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ASSOCIATION OF SOCIETIES FOR GROWING AUSTRALIAN PLANTS

ACACIA STUDY GROUP NEWSLETTER No. 80 August 2001

Dear members

This is the most exciting time of year for acacia enthusiasts and in some ways it is almost overwhelming. With so many wattles in flower at once I feel they don't all receive the attention they deserve. It's fortunate that there is such a diversity of leaves and phyllodes to be admired during the rest of the year.

It's great to be able to report that a number of old members have rejoined the group and we also have a number of new members. Welcome! A list is included.

My thanks to members who have contributed articles to this newsletter. This sharing of information is what makes the group so interesting. I hope to hear from more members in the future.

I had intended to include a soils key with this newsletter but thought something on hybridization might take precedence at this time of year just in case someone is willing to give it a try while so many plants are flowering.

I'm sure for many people the idea of deliberately hybridizing acacias is not at all attractive and even though some interesting hybrids turn up in gardens without any human assistance they rarely seem to be propagated. 'We have enough species of wattles so let's grow and experiment with what we have' is a reasonable attitude for people interested in acacias. However, with the general public wattles do not rate highly for a number of well known reasons and perhaps it is possible to produce hybrids which will help to overcome some of the prejudices – small, long lived, insect resistant plants with attractive foliage and form would be a start. Perhaps this is reaching for the moon but, to me, it's worth a try. The idea comes to mind whenever I visit a nursery and am confronted by the myriad of hybrid grevilleas and have trouble finding a wattle. I realise grevilleas have never had the bad press given to acacias and admittedly don't have some of the acacia problems but a just a small fraction of their popularity would help the acacia cause. Wattles are making their presence felt at the moment with their profuse flowering so I have been keeping an eye out for plants as I drive about in the suburbs of Brisbane. The number of plants in gardens is disappointingly small.

If hybrids do appear in your garden or among your seedlings and you have the space, please let them grow on. If they look promising please let us know and think about propagating them by cutting.

The Acacias of Yallaroo.
by Gloria and Warren Sheather

Our property Yallaroo (means beautiful flowers) is situated 25 kilometres west of Armidale on the Northern Tablelands of NSW. Yallaroo is about 64 hectares (160 acres) in area. The property was subjected to heavy grazing pressure in the past. The stock were removed when we bought the property ten years ago. In that time seven species of acacia have either appeared or increased in number.

Acacia brownii is a small prickly wattle with yellow flowers. *Acacia buxifolia* is a beautiful small shrub with bright yellow flowers and grey-green phyllodes. *Acacia implexa* is a small tree that has regenerated in large numbers. This wattle flowers several times a year. Acacia lanigera is an upright shrub with bright yellow flowers. *Acacia rubida* carries both juvenile bipinnate foliage and adult phyllodes. The phyllodes become redder during the cooler months. *Acacia neriifolia* has lovely glaucous phyllodes. Finally there is *Acacia viscidula* with sticky foliage and pale yellow flowers. This is another species that has returned in large

numbers since the departure of sheep and cattle. Our favourites from these naturally occurring acacias are *Acacia buxifolia* and *Acacia neriifolia*. Their attractive grey-green phyllodes contrast with the other natives growing on Yallaroo.

Out of Season Acacias.
Winter may be a lifeless time in New England gardens. We are always on the lookout for acacias that will bring that spring feeling to the winter garden. It is now early June and a number of wattles are blooming bounteously. *Acacia iteaphylla*, the Flinders Ranges Wattle, has pendulous grey-green foliage and masses of pale yellow flowers. *Acacia subulata*, the Awn Wattle is one of our favourite native plants. *Acacia subulata* is a tall shrub with upright growth habit and bright yellow flowers. Flowering occurs for most of the year except in spring when the other wattles take over the task. *Acacia podalyriifolia* is a well-known species. Sometimes frost damages this wattle. Our specimen is growing under a canopy of eucalypts and is in full flower (early June). Flowers and foliage are both features of this tall, spreading shrub. *Acacia deanei* is another winter flowering species. This tall shrub has light green, bipinnate foliage, conifer-like growth habit and pale yellow flowers.

