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.