



The litter cover of citrus leaves control soil and water losses in chemically managed orchards

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Soil erosion in chemically managed orchards results in bare soil due to the removal of the weeds and the lack of catch crops. Those conditions results in extremely high erosion rates in citrus orchards (Cerdà et al., 2011) such it has been found in other orchards in the Mediterranean where the soil degradation trigger a change in the soil water properties (Gómez et al., 1999). The Mediterranean climatic and human conditions contribute to very active soil water erosion (Ruiz Sinoga et al., 2010) where rilling and piping are found (Romero-Díaz, 2007). It is widely known that high erosion rates can trigger the soil degradation such it has been found in vineyards (Ramos and Martínez Casasnovas, 2006), Olive (García Orenes et al., 2010) and other crops, which is related to the land management and land use (García Ruiz, 2010).

Within the chemically managed citrus orchards, the surface cover is usually bare due to the removal of the pruned branches (usually burned) and the use of herbicides every season. A thin and non-continuous litter layer of leaves from the citrus trees covers the soil surface, which sometimes are removed by the farmers to keep the soil clean. There is no information about the effect of the citrus leaves effects on soil and water losses. The objective of this paper is to quantify the effect of the leaves cover on the surface runoff and soil losses.

Experiments were conducted by means of simulated rainfall at 55 mm h⁻¹ during one hour in a small circular plot (0.25 m²) to quantify in the field the effect of different litter cover on soil erosion and water losses. An orchard of orange trees (Navel-lane-late, 10 year old, and planted at 6 x 5m with a 45 % cover) was selected in the Municipality of Montesa. Witin the 2 ha field 35 plots were selected with litter covers from 0 to 100 % cover. The runoff discharge was measured every minute and each 5 minutes a sample for runoff sediment concentration was collected. The sediment concentration was measured by dessication. All the measurements were conducted during the summer (August 2008). The results show that the litter cover control the erosion processes. The orange leaves lying on the floor can reduce the soil losses to negligible values when the cover is higher than 60 %. After 20 % of litter cover the soil losses are dramatically reduced to values lower than 50 % of the soil losses under bare soil conditions. The litter cover also reduces the runoff rates, but the reduction is in 50 % for 80 % litter cover. The 20 % litter cover results only in a small reduction in the runoff discharge. The research conducted demonstrate that the farmers should maintain the leaves on the floor (do not brush them as they use to do) to control the high erosion rates.

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