Australian Native Plants Society (Australia) (ANPSA)

Eremophila Study Group Newsletter No. 118

Study Group members on the road north of Port Augusta

Lyndal Thorburn, Ken Warnes, Bev Rice and Bevan Buirchell at the ESG Field Trip

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Letter from the Editor

Welcome to the November 2017 edition of the Eremophila Study Group Newsletter.

I write following our successful member **field trip and seminar** in September 2017, in sunny Port Augusta and Owen, SA. We had 45 members attend, from all States and Territories, which was pretty good!!!.We started with a field day visiting sites north and west of Port Augusta to see Eremophila in the wild. This was ably led by Ken Warnes who showed us many species along roadsides and at local pastoral stations. Formal presentations on Saturday morning were followed by an informative trip to the Australian Arid Lands Botanic Gardens (AALBG), hosted by its Friends group led by John Zwar. On Sunday, we drove 300km to Ken Warnes' at Owen and busied ourselves admiring his plants and taking cuttings. The three days went quickly and we had great weather and company including a formal dinner on Saturday night, where we welcomed members of AALBG Friends plus a roving band of ANPS Canberra members who just happened to be passing through.

We wouldn't have managed anything without our volunteers. Ken Warnes and Bev Rice did a great job as co-organisers and Ross Dawson carefully recorded everything by video for future reference. We also thank our guest presenter Bevan Buirchell who gave his time freely (and hopefully enjoyed himself!!) all weekend. You will find the first of the presentations written up in this newsletter, together with some members' recollections of the event. Photo gallery is at http://anpsa.org.au/eremophilaSG/sep2017/ESG-sep17.html. Members have been sent an email with a link to the members-only URL to access presentation slides – please do not circulate this to non-members!

Lyndal Thorburn
Leader and Newsletter Editor, ESG

What's New in the Study Group

New members

Welcome to new members Jill Bartlett (Vic), Simon Brown (NT), Bevan Buirchell (WA), Joanne Cairns (Vic), Janet Flanigan (Qld), Ben Greatrex (NSW), Dane Lyddiard (NSW), Chantelle McConchie (Vic) and Neville White (NSW).

Website

I have now launched the next ESG project – the aim is to get photos of all species and named cultivars (as a first step) up on the website. Brian Walters, as always, is ably assisting. So far the collection is modest, but it is searchable by species name, colour and approximate size. Comments welcome on what is on display already.

We have used photos from several contributors to the Study Group, including Mike and Cathy Beamish, Phil Hempel, the late Tim Kolaczyk, the late Colin Jennings, Don and Chris Lill, Ian Rice, Bernie Shanahan, Russell Wait, Ken Warnes, (and me!!). I want to particularly thank Alice and John Newton from Burrendong Arboretum, who responded to a request on the Australian Native Plants Facebook page and sent me a CD with wonderful photos of 33 species growing at the arboretum (in NSW).

The gallery can be viewed at http://anpsa.org.au/eremophilaSG/gallery/index.html**.** Please send your good quality photos in to join the collection – the reward is seeing your name in lights as photographer!!!

Keying Eremophila

Lyndal Thorburn and Tom Jordan – edited version of presentation to the seminar in Port Augusta (all photos by Tom Jordan).

Introduction

The seminal work by Bob Chinnock about the family Scrophulariacae, and in particular the genus Eremophila, provides a dichotomous key by which the various species can be identified from samples collected in the wild. The written key is called "dichotomous" because at each step the reader must choose between two

options, in order to work their way through a series of decisions that (we hope) leads to a correct identification of the sample in hand.

Dichotomous keys are common in botany and are usually devised for regions (e.g. plants of NSW) or within genera (e.g. Eremophila). In all cases the key only applies to those species and subspecies described at the time of publication – so for Eremophila, Chinnock has devised a key for all species described up to 2008 (when the book was published) – those since described by others and hybrids will not be able to be identified by using this key.

A dichotomous key can be quite technical – it is a good idea to have a botanical dictionary to hand while working through a plant species/subspecies key (and in the case of Eremophilas, to realise there are lots of synonyms for the common English term "hairy"!). When choosing a sample to key, make sure you collect flowers, leaf and stem, and if possible fruit, as the key will ask you to examine different aspects of these in order to move to the next step.

The other thing to know is that at each step the choice is usually between a number (e.g. 4) vs the same number with a mark after it – often an asterisk (*) or a full-stop (.). Chinnock has chosen to use the number-followed-by-a-full-stop option as the second-choice throughout his key. Because some will read this newsletter in black and white, and also because "1." is quite difficult to read in normal text as "one full-stop", we have used the term "DOT" to replace the "." in the key from the book.

The Chinnock key starts at family level and allows us to first determine the genus of the flower we have found. We skipped that step in the seminar and started with a sample we knew was an Eremophila.

Example – E. oppositifolia

Chinnock first helps us get from the level of the genus the Section within the genus. To do that we first need to examine the sepals – the structures which cover the flower bud and which fold back as the flower opens – grouped together, the sepals are termed the calyx (below).

Our first task in examine the calyx is to determine if:

1 "the sepals form a deep calyx tube with calyx segments arranged equally or unequally on the rim."

Or

1. (1 DOT) the sepals are "free or fused only at the base."

As the photo shows (above) the sepals are fused at the base, we choose 1. (1 DOT) for this option – this sends us to step 2.

At step 2 we discover how important it is to have a close look at the hairs on stems, flowers and leaves for keying Eremophila. We again have two choices:

2 Vegetative parts clothed with a tomentum *(hairs)* of appressed *(flat)* greyish green to silvery-grey rounded scales or flattened, usually segmented, eglandular *(no glands)* hairs. Individual hairs or scales often indistinct.

Or

2. (2 DOT) vegetative parts glabrous *(lacking hairs or scales).*

Below is a close-up photo of the stem of our Eremophila sample and we can see that it is covered in scales so we choose 2 and that sends us to Step 3.

At step 3 of the Chinnock Eremophila key, we are asked to look at the scales in more detail. The options are:

3 Vegetative parts clothed in roundish, entire or ciliate scales; sepals small, ovate-triangular, acute

Or

3. (3 DOT) Vegetative parts clothed with flattened segmented hairs (segments often obscure); sepals large, obovate to oblanceolate or orbicular or obtuse

To choose 3 we need not only that the vegetative part (leaves and stems) be clothed in round scales but also that the sepals are large. Our sample has large sepals and scales so we choose 3. (3 DOT).

This leads us to section XI Eremophila within the genus. At this point the key re-starts its numbering so we again have options of 1 or 1. (1 DOT). For the first time, we look at the leaves of our sample with our choices being:

1 Leaves linear to linear oblanceolate

or

1. (1 DOT) leaves ovate to obovate or oblanceloate

"Oblanceolate" means that the more pointy part of the leaf is towards the base (where it joins the stem) whereas linear means that the leaf is long thin and undivided. The photo below shows the leaves are linear so we choose 1. (1 DOT).

As a final step, we are again asked about the sepals and "sepals separated at the base" (step 2) leads us to *E. oppositifolia* (below).

