THE MONTHLY BULLETIN OF THE KU-RING-GAI ORCHID SOCIETY INC.

(Established in 1947)
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Annual Membership : **$15 single, $18 family**

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Committee : **New committee members are required**
Committee : **Please put your hand up to help**
web site (active link) : http:/kuringaiorchidsociety.org.au
Society email : kuringgaiorchidsociety@gmail.com

Next Meeting : Mon 20th May 2024

Venue : ***The West Lindfield Community Hall, corner of Bradfield Rd and Moore Avenue, West Lindfield.***
COVID remains in the community. **In consideration of others, *PLEASE stay home if you are not feeling well.*** We prefer all meeting attendees to be Covid vaccinated, masks are optional. Please complete attendance list on arrival. We are introducing a signature on the attendance sheets so please sign against your name rather than just using a tick.

The hall is open from 6.30pm This is initially to set up the hall (please help). Benching can begin from 7 pm but please no benching until all the class dividers are in place. Give the set up team time to get everything organized.

Our Culture Class this month will be **David Floyd** once again. This time with a **repotting demo on an Oncidium.** Davids talks are always very popular. He is hugely experienced and his style drags in your attention. Get in early.

The sales table will be open as usual but as announced previously, please respect the ***"Sales Table Open / Sales Table Closed' sign.*** We are relaxing the set up timing for sellers, please follow the guidelines set out on page 3.

The Supper Break – The society supplies the tea, coffee, milk, sugar etc, **but - *we ask all members to bring in a contribution of cake, slice, or biscuits, etc for the supper table. Please bring something to add.* AND - please everyone, *bring your own mug for tea or coffee.***

Supper is not self-serve, PLEASE DON'T SERVE YOURSELF - members are assigned to serve to minimise handling. Our supper volunteer this month is **Betty Ng** plus another yet to be organised**.**

After the tea break, our Guest Speaker will be **Jon Hestelow** on the **"Terrestrial Orchids of South Western Australia"**. This should be a real delight. When Cynthia and I visited WA twice a long time back we were staggered at the prominence of their terrestrial orchids in the wild. They grow much more freely wild there.

Best of the Evening Open – *Blc or Rlc* California Girl 'Orchid Library' grown by **Gloria & Allan Cushway**

When I wrote about the 'glorious Cattleyas' recently, this is the kind of thing I was talking about. How can you be anything except admiring of this lovely pair of flowers. They have lips that look almost like Daffodils trumpets.

California Girl is a cross made way back in 1983, using an even older hybrid (Horace - 1938) as one parent. Horace has been a stalwart for breeders because it has a huge and well-formed flower nearly 20 cm across.

It is a big surprise to me that despite this lovely cross being made about 40 years ago, there seems to have only been one cultivar ever awarded, and it wasn't this one. In 1997 the cultivar 'Sweet Angel' received an HCC from the AOC in Victoria. I wonder if California Girl has been remade since that first cross? Perhaps "Orchid Library" will still get its award eventually.

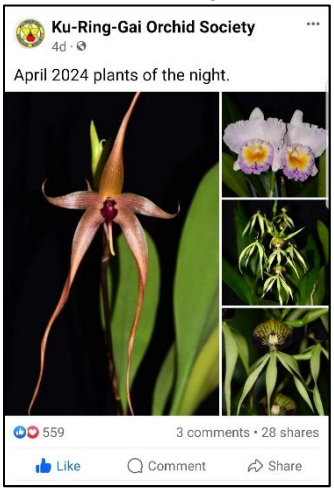
We are so lucky at Ku-Ring-Gai to have so many wonderful Catt growers like the Cushways and others. We are continually presented with exquisitely grown and presented beauties like this one so we can drool and dream each month. May the Cattleya growers continue to amaze us long into the future.

Maybe we need some more presentations on how these gurus get so much more from these orchids than the average growers like you and I do. I know Garrie and Gloria present culture talks these days but there are also many more up and coming growers also excelling at these very pretty orchids and I am thinking we should be able to twist and arm here and there to get more speakers? Unless we get some volunteers without the pressure? What do you all think? Come to the party please you better growers. Share your skills.

Congratulations yet again Gloria and Allan. Compared to other internet pictures of this cultivar, yours is outstanding.

Society News (if anyone has a news item, please phone Jim on 9476 3383, or email at jimbrydie@aussiebroadband.com.au)

President Dennys' Desk – Thank you all for a nice meeting in April where we had 40 members attend to enjoy a lovely talk by **John Chang** as well as a fine supper. We had quite a few apologies for the meeting, and I hope those that were not able to attend are managing ok. We had 110 orchids benched, a little down on the usual numbers for May, but compensated somewhat by the beautiful offering of so many fantastic cattleyas. **Peter** took some great photos of the BOE orchids, and they appeared quickly on our Facebook page shortly thereafter, thank you **Peter**. I thought **Jean's** *Bulbophyllum* was outstanding. It also seems many others liked **Jean's** plant since after 4 days, our Facebook page received 559 likes and 28 shares all over the planet. **David** ran another well received culture class on orchid root systems which prompted many questions and interactions. We were a bit light on with our supper service volunteers for the night and I thank **Di** for her effort in this regard and **Janine** for setting up the urns. Thanks also go to **Mary** for selling the raffle tickets. Lastly, I thank all those who helped pack up the hall after the meeting, it was another fine effort.



