UNDERGROUND ORCHID

Rhizanthella gardneri Rogers (ORCHIDACEAE)

Side view of an excavated Underground Orchid. (photo: S. D. Hopper) Inset shows a plant slightly emergent from the soil. (photo: A. Brown)

This extraordinary plant is one of only two subterranean orchid species known in the world. The other, somewhat similar species is *Cryptanthemis slateri*, which is native to New South Wales and Queensland. Their underground habit makes these orchids very difficult to find and, despite their enormous public and scientific appeal, many aspects of their biology remain a mystery.

Rhizanthella may have been collected as early as 1914 when a plant was unearthed on a farm west of Wubin. However, no specimens from this locality were preserved to permit a definite identification. The first verified collection of the orchid was made on 23 May 1928 by John Trott while he was clearing virgin bush on his farm near Corrigin in the central Western Australian wheatbelt. In the following month two further finds were made in similar agricultural districts by farmers ploughing virgin land.

Later in the same year Richard Rogers, an authority on Australian Orchids, described the plant as a new genus and species. The generic name is derived from the Greek words *rhiza* (root) and *anthos* (flower) and refers to the underground flowering habit of the species. The specific name honours the botanist Charles Gardner, who had provided Rogers with material and drawings of the orchid.

Four further sightings of *Rhizanthella*, including two completely new localities, were recorded before 1960. However, the orchid was rapidly eliminated by farming at all the known localities. In the following years all attempts to locate the orchid were fruitless and in 1978 John Trott offered a reward of $100 to anyone who could rediscover it. Eventually a new population was discovered in May 1979 near Munglinup, far removed from all previous localities. This discovery renewed interest in the orchid and permitted new studies of its biology to be undertaken. Indeed in 1980, a grant of $29 000 was awarded by the World Wildlife Fund to Dr P. R. Wycherley and Professor J. S. Pate for further study of the distribution and biology of *Rhizanthella*.

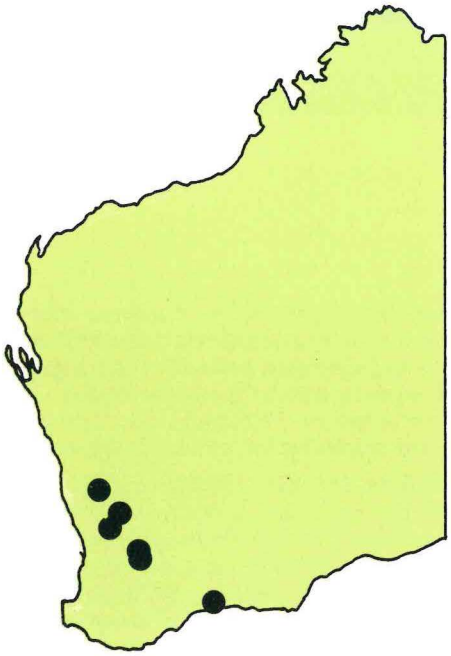
Being subterranean, *Rhizanthella* is unable to derive its energy by photosynthesis. Instead it subsists on the decaying stumps of the Broom Honeymyrtle, *Melaleuca uncinata*. A fungus (*Rhizoctonia*) that occurs in the outermost cells of the Underground Orchid and links it to the *Melaleuca* stump is probably essential for the orchid's very specialised lifestyle.

DESCRIPTION

Fleshly saprophytic underground herb with a short branching horizontal stem and longer vertical shoots bearing the terminal flower heads. Flower heads comprised of 50-100 flowers surrounded by 6-12 large spreading bracts. Flowers small, deep purple-red, arranged in spiral rows facing the centre of the heads.

Apart from its flowers, the orchid is uniformly white and if any part is cut it produces a faint formalin-like smell. *Rhizanthella's* closest relative is the other subterranean orchid, *Cryptanthemis slateri*, but this occurs on the other side of Australia and is sufficiently distinct in form to be placed in a separate genus.

Flowers of the Underground Orchid which occur within the swollen head of the plant. (photo: H. Foote)



DISTRIBUTION AND HABITAT

The known geographical range of the Underground Orchid extends approximately 500km through the Western Australian wheatbelt. The average annual rainfall in this area varies from 300 to 600 mm but is generally about 350 mm.

The orchid is invariably associated with thickets of the Broom Honeymyrtle (*Melaleuca uncinata*), always occurring within about 1.5 m of the melaleucas' lignotubers. At the Munglinup locality, the orchid occurred in brown sandy clay in a tall open shrubland of several mallee species with an understorey dominated by *Melaleuca uncinata* and an open heath of many smaller shrub species.

REPRODUCTIVE BIOLOGY

Flowering occurs in May and June and the plants may flower at least two years in succession. The mature flower heads never appear above ground level, their highest portions being a few millimetres below the soil surface. However, they do raise and crack the topsoil, allowing direct access to the flowers from above. The flowers produce a faint sweet odour which is not always noticeable.

Insect vectors are required for the flowers to be pollinated. There have been two observations of insects visiting the flowers and bearing the orchid's pollen. One of these insects was captured and identified as a species of wasp while the other insect was a fly. The seeds apparently mature in November-December but seed set appears to be low. The fruits are succulent.

A partially excavated Underground Orchid. (photo: S. D. Hopper)

The Underground Orchid's habitat near Munglinup with small Broom Honeymyrtle shrubs. (photo: S. D. Hopper)

CONSERVATION

All of the populations discovered prior to 1960 are now extinct and many others were probably destroyed by land clearance withouth even being noticed.

As a result of recent work by K. W. Dixon and members of the W.A. Native Orchid Study and Conservation Group, there are now five known surviving populations, three near Munglinup and two near Corrigin. In all, less than 50 plants have been found at these locations. (It takes ten man-hours to locate each *Rhizanthella* plant in known populations.). Two populations occur on Nature Reserves, one of which was upgraded to 'A Class' status in 1981.

It is particularly important to protect the known wild populations and locate further populations of the orchid because attempts to obtain mature seeds or cultures of it are only in their infancy. Even if adequate numbers of mature seeds could be found, the orchid is likely to prove difficult to grow in cultivation in view of its highly specialised biology.

IUCN Red Data Book Category : RARE
Australian Plants at Risk Code: 3V

FURTHER READING

George, A. S. (1980). *Rhizanthella gardneri*—the Underground Orchid of Western Australia. *Amer. Orchid Soc. Bull.* **49**: 631—646.

Rogers, R. S. (1928). A new genus of Australian orchid *J. Roy. Soc. West. Aust.* **15**: 1-7

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