above and Champion Plants: *Vriesea* 'Pink Dream' M. Cameron, and reserve Champion *Tillandsia ehlersiana* R. Jell.

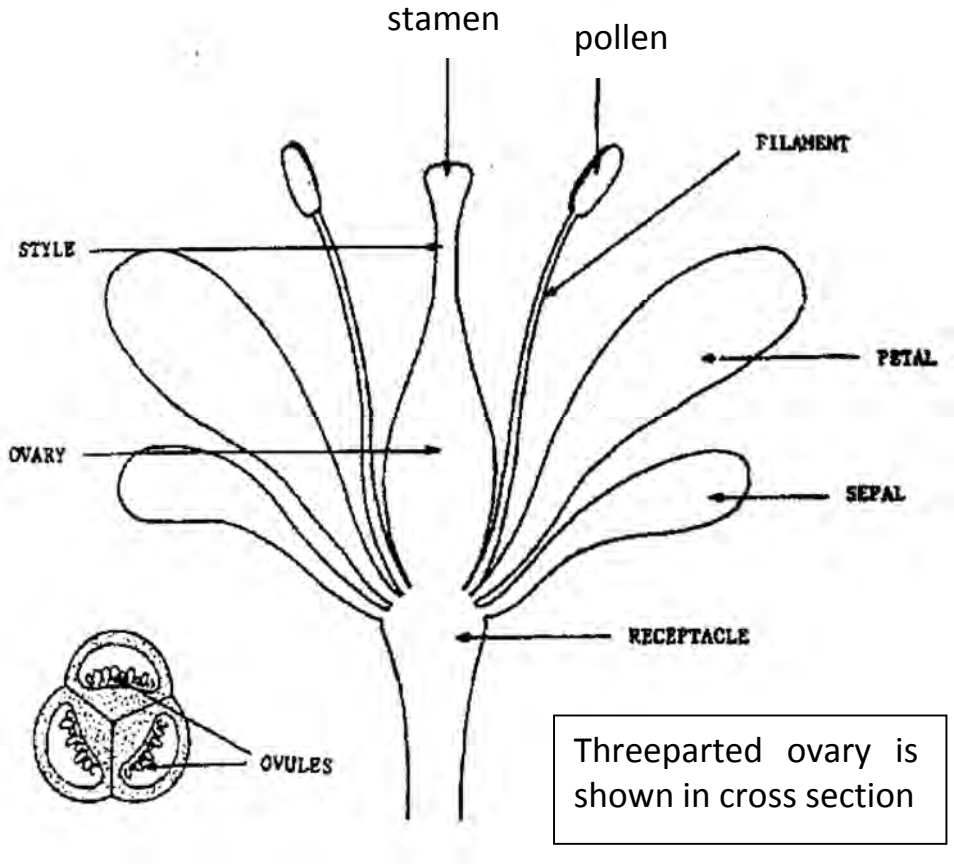
Breeding / Hybridising for Variegation

compiled by Ross Little

Extracted from FNCBSG -11-2017 Newsletter

A recently asked question: "How do you get seed and make variegated hybrids". The cross pollination of two plants is quite a simple process, basically one takes the pollen from the anthers of one plant and places it on the stigma of another and waits for seed to mature which can take from several months to a year or so for some species and hybrids.

A discerning hybridiser is one who sets out to create something different, to improve on a plants appearance, colour, shape, size or they breed for cold or heat tolerance, in other words a hybridiser has an end goal in mind, not just hit and hope. A good hybridiser is one that is selective as to what plant/s are cross pollinated with each other, crossing and back crossing until they achieve that end goal. Parental assurance is important too, so pollinating is done in a controlled environment rather than randomly in a shade house risking contamination. To be sure who the pollen parent is (dad) the anthers of the seed parent to-be (mum) should be emasculated (cut off) prior to the opening of the anthers (pollen bearing part of the flower). This is done just in case the flower is self compatible (will accept its own pollen). Label each flower as it is pollinated, don't leave it to memory especially if using several fathers onto the same plant. Once a grain of pollen has been placed on the stigma, if receptive (appears sticky), a pollen tube will begin to develop and grow down the style to the ovary and contact the ovules delivering the sperm, eventually developing into a seed.



