

## **Amazon Leafcutter Ants: Sample Research Proposal**

### **What Protects the Ants' Home?**

#### **Introduction**

Leafcutter ants in the Amazon rainforest have been farming a fungus for millions of years. They cannot eat the vegetative matter in the leaves they cut because of the high levels of toxic chemicals contained in the plant materials. Instead, they use the leaf parts as mulch for a nutritious fungus that grows in their nests. The fungus is filled with sugar and other nutrients that the ants need to survive. The ants fertilize, weed, and harvest their fungal farms. The fungal farms are very productive and seem to be free from any type of pest or parasite. This is very unusual since almost all organisms have some kind of pest or parasite. It was shown that in nests that do not have ants in them the fungal farms quickly get infected with a mold that soon destroys the entire farm. Also it has been noted that the ants seem to be covered with a white waxy substance.

#### **Hypothesis**

Since colonies with ants are mold free, colonies in which the ants have been removed are plagued with mold, and ants have a waxy coating, the coating may be acting as a natural defense against the parasitic mold.

#### **Predicted Outcome**

The white, waxy substance is some kind of natural protection against the invading mold. The ants have evolved a natural pesticide that helps to keep the cultivated fungal farms free of invading molds and other parasites.

#### **Procedure**

1. Obtain a portion of an active leafcutter ant colony and observe it in the laboratory.
2. Take samples of the fungus that is farmed by the ants and analyze it to find out if it is one species or a mix of species of fungus.
3. In a second sample of active colony, remove the ants and observe the fungal farm for a period of time (two weeks to a month). Observe the farm when other variables (other ant activities) are held constant.
4. Analyze the fungus each week to characterize the health of the fungal farm.
5. Analyze any mold or bacteria that appears in the cultivated fungus.
6. Analyze samples of the white, waxy coating from the exoskeleton of the leafcutter ant.
7. Apply the white substance to the abandoned, infected fungal farm to see whether the white substance alone is responsible for control of the fungus.
8. Continue to monitor the health of the fungal farms with and without ants.