Attendance – From the May meeting on we will require a signature on the attendance sheets. Just find your name and sign. We are no longer using ticks since this was a COVID procedure, but it is important to keep insurance risk low.

Special Fertiliser Offer - We currently have an excess of *Peter's Cal-Mag Finisher* (15kg bag) in stock. Some of our established members purchase larger volumes of fertiliser to cater for their big collections. The 15kg bag price is $134. If interested in buying the bag or **bark**, please contact KOS by email or ring **Dennys**.

Supper and such– We still need some volunteers to help each meeting so please add your name to the list. Also, if you are able, please contribute an offering to supper since it helps make the evening more enjoyable. Being a volunteer is not about supplying food, but by all means, bring in a contribution if you are able. Please, remember to wait until the supper helpers are ready to serve and, try and remember to wear your name badges.

The Orchid Pot Company (OPC) Closure – As previously informed, **John Howell** of OPC has advised that his company will be closing with effect from the end of June 2024 unless the company is taken over by some others. KOS acquires many pots each year from OPC, some of which are specialised. We expect to put in an order on 23 May, but the problem is that we will need someone to help store the boxes temporarily, since **Dennys** has no more room. We are prepared to submit special orders for members included in our society order as long as members can take delivery quickly.

Wearing masks – COVID is still around, I will no longer be wearing a mask at our meetings. However, please feel free to continue to wear a mask at our meetings and hand disinfectants will be available.

Member's welfare – personal challenges occur all the time, so please remember, if you need to speak to someone immediately then you are most welcome to contact me at any time, 24/7 on 043 88 77 689.

VALE David Butler 1938 – 2024

David was a long-term member of Ku-Ring-Gai, and many other Sydney orchid clubs as well, but he and his wife Elizabeth moved to the Central Coast quite a while back where he continued breeding orchids and helping all orchid growers with his talks and articles.

I knew David very well when he lived at Hornsby but only maintained a lesser connection once he moved. Australian native orchids were always one of Davids core interests and after his move he became Patron of the ANOS Central Coast native orchid group.

The following excellent tribute was written by Carole Barnett of the Central Coast ANOS group.

It is with a particularly heavy heart that we must say farewell to an icon, a truly honourable gentleman, a dedicated family man, and a wonderfully caring friend.

David was a long-term member of both ANOS Central Coast Group, joining 2006, becoming a Patron in 2013 and a Life member in 2016, and ANOS Sydney, joining in the 1980s, and later bestowed a Life membership. He was a highly valued Club person to both Groups.

David was one of the true pioneers in the orchid world and, in particular, of Australian native orchids. He was a prodigious author of articles for various Australian and international publications, and for his local Societies' monthly

newsletters. All were meticulously written and researched. He greatly appreciated, and liked to credit his wife, Elizabeth, for all her assistance in "tweaking and editing". He had a talent for producing well balanced articles that were a joy to read and view, always leaving the reader richer for the experience. In addition to his written articles, there were the many talks, complete with Power Point presentations, that always drew in the members and inspired us all to try to emulate him, to some small degree at least. A man more generous with his time and his knowledge would be hard to find. He gave of his knowledge willingly and unconditionally.

David was a highly regarded orchid hybridist with many registrations to his name. In particular, his use of Sarcochilus hirticalcar hybrids providing a good range of well-shaped, colourful orchids with an extended flowering season. Den. Midas Touch and Den. Cosmic Gold are just two of the more notable Dendrobium registrations of Davids. His legacy lives on.

Growing and showing orchids was also a passion for David. He was a perfectionist in his techniques and was a stickler for "presenting" his orchids at their best. He believed that as we would shower and dress appropriately for the outing so too should the orchids be clean and tidy for presentation at shows. This led to many Champions for him. Along with taking out shows, including as late as last year's shows, Davids plants received 17 ANOS awards, 16 AOC awards, plus a couple of AOC Orchids of the Year, and numerous Ira Butler awards.

Farewell David, a man who lived a life well lived and who left this world a better place. We will miss you immensely. Our thoughts go to the Butler family. ~ Carole Barnett

Other Society News

1. As Dennys mentioned, if you want to include anything in our final order to The Orchid Pot Company for any of their specialised pots, please email your requests by 23May to **kuringgaiorchidsociety@gmail.com** or phone Dennys on **043 88 77 689.** If you have capacity at home to store some stock for our sales table please let us know.

2. Buying from the sales table - Please respect the Open/Closed sign and do not try to reserve/pick up & hold/purchase items before the table is Open for business. Please be considerate of your fellow members. We can only bring a limited number of items each month so If you want a larger number of items, order them in advance from Dennys.

