

**Society for Invertebrate Pathology 34<sup>th</sup> Annual Meeting**  
**Noordwijkerhout – The Netherlands – 25-30/8/2001**

**PROGRAM**

**SATURDAY, AUGUST 25**

8:30-17:00 SIP Council Meeting  
 14:00-17:30 Registration  
 18:00- 19:00 5K  
 19:00-21:00 Mixer

**SUNDAY, AUGUST 26**

8:00-10:00 Registration

Sunday 8:30-10:00  
 Rotonde Hall  
**OPENING CEREMONY**

**Welcome:** Just Vlak & Meir Broza, co-chairmen  
 SIP President Jim Harper

**Professor dr. L. Speelman, Rector Magnificus of Wageningen University**  
 Representative of Israel

Founders' Lecture Honoree –  
**Dr. Jaroslav Weiser**  
 Lecturer: Wayne Brooks

10:00-10:30 Coffee break

Sunday, 10:30-12:30  
 Rotonde Hall  
**PLENARY LECTURE –**  
**Host-Pathogen Interaction**  
 Chair: Robert R. Granados and Dudley Pinnock

10:30 Signaling Pathways in the Drosophila Immune Response. Jules A. Hoffmann Institut de Biologie Moleculaire et Cellulaire, CNRS, Strasbourg, France.

11:10 New mechanisms for regulating apoptosis by the baculoviruses (A special Lois K. Miller lecture). Paul D. Friesen. Institute for Molecular Virology & Dept. of Biochemistry University of Wisconsin, Madison, WI 53706 USA.

11:50 Host-parasite interactions between insects and entomopathogenic nematodes. Harry K. Kaya<sup>1</sup>, James F. Campbell<sup>2</sup> and Albrecht Koppenhöfer<sup>3</sup> <sup>1</sup>Dept. of Nematology, University of California, Davis, CA 95616 USA<sup>2</sup>1515 College Ave., USDA-ARS, Manhattan, KS 66502 USA; <sup>3</sup>Dept. of Entomology, Rutgers University, New Brunswick, NJ 08903 USA

12:30-14:00 Lunch

Sunday, 14:00-16:00  
 Auditorium  
**SYMPOSIUM – Bacterial Systematics and Ecology**  
 Convenors: Trevor Jackson & Meir Broza

14:00 Molecular tools for unravelling the complex structure of the Enterobacteriaceae. Erko Stackebrandt. Braunschweig,

Deutsche Sammlung von Mikroorganismen und Zellkulturen, 38124 Braunschweig, Germany.

14:30 Distribution and ecology of *Serratia* spp. (Enterobacteriaceae) pathogenic to insects. M. O'Callaghan, S.D. Young and T.A. Jackson. AgResearch, PO Box 60, Lincoln, New Zealand.

15:00 Natural ecology of *Bacillus huringiensis* as an insect pathogen. Jørgen Eilenberg. Dept. of Ecology, The Royal Veterinary and Agricultural University, Thorvaldsensvej 40, DK-1871 Frb. C, Denmark.

15:30 Natural ecology of *Bacillus thuringiensis* as free-living bacteria. Bjarne Munk Hansen and Niels Bohse Hendriksen. Dept. of Microbial Ecology and Biotechnology, National Environmental Research Institute, Frederiksborgvej 399, DK 4000 Roskilde, Denmark.

Sunday, 14:00-16:00  
 Rotonde Hall  
**SYMPOSIUM – Apoptosis and Host Range of Insect Viruses**  
 Convenors: Suzanne M. Thiem & Nor Chejanovsky

14:00 What is the role of apoptosis in anti-viral defense in insects? Rollie Clem. Division of Biology Kansas State University, Manhattan KS 66506, USA.

14:30 Identification of a gene required for EppoMNPV iap-2 expression. Vernon Ward. Dept. of Microbiology, University of Otago, P.O. Box 56, Dunedin, New Zealand.

15:00 Protein synthesis arrest in AcMNPV-infected Ld652Y cells is enhanced by apoptotic suppressors and occurs at initiation. Suzanne M. Thiem. Dept. of Entomology and Microbiology & Molecular Genetics. Michigan State University, East Lansing, Michigan 48824 USA.

15:30 Interactions of the *Autographa californica* nucleopolyhedrovirus with the non-permissive *Spodoptera littoralis* host. Nor Chejanovsky. Inst. Plant Protection, The Volcani Center, POB 6, Bet Dagan, Israel.

