
EREMOPHILA STUDY GROUP NEWSLETTER

Number 59

August 1996

Thank you to all who have renewed their subscriptions for the next year, or as in some cases until the turn of the century. If you have paid in the interim between the last newsletter and now, you will find your receipt enclosed.

The Australian Plants for Containers Study Group has a new leader, Julie McGregor, 14 Bellevue Crescent, Terrigal, NSW 2260. I received a letter from her in July requesting information about eremophilas suitable for pot plant culture. I have suggested to her that some of her members experiment with some species and to let us know of the results and in turn I would seek information from our members, reciprocating information. To this end, I would like to make this a feature of our next newsletter. If you have been growing eremophilas as container plants, please send me the details of what you have grown, medium used, conditions under which they have been growing, fertilisers etc. I would need the replies by the end of October 1996.

Further to the brief note re collecting of wild material in the last newsletter, Bob has written an article for this issue, re collecting in Western Australia.

I am very pleased to have received a report from our lone overseas member in the Czech Republic. Paul has been doing a lot of work on seed raising in what we would consider less than ideal climatic conditions for growing eremophilas.

Thank you also to those of you who have taken the time to report on your eremophilas. It is only through such reports that we have a newsletter at all – you do not want to read only what Bob and I have to say about them. Your continued involvement and your reports on your findings are essential to the well-being of the Study Group. Please be positive.

Colin Jennings

WILDFLOWER SOCIETY OF WESTERN AUSTRALIA

I have received a note from the society advising that they are holding a **SPRING FLING** at Perry House, 71 Oceanic Drive, Floreat Park, Western Australia on Sunday 8 September, 9.30 a.m. to 4.00 p.m. For those of you who live in the immediate area or who might be visiting, this would be an opportunity to view a magnificent display of WA wildflowers.

Colin Jennings

FROM YOUR LETTERS

Paul Rezl – Czech Republic

“We had a very long and cold winter in Europe this year and my plants were tested to the limits. Temperatures in the greenhouse, which is attached to the house and not fully heated, dropped to minus 5°C on several occasions and the soil in the containers (most of the plants are grown in pots) was frozen solid. Some of the plants were moved inside for thawing to occur. Of my three *Eremophila* species at that time, two survived unharmed (*E. debilis* and *E. glabra*) and all of my *E. maculata* died. I noticed that *E. debilis* is especially tough and it is full of flowers again.”

(Paul's detailed report follows).

Lyndal Thorburn – Queanbeyan, New South Wales

“I must take issue with Russell Wait. In the last newsletter he referred to the frost tenderness of *E. Imacgillivrayi*. We have had this species growing in the ground at Queanbeyan for several years and it has

never shown any sign of frost damage, even through the record cold Augusts in 1994 and 1995, when the mean daily temperature was minus 1.4°C. Its growth is agonisingly slow, we only get 1–2 flowers per year, and it is a grafted plant, but it is not frost tender, not even on the tips.

I do agree, however, with his assessment of *E. freelingii*, which I think we lost in its first winter. Our *E. latrobei* (pink) was OK for a year or two, but died last spring. We have had *E. oppositifolia* in the ground also for several years. It has never done well, but I have always felt that the problem was lack of water and poor soil (our soil is shaly and water repellent) rather than frost. It flowered for several seasons but died this autumn after being sat upon by a dog."

Cherree Densley – Killarney, Victoria

"The SGAPVic weekend in Mildura was our largest ever (120) and eremophilas featured (naturally). We visited Ray Schilling's superb collection, saw some on slides in the evening when Peter Lang was our guest speaker and then visited Lang's Nursery on Sunday morning. There was an informal Eremophila Study Group gathering – Norma Boschen, Jan Hall, Russell Wait, Max McDowall, Chris Strachan, Peter Lang, myself and Rodger Elliott, as we walked through the well stocked nursery of Peter and his wife."

In a subsequent letter Cherree writes:

"Eremophilas continue to be my success story here at Killarney – they are the fastest growing, healthiest and showiest of all my plants. Grafting is essential, but as easy (or easier) than cuttings. I have been planting out 'just taken' grafts and covering them with cut-off 2L and 1L plastic drink bottles upturned and they almost push the bottle off after a few weeks. *Eremophila nivea* is by far the fastest and healthiest – even in mid-July when it has been so cold and wet. Covered with flowers, they are sensational. I think that the honeyeaters prefer them to the correas.

