

# Australian Native Plants Society (Australia) Inc



Ref No. ISSN 0725-8755

Newsletter No. 102 – October 2015

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## GSG Vic Programme 2015

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Contact Neil for queries about program for the year. Any members who would like to visit the official collection, obtain cutting material or seed, assist in its maintenance, and stay in our cottage for a few days are invited to contact Neil.

### GSG Living Collection

There has been further extensive planting of the collection, with the development of a South Australian Grevillea bed, a *Grevillea alpina* hill, many areas of Western Australian Grevilleas and a lovely NSW Grevillea bed. Any volunteer help would be greatly appreciated as the garden is now getting just too much to care for alone. Special thanks must go to those members who have donated plants recently to the collection: Brian Weir, Graeme Woods, Phil Vaughan, Neville Collier, Dave Binch, Barry Teague, Mike Williams, Humphris Nursery and Kuranga Nursery. Any members wishing to get seed or cutting material are most welcome – come and have a look around and collect your own.

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## GSG NSW Programme 2015

For details contact **Peter Olde** 02 4659 6598.

**Saturday, 28 November**

**VENUE:** Silky Oaks Farm for a look at the Grevilleas.

**TIME:** 10am

**TOPIC:** Morning tea will be followed by a conducted garden tour during which the taking of cuttings will be allowed. The meeting will be held in association with the Fern Study Group.

## GSG SE Qld Programme 2015

Meetings are usually held on the last Sunday of the even months. We meet for a communal morning tea at 9.30am after which the meetings commence at 10.00am. Visitors are always welcome. For more information or to check venues etc please contact **Bryson Easton** on 0402 242 180 or **Noreen Baxter** on (07) 3871 3932 as changes can occur.

**Sunday, 29 November**

**VENUE:** Home of Maria and Gordon Reynolds, 40 Smythe Drive, Highfields Qld 4352

**PHONE:** (07) 4615 5679 or 0403 500555

**TIME:** 9:30am for 10am meeting

Special thanks to the NSW chapter for this edition of the newsletter. Victorian members, please note deadlines on back page for the following newsletter.

In this newsletter we report some unfortunate name changes in *Grevillea*. These have been brought about because the fossil literature has not been properly searched until recently and there are several names currently in use that are occupied by earlier, validly published names. Since then I have discovered approximately 40 *Grevillea* names in that literature but no others among them further impact the current names we use. I have for many years been working on a nomenclatural update to the genus *Grevillea* and hope to publish it soon. The important thing is that people publishing new names need to be aware of them so they do not unwittingly use a name that has to be changed.

In October 2015, in *American Journal of Botany*, Austin Mast *et al.* published their long-awaited DNA analysis of the Hakeinae, which contains five currently recognised genera: *Opisthiolepis*, *Buckinghamia*, *Grevillea*, *Hakea* and *Finschia*. Because some critical species have not yet been sequenced and analysed, there is no change to the nomenclature for the time being. However, the results foreshadow some big changes for which we should be prepared.

There are many very interesting results in the paper. For instance, who would have believed that, of the tested species, *Grevillea endlicheriana* alone would be resolved at the bottom of the phylogenetic tree as sister to all other grevilleas+hakeas+finschias? It is not even closely related to *Grevillea gordoniana*, with which it is presently grouped, but rather was resolved in another clade entirely. Its ancestors evolved some 38 million years ago.

It should be remembered that most of the genera we use today were erected long before the concept of evolution was known and understood, let alone implemented and accepted. We know that the boundaries between *Hakea* and *Grevillea* break down in a small number of species and that they are often difficult to tell apart floristically. There are two options on the table really, apart from doing nothing. We either try to split *Grevillea* into 6 groups or more, or we lump them together with *Hakea* and *Finschia*. *Grevillea* and *Hakea* are genera based on morphology whereas modern genetics and methods of interpretation shine a light on their evolutionary relationships. However, DNA alone does not determine their future because we still look for morphological characters to unite proposed new genera.

Whatever the outcome, I will support the scientific case. I am not wedded by some religious belief to the concept of *Grevillea* and *Hakea* as they currently exist. I will attempt to summarise the findings and their implications in a future newsletter.

Study Group members proposing to come for a few drinks and garden tour to 'Silky Oaks' in November should let me know in advance so we can make the necessary arrangements. Please bring a plate and BYO.

The special edition celebrating our 25th year and 100th newsletter has fallen a bit behind. Hopefully we can get it out next year. Since all the newsletters plus index are now online, I no longer think we should be including old articles. We may include modified articles and perhaps some new material altogether. Thanks to the many people offering assistance.

## Some unexpected name changes in *Grevillea*

A paper published in 2014 by Ian M. Turner revealed that there were over 100 names published in the fossil literature that invalidated more recent and probably better applied names. Turner, who is a Kew botanist, used the search function in Biodiversity Heritage Library to run the names through their data base. Other internet tools that search published works, such as Google Books, Gallica, Hathi Trust Digital Library, can also help.

Turner found the names of three species of *Grevillea* that are occupied by earlier-published species and need to change their names. He enacted the changes in the paper. The *Grevillea* species affected are *Grevillea coriacea*, *Grevillea rigida* and *Grevillea dissecta*.

The new species that replace them are respectively *Grevillea macgillivrayi* I.M.Turner, *Grevillea neorigida* I.M.Turner and *Grevillea neodissecta* I.M.Turner. In addition, *Grevillea rigida* subsp. *distans* now becomes *Grevillea neorigida* subsp. *distans* (Olde & Marriott) I.M.Turner.

***Grevillea macgillivrayi*** I.M.Turner, 'as mcgillivrayi', *Ann. Bot. Fennici* 51: 307.

**Replaced synonym:** *Grevillea coriacea* McGill. *Telopea* 1(1): 19–20 (1975) *nomen illegitum*, non *G. coriacea* Saporta, *Ann. Sci. Nat. Bot. ser. 4* 17: 251, t. 7, fig. 13 (1862).

