BROMELETTER

THE OFFICIAL JOURNAL OF THE BROMELIAD SOCIETY OF AUSTRALIA INC.

Issue: **Volume 51 Number 3- May-June, 2013.**

CONTENTS

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Cairns Bromeliad Society Inc . The Secretary, P.O. Box 28, Cairns. Qld. 4870

Gold Coast Succulent & Brom. Society The Secretary, P.O. Box 94, Southport B. C., Southport Qld. 4215.

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All other correspondence to:
The Secretary, Bromeliad Society of Australia Inc.,
P.O. Box 340, RYDE NSW 2112.

Please Note

BROMELIAD plants will be on sale at the Club from 12.30 p.m. before the monthly meeting.

MEETING VENUE AND TIME
SECOND SATURDAY OF EACH MONTH AT THE BURWOOD R. S. L. CLUB,
Cnr. Shaftesbury Road and Clifton Avenue, Burwood.

Meetings commence at 1.00 p.m. in the First Floor Conference Rooms/ Auditorium.

MEETINGS PROGRAM

May 11, 2013	**Special General Meeting at 1.00 p.m.** **Show and Tell Members** after Special Meeting. **Talk: To be arranged.**
June 08, 2013	**Show and Tell Members.** **Talk: To be arranged.**

EVENTS CALENDAR

May 25/26, 2013. BSA Autumn Show, Burwood RSL, Shaftesbury Rd, Burwood.
July 13th, 2013. BSA 50th Anniversary Party. Burwood RSL - as above.
October 12/13, 2013. BSA Spring Show, Burwood RSL. - as above.
April 16 to 19, 2015. 18th Australasian Bromeliad Conference, Parramatta. NSW.

Life Members:
Grace Goode O.A.M
Bill Morris
Ruby Ryde
Keith Ryde
Andre Staelens
Ken Woods

Editor:
Eugene Morris,
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(02) 9743 6443

MAIL ORDER PAYMENTS BY BANKCARD/MASTERCARD/VISA.
(Subject to A$10.00 minimum.)

Members using the Bankcard, Mastercard or Visa mail order facility should provide the following details, printed clearly in block letters, on a separate sheet of paper:-

- Name and address of **MEMBER.**
- **CARDHOLDER** name details, as shown on card.
- Bankcard/Mastercard/Visa number and expiry date.
- **CARDHOLDER** signature (essential).
- Payment details (membership renewal, book purchase, postage, etc.) with $A amounts for each item.

BROMELIAD SOCIETY OF AUSTRALIA INC.

NOTICE IS HEREBY GIVEN
For a Special General Meeting of the members of the Society to be held at 1.00 p.m.
On Saturday, 11 May, 2013 at
Club Burwood (Burwood R.S.L.)
96 Shaftesbury Road,
BURWOOD NSW 2134

The purpose of the meeting is to consider the following special resolution relating to the Alteration of the Constitution:

Clause 42 and the heading AUDITOR are to be deleted and replaced with the following:

"**INSPECTION OF ACCOUNTS.**

The accounts of the Society shall be prepared by the Treasurer at the end of each calendar year. These accounts will be inspected by an Independent Accountant who shall report thereon, such report together with the accounts to be presented by the Treasurer at the Annual General Meeting.

Should an Independent Accountant not be available to act on an Honorary basis, funds shall be provided to obtain accounting services on a professional basis."

The reason for this alteration is that, under the old Clause 42, a complete audit of the accounts of the Society was required. This is expensive and time consuming and is not required by the Office of Fair Trading for small organisations. An inspection by an Independent Accountant is all that is required.

The normal monthly meeting of members will follow immediately on the closing of the Special General Meeting.

Only financial members of the Society will be permitted to vote at the Special General Meeting.

DATES OF SOME UPCOMING EVENTS TO GO TO...

a 13 July 2013 - Special 50th Anniversary of the BSA celebrations.
Please start contacting all of our respected older Bromeliad heroes and invite them along.

b The Queensland Bromeliad Society will be having a Tillandsia Workshop on May 26th, 2013, hosted by John Olsen. Enquiries to John at
tillsjohn@bigpond.com
All Welcome

c Bromeliad Society International - 20th World Conference
"Bromeliads in Paradise"
To be held in Honolulu, Hawaii, from September 8 to 14, 2014. Info at
www.bsi.org
or Greg Aizlewood, telephone (07) 5546 1161.

d 18th Australian Bromeliad Conference: "BROMSMATTA"
April 16th to 19th, 2015
At Parramatta, N.S.W. Australia.

e Toowoomba Orchid Society Inc.
Orchid and Bromeliad Shows at Toowoomba.
Friday September 20th to Wednesday September 25th, 2013.
Orchids at Centenary Heights School Hall, Cnr Ramsay & South Streets.
Bromeliads at St. Paul's Lutheran Church Hall, Cnr James & Phillip Sts.
For Information:
John: (07) 4697 8119
Margaret: (07) 4630 1911
E-mails: tanbark toowoomba@hotmail.com
Website: www.toowoombaorchidsociety.org.au

f "The Bromeliad Society of Queensland has moved its web site.
New address is <"www.bromsqueensland.com.au">

g Bundanoon Garden Ramble.
Saturday & Sunday, September 26/27, 2013. 9.30a.m to 4.30p.m.
Further Details:
info@bundanoongardenramble.org.au

h The Garden Clubs of Australia Inc. 2013 Biennial National Convention.
Blooming In Ballarat Gardens, Gold and History
September 15 to 18, 2013.
Ballarat, Victoria.
Contact Friends of Ballarat Botanical Gardens Inc.
On (03) 5342 9354 or info@fbbg.org.au and www.fbbg.org.au

Tulip Time again at Bowral. September 24 to October 7, 2013.
WWW.TULIPTIME.NET.AU. **Phone:** 1300 657 559.

