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Spatial patterns of herbaceous biodiversity within olive orchards under spontaneous cover crop soil management

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Cover crops are recommended in olive orchards mainly as a strategy to prevent soil degradation by water erosion (Gómez and Giráldez, 2009). However, bbiodiversity and improvement of soil organic carbon content are major ecosystem services that can be enhanced by use of cover crops in addition to reduction of soil water erosion (Fernández-Escobar et al., 2013). For economic and operational reasons, most of the olive farmers in Southern Spain simple managed the natural vegetation present in the farm (by mowing or herbicide use) instead of seeding a cover crop.

Both aspects, herbaceous vegetation bbiodiversity and impact on OC content due to cover crops are less studied than those related to erosion or water balance impact in olive orchards with minor exceptions (e.g. Allen et al., 2006). We have not found detailed studies evaluating the variability of herbaceous vegetation within commercial olive orchards when used as a cover crop, and its temporal variability due to changing climate conditions among different years. Proper understanding of both sources of variability is relevant for an adequate interpretation of the impact of cover crops in the different ecosystem services that they provide in olive orchards.

In this work, we have calculated different biodiversity indexes on grass cover in two olive orchard catchments with different managements (conventional tillage and non tillage with grass cover) during 3 years (2011-2013). Seasonal samples of vegetal material and pictures in a permanent grid (4 samples/ha) were done to characterize their spatial patterns of aggregation and distribution in both catchments. Spatial analyses based on distance indices were applied on the following indicators: number of species, frequency, diversity and transformed Shannon's and Palou's indices.

The specific objectives of this work are: 1) to describe the spatial patterns of the biodiversity indexes according to topographic characteristics and managements applied; 2) to explore possible relationships of these indexes with spatial pattern of OC.

The results might improve the management strategies of grass cover in spatial terms, optimising effort in different areas according to their environmental features as well as to quantify its impact in OC spatial distribution in contrasting olive orchards.

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