



III INTERNATIONAL SYMPOSIUM ON POSTHARVEST PATHOLOGY

Using science to increase food availability

Programme & Abstracts

BARI (ITALY), 7 - 11 JUNE 2015

BOTRYTIS CINEREA AND GRAPEVINE INFLORESCENCE INTERACTION

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Botrytis cinerea, a cosmopolitan necrotrophic fungus, is the cause of gray mold disease in a wide range of crops including grapevine, where it affects both fruit quality and yield. The pathogen is difficult to manage because of its quiescent, asymptomatic infections that often occur at the flowering stage. It is believed that following early colonization of the flowers, the fungus enters a quiescent phase until ripening onset. Then, it activates from quiescence by further colonizing the ripening berry without visible signs and finally it egresses. The asymptomatic stage of the disease makes the pathogen difficult to control as disease symptoms appear only after colonization has largely progressed. In order to verify the proposed infection model and shed light on the molecular mechanisms of the grapevine/fungus interaction, inflorescences of *Vitis vinifera* (cv. Pinot Noir) were inoculated with a GFP-labelled B05.10 strain at cap falling stage (EL25/26). Samples were taken at 12, 24, 48, 72 and 96 hours post inoculation (hpi) and subjected to plating on selective medium, targeted secondary metabolite analysis (mainly phenols) and RNA sequence analysis. By surface sterilizing infected berries, we observed that most of the spores germinate and then enter quiescence before penetrating into the lower cell layers. The analysis of phenols content showed a significant induction of several stilbenoids, including oligomeric ones and of some phenylpropanoids such as caftaric acid. The RNA sequence analysis showed a larger number of genes (807) modulated at the early time point (24 hpi) than at the later one (194, 96 hpi) suggesting that at this time the pathogen becomes quiescent. The genes were classified according to their annotated functional role and provided further understanding of the biology of the interaction between fungus and plant during the infection.