Ian Jardine – Broadmeadows, Victoria

"... The cuttings that you sent to me and I prepared would have to rank as my worst failure. Within a month I would have thrown out approximately 75%, and even more since. Species that have rooted or callused that still survive include *E. weldii*, *E. glabra*, *E. decipiens*, *E. inflata*, *E. maculata* 'Apricot' *E. maculata* 'procumbent form' and *E. alternifolia*. I don't believe that the results were actively due to the plants being stressed, I think the mix that I used may have been the problem. I have never used a mixture of sand and peat before, my normal medium is sharp sand alone. I really dislike failures, particularly if I have made a mistake. I am planning to try a few different ways next time. It was interesting how the two different lots of *E. weldii* went. From one lot I got a 90% strike, yet from the other I only got one strike from 12 cuttings taken."

(I can assure Ian that he is not the only one to have failures. I had a similar frustration last year with several lots of material and to this date am still not sure of the reasons. Others have reported failures in the past – they are as important to report on as the successes, but I am sure that we prefer to not let others know that we have 'failed'. It's just human nature to try to ignore our failures.) Colin.

Alice Aisthorpe – Roma, Queensland

"I have to write to tell you how well I have got on with my cuttings. So far I have planted 5 of the *E. maculata* 'Apricot' and they are flowering! there are also 5 plants of *E. glabra* with small yellow flowers, as well as plants of *E. eriocalyx*, *E. glabra* subsp. *albicans*, *E. dalyana*, and *E. rugosa*. The doubtfuls are *E. "pinnatifida"*, *E. pantonii*, *E. compressa* and *E. oppositifolia*. These need more cossetting to be sure that they have roots.

The new eremophila garden is ready to dig up now and I'll get these plants out after the middle of July. It's all go here now, with heavy flowering – you should see my *E. maculata* subsp. *brevifolia* – gorgeous. *Eremophila youngii* is blooming and I've finally got flowers on my *E. hillii*. *Eremophila subfloccosa* is struggling under the load of flowers and birds! What a joy!

So, I am looking forward to a wonderful season after so many years of drought and its struggles. I have to pinch myself every now and then to make sure that I have not died and gone to heaven. We actually have a lawn that covers the whole area, and we need to mow it regularly. Can you imagine someone who actually loves to get the mower out? Well that's me!

Russell Wait – Natya, Victoria

“I have enclosed a list of seeds that I tried in February this year. In most cases half were smoked by sowing the fruits and placing the trays in a large container and lighting a fire in it, covering with a 44 gallon drum with the bung out and then covering this with a tarpaulin, leaving it for an hour and a half. In general the smoked seeds germinated better than the unsmoked seed, and they germinated faster.

On 11th May I smoked the trays that had previously not been smoked and as a result seeds in these trays have since germinated. At the end of July occasional seedlings are still emerging, so I will continue to keep records.

Of the originally smoked fruits, positive results have been obtained from *E. compacta*, *E. glabra*, *E. granitica* (pink), *E. macdonnellii*, *E. nivea*, and *E. eriocalyx*. Quite a number of species gave no positive results for either treated or untreated seed, and without knowing the viability of the seed within the fruits it is not possible to tell whether the treatment or lack thereof is relevant.

Of the seed which underwent subsequent smoke treatment, germination has occurred in *E. maculata*, *E. viscida*, *E. nivea*, *E. maculata* subsp. *brevifolia*, *E. macdonnellii*, and *E. bignoniiflora*.”

(I have extracted the information which Russell had included in a tabulated form, but which would have taken up too much space to print in full.) Colin.

ASGAP CONFERENCE – ADELAIDE 1997

Details of dates etc. appeared in the last newsletter. I asked for feedback on the possibility of holding a day seminar during the conference week. To-date I have had about six replies, with expressions of interest, and I have taken note of these. So far there is no pattern, each response, as I suspected is asking for a different possibility. I will await further response, but in the end it may not take place or it might have to happen at a time unsuitable to some. I still have to coordinate such an event with our organising committee here in South Australia, so that it first in with the overall programme.

