

# PROGRAM

# 2014

## IMPORTANT NOTES:

The abstracts included in this book should not be considered to be publications and should not be cited in print without the author's permission.

Attendants shall not take pictures from projections during the presentations

**STU** indicates papers being judged for graduate student presentation awards

**129** indicates abstract number for ORAL presentation

**B-11** indicates abstract number for POSTER presentation



## SUNDAY - 3 August

9:00–17:30 SIP Council Meeting **P203**  
10:00–19:00 Registration **P1**  
18:00–21:00 Mixer **Alte Mensa**

## MONDAY - 4 August

07:30-18:00 Registration **P1**

Monday, 8:30-10:00. **P1**  
**Opening Ceremony  
and SIP Founders' Memorial Lecture**

### Opening Ceremonies

Johannes Jehle, Chair, Organizing Committee  
Jørgen Eilenberg, President, SIP

Welcome Addresses

Student Travel Award Presentation by M.van Oers

### Founders' Memorial Lecture

James Bechel, Chair, Founders' Lecture Committee

Honoree: **ALOIS M. HUGER**

Lecturer: **TREVOR A. JACKSON**

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10:00–10:30 **BREAK**

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Plenary Symposium Monday, 10:30–12:30. **P1**

### Microbial Control - from Bench to Business

Organizer/Moderator: Ralf-Udo Ehlers

- 10:30 **1 Potentials for utilizing and controlling insect pathogens** Richou Han, Xuehong Qiu and Xun Yan, Guangdong Entomological Institute, 105 Xingang Road West, Guangzhou 510260, China
- 11:00 **2 Story of an African firm: 10 years in the biopesticide business – lessons learned along the way** Sean Moore, Citrus Research International, Port Elizabeth, South Africa; Rhodes University, Grahamstown, South Africa
- 11:30 **3 A Roadmap to the Successful Development and Commercialization of Microbial Pest Control Products for Control of Arthropods** Willem J. Ravensberg, Koppert Biological Systems, Berkel en Rodenrijs, the Netherlands
- 12:00 **4 BASF Functional Crop Care. Unlocking Agricultural Potential in Soil, Seed and Crop** Sebastian Bachem, BASF – Limburgerhof, Germany

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12:30–14:00 **LUNCH** Mensa

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Symposium 1 (Nematodes) Monday, 14:00-16:00. **P4**

### Above and Belowground Interaction, Root-Shoot Interaction, Chemical Signaling

Organizers/Moderators: R. Campos-Herrera, F. Kaplan and S. Hazir

- 14:00 **5 Small molecule signals in nematodes - common motifs and species specific modifications** Stephan H. von Reuss, Max Planck Institute for Chemical Ecology, Department of Bioorganic Chemistry, Jena, Germany
- 14:30 **6 Olfactory Plasticity in Entomopathogenic Nematodes** Joon Ha Lee and Elissa Hallem, University of California, Los Angeles, USA
- 15:00 **7 Multiple Consequences of Belowground Herbivore Induced Volatile Signals** Jared G. Ali<sup>1,2</sup>, Raquel Campos-Herrera<sup>2,3</sup>, Hans T. Alborn<sup>4</sup>, Larry W. Duncan<sup>2</sup>, Lukasz L. Stelinski<sup>2</sup>; <sup>1</sup>Department of Entomology, Michigan State University, USA; <sup>2</sup>Entomology and Nematology Department, Citrus Research and Education Center, University of Florida, U.S.A.; <sup>3</sup>Departamento de Contaminación Ambiental, Instituto de Ciencias Agrarias, CSIC, Madrid, Spain; <sup>4</sup> Center for Medical, Agricultural, and Veterinary Entomology, Agricultural Research Service, U.S. Department of Agriculture, Gainesville, FL, U.S.A.
- 15:30 **8 Root Zone Chemical Ecology; New Techniques for Below Ground Sampling and Analyses of Volatile Semiochemicals** Hans T. Alborn<sup>1</sup>; Fatma Kaplan<sup>2</sup>; <sup>1</sup>USDA ARS Center for Medical, Agricultural and Veterinary Entomology, Gainesville FL, U.S.A.; <sup>2</sup>Kaplan Schiller Research LLC and Biology Dept. University of Florida, Gainesville, FL, U.S.A.

Contributed Papers Monday, 14:00-16:00. **P5**

### BACTERIA 1

Moderators: Raffi Aroian and Brian A. Federici

- 14:00 **9 Discovery of Insecticidal Proteins from Non-Bacillus Bacterial Species** Nasser Yalpani<sup>1</sup>; Dan Altier<sup>1</sup>, Jennifer Barry<sup>1</sup>, Jarred Oral<sup>2</sup>, Ute Schellenberger<sup>2</sup>, Adane Negatu<sup>1</sup>, Scott Diehn<sup>1</sup>, Virginia Crane<sup>1</sup>, Gary Sandahl<sup>1</sup>, Joe Zhao<sup>1</sup>, Dave Cerf<sup>2</sup>, Claudia Perez Ortega<sup>3</sup>, Mark Nelson<sup>3</sup>, Analiza Alves<sup>1</sup>, Lu Liu<sup>2</sup>, Gusui Wu<sup>1</sup>; <sup>1</sup>DuPont Pioneer, Johnston, IA, U.S.A.; <sup>2</sup>DuPont Pioneer, Hayward, CA, U.S.A.; <sup>3</sup>DuPont, Wilmington, DE, U.S.A..
- 14:15 **10 Discovery and optimization of hemipteran-active proteins for Lygus control in cotton** James A. Baum, Waseem Akbar, Konasale Anilkumar, David Bowen, Robert S. Brown, Cathy Chay, Thomas Clark, Michael Pleau, Xiaohong Shi, Uma Sukuru, Moritz Von Rechenberg, Halong Vu, Brent Werner, Andrew Wollacott; Monsanto Company, Chesterfield, Missouri U.S.A.
- 14:30 **11 Isolation and identification of potential biological control agent from *Tortrix viridana* L. (Lepidoptera: Tortricidae) pupae** Nurcan Albayrak Iskender; Yaşar Aksu<sup>2</sup>; <sup>1</sup>Artvin Coruh University, Faculty of Arts and Sciences, Department of Biology, Artvin, Turkey; <sup>2</sup>Artvin Regional Forestry Management, Artvin, Turkey

- 14:45 **12 STU** Evolution of a Sensor Protein Controlling Production of an Insecticidal Toxin in Plant-Beneficial *Pseudomonas protegens* Peter Kupferschmid<sup>1</sup>, Maria Péchy-Tarr<sup>1</sup>, Nicola Imperiali<sup>1</sup>, Monika Maurhofer<sup>2</sup>, Christoph Keel<sup>1</sup>; <sup>1</sup>Department of Fundamental Microbiology, University of Lausanne, Switzerland; <sup>2</sup>Plant Pathology, Institute of Integrative Biology, ETH Zürich, Switzerland
- 15:00 **13 STU** *Paenibacillus larvae*, the etiological agent of American Foulbrood, produces the catechol type siderophore bacillibactin Gillian Hertlein<sup>1</sup>; Sebastian Müller<sup>2</sup>; Eva Garcia-Gonzalez<sup>1</sup>; Roderich D. Süssmuth<sup>2</sup>; Elke Genersch<sup>1,3</sup>; <sup>1</sup>Institute for Bee Research Hohen Neuendorf, Germany; <sup>2</sup>Technische Universität Berlin, Institut für Chemie, Berlin, Germany; <sup>3</sup>Freie Universität Berlin, Institute of Microbiology and Epizootics, Berlin, Germany
- 15:15 **14** Two new *Bacillus thuringiensis* toxins active against Lepidoptera and Coleoptera Mikel Domínguez<sup>1</sup>, Iñigo Ruiz de Escudero<sup>1,2</sup>, Isabel Matas<sup>2</sup>, Leopoldo Palma<sup>1,2</sup>, Delia Muñoz<sup>2</sup>, Primitivo Caballero<sup>1,2</sup>; <sup>1</sup>Bioinsecticidas Microbianos, Instituto de Agrobiotecnología, Mutilva, Spain; <sup>2</sup>Laboratorio de Entomología Agrícola y Patología de Insectos, Universidad Pública de Navarra, Pamplona, Spain
- 15:30 **15-STU** Entomopathogenic *Bacillus thuringiensis* as PGPR Jiaheling Qi<sup>1,2</sup>; Daigo Aiuchi<sup>2</sup>; Shin-ichiro Asano<sup>3</sup>; Masanori Koike<sup>2</sup>; <sup>1</sup>The United Graduate School of Agricultural Sciences, Iwate University, Iwate Japan; <sup>2</sup>Department of Agro-environmental Science, Obihiro University of Agriculture & Veterinary Medicine, Obihiro, Japan; <sup>3</sup>Department of Applied Bioscience, Graduate School of Agriculture, Hokkaido University, Sapporo, Japan
- 15:45 **16** Vibrios pathogenic for oysters are found associated to plankton species. What possible consequences on pathogen transmission to oysters? Carmen Lopez-Joven<sup>1</sup>; Jean-Luc Rolland<sup>1\*</sup>; Eric Abaddie<sup>2</sup>; Mohamed Laabir<sup>1</sup>; Estelle Masseret<sup>1</sup>; Audrey Vanhove<sup>1</sup>; Audrey Caro<sup>1</sup>; Delphine Bonnet<sup>1</sup>; Delphine Destoumieux-Garzon<sup>1</sup>; <sup>1</sup>Ecology of coastal marine systems, UMR 5119, CNRS, Ifremer, IRD, University of Montpellier, France; <sup>2</sup>Laboratoire Environnement Ressource du Languedoc Roussillon, Ifremer, Sète, France.
- 14:30 **19 STU** Bracovirus-derived genes in the genome of *Spodoptera exigua* Hübner (Lepidoptera: Noctuidae) and their role in host susceptibility to pathogens Laila Gasmi, Agata K. Jakubowska, Juan Ferré, Salvador Herrero; Laboratory of Biochemical Genetics and Biotechnology, Department of Genetics, Universitat de València 46100 –Burjassot (Valencia), Spain
- 14:45 **20** Entry of *Bombyx mori* nucleopolyhedrovirus (BmNPV) into BmN Cells by Macropinocytic Endocytosis, Jinshan Huang<sup>1,2</sup>, Bifang Hao<sup>1,2</sup>, Chen Cheng<sup>1</sup>, Fei Liang<sup>1</sup>, Xingjia Shen<sup>1,2</sup>; <sup>1</sup>Sericultural Research Institute, Jiangsu University of Science and Technology, <sup>2</sup>Sericultural Research Institute, Chinese Academy of Agricultural Science, Zhenjiang, Jiangsu, PRChina
- 15:00 **21** Nuclear translocation of *Autographa californica* nucleopolyhedrovirus ME53 Yang Liu, Jondavid de Jong, Éva Nagy, Peter Krell, University of Guelph, Guelph Ontario, Canada
- 15:15 **22** Nuclear localization and other domains of *Autographa californica* nucleopolyhedrovirus DNA polymerase Guozhong Feng<sup>1</sup>, Peter Krell<sup>2</sup>; <sup>1</sup>State Key Laboratory of Rice Biology, China National Rice Research Institute, Hangzhou, 310006, China; <sup>2</sup>University of Guelph, Guelph Ontario, Canada
- 15:30 **23 STU** Investigations into the role of *Autographa californica* multiple nucleopolyhedrovirus (AcMNPV) AC141 (EXON0) and *Trichoplusia ni* kinesin-1 in budded virus nucleocapsid egress Siddhartha Biswas<sup>1</sup>; Gary W. Blissard<sup>2</sup>; David A. Theilmann<sup>3</sup>; <sup>1</sup>Plant Science, Faculty of Land and Food Systems, University of British Columbia, Vancouver, BC Canada; <sup>2</sup>Boyce Thompson Institute at Cornell University, Ithaca, NY, USA; <sup>3</sup>Pacific Agri-Food Research Centre, Agriculture and Agri-Food Canada, Summerland BC, Canada
- 15:45 **24** The Twist In Baculoviruses Loy Volkman, University of California, Berkeley, California, and Expression Systems, LLC, Davis, California, USA

Contributed Papers Monday, 14:00-15:30. **P2**

## FUNGI 1

Moderators: Italo Delalibera and Nina Jenkins

Contributed Papers Monday, 14:00-16:00. **P1**

## VIRUSES 1

Moderator: Eric Carstens and David Theilmann

- 14:00 **17** Investigation of Baculovirus RNA Polymerase Subunit Protein-Protein Interactions with *in vivo* Bimolecular Fluorescence Complementation Assays Jessica Breznik, Nicola Johnson, Mustapha El-Ayoubi and Eric B Carstens, Queen's University, Kingston, Canada
- 14:15 **18 STU** Characterization and Quantitative Analysis of *Autographa californica* Multiple Nucleopolyhedrovirus (AcMNPV) FP25K Localization and Aggregate Formation During Cell Infection Tyler A. Garretson and Xiao-Wen Cheng, Department of Microbiology, Miami University, Oxford, Ohio, USA
- 14:00 **25** A new mycopesticide developed especially for the control of the citrus greening vector *Diaphorina citri* (Hemiptera: Liviidae) Italo Delalibera Jr., Celeste P. D'Alessandro, Marcos R. Conceschi, John J. S. Ausique Department of Entomology and Acarology, ESALQ, University of São Paulo, Piracicaba, São Paulo, Brazil
- 14:15 **26** Effectiveness of biorationals and *B. bassiana* against tomato fruitworm in Sinaloa Cipriano García, Adolfo D. Armenta and Luis A. Gaxiola; Instituto Politécnico Nacional. CIIDIR-IPN Unidad Sinaloa, Guasave, Sinaloa, Mexico
- 14:30 **27** Evaluating *Metarhizium brunneum* F52 Microsclerotia Applied in Hydromulch for Control of Asian Longhorned Beetles Tarryn Anne Goble<sup>1</sup>, Ann Hajek<sup>1</sup>, Mark Jackson<sup>2</sup>, and Sana Gardescu<sup>1</sup>; <sup>1</sup>Department of Entomology, Cornell University, Ithaca, USA, <sup>2</sup>USDA-ARS-NCAUR, Crop Bioprotection Research Unit, Peoria, IL, USA

- 14:45 **28 STU Management of entomopathogenic fungal disease in rearing mealworms, *Tenebrio molitor* as animal feed** [Sihyeon Kim](#), Se Jin Lee, Jeong Seon Yu, Yu-Shin Nai and Jae Su Kim; Department of Agricultural Biology, College of Agricultural & Life Sciences, Chonbuk National University, Jeonju, Korea
- 15:00 **29 Use of *Beauveria bassiana* (Bals) in the management of larger grain borer, *Prostephanus truncatus* (Horn.) (Coleoptera: Bostrichidae) on stored maize in Tanzania** [Daniel Karanja](#)<sup>1</sup>, Pierre Grammare<sup>2</sup>, Olivier Potin<sup>2</sup>, Nick Jessop<sup>3</sup>, Mathew Smith<sup>3</sup>, Roger Day<sup>1</sup> and Belinda Luke<sup>4</sup>, <sup>1</sup>CABI Africa, Nairobi, Kenya, <sup>2</sup>SylvanBio, Société SOMYCEL SA, Loches, France, <sup>3</sup>Exosect Limited, Leylands Business Park, Colden Common, Hampshire, UK, <sup>4</sup>CABI Europe – UK, Egham, UK
- 15:15 **30 Management of *Frankliniella occidentalis* (Thysanoptera: Thripidae) with granular formulations of entomopathogenic fungi** [Jae Su Kim](#)<sup>1</sup>, Margaret Skinner<sup>2</sup>, Bruce L. Parke<sup>2</sup>, Se Jin Lee<sup>1</sup>, Jeong Seon Yu<sup>1</sup> and Si Hyeon Kim<sup>1</sup>, <sup>1</sup>Department of Agricultural Biology, College of Agricultural & Life Sciences, Chonbuk National University, Jeonju, Korea. <sup>2</sup>Entomology Research Laboratory, University of Vermont, Burlington, USA.

16:00–16:30

BREAK

Symposium 2 (Microsporidia)

Monday, 16:30-18:30.

P3

## Microsporidiology: Advances in Europe

Organizers/Moderators: Andreas Linde and Sebastian Gisder

- 16:30 **31 A new intracellular parasite is a missing link between fungi and microsporidia** [Karen L. Haag](#)<sup>1</sup>, Timothy Y. James<sup>2</sup>, Ronny Larsson<sup>3</sup>, Tobias M. M. Schaefer<sup>4</sup>, Dominik Refardt<sup>5</sup>, Dieter Ebert<sup>4</sup>, <sup>1</sup>Federal University of Rio Grande do Sul, Porto Alegre, RS, Brazil; <sup>2</sup>University of Michigan, Ann Arbor, MI, USA; <sup>3</sup>University of Lund, Lund, Sweden; <sup>4</sup>Basel University, Basel, Switzerland; <sup>5</sup>Zurich University of Applied Sciences, Campus Grüental, Wädenswil, Switzerland
- 17:00 **32 Parasite takes fly - A *Drosophila* model of Microsporidia infection** [Sebastian Niehus](#)<sup>1</sup>, Adrien Franchet<sup>1</sup>, Frédéric Delbac<sup>2</sup>, Michael Boutros<sup>3</sup>, Dominique Ferrandon<sup>1</sup>, <sup>1</sup>Institut de Biologie Moléculaire et Cellulaire, UPR 9022 du CNRS, Université de Strasbourg, Strasbourg, France; <sup>2</sup>Laboratoire Microorganismes: Génome et Environnement, UMR 6023 du CNRS, Université Blaise Pascal, Aubière, France; <sup>3</sup>German Cancer Research Center, Division of Signaling and Functional Genomics, and Department for Cell and Molecular Biology, Faculty of Medicine Mannheim, University of Heidelberg, Heidelberg, Germany
- 17:30 **33 White Sea metchnikovellids: morphology, life cycles; potential ancestral features of microsporidia** [Yuliya Y. Sokolova](#)<sup>1,2</sup>, <sup>1</sup>Core Microscopy Center, School of Veterinary Medicine, Louisiana State University, Baton Rouge LA, USA; <sup>2</sup>Institute of Cytology, St. Petersburg, Russia.
- 18:00 **34 Microsporidia: Pathogens of Opportunity** [James J. Becnel](#)<sup>1</sup>, Louis M. Weiss<sup>2</sup>, <sup>1</sup>Center for Medical,

Agricultural and Veterinary Entomology, USDA/ARS, Gainesville, FL 32608, USA, <sup>2</sup>Department of Pathology, Division of Parasitology and Tropical Medicine, and Department of Medicine Division of Infectious Diseases, Albert Einstein College of Medicine, Bronx, NY, USA

Contributed Papers

Monday, 16:30-18:30.

P4

## NEMATODES 1

Moderators: Edwin Lewis and Albrecht Koppenhöfer

- 16:30 **35 Measuring entomopathogenic nematode activity, abundance and soil food web assemblage in Swiss wheat and maize cultivation** [Raquel Campos-Herrera](#)<sup>1</sup>, Geoffrey Jaffuel<sup>1</sup>, Xavier Chiriboga<sup>1</sup>, Rubén Blanco-Pérez<sup>1</sup>, Marie Fesselet<sup>2</sup>, Vladimir Půža<sup>3</sup>, Fabio Mascher<sup>2</sup>, Ted C.J. Turlings<sup>1</sup>, <sup>1</sup>FARCE Laboratory, University of Neuchâtel, Neuchâtel (Switzerland); <sup>2</sup>Département fédéral de l'économie, de la formation et de la recherche DEFR, Agroscope, Institut des Sciences en Production Végétale IPV, Nyon (Switzerland); <sup>3</sup>Laboratory of Entomopathogenic Nematodes, Institute of Entomology, Biology Centre, Czech Academy of Sciences, České Budějovice, Czech Republic
- 16:45 **36 STU Biocontrol and nutrition: understanding the role of environment in the trait deterioration of an entomopathogenic nematode symbiont** [Dana Blackburn](#), Burke Crawford, and Byron Adams, Brigham Young University, Provo, UT, USA
- 17:00 **37 Insect-killing nematodes also kill competitors: lethal male-male fighting in *Steinernema*** Anniemie Zenner, Kathryn O'Callaghan and [Christine Griffin](#), Department of Biology, National University of Ireland Maynooth, Ireland
- 17:15 **38 STU Comparison of Life History Traits of the Entomopathogenic Nematodes *Steinernema feltiae* and *Steinernema riobrave*** [Temesgen Addis](#)<sup>1,3</sup>, Asmamaw Teshome<sup>2</sup>, Olaf Strauch<sup>3</sup> and Ralf-Udo Ehlers<sup>3</sup>, <sup>1</sup>Faculty of Agricultural and Nutritional Sciences, Christian-Albrechts-University, Kiel, Germany, <sup>2</sup>Department of Biology, Ghent University, Ghent, Belgium, <sup>3</sup>e-nema, GmbH, Schwentinental, Germany
- 17:30 **39 STU How does plant domestication influence entomopathogenic nematodes as potential biological control agents?** [Monique Rivera](#)<sup>1</sup>, Cesar Rodriguez-Saona<sup>1</sup>, Hans T. Alborn<sup>2</sup>, and Albrecht M. Koppenhöfer<sup>1</sup>, <sup>1</sup>Department of Entomology, Rutgers University, New Brunswick, NJ 08901, USA, <sup>2</sup>USDA ARS CMAVE, Gainesville, FL, USA
- 17:45 **40 Analysis of intraspecific variability in *Steinernema kraussei* populations using PCA**, M. Clausi<sup>1</sup>, G. Rappazzo<sup>1</sup>, [E. Tarasco](#)<sup>2</sup>, D. Leone<sup>1</sup>, M. T. Vinciguerra<sup>1</sup>, <sup>1</sup>Department of Biological, Geological and Environmental Sciences, Section of Animal Biology "M. La Greca", University of Catania, Catania (Italy), <sup>2</sup>Department of Soil, Plant and Food Sciences, Section of Entomology and Zoology, University of Bari "Aldo Moro", Bari, Italy
- 18:00 **41 Population genetic structure of entomopathogenic nematode *Steinernema affine* (Steinernematidae: Nematoda) inferred using microsatellite markers** [Vladimír Půža](#)<sup>1</sup>, Martina Žurovcová<sup>1</sup>, Jiří Nermut<sup>1</sup>, Daniela Chundelová<sup>1,2</sup>, Zdeněk Mráček<sup>1</sup>, <sup>1</sup>Institute of Entomology, Biology Centre of the AS CR, České Budějovice, Czech Republic; <sup>2</sup>Faculty of Sciences, University of South Bohemia, České Budějovice, Czech Republic

18:15 **42 STU** Eat or Be Eaten: Fungus and Nematode Switch off as Predator and Prey E. Erin Morris<sup>1</sup> and Ann E. Hajek<sup>2</sup>, <sup>1</sup>Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg 1871, Denmark; <sup>2</sup>Department of Entomology, Cornell University, Ithaca, New York 14853-2601, USA

18:15 **50** Enhancement of insecticidal activity of a nucleopolyhedrovirus isolated from *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) by coinfection with granulovirus Paola Cuartas, Laura Villamizar, Centro de Biotecnología y Bioindustria (CBB), Corpoica, Bogotá, Colombia

Contributed Papers Monday, 16:30-18:30. **P1**

## VIRUSES 2

Moderators: Jenny Cory and Agata Jakubowska

- 16:30 **43** Insect feeding induces transgenerational resistance to NPV in Lepidoptera Grant L. Olson<sup>1</sup>, Judith H. Myers<sup>2</sup>, Jenny S. Cory<sup>1</sup>, <sup>1</sup>Dept. of Biological Sciences, Simon Fraser University, Burnaby, British Columbia, Canada; <sup>2</sup>Biodiversity Centre, Dept. of Zoology, University of British Columbia, Vancouver, British Columbia, Canada
- 16:45 **44** The resistance of *Cydia pomonella* against baculoviruses is provoked by a mutation of the immediate-early *pe38* gene of *Cydia pomonella* granulovirus Manuela Gebhardt, Karolin E. Eberle, Johannes A. Jehle, Institute for Biological Control, Julius Kühn Institute (JKI), Federal Research Center on Cultivated Plants, Darmstadt, Germany
- 17:00 **45** CpGV-R5 allows replication of CpGV-M in resistant host insect larvae Benoit Graillot<sup>1,2</sup>, Sandrine Bayle<sup>1</sup>, Christine Blachere-Lopez<sup>1,3</sup>, Samantha Besse<sup>2</sup>, Myriam Siegwart<sup>4</sup>, Miguel Lopez-Ferber<sup>1</sup>, <sup>1</sup>LGEI, Ecole des Mines d'Alès, Institut Mines-Telecom et Université de Montpellier Sud de France, Alès, France. <sup>2</sup>Natural Plant Protection, Arysta LifeScience group, Pau, France. <sup>3</sup>INRA, Alès, France. <sup>4</sup>INRA, unité PSH, AVIGNON, France
- 17:15 **46** Simultaneous covert infections with three different RNA viruses in the Lepidoptera *Spodoptera exigua* Agata K. Jakubowska<sup>1</sup>, Melania D'Angiolo<sup>1</sup>, Rosa M. González Martínez<sup>2</sup>, Anabel Millán Leiva<sup>1</sup>, Arkaitz Carballo<sup>2</sup>, Rosa Murillo<sup>2</sup>, Primitivo Caballero<sup>2</sup>, Salvador Herrero<sup>1</sup>, <sup>1</sup>Department of Genetics, Universitat de València, Burjassot, Spain; <sup>2</sup>Bioinsecticidas Microbianos, Instituto de Agrobiotecnología, CSIC-UPNA, Gobierno de Navarra, Navarra, Spain
- 17:30 **47** Mixed SeMNPV genotypes comprised transmission capacities and insecticidal properties Cristina Virto<sup>1</sup>, David Navarro<sup>1,2</sup>, Ma del Mar Tellez<sup>2</sup>, Trevor Williams<sup>3</sup>, Rosa Murillo<sup>1,4</sup>, Primitivo Caballero<sup>1,4</sup>, <sup>1</sup>Instituto de Agrobiotecnología, CSIC-Gobierno de Navarra, Ctra. de Mutilva s/n 31192, Mutilva Baja, Spain; <sup>2</sup>IFAPA, La Mojonera, 04745, Almería, Spain; <sup>3</sup>Instituto de Ecología AC, Xalapa 91070, Mexico; <sup>4</sup>Departamento Producción Agraria, Universidad Pública de Navarra, Pamplona 31006, Spain
- 17:45 **48-STU** A novel mode of resistance of codling moth against *Cydia pomonella* granulovirus Annette J. Sauer, Eva Fritsch, Karin Undorf-Spahn, Johannes A. Jehle, Julius Kühn-Institut, Darmstadt, Germany
- 18:00 **49** The effects of temperature on *Cryptophlebia leucotreta* granulovirus (GrLeGV-SA) in mortality rates of false codling moth larvae Thaumatotibia leucotreta Devon Brits, Jaryd Ridgeway & Alicia Timm, Department of Zoology and Entomology, Rhodes University, Grahamstown, South Africa

