

# How a fungus turns ants into zombies

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Fruiting body of the fungus, growing out of an infected ant that clinged itself to a tree. Credit: Roel Fleuren

Researchers have elucidated the molecular mechanism of the fungus that turns ants into living zombies. The fungus specifically affects the ants' neurobiology, odor perception and biological clock. The Utrecht microbiologist Robin Ohm publishes this, together with American and German colleagues, in *G3*.

The [fungus](#) *Ophiocordyceps camponoti-floridani* can infect [ants](#) and manipulate their [behavior](#) in a way that is beneficial for fungus growth and transmission. These infected ants are called "zombie ants." Influenced by the fungus, the ants climb to a high point and bite into a branch, attaching themselves until death. The fungus then digests the ant and forms a fruitbody with which the fungus spreads its spores. The [molecular mechanisms](#) behind this behavioral modification are still largely unknown, as in similar parasitic interactions in which the behavior of a host is manipulated.

"We can realistically recreate this interaction between the fungus and the ant in the lab. We have sequenced the genome of the fungus and determined all its [genes](#). This gives us an important tool with which we can examine this system in detail," says fungal researcher Robin Ohm of Utrecht University. "We then looked at the expression of all genes in the fungus and the ant during the behavioral modification. In this way, you get a good picture of the genes of both the fungus and the ant that may be involved in the behavioral modification."

The fungus produces toxins—such as enterotoxins, aflatoxin and other toxic compounds—and all kinds of compounds associated with disrupting the foraging behavior of the ants. "In the ants, we discovered that genes involved in neurobiology, odor perception and the biological clock are affected during interaction with the fungus," Ohm says. "These genes can explain to a large extent how the fungus adjusts the ant's behavior. So we now have a better picture of the mechanisms behind behavioral [modification](#) in ants by fungi."

**More information:** Ian Will et al. Genetic Underpinnings of Host Manipulation by *Ophiocordyceps* as Revealed by Comparative Transcriptomics, *G3: Genes|Genomes|Genetics* (2020). [DOI: 10.1534/g3.120.401290](https://doi.org/10.1534/g3.120.401290)

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