

**Issue 28: Summer 2022.**

Australian Native Plants Association (Australia)



# **Banksia Study Group Newsletter No. 28.**

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## 2018 Western Europe/U.K. travels end.

On our return to the UK from Western Europe, we were treated to a few special botany activities organised by members of the Australasian Plant Society.

### Judy Clarke's private Garden.

Our first stop was to visit Judy Clarke, long serving secretary of the Society who lives in Hastings. She is an avid Australian Native plant enthusiast and has attended several ANPSA conferences in Australia.

She has approximately 300 species of plants in her garden with several lovely wattles, hakeas, Albany pitcher plants and a lovely old *B. marginata*, the pride of her garden. Extremes of cold and tough clay soil limit her banksia growing. She has a small glass house for propagation and shares an allotment with others growing callistemons, vegies and fruit trees.

### Millennium Seedbank.

Whilst with her, we were treated with a visit to Wakehurst "Millennium Seedbank" (a Kew Gardens annex) located in Sussex. Society president, Robbie Blackhall Miles, had arranged for Jo Wenham, propagation & collections manager, to show us the gardens and their banksias. They boasted quite a number of species but the severe 'Beast from the East' unseasonal weather event killed many. They had replanted some, best of which were 6 up-right Tasmanian *marginatas* which were in flower. Curiously they flower basipetously, unlike Judy's Tasmanian *marginata* plant which is acropetalous. Cold provenance species fare best and *B. integrifolia* var. *monticola* was also doing well. The only WA banksia species were a potted *occidentalis* and *brownii* (mountain form).

They also boast the tallest Wollemi pine in UK which has set seed.



Judy Clarke & Kathy at Wakehurst gardens.



Guide Jo Wenham with *B. marginata*.



Potted *B. brownii* (mountain form).

We were then given a private tour of the seedbank by staff member, Patricia. The bank held 70 % of U.K.'s flora at the time of our visit (1200 species) & were approaching their goal of 10% of all the world's flora. They have established partnerships with other nation seedbanks and a very strong Australian connection with some renown WA botany personnel have visited and participated - former Director of KPBG & Kew Gardens, Dr. Stephen Hopper and seed collector, Luke Sweedman.

What a facility!!! What a price tag!!! 8.2 billion pounds - and a brilliant tour!!!

We were shown the various stages. 1. *Collection & receipt*. 2. *Inspection & cleaning*. Many volunteers assist here with microscopes to check the tiniest of seed. 3. *Seed drying* - need to achieve 15% moisture content. 4. *Controlled temperature storage facilities*. The majority don't require cryo-storage. 5. *Inspection, sorting, counting & packaging using* glass jars with clip down rubber sealed lids. A minimum of 259 seeds of each species is placed in Lock-down never to be touched. Others are used for ongoing germination testing. 6. *Scientific study area* includes embryo & DNA examination. 7. *Germination rooms*. Many refrigerators set at varying temperatures and a range of germination techniques applied as necessary e.g., smoke, acid, seedcoat cutting etc. 8. *Propagation area*. Unknown species grown for identification and others for viability. All seedlings destroyed as they are the intellectual property of partners who don't wish to import them back due to quarantine regulations. We appreciated the informative visit to the seed bank. It is great to know there is a secure back-up storage for all our Australian banksia species.



Millennium seed bank.



Receival.



Inspection.



Patricia demonstrating embryo study.



Storage.

## **Cambridge University Gardens & Banksia talk to staff & Australasian Society members.**

A few of the garden staff and 15 members of the Society enjoyed my enlightening banksia presentation.

The president, Robbie Blackhall Miles, and two other members, Ben & Bob had travelled from the far western part of UK, Llanberis in Wales. Study group member and past visitor to our property, John Baker, also attended.

Head of Cambridge horticulture, Sally Pettitt, accompanied by Dr. Angela Cano, a South American DNA scientist, gave us the interesting history of the gardens and a garden & hot house tour. Angela was very keen to bridge the growing divide between scientists, systematic botanists and the public. Obviously, a world-wide phenomenon.

The extensive 40-acre garden houses around 8,000 species including Australian & N.Z. species.



Banksia presentation at Cambridge.



'Tour guides' Sally & Angela.