We will, most certainly, be arranging a display of eremophilas, both cuts and potted plants at the associated SA Region Flower Show and Plant Sales. More details of this as the time draws nearer, but I will be asking for contributions for the display from as many members who can assist in some way.

Colin Jennings

PLANTING AT THE ARID LANDS BOTANIC GARDEN, PORT AUGUSTA

In May, in response to an invitation from John Zwar on behalf of the Board of The Arid Lands Botanic Gardens, I contacted Ronda and Peter Hall and we drove to Port Augusta to advise on a mass planting of *Eremophilas* to beautify the surrounds of the new Interpretive Centre and Kiosk. Over 1,200 plants of over 120 species/forms accompanied us.

As the site was not ready the plants were put into storage until we returned a week later to supervise the actual planting by a group of volunteers. The ground was bone dry, much of it compacted during building operations and covered with fresh gum chips varying from 2” to 6” thick — hardly ideal conditions. Dripper lines snaked at random across the area and as each group of 6 to 8 were set into the rock-hard ground a dripper was installed next to each plant to water them in.

A total of 851 plants of 103 spp/forms went into this area and survival has been very good with the exception of some forms of *E. macdonnellii*. The excess of gum chips in the lower spots may have contributed to this. Replacements have been made.

Beyond the service road around the buildings a perimeter planting of the remaining, less showy, species/forms was made at a later date.

Since then, Ronda has returned with a further supply of bright-green foliaged species, such as *E. maculata*, which have been planted in the formal forecourt of the Interpretive Centre in alternating rows with *Maireana sedifolia*, (pearl bluebush) to develop a striking colour contrast.

It was gratifying to be associated with such a magnificent project, one which would quite likely have not been possible without the efforts of the members of the Eremophila Study Group in bringing so many species into

cultivation since we began in 1972. It would be fitting if our group could be represented at the Official Opening of the A.A.L.B.G. on September 24th.

Ken Warnes

PLANT COLLECTING IN WESTERN AUSTRALIA

Collecting native flora in Western Australia whether it be for private interest, scientific research, commercial flower collecting or horticultural purposes requires a licence issued by the Department of Conservation and Land Management (CALM). Severe penalties may be incurred if found collecting plants without a licence.

If you are visiting Western Australia you should write to CALM at least two months before you depart to obtain a licence application and allow at least six weeks for processing of the application once you have submitted it. It is important that you provide full details especially the areas you will be visiting and what you want to collect. The person processing the application is not a mind reader and the provision of full details will save time in processing the application.

There are three types of applications.

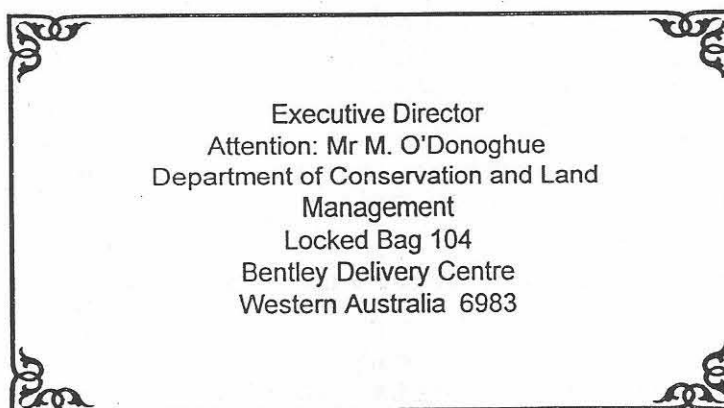
1. Licence for Scientific or Other Prescribed Purposes – This enables the collection of species not declared as Rare Flora for non commercial purposes.
2. Licence for Commercial Purposes – This enables the collection of species (other than rare and other species of special conservation concern) for immediate or future commercial purposes.
3. Permit to take Declared Rare Flora – Species gazetted as rare flora may only be collected with special permission of the Minister – in *Eremophila* terms this applies to species like *E. denticulata*, *E. nivea*, *E. racemosa*, *E. virens* and *E. viscida*.

