AUSTRALIAN NATIVE PLANTS SOCIETY [AUSTRALIA]

SPECIAL
Eremophila Newsletter No 2.

June 2015

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NEW LEADER

FOR STUDY GROUP

Lyndal Thorburn from Queanbeyan has agreed to be come the Leader of our group. This makes her the 4th Leader in our 43 year history.
In that time we have accomplished a lot, we've grown from initial group of about 20 to over 150, the species/hybrids/selections in cultivation from 5 to probably nearly 300 and without our probing and questioning Bob's Chinnock's revision may well have never eventuated. Everything else has flowed from there, including the various books which use Bob's work as a starting point.

There is much other research involving the genus Eremophila happening around the country, most of it well beyond our levels of understanding or comprehension, but we can feel justifiably proud to be asked to assist in some of this research.

This is the final interim Newsletter which Bev and I will be compiling. Bev in particular has spent a lot of time collating membership lists & financial records and we are all indebted to her work in this area.

Many of you suggested that I resume the Leader's position but that would have been a retrograde step. I seriously lack the skills to live in an electronic world and much of what is now happening has passed me by. But I do thank you and trust that the direct contact with many of you will continue.
Finally Bev & I sincerely thank you for your tolerance and patience through this transitional period
Welcome Lyndal!
Ken Warnes acting editor.

Early Newsletters:

In 1990 the S.A. Group of the then S.G.A.P. collated and published the News letters 1 - 30, covering the Leadership terms of Ken Warnes and Geoff Needham from 1972 - 1985.
These were edited to minimise duplication of information and excerpts from Bob Chinock's initial research included. The result is a fascinating, historical record of those early days. It was thought to be unavailable until a supply of 100 copies was found in Colin's shed and I am making enquiries to ascertain the means of making these available to members.
Currently the suggestion is to make them available to members at a cost of $20 - including p & p. [We have obtained a quote for a new print when they were thought to be unavailable and $20 is a good price.]
To save transporting them to Lyndal's tender care would those interested contact me directly and I will arrange supply & payment. Contact details are on Page 1 of this news letter.
Ken Warnes.

Article from Kay Bartlett—Pangarinda - Eremophila macdonnellii

'Pangarinda Arboretum' is near Wellington in S.A

It is hard to believe the straggly weak plant that was planted would grow to be the biggest bush of *Eremophila macdonnellii* that I have ever seen, have been told they grow bigger! A bush nearby blew out, under it was a small plant, the only self sown eremophila that I have seen regenerated at Pangarinda Arboretum, it is quite a large bush now.

At Pangarinda Arboretum *E. lannii* grows to a beautiful big bush, flowers well for a few years and then dies off, shoots leaves along some of the old wood, never seems to recover, have even had a new shoot come up a little way away, it also doesn't do well. A couple of pink flowered forms are really looking good at present only a couple of years old. *[February 2015]* ***Do other members have this problem?***

Summer has been harsh on some of the young plants when they haven't been watered, would have been worse if we had not received good rains in November. Lost a few of the older plants also mainly Hakeas from higher rainfall areas.

Editors: Pangarinda Arboretum is well worth a visit especially in Spring time [The soil at the Arboretum is sandy to sandy loam, acidic soil, other genus growing there are well worth seeing in bloom.]

From Philip Robinson

Mornington, Victoria

Eremophilas - My Friends

When we retired from running a bookshop after nearly 30 years, a long time customer presented us with a small grey bush with purple tubular flowers."What's that?" I asked . It turned out, of course to be *Eremophila nivea,* and thus an addiction to Australian native plants began. Now 20 or so years later, the 2/3 acre garden is ninety percent native. Gone is the grass, gone the dam, and gone the vegies [not that we ever had many] and what we now have amongst many other natives is a score or so of Eremophilas. In those far off years I had devised a system of labelling which almost immediately failed spectacularly, so though I am reasonably confident about the names of about half of them, my very good intention of seriously working through Bob Chinnock's magnum opus [and what a great book it is], somehow remains just that and I still have at least a dozen unknowns.

