XVIII. International Plant Protection Congress

Mission possible: food for all through appropriate plant protection

BERLIN 2015

IPPC

24–27 August 2015 • Berlin (Germany)

ABSTRACTS

IAPPS

DPG

JKI Julius Kühn-Institut Federal Research Centre for Cultivated Plants

Industrieverband Agrar

www.ippc2015.de

Oral Presentations
Endophytes I

O END I-1
Assessment of endophytic bacteria diversity in olive tree: a search for biocontrol agents against Verticillium wilt
D. Mina, J. Pereira, A. Bento, P. Baptista
Polytechnic Institute of Bragança, School of Agriculture, Bragança, Portugal
jdmina89@gmail.com

Endophytic microorganisms, living in inner tissues of plants, are recognized to confer positive effects to its host, including increase resistance to diseases caused by phytopatogens. This feature has encouraged the scientific community to search and explore these microorganisms as biological control agents against an array of phytopathogens. Verticillium wilt, a vascular disease caused by the soil-borne fungus *Verticillium dahliae*, is one of the major constraints for olive cultivation worldwide, for which there is no cure. To the best of our knowledge, bacterial endophytic community associated to olive tree was never studied, and its exploitation as biological control agents was never investigated. Before commencing the search for biological control agents it is firstly need to know the diversity of native endophytes inhabiting olive trees. Therefore, the aim of this work is evaluate endophytic bacteria associated to cv. Picual and its distribution through the organs (leaves, twigs and roots) of the host tree.
Endophyte bacterial were isolated from roots, twigs and leaves of 21 trees from 3 olive orchards (*Olea europaea* cv. Picual) located in Granada, Spain. Samples were collected in autumn 2013 and spring 2014, and isolation was performed in PDA and PCA culture medium. Pure bacteria cultures were identified morphological- and molecularly through sequencing of V1 to V4 regions from 16S rDNA.
From a total of 630 roots, twigs and leaves segments analyzed, was identified 35 species belonging to 14 genus. The species *Serratia plymuthica* and *Alcaligenes faeccalis* were the most frequent, each one representing 9,5% of the isolates. Only 3% of the species were found in twigs and 1% in leaves (fitting in *Alcaligenes* and *Bacillus* genus). The remain 96% were isolated from roots, being the species *Alcaligenes faeccalis* the most frequently isolated. Similarly, the frequency of bacteria colonization was greater on roots (43%) followed by twigs (5%) and leaves (2%). The greatest diversity of bacteria endophytes in roots opens new perspectives for the exploitation of these microorganisms as biological control agents of *V. dahliae*. Further work will include the evaluation of the antagonist capacity of the isolates obtained against this phytophatogen.
This work is funded by FEDER through the Operational Competitiveness Program - COMPETE - and by national funds through the Foundation for Science and Technology - FCT - in the scope of the project PTDC/AGR-PRO/4354/2012

O END I-2
Persistent fungal root endophytes isolated from a wild barley species suppress seed-borne infections in a barley cultivar
B. Murphy, T. Hodkinson, F. Doohan
Trinity College Dublin, Botany, Dublin 2, Ireland
murphb16@tcd.ie

Introduction: Barley is subject to many pathogenic infections which cause significant economic losses. Growers have used an ever-changing arsenal of chemicals in an effort to control these pathogens. As well as being economically costly, chemical crop treatments for pathogens can have severe and long-lasting negative effects on the environment and reduce biodiversity. While these chemicals can be effective in controlling pathogens in a single cropping season, infections which are transmitted vertically offer more of a challenge. Alternative control measures using biological organisms may provide a more environmentally-friendly and long lasting solution.
Material and methods: Fungal root endophytes were isolated from wild populations of *Hordeum murinum* ssp. *murinum* L. and inoculated onto untreated seeds of a barley cultivar using five artificial and one soil-based growth media.
Results: A co-inoculant of ten isolates as well as two individual isolates successfully suppressed the development of seed-borne fungal infections on germinated and ungerminated seed. The two most successful isolates were also the most persistent as re-emergents and may provide real potential for development as crop inoculants. All isolates were more persistent in barley exposed to light after germination. The soil-based compost was associated with the greatest degree of seed-borne infection suppression, and the most successful artificial medium for suppressing seed-borne infections was also the medium with the most similar pH to the soil at the sampling sites. The endophyte isolate with the greatest suppression of seed-borne infections also appeared to retard the growth of the serious barley disease 'take-all', which is normally transmitted through the soil.
Conclusion: The results are important because the seed-borne infections that emerge from control seeds with no inoculant are some of the most devastating pathogens of barley, and suggest a direct antagonistic effect of the endophyte(s) on seed-borne pathogens without the induction of plant defences, such as systemic acquired resistance (SAR). To our knowledge, this is the first time that fungal root endophytes isolated from roots of *any* wild *Hordeum* species have been shown to control vertically transmitted infections in a barley cultivar.