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

Study Group meets the third Thursday of each month

Next meeting 15th December 2016 at 11 a.m.

Venue: PineGrove Bromeliad Nursery

114 Pine Street Wardell 2477

Phone (02) 6683 4188

Discussion: November 2016

General Discussion

Editorial Team:
Kay Daniels
Trish Kelly
Ross Little
Helen Clewett

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Meeting 20th October 2016

The meeting was opened at approximately 11.00 am
The 20 members present and one visitor were welcomed.
A total of three apologies were received.

General Business

Ross asked that Popular Vote Shields be returned next month for engraving. A volunteer is needed to drop the Shields off, give the names to the engraver and when ready, pick the shields and trophies up. The Christmas party will be the same as last year with everyone requested to bring a plate and a plant / gardening item for our gift swap which will be run as per usual - the member/s who has attended the most meetings during the year gets to pick/swap first and so on.

From last month - Keryn's Neoregelia is an unknown hybrid and definitely not *Neoregelia* 'Citation' as tagged, further research is required.

Ross reminded everyone that the nursery is open by appointment only, please phone first to avoid disappointment, to ensure that somebody is available. Ross advised he is at the Lismore Car Boot Market, first Sunday each month.

Show, Tell and Ask ?

Ross showed *Aechmea brassicoides* which he has had for many years, this is the first time in years that he has flowered one. The inner leaves, which are very firm, fold in together and is often referred to as the 'cabbage brom'. It's hanging high in the shade house under 70% shade cloth in an area that mostly only gets afternoon sun. He also showed *Tillandsia australis,* a large tank type Tillandsia. This one had been attacked by grasshoppers and has been slightly sun burnt but still impressive. He showed a *Vriesea poenulata* which is pretty in a hanging basket and also *Aechmea manzanaresiana* which he saw growing in its natural habitat, in trees in Eucador. (photos p.9)

Helen showed some of her Tillandsias in flower - *Till. hammeri*, *Till. tenuifolia*, *Till. geminiflora*, *Till. dura*, *Till.* 'Jimna' and *Till. cyanea* var. *tricolor*.

Gloria showed a *Tillandsia tenuifolia* which was just starting to flower and also a *Tillandsia schiediana* which she refers to as her 'candle plant' because of the flowers. She also showed another tagged as *Tillandsia ionantha* 'Tall Orange' which wasn't very tall and also a *Till. ionantha* 'Pink Champagne'. (photos p.9)

Keryn had a plant in for identification with suggestions being *Aechmea maculata,* however it is most likely *Aechmea* 'Red Bands'. (photo p.9, article p.4)

After lunch Les gave an impromptu talk on fertilising. The first potting mixes were lacking basic elements. The first additives came in two bottles which had to be mixed together but the calcium and phosphate did not mix well. This led to prills e.g. Osmocote but it was temperature sensitive and could kill plants on a hot day by the dumping of fertiliser. Nutricote came along which is basically the same but works best within a certain temperature range. Les recommends this but also has his own mix containing calcium nitrate and potassium nitrate. Potassium phosphate is good for cool weather. Potassium nitrate is good for growing a sturdy plant. Half a teaspoon per watering can gives good carbohydrate plus half a teaspoon of molasses. Les was given *Cryptanthus* 'It', 'Ti' and 'New Costers Favorite'. *Cryptanthus* 'Ti' died and the others barely survived the first winter. They had no carbohydrate and were overloaded with urea and ammonium. Dosed with his own fertilising regime they have improved and now survive winters well. He made mention of Seasol which has a lot of growth hormones and a pH of 10.5. It is not sold as a plant nutrient but rather as a 'tonic' or a 'conditioner'. Black Gold fertiliser is excellent for producing more cells within plants. Seasol is good for multiplying plants plus use something else such as Powerfeed, molasses, Calcium nitrate and Potassium nitrate. By all means use commercial fertilisers, just read the analysis.

Vale: Warren William Hulbert - aged 66 years.

Sadly we lost our dear friend on 23rd October 2016. Warren was a leader in setting up floral and plant displays. For many years he was involved with the Newcastle Regional Show Horticultural and Agricultural displays. In the late 1990s he took a liking to Bromeliads and began to help set-up displays for Hunter District Bromeliad Society shows. WOW did we see some magnificent shows which really made a statement to remember, his eye for colour and balance was impeccable. Warren holidayed with us at PineGrove each September for several weeks which allowed him to show his talent and love of floral art to members of the FNCBSG NSW and to members at the Woodburn Orchid Show where he also made many friends.