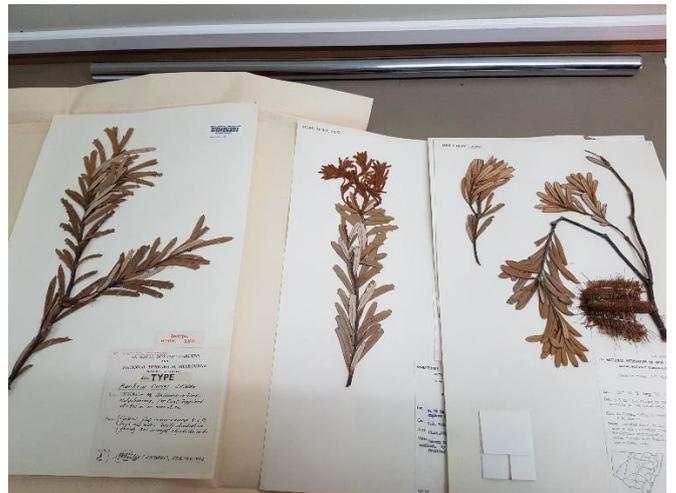
**Kew Gardens herbarium tour.**

This was kindly arranged by botanist, Alex George, who had worked with now-retired curator, David Simpson, sorting and cataloguing banksia & other Australian proteaceae specimens.

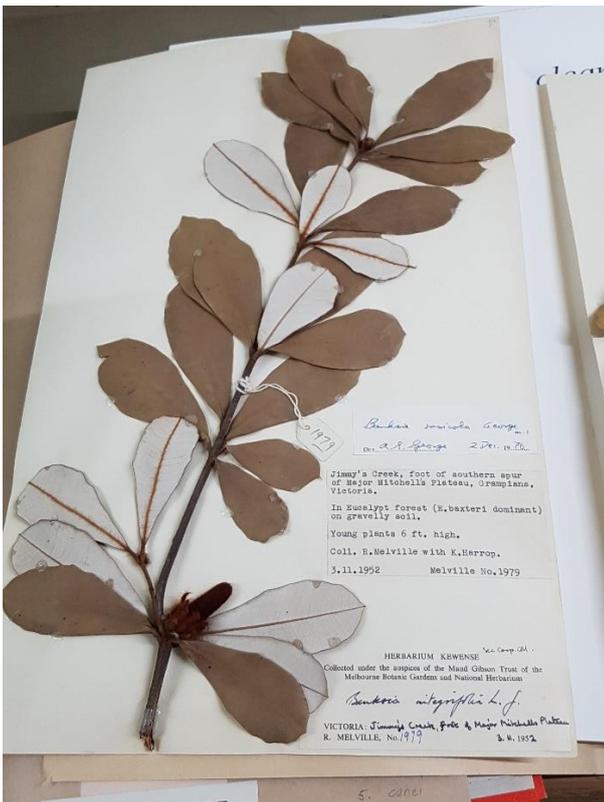
The building still retains many of its former Queen Victorian features. David had worked there for 30 years. Old style newspaper & wooden presses are still in vogue for specimens which are frozen to kill any pests & bugs, then numbered, classified & stored. Around 8 million specimens are housed with a big contingent from the colonies. 'TYPE SPECIMEN' is the very first collected, described & catalogued. Other collections of the same species are 'ISOTYPES' or 'LECTOTYPES'. Woodier cones not able to be pressed are stored in separate areas.



David and Kathy in the old section of the herbarium.



TYPE specimen of *B. canei*.



*B. integrifolia* corrected to *saxicola* by A. George.



*B. hookeriana*.

David also showed us one of the old botany books describing proteaceae.



PLATE CCLVIII.

**BANKSIA PRÆMORSA.**  
*Bitten-ended-leaved Banksia.*

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CLASS IV. ORDER I.

*TETRANDRIA MONOGYNIA.* Four Chives. One Pointal.

ESSENTIAL GENERIC CHARACTER.

<p><i>Receptaculum commune</i> elongatum, squamosum. Corolla tetra-petala. Stamina limbo infera. Capsula bivalvis, disperma, interjecto feminibus dissepimento mobili. Semina alata.</p>	<p><i>Common Receptacle</i> elongated, scaly. Blossom of four petals. Chives inserted into the limb of the blossom. Capsule two valves, two seeds, and a moveable partition between them. Seeds winged. See <i>BANKSIA SERRATA</i>, Pl. LXXXII. Vol. II.</p>
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SPECIFIC CHARACTER.