Example – E. youngii

Our second example is *E. youngii*. The first two steps for the key in this case take us

through the same choices we made for *E. oppositifolia:*

- 1 DOT Sepals free or fused only a the base
- 2 Vegetative parts clothed with a tomentum of appressed greyish green to silvery grey rounded scales or flattened, usually segmented, eglandular hairs. Individual hairs or scales often indistinct

And then at step 3 we choose 3 rather than 3 DOT

- 3 Vegetative parts clothed in roundish entire or ciliate scales; sepals small, ovate-triangular, acute TO SECT. XIII Pholidia
- 3. (3 DOT) Vegetative parts clothed with flattened segmented hairs (segments often obscured); sepals large, obovate to oblanceolate or orbicular, obtuse TO SECT XI Eremophila

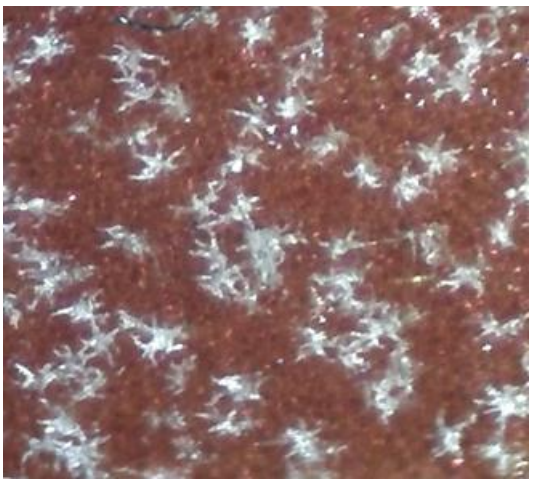
This is because the sepals are small and acute *(triangular or pointy)* and the stem is covered in scales.

Once we get to Section XIII Pholidae the key numbering again re-starts and we are asked to look at the flowers for the first time. We have a choice between

1 Outside surface of corolla clothed with flat circular scales

Or

1. (1 DOT) Outside surface of corolla covered with stellate-pubescent *(star-shaped)* hairs. The photo below of the corolla is taken at 60x magnification and leads us to choose 1. (1 DOT). This sends us to Step 4.



Step 4 also focusses on the corolla:

4 Corolla red, rarely yellow, stamens exserted *(extend beyond the open end of the flower)*

Or

4. (4 DOT) Corolla lilac to purple, occasionally white, stamens enclosed *(enclosed within the corolla)*.

A choice of 4 leads us to Step 5 where we are asked to look at both fruit and leaves:

5 Leaves linear, flattened, 2-7 mm wide; fruit ovoid-cylindrical, often 4-angled, 8-11 mm long, stellate-pubescent

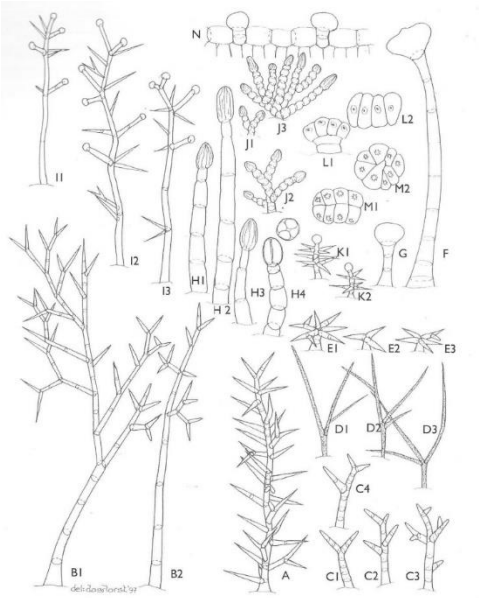
Or

5. (5 DOT) Leaves linear, flattened or subterete, 0.6-1 mm wide; fruit cylindrical, 13-16 mm long, stellate-tomentose.

We have (above) ovoid fruit and leaves which are a few mm wide so we choose 5 and are led to the answer, *E. oppositifolia* (choosing 5. – 5 DOT – would lead us to *E. pantonii*.

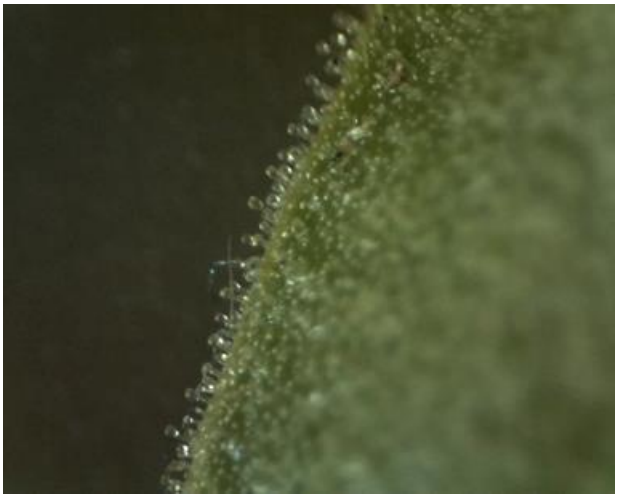
A general note about hairs

As already discovered, hairs are important in keying Eremophila successfully. Chinnock's book groups hairs into dendritic or tree-shaped (A and B below), branched (C and D below), stellate or star-shaped (E below), glandular (F below) and dendritic glandular (11-13 below).



Microscopic examination is needed to really appreciate the complexity of the variations. Below are three examples which I think are particularly interesting:

E. subfloccosa subsp. glandulosa showing glandular hairs in natural daylight and backlit.



E. bowmanii showing dendritic hairs on leaf surface and pedicel (backlit close up of dendritic hairs on pedicel are beneath).

Feature species – E. calorhabdos

Contributors: Brian Freeman, Karlo Taliano, Russell Wait, Ian Tranter, Lyndal Thorburn, Ken Warnes

E. calorhabdos is a large upright species. It is found naturally in West Australia around Esperance. It generally grows as an erect and somewhat spindly shrub and is a useful horticultural feature because of its tall narrow habit. The Australian National Herbarium web entry also recommends its use as a hedge (obviously with pruning). It is attractive to birds and does best in full sun.

Its leaf shape is variable. The leaf can be grey or green but according to Russell Wait the grey population is limited to areas west of Norsman (collected by Russell in 1997). It is reported as being drought tolerant and in Queanbeyan this is certainly the case. We (in Queanbeyan) have also found it to be frost tolerant though the herbarium says this is not the case in wetter areas. Other members have reported deaths of plants in severe frost.

The Peak Charles form that is also in cultivation was collected by Russell in 1995 and it had its first fork at 1.3 m (high) with leaders going up to 3.3 m high.

The bud is apricot to pink and the flower colour is pink, which can vary in brightness (first pic next column from Karlo Taliana and the second from Russell Wait).

Horticulture

Karlo Taliana reports "I've been growing a grafted specimen of *E. calorhabdos* for about 10 years (see pics below). Every year (around early summer), I prune it back quite hard to about one-third of its size to promote new vigorous growth. I had grown another one prior to this on its own roots, but while it flowered, I found it to be much less vigorous and it died after two years.

"The grafted plant pictured below had to be staked after 3-4 years as it had become top heavy and seemed susceptible to blowing over. I've had no issues with pests. Despite watering it once a week during summer, it requires little maintenance – just a good prune each year."