Warren's talents will forever be remembered and greatly missed.

Rest Well Big Buddy

Aechmea bromeliifolia, 'Brillig', 'Red Bands' & allied hybrids
or
Get to know your *Aechmea maculata*!

by Derek Butcher

In 1986 Geoff Lawn attended the Bromeliad Conference in New Orleans. In Bromeletter 25(2):15. 1987 we read, "Depending on the source, another winner is variously labelled *Ae. triangularis* 'Red Bands' or *Ae. maculata* or *Ae. triangularis x maculata*, its crossbanding more pronounced towards the rosette base."

We know that the plants that resemble *Aechmea bromeliifolia* or the Aechmea sub-genus Macrochordion are difficult to identify. One has only to read Harry Luther's comments in J. Brom. Soc. 48(6): 244-5. 1998 to find out why!

Aechmea triangularis has blue flowers and *Ae. maculata* has yellow flowers so why the various linking to 'Red Bands'. Since 1986 we have had the Bromeliad Cultivar Register published and we find that *Ae.* 'Red Bands' seems to be a Seaborn hybrid of *maculata* and *triangularis*. I quote from the Bromeliad Cultivar Registry 1998: "cv of maculata x triangularis – formula from verbal commentary and diagnosis by Harry Luther in 1996 – sometimes known as 'Seaborn's Red Bands' – Medium upright rosette with sharply tapered pale grey green leaves distinctly marked on outer leaf surface with red maroon thin cross bands – originally thought to be a form of *Ae. triangularis* – Thelma O'Reilly attributes the cultivar to a sport of triangularis for Alice Quiros which was refined and given to Seaborn – the cultivar is listed in 1977 Kent as *triangularis* (banded leaves) and Belton in 1983 as *triangularis* (red bands) – Bromeliad Treasury 1983 said, "New hybrid adds a touch of color to *triangularis* – inflorescence is same as triangularis except flowers are blue-green."

We know that a yellow petalled plant crossed with a blue petalled plant can give odd coloured petals in the progeny. In this case blue-green is quoted but in my experience the plants I have seen seem to vary between a dirty yellow to blue green to what I call a dirty grey. BUT never the bright yellow you associate with a true *Ae. maculata*.

In about the same period as the catalogues quoted above, namely 1984, I saw in California what I thought to be an "Ae. bromeliifolia" but with beautiful cross banding. Paul Isley said he thought it was *Ae. maculata* and this name remained on the tag until Harry Luther's article in 1998 as above. The plant keys out to be an *Ae. bromeliifolia* with its very short flowers – in fact the sepals are usually only 5mm long - except for the leaf markings. This sort of leaf markings is not mentioned in any of the descriptions of any of the species in this group! Even if we look at *Ae. maculata* we find that only spots on the leaf sheath are mentioned! Because of its unique banding it should have a cultivar name and I'll be calling it *Ae.* 'Crossbands'. Could this plant have been a parent to 'Red Bands' and supplied the leafmarkings?

Now to the mid 1990's in Australia when Peter Franklin and I discussed a plant

we had each got at separate times from Bill Morris. It had *Ae. maculata*? on the label but Peter and I could not get past the greyish flowers. We were almost going to call the plant 'The Old Grey Mare' but we chanced upon *Ae.* 'Red Bands'. We wondered what colour the petals were on the *Ae.* 'Red Bands' in Bird Rock Tropicals Catalogue in 2001 because ours were not really blue green. Pamela Koide could not remember so we were not much more forward. No other similar hybrids had been reported with *Ae. triangularis* as a parent so we felt we must be looking at 'Red Bands'. If there is anyone in California that has this plant we would like to hear more about it because of the confusion about its creation!

Now to another hybrid from this group namely 'Brillig' which seems to have had a similar stormy past and similar identity problems. Peter Franklin got a plant (PAF1105) called 'Brillig' from Bill Morris and which luckily still had CJ 3/84 2/86 suggesting it came from Carol Johnson of Pineapple Place Florida. Reference to the Bromeliad Cultivar Register shows its parents to be *maculata* x *bromeliifolia* var. *albobracteata*. On page 207 in the Journal of the Bromeliad Society Vol. 33 No.5, 1983 we read "has strongly banded foliage which is apple green and red brown (in other words apple green foliage with red brown bands). The pink scape bracts are banded as on the foliage. The inflorescence is cylindrical and stands 20-25cm above the foliage. The yellow flowers turn black as they age."