<p><i>Banksia</i> foliis cuneatis præmorsis, ferratis, subtus albo-punctatis, supra glabris; floribus externè purpureis.</p>	<p><i>Banksia</i> with wedge-shaped leaves, appearing bitten at the ends, sawed, dotted with white on the under part, smooth on the upper; flowers purple on the outside.</p>
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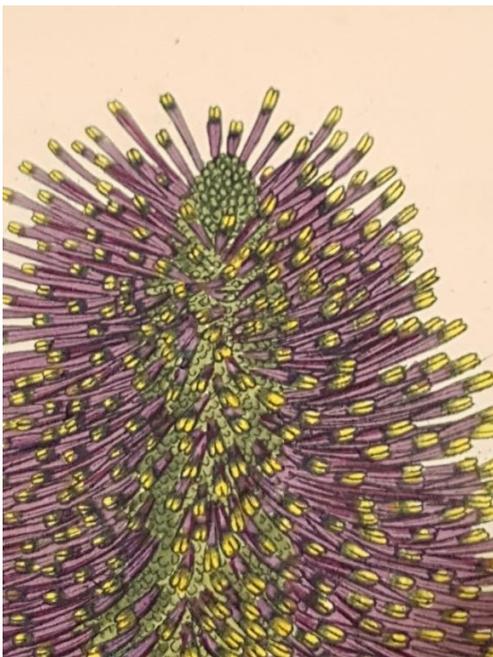
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REFERENCE TO THE PLATE.

1. A Flower not yet expanded, with the germ at the base.
2. The same open, the extremities of one of the petals magnified, to shew the situation of the Chive in its place.
3. The Pointal complete, the summit magnified.

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The first plants which were seen of this plant in England, were raised from seeds, at the Royal Gardens, Kew, in 1788. It is a handsome growing shrub, and the plant from which our figure was made had grown to the height of seven feet; it having been planted in the conservatory of the Clapham collection, where it flowered, for the first time, this year, in July, continuing in high beauty near two months. It is a plant of most difficult increase, rarely that it is to be propagated by cuttings; and the wood rots, if laid into the earth. A light soil, of sandy peat, and a small portion of sandy loam, appears most congenial to its growth. There are hopes, from the perfect state of the cones, that ripe seeds may be procured in this country.



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B. praemorsa (hand painted).

Love the old english!

## London Wetland Centre.

Converting four large, redundant, wasteland reservoirs into a complex of lakes & streams, revegetated with 27,000 trees & 300,000 water plants has created 100 acres of ecologically sound wetlands. Bordering the Thames, this successful urban conservation project, now teeming with birdlife, is in central London and provides succour to both local and migratory birds. A small section is dedicated to the Kakadu wetlands incorporating some eucalypts & callistemons. It is visited and loved by many tourists.

This brought an end to our amazing 2018 UK/Western Europe botany tour bonanza. K. & K. Collins.

## Banksias in-ground Brissago Is. Switzerland.

Courtesy Hans Griesser. (SA).

### Banksias in the ground in Switzerland

I can hear you think “Surely he is trying to pull my leg”, but I have photographic proof. Not all parts of Switzerland are covered in snow for months as per the winter tourism ads. At the very southern edge of Switzerland, south of the Alps and just a stone’s throw from the border with Italy, you can find the Brissago Islands Botanical Park (<https://www.ticinotopen.ch/en/parks/brissago-islands>). It has an unusually mild climate (for Switzerland) and the deep Lake Maggiore protects it from extreme cold spells. It is thus one of the few places in Switzerland suitable for growing Mediterranean and subtropical plants, and this is indeed what this botanical park aims to specialise in. It doesn’t have much competition in Switzerland for this, apart from some glasshouses.

The botanical park is on the larger one of the two Brissago islands. It’s not an expansive park at just over 6 acres, but they managed to cram an amazing number and variety of plants onto this little island, which used to be a private garden surrounding a villa, which nowadays serves as a restaurant and convention centre. My wife, Stefani, and I visited in early June on a misty overcast day when the thermometer did not reach 20 degrees (and they call that early summer ☺), but it was worth the short boat trip from the town of Ascona. Apart from a nice lunch, there was much to enjoy, for example a section with food and medicinal plants from around the world, in which we found some Aussies including Macadamia and Melaleuca alternifolia.