Brian Freeman's photo below clearly shows the flowering progression from low to high along the stem.

Propagation

E. calorhabdos strikes relatively easily from cuttings, although the grey-forms are prone to damping off (a common problem with grey-leaved Eremophila of any species). ANPS Canberra gets good results from IBA1000 on cuttings taken in winter (47%) or summer (26%) although it is also our experience that even green-leaved forms will dampen off in the hotbed (with overhead water) so perhaps rates would be higher in a cutting bed with more air movement and hand watering or watering from below.

Hybrids

Several hybrids are known in cultivation or through wild collection.

E. Beryl's Gem is a registered cultivar with the parents reported as *E. calorhabdos* and *E. splendens* (ACRA 1509) (photos below from Russell Wait). It is reportedly difficult to

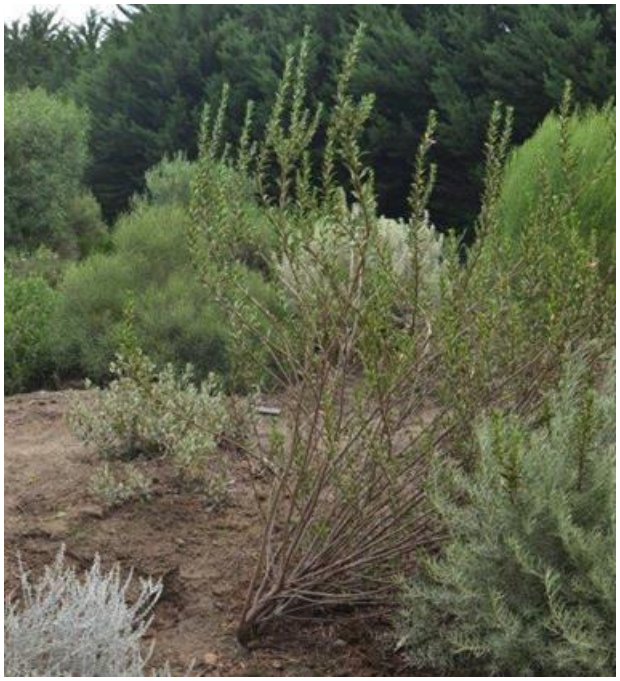
propagate but grows 2.5m x 2m and can be pruned or left as an open shrub. This cultivar arose from seedlings in Russell's garden in around 2000. It is strong garden subject and can flower year-round. It is not yet available through nurseries.

Another plant also originating in Russell's garden, and sold as Red Splendour (or Firesprite or Spitfire) in many nurseries, was originally suggested as another *E. calorhabdos x E. splendens* hybrid but is now thought to be *E. splendens x E. maculata ssp. brevifolia*.

Russell reports collecting a cross between *E. calorhabdos x E. subfloccosa ssp lanata*. He no longer has it growing and when he was back in the area a year later all the plants had disappeared. It was not a particularly a good garden subject as the flowers were pale pink and not showy in the greyish foliage.

Russell also reports *E. calorhabdos x E. glabra* (the latter being the green *E. glabra* from Steep Point). It has a darker green foliage with dark stems and a pink flower and is also not particularly good for the home garden as the flower is hidden in the foliage. It grows more than 2m high plus and is an open shrub. Photos of flower and shrub below (from Russell Wait).

E. calorhabdos x E. denticulata (below, from Russell) is an open shrub to 2m high plus, with a pink flowers and green leaves (there are photos of it online mislabelled as *E. calorhabdos x viscida*, a hybrid which is not known). This hybrid has the serrated leaves of the *E. denticulata* parent and the pink flowers of the *E. calorhabodos* parent (though more branched). This hybrid is widely available and is reported to be good for hedging.



Russell has tried several hybrids as grafting root stock with limited success.

A Note about Drought-hardiness

Ian Tranter

In searching for information about the African cousins of *Eremophilas* (for the chimera article, last newsletter) I found an article that says some of the *Anticharis* species use the C4 process.

Plants have stomata to breathe in CO_2 for photosynthesis but open stomata let out precious water which is a problem for plants in hot, dry areas. When CO_2 levels dropped (in the geological time frames) many species and genera of plants separately evolved mechanisms that waste less CO_2, require less open stomata and hence have in lower water loss. These processes require high light levels.

Most plants have a highly efficient photsynthetic reaction that creates two 3-carbon carbohydrates, termed a C3 reaction. Plants which developed mechanisms that use less CO_2 and hence which lose less water are termed C4 plants as they create a 4-carbon carbohydrate. The C4 reaction uses nearly twice as much energy as the C3 reaction, but prevents about half the fixed carbon being lost back to the atmosphere, and uses only a third of the water. To achieve the reaction, plants often have tight control of the area around the chloroplasts to prevent oxygen contamination. Sometimes they have even two types of chloroplast: an inner and outer form. Stomata are shut during the day to stop water loss and then opened at night to collect and store CO_2 for use during the day.

Not surprisingly, both mechanisms are found in areas of high light intensity, high temperatures and low water availability, such as hot arid regions. I came across a paper that had found C4 photosynthesis had evolved in some of the species of the genera Anticharis which is a relative of Eremophila found in Africa. Eemophilas seem to be a good candidate for being C4 plants. It would explain why they out-compete other plants in hot, sunny, dry conditions but do less well in cool, shady, wet

spots. However, later searching has uncovered information to indicate that *Eremophila* don't use C4 photosynthesis (or at least the few sampled so far). Turns out that the mammal and bird ecologists (and archaeologists) are using carbon isotope studies to deduce diets, and buried in a couple of these I have found some *Eremophila* samples.

I couldn't find any papers that specifically looked at Eremophila but it turns out that C4 plants have a distinctive ratio of the C^{12} and C^{13} isotopes and this ratio is also used by animal ecologists to get an idea of the diet of herbivores. I tracked down a couple of Australian papers which reported isotope ratios of many plant species including *Eremophila freelingii*, *E. longifolia* and *E. glabra*. All three have ratios typical of C3 plants. As they represent three separate Eremophila sections it seems likely that most of the genus will also be C3 plants. The secret of why they are desert-loving must lie elsewhere.

Of course that does raise the question of just how *Eremophilas* do so well in the high-light and low-moisture conditions favoured by C4 plants, and why the drop in atmospheric CO_2 didn't cause them any grief. But I guess those are puzzles for another day. One positive is that the current skyrocketing CO_2 is not likely to disadvantage the *Eremophilas*.

References:

"Phylogeny and photosynthetic pathway distribution in Anticharis Endl. (Scrophulariaceae)." R Khoshravesh et al *Journal of experimental botany* (2012): ers218.

"Carbon isotope evidence for an abrupt reduction in grasses coincident with European settlement of Lake Eyre, South Australia" BJ Johnson, GH Miller, JW Magee, MK Gagan, ML Fogel and P Quay *The Holocene 15,6 (2005) pp. 890-898*

"Determining the diet of tammar wallabies on Garden Island, Western Australia, using stable isotope analysis" A. McMillan, G. Coupland, B.K. Chambers, H.R. Mills and R. Bencini *Macropods: the biology of kangaroos, wallabies and rat-kangaroos. CSIRO Publishing, Collingwood, Victoria, Australia* (2010): 171-177.

