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Interactive comment on “Short term recovery of soil physical, chemical, micro- and mesobiological functions in a new vineyard under organic farming” by E. A. C. Costantini et al.

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Dear Prof. Brandmayr, thank you very much for your wellcome comments. We found your observations relevant to the paper, therefore we are pleased to take them into account in our manuscript revision. Here are resumed the clarifications and additional information you required, with an approximate indication of where they will be placed within the text (paragraph, page, line number):

1. Introduction

The following additional literature will be cited (including Culliney, 2013) in the introduc-

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tion on soil microarthropods, in support of their role in the soil:

- Page 5, in replacement of lines 15 (column 88) to 19: Arthropods are recognized to play an important role in soil formation as well as in soil organic matter transformation, nutrient cycling, C accumulation and plant and microbial diversity conservation, representing a useful and effective indicator for soil quality (Brussaard et al., 1997; Culliney, 2013; Parisi, 2001; Parisi et al., 2005). The abundance and diversity of soil fauna integrate soil physical, chemical and microbiological properties and reflect general ecological change, becoming an important asset in the landscape ecology and conservation tool box (Menta et al., 2008; Yan et al., 2012; Wardle, 2002). The spatial distribution of soil microarthropods and their functional groups' abundance are influenced by human induced disturbance such as cultivation and land management (Paoletti and Bressan, 1995).

2 Materials and methods

2.1 Site characteristics and experimental design

- Page 6, line 5: The vineyards are both situated on the top of a small hill, at about 400 m a.s.l. altitude, with gentle slopes (near 5%). The new vineyard has a North-West aspect, whereas the old vineyard a South-West aspect.

- Page 6, in replacement of lines 24 to 27: During the set-aside period 1990-2009 before the new vineyard establishment, the area was kept abandoned, allowing the development of shrubs, weeds and wild vine plant vegetation. A shallow and discontinuous dark A horizon, rich in organic matter, was clearly observable in the soil profile before land preparation for the new grapevine plantation in 2009. The pre-planting earthworks caused such horizon to be lost by mixing with the underlying mineral horizons. The new vineyard was entirely cultivated by periodic tillage, according to the farm strategy to maintain the soil surface free from weeds until the establishment of the new vines and the start of commercial level of grape production. The old vineyard was managed with alternating tilled (T) and grass-covered (G) inter-rows; the latter were

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kept under natural weed development, which was periodically mowed (two or three times per year) and shredded together with plant residues, to be left on the soil surface. Once a year, the grass-covered soil was scarified to 40-50 cm depth, without soil inversion, to allow soil aeration and avoid soil compaction.

2.4 Soil biological quality index (QBS-ar)

Additional details on microarthropod sampling:

- Page 11, in replacement of lines 4-7: All biological determinations were performed once a year, from 2011 to 2014, collecting 1/3 dm³ soil cores (sample depth = 10 cm) from 4 replicated zones within each vineyard. For the extraction of microarthropods, the soil samples were placed in Berlese-Tullgren funnels for 5 days. The soil was allowed to dry from the top down, by means of a heating light; the microarthropods moving through the soil were collected into a preservative solution (80 % ethanol) and afterwards identified to the order level using a stereomicroscope.

3 Results

3.4 Soil mesobiological quality

- Page 14, line 20: In all samplings, Collembola collected always included eudaphic forms (e.g. Onychiuridae, EMI=20).

According to your suggestion, a supplementary table will be provided, reporting the abundance and the taxa of arthropods found.

5 Conclusions

- As pointed out in materials and methods (Page 7, lines 19-25), the effects of alternating grass-covering (GC) and tillage (T) in the old vineyard were spatially heterogeneous; the development of natural weed often occurred also in the tilled inter-rows during the periods before sampling, due to the seasonal rainfalls, resulting in a variable degree of grass covering. As a consequence, the differences between GC and T

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inter-rows for selected soil properties were statistically not significant.

- In regard to mulching, as will be clarified in the next revision of article, this practice is already in use in the vineyard management; the natural weed developing in the grass-covered inter-rows is periodically mowed and shredded together with plant residues, to be left on the soil surface.

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