Contributed Papers Monday, 16:30-18:30. **P2**

## FUNGI 2

Moderator: Drauzio Rangel

- 16:30 **51** Rapid and simple method for overnight development of strain-specific markers: A case study with the commercial *Beauveria bassiana* strain, GHA George Kyei-Poku, Shajahan Johny, Agathe Roucou and Debbie Gauthier; Canadian Forestry Service, Great Lakes Forestry Centre, Natural Resources Canada, Sault Ste. Marie, Ontario, Canada
- 16:45 **52-STU** The functions of two Cu/Zn-superoxide dismutases and a Fe-superoxide dismutase in regulating the growth, antioxidation, UV tolerance and virulence of *Beauveria bassiana* Fang Li<sup>1</sup>, Zheng-Liang Wang<sup>2</sup>, Han-Qing Shi<sup>1</sup>, Sheng-Hua Ying<sup>1</sup>, Ming-Guang Feng<sup>1</sup>, <sup>1</sup>Institute of Microbiology, College of Life Sciences, Zhejiang University, Hangzhou, Zhejiang, People's Republic of China; <sup>2</sup>College of Life Sciences, China Jiliang University, Hangzhou, Zhejiang, P. R.China.
- 17:00 **53 STU** Effect of temperature, water activity and UV-B radiation on conidia germination and colony growth of *Beauveria bassiana* isolates from soil and phylloplane María Fernández-Bravo, Inmaculada Garrido-Jurado, Enrique Quesada-Moraga, University of Córdoba, Department of Agricultural and Forestry Sciences, ETSIAM, 14071 Córdoba, Spain
- 17:15 **54** Non-target aquatic arthropods testing of *Metarhizium* strains and their crude extracts produced by solvent extraction and nanofiltration technology Inmaculada Garrido-Jurado<sup>1</sup>, Steffan R. Williams<sup>2</sup>, Ahmed Abdrahman<sup>3</sup>, Darren L. Oatley-Radcliffe<sup>2</sup>, Enrique Quesada-Moraga<sup>1</sup>, Tariq M. Butt<sup>3</sup>, <sup>1</sup>Department of Agricultural and Forestry Sciences, ETSIAM, University of Cordoba. Campus de Rabanales. Edificio C4 Celestino Mutis. 14071 Cordoba, Spain, <sup>2</sup>Centre for Water Advanced Technologies and Environmental Research (CWATER), College of Engineering, Swansea University, Swansea, UK, <sup>3</sup>Department of Biosciences, College of Science, Swansea University, Swansea, UK
- 17:30 **56 STU** Development of analytical methods for the analysis of *Metarhizium brunneum* metabolites in crop matrices Judith Taibon<sup>1,2</sup>, Sonja Sturm<sup>1</sup>, Christoph Seger<sup>1,3</sup>, Hermann Stuppner<sup>1</sup>, Hermann Strasser<sup>2</sup>, <sup>1</sup>Institute of Pharmacy / Pharmacognosy, Leopold-Franzens University Innsbruck, Austria, <sup>2</sup>Institute of Microbiology, Leopold-Franzens University Innsbruck, Austria, <sup>3</sup>ZIMCL, University Hospital Innsbruck, Austria.
- 17:45 **57 STU**  $\alpha$ -1, 2-mannosyltransferase *ktr1*, *ktr4* and *kre2* regulate positively growth, conidiation, viability, virulence, and multi-stress tolerances in *Beauveria bassiana* Juan-juan Wang, Lei Qiu, Sheng-Hua Ying, Ming-Guang Feng<sup>1</sup>, Institute of Microbiology, College of Life Sciences, Zhejiang Univ., Hangzhou, Zhejiang, People's Republic of China

SIP Division Business Meetings: Monday, 20:00-21:30

**Microbial Control P3**

**DBI P5**

Nematode Division Workshop Monday, 20:00-21:30 P4

**Invertebrate Pathogens in the Classroom:  
Current Status and Future Challenges**

Organizers: Glen Stevens and Patricia Stock

## TUESDAY - 5 August

07:30-13:00 Registration P1

Symposium 3 (Fungi) Tuesday, 8:00-10:00. P2

**Fatal Attraction: Fungi and Odours in  
deadly Combinations for Pest Control**

Organizer/Moderator: Ingeborg Klingen

8:00 **58 Conifer - bark beetle - fungus interactions** Tao Zhao<sup>1</sup>, Paal Krokene<sup>2</sup>, Anna-Karin Borg-Karlson<sup>1</sup>, <sup>1</sup>The Royal Institute of Technology, Department of Chemistry, Ecological Chemistry Group, Stockholm, Sweden; <sup>2</sup>Norwegian Forest and Landscape Institute, Ås, Norway

8:20 **59 Carbon dioxide as an orientation cue for western corn rootworm and wireworm larvae - implications for an attract and kill approach using entomopathogenic fungi** Mario Schumann<sup>1</sup>; Anant Patel<sup>2</sup>; Miriam Hanitzsch<sup>2</sup>; Stefan Vidal<sup>1</sup>; <sup>1</sup>Georg-August-Universität Göttingen, Department of Crop Sciences, Göttingen, Germany; <sup>2</sup>Fachhochschule Bielefeld, University of Applied Sciences, Department of Engineering and Mathematics, Bielefeld, Germany

8:40 **60 Different behavioral responses in specialist and generalist natural enemy interactions (predators and fungi) in a strawberry-mite pest system** Stine Kramer Jacobsen<sup>1</sup>, Jørgen Eilenberg<sup>1</sup>, Ingeborg Klingen<sup>2</sup>, Lene Sigsgaard<sup>1</sup>, <sup>1</sup>Department of Plant and Environmental Sciences, University of Copenhagen, Denmark; <sup>2</sup>Norwegian Institute for Agricultural and Environmental Research (Bioforsk) Plant Health and Plant Protection Division, Norway.

9:00 **61-STU How *Fusarium graminearum* influences insect-plant interactions** Drakulic Jassy<sup>1,2</sup>, Bruce Toby<sup>2</sup>, Ray Rumiana<sup>1</sup>; <sup>1</sup>Division of Plant and Crop Sciences, University of Nottingham, UK; <sup>2</sup>Rothamsted Research, Department of Biological Chemistry and Crop Protection, Harpenden, UK

9:20 **62 Plant-microorganism interactions that shape host-plant selection in the grapevine moth** Geir K. Knudsen<sup>1</sup>, Ilaria Pertot<sup>2</sup>, Marco Tasin<sup>1,3</sup>, <sup>1</sup>Bioforsk, Norwegian Institute for Agricultural and Environmental Research, Plant Health and Plant Protection Division, Høgskoleveien 7, 1432 Ås, Norway; <sup>2</sup>Edmund Mach Foundation, 38010 San Michele all'Adige, Italy;

<sup>3</sup>Integrated Plant Protection, Dep. of Crop Protection Biology, Swedish University of Agricultural Sciences, Sweden

9:40 **63 Effect of host plant on aphid susceptibility to the fungal pathogen *Pandora neoaphidis*** Cezary Tkaczuk<sup>1</sup>; Paresh A. Shah<sup>2</sup>, Judith K. Pell<sup>2,3</sup>, <sup>1</sup>Department of Plant Protection, Siedlce University, Siedlce, Poland; <sup>2</sup>Plant and Invertebrate Ecology Department (now AgroEcology Department), Rothamsted Research, Harpenden, UK; <sup>3</sup>Current Address: J.K. Pell Consulting, Luton, UK

Contributed Papers Tuesday, 8:00-10:00. P4

## NEMATODES 2

Moderators: Patricia Stock and Christine Griffin

8:00 **64 Entomopathogenic nematode behavioral responses to chemical cues from cadavers** Paige Redifer, Brittany Gale, Allison McLain, Glen Stevens, Laura Grochowski, School of Natural Sciences and Mathematics, Ferrum College, Ferrum, VA, USA

8:15 **65 The *Wolbachia* Endosymbiont as a Nematode Drug Target for Control of Human Filariasis, a Neglected Tropical Disease and Other Insect Borne Pathogens** Barton E. Slatko, Molecular Parasitology Group, Genome Biology Division, New England Biolabs, Inc., Ipswich MA USA

8:30 **66 Differential PirAB expression of the entomopathogenic bacterium *Photorhabdus luminescens* (Enterobacteriaceae) based on tissue association and portal of entry to the insect host** Anais Castagnola<sup>1,2</sup>; Nathaniel Davis<sup>3</sup>; Belen Molina<sup>4</sup>; S. Patricia Stock<sup>1</sup>; John G. McMullen II<sup>1</sup>; <sup>1</sup>Department of Entomology, University of Arizona; <sup>2</sup>Center for Insect Science, University of Arizona; <sup>3</sup>Pima Community College; <sup>4</sup>Department of Ecology and Evolutionary Biology, University of Arizona, USA

8:45 **67-STU Candidate Virulence Loci in Pan-Genome of the Entomopathogenic Bacterium, *Xenorhabdus bovienii* (Gamma-Proteobacteria: Enterobacteriaceae)**, John G McMullen II<sup>1</sup>; Gaelle Bisch<sup>2</sup>; Jean-Claude Ogier<sup>2</sup>; Sylvie Pagés<sup>2</sup>; Sophie Gaudriault<sup>2</sup>; S. Patricia Stock<sup>3</sup>, <sup>1</sup>University of Arizona, School of Animal and Comparative Biomedical Sciences, Tucson, AZ; <sup>2</sup>Université Montpellier II/INRA, UMR 1333 Laboratoire DGIMI, Montpellier, France; <sup>3</sup>University of Arizona, Department of Entomology, Tucson, AZ, USA

9:00 **69 Molecular mechanism of the nematocidal activity of *Photorhabdus luminescens* LN2 against *Heterorhabditis bacteriophora* H06 nematodes** Xuehong Qiu and Richou Han Guangdong, Entomological Institute, Guangzhou 510260, China

9:15 **70 Natural products from entomopathogenic bacteria: Understanding the interaction of bacteria, insects and nematodes** Helge B. Bode, Merck Stiftungsprofessur für Molekulare Biotechnologie, Fachbereich Biowissenschaften, Goethe Universität Frankfurt, Germany

**VIRUSES 3**

Moderators: Zhihong Hu and Trevor Williams

- 8:00 **71 Characterization and formulation of a Colombian isolate of *Erinnyis ello* granulovirus (L.) (Lepidoptera: Sphingidae)** Juliana Gómez<sup>1</sup>, Gloria Barrera<sup>1</sup>, Paola Cuartas<sup>1</sup>, Carolina Ruiz<sup>1</sup>, Adriana Santos<sup>1</sup>, Liz Uribe<sup>1</sup>, Guillermo León<sup>2</sup>, Laura Villamizar<sup>1</sup>; <sup>1</sup>Centro de Biotecnología y Bioindustria (CBB), Corpoica, Bogotá, Colombia; <sup>2</sup>Centro de Investigación "La Libertad" Corpoica, Puerto López, Colombia
- 8:15 **72 PRODUCTION OF THE *Cydia pomonella* granulovirus (CpGV) IN A HETEROLOGOUS HOST** C.B. Chambers<sup>1</sup>, S.D. Moore<sup>2,3</sup>, M.P. Hill<sup>3</sup> & C. Knox<sup>4</sup>, <sup>1</sup>River Bioscience, PO Box 20388, Humewood 6013, Port Elizabeth, South Africa, <sup>2</sup>Citrus Research International, PO Box 20285, Humewood 6013, Port Elizabeth, South Africa, <sup>3</sup>Department of Zoology and Entomology, Rhodes University, PO Box 64, Grahamstown, South Africa, <sup>4</sup>Department of Biochemistry, Microbiology and Biotechnology, Rhodes University, Grahamstown, South Africa
- 8:30 **73 Post-translational cleavage of P74 of the *Helicoverpa armigera* single nucleopolyhedrovirus facilitates per os infection** Huachao Huang<sup>1</sup>, Manli Wang<sup>1</sup>, Xin Luo<sup>1</sup>, Xi Wang<sup>1</sup>, Basil M. Arif<sup>2</sup>, Fei Deng<sup>1</sup>, Hualin Wang<sup>1</sup>, Zhihong Hu<sup>1</sup>, <sup>1</sup>State Key Laboratory of Virology and Joint Laboratory of Invertebrate Virology, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan 430071, PR China; <sup>2</sup>Laboratory for Molecular Virology, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario, Canada
- 8:45 **74-STU Isolation, genetic characterisation and evaluation of biological activity of a novel South African *Phthorimaea operculella* granulovirus (PhopGV)** Michael D. Jukes<sup>1</sup>, Caroline M. Knox<sup>1</sup>, Sean D. Moore<sup>2</sup> & Martin P. Hill<sup>3</sup>, <sup>1</sup>Department of Biochemistry and Microbiology, Rhodes University, Grahamstown, 6140 South Africa, <sup>2</sup>Citrus Research International, Humewood, Port Elizabeth, 6013 South Africa, <sup>3</sup>Department of Zoology and Entomology, Rhodes University, Grahamstown, 6140 South Africa
- 9:00 **75 Genetic and biological characterisation of a novel South African *Plutella xylostella* granulovirus, P1xyGV-SA** Fatima Abdulkadir<sup>1</sup>, Caroline Knox<sup>1</sup>, Tamryn Marsberg<sup>2</sup>, Martin P. Hill<sup>2</sup> & Sean D. Moore<sup>2,3</sup>, <sup>1</sup>Department of Biochemistry, Microbiology and Biotechnology, Rhodes University, Grahamstown, South Africa; <sup>2</sup>Department of Zoology and Entomology, Rhodes University, Grahamstown, South Africa; <sup>3</sup>Citrus Research International, Humewood, Port Elizabeth, South Africa
- 9:15 **76-STU Comparative transcriptome analysis of CpGV-M in susceptible and resistant codling moth *Cydia pomonella*** Diana Schneider, Johannes A. Jehle; Julius Kühn-Institut, Institute for Biological Control, Darmstadt, Germany
- 9:30 **77 Transmission of mixtures of insect pathogenic viruses in a single virion: towards the development of custom designed virus insecticides** Inés Beperet<sup>1</sup>, Oihane Simón<sup>1</sup>, Trevor Williams<sup>2</sup>, Miguel López-Ferber<sup>3</sup>, Primitivo Caballero<sup>1</sup>; <sup>1</sup>Bioinsecticidas Microbianos, Instituto de Agrobiotecnología, Mutilva Baja, Navarra, Spain; <sup>2</sup>Instituto de Ecología AC, Xalapa, Mexico; <sup>3</sup>LGEI, École des Mines d'Alès, Alès France; <sup>4</sup>Departamento de Producción Agraria, Universidad Pública de Navarra, Pamplona, Spain

- 9:45 **78 Improvement of UV-resistance of Baculovirus by displaying the Nano-material binding peptides on the Polyhedron Envelope**, Jin Li, Yin Zhou, Chengfeng Lei, Xiulian Sun, Key Laboratory of Agricultural and Environmental Microbiology, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan 430071, China

**BACTERIA 2**

Moderators: Jean-Loius Schwartz and Juan Ferré

- 8:00 **79 *Yersina entomophaga* MH96 (Enterobacteriaceae) BC subcomplex of the Yen-Tc ABC toxin is able to induce toxicity independent of the A subcomplex** Sean D.G. Marshall<sup>1</sup>, Jason N. Busby<sup>2</sup>, J. Shaun Lott<sup>2</sup>, Sandra A. Jones<sup>1</sup>, Julie E. Dalziel<sup>3</sup>, Femke Schepers<sup>3</sup>, Mark Hurst<sup>1</sup>; <sup>1</sup>Innovative Farming Systems, AgResearch, Lincoln Research Centre, Christchurch 8140, New Zealand; <sup>2</sup>School of Biological Sciences, University of Auckland, New Zealand; <sup>3</sup>Food & Bio-based Products, AgResearch, Grasslands Research Centre, Palmerston North 4442, New Zealand
- 8:15 **80 Interaction of *Bacillus thuringiensis* Cry1Ab toxin with Mucus-rich structures** Diego Segond<sup>1,2</sup>, Agnès Rejasse<sup>1</sup>, Christophe Buisson<sup>1</sup>, Shuyuan Guo<sup>1,3</sup>, Karine Adel-Patient<sup>2,4</sup>, Hervé Bernard<sup>2,4</sup>, Didier Lereclus<sup>1</sup>, Christina Nielsen-LeRoux<sup>1</sup>; <sup>1</sup>INRA UMR1319-Micalis, team GME, 78352 Jouy en Josas France, <sup>2</sup>INRA, UR496 Unité d'Immuno-Allergie Alimentaire, France, <sup>3</sup>School of Life Science, Beijing Institute of Technology, Beijing, China, <sup>4</sup>CEA, IBItecS, Service de Pharmacologie et d'Immunoanalyse, Gif-sur-Yvette, France
- 8:30 **81-STU Pore formation helping ability and binding affinity of BmABCC2 and BtR175 against Cry1A toxins** Shiho Tanaka<sup>1</sup>, Ami Iizuka<sup>1</sup>, Kazuhisa Miyamoto<sup>2</sup>, Hiroaki Noda<sup>2</sup>, Shingo Kikuta<sup>1</sup>, Ryoichi Sato<sup>1</sup>; <sup>1</sup>Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan; <sup>2</sup>National Institute of Agrobiological Sciences, Tsukuba, Ibaraki, Japan
- 8:45 **82 A necessary step in the mode of action of the Cry8 toxin: the elimination of DNA from the Cry toxin-DNA complex**, Shuyuan Guo, Bingjie Ai, Jie Li, Dongmei Feng, Feng Li, School of Life Science, Beijing Institute of Technology, Beijing, China
- 9:00 **83-STU How does the *Bt* Cry41Aa toxin kill human cancer cells?** Barbara Domanska, Vidisha Krishnan, Gizem Altun, Michelle West and Neil Crickmore; Department of Biochemistry, School of Life Sciences, University of Sussex, Falmer, Brighton, UK
- 9:15 **84-STU Which regions of the *Bt* Cry41Aa toxin are responsible for its activity against human cancer cells?** Alicia Elhigazi, Vidisha Krishnan, Fatai Afolabi, Barbara Domanska, Lisa Muharib, Michelle West, Neil Crickmore. Department of Biochemistry, School of Life Sciences, University of Sussex, Falmer, Brighton, UK
- 9:30 **85 Parasporin PS1Aa2 induces ionic channels in lipid bilayer membranes and calcium oscillations in sensitive cells** Gabriel Narvaez<sup>1</sup>, Vincent Vachon<sup>1</sup>, Dong Xu<sup>2</sup>, Jean-Charles Côté<sup>2</sup>, Jean-Louis Schwartz<sup>1,3</sup>, <sup>1</sup>Groupe d'étude des protéines membranaires, Université de Montréal, Montreal, Quebec, Canada; <sup>2</sup>Research Center, Agriculture and Agri-Food Canada, St-Jean-sur-Richelieu, Quebec, Canada, <sup>3</sup>Centre Sève, Université de Sherbrooke, Sherbrooke, Quebec, Canada



9:45 **86-STU** *Caenorhabditis elegans* – *Bacillus thuringiensis* interactions: new insights into mechanisms of host resistance and pathogen virulence Igor Iatsenko, Iuliia Boichenko, Ralf J. Sommer; Max Planck Institute for Developmental Biology, Department for Evolutionary Biology, Tuebingen, Germany

10:00–10:30 BREAK

Symposium 4 (Viruses) Tuesday, 10:30-12:30. **P1**  
**Small non-coding RNAs as Regulators of Insect Host-Virus Interactions and Immunity**

Organizer/Moderator: Sassan Asgari

10:30 **87** Role of cellular and virus-encoded microRNAs in insect host-virus interactions Sassan Asgari, School of Biological Sciences, The University of Queensland, Brisbane QLD 4072, Australia

11:00 **88** Sensing viral RNA in *Drosophila melanogaster* Simona Paro<sup>1</sup>, Eric Aguiar<sup>2</sup>, Bill Claydon<sup>1</sup>, Joao Trindade Marques<sup>2</sup>, Jean-Luc Imler<sup>1,2</sup> and Carine Meignin<sup>1,2</sup>; <sup>1</sup>IBMC, CNRS-UPR9022, Strasbourg, France; <sup>2</sup>Laboratory of RNA Interference, Biochemistry and Immunology, Universidade Federal de Minas Gerais Belo Horizonte, Brazil; <sup>3</sup>University of Strasbourg, Strasbourg, France

11:30 **89** Small RNA-directed antiviral immunity in disease-vector mosquitoes Kevin M. Myles, Virginia Tech, Fralin Life Science Institute, Department of Entomology, Blacksburg, Virginia, USA

12:00 **90** Controlling viral infection in insects Mark Kunitomi, Michel Tassetto, Arabinda Nayak, and Raul Andino, Department of Microbiology and Immunology, University of California, San Francisco, California 94143-2280, USA

Contributed Papers Tuesday, 10:30-12:15. **P3**  
**MICROBIAL CONTROL 1**  
Moderator: Michael Brownbridge

10:30 **91** Double trouble for thrips: Effective biopesticide combinations to control soil-dwelling stages in chrysanthemums Michael Brownbridge, Taro Saito and Paul Côté, Vineland Research and Innovation Centre, Vineland Station, Ontario, Canada

10:45 **92-STU** Lethal and sub-lethal impacts of fungal biopesticides on house fly populations in simulated field settings of biocosms, Naworaj Acharya<sup>1</sup>, Simon Blanford<sup>1,2</sup>, Edwin G. Rajotte<sup>1</sup>, Nina E. Jenkins<sup>1</sup>, Mathew B. Thomas<sup>1,2</sup>; <sup>1</sup>Department of Entomology, Penn State University, 501 Agricultural Sciences and Industries Building, PA 16802, USA, <sup>2</sup>Center for Infectious Diseases Dynamics, Penn State University, Merkle Lab, PA 16801, USA

11:00 **93-STU** Management of *Prostephanus truncatus* (Horn.) on stored maize using *Beauveria bassiana* (Bals.) Mavis A. Acheampong<sup>1</sup>, Eric W. Cornelius<sup>1</sup>, Vincent Y. Eziah<sup>1</sup>, Ken O.Fening<sup>1</sup>, Clare Storm<sup>2</sup>, Dave Moore<sup>3</sup>, Nick Jessops<sup>2</sup>, Matthew Smith<sup>2</sup>, Olivier Potin<sup>4</sup>, Pierre Grammare<sup>4</sup> and Belinda Luke<sup>3</sup>; <sup>1</sup>Department of

Crop Science, University of Ghana, Legon; <sup>2</sup>Exosect Ltd, UK; <sup>3</sup>CABI, UK; <sup>4</sup>SylvanBio, France

11:15 **94-STU** Lack of involvement of chitinase in direct toxicity of *Beauveria bassiana* exudates to the aphid *Myzus persicae* Peter Cheong<sup>1</sup>, Travis R. Glare<sup>1</sup>, Michael Rostas<sup>1</sup>, Stephen Haines<sup>2</sup>, Jolon Dyer<sup>2</sup>, Stefan Clerens<sup>2</sup>, Jenny Brookes<sup>1</sup> and Stephen Ford<sup>3</sup>; <sup>1</sup>Bio-Protection Research Centre, P O Box 85084, Lincoln University, Lincoln 7647, Christchurch, New Zealand, <sup>2</sup>AgResearch, Lincoln Research Centre, Private Bag 4749, Christchurch 8140, New Zealand, <sup>3</sup>Biotelliga Limited, Pukekohe 2120, New Zealand

11:30 **95-STU** Entomopathogenic fungi for control of false codling moth in South African citrus orchards Candice A. Coombes<sup>1</sup>; Martin P. Hill<sup>1</sup>; Sean D. Moore<sup>1,2</sup>; Joanna F. Dames<sup>3</sup>; <sup>1</sup>Department of Zoology and Entomology, Rhodes University, Grahamstown, 6140, South Africa; <sup>2</sup>Citrus Research International, Humewood, 6013, Port Elizabeth, South Africa; <sup>3</sup>Department of Biochemistry and Microbiology, Rhodes University, Grahamstown, 6140, South Africa.