E. hygrophana seedlings

Ken Warnes and Brian Freeman (compilation by editor from emails)

From Brian - With Ken etc commenting on hybrids, this year was a first with having a few coming up after a wet winter and spring, and a cooler and wetter summer until end December 2016. So it appears that weather conditions play an important part of the process. And not an Emu in sight!!!! Though I had to take timeline photos after I was convinced that they weren't weeds!!!!

The first seedlings sighted, 3 February 2017:

These Eremophilas that are close (below), probably one or both) may be the parents? The closest one was purchased as *E. mackinlayi x hygrophana* and the back one was a cutting but the owner wasn't sure of the name, but it looks like an *E. hygrophana.*

12 April 2017, some of the first flowers appeared on the first seedling (right).

14 May 2017, the seedling has what appears to have a distinctive pyramid shape (over). Does that give any clues about the parents?

November 2017: A photo (below) of the self-seeded ones that are flowering now. I lost a few of the plants during our wet winter here when the garden was waterlogged for a while. (July 130mm and August 170mm) There are around 8 left in one patch, and a couple of single plants in other parts of the garden are still alive.

From Ken:

One of the findings from questions following my talk at Port Augusta is that not all members have the germinations that occur here (in Owen, SA) even though they have similar, mature plantings. There must be something in my surface soil conditions that enables mass germination at times. There's plenty of honey bees in my various plantings but I wouldn't have thought that was exceptional, there's plenty of them about in most gardens. Perhaps the presence of remnant vegetation has allowed the survival of unknown and unrecognised natural pollinators that are gone from other areas.

General comments: Brian's seedlings certainly look like *E. hygrophana* derivatives. The "mackinlayi x hygrophana" (M x H) is probably the one we have had trouble placing over the years as it doesn't accurately fit either of the suggested parents but is unlikely to be a hybrid. Growers use the term to differentiate it from true *E. mackinlayi*. I lump it in with *E. mackinlayi ssp mackinlayi* for convenience as much as anything. Whether it is a regional inland variant (true *E. mackinlayi* is near the coast) is unknown. It's been around for a long time and I remember Hall's having a plant at Pinery and we discussed whether or not it was a hybrid way back then. In my plantation it has been the provider of large numbers of seedlings from 2 specimens. Brian's *E. hygrophana* pic's look true enough.

So, some comments on my experience: *E. hygrophana* was the first to germinate in large numbers in one of my early plantations and I also had a plant there which from memory was close to the M x H discussed above. There was considerable variation in the 8-10 seedlings I grew on and gave away but detailed memories fade. This was probably following the drought breaking rains in early 1983. Certainly, there were gold and grey tomentums among them and I could make no meaningful assessments whether they were self-pollinated or if there had been pollen exchange. Keep in mind that this was the first time I had seen good number of seedlings and I was really flying in the dark.

Also, it pre-dates *E. hygrophana* as a species, it was all part of *E. mackinlayi* then.

To the present day and how it ties in with Brian's plants: Does *E. hygrophana* have a softer drupe structure than other related species which allows it to germinate a few years earlier than related species? These days I have very few straight *E. hygrophana* seedlings. Does this mean that available seed is exhausted? but if so, why haven't the plants continued to develop viable seed to continue the process?

The M x H hybrid is gone now, was its pollen a more important component of the process than I thought? But a seedling from that original batch has provided seedlings where I would think that cross-pollination is very unlikely and they appear to be true to type to the parent.

The *E. strongylophylla* which started the current spate of germination three seasons ago is now not appearing in the numbers it did. The plant itself died 3 years ago, so has the same seed exhaustion been a factor? The "open *E. mackinlayi*", as I call M x H and would appear to be the one as shown by Brian, has produced well over 100 seedlings in the past few years but none earlier. *E. mackinlay ssp spathulata* isn't much of a plant but is has produced large numbers in previous years but not many this season. *E. warnesii* has had good numbers on two sites, one of which must be from older fruits because I had grown an *E. acrida* in that spot for a few years and had to go to my records to work out why the seedlings weren't growing into *E. acrida*. But not one looks to be self-pollinated with no long hairs evident.

Another related one identified only as RW 4/4405 (a Russell collection from 2004 when 4405 km's from home) died off, but about 10 seedlings appeared in the space. That means they were quite old fruits. *E. fasciata* is always reluctant but I have two seedlings which may be true to type. Throw in Arkaroo Range which is the NT version of *E. hygrophana* which has good numbers at times.

It's possible to see combinations of all these in the seedlings even at an early age. So you can see that we still have much to learn about natural germination and how we can adapt that to nursery germination at will. *E. ovata* doesn't appear to be part of the picture, it has found other ways to survive with its strong suckering nature. Let's just hope that some of the seedlings don't throw suckers to prove me wrong.

The pyramid shape of Brian's plant is interesting, I can't see an obvious reason for it. Looks like I might have to take a drive to Inman valley Brian, after all, it's only a bit over 2 hours away. Thanks for your pic's and it just adds to the interest and further conjecture. And keep up with those time-line pic's, they are a valuable resource.

A Trip in Western Australia

Mike and Cathy Beamish

In late 2016 we spent a week around Exmouth and the Cape Range National Park, as far north and west as you can go on the Australian mainland, getting rained on and dodging the school holiday crowds.

Coral Bay was a nightmare, so crowded and expensive, but we toughed it out for a couple of days to take advantage of its ideal location on the southern end of the Ningaloo Reef, hoping the weather would clear enough to permit more enjoyment of the snorkeling and coastal scenery. It remained too cold to really enjoy the water, so we hit the road in our motorhome with the aim of driving until flowering plants caught our eye and then pausing for a short time to botanise.

Our second stop on the way out from Coral Bay was at the intersection with Exmouth Road, where some bright red *Calothamnus* were spied on the side of the road. While we were having a look at these and several other flowering plants, we noticed the different shade of red about 50m off the road in the sandy heath. This was the first of the *E. glabra* (we think subsp. *psammaphora*) and as you can see from the photos over the page, not quite a metre tall and absolutely covered in flowers. The plant with the orange flowers was found right on the side of the road a few km further south.

After spending a week around Carnarvon waiting for roads to open and tours to get underway, we gave up. We weren't sure that we could get to the Kennedy Ranges in our motorhome, so we decided to head for Gascoyne Junction (150km east, sealed road), just to see what we could.

We camped on the banks of the Gascoyne River (not flowing over the ground, but big, clean billabongs), a beautiful spot amongst the River Red Gums, birds everywhere. The road north to the Kennedy Ranges was still closed.

While enjoying the ambience, several other travellers passed by and some stopped to chat. One of these just happened to be the tour operator that we were waiting for in Carnarvon, so we had a long chat with her about our chances of reaching the Kennedy Ranges. She assured us that we would have no problems in the motorhome, provided the authorities opened the road in the near future. The road was only closed because of the rain further north, causing one of the rivers we had to cross to be flowing. Next day, the road closed signs had been removed, so off we went. The road was a bit rougher than we would have liked in places, but we took our time, negotiated the 20cm of water flowing over the concrete Lyons River ford without a problem and thoroughly enjoyed our 3 days in the Kennedy Ranges NP campground, where all the Eremophilas were in flower within walking distance.

