



Plant health for sustainable agriculture

CONFERENCE, 11 – 12 May 2015
Ljubljana, Slovenia



Book of Abstracts



Conference Programme

PLANT HEALTH FOR SUSTAINABLE AGRICULTURE

11-12 May 2015, Cankarjev dom, Linhartova dvorana, Ljubljana, Slovenia

11. May 2015

08:00 – 09:00 Registration

09:30 – 10.00 Welcome and Opening

10.00– 12.10 **Session 1: Challenges in Plant Health** chaired by Saša Širca and Richard Baker

10.00-10.20 **Richard Baker:** Protecting EU plant health: pest risk assessment activities and challenges at the European Food Safety Authority

10.20– 10.45 **Richard Baker:** Prioritising actions to enhance plant biosecurity: The UK Plant Health Risk Register

10.45 – 11:10 **Carlo Leifert:** Sustainable Agriculture and Food Security; the need to integrate of crop breeding, nutrition and health management

11:10 – 11:30 Coffee Break

11:30 – 11:45: **Saša Širca:** Root-knot nematodes *Meloidogyne* spp. as emerging pests

11:45 – 12:00 **Sergio Molinari:** Activation of the plant immune system as a sustainable strategy for pest management

12:00 – 12:10 Discussion

12:10 – 13:40 **Session 2: Plant Pests and Diseases Diagnostics** chaired by Irena Mavrič Pleško and Stephan Winter

12.10 – 12:35 **Stephan Winter:** Viruses of major European crops - challenges of disease prevention and control in light of an increased international movement of plant materials and intensified agricultural production

12:35 – 13.00 **Nathan Brown:** Unravelling interactions in complex diseases and disease complexes

13:00 – 13:15 **Pasquale Saldarelli:** The association of Grapevine Pinot gris virus with grapevine leaf deformation and mottling

13:15 – 13:30 **Nataša Mehle:** Phytoplasmas of grapevine: molecular diversity of Slovenian strains and new diagnostic challenges

13:30 – 13:40 Discussion

13:40 – 15:00 Lunch

15:00 – 17:10 **Session 3: Nonchemical (Alternative) Control of Pests and Diseases** chaired by Hans-Josef Schroers and Johannes A. Jehle

15:00 – 15:25 **Johannes A. Jehle:** The use of baculoviruses in biological control of insect pests

15:25 – 15:50 **Marc Stadler:** Phylogeny and chemical ecology of plant-associated fungi and their potential as biofertilisers and biocontrol agents

Activation of the Plant Immune System as a Sustainable Strategy for Pest Management

S. Molinari

¹Institute of Sustainable Plant Protection (IPSP), National Research Council of Italy (CNR), Via G. Amendola 122/D, 70126 Bari, Italy

E-mail address of corresponding author: s.molinari@ba.ipp.cnr.it

Plants have developed sophisticated molecular mechanisms to detect pathogens and parasites and to activate immune response. Immune response in plants is regulated by phytohormones that are low molecular weight molecules which interact in a complex network to regulate also many aspects of plant growth, photosynthesis, flowering, reproduction, seed production and response to environmental abiotic challenges. Innate immune system in plants should be considered as within plant growth processes; thus, expressing constitutive defence systems occurs only at the cost of plant growth and encounters the risk of allocating resources to defence in the absence of natural pathogens and pests. An effective alternative is to fine-tune immune responses by modulating the "immunological memory" of plants, as it occurs in animals. An aspect of this modulation may be represented by the so-called "priming" by which previously attacked plants respond more quickly or more strongly to a subsequent attack. The priming may be realized by Systemic Acquired Resistance (SAR) that is typically induced following effector-triggered immunity (ETI) or, in other words, *R* gene-mediated resistance. Salicylic acid (SA) is the key regulator of either *R* gene-mediated resistance to biotrophic pathogens or SAR. Priming is a relatively low-cost mechanism of advancing plant defence, as resources are not used until the threat returns. Another distinct pathway that is associated with induced immune response in plants is based on the plant hormones jasmonic acid (JA) and ethylene (ET) functioning as signaling molecules. JA and ET are involved in an induced systemic resistance (ISR) mediated by beneficial soil organisms such as arbuscular mycorrhiza forming fungi (AMF) and plant growth promoting rhizobacteria (PGPR). Hormone network interactions are as important for plant immune system expression that pathogens and parasites have developed sophisticated molecular mechanisms to deregulate the biosynthesis of hormones and/or to interfere with hormonal signalling pathways thus impairing plant defence response.

It should be clear that there will be no effective durable crop protection strategy if the health of the soil and the quality of the irrigation water of the monitored cropping systems will be not carefully taken into consideration in any integrated pest management. A natural stimulation of the immune system of plants should be pursued by enriching the soil of the fields, particularly those intensively cropped, with AMF and PGPR. Therefore, a holistic approach to durable crop protection strategies should be pursued in the consideration of the very complex relationship occurring between plants and changing natural environments, which may be characterized by a vast array of biotic attackers and abiotic challenges, also in view of new concerns as global warming.

Keywords: Systemic Acquired Resistance, effector-triggered immunity, *R* gene-mediated resistance, microorganisms, priming