Ian.

VRIESEA 'GEMMA'

by Derek Butcher Feb 2013

In 1995 Adelaide hosted an Australian conference and Adam Bodzioch presented a paper on Vrieseas from Belgium, that had been written by Gilbert Samyn from the Agricultural Research Centre in Ghent. Details were published in Journ. Brom Soc 45: 99-109. 1995. In the many revelations, mention was made of a *Vriesea* 'Gemma', a Duval hybrid in 1893. The problem was that his photo showed no resemblance to the 'Gemma' as grown in Australia. In fact our 'Gemma' looked like a 'Mariae'! The description of 'Gemma' in the Bromeliad Cultivar Register is confusing. I quote, 'A small plant with bright green foliage and a single upright flattened spike with yellow bracts edged in bright red – lemon yellow flowers.' Dutrie (1946) said, "Small plant, short fat spike, bright red."

Because I had no concrete information, this apparent misidentification was put on the back-burner. In 2013 I was browsing through an old publication in DC Monogr Phaner. IX 1896 by Mez where on page 567 I found the following:

Vr. Gemma Hort. Duval [*Barilleti* x (*carinata* x *psittacina*)] x Vr. (*duvaliana* x *incurvata*).
Est mixture infernalis, hortulanis gaudium, botanicis horror, specie cujusque aliquid praebens. Bracteis minute punctulatis et hic *Vr. Barilleti* compositionis partem esse affirmatur. Inflorescentia flabellata.

Roughly translated this says – An infernal mixture, gaudy horticulturally, botanically a horror. Bracts minutely spotted as per *Vr. Barilleti.* Inflorescence fan shaped.

The parents of Vr. 'Mariae' are [*brachystachys* (now known as *carinata*) x *barilleti*] and you can see some similarity in the parents used, with Vr. 'Mariae' easier to understand. If a re-make were done it is also easier to understand it would be easier done for Vr. 'Mariae' rather than Vr. 'Gemma'!

Note for the pedants amongst you. *Vriesea barilleti* was the spelling in those days even though you spell it *Vriesea barilletii* these days. If, by the way, you are growing this species please let the writer know.

We don't know how 'Gemma' got to Australia other than from a record in the infamous ledger of Pinegrove nursery where it shows they got the plant in 1984 from Margaret

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Vriesea 'Gemma' *Continued from Page 6)*

Paterson. She in turn got her plant from Mr G. A. (Don) Patterson from Coff's Harbour in the 1970s. Don was one of the founding members of the Australian Brom. Society and linked to 'Beautizone' Study group around Coff's Harbour area. This group seems to have quietly faded away. We do not know where he obtained it, but it could have been imported by one of his contemporaries.

Further investigation has revealed that about 40 years ago Robert and Gleness Larnach were looking for bromeliads at Ferguson's Nursery at Baulkham Hills in Sydney, and there on a round table was a Vriesea 'Polmanii' (Butcher's comment – We think this is a mis-spelling of Vr. 'Poelmanii' in its many forms.) which led to further enquiries. Jammed under a privet hedge was a plant called Vriesea 'Gemma' The assistant said that some old guy had deceased and the collection had been bought by Ferguson but no one knew what they were or what to do with them, so it was obvious that he was a collector of these imported exquisite plants very early on. We are therefore not certain if 'Gemma' was imported once or on more occasions but all the action seems to be in the Central Coast area. Importation would be more likely from the USA rather than Europe and where better than a large concern in California? We know that in the 1967-8 catalogue of California Jungle Gardens there is a reference to *Vriesea* 'Gemma' described as a free flowering small edition of Vr. 'Mariae' on offer at US$ 2.50 *Vriesea* 'Mariae' at the same time was US$4.00, so 'Gemma' must have had a lower status!

In trying to find what the real differences were between Vr. 'Mariae' and what we grow as Vr. 'Gemma', I looked at the yellow petals with or without green tips and came across a problem. Vr. Mariae' is very popular and has been widely written about. All paintings show green tips and yet the description says uniformly yellow! Our 'Gemma' has totally yellow petals and I cannot find any discernible differences. I am sure that although there are plants around with "Gemma' on the label there are some where the label got lost and the plant was subsequently identified as 'Mariae'. It has been suggested that this plant be called 'Gemma Gold' to show that it is different to the original 'Gemma'.

If you are the discerning type you may change your label but ,in any event, the Bromeliad Cultivar Register will have both names linked in case there are queries in the future.