Rare Flora is listed in the Declared Rare Flora Schedule which is reviewed annually. It is unlikely that a permit to take Declared Rare Flora would be issued to an individual unless they are undertaking bona fide scientific research on Rare Flora, and, in the case of *eremophila* there is no justification for collecting for horticultural reasons as all species currently on the list are in cultivation and cutting material is available from cultivated sources.

Although you may apply for a licence to collect cutting material there is no guarantee that you will be issued with one. Each application is treated on merit and if issued you may be required to comply with a number of conditions such as taking a specific number of cuttings and providing a report of flora taken. You may be required to provide a voucher herbarium specimen with locality data etc. for deposition in the PERTH Herbarium or you may have to provide propagation material for Kings Park and Botanic Garden (KPBG).

I should point out also that under permit conditions I am unable to provide you with locality data on rare species unless I have been given written permission to do so by CALM's Executive Director.

Licence application forms are obtained from:



Bob Chinnoek

STUDY ON *EREMOPHILA* SEED GERMINATION

18 species of *Eremophila* from two different sources were sown on 14 April 1996. Most of them (11) were collected on Meg Officer's property near Mullewa, Western Australia in September/October 1995. These were:

<i>E. clarkei</i>	<i>E. fraseri</i> subsp. "galeata"	<i>E. platycalyx</i>
<i>E. compacta</i>	<i>E. longifolia</i>	<i>E. serrulata</i>
<i>E. eriocalyx</i>	<i>E. mackinlayi</i>	<i>E. "spuria"</i>
<i>E. forrestii</i>	<i>E. oldfieldii</i>	

Other species (7) were obtained from Nindethana Seed Service in February 1996 but the age of the fruits was unknown. These were:

<i>E. cuneifolia</i>	<i>E. laanii</i>	<i>E. racemosa</i>
<i>E. densifolia</i>	<i>E. maculata</i>	<i>E. spectabilis</i>
<i>E. divaricata</i>		

Seed extraction

It is known that the *Eremophila* seeds are locked in woody fruits and for the germination to take place they need to be released. This is in most cases quite a laborious process, but nevertheless the most important one. *Eremophila* fruits exhibit a remarkable diversity, not only in the shape and size (ranging from as little as 2 mm in *E. densifolia* to 15 mm in *E. maculata*), but also in the internal structure. Some fruits are corky inside and the seed is quite loose but in many species the inside is more or less woody.

Fruits consist of four chambers and these contain up to 12 seed according to Richmond and Osborne (*Australian Plants* No. 134) but in practice I have never found more than 6 fully developed seed per fruit. Seeds are elongated, approximately 2–6 mm long. They are covered with thin skin-like testa. To release the seed from fruits it is necessary to open each of the four seed chambers and that means basically splitting the fruit in halves and quarters. I am using a board made of soft wood (pine, any offcuts would do), a light hammer and a Swiss army knife (or similar). Fruits are placed in small dents on the board for better stability and while holding the edge of a knife somewhere close to the central seam of the fruit they are split longitudinally. This needs to be done very carefully at first as different species require different force. Some seeds are inevitably damaged during the process.

Sometimes only a part of the seed is exposed and it is good to loosen it up by scraping off the surrounding shell using whatever is handy. Details on seed extraction are summarised in Table 1.

Table 1. Seed extraction

SPECIES	AVERAGE NO. OF SEED IN THE FRUIT	STRUCTURE OF THE FRUIT	EASE OF THE SEED EXTRACTION
<i>E. clarkei</i>	1–3	semi-hard	medium
<i>E. compacta</i>	1–2	soft	easy
<i>E. cuneifolia</i>	2–6	soft	easy
<i>E. densifolia</i>	2–4	soft	very difficult, tiny fruit
<i>E. divaricata</i>	0–2	semi-hard	medium, seed very small
<i>E. eriocalyx</i>	1–4	very soft, corky	very easy
<i>E. forrestii</i>	1	hard	medium
<i>E. fraseri</i> subsp. "galeata"	1–2	hard	medium
<i>E. laanii</i>	3–5	hard	medium
<i>E. longifolia</i>	1	very hard	very difficult
<i>E. mackinlayi</i>	0–1	hard	difficult
<i>E. maculata</i>	4	very hard	medium
<i>E. oldfieldii</i>	0–1	semi-hard	easy, low seed count
<i>E. platycalyx</i>	4–6	soft, brittle	medium
<i>E. racemosa</i>	2	hard	medium
<i>E. serrulata</i>	1	hard	medium
<i>E. spectabilis</i>	2–4	hard	medium
<i>E. "spuria"</i>	1–5	soft brittle	easy