3. Sales of Member's plants - We are relaxing the timing of when sales plants can be brought into the hall, this can now be done once the sales tables are in place, but take note that **buyers still have to wait for the Sales Table Open sign before making purchases.**

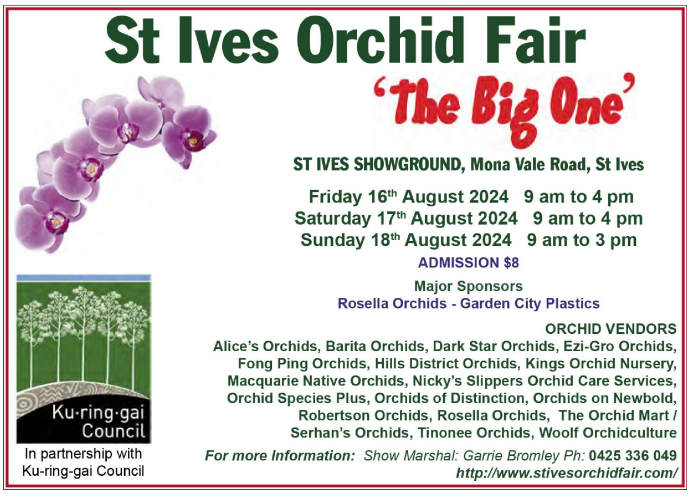
Dates of Coming events

Fri 17- Sun 19 May – Orchids Out West, Philip Charley Pavilion, Hawkesbury Showground, Clarendon

Sat 29, Sun 30 June Mingara Orchid Club Fair & Show, Mingara Recreation Club, Tumbi Umbi

Fri 9 – Sun 11 Aug – National Orchid Extravaganza & Paph Society of NSW, The Arena Sports Club, Yagoona

Fri 16 – Sun 18 Aug – St Ives Orchid fair
(see advert at the right)



Signs posted on Church noticeboard

* This morning's sermon : 'Jesus Walks on the Water'. The sermon tonight: 'Searching for Jesus'.

* For those of you who have children and don't know it, we have a nursery downstairs.

* Next Thursday there will be try-outs for the choir. They need all the help they can get.

* Irving Benson and Jessie Carter were married on October 24 in the church. So ends a friendship that began in their school days.

* The jumble sale ladies of the Church have cast off clothing of every kind. They may be seen in the basement on Friday afternoon.

* The eighth-graders will be presenting Shakespeare's Hamlet in the Church basement Friday at 7 PM. The congregation is invited to attend this tragedy.

* Weight Watchers will meet at 7 PM at the First Presbyterian Church. Please use the large double door at the side entrance.

* At the evening service tonight, the sermon topic will be 'What Is Hell?' Come early and listen to our choir practice.

* On Sunday Miss Charlene Mason sang 'I will not pass this way again', giving obvious pleasure to the congregation.

Best of the Evening Novice – Prosthechea cocleata - *grown by* ***Di Flinders***

This delightful species is a close relative to Epidendrum and has been a favourite with growers for many years.

Like many of the older genus definitions, especially those with huge numbers of species, Epidendrum has been re-examined many times and is still being redefined into multiple genera.

From the time Linnaeus proposed the current binomial system of classifying living things, orchids, although clearly a single family of plants, were going to take some time to separate out into genera that reflected the evolution of the huge group. For example, in the earliest versions, the genus Epidendrum (literally meaning 'on a tree') was used to accommodate all of the epiphytic orchids.

And, although it soon became obvious that the definition of Epidendrum was not correct, Epidendrum was still used for a long time as something of a bin for 'all the rest' of unclassified or not properly examined species.

These days, Epidendrum still comprises something more than 1600 species and is still under examination to rearrange and split off those that aren't "Epidendrum" as now specified. One of the first splits from Epidendrum was to create "Encyclia" to contain all the Epidendrums that had pseudobulbs but that soon evolved to become a whole group of new genera based on more specific genetic yet physical traits that indicate an evolutionary path. Our more current DNA research has made us rethink much of those rearrangements but has also confirmed much of it.

This is not the place for explaining or justifying the various differences and present genus definitions, but suffice to say, Prosthechea is just one of those that started as first an Epidendrum and then became an Encyclia before becoming today's Prosthechea. For those who are interested in such things, there are many others that underwent similar shifts but are now presently Anacheilium, Coilostylis, Anacheilium or others. In fact, some experts still consider 'cochleata' is an Anacheilium and not a Prosthechea.

The common name for Prosthechea cochleata is the Clamshell orchid or Cockleshell orchid and it is not hard to see why. This group of flowers are upside down orchids in that they flower with the lip pointing upwards. The bonnet shape part at the top is of course the lip, and resembles a clam or cockle shell. The petals and sepals all dangle below like some kind of 5 armed octopus (2 petals and 3 sepals).

Psh. Cochleata is a widely distributed orchid in nature and is found in quite a variety of habitats. The "Origin/Habitat" description from the Bakers in Orchidwiz tells the tale.

"ORIGIN/HABITAT: Mexico, Central America, Colombia, Venezuela, the West Indies, and Florida. In Mexico, plants grow on mountain slopes facing the Atlantic Ocean in the states of Campeche, Chiapas, Hildalgo, Oaxaca, Puebla, Quintana Roo, San Luis Potosí, Tabasco, Tamaulipas, and Veracruz. They are found in open forests and clearings in many types of forests including tropical deciduous, tropical evergreen, and oak. Habitat range is listed as near sea level to 2000 m. Plants usually grow in the midrange of the preceding elevations, however, and in much of Central America, plants are found at 300-1300 m. In Venezuela, plants were seen in open forests above Pie del Cerro near La Victoria at about 1520 m and in cloud forests along the road to Choroní at about 1370 m. In Puerto Rico, this orchid is widespread and common. It grows in both shady and bright conditions in nearly dry to wet forests at 200-900 m. In the Virgin Islands, however, plants are reported only on St. Croix."

