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3-18 Plant-mediated effects on antagonistic activity of endophytic fungi towards olive fungal diseases

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ABSTRACT

In recent years, fungal endophytes have received increasing attention as a promising supplement or alternative to chemical control. Much of the research undertaken on fungal endophytes as biocontrol agents have focused on the elucidation of the mechanisms that may control diseases suppression. However, the effect of plant host on their efficacy as biocontrol agents is poorly known. The endophytic fungus *Penicillium commune* isolated from the host plant *Olea europaea* Cv. Cobrançosa, has been shown the faculty to inhibit the growth of the phytopathogen *Colletotrichum acutatum*, which caused one of the major olive diseases - the anthracnose. The aim of this study was to determine the effect of the olive leaves on the antagonism displayed by *P. commune* against *C. acutatum* using simultaneous and sequential inoculations. For this, co-cultures on Petri dishes were established with the two strains either in the presence of one endophytic-free olive leaf (+leaf), placed in the middle of fungal inoculum, or in its absence (-leaf). The phytopathogen was inoculated on agar simultaneously with the endophyte, or 8 and 10 days after endophyte. Within the first 12 days after phytopathogen inoculation, the radial growth towards (internal radius) the interacting fungus, germination and sporulation of both fungal strains were evaluated and the outcome of interaction was assessed. To determine the degree to which plant and endophyte regulate phytopathogen infection, the colonization of leaves by the endophyte and the phytopathogen were assessed during the assay. The results indicate that in the presence of leaves the *P. commune* reduced significantly the sporulation (in an average 1.9-fold) and germination (in an average 2.6-fold) of *C. acutatum* when compared to –leaf treatment. Inoculation of *P. commune* 8 and 10 days prior to pathogen resulted in a more reduced germination and sporulation of *C. acutatum* than simultaneous inoculation. No significant differences were found on *C. acutatum* growth between +leaf and –leaf treatments, when both strains were inoculated simultaneously. However, the prior inoculation of agar with the

endophyte resulted in significantly increased of *C. acutatum* growth (in an average 25-fold) in the presence of leaf when compared to –leaf treatment. The colonization of leaves by *C. acutatum* was only observed when strains were inoculated simultaneously, being its value reduced over the incubation period from 19% to 0%. In all of the treatments the colonization of leaf by the endophyte was increased over the incubation period. The greater understanding of these interactions will allow the development of more effective biological control of plant diseases.

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