I keep hoping that something will happen to bring Graham & Maree Goods, whom we think of as friends, at least very good acquaintances, to the Mornington Peninsula again after many years, so that we can pick Maree's brains and fix up those elusive species with the smart new labels which we now use and which are mostly correctly placed, though there are a few mistaken identities. I can't remember just what brought us to Graham & Maree's garden 20 years ago, but I do remember coming away with a gift of pots and a huge heap of cuttings, many of which rooted successfully, though I had , of course failed to list the names correctly. However Maree's gift formed the nucleus of our Eremophila collection.

What Eremophila do for our garden is to bring us birds. *Eremophila maculata* with its purple blossoms, never seems to stop flowering. It is savaged by the red wattle birds our alpha bird, who do not welcome competition. However when their beady eyes are momentarily averted, the Eastern spinebills lip out of cover and consume their share of nectar. Three other things about Eremophilas that endear them to me, is firstly that there always seems to be one or two in flower all year round bringing splashes of colour, secondly that many species propagate easily from cuttings, and lastly that in our garden at least, they are as tough as old boots and cheerfully survive vigorous pruning, drought and systemic neglect.

Thank you Eremophilas.

Frost damage ratings, 21,22 August 2013 (-4 to -5 degrees C), D & P Fletcher O'Leary St, Warwick Qld

Name	Flower	Leaves	Stems	o/all	Name	Flower	Leaves	Stems	o/all
Acacia ?	n	1	1	2	Grevillea Copper Rocket	buds 9	1	1	8
Acacia aphila	1	n	6	6	Grevillea arenaria canescens	9	4	3	3
Banksia spinulosa	1	1	1	1	Grevillea beadliana	1	1	1	1
Calothamnus granitica*	n	9	8	7	Grevillea Carol Ann	1	1	1	1
Dicrastylis lewellinii	1	1	1	1	Grevillea Clearview David	1	1	1	1
Dodonea tenuifolia	1	1	1	1	Grevillea curviloba	1	2	1	1
Dodonea viscosa	1	1	1	1	Grevillea Evelyns Coronet	1	1	1	1
Doryanthes palmeri	1	1	1	2	Grevillea Flora Mason	2	1	1	2
Eeremophila decipiens*	8	9	7	8	Grevillea Gin Gin Special	n	1	1	1
Eremophiila maculata X racemosa	1	1	1	1	Grevillea lanigera lutea	9	2	1	3
Eremophila Beryls Blue	1	1	1	1	Grevillea Long John	9	2	2	2
Eremophila Blue Thunder	3	1	1	3	Grevillea Misty Pink	9	2	1	4
Eremophila bowmanii	1	1	1	1-	Grevillea New Blood	8	1	1	3
Eremophila drummoondii	1	1	1	1	Grevillea Peaches and Cream	9	2	1	7
Eremophila Fairy Floss	1	1	1	1	Grevillea Pink Pearl	1	1	1	1
Eremophila gibbifolia	n	n	9	9	Grevillea Pink Pixie	1	1	1	1
Eremophila gilesii	1	1	1	1-	Grevillea Porinda Peter	1	1	1	1
Eremophila glabra carmosa	1	1	1	1	Grevillea Red Wings	1	2	1	1
Eremophila glabra elegans*	8	8	7	8	Grevillea rosmarinifolia lutea	1	1	1	1
Eremophila Honan Downs	1	3	1	3	Grevillea Royal Mantle	1	1	1	1
Eremophila ionantha	1	1	1	1	Grevillea Scarlet Sprite	n	9	6	6
Eremophila Kalbari Carpet	1	1	1	1	Grevillea sericea	2	2	1	2
Eremophila laanii	1	2	1	2	Grevillea Splendour	1	3	1	3
Eremophila latrobei	1	1	1	1	Grevillea Jingle Bells STD	9	1	1	3
Eremophila lehmanniana "@"	9	1	1	1	Grevillea Nana Nana STD	9	1	1	3
Eremophila Lime Green	1	2	1	1	Grevillea Stripie	n	1	1	1
Eremophila maculata #	1	1	1	2	Grevillea Sygnet	1	1	1	1
Eremophila maculata brevifolia	1	2	1	1	Grevillea Tucker Box	1	1	1	1
Eremophila maculata Mauve	1	2	1	2	Grevillea victoriae Murray Queen	1	1	1	1
Eremophila nivea	1	1	1	1-	Grevillea Winpara Red*	9	8	2	5
Eremophila Pale Pink	3	2	1	2	Grevillea Winter Delight	1	1	1	1
Eremophila Pink Passion	1	1	1	1	Hakea Burrendong Beauty	8	8	8	7
Eremophila Silver	1	2	1	1	Leptospermim Pacific Cascade	1	1	1	1
Eremophila splendens	n	8	8	8	Leptospermum brevipes	1	1	1	1
Eremophila Spring Affair	1	1	1	1	Leptospermum Cherish	n	4	3	7
Eremophila subflocosa	1	1	1	1	Leucophullum Lavender Lights	1	1	1	1
Eremophila Winter Gold	2	2	1	2	Melaleuca fulgens	n	9	9	9
Eremophila Yana Road	1	1	1	1	Myoporun montanum	n	3	6	6
Eremophilla duttonii	1	1	1	1	Pimelia	1	1	1	1
Eremophilla hillii X	1	1	1	1	Pittosporum angustifolium	1	1	1	1
Eremphila macdonnellii	1	1	1	1	Prostanthera rhombea	n	3	2	3
Ereostemon longifolia (pot)	1	1	1	1	Xanthorrhorea	1	1	1	1