Alas, the scape bracts are not banded as expected. Peter also obtained an *Ae. maculata* (PAF 1229) from another source in New South Wales and this turned out to be the same as the 'Brillig'! But where do the leaf markings come from? We do know that Pineapple Place did grow an *Ae. bromeliifolia* (Banded form). Could it be the case of foreign pollen?! By the way, you do not identify *Ae. maculata* just by the spotting on the leaf sheath but rather on the bright yellow petals, the sepals at least 8mm long and the retuse floral bracts (a 'v' cut at the tip). It is also interesting that on the very page in Bromeletter where Geoff Lawn was expounding the virtues of 'Red Bands' in 1987 'Brillig' was on offer in the Seed bank! 'Brillig' is an alleged F1 hybrid and its F2 generation would have produced a motley crew including throwbacks to *Ae. maculata*!! Is anyone still growing seedlings from 1987 that do NOT have banding?! Did they wonder if they were wrongly named?

Alas there are no original photographs in the Bromeliad Register for either 'Red Bands' where the detail was gleaned well after the event with conflicting information or 'Brillig' where the photo has been lost.

We know that *Ae. maculata* is in Australia because it was grown for years as *Ae. lamarchei* 'Rubra'. Harry Luther's article in 1998 prompted me to this. It may also be grown in its non-rubra form! Remember it has notched floral bracts not long papery ones as in *Ae. lamarchei* and has bright yellow petals.

We think that *Ae.* 'Red Bands' is in Australia – just look for an odd coloured petal. If your plant has this then please change the name.
We surmise *Ae.* 'Brillig' is in Australia but there will also be seedlings around to cloud the issue.

A Note from Derek Butcher:

It is finally out! The revision of Tillandsioideae with DNA and all that.

We used to discuss Tillandsia and TV (Tillandsia / Vriesea) with a bit of Catopsis and Racinaea thrown in. Now things expand a bit and we will need to decide where our interest lies.

New genus names to consider are:
Barfussia includes wagneriana etc.
Lemeltonia includes dodsonii etc.
Pseudalcantarea (was a subgenus of Tillandsia) includes viridiflora.
Wallisia includes lindenii/cyanea which should be a beauty where we even had problems with the old names.

The document is only some 100 pages long, is technical and will take some time to filter through. There are still areas where there are ifs and buts but at least we know where things are heading. As far as Peer review goes I would think there will be little dissension with the number and calibre of the authors listed.

It would seem better if you get these changes a bit at a time so you can digest. It may take years for some people to change their labels! However if you are growing dyeriana, hamaleana or venusta these are now ***Racinaea***.

Wallisia or Single Paddles

by Derek Butcher October 2016

You will eventually get used to this genus name which has been resurrected from 1870 in Phytotaxa 279(1): 001-097. 2016 AND covers the common species *Tillandsia cyanea/lindenii* which has given us so much strife over the years in deciding which is which. You will have to get used to the idea that *lindenii* is no longer with us!

You may recall that in 1951 Lyman Smith straightened out what was *Till. cyanea* and what was *Till. lindenii.* Basically, if it had no peduncle you thought *Till. cyanea* and if it had a peduncle you thought *Till. lindenii.* It was very complicated story in the late 1800's with so many botanists wanting to get involved with an impressive plant in great demand in the horticultural world. It now seems that examination of the 'old' papers have revealed a different story which will eventually be part of the DVD under the species names. You may be pleased to know that *Wallisia cyanea* remains as the short peduncled plant but rare in cultivation because there are so many cultivar names on offer. It tends to be a fall back name for lost labels when you cannot decide what cultivar it is!