11:45 **97-STU** Wireworm control with entomopathogenic fungi and plant extracts Sonia Eckard<sup>1</sup>; Sven Bacher<sup>2</sup>; Jürg Enkerli<sup>1</sup>; Giselher Grabenweger<sup>1</sup>; <sup>1</sup>Agroscope, Institute for Sustainability Sciences, Reckenholzstrasse 191, Zürich, Switzerland, <sup>2</sup>University of Fribourg, Department of Biology, Unit of Ecology and Evolution, Fribourg, Switzerland

12:00 **98-STU** Long-term persistence of *Beauveria brongniartii* BIPESCO 2 used for cockchafer control in the Euroregion Tyrol Johanna Mayerhofer<sup>1,2</sup>, Jürg Enkerli<sup>2</sup>, Roland Zelger<sup>3</sup> & Hermann Strasser<sup>1</sup>; <sup>1</sup>Institute of Microbiology, Leopold-Franzens University Innsbruck, AUT, <sup>2</sup>Molecular Ecology, Institute for Sustainability Sciences, Agroscope, Zürich, CH, <sup>3</sup>Research Centre for Agriculture and Forestry Laimburg, Ora/Auer, Italy

Contributed Papers Tuesday, 10:30-12:30. **P4**  
**DIS. OF BENEFICIAL INVERTEBRATES 1**  
Moderators: Kelly Bateman and Spencer Greenwood

10:30 **99** The Curious Case of the PaV1 in Adult Caribbean Spiny Lobsters Donald C. Behringer<sup>1,2</sup>; Mark J. Butler IV<sup>3</sup>; Jessica Moss<sup>4</sup>; Jeffrey D. Shields<sup>4</sup>; <sup>1</sup>University of Florida, Program in Fisheries and Aquatic Sciences, Gainesville, Florida 32653 (USA); <sup>2</sup>University of Florida, Emerging Pathogens Institute, Gainesville, Florida 32611 (USA); <sup>3</sup>Old Dominion University, Department of Biological Sciences, Norfolk, Virginia 23529 (USA); <sup>4</sup>Virginia Institute of Marine Science, Gloucester Point, Virginia 23062 USA

10:45 **100** Defining lobster-pathogen interactions via high-throughput gene expression studies: The discovery and description of the interplay between the American Lobster (*Homarus americanus*) and the ciliated parasite *Anophryoides haemophila*, Spencer J. Greenwood<sup>1,2,3</sup>; K. Fraser Clark<sup>1,2,3</sup>; <sup>1</sup>Atlantic Veterinary College Lobster Science Centre; <sup>2</sup>Department of Biomedical Sciences, University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada; <sup>3</sup>Department of Plant and Animal Sciences, Dalhousie University, Truro, Nova Scotia, Canada

11:00 **101-STU** Metabolomic investigation of Bitter Crab Disease in snow crabs (*Chionoecetes opilio*) Melanie

- Buote<sup>1</sup>, Russ Kerr<sup>2</sup>, Rick Cawthorn<sup>1</sup>, Spencer Greenwood<sup>2</sup>, Glenda Wright<sup>2</sup>; <sup>1</sup>Department of Pathology and Microbiology, Atlantic Veterinary College at UPEI, Charlottetown, PEI; <sup>2</sup>Department of Biomedical Sciences, Atlantic Veterinary College at UPEI, Charlottetown, PEI
- 11:15 **102-STU** Assessment of immunocompetence in the shore crab, *Carcinus maenas*, to natural exposure of pathogens Lauren Hall<sup>1</sup>, Chris Hauton<sup>1</sup>, Grant Stentiford<sup>2</sup>, <sup>1</sup>National Oceanography Centre Southampton, University of Southampton, European Way, Southampton, SO14 3ZH, UK, <sup>2</sup>CEFAS, The Nothe, Barrack Road, Weymouth, Dorset, DT4 8UB, UK
- 11:30 **103-STU** Effects of artificial infection of juvenile edible crabs, *Cancer pagurus* with the parasitic dinoflagellate, *Hematodinium* sp. Amanda Smith, Andrew Rowley; Department of Biosciences, College of Science, Swansea University, Swansea, SA2 8PP, Wales, U.K.
- 11:45 **104** A role of polychaetes in transmission of white spot syndrome virus in shrimp ponds? H. Desrina<sup>1,2,3</sup>, Marc C.J. Verdegem<sup>2</sup>, Johan A.J. Verreth<sup>2</sup>, Slamet B. Prayitno<sup>3</sup> and Just M. Vlak<sup>1</sup>; Laboratories of <sup>1</sup>Virology and <sup>2</sup>Aquaculture and Fisheries, Wageningen University, Wageningen, The Netherlands, and <sup>3</sup>Department of Fisheries, Faculty of Fisheries and Marine Sciences, Diponegoro University, Jl. Prof Sudharto, Tembalang, Semarang, Indonesia.
- 12:00 **105** Novel Pattern Recognition Receptor Protects Shrimp from *Vibrio* Infection by Binding Flagellin and LPS through Different Recognition Modules, Xian-Wei Wang; Jin-Xing Wang, School of Life Sciences, Shandong University, Jinan, China
- 12:15 **106** Observations on *Agmasoma penaei* and *Perezia nelsoni* in White shrimp *Litopenaeus setiferus* from the Gulf of Mexico Yuliya Sokolova<sup>1,3</sup>, John Hawke<sup>2</sup>, <sup>1</sup>Core Microscopy Center, <sup>2</sup>Dept. Pathobiol.Sci., School Vet. Medicine, Louisiana State University, Baton Rouge LA, USA; <sup>3</sup>Institute of Cytology, St. Petersburg, Russia

- 11:15 **111** Horizontal transmission of entomopathogenic fungi by ectoparasitoid *Habrobracon hebetor* Vadim Kryukov, Natalia Kryukova, Olga Yaroslavtseva, Victor Glupov; Institute of Systematics and Ecology of Animals, Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia
- 11:30 **112** N Fast spread of the parasitic *Laboulbenia formicarum* in a supercolony of the invasive garden ant *Lasius neglectus* Simon Traugust<sup>1</sup>, Heike Feldhaar<sup>1</sup>, Jes Søren Pedersen<sup>2</sup>; <sup>1</sup>Animal Ecology I, University of Bayreuth, Germany, <sup>2</sup>Centre for Social Evolution, Department of Biology, University of Copenhagen, Denmark
- 11:45 **113** The dietary preference of a beneficial predator in apple orchards reveals an undocumented spore dispersal mechanism for entomopathogenic fungi Anja Amtoft Wynns<sup>1</sup>; Annette Bruun Jensen<sup>1</sup>, Celeste d'Allesandro<sup>2</sup>, Jørgen Eilenberg<sup>1</sup>; <sup>1</sup>Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg C, Denmark; <sup>2</sup>Department of Entomology and Acarology, ESALQ, University of São Paulo, Brazil
- 12:00 **114** Effects of entomopathogenic fungi on the "*Trialeurodes vaporariorum* – *Encarsia formosa*" system: preliminary results Monica Oreste, Eustachio Tarasco, Department of Soil, Plant and Food Sciences, Section of Entomology and Zoology, University of Bari, Bari, Italy

**12:40-16:30 Optional Excursion**

**16:30-18:00 5K Race**

**17:00-21:30 BBQ**

**WEDNESDAY - 6 August**

Contributed Papers Tuesday, 10:30-12:15 **P2**

### FUNGI 3

Moderators: Helen Hesketh and Ann Hajek

- 10:30 **107** Comparison of ecological traits of co-existing *Metarhizium*: What does it take to dominate an agricultural field? Bernhardt M. Steinwender<sup>1</sup>, Miriam Stock<sup>2</sup>, Kasper Brink - Jensen<sup>3</sup>, Jørgen Eilenberg<sup>1</sup>, Nicolai V. Meyling<sup>1</sup>, <sup>1</sup>Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg C, Denmark; <sup>2</sup>IST Austria (Institute of Science and Technology Austria), Klosterneuburg, Austria; <sup>3</sup>Department of Biostatistics, University of Copenhagen, Denmark
- 10:45 **108-STU** Effect of entomopathogenic fungal strains on non-target arthropods in sour cherry orchard Emese Balog, Zoltán István Tímár, Judit Papp-Komáromi, György Turóczi; Szent István University, Plant Protection Institute, Gödöllő, Hungary
- 11:00 **109-STU** Potential of endophytic *Beauveria bassiana* in grapevine against insects Yvonne Rondot, Annette Reineke, Hochschule Geisenheim University, Center of Applied Biology, Institute of Phytomedicine, Geisenheim, Germany

7:30-18:00 REGISTRATION

**P1**

Symposium 5 (Microbial Control) Wednesday, 8:00–10:00. **P3**

### Developments/Issues in the Regulation of Microbial Products: Harmonization across Jurisdictions

Organizers/Moderators: Roma Gwynn and David Grzywacz

- 8:00 **115** The authorisation and regulation of microbial biopesticides: why bother? David Chandler<sup>1</sup>, Liam Harvey & Wyn Grant<sup>2</sup>, <sup>1</sup>Warwick Crop Centre, School of Life Sciences, University of Warwick, UK, <sup>2</sup>Department of Politics and International Studies, University of Warwick, UK
- 8:24 **116** Registration of Biopesticides in the EU: a company perspective Philip Kessler, Andermatt Biocontrol AG, Grossdietwil, Switzerland

- 8:48 **117 Biopesticide registration, a company perspective and how registration influences biopesticide R&D approach of companies in North American** Jarrold Leland, Novozymes Biologicals, Inc., 5400 Corporate Circle, Salem, United States
- 9:12 **118 Registration of biopesticides: how research can be structured to suit microbial registration needs and promote the commercial development of new biopesticides** Roma Gwynn, Biorationale Limited, Duns, UK
- 9:36 **119 Current developments and issues on regulation of biopesticides- Lessons from REBECA project, comparison of EU and USA systems** Sabine Asser-Kaiser, Jacqueline Süß, Rüdiger Hauschild; GAB Consulting GmbH, Heidelberg/Lamstedt, Germany

Contributed Papers Wednesday, 8:00-9:45. **P5**

## BACTERIA 3

Moderators: Juan Luis Jurat-Fuentes and David Heckel

- 8:00 **120 Resistance alleles to *Lysinibacillus sphaericus* are co-select in a *Culex quinquefasciatus* colony and display distinct features** Maria Helena N. L. Silva-Filha<sup>1</sup>, Karlos D. M. Chalegre<sup>1</sup>, Tatianny P. Romão<sup>1</sup>, Daniella A. Tavares<sup>1</sup>, Hervely S. G. Menezes<sup>1</sup>, Cláudia M. F. de Oliveira<sup>1</sup>, Osvaldo P. de-Melo-Neto<sup>2</sup>, <sup>1</sup>Department of Entomology, <sup>2</sup>Department of Microbiology, Centro de Pesquisas Aggeu Magalhães-FIOCRUZ, Recife, Brazil
- 8:15 **121-STU Untangling insect pathogenicity in plant-beneficial pseudomonads by a combination of comparative genomics, bioassays and histopathology** Pascale Flury<sup>1</sup>, Beat Ruffner<sup>1</sup>, Shakira Fataar<sup>1</sup>, Maria Péchy-Tarr<sup>2</sup>, Regina G. Kleespies<sup>3</sup>, Cornelia Ullrich<sup>3</sup>, Johannes A. Jehle<sup>3</sup>, Theo H. M. Smits<sup>4</sup>, Christoph Keel<sup>2</sup>, Monika Maurhofer<sup>1</sup>, <sup>1</sup>Institute of Plant Pathology, Swiss Federal Institute of Technology, Zürich, Switzerland; <sup>2</sup>Department of Fundamental Microbiology, University of Lausanne, Lausanne, Switzerland; <sup>3</sup>Institute for Biological Control, Julius Kühn Institute, Darmstadt, Germany; <sup>4</sup>Research Group for Environmental Genomics and Systems Biology, Institute for Natural Resources Sciences, Zurich University of Applied Sciences ZHAW, Wädenswil, Switzerland
- 8:30 **122 Comparative analysis of the Cqm1 and Aam1 ortholog proteins from mosquitoes that have a differential capacity to bind to the Binary toxin from *Lysinibacillus sphaericus*** Lígia M. Ferreira<sup>1</sup>, Nathaly A. do Nascimento<sup>1</sup>, Tatianny P. Romão<sup>1</sup>, Antônio M. Rezende<sup>2</sup>, Osvaldo P. de-Melo-Neto<sup>2</sup>, Maria Helena N. L. Silva-Filha<sup>1</sup>, <sup>1</sup>Department of Entomology, <sup>2</sup>Department of Microbiology, Centro de Pesquisas Aggeu Magalhães-FIOCRUZ, Recife, Brazil
- 8:45 **123 Resilience of the intestinal epithelium to the action of a bacterial pore-forming toxin and to xenobiotics in *Drosophila*** Kwang-Zin Lee, Matthieu Lestradet, Stephanie Limmer, Samuel Liégeois and Dominique Ferrandon; University of Strasbourg Institute for Advanced Study, IBMC, Strasbourg, France
- 9:00 **124 Cadherin mutations and Bt resistance: Field screening and fitness costs** Linda Gahan<sup>1</sup>; Fred Gould<sup>2</sup>, David G. Heckel<sup>3</sup>; <sup>1</sup>Clemson University, Clemson, South Carolina, USA; <sup>2</sup>North Carolina State University, Raleigh, North Carolina, USA; <sup>3</sup>Max Planck Institute for Chemical Ecology, Jena, Germany

- 9:15 **125 Down regulation and mutation of cadherin gene associated with Cry1Ac resistance in Asian corn borer** Tingting Jin<sup>1</sup>, Xue Chang<sup>1</sup>, Angharad M. R. Gatehouse<sup>2</sup>, Zhenying Wang<sup>1</sup>, Martin E. Edward<sup>2</sup>, Kanglai He<sup>1</sup>, <sup>1</sup>The State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, China; <sup>2</sup>Newcastle Institute for Research on Environment and Sustainability, School of Biology, University of Newcastle, UK
- 9:30 **126 ABCC transporters mediate insect resistance to multiple Bt toxins revealed by BSA analysis** Youngjin Park<sup>1</sup>, Rosa M González-Martínez<sup>2</sup>, Gloria Navarro-Cerrillo<sup>2</sup>, Maissa Chakroun<sup>2</sup>, Yonggyun Kim<sup>1</sup>, Peio Ziarsolo<sup>3</sup>, Jose Blanca<sup>3</sup>, Joaquin Cañizares<sup>3</sup>, Juan Ferré<sup>2</sup>, Salvador Herrero<sup>2</sup>; <sup>1</sup>Department of Bioresource Sciences, Andong National University, Korea, <sup>2</sup>Department of Genetics, Universitat de València, Spain, <sup>3</sup>Institute for Conservation & Improvement of Valencian Agrobiodiversity (COMAV). Polytechnic University of Valencia, Spain

Contributed Papers Wednesday, 8:15-9:45. **P4**

## DIS. OF BENEFICIAL INVERTEBRATES 2

Moderator: Lena Poppinga

- 8:15 **128 *Nosema ceranae* News: Update on Species Competition and Host-Pathogen Interaction Studies** Leellen Solter<sup>1</sup>, Zachary Huang<sup>2</sup>, Wei-Fone Huang<sup>1</sup> and Meghan Milbrath<sup>2</sup>; <sup>1</sup>Illinois Natural History Survey, University of Illinois; <sup>2</sup>Michigan State University
- 8:30 **129 Influence of temperature on the development of *Nosema apis* and *Nosema ceranae*** Sebastian Gisdler; Elke Genersch; Institute for Bee Research, Hohen Neuendorf, Germany
- 8:45 **130-STU The involvement of bumblebee small interfering RNA pathway against two different bee viruses** Jinzhi Niu, Ivan Meeus, Guy Smagge; Department of Crop Protection, Faculty of Bioscience Engineering, Ghent University, Ghent, Belgium
- 9:00 **131 Impact of *Wolbachia* endosymbionts on the evolution of sex determination in the isopod *Armadiidium vulgare*** Sébastien Leclercq, Julien Thézé, Isabelle Giraud, Lise Ernenwein, Bouziane Moumen, Pierre Grève, Clément Gilbert, Richard Cordaux; Université de Poitiers, UMR CNRS 7267 Ecologie et Biologie des Interactions, Equipe Ecologie Evolution Symbiose, Poitiers Cedex, France
- 9:15 **132 First characterization of a mollusk beta pore forming toxin** David Duval<sup>1,2</sup>, Richard Galinier<sup>1,2</sup>, Guillaume Mitta<sup>1,2</sup>, Benjamin Gourbai<sup>1,2</sup>; <sup>1</sup>CNRS, UMR 5244, Ecologie et Evolution des Interactions (2EI), Perpignan, France, <sup>2</sup>Université de Perpignan, Perpignan, France
- 9:30 **133-STU A first report of an immune-associated cytosolic PLA<sub>2</sub> in insects: Gene structure and function** Jiyeong Park and Yonggyun Kim; Department of Bioresource Sciences, Andong National University, Andong, Korea

## FUNGI 4

Moderator: Richard Humber and Annette Brunn Jensen

- 8:00 **134 Fungal dimorphism in the entomopathogenic fungus *Nomuraea rileyi*: A search for *in vivo* produced quorum-sensing molecules** [Boucias, Drion<sup>1</sup>](#), Liu, Shouzou<sup>2</sup> and Baniszewski, Julie<sup>1</sup>, <sup>1</sup>Entomology and Nematology Department, University of Florida, Gainesville FL, USA, <sup>2</sup>Agricultural College, Liaocheng University, Liaocheng, Shandong, China
- 8:15 **135 Multilocus genotyping of *Amylostereum* spp. associated with *Sirex noctilio* and other woodwasps from Europe reveal clonal lineage introduced to the US** [Louela A. Castrillo<sup>1</sup>](#), [Ann E. Hajek<sup>1</sup>](#), Ryan M. Kepler<sup>1</sup>, Juan A. Pajares<sup>2</sup>, Iben M. Thomsen<sup>3</sup>, György Csóka<sup>4</sup>, Paula Zamora<sup>5</sup>, and Sergio P. Angeli<sup>6</sup>, <sup>1</sup>Department of Entomology, Cornell University, Ithaca, USA, <sup>2</sup>Sustainable Forest Management Research Institute, University of Valladolid, Palencia, Spain, <sup>3</sup>Department of Geosciences and Natural Resource Management, University of Copenhagen, Copenhagen, Denmark, <sup>4</sup>Department of Forest Protection, Forest Research Institute, Mátrafüred, Hungary, <sup>5</sup>Calabazanos Forest Health Center, Castile and Leon, Palencia, Spain, <sup>6</sup>Faculty of Science and Technology, University of Bolzano, Italy
- 8:30 **136 Preliminary analysis of the genome sequence of *Beauveria caledonica*** [Travis R. Glare<sup>1</sup>](#), Aimee C. McKinnon<sup>1</sup> and Murray P. Cox<sup>2</sup>, <sup>1</sup>Bio-Protection Research Centre, Lincoln University, Lincoln, New Zealand, <sup>2</sup>Massey University, Palmerston North, New Zealand
- 8:45 **137 MALDI-TOF Mass Spectrometry: A complement to sequence-based identification technologies for major fungal entomopathogens** [Richard A. Humber<sup>1</sup>](#), Rogério Biaggioni Lopes<sup>2</sup>, Marcos Faria<sup>2</sup>, <sup>1</sup>USDA-ARS Biological IPM Research, RW Holley Center, Ithaca, New York, USA; <sup>2</sup>Embrapa Genetic Resources and Biotechnology, Brasília, Brazil
- 9:00 **138 Transcriptomic study reveals *Pandora formicae* expressing pathogenicity related genes in final stages of host infection** [Joanna Malagocka<sup>1</sup>](#), Morten N. Grell<sup>2</sup>, Lene Lange<sup>2</sup>, Jørgen Eilenberg<sup>1</sup>, Annette Bruun Jensen<sup>1</sup>; <sup>1</sup>Centre for Social Evolution, Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg C, Denmark; <sup>2</sup>Department of Biotechnology, Chemistry and Environmental Engineering, Aalborg University, Copenhagen, Denmark
- 9:15 **139 Transcriptome analysis of the entomopathogenic oomycete *Lagenidium giganteum* reveals putative virulence factors shared by fungal and oomycete entomopathogens** Paula F. Quiroz Velasquez, Sumayyah Abiff, Quincy B. Conway, Norma C. Salazar, Ana Paula Delgado, Jhanelle K. Dawes, Lauren G. Douma, [Aurélien Tartar](#); Nova Southeastern University, Fort Lauderdale, FL, USA

10:00–10:30

BREAK

## Structure and Function of Novel Insecticidal Toxins

Organizers/Moderators: Ken Narva and Colin Berry

- 10:30 **140 Structural and biophysical characterization of Cry34Ab1 and Cry35Ab1** [Matthew S. Kelker<sup>1</sup>](#), Colin Berry<sup>2</sup>, Matthew D. Baker<sup>2</sup>, Steven L. Evans<sup>1</sup>, Reetal Pai<sup>1</sup>, David McCaskill<sup>1</sup>, Joshua C. Russell<sup>1,2</sup>, Nick X. Wang<sup>1</sup>, J.W. Pflugrath<sup>3</sup>, Cheng Yang<sup>3</sup>, Matthew Wade<sup>4</sup>, Tim J. Wess<sup>4\*</sup>, Kenneth E. Narva<sup>1</sup>, <sup>1</sup>Dow AgroSciences, LLC, Indianapolis, Indiana, USA; <sup>2</sup>Cardiff School of Biosciences, Cardiff University, Cardiff, Wales, UK; <sup>3</sup>Rigaku Americas Corporation, The Woodlands, Texas, USA; <sup>4</sup>School of Optometry & Vision Sciences, Cardiff University, Cardiff, Wales, UK, <sup>\*</sup>Current address: Department of Biochemistry, University of Washington, Seattle, Washington, USA; <sup>†</sup>Current address: Office of the Dean of Science, Charles Sturt University, New South Wales, Victoria, Australia
- 10:50 **141 Structure/function studies of Cry5B via alanine-scanning mutagenesis** [Jillian Sesar<sup>1</sup>](#); [Melanie Miller<sup>1</sup>](#), [Yan Hu<sup>1,2</sup>](#), [Raffi V. Aroian<sup>1,2</sup>](#), <sup>1</sup>Division of Biological Sciences, University of California, San Diego, CA, USA; <sup>2</sup>Program in Molecular Medicine, University of Massachusetts Medical School, Worcester, MA, USA
- 11:10 **142 Insights into the structures of non-3-domain toxins through structural modelling** [Colin Berry](#), Cardiff School of Biosciences, Cardiff Univ., Cardiff, UK
- 11:30 **143 Novel MTX Toxins for Insect Control** [Yong Yin](#), Monsanto Company, St. Louis, MO, USA
- 11:50 **144 Insecticidal toxins from *Photorhabdus luminescens* and *asymbiotica*, targeting the actin cytoskeleton and GTP-binding proteins** [Thomas Jank](#), Alexander E. Lang and Klaus Aktories; Institute of Experimental and Clinical Pharmacology and Toxicology, University of Freiburg, Freiburg, Germany
- 12:10 **145 Molecular basis of parasporin-2 action toward cancer cells** [Sakae Kitada](#), Yusuke Yoshida, Yoshimi Ozaki, Hirioyasu Shimada, Kyushu Institute of Technology, Iizuka,

## MICROBIAL CONTROL 2

Moderator: Surrendra Dara

- 10:30 **146 Evaluation of the non-target effects of *Bacillus thuringiensis* subspecies *israelensis* in standardized aquatic microcosms** Irene Ketseoglou; [Gustav Bouwer](#), School of Molecular and Cell Biology, University of the Witwatersrand, Johannesburg, South Africa
- 10:45 **147 *Bacillus thuringiensis* 00-50-5 strain with high activity against plant-parasitic nematodes and insect pests** [Cheng Bai<sup>1</sup>](#), Haibo Long<sup>1</sup>, Liping Liu<sup>1</sup>, Yanling Yang<sup>2</sup>, Jianjun Yue<sup>1</sup>; <sup>1</sup>Environment and Plant Protection Institute, Chinese Academy of Tropical Agricultural Sciences, Haikou, Hainan, China; <sup>2</sup>North University of China, Taiyuan, China
- 11:00 **148 Investigations on residues of *Bacillus thuringiensis* on tomato** [Dietrich Stephan<sup>1</sup>](#); Heike Scholz-Döblin<sup>2</sup>, Hans Kessler<sup>2</sup>, Theo Reintges<sup>2</sup>, <sup>1</sup>Julius Kühn-Institute, Darmstadt, Germany, <sup>2</sup>Landwirtschaftskammer Nordrhein-Westfalen, Germany

- 11:15 **149** Biological control of western corn rootworm larvae (*Diabrotica virgifera virgifera*) with *Dianem*<sup>®</sup> (*Heterorhabditis bacteriophora*) Ralf-Udo Ehlers, e-nema, GmbH, Schwentintental, Germany
- 11:30 **150** Evaluation of Ten Plant Extracts as Ultraviolet Protectants for *Spodoptera littoralis* nucleopolyhedrovirus Koko Dwi Sutanto, Said El Salamouny, Martin Shapiro, Merle Shepard, Sukirno Miharjo, Muhammad Tufail, Khawaja Ghulam Rasool and Abdulrahman S. Aldawood, Plant Protection Department, College of Food Sciences and Agriculture, King Saud University, Riyadh, Saudi Arabia; CREC, Clemson University, Charleston South Carolina, USA
- 11:45 **151** Interactions among Fungal and Viral Pathogens and Parasitoids Ann E. Hajek<sup>1</sup>; Saskya van Nouhuys<sup>2</sup>, <sup>1</sup>Department of Entomology, Cornell University, Ithaca New York, USA, <sup>2</sup>Department of Biosciences, University of Helsinki, Helsinki, Finland
- 12:00 **152** *Oryctes rhinoceros* population diversity and potential implications for control using *Oryctes nudivir* Sean D.G. Marshall<sup>1</sup>, Aubrey Moore<sup>2</sup>, Russell K. Campbell<sup>3</sup>, Roland J. Quitugua<sup>2</sup>, Trevor A. Jackson<sup>1</sup>, <sup>1</sup>Innovative Farming Systems, AgResearch, Lincoln Research Centre, Christchurch, New Zealand; <sup>2</sup>College of Natural and Applied Science, University of Guam, USA; <sup>3</sup>Biosecurity Division, Guam Department of Agriculture, Guam, USA
- 12:15 **153** The Control of Fungi Using with Liposomal Formulation of Essential Oil of *Satureja hortensis* and its cell viability assay Müge Yazıcı<sup>1</sup>, Güleğül Duman<sup>2</sup>, İsmail Aslan<sup>2</sup>, Burçin Asutay<sup>1</sup>, Tuğçe Palamut<sup>1</sup>, Sıdıka Tapşın<sup>1</sup>, Fikrettin Şahin<sup>1</sup>, <sup>1</sup>Department of Genetics and Bioengineering, Yeditepe University, Istanbul, Turkey, <sup>2</sup>Faculty of Pharmacy, Yeditepe University, Istanbul, Turkey
- 11:15 **157** Expressed viral ORF and new virus discovery from high throughput transcriptomes of non-model animal Diane Bigot<sup>1</sup>, Marion Ballenghien<sup>2</sup>, Vincent Cahais<sup>2</sup>, Nicolas Galtier<sup>2</sup>, Elisabeth Herniou<sup>1</sup>, Philippe Gayral<sup>1</sup>, <sup>1</sup>Institut de Recherches sur la Biologie de l'Insecte, CNRS UMR 7261, Université François-Rabelais, Tours, France. <sup>2</sup>Université Montpellier 2, Institut des Sciences de l'Evolution de Montpellier, Montpellier, France
- 11:30 **158** Population genomics supports baculoviruses as vectors of horizontal transfer of insect transposons Clément Gilbert<sup>1</sup>, Aurélien Chateigner<sup>2</sup>, Lise Ernenwein<sup>1</sup>, Valérie Barbe<sup>3</sup>, Annie Bézier<sup>2</sup>, Elisabeth A. Herniou<sup>2,\*</sup> & Richard Cordaux<sup>1</sup>, <sup>1</sup>Université de Poitiers, Ecologie et Biologie des Interactions, Equipe Ecologie Evolution Symbiose, Poitiers Cedex, France; <sup>2</sup>Université François-Rabelais de Tours, Tours, France, <sup>3</sup>Laboratoire de Finition, CEA/IG/Genoscope, Evry, France
- 11:45 **159** Genomic analysis of five *Lymantria dispar* multiple nucleopolyhedrovirus isolates and biological activity against different host strains of *Lymantria dispar* Robert L. Harrison<sup>1</sup>; Daniel L. Rowley<sup>1</sup>; Melody Keena<sup>2</sup>, <sup>1</sup>Invasive Insect Biocontrol and Behavior Laboratory, Beltsville Agricultural Research Center, USDA Agricultural Research Service, Beltsville, Maryland, USA; <sup>2</sup>Northern Research Station, USDA Forest Service, Hamden, CT, USA
- 12:00 **160** Phylogenomics reveals ecological factors that lead to speciation in *Baculoviridae* Julien Thézé<sup>1</sup>; Carlos Lopez Vaamonde<sup>2</sup>; Jennifer S. Cory<sup>3</sup>; Elisabeth A. Herniou<sup>1</sup>, <sup>1</sup>Université François-Rabelais, UFR Sciences, Tours, France; <sup>2</sup>INRA, Zoologie Forestière, Orléans, France; <sup>3</sup>Dept of Biological Sciences, Simon Fraser University, Burnaby, British Columbia, Canada