Legend: 1= good no damage 9= bad, dead, very severe n= not flowering or no recording

*E decipiens stressed and leafless prior to July

*E glabra elegans leaf damaged from wet winter

*Calothamnus granitica is shooting from base

several selections ex St George Goondiwindi

"@" Flowers were frosted but buds were not by 25 Aug flowering was normal

STUDY GROUP V FACE BOOK

It has come to our attention that in the period where the Study Group has been largely inactive a large Facebook site has emerged. This has obviously filled a void and while acknowledging the immediacy of Facebook and its pretty pictures we trust that we can all proceed together.

Editor

Genera	species	subsp	Number planted	Days to potting up after planting.	33	39	44	51	59	61	64	67	69	71	73	76	81	81	72	73	93	100	111	114	116	123	130	135	141	165	237	Total # struck
				12-Apr	18-Apr	23-Apr	30-Apr	8-May	10-May	13-May	16-May	18-May	20-May	22-May	25-May	30-May	30-May	21-May	22-May	11-Jun	18-Jun	29-Jun	2-Jul	4-Jul	11-Jul	18-Jul	23-Jul	29-Jul	22-Aug	2-Nov		
Dirocirea	acutifolia		8																			1		2							3
Eremophila	accrescens		8														1												1		2
Eremophila	alternifolia	X E. occidens	8																												0
Eremophila	Augusta Storm		11	6																	1							1			8
Eremophila	aureivisca		8																												0
Eremophila	battii		8																												0
Eremophila	bowmanii	latifolia	8	2																											2
Eremophila	clarkei		8																												0
Eremophila	cuneifolia		8																												0
Eremophila	decussata		8			1																									1
Eremophila	delisseri		15	1			2														1				1						5
Eremophila	*dempsteri*		19																												0
Eremophila	denticulata	trisulcata	8																	1	1			1				1			5
Eremophila	drummondii		8	1																											1
Eremophila	georgei		8	1																											1
Eremophila	gilesii		8							1	2												1								4
Eremophila	glabra	albicans	8																												0
Eremophila	glabra	Canning	8	5		1								1			1															8
Eremophila	latrobei		8		1		1		1							1								2				1			7
Eremophila	macdonnellii		8	3																											3
Eremophila	macdonnellii		8	8																											8
Eremophila	maculata		8	7																											7
Eremophila	occidens		8	3			1		1	1							1							1							8
Eremophila	oppositifolia	X E. scoparia	9	4	2				1																						7
Eremophila	platycalyx		8				1																					1			2
Eremophila	pterocarpa		16																					2		1					3
Eremophila	*tetraptera*		8																												0
Eremophila	veneta		8	3		1						1	2		1																8
Eremophila	verticillata		10																												0
Eremophila	youngii	lepidota	10																			1				1					2
Saltbush			9	6	1	1																									8
				50	4	4	5	3	1	1	3	2	1	1	1	3	0	0	0	3	2	1	2	7	1	0	2	2	2	1	103
			293	Totals																											

26°C

1.

