BankWest *Landscope* Conservation Visa Card Trust Fund Grants 2006-2007

The Role of pollinators and mycorrhiza in rarity of the Glossy-leaved Hammer Orchid, *Drakaea elastica*, and the Kneeling Hammer Orchid, *Drakaea concolor*.

The Kneeling Hammer Orchid, *Drakaea concolor*

Ryan Phillips
Kings Park and Botanic Gardens, Fraser Avenue, West Perth, 6005
The School of Plant Biology, the University of Western Australia, Crawley, 6009

The Glossy-leaved Hammer Orchid, *Drakaea elastica*. Photo by Ester Beaton

GENERAL METHODS

By baiting for the presence of mycorrhiza (fungi) using hammer orchid seed and pollinators using picked hammer orchid flowers, it is possible to determine the role of these partners in limiting the distribution of orchids and the suitability of sites for re-introduction.

Hammer orchids utilize sexual deception to attract flower wasps (thynnine species) pollinators, with each orchid relying on a single species of wasp. This method is extremely effective and, when picked flowers are relocated to a new site, the wasps's response is rapid with the first males usually arriving within two minutes. I surveyed for pollinators by picking flowers (two at a time) and baiting for 6 periods of 2 minutes at each site.

Orchids require mycorrhizal fungi to germinate, however, there is great variation in the species of mycorrhiza used. To determine the distribution of the fungus, packets of seed in fine mesh are submerged in the organic layer at the soil surface. The seed packets are sown in winter, removed during spring and then scored for germination - with germination indicating the presence of the fungus. Thirty baits were randomly distributed *per* site within areas of suitable habitat

RESULTS

Drakaea elastica – pollinator

I have baited for *D. elastica* wasps at 32 locations from Moore River National Park to Ruabon Nature Reserve near Busselton. While the pollinator was reasonably common in the Capel-Ruabon region (6 of 15 locations), there were only two records from north of Bunbury. Pollination rates remain high (54%, based on 4 populations), however, this is an artifact of the extreme efficiency of sexual deception. Despite intensive survey effort

in suitable habitat outside the distribution of the orchid, the pollinator could not be located away from the Swan Coastal Plain. Due to the scarcity of the pollinator across most of the distribution of *D. elastica*, the conservation of the wasp is a major concern.

Drakaea elastica – mycorrhiza

The mycorrhizal baiting study (at nine locations) revealed that the abundance of the mycorrhiza of *D. elastica* is no different to that in more common hammer orchids. It also revealed that the mycorrhiza occurs at sites where *D. elastica* is absent. Seed and mycorrhiza have been collected for long term storage and germination.

Drakaea concolor – pollinator

In 2006 I baited for the pollinator on private property west of Northampton and in Kalbarri National Park in 17 locations. It was present at four locations, both west of Northampton and in Kalbarri National Park. In Kalbarri N.P. it was widespread on the sandplain and occurred well away from the restricted habitat of the orchid. I also baited for the pollinator around the Eneabba-Watheroo area without success during 2007 (there is a single record of *D. concolor* from this region).

Drakaea concolor – mycorrhiza

Due to the extreme drought during 2007, no mycorrhizal baiting could be conducted. However, some seed was collected for long term cryogenic storage and future studies. Fungi was isolated from a small number of individuals and based on morphology appears to be closely related to that in other *Drakaea*.

KEY CONSERVATION OUTCOMES

Drakaea elastica

The scarcity of the pollinator of *D. elastica* is a major concern in the northern part of this species' distribution. Alternatively, the mycorrhizal fungus required for this species shows similar abundance to other orchid species and there are several additional locations where the fungus has been located. Habitat clearing and rarity of the pollinator are the main causes behind the rarity of this species. Some reserves in the south of this species range have both suitable habitat, mycorrhiza and the pollinator and are potential sites for reintroduction of this orchid.

Drakaea concolor

The widespread nature of the pollinator on the Kalbarri sandplain and the restricted habitat preferences of the orchid suggest that a paucity of suitable habitat is the primary factor limiting the abundance of this species. Conservation efforts should focus on maintaining the condition of existing populations. It is unknown whether pollinator communities will have survived the 2007 drought.

REPORTING

All results will be published in scientific journals upon completion of the research being undertaken on the other species of *Drakaea*.

BUDGET

Mesh for seed baits (SEFAR – 9 x 90µm Nitex)	$ 999.60
Mileage (UWA vehicle @ 40c *per* km)	$ 2,200.00
Project Total	$ 3,199.60

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