In my last epistle in May 2016 on this complex with 'Pink Plume' (See BCR) I wondered why I saw so many plants that were in between that I felt I could not call them *Till. lindenii*. This latest Taxonomic revision has tackled this problem of hybridisation under the ICN rules rather than the ICNCP rules even though it occurred in culture and not in the wild. It would now seem that if you can't link your plant to a Cultivar name then the name to use is the hybrid *Wallisia* 'Duvalii' These include plants whose spike has a substantial peduncle (stalk). Most of these hybrids were done in Europe in the 1800s so would have had to survive two world wars. There is a much better chance that the plants we grow today originated in European nurseries after 1945 but there is little or no record of any hybridising. The first reporting is in 1962 in America with 'Caeca' which we can only presume had a peduncle in line with 'Duvalii'. However, primary investigations have not revealed this is being grown at this time, which shows how easily cultivars go out of fashion. If you have *Tillandsia lindenii* on your label it may be prudent to change it to *Wallisia* 'Duvalii'.

Now to the tricky bit:
Although we have lost 'lindenii' we do have a new *Wallisia lindeniana* which is the new name for *Tillandsia umbellata*! Because there is no formal description for *Wallisia lindeniana* we use that of *Till. umbellata.* If you do have provenance for wild collected *Wallisia* with a peduncle then *Wallisia lindeniana* should be considered.

Other *Wallisia* to look for are *Wall. anceps* and *Wall. pretiosa. Wallisia pretiosa* now includes what was called *Till. lindenii* var. *tricolor* or *Till. cyanea* var. *tricolor*. These too have paddle-like inflorescences.

Cultivars are as follows:
Anita
Caeca (considered a synonym in Phytotaxa 2016 but leave as is because it is a fairly recent hybrid)
Duvaliana (now considered synonymous with Duvalii in Phytotaxa 2016 so delete this name)

Duvalii
Emilie
Hans Gulz
Hybride H G
Josee
Paradise
Pink Plume
Roku
Sandy
Triflor

Wallisia cyanea as *lindenii*

Vriesea Tasman hybrid
1st Open Jennifer Laurie

Aechmea 'Samurai'
1st Novice Coral McAteer

'Crustaceous Tillandsia'
equal 1st Decorative John Crawford

'Twin Warriors'
Judges Choice / equal 1st Decorative
Ted Devine

Neoregelia 'Princess Caroline'
grown by John Crawford

Neoregelia 'Wild Rabbit'
grown by Keryn Simpson

Aechmea 'Red Bands'
grown by Keryn Simpson

Vriesea poenulata
grown by Ross Little

Aechmea brassicoides

Tillandsia australis

grown by Ross Little

'A Touch of Broms'
by Keryn Simpson

Tillandsia geminiflora
by Helen Clewett

Tillandsia ionantha 'Tall Orange' and 'Pink Champagne'
and *Tillandsia tenuifolia* grown by Gloria Dunbar

Photos supplied by: Ross Little

The *Orthophytum mello-barretoi* Group

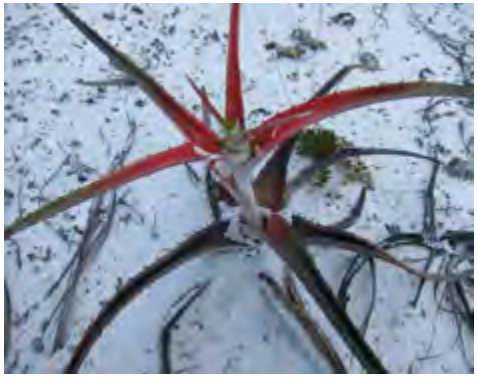
by Doug Binns 2016

Anyone with an interest in the scapose orthophytums (those species with the flowers occurring in bundles on elongated stems) will have noticed a virtual explosion in the number of described species over the last few decades, as they have increasingly attracted the attention of taxonomists. Noted Brazilian author Elton Leme has recognised three informal groups of species of scapose orthophytums, which he calls subcomplexes. Of these, the *Orthophytum disjunctum* subcomplex has by far the most species, over 30, and increasing. This group is also by far the most common in cultivation in Australia, perhaps because many species of the group have the habit of producing adventitious offsets in the inflorescence, often abundantly, making them very easy to propagate. In contrast, the six described members of the *Orthophytum mello-barretoi* subcomplex don't produce such offsets and appear to be rare in cultivation, at least in Australia. Leme notes that the *Orth. mello-barretoi* subcomplex is distinguished from the *Orth. disjunctum* subcomplex by its cucullate petals and clavate corolla (i.e. the petals are slightly hooded, to produce more-or-less club-shaped flowers). However, the two groups are usually also easily distinguished by their different overall appearance, with members of the *Orth. mello-barretoi* group having more compact inflorescences with larger inflorescence bracts which are similar in size to the basal leaves, or sometimes larger than the basal leaves. This contrasts with the *Orth. disjunctum* group in which the inflorescence is usually more elongated, with a greater number of flower clusters (often producing adventitious offsets) and bracts much smaller than the basal leaves, although there are rare exceptions to this pattern.