PLEASE NOTE

Editors comments:

These detailed records were forwarded in response to our request in Special Newsletter No.1 .

The frost refers to a specific episode, the type of event that many of us experience *from time to time.*

Note the results from the cutting records, how quickly the numbers fall away once the cooler weather sets in .

We have no details re garden situation or facilities for propagation.

FAREWELL! FROM US !

Congratulations Lyndal Many thanks for taking on the Leadership role. Please support Lyndal by continuing to send in reports and articles to be printed. We all come from vastly different areas and situations in this big country of Australia and Eremophilas come from so many diverse places. A wonderful challenge for us as a Study Group to learn and absorb more knowledge about the garden culture of Eremophilas and just how adaptable these plants can be.

My personal thanks to Ken for his support, for his wealth of knowledge, for the articles he has written and for making many valuable suggestions, my job was easy. Ken's enthusiasm and dedication is to be admired.

Thank you Ken - Bev Rice.

Recent Eremophila Research - Excerpts taken from article submitted by *Ian Tranter June 2014*

New research starting on Eremophila molecular phylogeny

Great news, Rachael Fowler has just started a PhD at the University of Melbourne looking at the evolutionary relationships of the Eremophila. The task is complex but hopefully she may be able to disentangle the various glabra and latrobei forms, clarify the relationships between the various species and sections proposed by Bob Chinnock and work out if the evolutionary history suggested by Scott Kelchner (which was based on chloroplast DNA) might be correct. I am particularly interested to find out if Bontia daphnoides is most closely related to Eremophila debilis which would suggest an amazing long distance seed dispersal at some stage. I wonder what bird migrated from Australia to the Caribbean. Also, are the Myoporums really derived from Eremophilas or did one just steal a chloroplast from the other along the way? And which species originated as hybrids and when?

Given the huge variation in Eremophila forms, and the recent surprises in DNA taxonomy from Eucalypts, Callistemons, Dryandras etc I won't be surprised if there are upsets ahead. If we are really lucky she may even compare the germination inhibition genes which might then indicate which are likely to have the same switches.

The scope of the project is described as:

To study the genus Eremophila (Myoporaceae) in Australia's arid zone, focussing on phylogeny, classification, biogeography. This project has the potential to investigate the coevolution of sap sucking insects on Eremophila. The student will be enrolled at The University of Melbourne and supervised by Dr Mike Bayly (School of Botany), Dr Dan Murphy (Royal Botanic Gardens Melbourne) and Prof. Gerry Cassis (University of New South Wales). Eremophila is a large plant genus (c. 215 species), with greatest diversity in arid Australia. This project will use nuclear and cpDNA markers, including Next Generation Sequencing techniques to answer the following questions. What are the molecular phylogenetic relationships of species of Eremophila and allied genera, and what do they imply for generic limits, infrageneric classification and biogeographic history of these plants, especially in Australia's arid zone?

Native Lace Bugs prey on Eremophilas

A paper just out proposes a new genus of hairy lace bug. All three species occur in southern Australia and attack Eremophilas. Lace bugs can severely damage plants, usually feeding on the undersiders of leaves, sucking out the sap and leaving the leaves with a pale silvery appearance.

Given it is a new genus and eremophila sap is often full of an extreme chemical cocktail, I suspect these must be fairly specialised. It also means they might be very good at attacking eremophilas and may drive some of their distribution. In terms of cultivation I guess it also means they will be an ever present risk in Australian gardens, and large concentrations of vulnerable plants may lead to a build up of pests. Presumably also some clones are more resistant than others. Symonds, C. L. and Cassis, G. (2014), A new genus ***Ittolemma*** (Heteroptera: Tingidae) gen. nov. and three included species of hirsute lace bugs from temperate woodlands of southern Australia. Austral Entomology. doi: 10.1111/aen.12089

Abstract

A new Australian lace bug genus *Ittolemma* gen. nov. is described for the inclusion of three species. *Tingis teretis* Drake is transferred to the new genus *Ittolemma*, made the type species of the new genus and redescribed. Two new species – collected on recent Bush Blitz surveys in Western Australia – are described: *I. credo* sp. nov. and *I. micula* sp. nov. All species occur in temperate southern Australia from host plant genera in the families Lamiaceae and Scrophulariaceae (order Lamiales), including *Eremophila*. This work documents the first host plant records and a large range extension for *I. teretis*. A key to species, diagnostic images and notes on the generic placement within the Australian Tingidae fauna, is provided.

