

Cover crops under-vine impact on grapevine performance and vineyard soil microorganisms is highly affected by edaphoclimatic conditions at a regional scale

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Abstract (250 words)

Soil management through cover crops can influence the cycle of nutrients, promote water infiltration, decrease erosion, and enhance the soil microbiota biodiversity, improving the grapevine performance. However, the area under the vines tends to be left bare by applying herbicides or tillage to avoid competition with the crop in semi-arid climates. Use of covers under-vine might be an alternative to these practices aiming at grapevine quality and soil health improvement. The aim of this research was to study the implications of soil management under the vines (cultivation and cover crops) on growth, yield, berry composition and soil microbial communities. A cover crop composed by a mixture of legumes was sown and compared with a control (cultivation), which includes frequent tillage to keep the soil bare, in three areas characterized by different edaphoclimatic conditions in the region of Navarra.

The use of cover crops under the vines tended to decrease vegetative growth and increase yield, although these differences were modulated by the edaphoclimatic characteristics of the area. Few effects were observed on berry quality at harvest, with only some variations on berry mass and malic acid content in the cover cropped treatment. On the other hand, soil health indicators were improved, the cover crop establishment accounting for a better nutrient profile in soils and microbial diversity. In conclusion, the use of under-vine covers could be an alternative to conventional management to control the growth of adventitious vegetation with little competition with the vines and improved soil quality.

Keywords: Berry quality, legumes, soil health, soil management, vineyard-living microbiota.