Far North Coast Bromeliad Study Group N.S.W.

Study Group meets the third Thursday of each month

Next meeting October 20th 2016 at 11 a.m.

Venue: PineGrove Bromeliad Nursery

114 Pine Street Wardell 2477

Phone (02) 6683 4188

Discussion: September 2016

General Discussion

Editorial Team:
Kay Daniels
Trish Kelly
Ross Little
Helen Clewett

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Meeting 18th August 2016

The meeting was opened at approximately 11.00 am
The 19 members and one visitor present were welcomed.
A total of two apologies were received.

General Business

Ross opened the meeting welcoming a slightly smaller group than usual and distributed the Newsletter.

An interesting and lengthy discussion ensued about fewer people from many localities attending Bromeliad group meetings. Recent discussions are indicating membership numbers have been shrinking with thoughts being that this may be due to a greater use of internet forums rather than attending Society meetings to ask for tips on how best to grow Bromeliads and plant identification. When one follows forums for some time one realises that not all information offered is accurate with some plant identifications very misleading. Cultural tips are often offered relevant to where the responder grows his/her plants with little thought as to where the person asking the question is growing their plants. At times the discussion can be between people 1000's of kilometres apart with totally different growing climates, therefore cultural advice can differ. The reliance of many people to gain their information from the internet and how to address this was discussed, with concern expressed that many would accept all of the advice, much of which may be incorrect. Moral here is use forums as a guide only for cultural hints and check identification advice, if a cultivar or hybrid on the Bromeliad Cultivar Registry - BCR. Do not trust spelling on these forums always refer to the BCR or for species The New Bromeliad Taxon List. For species identification use Brom-L..

There was a general plea for those beginning to collect Bromeliads and those seeking advice, to gain their information from well recognised growers and Bromeliad Societies / Groups as well as the internet.

As Ross has already indicated, he will not be at the November meeting and has asked for volunteers to assist in the preparation of the December Newsletter. We would like a small contribution from many of our members who have not yet contributed, please!!

The notes can be basic, handwritten if you like; the editors are willing to fatten them up. The idea is to find subjects and topics you want to learn more about!

Show Tell and Ask!

Ross had two very different Billbergias from John Catlan's 'Helen of Troy' grex showing great variation in colours of the foliage, flowers and sepals along with variation in the patterning of the foliage. Ross suggested when asked to name / identifying a bromeliad, to not only look at the foliage but to always check on the colours of the individual parts of the flower - the petal colour, sepals and even the colour of the stigma. This last colour trait is noticeable in the two *Billbergia* 'Helen of Troy' grex plants on show. (photos p.5)

Ross showed *Tillandsia guatemalensis* in flower with its distinct peduncle bracts which were more greenish in previous flowerings but bright orange/red this year.

Keryn brought in an Aechmea for identification which was *Aechmea cylindrata*.

Gloria showed some Tillandsias in flower, a Margaret Patterson hybrid *Tillandsia exerta* x *tricolor*, *Till. juncea*, *Till. complanata,* originally obtained from Genny Catlan, this is a very dainty Tillandsia in flower. From the red flowering complex were *Tillandsia sprengeliana* and *kautskyi*. Lastly *Till. dura* with its thin red spike and *Till*. 'Josee' with its branched paddles of bright pink with blue flowers.

Ross mentioned while on his travels in Ecuador he saw the small green leaf form of *Tillandsia complanta* which we often see in collections similar to Gloria's plant. However the plants that most excited him that he spoke of were the large red foliaged form of *Tillandsia complanata* he saw at 3,200 mtrs alt. in Ecuador on his visit in 2015. (photos p.10)

Gloria asked about the growing needs of *Orthophytum burle-marxii* as she had just lost hers. It was suggested to Gloria that these Orthophytums do not like cold and wet together. They prefer a warm, sunny terrestrial situation protected by other plants, they are slow growing, respond well to foliar feeding and stone or gravel mulching.

Laurie had *Tillandsia caerulea* in flower, with a very distinct perfume from a long stemmed dainty blue flower. Bottle it if you can !

Helen showed *Tillandsia neglecta*, a small clump with attractive blue flowers.

The Woodburn-Evans Head & District Orchid & Foliage Society Inc. will be conducting their Orchid and Bromeliad Show again on September 16, 17 and 18 at the Woodburn Memorial Hall on the Pacific Highway Woodburn. Don't miss this one as it is an excellent show with many plants for sale at reasonable prices.