Gloria and Warren Sheather have a very interesting, non-commercial native plant website at http://home.bluepin.net.au/yallaroo. Well worth a visit!

Acacias:
By Margaret Moir

Our property is in the SW of WA, at Margaret River, in a strongly Mediterranean climate, wet winter, dry summer region. Total rainfall is around 1200mm average, soils vary from sandy loam, to alluvial, to clay, very acid [PH 4.5-6]. Original vegetation on the farm was dry sclerophyll forest, including *E. patens, calophylla, marginata*, with a rich understorey.
Remnants remain, but not as much as I would like, so I've embarked on a revegetation program, with about 20,000 plants planted in 7 years.

My initial enthusiasm for Acacias developed because of the invaluable role they play in farm tree plantings as pioneers and quick shelter. Now I just grow them because they are wonderful!

Everything planted here, whether in the garden or out on the farm, has to be tolerant of wind, wet feet for extended periods in winter, and if outside the garden, long dry months. It is also a big help if they can grow fast enough to beat the weeds, and aren't too irresistible to kangaroos.

Original Acacia under story here would have included *A. pulchella, drummondii, myrtifolia, extensa, alata*, all most beautiful plants in there own right. The only one I've had trouble re-introducing unfortunately has been the *drummondii*, mainly because of kangaroo predation. It is a slow grower in re-plants, unlike the others. Surprisingly it is not widely or easily available in nurseries here, so I've grown it from seed. Just a pity that such a pretty plant is not more widely grown in its native country.

These are all under 2m plants, so I've gone further a field where I want bigger shrubs, or trees.

Acacia saligna: Tough as boots small tree, good for windbreaks and relished by the cattle where they can reach it. I would like to see it planted more as stock feed instead of Tagasaste, which is very weedy here and a menace in the forest. Native to this region, but not this location.

A. floribunda: One of my favourites, grows fast, flowers when only 2 years old. Excellent shelter. I've used it widely in shelter belts and it's done me proud.

A. cognata: in the garden only. I'm not sure if it will cope without extra water in the summer. Any comments? A stunning foliage tree, and the dwarf Green Mist is superb. Anybody who doesn't think they

like wattles is always seduced by this, dwarf or tall. Very fast in the grown-up version. Can't wait for it to flower so that I can collect seeds and grow more. Comes close to being one of my all time favourite plants.

A. fimbriata: Again, superb foliage. Budding up now, but only young plants. Hardy, not so fast for me as many others.

*A. howitti*i: Foliage again. Love the perfume of the foliage too. Not overly fast again, I believe can make reasonable size tree, so I've allowed a bit of room.

A. cardiophylla: loves the dry summers, have occasionally had trouble getting it thro' the wet winters. Gorgeous medium shrub, in full flower now [July]

*A. boormanni*i: Newly planted this year. Flowering now (2 yrs old) and beginning to sucker. I think this is one that will benefit from pruning.

(None of the others have ever been pruned. The birds relish the seeds, and they don't last long.)

A. *spectabilis*. Also in flower now, and a real spectacle!!! Has never set seed here, which I thought was strange.

A. iteaphylla: A lovely shrub, very short lived here with too much rain in the winter and soils being rich. I no longer plant this as it has too much weed potential in the district (tho' I'm certain not on this farm!!)

A. melanoxylon: Planted widely on the farm initially as amenity and windbreak, which of course it is brilliant for. Very widely available, like the *iteaphylla*, but too much weed potential again. I no longer recommend anyone to plant it, and wish I could reverse what has been planted. Still, when they get chopped, it will be beautiful timber, and meanwhile, the Golden Whistlers favour it as a nesting site!

