Fungicides are similarly affecting flora and carabid beetles in both organic and conventional vineyards

Filip POŠĆIĆ, Nataliya POŠĆIĆ, Fabrizio GINALDI, Claudio FERFUIA, Simone DEL FABRO, Francesco BOSCUTTI

Università degli Studi di Udine, Department of Agricultural and Environmental Sciences, Via delle Scienze 206, Udine, Italy, (e-mail: filip.poscic@uniud.it)

Abstract

Organic management is generally leading to improve soil quality and biodiversity compared to conventional systems. However, in organic management, Cu-based fungicides are used enabling environmental pollution. Therefore, it is legitimate to investigate if organic farming is more close to natural environment than the conventional one. However, it is very difficult to compare the two systems and many authors did not use correct comparison procedures. While many references are reporting the toxicity of Copper to different single species, there are missing comparisons in terms of whole vegetation communities and carabid beetles species compositions especially between organic and conventional vineyards. Thus an investigation was carried out in two conventional vineyards, three organic vineyards and as a reference three natural sites (permanent meadows and set aside) in Friuli venezia Giulia (Italy). In spring, summer and autumn during 2010, ground beetles were sampled by means of pitfall traps and seasonal flora surveys were carried out according to Braun-Blanquet. Soil phisico-chemical characteristics were recorded as well.

Canonical correspondence analysis (CCA) showed that fungicide applications and the soil texture characteristics are the main factors impacting both, plants and carabid beetles community. However, conventional and organic vineyards resulted much overlapped showing no difference between them according to the soil and plant community composition. On the other hand, organic vineyards were separated from conventional one according to soil texture characteristics and carabid beetles community. Despite different managements, carabid beetles and plant community, seems to be affected mostly by fungicides and copper, both total and bioavailable (DTPA). Organic C was not significantly different between different managements. IndVal analysis found only *Harpalus affinis*, *Harpalus distinguendus* and *Harpalus pygmaeus* to be significantly associated to conventional vineyards and neither one to organic vineyards. Regarding plants we found only species significantly associated to vineyards irrespectively organic or conventional (*Cynodon dactylon*, *Lolium perenne*, *Plantago major* subsp. *major*, *Taraxacum* sect. *Taraxacum*, *Trifolium repens* subsp. *repens* and *Veronica persica*). Thus both managements are similarly stressed at community level if compared to natural sites.

Key words: organic vineyards, conventional vineyards, carabid, plant community, CCA

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