Australian Native Orchid Society - Macarthur Group

April 2015

Edited by Tony Asquith mail: aaasquith@bigpond.com. Phone 4625 9874

President: Mr. W. Southwell (Ph. 46818589) **Postal Address**:- 8A Boundary Road,

Secretary: Mr. J. English (Ph.86262934) **PARRAMATTA. 2150**

Treasurer: Mrs. C. Asquith (Ph. 46259874) **Next Meeting:** **THURSDAY , 21st May, 2015**

Life Member: Mr. J. Riley, M. T. Cooke.

Conservation Officer: R. Hanman

Venue: **BIRRAWA HALL**
FITZPATRICK ROAD
Mt. ANNAN. , **Doors open 7.15pm, benching closes 7.45pm, meeting starts 8pm**

President's Message Hi to all.
Congratulations to Noel Bates for Plant of the Night and Popular Choice at the last meeting. Well done!

Good result from last months auction, with very generous donations.

The Rosemeadow Market Place show was an outstanding result, the contribution from Campbelltown members was very good and completed a very good display. Lots of interest, good plant sales and 4 new members signed up on the day. It was great to see Mary-Anne in the winners circle, well done and keep up the good work.
Wally

Rosemeadow Market Place Results 9th May 2015

Champion Bigibbum - Mary-Anne Warner
Champion Terrestrial - Nita Wheeler
Champion Other Orchid - Noel Bates
Champion Specimen - Noel Bates

Grand Champion - Mary-Anne Warner
Reserve Champion - Noel Bates

Champion Exotic - Peter Hestelow A zygopetalum.

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MINUTES OF MEETING HELD 16th April, 2015.

Meeting Opened: About 7.30pm**,** and President Wal welcomed members.

1. **Apologies**: Greg Steenbeeke.
2. **Minutes from Previous Meeting:**
   Proposed by: Tony Asquith **seconded by:** Peter Gibson
3. **Business Arising from the Minutes:** Nil
4. **Treasurer's Report:** Moved Carol Asquith Second: Tony Asquith

Inward & Outwards Correspondence: Various Newsletters, sent & received.

Delegates Report Phil Griffiths moved that we pay 6 monthly rent.
General Business

Margaret asked to check with Garden Club re Insurance..

Discussion regarding May Show at Rosemeadow confusion.

Next Meeting Speaker will be Gerry Walsh…June meeting will be Alan Stephenson.

.... And the meeting closed.. about 9.30pm

GOOD GROWING.

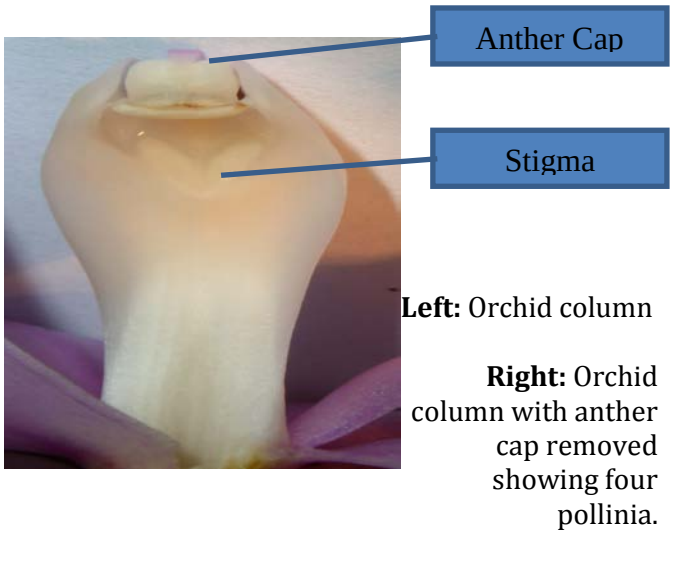
A friend of mine is an upholsterer. He had a bit of an accident. He fell into his sewing machine. You will be pleased to note that is recovered.
When my wife found her first grey hair, she thought she would dye.