The French paleontological botanist Gaston de Saporta (1823–1895) published the name thus:

*G. foliis coriaceis, oblongis, obtusatis, margine revolutis, supra punctulatis, subtus levibus.*

[*Grevillea* with leaves leathery, oblong, obtuse, revolute at the margin, slightly punctate on the upper surface, smooth below.]

**Calcaires de la partie inferieure.** (Tres rare).

Saporta drew a comparison with *Grevillea sericea* R. Br. (sic!) although there is no other evidence that species of *Grevillea* ever occurred naturally in the northern hemisphere. The species is described purely on leaf characters. No specific type specimen was cited. Apparently the type is based on the illustration accompanying the text.

***Grevillea neodissecta*** I.M.Turner, *Ann. Bot. Fennici* 51: 307.

**Replaced synonym:** *Grevillea pilosa* subsp. *dissecta* McGill., *New Names Grevillea* 12 (1986); *Grevillea dissecta* (McGill.) Olde & Marriott *Nuytsia* 9(2): 282 (1993) *nomen illegitum*, non *G. dissecta* L. *Laurent, Fl. Calc. Célas* 79, t. 4 fig. 18 (1899).

I have been unable to gain access to the original description by Laurent. However the selected new

name is sufficiently reminiscent of the old to provide linkage and should not cause any problems. The cited plate will serve as a type for the name.

***Grevillea neorigida*** I.M.Turner subsp. *neorigida*, *Ann. Bot. Fennici* 51: 307.

**Replaced synonym:** *Grevillea rigida* Olde & Marriott, *Grevillea Book 1*: 186 (1994) *nomen illegitum*, non *G. rigida* Saporta, *Ann. Sci. Nat. Bot. ser. 5* 3: 100, t. 5, fig. 2 (1865)

The homonym *Grevillea rigida* Saporta is a complex one. Saporta (1862: 252) first used the epithet to describe a petiolate leaf specimen from the middle and lower calcareous sediments at Aix and Eguilles. The description is valid but there is no plate that can be used to typify it. There is no statement about where the syntype specimens mentioned in the text are located but I would be very surprised if they did not exist somewhere among museum specimens of fossil flora. If one of the specimens to which Saporta referred can be found and positively identified, then the 1862 description would have priority.

Apparently Saporta forgot that he had already used this epithet and he again used it in 1865 to describe a sessile leaf fossil from the gypsum of Camoins-les-Bains, in France. He notes the leaf as analagous to that of *Grevillea buxifolia* and several other species. The margins are strongly rolled to the underside, the texture is coriaceous and the surface punctate. This time Saporta does cite an illustration which is functionally the type but which Turner erroneously indicates as '1862'. I have taken this to be an unfortunate typographic error as the remaining details cited are those related to description in 1865.

Turner also takes the opportunity to provide a new combination for the heterotypic subspecies, subsp. *distans*, which is to be known as *Grevillea neorigida* subsp. *distans* (Olde & Marriott) I.M. Turner.

### References

- Laurent L (1899) Flore des calcaires de Célas. (Diss., Marseille Moullot Fils)
- Saporta G de (1862) Études sur la végétation du sud-est de la France a l'époque tertiaire 111, 1V – *Ann. Sci. Natur. – Bot.*, 17: 191–314.
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- Turner IM (2014) Names of extant Angiosperm species that are illegitimate homonyms of fossils. *Annales Botanici Fennici* 51(5): 305–317. <http://dx.doi.org/10.5735/085.051.0506>.

### News from Wilsons Creek

Still learning how to garden in this climate but it is easier than in Melbourne, things just grow, even the few Eremophilas that I brought with me are doing very well and vegetables do wonderfully. I have planted out a lot of Grevillea hybrids mostly *G. banksii* crosses that are readily available in the area. Neil's *G. 'Pick o the Crop'* and *G. thyrsoides* subsp *pustulata* are doing well (grafted). I also found a *G. helmsiae* from the native rainforest nursery in Burringbar. There is an indigenous

nursery in the very next street which is handy. I got the Rainforest Plants of Australia key from Hugh and Nan Nicholson at an ID session here at Mullumbimby and I find the inputs need to be a lot more accurate than the Eucalyptus and Acacia keys. I have attached a few pics of the property as it was not long after we arrived, since then a lot of plants have been put in. Costa was at the Mullumbimby community festival.

T &amp; P Gibian

Peter Olde

### Grevilleas in Austria

We went on our long-awaited holiday to my parental homeland of Austria in May of this year. I thought you would be impressed by the attached photo taken in the huge Palm House in the vast gardens of the Schonbrunn Palace in Vienna. Tom is pictured in front of two large and healthy grevilleas at least 10 metres tall--a *Grevillea hilliana* and a *G. robusta*. Amazingly, about a quarter of the species in the Palm House are Australian.



Large *G. robusta* and *G. hilliana* in Schonbrunn Palm House

### *Grevillea* 'Scarlet Moon'

*Grevillea* 'Scarlet Moon' is another of Digby Grown's proud achievements. It is a hybrid between *Grevillea nivea* and *Grevillea* 'Crowning Glory' and has been released in the US recently as *Grevillea* 'Kings Fire'. It will be released here in Australia either this spring, or this time next year. It is not clear why we need a change of name. The American commercial partner with Kings Park obviously has an important stake in the U.S. release.