Quite a large section of the gardens is dedicated to Australian plants. Many of the plants are those that you would expect to be able to tolerate the local climate: several Tasmanians, *Grevillea rosmarinifolia*, *Acacia dealbata*, *Melaleucas*, *Callistemons*, *Hymenosporum flavum*, and *Waratahs*, just to name a few. Not surprisingly, the majority of the *Banksias* were from the Eastern States and mostly growing well, including *B serrata*, *B spinulosa* (variety not specified on the sign but the leaf width suggested that it is not *var spinulosa*), and *B robur*, which seemed not 100% happy as it had some leaves looking a bit yellowish. Another *Banksia* in the middle of a garden bed looked much like *B integrifolia* but as this was Switzerland, it would be unthinkable to trespass off the path over the boundary rope onto the garden bed for a closer look.

But those Swiss gardeners also showed an adventurous streak, venturing to plants that I might not necessarily have recommended, including an impressive variety of Western Australians given that the Brissago summers are mild and relatively humid, with regular rainfall, never experiencing those torching hot winds that many WA plants have learnt to live with. Most of the WA plants I saw were from the milder South Coast regions, and a few were growing well and were flowering at the time, for example Kangaroo Paws, *Grevillea bipinnatifida* and *Callistachys lanceolata* (the latter is visible in one of the photos with its yellow-orange pea flower stalks). The biggest surprises were two *Eremophilas* (*splendens* and *nivea*) but both looked a bit unhappy with the local climate, but I still admired the fact that the gardeners had managed to keep them alive. Most other WA plants looked fine, including two plants, both still small, of *B. solandri*, a *B. praemorsa*, and a plant that looked like *B. menziesii* but with no flowers and only one

cone, I couldn't be sure, and again it was some distance from the path, preventing a closer look. There was also a really well-growing plant of *Dryandra praemorsa* aka *Banksia undata* (I am agnostic on the question of *Banksias* vs *Dryandras*).

With spacious lawn areas and large trees elsewhere, it is a beautiful and diverse botanical park and a great place for an enjoyable and relaxing day trip. If you're in the vicinity, go see it, I am sure you'll enjoy it as much as we did. And it left me with renewed appreciation for how adaptable some of our *Banksias* are – a great reminder when I am having trouble keeping the fussier ones alive in my garden.



**B. serrata.**



**B. solandri.**



**B. spinulosa.**



**B. burdettii.**



**Garden scene with possible *B. integrifolia*.**

## Growing Banksias in-ground in Portugal.

We recently spotted posts from Pedro Torres of Portugal on the 'Banksia Lovers' Facebook site. While covering banksias growing in Europe from our trip in 2018, we thought it pertinent to include his garden.

He kindly allowed us to feature his private garden and has furnished these details stating he is a plant enthusiast but not much of a science guy. Pedro lives in Northern Portugal approximately 40kms inland from the Atlantic Ocean and the climate has hot dry summers with daily temperatures ranging from 14 to 35 degrees centigrade and cold winters with minimum temperatures as low as zero to -3 degrees with maximums of 16 degrees. He encounters lots of light frosts and living in a valley, during winter, has persistent fog and humidity.

Rain predominantly occurs in winter with just a little in summer. His soils are granitic and neutral PH.

Pedro sourced his plants from local nurseries. These nurseries and many others throughout Europe are stocked by an Italian company called Flora Toscana who specialise in growing many Australian plants.

[www.floratoscana.it](http://www.floratoscana.it)



**Pedro's garden in Portugal.**



**B. plagiocarpa foreground, serrata  
and ericifolia in the background.**

*Leaders' notes: Congratulations Pedro.*

*Your banksias look very healthy and have surpassed our expectations with your climate and extremes of cold. Your B. menziesii looks a little yellow (not shown) and could improve with a light dressing of iron sulphate. Very surprised you can manage to grow it at all with frosts and cold temperatures.*

*Kevin & Kathy.*

# Cotyledon grafting of banksias – a report.

By Phil Trickett

Over the last year I have been experimenting with cotyledon grafts for a range of banksias and dryandras, particularly with species that previously I have been unable to graft (such as *B. speciosa*). Two stock species were trialled – *B. integrifolia* and *B. serrata*. *B. integrifolia* is the preferred stock species as it is considerably tougher than *B. serrata* in a range of conditions. Initial results have been promising, both in terms of success rates and the identification of new stock/scion compatibilities.

