



Impact of set-aside management on soil mesofauna

Silvia Landi, Giada d'Errico, Giuseppe Mazza, Stefano Mocali, Paolo Bazzoffi, and Pio Federico Roversi
Center for Agrobiology and Pedology, Agricultural Research Council (C.R.A), Florence, Italy (silvia.landi@entecra.it, +39055241485)

To contrast the biodiversity decline, the current Common Agricultural Policy (CAP) 2014-2020 responds to urgent environmental challenges and provides some new greening attempts as pastures, rotations, orchard grasses, ecological set-aside and organic farming. This study, supported by the Italian National Project MONACO (MIPAAF), aims to provide preliminary indications about the ecological impact of set-aside on soil biodiversity. Soil invertebrates, mainly nematodes and microarthropods, are excellent candidates to study the human activity impacts on the environment. Indeed, invertebrates are abundant, relatively easy to sample, and they can quickly respond to soil disturbance. Nematode assemblages offer several advantages for assessing the quality of terrestrial ecosystems because of their permeable cuticle through which they are in direct contact with solvents in the soil capillary water. Moreover, nematodes have high diversity and represent a trophically heterogeneous group. The Maturity Index (MI), based on the nematode fauna, represents a gauge of the conditions of the soil ecosystem. Edaphic microarthropods play an important role in the soil system in organic matter degradation and nutrient cycling. They show morphological characters that reveal adaptation to soil environments, such as reduction or loss of pigmentation and visual apparatus, streamlined body form with appendages reduction, reduction or loss of flying, jumping or running adaptations, thinner cuticle for reduced water-retention capacity. The "Qualità Biologica del Suolo" (QBS) index, namely "Biological Quality of Soil", is based on the types of edaphic microarthropods to assess soil biological quality.

Three different set-aside managements were compared with a conventional annual crop in three Italian sites (Caorle, VE; Fagna, FI; Metaponto, MT). After five years the biological quality of soils using MI and QBS was evaluated. Regarding nematodes, the family richness and the biological quality (MI) resulted significantly higher in set-aside managements than in conventional crops in Fagna and Metaponto sites. In contrast, Caorle was characterized by a significant soil degradation (prevalence of extreme colonizers) and any increase of MI values in the set-aside have been not detected. About microarthropods, the taxa richness was significantly higher in set-aside managements than conventional crops in all the sites sampled. QBS index showed the same trend, but the differences were not significant. Caorle site was characterized by a lack of balance in the relative abundance among soil microarthropods taxa. In particular, set-aside managements showed a strong prevalence of an aggressive ants *Solenopsis fugax* (Hymenoptera: Formicidae).

In conclusion, the best results were observed in Fagna and Metaponto sites, where MI and QBS values increased under set-aside management as compared to the conventional. Further analyses will be carried out over a long period to better understand the possible correlation between the enhancement of the organic matter observed in the soils less degraded and the biological quality improvement.