Seed sowing

Soilless propagating mixture was used for sowing. It is based on Lignocel (milled coconut shells which are compressed into brick-like blocks) and perlite in the rate of 3:1. I am using this universally for all sowings. It is similar to peat/perlite mix but it has better water holding capacity and the structure is more open, doesn't compact easily and unlike the peat, absorbs water readily even when dry. As a result young seedlings root very well in this mixture.

I do not sterilise the mix, it is generally treated with fungicide. In this case a new product, **PolyversumTM**, was used for the first time. It is a new generation biofungicide that works on the wide spectrum of soil-borne diseases. The active agent is the fungus *Pythium oligandrum* which is naturally present in small quantities in the soil. This "friendly fungus" lives in symbiosis with a root system of the plants. As stated by the manufacturer the product is non-chemical and therefore completely harmless. Remarkable is the long storage capacity of 10 years (provided it is kept dry). When preparing the propagating mixture a Lignocel block must be water saturated first and this was done by adding 5 litres of water to the compressed block. In this case a 0.05% Polyversum was used in order to inoculate the substrate. Seeds were treated with Polyversum prior to sowing and sown immediately in small containers only lightly covered. Containers were watered by soaking in 0.05% Polyversum and placed in the propagating box with the temperature regime of 25°C day/5°C night in order to simulate the oscillating temperatures inland where most eremophilas grow. As I do not have a growth room or a thermostat, the box was placed in a fridge every night and removed in the morning for the period of first two weeks from the date of sowing. The propagating box was then left on 25°C permanently. Results are summarized in Table 2.

Table 2. Seed germination

SPECIES	NO. OF FRUITS USED	NO. OF SEEDS SOWN	FIRST SEEDLING [DAYS]	NO. OF SEEDS GERMINATED
<i>E. clarkei</i>	12	8	8	2
<i>E. compacta</i>	12	13	5	9
<i>E. cuneifolia</i>	10	14	17	1
<i>E. densifolia</i>	20	5	–	0
<i>E. divaricata</i>	10	4	–	0
<i>E. eriocalyx</i>	14	17	6	8
<i>E. forrestii</i>	11	9	6	5
<i>E. fraseri</i> subsp. "galeata"	6	6	21	2
<i>E. laanii</i>	5	4	7	3
<i>E. longifolia</i>	10	2	7	2
<i>E. mackinlayi</i>	12	1	10	1
<i>E. maculata</i>	3	7	27	2
<i>E. oldfieldii</i>	15	1	14	1
<i>E. platycalyx</i>	16	14	9	6
<i>E. racemosa</i>	2	5	–	0
<i>E. serrulata</i>	5	6	9	1
<i>E. spectabilis</i>	4	5	11	1
<i>E. "spuria"</i>	11	11	7	5

Results and observations

Of the total of 132 seeds sown 49 have germinated and that means 37% germination in total. I have deliberately not counted the germination for each species because the number of seeds sown varied, in some cases being as little as 1.

Generally all species from Mullewa have germinated. They showed much better germination rate (48%) than the Nindethana seeds (16%). Three species did not germinate and they were all from the Nindethana source.

Germination was rapid. Most of the germination occurred in the second and third week from the date of sowing and after one month I considered it to be complete.

In two seeds of *E. maculata* refusing to germinate in spite of all efforts I have decided to remove a testa. It was carefully peeled off and both seeds have germinated immediately.

Pots with seedlings were placed under the fluorescent lights with a 14 hour day/10 hour night cycle. They were growing vigorously as expected and quickly showed some signs of nutrient deficiency. Because the

propagating mixture is very low in nutrients I started to apply regular doses of complete fertiliser and the seedlings responded immediately by strong healthy growth.

