

Abstract – Impact of compounds allowed in organic farming for the olive fly control on arthropod fauna

Insects play an important role in agroecosystems, representing the major part of biodiversity mainly composed by phytophagous of the olive tree (*Olea europaea* L.), their antagonists, and indifferent insects. If it is balanced, such complex representing a rich community provides a potentially high stability to the olive ecosystem allowing to a given phytophagous to attain only occasionally the intervention threshold. In the Mediterranean basin, olive farming maintained this ecological balance for thousands years.

The main insect pest in olive orchards is *Bactrocera oleae* (Rossi, 1790), which causes serious damages to qualitative production. Against this species a large list of compounds is available under conventional and organic regimes. In order to safeguard human and ecosystem health, the European Union has favoured the organic farming regime according to EC Reg. 2092/91 and its updates. Many data are available in literature on the side-effects of pesticides utilized in conventional farming concerning consumers and operators health and ecosystem functioning, while few data are available for pesticides allowed in organic farming.

These argumentations suggest searching for a method for evaluating agroecosystem health. This method should be reliable and easy to apply. In recent time, the research focused the evaluation of ecosystem animal biodiversity (arthropods) in order to find bioindicators able to give information on good environmental health.

Selected insect taxa, known to react very quickly to environmental perturbations mainly at community level and to be, consequently, good bioindicators, were chosen. The study was carried out in organic olive orchards in the municipalities of Terranova da Sibari and Mirto-Crosia (Cosenza), within a private farm and the experimental field of C.R.A. Research Center for Olive Growing and Olive Oil Industry, respectively. The tested active agents were Azadirachtin, Rotenone, Copper Oxochloride, Mixture of Copper oxochloride and Propolis, Kaolin and Dimethoate (conventional pesticide).

The aim of this paper is to clarify the main side-effects of the use of pesticides allowed in organic olive farming against *B. oleae* by analysing entomocoenosis as bioindicators of balance among the different functional units, i.e. phytophagous pests, their antagonists and indifferent insects. Also a search for a good olive ecosystem health indicators among arthropods has been performed, suggesting ecocompatible olive management strategies.

In ploughed theses no tested compound seems to be harmless to the entomocoenosis. In particular, Rotenone caused the highest functional imbalance. At last, it is important to underline that the patterns here showed were registered as short-term consequences of tested active agents sprays. In definitive, in truly organic farming it is necessary to provide natural refuge areas to beneficial insects (i.e. parasites antagonists) in which no active agent is sprayed and alternative preys could be found.

Better conditions were observed within grassed theses, independently from utilised active ingredients. When ploughing was interrupted, a strong increment in arthropod biomass was registered also in treated theses. Also rotenone showed a reduced impact to the soil in grassed theses. This fact could be attributed to the grass cover which probably reduced the effects of active agents showing short term efficacy. In definitive, the grass cover could be play an important role in minimising the impact of sprayed compounds on non target arthropods furnishing a shelter against the direct contact with active agents.

European Union eliminated rotenone among allowed pesticides in organic farming after ten years.

Carabid beetles could be useful bioindicators of olive ecosystem health because they react to the farming management. In fact, these strategies strongly affect Carabid populations. In detail, conventional pesticides favour the outbreak of *Calathus fuscipes*, while rotenone favours *Pterostichus melas italicus* outbreak.

Kaolin seems to be the best alternative control method in organic farming, because showed a reduced environmental impact and a good efficacy against the olive fly.