*Grevillea* 'Scarlet Moon'



### *Grevillea buxifolia* and the Carpenter Bee

Recently I received a photo of a xylocopan bee that might prove to be the heretofore unknown culprit. This *Grevillea* species is never attended by birds but is visited by numerous insects, including aporine non-native bees (*Apis mellifera*) that appear to have taken over the function of pollinating it. In the middle of a sunny day the flowers of *Grevillea buxifolia* emit a light perfume which can be quite strong in areas where the species occurs. Plants usually aggregate in large populations on the Sydney sandstone, and flowering occurs over a long period between late winter and summer. Spasmodic out of season flowers can even be found in autumn–early winter. Seed-set is plentiful, but most abundant towards the end of the principal flowering around October–November. Although insects generally are thought to be the pollinator, floral structure is melittophilous, a syndrome in which the inside of the perianth everts into a small landing platform below the pollen-presenter which overhangs it. I have found two unnamed insect species utilising the flowers, one of which was a tiny earwig which was hiding inside the perianth wallowing in the nectar produced at the base. The other was the omnipresent psyllid. However, small insects are thought to be too small to effect pollination of this species and have not been observed on the flowers mixed with pollen.



The question as to what might be the native pollinator has been addressed with an interesting photograph provided to me by Dr Trevor Wilson, a post-doctoral Research Scientist at the National Herbarium of New South Wales. The photograph, taken by an un-named friend, is of

a Carpenter Bee which appears to be clearly foraging, not making an accidental landing. The photograph is of course only incriminating evidence, not proof, but shows that if you are observant you just might confirm this possibility. Over a period of more than 20 years I have been watching and observing this *Grevillea* species in the wild at every opportunity in the hope of finding any evidence of a native pollinator, which has been, it must be said, somewhat on the lean side.

According to Wikipedia, there are two species of *Xylocopa*, found in the Sydney region; *Xylocopa bombilans*, the Peacock carpenter bee and *Xylocopa aeratus*, the Golden-green carpenter bee. From the literature I have consulted there is also evidence that the Great carpenter bee, *Xylocopa aruana*, which is Australia's largest bee and the recently described *X. lieftincki* Leys occur in New South Wales. However, the most likely species in the photo pollinating *G. buxifolia* is *Xylocopa aeratus*.

It is not unknown for Carpenter bees to attend the flowers of *Grevillea*. In most cases they appear to be robbing nectar. Photos taken from <http://www.aussiebee.com.au/xylocopa.html> show the Great carpenter bee attending what appear to be, from the flowers and foliage, the flowers of tropical *Grevillea* species or hybrid but not actually gathering pollen though accidental pollen transfer might be occasioned by the visit.



Carpenter Bees effect pollination by buzzing the flowers they attend. They curl their bodies around the pollen presenter or anthers and vibrate their muscles to release the pollen,

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accumulating it via bristles on the underside of their bodies and legs. They are mainly solitary bees but some species have simple social nests in which mothers and daughters cohabit. However, even solitary species can be gregarious, and often several nest near each other. Over a thousand female Great carpenter bees were witnessed on *Jagera pseudorhus* at Arcadia, near Magnetic Island Queensland by C. Lane (2006). Carpenter bees cut nest burrows by tunneling into soft timber, vibrating their bodies as they rasp their mandibles against the wood, each nest having a single entrance which may have many adjacent tunnels. The entrance is often a perfectly circular hole on the underside of a beam, bench, or tree limb.

The natural distribution of *X. bombilans* is from the Cape York Peninsula in north Queensland south along the eastern seaboard to the Sydney region (where it overlaps with *X. aeratus*). They can be seen from spring to autumn, commonly feeding at pea flowers of the family Fabaceae, such as *Gompholobium* species, including *Gompholobium latifolium* in spring, and *Pultenaea elliptica* in autumn. It is a pollinator of *Melastoma affine*. Other flowers visited include those of *Banksia*, *Xanthorrhoea*, *Hardenbergia violacea*, *Tristania*, *Leptospermum*, *Aotus*, *Cassia* and *Leucopogon*.

The Golden-green carpenter bee (*X. aeratus*) is a metallic green in colour, although it may appear purplish or bluish from some angles. A large stocky bee, it is often heard by its loud low-pitched buzzing while flying between flowers. The male has yellow face markings. The bee does have a sting which is potentially painful, although no stings have been recorded.



Great Carpent Bee on Grevillea – Photo Kari Ludvigsen

The natural distribution is southeastern New South Wales from Sydney southwards, and into Victoria and southeastern South Australia. They can be seen from spring to autumn, commonly feeding at pea flowers of the family Fabaceae, such as *Gompholobium* species, including *Gompholobium latifolium* in spring, and *Pultenaea elliptica* in autumn. Flowers of *Leucopogon* and *Leptospermum* are also visited.

The Golden-green carpenter bee nests by hollowing out stalks of grasstrees (*Xanthorrhoea*), or soft wood such as *Banksia*, *Casuarina*, *Melaleuca* and *Leptospermum*. The female excavates a tunnel with her jaws and picks up and dumps the wood shavings outside. The hollow can reach 30 cm long by c.1.5 cm diameter wide. Larger pieces of wood may allow for multiple tunnels. Several female bees may use a nest, one breeding and the others guarding. A bee defends the 0.7–1.0 cm wide entrance by blocking it with its abdomen. Both male and female bees may overwinter within the tunnels. The tunnels are partitioned into several cells, where the mother bee lays an egg in each accompanied by provisions of nectar and pollen.

#### References

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<http://magneticisland.s4space.com.au/cbee.html>
- Leys R (2000) A revision of the Australian carpenter bees, genus *Xylocopa* Latreille, subgenera *Koptortosoma* Gribodo and *Lestis* Lepeletier & Serville (Hymenoptera: Apidae). *Invertebrate Taxonomy* 14 (1) 115–136.
- Walker K (2009) Carpenter *Xylocopa* bees (*Xylocopa* (*Koptortosoma*) *lieftincki*) Updated on 9/7/2011 8:14:34 PM Available online: PaDIL  
<http://www.padil.gov.au>

## A review of recently published papers on 'Grevillea' bees

Pollination in *Grevillea* is largely assumed and uncertain. Floral syndromes distinguish species as being bird- or insect-pollinated. Precise pollinators are unknown and even the underlying syndrome may be an incorrect assumption. A possible scenario is that all or some species may have multiple pollinators. We often see photos of feral bees (*Apis mellifera*) attending the flowers of *Grevillea*. They were introduced to Australia through Hobart in 1831 by Thomas Braidwood Wilson (for whom *Grevillea wilsonii* was named). There are now at least 20 recognised subspecies. However, although it is an excellent pollinator and may have largely superseded native pollinators for some species, the pollinators of species that interest biologists existed well before they arrived. They are interested in the evolutionary process and the part that natural pollinators have played. While researching this article I observed a photograph of *Grevillea eryngioides* taken by *terraincognita96* on [www.flickr.com](http://www.flickr.com) showing good evidence of pollination by a unid WA bee, commonly known as winter bees.