The cotyledon grafting method involves grafting the scion (the species being grafted onto a hardy rootstock) at a very early stage of its development, when the true leaves have just started to emerge, onto a seedling rootstock of *B. integrifolia* or *B. serrata*. These grafts use the entire scion seedling rather than just a cutting from a more mature seedling or plant as per the method I usually use. Here, I sacrifice the scion seedling by cutting it off around 1-1.5 cm below the cotyledon leaves. I use a top-wedge graft where two opposite cuts are made on the scion stem producing a wedge-shape. This scion is then inserted into a slit made in the stock plant just below a leaf bud (this keeps the sap flowing to the leaf bud of the stock plant while the graft knits). A small snap-lock bag is then placed over the scion for around 21 days in a protected, shady spot – a glasshouse is good.

Once the bag is removed, some protection from wind and heat is required for the next month or so until the graft fully establishes.



*B. aculeata* on *B. serrata* – grafted 15 days



*B. blechnifolia* on *B. integ* – grafted 3 months

The following table shows the species trialled and results so far.

Scion species	<i>B. integ</i> stock	<i>B. serrata</i> stock	Comments
aculeata	Success	Untried	Grafts are only 5 weeks old, so results prelim.
ashbyi ssp. ashbyi	Failed	Failed	Very thin scion stems make grafting difficult

attenuata	Failed	Failed	Only small number tried, will retry
audax	Success	Untried	Looking good after 3 months
baueri	Failed	Failed	No success from around 10 attempts
baxteri	Success	Success	Grafts only 5 weeks old, so results prelim.
blechnifolia	Success	Untried	High success and proven long-term compatible
caleyi	Failed	Success	Confirms serrata compatibility with traditional grafts
dentata	Success	Untried	Looks promising after 3 months
elderiana	Success	Untried	Looks promising after 3 months
gardneri var. gardneri	Success	Untried	Looks promising after 4 months
gardneri var. brevidentata	Success	Untried	Looks promising after 4 months
gardneri var. hiemalis	Success	Untried	Looks promising after 4 months
goodii	Failed	Failed	Disappointing – two attempts on each stock
grandis (v. low)	Failed	Failed	Very surprising given it grafts onto integ. readily
hookeriana	Failed	Success	Only one success from ten attempts
lemanniana	Success	Untried	High success and proven long-term compatible
menziesii	Failed	Success	A number looking great on serrata
ornata	Failed	Failed	No success from around 10 attempts
pilostylis	Success	Untried	Grafts only 5 weeks old, so results prelim.
prionotes	Success	Failed	Looks surprisingly promising after 4 months
quercifolia	Success	Untried	Grafts only 5 weeks old, so results prelim.
repens	Success	Untried	Looks promising after 4 months
sceptrum	Failed	Failed	No success from around 10 attempts
speciosa	Success	Untried	Looks surprisingly promising after 4 months

victoriae	Success	Success	Looks promising after 4 months, integ looks best
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Unfortunately, I lost a lot of grafts to fungal attack in our relentless rain from October through to the end of January (910mm in these four months!). In future it might be worth housing the new grafts in a protected environment away from natural rain, to establish if this approach can increase success rates.

A major positive from this cotyledon grafting trial is the establishment of new compatibilities for certain species. This knowledge will enable a more targeted approach to traditional banksia grafting, using only the rootstock identified in the cotyledon grafting trials.

It is important to note that the above results are not definitive. They are based on small numbers of grafts (less than 10 attempts on each stock for each species) and the fungal issues cast further doubt on the validity of failures. An example is *B. attenuata* (dwarf form) where all of my cotyledon grafts failed, yet I have a traditional graft shooting nicely on *B. integrifolia*.

More work is required to assess which species are best suited to cotyledon grafting. It is obviously best suited to the prostrate species such as *B. blechnifolia*, *B. repens* and *B. gardneri* where suitable grafting material cannot be obtained from mature plants. The lack of suitable material is also an issue with species such as *B. victoriae* where mature plants only have thick-stemmed, unsuitable material.

Given my successes above, I recommend that grafters have a go at some cotyledon grafts and report back to the study group. The more of us that share their experiences grafting banksias, the greater the collective knowledge within the study group. Who knows, one day we may see grafted banksias widely available in native nurseries.



