



**IOBC**  
**WPRS**

*International Organisation for Biological and Integrated Control (IOBC)  
West Palaearctic Regional Section (WPRS)*

*Organisation Internationale de Lutte Biologique et Intégrée (OILB)  
Section Régionale Ouest Paléarctique (SRPOP)*

## XV Meeting of the Working Group 'Biological and integrated control of plant pathogens'

# Biocontrol products: from lab testing to product development



**23-26**  
**April 2018**  
**Lleida**

Scientific program  
[www.iobc-wprslleida2018.cat](http://www.iobc-wprslleida2018.cat)

**IRTA**



# Scientific program

Works marked with (\*) are susceptible to win an award for the best oral or poster presentation.

## Monday, 23<sup>rd</sup> April 2018

- 15:00-17:00 **Arrival and registration**
- 18:00-20:30 **Exploring Saint George's Day Festival**
- 20:30-22:00 **Welcome reception**  
Campus del Rectorat, Plaça de Víctor Siurana, 1, 25003 Lleida

## Tuesday, 24<sup>th</sup> April 2018

- 8:30-9:00 **Registration**
- 9:00-9:20 **Welcome and opening**  
Neus Teixidó, Charo Torres, Josep Usall (Lleida/CAT)  
*Conference Chairs*  
Jürgen Köhl (Wageningen/NL)  
*IOBC-Working Group Convenor*
- 9:20-9:30 **IOBC – WPRS International Organization for Biological and Integrated Control: Structure and mission**  
Marc Bardin (Montfavet/FR)  
*Liaison Officer IOBC*

### 9:30-11:00 **Session I: Searching new agents**

Chairs Dr. Nicot/Dr. Bardin

- 9:30-10:00 **New concepts in the identification and practical application of biocontrol agents against plant pathogens**  
Inv I.1 Ilaria Pertot

- 10:00-10:15 **Efficient biocontrol of the phytopathogen *Ralstonia solanacearum* by novel lytic bacteriophages in irrigation water, *in planta* and after mass production**  
OI.01 Belén Álvarez

- 10:15-10:30  
OI.02 **Novel isolates of *Ralstonia* and *Mitsuaria* species as biocontrol agents for controlling tomato bacterial wilt**  
Malek Marian\*
- 10:30-10:45  
OI.03 **Suppressive effect of aquaponic water on the development of root rot caused by *Pythium aphanidermatum* in lettuce**  
Gilles Stouvenakers\*
- 10:45-11:00  
OI.04 **An *in planta* method for the screening of plant growth promoting Rhizobacteria to control plant pests and pathogens**  
Trimurti Habazar

11:00-11:30 COFFEE BREAK + POSTER VIEW OF SESSION I

**11:30-13:00 Session I continued: Searching new agents**

Chairs Dr. Droby/Dr. Hoyte

- 11:30-12:00  
Inv I.2 ***Botrytis* bunch rot in vineyards: still a challenge for commercial biological control products and novel microbial antagonists**  
Carlos Calvo-Garrido

- 12:00-12:15  
OI.05 **Development of a new biological control product for powdery mildew control in cereals**  
Jürgen Köhl

- 12:15-12:30  
OI.06 **Characterization of the biocontrol of *Phytophthora infestans* and *Alternaria solani* by bacteria isolated from Belgian agroecosystems**  
Gil Colau\*

- 12:30-12:45  
OI.07 **Screening of efficient bacterial control agents against two fungal pathogens *Phaeoemoniella chlamydospora* and *Neofusicoccum parvum*, involved in grapevine trunk diseases**  
Rana Haidar\*

- 12:45-13:00  
OI.08 **Antifungal activity of *Ecklonia* sp. and *Jania* sp. polysaccharides against *Botrytis cinerea***  
Hillary Righini\*

13:00-14:30 LUNCH BREAK

**14:30-16:30 Session II: Bringing agents to the field**

Chairs Dr. Magan/Dr. Calvo-Garrido

- 14:30-15:00  
Inv II.1 **Biocontrol agents: development and implementation aspects**  
Antonietta De Cal

