

# THE EFFECT OF DISTANCE ON FORAGING SELECTIVITY OF LEAF CUTTER ANTS (*ATTA CEPHALOTES*)

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## ABSTRACT (PLK)

We examined the effect of distance from the nest on the foraging selectivity of *Atta cephalotes*. We found that *Atta cephalotes* workers picked up fewer introduced leaf disks with increasing distance from the nest, indicating that they are more selective at this distance. Although this trend was not statistically significant, we concluded that it may be biologically relevant as the trend seems to follow an optimal foraging strategy.

Key Words: *Atta cephalotes*, leaf-cutter ant, optimal foraging

## INTRODUCTION (DBZ)

*Atta cephalotes* is the most common of the leafcutter ants in Corcovado National Park, Costa Rica. Worker ants travel on foraging paths between their nest and a target tree from which they cut leaf fragments. We examined ant response to the non-target leaf fragments.

Optimal foraging theory would predict that acceptance of leaf fragments would decrease with increasing foraging investment (i.e., travel time). We hypothesized that as distance from the nest increases, ants should be more selective, and therefore less likely to carry non-target leaf fragments back to their nest.

## METHODS (PLK)

We conducted our study on an *Atta cephalotes* nest on the Sendero Espavales in Corcovado National Park, Costa Rica. We first performed a preliminary study to identify a palatable species other than the current target species. We selected leaves from seven different woody plant species, including the current target species (*In-*

*ga*) which was used as a control. We placed five 6mm diameter leaf disks of each species on the ant foraging trail, observed ant responses to the introduced disks, and recorded the number of disks carried 50cm towards the nest and the number of disks moved to the side of the trail.

In the main experiment, we placed two leaf disks of the preferred species in the preliminary study (hereinafter Species X) on the ant trail at 20, 40 and 60m from the nest. When a leaf disk was removed by an ant, we replaced it with another disk; new disks were also used at the beginning of each trial. We handled the leaves with tweezers and hole punches to avoid contacting the leaf disks with our hands.

A total of six 15 minute trials were performed, and the data for each site were pooled. We used a Chi-square analysis to test for differences in acceptability as a function of distance from the nest.

## RESULTS (DBZ)

In the pilot preference study, ants carried 100% of disks cut from target tree (*Inga*) leaf

Table 1: Leaf preference data from a pilot study to determine the most preferred non-target plant species.

Plant Family	Number of Disks	Number of Disks
	Carried 50cm	Moved to Side of Trail
<i>Heliconia</i>	0	5
Marantaceae	0	4
Araceae	0	2
Melastomataceae	0	5
Piperaceae	0	5
<i>Inga</i> (target tree)	5	0
Species X	3	0

fragments that were previously carried by ants of the same trail. The ants carried 60% of species disks at least 50cm towards their nest during a 15 minute trial period. Of the other five species tested, the ants did not carry any disks towards their nest and removed at least some of the disks from the trail (Table 1).

The total number of disks of species and carried by the ants was two times greater at 20m than at 40 or 60m, although this result was not statistically significant ( $x = 4.22$ ,  $p = 0.10$ ; Figure 1).

## DISCUSSION (DML)

The greater number of leaf disks picked up at 20m than either 40m or 60m from the ant nest suggests that ant selectivity increases with increasing distance from the nest. This result is consistent with the hypothesis that ants are less likely to alter their foraging preferences as they get further from the nest. Presumably, this is because the more an ant invests in a particular foraging bout, the more worthwhile it is for it to complete the bout.

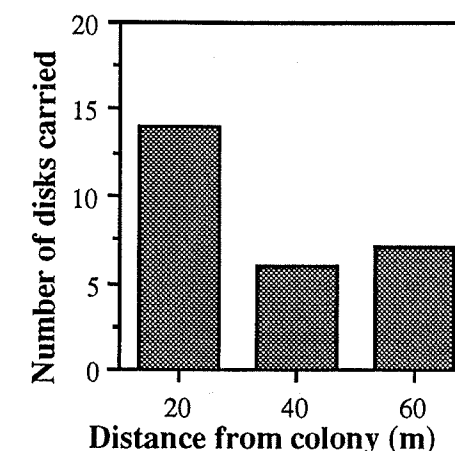


Figure 1. Total number of leaf disks carried to colony for 90 minutes of observation.

Alternatively, our findings may indicate decreased ant activity rather than increased ant selectivity with increased distance from the nest. Assuming that each ant has the same probability of picking up Species X, our results could be explained if there were simply more ants closer to the nest. Differences in ant activity with distance from the nest should therefore be controlled for in future studies.

More extensive studies with larger sample sizes could provide a stronger test of the optimal foraging hypothesis. In future experiments we would suggest performing a greater number of trials at a greater number of sampling distances. In addition, several colonies should be examined.