Searching for olives displaying resistance traits to *Xylella fastidiosa* subsp. *pauca* ST53: experimental evidence and challenges

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Since 2015, a large-scale olive screening program for identifying sources of resistance to *Xylella fastidiosa* subsp. pauca ST53 (Xfp) was started under natural (field) and controlled conditions (greenhouse, GH) in Apulia (southern Italy). Approx. 100 genotypes including olive cultivars (from 15 different olive-growing countries) and breeding selections were planted in experimental plots located in the demarcated infected area, exposed to natural infections. The panel of tested plant material included also O. europaea subsp. cerasiformis, subsp. guanchica and var. sylvestris. Most of the experimental materials consisted of self-rooted plants propagated from the sources maintained at the World Olive Germplasm Bank and Breeding Program of IFAPA Córdoba (Spain). Sixty genotypes of the plant material under study were also evaluated in GH upon mechanical inoculations.
Field trees were tested once a year and inspected for symptoms twice a year. Potted plants in the GH were monitored periodically to assess symptoms and host bacterial colonization.
Under field conditions, symptoms usually began on the susceptible cultivars during the third year. Colonization was detected since the first year (incidence of 4-20%) and then progressed rapidly reaching values higher than 60% for most of the selections. For few selections, including Leccino, infections were in the range of 20%-40%. After 5 years, shoot dieback/desiccations were evident on trees belonging to all genotypes under testing, with scores ranging from 1 to 2.5 (on a scale 0-5), except only a few showing scores <1.
In the GH tests, within the 3 years of observations, symptoms of desiccations could be observed on the majority of the systemically-infected plants, with symptoms appearing at different times post-inoculation. Infection rates for the majority of the selections ranged from 50% to 89%.
Overall, even if in some genotypes lower incidence of infections and longer asymptomatic periods were recorded, so far none displayed clear phenotypic traits of resistance (low prevalence, symptoms and bacterial population) similar to that observed in the resistant control (Leccino). The data collected from this large screening program showed that the occurrence of genetic traits conferring resistance to Xfp may be very limited in the olive germplasm, emphasizing the need to put in place all measures to restrain and limit its further spread in olive growing areas.

Key words: olive, germplasm, resistance