Contributed Papers Wednesday, 10:30-12:15. **P1**

## VIRUSES 4

Moderators: Martin Erlandson and Robert Harrison

- 10:30 **154** *Mamestra configurata* nucleopolyhedrovirus-A transcriptome from infected host midgut Martin A. Erlandson<sup>1</sup>, B. Cameron Donly<sup>2</sup>, David A. Theilmann<sup>3</sup>, Dwayne D. Hegedus<sup>1</sup>, Cathy Coutu<sup>1</sup> and Douglas Baldwin<sup>1</sup>, <sup>1</sup>Saskatoon Research Centre, AAFC, Saskatoon, Canada; <sup>2</sup>Southern Crop Protection & Food Research Centre, AAFC, London, Canada; <sup>3</sup>Pacific Agri-Food Research Centre, AAFC, Summerland, BC, Canada
- 10:45 **155-STU** Genomic adaptation to different hosts – Impact of genetic diversity on viral fitness Aurélien Chateigner; Cindy Pontleve; Carole Labrousse; Elisabeth Herniou, Institut de Recherche sur la Biologie de l'Insecte, Université François Rabelais de Tours, Faculté des Sciences et Techniques, Tours, France
- 11:00 **156-STU** Transcriptomic analysis of a host-parasitoid interaction between a Hymenoptera *Cotesia congregata*, a Lepidoptera *Manduca sexta* and a Polydnaviridae Germain Chevignon; Sébastien Cambier; Jean-Michel Drezen; Elisabeth Huguët; Sébastien Moreau; Institut de Recherche sur la Biologie de l'Insecte, Université François Rabelais de Tours, Faculté des Sciences et Techniques, Tours, France

Contributed Papers Wednesday, 10:30-12:15. **P2**

## FUNGI 5

Moderators: Travis Glare and Jürg Enkerli

- 10:30 **162** An entomopathogenic strain of *Beauveria bassiana* against *Frankliniella occidentalis* with no detrimental effect on the predatory mite *Neoseiulus barkeri* Yulin Gao<sup>1</sup>, Shengyong Wu<sup>1</sup>, Zhongren Lei<sup>1</sup>, Xuenong Xu<sup>1</sup>, <sup>1</sup>State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, China
- 10:45 **163-STU** Interactions between the insect pathogenic fungus *Metarhizium*, the wheat pathogen *Fusarium culmorum* and the mycoparasitic fungus *Clonostachys rosea* Chad A. Keyser, Birgit Jensen, and Nicolai V. Meyling, Department of Plant and Environmental Sciences, University of Copenhagen, Copenhagen, Denmark
- 11:00 **164** Diversity, ecology and virulence of entomopathogenic fungi isolates naturally infecting the red palm weevil *Rhynchophorus ferrugineus* (Olivier) in the Mediterranean Basin Natalia González-Mas, Lola Ortega-García, Carlos Campos-Porcuna, Inmaculada Garrido-Jurado, Enrique Quesada-Moraga; University of Córdoba, Department of Agricultural and Forestry Sciences, Córdoba, Spain

- 11:15 **165-STU Recovery and detection of an entomopathogenic endophyte: overcoming the challenges involved** Aimee McKinnon<sup>1</sup>; Travis Glare<sup>1</sup>, Hayley Ridgway<sup>2</sup>, Andrew Holyoake<sup>1</sup>, <sup>1</sup>Bio-Protection Research Centre, Lincoln University, Christchurch, New Zealand; <sup>2</sup>Faculty of Agriculture and Life Sciences, Lincoln University, Christchurch, New Zealand
- 11:30 **166-STU Intense spatio temporal pattern in pathogen-host interaction between *Pandora formicae* and *Formica rufa*** Joanna Malagocka; Jørgen Eilenberg, Annette Bruun Jensen; Centre for Social Evolution, Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg C, Denmark
- 11:45 **167 Patterns of host adaptation in fly infecting *Entomophthora* species** Henrik H. De Fine Licht; Annette Bruun Jensen, Jørgen Eilenberg, Department of Plant and Environmental Sciences, University of Copenhagen, Denmark
- 12:00 **168-STU Plant volatile organic compound manipulation by endophytic entomopathogenic fungi** Aragón, Sandra<sup>1,2</sup>, Cotes, Alba Marina<sup>2</sup>, Vidal, Stefan<sup>1</sup>, <sup>1</sup>Georg-August-Universität Göttingen, Department of Crop Sciences, Göttingen, Germany. <sup>2</sup>BioTechnology and Bioindustry Center, Colombian Corporation for Agricultural Research Corpoica, Mosquera, Colombia

12:30–14:00 **LUNCH** Mensa

Contributed Papers Wednesday, 13:15-14:00. **P203**  
**JIP EDITORIAL BOARD**

Student Workshop Wednesday, 12:30-14:00. **P2**  
**HOW TO WRITE A PAPER**  
Moderators: Rich Humber, Mark Goettel and Yukino Inoue

Contributed Papers Wednesday, 14:00-16:00. **P4**  
**MICROSPORIDIA 1**  
Moderator: Susan Bjørnson

- 14:00 **169 Effects of the microsporidium *Nosema adalae* on the multicoloured Asian lady beetle, *Harmonia axyridis*** Bryan Ellis, Susan Bjørnson, Department of Biology, Saint Mary's University, Halifax, Nova Scotia, Canada
- 14:15 **170-STU Effects of two microsporidia from lady beetles on the green lacewing, *Chrysoperla carnea*** Jackline Sirisio, Susan Bjørnson, Department of Biology, Saint Mary's University, Halifax, Nova Scotia, Canada
- 14:30 **171 Features of the genomes of microsporidia in mosquitoes: status and preliminary findings** James J. Becnel<sup>1</sup>, Christopher Desjardins<sup>2</sup>, Neil Sanscrainte<sup>1</sup>, and Christina Cuomo<sup>2</sup>, <sup>1</sup>Center for Medical, Agricultural and Veterinary Entomology, USDA/ARS, Gainesville, FL, USA, <sup>2</sup>Genome Sequencing Center for Infectious Disease, Broad Institute of MIT and Harvard, Cambridge, MA, USA

- 14:45 **172 Multi-gene phylogeny applied to the taxonomy of microsporidian parasites of crustacean hosts** K.S. Bateman<sup>1</sup>, R. Kerr<sup>1</sup>, D. Wiredu-Boakye<sup>2</sup>, B. Williams<sup>2</sup>, G.D. Stentiford<sup>1</sup>, <sup>1</sup>European Union Reference Laboratory for Crustacean Diseases, Centre for Environment, Fisheries and Aquaculture Science (Cefas), Weymouth, Dorset, UK, <sup>2</sup>Biosciences, University of Exeter, Devon, UK
- 15:00 **173-STU Understanding the evolutionary loss of glycolysis in intranuclear crab microsporidians** Dominic Wiredu Boakye<sup>1</sup>, Bryony Williams<sup>1</sup>; Grant Stentiford<sup>2</sup>, and Thomas Williams<sup>3</sup>, <sup>1</sup>College of Life and Environmental Sciences, University of Exeter, Exeter, UK, <sup>2</sup>Centre of Environment, Fisheries and Aquaculture Science, CEFAS, Weymouth, UK, <sup>3</sup>Institute for Cell and Molecular Biosciences, University of Newcastle, Newcastle upon Tyne, Tyne and Wear, UK
- 15:15 **174-STU Temporal trends and the effect of seasonal temperature on the prevalence of *Nosema* spp. in *Apis mellifera* in north-east Germany** Anto Raja Dominic<sup>1,3</sup>, Sebastian Gisder<sup>2</sup>, Elke Genersch<sup>2</sup>, Andreas Linde<sup>1</sup>, <sup>1</sup>Hochschule für nachhaltige Entwicklung Eberswalde, Dept. of Forest and Environment, Eberswalde, Germany, <sup>2</sup>Länderinstitut für Bienenkunde Hohen Neuendorf e.V., Hohen Neuendorf, Germany, <sup>3</sup>Freie University, Berlin, Germany
- 15:30 **175 STU Characterising putative virulence factors of the bee pathogen *Nosema ceranae*** Graham Thomas, Ken Haynes; University of Exeter, UK
- 15:45 **176 Detection of Microsporidia in Gammarids in the Delta of the Kuban River (Azov Sea, Russia)** Yuri Tokarev<sup>1</sup>, Vladimir Voronin<sup>2</sup>, Egor Rusakovich<sup>3</sup>, Irma Issi<sup>1</sup>, <sup>1</sup>All-Russian Institute of Plant Protection, St. Petersburg, Russia; <sup>2</sup>St. Petersburg Veterinary Medical Academy, St. Petersburg, Russia; <sup>3</sup>Herzen State Pedagogical University of Russia, St. Petersburg, Russia

Contributed Papers Wednesday, 14:15-15:45. **P3**  
**MICROBIAL CONTROL 3**  
Moderator: Stefan Jaronski

- 14:15 **178-STU Synthesis and Characterization of fungus mediated silver nanoparticle for the toxicity on filarial Vector, *Culex quinquefasciatus*** Siva Kamalakannan<sup>1</sup>, Chandrakasan Gobinath<sup>2</sup>, Sivapunyam Ananth<sup>3</sup>, Kadarkarai Murugan<sup>1</sup>; <sup>1</sup>Division of Entomology, Department of Zoology, Bharathiar University, Coimbatore, Tamil Nadu, India; <sup>2</sup>Bio control laboratory, Department of Biotechnology and Genetic Engineering, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India; <sup>3</sup>Insect control division, Department of Biotechnology, Annai Arts and Science College, Kumbakonam, Tamil Nadu, India
- 14:30 **179-STU Entomopathogenic fungi as endophytes: interaction with phytohormones** Dalia Muftah Alkhayat; Katharina Döll, Petr Karlovsky, Stefan Vidal; Institute for Plant Protection and Plant Pathology, Georg-August University, Göttingen, Germany
- 14:45 **180 Pathogenicity of three entomopathogenic fungi on larvae and adults of the sisal weevil: The less the better?** Vasiliki Gkounti<sup>1</sup>, Markogiannaki Dimitra<sup>2</sup>, Dimitris Kontodimas<sup>2</sup>, <sup>1</sup>SLU, Sweden, <sup>2</sup>Benaki Phytopathological Institute, Greece

- 15:00 **181** Understanding *Beauveria bassiana* infection within its host *Triatoma infestans*: time course expression of genes encoding fungal toxic nonribosomal peptides and insect humoral immune proteins Luciana S. Lobo<sup>1,2</sup>, Éverton K. K. Fernandes<sup>2</sup>, Christian Luz<sup>2</sup>, M. Patricia Juárez<sup>1</sup>, Nicolás Pedrini<sup>1</sup>, <sup>1</sup>Instituto de Investigaciones Bioquímicas de La Plata (CCT La Plata CONICET-UNLP), Facultad de Ciencias Médicas, La Plata, Argentina; <sup>2</sup>Instituto de Patología Tropical e Saúde Pública (IPTSP), Universidade Federal de Goiás, Goiânia, Brazil
- 15:15 **182** Compatibility of herbicides used in olive orchards with a *Metarhizium brunneum* strain used for the control of the olive fly preimaginals in the soil Enrique Quesada-Moraga, Inmaculada Garrido-Jurado, Meelad Yousef, University of Córdoba, Department of Agricultural and Forestry Sciences, Córdoba, Spain
- 15:30 **183** The Seed Corn Maggot and *Metarhizium* are Related to Maize Yield in an Organic, Cover Crop-Based Farming Systems Experiment Mary Barbercheck; Christina Mullen, Department of Entomology, Penn State University, University Park, USA

Contributed Papers Wednesday, 14:00-16:00. **P1**  
**VIRUSES 5**  
 Moderators: Bryony Bronning and Alicia Timm

- 14:00 **184** Soybean aphid viruses exploit contrasting transmission strategies Diveena Vijayendran, Sijun Liu, Bryony C. Bonning, Department of Entomology, Iowa State University, Ames, USA
- 14:15 **185** Characterization of mechanisms involved in the transmission of a lepidopteran densovirus Cécilia Multeau<sup>1</sup>, Doriane Mutuel<sup>2</sup>, Manuela Rakotomanga<sup>2</sup>, Anne Kenaghan<sup>2</sup>, Clément Bousquet<sup>2</sup>, Rémy Froissart<sup>3,4</sup>, Nathalie Volkoff<sup>2</sup> and Mylène Ogliaastro<sup>2</sup>; <sup>1</sup>InVivo AgroSolutions, Valbonne, France; <sup>2</sup>INRA, UMR 1333 DGIMI, INRA, Montpellier, France; <sup>3</sup>CNRS, UMR 5290 MIVEGEC, Montpellier, France; <sup>4</sup>CIRAD-SupAgro, UMR 385 BGPI, Montpellier, France
- 14:30 **186** Discovery of circular single-stranded DNA viruses in top insect predators Karyna Rosario<sup>1</sup>, Anisha Dayaram<sup>2</sup>, Jessica Ware<sup>3</sup>, Milen Marinov<sup>2</sup>, Mya Breitbart<sup>1</sup>, Arvind Varsani<sup>2</sup>; <sup>1</sup>College of Marine Science, University of South Florida, Florida, USA; <sup>2</sup>School of Biological Sciences, University of Canterbury, Christchurch, New Zealand; <sup>3</sup>School of Environmental and Biological Sciences, Rutgers University, New Jersey, USA
- 14:45 **187-STU** Single-stranded DNA viruses in marine crustaceans Ryan Schenck<sup>1</sup>; Karyna Rosario<sup>1</sup>; Rachel Harbeitner<sup>1</sup>; John Cannon<sup>2</sup>; Mya Breitbart<sup>1</sup>; <sup>1</sup>University of South Florida College of Marine Science, Tampa, Florida, USA; <sup>2</sup>University of South Florida College of Medicine Department of Pediatrics, USA
- 15:00 **188** Remarkable diversity of endogenous viruses in the genome of an isopod crustacean Julien Thézé, Sébastien Leclercq, Bouziane Moumen, Richard Cordaux, Clément Gilbert; Université de Poitiers, Laboratoire Ecologie et Biologie des Interactions - UMR CNRS 7267, Equipe Ecologie Evolution Symbiose, Poitiers Cedex, France

- 15:15 **189** Iteraviruses (Densovirinae) from monarch and black swallowtail butterflies and slug caterpillar moths and characterization of their expression strategies Qian Yu, Max Bergoin, and Peter Tijssen, INRS-Institut Armand-Frappier, Laval, QC, Canada
- 15:30 **190** Remarkable genetic diversity of single-stranded DNA viruses in cultured shrimps and crickets Hanh T. Pham, Qian Yu, Max Bergoin, Peter Tijssen, INRS-Institut Armand-Frappier, Université du Québec, Laval, QC, Canada
- 15:45 **191** How do vine mealybug, grapevine leafroll-associated virus and grapevine interact on a molecular level? Alicia Eva Timm<sup>1</sup> & Annette Reineke<sup>2</sup>, <sup>1</sup>Department of Zoology and Entomology, Rhodes University, Grahamstown, South Africa, <sup>2</sup>Institut für Phytomedizin, Geisenheim Hochschule, Geisenheim, Germany

Contributed Papers Wednesday, 14:00-15:45 **P5**  
**BACTERIA 4**  
 Moderators: Yulin Gao and Neil Crickmore

- 14:00 **192** Analysis of the bacterial community of the insect pest *Lymantria dispar* during its life cycle Zane Metla<sup>1,2,3</sup>, Monika Maurhofer<sup>2</sup>, Liga Jankevica<sup>1,3</sup>, <sup>1</sup>Plant Pathology, Institute of Integrative Biology (IBZ), Swiss Federal Institute of Technology, Switzerland; <sup>2</sup>Laboratory of Experimental Entomology, Institute of Biology, Univ. Latvia, Latvia; <sup>3</sup>Univ. of Daugavpils, Latvia
- 14:15 **193** Contacting microbe induce grooming behaviour in *Drosophila Aya Yanagawa*<sup>1,2</sup>, Tsuyoshi Yoshimura<sup>1</sup>, Hata Toshimitsu<sup>1</sup> and Frédéric Marion-Poll<sup>2,3</sup>, <sup>1</sup>Kyoto University, Uji, Japan; <sup>2</sup>CNRS, Laboratoire Evolution, Génomes et Spéciation, Gif-sur-Yvette, France; <sup>3</sup>AgroParisTech, Département Sciences de la Vie et Santé, Paris, France
- 14:30 **194** Cultivable gut bacteria of scarabs inhibit *B. thuringiensis* multiplication Yueming Shan<sup>1,2</sup>, Changlong Shu<sup>2</sup>, Neil Crickmore<sup>3</sup>, Chunqin Liu<sup>4</sup>, Wensheng Xiang<sup>1</sup>, Fuping Song<sup>2</sup>, Jie Zhang<sup>2,3</sup>, <sup>1</sup>School of Life Science, Northeast Agricultural University, Harbin, P.R. China; <sup>2</sup>State Key Laboratory of Biology for Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, P.R. China; <sup>3</sup>School of Life Sciences, University of Sussex, Falmer, Brighton, UK; <sup>4</sup>Cangzhou Academy of Agricultural and Forestry Sciences, Cangzhou, P.R. China
- 14:45 **195** Interactions between the Med fly *Ceratitis capitata* (Wied.) and a new *Bacillus cereus sensu lato* strain Luca Ruiu<sup>1,2</sup>, Giovanni Falchi<sup>2</sup>, Ignazio Floris<sup>1</sup>, Maria G. Marche<sup>1,2</sup>, Maria E. Mura<sup>2</sup>, Alberto Satta<sup>1</sup>, <sup>1</sup>Dipartimento di Agraria, University of Sassari, Italy; <sup>2</sup>Biocepest Srl. Technology Park of Sardinia, Italy
- 15:00 **196** Long-term effect of *Bacillus thuringiensis* subsp. *israelensis* application on *B. cereus* group populations in Swedish riparian wetland soils Salome Schneider<sup>1</sup>, Tania Tajrin<sup>1</sup>, Niels B. Hendriksen<sup>2</sup>, Jan O. Lundström<sup>3</sup>, Petter Melin<sup>1</sup>, Ingvar Sundh<sup>1</sup>, <sup>1</sup>Department of Microbiology, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden, <sup>2</sup>Department of Environmental Science, Aarhus University, Roskilde, Denmark, <sup>3</sup>Mosquito and Environment Group, Program for Population and Conservation Biology, Department of Ecology and Genetics, Uppsala University, Uppsala, Sweden

- 15:15 **197 Proteomics of *Brevibacillus laterosporus* and its insecticidal action against noxious Diptera** Maria G. Marche<sup>1,2</sup>, Maria E. Mura<sup>1</sup>, Giovanni Falchi<sup>1</sup>, Luca Ruiu<sup>1,2</sup>, <sup>1</sup>Dipartimento di Agraria, University of Sassari, Italy, <sup>2</sup>Biocepest Srl. Technology Park of Sardinia, Italy
- 15:30 **198-STU Outer membrane vesicles are vehicles for the delivery of *Vibrio* virulence factors to oyster immune cells** Audrey S. Vanhove<sup>1</sup>, Marylise Dupertuy<sup>1,2</sup>, Guillaume M. Charrière<sup>1</sup>, Frédérique Le Roux<sup>3</sup>, David Goudenège<sup>3</sup>, Benjamin Gourbal<sup>4</sup>, Sylvie Kieffer-Jaquinod<sup>5</sup>, Yohann Couté<sup>5</sup>, Sun N. Wai<sup>2</sup> and Delphine Destoumieux-Garzon<sup>1</sup>, <sup>1</sup>Ecology of coastal marine systems, CNRS, Ifremer, IRD, University of Montpellier, France; <sup>2</sup>Umea University, Department of Molecular Biology, The Laboratory for Molecular Infection Medicine Sweden (MIMS), Sweden; <sup>3</sup>Integrative Biology of Marine Models, CNRS, Ifremer, Université Pierre et Marie Curie. Station Biologique de Roscoff, France; <sup>4</sup>Université de Perpignan, Ecology and Evolution of Interactions, France; <sup>5</sup>Université Grenoble-Alpes, CEA, iRTSV, Biologie à Grande Echelle; INSERM, France

16:00–16:30

BREAK

Wednesday, 16:30-18:30.

Philosophicum

## POSTERS

Posters should be displayed from Monday UNTIL NOT LATER THAN 18:00 THURSDAY

## BACTERIA

- BA-1** A New Local Bio-Insecticide: Developing, Optimization, Toxicity and Determination of Activity Kazım Sezen, Remziye Nalcacioglu, Ismail Demir, Hüseyin Tepe, İslam Yıldız, Ardahan Eski, Zihni Demirbag, Karadeniz Technical University, Faculty of Science, Department of Biology, Trabzon, Turkey
- BA-2** *Candidatus Rickettsiella isopodorum*, a new lineage of intracellular bacteria infecting woodlice Regina G. Kleespies<sup>1</sup>, Andreas Leclercq<sup>1,2</sup>, <sup>1</sup>Institute for Biological Control, Julius Kühn Institute (JKI), Germany, <sup>2</sup>Geisenheim University, Institute for Microbiology and Biochemistry, Geisenheim, Germany
- BA-3-STU** Analysis and characterization of binary AB toxins in the honey bee pathogen *Paenibacillus larvae* Julia Ebeling, Lena Poppinga, Anne Fünfhaus, Elke Genersch, Institute for Bee Research, Hohen Neuendorf, Brandenburg, Germany
- BA-4** Interplay of Regulators Controlling Fit Insect Toxin Expression in the Biocontrol Bacterium *Pseudomonas protegens* Nicola Imperiali<sup>1</sup>, Flavia Büchler<sup>1</sup>, Maria Péchy-Tarr<sup>1</sup>, Peter Kupferschmied<sup>1</sup>, Monika Maurhofer<sup>2</sup>, and Christoph Keel<sup>1</sup>; <sup>1</sup>Department of Fundamental Microbiology, University of Lausanne, Switzerland, <sup>2</sup>Plant Pathology, Institute of Integrative Biology, ETH Zurich, Switzerland

**BA-5-STU** Identification and Characterization of *Bacillus thuringiensis* Strains with Nematicidal Activity Luis A. Verduzco-Rosas and Jorge E. Ibarra. CINVESTAV IPN, Irapuato, Mexico

**BA-6** Evaluation of Culture media for maximal growth, Cry toxin production and insecticidal toxicity of *Bacillus thuringiensis* M. Tripathi<sup>1</sup>, A. Kumari<sup>2</sup>, L. Saravanan<sup>3</sup>, G.T. Gujar<sup>4</sup>, <sup>1,4</sup>Division of Entomology, Indian Agricultural Research Institute, New Delhi, <sup>2</sup>TERI, India Habitat Centre, New Delhi, <sup>3</sup>Directorate of Medicinal and Aromatic Plants Research, Anand

**BA-7** Gene organization of large plasmids of novel mosquitocidal *Bacillus thuringiensis* TK-E6 Mayu Noda, Naruhei Okamoto, Kimie Hayasaki, Yoshinao Azuma, and So Takebe; Faculty of Biology-Oriented Science and Technology, Kinki University, Wakayama, Japan

**BA-8-STU** Testing of Vip3 proteins for the control of caterpillar pests Iñigo Ruiz de Escudero<sup>1,2</sup>, Núria Banyuls<sup>3</sup>, Yolanda Bel<sup>3</sup>, Mireya Maeztu<sup>1</sup>, Baltasar Escriche<sup>3</sup>, Delia Muñoz<sup>2</sup>, Primitivo Caballero<sup>1,2</sup>, Juan Ferré<sup>3</sup>, <sup>1</sup>Instituto de Agrobiotecnología, CSIC-UPNA, Gobierno de Navarra, Campus Arrosadía, Mutilva, Navarra, Spain. <sup>2</sup>Laboratorio de Entomología Agrícola y Patología de Insectos, Departamento de Producción Agraria, Universidad Pública de Navarra, Pamplona, Spain. <sup>3</sup>Departamento de Genética, Facultad de CC. Biológicas, Universitat de València, Valencia, Spain

**BA-9** Interactions between Cry and Vip proteins from *Bacillus thuringiensis* against different lepidopteran pests Ana Rita Nunes Lemes<sup>1</sup>, Camila Chiaradia Davolos<sup>1</sup>, Paula Cristina Brunini Crialesi Legori<sup>1</sup>, Odair Aparecido Fernandes<sup>2</sup>, Juan Ferré<sup>3</sup>, Manoel Victor Franco Lemos<sup>1</sup>, Janete Aparecida Desiderio<sup>1</sup>; <sup>1</sup>Dpto de Biología Aplicada à Agropecuária, UNESP/Campus de Jaboticabal, Brazil, <sup>2</sup>Dpto de Fitosanidade, UNESP/Campus de Jaboticabal, Brazil, <sup>3</sup>Dpto de Genética, Universidade de València, Spain

**BA-10** Cry1Ac and Cry1F toxicity and binding sites study in two important soybean pests, *Anticarsia gemmatilis* and *Chrysodeixis (=Pseudoplusia) includens*. Yolanda Bel 1, Ken Narva 2, Joel Sheets 2, Baltasar Escriche<sup>1</sup>, <sup>1</sup> Dept. Genetics, ERI BioTecMed, Universitat de València, Dr. Moliner, Burjassot, Valencia, SPAIN; <sup>2</sup> Dept. Biochemistry/Mol. Biology. Dow AgroSciences, Zionsville Rd. Indianapolis, USA