Acknowledgements – I would have been lost but for the findings of Ross Little.

SHOW & TELL
FEBRUARY, 2013

The beginning of this month's Show and Tell belonged to ***Terry Davis,*** who commenced with a *Tillandsia* from Ken Woods. Ken belongs to a group of Tillandsia growers which goes under the name of 'Tillnuts' and meets every two years or so in Albury, in southern New South Wales. One of its members looks after the varieties of *Tillandsia fasciculata* and at the present time he is up to something like sixty-two different varieties in the group. The plant Terry was showing was one of them and it was followed by a second plant which survived a break-up because he wanted to see what it would do; he says he likes letting his Tillandsias go so that he can follow their course of development. He also likes to grow his Tills. into clumps and, to illustrate this, he presented a clump of *T. leoboldiana,* which he feels looks so much better with three or four spikes instead of just one. They are easy to grow and easy to care for. It would not be called a 'colony', it is really an example of multiple plant growth. He has a number of different varieties of *T. leoboldiana* and they all grow differently. Some are quite small, but there are pendulous forms, of which he has one, and has about four distinct varieties as well.

The other plant he brought in was a different variety of *Nidularium innocentii.* There are several different varieties of it, one with striations and other things. A lot of Nidulariums have white flowers, depending on how much light they receive.

Last but not least, Terry referred to the Seed Bank. Some years ago, Debbie Hurst brought in some *Aechmea recurvata* seeds, so Terry took some and grew them. Now he has a lot of seeds to give to anyone who would like to try growing them. Of course they were not from the Seed Bank. He has also some tiny seedlings of *Aechmea recurvata* which came into the Seed Bank in September last year. He planted them in November in a take-away container, covered to stop pests from attacking them. It proves that you can have quite a number of plants of aechmeas or vrieseas or whatever, but Tillandsias and Vrieseas do take considerably more time. It is interesting that, for 50 cents a packet and 60 cents postage, you can build yourself a lot of plants quickly and have a lot of enjoyment doing it. One of the plants he brought in for today's Sales Table was grown from seeds which he purchased from the Seed Bank in 2007. From the Seed Bank now, he has some seed of *Aechmea rubens*, the seed having been donated by Werner Raff, plus some seeds of *Aechmea bromeliifolia* var.*albobracteata,* donated by Laurie Mountford from Ballina.

Kerry McNicol was next with a *Canistrum aurantiacum,* which she has had for years. It doesn't like the cold, so it has been in her shadehouse for most of the time she has owned it. It has green leaves and red flowers..

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Show and Tell—February, 2013. *(Continued from Page 8)*

Joy Clark presented a *Vriesea* which she bought from Ross Little in Wardell. It has the number 3037 written on the label, but she would like some better identification of what the plant really is. No one was able to help.

President Ian also had some Show and Tell items, the first being that, at our last meeting, February, a plant, *Vriesea lubbersii,* was left behind; it was soon claimed. The first plant from his own collection was a small *Vriesea,* labelled *V.* Patty, one of Ken Woods' hybrids. Now that it has flowered, it is obviously wrongly named, but he is chasing this one particularly because he really loves the flowers. There is no hint of green at all, just a rich brown scape, then a few yellow flowers. No one was able to help him at this stage.

Next was one for newer members who may not have come across it so far. It was an *Acanthostachys.* There are only two known species in the whole Bromeliad genera. One is *A. strobilacea,* which has the little pineapple-like growth coming at the end of the plant, little miniature pineapples. A lovely plant but very rare, as there are only two in this family. The other one is called *A pitcairnioides;* its flowers are unusual but not very remarkable in appearance. They pop up for a day or so, right down at the base level and, unless you are extremely lucky, you would never see them. They are tiny little blue flowers and they just look like a pile of grass, as Ruby and Keith say, growing all over the paddock. But the plant which did flower and which Ian had seen before, did actually set seed after flowering, weird white lumps down at the base of the plant.

SHOW & TELL
MARCH, 2013

President Ian began this session with a query about a whole family of *Aechmeas* named 'Rajah', 'Candy Corn' and 'Popcorn' and he wanted to know if anyone is easily able to tell the difference between the different hybrids. They are all listed on our web-site and the BSI website, with unknown parentage; nearly all of them came from Hummel. He was one of the early developers and breeders of Bromeliads who did not list the parents of his plants very well. So do we think we have any experts here?

Most seem to lean towards the name *Ae.* 'Rajah', because of the broad leaves. Ian says that there is a subtle difference in the flowers as well. Ken Woods said that they are all much the same in color, i.e. reddish, but the shape of the inflorescence varies. Ian agreed; some were triangular, some more open.