Threeparted ovary is shown in cross section

We have now begun to understand the process of pollination, but, to achieve a variegated hybrid, first one must use a mother plant (seed parent) known to be a transmitter of the variegated genes. Often these are a variegated *Neoregelia carolinae* type. Here in Australia the most consistent transmitters used are variegated forms of *Neo*. 'Meyendorffii' and *Neo*. 'Mother' and progeny of it. One must now be thoughtful in their fathering process and what desired traits are wishing to be passed on before randomly splashing pollen on everything. If it's cross banding you are after, add pollen of *Neo. zonata,* 'Skotaks Tiger' or 'Hannibal Lector' to your variegated mother (seed) plant **NOT** the reverse.

Using the larger Neoregelias as father like *Neo*. 'Great White', *Neo. pascoaliana* or *Neo. silvomontana* onto a variegated mother will often give large variegated progeny. If it is stolons you're after use *Neo. pauciflora*, *Neo. ampullacea*, *Neo. lilliputiana* or *Neo*. 'Fireball' pollen onto your variegated mother plant, these will produce mini to medium sized progeny.

Another consideration once you have achieved variegation, try using a spineless plant as a pollen parent (dad) like *Neo*. 'Medusa' onto your known transmitter or even onto one of your own creations. Hopefully some of the resultant seedlings will be spineless and variegated. Pushing your boundaries further try using a spineless *Aechmea fasciata* to experiment with and enjoy the results. Don't forget culling is important as not everything you produce is perfect, keep only the best, most distinctive progeny and toss the rest. Good record keeping on your label as well as in a book is important also, it will help in analysing your results later and assist in further breeding programs one may wish to undertake. Records are also a big help with your BCR registration. An answer to the question: "Is your hybridising really necessary? Think Twice!" The two plants pictured here from the same grex are the result of crossing: Neo. 'Ladd's Gem' with Neo. 'Great White' by Ross Little. The only two variegates retained from the grex. Acknowledgements: David Benzing, The Biology of the Bromeliads for information and line drawings, Derek Butcher for photo etc.

Variegation in Bromeliads

Comments by Dr. David Benzing, reprinted from a Facebook posting on: Planet Tillandsia ionantha, 28th. August, 2017

Initial comment and photos were posted by: Lloyd Godman Incredibly beautiful, I got this variegated *Tillandsia ionantha* the other day. I asked David Benzing for his ideas on variegation and here is his response:

"What you've dug up on the internet is a good example of how bad its content can be. What's claimed that's true is poorly presented, only half true or flat out incorrect. Here's what I can add that might help. First, I've got to admit that I'm not an authority when it comes to plant pathology or leaf variegation. It's true that the genetic changes that underlie leaf variegations can be spontaneous or induced by a variety of external agents, including ionizing radiation, viruses, mutagenic chemicals, and heat shock. Viruses are ubiquitous of course-even bacteria have them! Their replication always involves disruptive change in the host's genome.

Bromeliads, being monocots possess two kinds of meristems, whose constituent embryonic stem cells are vulnerable to alteration by all of the agents just identified. In addition to the apical meristem that all plants possess (woody plants also have a cambium that causes stems and roots to become thick and woody) monocots have intercalary meristems located at the base of each leaf and this meristem produces the leaf blade in linear fashion, nothing more, whereas the apical meristem located at the apex of every shoot and root is responsible for the growth of those entire organ systems (shoots and roots respectively). Being non-woody, most monocots lack meristem number three, the cambium.

Leaf variegations occur when patches of stems cells within an intercalary meristem possess mutations that block chlorophyll synthesis (or development of the chloroplasts themselves) within those cells rendering them and the cells derived from them non-green. I don't think it's accurate to describe Bromeliads as unusually prone to such mutations.

It is true that leaf variegations within certain Bromeliads are quite unstable, their patterns even shifting from leaf to leaf in a single plant. Such instability can have several causes, viruses for example or simply because the genes that regulate chlorophyll synthesis are unstable in certain genotypes. But such conditions are to my knowledge no more common in Bromeliaceae than in many other families.

It certainly is possible by the way that the progeny from a single mother plant (its seeds) may include the rare variegated individual. The condition of this individual may result because it has a different father, the mother receiving pollen from more than one plant or that seed may have experienced a spontaneous mutation that affected the biosynthetic pathway that mediates chlorophyll synthesis, or simply because it is the possessor of the rare homozygous condition that pops up should the defective chlorophyll synthesis gene be recessive and rare in the subject population's gene pool.