Sunday, 14:00-16:00  
 Room C6  
**SYMPOSIUM – Fungal Biocontrol of Tropical Insects.**  
 Convenors: Fernando E. Vega & Nguya Maniania

14:00 Prospects for microbial control of the coffee berry borer. Fernando E. Vega<sup>1</sup>, Pablo Benavides<sup>2</sup>, Jeff Stuart<sup>2</sup>, Scott L. O'Neill<sup>3</sup>, and Cletus A. Kurtzman<sup>4</sup>. <sup>1</sup>Insect Biocontrol Laboratory, USDA, ARS, Beltsville, Maryland 20705, USA; <sup>2</sup>Dept. Entomology, Purdue University, West Lafayette, Indiana 47907 USA; <sup>3</sup>Dept. Epidemiology & Public Health, Yale University, New Haven, Connecticut 06520 USA. <sup>4</sup>Microbial Properties Research Unit, NCAUR, USDA, ARS, Peoria, Illinois 61604 USA.

14:20 Beyond locusts and grasshoppers: future roles for mycoinsecticide sprays. R.P. Bateman<sup>1</sup>, B.S. Ali<sup>2</sup> and B. Luke<sup>1</sup>. <sup>1</sup>.CABI Bioscience, Silwood Park, Ascot, Berks, UK. <sup>2</sup> Caroni

- (1975) Ltd. Research Station, Waterloo Rd., Carapichaima, Trinidad & Tobago.
- 14:40 Tsetse fly-pathogens and their potential use for its biocontrol. Nguya K. Maniania. International Centre of Insect Physiology and Ecology (ICIPE), P.O. Box 30772 Nyayo Stadium Nairobi, Kenya.
- 15:00 Fungal control of termites: A viable option for Africa? J. Langewald<sup>1</sup>, A. Bokonon-Ganta<sup>2</sup>, W. Gitonga<sup>3</sup>, C. Kooyman<sup>4</sup>, N.K. Maniania<sup>5</sup>. <sup>1</sup>IITA (PHMD) Benin, B.P. 08-0932, Cotonou, Benin; <sup>2</sup>Service de Protection des Végétaux, Porto Novo, Benin; <sup>3</sup>Kenya Agricultural Research Institute, Nairobi, Kenya; <sup>4</sup>CABI Bioscience, Africa Regional Centre Nairobi, Kenya; <sup>5</sup>ICIPE, Nairobi, Kenya.
- 15:20 Recent advances in production and formulation of entomopathogenic fungi. Stephen P. Wraight<sup>1</sup> and Mark A. Jackson<sup>2</sup>. USDA, Agricultural Research Service<sup>1,2</sup>. <sup>1</sup>U.S. Plant, Soil and Nutrition Laboratory, Ithaca, New York 14853. <sup>2</sup>National Center for Agricultural Utilization Research, Peoria, Illinois 61604.
- 15:40 Fungal biocontrol of the diamondback moth. John D. Vandenberg<sup>1</sup> and Judith K. Pell<sup>2</sup>. <sup>1</sup>USDA Agricultural Research Service, U.S. Plant, Soil & Nutrition Laboratory, Tower Road, Ithaca, NY 14853 USA; <sup>2</sup>Plant and Invertebrate Ecology Division, IACR-Rothamsted, Harpenden, Hertfordshire, AL5 2JQ, U.K.

Sunday, 14:00-16:00

Room C-x

**CONTRIBUTED PAPERS – Nematodes I**

Moderators: Noel Boemare and Zdeněk Mráček

- 14:00 Safety of entomopathogenic nematodes. Ralf-Udo Ehlers. Institute for Phytopathology, Dept. for Biotechnology and Biological Control, Christian-Albrechts-University Kiel, Klausdorfer Str. 28-36, 24223 Raisdorf, Germany.
- 14:15 Third trophic level effects over *S. carpocapsae*. Francisco Pinto and Nelson Simões. Dep. de Biologia, Universidade dos Açores, 9502 Ponta Delgada (Codex), Açores, Portugal (**STUDENT PAPER**).
- 14:30 Records of the *Steinernema glaseri* group (Nematoda: Rhabditida) in Europe, with notes on the morphological characteristics of this species group. Dieter Sturhan<sup>1</sup> and Zdeněk Mráček<sup>2</sup>. <sup>1</sup>Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Nematologie und Wirbeltierkunde, Toppheideweg 88, 48161 Münster, Germany, <sup>2</sup>Czech Academy of Sciences, Institute of Entomology, Branišovská 31, 37005 České Budějovice, Czech Republic.
- 14:45 Sustainable control of white grubs with Nema-Green. Ralf-Udo Ehlers<sup>1</sup> and Arne Peters<sup>2</sup>. <sup>1</sup>Inst. for Phytopathology, Dept. for Biotechnology & <sup>2</sup>Biological Control, Christian-Albrechts-University Kiel & E-Nema GmbH, Klausdorfer Str. 28-36, 24223 Raisdorf, Germany.
- 15:00 Influence of chemical insecticide on susceptibility of insects treated with entomopathogenic fungus and nematodes. Andrzej Bednarek<sup>1</sup>, Agnieszka Szyk<sup>1</sup>, Elżbieta Pezowicz<sup>1</sup> and Elżbieta Popowska-Nowak<sup>2</sup>. <sup>1</sup>Dept. of Animal Biology, Warsaw. <sup>2</sup>Agricultural University Institute of Ecology PASc in Warsaw, Poland.
- 15:15 Phylogenetic analysis of Australian clinical isolates of *Photorhabdus*. Ray Akhurst<sup>1</sup>, Cheryl Beard<sup>1</sup>, Peter Janssen<sup>2</sup> and Noel Boemare<sup>3</sup>. <sup>1</sup>CSIRO Entomology, Canberra ACT 2611, Australia. <sup>2</sup>Dept. of Microbiology and Immunology, University of Melbourne, Victoria 3010, Australia. <sup>3</sup>Laboratoire Ecologie microbienne des Insectes et Interaction Hôte-Pathogène, Université Montpellier II, 34095 Montpellier Cedex 05, France.