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*Show and Tell - March, 2013.**((Continued from Page 9)*

Continuing, Ian said that there are a few examples which most collectors would have and no one is very thrilled about them these days, but when they first came out, they were the hottest things going. And they are still lovely plants.
Keith Ryde added the comment that, while Hummel did record the parents of his plants, he didn't release the details to the public, which makes it difficult when, later on, members make a similar cross and they have to scratch their heads to try to work out where the parents came from. Both our website and the Florida County Bromeliad Society website have some examples of the Hummel hybrids, but Ian doubts if there is a cross reference between each of them which he should put in, saying 'This is Rajah, but also look at X, Y and Z,' If you look at those photos you will have a fair idea of which one is which. Even more importantly, when you acquire a plant, don't lose the label!
Robyn Firth brought in some plants which have curious backgrounds. One was *Ochagavia literalis;* some will call it '*carnea';* there is quite a bit about it on our website and it is well worth a look. It comes from the cool southern areas of Chile and grows well in her place which would be a little bit cooler than some of the coastal areas of Chile. It is quite stunning, with spiky green leaves. Ian commented that Derek Butcher has been working on some of these plants which are turning up in South Australia labelled 'carnea'. Apparently there were some problems with that name so he has amended it and come up with some good arguments as to why it was probably that one. But there is another one in the family which doesn't flower and without flowers you haven't a clue as to what it is.
Robyn's second plants were *Nidularium innocentii* and *Nidularium rubens,* which is a species, but, according to Ruby, 'rubens' is no longer found in nature. Robyn's 'innocentii' plants were *Nid. innocentii* var *striatum* and *Nid. innocentii* var *lineatum;* one of them has been in a fair bit of shade. It will become more compact and show the difference between the two plants. '*striatum'* has leaves which are white on green and *'lineatum'* leaves are just the opposite, green on white. Ian commented that one of Robyn's plants has stripes which are sometimes red, sometimes white and come and go and are yellowish, while the other plant's stripes are greyish/white. But these are
.

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Treasurer's Report – (1):

Treasurer Alan Mathew gave the following details regarding our Operating Account to January 31, 2013:

Brought Forward	**$12,001.36**
Plus Income:	**1,084.54**
Less expenses	**3,695.63**
Bank Statement as at 31/01/2013:	**$9,390.27**

Show and Tell. *(Continued from Page 10)*

only subtle differences; put them side by side and they look completely different. One of them has a very bluish tone.

Ron Farrugia referred to *Aechmea recurvata.* He has had a few on the Sales Table and people have been asking him how to grow them. So he showed a seed pod from one of the plants and explained that first you need to take a tissue about the same size as your pot. Set up your pot using a fine bark mix or a slightly coarse potting mix. Then you squeeze the contents of the seed pod on to the tissue paper and you will have up to fifty little black seeds. They come out like a gel, so you spread them out as much as you can, put the piece of paper on top of the mix in the pot and sprinkle a little more mix over the seeds. You must keep it moist and eventually they will grow into *recurvata* seedlings. When they are big enough, you transplant them into pots.

Ron took the opportunity to mention that the Clubs associated with one of his other hobbies, Koi fish, were having a Show on April 7th at Castle Hill, in the Cumberland State Forest.

The approaching Autumn Show was Ron's next subject and he concentrated on labels, encouraging all intending sales people to ensure that their labels were readable. The labels should be the new stick-on type that the Society has introduced with the 2015 Conference firmly in mind. Tillandsias presented a problem for these labels as most of them are on mounts, not in pots, meaning that there is no place to affix a label. If the name is on a paddle-pop stick, the label could be stuck on to the stick, but inevitably there would be a large overhang. The labelling must be uniform and the new labels used.

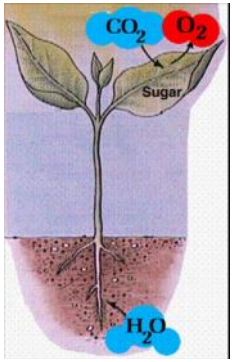
Alan Mathew showed a photograph taken in the Sydney Botanical Gardens of a bromeliad which he hoped someone would recognize and identify. Apart from the fact that it was an *Aechmea,* no one was able to help.

Next, Alan presented a *Tillandsia utriculata* which had produced an inflorescence with branches like a deciduous apple tree, but it has not come up with any flowers yet. It was four months old, had green leaves and was a good-looking plant which has to be grown from seed, as pups are extremely rare.

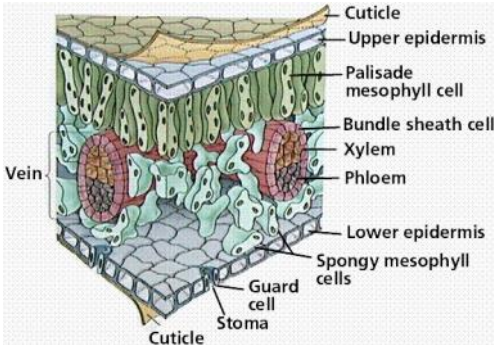
Kerry McNicol's first plant had green/maroon leaves and was labelled *Wittrockia smithii,* but she doubts if this is correct as it looks very much like a *Nidularium*. No one was able to help at this stage.

Next she showed a *Nidularium* 'Maggie Hicks' and she was trying to find out any information members might have about it. The leaves are always a problem as they tend to drop off and no amount of care makes any difference. Ian mentioned that everyone who grows Nidulariums faces that problem and it is almost impossible to keep the leaves in good condition.

Her third plant was an unknown *Neomea*; it was something like 'Shooting Star' but no one was able to help any further than that.

