



Conference Abstract

# Body burden of pesticides and shape asymmetry in carabid beetles in different agricultural practices in Mediterranean agroecosystems

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## Abstract

Neonicotinoids have been the most commonly used insecticides worldwide in the last two decades, whereas application of Copper (Cu) has a much longer history, especially in Mediterranean agriculture, (e.g. vineyards). Lately, large numbers of studies have shown negative effects of neonicotinoids on non-target species (especially on bees but also on other insects, and indirectly on insectivorous species like birds) being thus recently banned by EU commission. On the other hand, intensification of production in favour of ecological pest management increases the use of copper in pest control schemes and its absorption in agroecosystems. In this study we aimed to quantify the relationships between pesticide concentrations, including those with copper compounds, in soil, carabids and its prey at four sampling sites, in vineyards and olive groves under integrated (IPM) and ecological pest managements (EPM), and in pristine habitats in Zadar County, in Mediterranean region of Croatia. Soil, carabids, earthworms, snails and woodlice were sampled using pitfall traps and by hand. LC-MS/MS and ICP-MS technique were utilised to quantify pesticides and Cu concentrations in the soil and in the animals representing different trophic guilds. In addition we analysed changes in body shape symmetry of *Poecilus koyi*,

one of the most dominant predatory carabid species in the study sites, in order to evaluate the potential environmental stress between managed and pristine habitats that can affect carabids during their development. Geometric morphometrics (GMM) has been used to analyse pronotum and abdomen shape variations, and left/right asymmetries in up to 100 individuals of *P. koyi* per study site. Some preliminary results showed that body burden with pesticides differ between prey and predator organisms, and body concentrations of certain pesticides in carabid beetles did not correlate with those in the soil. Distribution of pesticide along different trophic guilds and changes in body shape and fluctuating asymmetry in *P. koyi* populations will be presented and discussed in details.

## Keywords

fluctuating asymmetry, olive orchards, predators, pest management type, pesticides, vineyards

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## **Conflicts of interest**

Authors declare no conflicts of interests.