Orthophytum disjunctum
photo by John Catlan

The species of the *Orth. mello-barretoi* subcomplex individually have restricted geographical distributions, but may be common within the limited areas in which they occur. They usually occur on rocky ground or near rock outcrops, often in patches of sand among outcrops. Although *Orth. mello-barretoi* was the first species of the group described (in 1952), ironically it appears to be one of the rarest or most poorly-known species. Very little has been written about it since the original description and all references to it relate to a single locality, the type locality of the initial collection in Serra do Cipo. All other species were described after a gap of almost 50 years, since 2000.

Orthophytum diamantinense is named after the region of Diamantina in which it occurs. It is a striking species, among the largest of the complex and usually with a strong dark red tint in the leaves when it flowers. It is fairly common within the vicinity of the city of Diamantina but usually occurs as scattered individuals rather than in dense colonies like some of the related species. Considering that it is fairly common in a well-explored and easily accessible area, it is perhaps surprising that it was not described until 2008. This is no doubt due to the level of taxonomic neglect of orthophytums generally until recently and the likely assumption that it was just a form of *Orth. mello-barretoi*. Based on the description of the latter, the two species are similar but *Orth. diamantinense* is usually a larger plant with longer petals, sepals and floral bracts. However, plant size alone is not diagnostic. Although the longest leaves of mature plants are mostly more than 30 cm long, they can be much smaller and overlap in size with *Orth. mello-barretoi* if growing under stressful conditions.



Orthophytum diamantinense

Orthophytum diamantinense

Orthophytum eddie-estevesii is perhaps the most attractive species, although I have not seen flowering plants and base my opinion on the few available images. It is another relatively poorly-known species which appears to be rare and known only from the vicinity of the type locality (which however, was not precisely specified in the protologue). In contrast, *Orth. piranianum* and *Orth. graomogolense* are abundant within the limited area of their occurrence around Grão Mogol. The ranges of these two species occur in very close proximity and perhaps overlap, but they mostly occupy slightly different habitats, with *Orth. piranianum* occurring at higher elevations.

Orthophytum graomogolense

The sixth named species, *Orthophytum schulzianum*, was only known from its type locality when first described but other populations also occur in the same general area, near Diamantina. It is uncommon and occurs in small populations. It is very similar to *Orth. piranianum*, but the two species are geographically separated, by a little over 200 km. When Leme described *Orth. piranianum* he contrasted it with *Orth. graomogolense* (as a species to which it is similar) but did not even mention *Orth. schulzianum*, which to me is a much more closely similar species. The differences are mainly in the larger flower parts (bracts, sepals and petals) of *Orth. schulzianum* and longer spines on the floral bracts of *Orth. piranianum*. Non-flowering rosettes of both *Orth. schulzianum* and *Orth. piranianum* are superficially very similar to *Orth. disjunctum*, with their striking silvery-white leaves, but flowering plants are easily distinguished by their different inflorescence structure. The photograph of *Orth. schulzianum* which accompanies the original description seems to be of a drought-stressed plant and I don't think it does the species justice.

Orthophytum schulzianum

Orthophytum piranianum

During a recent visit to Brazil I was excited to find a population of a member of the *Orthophytum mello-barretoi* subcomplex, about 150 km north of the type locality of *Orthophytum piranianum*, which may represent a seventh, currently undescribed species. It is similar to *Orth. piranianum* but has larger leaf spines, shorter primary inflorescence bracts and more floccose leaf scales which give the plants a 'fluffier' appearance. No doubt one of the Brazilian taxonomists will eventually decide whether it really is a new species or just a separate population of *Orthophytum piranianum*.

Orthophytum aff. *piranianum* sp.

All photos by Doug Binns unless specified

Understanding Plant Nutrient - part 3 of 3

by Les Higgins 2016

Leaf analysis reveals plants taken from the wild are low in nitrogen but high in carbohydrate. Cultivated plants are the reverse having ample nitrogen and often carbohydrate deficient.

