



Evaluation of different agronomic managements on rice mesofauna: a case study in Piedmont (North Italy)

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Rice is the most important cereal crop in the developing world and, in Europe, Italy is leader in rice production. The intensive cultivation of rice leads to continuous inputs chemicals as fertilizers, weeding and pesticides. The intensification of sustainable rice production by minimizing the impact on the environment of cultivation is a main issue. In this context this study, supported by the Italian National Project POLORISO (MIPAAF), aims to afford preliminary indications about the evaluation of ecological impact by different managements on soil mesofauna biodiversity.

Biomonitoring of soil mesofauna, in particular nematodes and microarthropods, allows to determine the effects of crop management on the communities; the lack and/or reduction of these organisms can allow inference on the soil quality. This preliminary study aims at evaluate the different influence of conventional, integrated and biological managements on mesofauna communities.

The samplings were conducted in Summer and Autumn 2013 near Vercelli (North Italy) in three study sites with similar pedologic characteristics but different in control strategies (conventional, organic farming, Integrated Pest Management (IPM)). The extraction of nematodes and microarthropods was performed by Bermann method and the Berlese-Tullgren selector, respectively. All specimens were counted and determined up to the order level. The biological soil quality was evaluated by Maturity Index (MI) for nematodes, BSQar and the soil Biological Classes (sBC)(range I-VII) for microarthropods.

Regarding nematodes, Rhabditidae, Dorylamidae, Mononchidae, Tylenchidae and Heteroderidae were the most represented families. The Principal Component Analysis (PCA) evidenced that the trophic group of plant parasites was favored in organic farming, while groups of omnivores and predators were abundant in the other managements. The lowest nematodes' abundance was found in submerged rice soil with dominance of omnivores and plant parasites groups. Dry land was more suitable to development of bacterial feeders and predators. On the whole, MI values ranged between 2 and 3, registered in organic farming and conventional management, respectively.

The Acari represented the main group of microarthropods (about 43%), then Diptera (33%), Collembola (19%) and the others. The only euedaphic groups are Acari and Collembola. The BSQar value was 48 (sBC II) in IPM rice field, 71 in organic farming (sBC II/III), 95 in conventional management (sBC III). On all situation tested, the analysis of soil quality, by the study of mesofauna, reflects low differentiation in the arthropod communities' structure.

In general, the results relative to the soil mesofauna biodiversity indicated a quite high level of disturbance and a low level of biodiversity. Future studies on this subject could help preserve, or even enhance, the biodiversity and soil quality.