Eremophila sturtii teens are tough

A new paper out looks at why Eremophila sturtii dominates large areas of eastern Australia. Even in severe drought about half the young plants still survive to reproduce!

Norman, P., Denham, R., & Calvert, M. (2014). Life histories of two arid zone shrubs change with differences in habitat, grazing and climate. *The Rangeland Journal.*

Abstract

Shrubs are an important component of vegetation throughout the world. They are particularly significant in semi-arid environments where they can dominate, driving ecosystem structure and functioning, and shaping land use. Life history information was derived for Eremophila sturtii R.Br. and Dodonaea viscosa ssp. angustissima J.G.West, two widespread and common shrubs of semi-arid eastern Australia. Plants growing under background climatic conditions took between 2 and 4 years to become established, attained the capacity to reproduce sexually at between 10 and 12 years, were in a sexually reproductive stage for between 17 and 28 years and lived an average maximum of 33 to 40 years. Under background climatic conditions between 70% and 80% of plants that entered the juvenile stage survived to sexual maturity while under severe drought this proportion fell to between 40% and 60%. Juvenile plants, particularly of E. sturtii, experienced the highest mortality under background conditions whilst, when exposed to severe drought, older plants, particularly D. viscosa ssp. angustissima in the intermediate stage, experienced the greatest increase in mortality, dying at more than twice the background rate. The high survival rates of E. sturtii and D. viscosa ssp. angustissima shown here, even under extreme drought conditions and in grazed and un-grazed areas, help to explain why these shrub species have been observed to dominate vegetation in large areas of eastern Australia.

Ultraviolet photos of Eremophilas

'Aussie Bunyip' is putting online fascinating ultraviolet photos of some eremophila flowers. http://www.ultravioletphotography.com/content/index.php?/topic/772-eremophila-neglecta/ . Given the wide range of visible spots, streaks and runway signals in Eremophila flowers it is surprising that there seems to be few complex UV marks even on the insect pollinated ones. Does this suggest something about the vision systems of the Australian desert pollinators?

Online key for identifying Eremophilas

The Melbourne Botanic Gardens has an online key for identifying eremophilas. It is out of Chinnock, but nice to have it online as well. http://keybase.rbg.vic.gov.au/key/bracketedkey/1541

Grafting can (very rarely) result in the chloroplast from the stock ending up in the scion

The prevalence of grafting of eremophilas has led to the generation of some chimeras. Normally with grafting the three growth layers of the top of the new plant are those of the scion. Very occasionally, if a graft fails, a shoot from the graft point can have a mix of cells from the stock and the scion. For example see the photo below where the outside cell layer is E hygophana but the underlying two layers are M insulare. So the plant has the form of M insulare but with furry coating of E hygrophana. (And apparently the flowers are M insulare shape and size but with a purple E hygrophana coat.) As you can see from the photo, chimeras are often unstable since all the new cells are formed from a tiny few cells at the apex shoot, and any damage such as insect munching can l lead to the second cell layer taking over the production of the epidermis – in the photo the red M insulare stem and green leaf surface versus the grey green E hygrophana stem and leaf surface.

Interestingly, a recent paper has suggested that very, very rarely you can also have the chloroplast from the stock sneaking into the cells of the scion. So presumably you could have an almost failed graft shooting away from the graft point and being apparently wholly the scion, whereas in fact it has the chloroplast of the stock (or a mix of cells with the different chloroplasts). Chloroplasts have their own DNA so it is possible that the new chloroplast is

Stegemann, S., Keuthe, M., Greiner, S., & Bock, R. (2012). Horizontal transfer of chloroplast genomes between plant species. *Proceedings of the National Academy of Sciences, 109*(7).