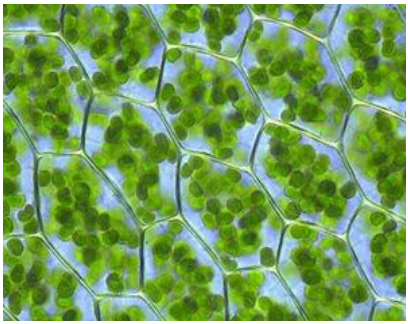


Picture 1 -



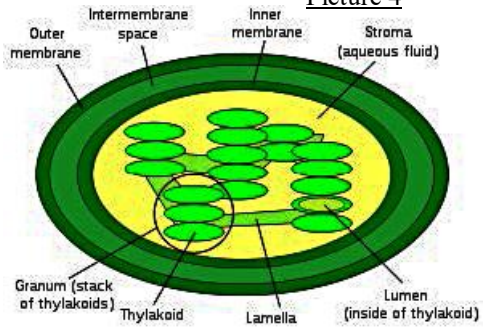
Picture 2

Picture 3

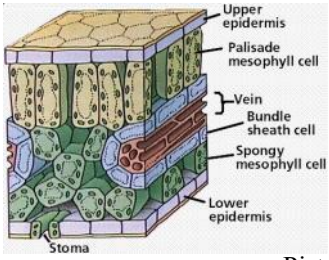


Plant cells with visible chloroplasts.

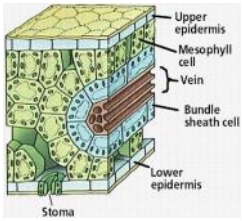
Picture 4



Simplified structure of a chloroplast.



Picture 5—Page 18
Cross-section C3 leaf



Picture 6—Page 18
Cross-section C4 leaf

Pictures referred to in Don Beard's article on Pages 17 to 19.

Vriesea 'Nicci Isley' by Ken Woods

Bill 'Hallelujah' Open 1st Judges, 2nd Members Philip La

Tillandsia 'Tamaree' 1st Judges & Members Novice Kerry McNicol

Aechmea purpureorosea 2nd Judges 1st Member Open. David Scott

Neomea Unknown. 2nd Judges & Members. Novice Kerry McNicol.

Neoregelia 'Domino" 3rd Members. Open John Cornale

Tillandsia tectorum 3rd Judges Open John Cornale

Guzmania unknown. 1st Judges & Members Open. April, 2013. Helga Nitschke.

SEARCH FOR A BROMELIAD
IDENTITY UNKNOWN

Last November Ian received this e-mail:

Hello there,
I have been reading about Mr Butcher, the detective on your web and it has inspired me to write about my quest.....
When I got married (in the last century, in Germany, and for about ten minutes) , there were two small bright green plants in with the orchids in my wedding bouquet. Like stars, each about 7cm diameter together, the leaves curving out, down and away, about 1cm across at their widest part, the suggestion of a dark pink line down the middle.
I gave one to my mother in law, who threw it on the compost heap (an ominous sign of things to come), and I filed my copy in a large sealed glass jar on a bed of sand, in an ill-lit position, and there it thrived and multiplied in a way both uncanny and spooky.
That was in Germany and when we divorced it was (also) Disposed Of.
In the last year I have had the idea of starting up another such plant, but have been quite unable to identify it, or find anything similar.
Would you be able to suggest any ways for me to find out please?
I don't have any photos of my bouquet.

Hope this letter is not a nuisance for you,
Yours sincerely,
Robyn Pogmore.
From Wagga Wagga, NSW.

President Ian thought that there was enough in this story for it to be shown in Bromeletter and here it is.

Ian can also now report a happy conclusion to the story, yet another person bitten by the Bromeliad Bug. And another guest at a 2013 Show?
By exchanging photos and after many e-mails, the plant was narrowed down to a *Cryptanthus,* probably *bivittatus,* Starlight, Ruby or Pink Starlite.
He sent her several possible plants, which are all doing well and are all VERY MUCH LOVED.
So there you are; you never know what you can do!.

Plant of the Month Competition
February, 2013

Open	**Judge's Choice.**	
First	John Cornale	*Tillandsia fasciculata.*
Second	David Scott	*Tillandsia capitata* 'Marron'.
Third	Joe de Gabriel	*Guzmania* 'Theresa'.
Open	**Members' Choice**	
First	David Scott	*Tillandsia capitata* 'Marron'.
Second	John Cornale	*Tillandsia fasciculata.*
Third	Joe de Gabriel	*Guzmania* 'Theresa'.
Novice	***Judge's Choice***	
First.	Joy Clark	*Neoregelia pendula x eleutheropetala.*
Second	Warril Evans	*Tillandsia mallemontii.*
Third	Kerry McNicol	*Neoregelia* 'Picalo'.
Novice	**Members' Choice**	
First	Joy Clark	*Neoregelia pendula x eleutheropetala*
Second	Warril Evans	*Tillandsia mallemontii*
= Second	Kerry McNicol	*Neoregelia* 'Picalo'.
	Margaret Draddy Artistic Competition	
First	Joy Clark	Habitat
Second	John Cornale	Brom Mix.
Third	Joe de Gabriel	Owl in the Log.