As you can see, all locations are from tropical zones but it can be found in various types of habitat from sea level right up to 2000 m elevation. I suspect that plants from different elevations might exhibit greater or lesser tolerance to low winter temperatures but nearly all plants traded in the orchid scene are bred from seed using selected cultivars anyway so it is hard to make any assessment about that aspect. Here in Sydney, nearly all plants I have come across could be grown in a shade house without winter heat so I am guessing that the species must have inherent genetic ability to tolerate out winters. Other than that, cochleata is a typical epiphyte and grows well enough in most epiphytic mediums.

An easy orchid to acquire, and easily enough grown if you take care of it. In nature its annual waterfall cycle indicates that its main growing season is summer (Dec to April – southern hemisphere seasons) and that it gets a distinctly reduces water availability May through perhaps October. I would suspect new growths to initiate in spring and flowering to late spring and through summer.

Congratulations Di. A delightful orchid that was grown and flowered very well.

My boyfriend was dying, I was by his bedside when he said something with a weak voice, "There's something I must confess." -- "Shhh" I said "There's nothing to confess Everything is alright."
"No, I must die in peace" he said, "I had sex with your sister, your best friend and your co-worker."
"I know" I whispered, "That's why I poisoned you ... Now close your eyes."

Best of the Evening Species - Bulbophyllum echinolabium grown by ***Jean Fulcher***

This is a real stunner of an orchid. Gigantic flowers for a Bulbophyllum. Its flowers are up to 40 cm vertically and 10 -12 cm horizontally. Maybe not as filled in as a big Cattleya, but those dimensions are pretty impressive anyway.

Bulb echinolabium is found in Sulawesi and Borneo in riverine to primary forests at elevations of 600 to 1200 meters. To interpret that a little for you, that means warm, high humidity, and regular water - between 45 and 80 mm of rain every month of the year. As these are equatorial tropics there is also bright light 12 hours a day in the high canopy above but echinolabium doesn't grow up there. I haven't found much info on habitat specifics but this picture at the left, from Travaldo's blog, would imply that it occurs in the lowest part of the forest on mossy tree trunks and limbs. As such, the light levels would be quite shady but the day length is still the same as in the canopy.

Jean is an excellent grower of Bulbophyllum and regularly presents wonderful specimens at our meetings to show us the scope of this curious but intriguing genus. She also wrote a great introduction to Bulbophyllum for our Dec 2021 bulletin so I am now thinking it might be time to try to cajole her into a guest speaker spot on Bulbos at a meeting night and to extend it to some 'how to grow' culture stuff because these wonderful orchids do have some idiosyncrasies that make their culture a little different to many other kinds of orchids. (Hmmm, which arm should I try to twist first Jean?)

However, in the meantime, as Jean told us in 2021, Bulbophyllum is perhaps the largest genus of all orchid genera with something like 2200 species. But I say 'perhaps the largest' for a reason and that is because the mega-genera like Bulbophyllum and Pleurothallis, and even some slightly smaller giants, are almost certain to eventually be re-examined and split up into multiple smaller genera. The present DNA recalibration of the orchid family tree is still proceeding but on the areas already done we can see already that many changes will ensue.

Bulbophyllum is one of those very few genera that occupies all of the tropical geographic zones on earth, Calanthe is another. The majority of orchid genera are either of wholly Asian or wholly American. For example, Dendrobium and Vanda in Asia vs Cattleya and Epidendrum in the Americas. A group that almost makes both is the slipper orchid complex that comprises Cypripedium and Paphiopedilum in Europe/Asia and Cypripedium/ Phragmipedium in the Americas. I am guessing that that group began with the predecessors of Cypripedium in the northern hemisphere when the north was a tropical zone with land connections across Europe/Asia/America. Paphs were s southerly Asian evolutionary path from Cypripedium, and Phragmipedium was the southerly evolutionary path in the Americas.

The separate development of the Orchid family in Asia vs the Americas is important because of its relatively recent evolution. When you consider the landmass distribution that comprises the tropical zones today, most are segments of the great southern Gondwanaland that broke apart and migrated north. One was present day Africa, and others were Madagascar and India. Both Africa and India eventually bumped into the Europe/Asia landmass to create land bridges for plant evolution. Madagascar doesn't touch the land around it but is close enough for genetic spread, perhaps by seed. Australia likewise doesn't land connect to Asia but is close enough via chains of islands for genetic connections.

The Americas virtually connect to the Europe/Asia land mass in the very far north but couldn't be further separated in the tropic zones. Which has led to the parallel evolution of the orchidaceae in Africa/Asia and the Americas. E.g. Cattleyas in America vs Dendrobium in Asia. Which leads us to consider how just a few genera, like Bulbophyllum, became pan tropical.

From my point of view, the wide geography and great diversity of Bulbophyllum makes it difficult to see the genus as a whole to gain any insight into its points of origin. The species we call Bulbophyllums in Africa have some quite different characteristics to other Bulbophyllum groups that occur across Asia but then the genus is so diverse in its physical nature that that may just be a side development.