I've also planted a few *A. elata* around a Bunya Pine; they don't relish the dry summers, but will be fine in a year or two.

We have been having an exceptionally dry winter here, therefore exceptionally frosty. Almost every night in July we had a frost, unheard of. One morning some *A. howittiis* in small pots waiting to be planted were frozen solid, roots and all.

No problems whatsoever with any of the Acacias. The only visible damage was a tiny bit of tip burn on the *cognata*, quite minute.

Now that the group is active again, I look forward to getting seed of some of the other desiderata for which I've been lusting.

What I would most like to know, if anyone can tell me, is about the longevity of some/all of the species listed. I try to be smart and use wattles as "nurse" plants in the situations where I use them. But my cognata has pride of place in a bed of Boronias!

I can only comment on a few. Grown in a rainfall of 700mm, in shallow, infertile soil on a ridge near Kingaroy. So very different conditions to yours.
A. cardiophylla – about 9 year growing in very shallow subsoil. One of six has died, the others look great and flower magnificently. I think they appreciate the frequent droughts. Very little insect attack.
A. fimbriata – a local, but seems to have a limit of about 10 – 12 years. A lot of ring barking by insects doesn't help.
A. saligna – very short lived for me (as little as 5 years in some cases), death is a result of insect attack.
A. spectabilis – again about 10 years or so but oh so fast!

Thais

Hybridising Acacias.
By Thais Eisen

I have to admit that hybridizing acacias is not an easy task. The overwhelming problem is the small size of the flowers. Each flower head or spike consists of a number of sometimes very small flowers so a hand lens and patience is needed to check the stage of the flowers and pinpoint the best time to attempt cross pollination. After looking into this, my initial thought was that perhaps it's best to leave the process to the insects - after all quite a few hybrids do occur naturally in gardens. However it is a challenge and I hope that some of you will join me and give it a go.

Before I turn you off any further I will run through flower structure and pollination in general and then acacias specifically.

As most of you will already know about flower structure, rather than use a large flower of a different genus, I have used a single acacia flower (fig 1) as an example of flower structure with a very simplified diagram (fig 2) to illustrate the parts. The surrounding flowers on the spike have been removed to give a better view. Unfortunately the flower was too small for a section to be photographed with the equipment available so some imagination is required. In acacia flowers the petals are small and the prominent part of the flower is the mass of stamens. The other unusual feature is the massing of pollen in clumps or polyads. A further complication is that many flowers are male only with small or absent female parts.

For the ovules to be fertilised and seed set, pollen must be transferred from the anthers to the stigma – the receptive area at the tip of the style. A pollen tube then grows down through the style and enables the male sex cells to reach the ovules and fertilisation to occur. In general, plants would prefer to be cross-pollinated i.e. the pollen should be from a different plant of the same species to ensure the genetic variability so important for survival. Some plants do encourage self-pollination normally and others encourage it if cross-pollination fails. In other words self-pollinated seed is then better than none at all.

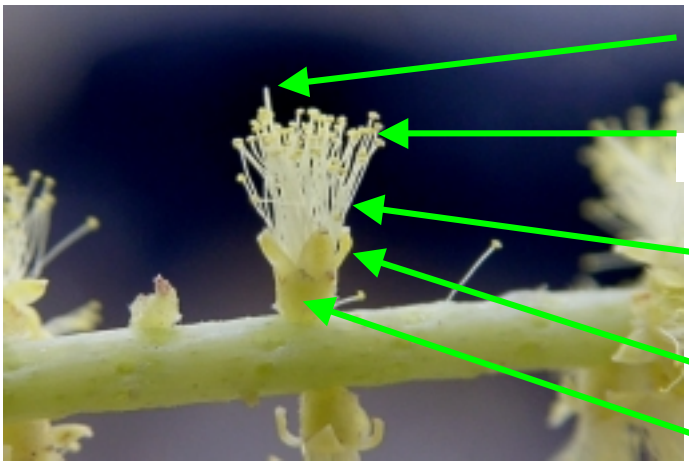
To avoid self-pollination a number of techniques are used including the anthers and stigma maturing at different times. In many plants the anthers mature while the stigma is still unreceptive to pollen. If you look at a large flower eg a lily this can be easily seen. The anthers split open and by touching them with your finger you can pick up a coating of yellow pollen. At this stage the stigma may not be expanded or is dull in appearance and only becomes glossy with secretions when it is receptive. Pollen will then easily adhere to it. Hybridizing large flowers such as these is easy as you can see what you are doing.

