

collected in an olive grove. In the laboratory, leaves, particularly the interior part of the blade which is a common oviposition location for spittlebugs, were observed under binocular stereoscope. Viable eggs were introduced in petri dishes until hatching. A total of 647 egg-laying masses and 8,222 eggs with a mean of 12.7 eggs per egg laying was recorded. Egg masses were characterised and the action of predation, parasitism and fungi were recorded. Eggs presenting signs of parasitism plus predation were more than 50%. Intact field eggs were kept in controlled conditions until hatching of nymphs and evolution. The parasitoids were identified as *Paracentrobia* sp. (Trichogrammatidae) being the first report for the genus in Portugal. These results constitute an important opportunity to control the main insect vectors of *X. fastidiosa* and containing its spread.

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Bibliography

Wells

ResiXO: a project aimed to develop resistant germoplasm for the protection of olive tree heritage in Salento (southern Apulia, Italy)

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Abstract: With the general aim to find sustainable genetic/agronomic solutions for the coexistence of the strategic olive sector with the threat of the *Xylella fastidiosa* epidemic in Apulia, a five-year project, 'Strategies for the containment of olive quick decline: a research and study of resistant germoplasm for the protection of olive tree heritage in Salento (ResiXO)', co-funded in December 2018 by Apulia Region and CNR-Istituto Per la Protezione Sostenibile delle Piante. The Project has two main goals: several resistant varieties for the new future olive plantations, the protection/survival of the monumental trees substituting the susceptible canopy, by overgrafting, with the resistant cvs. ResiXO, even if enriched by new important experimental activities, inheriting over 13 hectares of experimental fields and pre-select panel of asymptomatic seedlings with interesting phenotypic and technological traits, starts from pre-existing activities, initiated in 2016, of olive germplasm's screening for the identification of new resistant varieties through: the over-grafting of about 450 regional Italian and Mediterranean varieties onto infected mother plants; the selection, in strongly infected areas, of resistant/tolerant spontaneous seedlings. Besides those activities ResiXO aims to verify, study, validate and transfer practical innovations such as: a) new resistant cvs or candidate varieties; b) new information on genomic and metabolic mechanisms of resistance / tolerance; c) new quick and reliable protocols for testing olive germplasm for resistance/tolerance; d) new eco-sustainable strategies for the control of vector populations in infected areas; e) improved over-grafting alternative protocols adapted to specific local conditions and applicable on large scale to save the landscape and the heritage of the monumental olive trees.

A systematic large-scale vector monitoring programme to optimise strategies for controlling vectors of *Xylella fastidiosa*

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Abstract: Transmission tests carried out in Apulia region (southern Italy) identified three spittlebug species as vector of *Xylella fastidiosa* (Xf) subspecies *pauca*, ST53, causing severe decline on olive trees. This information, along with the data on the host-preference and biology, has been essential to assist the implementation of the containment measures in place, in the so called *Xylella*-demarcated areas, where actions for the control of the

vector are mandatory. Since 2019, the Apulian Phytosanitary Authority is supporting a monitoring programme to promote a sustainable and effective application of the vector control strategies (mechanical interventions for reducing the juveniles and applications of insecticides for the adults). The programme aims to provide accurate estimation of the best time to apply the specific interventions, i.e. in relation to the stage of development (juveniles) and to the population dynamics (adults) in olive groves and other crops. A total of 40 representative locations (located at different altitudes) were selected, in the Xf-free area, through the buffer, containment and infected areas. These include cultivated (plots under organic and IPM management) and non-cultivated sites, monitored periodically from March to October. Surveys for juveniles are based on a standard number of field sampling units (transect), whereas the counting of adults is made through traps and a fixed number of sweeping net/canopy/plot. A weekly/biweekly bulletin is then published by the Phytosanitary Authority with recommendations/specific warnings on the most appropriate timing for applying the mandatory control measures. The data so far collected confirmed that the length of the juvenile stages is greatly influenced by the micro-climatic conditions, and as such, the timing for mechanical interventions on the ground vegetation has to be targeted area-by-area. Ultimately, important information is going to be collected regarding the population density, which in the future will help to target the areas/crops/ecosystems where vector control should be prioritised.

Methylobacterium* spp., endophytes of olive trees, as potential biocontrol agents of *Xylella fastidiosa* subsp. *pauca

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Abstract: Interactions between endophytes and plants can promote the health of the host and play a significant role in low-input sustainable agriculture. Understanding this plant-microbe interaction and the mechanisms that enable endophytes to enhance the plant defence response is essential, especially for endophytic bacteria that show biocontrol potential against vascular wilt pathogens. Investigations on the bacterial endophytic population occurring in the xylem of healthy and *Xylella fastidiosa* subsp. *pauca* ST53 (XfpST53)-infected olive trees showed that under field conditions, the population level of cultivable endophytic bacteria is highly variable, being mainly affected by the host genotype, host age, and wilting severity. Among the different cultivable bacteria occurring in the wood of olive trees, *Methylobacterium* spp. are one of the most interesting groups. *Methylobacterium* strains isolated from the xylem of healthy and XfpST53-infected olive trees have been identified as *M. mesophilicum* and *M. radiotolerans*. Species of *Methylobacterium* have also been reported as potential biocontrol agents, plant-growth-promoting bacteria, and resistance inducers, by producing phytohormones, inducing plant systemic resistance, and supplying or mobilising nutritional elements (siderophore production). In order to evaluate the potential of *M. mesophilicum* GR19, and *M. radiotolerans* GR18, GR22 e GR23, as nutrient competitors of XfpST53, the production of siderophores was investigated by using the Chrome Azurol S (CAS) agar and ferric perchlorate assay to detect hydroxamates. *M. mesophilicum* DSM 1708 and *M. radiotolerans* DSM 1819 were used as reference strains. All the tested strains produced different levels of siderophores, and the most effective were applied by endotherapy in healthy and XfpST53-infected olive trees, in order to evaluate *in planta* their activity in containing the olive quick decline syndrome. Moreover, the characterisation of plant-growth-promoting traits of several *Methylobacterium* strains are currently in progress, i.e. by screening the production of indole-3-acetic acid (IAA), and the 1-aminocyclopropane-1-carboxylate (ACC) deaminase activity.