Ross has reminded everyone to take home their possessions after each meeting or they go into the next month's raffle.

As everybody is well aware our Group operates on meagre funds mostly gained from our monthly raffle and meeting attendance fee. These funds cover the cost of our Newsletter and few other necessities required during the year. When the funds are healthy we will buy new books for our Library. Occasionally a member will bring a tray of seedlings or excess plants along for give-aways/freebies, this is great but remember we do need funds. Therefore it has been suggested that as of the September meeting, all “give-aways” will have a $1.00 charge/donation which will go directly into our coffers.

Les demonstrated the presence of microbial growth on the bromeliad roots and surrounding potting medium. Indicating to the group that when Mycorrhiza was present you would not need to fertilise your plants as it was doing it for you.
A mycorrhiza (Greek: μυκός, mykós, "fungus", and ρίζα, riza, "root", plural **mycorrhizae** or **mycorrhizas**) is a symbiotic association composed of a fungus and roots of a vascular plant.
mycorrhizae*.com/Mycorrhizal* fungal filaments in the soil are truly extensions of root systems and are more effective in nutrient and water absorption than the roots themselves. More than 90 percent of plant species in natural areas form a symbiotic relationship with the beneficial *mycorrhizal* fungi.
Mycorrhizal fungi increase the surface absorbing area of roots 100 to a 1,000 times, thereby greatly improving the ability of the plant to access soil resources. Several miles of fungal filaments can be present in less than a thimbleful of soil. Mycorrhizal fungi increase nutrient uptake not only by increasing the surface absorbing area of the roots, but also release powerful enzymes into the soil that dissolve hard-to-capture nutrients, such as organic nitrogen, phosphorus, iron and other “tightly bound” soil nutrients. This extraction process is particularly important in plant nutrition and explains why non-mycorrhizal plants require high levels of fertilization to maintain their health. Mycorrhizal fungi form an intricate web that captures and assimilates nutrients, conserving the nutrient capital in soils. (Information gleaned from the internet)

Coral gave an interesting and very entertaining talk on her Bromeliads the experiences and obstacles she encounters trying to maintain the best growing conditions within her given section.

Gary gave a very informative talk on his irrigation system and “fertigation” equipment he uses to simultaneously water and fertilise his bromeliads and orchids. He uses a multi nozzled head for his more delicate plants which delivers the water as a soft shower. A canister connected into the main watering line dissolves a granular fertilizer whilst watering the plants. A venturi system mixes a fertilizer concentrate into the watering line as you water the plants. (photos p.11)

Billbergia ‘Helen of Troy’ and inflorescence

Billbergia ‘Archilles’ and inflorescence

Both plants are from the *Bill*. ‘Helen of Troy’ grex of ‘Trojan Tiger’ x ‘Hallelujah’ following the ‘Troy’ naming we get ‘Achilles’ for our second photo.
While foliage differences are obvious note the floral differences:
’Helen of Troy’ has rose coloured sepals with blue apex, green petals with blue tip and green stigma.
‘Achilles’ has greenish white sepals with blue apex, blue petals and blue stigma.

Some Amazing Bromeliads — Part 2 by Derrick. J. Rowe.

"Arboreal Ant-house plants revisited".

Tillandsia bulbosa

Tillandsia baileyi, Till. balbisiana, Till. bulbosa, Till. butzii, Till. caput-medusae, Till. paucifolia, Till. pseudobaileyi and ***Till. streptophylla*** are the species already mentioned in article two of this series as having enlarged pseudobulbous bases with hollows that field observations confirm regularly house ant-colonies. In addition to these eight species, I have added *Till. seleriana* due to a field report that Derek Butcher kindly advised (Rauh 1970) and because Benzing 2000 also claims it is an ant-house plant.

That *Tillandsia seleriana* is a confirmed myrmecophyte is not at all surprising. It has such a large, rotund pseudobulbous base with many cavities, that among *Tillandsia* species it is probably the one most similar in general outline to tuberous myrmecophytes such as Australia's *Myrmecodia beccarii* (other major differences aside).