Photos from the trip are below and over page.


Unknown, aff. coacta

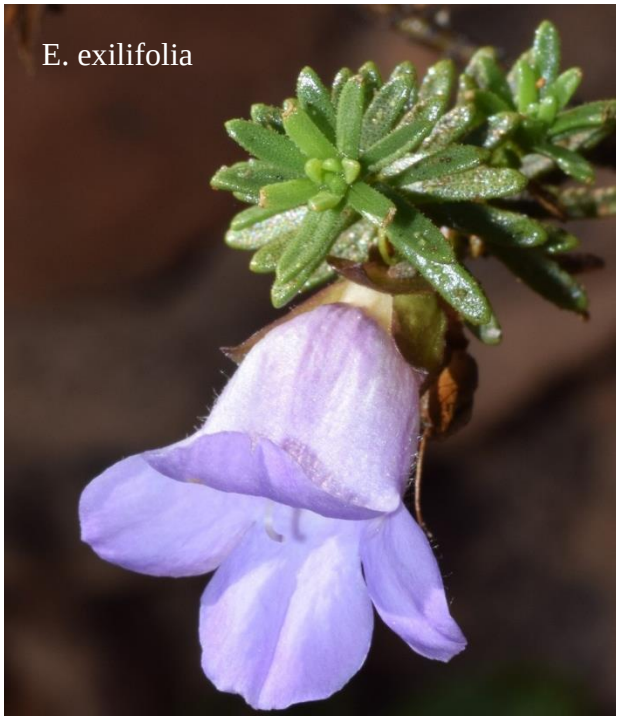

E. tietkensii


E. forrestii


E. maitlandii


E. latrobeii


E. macmilliana




E. pterocarpa subsp. pterocarpa

After leaving Kennedy Ranges/Carnarvon area in mid July, we continued heading south, pausing at regular intervals to walk through promising roadside areas. Large *Eremophila oldfieldii ssp. oldfieldii* shrubs were obvious in a number of places, such as around Hamelin Pool (pic immediately below) and on Nerren Nerren Station (2nd below).

E. youngii ssp. youngii was also found here (over).

In the sandy heaths around Shell Beach (half way up the Peron Peninsula on the Shark Bay Denham Road), we spotted the first of the silver-grey *E. glabra* forms (below), presumably *ssp. tomentosa*, but it might be *ssp. albicans*, not sure of the differentiation.

Similar plants with more ovate leaves that better suit the description for *subsp. tomentosa*, were found further south, on the Kalbarri coastal cliffs (photo below), with two other green-leaved forms scattered amongst them.

I'd guess photo below is *E. glabra ssp. psammophora* again, but it is much smaller and more scraggly than the plants at Coral Bay, no doubt due to the very exposed, coastal locality.

The other green leafed plants (below) are *E. decipiens* I think, due to the longer S-shaped pedicel, probably subspecies *decipiens* but the calyx lobes seem longer and pointier than the descriptions.

The only other Eremophila we found in the area was deep in the Murchison River Gorge at Z Bend, perhaps 30km inland from the Kalbarri township. We walked from the carpark down to the river via a rocky gully, which had a small amount of water trickling through it and there were a few plants of *E. serrulata* (below) growing in the cooler, shady areas where a little soil had accumulated.

Great scenery and heaps of other flowering plants make this a must see locality for anybody travelling in this part of the country.

A new hybrid

Russell has sent some photos of a new hybrid that he is just in the process of registering with The Australian Cultivar Registration Authority CRA in Canberra with the name "Pink Panther".

It is a hybrid between *E. glabra* (possibly the one from the Canning Stock Route) and *E. nivea* or the *E. compacta* group. This was the plant that was queried to in the last newsletter as a possible chimera (page 11 of NL 117– close up pic there too).

Study Group Field Trip Report

Christine Strachan

Words cannot really describe the thrill of participating in this well organised gathering of the 'who's who' of the Eremophila world. We were treated to a well-balanced and interesting program to satisfy the experts and enthusiasts alike and it is hard to pick out my personal highlights. However, these thoughts come to mind easily:

1. Mixing and learning from the leading Eremophila 'brains trust' who were happy to share their knowledge and stories of past collections, propagation hints and identification. The friendly banter and difference of opinion on 'correct parents' had us all laughing throughout the three days.

2. The opportunity to visit Ken Warnes' property and see his collection of amazing Eremophila hybrids and rarities was a privilege. Thank you, Ken.

3. Being given the chance to visit the Australian Arid Lands Botanic Gardens and their propagation nursery, which had all of us curious about their methods and their ability to grow such a huge range of Eremophilas.

So many more parts of the three day program could be discussed but I will leave that to other fellow travellers who came from most States. I would just like to sincerely thank Lyndal, Ken, Bev and everyone who helped put this together. Absolutely wonderful and worthwhile experience to bolster our enthusiasm.

Photos: *E. oppositifolia* growing wild near Quorn

E. arachnoides subsp. tenera at AALBG

E. rotundifolia growing wild 30km north of Glendambo.

E. christophorii at AALBG

E. interstans at Uno Station

E. miniata, Warnes property near Owen, SA

You can order Nescofilm grafting tape from your Study Group leader - $2 per linear metre + $1 postage. Order by email or post; direct credit of payments preferred.

Sydney meeting

Ian Tranter

The **Sydney sub-group** of the Eremophila Study Group met on 22 July 2017 to discuss propagation methods. In addition to normal cutting methods, a few attempts at striking in water had been successful (for *E. nivea* and *E. calcicola*). When using a cutting mix an open structure with more air gaps works best and gives thicker roots. Some of the harder-to root-species appear to strike better in the weeks after heavy rain that follow a long dry spell.

For cutting grafts a range of rootstocks are used including *M. insulare*, the 'Curlewis' chimera (see Newsletter 117) and *E. denticulata ssp. trisulcata*. Best results are with fresh, actively growing material of both stock and scion. Both are dipped in 1:8 bleach to reduce fungal infection. Leaving a stock leaf above the bottom of the graft cut seems to aid graft formation. Both Rob and Charles reported that when the scion dies with the 'Curlewis' chimera the internal *M. insulare* can shoot away from the graft point.

Members took the opportunity to peruse the stunning array of Eremophilas and Grevilleas in Peter Olde's garden including some grafted standards of *E. subterretifolia* and *E. glabra* Kalbarri Carpet. See picture on back page of this newsletter.

The group met again on 28 October to talk through all the information arising from the SA visit by ESG members. Topics covered included the current species that are probably hybrids, germination experiences, Arid Land propagation techniques, wild sightings of Eremophila, and Ken's Patch.

The next meeting of the Sydney sub-group is on Saturday 10 February, location still to be decided.

For more information email Charles Farrugia at eremgenus4719 (at) hotmail.com

Queensland meetings

Jan Glazebrook

The **Queensland sub-group** has held two meetings since the last newsletter.

In June the group met at Torrington in Queensland at the home of Jan and Ken Mathieson. This meeting focussed on Eremophilas for hedging and Eremophilas that grow on black soil. On the former topic members had had most success with *E. maculata* and *E. glabra*.