**BA-11-STU** *In vivo* and *in vitro* binding of Vip3Aa to *Spodoptera frugiperda* midgut and characterization of binding sites using <sup>125</sup>I-radiolabeling Maissa Chakroun and Juan Ferré, Department of Genetics, University of Valencia, 46100-Burjassot (Valencia), Spain

**BA-12** Comparative histopathology of two novel bacterial insecticidal proteins in *Tenebrio molitor* and *Diabrotica virgifera virgifera* larvae Heba Abdelgaffar<sup>1</sup>; Cris Oppert<sup>2</sup>, Jayme Williams<sup>2</sup>, Deepa Balasubramanian<sup>2</sup>, Juan Luis Jurat-Fuentes<sup>1</sup>; <sup>1</sup>Department of Entomology and Plant Pathology, University of Tennessee, Knoxville (TN), USA; <sup>2</sup>Bayer CropScience, Morrisville (NC), USA

**BA-13-STU** Role of ABC-C2 in the interactions of *Heliothis virescens* with its host plants and Bt toxins Anne Karpinski, Yannick Pauchet, Heiko Vogel and David Heckel, Department of Entomology, Max Planck Institute for Chemical Ecology, Jena Germany



**BA-14-STU** AminomemtidaseN in *Popillia japonica* Newman larvae is putative *Bacillus thuringiensis* Cry8Da toxin receptor Yuu Taniguchi, Takuya Yamaguchi, Hisanori Bando, Shin-ichiro Asano, Graduate School of Agriculture, Hokkaido University, Sapporo, Japan

**BA-15** A Whole Genome Approach to Determine Cadherins associated with Bt toxicity in the Diamondback Moth, *Plutella xylostella* Youngjin Park and Yonggyun Kim, Department of Bioresource Sciences, Andong National University, Andong, South Korea

**BA-16** RNA Interference of Integrin subunit  $\beta 1$  Impairs Development and Immune Responses of the Oriental tobacco budworm, *Helicoverpa assulta* against Bacteria Youngjin Park and Yonggyun Kim, Department of Bioresource Sciences, Andong National University, Andong, South Korea

**BA-17** A natural hybrid of a *B. thuringiensis* Cry2A toxin implicates domain I in specificity determination. Guihua Chen<sup>1,3</sup>, Changlong Shu<sup>1</sup>, Jacob Evans<sup>2</sup>, Fuping Song<sup>1</sup>, Guoxun Li<sup>3</sup>, Neil Crickmore<sup>2</sup>, Jie Zhang<sup>1</sup>; <sup>1</sup>State Key Laboratory of Biology for Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, P. R. China; <sup>2</sup>School of Life Sciences, University of Sussex, Falmer, Brighton, UK; <sup>3</sup> College of Agronomy and Plant Protection, Qingdao Agricultural University, Qingdao, China

**BA-18** *Bacillus thuringiensis* Cry3Aa toxin increases the susceptibility of *Crioceris quatuordecimpunctata* to *Beauveria bassiana* infection Yulin Gao<sup>1</sup>, Zhongren Lei<sup>1</sup>, Xuenong Xu<sup>1</sup>, <sup>1</sup>State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing 100193, P.R. China

**BA-19** InterVening Sequence (IVS) elements as genetic markers for the differential diagnosis of arthropod-associated *Rickettsiella* bacteria Christina Schuster<sup>1</sup>; Katharina Saar<sup>1</sup>; Regina G. Kleespies<sup>1</sup>; Andreas Leclerque<sup>1,2</sup>, <sup>1</sup>Institute for Biological Control, Julius Kühn Institute (JKI), Darmstadt, Germany; <sup>2</sup>Institute for Microbiology and Biochemistry, Geisenheim University, Geisenheim, Germany

**BA-20** Type IV Secretion System (T4SS) substrates as potential virulence factors of arthropod-pathogenic *Rickettsiella* bacteria Andreas Leclerque, Institute for Microbiology and Biochemistry, Geisenheim University, Geisenheim, Germany

**BA-21** Unbalanced Polyphosphate Levels Impair Insect Pathogenicity in Plant-Beneficial *Pseudomonas protegens* Maria Péchy-Tarr<sup>1</sup>, Nicolas Wenner<sup>1</sup>, Peter Kupferschmid<sup>1</sup>, Romane Keller<sup>1</sup>, Monika Maurhofer<sup>2</sup>, Christoph Keel<sup>1</sup>; <sup>1</sup>Department of Fundamental Microbiology, University of Lausanne, Switzerland; <sup>2</sup>Plant Pathology, Institute of Integrative Biology, ETH Zurich, Switzerland

**BA-22-STU** *Paenibacillus larvae* and the virulence factor SplA- an ERIC II specific S-layer Protein Henriette Knispel, Lena Poppinga, Anne Fünfhaus, Elke Genersch\*, Institute for Bee Research, Hohen Neuendorf; Division of Molecular Microbiology and Bee Pathology, Hohen Neuendorf, Germany

**BA-23** Influence of (varying) population size on host-parasite coevolution: an experimental approach Andrei Papkou, Rebecca Schalkowski, Mike-Christoph Barg, Ines Braker, Hinrich Schulenburg, Evolutionary Ecology Genetics, Zoological Institute, CAU Kiel. Address for Correspondence: apapkou@zoologie.uni.kiel.de

**BA-24** An *in vivo* experimental evolution system for analyzing bacterial adaptation and evolution of *Bacillus cereus sensu lato* in an insect model Rafael Patiño Navarrete<sup>1,2</sup>, Isabelle Jehanno<sup>1,2</sup>, Christina Nielsen-Leroux<sup>1,2</sup> and Vincent Sanchis<sup>1,2</sup>, <sup>1</sup>INRA, UMR1319 Micalis, F-78350 Jouy-en-Josas, France; <sup>2</sup>AgroParisTech, UMR Micalis, F-78350 Jouy-en-Josas, France

## DISEASES OF BENEFICIAL INVERTEBRATES

**DB-1-STU** Identification and Characterization of Immune Inhibitor A Metalloprotease of the Honey Bee Pathogen *Paenibacillus larvae* Birte Arlt<sup>1,2</sup>; Gillian Hertlein<sup>1</sup>; Lena Poppinga<sup>1</sup>; Eva Garcia-Gonzalez<sup>1</sup>; Elke Genersch<sup>1,3</sup>, <sup>1</sup>Institute for Bee Research Hohen Neuendorf, Hohen Neuendorf, Germany; <sup>2</sup>Technische Universität Berlin, Institute of Biotechnology, Berlin, Germany; <sup>3</sup>Freie Universität Berlin, Institute of Microbiology and Epizootics, Berlin, Germany

**DB-2** Awareness and Concept of Insects in a Korean Population Sung Min Bae, Tae Young Shin, Jae Bang Choi, Won Seok Kwak, Yong Oh Ahn, See Nae Lee, In Hui Kim, Ra Mi Woo, Dong Jun Kim and Soo Dong Woo, Department of Agricultural Biology, Chungbuk National University, Chungju, Korea

**DB-3** Virus Epizootiology in Managed and Native Bee Populations John P. Burand<sup>1</sup>; Matthew Boucher<sup>2</sup>; Anne Averill<sup>3</sup>, Departments of <sup>1</sup>Microbiology, <sup>2</sup>Biology and <sup>3</sup>Environmental Conservation, University of Massachusetts - Amherst, Amherst, USA

**DB-4** Honeybee Virus Epizootiology in Bee Populations in Connecticut, USA John P. Burand<sup>1</sup>; Shuning Zheng<sup>2</sup>; Kimberly Stoner<sup>3</sup>, <sup>1</sup>Department of Microbiology, <sup>2</sup>Graduate Program in Molecular and Cellular Biology, University of Massachusetts - Amherst, Amherst, USA and <sup>3</sup>Connecticut Agricultural Experiment Station, New Haven, USA

**DB-5** High-throughput sequence analysis of the change in expression profile of Ig2-, Ig3- and Ig7- variant domains in *Carcinus maenas* Down Syndrome Cell Adhesion (*CmDscam*) mRNAs in response to pathogenic infection Chris Hauton<sup>1</sup>; John A. Hammond<sup>2</sup>, <sup>1</sup>School of Ocean and Earth Sciences, University of Southampton, National Oceanography Centre, Southampton, Hants, UK; <sup>2</sup>Immunogenetics Group, The Pirbright Institute, Pirbright, Woking, UK

**DB-6** A novel pathogenic *Paenibacillus* strain of *Biomphalaria glabrata*, an intermediate host for schistosomiasis David Duval<sup>1,2</sup>, Richard Galinier<sup>1,2</sup>, Gabriel Mouahid<sup>1,2</sup>, Eve Toulza<sup>1,2</sup>, Anne Rognon<sup>1,2</sup>, Nathalie Arancibia<sup>1,2</sup>, Jean Francois Allienne<sup>1,2</sup>, Guillaume Mitta<sup>1,2</sup>, André Théron<sup>1,2</sup>, Benjamin Gourbal<sup>1,2</sup>, <sup>1</sup>CNRS, UMR 5244, Ecologie et Evolution des Interactions (2EI), Perpignan, France, <sup>2</sup>Université de Perpignan Via Domitia, Perpignan, France

**DB-7** Venom from the ectoparasitic wasp *Habrobracon hebetor* activates calcium-dependent processes of haemocytic degradation in *Galleria mellonella* larvae Natalia A. Kryukova<sup>1</sup>, Ekaterina A. Chertkova<sup>1</sup>, Alexandra D. Semenova<sup>2</sup>, Yuri I. Glazachev<sup>2</sup>, Irina A. Slepneva<sup>2</sup>, Victor V. Glupov<sup>1</sup>, <sup>1</sup>Institute of Systematics and Ecology of Animals, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia; <sup>2</sup>Institute of Chemical Kinetics and Combustion, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia

**DB-8** Histopathological analyses of different tissues of diseased honey bees (*Apis mellifera*) Lena Poppinga<sup>1</sup>, Heike Aupperle<sup>2</sup>, Elke Genersch<sup>1</sup>, <sup>1</sup>Institute for Bee Research, Molecular Microbiology and Bee Pathology, Hohen Neuendorf, Germany; <sup>2</sup>Laboklin GmbH & Co KG, Bad Kissingen, Germany

**DB-9** New findings in genome of *Apis mellifera* filamentous virus Lukasz Rabalski<sup>1</sup>, Urszula Grzeda<sup>2</sup>; Grazyna Topolska<sup>2</sup>; Martyna Krejmer<sup>1</sup>; Boguslaw Szewczyk<sup>1</sup>, <sup>1</sup>Department of Recombinant Vaccines, Intercollegiate Faculty of Biotechnology of the University of Gdansk and Medical University of Gdansk, Gdansk, Poland; <sup>2</sup>Laboratory of Bee Diseases, Department of Pathology and Veterinary Diagnostics, Faculty of Veterinary Medicine, Warsaw University of Life Sciences, Warsaw, Poland

**DB-10** Development of prototypes of rapid molecular diagnostic tests for pathogens of honeybees (*Apis mellifera* L.) on chromatographic NALF platform (Nucleic Acid Lateral Flow) Adriano Ragni<sup>1</sup>; Francesca Tabarrini<sup>1</sup>; Mario Carucci<sup>1</sup>; Claudio E. Lorenzetti<sup>1</sup>; Antonella Cersini<sup>2</sup>; Silvia Puccica<sup>2</sup>; Valeria Antognetti<sup>2</sup>; Marcella Milioto<sup>2</sup>; Alessandra Giacomelli<sup>2</sup>; Giovanni Formato<sup>2</sup>; Francesco Panara<sup>3</sup>, <sup>1</sup>RAPID BIOTECH, Perugia; <sup>2</sup>Istituto Zooprofilattico Sperimentale del Lazio e della Toscana, Roma; <sup>3</sup>ENEA - Centro Ricerche Trisaia S.S. 106 Ionica, Rotondella Matera, Italy

**DB-11** What Kind of Insects Do You Like? Tae Young Shin, Sung Min Bae, Jae Bang Choi, Won Seok Kwak, Yong Oh Ahn, See Nae Lee, In Hui Kim, Ra Mi Woo, Dong Jun Kim and Soo Dong Woo, Department of Agricultural Biology, Chungbuk National University, Chungju, Korea

**DB-12** A muscle-infecting microsporidium infecting pink shrimp (*Pandalus montagu*) from Europe: closing in on the type species of *Thelohania*? Stentiford, G.D., Ross, S., Kerr, R., Bateman, K.S., European Union Reference Laboratory for Crustacean Diseases, Centre for Environment, Fisheries and Aquaculture Science (Cefas), Weymouth, Dorset DT4 8UB, UK

## FUNGI

**FU-1-STU** Monitoring of entomopathogenic fungi in *Metarhizium* and *Beauveria* treated fields Emese Balog, Do Van Hung, Zoltán Mayer, György TuróczySzent István University, Plant Protection Institute, Gödöllő, Hungary

**FU-2** Distribution of insect-pathogenic soil fungi in agricultural and forest ecosystems in Georgia Medea Burjanadze<sup>1</sup>, Richard Humber<sup>2</sup>, Mariam Arjevanidze<sup>1</sup>, Tea Abramishvili<sup>1</sup>, Giuli Tsereteli<sup>1</sup>, Manana Lortkipanidze<sup>3</sup>, <sup>1</sup>Agricultural University of Georgia, Department of Forest protection, Georgia;

<sup>2</sup>USDA-ARS BiolPM Research, RW Holley Center for Agriculture and Health, Ithaca, NY., USA; <sup>3</sup>Illis State, University Institute of Zoology, Georgia.

**FU-3** Diversity of Entomopathogenic fungi in different citrus cropping systems in Brazil

Celeste P. D'Alessandro, Vanessa da Silveira Duarte, Elisa S. Dominguez, Ana C. Oliveira dos Santos, Italo Delalibera Jr. Department of Entomology and Acarology, ESALQ, University of São Paulo, Av. Pádua Dias 11, CP. 9, Piracicaba, São Paulo, Brazil.

**FU-4** The Entomopathogenic Fungus *Isaria* for Pest Insect Control in Vegetables Katharina Saar<sup>1</sup>;

Andreas Leclerque<sup>2</sup>, Dietrich Stephan<sup>1</sup>, <sup>1</sup>Institute for Biological Control, Julius Kühn-Institut (JKI), Darmstadt, Germany; <sup>2</sup> Institute for Microbiology and Biochemistry, Geisenheim University, Geisenheim, Germany

**FU-5** Prevalence of *Beauveria pseudobassiana* among tick-associated fungal isolates from the Republic of Moldova

Natalia V. Munteanu<sup>1</sup>; Polina V. Mitkovets<sup>2</sup>; Galina V. Mitina<sup>2</sup>; Alexandru Movila<sup>1</sup>; Yuri S. Tokarev<sup>2</sup>; Andreas Leclerque<sup>3,4</sup>, <sup>1</sup>Institute of Zoology, Academy of Sciences of Moldova, Chisinau, Republic of Moldova; <sup>2</sup>All-Russian Institute for Plant Protection, Saint-Petersburg, Russia; <sup>3</sup>Institute for Biological Control, Julius Kühn Institute (JKI), Darmstadt, Germany; <sup>4</sup>Institute for Microbiology and Biochemistry, Geisenheim University, Geisenheim, Germany.

**FU-6** Diversity and abundance of entomopathogenic fungi on strawberry crops in Brazil

Thiago Rodrigues de Castro<sup>1,2</sup>; Livia Maria Alves Porto<sup>1</sup>, Jørgen Eilenberg<sup>2</sup>, Italo Delalibera Júnior<sup>1</sup>; <sup>1</sup>University of São Paulo (ESALQ), Brazil; <sup>2</sup>Department of Plant and Environmental Sciences, University of Copenhagen, Denmark.

**FU-7** Abundance and diversity of *Metarhizium* spp. in an agricultural landscape in Sweden

Salome Schneider<sup>1</sup>, Stefan Stranne<sup>1</sup>, Hanna Friberg<sup>2</sup>, Ingvar Sundh<sup>1</sup>; <sup>1</sup>Department of Microbiology and <sup>2</sup>Department of Forest Mycology and Plant Pathology, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden.

**FU-8** Diversity and distribution of entomopathogenic fungi in Czech Republic soils

Kateřina Šimáčková<sup>1,2</sup>; Jana Kročáková<sup>2</sup>; Andrea Bohatá<sup>2</sup>; Noemi Herrero<sup>1</sup>; <sup>1</sup>Biology Centre of the Academy of Sciences of the Czech Republic, v.v.i. Institute of Entomology, České Budějovice, Czech Republic; <sup>2</sup>University of South Bohemia, Faculty of Agriculture, České Budějovice, Czech Republic

**FU-9** Entomopathogenic fungi as plant growth enhancers

Surendra K. Dara<sup>1</sup>, Sumanth S. Dara<sup>2</sup>, Suchitra S. Dara<sup>3</sup>; <sup>1</sup>Division of Agriculture and Natural Resources, University of California; <sup>2</sup>Stockdale High School, Bakersfield, USA; <sup>3</sup>Warren Junior High School, Bakersfield, USA.

**FU-10** The entomopathogenic fungus *Beauveria bassiana* improves the growth of *Triticum aestivum* and *Triticum durum*

Antonio Rafael Sánchez-Rodríguez<sup>1</sup>, María del Carmen del Campillo<sup>2</sup>, Inmaculada Garrido-Jurado<sup>1</sup>, Enrique Quesada-Moraga<sup>1</sup>; <sup>1</sup>Departamento de Ciencias y Recursos Agrícolas y Forestales, Universidad de Córdoba, España, <sup>2</sup>Departamento de Agronomía, Universidad de Córdoba, España

**FU-11-STU** Interactions between cowpea plants vs.

*Metarhizium* spp. entomopathogenic fungi Patrícia S. Golo<sup>1</sup>; Walquíria Arruda<sup>2</sup>; Flávia R. S. Paixão<sup>2</sup>; Fabrício

M. Alves<sup>2</sup>; Éverton K. K. Fernandes<sup>2</sup>; Donald W. Roberts<sup>3</sup>; Vânia R. E. P. Bittencourt<sup>1</sup>; <sup>1</sup>Universidade Federal Rural do Rio de Janeiro, Seropédica, Brazil; <sup>2</sup>Universidade Federal de Goiás, Goiânia, Brazil; <sup>3</sup>Utah State University, Logan, USA.

**FU-12 Biological control in oilseed rape: An attempt to establish the entomopathogenic fungus *Beauveria bassiana* as an endophyte in oilseed rape plants** Cornelia Ullrich<sup>1</sup>; Saoussene Talbi<sup>1</sup>; Andreas Leclerque<sup>1,2</sup>; Frank Rabenstein<sup>3</sup>; Regina G. Kleespies<sup>1</sup>; <sup>1</sup>Institute for Biological Control, Julius Kühn Institute (JKI), Germany; <sup>2</sup>Hochschule Geisenheim, University, Geisenheim, Germany; <sup>3</sup>Julius Kühn Institute, Quedlinburg, Germany

**FU-13 Azygo- and zygospore formation of *Neozygites floridana* in the two-spotted spider mite (*Tetranychus urticae*) in strains from tropical and temperate regions** Karin Westrum<sup>1</sup>; Vanessa S. Duarte<sup>2</sup>; Richard A. Humber<sup>3</sup>; Italo Delalibera Jr<sup>2</sup>; Ingeborg Klinge<sup>1</sup>; <sup>1</sup>Norwegian Institute for Agricultural and Environmental Research (Bioforsk), Ås, Norway; <sup>2</sup>ESALQ – University of São Paulo, Piracicaba, Brazil; <sup>3</sup>USDA-ARS BiolPM Research, Ithaca, NY, USA.

**FU-14 Susceptibility of *Biomphalaria glabrata* egg masses to fungal infection** Glennyha F. Duarte, Juscelino Rodrigues, Éverton K. K. Fernandes, Christian Luz Instituto de Patologia Tropical e Saúde Pública, Universidade Federal de Goiás, Goiânia, GO, Brazil

**FU-15 Antimicrobial, Antioxidant and Anticancer Activity of Culture Filtrates from Entomopathogenic Fungi** Tae Young Shin, Sung Min Bae, Jae Bang Choi, Won Seok Kwak, Yong Oh Ahn, See Nae Lee, In Hui Kim, Ra Mi Woo, Dong Jun Kim and Soo Dong Woo; Department of Agricultural Biology, Chungbuk National University, Chungju, Korea

**FU-16 Evolutionary-ecological strategies of *Metarhizium robertsii*** Olga Yaroslavtseva, Vadim Kryukov, Ivan Dubovskiy, Maxim Tyurin, Victor Glupov; Institute of Systematics and Ecology of Animals, Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia

**FU-17 Mycelial and conidial thermotolerance of *Metarhizium anisopliae* s.l. IP 46 and *Metarhizium robertsii* ARSEF 2575** Flávia R. S. Paixão<sup>1</sup>; Elen R. Muniz<sup>1</sup>; Cintia C. Bernardo<sup>1</sup>; Gabriel M. Mascarin<sup>2</sup>; Christian Luz<sup>1</sup>; Éverton K. K. Fernandes<sup>1</sup>; <sup>1</sup>Universidade Federal de Goiás, Goiânia, Brazil; <sup>2</sup>Embrapa Arroz e Feijão, Goiânia, Brazil.

**FU-18 Delayed germination of heat-stressed conidia of *Metarhizium anisopliae* on tick cuticle** Lucas P. Barreto<sup>1</sup>; Fabrício M. Alves<sup>1</sup>; Christian Luz<sup>1</sup>; Gabriel M. Mascarin<sup>2</sup>; Donald Roberts<sup>3</sup>; Walquíria Arruda<sup>1</sup>; Éverton K. K. Fernandes<sup>1</sup>; <sup>1</sup>Universidade Federal de Goiás, Goiânia, Brazil; <sup>2</sup>Embrapa Arroz e Feijão, Goiânia, Brazil; <sup>3</sup>Utah State University, Logan, USA.

**FU-19 Influence of environmental factors on insects resistance to anamorphic fungi** Vadim Kryukov; Ivan Dubovskiy, Olga Yaroslavtseva, Maxim Tyurin, Natalia Kryukova, Victor Glupov; Institute of Systematics and Ecology of Animals, Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia

**FU-20 Intraspecific and interspecific variation in osmotolerance of entomopathogenic fungi** Claudineia A. S. Araujo<sup>1</sup>, Clara C. Oliveira<sup>1</sup>, Marília A. Rodrigues<sup>1</sup>, Breno Pupin<sup>1</sup>, Luciana P. Dias<sup>1</sup>, John E. Hallsworth<sup>2</sup>, and Drauzio E. N. Rangel<sup>1</sup>. <sup>1</sup>Instituto de

Pesquisa e Desenvolvimento, Universidade do Vale do Paraíba, São José dos Campos, Brazil. <sup>2</sup>School of Biological Sciences, MBC, Queen's University Belfast, UK

**FU-21 Different intensities of visible light during mycelial growth induce differently the conidial tolerance to menadione in *Metarhizium robertsii*** Luciana P. Dias<sup>1,2</sup>, Drauzio E. N. Rangel<sup>1</sup>, <sup>1</sup>Instituto de Pesquisa e Desenvolvimento, Universidade do Vale do Paraíba, São José dos Campos, Brazil.

**FU-22 Effect of *Metarhizium* spp. growth media on the accumulation of destruxins in a 10-L stirred tank reactor** Martin Parth<sup>1</sup>, Judith Taibon<sup>1,2</sup>, Hermann Strasser<sup>1</sup>; <sup>1</sup>Institute of Microbiology, Leopold-Franzens University Innsbruck, Austria; <sup>2</sup>Institute of Pharmacy / Pharmacognosy, Leopold-Franzens University Innsbruck, Austria

**FU-23 Evaluation of destruxin A production in four strains of *Metarhizium* by capillary electrophoresis** Alex Ríos-Moreno<sup>1</sup>, Azahara Carpio<sup>2</sup>, Inmaculada Garrido-Jurado<sup>1</sup>, Lourdes Arce<sup>2</sup>, Miguel Valcárcel<sup>2</sup>, Enrique Quesada-Moraga<sup>1</sup>; <sup>1</sup>Department of Agricultural and Forestry Sciences, ETSIAM, University of Córdoba. Campus de Rabanales. Edificio C4 Celestino Mutis. Córdoba, Spain, <sup>2</sup>Department of Analytical Chemistry, University of Córdoba, Annex C3 Building, Nanochemistry and Fine Chemistry Research Institute (IUIQFN), Campus of Rabanales, Córdoba, Spain

**FU-24 Entomopathogenic fungal genera and the 1F=1N standard: The shape of the future begins to emerge** Ryan M. Kepler<sup>1</sup>, Stephen A. Rehne<sup>1</sup>, Richard A. Humbe<sup>2</sup>, <sup>1</sup>USDA-ARS Systematic Mycology and Microbiology Laboratory, Beltsville, Maryland, USA; <sup>2</sup>USDA-ARS Biological IPM Research, RW Holley Center, Ithaca, New York, USA

**FU-25 Genotyping of Georgian isolates of entomopathogenic fungi *Beauveria* spp.** Nana Kunelauri<sup>1</sup>, Vladimer Baramidze<sup>1</sup>, Medea Burjanadze<sup>1</sup>, Ekaterine shubladze<sup>1</sup>, Eka Mikeladze<sup>1</sup>, <sup>1</sup>Agricultural University of Georgia, Tbilisi, Georgia, <sup>2</sup>G. Tevzadze Laboratory of Microbial Genomics, <sup>3</sup>Agricultural University of Georgia, Department of Forest Protection, Tbilisi, Georgia

**FU-26 Genetic characterization, fungicide sensitivity, and aphicidal potential of *Lecanicillium* fungi from Argentina** Romina Manfrino<sup>1,2</sup>; Christina Schuster<sup>3</sup>; Julieta Tornesello Galván<sup>1</sup>; Katharina Saar<sup>3</sup>; Juan J. García<sup>1</sup>; Claudia C. López Lastra<sup>1</sup>; Andreas Leclerque<sup>3,4</sup>, <sup>1</sup>Centro de Estudios Parasitológicos y de Vectores (CEPAVE), La Plata (BsAs), Argentina; <sup>2</sup>Instituto Nacional de Tecnología Agropecuaria (INTA), Rafaela (Santa Fe), Argentina; <sup>3</sup>Institute for Biological Control, Julius Kühn Institute (JKI), Darmstadt, Germany; <sup>4</sup>Institute for Microbiology and Biochemistry, Geisenheim University, Geisenheim, Germany

**FU-27 Species-specific PCR assay to identify and discriminate *M. pingshaense*, *M. anisopliae*, *M. brunneum*, and *M. robertsii*** Johanna Mayerhofer<sup>1</sup>, Andy Lutz<sup>1</sup>, Franco Widmer<sup>1</sup>, Stephen A. Rehner<sup>2</sup>, Ryan M. Kepler<sup>2</sup>, Adrian Leuchtman<sup>3</sup>, Jürg Enkerli<sup>1</sup>, <sup>1</sup>Molecular Ecology, Institute for Sustainability Sciences, Agroscope, Reckenholzstrasse Zurich, Switzerland; <sup>2</sup>Systematic Mycology and Microbiology Laboratory, USDA-ARS, Beltsville, Maryland, USA; <sup>3</sup>Plant Ecological Genetics, Institute of Integrative Biology, ETH Zurich, Switzerland

**FU-28** Species identification of entomopathogenic fungi of the genus *Lecanicillium* (= *Verticillium lecanii* s.l.) by mitochondrial gene sequences Galina V. Mitina, Yuri S. Tokarev, Igor A. Kazartsev, All-Russian Institute for Plant Protection, Saint-Petersburg, Russia

**FU-29** The genomic basis for evolved resistance to *Beauveria bassiana* in *Drosophila melanogaster* Parvin Shahrestani<sup>1</sup>, John Vandenberg<sup>2</sup>, Michael Griggs<sup>2</sup>, Stephen Wraight<sup>2</sup>, Yonathan Estrella<sup>1</sup>, Susan Rottschaefel<sup>1</sup>, Andrew Clark<sup>3</sup>, Brian Lazzaro<sup>1</sup>, <sup>1</sup>Department of Entomology, Cornell University, Ithaca NY, USA; <sup>2</sup>USDA Agricultural Research Service, Ithaca NY, USA; <sup>3</sup>Department of Molecular Biology and Genetics, Cornell University, Ithaca NY, USA

**FU-30-STU** Behavioral control of malarial mosquito by entomopathogenic fungi: Death as the vector Minehiro Ishii<sup>1</sup>; Masanori Koike<sup>2</sup>; Daigo Aiuchi<sup>2</sup>, <sup>1</sup>The United Graduate School of Agricultural Sciences, Iwate University, Japan; <sup>2</sup> Department of Agro-environmental Science, Obihiro University of Agriculture & Veterinary Medicine, Japan.