By the way variegations that involve chlorophyll versus anthocyanins (the violet to red pigments) are totally independent genetically, the synthesis of these two classes of pigments being entirely separate. This is why green-white variegations usually exhibit the usual suffusions of pink displayed by non-variegated close relatives. Finally, variegated plants are more common in horticulture than nature in part at least because being less photosynthetically competent than their non-variegated relatives the former are less fit in nature and more vulnerable to elimination by natural selection."

Controlled Release or Slow Release, What is the Difference?

For further information go to http://fernland.com.au/blog/

Although these terms are sometimes used interchangeably, the terms 'slow-release fertiliser' (SRF) and 'controlled-release fertiliser' (CRF) strictly do *not* mean the same thing – even though both do release plant nutrients at a slower rate than when highly-soluble conventional or 'straight' fertilisers are used.

Slow-release fertilisers (SRFs), are not encapsulated in coated prills. The most commonly used slow-release fertilisers are those which supply nitrogen (N) at a slower rate than if a readily-soluble source of nitrogen were applied (e.g. ammonium sulphate, ammonium nitrate or urea). In one of the methods to achieve this, fertiliser manufacturers synthesise long-chain molecules by chemically combining a nitrogen-source molecule with an aldehyde – eg, urea formaldehyde or methyl urea. The delayed release of nitrogen is achieved by microbial action in the growing medium – slowly breaking down the long-chain molecules and eventually converting the resulting ammonium nitrogen to nitrate (the form of nitrogen which plant roots can take up). The duration of release in a slow-release fertiliser cannot be controlled because the effectiveness of the microbial organisms in molecular breakdown is in turn dependent on other factors – the nature of the growing medium, moisture level and temperature. A release time extending beyond 2 or 3 months cannot be expected.

Controlled-release fertilisers (CRFs) differ fundamentally from (SRFs) in both technology and mode of nutrient release. Soluble essential plant nutrients, either individually or in various homogeneous blends (depending on the application) are encapsulated in an organic resin or

polymer coating to form prills. This coating is the secret of delayed release of nutrients in a CRF. The physical processes by which this is achieved is explained in simplified terms below.

The term 'controlled' indicates a much greater degree of control in the rate, pattern and duration of nutrient release than can be achieved using SRFs. The principle behind the success of CRFs was first employed several decades ago. Subsequent technological advances and refinements have led to a range of well-known brands of CRFs – for example, Osmocote, Nutricote, Plantacote, Floracote, Multicote, Basacote and Macracote.

Now let's explain simply how a CRF works: The coating on the prills acts as a selectively-permeable or semi-permeable membrane – a barrier to some molecules, but allowing certain different molecules to pass through. When a CRF is applied to an *adequately-moist* growing medium, there is a one-way passage of water through the coating to the inside of the prill. This phenomenon is called 'osmosis'. The absorbed water partially dissolves the mineral nutrients inside the prill to create a highly-concentrated solution. This then increases the hydrostatic pressure within the capsule. When the hydrostatic pressure becomes equal on both sides of the capsule, no more water will enter. How then does the fertiliser get out into the growing medium? This is attributable to another phenomenon known as 'diffusion' (the movement of molecules from a liquid of higher concentration into a liquid of lower concentration). Again the key lies in the structure of the coating which contains minute micropores. When the plants are watered, the hydrostatic pressures become unequal inside and out-side the capsule, and a small amount of dissolved nutrient moves out, by diffusion, through these micropores into the growing medium.

The *rate* of nutrient release in a CRF is, in most cases, temperature-related. An increase in temperature causes the micropores to expand in width, allowing more nutrient to diffuse out; remember, this is not osmosis but diffusion. (Osmosis is water *in*, diffusion is nutrient *out*.) The nutrients are then dispersed within the growing medium (also by diffusion) – coupled with percolation of dissolved nutrients when the plants are watered. We should regard this correlation between increased nutrient release and increasing temperature as a *key redeeming feature of a CRF*: Cooler weather, in general, means slower plant growth – and lower nutrient demand. This lower demand correlates with the reduced rate of nutrient release. Conversely, as temperatures rise, growth increases – demanding more nutrient. This is exactly what happens in the temperature-related release pattern of CRFs! The *duration* of nutrient release is governed in most cases by the thickness of the coating. Products have been developed which offer release times ranging from 2 to 24 months.