- 15:00-15:15  
OII.01 **Efficacy and effect of novel film-forming formulations of the biocontrol agent *Candida sake* CPA-1 applied at field conditions in organic wine grapes**  
Anna Carbó\*
- 15:15-15:30  
OII.02 **Controlling fire blight (*Erwinia amylovora*) infection of apple and pear flowers using biocontrol organisms dispersed by pollinating insects**  
Bart Vanhoutte
- 15:30-15:45  
OII.03 **The inhibitory activity of the biocontrol agent *Lysobacter capsici* AZ78 is negatively modulated by *Bacillus* spp. isolated from grapevine leaves**  
Francesca Brescia\*
- 15:45-16:00  
OII.04 **Formulation development of biological products from lab to commercial scale**  
Pankaj Pathak
- 16:00-16:15  
OII.05 ***Bacillus subtilis* MBI 600: A new potential biocontrol agent as an alternative solution against *Botrytis cinerea* in cucumber plants**  
Anastasios Samaras\*
- 16:15-16:30  
OII.06 **Development of biological control products through vertical integration and global collaboration**  
Molly Cadle-Davidson
- 16:30-17:00 COFFEE BREAK + POSTER VIEW OF SESSION II
- 17:00-18:45 **Session II continued: Bringing agents to the field**  
Chairs Dr. Wisniewski/Dr. Fermaud
- 17:00-17:30  
Inv II.2 **Strategy for the discovery, development and delivery of biopesticides: A case study**  
Alba Marina Cotes
- 17:30-17:45  
OII.07 **Validation of a biological control strategy against brown rot in different European stone fruit producing areas**  
Carla Casals
- 17:45-18:00  
OII.08 **Lab and field tests with *Metschnikowia pulcherrima* as a possible biocontrol agent against storage diseases of apple**  
Sarah Perren

- 18:00-18:15  
OII.09 **Helping farmers in timing the application of biocontrol agents in viticulture**  
Elisa González-Domínguez
- 18:15-18:30  
OII.10 **Control of fruit and leaf diseases of olive with a pomegranate peel extract**  
Leonardo Schena
- 18:30-18:45  
OII.11 **Soaking seed with chitosan promotes wound healing of harvested potato tubers**  
Yang Bi

## Wednesday, 25<sup>th</sup> April 2018

### 9:00-10:30 **Session III: Elucidating the mode of action and improving efficacy**

Chairs Dr. De Cal/Dr. Schena

9:00-9:30  
Inv III.1 **Utilizing metagenomics to improve efficacy of postharvest biocontrol agents**  
Samir Droby

9:30-9:45  
OIII.01 **Designing a dual RNA-Seq approach to dissect the mode of action of biocontrol bacteria against phytopathogenic eukaryotes**  
Gerardo Puopolo

9:45-10:00  
OIII.02 **Mechanistic characterization of the antagonistic interaction between *Collimonas fungivorans* Ter331 and *Aspergillus niger* N402**  
Sandra Mosquera\*

10:00-10:15  
OIII.03 **Differential interaction of dark septate endophytes and fungal pathogens *in vitro* and *in planta***  
Wael Yakti\*

10:15-10:30  
OIII.04 **Elucidating the mechanisms of action of the non-pathogenic strain of *Fusarium oxysporum* FO12 against *Verticillium* wilt of olive**  
Antonio Mulero-Aparicio\*

10:30-11:00 COFFEE BREAK + POSTER VIEW OF SESSION III

### 11:00-13:00 **Session III continued: Elucidating the mode of action and improving efficacy**

Chairs Dr. Pertot/Dr. Jijakli

- 11:00-11:30  
Inv III.2      **Is the development of resistance to biological control among plant pathogens possible?**  
Marc Bardin
- 11:30-11:45  
OIII.05      **Role of the Moroccan *Streptomyces* in the induction of defensin system of pea against *Aphanomyces euteiches***  
Brahim Oubaha\*
- 11:45-12:00  
OIII.06      **Colonization of the phylloplane of banana plants by *Bacillus subtilis* EA-CB0015**  
Tatiana Z. Cuellar-Gaviria\*
- 12:00-12:15  
OIII.07      **Role of *Burkholderia*-derived pyochelin in the *Fusarium* wilt suppression of *Allium*-cultivated soil**  
Tomoki Nishioka\*
- 12:15-12:30  
OIII.08      **Different modes of action of the two *Aureobasidium pullulans* L1 and L8 strains biological control agents**  
Alessandra Di Francesco\*
- 12:30-12:45  
OIII.09      **The role of water-soluble and volatile secondary metabolites of *Pseudomonas donghuensis* P482 in antimicrobial activity**  
Sylwia Jafra
- 12:45-13:00  
OIII.10      **Histological studies on the establishment of putative endophytic fungi in leaf tissue**  
Eckhard Koch
- 13:00-14:30      LUNCH BREAK
- 14:30-16:30      Session IV: Development of commercial products**  
Chairs      Dr. Cotes/Dr. Casals
- 14:30-15:00  
Inv IV.1      **Production of microbial biological control agents**  
Ralf-Udo Ehlers
- 15:00-15:15  
OIV.01      ***Trichoderma asperellum* strain T34: from the laboratory-patent to the registration-market**  
M. Isabel Trillas
- 15:15-15:30  
OIV.02      **Development of a new biocontrol product (AUREO®Gold) for control of *Pseudomonas syringae* p.v. *actinidiae* in kiwifruit (*Actinidia* spp.)**  
Stephen Hoyte

