FLORA

TOWARDS THE CONSERVATION OF THE WESTERN AUSTRALIAN UNDERGROUND ORCHID

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ONE of Western Australia's most interesting plants and possibly one of the rarest is the underground orchid (*Rhizanthella gardneri*, Fig 1). What makes this plant so interesting you ask. Is it the fact that this orchid germinates, grows and flowers underground or that it has an intimate life long relationship with a specific fungus? Well it doesn't stop there - the orchid only grows in association with the broom honeymyrtle where the fungus attaches to the roots of the broom bush completing a three-way relationship.

Recent research at Kings Park & Botanic Garden and the University of Western Australia has successfully germinated seed (Fig 2) of the orchid in association with the plant partner that the orchid needs to ensure a supply of carbohydrate and other nutrients. These plants (Fig 3) have developed rapidly and it is anticipated that some will flower in 2005.

A research project, with outcomes to assist in the conservation of the underground orchid, commenced in 2004. PhD research student Jeremy Bougoure will investigate how *R. gardneri* obtains essential nutrients and sugars. This will be done using labeled isotopes in conjunction with a cutting edge electron microscopy technique. Understanding how this unique species acquires nutrients and especially sugars from its fungal partner will greatly enhance knowledge of this orchid's basic biology and provide valuable information for successful translocation attempts.

Our recent surveys with CALM (Esperance) and Friends of Kings Park have discovered more than fifty flowering plants in the southern populations indicating a bright future. However, the northern populations in the wheatbelt around Corrigin remain on the edge of extinction with only three flowering plants found this year (Fig 4). Given that over 100 plants were found during surveys in the 1980's, urgent work is required to prevent the extinction of these populations. This is especially important as preliminary genetic data suggests that the northern and southern populations may be taxonomically separate. Further research is required to confirm this.

As new information is unraveled we will keep you informed with further updates. Please contact the Orchid Research Group at Kings Park and Botanic Garden, ph (08) 94803648 for further information.

Figure 1: Two flowering underground orchids. Each inflorescence consists of 40–50 tiny maroon flowers surrounded by pinkish bracts. The leaf litter has been removed allowing the bracts to unfold exposing the flowers. Photo Mark Brundrett

Figure 3: The rhizome of Rhizanthella gardneri *10 months after germination. The plant is now over 4 cm long and is expected to flower in 2005. Photo Mark Brundrett*

Figure 2: In order to germinate, seed of Rhizanthella gardneri *is sown amongst the roots of* Melaleuca uncinata *colonized by the fungus that forms the essential link between orchid and shrub. Seed is inserted through windows cut in the side of the pot.*

Fig 4: Jeremy Bougoure (PhD student, left), Ross Brockway (Kings Park volunteer) and Robin Campbell (Corrigin LCDC) are excited after finding one of only three flowering Rhizanthella gardneri *plants at the base of a broombush. Photo Mark Brundrett*