At this stage two applications of 0.05% Polyversum were applied to the seedlings (watering) as recommended by the manufacturer.

Seven seedlings were lost before the first repotting, possibly due to an airborne fungal infection, drying out or natural weakness. First repotting was done approximately one month from the date of sowing and most of the seedlings had 2–4 pairs of leaves. Potting mix was based on loam/peat 1:1 which I am using for all of my plants. I have noticed a very healthy, well developed root system in all seedlings.

There were no losses after the first repotting and all of the plants (42) are healthy and growing well at the time of writing.

Conclusion

Seed extraction is the single most effective method of sowing the *Eremophila* seed. Other methods mostly use fruits and not the seed for sowing and therefore are much less effective. Many fruits contain no viable seeds and these are eliminated by the extraction method.

Several germination delay mechanisms other than the physical one which in all cases is the impervious woody fruit have been observed. It is the effect of temperature (oscillating temperatures promote germination) and the presence of inhibitor in the seed testa. These two mechanisms are not developed in all species and many germinate under the constant temperature. Most seeds will germinate without the removal of testa but in some cases as demonstrated on *E. maculata* this procedure is very helpful.

Contrary to what has been previously published, fresh seed germinate better than old.

Treatment of seed, soil and seedlings with Polyversum has proved to be very beneficial. Root systems on the first repotting was well developed. Plants appear to be very compact with short internodes and many side shoots. Polyversum seems to stimulate the growth through the root tissue. I sincerely recommend it for testing with many other Australian native plants.

Sowing of *Eremophila* seed as described above can be a good alternative to the vegetative propagation and can be used for breeding new cultivars and propagation of the rare species.