March, 2013

Open	**Judge's Choice.**	
First	Phillip La	*Billbergia* 'Hallelujah'.
Second	David Scott	*Aechmea purpureorosea.*
Third	John Cornale	*Tillandsia tectorum.*
Open	**Members' Choice**	
First	David Scott	*Aechmea purpureorosea.*
Second	Phillip La	*Billbergia* 'Hallelujah'.
Third	John Cornale	*Neoregelia* 'Domino'.
Novice	**Judge's Choice**	
First	Kerry McNicol	*Tillandsia* 'Tamaree'.
Second	Kerry McNicol	*Neomea Unknown.*
Novice	**Members' Choice**	
First	Kerry McNicol	*Tillandsia* 'Tamaree'.
Second	Kerry McNicol	*Neomea Unknown* .

PHOTOSYNTHESIS FOR BROMELIAD GARDENERS

A three-part article, presented to the Far North Coast Study Group, NSW.

Photosynthesis 1 by Don Beard.

The following presentation was given to FNCBSG(NSW) members as a precursor to an introduction to C4 and CAM plants. It is believed that a basic knowledge of photosynthesis in vascular plants will be a good beginning. The initial discussion of very basic chemistry will be foregone herein.

Photosynthesis means the putting together with light or the making or manufacturing with light. It converts light energy into chemical energy and stores it as sugar. It occurs in green plants and requires the green pigment 'chlorophyll'. It is the source of energy for nearly all life, the exception being bacteria and archaea living in extremely hostile environments (chemoautotrophs). This very important but simplified process can be written chemically as:

$$6CO_2 + 6H_2O \text{ (+ light energy)} \rightarrow C6H_{12}O_6 + 6O_2$$

i.e. green plants in the presence of light combine carbon dioxide and water to make sugar and oxygen. In other words green plants make their own food. This most important equation is the ultimate source of all carbon in the atmosphere.

For this process green plants capture approximately100 terawatts of energy in any one year. This is approximately six times the entire human power usage in one year. But where in the plant does this all take place? The answer is in the leaves so we had better look more closely at a typical leaf cross-section.(See Picture 2 on Page 12.). The green colouration occurs in bodies called chloroplasts which in turn occur in the mesophyll of the leaf, not in the surface of the leaf. (See Pictures 3 & 4.) These chloroplasts contain bodies (thylakoids) which are stacked like pancakes. It is in the margins of these pancakes that the chlorophyll and other pigments occur. It is here that the energy from the sun is absorbed.

Simplified, photosynthesis can be divided into two stages:

Stage 1 or the Light-dependant Stage is where energy is absorbed from sunlight by the chlorophyll in the Thylakoid membranes. Only the red and blue ends of the spectrum are absorbed and stored. Green light is not used and is reflected, hence the plant's green appearance. At this stage oxygen is released.

Stage 2 or the Dark Stage does not require sunlight. This is where the stored energy from the Light Stage is used to convert carbon dioxide and water into an organic compound which has three carbon atoms, a C3 molecule. This reaction occurs in the aqueous fluid in the chloroplast. After six of these cycles, glucose is produced. This is the food and energy for the plant. This is also called the Calvin cycle (after Melvin Calvin) and these sorts of plants are referred to as C3 plants and this the C3 pathway. This is a distinctly different pathway to that followed by C4 and CAM plants.

Other Interesting Snippets of Photosynthesis.

The basic process for photosynthesis was understood early in the 18th century. However some stages of photosynthesis are still not fully understood. If the carbon dioxide level is too low, oxygen will replace it and carbon will be lost from the cycle, sugars drained, toxins produced, and photosynthesis inhibited. The plant will die.

(Continued on Page 18)

Photosynthesis. (Continued from Page 17)

Generally plants sleep at night when their stoma are closed. No carbon dioxide in, no oxygen out.

A typical plant mesophyll cell contains between 10-100 chloroplasts. An area of one square mm. of a leaf contains up to 800,000 chloroplasts.

One hectare of corn (which is actually a C4 plant) will produce enough oxygen in one day in mid-summer for 325 people.

This presentation has been gleaned from the following internet pages. For those seeking a more detailed and less simplified explanation / introduction to photosynthesis, these same references can be used.

www.biology.clc.uc.edu/courses/bio104/photosyn.htm
www.en.wikipedia.org/wiki/Photosynthesis
www.emc.maricopa.edu/faculty/farabee/biobk/biobookps.html

Photosynthesis 2.

Photosynthesis 1 introduce the Study Group to basic Photosynthesis and the C3 pathway:

$$6CO_2 + 6H_2O \text{ (+ light energy \& photosynthesis)} \rightarrow C_6H_{12}O_6 + 6O_2$$

We will recall that the equation for photosynthesis, simply expressed, is as above. However one additional item needs to be introduced with respect to C3 plants and that is the enzyme/ catalyst RuBisCo. This is probably the most abundant protein on earth and is used to fix or trap carbon dioxide (CO_2) in the process of photosynthesis. In a C3 plant where the first product of photosynthesis is a molecule with three Carbon (C) atoms, RuBisCo acts alone. Slightly up the evolutionary ladder are plants where the first product of the photosynthetic process is a molecule with four C atoms and where RuBisCo does not act alone. These are C4 plants and were developed along a number of parallel evolutionary lines in order to tolerate aridity, high temperatures and low CO_2. These C4 plants developed by some five to 10 million years ago, late in the Miocene. This was also during a maximum glacial period. These plants were all phylogenetically derived from C3 plants. Examples of C4 plants include grasses, maize, corn, sugarcane, sorghum and lots of weeds.