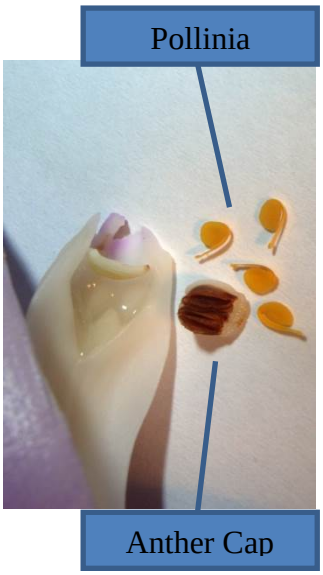
This article appeared in "The Kalhari", the bulletin of The KABI ANOS Group in Queensland, April 2015. Well written and good photographic support, I commend this article to all. The original posted newsletter did not include the colour photo's.

Orchid Pollination Graham Corbin

Orchids are the second largest group of plants in the world, only being beaten by grasses. Orchids grow in almost every habitat and every continent except Antarctica, although they do grow very close by on Macquarie Island. To reproduce in such a variety of conditions, orchids have evolved a large number of different strategies to reproduce, many of which are very unexpected and even bizarre. Even so, there are some common aspects shared by all orchids.

All orchids have a column topped with pollinaria. Unlike other plants, pollen grains of orchids are not separate, but clump together into masses, typically one, two, four or eight masses. The pollinia commonly have a viscidium which is a sticky disc connected to the pollinia by a short stalk. The viscidium sits just under the anther cap and when touched by a pollinator in the correct orientation sticks tightly to the pollinator withdrawing the pollinia from under the anther cap where it remains firmly stuck to the pollinator. The pollinator will then take the pollinia to a new orchid flower where it will deposit the pollinia onto the female part of the flower, the stigma on the column.





Left: Orchid column

Right: Orchid column with anther cap removed showing four pollinia.

If this sounds all very unlikely, as it does to me, rest assured it does work very successfully as proven by the world being full of orchids. There is actually much more going on than my simple description: Firstly, why does the pollinator visit the orchid? Well everyone knows it is to collect the nectar that the flower delivers, which is so simple and obvious. Well unfortunately, the majority of Australian orchids don't produce nectar. Indeed, it is conservatively estimated that over 30% of orchids worldwide do not produce nectar. Well what is going on with pollinators if they are not being attracted by nectar?

Lets go back to basics. Why do orchids produce pollen at all and don't just bypass the whole flower pollinator thing and just self-pollinate to produce their seed, a much simpler and far less risky strategy? Well some do, for example *Epipogium roseum* and *Acianthus amplexicaulis*, but the vast majority of orchids do not. The benefit of cross pollination was discussed extensively by Charles Darwin and is thought to bring vigour and improvements to the progeny by introducing the best genes from both parents giving an advantage over self-pollination where no new genes are introduced. Thus, even though transferring pollen from one plants flower to another is risky and difficult, it is worth the effort by getting better progeny when it does succeed. Some orchids have a bet both ways and will attempt to transfer their pollen to a different plant but will self-pollinate as a last resort should outcrossing fail. *Calochilus* for example follow this strategy. Even so, the majority of orchids will only produce fertile seed by getting pollen from other plants and indeed many species are self-infertile to prevent self-pollination.

If we consider the most common pollination strategy where pollen must come from other plants, we see some significant differences between orchids and non-orchids following this strategy. Most non-orchids do not form pollen masses but have thousands of individual pollen grains. Their strategy is to encourage pollinators to visit flowers frequently and give pollen grains to every pollinator so the pollinator will have a high chance of transferring a grain of pollen to a different plants flower. When transferred to a flower in a different plant, that one

Epipogium roseum *Acianthus amplexicaulis*

grain of pollen will form a large seed which contains the embryo plus a large amount of endosperm (food storage), enough to allow the new seed to grow roots and leaves and growing independently. Each non-orchid flower will form a small number of seeds, often just a single seed, but each seed has a large food store to be entirely independent. To ensure a large number of pollinators visit a non-orchid flower, non-orchids typically give pollinators a reward, generally nectar or some of the pollen itself to eat. This is how bees survive. (This description is a generalisation and there are many non-orchids which follow variations of this strategy or completely different strategies, so do not assume that all non-orchids are pollinated in this way even though it is often the case.)

