

Carposphere microbiome of pear harbours potential microbial biocontrol agents against *Stemphylium vesicarium*

A. Montorsi¹, M. Cortiello¹, F. Bellameche¹, C. Nasuti¹, M. Menghini², R. Baroncelli², M. Collina², L. Solieri¹, E. Stefani¹, D. Giovanardi¹

¹Department of Life Science, University of Modena and Reggio Emilia, 42122 Reggio Emilia, Italy; ²Department of Agricultural and Food Sciences (DISTAL), Alma Mater Studiorum, University of Bologna, 40127 Bologna, Italy. Email: davide.giovanardi@unimore.it

Stemphylium vesicarium, the causal agent of brown spot of pear (BSP), is responsible for important economic losses in the main pear-producing areas of Italy, particularly in Emilia Romagna, where the highly susceptible cultivar *Abbé Fétel* is widely cultivated. The pear microbiome is a rich reservoir of microorganisms, offering a valuable source of potential microbial biocontrol agents (mBCAs) against major diseases. Using a culturomics approach, eight isolates, selected over 1000 initial bacteria and yeasts isolated from the pear carposphere in orchards located in Emilia Romagna provinces, were tested for their antagonistic activity *in vitro*, using dual-culture assays, against a set of *S. vesicarium* strains. A bioassay on detached leaves was then conducted to assess their biocontrol potential *in vivo*. The candidate yeasts and bacteria were identified by sequencing the ITS regions and 16S rRNA gene, respectively. Antagonistic yeasts were identified as *Aureobasidium pullulans*, *Metschnikowia* sp., *Rhodotorula babjevae*, and *Rhodotorula* sp.; bacterial isolates belonged to the genera *Bacillus*, *Pseudomonas*, and *Pantoea*. *In vitro* antagonistic activity of the selected isolates was slightly variable, depending on the *S. vesicarium* strains tested. On detached leaves, both bacterial and yeast isolates significantly reduced BSP severity. Interestingly, results from *in vitro* assays were not always consistent with those from pear leaf bioassays, suggesting different biocontrol mechanisms. Further investigations are needed to identify the mechanisms of action of these mBCA candidates against *S. vesicarium*. Finally, *in planta* assays are currently ongoing to assess their ecological behaviour and potential for effective BSP control.

This study was funded by the Emilia Romagna region within Reg. Law 17 del 27/10/2022. Type of operation "Urgent interventions to support the agricultural, agri-food, fishing and reclamation sectors" Art. 1 "Interventions for innovation in the agricultural and agri-food sector" – Project "A.MA.PERO - Approcci innovativi indirizzati a contrastare la Maculatura bruna del Pero". Research was conducted in collaboration with the framework of the EU-COST action CA22158 (MiCropBiomes: Exploiting Plant-Microbiomes Networks and Synthetic Communities to improve Crops Fitness).