There are other Tillandsia species with pseudobulbous bases that are also probable myrmecophytes but I have yet to find field observations confirming this in the literature. They are *Tillandsia ariza-juliae, Till. diguetii, Till. intermedia* and *Till. pruinosa* all of which are placed in sub genus Tillandsia making a grand total of thirteen species. Nevertheless, just to complicate the situation, five species that according to their DNA very probably belong in this 'pseudobulbous' clade have reverted to no longer having a pseudobulb. They are *Tillandsia achyrostachys, Till. concolor, Till. ionantha, Till. juncea*, and *Till. palmasolana*. For example *Tillandsia achyrostachys* is a sister species to *Till. pseudobaileyi* while *Till. ionantha* is sister to *Till. bulbosa*. In other words they are pairs of closest living relatives species-wise but only one of each pair has what was considered to be a synapomorphic pseudobulb. A synapomorphy is an evolved feature shared by all future descendents; hence it should define all future branching in a cladogram – a diagram of an evolutionary-tree. All descendents in theory should have the same synapomorphic feature but as we can see, nature seldom fits neatly into human pigeon holes. It also shows how the use of comparative morphology without the evidences emerging from genetics and other modern sciences can be very misleading.

Tillandsia ionantha

Two other pseudobulbous species are currently placed in subgenus Allardtia which possibly indicates that the pseudobulbous habit evolved at least twice within Tillandsia but the correct phylogeny is still unclear. They are *Tillandsia disticha* and *Till. ehlersiana* (Chew et al. 2010). Werner Rauh 1970 notes that *Till. disticha* is a transitional form, "the bases of the scoop-like leaf sheaths are succulent, have water-holding tissue and lie tightly packed together, the non-succulent upper sheath sections, on the other hand, form hollows inhabited by ants".

Tillandsia streptophylla

Tillandsia flexuosa co-occurs with the ant-house species *Till. baileyi, Till. balbisiana, Till. bulbosa* and *Till. streptophylla* in a study site in the State of Quintana Roo, Mexico, yet in this study it was the only species found not to contain ants (Olmsted and Dejean 1987). Although not considered a member of the pseudobulbous clade by Dr Chew's team it has a 'bulbous' base with large water-tight chambers and it usually grows high in tree canopies; a site typical of most sunlight-preferring myrmecophytes and their ants. Benzing 1990 however states that this species sometimes contains ants.

Aechmea bracteata, Ae. brevicollis and ***Brocchinia acuminata*** are all confirmed ant-house plants that have been mentioned in a previous issue.

In regard to Tillandsia ant-plants, Dr Benzing notes that their dry windblown seed offer no inducement for ants to disperse or collect seed for ant gardens, which is perhaps why some members of the so-called pseudobulbous clade have developed ant-housing rather than a life in ant-gardens. Furthermore, because trichome coated Tillandsia leaves are better than their roots in regard to nutrient uptake this also predisposes these plants to ant-fed mutualisms. He also writes that "ant-fed, ant-house Bromeliaceae outnumber those that root in ant-gardens". Yet there is little or no evidence that 'ant-house' bromeliads can "equal other ant-house flora". Presumably this is referring to their relative lack of evolutionary development toward symbiotic mutualisms. Nonetheless, as we will see in my next article on ant-gardens, probably more bromeliads gain reproductive vigour from a generalised hosting of ants and their wastes than does any other plant family.

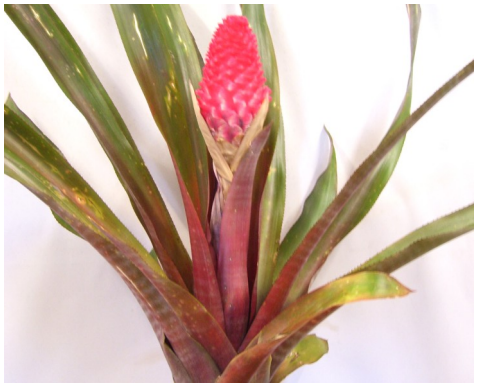
Aechmea bracteata

Incidentally, it was Dr Benzing that as long ago as 1970 first confirmed the absorption of ant derived nutrients within Tillandsia domatia.