Orchids take a different method to get pollinated. As described previously, orchid flowers have

pollen masses which are generally taken by a single pollinator, very different to typical non-orchids where only a few pollen grains are taken by each pollinator. Thus, an orchid flower only ever needs a single pollinator visit where the pollinator will drop off the pollen mass from another orchids flower

and then pick up the pollen mass from this flower to take to another orchid. Once this visit has occurred, there is no pollen remaining to be picked up and the flower has been fertilised so has no need for more pollen. Thus, an orchid flower only ever wants a single pollinator visit. Any further visits are of no help. Thus, why should an orchid provide nectar to encourage dozens of pollinators to visit when you only want one visit? Some orchids do indeed provide nectar to ensure that one visit but many use other methods.

Getting back to the pollinated orchid flower for a moment, the pollen mass which pollinates the flower contains tens of thousands of pollen grains. This enables the orchid flower to produce tens of thousands of seed from a single pollination event. Orchid pods will contain thousands of seed but are quite different to non-orchid seeds. Orchid seed is tiny, like dust, only containing the embryo and virtually no endosperm (food storage). Being dust like, orchid seed is dispersed widely by the wind which is a great advantage but also has the disadvantage that orchid seed contains virtually no food storage. Orchid seed does not have any nutrient storage to enable it to grow roots and leaves. Instead, the seed must randomly fall in a location which is both suitable for an adult plant to grow plus firstly have a suitable symbiotic fungus which will provide the embryo's nutrition and allow it to grow roots and leaves. Symbiotic fungus is a fascinating topic in its own right, but I will gloss over this subject for the moment with just the comment that as unlikely as this seems, it works quite well in practice as evidenced by the large number of orchids around the world.

Prasophyllum odoratum flowers with pollen partially removed

To continue with pollinators, take an example of a *Dendrobium speciosum* orchid. A single plant may have hundreds of open flowers. What this orchid ideally wants is for a pollinator to visit a flower and pick up the pollinia and then fly off to a different plant to drop off its pollen. This will fertilise the flower with pollen from a different plant, the ideal outcome. The orchid does not want the pollinator to visit a flower picking up the pollinia and then visiting the next flower on the same orchid dropping off the pollinia and picking up the new pollinia and visiting the next flower, etc. Should this happen, every flower on the orchid will have its pollen removed and deposited on the flower next door, or selfed. This is a disaster for the orchid as each flower has been selfed. Thus, unlike most other flowering plants, this orchid does not want to encourage a pollinator to visit every flower, but only visit a single flower. Orchids like *Dendrobium speciosum* do not produce nectar but trick a pollinator to visit with fragrances and the appearance of providing nectar so the pollinator will visit transferring the pollen but be disappointed by the lack of nectar and not visit the other flowers on this orchid but hopefully be tricked again to visit the next orchid.

This at first seems wrong as we are all used to seeing flowers of non-orchids full of visiting insects so we assume orchids are the same. If you grow orchids such as *Dendrobium speciosum* in your garden or see it flowering in the bush and have a close look at the flowers, you will rarely see any insects around the flowers and virtually never see an insect land on the flower. You will almost never see a pollinator pick up or drop off pollinia and if you have been privileged to see this event, count yourself very lucky.

Dendrobium speciosum

While I have described one pollination method using insect pollinators, it is not the only method of pollination of orchids. Some orchids are pollinated by birds (ornithophily). *Dendrobium smilliae* for example does produce nectar and is Australia's only known bird pollinated orchid and is pollinated by the Yellow Honeyeater. While Australia only has one bird pollinated orchid, there are many examples overseas. Bird pollinated orchids are usually brightly coloured or with a prominent coloured spot and don't have fragrance. The flowers are usually tubular and pendulous, perfect to transfer the pollinia onto the bird's beak.