Paul Rezl

Leader: Colin Jennings, 4 Kinnaird Crescent, HIGHBURY SA 5089

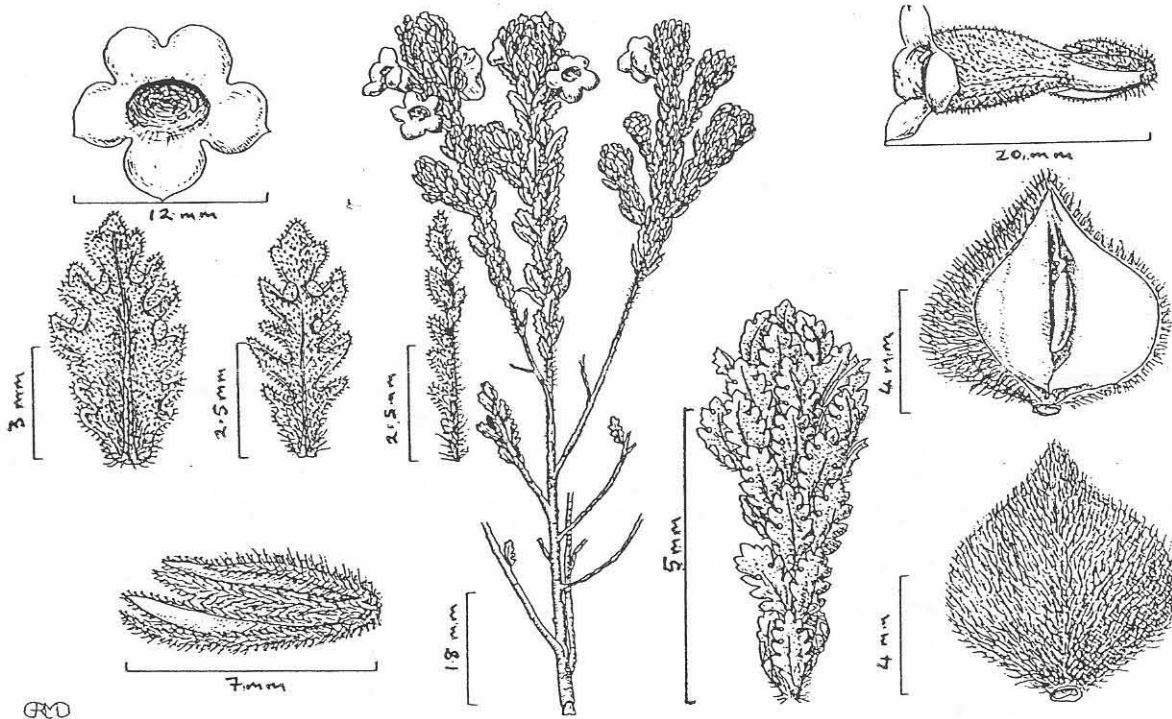
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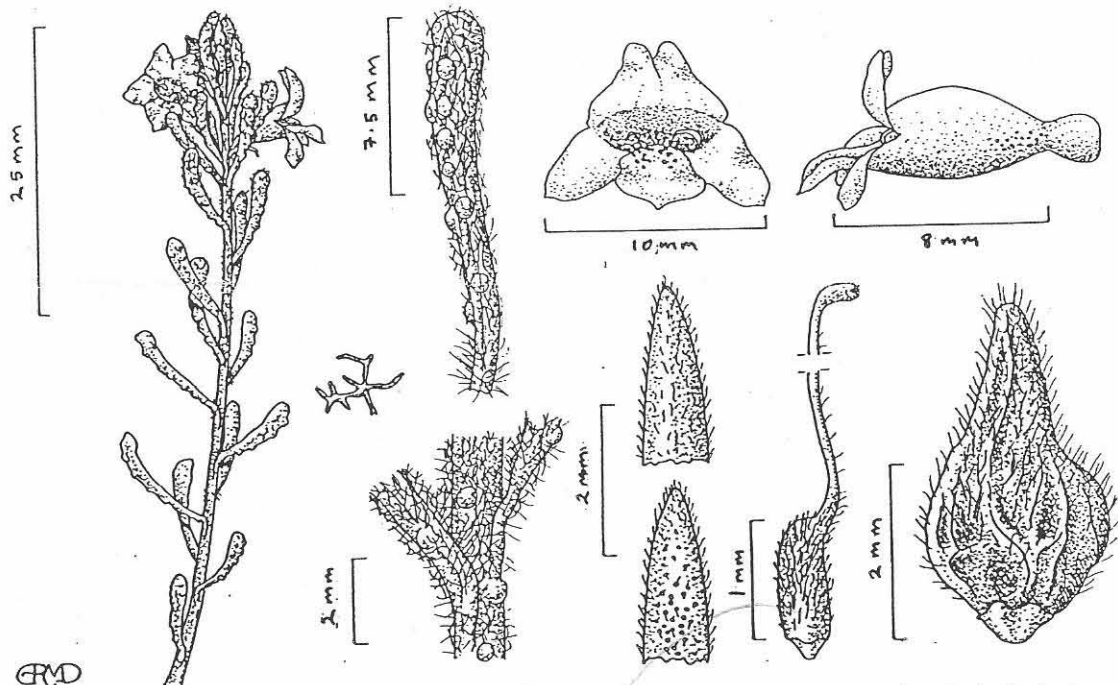
EREMOPHILA PORTRAITS

If space permits I will endeavour to include illustrations of eremophilas in forthcoming newsletters. I have a complete set for all species and subspecies but most of these have not yet been published. They will appear in the newsletter with permission of the Board and Director of the Botanic Garden of Adelaide and State Herbarium who retain the copyright. They cannot be reproduced elsewhere without the Director's permission.

Those names in parenthesis (e.g. "pinnatifida") refer to my manuscript names and have not yet been published. You should not use these names in other publications (e.g. Australian Plants).



Eremophila "pinnatifida" – I found this species by chance in 1990. It is extremely rare and known only from one locality in Western Australia. It grows well from cuttings and forms a compact shrub to about 1 metre high. The pinnately divided leaf is unique in eremophila.



Eremophila "clavata" – you may have this species as *E. caerulea* as it was previously included under this name. It replaces *E. caerulea* south of Coolgardie and can be distinguished by its club-shaped leaves and the glabrous corolla (outside surface). Apparently not common in cultivation although the plant in my garden (at least 10 years old) flowers well and appears hardy.