**Bernhard Jacobi (2009)** has made some interesting observations on *Anthoglossa cf. callander* (Cockerell 1915) and *Anthoglossa nigrocincta* (Cockerell 1914). 'The flower visits of two species of the genus *Anthoglossa* were observed and photographed in a total of five localities. The presumed oligolecty of both species is confirmed. [Oligolecty refers to a narrow, specialized preference for pollen sources, typically to a single genus of flowering plants.] The pollen loads in both bee species were apparently bound by an unknown agent. The bigger species is able to fly on cool overcast days even in drizzle. The orange colour of this species' males agrees very well with inflorescences of the main observed pollen-source, a *Grevillea* species. This may be another of the rare cases of male crypsis in bees.



### *Anthoglossa cf. callander* (Cockerell, 1915)

This species was encountered at two locations on the Mullewa–Wubin Road. The species' females were observed collecting pollen and nectar on *Grevillea excelsior* plants growing on the roadside between Mullewa and Wubin on a windy day with complete cloud-cover and occasional light rain (October 2, 2008). It was quite unexpected to find bees active under these conditions.

The more or less horizontal bright orange-yellow flower spikes of *G. excelsior* exhibit a bird-pollination syndrome. The viscid nectar is secreted in copious amounts. Probably Honeyeater species (Meliphagidae) are among the natural pollinators. Individuals of the Singing Honeyeater *Lichenostomus virescens* were observed nearby.

The female bees were observed hovering above the flower spikes scraping the sticky beaded pistils with fore and middle tarsi. Apparently they removed pollen already stuck there and possibly some of a sticky secretion as well. Females were also regularly observed to land below the flower spikes and lick up the syrupy nectar with their short tongues. The pollen loads carried by the females in their scopae appeared as bound by some unknown agent.

The species' males were constantly flying fast around the *G. excelsior* plants looking for sitting females. If they detected one, they hovered about 5 cm behind for a second then dive-bombed and tried to grab it, which always failed. No mating was observed in one hour of continuous observation by four observers. Only occasionally a male would sit on a plant to rest or preen. Both sexes were extremely alert and did only rarely sit for more than a second. This made them very hard to photograph.

A few kilometres to the north on the same road a single female was encountered collecting roseate pollen from *Grevillea paradoxa*.

**Jacobi & Newman (2012)** summarised new findings, again published in *Bembix*.

'In the Wheatbelt and Goldfields area of Western Australia, females of the Masked bee *Hylaeus* (*Hylaeteron*) *douglasi* were encountered exclusively on two species of *Grevillea* (Proteaceae). Scrutiny of the many macro photos

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taken resulted in the discovery of pollen robbery by this species of bee, which bites open the closed individual flowers to access the pollen, before the tepals split naturally to free the style on top of which the pollen would normally be presented. The opening technique applied by *H. douglasi* is different in both floral host species used, according to the species-specific flower anatomy. Probably the oligolectic bee does not contribute to pollination when applying this technique. However normal pollen harvest from the pollen presenter on top of the style was documented. Non-damaging pollen collecting in the related species *H. riekianus* has been observed and photographed on one of the *Grevillea* species.'

The *Grevillea* species in question are *Grevillea excelsior* and *G. petrophiloides*. On a recent (private) GoBeeWA II excursion to Western Australia the authors found *H. douglasi* repeatedly on *G. excelsior*. The bee seemed to represent a regular element of the flower visitor community on this plant species. On at least one occasion several individuals were encountered on one confluence. A published image shows *Hylaeus douglasi* extracting pollen from a hole cut in the perianth limb of a flower of *Grevillea excelsior* still closed. The analysis of photos taken showed that *H. douglasi* forcibly opens flowers still closed in this host species. One photo shows a group of flowers with pollen presenter still hidden, that have been opened laterally by biting a hole into the incurved limb of one of the ventral tepals. Small amounts of pollen strewn in the following extraction process are visible in the photo. The bee is seen extracting pollen from the last hole by means of its fore tarsi. They did not see *H. douglasi* removing pollen from the pollen presenters of already erected styles, even though such pollen was present on a confluence where two bees were active on unopened flowers.



#### **Behavioural observations in *Hylaeus douglasi* on Pink Pokers (*Grevillea petrophiloides*)**

In one location a female was observed and photographed removing pollen from the pollen presenter of a fresh post-anthesis flower. The bee was photographed ingesting small clumps of pale pinkish-violet pollen until the pollen presenter was freed of pollen almost completely. Afterwards, the bee cleaned her body from adhering pollen, which she ingested, too. Additionally, the tepals with their fused anthers were cleaned of remaining pollen after the pollen presenter has left the perianth limb. The newly discovered specialized pollen robbing behaviour has not been noticed in the field, but only when looking closely at the many photos taken. Among them at least one complete series was found, showing the opening of a still closed *Grevillea petrophiloides* flower by a female *H. douglasi*. Generally the flowers cut open were in the transition zone of a confluence in progressing anthesis. The bees concentrate on flowers about to open, which apparently had a pollen already deposited on the spindle like pollen presenter of the style, which was still enclosed by the four tepals with their set of fused anthers. The tepals were chewed open always from top laterally. As a rule two tepal tips were partly severed in the process. The opening having been achieved, one or (alternating) both fore tarsi were inserted to the tibial joint into the narrow cleft between the enclosing tepal-anther complex and the enclosed pollen carrier of the style. After retracting the tarsi, pollen grains trapped in the tarsal brush were ingested by the female. The procedure of inserting, - retraction - ingestion was repeated several times apparently until the pollen of the flower had been depleted.