Abstract
The genomes of DNA-containing cell organelles (mitochondria, chloroplasts) can be laterally transmitted between organisms, a process known as organelle capture. Organelle capture often occurs in the absence of detectable nuclear introgression, and the capture mechanism is unknown. Here, we have considered horizontal genome transfer across natural grafts as a mechanism underlying chloroplast capture in plants. By grafting sexually incompatible species, we show that complete chloroplast genomes can travel across the graft junction from one species into another. We demonstrate that, consistent with reported phylogenetic evidence, replacement of the resident plastid genome by the alien genome occurs in the absence of intergenomic recombination. Our results provide a plausible mechanism for organelle capture in plants and suggest natural grafting as a path for horizontal gene and genome transfer between sexually incompatible species. - *[Now you know! Editor]*

Significant chemical diversity in E. longifolia and diploid populations in NSW

There have been a series of papers over the last few years looking at the diverse chemistry of Eremophilas. Nick Sadgrove and Graham Jones at UNE have been researching E. longifolia. Their most recent paper is fascinating. It finds that there are a series of forms of E. longifolia with different chemical characteristics. Some of the chemistry is a bit beyond me. However I take this to imply that even a widespread species with roughly consistent appearance can still be made up of quite different cryptic forms. Also interesting is that the NW WA wide grey leaved form which is diploid has a unique chemical form, perhaps suggesting it is a separate species.

Also fascinating is that they found two closely located populations in NSW which are also diploid, but with a chemistry similar to some of the other tetraploids (though in higher concentrations). Which is a real puzzle. Why is there a nationwide tetraploid (36 pairs of chromosomes) species with two widely separated diploid (18 pairs of chromosomes) forms? Are they both relics of a nationwide diploid population now almost entirely overrun by a tetraploid offspring? Or is the WA diploid a species resulting from hybridisation with another Eremophila but keeping the longifolia flower? Lots of possibilities. The paper hypothesises that the Mutawintji/Wilcannia diploids might be the relic origin of the species that then generated a tetraploid form that spread over the country, with the NW WA form being a possible offshoot species. They intend doing some molecular genetics to test this.

Sadgrove, N. J., & Jones, G. L. (2014). Cytogeography of essential oil chemotypes of Eremophila longifolia F. Muell (Scrophulariaceae). *Phytochemistry*.

Abstract
Previous studies have demonstrated that the widely distributed desert plant *Eremophila longifolia* has at least six geographically defined essential oil chemotypes. The focus of the present study is to extend and enhance information concerning known chemotypes and to investigate the involvement of cell nuclei ploidy in this variation. Forty field collected specimens of *E. longifolia* were taken from most of the mainland states of Australia then subjected to hydrodistillation to produce essential oils, which were then chemically characterised. Ploidy was determined using relative fluorescence of cell nuclei stained with propidium iodide, measured in a flow cytometer. Using principal component analysis (PCA), at least three essential oil chemotypes, in addition to the six already described, were identified in the present study. Previously described high yielding essential oil chemotypes were also characterised in terms of diploidy. For the first time diploid populations were identified in South Wales, correlating with high yielding isomenthone/menthone and karahanaenone chemotypes. Furthermore, the separate diploid population previously described from Western Australia was demonstrated to be the safrole/methyl eugenol type, which is restricted to a small geographic range in far north-west Western Australia (Murchison District). All other chemotypes were shown to be tetraploid, including apparently randomly emerging individuals, representative of chemotypes producing low yields of isomenthone/menthone and karahanaenone similar in composition to the high yielding diploid types.

***Note:** Two different leaf & stem colours - green & grey*

PLEASE NOTE

This will be your last Newsletter it you are not a member of A.N.P.S.A.
All Study Groups operate under the Australian Native Plants Society [Australia]
Thanks to those who replied with their updated addresses and e-mail addresses.
Many members on our list did NOT RESPOND which makes us assume that you are no longer interested in being a member. Therefore this will be your last newsletter unless you respond to the New Leader

PLEASE DO NOT SEND ANY SUBSRIPTIONS

UNTIL YOU ARE NOTIFIED