**FU-31** Effect of *Metarhizium brunneum* strain LRC112 and *M. anisopliae* F52 on non-target Carabid Beetles Alida F. Janmaat<sup>1</sup>, Chera Rempel<sup>1</sup>, Rita Quik<sup>1</sup>, Todd Kabaluk<sup>2</sup>, Manon Peyre<sup>2</sup>, Remi Thomasset<sup>2</sup>, <sup>1</sup> Biology Department, University of the Fraser Valley, Abbotsford, BC, Canada; <sup>2</sup> Agriculture and Agri-Food Canada, Agassiz, BC, Canada

**FU-32** Effect of a local strain of the fungus against *Corythucha ciliata* (Say) and *Glyphodes pyloalis* (Walker) in Georgia Manana Kereselidze, Mzia Beruashvili, Mzagho Lobzhanidze, Agricultural University of Georgia, Tbilisi, Georgia

**FU-33** The effect of pesticides used in strawberry and soybean on the mite pathogenic fungus *Neozygites floridana* Thiago Rodrigues de Castro<sup>1</sup>; Samuel Roggia<sup>1,4</sup>, Vitalis Wafula Wekesa<sup>2</sup>; Ingeborg Klingens<sup>3</sup>; Italo Delalibera Júnior<sup>1</sup>, <sup>1</sup>University of São Paulo (ESALQ), Brazil; <sup>2</sup>The Kenya Polytechnic University College, Kenya; <sup>3</sup>Norwegian Institute for Agricultural and Environmental Research (Bioforsk), Norway; <sup>4</sup>The Brazilian Agricultural Research Corporation – Embrapa Soybean, Brazil.

**FU-34** Development of a granular formulation of *Metarhizium brunneum* based on mycelial fragments Christopher Seib; Johannes Schäfer; Dietrich Stephan, Julius Kühn Institute, Darmstadt Germany

**FU-35** Innovative biological products for soil pest control: Outline of an EU project Stefan Vidal<sup>1</sup>; Anant Patel<sup>2</sup>; Hermann Strasser<sup>3</sup>; Tariq Butt<sup>4</sup>; Joergen Eilenberg<sup>5</sup>; Juerg Enkerli<sup>6</sup>; Enrique Quesada-Moraga<sup>7</sup>; Justus Wesseler<sup>8</sup>; Francesca Tencalla<sup>9</sup>; Arne Peters<sup>10</sup>; Miloslav Nesrsta<sup>11</sup>; Andrew Shearer<sup>12</sup>; Hermann Limbers<sup>13</sup>; Erik Hansen<sup>14</sup>; Athanasios Koukoutsakis<sup>15</sup>; <sup>1</sup>Georg-August-Universität Göttingen, Germany; <sup>2</sup>University of Applied Sciences, Germany; <sup>3</sup>University of Innsbruck, Austria; <sup>4</sup>Swansea University, United Kingdom; <sup>5</sup>University of Copenhagen, Denmark; <sup>6</sup>Agroscope Reckenholz Tänikon, Switzerland; <sup>7</sup>University of Córdoba, Spain; <sup>8</sup>Technische Universität München, Germany; <sup>9</sup>Toxmins, Belgium; <sup>10</sup>e-nema GmBH, Germany; <sup>11</sup>Fytovita, Czech Republic; <sup>12</sup>Nem Biotech Ltd, United Kingdom; <sup>13</sup>Klasmann-Deilmann GmbH, Germany; <sup>14</sup>EWB BioProduction Aps, Denmark; <sup>15</sup>Torux Software Ltd, UK

**FU-36** Oxidative stress levels in the entomopathogenic fungus *Beauveria bassiana* growing in very long-chain hydrocarbons Carla Huarte-Bonnet, Nicolás Pedrini, Instituto de Investigaciones Bioquímicas de La Plata (CCT La Plata CONICET-UNLP), Facultad de Ciencias Médicas, Calles 60 y 120, La Plata, Argentina

## MICROBIAL CONTROL

**MC-1-STU** Fungal strain selection and greenhouse evaluation of the virulent isolate against aphids on crucifer and okra vegetables Wakuma Bayissa<sup>1,2</sup>; Sunday Ekese<sup>1</sup>; Godwin P. Kaaya<sup>2</sup>; Samira Mohamed<sup>1</sup>; John M. Wagacha<sup>2</sup>; and Nguya K. Maniania<sup>1</sup>, <sup>1</sup>International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya, <sup>2</sup>School of Biological Sciences, University of Nairobi, Nairobi, Kenya

**MC-2** Virulence of fungal spores produced in liquid and solid state media on nymphs of *Trialeurodes vaporariorum* Eduardo Abreo & Nora Altier; Bio-production Lab, INIA Las Brujas, Canelones, Uruguay

**MC-3-STU** Development of entomopathogenic fungi in mosquito control: which kind of production for which efficiency? Thomas Bawin<sup>1</sup>, Frank Delvigne<sup>2</sup>, Frédéric Francis<sup>1</sup>, <sup>1</sup>Functional and Evolutionary Entomology, Gembloux Agro-Bio Tech, University of Liege, Belgium, <sup>2</sup>Bio-industries, Gembloux Agro-Bio Tech, University of Liege, Belgium

**MC-4** The basis for rootstock resilient to *Capnodis* species: screening for genes encoding delta-endotoxins from *Bacillus thuringiensis* Eitan Ben-Dov<sup>1</sup>; Galina Gindin<sup>2</sup>; Zvi Mendel<sup>2</sup>; Arieh Zaritsky<sup>3</sup>; Ariel Kushmaro<sup>4</sup>, <sup>1</sup>Department of Life Sciences, Achva Academic College, Israel; <sup>2</sup>Department of Entomology, Agricultural Research Organization, The Volcani Center, Bet Dagan, Israel; <sup>3</sup>Faculty of Natural Sciences, Ben-Gurion University of the Negev, Be'er-Sheva, Israel; <sup>4</sup>Department of Biotechnology Engineering, Ben-Gurion University of the Negev, Be'er-Sheva, Israel

**MC-5** Selection of entomopathogenic fungi for the control of *Aegorhynus nodipennis* (Coleoptera: Curculionidae) under laboratory conditions Ernesto Cisternas<sup>1</sup>, Andrés France<sup>2</sup> and Irina Urtubia<sup>2</sup>, <sup>1</sup>Instituto de Investigaciones Agropecuarias (INIA), La Cruz, Chile. <sup>2</sup>INIA Quilamapu, Chillán, Chile

**MC-6** Susceptibility of *Plutella xylostella* (L.) (Lepidoptera: Plutellidae) populations to *Bacillus thuringiensis* strain HD1 Caroline Placidi De Bortoli<sup>1</sup>, Ricardo Antonio Polanczyk<sup>1</sup>, Neil Crickmore<sup>2</sup>, Rafael Ferreira dos Santos<sup>1</sup>, Alessandra Marieli Vacari<sup>1</sup> and Sergio Antonio De Bortoli<sup>1</sup>, <sup>1</sup>Department of Plant Protection, Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil, <sup>2</sup>Department of Biochemistry, University of Sussex, Brighton, UK

**MC-7** Sublethal effects of the Cry1Ac toxin of *Bacillus thuringiensis* Berliner in different Brazilian *Plutella xylostella* (L.) (Lepidoptera: Plutellidae) populations Sergio Antonio De Bortoli<sup>1</sup>, Caroline Placidi De Bortoli<sup>1</sup>, Ricardo Antonio Polanczyk<sup>1</sup>, Neil Crickmore<sup>2</sup>, Rafael Ferreira dos Santos<sup>1</sup> and Alessandra Marieli Vacari<sup>1</sup>, <sup>1</sup>Department of Plant Protection, Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil, <sup>2</sup>Department of Biochemistry, University of Sussex, Brighton, UK

- MC-8** Effect of *Bacillus thuringiensis* Berliner on biological characteristics of *Orius insidiosus* Say (Hemiptera: Anthracoridae) fed with eggs of *Plutella xylostella* (L.) (Lepidoptera: Plutellidae) Sergio Antonio De Bortoli, Ricardo Antonio Polanczyk, Alessandra Marieli Vacari, Roberto Marchi Goulart and Caroline Placidi De Bortoli, Department of Plant Protection, Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil
- MC-9-STU** Evaluating microbial biocontrol agents: effects of *Metarhizium brunneum* on a non-target arthropod Martina Falagiarda, Chad Alton Keyser, Bernhardt M. Steinwender, Lene Sigsgaard, Jørgen Eilenberg, Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg C, Denmark
- MC-10-STU** An experimental autoinoculation device to control an invasive Asiatic pest, *Drosophila suzukii* María Fernández-Bravo, Enrique Quesada-Moraga, University of Córdoba, Department of Agricultural and Forestry Sciences, ETSIAM, Córdoba, Spain
- MC-11** Use of a commercial *Metarhizium anisopliae* s.l. formulation to control *Rhipicephalus microplus* ticks in pen study Mariana G. Camargo<sup>1</sup>; Allan F. Marciano<sup>1</sup>; Fillipe A. Sá<sup>1</sup>; Wendell M. S. Perinotto<sup>1</sup>; Simone Quinelato<sup>1</sup>; Patrícia S. Golo<sup>1</sup>; Isabele C. Angelo<sup>1</sup>; Márcia C. A. Prata<sup>2</sup>; Vânia R. E. P. Bittencourt<sup>1</sup>, <sup>1</sup>Departamento de Parasitologia Animal, Instituto de Veterinária, Universidade Federal Rural do Rio de Janeiro, Seropédica, RJ, Brazil; <sup>2</sup>Embrapa Gado de Leite, Juiz de Fora, MG, Brazil
- MC-12** Two Colombian entomopathogenic fungi are highly efficient on *Ceratomyxa tingomariana* Erika Grijalba, Adriana Santos; Carlos Espinel, Center of Biotechnology and Bioindustry CBB; Colombian Corporation for Agriculture Research, CORPOICA. Mosquera, Colombia
- MC-13-STU** Biological control of pollen beetles with the entomopathogenic fungus *Beauveria bassiana* Deborah Kaiser<sup>1</sup>, Sven Bacher<sup>2</sup> and Giselher Grabenweger<sup>1</sup>, <sup>1</sup>Agroscope, Institute for Sustainability Sciences, Zurich, Switzerland, <sup>2</sup>University of Fribourg, Department of Biology, Unit of Ecology and Evolution, Fribourg, Switzerland
- MC-14** Pathogenicity and virulence of *Beauveria* spp. against mountain pine beetle, *Dendroctonus ponderosae* (Coleoptera: Curculionidae: Scolytidae) George Kyei-Poku<sup>1</sup>, Shajahan Johny<sup>1</sup>, William Fick<sup>1</sup>, and Katherine Bleiker<sup>2</sup>, <sup>1</sup>Great Lakes Forestry Centre, Canadian Forestry Service, Natural Resources Canada, Sault Ste. Marie, Ontario, Canada, <sup>2</sup>Pacific Forestry Centre, Canadian Forest Service, Natural Resources Canada, Victoria, British Columbia, Canada
- MC-15** The Use of Microbial Plant Protection Agents for Insect Control in Germany Johannes A. Jehle, Annette Herz, Brigitte Keller, Regina G. Kleespies, Eckhard Koch, Andreas Larem, Annegret Schmitt, Dietrich Stephan, Julius Kühn Institute, Darmstadt, Germany
- MC-16-STU** Synthesis and secretion of volatile organic compounds by *Triatoma infestans* infected with *Beauveria bassiana* Luciana S. Lobo<sup>1,2</sup>, Sergio J. Mijailosky<sup>1</sup>, M. Patricia Juárez<sup>1</sup>, Christian Luz<sup>2</sup>, Everton K. K. Fernandes<sup>2</sup> and Nicolás Pedrini<sup>1</sup>, <sup>1</sup>Instituto de Investigaciones Bioquímicas de La Plata (CCT La Plata CONICET-UNLP), Facultad de Ciencias Médicas, La Plata, Argentina; <sup>2</sup>Instituto de Patología Tropical e Saúde Pública, Universidade Federal de Goiás, Goiânia, Brasil
- MC-17** Preliminary studies of entomopathogenic microorganisms present in Latvian population of horse-chestnut leaf miner *Cameraria ohridella* Zane Metla<sup>1,2</sup>, Rita Seskena<sup>1</sup>, Santa Voitkane<sup>1</sup>, Monika Maurhofer Bringolf<sup>2</sup>, Liga Jankevica<sup>1</sup>, <sup>1</sup>Laboratory of Experimental Entomology, Institute of Biology, University of Latvia, Latvia, <sup>2</sup>Plant Pathology, Institute of Integrative Biology (IBZ), Swiss Federal Institute of Technology, Switzerland
- MC-18** Toxicity of *Bacillus thuringiensis* BERLINER Cry toxins in different Brazilian *Plutella xylostella* (L.) (Lepidoptera: Plutellidae) populations Ricardo Antonio Polanczyk<sup>1</sup>, Caroline Placidi De Bortoli<sup>1</sup>, Neil Crickmore<sup>2</sup>, Rafael Ferreira dos Santos<sup>1</sup>, Alessandra Marieli Vacari<sup>1</sup> and Sergio Antonio De Bortoli<sup>1</sup>, <sup>1</sup>Department of Plant Protection, Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil, <sup>2</sup>Department of Biochemistry, University of Sussex, Brighton, UK
- MC-19** *Bacillus thuringiensis* isolation from Brazilian soil samples: molecular characterization and biological activity against *Plutella xylostella* (Lepidoptera: Plutellidae) Ricardo Antonio Polanczyk<sup>1</sup>; Thiago Trevisoli Agostini<sup>1</sup>; Lais Fernanda Moreira<sup>1</sup>, Rogério Teixeira Duarte<sup>1</sup>; Fernando Hercos Valicente<sup>2</sup>, <sup>1</sup>Microbial Control of Pests Lab, Plant Protection Department, Universidade Estadual Paulista, Jaboticabal, Brazil, <sup>2</sup>EMBRAPA Milho e Sorgo, Sete Lagoas, Brazil
- MC-20** STU Effect of endophytic *Beauveria bassiana* on herbivore defence in *Arabidopsis thaliana* Maya Raad, Travis Glare, Michael Rostás, Bio-Protection Research Centre, Lincoln University, Lincoln, New Zealand
- MC-21-STU** Pathogenicity of *Beauveria* and *Metarhizium* to the two stink bug species *Nezara viridula* and *Piezodorus guildinii* (Hemiptera: Pentatomidae) in laboratory and semi-field Yordanys Ramos González<sup>1</sup>, Ingeborg Klingen<sup>2</sup>, Jorge R. Gómez Sousa<sup>3</sup>, <sup>1</sup>Universidad Central "Marta Abreu de Las Villas (UCLV), Faculty of Agricultural and Animal Science, Villa Clara, Cuba; <sup>2</sup>Norwegian Institute for Agricultural and Environmental Research (Bioforsk), Plant Health and Plant Protection Division, Aas, Norway
- MC-22** STU Evidence for synergies between *Heterorhabditis bacteriophora* (Nematoda: Heterorhabditidae) and *Metarhizium brunneum* (Hypocreales: Clavicipitaceae) in western corn rootworm control Hannes Rauch<sup>1,2</sup>, Hermann Strasser<sup>1</sup>, Roland Zelger<sup>2</sup>, <sup>1</sup>Institute of Microbiology, Leopold-Franzens University Innsbruck, Innsbruck, Austria; <sup>2</sup>Research Centre for Agriculture and Forestry Laimburg, Laimburg Auer/Ora, Italy
- MC-23** Evaluation of the effectiveness of the entomopathogens for the management of wireworms (Coleoptera: Elateridae) on spring wheat Gadi V.P. Reddy<sup>1</sup>, Khanobporn Tangtrakulwanich<sup>1</sup>, Shaohui Wu<sup>1</sup>, John H. Miller<sup>1</sup>, Victoria L. Ophus<sup>1</sup>, Stefan T. Jaronski<sup>2</sup>, <sup>1</sup>Western Triangle Agricultural Research Center, Montana State University, Conrad, USA; <sup>2</sup>United States Department of Agriculture, Agricultural Research Service, Northern Plains Agricultural Research Laboratory, Sidney, USA
- MC-24** STU Using the combination of entomopathogenic

fungi and extracts improves control of *Spodoptera littoralis* (Boisduval) (Lepidoptera: Noctuidae) Gloria Resquín-Romero, Inmaculada Garrido-Jurado, Enrique Quesada-Moraga; University of Córdoba, Department of Agricultural and Forestry Sciences, Córdoba, Spain

**MC-25 STU** Wireworm control with fungus colonized barley kernels in cover-crops Sina Rogge; Giselher Grabenweger, Agroscope, Institute for Sustainability Sciences, Zurich, Switzerland

**MC-26** A resource efficient method to test non target effects of new biocontrol agents in vitro Bernhardt M. Steinwender, Jørgen Eilenberg, Elina Panahi, Kiri M. Fløistrup, Marta M. Cáceres, Gabriela M. Vergara, Lene Sigsgaard; Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg C, Denmark

**MC-27** Ultrastructure of midgut of *Podisus nigrispinus* (Dallas) (Hemiptera: Pentatomidae) after consumption of prey with the *Bacillus thuringiensis* strain HD1 Alessandra Marieli Vacari, Vanessa Fabíola Pereira de Carvalho, Caroline Placidi De Bortoli, Ricardo Antonio Polanczyk and Sergio Antonio De Bortoli, Department of Plant Protection, Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil

**MC-28** Control of sugarcane borer, *Diatraea saccharalis*, with formulations of *Beauveria bassiana* and *Metarhizium anisopliae* Inajá M. Wenzel<sup>1,2</sup>; Antonio Batista Filho<sup>2</sup>; Moacir R. Forim<sup>1</sup>; Isabella B. Giordano<sup>1</sup>; Bárbara E. Denadae<sup>1</sup>; <sup>1</sup>Federal University of São Carlos/Chemistry Department/ Natural Products Laboratory/São Carlos city, São Paulo state, Brazil, <sup>2</sup>Biological Institute/Biological Control Laboratory/ Campinas city, São Paulo state, Brazil

**MC-29-STU** Identification and functional analysis of two ABCC family genes in *Helicoverpa armigera* Yutao Xiao, Kongming Wu, The State Key Laboratory for Biology of Plant Disease and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, China

## MICROSPORIDIA

**MI-1** Decline of native bumblebees (*Bombus*) and *Nosema* (Microsporida: Nosematidae) infections associated with introduction of the European bumblebee in Northern Japan Maki N. Inoue, Takahiro Yanagisawa, Madoka Nakai, Yasuhisa Kunimi, Institute of Agriculture, Tokyo University of Agriculture and Technology, Japan

**MI-2** Development and application of a loop-mediated isothermal amplification method for rapid detection of *Nosema ceranae* George Kyei-Poku, Debbie Gauthier, Shajahan Johny, Great Lakes Forestry Centre, Canadian Forestry Service, Natural Resources Canada, Sault Ste. Marie, Ontario, Canada

**MI-3** Permanent level of pathogens within ten bark beetles generations Karolina Lukášová; Jaroslav Holuša; Jiří Trombik, Department of Forest Protection and Entomology, Faculty of Forestry and Wood Science, Czech University of Life Sciences, Prague, Czech Republic

**MI-4** Microsporida in beet webworm *Loxostege sticticalis*

(Pyraloidea: Crambidae): a survey of 2013 Julia Malysh, Yuri Tokarev, Andrei Frolov, Anastasia Ignatieva, Irma Issi, All-Russian Institute of Plant Protection, St. Petersburg, Russia

**MI-5** Microsporida from larvae of different lepidopteran species in Bulgaria Daniela Pilarska<sup>1</sup>, Danail Takov<sup>1</sup>, Miroslav Hylis<sup>2</sup>, Renate Radek<sup>3</sup>, Leellen Solter<sup>4</sup>, Andreas Linde<sup>5</sup>, <sup>1</sup>Institute of Biodiversity and Ecosystem Research, Sofia, Bulgaria; <sup>2</sup>Faculty of Science, Charles University, Prague, Czech Republic; <sup>3</sup>Free University of Berlin, Berlin, Germany; <sup>4</sup>Illinois Natural History Survey, University of Illinois, USA; <sup>5</sup>University of Applied Sciences, Eberswalde, Germany

**MI-6** Ultrastructural characterization of a new microsporidium (Opisthokonta: Chytridiopsida) from the pigeon feather mite *Falculifer rostratus* (Astigmata: Pterolichoidea) Renate Radek<sup>1</sup>, Madlen Kariton<sup>1</sup>, Jacek Dabert<sup>2</sup>, Gerd Alberti<sup>3</sup>, <sup>1</sup>Free University of Berlin, Berlin, Germany; <sup>2</sup>Adam Mickiewicz University, Poznan, Poland; <sup>3</sup>Ernst-Moritz-Arndt-Universität Greifswald, Greifswald, Germany

**MI-7** Infectivity of a *Thelohania* like microsporidian isolated from *Phthonandria atrilineata* to the silkworm, *Bombyx mori* Liangen Shi, College of Animal Sciences, Zhejiang University, Hangzhou, Zhejiang Province, China

## NEMATODES

**NE-1** First release of the mermithid *Strelkovimermis spiculatus* in *Culex pipiens* mosquito populations in Argentina Evangelina Muttis<sup>1</sup>; María F. Achinelly<sup>2</sup>; María V. Micieli<sup>3</sup>; <sup>1</sup>Fellowship CONICET Centro de Estudios Parasitológicos y de Vectores, CEPAVE, La Plata, Argentina; <sup>2,3</sup>Researcher CONICET, Centro de Estudios Parasitológicos y de Vectores, CEPAVE, La Plata, Argentina

**NE-2** Increased infectivity in *Steinernema websteri* IJ after development in desiccation-stressed hosts Andrea Binnebose and Susan M. Bornstein-Forst; Marian University, Fond du Lac, WI 54935 USA

**NE-4-STU** Characterization of symbiotic bacteria *Photorhabdus luminescens* subsp. *laumondii* associated with *Heterorhabditis bacteriophora* isolated from Turkey Harun Çimen; Selçuk Hazır, Adnan Menderes University Faculty of Arts and Science Department of Biology, Turkey

**NE-5** Pathogenicity of nematobacterial complexes and its development Pavel Dobes; Jakub Berka; Jana Hurychova; Libor Vojtek; Pavel Hyršl, Department of Animal Physiology and Immunology, Institute of Experimental Biology, Faculty of Science, Masaryk University, Brno, Czech Republic

**NE-6** Use of entomopathogenic nematodes to control vine weevils on Chilean berry orchards Andrés France<sup>1</sup>, Ernesto Cisternas<sup>2</sup>, Irina Urtubia<sup>1</sup>, <sup>1</sup>Instituto de Investigaciones Agropecuarias (INIA), Quilamapu, Chillán, Chile, <sup>2</sup>INIA La Cruz, La Cruz, Chile

**NE-7** Nematodes of large larch bark beetle *Ips cembrae*

(Coleoptera: Scolytinae) Sarka Grucmanová<sup>1</sup>; Václav Čermák<sup>2</sup>, Jaroslav Holuša<sup>1</sup>, <sup>1</sup>Czech University of Life Sciences Prague; Czech Republic, <sup>2</sup>Central Institute for Supervising and Testing in Agriculture, Olomouc, Czech Republic

**NE-8 Natural Occurrence of Entomopathogenic**

**Nematodes (Steinernematidae and Heterorhabditidae) in the Aydin district of Turkey**  
Baris Gulcu<sup>1</sup>, Canan Hazir<sup>2</sup>, Mehmet Karagoz<sup>3</sup>, M. Alper Kesici<sup>3</sup>, <sup>1</sup>Düzce University, Faculty of Arts and Science, Department of Biology, Düzce, Turkey; <sup>2</sup>Aydin Vocational School of Health Services, Adnan Menderes University, Aydin, Turkey; <sup>3</sup>Adnan Menderes University, Faculty of Agriculture, Department of Plant Protection, Aydin, Turkey

**NE-9 Detection of dsRNA virus-like molecules in**

**entomopathogenic nematodes** Noemi Herrero; Jiří Nermuť; Vladimír Půža; Zdeněk Mráček, Biology Centre of the Academy of Sciences of the Czech Republic, v.v.i. Institute of Entomology, České Budějovice, Czech Republic

