10(2)

Western Wildlife

DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

LAND FOR WILDLIFE

April 2006 Vol. 10, Number 2

NEWSLETTER OF THE LAND FOR WILDLIFE SCHEME

REGISTERED BY AUSTRALIA POST PRINT POST: 606811/00007

THE CORRIGIN GREVILLEA: 12 YEARS OF RECOVERY

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In the very first Western Wildlife (1/1, Feb 1997) Kings Park researchers wrote about plans to conserve the Corrigin grevillea. This article brings readers up to date with the recovery programme.

The wheatbelt region of Western Australia has been extensively cleared for agricultural purposes and Corrigin Shire is one of the worst affected areas with about 95 per cent of land cleared and further native vegetation lost through salination, weed encroachment, and grazing. *Grevillea scapigera* is critically endangered and only known historically from 13 small, scattered populations restricted to a 50 km radius area around the town of Corrigin. Due to its rarity it was decided to translocate this species back into the wild.

A translocation site with G. scapigera in flower, Nov 2005. Note infilling with native species and low weed numbers.

Maurizio Rossetto studied the biology of the plant for his PhD, which included an assessment of genetic diversity and propagation methods. For translocation, 10 clones were identified which represented 87% of the known genetic diversity of the species. Translocation has been ongoing since the first trial planting began in 1993, however, some of the earlier sites have been abandoned due mainly to unsuitable site conditions. Finally it was decided to use three larger and more secure translocation sites (0.2 ha in size and protected with rabbit proof fencing - kangaroos do not appear to damage this species) with similar soil and vegetation types. This was a challenge in itself as few similar vegetation pockets still occur, and planting did not begin on the third site until the year 2000.

Initially plants were grown vegetatively, mostly by tissue culture, to produce an exact replica of the parent plants. This process was very expensive and plants were difficult to get out of culture and into the wild. Better horticultural practices (giving the jars/cultures more light and drying them out until the agar starts cracking) have improved survival rates. As new germinants have appeared in wild populations they are propagated and planted out to add more genetic diversity, hence the number of clones on site is increasing. This new genetic resource, as well as the other clones, has been preserved in cryostorage (minus 196 degrees centigrade) for future use, and as an insurance against any disaster such as disease. As seed became available many pre-treatments have been tried to increase germination rates, the best to date is a special scarification technique, in combination with gibberrelic acid. Seed are smoke responsive but this treatment is often unreliable.

The success of the initial plantings varied considerably and was often related to good seasonal growing

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Corrigin grevillea

conditions. Due to the vagaries of the weather and the ever-declining rainfall it was decided to install drip irrigation systems on all sites to try and improve survival rates and seed production.

Present status

The numbers of this critically endangered species in the wild (as at Nov 2005) are currently down to two seedlings and three mature plants (10 years ago there were about 40 plants). Though a disturbance opportunist, populations in the wild are unlikely to increase significantly as most occur as single plants on badly degraded road verges (this species needs cross pollination from another plant to produce good seed). Plants are short lived, about eight years, and generally germinate after disturbance events such as fire or grading.

Plants protected from herbicide overspray when controlling Guildford grass in 2003.

The same site in Nov 2005 with volunteer Kings Park Master Gardeners Robyn Benken and Kaye Thies inspecting the grevilleas.

The situation on the three translocation sites is encouraging. The two earlier irrigated sites contain large numbers of plants and have experienced large seed rains to the soil seed bank. The third site contains a few fully mature plants that had not flowered or seeded for two years because of drought conditions. This site has been improved by enlarging it to 0.2 ha, fencing with rabbit proof wire, fitting a drip irrigation system, and adding over 1000 new plants to the site in 2003, with further planting in 2004 to fill in gaps.

Genetic management has been a key component of recovery. Using powerful molecular techniques, genetic variation has been assessed, and genetic erosion identified. Current research is identifying whether this genetic erosion threatens the long-term viability of this population, through, for example, inbreeding depression. New plants were also added to the other sites to increase genetic diversity and fill in gaps. Many of these poorly represented clones were recovered from ex situ cryogenically or tissue culture stored germplasm. Resulting seed, harvested in Dec 2003, from this previously cryostored material was sown and the seedlings were planted last winter (they flowered in Nov 2005) to evaluate their progress. The total number of mature plants, excluding last winter's plantings, is well over 1600 in the three translocation sites. The three sites are very different in their species composition, the best site, now on a low maintenance programme - eg reticulation system removed - is well vegetated with indigenous species therefore few weeds are present. This illustrates how important it is to use good sites for translocation purposes as our goal is to produce self-sustaining populations that require minimal ongoing management.