Something to keep in mind is that hybridization should only be attempted between plants that are closely related. Successful hybridization in any group of plants becomes increasingly unlikely as the relationship between the plants becomes more distant.

Back to acacias. Here, in general, in Australian species, the female part of the flower matures first and this can be seen in fig 3 *(A. leiocalyx).* The sepals and petals of the flowers have opened and the styles have extended. They are the rods protruding from the flowers. Most of the flowers here are bisexual. At this stage the flower should be ready for pollination. Within a short period of time (hours) the anthers begin to extend fig 4 (*A. leiocalyx*) and by the time they are mature the stigma should no longer be receptive and pollen is ready to be shed fig 5 (*A. leiocalyx*). In fig 6 *(A. semilunata)* the flowers are in various stages of maturation. The flowers to be pollinated should be isolated in some type of bag just as they begin to open eg a paper bag closed with a twistie or paperclip. These flowers should all be at the same stage of maturation.

The extension of the styles before the stamens was obvious in most of the species I looked at including *A. cardiophylla, A. cultriformis, A. hubbardiana, A. juncifolia, A. leiocalyx, A. macradenia, A. paradoxa, A. podalyriifolia, A. semilunata, A. spectabilis, A. subulata, A. terminalis, A. triptera, A. wilhelmiana*. It was not as obvious in A. *baileyana.*

Pollen must be transferred to the stigmas as soon as they have extended. Not all flowers will be at the same stage of development (styles recently extended) and any flowers where the stamens are extended should be removed. to prevent self-pollination. Pollen is collected by picking flower heads or spikes where the stamens are extended and allowing them to dry for a few hours. Because the clumps of pollen are very small and not shed in copious amounts they are hard to see and drying in a narrow, open jar helps keep them together. The pollen can then be picked up with a brush and transferred to the newly extended stigmas of another plant. The fertilised spikes or heads must then be isolated in a bag for a couple of days so that insects are unable to carry other pollen to the stigmas.



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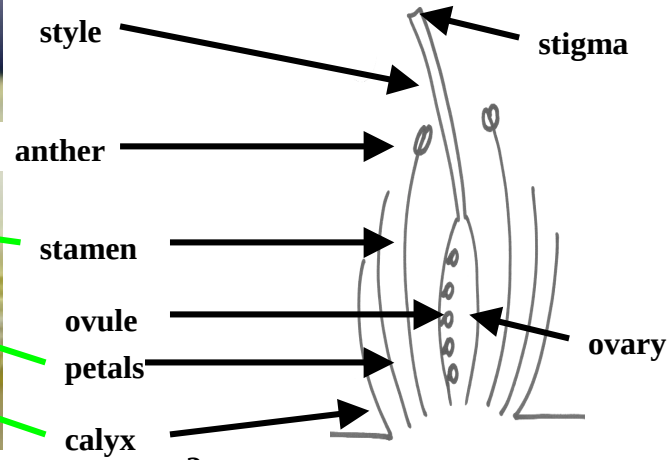

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This is a very hit and miss account of how to hybridize acacias and I have not mentioned removing anthers or stamens from the flowers to be pollinated. This is normally done to prevent self-pollination. With these very tiny flowers this is quite a job. If it is not done, not all resultant seed can be expected to be hybrid but hopefully some is.

