EREMOPHILA STUDY GROUP NEWSLETTER NO. 12 DECEMBER 1978

FLOWER SHOW

Geoff Needham

The Study Group's effort at the S.A. Regional Flower Show was very successful; it was easily the biggest and best display of eremophilas we have had in South Australia. Behind the display table we featured a background board, yellow in colour, measuring 2.1 x 1.1 m, and this had twelve illustrations depicting both the Group's horticultural activity and the scientific work of Bob Chinnock, together with an explanation of the Group's activities.

The display table, 9 m long, was filled with 26 plants in pots arranged along the centre with 60 vases of cut flowers down the sides. In all there were 50 species represented. Many people stopped to peruse the illustrated board and inspect the plants. Notebooks were out and pens busy recording plants. At the plant sale over 500 Eremophila plants were sold in a very short time. That is one way to get plants into cultivation, which is one of our aims.

The showing of plants in pots presents a much more natural appearance to the display—an aspect which was obvious in sections other than ours. Prostrate species in vases cannot convey their natural habit. Eremophilas look good in pots, so if you wish to promote the genus put a few in now. Those of small habit, such as E. parvifolia, E. gibbifolia and E. behriana will last for some years in 25 cm pots. Larger species, such as E. longifolia, E. bignoniiflora, and E. maculata, will overgrow the pots in a few years and will need to be renewed in successive years.

Whatever plant is selected, do prune to shape just as you would any other plant in a container you were exhibiting. To keep it growing evenly rotate the plant except when in bud (change of aspect can cause flowers to drop off), and keep free of pests to avoid disfigurement.

BALAKLAVA-OWEN FIELD TRIP (SEPTEMBER 24TH)

Geoff Needham

The weather was excellent for the day's outing at Balaklava and Owen. Approximately 30 people attended from far and wide, to name a few places: Arno Bay, Bute, Koolunga, Waikerie, Berri, Loxton, Geranium, Two Wells, and some from Adelaide. Check these places on a map and you will see how enthusiastic some people are. The Barr's residence was nearly isolated by late spring rains, necessitating a detour. We now know how those black box gums come to be growing in a seemingly dry area. Many of the eremophilas were spectacular in bloom. Some that come to mind are: E. pachyphylla, a well shaped erect shrub, E. granitica, both pink and purple flower forms, and E. margarethae from last year's collection, mauve flowers contrasting with slender silvery foliage. There were many of the more common species in flower, and these must rate as good garden specimens equal to many other native plants. Some plants such as Ken Warnes' single plant of E. pentaptera were of special interest. It was 10 cm high and had a few tiny green shoots. All in all it was a good day with plenty of cutting material to further spread the species in cultivation.

DISEASES OF CUTTINGS

David Lawry

Anyone who has ever attempted to propagate eremophilas will no doubt have experienced the joys of success and the sobering (and often more frequent) moments of failure. Few genera display such variation between species in their amenability to propagation. E. maculata strikes almost on demand in spite of conditions, while others

such as E. tetraptera have put down roots for only the most gifted, or lucky, propagators.

As a nurseryman, all of my experience prior to joining this Study Group had been with species commonly in cultivation using cuttings taken from local gardens. It is only recently that I have had the chance to become acquainted with what seems to be an inexhaustible number of so called impossible species collected on trips by Bob Chinnock and Ray Isaacson. Most of these species have come from the far north of S.A. or from extremely arid areas and many have had a tendency to be hairy on the leaves or stems. I have attempted to propagate them in an air-conditioned glasshouse furnished with mist and bottom heat; and by varying soil mixes have managed to kill some less slowly than before.

Some members without these technological aids have met with considerably more success after a long period, but my interest is in ultimately having some beautiful eremophilas which can be produced relatively easily and quickly for general ornamental use, and which would, therefore, need to share the conditions in a glasshouse used to propagate other plants.

This warm moist environment, as well as promoting plant development, also favours the growth of a variety of pathogens, which are widely distributed in the soil, air, and water. We become aware of their presence when we find our cuttings rotting from the base upwards, as caused by soil pathogens; or find the leaves shrivelling or dropping off as a result of air-borne diseases.