Billbergia 'Bellesima' 1st Open
and Judges Choice Marie Essery

Vriesea fosteriana var. *seideliana*
equal1st Novice Coral McAteer

Billbergia 'Kolan Magic'
equal1st Novice Keryn Simpson



Quesnelia quesneliana
equal1st Novice Ted Devine

'Xmas'
1st Decorative Ted Devine

Tillandsia 'Josee'
grown by Gloria Dunbar

'Celebrating the Olympic Games' by two of our Members
Keryn Simpson and Dave Boudier

Aechmea warasii var. *intermedia*
grown by Dave Boudier

Tillandsia tenuifolia
grown by Laurie Mountford

Vriesea 'Tiger Tim'
grown by Kay Daniels

Photos by: Ross Little

Two forms of *Tillandsia complanata* photographed in Ecuador by Ross Little

Tillandsia complanata
grown by Gloria Dunbar

Tillandsia complanata natural hybrid ?
photo taken in Ecuador - Ross Little

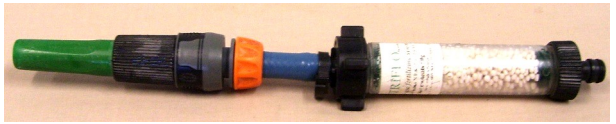
Tillandsia juncea
grown by Gloria Dunbar

Tillandsia 'Josee'
grown by Gloria Dunbar

Tillandsia kautskyi *Tillandsia sprengeliana*
grown by Gloria Dunbar

Tillandsia neglecta
grown by Helen Clewett

Tillandsia guatemalensis
grown by Ross Little



Fill clear canister with a soluble fertilizer,
connect to a garden hose,
water and fertilize your plants.

'Soft Shower' rose
used by Gary for
gentle misting.

Venturi watering system shown by Gary connects to a garden hose, the venturi line draws up concentrated fertilizer from a bucket mixing it in your main watering line while watering your plants.

Understanding Plant Nutrient - part 1 of 3

by Les Higgins 2016

Von Helmut, a Dutch botanist, in the year 1750 published the results of an experiment: A willow seed was planted into 200 pounds of oven dried soil. It was only watered. The sapling was harvested and oven dried giving 164 pounds of plant material. The soil was oven dried and found to have lost 2 ounces. To make identical units; multiply 2 by 8 = 16 ounces (one pound), multiply 164 by 8 = 1,312 pounds. The experiment suggests one pound of nutrient makes 1,312 pound of plant mass. Von Helmut concluded plants are composed of Air, Water and Sunlight with a dash of something from the soil. Little is known of this experiment. It is not considered valid and remembered only for the discovery of photosynthesis.

Von Helmut is more right than wrong! Hydrogen, Oxygen and Carbon, are "Freebies", nutrients obtained in quantity from air and water. Blending with the freebies are six macronutrients in very small proportions combined with numerous micronutrients in trace amounts. Best growth is obtained by applying minerals "weekly and weakly". Nutrient availability is controlled by pH.

"Lieberg's Law of the Minima" was published in 1860. Lieberg claimed that plant growth is restricted by the nutrient in least supply. This advice is beneficial only to fertiliser sellers. It is now known that absence of an element causes substitution or a plant demonstrates deficiency symptoms and dies without completing its life cycle. Potassium is an element that has no substitute.

Soluble nutrient is wasteful and becomes growth suppressive when exceeding the amount on the upward line of Fig 1. Every macro and micro nutrient has its own specific nutrient graph. Nitrogen's graph may have the flat line starting at below 150 parts per million. Best growth is obtained when each mineral's amount is no more than at the cusp of the sloping and flat line.

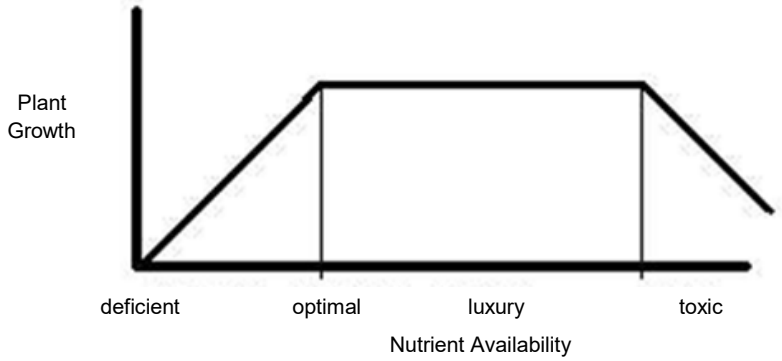


Figure 1: Graph of a Single Nutrient quantity related to plant growth.

