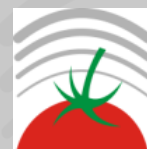




IOBC-WPRS
OILB-SROP



IOBC WG
Protected Crops

IOBC-WPRS
WG Integrated Control
in Protected Crops
Mediterranean Climate

Catania, Italy
9th-12th October 2012

BOOK OF ABSTRACTS



Foreword

On behalf of the International Organization for Biological Control of Noxious Animals and Plants (IOBC), West Palaearctic Regional Section (WPRS), you are cordially welcome to attend the meeting of the IOBC Working Group "Integrated Control in Protected Crops, Mediterranean Climate" held at the University of Catania (Italy) from 9th to 12th October 2012.

The aim of the Meeting is to promote research, development, implementation, and training of Integrated Pest and Disease Management (IPM) systems in protected crops, providing a common forum for researchers and technicians from public and private sectors, to address the challenges of biological and IPM strategies against the main pests and diseases of vegetable and ornamental crops.

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Cristina Castañé (Convenor)

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ABSTRACTS OF
PLENARY LECTURES

Integrating community ecology theories for optimizing IPM

Nicolas Desneux

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In agro-ecosystems, species may interact with one another, either directly or indirectly, in numerous and complex ways. Indirect interactions (i.e. those that are mediated by the first or third trophic levels) have been somewhat neglected despite their diverse – positive, negative or neutral – effects on populations. However, the occurrence of indirect interactions represents an important mechanism in determining the establishment and strength of food web interactions in any ecological system. In case of plant-mediated interactions among pests, understanding and identifying these interactions in agro-ecosystems is of major importance because plants have to cope with multiple, taxonomically distant second level consumers. Despite obvious differences in damages inflicted to plants by phytophagous arthropods and plant pathogens, potential indirect interactions between these two types of organisms have received limited attention. In the same way, indirect interactions between arthropod pests sharing a common predator (e.g. apparent competition mediated by the third trophic level), despite having been largely described using mathematical models, have been somehow relatively neglected, especially for optimizing Integrated Pest Management (IPM).

Using cross infestation experiments in controlled laboratory conditions, as well as population dynamic studies in larger scale experiments (compartmented greenhouses), we characterized and documented the impact of indirect interactions on life history traits of various endemic and invasive pests. Indirect interactions between pests proved to largely impact pest population growth on rose and tomato plants. Notably, we demonstrated two-way negative interactions between sucking insects (aphids and whiteflies) and plant pathogens suggesting that defensive pathways activated by attackers from different kingdoms likely overlap. We also demonstrated that the nature of indirect interactions may also change over time, e.g. apparent competition and apparent mutualism are not mutually exclusive processes. We showed that ecological context can shift outcomes between the same species pair from positive to negative effect. Positive short time indirect interaction mediated by a generalist predator between two tomato pests (invasive and local pests) can evolve, at longer time scales, to a negative one.

A sound understanding of ecological processes that drive population dynamics is a prerequisite for the design of optimized IPM strategies. Applied perspectives promoting negative indirect interactions, such as a negative effect of sucking pest insects on growth of plant pathogens may be useful for IPM, notably for decreasing fungicides use. Reciprocal indirect negative interactions between pests could increase the IPM long term sustainability, e.g. an agro-ecosystem maintaining simultaneously low levels of several pest populations would be more sustainable than agro-ecosystems aimed at excluding some target pest species. We emphasized the keystone role of generalist predators for managing both local and invasive pests' populations. Indeed, in the framework of invasive pest management, generalist predators could be favored by richer prey diversity and if settled in crops before the arrival of a new pest, they could act as a form of biotic resistance for the greenhouse.

Natural antagonists and insect control: a new perspective

Francesco Pennacchio

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The astonishing biodiversity of parasitic Hymenoptera and the large variety of strategies they use to colonize and exploit their insect hosts offer a wealth of molecular tools that can be profitably used for pest control. The virulence factors encoded by parasitic wasps and their associated symbionts are able to suppress the immune response of the host and to disrupt its physiological and reproductive processes. These molecules can directly target insect pests, and, by disrupting their immune response, they can also enhance the value of the ecological services offered by natural antagonists. The use of these natural bionsecticides is highly dependent on the development of targeted delivery strategies, which have to be designed to enhance both the efficacy and safety. The fast expansion of molecular technologies opens new avenues of research and makes possible the development of innovative pest control technologies, based on the use of parasitoid-derived molecules and/or on strategies mimicking their effects on insect hosts.

Prospects and challenges for biological pest control in protected crops in the Mediterranean

Karel J. F. Bolckmans

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The Mediterranean is a major producer of protected crops. Especially during the past six years the uptake of biological control of pests has increased rapidly in the Mediterranean. The key challenges for growers are pesticide resistance management, residue management, regulatory requirements, risk management and cost-effectiveness. Suggestions are provided for continued research on improving biological control.

Biological and integrated protection in the Mediterranean greenhouse: is disease management the weak link?

Philippe C. Nicot, Marc Bardin

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While biocontrol is commonly used for the protection of greenhouse crops against arthropods, continued reliance on chemical control against diseases is often considered as a hindrance to integrated protection. This paper presents a review of currently available biocontrol products and other alternatives to pesticides for use against plant diseases in the Mediterranean greenhouse. At least 12 biological active substances (micro-organism or plant extract) are commercially available for the control of soilborne pathogens and 14 against foliar diseases, in one country or more in the Mediterranean Basin. Future prospects and challenges are presented.