The next meeting was held on 14 October in Logan Village and was hosted by Jan Glazebrook and Dennis Cox. The meeting discussed the flower show organised by Native Plants Queensland at Mt Coot-tha in September 2017 and thanked Peter Bevan and his colleagues Trish and Shawn for the flowers provided from Peter's Rail Trail for the Eremophila display there.

Pam, Darrel, Janet, Margaret and Peter had all attended the Eremophila conference at the AALBG in Port Augusta. Darrel started reporting on the conference and others added to the report along the way. The group also raffled 9 Eremophilas purchased from the AALBG during the field trip – the intention is to take cuttings for distribution amongst the members when these plants grow successfully.

The meeting discussed Eremophilas for sandy soils which predominate in Logan. Jan only plants new stock in the garden after a rain event when the soil is moist and only continues to water new plantings until 25 mm of rain has fallen.

The next Queensland sub-group meeting is in April 2018 in **Warwick.** The topic is Eremophilas in shade. The following meeting will be in June 2018 in Lowood and the topic will be Eremophilas of the mackinlayi/hygrophana group.

For more information email Jan Glazebrook at janglazebrook (at) gmail.com

Victorian meeting

David Oldfield

Fifteen members and partners from the **Victorian sub-group** met at the home of Neville and Helen Collier near Avoca on 23rd September 2017. Neville showed the group around his magnificent garden which included examples of his creative welding skills in making sculptures.

The extensive list of Eremophilas, not necessarily in flower at the time, was: *abietina ssp abietina, abietina ssp ciliata, accrescens, alternifolia,* "Amber carpet", *arachnoides ssp tenera, aureivisca,* "Beryl's Blue", "Beryl's Gem", "Beryl's Lipstick", "Big poly", *biserrata, biserrata x glabra, bowmanii ssp nutans, brevifolia ,* "Crazy Mac", *caerulea ssp caerulea, caerulea ssp merrallii, clarkei, compacta ssp compacta , compacta ssp fecunda, cuneifolia, debilis, decipiens ssp decipiens , decipiens ssp linearifolia , decussata, delisseri, densifolia ssp capitata, densifolia ssp erecta, densifolia prostrate, denticulata ssp trisulcata, drummondii, drummondii prostrate, duttonii, enata, eriocalyx, flabellata, flaccida ssp flaccida, fraseri ssp fraseri, fraseri x cuneifolia , georgei, georgei x glabra, gilesii ssp gilesii, glabra* "Canning red", *glabra ssp carnosa, glabra ssp glabra, glabra* "Steep Point", *glabra ssp tomentosa, glandulifera, grandiflora, granitica, hillii, hygrophana,* "Kalbarri Carpet", *interstans ssp interstans, laanii white, laanii pink, lachnocalyx, lanceolata, latrobei ssp latrobei, latrobei ssp filiformis, lehmanniana, longifolia x scoparia, lucida, macdonnellii green leaf form, macdonnellii grey leaf form, macgillivrayi, mackinlayi ssp mackinlayi, macmillaniana, maculata (x 7), maculata x brevifolia,* "Meringur. Isaac", "Meringur pink", *microtheca ,* "Mingenew Gold", *miniata, mirabilis, muelleriana, nivea blue, nivea white, nivea x drummondii, obovata, oldfieldii ssp oldfieldii, oppositifolia, ovata, paisleyi, pantonii, phyllopoda x spathulata, phyllopoda x lachnocalyx* "Piccaninny dawn", *pinnatifida, platycalyx ssp pardolota, platycalyx ssp platycalyx, pterocarpa, punicea pink, punicea white, reticulata,* "Roseworthy", *sulcata,* "Summertime blue", *serpens, spathulata, spectabilis ssp spectabilis, splendens, strongylophylla, sturtii, subfloccosa ssp glandulosa, subfloccosa ssp lanata, subteretifolia, tetraptera, tietkensii, veneta, vernicosa, viscida, warnesii, weldii,* "Yana road", *youngii ssp youngii, youngii yellow flower.*

Discussion after lunch centred on pruning of Eremophilas. Neville stressed that pruning should not be done until November, old burnt growth should be left on until the last of the frosts. Norma also agreed with November pruning, late pruning can lead to no new growth until the following spring. After prolonged drought some plants which had been assumed dead produced new shoots after heavy drought-breaking rains. Someone commented that *Eremophila maculata* cuttings held in the refrigerator sometimes freeze but can still be grafted.

A possible topic for the next meeting was suggested as the cutting mixes which members had found most useful and hormone treatments.

The next meeting will be at the home of Bob and Margaret Blake, **39 Miller Street, Pimpino near Horsham, on Saturday 24th March 2018**.

For more information email David and Sue Oldfield on dsoldf (at) netconnect.com.au.

From Your letters

Jill Bartlett (Vic): *(re the field trip)*

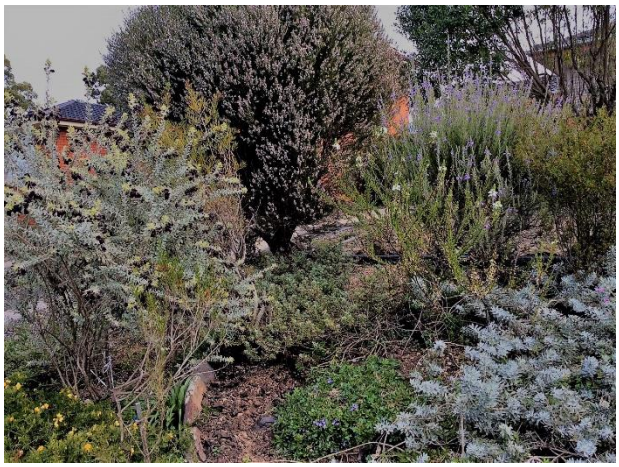
Thankyou Lyndal for enabling this memorable weekend. I was totally focused and transported from my real world and really impressed by the friendliness of the participants. I was blessed to

have South Australians offering me lifts hither and thither as well as acting as volunteer tour guides re the area and beyond.

The balance between information sessions (all interesting), outings and free time was perfect . My enthusiasm is boundless, I wish my knowledge could match it on some level.

Charles Farrugia (NSW): When Lyndal spoke to the Menai group in July she brought some cutting material of *E. galeata*. I did whatever grafts I could get from it and at the end there was a bare stem about 10cm long, left over. I did this piece as a cutting using cutting powder. In August I inspected the grafts and lo and behold, there's *E. galeata* bare stem sending new shoots from every node above the medium. I cannot see any signs of a root system but this was the case with all the other grafts. So I am just keeping my fingers crossed. Moral of this story is not to throw away any pieces of cutting material but use every bit one has available.

Photos of *E. sulcata* and Charles' front garden are below.

