

Impact of Soil Management Methods in Vineyards

Soil management lies at the heart of major global warming and sustainable viticulture issues. In this context, inter-row plant cover in vineyards comes with its share of benefits and drawbacks.

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Plant-cover trial at Agroscope’s vineyard in Changins-Nyon.

A trial comparing different maintenance strategies and soil covers in inter-rows was conducted for three years from 2019 to 2021 on Agroscope’s Changins site. The study compared a chemically cleared plot (bare soil) to three permanent herbaceous covers: spontaneous natural grass cover, the sowing of a standard vineyard mixture (UFA2) and the sowing of an MCS4 mixture composed of less vigorous, and hence potentially less competitive species.

Different plant covers

With the ‘regularly cleared’ approach, the soil remains bare during the summer periods. With the ‘spontaneous grass cover’ approach, however, the ground remains continuously covered from the first spring onwards. The vegetation, which is furthermore quite ordinary, does not contribute to biodiversity promotion. The standard vineyard mixture (UFA2), for its part, facilitates the rapid establishment of good soil cover, but is no better at improving biodiversity. Lastly, the MCS4 mixture yields a less competitive permanent cover and achieves at least quality level I in terms of biodiversity promotion.

Impact on vine yield and vigour

Although annual rainfall varied from one year to the next, the vines were not subject to significant water stress over the three years of the study. In these conditions, the natural or sown grass cover of the inter-rows did not exert a major influence on yield components such as bud fertility, berry and bunch weight and shoot vigour compared to the chemical clearing of the ground.

Berry composition

Berry composition (sugar levels, pH, total acidity, tartaric and malic acid) at harvest was the same, regardless of the soil maintenance approach pursued. The ‘natural’ or ‘sown’ grass cover approaches resulted in a decreased berry assimilable nitrogen content compared to that of

the ‘no grow’ (‘bare soil’) approach. Berry NH₃ and primary amino acid (α-amino acid) content were lower than in the ‘grassed-over’ (grass cover) variants.

Sensorial analysis of the wines

Conducted two months after bottling, the sensorial analysis of the wines failed to identify any olfactory or gustatory differences between the three ‘grassed-over’ (grass cover) variants and the ‘bare soil’ soil variant throughout the 2019 vintage. In 2020, however, the wines produced from the ‘grassed-over’ variants with the ‘MCS4’ and ‘UFA vineyard’ mixtures exhibited slightly higher bitter notes as well as a more subdued bouquet than those of the ‘spontaneous grass cover’ and ‘bare soil’ variants. In 2021, the wines from the ‘cleared’ (‘bare soil’) variant were preferred at tastings. Furthermore, no olfactory or gustatory differences were noted between natural grass cover and sown grass cover in the inter-rows. —

Conclusions

- ▶ Natural grass cover and sown grass cover with the ‘MSC4’ and ‘UFA vineyard’ mixtures resulted in a decrease in the berry nitrogen composition at harvest, i.e. lower NH₃, lower primary amino acid (α-amino acid) content and, lastly, lower assimilable nitrogen content compared to the ‘no grow’ (‘bare soil’) variant.
- ▶ In the absence of water stress, the yield components (bud fertility, berry and bunch weight) and shoot vigour were the same, regardless of the soil management method used.
- ▶ The different soil management methods did not significantly influence berry composition such as sugar content, pH, total acidity and tartaric and malic acid content.
- ▶ The wines from the ‘grassed-over’ variants were judged to be slightly more bitter and with a more subdued bouquet than those from the ‘no grow’ (‘bare soil’) variant.
- ▶ The breeding, establishment and maintenance of less competitive species for grassing-over vineyard plots will require further in-depth investigations.



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