15:30 *Xenorhabdus nematophila* produces two distinct cytolytic activities against insect hemocytes. Julien Brillard, Carlos Ribeiro, Noël Boemare, Michel Brehélin and Alain Givaudan. Laboratoire EMIP, IFR56, Institut National de la Recherche Agronomique (UMR1133), Université Montpellier II, CC101, 34095 Montpellier Cedex 5, France. (**STUDENT PAPER**).

15:45 Interactions between a *Paenibacillus* sp. bacterium and *Heterorhabditis* spp. nematodes. Michael Roy Enright<sup>1, 2</sup>, Michelle M. Finnegan<sup>2</sup> and Christine T. Griffin<sup>1</sup>. Institute of Bioengineering and Agroecology<sup>1</sup> & Dept. of Biology<sup>2</sup> National University of Ireland, Maynooth, Co. Kildare, Ireland. (**STUDENT PAPER**).

16:00-16:30 Coffee break

Sunday, 16:30-18:30

Room B2/B4

**POSTER SESSION I**

**Bacteria**

- BP1** Expression and Toxicity of *Bacillus thuringiensis* Cry11Aa Protein in Prostheated Bacteria. Oscar E. Guevara<sup>1</sup>, Gemma Armengol<sup>1</sup>, Sam Wilson<sup>2</sup>, Sergio Orduz<sup>1</sup>, Neil Crickmore<sup>2</sup>. <sup>1</sup>Biotechnology and Biological Control Unit, Corporación para Investigaciones Biológicas, Medellín, Colombia. <sup>2</sup>School of Biological Sciences, University of Sussex, Brighton, UK.
- BP2** Bivalent sequential binding model of the Cry1Ba toxin to *Pieris brassicae* aminopeptidase N receptor. Shin-ichiro Asano, Yoko Ishida, Ken Sahara and Hisanori Bando. Dept. of Applied Molecular Biology, Graduate School of Agriculture, Hokkaido University N9W9 Sapporo, Hokkaido 060-8589, Japan.
- BP3** Interaction of Cry1C separate domains with *Spodoptera littoralis* gut membrane vesicles. Dror Avisar, Baruch Sneh and Aviah Zilberstein. Dept. of Plant Sciences, Tel Aviv University, Tel Aviv, 69978, Israel. (**STUDENT POSTER**).
- BP4** Ecological risk of transgenic insect resistance under Canadian field conditions - Field and laboratory assessment of fitness and toxicity of Bt Canola. Lorraine Braun<sup>1</sup>, Suzanne Warwick<sup>2</sup>, Peter Mason<sup>2</sup>, Bin Zhu<sup>2,3</sup>, and Neal Stewart Jr.<sup>4</sup>. <sup>1</sup>AAFC-SRC, 107 Science Place, Saskatoon SK Canada S7N 0X2; <sup>2</sup>AAFC-ECORC, Ottawa ON Canada K1A 0C6; <sup>3</sup>NWRI-AEPRB, 11 Innovation Blvd., Saskatoon SK Canada S7N 3H5; <sup>4</sup>Dept. Biol. UNC Greensboro NC 27402-6174, USA.
- BP5** Effect of Bt-transgenic corn on *Helicoverpa zea* and *Spodoptera frugiperda*. Charles F. Chilcutt<sup>1</sup>, Gary Odvody<sup>2</sup>, and Roy Parker<sup>1</sup>. <sup>1</sup>Depts. of Entomology and <sup>2</sup>Plant Pathology, Texas A&M University System, Route 2, Box 589 Corpus Christi, TX 78406 USA.
- BP6** Polypeptide denaturation of either *Manduca sexta* EPN or *Bacillus thuringiensis* toxin alters the specificity of their interaction. Anu Daniel<sup>1</sup>, Sreedhara Sangadala<sup>2</sup> and Michael J. Adang<sup>1,2</sup>. <sup>1</sup>Dept. of Biochemistry and Molecular Biology and <sup>2</sup>Dept. of Entomology University of Georgia, Athens, Georgia 30602 USA. (**STUDENT POSTER**).
- BP7** Association between the production of  $\beta$ -exotoxin and the expression of Cry2 proteins in *Bacillus thuringiensis*. Bertha A. Calderón-Limón<sup>1</sup>, N. Katiuska Guerrero-González<sup>1</sup>, E. Regina Basurto-Ríos<sup>1</sup>, J. Eleazar Barboza-Corona<sup>2</sup>, and Jorge E. Ibarra<sup>1</sup>. <sup>1</sup>Dept. de Biología y Bioquímica, CINVESTAV-IPN, 36500 Irapuato, Gto. MÉXICO; <sup>2</sup>Instituto de Ciencias Agrícolas, Universidad de Guanajuato, 36500 Irapuato, Gto. México.
- BP8** Diversity of *Heliothis virescens* resistance mechanisms against Cry1 toxins from *Bacillus thuringiensis*. Juan L. Jurat-Fuentes<sup>1</sup>,