This attack by a pathogen may be divided into three phases:- **the pre-penetration phase,** covering the dispersal of the parasite; **the penetration phase,** which is the phase of the establishment of the parasite within the host; and **the post-penetration phase,** which is the subsequent exploitation of its tissues.

1. Pre-penetration phase: The methods by which a parasitic organism reaches a new host plant are many and varied. The aerial parts of plants become infected by infection units (propagules) carried to them by the agency of wind, water (including rain splashes), insects or other animals, or by contact with infected plants.

2. Penetration phase: Bacteria and some fungi enter the host only through natural openings such as stomates, or through natural or induced wounds. When these fungal spores or bacteria alight on the newly cut surface of a vascular bundle, they may actually be sucked into the vessel. Other fungi are able to penetrate the intact cuticle (skin).

3. Post-Penetration phase: The exploitation of the host cells is brought about by the secretion of pectolytic enzymes which attack the pectins of the middle lamella, or central part of the wall between the cells, thus causing the cells to separate. As the fungal hyphae grow into the plant, these enzymes cause the ultimate disintegration of the plant tissue, thus bringing about the death of the cutting.

DISEASE CONTROL

Intelligent control of a plant disease depends upon a detailed knowledge of the life cycle of the parasite, its mode of attack, and the environmental factors which influence its growth and reproduction.

General nursery hygiene aims at control at the pre-penetration phase and includes: the avoidance of overcrowding of cuttings, the removal of dead or dying shoots or leaves, and the elimination of sources of infection such as dirty propagation equipment or insects. The use of disinfectants or fungicides, such as formalin or NATRIPHENE, to drench cuttings prior to planting, is an obvious precaution against the spread of disease, as another is the use of pasteurized or fumigated soil mixes.

The adjustment of cultural conditions may also prevent or lessen the effects of the disease, since temperature moisture and light intensity all affect the susceptibility of the cuttings to infection.

The application of chemicals, which kill or inhibit growth of the parasite, is extensively used to control plant diseases, particularly those caused by fungi. Comparatively recently we have seen the development of systemic fungicides, that is, substances which are readily taken up by the plant and thus protect all parts of it against invasion. However, most of the chemicals are effective against a limited range of pathogens. BENLATE, for instance, is useful for the control of the air-borne Botrytis cinerea which attacks the stems and leaves, but is quite useless against Phythium, or Phytophthora, which are water moulds possibly already present in the soil and which cause the cuttings to rot from the base. Hence, it is important, as I said before, to know which parasite we are dealing with if we wish to tackle the problem intelligently.

I am currently having some cultures made at the Waite Institute of infected cuttings and of my 1:1 peat and perlite mix, in order to identify the pathogen or pathogens, and I have been offered trial samples of two new fungicides from Ciba-Geigy to test. It is also remotely possible that the larval stage of a minute insect is involved and I am grateful for the assistance of the Waite Institute's Entomology Department in investigating this matter.

Because of these proceedings, it is not timely to enlarge on this background discussion, and I intend to follow up with another article which will deal with these findings and make some specific recommendations.

NEW EREMOPHILA INTRODUCTIONS

E.No.	Collector & No.	Name	State	Location
675	R.I. 62	E. "elliptica"	W.A.	24 km W of Grasspatch
682	R.I. 68A	E. woollsiana var. dentata	W.A.	30 km S of Watheroo

A SHORT TRIP TO THE WEST

Bob Chinnock

In early November I visited Perth to work on the Eremophila collections held at the Perth Herbarium. However, I had the opportunity, thanks to Dr. J. Green, the Curator of the Herbarium, to do a six-day trip to eremophila country in the south-west of the State.

When I visited Western Australia last year it was still in the grip of the drought and the eremophilas in most areas, including the south-west, were not doing too well, most being vegetative only. This year I revisited a number of sites to see if the populations were in flower. The first of these was E. merallii, which occurs near Bruce Rock and is similar in form to E. caerulea, but the leaves and stems have numerous branched hairs. The population was in full flower, the plants forming dense intricate shrubs to 80 cm high.

