CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
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Project Number
S2210

Project Title
Discrimination in Ants: Effects of Varying Territorial Distribution on Cohabitation of L. humile and P. imparis

Abstract

Objectives/Goals
In this research, the effect of varying territorial distribution on the cohabitation of the two species in conflict was tested.

Methods/Materials
Because the ants previously displayed high levels of aggression when equal numbers of both species were placed into a single habitat, unequal numbers of ants were injected into the environments (based on a pilot study): 20 L. humile and 4 P. imparis. Two separate environments were created using clear plastic jars (diameter: 6 in) topped with a layer of punctured aluminum foil. Territory was distributed using food (2 g of diced pear). In group 1, the food was spread out over the entire bottom of the container. L. humile was placed into the environment first. In group 2, the food was placed into a separate, open plastic container in the habitat (diameter: 1.5 in), and P. imparis was placed outside the container. The frequency of visits and average duration of stay (in the L. humile territory) per P. imparis ant were recorded over four hours and statistically analyzed between groups.

Results
In group 1, the outnumbered P. imparis traveled up to the ceiling, coming down quickly to eat and ascending again. In group 2, any L. humile ant venturing into the P. imparis territory was targeted. In each group, the frequency of visits and average duration of stay significantly increased over time ($p < 0.05$). While group 1 showed more increase in visits than group 2 ($p < 0.01$), the overall duration of stay between the groups was not significantly different ($p > 0.05$).

Conclusions/Discussion
The more frequent visits in group 1 can partially be attributed to the larger territory possessed by L. humile; there is a higher chance that the L. humile chemical cues were spread over a larger area, due to the territorial distribution. Thus, there was probably a higher chance for CHC exchange, eliminating cues for discrimination. Despite the difference in rates of frequencies, statistical analysis demonstrated that the overall duration of stays of P. imparis were not significantly different. This could be attributed to the natural biorhythms of the ants. Results support that when a larger group of L. humile and a smaller group of P. imparis are cohabitating, the likelihood of peaceful cohabitation increases when the L. humile territory is larger.

Summary Statement
This study was conducted to find the optimal cohabitation settings for species in conflict: the non-native L. humile (Argentine) ants and the native P. imparis (winter honey) ants.

Help Received
Dad helped with statistical analysis, mom helped collect ants and take photos.