Benefits of using SRFs and CRFs The major benefits from using slow- or controlled-release fertilisers over readily-soluble 'straight' fertilisers include:

- Slower release rates mean longer-term feeding and minimal nutrient wastage.
- better synchronisation of nutrient release with demand.
- Improved plant growth and health (plants get what they need as they need it).
- Reduced frequency of application, with associated lower labour costs.
- Environmental benefits - minimal nutrient in leachate.
- Minimisation of concentrated nutrient build up.

2018 Popular Vote and Mini Show YTD Results

Popular Vote

Advanced		Points
First Place	Ron Jell	21
Second Place	Barry Kable	7
Third Place	Barbara McCune	6
Intermediate		
First Place	Greg Aizlewood	11
Second Place	Fred Thomson	6
Third Place	John Olsen	3
Novice		
First Place	Alfonso Trudu	16
Second Place	Gilda Trudu	8
Third Place	Cameron Smith	5
Decorative		
First Place	Ron Jell	10
Second Place	Janet Richter	6
Third Place	Gilda Trudu	5

Mini Shows

Advanced		Points
First Place	Barbara McCune	29
Second Place	Bruce Dunstan	8
Third Place	Ron Jell	5
Intermediate		
First Place	Livia Doidge	10
Second Place	Fred Thomson	7
Third Place	P Butler/J Olsen	2
Novice		
First Place	Alfonso Trudu	27
Second Place	Gilda Trudu	16
Third Place	Steve Molnar	9

CALENDAR OF EVENTS 2018

Monthly Meetings commence with plant sales from 6:45pm;

Information/Practical sessions at 7pm;

Presentations then commence at 7:30 PM.

AGM is held prior to March meeting.

Meetings are held at Uniting Church, Merthyr Road, New Farm on third Thursday each month except December.

April	19 April
May	17 May
June	21 June
July	19 July
August	16 August
September Meeting	20 September
October meeting	18 October
November Meeting	15 November

Autumn Show	21-22 April at Genesis College, Young's Crossing Rd, Bray Park
Tillandsia Study group	May 20**,** July, Sept, Nov, dates tba
Spring Show	3-4 November at Belmont Shooting Centre, Old Cleveland Rd, Belmont
Xmas Party	6 December – venue tba

Plant of the month List for 2018-19

April	Dyckia, Hechtia, Orthophytum
May	Alcantarea
June	Vriesea
July	Intergenerics
August	Sincoria
September	Billbergia
October	Guzmania
November	Neoregelia, Nidularium
2019	
January	Aechmea
February	Tillandsia

COMPETITION SCHEDULE

Note: Each member may enter 3 plants in any class at a Mini Show and 3 plants for Popular Vote.

Feb & Mar POPULAR VOTE – any genus species & hybrids + novelty bromeliad display

April -MINI SHOW

Class 1 – Bromelioideae not listed elsewhere in Schedule, species & Hybrids

(Acanthostachys, Ananas, Androlepis, Araeococcus, Bromelia, Canistropsis, Canistrum, Edmundoa, Fascicularia, Hohenbergia, Hohenbergiopsis, Neoglaziovia, Nidularium, Ochagavia, Orthophytum, Portea, Quesnelia, Ursulaea, Wittrockia)

Class 2 – Guzmania species & hybrids

Class 3 – Pitcairnia species & hybrids

Class 4 - any other flowering bromeliad species & hybrids

May & June POPULAR VOTE – any genus species & hybrids + novelty bromeliad display

July - MINI SHOW

Class 1 – Billbergia

Class 2 – Tillandsioideae not listed elsewhere in Schedule, species & hybrids

(Alcantarea, Catopsis, Mezobromelia, Racinaea, Werauhia)

Class 3 – Neoregelia up to 200mm diameter when mature, species & hybrids

Class 4 - any other flowering bromeliad species & hybrids

Aug & Sept POPULAR VOTE – any genus species & hybrids + novelty bromeliad display

October - MINI SHOW

Class 1 – Neoregelia over 200mm diameter when mature, species & hybrids

Class 2 – Tillandsia species & hybrids

Class 3 – Pitcairnioideae not listed elsewhere in Schedule, species & hybrids *(*Brocchinioideae, Lindmanioideae, Hechtia), Puya), Navioideae, Deuterocohnia, Encholirium, Fosterella)

Class 4 - any other flowering bromeliad species & hybrids

November - POPULAR VOTE– any genus species & hybrids + novelty bromeliad display

Lloyd Godman Tillandsia Sculpture Melbourne