Urea/ammonium (NH_4) is an organic form of nitrogen that incorporates into the plants organic compounds becoming glutamate tissue. The result is big, soft leaves that are cold sensitive. Urea/Ammonia is a micro organism food that in nature is a gift from a passing animal. Plants compete with bacteria by squandering their carbohydrate to facilitate rapid absorption of Urea and Ammonium. NH_4 needs 1 nickel atom/1,000,000 NH_4 atoms as catalyst. (Nickel chloride).

Nitrate (NO_3) is an inorganic form of nitrogen. Utilised only by plants NO_3 is leisurely combined into carbohydrate tissue. Environmental nitrogen is mostly nitrate, the result of microbes or atmospheric nitrogen breakdown by lightning strike. (A spurt in growth often follows a thunderstorm). Molybate (Sodium molybate) is the catalyst for nitrate (1moly atom /250,000 NO_3 atoms). Nitrate (NO_3) is not absorbed by plants on a dull day or those growing in shady conditions.

Nitrogen deficiency first symptom is stunted growth. Chlorosis (yellowing of the leaf) causes anthocyanins to form in excess, giving a hint of a purple coloration to the leaves. Nitrogen can be relocated from the older leaves.

Potassium looks after health and activates many enzymes involved in respiration and photosynthesis. Potassium, for Bromeliads, is the element in highest demand. Deficiency of Potassium allows cold damage. Symptoms of lack of Potassium include dry burn (Leaf edges turn brown) and leaf spotting. Potassium can be mobilised from the older leaves to the younger leaves. Potassium can be repressed by Nitrogen.

Potassium nitrate plus Epsom salts promote flowering. This combination tends to deter insects.

Potassium phosphate accelerates maturity and autumn applications increase cold hardiness.

Phosphate is an integral part of many compounds, including sugar-phosphates of respiration and photosynthesis. Also in phospholipids that make plant membranes. Phosphates create insoluble bonds with Calcium (Tri calcium phosphate) and also iron (Iron phosphate). Deficiency symptoms of phosphate include stunted growth and dark greenish-purple colouration in leaves that may be deformed and contain necrotic spots.

Soft rock phosphate (Mono calcium phosphate, Ca24 % P10 %) does not bond with free Phosphate. Use in lieu of calcium in a potting mix. Mono calcium phosphate +Potassium nitrate + Shuttle make excellent cold weather nutrient giving N.P.K. Ca plus micronutrient (this is similar to Phostrogen™) needing only an individual application of Epsom salts to make the macronutrients complete.

Phostrogen™ is formulated for English (cold weather) orchids. Campbells Yellow™ is formulated for Australian orchids (warmer conditions). The ingredients of Campbells Yellow™ differ from Phostrgen™ in Ammonium-phosphate not Mono-calcium-phosphate. In cold weather Ammonium causes toxicity but its advantage is that it forces growth. Of the two nutrients Phostrogen™ would be slightly better for Bromeliads due to the calcium content and Campbells Yellow™ is preferred for Australian orchids because of the growth driving effect of Ammonium.

Calcium (a metal) improves leaf concentrations of N, K, Mg and Boron and increases Brix (sucrose content). Calcium moves poorly in plant tissue and is pulled from the growing points by EDTA. Deficiency is a black root tip and necrosis of leaf margins and tips. Further deficiency symptoms occur in the meristematic regions, where mitotic cell division, (one cell divides into two cells) has occurred and particularly in the middle lamellae separating the newly divided cells.

Magnesium is central in chlorophyll. Magnesium**:** calcium ratio governs oxygen intake. Deficiency reduces the uptake of other elements and increases the possibility of heat damage. Deficiency symptom is interveinal chlorosis first seen in the older leaves. Premature leaf abscission may occur. Magnesium nitrate (home-made, see May 2016 newsletter, page 16) is a ratio of 80,000 atoms of Magnesium and 250.000 atoms of Nitrogen. Epsom salt ratio has 80,000 atoms of Magnesium and 30.000 atoms of sulphate. The companion assists in nutrient uptake. The quantity of Sulphate may not be sufficient to enable the full absorption of magnesium. Nitrate puts Magnesium into overdrive.

