



Foraging Strategy of *Messor* (Forel) seed-eating ants in a Mediterranean-type ecosystem



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Introduction

The ants of the genus *Messor* are the most important seed removing arthropods in typical Mediterranean-type ecosystems (Azcárate & Peco, 2003). They are polydomus and territoriality has been shown to exist between colonies (Hölldobler, 1976). Foraging takes place along well established trunk trails and recruitment is performed with the use of pheromones along that trail.

Area of Study

Typical Mediterranean-type ecosystem
Vegetation: Gramineae grasses, *Sacropoterium spinosum*, *Capsella bursa-pastoris*, *Medicago* sp., *Calendula arvensis*, *Aira* sp.
Coordinates: N38° 10' 20" E23° 48' 53" Altitude: 560m (1837ft)

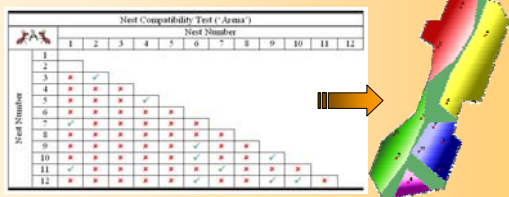


Abiotic factors

With the use of a hand-held meteorological logger we recorded abiotic factors such as air temperature, air relative humidity, barometric pressure and wind speed in the immediate vicinity of the nest entrance every 5 minutes of the day. The data were transferred using the appropriate software to a PC. In addition, soil properties were measured using standard methods.

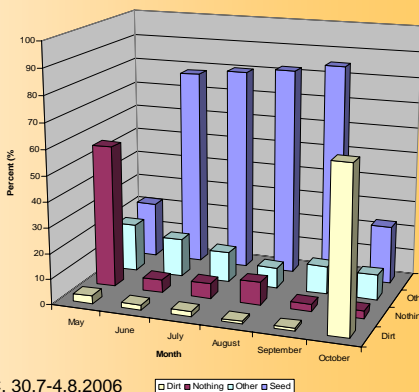
Territoriality

'Arena' tests → establish relationships between ant nests
Individual ants from one nest were placed in the same petri dish with ants from other nest after leaving them alone for 2 minutes. Aggressive or kin behavior was recorded.
After duplication → 5 groups (colonies) seem to exist



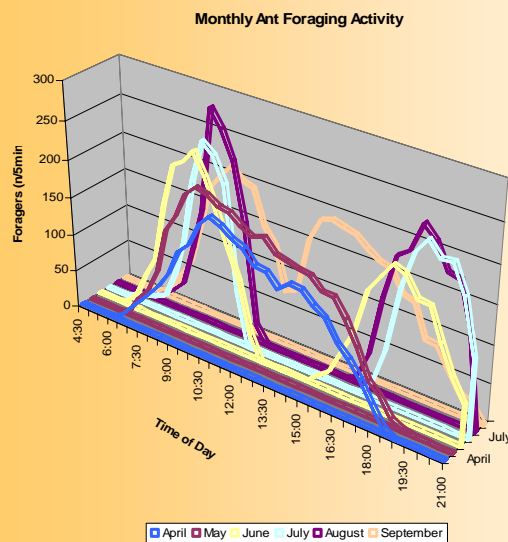
Percentages of Material Transported

Using a multiple tally counter, we recorded number of ants returning to the nest carrying different loads. Following the nuptial flight (about 10th of October) a rapid shift in the foraging activity takes place.



Daily Phenology

5 nests were selected (No. 1-5) and all entrances were encircled with initially plastic and later aluminum strips (Pic.1.). It was shown that this enclosure did not have an effect on the foraging activity. All ants were thus directed through a single opening of the strips for ease of measurements. Recordings of ant numbers exiting each nest for the first 5 minutes of every half hour were performed twice a week, between April and September for the years 2004-2006.

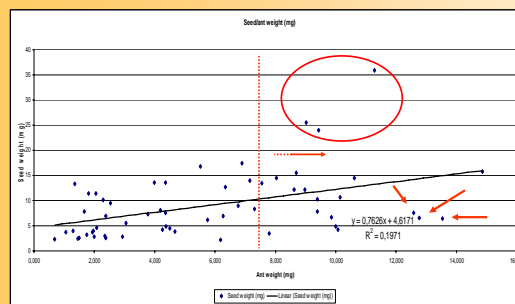


The relation of the abiotic factors that may affect ant foraging activity was explored by initially performing a multiple regression between these factors (adjusted R²=0.856, p=0.015) followed by a forward stepwise regression. Atmospheric pressure and air temperature seem to be the most important factors affecting foraging activity.

	F to enter	p value
Atmospheric pressure	5.81	0.07
Air Temperature	21.47	0.01
Wind Speed	1.41	0.30
Air Relative Humidity	1.16	0.34

Ant – Seed Size and Weight Correlation

Individual ants carrying seed were collected with the seed and stored in eppendorf tubes with 95% alcohol. Standard morphometric measurements were taken using a high-definition camera mounted on a stereoscope and connected to a PC. In addition, the weight of the ants and their seeds was recorded.



Body weight is a limiting factor for slimmer ants. Heavier ants can carry larger loads **but are also non-selective.**

Selected References

Hölldobler, B. 1976. Recruitment behavior, home range orientation and territoriality in harvester ants, *Pogonomyrmex*; *Behavioral Ecology and Sociobiology*, 1(1), 3-44.
Azcárate, F.M. and Peco, B. 2003. Spatial patterns of seed predation by harvester ants (*Messor Forel*) in Mediterranean grassland and scrubland, *Insectes Sociaux*, 50(2), 120-126.

This project is part of a Ph.D. dissertation which is financially supported by the grant IRAKLEITOS - Fellowships for Research of NKUA- from the Greek Ministry of Education. The project is co-financed within Op. Education by the ESF (European Social Fund) and National Resources.