

# One of the World's Rarest Orchids

## *Rhizanthella slateri*

### The Eastern Australian Underground Orchid

The genus *Rhizanthella* are extremely unusual orchids, only found in Australia. They spend all their lives underground, only emerging when they flower. Even then, the flowers are usually hidden by soil or leaf litter. Consequently, they are very hard to find, are all critically endangered, and are often listed in the top 10 rarest orchids in the world.

There are currently five species known. *Rhizanthella gardneri* and *R. johnstonii* are found in the south-west of Western Australia, where they occur under Broombush (*Melaleuca* sp.). The underground orchids from eastern Australia are even rarer; so rare that they often don't even make it onto lists of rare orchids! *Rhizanthella omissa* is known from a single collection in south-eastern Queensland; and a newly described species, *R. speciosa*, is known from a single location in Barrington Tops National Park.



**Figure:**

Two composite flowering heads from the recently discovered Lane Cove population of *Rhizanthella slateri*.

Note the lack of chlorophyll and the yellow pollinia within the individual flowers

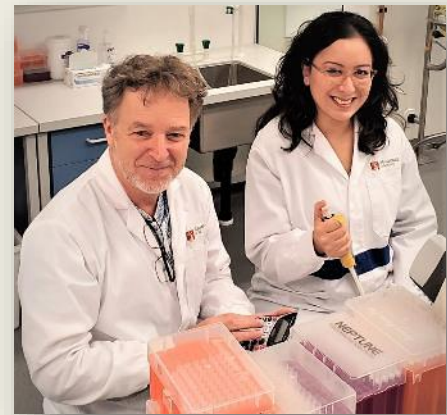


*Rhizanthella slateri* – a single flower!

The final species, *Rhizanthella slateri*, is known from a small number of plants at a handful of locations: near Buladelah; in the Watagan Mountains; in the Blue Mountains; and near Nowra. So that makes it even more remarkable that in 2020, a new population of *R. slateri* was found within five kilometers of the Macquarie Campus. The new population, consisting of 14 plants, was found in local bushland by Vanessa McPherson and Michael Gillings while they were surveying for club and coral fungi. The location is secret, and known only to a small number of people.

The biology of these orchids is fascinating. Since they live underground, they cannot photosynthesise. In fact, they have the smallest chloroplast genome described in land plants. So how do they make their living? *Rhizanthella* are parasites. They form associations with ectomycorrhizal fungi that, in turn, are associated with trees or shrubs. The *Rhizanthella* ultimately get their nutrients from the tree or shrub, with the fungi acting as intermediaries. In Western Australia, the plant partner is *Melaleuca*, while the fungus is probably a member of the genus *Ceratobasidium*. Nothing concrete is known about the land plants or fungi that associate with *Rhizanthella* on the East coast.

But the strange, enigmatic nature of these orchids does not end here. When the flowers bloom, they produce a strong ammonia smell. This attracts small coffin flies that move pollinia from flower to flower, fertilizing them. The fruit develop very slowly over almost a year, and each contains about 50 seeds (which are very large for seeds produced by orchids). The fruit are probably eaten by bandicoots or wallabies which then disperse the seeds.



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