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# Fire versus chipped pruned branches impact on soil infiltration in vineyards. The "Els Alforins" study site, Valencia, Spain

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## Abstract

Vineyards are being seen as a source of sediments and water due to the abuse of herbicides and plowing (Richter and Negendank, 1977; Prosdocimi et al., 2016; Biddoccu et al., 2018; Rodrigo-Comino, 2018; Rodrigo-Comino et al., 2018). The highest erosion rates within the world's agricultural land are found in vineyards (Panagos et al., 2015; Borrelli et al., 2021) and the future will be also negative due to the expected climate change (Panagos et al., 2021). There is a need to develop new strategies to reduce soil and water losses and restore the soil functions and soil properties that will restore the basic ecosystem services (Keesstra et al., 2016). Within the new strategies: cover crops, mulches, catch crops, or geotextiles (Keesstra et al., 2019; Rodrigo-Comino et al., 2020; Cerdà et al., 2021) farmers will prefer to use local and nature-based solutions such as chipped pruned branches (Keesstra et al., 2018). The infiltration capacity of soils is a relevant factor in soil erosion and runoff delivery. This is an easy-to-measure soil property that informs about soil sustainability. The steady-state infiltration rate informs about the soil health from a hydrology point of view.
This research evaluates the impact of chipped pruned branches on soil erosion and runoff loss control in rainfed vineyards. We selected two paired fields to measure the infiltration rate by means of a single-ring infiltrometer in the summer of 2022 (July) when the soil was dry. Two hundred measurements (100 in each of the fields) were carried out in a Control field (burn chipped pruned branches) and a Mulch field (chopped pruned branches). The measurements last 60 minutes and the Horton equation was fitted. The steady-state infiltration rate was calculated for each infiltration envelope. The results show that the soil infiltration rate ranged from 35.33 to 234.23 mm h-1 in the control field and from 33.45 to 244.31 mm h1. The average steady-state infiltration rates were 89.32- and 91.32-mm h-1 respectively for control and Mulch plots. It was no statistical differences in the infiltration capacity of soils. We discuss if the 3 years of mulch

application was not enough to trigger a change in the soil infiltration capacity.

**Keywords:** Vineyards, Infiltration, Soil, Chipped pruned branches, Fire,

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