**NE-10 Cellular and humoral interactions between the white grub, *Polyphylla adspersa* Motschulsky (Col., Melolonthidae) and entomopathogenic nematodes**

Jamileh Avandi<sup>1</sup>, Javad Karimi<sup>1</sup>, Mohammad Ghadamyari<sup>2</sup> & Ahmad Asoode<sup>3</sup>, <sup>1</sup>Biocontrol and Insect Pathology Laboratory, Department of Plant Protection, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran, <sup>2</sup>Department of Plant Protection, College of Agriculture Science, University of Guilan, Rasht, Iran, <sup>3</sup>Department of Chemistry, Faculty of Science, Ferdowsi University of Mashhad, Iran

**NE-11 *Oscheius rugaolensis*, new genus and species of insect parasitic nematodes from Iran**

Reyhaneh Darsouei & Javad Karimi, Biocontrol and Insect Pathology Laboratory, Department of Plant Protection, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran

**NE-12 Reproduction status of *Tribolium castaneum* affects its response to infection by *Steinernema feltiae***

Dariusz Malek<sup>1</sup>, Joanna Homa<sup>2</sup>, Maria Gaweł<sup>1</sup>, Paulina Kramarz<sup>1</sup>, <sup>1</sup>Institute of Environmental Sciences, Jagiellonian University, 30-387 Krakow, Poland, <sup>2</sup>Institute of Zoology, Jagiellonian University, 30-387 Krakow, Poland

**NE-13 Effect of culture type, container type, and temperature on a Korean strain of the entomopathogenic nematode, *Steinernema carpocapsae***

DongWoon Lee<sup>1</sup>; Ho Yul Choo<sup>2</sup>, <sup>1</sup>Major of Applied Biology, School of Ecological Environment and Tourism, Kyungpook National University, Sangju, Republic of Korea; <sup>2</sup>Department of Applied Biology, College & Institute of Agriculture & Life Sciences, Gyeongsang national University, Jinju, Republic of Korea

**NE-14 *Steinernema feltiae* (Nematoda: Steinernematidae) to control fungus gnat, *Bradysia mabiusi* (Diptera: Sciaridae): effect of dosage and application time \***

Patricia Ballone<sup>1</sup>; Luis G. Leite<sup>1</sup>; Fabio S. Schmidt<sup>2</sup>; Victória R. Campos<sup>1</sup>; Roselaine N. S. Bueno<sup>1</sup>; <sup>1</sup>Instituto Biológico, CEIB, CP70, Campinas, Brazil, <sup>2</sup>Bio Controle, Indaiatuba, SP 13347-630, Brazil

(Tylenchida: Neotylenchidae) and its development on different strains of *Amylostereum* (Basidiomycota: Russulales) Isis A. L. Caetano, Ann E. Hajek, Department of Entomology, Cornell University, Ithaca, New York, USA

**NE-16 Use of entomopathogenic nematodes in the**

**biological control of gypsy moth *Lymantria dispar* (L.) (Lepidoptera: Lymantriidae)** Manana Lortkipanidze, Oleg Gorgadze, Madona Kuchava, Nana Gratiashvili, Mzia Kokhia, Nino Gabroshvili, Institute of Zoology, Ilia State University, Tbilisi, Georgia

**NE-17 The susceptibility of Colorado potato beetle**

***Leptinotarsa decemlineata*, and mulberry moth *Glyphodes pyloalis* to entomopathogenic nematodes, *Steinernema carpocapsae* and *Steinernema feltiae* in Georgia** Nona Mikaia, Sokhumi State University, Tbilisi, Georgia

**NE-18 Co-infection interactions between entomopathogenic fungi and *Steinernema feltiae* using *Tenebrio molitor* as a model system**

E. Erin Morris, Annette B. Jensen, Anja A. Wynns, Jørgen Eilenberg, Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg, Denmark

**NE-19 Some observation on morphology and ecology of mollusc-parasitic nematode *Alloionema***

***appendiculatum*** Jiří Nermuť, Vladimír Půža, Zdeněk Mráček; Biology Centre ASCR v.v.i., Institute of Entomology, Branišovská 1160/31, 370 05 České Budějovice, Czech Republic

**NE-20 Osmotic stress tolerance and infective juvenile production of entomopathogenic nematodes subject to fast host-desiccation treatments**

Jaime Ruiz-Vega<sup>1</sup>, Teodulfo Aquino-Bolaños<sup>1</sup>, Juan R. Delgado-Gamboa<sup>2</sup> and Carlos I. Cortés-Martínez<sup>2</sup>, Becarios <sup>1</sup>COFAA-IPN y <sup>2</sup>PIFI-IPN, Laboratory of Biological Control, CIIDIR U. OAXACA, IPN, Santa Cruz Xoxocotlan, Oax., México

**NE-21 Assessing entomopathogenic nematode population genetics: a research and teaching approach**

Abigail Lewis, Logan Jefferson, Glen Stevens, Michaela Gazdik, School of Natural Sciences and Mathematics, Ferrum College, Ferrum, VA, USA

**NE-15 The non-sterilizing strain of *Deladenus siricidicola***

## VIRUSES

- VI-1 High-level Expression of Foreign Protein Using the Partial Polyhedrin-fused Baculovirus Expression System** Sung Min Bae<sup>1</sup>; Tae Young Shin<sup>1</sup>; Jae Bang Choi<sup>1</sup>; Yeon Ho Je<sup>2</sup>; Byung Rae Jin<sup>3</sup>; Soo Dong Woo<sup>1</sup>, <sup>1</sup>Department of Agricultural Biology, Chungbuk National University, Chungju, Korea; <sup>2</sup>Research Institute for Agriculture and Life Sciences, Seoul National University, Seoul, Korea; <sup>3</sup>College of Natural Resources and Life Science, Dong-A University, Busan, Korea
- VI-2 A natural recombinant between *S. frugiperda* MNPV and *S. litura* NPV** Gloria Barrera<sup>1</sup>, Laura Villamizar<sup>1</sup>; Manuel Alfonso Patarroyo<sup>2</sup>, Oihane Simón<sup>3</sup>, Primitivo Caballero<sup>3</sup>, Mariano Belaich<sup>4</sup>, Daniel Ghiringhelli<sup>4</sup>; <sup>1</sup>Centro de Biotecnología y Bioindustria (CBB), Corpoica, Bogotá, Colombia, <sup>2</sup>Fundación Instituto de Inmunología de Colombia (FIDIC), Bogotá, Colombia, <sup>3</sup>Instituto de Agrobiotecnología, CSIC-Gobierno de Navarra, Navarra, España, <sup>4</sup>Laboratorio de Ingeniería Genética y Biología Celular y Molecular – Area Virosis de Insectos, Universidad Nacional de Quilmes, Argentina
- VI-3 Host specificity and PIFs based phylogeny of Betabaculovirus isolates from Gelechiidae family** Juliana Gómez<sup>1</sup>, Laura Villamizar<sup>1</sup>, Gloria Barrera<sup>1</sup>; Cecilia Turco<sup>2</sup>, Mariano Belaich<sup>2</sup>, Daniel Ghiringhelli<sup>2</sup>, <sup>1</sup>Centro de Biotecnología y Bioindustria (CBB), Corpoica, Bogotá, Colombia <sup>2</sup>Laboratorio de Ingeniería Genética y Biología Celular y Molecular – Area Virosis de Insectos, Universidad Nacional de Quilmes, Argentina
- VI-4 Diagnosing the unknown – advancing the taxonomy of aquatic invertebrate viruses** Kelly S. Bateman<sup>1</sup>, Grant D. Stentiford<sup>1</sup> and Monique M. van Oers<sup>2</sup>, <sup>1</sup>European Union Reference Laboratory for Crustacean Diseases, Centre for Environment, Fisheries and Aquaculture Science (Cefas), Dorset, UK, <sup>2</sup>Laboratory of Virology, Wageningen UR, Wageningen, Netherlands
- VI-5 Proteomic analysis of the occluded *Tipula oleracea* nudivirus (ToNV)** Annie Bézier<sup>1</sup>, Grégoire Harichaux<sup>2</sup>, Julien Gaillard<sup>3</sup>, Karine Musset<sup>1</sup>, Valérie Labas<sup>2</sup>, Elisabeth A. Herniou<sup>1</sup>, <sup>1</sup>Institut de Recherche sur la Biologie de l’Insecte, CNRS UMR 7261, Université François Rabelais, France; <sup>2</sup>Laboratoire de Spectrométrie de masse, Plateforme d’Analyse Intégrative des Biomolécules et des Phénomique des Animaux d’Intérêt Bio-agronomique. UMR INRA 0085-CNRS 7247-UFR-IFCE, Nouzilly, France; <sup>3</sup>Laboratoire de Biologie Cellulaire, Microscopie Electronique, Faculté de Médecine, Université François Rabelais, Tours, France
- VI-6 Nucleopolyhedrovirus and Microsporidia in Winter Moth (*Operophtera brumata*, L.) and Bruce Spanworm (*O. bruceata*, Hurst) populations in the Northeast US** Hannah J. Broadley<sup>1,2</sup>; Joseph S. Elkinton<sup>1,2</sup>; John P. Burand<sup>3</sup>; Lina Tian<sup>3</sup>; Leellen F. Solter<sup>4</sup>; <sup>1</sup>Graduate Program in Organismic and Evolutionary Biology, University of Massachusetts Amherst, USA; <sup>2</sup>Department of Environmental Conservation, University of Massachusetts Amherst, USA; <sup>3</sup>Department of Microbiology, University of Massachusetts Amherst, USA; <sup>4</sup> Department of Entomology, University of Illinois, USA
- VI-7 Regulation and activation of two effector caspases that affect Sindbis virus replication in *Aedes aegypti* mosquitoes** Ning Huang, A. Lorena Passarelli, and Rollie J. Clem, Division of Biology, Kansas State University, Manhattan, KS
- VI-8 Proteomic analysis and *in vivo* differential gene expression of *Trichoplusia ni* granulovirus (TnGV)** Angeles Bivián Hernández; Ingrid Zanella-Sainz; Paloma Dávila-Alvarez, J. Eleazar Barboza-Corona; Fabiola León-Galván; M. Cristina Del Rincón-Castro, Food Department, Division of Life Sciences, University of Guanajuato, Irapuato, Gto. México
- VI-9 Recombinant Iridovirus IIV-6 expressing the Cn-10 neurotoxin from *Centruroides noxius* scorpion** Flor C. Arellano-Villagómez<sup>1</sup>; Jorge E. Ibarra<sup>2</sup>; M. Cristina Del Rincón-Castro<sup>1</sup>, <sup>1</sup>Food Department, Division of Life Sciences, University of Guanajuato, Irapuato, Gto. México, <sup>2</sup>CINVESTAV-IPN Unidad Irapuato, Irapuato, Gto. México
- VI-10 Genomic sequencing and analysis of *Sucrea jujuba* nucleopolyhedrovirus** Xiaoping Liu, Feifei Yin, Zheng Zhu, Dianhai Hou, Jun Wang, Lei Zhang, Hualin Wang, Zhihong Hu, Fei Deng, State Key Laboratory of Virology, Virus Resource and Bioinformatics Center, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan 430071, P.R. China
- VI-11 Functional analysis of exonuclease gene (012L) of *Chilo iridescent virus*** Yeşim Aktürk Dizman<sup>1,2</sup>, Cemal Sandallı<sup>2</sup>, Zihni Demirbağ<sup>1</sup> and Remziye Nalçacıoğlu<sup>1</sup>, <sup>1</sup>Karadeniz Technical University, Faculty of Sciences, Department of Biology, Trabzon, Turkey, <sup>2</sup>Recep Tayyip Erdoğan University, Faculty of Arts and Sciences, Department of Biology, Rize, Turkey
- VI-12 Identification of a new multiple nucleopolyhedrovirus isolated from the Jasmine moth, *Palpita unionalis* (Hübner) (Lepidoptera: Pyralidae) in Egypt** Regina G. Kleespies<sup>1</sup>, Yongjie Wang<sup>2</sup>, Said El Salamouny<sup>3</sup>, Mona Awad<sup>3</sup>, Essam Agamy<sup>3</sup>, Ramadan Salama<sup>3</sup> and Johannes A. Jehle<sup>1,2</sup>; <sup>1</sup>Institute for Biological Control, Julius Kühn Institute, Darmstadt, Germany; <sup>2</sup>Agricultural Service Station Palatinate, Neustadt/Weinstr., Germany; <sup>3</sup>Department of Economic Entomology and Pesticides, Faculty of Agriculture, Cairo University, Giza, Egypt.
- VI-13 A single baculovirus for the production of recombinant Adeno-Associated Virus 8 vectors** Lionel Galibert; Aurélien Jacob; Bérangère Bertin; Marjorie Boutin Fontaine; Delphine Bonnin; Christophe Lecomte; Christel Rivière; Otto-Wilhelm Merten Genethon, 1bis, rue de l’Internationale, Evry, France
- VI-14 Determining the role of P10 during baculovirus infection through the development of novel mutants in *Autographa californica* multicapsid Nucleopolyhedrovirus** Leo Graves<sup>1</sup>, Farheen Raza<sup>1</sup>, Sarah L. Irons<sup>1</sup>; Robert D Possee<sup>1,2</sup> & Linda A King<sup>1</sup>, <sup>1</sup>Department of Biological and Medical Sciences, Oxford Brookes University, Oxford UK, <sup>2</sup>Oxford Expression Technologies Ltd, Oxford, UK
- VI-15 Evaluation of the transcriptional transactivation of betabaculovirus regulatory elements in transformed cell lines by alphabaculovirus transcription factors** Santiago Haase<sup>1</sup>, M. Leticia Ferrelli<sup>1</sup>; Matías L. Pidre<sup>1</sup>; Alicia Sciocco-Cap<sup>2</sup>, Víctor Romanowski<sup>1</sup>, <sup>1</sup>IBBM-UNLP-CONICET, La Plata, AR; <sup>2</sup>IMyZA-INTA, Castelar, AR



- VI-16 Enhancin Genes of *Lymantria dispar* NPV Do Not Increase Potency Via Metalloprotease Activity** Kelli Hoover<sup>1</sup>, James Slavicek<sup>2</sup>, Algimantas P. Valaitis<sup>2,3</sup>, Nancy Hayes-Plazolles<sup>2</sup>, and Elizabeth McCarthy<sup>1</sup>, <sup>1</sup>Department of Entomology, Penn State University, University Park, PA USA, <sup>2</sup>USDA Forest Service, Delaware, OH USA, <sup>3</sup> Retired
- VI-17 A Cypovirus VP5 Displays the RNA Chaperone-like Activity that Destabilizes RNA Helices and Accelerates Strand Annealing** Jie Yang, Jiamin Zhang, Yuehua Kuang and Yuanyang Hu, State Key Laboratory of Virology, College of Life Sciences, Wuhan University, Wuhan, China
- VI-18 A recombinant *Autographa californica* nucleopolyhedrosis virus expressing a Cyt1A/GFP chimera in *Trichoplusia ni* larvae** Miguel A. Salas-Marina<sup>1</sup>, Cristina Del Rincón-Castro<sup>2</sup> and Jorge E. Ibarra<sup>1</sup>, <sup>1</sup>CINVESTAV-Irapuato, Irapuato, GTO, Mexico; <sup>2</sup>División de Ciencias de la Vida, Universidad de Guanajuato, Irapuato, GTO., Mexico
- VI-19 iLOV baculovirus: Using a novel small fluorescent protein for imaging virus proteins during infection** Farheen Raza<sup>1</sup>, Sarah Irons<sup>1</sup>, Leo Graves<sup>1</sup>, Stan Botchway<sup>2</sup>, Robert Possee<sup>1,3</sup>, Linda King<sup>1</sup>, <sup>1</sup>Department of Biological and Medical Sciences, Oxford Brookes University, Oxford, UK; <sup>2</sup>Central Laser Facility, STFC, Harwell, UK; <sup>3</sup>Oxford Expression Technologies, Oxford, UK
- VI-20 Expression analysis of the *nsd-2* gene encoding the putative densovirus receptor in the midgut** Katsuhiko Ito<sup>1</sup>, Hiroko Tabunoki<sup>1</sup>, Takeshi Yokoyama<sup>1</sup>, Keiko Kadono-Okuda<sup>2</sup>, <sup>1</sup>Tokyo University of Agriculture and Technology, Tokyo, Japan; <sup>2</sup>National Institute of Agrobiological Sciences, Ibaraki, Japan
- VI-21 Simultaneous covert infections with three different RNA viruses in the Lepidoptera *Spodoptera exigua*** Agata K. Jakubowska<sup>1</sup>; Melania D'Angiolo<sup>1</sup>; Rosa M. González Martínez<sup>1</sup>; Anabel Millán Leiva<sup>1</sup>; Arkaitz Carballo<sup>2</sup>; Rosa Murillo<sup>2</sup>; Primitivo Caballero<sup>2</sup>; Salvador Herrero<sup>1</sup>; <sup>1</sup>Department of Genetics, Universitat de València, Dr Moliner 50, 46100 Burjassot, Spain; <sup>2</sup>Bioinsecticidas Microbianos, Instituto de Agrobiotecnología, CSIC-UPNA, Gobierno de Navarra, 31192 Mutilva Baja, Navarra, Spain
- VI-22-STU A novel baculovirus-derived promoter with high activity in the Baculovirus Expression System** Maria Martinez-Solis<sup>1</sup>; Silvia Gomez-Sebastian<sup>2</sup>; Jose M Escribano<sup>3</sup>; Agata K. Jakubowska<sup>1</sup>; Salvador Herrero<sup>1</sup>; <sup>1</sup>Department of Genetics, Universitat de Valencia, Burjassot, Spain; <sup>2</sup>Alternative Gene Expression S.L. (ALGENEX), Centro Empresarial, Parque Científico y Tecnológico de la Universidad Politécnica de Madrid, Campus de Montegancedo, Madrid, Spain; <sup>3</sup>Departamento de Biotecnología, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA), Madrid, Spain
- VI-23 Construction and Characterization of a Recombinant Invertebrate Iridovirus** Arzu Ozgen<sup>1</sup>, Hacer Muratoglu<sup>2</sup>, Zihni Demirbag<sup>1</sup>, Just M. Vlak<sup>3</sup>, Monique M. van Oers<sup>3</sup>, Remziye Nalcacioglu<sup>1</sup>, <sup>1</sup>Karadeniz Technical University; Faculty of Science, Department of Biology, Trabzon, Turkey; <sup>2</sup>Karadeniz Technical University, Faculty of Science, Department of Molecular Biology and Genetics, Trabzon, Turkey; <sup>3</sup>Laboratory of Virology, Wageningen University, Wageningen, The Netherlands
- VI-24 RNA interference and insect-virus interactions** David Neunemann, David G. Heckel, Heiko Vogel; Max Planck Institute for chemical ecology, Jena, Germany
- VI-25 Studies on existing and new isolates of *Cryptophlebia leucotreta granulovirus* (CrleGV) on FCM populations from a range of geographic regions in South Africa** John K. Opoku-Debrah<sup>1,4</sup>; Martin Hill<sup>1</sup>; Sean Moore<sup>1,2</sup>; Caroline Knox<sup>3</sup>, <sup>1</sup>Department of Zoology and Entomology, Rhodes University, Grahamstown, South Africa; <sup>2</sup>Citrus Research International, Humewood, Port Elizabeth, South Africa.; <sup>3</sup>Department of Biochemistry, Microbiology and Biotechnology, Rhodes University, Grahamstown, South Africa; <sup>4</sup>River Bioscience (Pty) Ltd, Humewood, Port Elizabeth, South Africa
- VI-26 Effects of the baculovirus fibroblast growth factor on Sindbis virus replication** Wenbi Wu, Rollie J. Clem, and A. Lorena Passarelli, Division of Biology, Kansas State University, Manhattan, USA
- VI-27 Sensitivity and vertical transmission of nucleopolyhedrovirus in various populations of gypsy moth *Lymantria dispar*** Olga Polenogova<sup>1</sup>, Alexandr Ilyinykh<sup>1</sup>, Dmitriy Kurenschikov<sup>2</sup>, Philipp Ilyinykh<sup>3</sup>, Elena Imranova<sup>2</sup>, Alexandr Baburin<sup>2</sup>; <sup>1</sup>Institute of Systematics and Ecology of Animals Siberian Branch of Russian Academy of Sciences, Novosibirsk, RUSSIA; <sup>2</sup>Institute of Water and Ecological Problems Far Eastern Branch of Russian Academy of Sciences Kim-Yu-Chena, Khabarovsk, RUSSIA; <sup>3</sup>State Research Center of Virology and Biotechnology "Vector", Novosibirsk, RUSSIA
- VI-28 Establishment of SeMNPV Persistent Infection and Screening of Persistent Infection Associated Genes in Baculovirus** Weng Qingbei<sup>1</sup>, Li Min<sup>1</sup>, Yang Kai<sup>2</sup>, Pang Yi<sup>2</sup>, <sup>1</sup>School of Life Sciences, Guizhou Normal University, Guiyang, China; <sup>2</sup>State Key Laboratory of Biocontrol and Institute of Entomology, Sun Yat Sen University, Guangzhou, China
- VI-29-STU Larvicidal activity of an ascovirus from *Spodoptera litura* against parasitoid wasps** Shiori Sagawa, Eiko Arai, Maki Inoue, Yasuhisa Kunimi, Madoka Nakai; Graduate School of Agriculture, Tokyo University of Agriculture and Technology
- VI-30 "11K" genes family *sf68*, *sf95* and *sf138* modulate transmissibility and insecticidal properties of *Spodoptera frugiperda* multiple nucleopolyhedrovirus** Inés Beperet<sup>1</sup>; Oihane Simón<sup>1</sup>; Trevor Williams<sup>2</sup>; Miguel López-Ferber<sup>3</sup>; Primitivo Caballero<sup>1,4</sup>; <sup>1</sup>Bioinsecticidas Microbianos, Instituto de Agrobiotecnología, Mutilva, Spain; <sup>2</sup>Instituto de Ecología AC, Xalapa, Mexico; <sup>3</sup>LGEl, Ecole de Mines d'Alès, Alès, France; <sup>4</sup>Departamento de Producción Agraria, Universidad Pública de Navarra, Pamplona, Spain
- VI-31 Characterization of two ORFs undergoing positive selection in a genotype of *Chrysodeixis chalcites* single nucleopolyhedrovirus from the Canary Islands** Oihane Simón<sup>1</sup>; Leopoldo Palma<sup>1</sup>; Alexandra Bernal<sup>1</sup>; Delia Muñoz<sup>2</sup>; Trevor Williams<sup>3</sup>; Primitivo Caballero<sup>1,2</sup>; <sup>1</sup>Bioinsecticidas Microbianos, Instituto de Agrobiotecnología, Mutilva, Spain; <sup>2</sup>Departamento de Producción Agraria, Universidad Pública de Navarra, Pamplona, Spain; <sup>3</sup>Instituto de Ecología AC, Xalapa, Mexico

**VI-32 Genome sequence and organization of a *Betabaculovirus* pathogenict to cassava hornworm, *Erinnyis ello ello* (Lepidoptera: Sphingidae)**  
Daniel M. P. Ardisson-Araújo<sup>1</sup>; Fernando Lucas Melo<sup>1</sup>; Miguel S. Andrade<sup>1</sup>; William Sihler<sup>2</sup>; Sonia N. Báo<sup>1</sup>; Bergmann M. Ribeiro<sup>1</sup>; Marlinda L. Souza<sup>2</sup>; <sup>1</sup>Laboratory of Baculovirus, Cell Biology Department, University of Brasília, 70910-900, Brasília, DF;Brazil. <sup>2</sup>Embrapa Genetic Resources and Biotechnology, Biological Station Park, 70770-917, Brasília, DF, Brazil.