Winter dormancy allows a plant to rejuvenate. Plants in rest require no more nutrient than is necessary to replace those elements expended to maintain the living state. (Potassium nitrate and Potassium phosphate are ideal winter nutrient).

Sixty years ago (during the writer's formal studies) this is the information to create the structure of a (non-existent) typical plant:
For one atom of molybate.
100 atoms of copper.
200 atoms of zinc.
1,000 atoms of manganese.
2,000 atoms of iron.
3,000 atoms of boron.
30,000 atoms of sulphur.
60,000 atoms of phosphate.
80,000 atoms of magnesium.
112,000 atoms of calcium.
230,000 atoms of potassium.
250,000 atoms of nitrogen.
This information is far from accurate for bromeliads but is a useful general guide to nutrition. Add a late addition to the list, one atom of nickel for every four molybate atoms.

Digressing to plant physiology; Maximum growth requires plants receiving 8 to 10 hours of darkness in every 24 hours. Non-CAM plant stomata are closed during the 'Dark Period'. Intense chemical activity occurs during darkness. Sucrose is transported from the photosynthetic cells and into the cells of storage, growth and fruiting. CAM plants require no less than 10 hours of darkness during which time their stomata are open. CAM plant stomata are closed during the 'Light Period' allowing sucrose transportation. Regular transport periods empty the Photosynthetic Cells, otherwise growth ceases. Lighting beyond a 14 hour period is counter-productive. Very difficult to comprehend is that the 'Dark Period' is actually more important than the 'Light Period'.

Inorganic elements are held in an ionic bond.
(See FNCBSG N/letter April 2016: Atomic Structure of Plant Nutrients).
'Straight Fertilizer' is one element.
'Mixed Fertilizer' is two or more elements combined but not making N.P.K.
A 'Compound Fertiliser' contains N.P.K. — 'Compound fertiliser with Trace Elements' supersedes the old name 'Complete Plant Food'.

Many fertiliser combinations are available but no one product is best for all plants in all seasons. Cheapest compound fertilizer is made from agricultural

grades of Urea (containing 1.5% Biuret poison), Potassium Chloride (Chloride 53%) and Ammonium Phosphate. More expensive and better quality nutrient is from a selection including, Potassium Nitrate, Potassium Phosphate, Mono Calcium Phosphate and Food Grade Urea (Biuret a maximum 0.04%).

Urea is the most rapidly absorbed of all chemicals. Plants are compelled to take-up urea whenever available and it assists all other minerals and chemicals to enter into plant tissue. Urea Food Grade should be the selection for plant nutrient. Urea Agricultural grade added to herbicide increases the poisons power.

Urea Technical grade is 1.0% Biuret. Urea commercial grade kills plants very quickly. Urea is unsuitable for soil addition except in "Biological Farming". For Bromeliads, fertilisers that have more than a small amount of Urea/Ammonium are best avoided. Plants growing in heavy shade are in danger of being killed by regular applications of fertilisers containing urea / ammonium regardless of the grade.

Biuret is exclusively a Urea contamination. It is so poisonous that by law, the amount of biuret in a fertiliser must be declared. Urea's nitrogen content is 46%. If the plant's label states 23% nitrogen as urea, divide 23 by 46 = 0.5. Half of that mix is urea. When that same mix states, biuret is 0.75 then the urea is agricultural grade (1.5% biuret) and indicates a very cheap, low grade fertiliser.

Organic fertilisers originate from the residues and waste of animal and plant life. They contain mineral nutrients in the form of complex organic molecules. Several weeks elapse as nutrients slowly leach from organics. The true value of Organic substance is in improving the structure and texture of the substrate, moisture retention and temperature stabilising. Crops produced by atoms of organic origin compared to atoms of inorganic salts have no discernible difference.

Plants are autotrophic, growing as a result of biosynthesizing complex inorganic components under the influence of light. Animals, and microbes are heterotrophic, they are independent of light and grow by eating organic substances. Fusion Fertilisers, formulated for Biological Farming have combined inorganic substances for plants with organics to feed microbes. They produce excellent growth partly due to having added growth hormones.