After all that, don't forget to record what you have done then sit back and wait for the seed. Considering the large number of flowers in a spike or head, if you think about it, not much seed is set with insects doing the job so don't be too hopeful.

Many of the hybrids I have seen have shown characters intermediate between those of the parents and, in these cases, can be identified in the seedling tray. As a result a large number of seed can be sown and just a small number of seedlings grown on. Seedlings which are very close to either parent may not be of great interest. Again keep an eye out for anything unusual in seedling trays, especially if the seed is from cultivated plants.

Hybrids will, of course, need to be propagated by cutting.

Plant Galls in general and rust fungus galls in particular.
by Thais Eisen

Galls are abnormal growths on plants caused by parasites i.e. organisms which are dependant on a host for food and cannot live independently. The gall producing parasites include viruses, bacteria, fungi, nematodes, mites and insects. The parasite releases chemicals which act as a growth stimulus to the tissues of the host plant and cause the plant to produce the gall. The galls provide food, some shelter from predators and a more protected environment for the parasites. They rarely kill the host plant (it's not in their best interests) but they can weaken it and severely restrict its ability to reproduce particularly when the galls are in the flowers. In the case of the *Rhizobium species* (bacteria) which form galls on the roots of leguminous plants (including acacias) the relationship actually benefits the plant as the bacteria assist with nitrogen uptake. This is a very rare state of affairs.

Galls come in a variety of shapes and colours and are often restricted to a particular structure on a plant eg leaves or roots. They may also be restricted to a particular species of plant. These characteristics help to identify the organism causing the gall.

I had intended to restrict the scope of the investigation of pests on acacias to insects but in trying to distinguish between different galls it became obvious that I would have to deal with one of common galls on acacias first up. It can then be removed from the list of possibilities. This is the rust fungus gall caused by a number of species of the genus *Uromycladium.*

Rust Fungus Galls – *Uromycladium species*

The seven species of this genus occur only on acacias in Australia. *Uromycladium tepperanium*, the species photographed here, is the most common. It is not specific to one host but infects nearly fifty species of acacia.

The infection most commonly produces reddish brown, powdery or granular, globose galls on the young stems and shoots of acacias. As a result the galls may be festooned through the outer branches of the infected plant. Locally, at Booie, many of the galls tend to take the form of thickenings of the young stems with repeated branching. In some cases the mass of infected shoots becomes quite large and heavy and weighs down the stem. The galls are woody and the globose form may occasionally grow to a considerable size - over 500g. However smaller galls may infect flowers, phyllodes, and fruits. The galls may be annual or persist for years. Old dead galls become blackened and in the case of thickened shoots quite withered. The lifecycle of the fungus is completed on one tree with one moderately sized gall able to produce millions of minute fungal spores each able to infect another acacia.

In parts of South Africa, where *Acacia saligna* has been introduced and become a pest, *U. tepperanium* has been introduced as a biological control agent. It is slow to establish after deliberate infection but within five years has caused obvious dieback and has reduced the density of *A. saligna* in some areas by eighty percent (Holmes and Cowling 1997). This is a very high mortality rate and I have not seen anything like that locally though some heavy infestations and a few deaths can be seen.

The heaviest infection at Booie is in a group of fifteen cultivated *A. juncifolia.* All are infected, four have died and only four are managing to flower this year. A group of the same species a hundred metres away is healthy with no sign of galls. No other cultivated plants are infected. Among the locals, in some areas groups of *A. implexa* are heavily infected and in others *A. leiocalyx* is the victim. Surrounding plants are healthy or have only a few galls. Perhaps this is a matter of susceptibility.

Once a plant is infected all that can be done is cut off the infected shoots and try to improve growing conditions.