- 15:30-15:45  
OIV.03 ***Aureobasidium pullulans* strain Ach1-1 in biocontrol of postharvest diseases of apples: 15 crucial years of research before starting commercial development**  
Hanène Badri
- 15:45-16:00  
OIV.04 **Biocontrol products: From lab testing to product development**  
Javier Nacher
- 16:00-16:15  
OIV.05 **PhylloLux®, an alternative technology to synthetic fungicides for controlling major diseases of strawberries**  
Wojciech J. Janisiewicz
- 16:15-16:30  
OIV.06 **Licorice leaf extract as plant protection agent against tomato late blight - on the way from lab to field**  
Annegret Schmitt

16:30-17:00 COFFEE BREAK + POSTER VIEW OF SESSION V

17:00-18:30 **Round table discussion**

**The difficult way to the field: How companies experience commercialisation of biological control products**

Chair

Dr. Jürgen Köhl

**Registration and legal aspects.** Ralf-Udo Ehlers. E-Nema.

**Production and formulation.** Pankaj Pathak. Marronebio.

**A big job for a small company.** Javier Nacher. Seipasa.

**Cooperation of companies and researchers.** Carolina Fernández. Futureco.

**Commercial application.** Jordi Rebull. Kenogard.

## Thursday, 26<sup>th</sup> April 2018

9:00-10:30 **Session V: Risk Assessment**

Chairs

Dr. Schmitt/Dr. Koch

9:00-9:30

Inv V.1

**Resilience, production and formulation issues in the production of biocontrol agents for disease control**

Naresh Magan

9:30-9:45

OV.01

**Polyextremotolerant yeasts *Aureobasidium* spp.: Antagonistic activity against phytopathogenic fungi**

Janja Zajc

9:45-10:00 OV.02	<b>Biocontrol products - current regulatory situation</b> Agata Jakubowska
10:00-10:15 OV.03	<b>Specific monitoring and quantification of the biological control agent <i>Lactobacillus plantarum</i> PM411 by viability qPCR</b> Núria Daranas*
10:15-10:30 OV.04	<b>Can sclerotium size of <i>Sclerotinia sclerotiorum</i> be used as a predictor of susceptibility to <i>Coniothyrium minitans</i>?</b> Philippe C. Nicot
10:30-11:00	COFFEE BREAK + POSTER VIEW OF SESSION VI
<b>11:00-13:00</b> Chairs	<b>Session VI: Using consortia of strains in biocontrol</b> Dr. Janisiewicz /Dr. Jafra
11:00-11:30 Inv VI.1	<b>Challenges in developing microbial seed treatments</b> Gertjan van Westen
11:30-11:45 OVI.01	<b>Improving biological control using microbiota: the case of apple for postharvest diseases</b> M. Haissam Jijakli
11:45-12:00 OVI.02	<b>Efficacy of three biocontrol agents applied individually and in combination in the control of <i>Neofusicoccum parvum</i>, a fungal pathogen involved in grapevine trunk disease</b> Amira Yacoub*
12:00-12:15 OVI.03	<b>Recent advances in the analysis of the olive fungal microbiome</b> Ahmed Abdelfattah*
12:15-12:30 OVI.04	<b>Microbial community composition in take-all suppressive soils</b> Paola Duran*
12:30-12:45 OVI.05	<b>Fermented foods as source for novel biocontrol microbial consortia</b> Michael Wisniewski
12:45-13:00 OVI.06	<b>Better together! Insights from the development of a biological control product based on combination of different microorganisms - a way to success?</b> Robert Czajkowski
<b>13:00-13:30</b>	<b>Closing remarks</b>
13:30-15:00	LUNCH BREAK



# Poster views

Posters will be displayed during the entire congress. Authors of posters will have to remove them the last day of the congress. Organizers ask authors to be in front of posters at the assigned session to answer questions or comments.

