



Studying relation between plants and soil: use of vegetation covers in a vineyard to improve soil physical properties

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Traditional tillage on vineyards cause soil degradation in the course of the years. This study is located in the East of Madrid (Spain), in a vineyard at 595 m.a.s.l under Mediterranean semiarid climatic conditions. We studied the effects of vegetation covers management on soil properties, such as porosity and bulk density, which are good indicators of soil degradation.

Three treatments were tested in plots (1,5 x 7m): traditional tillage (“till”), *Brachypodium distachyon* (“bra”) and *Poa bulbosa* (“poa”), they both sown on December 2009. In this vineyards have installed a drip irrigation system.

We observed that presence of vegetation protects soil from raindrop impacts due to the fact that soil is protected by different percentage of grass cover (66% in “bra”, 65% in “poa” and 13% in “till”, measured in November, 2010).

We collected nine undisturbed soil samples for each treatment to study porosity in summer 2010. It was measured with moisture extraction equipment. With the results obtained, the pF curves were drawn (van Genuchten, 1980). Results showed that grass cover treatments present higher porosity values, being “poa” the treatment with more total porosity (63%), in front of “bra” (61%) and “till” (59%).

Lastly, bulk density was also analyzed and these results confirmed that traditional tillage causes an increase of this property, favoring surface soil compaction (“poa” 1.06 g cm⁻³, “bra” 1.07 g cm⁻³ and “till” 1.13 g cm⁻³).

There are not significant differences among the treatments analyzed with Kolmogorov-Smirnov test, which is due to the high variability of data.

In conclusion, vegetation covers modify soil surface helping soil structure improvement and protecting it from degradation. On the contrary, the traditional tillage treatment showed less total porosity and a higher bulk density.