Leaf Anatomy.

There are anatomical differences between the leaves of C3 plants and C4 plants. Note the differences between the two drawings (Pictures 5 & 6) on Page 12.

With regard to the vein or vascular bundle, the C4 leaf has a vein that is surrounded by thick-walled parenchyma cells which are more tightly packed than for the C3 leaf. These are the bundle sheath cells (BSC) and in a C4 plant it is where the photosynthesis takes place. The much less tightly packed arrangement for the C3 leaf is what eventually allows CO_2 to escape back into the atmosphere i.e. the process of photorespiration. This process is negligible to absent in the C4 leaf.

C4 plants generally exhibit parallel venation and have more veins per unit area.

The C4 Mechanism

Whereas the RuBisCo in the C3 plant fixes the CO_2 (rather poorly) and prepares for the photosynthesis process in all the chloroplasts in all the mesophyll cells, the C4 plant has a more efficient way of fixing the CO_2. It has a much more efficient enzyme called PEP which, compared to RuBisCo, has a much greater affinity with CO_2.

(Continued on Page 19)

Photosynthesis. (Continued from Page 18)

. When the stomata open in the morning, the PEP combines with the incoming CO_2 and forms oxaloacetic acid and then malic acid. Both these compounds have four carbon atoms in their makeup ... hence the C4 pathway or C4 plant. The malate then travels to the bundle sheath cells (BSC) where it is converted back to CO_2 and PEP. The CO_2 is then fixed by the RuBisCo in the bundle sheath cells, and photosynthesis occurs with its resultant sugar via the C3 pathway and the Calvin cycle.

The direct C4 pathway...

CO_2 + PEP --> oxaloacetic acid --> malic acid --> to bundle sheath cells.

Then in bundle sheath cells, in the presence of RuBisCo, using the Calvin cycle...

CO_2 + PEP --> photosynthesis --> Sugar.

The combined efficiency of PEP in fixing CO_2, together with the tightly packed double ring of bundle sheath cells and mesophyll cells (called Kranz anatomy..... meaning 'wreath'), makes for an easy method of concentrating CO_2 without allowing it to escape. An efficient sugar making process. A marked contrast to the C3 plant. An additional feature of the C4 plant is its ability to close it's stomata in the heat of the day. This of course prevents loss of water. So with low transpiration, negligible photorespiration, and efficient sugar making we have evolved our drought, heat and low CO_2 tolerant plant. Note that photorespiration which is in general caused by the uptake of O_2 (oxygen) instead of CO_2 by the RuBisCo enzyme, undoes the good work of photosynthesis in the C3 plant. From the increased light use efficiency of the C4 plant we improve the quantum yield or in other words growth of the plant. As a consequence of this, many C4 plants are grown commercially and are recognized as some of the world's major crops..

Note: As this article is quite long, it is being presented in three parts. Part 2 will appear in the July/August issue of Bromeletter.

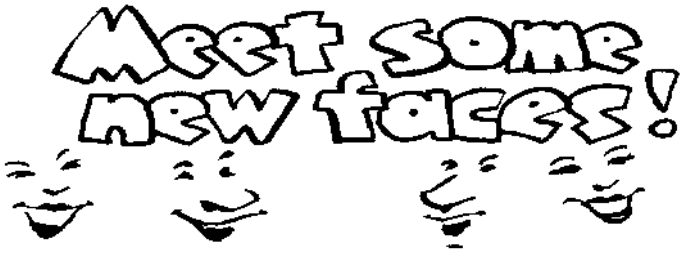
SPECIAL 50TH ANNIVERSARY EVENT

On July 13th, 2013, The Bromeliad Society of Australia will celebrate the 50th Anniversary of its formation with a party and lunch.

The occasion will provide us with the opportunity to welcome as many of our long-standing members and former members as we can muster.

We hope it will prove to be an outstanding attraction and will provide everyone with the chance to renew relationships and friendships which were established and grew over many years and which, in lots of cases, are continuing today.

We need to know who will be coming so our Secretary, Marilyn Heaps, will be happy to take your call on (02) 9502 3231.



WELCOME TO NEW MEMBERS.

We continue to attract new members into the Society and we would like to welcome
The Far North Coast Bromeliad Study Group,
Val Smith, Laurence Treanor, Yvette Lowell from Russell Lea, NSW,
Gabrielle Maitland, Haberfield and Robert Brumfield, from Plumpton, NSW,

as our latest to come to admire, enjoy and learn about the wonderful world of Bromeliads.

From my e-mails ...

'Having more money doesn't make you happier. I have 50 million dollars but I'm just as happy as I was when I had 48 million'.
~ Arnold Schwarzenegger.

POTTING MIXES AND FERTILIZERS.

