

Perspectives on the use of plant growth promoting bacteria as biocontrol agents for the pine wilt disease

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Pine Wilt Disease (PWD) has been considered one of the major threats affecting conifer forests and forestry economics throughout the whole world. This complex disease is caused by the pinewood nematode (PWN) *Bursaphelenchus xylophilus*, through an intricate interaction with other partners like nematode associated bacteria and an insect vector that is responsible for nematode tree-to-tree transportation and dissemination. The first report of PWD dates to 1905 in Japan. Later, the PWD spread out to China (1982) and Korea (1988). In Europe, PWD was firstly reported in Portugal in 1999. Since then the disease has spread throughout the country and recently new PWD focus were found in Madeira Island (2008) and Spain (2010), thus indicating an elevated risk to other European countries (including the Scandinavia region) and forestlands.

Although efforts for controlling and understanding PWD have been made, till now there are no significant solutions rather than the destruction of infected trees and forestlands, leading to huge losses, i.e 26 million m³ of timber in Japan, which is both economic and ecologically unacceptable. Therefore, new solutions are needed in order to control PWD. Some of the disease control methods developed rely on the use of chemicals with nematicidal effects. Plant breeding programs are also being conducted in order to obtain resistant pine trees. Yet, these approaches can endure as also they can be non-environmental friendly.

In other plant diseases caused by plant parasitic nematodes the use of plant growth promoting bacteria (PGPB) as biocontrol agents is considered to be an interesting and effective green-approach. In this sense, the results obtained in our lab indicate that the inoculation of *Pinus pinaster* (maritime pine) seedlings with PGPB leads to a reduction of PWD development, as also to an increased plant growth. These results suggest that the inoculation of pine seedlings with PGPB in a “nursery” system can be a useful alternative in obtaining PWN resilient pine trees.