<b>Tuesday 24<sup>th</sup> April</b>	11:00-11:30	(Session I)
	16:30-17:00	(Session II)
<b>Wednesday 25<sup>th</sup> April</b>	10:30-11:00	(Session III)
	16:30-17:00	(Session V)
<b>Thursday 26<sup>th</sup> April</b>	10:30-11:00	(Session VI)

## Poster session - Tuesday, 24<sup>th</sup> April 2018

### Session I: Searching new agents

- PI.01      **Effect of microscopic fungi on larval mortality of the root-knot nematodes *Meloidogyne incognita* and *Meloidogyne javanica***  
Varvara Migunova
- PI.02      **Characteristics of biocontrol agents of *Diplodia seriata*, one of the pathogen causing 'Botryosphaeria dieback' on vine plants in Chile**  
Jaime Montealegre
- PI.03      **Screening of bacteria and fungi for activity against soil-borne *Fusarium* infections of maize seedlings**  
Eckhard Koch
- PI.04      **Identification and biocontrol of antagonistic yeast *Botrytis cinerea* on different host**  
Lourdes Soto-Muñoz
- PI.05      **Virulence enhancement of weed biocontrol agents by elevating their amino acid excretion**  
David C. Sands
- PI.06      **Biological control of hairy roots disease in greenhouse vegetables**  
Marta A. Streminska
- PI.07      **Impact of *Sclerotinia sclerotiorum* control by *Trichoderma* strains on soybean yield**  
Cleusa M.M. Lucon

- PI.08      **Aromatic plant interrows to control grapevine moth *Lobesia botrana* populations in vineyards**  
Ana M. Díez-Navajas
- PI.09      **Antifungal activity of *Coriandrum sativum* essential oil on seed pathogens**  
Alma Valiuškaite
- PI.10      **Antifungal activities of the leaf and sap extracts of two endemic *Aloe* species against seed borne fungal pathogen (*Aspergillus* species) of groundnut (*Arachis hypogaea* L.)**  
Dinkayehu Alamnie\*
- PI.11      **Evaluation of leaf extracts of four plant species against rice blast pathogen (*Magnaporthe oryzae*)**  
Matthew O. Adebola
- PI.12      **Evaluating the biocontrol efficiency of six medicinal plant extracts against watermelon bacteria blotch disease caused by *Acidovorax citrulli***  
Matthew O. Adebola
- PI.13      ***Thymus vulgaris* and *Coriandrum sativum* essential oils for the control of *Fusarium graminearum***  
Neringa Rasiukevičiūtė\*
- PI.14      **Aromatic plants activity on *Alternaria* spp. pathogen**  
Alma Valiuškaite

## Session II: Bringing agents to the field

- PII.01      **New advances in the formulation of the biopreservative strain CPA-7 of *Pseudomonas graminis***  
Núria Baró-Montel\*
- PII.02      **Impact of UV-C radiation combined with biocontrol agents on the susceptibility of strawberry plants to *Botrytis cinerea***  
Marc Bardin
- PII.03      **Biological control of yellow rust in spring wheat in Latvia 2017**  
Līga Feodorova-Fedotova\*

- PII.04 **Evaluation of the biofungicides Timorex Gold®, STK-73 and Serenade ASO® on the control of gray mold (*Botrytis cinerea*) in blueberries cv. Jewell and cv. Star. Chillan, Bio-Bio Region, Chile**  
Juan Cristobal Arroyo
- PII.05 **Seedling treatments with biological pesticides and biostimulants against *Fusarium* basal rot on onion**  
Emmi Kuivainen\*
- PII.06 **Elucidation of boundaries for the effective use of biological control organisms against wound pathogens causing fungal storage diseases in apples**  
Tanja Vanwalleghem
- PII.07 **Strategies for organic control of tomato bacterial spot**  
Giorgio M. Balestra
- PII.08 **Environment-friendly postharvest technologies reducing strawberry fruit contamination**  
Neringa Rasiukevičiūtė\*
- PII.09 **Diversity in the susceptibility of *Botrytis cinerea* strains to the biological control agent *Pseudomonas helmanticensis***  
Marc Bardin
- PII.10 **Medium optimization for enhancing antifungal HSAF production by *Lysobacter enzymogenes* OH11**  
Fengquan Liu
- PII.11 **Antifungal activity of *Bacillus amyloliquefaciens* BUZ-14 and *B. methylotrophicus* CECT 8661 against the grey rot in vineyards**  
Héctor Calvo\*
- PII.12 **From the mass production and formulation to the fate in the environment of *Lysobacter capsici* AZ78, a biological control agent of *Plasmopara viticola***  
Gerardo Puopolo
- PII.13 **Application of isothermal microcalorimetry for rapid quantification of bacterial and fungal biocontrol agents**  
Johanna Nykyri\*