**VI-33-STU Analysis of genetic interactions among four non-essential genes of BmNPV** Hitomi Taka<sup>1</sup>, Chikako Ono<sup>2</sup>, Masanao Sato<sup>3</sup>, Shin-ichiro Asano<sup>1</sup>, Hisanori Bando<sup>1</sup>; <sup>1</sup>Graduate School of Agriculture, Hokkaido University, Sapporo, Japan; <sup>2</sup>Research Institute for Microbial Diseases, Osaka University, Suita, Japan; <sup>3</sup>Okazaki Institute for Integrative Bioscience, National Institute for Basic Biology, Okazaki, Japan

**VI-34-STU Comparative fitness of a granulovirus mutant possessing larger occlusion bodies than wild type *Adoxophyes orana* granulovirus** Haruaki Uchida, Yasuhisa Kunimi, Maki Inoue, Madoka Nakai; Graduate School of Agriculture, Tokyo University of Agriculture and Technology

**VI-35 Granulovirus detection in larvae of sugarcane borers *Diatraea* spp. (Lepidoptera: Pyralidae) in Colombia** Cristian Guzmán, Diana Pinzón, Carolina Ruiz, Juliana Gómez, Carlos Espinel, Gloria Barrera, Laura Villamizar; Centro de Biotecnología y Bioindustria (CBB), Corpoica, Bogotá, Colombia

**VI-36 Earthworm-mediated dispersal of baculovirus occlusion bodies in soil: a laboratory study**  
Dennis A. Infante-Rodríguez<sup>1</sup>; Delia Muñoz<sup>2</sup>; Jorge Valenzuela<sup>1</sup>; Trevor Williams<sup>1</sup>; <sup>1</sup>Instituto de Ecología AC, Xalapa, Mexico; <sup>2</sup>Departamento de Producción Agraria, Universidad Pública de Navarra, Pamplona, Spain

**VI-37-STU Effects of rearing temperature on the susceptibility of larvae of the smaller tea tortrix, *Adoxophyes honmai* (Lepidoptera: Tortricidae) to *A. honmai* nucleopolyhedrovirus** Takeshi Yamaga, Madoka Nakai, Maki Inoue, Yasuhisa Kunimi, Laboratory of biological control, Graduate School of Agriculture, Tokyo University of Agriculture and Technology, Fuchu city, Tokyo, Japan

**VI-38 Characterization of Nodaviral Protein A Revealed RNA Synthesis and Terminal Nucleotidyl Transferase Activity** Zhaowei Wang, Xi Zhou, Dong Li and Congyi Zheng; State Key Laboratory of Virology, College of Life Sciences, Wuhan University, Wuhan, China

SIP Division Business Meeting: Wednesday evening  
**BACTERIA + Workshop** 20:00-21:30. **P5**  
**Non-Target Effects on Biological Pesticides Transgenic Crops**  
Moderator: Ken Narva

**199 The impact of herbicide tolerant crops on non-target organisms** Ramon Albaiges; Marina S. Lee; and Agnès Ardanuy, Universitat de Lleida, Agrotecnio Center, Lleida, Catalonia, Spain

**200 Your Right to Know What You Eat: On the Occurrence of Viable *Bacillus thuringiensis* in Commercial Food Products** Brian Federici, Department of Entomology and Interdepartmental Graduate Programs in Microbiology & Cell, Molecular and Developmental Biology, University of California, Riverside, Riverside, California USA

**201 Environmental risk assessment of genetically engineered crops for spiders** Michael Meissle, Jörg Romeis, Agroscope, Institute for Sustainability Sciences, Zürich, Switzerland

**202 Conclusions from 10 years of accumulated evidence from publicly funded field trials research with Bt-maize in Germany** Stefan Rauschen, Forschungszentrum Jülich GmbH, Projektträger Jülich, Jülich, Germany

SIP Division Business Meeting: Wednesday evening  
**MICROSPORIDIA + Workshop** 20:00-21:30. **P4**

SIP Division Business Meeting: Wednesday evening  
**FUNGI** 20:00-21:30. **P2**

SIP Division Business Meeting: Wednesday evening  
**VIRUSES** 20:00-21:30. **P3**

## THURSDAY - 7 August

7:30-16:30 REGISTRATION

P1

### Symposium 7 (Dis. of Ben. Invertebr.) Thursday, 8:00 -10:00. P2 Emerging Tools for Aquatic Pathogen Discovery and Description

Organizers/Moderators: Spencer Greenwood and Grant Stentiford

- 8:00 **203 Early mortality syndrome is an infectious disease with a bacterial etiology** Loc Tran<sup>1,2,3</sup>, Kevin Fitzsimmons<sup>2</sup> and Donald V. Lightner<sup>1</sup>, <sup>1</sup>Aquaculture Pathology Laboratory, School of Animal and Comparative Biomedical Sciences, University of Arizona, Tucson, AZ 85721, USA, <sup>2</sup>Department of Soil, Water and Environmental Science, University of Arizona, Tucson, AZ 85721, USA, <sup>3</sup>Department of Aquaculture Pathology, Nong Lam University at Ho Chi Minh, Vietnam
- 8:30 **204 Policy, phylogeny, and the parasite** Grant D. Stentiford<sup>1,2</sup>, Stephen W. Feist<sup>2</sup>, David M. Stone<sup>2</sup>, Edmund J. Peeler<sup>2</sup> and David Bass<sup>3</sup>, <sup>1</sup>European Union Reference Laboratory for Crustacean Diseases, Centre for Environment, Fisheries and Aquaculture Science (Cefas), Weymouth Laboratory, UK, <sup>2</sup>Aquatic Pests and Pathogens Group, Centre for Environment, Fisheries and Aquaculture Science (Cefas), Weymouth Laboratory, Dorset, UK, <sup>3</sup>Division of Genomics and Microbial Diversity, Department of Life Sciences, Natural History Museum, Cromwell Road, London, UK
- 9:00 **205 The Next Generation of Crustacean Health: Disease Diagnostics Using Modern Transcriptomics** K. Fraser Clark<sup>1,2,3</sup>, Spencer J. Greenwood<sup>1,2</sup>, <sup>1</sup>Atlantic Veterinary College Lobster Science Centre; <sup>2</sup>Department of Biomedical Sciences, University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada; <sup>3</sup> Department of Plant and Animal Sciences, Dalhousie University, Truro, Nova Scotia, Canada
- 9:30 **206 Environmental DNA as a tool for detection and identification of aquatic parasites: known unknowns and just plain unknowns** Hanna Hartikainen<sup>1,5</sup>, Grant D. Stentiford<sup>2,3</sup>, Kelly Bateman<sup>2,3</sup>, Stephen W. Feist<sup>3</sup>, David M. Stone<sup>3</sup>, Matt Longshaw<sup>3,4</sup>, Georgia Ward<sup>1</sup>, Charlotte Wood<sup>1</sup>, Beth Okamura<sup>1</sup> and David Bass<sup>1</sup>, <sup>1</sup>Department of Life Sciences, The Natural History Museum, London, UK; <sup>2</sup>European Union Reference Laboratory for Crustacean Diseases, Centre for Environment, Fisheries and Aquaculture Science (Cefas), Weymouth Laboratory, Dorset, UK; <sup>3</sup>Aquatic Pests and Pathogens Group, Centre for Environment, Fisheries and Aquaculture Science (Cefas), Weymouth Laboratory, Dorset, UK; <sup>4</sup>Fish Vet Group, Inverness, <sup>5</sup>ETH Zürich and Eawag, Dübendorf, Switzerland

Contributed Papers

Thursday, 8:00-10:00.

P4

## Nematodes 3

Organizer/Moderator: Luis Leite and Glen Stevens

- 8:00 **207 The Role of biocontrol agents within IPM of *Tuta absoluta* on tomato in Egypt** Mahfouz Abd-Elgawad, Phytopathology Department, National Research Center, Giza, Egypt.
- 8:15 **208 Insecticidal activity of *Heterorhabditis bacteriophora* Shandong toward *Brontispa longissima* and *Cryptothoelela variegata*** Cheng Bai<sup>\*</sup>, Liping Liu, Haibo Long, Qian Jin and Zhengqiang Peng; Key Laboratory of Pests Comprehensive Governance for Tropical crops, Ministry of Agriculture, Hainan Key Laboratory for Monitoring and Control of Tropical Agricultural Pests, Hainan Engineering Research Center for Biological Control of Tropical Crops Diseases and Insect Pests, Environment and Plant Protection Institute, Chinese Academy of Tropical Agricultural Sciences, Haikou, Hainan China.
- 8:30 **209 Prospects for using Entomopathogenic Nematodes to Control the Vine Mealybug, *Planococcus ficus*, in South African Vineyards** Patrique D. Le Vieux, Antoinette P. Malan; Department of Conservation Ecology and Entomology, Stellenbosch University, Stellenbosch, Matieland, South Africa.
- 8:45 **210 New data on *Steinernema ichnusae* distribution in the Mediterranean Area** E. Tarasco<sup>1</sup>, M. Clausi<sup>2</sup>, G. Rappazzo<sup>2</sup>, M. Oreste<sup>1</sup>, L. Rubino<sup>2</sup>, D. Leone<sup>2</sup>, M. T. Vinciguerra<sup>2</sup>, <sup>1</sup>Departement of Soil, Plant and Food Sciences, Section of Entomology and Zoology, University of Bari "Aldo Moro", Bari (Italy), <sup>2</sup>Department of Biological, Geological and Environmental Sciences, Section of Animal Biology "M. La Greca", University of Catania, Italy
- 9:00 **211-STU Evaluation of entomopathogenic nematodes for control of the diapausing overwintering codling moth population** Odendaal Deidré; Addison F. Matthew; Malan P. Antoinette; Department of Conservation Ecology and Entomology, Faculty of AgriSciences, University of Stellenbosch, South Africa
- 9:15 **212-STU A new entomopathogenic *Oscheius* (Nematoda: Rhabditidae) from Italian cave** Giulia Torrini<sup>1</sup>, Beatrice Carletti<sup>1</sup>, Giuseppe Mazza<sup>1</sup>, Pio Federico Roversi<sup>1</sup>, Elena Fanelli<sup>2</sup>, Francesca De Luca<sup>2</sup>, Alberto Troccoli<sup>2</sup>, Eustachio Tarasco<sup>3</sup>, <sup>1</sup>Agricultural Research Council - Agrobiological and Pedology Research Centre (CRA-ABP), Firenze (Italy); <sup>2</sup>Istituto di Plant Protection (IPP)-CNR, Bari (Italy); <sup>3</sup>Department of Soil, Plant and Food Sciences, Section of Entomology and Zoology, University of Bari "A. Moro", Bari, Italy
- 9:30 **213 Genetic improvement of the entomopathogenic nematode *Heterorhabditis bacteriophora*** Ralf-Udo Ehlers, e-nema, GmbH, Schwentimental, Germany
- 9:45 **214-STU Perspectives of new nematode formulation technology for biological control to pest insects in Georgia** Mariam Chubinishvili, Tsisia Chkhubianishvili, Manana Kakhadze, Iatamze Malania, Kanchaveli Institute of Plant Protection, Agricultural University of Georgia, Tbilisi, Georgia

## Viruses 6

Moderator: Adly Abd-Alla and Madoka Nakai

- 8:00 **215 Interactions between salivary gland hypertrophy virus and tsetse microbiota** Güler Demirbas Uzel<sup>1</sup>, Vangelis Doudoumis<sup>2</sup>, Antonios Augustinos<sup>1</sup>, Gisele Ouedroogo<sup>1</sup>, Andrew Parker<sup>1</sup>, Drion Boucias<sup>3</sup>, Kostas Bourtzis<sup>1</sup>, Adly Abd-Alla<sup>1</sup>, <sup>1</sup>Insect Pest Control Laboratory, Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture, Vienna, Austria; <sup>2</sup>Department of Environmental and Natural Resources Management, University of Patras, Agrinio, Greece; <sup>3</sup>Entomology and Nematology Department, University of Florida, Gainesville, Florida, USA
- 8:15 **216 STU Mechanisms of tree-top disease induced by the specialist baculovirus SeMNPV** Yue Han, Stineke van Houte, Vera I.D. Ros, Just M. Vlák and Monique M. van Oers, <sup>1</sup>Laboratory of Virology, Wageningen University, Netherlands
- 8:30 **217 Temporal proteomics to study virus infection and function in the host cell** İkbâl Aqah İnce<sup>1</sup>; Sijf Boeren<sup>2</sup>, Just Vlák<sup>3</sup>, Monique van Oers<sup>3</sup>, <sup>1</sup>Department of Medical Microbiology, Acibadem University, School of Medicine, Istanbul, Turkey; <sup>2</sup>Laboratory of Biochemistry, Wageningen University, Wageningen, The Netherlands; <sup>3</sup>Laboratory of Virology, Wageningen University, Wageningen, The Netherlands
- 8:45 **218 Characterization of an atypical fast-killing ascovirus: *Spodoptera frugiperda* ascovirus 1d (SfAV-1d)** Eiko Arai<sup>1</sup>; Shiori Sagawa<sup>1</sup>; Yasumasa Saito<sup>1</sup>; Xiao-Wen Cheng<sup>2</sup>; Dennis Bideshi<sup>3</sup>; Maki Inoue<sup>1</sup>; Yasuhisa Kunimi<sup>1</sup>; Brian Federici<sup>3</sup>; Madoka Nakai<sup>1</sup>, <sup>1</sup>Institute of Agriculture, Tokyo University of Agriculture and Technology, Fuchu, Tokyo, Japan; <sup>2</sup>Department of Microbiology, Miami University, Oxford, Ohio, USA; <sup>3</sup>Department of Entomology, University of California, Riverside, USA; <sup>4</sup>California Baptist University, Riverside California, USA
- 9:00 **219-STU Two nucleopolyhedroviruses isolated from the genus *Adoxophyes* inhibit juvenile hormone (JH) esterase activity but not JH epoxide hydrolase activity** Yasumasa Saito<sup>1,2</sup>; Shizuo G. Kamita<sup>2</sup>; Bruce D. Hammock<sup>2</sup>; Yasuhisa Kunimi<sup>1</sup>; Maki N. Inoue<sup>1</sup>; Madoka Nakai<sup>1</sup>, <sup>1</sup>Laboratory of Biological Control, United Graduate School of Agricultural Science, Tokyo University of Agriculture and Technology, Fuchu, Tokyo, Japan; <sup>2</sup>Laboratory of Pesticide Biotechnology, Department of Entomology and Nematology, University of California, Davis, USA
- 9:15 **220 Mechanism underlying virus-induced hyperactive behavior: Substrate identification of the baculovirus protein tyrosine phosphatase** Stineke van Houte, Carmen Embregts, Esther van Andel, Vera I.D. Ros, Just M. Vlák and Monique M. van Oers. Laboratory of Virology, Wageningen University, Wageningen, Netherlands
- 9:30 **221-STU The genome of a baculovirus isolated from *Lononia obliqua* (Lepidoptera: Saturniidae) reveals a new transcription terminator factor possible acquired from the host** Clara Wandenkolck Silva Araújo<sup>1</sup>; Bergmann Morais Ribeiro<sup>1</sup>; Fernando Lucas Melo<sup>1</sup>; <sup>1</sup>University of Brasília- UnB- Brazil

- 9:45 **222 The essential baculovirus protein VP1054 is a hijacked cellular PUR $\alpha$ , a nucleic-acid-binding protein specific for GGN repeats** Martin Marek<sup>1</sup>, Christophe Romier<sup>1</sup>, Lionel Galibert<sup>2</sup>, Otto-Wilhelm Merten<sup>2</sup> and Monique M. van Oers<sup>3</sup>, <sup>1,2,3</sup>Biologie Structurale Intégrative, Institut de Génétique et Biologie Moléculaire et Cellulaire (IGBMC), UDS, CNRS, INSERM, Illkirch, France; <sup>2</sup>Laboratory of Applied Vectorology, Génomex, Évry, France; <sup>3</sup>Laboratory of Virology, Wageningen University, Netherlands

Symposium (Special)

Thursday, 8:00-10:00.

P5

DFG Priority Program  
Host Parasite Coevolution

Organizer/Moderator: Joachim Kurtz

- 8:00 **223 Escaping parasite manipulation: Apoptosis and host-parasite co-evolution in *Apis mellifera*** Christoph Kurze<sup>1</sup>, Oleg Lewkowski<sup>1</sup>, Yves Le Conte<sup>2</sup>, Claudia Dussaubat<sup>2</sup>, Thomas Müller<sup>3</sup>, Silvio Erler<sup>1</sup>, Per Kryger<sup>4</sup>, and Robin F.A. Moritz<sup>1</sup>; <sup>1</sup>Institute of Biology, MLU Halle-Wittenberg, Germany; <sup>2</sup>Abeilles et Environnement, INRA Avignon, France; <sup>3</sup>Department of Internal Medicine IV, MLU Halle-Wittenberg, Germany; <sup>4</sup>Department of Agroecology, Aarhus University, Denmark.
- 8:15 **224 Overcoming external immunity: An increase in virulence as a result of host-parasite coevolution in *Beauveria bassiana*** Charlotte Rafaluk<sup>1</sup>, Wentao Yang<sup>1</sup>, Philip Rosenstiel<sup>2</sup>, Hinrich Schulenburg<sup>1</sup> and Gerrit Joop<sup>1,3</sup>, <sup>1</sup>Evolutionary Ecology Genetics, Zoological Institute, Christian-Albrechts-Universität zu Kiel, Germany; <sup>2</sup>Institut für Klinische Molekularbiologie, Christian-Albrechts-Universität zu Kiel, Universitäts-klinikum Schleswig-Holstein, Campus Kiel, Germany; <sup>3</sup>Institute for Phytopathology and Applied Zoology, University of Giessen, Gießen, Germany
- 8:30 **225 Rapid adaptation of *Bacillus thuringiensis* to its nematode host *Caneorhabditis elegans*** Leila Masri<sup>1,2</sup>, Antoine Branca<sup>3</sup>, Anna Sheppard<sup>1,4</sup>, Hinrich Schulenburg<sup>1</sup>, <sup>1</sup>Dept. Evolutionary Ecology and Genetics, University of Kiel, Germany; <sup>2</sup>Present address: IST Austria, Austria; <sup>3</sup>CNRS-Université Paris-Sud, Orsay, France; <sup>4</sup>Present address: Nuffield Department of Medicine, University of Oxford, Oxford, UK
- 8:45 **226 Intra-host parasite interactions between co-infecting *Bacillus thuringiensis* strains** Michaela H. Klösener, Joy Bose, Rebecca D. Schulte, Department of Behavioural Biology, University of Osnabrueck, Germany
- 9:00 **227 Experimental evolution *in silico*: host-parasite coevolution versus parasite adaptation** Jakob Strauß<sup>1</sup>, Philip Crain<sup>2</sup>, Sultan Beshir<sup>1</sup>, Joachim Kurtz<sup>1</sup>, Hinrich Schulenburg<sup>3</sup>, Arndt Telschow<sup>1</sup>; <sup>1</sup>Westfälische Wilhelms Universität, Institute of Evolution and Biodiversity, Münster Germany; <sup>2</sup>DuPont Pioneer, Delaware USA; <sup>3</sup>Christian-Albrechts-Universität zu Kiel, Department of Evolutionary Ecology and Genetics, Kiel Germany
- 9:15 **228 Immune priming with *Bacillus thuringiensis* in *Tribolium castaneum*** Joachim Kurtz, Barbara Milutinovic, Robert Peuss, Kevin Knoblich, Hendrik Eggert, Sarah Behrens, Jenny Greenwood, Westfälische Wilhelms Universität, Institute of Evolution and Biodiversity, Münster, Germany

- 9:30 **229 Rapid reciprocal adaptation between the red flour beetle and *Bacillus thuringiensis* bacteria during experimental coevolution** Barbara Milutinovic & Joachim Kurtz, Institute for Evolution and Biodiversity, Münster, Germany
- 9:45 **230 Means of fast virulence adaption: the plasmid and prophage equipment of selected *Bacillus thuringiensis* strains** Jacqueline Hollensteiner<sup>1</sup>, Joachim Kurtz<sup>2</sup>, Hinrich Schulenburg<sup>3</sup>, Heiko Liesegang<sup>1</sup>, <sup>1</sup>Georg-August University Göttingen, Institute für Mikrobiologie und Genetik, Germany; <sup>2</sup>Westfälische Wilhelms-Universität Münster, Germany; <sup>3</sup>Christian-Albrechts-Universität Kiel, Zoological Institute, Germany

10:00–10:30

**BREAK**

Thursday, 10:30-12:30.

**P1**

**SOCIETY FOR INVERTEBRATE PATHOLOGY**

**Annual Business Meeting**

Presiding: Jørgen Eilenberg

12:30–14:00

**LUNCH**

Mensa

Symposium 8 (Cross-Divisional) Thursday, 14:00-16:00.

**P2**

**Host – Pathogen Ecology at the Molecular Level: Gene Regulation and Environment Sensing**

Organizers/Moderators:

Christina Nielsen-LeRoux and Elke Genersch

- 14:00 **231 The *Bacillus thuringiensis* way of life: communicate to kill and survive in the insect host** Didier Lereclus, INRA, UMR1319 - Micalis, La Minière, 78280 Guyancourt, France.
- 14:30 **232 The interplay of *Paenibacillus* larvae with honey larvae during infection** Elke Genersch; Anne Fünfhaus; Eva Garcia-Gonzalez; Gillian Hertlein; Lena Poppinga, Institute for Bee Research, Hohen Neuendorf, Germany
- 15:00 **233 Antimicrobial defense and persistent infection in insects revisited** Jens Rolf, Evolutionary Biology, Fachbereich Biologie, Chemie, Pharmazie, Freie Universität Berlin, Berlin, Germany
- 15:30 **234 *Vibrio* and the intraphagosomal environment: how an oyster pathogen evades intracellular killing in oyster hemocytes** Audrey Vanhove<sup>1</sup>, Annick Jacq<sup>2</sup>, Frédérique Le Roux<sup>3</sup>, Tristan Rubio<sup>1</sup>, Alexandra Calteau<sup>4</sup>, Evelyne Bachère<sup>1</sup>, Julie Nicod<sup>1</sup>, Agnès Vergnes<sup>1</sup>, Astrid Lemire<sup>3</sup>, Guillaume Charrière<sup>1</sup> and Delphine Destoumieux-Garzon<sup>1</sup>; <sup>1</sup>Ecology of coastal marine systems, University of Montpellier, France; <sup>2</sup>Institut de Génétique et Microbiologie, Université de Paris Sud, France; <sup>3</sup>Integrative Biology of Marine Models, Ifremer, Université Pierre et Marie Curie. Station Biologique de Roscoff, France; <sup>4</sup>Laboratory of Bioinformatics Analyses for Genomics and Metabolism, Genoscope, Evry, France

Contributed Papers

Thursday, 14:00-15:45.

**P3**

**MICROBIAL CONTROL 4**

Moderator: Trevor Jackson

- 14:00 **235 Establishing the fungal entomopathogen *Beauveria bassiana* (Ascomycota: Hypocreales) as an endophyte in cucurbits for managing Zucchini Yellow Mosaic Virus (ZYMV)** Lara R. Jaber & Nida' Salem, Department of Plant Protection, Faculty of Agricultural Sciences, The Univ. of Jordan, Amman, Jordan
- 14:15 **236 Bean plant *Phaseolus vulgaris* endophytically colonized by *Beauveria bassiana* and *Hypocrea lixii* acquires protection against *Liriomyza huidobrensis* (Diptera: Agromyzidae) in the field** Jane W. Gathage, Komivi S. Akutse, Komi K.M. Fiaboe, Sunday Ekesi and Nguya K. Maniania, International Centre of Insect Physiology and Ecology, Nairobi, Kenya
- 14:30 **237 Colonized plants with entomopathogenic fungi produce mortality in *Spodoptera littoralis* (Boisduval) (Lepidoptera: Noctuidae) larvae** Gloria Resquín-Romero, Cristina Delso, Carlos Campos, Lola Ortega, Inmaculada Garrido-Jurado, Enrique Quesada-Moraga, University of Córdoba, Department of Agricultural and Forestry Sciences, Córdoba, Spain
- 14:45 **238 *Beauveria bassiana* and California strawberries: endophytic, mycorrhizal, and entomopathogenic interactions**, Surendra K. Dara, Division of Agriculture and Natural Resources, University of California, USA
- 15:00 **239 Perceptions, trust, terminology and influence: What do consumers think about biological control?** Michael Brownbridge and Alexandra Grygorczyk, Vineland Research and Innovation Centre, Vineland Station, Ontario, Canada
- 15:15 **240 A phylogenetic survey of protistan parasites** David Bass<sup>1</sup>, Hanna Hartikainen<sup>2</sup>, Cedric Berney<sup>1</sup>, Sigrd Neuhauser<sup>1</sup>, Georgia Ward<sup>1</sup>, Grant Stentiford<sup>3</sup>; <sup>1</sup>Division of Genomics and Microbial Diversity, Department of Life Sciences, Natural History Museum, UK; <sup>2</sup>ETH Zürich and Eawag, Duebendorf, Switzerland; <sup>3</sup>European Union Reference Laboratory for Crustacean Diseases, Centre for Environment, Fisheries and Aquaculture Science (Cefas), Weymouth Laboratory, UK
- 15:30 **241 *Bacillus thuringiensis* toxins vs baculovirus: differential induction of immune system related genes in *Spodoptera exigua*** Cristina M. Crava, Agata Jakubowska, Salvador Herrero, Baltasar Escriche, Yolanda Bel, Department of Genetics, ERI BIOTECMED, Universitat de Valencia, Burjassot, Spain

**VIRUSES 7**

Moderator: Zihni Demirbag and Mehin Yuan

- 14:00 **242 Lysine Residues in N-terminal Tail of a Viral Histone H4 are Crucial in Controlling Host Gene Expression** Rahul Hepat, Yonggyun Kim, Department of Bioresource Sciences, Andong National University, Andong, Korea
- 14:15 **243 Heat-shock protein 90 is a broadly active regulator for baculovirus infection** Shufen Li; Dianhai Hou; Fei Deng; Hualin Wang; Manli Wang; Zhihong Hu, Wuhan Institute of Virology, Chinese Academy of Sciences, P. R. China
- 14:30 **244 Development and immunity-related microRNAs of the lepidopteran model host *Galleria mellonella*** Krishnendu Mukherjee and Andreas Vilcinskis, Fraunhofer Institute of Molecular Biology and Applied Ecology, Department of Bioresources, Giessen, Germany
- 14:45 **245 The *sf122* gene of *Spodoptera frugiperda* nucleopolyhedrovirus modulates key aspects of insect-to-insect transmission and post mortem host liquefaction** Inés Beperet<sup>1</sup>; Oihane Simón<sup>1</sup>; Trevor Williams<sup>2</sup>; Sarah L. Irons<sup>3</sup>; Leopoldo Palma<sup>1</sup>; Miguel López-Ferber<sup>4</sup>; Linda A. King<sup>3,5</sup>; Primitivo Caballero<sup>1,5</sup>, <sup>1</sup>Bioinsecticidas Microbianos, Instituto de Agrobiotecnología, Mutilva, Spain; <sup>2</sup>Instituto de Ecología AC, Xalapa, Mexico; <sup>3</sup>Department of Biological and Medical Sciences, University of Oxford, United Kingdom; <sup>4</sup>LGEI, Ecole de Mines d' Alès, Alès, France; <sup>5</sup>Departamento de Producción Agraria, Universidad Pública de Navarra, Pamplona, Spain
- 15:00 **246 Effect of a Viral Encoded Protein Kinase on Gene Expression in *Amsacta moorei* Entomopoxvirus Infected Cells** Hacer Muratoglu<sup>1</sup>, Remziye Nalcacioglu<sup>2</sup>, Basil Arif<sup>3</sup>, Zihni Demirbag<sup>2</sup>, <sup>1</sup>Karadeniz Technical University, Faculty of Sciences, Department of Molecular Biology and Genetic, Trabzon, Turkey; <sup>2</sup>Karadeniz Technical University, Faculty of Sciences, Department of Biology, Trabzon, Turkey; <sup>3</sup>Laboratory for Molecular Virology, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario, Canada
- 15:15 **247 FP25K acts as a negative regulator in the infectivity improvement of AcMNPV Budded viruses** Shufen Li, Manli Wang, Zhihong Hu, Fei Deng, Hualin Wang, State Key Laboratory of Virology, Virus Resource and Bioinformatics Center, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, P.R. China.

- 15:30 **248 The leucines in the transmembrane domain of *Autographa californica nucleopolyhedrovirus Ac76* are important for intranuclear microvesicle formation** Denghui Wei, Yan Wang, Xiaomei Zhang, Meijin Yuan, Kai Yang, State Key Laboratory of Biocontrol, Sun Yat-sen University, Guangzhou, China
- 15:45 **249 High-throughput purification of dsRNA against sacbrood virus disease in honey bees *Apis cerana* (Hymenoptera: Apidae)** Jianqing Zhang, Yi Zhang and Richou Han, Guangdong Entomological Institute, Guangzhou China

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16:00–16:30 **Student Business Meeting** **P4**

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18:30 **Bus transfer to SIP Banquet** Alte Lokhalle

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**IMPORTANT NOTE: Remove all posters before 18:00**

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**19:00-1:00 RECEPTION  
BANQUET &  
AWARDS CEREMONY**

**SEEING YOU IN VANCOUVER  
IN 2015**