

Control of foliar pathogens in organic viticulture

Problem

Different types of pests and abiotic stress factors (e.g., deficiency of nutrients, drought) reduce quantity and quality of agricultural and horticultural crops worldwide. Relevant fungal pathogens of grapevine produce inoculum (spores) on plant debris that present on the soil surface of vineyards. These spores travel to aerial plant organs by rain splashes (splash-borne pathogens, *Plasmopara viticola*) or air currents (air-borne pathogens, *Botrytis cinerea*) and, under favourable environmental conditions, can cause infections.

Solution

Dense soil-covering vegetation is an efficient way to limit spore dispersal of fungal pathogens. Horseradish at different heights was planted as an interfering crop against dispersal of pathogenic spores. To monitor splash and wind dispersal (i.e., dispersal of *Plasmopara viticola*, *Botrytis cinerea*), a colouring experiment was launched on bare soil and on horseradish cover crop plots of different heights (Picture 1). Spore traps were later analysed for the presence of spores.

Outcome

A high soil coverage and leaf development of the cover crop were observed for the first sowing. Coloured droplets homogeneously covered the bare soil and these splashes from the soil could easily reach all the traps. In contrast, the cover crop reduced the amount of direct impacts by 44% during its growing and by 75% at flowering. Horseradish also reduced the splashes to reach the traps at all heights by 90%. Similarly, the spread of conidia of *Botrytis cinerea* was severely affected by the presence of the cover crop and reduced by 80-95% compared to bare soil with increasing heights of the cover crop. Thus, the canopy structure and plant coverage of the soil allowed a significant reduction of the dispersal of pathogen spores through both rain splashes and wind gusts. This practice of cover cropping may help farmers to reduce pesticide/fungicide use, while also generating economic benefits by preventing yield loss.

Practical recommendation

- **Horseradish should be sown in autumn to avoid drought and in order to get soil covered before bud break.**
- **Sow the cover crop along the interrows and between the plants to maximise the effect (Picture 2).**
- **Cut the cover crop plant when it reaches a particular height in order to avoid nutrient and water competition.**
- **Mulch soil with cut parts of the plant for a biofumigant effect, which is also reducing soil born infections.**

Applicability box

Theme

Cover cropping, horseradish

Geographical coverage

Vineyards in European/
Mediterranean area

Application time

Autumn sowing

Period of impact

Continuous (including sowing
and mulching periodically)

Equipment

Basic sowing method



Picture 1: Colouring experiment to monitor splash and wind dispersal of fungal diseases (left); bare soil and Horseradish (at different heights) plots (right).



Picture 2: Cover crop (Horseradish) applied in interrows.

Further information

Weblinks

- Check the [Organic Farmknowledge Platform](#) for more practical recommendations.
- BIOVINE web page: <https://www.biovine.eu/>

About this fact sheet and NAME OF THE PROJECT

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Permalink: <https://orgprints.org/39946/>

BIOVINE: This fact sheet was elaborated in the BIOVINE project. The project is running from March 2019 to May 2021, as part of the CORE Organic Cofund.

Project website: <https://www.biovine.eu/>

Project partners: DIPROVES-Università Cattolica del Sacro Cuore (UCSC), Piacenza, Italy; INRA-UMR Agroecologie (INRA), Dijon, France; Universitat Politècnica de València (UPV), Valencia, Spain; Agroscope, Switzerland; Research Station for Viticulture and Enology (SCV), Murfaltar, Romania; Agricultural Institute of Slovenia (KIS), Slovenia.

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