Wikipedia tells us that: "Molecular phylogenetic studies place the origin of the orchid genus Bulbophyllum into the early Miocene (that is, about 5 million years ago to 23 Million years ago). Biogeographic analyses and ancestral area reconstructions identified the Asia-Pacific region as the ancestral area of Bulbophyllum and suggest an early-to-late Miocene scenario of 'out-of-Asia-Pacific' origin and a progressive (east-to-west) dispersal-mediated diversification, resulting in three additional radiations in Madagascar, Africa and the Neotropics, respectively." I am not sure how widely that view is agreed.

New Guinea has the largest number of Bulbophyllums with around 600 species so many consider that a possible point of origin, which would be consistent with the Wikipedia view.

So what is it that defines an orchid as a Bulbophyllon? Perhaps a little Botany is called for.

In her article, Jean quoted the following 3 key genus defining criteria from author Bill Thoms - :

1. There is only one joint in the pseudobulb
2. The inflorescence must arise from the base of the plant or along the rhizome
3. The lip must be mobile. That is, connected with a flexible joint

Wikpedia writes it up a little more taxonomically but ends up saying pretty much the same. - *"Plants in the genus Bulbophyllum are epiphytic or lithophytic sympodial herbs with thread-like or fibrous roots that creep over the surface on which they grow. The stem consists of a rhizome and a pseudobulb, the latter with one or two usually fleshy or leathery leaves. The flowers are arranged on an unbranched raceme that emerges from the pseudobulb, usually from its base. The dorsal sepal is free from the lateral sepals which themselves may be free or fused to each other. The petals are also free from each other and smaller than the lateral sepals. The labellum is often fleshy, curved and hinged to the base of the column."*

From a growers point of view.

1. The fact that the base flower stalk (peduncle) arises from the rhizome is quite different to most other orchids, and it is also significant that the inflorescence is never branched.

   Some Bulbophyllum species do have more than one flower per peduncle – for example the daisy flower head types we mostly used to call Cirrhopetalum, but there are also other groups with cluster headed, multiple flowers at the top of a single stem.

   In addition, some Bulbophyllums flower along the sides of the peduncle itself. If the flower has a separate stalk connecting the flower to the peduncle, that stalk is called a pedicel. In some cases flowers have pedicels, in some cases they do not. If the flower has no pedicel it is describes as sessile. As an example, the bulbed garden plant Gladiolus has sessile flowers on an unbranched inflorescence (a spike).

2. ***The Flowers***. Wikipedia tells us that the petals are free and smaller than the sepals. Free means not fused together. Now if I was looking at a new orchid in flower in front of me, I am afraid that is unlikely to help me separate the newbie as a Bulbophyllum or anything else unless the petals in front of me did happen to be fused which would rule out Bulbophyllum.

   What is more significant is the bit about the hinged labellum which as Bill Thoms notes, makes the lip mobile. That is, it bobbles about as part of the mechanism to attract a pollinator. And although it isn't an official discriminator, the mobile lip is almost always associated with a second attractant – perfume. Bulbophyllums are almost always pollinated by flies and their perfume is notoriously on the unattractive side. Not all are real stinkers, but most have an aroma reminiscent of rotting meat or similar.

3. ***The pseudobulb***. Very few orchids have single segment pseudobulbs. If you bring to mind Dendrobiums for example, the 'canes'or pseudobulbs have many joints separating each segment of the pseudobulb. Cattleyas have less, but also have multiple segments. The fact that Bulbophyllums have only one segment pseudobulbs is significant and may imply that they are relatively primitive in the evolution of the orchid family.

4. But finally, and it isn't a genuine botanical separator, but the majority of Bulbophyllums are creepers or climbers with a distinct and sometimes exaggerated rhizome stem in between each pseudobulb. They march across a pot or tray and go exploring. In an orchid house they go over the edge of their container and off, in between other pots, across other pots, up a wall, whatever. They are hard to organise. However, if you see it happening you can steer the new growth back around the original container and try to send it back criss crossing itself if you try hard. So what I am saying is that the adventuring nature of most Bulbophyllums helps you decide whether what you are looking at is a Bulbophyllum or not. Definitely not scientific, but at least a good pointer.

So lets look at some of the amazing physical forms of Bulbophyllum in plant and flower. ***First the Rhizome.***

Bulb tenuifolium

Bulb inconspicuum

Bulb laxum

As you can see above, the pseudobulbs are not always widely spaced with an exaggerated rhizome between them, but

their habit is explorative. Sometimes they march straight ahead, other times the growth branches from the rhizome and creates multiple growth directions but it seems to me the genus has the ability to go looking for a better location than where the seed may have started them. Perhaps they need a bit better light, perhaps more reliable water or accessible food, but they don't just stay put and die out.

Flower and plant size - While echinolabium probably has the largest flower, it is nowhere near the largest plant. That honour goes to Bulb fletcherianum from PNG which has huge, dangling, strap shape leaves that measure up to 1.5 metres long x 17 cm wide. The picture at the right shows a cluster of plants growing in the wild on a wet rockface in PNG. The closely clustered flowers are reddish lilac and about 2.5 cm wide.

