Biotic interactions: case of grapevine cultivars – the fungal pathogen *Neofusicoccum parvum* – biocontrol agents

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Abstract

Grapevine is subject to multiple stresses, either biotic or abiotic, frequently in combination. These stresses may negatively impact the health status of plants and reduce yields. For biotic stress, grapevine is affected by numerous pest and diseases such as downy and powdery mildews, grey mold, black rot, grapevine fanleaf virus and trunk diseases (namely GTDs). The interaction between grapevine and pathogens is relatively complex and linked to various pathogenicity factors including cell-wall-degrading enzymes (especially CAZymes) and phytotoxic secondary metabolites, growth regulators, effectors proteins, and fungal viruses. In response to pathogen attacks, the grapevine is capable of inducing or inhibiting various pathways related to its traits of tolerance or susceptibility. These responses depend on both the pathogen genotype and the plant genotype. Similar behaviors have been described for the relationship between the plant and beneficial microorganisms. To illustrate these biotic interactions, the relationship between grapevine cultivars and a fungal pathogen associated to the Botryosphaeriaceae dieback, *Neofusicoccum parvum*, will first be described. Secondly, this interaction could itself be changed by the addition of biocontrol agents (bacteria, or fungi, or oomycetes), sole or in combination. Finally, this is a major challenge to determine the best balance between the vigor and health of the grapevine, the control of the pathogen attack and the damage caused, and the use of biocontrol agents.

Keywords: biological control aspect, Botryosphaeriaceae species, fungal pathogen, plant tolerance, pathogenicity factors