Geophysical Research Abstracts
Vol. 16, EGU2014-799-3, 2014
EGU General Assembly 2014

Short term effect of conventional tillage and cover crops in physical and chemical properties in two olive orchards of southern Spain

Gema Guzmán (1), Juan Vicente Giráldez (2), José Alfonso Gómez (1,2)

(1) Universidad de Córdoba, Agronomía, Córdoba, Spain (g92gudim@uco.es), (2) Institute for Sustainable Agriculture-CSIC, Córdoba, Spain

Numerous studies have attempted to assess the differences in soil properties caused by different management systems in olive cropped farms. Nevertheless the influence of the most frequent management systems on the hydraulic properties of these soils has not been evaluated. Contrarily, there are very few studies that have tried to correlate these results with soil losses due to water erosion. There are complementary approaches to traditional degradation indices, as the S index based on the form of the soil retention curve (Dexter 2004a,b,c). The objectives of this study were (i) to evaluate the methods based on the S index to assess the physical quality of soil in olive orchards, (ii) to assess the short-term changes (2 years) in soil physical and chemical properties in two olive orchards under different managements systems, namely conventional tillage and cover crop, and (iii) to formulate strategies for assessing the quality of soil in olive orchards.

For the studied soils, degradation processes (associated to conventional tillage) and the improvement of their properties (linked to cover crops) showed a fast response. Chemical changes were quickly observed. However physical changes are slower than chemical changes for both soils. Water retention curves allowed the evaluation of soil porosity based on depth in the profile and the management practices. The S index was computed for every soil using the conventional soil water retention equations fitted to the experimental data. For the olive cropped soils, higher S index values were obtained in the less degradated areas, in most of the cases. Therefore, the S index could be used as a soil quality indicator although further research should be required to study its evolution at a larger temporal scale.

References:

Dexter, A. R. 2004. a.- Soil physical quality. PartI. Theory, effects of soil texture, density, and organic matter, and effects on root growth. Geoderma 120 (2004) 201–214.

Dexter, A. R. 2004. b.- Soil physical quality. Part II. Friability, tillage, tilth and hardsetting. Geoderma 120 (2004) 215–225.

Dexter, A. R. 2004. c.- Soil physical quality. Part III: Unsaturated hydraulic conductivity and general conclusions about S-theory. Geoderma 120 (2004) 227–239.