To evaluate if the seed being produced was entering the soil seedbank, experiments were conducted in 2001 to stimulate the seed to germinate. This initially resulted in germination in an aerosol-smoked quadrat and two years later in other quadrats where fire and soil disturbance treatments had been used. The winter of 2004 saw the first natural recruits, 10 seedlings on one site. Germination occurred under dead *Grevillea scapigera* plants where there should be a large soil seedbank and between rows of plants amongst Cape weed *Arctotheca calendula*. This illustrates there is a dispersal agent on site eg ants, and some seedlings are capable of germination and survival amongst severe competition from weeds. These seedlings are not being watered as we wish to look at natural survival rates and establish if the translocations can be self sustaining in the long term. Further recruits have been recorded this year on the same site and on

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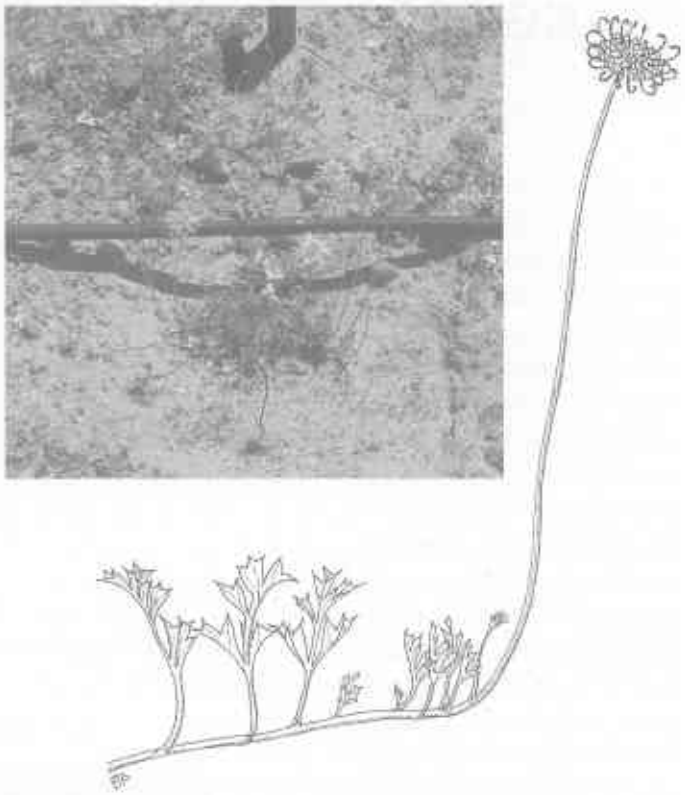
another site for the first time.

Herbicide trials for the control of Cape weed have been conducted to test the efficacy and crop tolerance. To date one herbicide has shown no deleterious effects, at high rates, when applied to mature plants. The same herbicide has been trialled over seed and seedlings in glasshouses as a pre and post emergent herbicide. At high rates some damage has resulted when applied directly to seedlings. No deaths have occurred and the plants are being grown on to monitor the long term effects.

Future research and operations will include addressing genetic erosion by increasing the number of clones (genetic material) from new germinants found in wild populations, monitoring genetic fitness, harvesting seed from 50 year soil seed burial experiments, weed management and monitoring.

The translocation project is a team effort managed by Botanic Gardens and Parks Authority and the Department of Conservation and Land Management, Narrogin District with assistance from Corrigin LCDC, local volunteers including the Bullaring community and Kings Park Master Gardeners.

This project, over the years, has been funded mainly by the Department of the Environment and Heritage, and also by smaller grants through the World Wildlife Fund. The recent site enlargement and improvement was funded by the Western Australian Government Environment Minister's Community Conservation Grant.



The photo shows a flowering plant that has been through the cryostorage process

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