



Avoidance of entomopathogenic fungi by insect predators

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41th ANNUAL MEETING
of the
Society for
**INVERTEBRATE
PATHOLOGY**

and

9TH INTERNATIONAL CONFERENCE ON
BACILLUS THURINGIENSIS

Incorporating COST862 Action: Bacterial
Toxins for Insect Control

PROGRAM and ABSTRACTS

3-7 August 2008
University of Warwick,
Coventry, UK

- F-24 Avoidance of entomopathogenic fungi by insect predators** Nicolai V. Meyling¹; Emma Ormond²; Helen E. Roy³; Judith K. Pell⁴; ¹University of Copenhagen, Denmark; ²Anglia Ruskin University, Cambridge, UK; ³NERC Centre for Ecology and Hydrology, Cambridgeshire, UK; ⁴Rothamsted Research, Plant and Invertebrate Ecology Department, Harpenden, Hertfordshire, UK
- F-25 Isolation of entomopathogenic fungi from soil collected from western United States** Everton K. K. Fernandes¹; Chad A. Keyser¹; Drauzio E. N. Rangel¹; R. Nelson Foster²; Donald W. Roberts¹; ¹Utah State University, Logan, UT, USA; ²USDA/APHIS/PPQ/CPHST Lab, Phoenix, AZ, USA
- F-26 Survey for entomopathogenic fungi from *Rhynchophorus ferrugineus* (Oliv.) (Coleoptera, Curculionidae)** Barbara Manachini, Sandra Marineo, Franco Palla, University of Palermo, Italy
- F-27 STU Induction of defense-related genes in banana (*Musa* spp.) by endophytic *Fusarium oxysporum*** Pamela Paparu¹; Thomas Dubois²; Daniel Coyne²; Claire Munro¹; Altus Viljoen³; ¹University of Pretoria, South Africa; ²International Institute of Tropical Agriculture, Kampala, Uganda; ³University of Stellenbosch, South Africa
- F-28 STU Observations of fungal disease in the giant willow aphid (*Tuberolachnus salignus*): Is it a new species of *Neozygites*?** Gudbjorg Aradottir^{1,2}; Richard Harrington²; Angela Karp²; Steve Hanley²; Ian Shield²; William Macalpine²; Matilda Collins²; Simon Leather²; Judith Pell²; ¹Rothamsted Research, Harpenden, Hertfordshire, UK; ²Imperial College London, Ascot, UK

12:30–14:00 **LUNCH** Rootes Restaurant

13:30-18:30 **EXCURSION**

19:00-23:00 **BBQ** including presentation of 5K awards and Auction

WEDNESDAY - 6 August

Symposium (Bacteria Division) Wednes., 8:00–10:00. Arts C. Theatre

Entomopathogenic Bacteria Other than *Bacillus*

Organizers/Moderators: Christina Nielsen-LeRoux and Juan-Luis Jurat-Fuentes.

- 8:00 **90 *Drosophila* host defence against *Pseudomonas entomophila*** Onya Opota¹; Bruno Lemaitre¹; ¹Ecole Polytechnique Federale de Lausanne, Switzerland
- 8:30 **91 Virulence determinants of *Yersinia entomophaga* MH96: a genomic perspective.** Mark R H Hurst¹; Regina Shaw²; William G. Farmerie²; Anette Becher³; ¹AgResearch, Bioprocessing and Biosecurity, Canterbury, New Zealand; ²University of Florida, Gainesville, FL, USA; ³AgResearch, Invermay, New Zealand
- 9:00 **92 Insecticidal toxins from *Photorhabdus*: Comparative genomics and Rapid Virulence Annotation (RVA)** Richard H. French-Constant¹; Stewart Hinchliffe¹; Michelle Hares¹; Andrea J. Dowling¹; Nicholas Waterfield²; Isabella Vlisidou²; Maria Sanchez Contreras²; ¹University of Exeter in Cornwall, Penryn, UK; ²University of Bath, UK

- 9:30 **93 Pathogenesis of *Serratia entomophila* (Enterobacteriaceae) towards the New Zealand grass grub *Costelytra zealandica*.** Trevor A. Jackson¹; Sean M. Marshall¹; Mark R.H. Hurst¹; Drion G. Boucias²; Heather S. Gatehouse³; John C. Christeller³; ¹AgResearch, Canterbury, New Zealand; ²University of Florida, Gainesville, FL, USA; ³Horticulture and Food Research Institute, New Zealand