For pot plants it is prudent not to use Organics alone. There is no nitrate in Fusion Fertilises. NO_3 evolves from the waste of five species of two genera of micro-organisms. The reduction is NH_4-NH_3-NH_2-NO-NO_2-NO_3. Organic material in the substrate encourages bacteria and fungi. There is always the possibility of a beneficial symbiotic association. Benign fungi mycelium can be white hyphae, or white fur that is sometimes mistaken for root mealy bug filament. (A simple

identifier, fungus smells like mushroom). In the event of a pathogen invasion, such as *Phytophthora* use a suppressant with an active ingredient (a.i) that is also a plant growth stimulant such as Phosphorous Acid, an ingredient in 'Yates Anti Rot Fungicide'.

Scams abound in "Organics". One expensive liquid Organic Fertilizer sold to Orchid Growers made extravagant claims including "Magical Properties that confounded all the world's scientists". A competent laboratory compiled the guaranteed minimum analysis, adding the word insoluble to every element. The purchasers of this product failed to understand that the label clearly stated, "This liquid has no nutritional value". To 'off-load' this junk the seller also claimed that this product was exclusively used by the CSIRO scientists. Orchid growers actually believed this nonsense!

Before buying any fertiliser, organic or inorganic, always read the Guaranteed Minimum Analysis and don't listen to the sales person. There can be confusion between the N.P.K system and American Oxide Potential. (see FNCBSG Newsletter March 2013 - Fertiliser Confusion)

Over 80 inorganic elements have, so far, been identified as beneficial or essential for plants but not all plants need all elements. Chemical Impurities are elements that can be catalysts or poisons. Commercial grade chemicals have no impurity restriction. Agricultural grade has basic restrictions. Technical grade has greater purity. Food grade is quality at a reasonable price. A.R grade (Analytical Reagent) is extremely expensive, very pure and essential for research into plant nutrition but not required as general plant nutrition.

Strontium, a magnesium impurity, in minute amount is essential for the calcium skeleton to form. Excess strontium in cells substitutes for calcium and terminates growth. Arsenic is an impurity of Sulphate. When extremely minute amounts of arsenic were discovered in plants it was suggested to be "The spark of life". It also kills life! Epsom Salt (Magnesium Sulphate) Food Grade @$22/25kg is only slightly more expensive than Agricultural Grade and is a wise choice.

Sodium and chlorine, in minute amounts, are essential to balance the solute in cells. Chemical impurities supply adequate amounts of both micronutrients. Coconuts use sodium as terrestrials use potassium. Sodium is present in coir. Before combining coir into a potting mix eliminate the sodium by washing it in water containing Potassium chloride. After soaking the coir dump the detritus laden saline solution and rinse the remaining coir with fresh water. Sodium and chlorine in excess debilitate and finally kill a plant.

To be continued.....

Novice Popular Vote

1st	Ted Devine	*Quesnelia quesneliana*
1st	Keryn Simpson	*Billbergia* 'Kolan Magic'
1st	Coral McAteer	*Vriesea fosteriana*

Open Popular Vote

1st	Marie Essery	*Billbergia* 'Bellesima'
2nd	Kay Daniels	*Vriesea* 'Tiger Tim'
3rd	Laurie Mountford	*Tillandsia tenuifolia*

Judges Choice

1st	Marie Essery	*Billbergia* 'Bellesima'

Decorative

1st	Ted Devine	'Basket Case - Mini Neos'

Comments from the Growers:

Ted gathered his Quesnelia from the garden and potted it for the competition. He is not sure where he obtained the original, however it has grown well and rewarded him by flowering.

Keryn purchased her Billbergia some time ago and protects it from very hot afternoon sun with a large umbrella.

Coral obtained her Vriesea as a pup from the raffle, it grows on her deck out from the house where she has many of her other bromeliads. Coral has no problems with pests and diseases.

Marie purchased her Billbergia from M&M Cameron at the Queensland Brom. Society sales some years ago and it is still in its original pot. It's grown in plenty of sunshine, no fertiliser and only receives rainwater.

Kay's Vriesea was a pup acquired from Trish, the original from Peter Tristram. It grows in a shade house with 50% black shade cloth, fertilised when planted and watered when the weather is hot and dry.

Laurie's *Tillandsia tenuifolia* looks after itself and is only watered occasionally; it grows out in the full sun and thrives. Laurie has had problems with locusts.

Ted's decorative entry was purchased from Helen about 12 months ago and has grown well under his care making a lovely basket full of mini Neoregelias.