Avoidance of entomopathogenic fungi by insect predators

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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. Meyling[1]; Emma Ormond[2]; Helen E. Roy[3]; Judith K. Pell[4], [1]University of Copenhagen, Denmark; [2]Anglia Ruskin University, Cambridge, UK; [3]NERC Centre for Ecology and Hydrology, Cambridgeshire, UK; [4]Rothamsted 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. Fernandes[1]; Chad A. Keyser[1]; Drauzio E. N. Rangel[1]; R. Nelson Foster[2]; Donald W. Roberts[1], [1] Utah State University, Logan, UT, USA; [2]USDA/APHIS/PPQ/CPHST Lab, Phoenix, AZ, USA

F-26 **Survey for entomopathogenic fungi from *Rhynchophorous 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 Paparu[1]; Thomas Dubois[2]; Daniel Coyne[2]; Claire Munro[1]; Altus Viljoen[3], [1]University of Pretoria, South Africa; [2]International Institute of Tropical Agriculture, Kampala, Uganda; [3]University 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 Harrington[2]; Angela Karp[2]; Steve Hanley[2]; Ian Shield[2]; William Macalpine[2]; Matilda Collins[2]; Simon Leather[2]; Judith Pell[2], [1]Rothamsted Research, Harpenden, Hertfordshire, UK; [2]Imperial 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 Opota[1]; Bruno Lemaitre[1], [1]Ecole Polytechnique Federale de Lausanne, Switzerland

8:30 **91** **Virulence determinants of *Yersinia entomophaga* MH96: a genomic perspective.** Mark R H Hurst[1]; Regina Shaw[2]; William G. Farmerie [2]; Anette Becher[3],[1]AgResaerch, Bioprocessing and Biosecurity, Canterbury, New Zealand; [2]University of Florida, Gainesville, FL, USA; [3]AgResearch, Invermay, New Zealand

9:00 **92** **Insecticidal toxins from *Photorhabdus*: Comparative genomics and Rapid Virulence Annotation (RVA)** Richard H. ffrench-Constant[1]; Stewart Hinchliffe[1]; Michelle Hares[1]; Andrea J. Dowling[1]; Nicholas Waterfield[2]; Isabella Vlisidou[2]; Maria Sanchez Contreras[2], [1]University of Exeter in Cornwall, Penryn, UK; [2]University of Bath, UK

9:30 **93** **Pathogenesis of *Serratia entomophila* (Enterobacteriaceae) towards the New Zealand grass grub *Costelytra zealandica*.** Trevor A. Jackson[1]; Sean M. Marshall[1]; Mark R.H. Hurst[1]; Drion G. Boucias[2]; Heather S. Gatehouse[3]; John C. Christeller[3], [1]AgResearch, Canterbury, New Zealand; [2]University of Florida, Gainesville, FL, USA; [3]Horticulture and Food Research Institute, New Zealand

Symposium (Microsoridia 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 Hyliš[1], [1]Charles University, Prague, Czech Republic

8:20 **95** **Evolutionary interactions between microsporidia and their hosts: Lessons from an ancient lake** Judith E. Smith[1]; Qui Yang[1]; Ravil M. Kamaltynov[2]; Dmitry Y. Sherbakov[3], [1]Leeds University, UK; [2]Siberian Branch of Russian Academy of Sciences, Irkutsk, Russia

8:40 **96** **Microsporidia in freshwater Amphipods: an overview and an example** Remi A. Wattier[1]; Karolina Bacela[1]; Thierry Rigaud[1], [1]Université de Bourgogne, Dijon, Burgundy, France

9:00 **97** **Coevolutionary dynamics of host-parasite interactions in natural *Daphnia* populations** Ellen Decaestecker[1] [1]K.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 Micieli[1]; James J. Becnel[2]; Gerardo A. Marti[1]; María C. Tranchida[1]; Juan J. García[3], [1]Centro de Estudios Parasitológicos y de Vectores- CEPAVE (UNLP-CONICET), Argentina; [2]USDA, ARS, Gainesville, FL, USA

9:40 **99** **Intranuclear microsporidians in crustaceans: The genus Enterospora** Grant D. Stentiford[1],[1]Centre 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 Dryburgh[1]; Weiguo Fang[2]; Raymond J. St. Leger[2]; Michael J. Bidochka[1],[1]Brock University, ON, Canada [2]University of Maryland, College Park, Maryland, USA

8:15 **101** **Directed adaptation of *Metarhizium anisopliae* to cockroach cuticle** Eudes de Crecy[1]; Nemat O. Keyhani[2], [1]Evolugate LLC, Gainesville, FL, USA; [2]University 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 Gindin[1]; Dana Ment[1]; Asael Rot[2]; Itamar Glazer[1]; Michael Samish[3],[1]The Volcani Center, (ARO), Bet Dagan, Israel; [2]Kimron 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.