The behaviour of these bees is reminiscent of operculum-lifting behaviour in the Eucalypt-visiting hylaeine Australian Masked bees reported in an earlier article by Newman and Jacobi (2011).

#### **Behavioural observations in *Hylaeus riekianus* on Pink Pokers (*Grevillea petrophiloides*)**

To observe details of behaviour in this tiny bee with unaided eyes is even more difficult than in the previous species. The less often encountered females of *H. riekianus*, too, preferred the intermediate zone of the confluences, between pre- and post-anthesis flowers. On some photos the tip of the worked flower is

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visible, showing the four tepals having parted and minimally diverged apically,

forming an minute cross-shaped opening through which the pale violet pollen is visible. The bee was busy ingesting the pollen directly from there. Utilisation of

forelegs in pollen harvest has not been observed clearly in this species but does not seem unlikely, either. Neither has the opening of closed flowers by force of mandibles been seen in this species. Maybe the mandibles are used to expand the naturally formed opening just a little?

### Oligolecty on *Grevillea*

Houston (1981, p.77) already stated: 'These bees appear to be specialist visitors to flowers of *Hakea* and *Grevillea* (Proteaceae). As we did not find *Hylaeteron* on any other flowering plants except *Grevillea*, our observations agree well with the citation above.

### Knobbed setae on fore tarsi

When discussing oligolecty among Western Australia bees Houston (2000, p. 7) suggested, referring to *Hylaeteron* species, that 'Their knobbed fore tarsal setae may be an adaptation for removal of pollen from flowers of these genera [*Grevillea* and *Hakea*]' (p. 7). The knobbed setae on the fore tarsi of *H. douglasi*, as illustrated by Houston (1981) in his revision of several subgenera of *Hylaeus*, form excellent tools for the pollen-robbing behaviour described above for this species. Likely the forms of the front tarsal claws, which apparently can be held at right angles to the last tarsal member, aid the extraction of pollen from the intra-floral pollen storage space, too.

### Mandibular shape of females

From other female *Hylaeus* depicted in Houston (1981) *H. douglasi* differs in having stout mandibles with three sharp apical teeth. Such mandibles are present in bees regularly destroying plant tissues. A well-known example is the stingless bee *Trigona silvestriana* from tropical Meso-America. Interestingly *H. riekianus* females have differently shaped mandibles with one apical tooth only, suggesting absence of plant-tissue cutting behaviour.

### Pollen robbery – a strategy to reduce competition?

It is assumed that in areas with strong honeybee presence these, together with native bees, remove the rather small amount of pollen presented in the narrow zone of flowers on each progressively opening conflorescence very effectively as soon it becomes available, so that there may be little left for specialist bees like both *Hylaeteron* species herein discussed. In this situation a method ensuring access to pollen ahead of competitors may greatly reduce the impact of competition. Interestingly, the anatomical adaptation of knobbed setae on the fore tarsi is useful especially in the context of this competition-reducing strategy. As competition can act as a strong selective force, it may have driven the transformation of fore tarsal setae, present in and used for pollen harvest by all Hylaeinae females, to a form increasing effectiveness of pollen removal from flowers with tepals still fused.

A related strategy to reduce honeybee competition has been recently described by Newman & Jacobi (2011) for two other hylaeine bees from southern Queensland. In this case no apparent anatomical adaptation was found. So this purely behavioural adaptation may be a more short term response to the presence of honeybees, while anatomical adaptations, like specialized setae probably predate the honeybee importation to Australia, which only happened around 200 years ago.

### *Euhesma albamala*

In a paper published in 2015, Hogendoorn & Leijts describe a new euryglossine bee collected from a red-flowered *Grevillea*. In the introduction to a paper in which begin a DNA bar-coding project, they note that 'despite their environmental and economic importance as pollinators of native plants, and as ecosystem services providers for crop pollination worldwide and in Australia, only an estimated two-thirds of the Australian bee species are as yet known to science (Batley and Hogendoorn 2009). Opportunities to ameliorate this situation are constrained by a shortage of funding and career prospects for taxonomists. Hence, species may become extinct before they have been recognized.'

continued >

*Euhesma albamala* Hogendoorn & Leijs

Holotype: ♀, RL1807C, Cane River Conservation Park, Western Australia, 22.0936°S, 115.3507°E, 26 June 2011, R. Leijs, on flowers of a red flowering *Grevillea* (WAM).

*Euhesma albamala* is described from its occurrence on an unidentified red-flowering *Grevillea* in Cane River Conservation Park, north-west, Western Australia. The new species is in the *walkeriana* species group. The bee specimens studied in this paper were collected during six intensive short term (1–2 week) Bush Blitz surveys (Department of the Environment 2010), at various remote locations in Australia. Coordinates of the locations are given in decimal degrees. The species were caught mainly on flowering plants using a hand net, but on occasion a vehicle net or malaise traps were used. The bees were killed by freezing, pinned within a day of capture and sorted into morpho-species. The authors attempted to key all collected euryglossine specimens to species. The specimens were compared to all type specimens and all other relevant reliably named material at the Queensland Museum, the Western Australian Museum, the Australian National Insect Collection, and the South Australian Museum. Based on these morphological comparisons, several species, including four species in the genus *Euhesma*, were identified as new.

The fifteen known species in the *walkeriana* species group (Exley 2001) are small (4–6 mm), black and or with metallic sheen, often marked with yellow. Heads are wider than long with antennae low down on the face so that subantennal sutures are absent or almost so. While similar to *Xanthesma* (subgenus *Chaetohesma*), the *walkeriana* group differs from this subgenus in the following characters: the facial foveae are straight and do not curve towards lateral ocelli, the pronotum is relatively short and the basitarsi of the forelegs do not bear long, stiff setae (Exley 2001).

