MYCO-MIMICRY - Abstract
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The diversity of life forms found in both the fungal and plant kingdoms provides a high probability that similar physical life forms, will be found in both kingdoms.
The oldest known fossil fungus is probably from the Devonian (417 to 354 Million Years ago) from Aberdeenshire, Scotland.
While the fungi evolved quite early it was the appearance of flowering plants about 125 million years ago and the advent of parasitic plants, both having similar lifestyles, that has given rise to the convergent evolution of some fungi and plants.
The eons since their first appearance has allowed both fungi and plants to radiate into all manner of lifestyle niches. To survive in that niche, a primary need for any organism is to have a fitness such that it fulfills the necessary functions for it and it's progeny to survive in that niche.
As such, the generation and dispersal of propagules for an organism is an important reproductive function; in order to maintain the species, extend the existing habitat range and also to spread genetic variability, when it occurs, throughout the population.
Dispersal may be achieved by the physical mechanisms of gravity, wind, water and animals.
Also, many organisms may have active mechanisms to generate and affect release of their propagules, which are then dispersed by these external agencies.
To fulfill it's reproductive function an organism's fruiting body needs to utilize these dispersal agents and to be positioned and have a structure such as to allow the fruiting body of the organism to be exposed to these external physical agents..
Many macrofungi have a structure that provides the function of elevating the spore-bearing part of the sporophore to a position, generally above soil level, where the spores may be exposed to external dispersal agents.
Vascular flowering plants that parasitize the roots of host plants mimic closely the lifestyle of many macrofungi and similarly, need to have their flowers exposed to these above ground agents for pollination and dispersal.

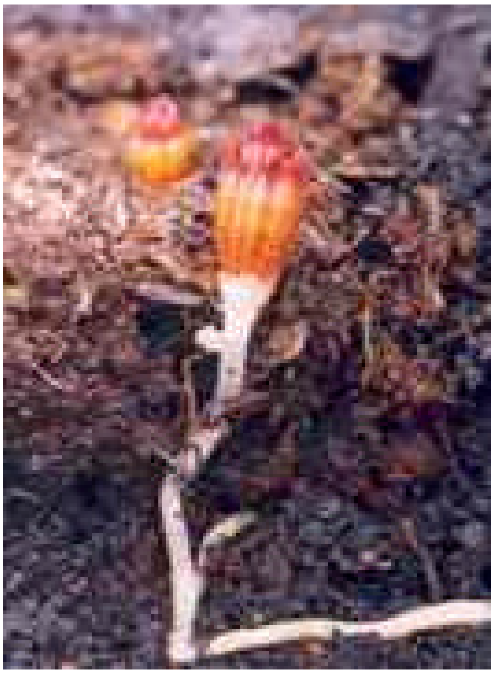
Many parasitic flowering plants are in the Family *Balanophoracea*, which may be generally described as being; plants that are monoecious or dioecious, attaching to the roots of trees and shrubs by a tuber, which may contain only parasite tissue or mixtures of host and parasite. Slender rhizomes grow from the tuber and form haustorial connections to the host roots. The inflorescence is above ground, arising endogenously within the tuber. Leaves are spirally arranged, without stomata, scaly. Flowers are minute and numerous - some of the smallest flowers in the angiosperms. They are achlorophyllous, need to expose their flowers to external pollinating and dispersal agents and generally are low growing.

Belanophora sp.

These characteristics mimic quite closely those of many mycorrhizal macrofungi and as such the flowers of these plants mimic not only the physical appearance of some macrofungi but have also attractants for pollination vectors.
In the SFSGI Newsletter, Vol. 13, No. 5. 2001, it was reported that *Thismia clavarioides* , a new species and fungal mimic, was found at Morton National Park near Bundanoon, New South Wales and the SFSGI Newsletter, Vol. 14, No. 2. 2002, reported that the flowering plant *Balanophora fungosa* , a fungal mimic, was found at Mosman Gorge Queensland.