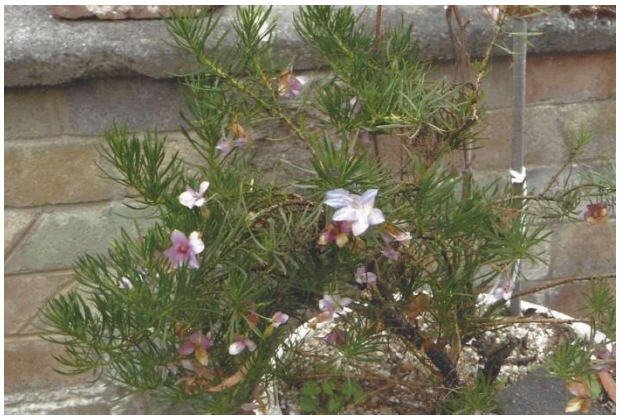


Brian Freeman (NSW): I have had this *E. cuneifolia x fraseri* for a few years now. I got it from Keith Pittman. I have shown it on some of the Facebook sites and I sing its praises. I think it is one of the best Eremophilas that I have (no doubt taken in by the beautiful flower display). I have only grafted plants and now have 20-30 scattered around. Frost is its enemy here and it will only tolerate light frost without getting damaged. My first plant would now be around 800mm wide by 400 tall.

Bruce Grose, (Victoria): After we (Lyndal and Bruce) spoke about an Eremophila I tried to identify, you suggested I get in touch with Russell Wait. I was wondering when and how to do this when our local ANPS group said it was planning to visit his home at Riddell's Creek and I was able to get a lift from one of our members.

Russell looked at the photo and thought it looked very much like *E. abietina*. I looked in the book by Bob Chinnock and could not find

it, but I did find it in the book by the Horsham group[1] – I found this far easier to read and understand and found it straight away.



My *E. abietina* was in a container, was grafted and was bought in 1982 when (then) SGAP had their meetings in the city. A member who was a plumber from Croydon or Clayton grafted it – he died in the late 1980s, and I didn't find out the name of the Eremophila as he didn't come all that often. So the plant would be around 30 years old. It didn't get more than 60cm tall and it lived in a pot with bluestone chips, soil, course and fine sand, Rooster Booster with a little water. It was alright just prior to Christmas 2016, when it died – alright one day and gone the next.

The other photo is of *Eremophila muelleriana*, which is around 4 years in the ground and is over 180cm high. It is grafted and is in the terrace in front of the house and gets a lot of sun. It has been a losing job trying to keep it smaller.

[1] Norma Boschen, Maree Good and Russell Wait

I have a number of other Eremophilas that I have no idea what they are, some are so tall I miss the flowering and only know about it when I see flowers on the ground.

I have been trying to identify an Eremophila I saw south of Whyalla in SA – I picked up a piece out of the sea. It was prostrate, the leaves were dark green, the flowers were short-stemmed. The base of the flower was green along the tube and blended to deep re-maroon. It was a striking colour and I've never seen it for sale and it seemed quite hardy. I'd like to get a plant of it if I could.

Robb Grundy (NSW): I live at Appin 15 minutes south of Campbelltown. Our coldest morning was minus7, we also had minus 6, minus 5, and quite a few minus 2's. Our record of consecutive frosty mornings is 12. My *E. flaccida* and *E. flaccida subsp. attenuata* are quite crispy at the moment with the stems still green, so I'm still hopeful.

One *E. latrobei* and *E. platycalyx* were slightly damaged, but my *E. cuneifolia* small & large leaf forms, plus *E. fraserii x cuneifolia*, even though they were way out in the open, all survived unscathed. I had read that these were sensitive to frost. My orchids in a protected covered shade house even froze. I lost most of my Cymbidium flower spikes.

The other 70- to 80-odd varieties of Eremophila were undamaged.

Graeme Nicholls (Victoria): *(Graeme isn't a member – yet! – but wrote to me after I spoke at the Maroondah meeting. He and his wife Jan kindly provided overnight accommodation as well. Their garden is on an absolutely south facing hillside, and in winter gets almost no sun - Lyndal).*

As a matter of interest, I have made a list of all the Eremophilas that I am growing here (some very small, as yet). They are *E. abietina* (grafted), *E. bignoniiflora x polyclada*, *E. biserrata*, *E. calorhabdos x denticulata*, *E. calorhabdos x splendens*, *E. decipiens*, *E. georgei* (grafted), *E. glabra* forms, *E. latrobei ssp. filiformis*, *E. longifolia* hybrid, *E. macdonnellii* (grafted), *E. mackinlayi* (grafted), *E. maculata* forms, *E. mirabilis* (so far so

good!), *E. nivea* (grafted), *E. prostrata*, *E. santalina* (I think), *E. splendens* (grafted), E. Summertime Blue, E. Yana Road (grafted), *E. youngii*, *E. debilis*.

Some of these are a bit spindly in our shady garden, but some are growing well in another garden we look after in full sun. I also have a number of other species hopefully coming along in the cuttings and grafts propagating frame. So that is quite a good list.

Ian Tranter (NSW): Russell's chimera has been flowering madly and one of the half-reverted twigs has both chimera and insulare flowers on it, so I cut a sprig off my *E. hygrophana*, and put them together so I had a photo (below) of both 'parents' and the mix.

Next to each other out in the open this cold and frosty winter I had a bush of the Phil Vaughan chimera and bush of the *E. mackinlayi* clone that
contributed its skin. The straight *E. mackinlayi* was unaffected by the frost, whereas the chimera had the top cm or so of each branch nipped back. In similar frosts in previous years a straight *M. insulare* would have been burnt almost to the ground, so the *E. mackinlayi* skin definitely provided some protection. I was wondering if the internal *M. insulare* cells at the growing tip would be killed allowing the *E. mackinlayi* cells to shoot away. But all the regrowth is from just below the burnt tips and is all chimera.

Russell Wait (Vic): *(Russell responded to the 2017 grafting survey but provided the following notes separately. The grafting survey will be written up for the next newsletter)*

Here are my thoughts on grafting, which is my main way of propagating.

I use *Myoporum insulare*, which is good, but is not completely compatible with all species. By that, I mean that some species will stick for a while or they shoot out from the graft. It can also suffer from borers in the root stock and mites.

Myoporum montanum is good but it doesn't like putting roots on all the year (only good during the summer) and is not completely compatible with some species.

Myoporum bateae is good for smaller species but it isn't a long-lived plant; however it seems to graft quite well.

Myoporum petiolatum seems to be quite good, but doesn't root as well as cutting grafts during late autumn and winter. I am not sure if it is completely compatible with all species as I haven't had it long enough.

Myoporum turbinatum has been tried but is not grown now as it is short lived but did work practically for small species.

Myoporum Monaro Marvel is very good and is the most compatible of all the species that I have tried. It can send up suckers but I have found that if you cut the leaf node out with a pair of curved snips that this is reduced and it is the best one to put on roots. For cutting grafts I leave 3 leaves on and cut off the 2 bottom leaves first.

The chimera isn't as good as the straight *Myoporum insulare*.

I have used *Eremophila glabra sub sp glabra* with some success, but it none is as good as the Myoporums.

Others I have tried are *E. calorhabdos x E. denticulata*, *E. calorhabdos x E. glabra*, *E. denticulata*, *E. calcicola*, *E. glabra* green prostrate, *E. polyclada*, *E.* Meringur Isaac, *E.* Meringur Midnight and of those I have only

found the last two are reasonable but the graft seems to take a while to take.

I have heard of people complaining about shoots coming out of where they have grafted. My feeling it can be caused but not being completely compatible as some species graft very well and others give trouble. Parting of where the graft is and can be stopped by using tomato grafting clips. I use 2 different types and mini pegs depending on the thickness of the graft.