This is the text of the presentation given by our Guest Speaker, John Cornale, at the March meeting.

John began by expressing his feeling that everyone probably has a favourite mix of ingredients which comprise the chosen food for their bromeliads. There are, however, many items from which you can choose and, no doubt, every mix will be different.

One of John's ingredients is Coco Palm, but it is very rough, so he puts it through a mulching machine until it is the size he wants. There is also pine bark, which can also be quite coarse, but it can be reduced in size as well. Coarse river sand is very useful and works well, especially if you have really small plants. By putting them in the sand they will develop roots in about three months. It is excellent to use with small plants which may have broken off a mother plant.

Among other materials there are perlite and coral-peat bricks. These he places in a concrete-mixer and churns them around for ten or fifteen minutes until they are thoroughly blended.
As far as quantities are concerned, the amounts are fairly standard:

Pine Bark Mulch	1 bag.
Organic Extra	1 Kilogram
Coral-peat Bricks	2 Blocks
Orchid Potting Mix	1 Bag
Charcoal	1 Kilogram
Coco Palm	1 Bag
Coarse River Sand	5 Kilograms.

By including in the mix some of your favourite fertilizer, you can give the plants a good place in which to grow.

One of John's favourite additions is charcoal; it is one of the best materials you can use to keep the plants growing well. It is very good for promoting root growth and the health of your plants.

Digressing a little from fertilizers, John mentioned his continuing problem with curl grubs in his lawn. He has been able to control them fairly successfully with a preparation called "Lawn Grub Killa". By adding it to his mix, he has just about eliminated them from his property.

OFFICE-BEARERS:

Public Officer	Gary Lock
Book Sales	Ian Hook
Librarian	Grahame Macfarlane
Catering	Helga Nitschke, Lydia Hope
Raffle Sales	Helga Nitschke.
Pots, Labels, etc – Sales	Ron Farrugia
Plant of the Month	Terence Davis and Anne Bray
Show Registrar	Robyn Firth
Show Co-Ordinator	David Scott.

Treasurer's Report - (2):

Treasurer Alan Mathew gave the following details regarding our Operating Account to February 28, 2013:

Brought Forward	**$9.390.07**
Plus Income:	**1,259.54**
Less expenses	**981.81**
Bank Statement as at 28/02/2013	**$9,667.80**

LITERATURE

TITLE	AUTHOR	PUBLICATION COST ($A)	POST/PACK ($A)
Growing Bromeliads - 3rd. Edit-Ion.	Bromeliad Society of Australia Inc.	$10.00	$6.00
Bromeliads for the Contemporary Garden. Completely Revised Edition.	Andrew Steens	$35.00	$6.00
Bromeliads, A Cultural Manual.	BSI	$5.00	$2.00
Bromeletter Index—SeptOct,1979 -Nov/Dec 1989—Vols. 16 to 27.	Geoff Lawn / Derek Butcher	Contact Book Sales	
Bromeliads– The Connoisseur's Guide, 2007.	Andrew Steens	$31.00	$6.00

SEED BANK

The Seed Bank provides a service to members of the Bromeliad Society of Australia, supporters of the Seed Bank and other interested enthusiasts, for the collection and distribution of all types of Bromeliad seeds from local and overseas sources.

Seeds cost 50¢ per packet for Members and Seed Bank supporters (plus postage) or $1 per packet (plus postage) for all other enquiries.

Enquiries for seeds should be directed, for the time being, to
Terry Davis
(02) 9636 6114 Or 0439 343 809

The following Seeds *are now available:*

Aechmea bromeliifolia var *albobracteata, Aechmea rubens, Aechmea warassii, Alcantarea geniculata, glaziouana and vinicolor, Guzmania sanguine (Costa Rica form), Tillandsia australis (locality of Till. albertiana), Till. balbisiana, Till. belloensis, Till. fasciculata,* (large multi ex. Birdrock), *Till. flavobracteata* (ex Lau), *Till xfloridana, Till gardneri, Till. geminiflora, Till. ionantha* var. *stricta, Till. jalisco-monticola, Till. latifolia* var. *divaricata, Till. magnusiana, Till pohliana, Till. pruinosa, Till. pseudo-setacea (ex Holm), Till remota, (Holm x 2), Till. rubella x 2, Till utriculata, Vriesea racinae, Vriesea saundersii.*

Thanks to Bob Hudson, Qld., Laurie Mountford, NSW, Chris Larson, Vic. Werner Raff, NSW and Terry Davis, NSW for their valuable contributions to the Seed Bank.

Thank you, Supporters of the Seed Bank.

A continued supply of fresh seed is constantly required by the Seed Bank to ensure that the Bromeliad needs of tomorrow will be met.

MEMBERSHIP APPLICATION:

ANNUAL SUBSCRIPTION: Renewal due January 1st for membership year January to December.

Membership: Australia A$20

Overseas Membership: Asia/Pacific Zone A$30. Rest of the World A$35.

New Membership requires a $5 joining fee, plus Annual Subscription. (Those joining after October 1st are covered for the following year.)

Note: Un-financial members add $5 rejoining fee when re-applying for membership.

If undelivered, return to:
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