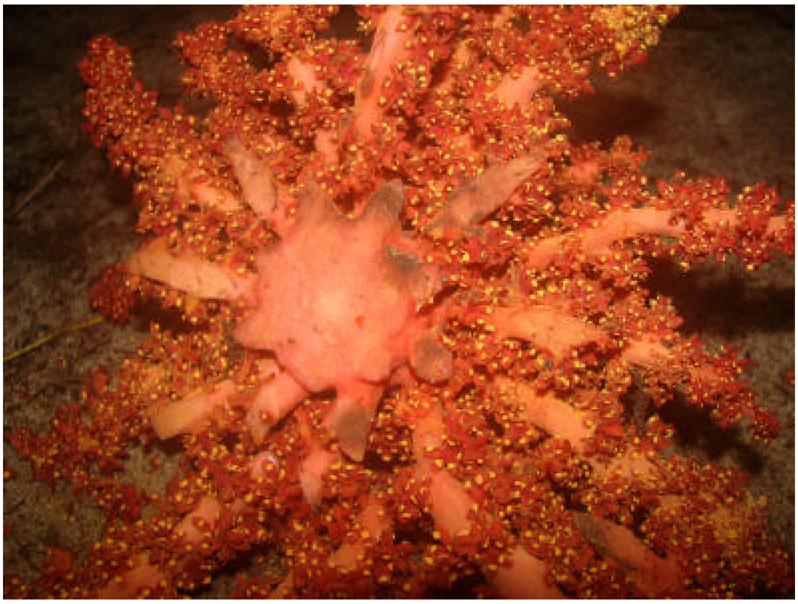
Myco-mimic Parasitic Plants

Balanophora fungosa



Thismia rodwayi

Cynomorium coccineum Cadiz, Spain.



Chlamydophytum aphyllum Gabon W. Africa

Ombrophytum violaceum Peru

Exorhopala ruficeps
Penang Malaysia

Hydnora africana Namibia
Day one flower right, day two flower left.

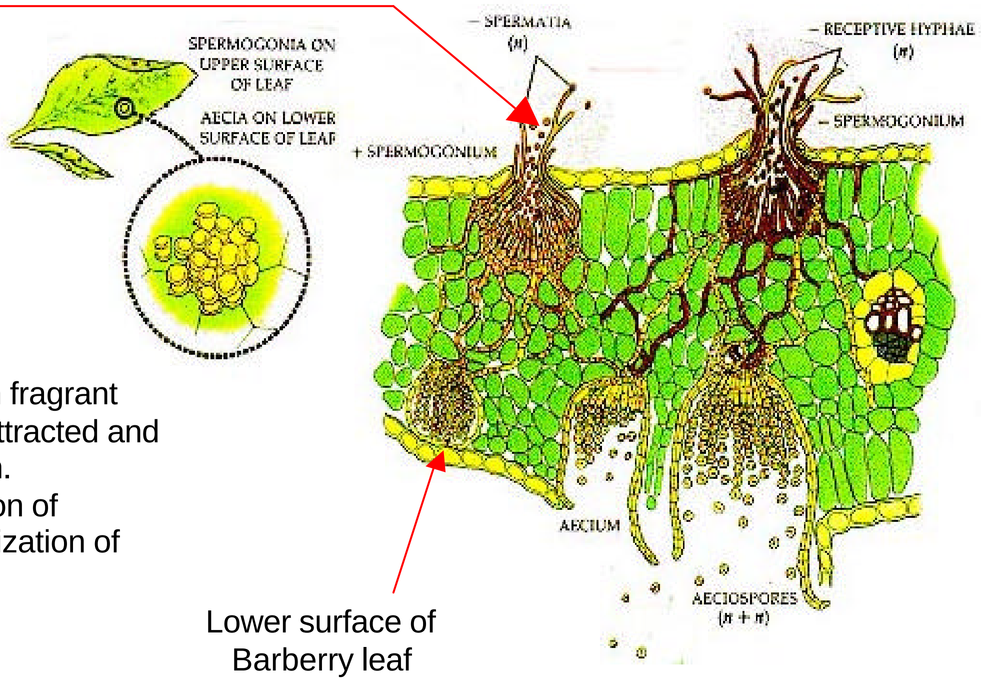
The bristles detain visiting insects (carrion, scarab, or dermestid beetles) attracted to the putrid odour. In *H. africana*, the odour emanates from "bait bodies" (specialized hairs) within the flower. Flowers are large (10-15 cm), fleshy, malodorous, beetle and blowflies are pollinators.

Rhizanthella slateri **An Australian Underground Orchid.**


Rhizanthella slateri Bulahdelah NSW emerging buds (left) and flower (right).
A rare saprophytic orchid that lives beneath the soil and only as flowering is approaching does it just broach the surface. Almost entirely subterranean, with only the flowers, fruit and involucral bracts emerging above the soil surface. Distribution and occurrence**:** World: 3 species, *R.gardneri*, *R. slateri*, *R. omissa*, endemic Australia: WA, N.S.W., Qld.

A Fungal Flower.

The "Cereal Rust" *Puccinia graminis* (Uredinales) is a microfungi parasitic on wheat. To complete its lifecycle two different plant hosts; wheat and barberry are required (heteroecious) and an insect vector is necessary for spermatization
To produce binucleate spores (aeciospores) for reinfection of wheat, it is necessary for an insect "pollinator", attracted to the fragrant nectar secreted by the spermogonia, to mechanically transport the spermatia + or – to the - or + receptive hyphae respectively, to allow "fertilization of the myco-flower".



Spermatia exuded in fragrant nectar. Insects are attracted and effect spermatization. Plasmogamy or fusion of protoplasts i.e. "fertilization of the fungal flower".

Lower surface of Barberry leaf