*Euhesma albamala* was collected from a red-flowering *Grevillea* species that is unidentified to species at this time.

**Etymology:** The specific name refers to the white mandibles.

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## How the white Grevillea was found

Most of us here on the south coast of New South Wales know that Ryan Harris often goes bush on his own in his 4x4 drive ute. We also know that he has an eagle eye and an insatiable curiosity about the plants that grow in our region.

When a new examination of the *Grevillea victoriae* complex (all the species in this complex have red flowers) was published in 2000, a new species, *G. epicroca*, was described with a few small populations in the Deua National Park. Combine the three conditions above, and it was inevitable that Ryan would go looking for another location.

Some time after this, on his regular Thursday afternoon in the Herbarium, he announced that he thought he had found some *G. epicroca*, growing in steep country along the Golaribbee Fire Trail in the top end of the Deua National Park. Naturally, I was interested, so asked if and when he would be going to have another look. "Saturday", he replied, "would you like to come?" Somewhat flattered that he would welcome an 'old lady' on a bush expedition, I said yes, and so it was arranged.

We drove along the forest roads, admiring the wonderful views, although they were slightly obscured by mist in the valleys, and parking ultimately on the top of a ridge. Around about were numerous bushy red flowered grevilleas. "Here they are", Ryan said, commencing to walk down the road which was quite steep and windy. There was a high embankment on one side of the track and a series of deep gullies on the other. The plants in question were growing on both sides, some seedlings and others more mature.

In addition to the grevilleas, there were several other species that I had not seen before – among them a *Pterostylis*, *Sannantha* (*syn. Baeckea latifolia*), *Hibbertia circumdans* and *Pultenaea vilifera*.

Half way down the hill, we stepped off the road and across the face of the mountainside. In the distance, over layer upon layer of forested hills and valleys, we could see as far south as Mt Dromedary.

By this time it was after midday, and I was feeling peckish, so we decided to return to the vehicle. I, being rather more cautious than Ryan, walked up the road, but he said "I am going to cut across all the corners through the bush, however up and down it may be".

Of course, I got to the top first. After a little wait, I spied Ryan striding up the hill, brandishing a fistful of foliage and with a grin from ear to ear. The foliage was the usual grevillea type, and it had creamy white flowers. This looked identical in all but colour to the plant with red flowers we had been seeing all the morning.

I was suitably astonished, and naturally, wanted to know if he had been able to obtain any cuttings. They were there, in a plastic bag, and were quickly misted and secured. Even though it was a Saturday – not a working day for him – he was anxious to call at the Gardens to pot the cuttings before they lost too much moisture. So Ryan had his usual 'grazing' lunch, and I had my peanut butter and lettuce sandwich on the way home.

After leaving me at Moruya, he drove to the Gardens in great excitement, found John and showed his find, then potted the cuttings at once. The cuttings, as we know, thrived, and the creamy white grevillea is now on the way to being mass produced by specialist nurserymen for the trade. Apparently, Ryan's grevillea is new to all who have seen it.

And after all that, the grevilleas we had seen that day – the red and the white - turned out to be not *G. epicroca* at all, but a subspecies of the more common *G. rhyolitica*.



Ryan Harris



## Grevillea species seen in southern water catchment area during October – November 2014

During October – November 2014, I asked permission from the southern water catchment authority to enter their lands and roads to explore the flora growing there. Sydneysiders will know these enclosed lands with signs saying there is a \$12000 fine for entering. Gordon Meiklejohn, Peter Olde and I completed the online entry test and over several expeditionary days, with gate key in hand, we found the following:

### Day one

1. Diamond Field Road - *Grevillea baueri* and *G. patulifolia*.
2. White waratah track - *G. baueri* and *G. patulifolia*.
3. Fire Road No. 2a to No. 2 - *G. baueri* to just past Belmore Crossing, *G. oleoides* (pink-flowered) scattered.
4. Fire Road No. 2 to No. 2a - *G. oleoides* scattered with *G. patulifolia* near wet areas.
5. Fire Road No.10 - *G. baueri* & *G. patulifolia* at beginning of track, *G. oleoides* (scattered) with *G. raybrownii* at end.
6. Fire Road No 18. - *G. oleoides* scattered, up to 3m high, *G. patulifolia* near wet areas, *G. raybrownii*, *G. sphacelata* and *G. ferruginea* at end with *G. oleoides*.
7. *G. baueri* under power lines at top of hill, Robertson Burrawang water supply area, 2.1km west of Tourist Road.

### Day two

We reinvestigated Fire Road No 18, stopped at one of the hanging swamps on right which had good flower colour range of *G. patulifolia*. *G. ferruginea (arenaria)* was also found at end of the road this time. There was nothing much across Fire Road 1A.

In the afternoon, Fire Road No. 1 - *G. baueri* and *G. patulifolia* at Molly Morgan crossing, a natural hybrid *G. baueri* x ?*G. mucronulata*, *G. patulifolia* near wet areas, *G. oleoides* and *G. sphacelata* all the way till *G. raybrownii* for a 2km near turn off to Fire Road No. 1E. A shady section with *G. ferruginea (arenaria)* for 1km, a weird grassed area at Cupids Forest and maybe large snow gums then *G. mucronulata* to the end.

### Day three

We reinvestigated Mollys Crossing and then all

the way to end on Fire Road No. 1 and down Fire Road No. 1 F with *G. mucronulata*, *G. raybrownii* and *G. sphacelata* scattered to the end.

Back on Fire Road No 1 - Large areas of *G. raybrownii*, *G. mucronulata*, and *G. sphacelata* with very little *G. oleoides* but some *G. patulifolia*. there were two conifer (*Callitris*) plants out of their range and a patch of white *Homoranthus*, pink *Kunzea* with Tea tree and Boronia on rocky outcrops.

