

# IMPACT OF AGROCHEMICAL MANAGEMENT ON EDAPHIC MESOFAUNA: APPLYING A BIOINDICATOR IN THE EVALUATION OF AGRICULTURAL SYSTEMS

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**Introduction:** Soil characteristics and quality are determined, mainly, by the edaphic fauna present in this matrix. They present body diameters between 100  $\mu\text{m}$  and 2 mm, and include acari, collembola, myriapoda, arachnids, several insect orders, oligochaetes and crustaceans. The interference caused by these organisms can be clear, such as faster decomposing rates, due to the higher C/N ratio of their feces compared to the surrounding litter, and regulation of microbial populations; or not, as in soil texture and water retaining capacity. Different soil and vegetation characteristics and types of soil use, such as litter removal or manipulation, reflecting the soil management of the area, also affect the biota. In perennial productive systems, such as pastures, low vegetation diversity is common, and, as a result, not many soil fauna species are able to colonize these areas. However, some well adapted to these conditions can reach high population levels, creating hardships in pasture managements. Due to their intimate association with litter-soil processes and sensitivity to ecosystem interferences, soil fauna density, relative abundance and diversity reflect ecosystem operations and changes in these factors are observed in modified ecosystems, therefore constituting a good indicator of system alterations.

**Objective:** Identify significant differences in the fertility situation and level of pesticide and fertilizer contamination, by analyzing the edaphic mesofauna in different soil horizons of agricultural areas with different management histories.

**Methodology:** Different crop growing areas with different management histories were chosen as study areas. Control areas were non-agricultural systems (primary and secondary forest areas). A 7,5 cm x 15 cm probe was used for soil removal and fauna sampling. Animals were sampled at 5 and 5-10 cm depths, and extracted using a Berlese-Tüllgren funnel. Fertility parameters (granulometry, pH in water, exchangeable  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$  and  $\text{Al}^{3+}$ ,  $\text{Na}^+$ , assimilable P, and  $\text{K}^+$ ) were analyzed in soil samples from up to 10 cm in depth, according to the EMBRAPA protocol for soil analysis [1].

**Results:** Fauna analysis showed higher frequencies in the control areas, followed by the fallowing area. In these areas, the higher fertility soil profile, in the superficial layer, presented significantly higher taxa density and diversity. In the agricultural areas, the sites frequently pulverized by pesticides presented significantly lower animal frequencies in the same layer. Pesticide levels observed in the soils were in the order of  $\text{mg Kg}^{-1}$ .

**Conclusions:** The taxonomic distribution and diversity of edaphic mesofauna, here represented by acari and collembola, demonstrated a significant relationship to the fertility profile of the study areas, to the different types of vegetation and to the areas suffering agrochemical management practices. This indicates that these organisms are an excellent bioindicator in areas that suffer this type of management, due to their sensitivity to pesticide doses and pulverization frequency, contributing with extremely relevant information about soil system health and subsidizing management actions in order to optimize productivity without harming system dynamics, which are also essential for obtaining a successful crop.

**References:** [1] - Silva, F. C. Manual de análises químicas de solos, plantas e fertilizantes. Embrapa Solos. 370 pp. 1999.