# New parasitic fungi found that turn ants into zombies

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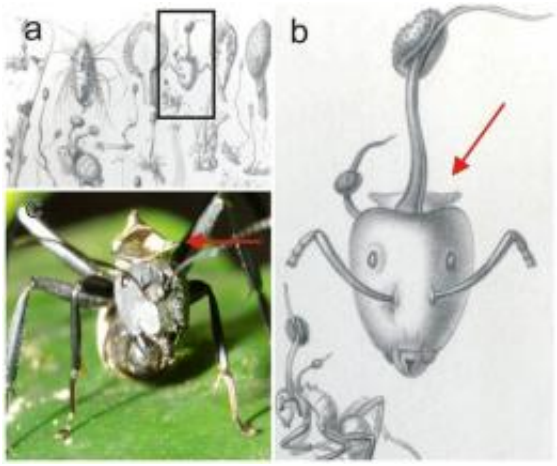


Ophiocordyceps unilateralis. Image credit: *PLoS ONE* 6(3): e17024. doi:10.1371/journal.pone.0017024

(PhysOrg.com) -- Scientists from the US and UK have discovered four new species of parasitic fungi in the Brazilian rainforests. The fungi attack four distinct species of ants and release mind-altering chemicals that gradually turn the ants into zombies and then kills them.

David Hughes, Assistant Professor of entomology and biology at the Pennsylvania State University, and colleagues found the new fungi, all in the *Ophiocordyceps unilateralis* species complex, in the Zona da Mata area in south-eastern Brazil. Each fungus species was a different shape and size and was found to be parasitic on a different species of carpenter

ant (*Camponotus sp*).

Ants that come into contact with the fungus spores become infected, and within a week they begin behaving like zombies and leave the nest. They then find a shrub leaf in an exposed position a short distance above the forest floor and lock their mandibles onto the central vein or the leaf edge and die in that position. The fungus sprouts spore-bearing stalks out of the back of the neck of the dead ant and releases its spores at night, which float down to the forest floor ready to infect more ants.

Two of the species bore short spores that changed to a boomerang shape in mid-air. If the spores did not land on an ant they sprouted secondary spore stalks that could infect ants walking on them. The other two species bore longer spores that were shot like arrows from the stalks, but which did not grow secondary stalks.

The researchers are not certain how the fungus controls an ant's behavior but said it consumes the ant from the inside, releasing alkaloid chemicals as it does so. The chemicals released by the Cordyceps group of fungi have been known to traditional medicine for millennia, and are used in Western medicine in some antibiotics, anti-cancer, anti-malarial, and anti-organ rejection drugs.

A similar parasitic fungus was found in Indonesia in 2009 by researchers led by Dr Hughes. That fungus also turned ants into zombies, and they attached themselves to leaves a consistent 25 cm above the ground where the humidity was 95 percent, which provided perfect conditions for the growth of the fungus.

According to Commonwealth Scientific and Industrial Research Organisation (CSIRO) entomologist Dr Steve Shattuck, there have been reports of several species of fungus parasitic on ants in the tropical rainforests of north-eastern Australia. Dr Shattuck said no one knows

exactly how rare the fungus is, but it is hard to find.

The study, published online in the journal *Public Library of Science ONE* (*PLoS ONE*), highlights the biodiversity found in the rainforests since the four different species were found in close proximity. The rainforests in the region are rapidly being destroyed, with over 92 percent already gone.

**More information:** Evans HC, Elliot SL, Hughes DP (2011) Hidden Diversity Behind the Zombie-Ant Fungus Ophiocordyceps unilateralis: Four New Species Described from Carpenter Ants in Minas Gerais, Brazil. *PLoS ONE* 6(3): e17024. doi:10.1371/journal.pone.0017024