Symposium (Microsporidia Division) Wednes., 8:00–10:00. SS020

Microsporidia of Aquatic Arthropods

Organizer/Moderator: Regina Kleespies

- 8:00 **94 Microsporidian parasite of caddis flies (Trichoptera) with comment to phylogeny and classification of Microsporidia in general** Miroslav Hyliš¹; ¹Charles University, Prague, Czech Republic
- 8:20 **95 Evolutionary interactions between microsporidia and their hosts: Lessons from an ancient lake** Judith E. Smith¹; Qui Yang¹; Ravil M. Kamaltynov²; Dmitry Y. Sherbakov³; ¹Leeds University, UK; ²Siberian Branch of Russian Academy of Sciences, Irkutsk, Russia
- 8:40 **96 Microsporidia in freshwater Amphipods: an overview and an example** Remi A. Wattier¹; Karolina Bacela¹; Thierry Rigaud¹; ¹Université de Bourgogne, Dijon, Burgundy, France
- 9:00 **97 Coevolutionary dynamics of host-parasite interactions in natural *Daphnia* populations** Ellen Decaestecker¹; ¹K.U.Leuven - Campus Kortrijk, Belgium
- 9:20 **98 Epizootiological studies of *Amblyospora camposi* (Microsporidia: Amblyosporidae) in *Culex renatoi* (Diptera: Culicidae) and *Paracyclops fimbriatus fimbriatus* (Copepoda: Cyclopidae) in a bromeliad habitat** Victoria Micieli¹; James J. Becnel²; Gerardo A. Marti¹; Maria C. Tranchida¹; Juan J. Garcia³; ¹Centro de Estudios Parasitológicos y de Vectores- CEPAVE (UNLP-CONICET), Argentina; ²USDA, ARS, Gainesville, FL, USA
- 9:40 **99 Intranuclear microsporidians in crustaceans: The genus *Enterospora*** Grant D. Stentiford¹; ¹Centre for Environment, Fisheries and Aquaculture Science, Weymouth, Dorset, UK

Contributed Papers

Wednesday, 8:00-10:00. SS021

FUNGI 2

Moderator: Surendra Dara.

- 8:00 **100 Genetic analysis of conidiation mutants in *Metarhizium anisopliae* derived by *Agrobacterium*-mediated mutagenesis** Farah-Jade Dryburgh¹; Weiguo Fang²; Raymond J. St. Leger²; Michael J. Bidochka¹; ¹Brock University, ON, Canada; ²University of Maryland, College Park, Maryland, USA
- 8:15 **101 Directed adaptation of *Metarhizium anisopliae* to cockroach cuticle** Eudes de Crecy¹; Nemat O. Keyhani²; ¹Evolugate LLC, Gainesville, FL, USA; ²University of Florida, Gainesville, FL, USA
- 8:30 **102 The effect of tick species and stages on the pre-penetration steps of the entomopathogenic fungi, *Metarhizium anisopliae*** Galina Gindin¹; Dana Ment¹; Asael Rot²; Itamar Glazer¹; Michael Samish³; ¹The Volcani Center, (ARO), Bet Dagan, Israel; ²Kimron Veterinary Institute, Bet Dagan, Israel

Avoidance of entomopathogenic fungi by insect predators

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Abstract

Insects can detect cues related to the risk of attack by their natural enemies; including entomopathogenic fungi. Behavioural mechanisms that enable insects to avoid infection by fungal pathogens would be advantageous adaptations. We conducted experiments to assess the potential of common insect predators to detect and avoid their fungal natural enemy *Beauveria bassiana*. The predatory bug *Anthocoris nemorum* avoided nettle leaves treated with *B. bassiana*, and females laid fewer eggs on leaf halves contaminated with the pathogen. Adult seven spot ladybirds, *Coccinella septempunctata*, overwinter in the litter layer often in groups. Adult *C. septempunctata* modified their overwintering behaviour in relation to the presence of *B. bassiana* conidia in soil and sporulating conspecifics by moving away from sources of infection. Furthermore, active (non-overwintering) adult *C. septempunctata* detected and avoided *B. bassiana* conidia on different substrates, including leaves and soil. Our studies show that insect predators have evolved mechanisms to detect and avoid pathogens that they are susceptible to. Fungal pathogens may be significant mortality factors among populations of insect predators, especially long-lived species that must diapause before reproduction. Likewise, actively foraging species are more likely to come in contact with pathogens than predators that sit and wait for prey.