Dendrobium smilliae

Calanthe triplicata

Moths are another pollinator (phalaenophilly) Orchid flowers with moth pollinators usually have White or pale flowers with a large labellum for Prominent landing platform and are perfumed at Night. Calanthe triplicate is a typical moth Pollinated flower.

Flies are another pollinator of orchids. There are three different types of fly pollination, myophilous (nectar feeders), sapromyophilous (dead animal and dung feeders) and sexomyophilous (sexual attracted). Myophilous orchids often have open fragrant flowers with nectar droplets clearly visible. Examples are *Bulbophyllum baileyi* which is pollinated by fruit flies attracted by the sweet fragrance or *Bulbophyllum weinthalii* whose Semen-like fragrance attracts blowfly Pollinators.

Bulbophyllum baileyi

Sapromyophilous orchids are generally pollinated by tiny flies which usually visit dead animals and dung. The orchids use unpleasant odours, dull purple or brown colours and hairy structures to attract the flies but do not supply nectar. *Corybas* and some *Pterostylis* are pollinated by fungus gnats attracted by a musty fragrance similar to that of fungus. *Genoplesium* are pollinated by vinegar flies which are attracted by fragrance, colour and hairy structures, depending on the species of *Genoplesium. Liparis swenssonii* is pollinated by flies attracted by its urine like fragrance.

Liparis swenssonii

Sexomyophilus orchids attract male flies by sexual deception by structures on the labellum which resemble female insects and by pheromones which smell like female insects. This group does not produce nectar. Orchids in this group include most species of *Pterostylis* which attract pollinators by pheromones and *Chiloglottis* and *Arthrochilus* which use a combination of pheromones and labellum structures resembling female insects.

Chiloglottis formicifera

Other types of insects also pollinate orchids. Ants pollinate orchids (formicophily) but this is unusual in Australian orchids. *Microtis parviflora* is one species which is pollinated by ants which are regularly seen visiting the flowers of this species.
Orchids are a wondrous plant, not just because of their beautiful and unusual flowers. Their method of reproduction seems so unlikely that it could never possibly succeed, but despite my disbelief, is very successful. The more we learn about orchids and their reproduction, the more amazing we find these beautiful plants.

Prasophyllum odoratum with pollinator

References

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Lavarack, B., Harris, W., Stocker, G. 2006. Dendrobium and it Relatives. Kangaroo Press.
Pijl, L Van Der., Dodson, Calaway H. 1969. Orchid Flowers Their Pollination and Evolution. University of Miami Press.
Pridgeon, Alec. 2000. What Orchid is That?. Lansdowne.
Wood, Howard P. 2006. The Dendrobiums. A.R.G. Gantner Verlag.

Benching Results APRIL Meeting 16/4/2015

Dendrobium Species	Den. bigibbum	J. English
	Den. bigibbum	M. Warner
Dendrobium Hybrid	D. Topaz Dream 'Sweet'	M. Warner
	D. Pinterry	R. Morrison
Sarcanthinae Species	Nil	
Sarcanthinae Hybrid	Nil	
Bulbophyllum	B. schillerianum	R. Morrison
	B. schillerianum	R. Morrison
Aust. Species Other	Cestichis condylobulbon	J. English
	Cestichis reflexa	R. Morrison
Aust. Hybrid Other	D. Eleanor Chan	N. Bates
Terrestrial Pterostylis	P. ophioglossa	T. Cooke
	P. Urochilus sanguinea??	T. Cooke
Dockrillia	Nil	
Terrestrial Other	Acianthus pusillis	T. Cooke
Caladenia Species	Nil	
Australasian Species	Medio decoratum	A. & C. Asquith
	Medio decoratum	R. Morrison
Australasian Hybrid	D. D'bush Patsy?	J. English
Seedling		
Seedling First Flowering	D. bigibbum Superbiens	P. Brown
Growing Competition 1	N. Bates	
Growing Competition 2	A. & C. Asquith	

Plant of the night and the Popular Choice was Dendrobium Eleanor Chan grown by Noel Bates Congratulations

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GOOD GROWING.