Fire Road No. 38 - *G. ferruginea* and *G. sphacelata*.

Fire Road No. 3A - *G. ferruginea* – road blocked.

Fire Road No. 3 - *G. patulifolia* various plants with one fine-leaf variant similar to the Manchester Square population near Moss Vale, *G. baueri* at Chain of Ponds crossing.

Fire Road No. 1E - Large variation in population of *G. baueri* at Chalkers Crossing.

What was achieved in this quick survey:

1. *G. oleoides*. This southern form on the Avon River system does not appear to root sucker. On the higher ridges it attains a height of up to three metres and the flower colour is much more pink in the catchment than the red northern forms outside of the catchment.
2. *G. patulifolia* was fairly constant in growth habit except the population nearer to Mittagong. All populations with variation in flower colour.
3. *G. ferruginea* was the same as other collections outside of the catchment.
4. *G. mucronulata* was similar to other collections but will need to be looked at more closely.
5. *G. baueri* appears to be the same as the Welby/Bundanoon population except for the Chalkers Crossing population where there was some variation around the swamp.
6. *G. sphacelata*. Its range has now been extended a lot further south than was known.
7. *G. raybrownii* This plant appeared to be relatively rare outside of the catchment. Here it is a common plant, like *G. sphacelata*, in some areas we looked at.
8. The *Grevillea* hybrid may be *G. baueri* x *G. mucronulata* although *G. mucronulata* does not grow near this old quarry site.

## Grevilleas and the Blue-Banded Bee

In mid-February (2015) I attended a one-day seminar at the University of Western Sydney, Richmond campus on the subject of native bees. The day was a fascinating exposition of the many different species of our local bees. A well known member of APS, Martyn Robinson (Northern Beaches Group) was one of the half-dozen or so speakers during the day. The species that really grabbed my attention was the Blue-Banded Bee.



This little bloke (gender neutral) is one of our many solitary bees; that is, it does not live in a communal hive but rather inhabits anything from a hole in the brickwork to a cavity in a river bank. But it's only the girls who seek such luxurious accommodation, and even then only on their own. The boys roost nearby by hanging on with their mouths to some nearby stalk or stem of (usually) a plant as this picture taken by Murray Irwin attests. While this species can sting, they are very tolerant and short of grabbing hold of one, will allow very close inspection. Individual bees only live for one year, dying when the cold weather arrives. Before this, they mate and the female lays her eggs in her chosen home with a store of pollen and honey awaiting the young when they emerge when the weather warms up again. And so life goes on.

In addition to the traditional pollination method, this species is also capable of buzz pollination. This process involves the rapid beating of the wings to effect the release and dispersion of the

pollen. A particular vegetable (or is it a fruit) crop that depends on this method of pollen dispersion is the tomato. Blue-banded bees are said to increase the fruit yield of a tomato plant and even chillies by up to 30%.

So what's all this got to do with Grevilleas you might ask. It really is a pity that on the native bee website dealing with this particular variety of native bee <http://bluebandedbees.com/flowers.htm>, while about 19 different plant names are listed as being sought by the Blue-Banded Bee, only four seem to relate to native plant species, they being 'Myrtle, Mountain Devil, Senna and Spider flower grevillea'. And more of the grevillea shortly.

I was aware of this particular bee before attending the seminar, mainly because of a couple of visits to my garden at Westleigh by Martyn Robinson who, apart from being a long-time member of APS, is also an insect expert with the Australian Museum. But my enthusiasm was really stirred at the seminar and afterwards I resolved to try building a home to attract the bee. The advice was to provide a mixture of about 80% river sand and 20% clay in around a 20cm long piece of rectangular PVC downpipe. A few holes about the diameter of a pencil are then pushed about two-thirds of the way into the mixture while still moist and hey presto, when the mixture sets along should come the little bees. I didn't have any bits of downpipe and being the impetuous and impatient (at times) bloke that I am, I saw the opportunity to use some spare black plastic plant tubes as shown below.



continued >

Three weeks later I felt like a new father when the centre unit on the left was occupied by a beautiful, buzzing blue-banded bee. I've even taken a couple of videos but can't include them here. Since then another one or two apartments have been snapped-up.

Prior to attending the seminar, I had only specifically noticed Blue-Banded Bees on the flowers on *Melaleuca thymifolia*. But since taking up residence in their new home I have repeatedly seen these bees on *Grevillea* 'Lady O'. I presently (early April 2015) have one in flower about 10 metres from their new home and

it's obviously the go-to plant. Just what this may mean in relation to pollination and hybridization of this and other grevilleas I'll leave to others but one important aspect that has emerged for me since attending the seminar is to stop, look and listen to the wonderful world of our native bees.

Peter Olde

### Elizabeth Margaret 'Beth' (1939–20 March 2013) and Kenneth Andrew 'Ken' Forbes (1937–31 De-cember 2014)

The long lives and recent deaths of two of New South Wales' most loyal, hard-working and reliable Study Group members are recorded here: Beth and Ken Forbes. The couple, formerly of Sylvania, who were 'joined at the hip' as Beth once said, had a retirement farm at Burrier, in a remote and rugged part of the country west of Nowra. There they grew a remarkable range of native plants in-cluding grevilleas. Beth had been a school teacher but for as long as I had known them in retire-ment, Beth was very ill, having been diagnosed and treated for cancer. She was however always there to enjoy the environment, the plants and to help at all our fund-raising events, plant sales and meetings as best her frail body would allow. In short, her limited time, debilitating illness and treat-ment, did not prevent her from enjoying every minute of it. She was a gently spoken woman of good humour, related, she proudly informed me, to J.A. Baines, author of *Australian Plant Genera*. Beth died in March 2013, pre-deceasing Ken, who by then had himself been diagnosed with a ter-minal disease, pulmonary edema.