From Hyden we went east to Forrestania near the Lake Cronin crossroads to examine E.101(=KP101) (now known by most of you as E. bicolor). This species is extremely rare and is known only from two locations within a few kilometres of each other. This year the plants were in full bloom whereas last year they were vegetative.

Although this is the third year in a row I have travelled down the road from Forrestania to Lake Varley, it is the first year I have noticed Eremophila inflata and E. densifolia in this area. They were very common along stretches of the road and were in full bloom. However, I am quite sure that they were absent previously. All plants were actively growing and I assume that all the aerial shoots were new, as it is not possible that I could have missed the characteristic E. densifolia type plant in the last two visits. The plants were obviously not seedlings either, so one wonders whether species like this die back to ground level and remain dormant until favourable conditions are again present.

From Lake King we travelled to Newdegate as I wanted to locate E. "serpens" and another peculiar new species which has leaves in whorls of three and appressed to the stem. We were unsuccessful on both counts. However, we took the road south from Newdegate and Jerramungup and found a good colony of the new species under Eucalyptus near a salt lake. This species emits a smell like E. phillipsii and E. sargentii, although it is not as strong or persistent as the former species.

At Ravensthorpe, I successfully located a peculiar Myoporum which I was hoping to find. Its flowers are more like a jasmine than Myoporum, and it appears to have adapted to butterfly and moth pollination as few bees would be capable of reaching the nectar supply at the base of the long narrow tube. The common white cabbage butterfly was found feeding on one bush.

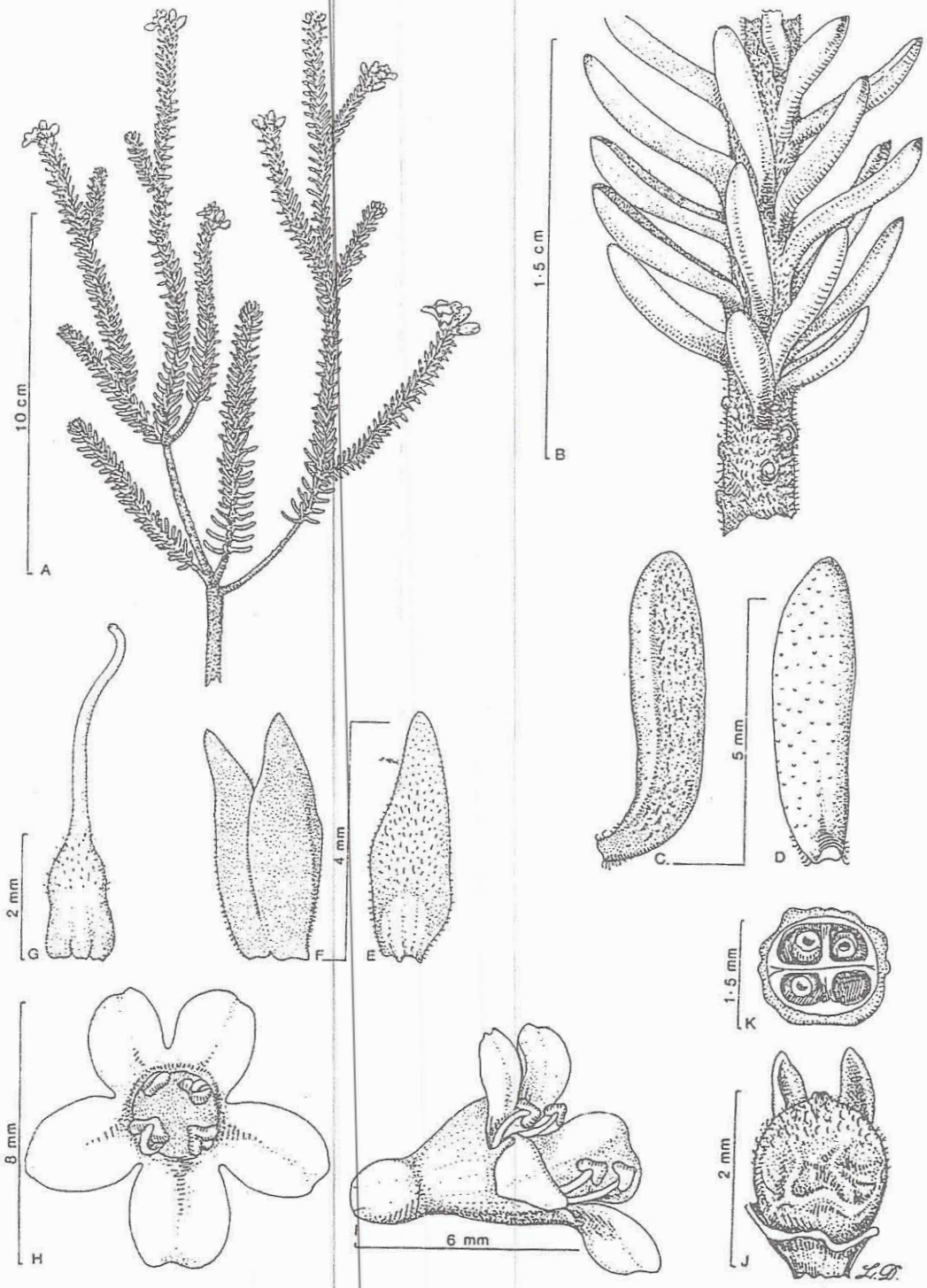
We went north from Esperance in search of E. chamaephila, an extremely rare species which has been collected only once since Diels originally collected and described it early this century. It seemed a hopeless task as the only details I had was 'sandplain near Scaddan'. We searched unsuccessfully in this area only managing to find a number of interesting Banksia and Eucalyptus as a sideline. We were heading north towards Grasspatch when 15 km from Scaddan I noticed the flash of blue of a low growing Eremophila, no bigger than an inverted soup bowl. It was the elusive E. chamaephila, with rich purple flowers and bright green terete leaves, which have a prominent band of raised glistening tubercles on the underside

