



## **Soil water content and yield a vertisol in a rain-fed olive grove under four different soil management practices in a four year experiment.**

Maria Auxiliadora Soriano (1), Jose Manuel Cabezas (2), and Jose Alfonso Gómez (3)

(1) Department of Agronomy. University of Cordoba. Córdoba. Spain. , (2) IFAPA-Centro Alameda del Obispo, Natural Resources Department, Córdoba, Spain, (3) Inst.for Sustainable Agriculture. CSIC, Department of Agronomy, Cordoba, Spain.

Vertisols are frequent in agricultural areas of Andalusia, Southern Spain. They have traditionally been dedicated to rainfed annual crops. In recent years it has been an expansion of olive cultivation in these soils due to their higher profitability. These soils shrink when drying, originating vertical cracks and the farmers give passes of work during the summer, with the aim to cover the cracks and reduce the loss of water by evaporation of the soil. This practice involves the elimination of plant residues on the ground, so the soil will be unprotected at the beginning of the wet season, where high intensity precipitation is frequent, these being ideal conditions for the loss of soil due to water erosion (Gómez et al., 2014).

The objective of this work was to study the soil water content of a vertisol in a rain-fed olive grove under two different soil management strategies: a) temporary cover crop during of *Bromus rubens* in the lanes from fall to mid Spring, or b) or bare soil all the year through application of herbicides. In each of them to alternatives, soil tillage in summer to cover the cracks or no tillage was applied, resulting in the four treatments. Soil moisture was measured periodically by means of a neutron probe, in three olive trees per treatment and in nine access tubes per tree, up to 3-m depth. The experiments run from September 2014 to January 2018, and during these years these measurements were complemented with yield records, and determination of tree root density, evolution of soil cracks, and cover crop biomass at a few selected moments.

Preliminary results from the 1st year (Cabezas et al. 2016) showed that, despite being a rain-fed olive grove, it was possible the establishment of a temporary vegetative cover without resulting in a penalty for olive productivity. While on the bare soil, cracks covered in summer resulted in lower soil water evaporation compared to no tillage, water loss by evaporation in summer was further reduced when residues of *Bromus rubens* were left on the soil surface, compensating largely water consumption by cover crop in Spring. This communication will present an analysis of the complete four year cycle to provide a thorough evaluation of the impact on soil water and olive yield of the management evaluated, and its implications for improvement of management of temporary cover crops in olives to provide environmental benefits, such as soil protection against water erosion.

Keywords: plant cover, tillage, cracks, evaporation, erosion.

### References

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