Avoidance of entomopathogenic fungi by insect predators

Meyling, Nicolai Vitt; Ormond, Emma; Roy, Helen E.; Pell, Judith K.

Publication date: 2008

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
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
Avoidance of entomopathogenic fungi by insect predators
Nicolai V. Meyling¹; Emma Ormond; Helen E. Roy; Judith K. Pell; University of Copenhagen, Denmark; Angelia Ruskin University, Cambridge, UK; NERC Centre for Ecology and Hydrology, Cambridge, UK; Rothamsted Research, Plant and Invertebrate Ecology Department, Harpenden, Hertfordshire, UK

Isolation of entomopathogenic fungi from soil collected from western United States
Everton K. K. Fernandes; Chad A. Keyser; Drauzio E. N. Rangel; E. Nelson Foster; Donald W. Roberts; Utah State University, Logan, UT, USA; USDA/APHIS/PPQ/CPHST Lab, Phoenix, AZ, USA

Survey for entomopathogenic fungi from soil collected from western United States
William G. Farmerie; Invermay, New Zealand

Induction of defense-related genes in banana (Musa spp.) by endophytic Fusarium oxysporum
Panama Paparu; Thomas Dubois; Daniel Coyne; Claire Munro; Altus Viljoen; University of Pretoria, South Africa; International Institute of Tropical Agriculture, Kampala, Uganda; University of Stellenbosch, South Africa

Observations of fungal disease in the giant willow aphid (Tuberolachnus salignus): Is it a new species of Neocyptus? Guadalupe Acaciatl; Richard Harrington; Angela Karp; Steve Hanley; Ian Shield; William Macalpine; Matilda Collins; Simon Leather; Judith Pell; Rothamsted Research, Harpenden, Hertfordshire, UK; Imperial College London, Ascot, UK

9:00 92 Pathogenesis of Serratia entomophila (Enterobacteriaceae) towards the New Zealand grass grub
Costelytra zealandica.
Doev A. Jackson; Sean M. Marshall; Mark R.H. Hurst; Drion G. Boucias; Heather S. Gatehouse

9:30 93 Microsporidiosis in freshwater Amphipods: an overview and an example Remi A. Wattier; Karolina Bacela; Thierry Rigaud; Université de Bourgogne, Dijon, Burgundy, France

9:40 94 Coevolutionary dynamics of host-parasite interactions in natural Daphnia populations
K. U. Leuven - Campus Kortrijk, Belgium

9:20 95 Evolutionary interactions between microsporidia and their hosts: Lessons from an ancient lake Judith E. Smith; Qui Yang; Raval M. Kamalatyov; Dmitry T. Sherebakov; Leeds University, UK; Siberian Branch of Russian Academy of Sciences, Irkutsk, Russia

9:30 96 Evolutionary interactions between microsporidia and their hosts: Lessons from an ancient lake Judith E. Smith; Qui Yang; Raval M. Kamalatyov; Dmitry T. Sherebakov; Leeds University, UK; Siberian Branch of Russian Academy of Sciences, Irkutsk, Russia

9:40 97 Microsporidiosis in freshwater Amphipods: an overview and an example Remi A. Wattier; Karolina Bacela; Thierry Rigaud; Université de Bourgogne, Dijon, Burgundy, France

9:00 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; James J. Becnel; Gerardo A. Martí; María C. Tranchida; Juan J. García; Centro de Estudios Parasitológicos y de Vectores - CEPAVE (UNLP-CONICET), Argentina; USADA, ARS, Gainesville, FL, USA

9:40 99 Intranuclear microsporidians in crustaceans: The genus Enterospora
The genus Enterospora (Generi D. Stentiford; Centre for Environment, Fisheries and Aquaculture Science, Weymouth, Dorset, UK

8:00 100 Genetic analysis of conidiation mutants in Metarhizium anisopliae derived by Agrobacterium-mediated mutagenesis
Farah-Jade Dryburgh; Weiguo Fang; Raymond J. St. Leger; Michael J. Bidochka; Brock University, ON, Canada

8:15 101 Directed adaptation of Metarhizium anisopliae to cockroach cuticle
Eades de Crecy; Nenad O. Kehyani; Evolgate LLC, Gainesville, FL, USA; 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; Dana Ment; Asael Rot; Ramar Glazer; Michael Samish; The Volcani Center, (ARO), Bet Dagan, Israel; Kimron Veterinary Institute, Bet Dagan, Israel

8:00 Drosophila host defense against Pseudomonas entomophaga
Onya Oono; Bruno Lemaître; Ecole Polytechnique Federale de Lausanne, Switzerland

8:30 Virulence determinants of Yersinia entomophaga MH96: a genomic perspective.
Mark R H hugs; Regina Shaw; William G. Farmerie; Anette Becher; AgResearch, Bioprocessing and Biosecurity, Canterbury, New Zealand; University of Florida, Gainesville, FL, USA; AgResearch, Invermay, New Zealand

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

F-24 F-25 F-26 F-27 F-28 TUESDAY PM WEDNESDAY AM

F-24 Avoidance of entomopathogenic fungi by insect predators
Nicolai V. Meyling¹; Emma Ormond²; Helen E. Roy³; Judith K. Pell⁴; University of Copenhagen, Denmark; Angelia Ruskin University, Cambridge, UK; NERC Centre for Ecology and Hydrology, Cambridge, UK; 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; Chad A. Keyser; Drauzio E. N. Rangel; E. Nelson Foster; Donald W. Roberts; Utah State University, Logan, UT, USA; USDA/APHIS/PPQ/CPHST Lab, Phoenix, AZ, USA

F-26 Survey for entomopathogenic fungi from Rhyphophorous ferrugineus (Oliv.) (Coleoptera, Curculionidae)
Barbara Manaching, Sandra Marineo, Franco Palla, University of Palermo, Italy

F-27 STU Induction of defense-related genes in banana (Musa spp.) by endophytic Fusarium oxysporum
Panama Paparu; Thomas Dubois; Daniel Coyne; Claire Munro; Altus Viljoen; University of Pretoria, South Africa; International Institute of Tropical Agriculture, Kampala, Uganda; 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 Neoclytus? Guadalupe Acaciatl; Richard Harrington; Angela Karp; Steve Hanley; Ian Shield; William Macalpine; Matilda Collins; Simon Leather; Judith Pell; Rothamsted Research, Harpenden, Hertfordshire, UK; Imperial College London, Ascot, UK

12:30-14:00 LUNCH

13:30-18:30 EXCURSION

19:00-23:00 BBQ including presentation of 5K awards and Auction
Avoidance of entomopathogenic fungi by insect predators

Nicolai V. Meyling¹, Emma Ormond², Helen. E. Roy³ and Judith K. Pell⁴

1) Department of Ecology, University of Copenhagen, Denmark (nvm@life.ku.dk)
2) Department of Life Sciences, Anglia Ruskin University, Cambridge, CP1 1PT, UK
3) NERC Centre for Ecology and Hydrology, Monks Wood, Abbots Ripton, Cambridgeshire, PE28 2LS, UK (hele@ceh.ac.uk)
4) Plant and Invertebrate Ecology Department, Rothamsted Research, Harpenden, Hertfordshire, AL5 2JQ, UK (judith.pell@bbsrc.ac.uk)

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.