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BOOK of ABSTRACTS

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A novel biopesticide with a new mechanism of action against grapevine downy mildew

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Grapevine (*Vitis vinifera*) is one of the major fruit crops worldwide and is susceptible to several devastating diseases. Therefore, frequent applications of synthetic chemical fungicides are required to avoid yield and quality losses. Concerns about the environmental impact of the pesticide overuse have sparked crescent interest in developing alternative control methods, but the available biopesticides have limited efficacy under field conditions. We assessed the efficacy of a novel biopesticide based on a natural molecule against grapevine downy mildew (*Plasmopara viticola*) under field conditions. Since this natural molecule may act as nutritional/anti-nutritional substrate for microorganisms, we assessed its impact on the phyllosphere microbiota by a high-throughput metabarcoding approach. The biopesticide successfully reduced downy mildew severity on leaves and bunches in two growing seasons and locations in Northern Italy, demonstrating a good efficacy under field conditions. Culturable leaf microorganisms were affected by the biopesticide when applied under lab conditions and not under field conditions, indicating the resilience of the phyllosphere microbiota under field conditions. As demonstrated by other studies, the taxonomic composition of fungal and bacterial leaf populations differed according to the grapevine locations and agronomic practices. Particularly, the relative abundance of dominant bacterial families (Enterobacteriaceae, Orbaceae, Pseudomonadaceae and Xanthomonadaceae) and fungal phyla (Ascomycota and Basidiomycota) discriminated the two vineyards. The biopesticide increased the abundance of potential biocontrol bacteria (e.g. *Pseudomonas* spp.) and fungi (e.g. *Aureobasidium* spp.) on grapevine leaves of both vineyards, but it did not affect the abundance of bacterial grapevine pathogens. On the other hand, the biopesticide reduced the abundance of the genus *Erysiphe* on grapevine leaves, in agreement with the visible reduction of powdery mildew (*Erysiphe necator*) symptoms on leaves and bunches. In conclusion, this new biopesticide is highly effective against grapevine downy and powdery mildew under field conditions and the changes in abundances of phyllosphere bacterial and fungal populations suggest nutritional/anti-nutritional effects on some specific taxa and a new mechanism of action against grapevine pathogens.