I use a what I call a double wedge graft and put it in the side. A double wedge is where it is wedged along the length of the cutting and also across the width and now I am trying it without any tape and having some success but not with all. It seem to be best in the green sticky ones. The others I am only putting the tape around twice with only one thickness on the graft.

I have also sown seeds of Eremophilas this year and have tried gibberellic acid. They have started to come up. It looks as though some have come up only in the treatments which were gibberellic acid and smoke or only smoke.

Ken Warnes (SA): I've said for years that learning to germinate Eremophila will open a can of worms with garden seed and this is proving to be the case. With the increased recognition of hybrids from the wild and the gene mixes contained within the collections in our gardens we can now list over 100 presumed hybrids. In most cases we can name at least one parent, the seed provider, and in most make an educated guess to the pollen provider.

With Russell's assistance and experience I am looking at bringing the information from a previous Newsletter up to date. There will of necessity be certain levels of conjecture and debate but we'll do our best. Perhaps it's as well that only 2 survived out of the over 200 seedlings that friends dug up following the Pinery Fire. Yes, that's right, it shows that they can be difficult without some experience of their needs for survival. Even with my experience I struggled to keep some species alive although with others its nearly 100%

To complicate matters there is fairly clear evidence of 3rd party involvement, in one case I suspect hybrid x hybrid but the seedling has died after 15 months of nurturing so I can't follow it through.

Re the future, I'm often asked "will there be Eremophilas in cultivation in the future?" My answer is an unequivocal "yes, but most will be hybrids and quite possibly plants yet to be seen on earth". That ties in with Ian's thoughts. I said to Lyndal in a recent exchange that the days of the purists are numbered. Field collections are still a subject of great interest to the purists and without us the genus wouldn't have its present standing and knowledge would be so much less. But progress is progress and now the original purists are probably leading the field in the study of hybrids. I think it's called Rakes Progress.

When natural species are in the Nursery trade under cultivar names and you have to search to find the species name among the small print it proves my point. I'm not talking about hybrids or *E. glabra* selections but pure species e.g. *E. aureivisca* and *E. nivea*. I accept the need for such measures as a selling point but it doesn't stop me feeling frustrated, even angry at the sheer "don't give a damn" of it.

The Conference seems a long time ago. Some of the 2015 *E. warnesii* and *E. mackinlayi ssp spathulata* seedlings are coming into flower and there's a couple of real beauties to explore further. One other small seedling has had its first flowers and while smaller, the shape and colour is pure *E. muelleriana*. Needless to say, a graft will be attempted in the near future.

Merele Webb (Victoria): Thank you for your talk on Eremophilas at the Maroondah meeting (June). I was surprised by the number of Eremophilas that grow in Canberra. In fact they are incredibly adaptable and creating a microclimate pocket for particular species seems to work well.

Future Newsletter Themes

Feature plant – E forrestii – please send any contributions by end January

Write up of The Great Grafting Survey

Financial Report 2016-17

Eremophila Study Group
3 Considine Close
Greenleigh NSW 2620

Profit & Loss [Cash]

July 2016 through June 2017

	NOTES	BALANCE
Income		
Memberships	(1)	$896.00
Conference fees	(2)	$580.00
Book sales	(3)	$25.00
Propagation material sales	(4)	$16.00
Total Income		$1,517.00
Cost Of Sales		
Total Cost Of Sales		$0.00
Gross Profit		$1,517.00
Expenses		
Conference Fees	(5)	($0.01)
Printing and photocopying	(6)	$51.42
Postage	(7)	$120.00
Stationery		$6.36
Travel	(8)	$786.72
Plants	(9)	$24.00
Total Expenses		$988.49
Operating Profit		$528.51
Other Income		
Bank interest		$0.54
Total Other Income		$0.54
Net Profit (Loss)		$529.05

1 Memberships include payments forward for multiple years: 14 people paid to June 2017; 27 to June 2018; 45 to June 2019; 20 to June 2020, 16 to June 2021 and 2 further than that (before limit was put on forward memberships) + 6 gratis members (Ken Warnes and Russel Wait as honorary members, and ANPSA contacts)

2 Conference fees (for September 2017) paid by cheque to ESG. A further $5,400 was collected through StickyTickets and has been paid in since the field trip but will be reported in the 2017-18 accounts. A conference income reckoning will be published separately

3 Sales of the “First 30” newsletters $5 per copy

4 Nescofilm sales @$2 per metre

5 StickyTickets setup payment validating the bank account

6 Printing of newsletters (B/W) for approx. 13 postal recipients

7 Postage of newsletters and Nescofilm

8 Conference travel (flights) for speakers (advance payments for flights in Sept 2017)

9 Purchase of Eremophila from ANPS Canberra for donation to Maroondah raffle

These photos of *E. maculata* and *E. nivea* were taken at the Australian Arid Lands Botanic Gardens and were provided by John Zwar

Errata

The *E. warnesii* that was one of the photos that Sue Guymer provided for the last newsletter turns out to be an *E. mackinlayi ssp mackinlayi* (we think).

About the Study Group

The Eremophila Study Group aims to further knowledge about the cultivation, propagation and conservation of the 200+ species of Eremophilas, an endemic genus of Australian plants. It is one of several Study Groups which operates under the auspices of the Australian Native Plants Society (Australia) (ANPSA).

SUBCRIPTIONS

Membership is $5 per annum. Subscriptions for a financial year can be sent by cheque and posted to 3 Considine Close Greenleigh NSW 2620 or paid by direct deposit into the Group's bank account:

BSB: 105-125
Bank name: **Bank of South Australia**

Account No.: 013 751 340
A/c name: **ASGAP Eremophila Study Group**

Please put your surname and state/group membership in direct deposit details

ANPSA policy is that regional groups pay for two subscriptions in recognition that Study Group material will be used by several group members

New members, please download the application form from our website and send with your cheque/transfer (details below) http://anpsa.org.au/eremophilaSG/index.html

Study Groups allow members with specific interests to develop that interest to the fullest extent and to contribute in a practical way to the body of knowledge on the Australian flora. Active members collect information on the genus and send their observations to the leader who collates and publishes the information, in a newsletter or in other Society publications. The Study Group can record any aspect of cultivation, propagation and ecology of the preferred genus. Study Groups are expected to publish at least two newsletters per year.

In addition to paying annual fees, members must also be members of an ANPSA-affiliated regional society (http://anpsa.org.au/region.html).

This Study Group aims to study the cultivation and propagation of the genus *Eremophila*; to expand cultivation of *Eremophila* in gardens; and to examine the growing requirements of the various species to improve their reliability.

For information about the Eremophila Study Group contact Dr Lyndal Thorburn, Study Group leader lthorburn (at) viria.com.au
Ph: 0418 972 438 or 02 6297 2437 Address: 3 Considine Close Greenleigh NSW 2620

Honorary members: Ken Warnes and Russell Wait

Newsletters are available in Black and White by post and in COLOUR by email or CD.

For more general information about Study Groups, contact Ms Jane Fountain Coordinator, Study Groups, Australian Native Plants Society (Australia) (jlfountain5 (at) gmail.com)

NEXT NEWSLETTER FEBRUARY 2018

Members of the NSW sub-group at Peter Olde's in July (photo Ian Tranter)