

# Influence of the type of pruning chopper and its velocity in the fuel consumption and the quality of the chopped pruning residues in olive orchards

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## Introduction

Soil loss is the main threat of the agrarian activity and directly affects to the sustainability of the agricultural ecosystems. This problem is especially important for woody crops, due to the lack of soil cover, contributed by the separation of trees, the tillage as the most common soil management system and the burn of the pruning residues (2). The olive tree is one of the main crops in the Mediterranean basin. In Spain the surface occupied by the olive tree is around 2.5 Mha. In Andalusia this crop covers around 1.5 Mha, more than a 50% of its arable land. So, the recycling of its pruning residues, using them as mulch after its grinding, shows as a very effective alternative (1). But, this operation has high fuel consumption, a low field capacity and the form and size of pruning residue after the grind is very dependent on the machinery used. Therefore, the aim of this study is to evaluate the influence of the machinery used and the field velocity in its fuel consumption, field capacity and the quality of the chopped pruning residues in olive orchards.

## Material and Methods

This work belongs to an INIA Project, RTA2010-00026-C02, and it showed the results of 2 years study carried out in an olive rainfed orchard in Southern Spain. The experimental design consisted of random blocks with four repetitions. The experimental unit consisted of one block with an area of 73.5 m<sup>2</sup>, corresponding to 35 m long (5 lines of trees) and 2.1 m wide (the working breadth of the chopper). The 2 most common choppers in the region were studied, at 3 different working velocities (low, medium, and high) and 2 volumes of pruning residues (the medium production “14.9 kg/tree” and high volume “29.8 kg/tree”). For the study of the fuel and power consumption and the field capacity of each treatment a monitored tractor (JD 6420, 110 CV) was used, with a flow gauging sensor and a par sensor installed in the tractor rear. The quality of the chopped pruning residues was analyzed by the study of the pruning soil cover, its distribution and size by using digital analysis. Images were processed by an image analysis program (Inspector 2.2, Matrox Imaging, USA).

## Results

Results showed that existed differences between the two machines studied. Especially on fuel and power consumption. Both parameters increased with work velocity. But, at high velocity the power consumption was too high and the chopper operation could not be conducted properly. The images analysis showed that existed significant differences between the machinery studied. Moreover, the second velocity produced the better cover distribution and size of chopped pruning residues. However, in all the treatments studied the cover was enough to protect the soil of the erosion.

## Conclusion and Perspectives

Not only existed an important influence of the type of chopper used in the fuel and power consumption. But also, appeared important differences in the quality of the chopped pruning residues and its relation with the work velocity.

## References

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