*B. prionotes* (dwarf) on *B. integrifolia* -grafted 4 months

### Cotyledon grafting of Banksia – methodology. Phil Trickett

The cotyledon grafting method involves using a scion at a very early stage of its development, when the first true leaves have just started to emerge, but the cotyledons are still present, to graft onto a standard seedling rootstock of *Banksia integrifolia* or *B. serrata*. These grafts involve using the entire scion seedling at the immature stage rather than just a cutting from a more mature seedling or plant as per the method I usually use. Here, I sacrifice the scion seedling by cutting it off around 1-1.5 cm below the cotyledon leaves. I use a top-wedge graft where two opposite cuts are made on the scion stem

producing a wedge-shape. Because the scion stem is very soft, a very sharp knife/scalpel is needed. This scion is then inserted into a slit made in the stock plant just below a leaf bud (this keeps the sap flowing to the leaf bud of the stock plant while the graft knits). A small snap-lock bag is then placed over the scion for around 21 days in a protected, shady spot – a glasshouse is good.

Once the bag is removed, some protection from wind and heat is required for the next month or so until the graft fully establishes.



Cotyledon seedling of *B. aculeata*



*B. integrifolia* seedling



Wedge cut on *B. aculeata* stem



*B. integrifolia* seedling with slit made in the stock plant just below a leaf bud



Completed cotyledon graft taped with parafilm



Bagged with snaplock bag for 21 days

### **Fascinating 'Fasciation' in Banksias.**

This phenomenon not easily defined as it typically occurs in up to 100 species of vascular plants. It generally manifests as misshapen flowers or flattening of stems. In the case of banksias, it is possibly the cause of multi-heading in inflorescences.

With the popularity of the wonderful 'Banksia Lovers' Facebook site and the postings from many enthusiasts' gardens, we see multi-heading occurs quite regularly in some species whilst rarely in others.

Fasciation is a random genetic mutation caused by the disturbance of the meristem at time of growth. It can be caused by many factors including hormonal, viral, bacterial, physiological or genetic. These can in turn be influenced by outside factors which can cause hormone imbalance leading to the physical disorder. Physical damage by insects, chemicals, frosts or weather extremes can traumatise the plant into fasciation. Viral, bacterial or fungal infection can leave the plant vulnerable. Nutritional deficiency, especially zinc can also be a traumatising factor.

The most recorded multi-heading occurs in *B. praemorsa* and close relatives *epica* & *media*. Also seen occasionally in *ericifolia*. It has rarely been recorded in other than cultivated plants.



**B. ericifolia.** Karlo Taliano

*Most likely fasciation.*



**B. epica.** Liesbeth Uijtewaal.(Netherlands)

*Most likely fasciation.*



**B. tricuspis** Kevin Collins

*Split bud most likely from banksia moth larvae*



**B. repens** Kevin Collins

*Most likely fasciation.*



**B. baueri** Kevin Collins.

*Most likely fasciation.*



**B. robur**

Kevin Collins.

*Possibly from epicormic buds.*



**B. epica.**

Kevin Collins

*Possible fasciation.*



**B. spinulosa var. spinulosa (Qld form).**

*Blooms from a lignotuber.*



**B. spinulosa "Coastal Cushion"**

*Blooms from epicormic buds.*



**B. plagiocarpa.**

*Spilt bud from banksia moth larvae damage.*



**B. tricuspis.**

*Possible fasciation.*



*B. aquilonia.*

*Possible fasciation.*



*B. seminuda cones.*

*From split buds caused by banksia moth larvae in early bud stage.*



*B. praemorsa (yellow).*

Angela & Ross Shephard. (Vic.)

*Possible fasciation.*



*B. praemorsa (yellow).*

Deborah Burn. (S.A.)

*Possible fasciation.*



*B. integrifolia.*

Marsh Johnson-Ross (NSW).

*Possible fasciation.*



*B. praemorsa (yellow).*

Tim Darrington – Vienne, France.

*Possible fasciation.*

## **New Members and Financials.**

Thanks to those new members joining in the past months. Current membership sits at 115 - possibly an all-time high. Welcome to those from 'Banksia Lovers' who have chosen to join our group to learn and contribute.

Current bank balance is: \$1,942.52.

*A special vote of thanks to guest contributors for this newsletter; Hans Griesser, Pedro Torres and Phil Trickett.*

Members, please let us know of your successes, failures, discoveries & anything you may have observed that is slightly different in the wild or in your garden. This does not need to be in "scientific" terms!

We plan to look at mistletoe in banksias and fungus associated with or growing on banksias. We would love to add your pics and observations to these topics.

**Your input and any donations are greatly appreciated.**

All the very best for 2022 and may you all keep Covid-safe. Sadly, WA appears to have joined the rest of Australia pandemic-wise.

**Kevin & Kathy.**

