

Improvement of the natural phyllosphere microbiota of the grapevine to increase resistance against downy mildew

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While rhizosphere microorganisms have been largely characterized in the last years, the impact of nonpathogenic microorganisms of the phyllosphere on the plant health was poorly understood. Therefore the knowledge on the role and ecology of phyllosphere microbial populations is relatively scarce and limited to few crops. On grapevine, the role of the environment in shaping phyllosphere microbial populations seems to be greater than the effect of fungicide treatments. Richness and diversity of bacterial and fungal populations were only minimally affected by the chemical (penconazole) and biological (*Lysobacter capsici* AZ78) treatments. Indigenous microbial communities of the phyllosphere are adapted to environmental and biotic factors in the place where the grapevines are grown, and they are resilient to the treatments tested. This is also reflected in the biocontrol properties of phyllosphere communities against downy mildew, which differed among grapevine locations, suggesting that beneficial populations could be increased by agronomic practices or application of nutritional factors. Treatments with a natural product, which promote the microbial growth *in vitro*, were applied on grapevine leaves under greenhouse conditions, in order to understand if the leaf microbiota could be modified. The natural product increased the number of culturable bacteria and fungi residing on the phyllosphere and significantly reduced the severity of downy mildew symptoms. Overall, treatments stimulated the growth of leaf microbial populations with and without biocontrol properties, suggesting that the stimulated microbiota may compete for space and reduce the pathogen infection. Identified fungi and bacteria will be discussed in the view of clarifying the mechanism of action of this natural product against downy mildew.




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