A reddish brown or rust coloured woody gall on an acacia can fairly safely be identified as a rust fungus gall. The powdery substance on the surface of the gall consists of spores and their rusty colour gives the fungus its common name. These galls are usually solid and certainly start out that way. However on cutting one up a number of insects and mites can often be found taking advantage of the food and shelter provided by the galls Even the surface can be well colonised. These secondary invaders should not be mistaken for the original cause of the gall. Associated with the galls shown were mites, moth larvae, mealy bugs and smaller numbers of other insects. Some moths and beetles breed only in rust fungus galls which is a very interesting association. They tunnel into the gall to feed but have nothing to do with producing the gall. Once a cavity has been eaten out other insects can move in but again, these have not been involved in the production of the gall. Many of the dead, blackened galls had been almost entirely eaten away inside and only the presence of live galls on the plant indicated that the gall had been originally produced by a rust fungus.

Holmes, P.M. and R.M. Cowling. 1997. Journal of Applied Ecology 34: 317-332.

Coloured Plates

Plates 1 – 6 *Uromyocladium tepperanium* (rust fungus) galls

1. A typical rust fungus gall on *A. implexa*
2. Dead galls on *A. leiocalyx*. These had virtually all been eaten out by insects. This part of the plant has died probably as a result of the infection but the plant is still alive and flowering on higher branches. The globular type of rust fungus gall is typical on *A. leiocalyx* locally. There were no living galls on this plant and it will be interesting to see if new infections occur in the warmer, hopefully damper weather of summer.
3. This gall mass is typical of those found on *A. implexa* locally. Up to a dozen masses hang on one plant but do not seem to do serious harm. The mass is a mixture of globular galls and thickenings with much abnormal branching.
4. One of the above, which has died and is blackened and withered.
5. Infection on *A. juncifolia*. This consisted entirely of thickenings without any globular masses. These galls have been present on the plants for about 3 years and have only died when the plant died.
6. Mealybugs have moved into the eaten out centre of this gall.

Does anyone else have *Uromycladium* galls in their district on wild or cultivated plants? If so please let me know. It would be useful to have a record of their importance in other areas.

Plates 7 and 8 *Acacia havilandiorum* (previously *havilandii*)

A. havilandiorum is an inland species naturally occurring in western NSW (more or less in a band down the middle), SA (largely in the Flinders Ranges) and Vic (in a very limited western area). It tends to grow in sandy/loamy red soils often on ridges

It copes very well at Booie in conditions mentioned in the previous newsletter. Briefly – 700mm rainfall (rarely achieved); on a ridge with shallow, infertile, duplex soil which dries out rapidly but becomes waterlogged after very heavy rain. Frosts to –5 degrees.

These plants are 6 years old and about 2.5m high. They are of good, bushy shape, have attractive greyish foliage and flower well. They are remarkably free of serious insect attack so look set for a reasonable lifespan.

I hope you are all taking photos for this section now that so many acacias are flowering.

Thais

Seed Bank

First of all I must apologise for the typos in the previous newsletter. Somehow I missed them until just after I posted the newsletters. Some names ended up combined giving rise to unlikely names such as *venulosaverniciflua*. Also, the computer, for reasons unknown to me, kept changing 'a's at the end of specific names to 'e's. Hence *venulosa* became *venulose*. Hope you were able to make sense of it. The following are additions to the Seed Bank –

A. camptoclada,
jucunda
rupii
tindaleae.

Membership

Welcome to the following new or rejoining members

Fran Bright	41 Lavelle Dr, Logan Village 4207
Irene Cullen	Unit 3, Robertson Park, 7 Braddock St, Robertson 4109
Ken and Elizabeth Forbes	P.O. Box 208, Nowra 2541
Jan Glazebrook	87 Daintree Dr, Logan Village 4207
Barbara Henderson	M.S. 1063 Farrow Rd, Sampsonvale 4520
Fred Mazzaferri	64 Roselea St, Shailer Park 4128
Lorna Murray	P.O. Box 571, Mt Ommaney 4075
June Rogers	RMB 5361, Horsham 3401
Brendon Stahl	9 Parkers Rd, Deans Marsh, RSD Birregurra 3242

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