



Global Re-introduction Perspectives: 2013

Further case-studies from around the globe
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IUCN/SSC Re-introduction Specialist Group (RSG)





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Published by: IUCN/SSC Re-introduction Specialist Group & Environment Agency-ABU DHABI

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Citation: Soorae, P. S. (ed.) (2013). *Global Re-introduction Perspectives: 2013. Further case studies from around the globe*. Gland, Switzerland: IUCN/SSC Re-introduction Specialist Group and Abu Dhabi, UAE: Environment Agency-Abu Dhabi. xiv + 282 pp.

ISBN: 978-2-8317-1633-6

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Conservation translocation of the large-headed daisy to Mount Bold, South Australia

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Introduction

Brachyscome diversifolia (Graham ex Hook.) Fischer and Meyer (Compositae) is a perennial daisy with tufted leaves and long peduncles up to 30 cm, terminating in white flowers. Flowering occurs between spring and early summer and flowers readily set seed (Salkin *et al.*, 1995). *Brachyscome diversifolia* occurs in open woodland forest on steep rocky slopes and gullies, and on coastal cliffs (Salkin *et al.*, 1995). There are two small extant populations of *B. diversifolia* in South Australia, one at Scott Creek Conservation Park and the other at Ironbank, both in the Adelaide Hills within 20 km of each other. Populations are restricted in South Australia because of the species' specialised habitat preferences. Potential threats to the species include grazing by slugs and snails (Salkin *et al.*, 1995),

weed invasion (Wilson & Bignall, 2009), trampling of populations along hiking trails, and limited suitable habitat. The species is endangered in South Australia (National Parks and Wildlife Act 1972). It also occurs in New South Wales, Victoria, and Tasmania, but is not listed as threatened in these states. The South Australian population has biogeographic and genetic significance as it represents the western-



Translocants flowering and setting seed 6 months after transplanting © M. Jusaitis

most outlier for the species, significantly disjunct from its nearest neighbour in Victoria.

Goals

- **Goal 1:** Extend the natural population of *B. diversifolia* by re-introducing it to a putative historic site.
- **Goal 2:** Determine any threats to the survival and establishment of the species.
- **Goal 3:** Examine the influence of Ambiol seed-pretreatment on translocation success.



Grazing damage to *Brachyscome diversifolia* leaves three months after planting © M. Jusaitis

Success Indicators

- **Indicator 1:** Survival, reproduction and recruitment of *B. diversifolia* over ten years following translocation.
- **Indicator 2:** The completion of monitoring to ascertain any threats to survival and growth of translocants.
- **Indicator 3:** Increased knowledge of how Ambiol might be used to improve the survival and health of translocants.

Project Summary

Feasibility: The translocation site was located in the water catchment of Mount Bold Reservoir, a secure natural bush site protected from direct human disturbance. The site was chosen because of similarities in slope, aspect and vegetation to remnant habitat sites, and because the species had been previously recorded at the Mount Bold water catchment (State Herbarium of South Australia records, 1993 & 1994). The translocation site has a steep, rocky south-facing slope supporting an open woodland forest above a thick understorey of grasses and herbs. The extreme steepness of the cliff made the process of planting and monitoring quite difficult.

Implementation: Translocants were raised in a glasshouse from seed collected from a naturally occurring population at Scott Creek Conservation Park, approximately 10 km from the translocation site. The existing population at Scott Creek is very small (<200 plants), and one of only two naturally occurring populations in South Australia.

