

PROJECT TITLE

Assessment of downy mildew development in grapevine plants exposed to bioactive volatile organic compounds

CONSORTIUM

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SUMMARY OF THE REPORT

The project DownyGrape (ID: 501) aimed at phenotyping the influence of three different volatile organic compounds (VOCs) on the susceptibility of grapevine (*Vitis vinifera*) cultivar Pinot noir to downy mildew (*Plasmopara viticola*) in a precise and reliable way. To this end, Pinot noir plants were transported to the access provider's laboratory. First, the downy mildew inoculation method was optimized in the access provider's laboratory. In August 2021 Dr. Valentina Lazazzara traveled to the access provider's lab to establish and optimize VOC fumigation experiments on whole grapevine plants. After all methods had been optimized, the main experiment was performed between September 27th and October 21th 2021. Six replicate experiments were conducted in order to achieve N=6 biologically, independent replicate data sets for statistical analysis. In each experiment, 2 plants were fumigated with each of three VOCs and one control treatment (plants fumigated with distilled water)

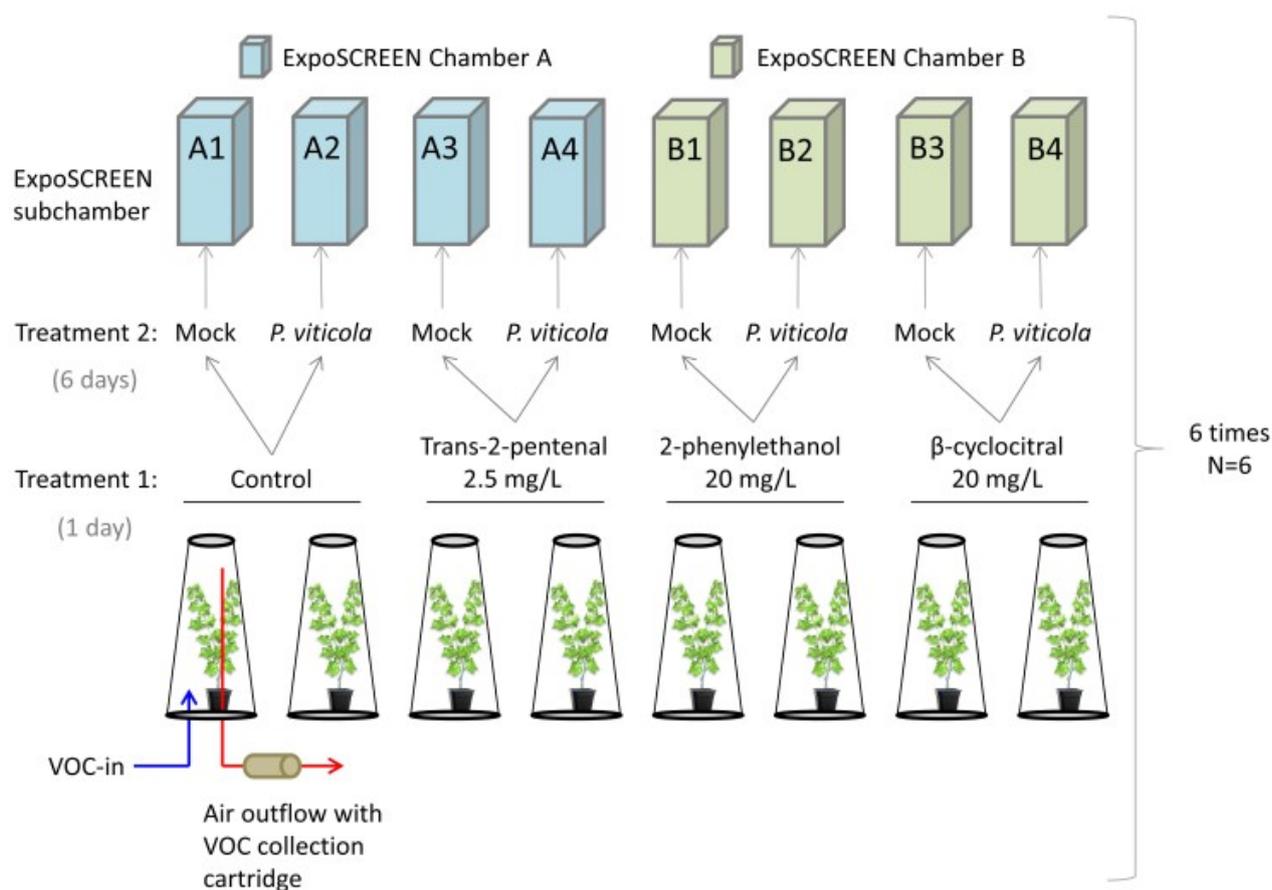


Figure 1. Overview of the experimental design.

. After one day of treatment, one plant *per* treatment was inoculated with *Plasmopara viticola*, and the second plant was sprayed with distilled water (mock-inoculated). Plants were incubated overnight to allow the infection to commence and for harvesting samples for additional analyses, which were conducted in the frame of the accompanying EPPN2020 experiment, Grape VOC (ID: 500), performed in ExpoSCREEN. At 6 days post-inoculation, 8 leaf discs were harvested from two leaves of each plant, and the appearance of *P. viticola* structures was quantified using SignalSCREEN. Preliminary data revealed that exposure of Pinot Noir plants to VOCs reduced the susceptibility of the plants to *P. viticola*. This is the first time, such beneficial effects of VOCs on grapevine downy mildew susceptibility was observed using a precise and reliable quantification method at the whole plant level.