At the other end of the scale, Bulb minutissimum from Australia has to be one of the smallest for both plant and flower. The chains of little green or reddish blobs in this picture by David Banks are the pseudobulbs. They are between 2 and 3 mm wide and perhaps half that thick. Kind of flattened, and with a little pointy leaf in the middle. The leaf is only 0.2 mm wide and it is the little flat topped pseudobulb that does most of the photosynthesis. The red striped flower (at the right edge of the picture) is about 4 mm across and the plant pictured here is mounted on a piece of cork.

Flower form. And lastly, just a few very beautiful examples of the amazing variability among its flowers. The first line shows some examples of small flowers arising directly from the peduncle and where the display is not just the flower but the combination of the two parts

Bulb pinelianum

Bulb falcatum

Bulb maximum

This next set (see below) are my favourites. What I called earlier "the daisy flowered types". The majority if these fall in section Cirrhopetalum, but not all, so I can't just call them Cirrhopetalums. The peduncle rises away from the rhizome and ends in a growth point that produces multiple flowers, usually arranged in a circle. As you can see below they make very beautiful flowering orchids and come in a rich array of colours. Those that array like a daisy flower head may only array a half or ¾ of a daisy but still look so lovely. Others like medusae arrange in a less single plane to present almost a ball of flowers.

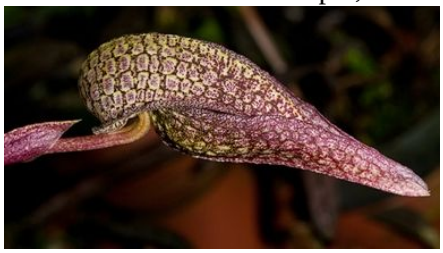
B. makoyanum

Bulb. medusae

Bulb skeatianum

Bulb mastersianum

And as a final exotic example, there are those that produce a large flower but often closed over to create a limited space for the desired pollinator to enter. Sort of an attempt to keep out the riff raff and just let in the right types. The one on the left is arfakianum (6 cm wide x 10 cm long), the next is grandiflorum (7 cm x 13cm).



Congratulations on another wonderful BOE Jean, and my humble apologies for hijacking the write up. And growers please remember, Bulbos are ***warm*** growers. When you are ready, ask about what you need to consider before buying a glasshouse. That is a topic in itself.

Forms of Nitrogen in Fertilisers. a comment by Jim Brydie

I think Dave Floyd mentioned this in his culture class talk last month (quite correctly) and I was thinking about it after the meeting when the Cumberland OS bulletin arrived and contained a very nice article on the same by Noel Grundon from Queensland. The various implications of what kind of nitrogen supplying chemical a fertiliser contains is something that does need to be understood because the nitrogen supply can be affected by other circumstances.

I was considering putting out a request to Queensland for permission to republish when I recalled another very nicely explained article by Sue Bottom that I thought might be an alternative and Sue has given me permission to republish here for you. This is an important subject that you will find you need to take into account as your skills become more and more sophisticated. Please read and start looking at those fertiliser product labels more closely.

Orchid Myths – Urea by Sue Bottom, courtesy of Sue and the St. Augustine Orchid Society, Florida

I never had so much fun learning how little I knew about something I thought I understood than I did at the kitchen counter with Alan Koch après our Orchid Club meeting. I have read and oft repeated that urea fertilizers should be avoided. Does the form of nitrogen make a difference? The short answer is yes. Some urea in the fertilizer is fine, use a fertilizer that has more than half of the nitrogen in the nitrate form and less than half in the ammonium form. Now for the long answer.

Forms of Nitrogen. There are many water soluble fertilizers labeled for use as orchid food, though the formulations are very different. If you read fertilizer labels, you've noticed that the percentages of nitrate nitrogen, ammoniacal nitrogen and urea nitrogen are listed. The forms of nitrogen in fertilizers and how they are used by orchids are summarized in Table 1.

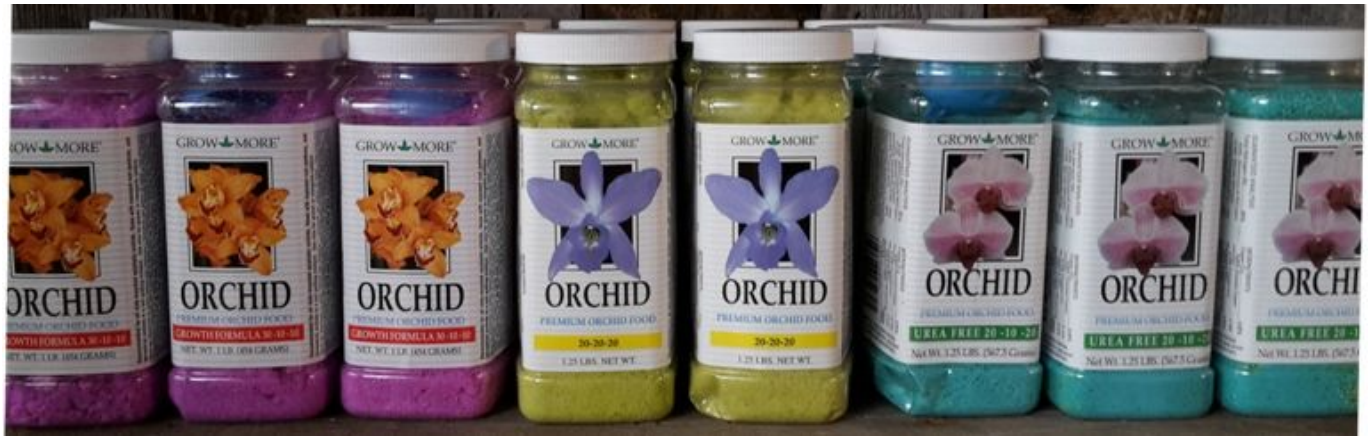
(left) Alan Koch of Gold Country Orchids loves to talk about orchids. His ideas on growing orchids are sometimes a bit out of the mainstream, but his plants speak for themselves.