We continued west from Grasspatch along the West Grasspatch Road to see whether a new species, E. "elliptica", found by Tom Loffer two years ago, was in fruit. I pulled up at a big population of this species and stepped out to find the common ground cover under the species was E. chamaephila. We proceeded to the west for another 8 km and then to the north for 7 km and then turned eastwards back to the Norseman-Esperance road again. Both species were observed and collected in a number of locations, and a particularly ovate leaf form of E. calorhabdos was also found. Just south of Norseman I revisited a site of E. saligna to collect fruiting material. Although there have been many collections made of this species, all have been in flower.

Between Norseman and Coolgardie Eremophila veronica was found in a number of places, as was a closely related unnamed species established last year from material brought back by Ken Warnes (E.457, see Newsletter no. 9). These two species, together with E. elachantha and another unnamed one (mentioned below), are unique within Eremophila. They are intermediate between Myoporum and Eremophila, and where they occur they normally form dense stands under Eucalyptus almost to the exclusion of other species.

The fourth species of this group was found 21 km WSW of Coolgardie. I thought it was E. veronica as the characteristic dense layer of low growing Eremophila came in under Salmon Gum. When I got out to collect some material I first thought 'ever been fooled' as the plants did not really appear to be eremophilas. The branches including leaves were very thin and whip-like, about 2 mm in diameter. The leaves were minute and appressed to the stem, completely obscuring it. However, the more I looked at the plants, which were not flowering, the more they looked like E. veronica in habit, and I

noted too that the tips of the shoots had white resin deposits like those of E. elachantha under drought conditions. I searched for some time but was unable to find any suggestion of flowers or buds, so I crossed the road and started searching on the other side (many a time I have found this method rewarding as often a seemingly dormant species on one side of the road may be flowering on the other). Success again! I found a number of plants with the characteristic flowers of the unnamed species which clearly belonged to the E. veronica group.



Eremophila veronica

A, habit; B, enlargement of branch; C-D, upper and lower surface of leaf; E-F, inside and outside surface of sepal; G, gynoecium; H-I, front and side view of corolla; J-K, side view and cross-section of fruit.