Ants as bioindicators in agroecosystems of Londrina, PR, Brazil

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Ants (Formicidae) are found in most ecosystems; their species richness is correlated with vegetation diversity. Increases in this complexity often provide increases in their diversity. The close relationship that exists between ants and the vegetation make them sensitive to environmental changes; therefore, they play an important ecological role in the ecosystem and are useful indicators of environmental modifications. Six ecosystems were studied: a Forest Fragment, a Pasture, a Conventional Planting area, No-Till areas established either three years or ten years earlier, and a Coffee Field. Samplings were obtained using the TSBF (Tropical Soil and Biology Fertility) methodology, which consists in removing 9 monoliths measuring 25cm² by 30cm in depth, spaced 5 meters apart from one another. Collections were performed in August 2007 (winter/ drought period), at Universidade Estadual de Londrina's School Farm, PR, Brazil. Four ant subfamilies (Dolichoderinae, Myrmicinae, Formicinae, Ponerinae) and 28 ant species were found in the areas under study. When separated by morphospecies, 16 different species were found in the Forest and Pasture areas, eight in the Conventional Planting and No-Till (10 years) areas, 6 in the Coffee Field, and 5 in the No-Till (3 years) area. The Forest (5 species), Pasture (4), and Coffee Field (3) were the ecosystems with the highest numbers of species that belonged to the subfamily Ponerinae, followed by No-Till (10 years) (1). No ant of the subfamily Ponerinae was found in the Conventional Planting and No-Till (3 years) areas. Subfamilies Myrmicinae and Formicinae, the most frequently found subfamilies in the ecosystems, have great ecological diversity and are species-rich groups. Subfamily Myrmicinae had 10 ant species in the Forest, 9 in the Pasture, 6 in the Conventional Planting, 4 in the No-Till systems, and 2 in the Coffee Field. Although Formicinae was present in all ecosystems studied, only two species were found, and one of them was present in the Forest only. Jaccard's similarity index showed the highest similarity between the Pasture and the Forest (45.5%), with the lowest similarity between Conventional Planting and the Forest (19%). When compared with the Forest, the Coffee Field and the No-Till system (10 years) had similarity values of 22.2%, while No-Till (3 years) had a 23.5% similarity. It was observed that plant cover and little anthropic interference with the soil promote species richness in the family Formicidae.

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