## Poster session - Wednesday, 25<sup>th</sup> April 2018

### Session III: Elucidating the mode of action and improving efficacy

- PIII.01      Interaction of dark septate endophytes with arbuscular mycorrhizal fungus *Rhizoglyphus irregularis*  
Wael Yakti\*
- PIII.02      Genomic sequencing of *Pasteuria penetrans*, an obligate parasite of *Meloidogyne* spp.  
Jamie Orr\*
- PIII.03      Effects of elicitors on Trichothecene accumulation and *Tri* genes expression in potato tubers inoculated with *Fusarium sulphureum*  
Yang Bi
- PIII.04      Mechanism research of transcriptional regulator LeClp in the biosynthesis of WAP-8294A2 in *Lysobacter enzymogenes*  
Huiyong Xu
- PIII.05      Antifungal activity and action mode of HSAF from *Lysobacter enzymogenes* against *Fusarium graminearum*  
Yangyang Zhao
- PIII.06      Antibacterial mechanism of Luteolin-7-O-Glucoside from artichoke extracts against bacterial plant pathogens  
Pedro Laborda\*
- PIII.07      Elucidating the mode of action of licorice as a new biocontrol solution against oomycetes and phytopathogenic bacteria  
Sophie Hermann
- PIII.08      Volatile organic compounds emitted upon infection of barley roots by fungal pathogens: antifungal effects and mode of action  
M. Haissam Jijakli
- PIII.09      Temperature affects *Bacillus* antimicrobial compounds production but not the biocontrol of common bean diseases  
Andrea B. Moura
- PIII.10      Build-up of a *Bacillus* strain collection for strains with high potential as plant biocontrol agents based on a promising biocontrol candidate  
Nikolaus Pfaffenbichler\*
- PIII.11      Endophytic *Bacillus* screening and identifications as growth promotor and biocontrol of *Colletotrichum capsici* on chili  
Yulmira Yanti

- PIII.12 *Bacillus atrophaeus* strain L193 surfactants for the biocontrol of aphids in cereal crops  
Laura Toral\*

**Session V: Risk assessment**

- PV.01 **Monitoring the dispersion and persistence of *Penicillium frequentans* Pf909 to field and postharvest conditions to control brown rot**  
Marta Balsells-Llauradó\*
- PV.02 **Persistence of *Bacillus amyloliquefaciens* CPA-8-formulated products on nectarines and peaches after exposure to unfavourable environmental conditions**  
Neus Teixidó
- PV.03 **Resilience of different formulations of the biocontrol agent *Candida sake* CPA-1 on grapes under climate change conditions**  
Anna Carbó\*
- PV.04 **Biocontrol as a key component to manage brown rot diseases on cherry**  
Sophia Grannell\*
- PV.05 **Water stress tolerance and transcriptional response in biological control strains of *Lactobacillus plantarum* from plant environments**  
Núria Daranas\*
- PV.06 **First steps in the identification of arthropods associated to potato and corn orchards in organic farming in North Spain**  
Roberto Ruiz de Arcaute
- PV.07 **Osmotic tolerance response induced on survival ability at antagonist *Yarrowia lipolytica* M18/3B on apple fruit**  
Lourdes Soto-Muñoz
- PV.08 **Stability and biocontrol ability of *Ralstonia solanacearum* lytic bacteriophages in diverse environmental conditions**  
Belén Álvarez

**Session VI: Using consortia of strains in biocontrol**

- PVI.01      Integrated approach to control soil-borne pests in organic strawberry plantations  
Loredana Canfora\*
- PVI.02      Design and development of a biological fungicide composed of a consortium of *Bacillus subtilis*  
V́ctor Alfonso Sáenz Álvoro
- PVI.03      Preventing post-harvest losses in sugar beet: Biological control consortia with antagonistic and VOCs producing potential  
Peter Kusstatscher\*
- PVI.04      Biological control of root-knot nematode *Meloidogyne incognita* infesting eggplant by the nematode-trapping fungus *Dactylaria brochopaga* and the nematode egg parasitic fungus *Verticillium chlamydosporium* under field conditions.  
Ezzat M. A. Noweer





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