Ken had been a very energetic hippie in retirement, growing his hair long and scampering around his block of land, making garden beds on the sides of its hills, fishing, bush walking, bird watching, native plant enthusiast. He fought long and hard against the local wombats who continuously raided his vegetables. He recounted his observation of one actually charging at

the protective wire he had erected to exclude them. One of his enduring retirement feats was the construction of a massive bridge over an otherwise impassable gorge on the farm. Ken had been an electrician for much of his life but was a talented handyman at almost everything. I was shocked to see this vital, apparently healthy man at the last Fred Rogers Conference puffing as he walked up a hill at Ma-rilyn Sprague's garden. When I enquired of this he told me his prognosis but felt he had another five or so years. Sadly, he suffered a stroke only a few weeks later from which he did not recover.

Ken and Elizabeth had two children, Rohan and Peta. Vale to both.



Beth and Ken Forbes in the back of the photo



**Seed bank****Matt Hurst**

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<i>Grevillea aurea</i>	<i>Grevillea nana</i>
<i>Grevillea baileyana</i>	ssp <i>abbreviata</i>
<i>Grevillea banksii</i> alba	<i>Grevillea newbeyi</i>
prostrate	<i>Grevillea nudiflora</i>
<i>Grevillea biternata</i>	<i>Grevillea occidentalis</i>
<i>Grevillea</i>	<i>Grevillea paniculata</i>
<i>candelabroides</i>	<i>Grevillea paradoxa</i> (ltd)
<i>Grevillea crithmifolia</i>	<i>Grevillea pilulifera</i>
<i>Grevillea decora</i>	<i>Grevillea polybotrya</i>
<i>Grevillea decurrens</i>	<i>Grevillea preissii</i>
<i>Grevillea eriobotrya</i>	<i>Grevillea pteridifolia</i>
<i>Grevillea eriostachya</i>	<i>Grevillea pulchella</i>
<i>Grevillea excelsior</i>	<i>Grevillea refracta</i>
<i>Grevillea floribunda</i>	<i>Grevillea ramosissima</i>
ex Coonabarabran	<i>Grevillea ramosissima</i>
<i>Grevillea glauca</i>	ssp <i>ramosissima</i>
<i>Grevillea johnsonii</i> (ltd)	<i>Grevillea stenobotrya</i>
<i>Grevillea juncifolia</i>	<i>Grevillea striata</i> (ltd)
<i>Grevillea leucopteris</i>	<i>Grevillea superba</i>
<i>Grevillea longistyla</i>	<i>Grevillea synapheae</i>
<i>Grevillea magnifica</i>	<i>Grevillea teretifolia</i>
<i>Grevillea magnifica</i>	<i>Grevillea tetragonoloba</i>
ssp <i>magnifica</i>	<i>Grevillea triloba</i>
<i>Grevillea manglesii</i>	<i>Grevillea triternata</i>
ssp <i>manglesii</i> (ltd)	<i>Grevillea vestita</i>
<i>Grevillea monticola</i>	<i>Grevillea wickamii</i>
	ssp <i>aprica</i>
	<i>Grevillea wilsonii</i>

**Free + s.a.e.**

<i>Grevillea banksii</i> prostrate white
<i>Grevillea banksii</i> prostrate red
<i>Grevillea banksii</i> prostrate red ex 1770
<i>Grevillea bracteosa</i>
<i>Grevillea glauca</i>
<i>Grevillea juncifolia</i>
<i>Grevillea johnsonii</i> red flowers
<i>Grevillea longistyla</i>
<i>Grevillea leucopteris</i>
<i>Grevillea magnifica</i>
<i>Grevillea</i> moonlight
<i>Grevillea petrophiloides</i>
<i>Grevillea plurijuga</i>
<i>Grevillea ramosissima</i>
<i>Grevillea robusta</i>
<i>Grevillea stenobotrya</i>

Please note: seed from hybrid -substitute -cultivated plants does not necessarily come true to type.

**Fresh stocks of garden seed are desperately needed as most species are almost out of seed.**

Can members asking for seed please give an alternative list in case some species are no longer in stock. It is preferred if requests are sent with a small padded post pack. It costs less to send at approx \$1.50 per letter than padding an envelope at \$2.00 each or more so the seed will survive the trip down the sorting rollers. It's a good idea to send extra stamps with requests as extra postage is usually needed to be paid with almost every request. Leftover stamps would be sent back with your seed.

Direct deposits can be made into the Grevillea Study Group account

**BSB 112-879****Account Number 016526630**

(St George Bank).

Please notify the Treasurer of transfer by email

**([bruce.moffatt@tpg.com.au](mailto:bruce.moffatt@tpg.com.au))**

or by post to

**Grevillea Study Group,  
32 Blanche St Oatley, NSW 2223**

**Financial report – October 2015****Income**

Subscriptions	\$785.00
Donations	30.00
Interest	0.69
	<hr/>
	\$815.69

**Expenditure**

Newsletter publishing	\$270.00
Printing	161.44
Postage	48.30
	<hr/>
	\$479.74

Amount in interest bearing deposit till 4/2/2015  
**\$18,750.25**

Balance in current account 25/0/2015  
**\$4,569.66**

Balance in business cheque account  
 25/10/2015  
**\$186.68**

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**Email group**

This email group was begun by John and Ruth Sparrow from Queensland. Free membership.

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**Deadline for articles for the next newsletter is 31 January 2016, please send your articles to peter.olde@exemail.com.au before this date.**

If a cross appears in the box, your subscription is due.

Please send to the Treasurer, Christine Guthrie, 32 Blanche Street, Oatley 2223.

Please make all cheques payable to the Grevillea Study Group.

2014

2015

If a cross appears in both boxes this will be your last newsletter.

**Membership fees**

The annual subscription is \$10 per year or \$40 for 5 years. If you choose to receive the newsletter by email there will be a 50% discount ie membership will be \$5 per year – \$20 for 5 yrs. I would encourage everyone to take advantage of the savings by paying for 5 years, and choosing email. Overseas membership \$20 if posted.