Effects of Various Fungal Pathogens on *Trachymyrmex septentrionalis* Ants and their Fungal Cultivars

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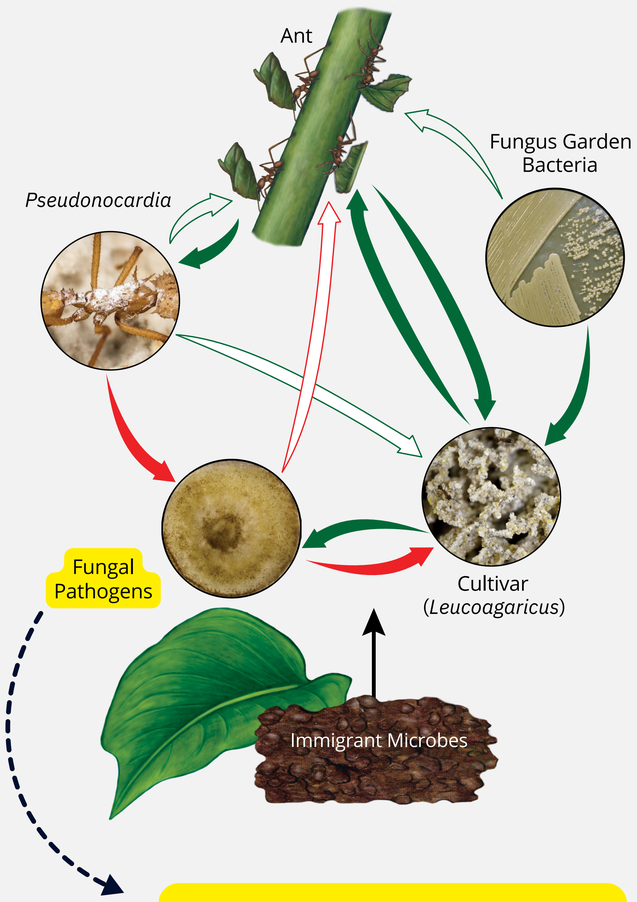
Attine Ants Symbiotic Network



Fungal Pathogens

The main fungal pathogen in the Attine Ant-fungi symbiosis is *Escovopsis,* which targets the ant's fungal cultivar, *Leucoagaricus.* This pathogen has been around for a long time, evolving alongside the ants and their fungal gardens in a co-evolutionary arms race.

Ant boxes

Fungus-growing Attine ants cultivate their own fungus gardens. They do this by **feeding the cultivar food** (in this case cornmeal) and protecting the garden from harmful microorganisms with **hygienic cleaning behaviors**. The ants will weed out fungal debris, spores, and hyphae and move them to a designated area away from their fungal garden.

Subcolonies were made for each pathogen + the control

In this infection experiment, 6 different fungal pathogen strains were tested:

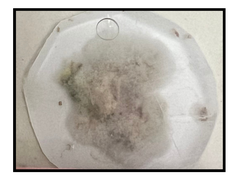
- *Escovopsis, Trichoderma,* and *Syncephalastrum,* which are all fungal garden pathogens
- *Fusarium,* which is a soil fungus (contaminates fungus gardens but rarely causes disease)
- *Metarhizium* and *Beauveria,* which are ant pathogens

Two infection experiments were run: one with the ants and one without.

Fungus garden infection experiment without ants

Fungal Pathogen	Growth on Garden (over 8 days)	Isolation on plate
None	-	unknown fungus
Escovopsis	+	*Escovopsis*
Syncephalastrum	+	*Syncephalastrum*
Fusarium	+	*Fusarium*
Metarhizium	+	*Metarhizium* & *Syncephalastrum*
Beauveria	+	unknown fungus
Trichoderma	+	*Trichoderma*

Healthy garden cultivar



Fungus garden overgrown with *Trichoderma.*

Key results:

- Fungal growth seen on all the gardens infected with pathogens, no growth on the control
- *Beauveria* was not isolated from its infected garden, instead there was an unknown fungus
- The garden infected with *Metarhizium* had both *Metarhizium* and *Syncephalastrum* when isolated

Melanin producing stress response in cultivar after infection with *Syncephalastrum*

Infection experiment with ants

Key results:

- *Escovopsis* and *Metarhizium* had the most impact on the ants and their fungal gardens
  - 3 out of 8 ants died in the *Metarhizium* subcolony (seeing as it is an ant pathogen)
  - no ants died in any of the other subcolonies
- *Fusarium* and *Beauveria* had the least impact
- *Syncephalastrum* was the only pathogen that allowed the fungal garden to increase in weight, all others decreased it (including the control group)