Table 1 – Different Forms of Nitrogen in Fertilizers

	Nitrate Nitrogen	Ammonium Nitrogen	Urea Nitrogen
Chemical Formula	NO_3^-	NH_4^+	$CO(NH_2)_2$
Availability to the Plant	Immediately available for uptake by the roots	Immediately available for uptake by the roots	Must be converted to ammonium by the enzyme urease in the orchid roots and microorganisms in the root zone
Impact on Substrate pH	Basic reaction, causes an increase in root zone pH when absorbed by the roots	Acidic reaction, causes a decrease in root zone pH when absorbed by the roots and when converted to nitrate by nitrifying bacteria in the root zone	Acidic reaction, causes a decrease in root zone pH when converted to ammonium by microorganisms
Leachability through the Substrate	Easily flushed through the pot and lost if not absorbed by the roots	Can be absorbed by the roots and adsorbed onto organic matter for subsequent uptake or conversion to nitrate, particularly in mixes having a high cation exchange capacity	Easily flushed through the pot and lost if not absorbed by the roots or not converted to the ammonium form by microorganisms in the root zone

Note: Whether or not urea can be taken up directly by roots is the subject of some debate. The ease with which urea is converted into ammonium nitrogen is the subject of more debate, but to the extent that urea can be converted into ammonium, ammonium and urea are often grouped together and referred to as ammoniacal nitrogen.

A quick search on Amazon.com reveals some common orchid fertilizer brands. There is the Sun Bulb Better Gro Orchid Plus with a 20-14-13 formula that touts the fact that it is urea free. The Grow More brands of orchid fertilizers have various formulations such as a 20-20-20, 20-10-20 and 30-10-10; some formulas say they are urea free and others say they contain a variety of nitrogen forms. The Jack's Classic Orchid Special has a 30-10-10 formula in which virtually all the nitrogen is in the urea form while Jack's Professional Orchid Fertilizers contain no urea. What gives?



Fertilizer companies are in the business of selling fertilizers. Don't buy a fertilizer just because the label has the word orchid on it. Learn which fertilizer is best for your water quality and growing conditions or ask your local orchid society for a recommendation.

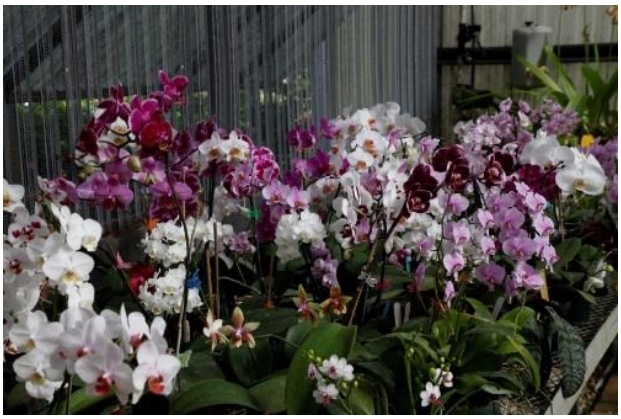
Conversion of Urea to Ammonium Nitrogen. The basic issue is whether or not your orchid is able to absorb urea directly into the roots. Most debates on urea revolve around whether it is converted into usable ammonium nitrogen by the microorganisms present in the root zone or it is simply flushed out of the pot never to be seen again. You can find a full spectrum of opinions about how long it takes to convert urea to ammonium, with estimates ranging from over a year to a matter of hours or days. The scientific literature suggests the conversion is fairly rapid. One study involving bark showed that 71% of the urea applied was hydrolyzed to ammonium within 24 hr and 95% within 40 hr (Wright, 1987).

Orchids mounted directly onto a wooden surface probably have the smallest population of microorganisms in the root zone so urea fertilizers may be flushed from the roots before the urea can be converted into ammonium for uptake by the plant.

A little moss or other organic matter around the roots of mounted orchids may create a microenvironment where microorganisms can grow more easily facilitating the conversion of urea to ammonium, so some of the urea can be used by the plant.

You know intuitively that the population of microorganisms is probably greater in a soilless peat or bark based mix than in an inorganic mix and certainly greater than around a mount or in a basket with no media, so the conversion of urea to ammonium is likely to be greater in bark and soilless potting mixes than in mounted orchids. If most of your orchids are mounted, a high urea fertilizer may not supply the expected amount of nitrogen because low populations of microorganisms won't convert much of the urea to the usable ammonium or nitrate forms so most of the urea will probably just wash away. Perhaps your potting mix is sterile when you first repot your orchids, but orchids growing with potting media around the roots have likely developed a population of microorganisms that can convert urea to ammonium, and the more organic matter present in the mix, the greater the expected rate of conversion from urea to ammonium and ultimately nitrate nitrogen. While some of the urea may wash through the pot unused, this is probably also true of some of the nitrate nitrogen you apply.

