Diversity patterns of ants along an elevation gradient at St. Catherine Protectorate, South Sinai, Egypt

(Hymenoptera: Formicidae)

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Abstract. Ants (Hymenoptera: Formicidae) captured in pitfall traps were compared within and among three altitudinal gradients in St. Catherine Protectorate, south Sinai, Egypt, to study the ant diversity patterns and their relationship with environmental factors. A total of 26,165 specimens of ants belonging to 17 different species were sampled. Our main findings were that (1) there were no significant differences in ant species richness, evenness and Shannon`s diversity index between the three elevation plots; while ant abundance was significantly different between low-elevation plots and both mid- and high-elevation plots, there was no significant difference between mid- and high-elevation plots in terms of ant abundance. (2) TWINSPAN analysis and detrended correspondence analysis (DCA) of the ant fauna indicated that the high-elevation plots were distinctly separated from both mid- and lower-elevation plots according to their ant species composition. (3) CCA showed that both the elevation and the two plant species *Acacia raddiana* and *Casuarina* sp. were the significant factors separating the ant species community along their altitudinal gradients. (4) *Lepisiota nigra* ((Dalla Torre, 1893) (P<0.01), *Tetramorium depressiceps* Menozzi, 1933 (P<0.05), and *Cataglyphis ruber* (Forel, 1903) were found at the high-elevation plots; while *Camponotus aegyptiacus* Emery, 1915 (P<0.02), *Cataglyphis sabulosus* Kugler, 1981 (P<0.03), and *Messor foreli* Santschi, 1923 (P<0.05) favoured the low-elevation plots.

Key words. Bioindicators, species richness, vegetation, arid ecosystem, Sinai, Egypt.

Introduction

Ants account for an estimated 30% of terrestrial animal biomass (HÖLLDOBLER & WILSON 1990) and play many important ecological roles, having direct interactions with the soil, plants and animals at all trophic levels. Many of these roles relate to paedogenesis, nutrient cycling (HUTSON 1989), seed predation (ANDERSEN 1990, MAJER 1990) and seed dispersal (MAJER 1990). Ants are considered to be an ideal candidate for use as an indicator group for a number of reasons: they are abundant and ubiquitous in areas of disturbance (ANDERSEN 1990), they exhibit strong interactions with all trophic levels (BRIESE 1982), and most ants have stationary nests and restricted foraging ranges which reduce competition between ant species (ALONSO 2000). They are highly sensitive to environmental conditions and disturbance and they respond rapidly to environmental change (VAN DER WOUDE et al. 1997, ANDERSEN 1990). Furthermore, sampling is relatively easy, without requiring enormous expertise and experience.

Given the diversity and abundance of ants, identifying change in a community is more eas-

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