Sulphate deficiency symptoms are similar to nitrate deficiency. This is not surprising, since sulphate and nitrogen are both components of protein. Use potassium sulphate to counteract deficiency.

Many micronutrients are present in the biosphere and detected in plant tissue. A valuable micronutrient source is seaweed, by 1980, is known to contain over 40 elements. More than one hundred years ago only six micronutrients were determined to be essential for plant growth. Today they are the micronutrient of commercial products. Including molybate, they are:

Boron improves fertility, is involved in nucleic acid, hormones and membrane function. Increasing the amount of boron makes some ‘self sterile’ plants become self fertile. Boron is toxic when calcium levels are low. Deficiency is a black necrosis of young leaves and terminal buds. Borax is not the best selection of boron but is cheap and easily obtained.

Iron is in chlorophyll biosynthesis. Apply Iron Sulphate with citric acid or tartaric acid, both are chelating agents, and thus avoid using Iron Chelate, (Iron EDTA). Iron deficiency can be seen as yellowing in the older leaves. Ferbam™ (Fe= ferrous) is a superb fungicide and growth stimulant, if it can be obtained. It was never popular due to rusty stains that persisted for months. Ferbam is no longer registered for use in N.S.W.

Silicon, occasionally added to the trace element list, is not essential for Bromeliads but has the potential to stiffen the sieve tubes, preventing the entry of insect piercing and sucking mouthparts (aphids, mealy bug and scale). Silicon has limited movement in plant tissue and must therefore be constantly available throughout the growing season. Diatomaceous earth break-down has the potential to supply silicon. Bottles of 48% Potassium silica are available together with unrealistic claims.

Copper and **Zinc** are associated with photosynthesis, enzymes and chlorophyll. Almost zero copper and very little zinc are required by Bromeliads. Fungicides made from either of these two metals are extremely damaging to Bromeliads.

Manganese is a metal that activates a number of enzymes. Manganese absorption is prevented when foreign sources of EDTA, usually Iron Chelates, are within the plant. Lack of manganese causes an emerging leaf to be white. In mature leaves the deficiency symptom is interveinal chlorosis. Manganese is involved in the photosynthetic reaction of extracting oxygen from water. Manganese deficiency can be corrected by Manganese sulphate.

For readers who appreciate scientific explanation: Manganese photosynthetic information taken from the book - **Plant Physiology**
“Decarboxylases and dehyrogenases involved in the tricarboxylic acid cycle are specifically activated by this divalent cation”.
Scientific language is inappropriate for amateur publications unless fully explained: Decarboxylases, remove the carbon atom.
Dehyrogenases, from water.
The writer attempts to present articles at the reader’s presumed level of understanding and apologises for articles that have been described:
“A bit too technical” or maybe inadequate in detail.

Novice Popular Vote

1st	Coral McAteer	*Aechmea* 'Samurai'
2nd	Keryn Simpson	*Neoregelia* 'Wild Rabbit'
3rd	- - - - - - -	

Open Popular Vote

1st	Jennifer Laurie	*Vriesea* 'Tasman' hybrid ?
2nd	John Crawford	*Neoregelia* 'Princess Caroline'
3rd	Laurie Mountford	*Tillandsia duratii*

Judges Choice

1st	Ted Devine	*Neophytum* 'Galactic Warrior' (Twin Warriors)

Decorative

1st	John Crawford	'Crustaceous Tillandsia'
1st	Ted Devine	'Twin Warriors'

Comments from the Growers:

Jennifer's Vriesea, imported from the New Zealand Conference by Neil Bain is grown under beige shade cloth, it's given slow release fertiliser when potted.

John grows his Neoregelia under 50% shade cloth, having it hung high close to the mesh he feels it gains better colour and still pups very well.

Laurie has had his Tillandsia duratii for over 20 years, it is a very slow grower for him, it has never flowered, maybe move it to another position may help.

Coral was given her *Aechmea* 'Samurai' by a friend 6 mths ago, it has done well through winter being watered twice weekly and grown in filtered light.

Keryn bought her Neoregelia from the Gold Coast, she finds it requires plenty of light for good colour. It is grown in a well protected position along the side of her house. It did have some scale but the use of 'Crown' kept it at bay.

Due to time constraints (your editor is taking a well deserved holiday) there will be NO Newsletter for December.
Hope you have a good November meeting and I'll see you when I return, with a few tales.