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The use of pruned chipped branches to increase the soil infiltration capacity and reduce the soil losses on citrus orchards in Eastern Spain

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Soil water erosion is causing problems on the agriculture land of the world. The high erosion rates registered in the agriculture land are due to the lack of a vegetation cover that protects the soil. High erosion rates in agriculture lands are found in Africa, Europe, Asia, and any other continent. Soil erosion on citrus orchards has been researched recently and shown huge erosion rates in the Mediterranean and in China. All this research findings allow us to confirm that the soil erosion rates on citrus orchards are not sustainable and strategies to control the soil erosion should be applied.
The increasing erosion rates are due to the bare soils, but also are due to the soil structure degradation and soil organic matter exhaustion. Some authors applied cover on crops to avoid the raindrop impact and the surfaces wash but there is a need to develop new strategies to reduce soil losses and keep sustainable the citrus productions. The agriculture production also results in a large amount of residues than can be a resource to improve the soil cover. This has been done in road embankments, in forest land affected by wildfires and on afforestation.
As a consequence of the mechanization of the agriculture, and the reduction of the draft animals (mainly horses, mules, donkeys and oxen), the straw and the pruned branches are being a residue instead of a resource in many developed countries. Straw was used as a forage and the pruned branches as a source of heat and energy but both can be used as a mulch to control the soil erosion. The pruned branches can contribute with a valuable source of nutrients and a good soil protection. The leaves of the trees, and some parts of the plants, once harvest can contribute to reduce the soil losses. Our goal is to test if a residue such as the chipped pruned branches can be transformed as a resource that will help to control the soil erosion rates. Straw has been seen as a very efficient to reduce the water losses in agriculture land, the soil losses in fire affected land, improving soil properties, but very little is done in active citrus orchards plantations.
On this study, forty rainfall simulations under 55 mm h-1 rainfall intensity during one hour, were carried out on 0,25 m2 microplots: bare (n=20) and covered with chipped pruned branches (n=20). The plots covered with the chipped branches had different mulch cover; ranging from 0 to 100 % cover and from 0 g m2 to 465 g m2. The results show a positive effect of the chipped pruned branches that reduce the soil losses to 10 % of the bare soils after a mulch cover of 25 %. It shows an exponential relation between the straw cover and weight, with the sediment yield.
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