As part of the translocation, Ambiol (2-methyl-4-[diethylaminomethyl]-5-hydroxybenzimidazol dihydrochloride) was tested to determine if it could improve survival and growth of translocants. Ambiol has been effective in improving



Translocation site in the Mt. Bold Reservoir water catchment area © R. Aleman

seedling growth and relieving drought stress of agricultural plants such as tomato (MacDonald *et al.*, 2010) and carrot (Lada *et al.*, 2005), and North American pine trees (Borsos-Matovina and Blake, 2001), but has not been tested on Australian native plants. To test the effect of Ambiol, seeds were pretreated by soaking in 10 mg/L Ambiol for 24 hours before sowing. An equivalent number of seeds were presoaked for the same length of time in water. Control seeds received

neither pretreatment. The seeds were then germinated in petri dishes for eight weeks before being transplanted to 50 mm (diameter) tubes containing commercial potting mix and grown on in a glasshouse until seedlings were vigorous enough (10 weeks old) to survive at the translocation site.

Planting at the translocation site occurred in June 2011, during the wet season when soil was moist. Seedlings (10 weeks old) were planted in a prescribed planting pattern using a 1 m² quadrat subdivided into 100 grids (10 cm x 10 cm). Five plants of each pretreatment (Ambiol, water, no pretreatment control) were randomized within each quadrat, and quadrats were replicated six times over an area of approximately 25 m x 10 m. At planting, and thereafter at approximately three-monthly intervals, rosette diameter, plant height (to highest emerged peduncle if plants were in bud), number of healthy leaves, number of peduncles, grazing damage, and plant health rating (scale of 1-5, 1 = dead, 5 = alive and completely healthy) were recorded.

Post-translocation monitoring: A year after translocation, 81% of all translocants survived. Most of the plants experienced their usual die-back in summer as the soil dried out, and re-sprouted again from root stocks following opening rains in autumn. The plants derived from seed pretreated with Ambiol failed to show any significant difference in survival, growth or health compared to water-pretreated or control plants, all three groups performing equally well. Five months after planting (November), most plants had produced flowers and were setting seeds. However, no new recruitment was observed during the following winter.

Although about 60% of plants were observed with some minor grazing damage, this did not seem to affect plant survival. The damage was possibly caused by

snails, slugs or caterpillars, but plants seemed to be able to withstand a small degree of leaf damage by regrowing new leaves from the central meristem. Despite the observed grazing, 81% of plants survived after 56 weeks, suggesting that grazing does not constitute an immediate threat to survival. So far the site appears to be an ideal weed-free habitat for the species. We intend to continue monitoring the trial and time will tell whether the long-term sustainability of the translocation will be assured through recruitment of new individuals.

Major difficulties faced

- The extreme steepness of the slope at the translocation site made planting and monitoring difficult.
- Invertebrate predation was observed on some plants over a year of monitoring, and will need to be monitored to ensure it does not become a long-term problem.
- Recruitment was difficult to assess in the early stages because of a dense herbaceous layer. New recruits may only become evident after they reach a certain size and emerge from this layer.

Major lessons learned

- Selecting a translocation site as similar as possible (aspect, slope, vegetation associations) to the original habitat was very important for the success of this translocation.
- Invertebrate grazing did not significantly affect survival of plants over one year, but may cause long-term issues and will continue to be monitored.
- Recruitment of new plants may be a slow process, as no new individuals were seen one year after planting, even though flowering and seed production were prolific during the previous season.
- Ambiol applied as a seed pretreatment had no effect on survival, growth or health of plants. This may be because the translocation site received ample rainfall and plants were not subjected to water stress. Preconditioning seed with Ambiol is thought to promote drought tolerance in many plants.

Success of project

Highly Successful	Successful	Partially Successful	Failure
		√	

Reasons for success/failure:

- The survival rate after the first year was good (81%), and 97% of all surviving plants were healthy, even though some invertebrate grazing was observed. It may be too early to observe recruitment yet, as young plants may remain hidden beneath the herbaceous layer until they emerge. Long-term success is predicated on successful recruitment and this will continue to be monitored.
- Selection of a suitable habitat for the translocation site was critical to success.
- Use of locally-sourced seed may have contributed to successful plant establishment because of similar climate and habitat features to the seedlings' original habitat.

- The commitment of the South Australian Water Corporation to maintaining the Mount Bold catchment as a conservation zone and for supporting research on threatened species is acknowledged.

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