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Evaluation of the biocontrol potential of an antagonist against olive knot disease in olive trees (*Olea europaea* L.)

Diogo Mina¹, José Alberto Pereira¹, Teresa Lino-Neto² & Paula Baptista¹

¹ CIMO/Escola Agrária, Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

² BioSystems & Integrative Sciences Institute (BioSI), Centro de Biologia Funcional de Plantas, Universidade do Minho, Campus de Gualtar, 4710-057 Braga, Portugal

Abstract

The olive knot, caused by the bacterium *Pseudomonas savastanoi* pv. *savastanoi* (Psv), is one of the most serious diseases affecting olive tree (*Olea europaea* L.) in many regions of the world and mainly in Mediterranean countries. This disease produces tumors, especially in olive tree stems and trunk, leading to the death of the plant. In recent years, the use of microbial biocontrol agents for the control of plant diseases has gained considerable attention. Previous studies have revealed that, several bacteria strains naturally occurring in the olive tree phyllosphere, exhibit capacity to inhibit *in vitro* growth of Psv, being the greatest antagonistic effect displayed by *Bacillus* En40. The aim of the present study was to evaluate the ability of this strain to suppress Psv and olive knot development in olive trees. Pot experiments were conducted with 2-year-old olive plantlets cv. Cobrançosa inoculated with the selected strain or Psv, or in combination of both. Phenotypic traits associated with plant growth (e.g. biomass yield, total shoot/root height, and photosynthetic pigments content) and biocontrol abilities (e.g. abundance of Psv and assessment of disease symptoms) were evaluated, up to 120 days after inoculation. While development and growth of Psv+antagonist-inoculated plants showed to be similar to non-inoculated plants, photosynthetic pigments contents were observed to be higher in antagonist-inoculated plants than in other treatments. When compared with Psv-inoculated plants, plants treated with the antagonist revealed a significant reduction ($p<0.01$) in knots formation and size. Antagonist-inoculated plants showed also a reduction of the abundance of Psv in the inoculation sites (from 22.4 to 7.5 UFC/ μ L, $p<0.01$), suggesting its capacity to reduce the pathogen's growth. This strain was identified to suppress Psv and disease development on olive plants and thus, it should be considered in the future as a possible biocontrol agent against olive knot disease.

Keywords: Pathogen, bacteria, *in plant* assay

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