Potting mixes may be nearly sterile when you repot, but over time the microbial population will develop, and you may selectively encourage growth by adding biofungicides or organic fertilizers after potting.



Plants grown in organic mixes containing mostly bark or peat likely have developed a healthy microbial population that helps mediate the conversion from urea to ammonium.

Ammoniacal vs. Nitrate Nitrogen. More important than the presence or absence of urea is the relative proportion of nitrate nitrogen to ammoniacal nitrogen (ammonium plus urea are lumped together and called ammoniacal nitrogen). Ammoniacal nitrogen tends to produce lush, soft growth more susceptible to disease while nitrate nitrogen promotes sturdier growth. Nitrifying bacteria in the substrate are very effective at converting ammonium to the nitrate form except when temperatures drop below 60F, the potting mix is too wet or the potting mix pH is too low, and this can potentially allow ammonium levels to build up which may result in ammonium toxicity. One study concluded that a minimum 1:1 ratio of nitrate to ammoniacal nitrogen and preferably a 3:1 nitrate to ammonium ratio improves vegetative growth and flowering in Phalaenopsis (Wang, 2008).

Choose Your Fertilizer Based on Your Water Quality. Your water quality is one of the factors you should consider when selecting your fertilizer. If you have a naturally soft water with low alkalinity and total dissolved solids, your fertilizer of choice is probably one that is primarily nitrate nitrogen because the high nitrate content will result in a slightly basic reaction around your roots. So if you use rainwater or reverse osmosis water, your public water supply is from reservoirs in clean recharge areas or your well is drilled in granite, your water probably has a very low pH, low total dissolved solids content and low buffering capacity so you should seek out high nitrate fertilizers. For these pure water sources, avoid fertilizers with an acidic reaction like those containing more than 25% of the nitrogen in the ammoniacal form because it can cause precipitous drops in the pH around your roots. A good Cal Mag fertilizer is probably a good choice for waters with an alkalinity below 150 ppm. Some potentially suitable fertilizers for pure water are listed in Table 2.

Table 2- Fertilizers Suitable for Naturally Soft Water

Formula N-P-K-Ca-Mg	**Fertilizer Name and Potential Source**	**Forms of Nitrogen**
12-3-15-7-2 w/ micronutrients	Jacks Professional Orchid RO Water - available in 25 lb bags from nursery supply and online sources	0.4% ammoniacal (0% urea) 11.6% nitrate
15-5-15-5-2 w/ micronutrients	Peters Excel Cal Mag Special - available in 25 lb bags from nursery supply and online sources	3.2% ammoniacal (2.1% urea) 11.8% nitrate
13-3-15-8-2 w/ micronutrients	MSU Orchid Fertilizer for RO/Rain Water - available in small quantities from FirstRays.com and rePotMe.com	0.7% ammoniacal (0% urea) 12.5% nitrate

Note: This table lists some fertilizers suitable for water which is naturally soft, less than 150 ppm alkalinity. Do not water your orchids with tap water that has been softened because the sodium from your water softener is toxic to your orchids. Some fertilizer manufacturers lump together the urea and ammonia nitrogen and report the sum as ammoniacal nitrogen.

On the other hand, if you have hard water with high alkalinity and high total dissolved solids, you should probably use a fertilizer that will cause an acidic reaction around the roots so the naturally occurring calcium and other supplied nutrients will be more available to your plant. You'll look for a fertilizer with up to half the nitrogen in the ammoniacal form. Some potentially suitable fertilizers are listed in Table 3.

Table 3- Fertilizers Suitable for Hard Water (may need to add supplemental calcium or magnesium)		
Formula N-P-K-Ca-Mg	**Fertilizer Name and Potential Source**	**Forms of Nitrogen**
16-4-20-3-1 w/ micronutrients	Jacks Professional Orchid Well Water - available in 25 lb bags from nursery supply and online sources	3.8% ammoniacal (0% urea) 12.2% nitrate
21-5-20-0-0 w/ micronutrients	Peters Excel Multi Purpose - available in 25 lb bags from nursery supply and online sources	8.3% ammoniacal (1.1% urea) 12.7% nitrate
20-14-13-0-1 w/ micronutrients	Better Gro Orchid Plus – may be available in local nurseries and big box stores	9.4% ammoniacal (0% urea) 10.6% nitrate
19-4-23-2-0 w/ micronutrients	MSU Orchid Fertilizer for Well Water - available in small quantities from FirstRays.com and rePotMe.com	5.7% ammoniacal (0% urea) 13.6% nitrate
Note: This table lists some fertilizers suitable for water which has an alkalinity greater than 150 ppm. Some fertilizer manufacturers lump together the urea and ammonia nitrogen and report the sum as ammoniacal nitrogen. High salt content in the root zone is the enemy of your orchids and hard water has lots of dissolved salts present even before you add fertilizer, so flush salts from the pots regularly.		

Humour to End the day