

The role of *Bursaphelenchus xylophilus* associated bacteria in pine wilt disease

La función de las bacterias asociadas al *Bursaphelenchus xylophilus* en la enfermedad del marchitamiento de los pinos

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Pine wilt disease (PWD) is a complex disease integrating three major factors: the causal agent, the pinewood nematode *Bursaphelenchus xylophilus*; the insect-vector *Monochamus* spp.; and the host pine tree, *Pinus* sp. Since the early 80's, the notion that another pathogenic agent involved, namely bacteria, may play a role in PWD has been gaining traction, however the role of bacteria in PWD is still unknown. The present work suggests the intriguing possibility that some *B. xylophilus*-associated bacteria may play a significant role in the development of this disease. This is inferred as a consequence of: (i) the phenotypic characterization, of a collection of 35 isolates of *B. xylophilus*-associated bacteria, in different tests broadly used to test plant pathogenic and plant growth promoting bacteria, and (ii) greenhouse experiments that infer pathogenicity of these bacteria in maritime pine, *Pinus pinaster*. The results illustrate the presence of a heterogeneous microbial community associated with *B. xylophilus* and the traits exhibited by at least some of these bacteria appear to be related to PWD symptoms. The inoculation of four specific *B. xylophilus*-associated bacteria in *P. pinaster* seedlings resulted in the development of some PWD symptoms suggesting that these bacteria likely play an active role with *B. xylophilus* in PWD.