Fred L. Gould<sup>2</sup>, and Michael J. Adang<sup>1,3</sup>. Dept. of Entomology<sup>1</sup>, and Dept. of Biochemistry and Molecular Biology<sup>3</sup>, University of Georgia, Athens, Georgia 30602. Dept. of Entomology<sup>2</sup>, North Carolina State University, Raleigh, North Carolina 27659, USA.

**BP9** Toxicity and synergism in recombinant *Escherichia coli* expressing Cry and Cyt from *Bacillus thuringiensis* subsp. *Israelensis*. Vadim Khasdan<sup>1</sup>, Eitan Ben-Dov<sup>1,3</sup>, Robert Manasherob<sup>1</sup>, Sammy Boussiba<sup>2,3</sup> and Arie Zaritsky<sup>1,3</sup>. <sup>1</sup>Dept. of Life Sciences, P.O. Box 653, Be'er-Sheva 84105, <sup>2</sup>Microalgal Biotechnology Laboratory, Blaustein Institute for Desert Research, Sede-Boker, 84990, Ben-Gurion University, <sup>3</sup>BioSan Ltd., P.O. Box 3, Ariel 44837, Israel. **(STUDENT POSTER)**.

**BP10** Monitoring of the resistant European Corn Borer (ECB) against insect resistant corn expressing *Bacillus thuringiensis*-toxin. Thomas Meise<sup>1</sup>, Danila Liebe<sup>2</sup>, G.-A. Langenbruch<sup>1</sup> and Bernd Hommel<sup>2</sup>. <sup>1</sup>Institute for Biological Control Heinrichstraße 243, D - 64287 Darmstadt. <sup>2</sup>Institute for Integrated Plant Protection Stahnsdorfer Damm 81, D - 14532 Kleinmachnow, Germany.

**BP11** Characterization of parasporal inclusion proteins of a Diptera-specific *Bacillus thuringiensis* serovar *sotto* strain. Ohgushi<sup>1</sup>, N. Wasano<sup>1</sup>, N. Shisa<sup>1</sup>, H. Saitoh<sup>2</sup> and M. Ohba<sup>1</sup>. <sup>1</sup>Bioresource and Management Laboratory, Graduate School of Agriculture, Kyushu University, Fukuoka 812-8581, Japan; <sup>2</sup>Biotechnology & Food Research Institute, Fukuoka Industrial Technology Center, 1465-5 Aikawa, Kurume, Fukuoka 839-0861, Japan. **(STUDENT POSTER)**.

**BP12** Molecular characterization of *Bacillus thuringiensis* strains with dual insecticidal activity to control Lepidopteran and Coleopteran pests of tobacco. David Noriega<sup>1</sup>, Jose D. Tinoco<sup>2</sup>, Azucena Fernández<sup>2</sup>, Sergio Orduz<sup>1</sup>. <sup>1</sup>Biotechnology and Biological Control Unit, CIB. <sup>2</sup>Compañía Colombiana de Tabaco S.A. Colombia.

**BP13** Improved *Bacillus thuringiensis* production by intermittent Fed-Batch culture with total cell retention. Edwin Habeych, Andres Gonzalez, Alexandre Restrepo & Sergio Orduz. Biotechnology and Biological Control Unit, Corporacion para Investigaciones Biologicas (C.I.B) A.A. 7378, Medellin, Colombia.

**BP14** Runtush 400. - Sustained Release Formulation of Bti. Eli Zomer, Alicom - Biological Control Ltd., Granot Initiative Center, D.N. Hefer, 38100 Israel.

## Fungi

**FP1** *Entomophaga* sp., a fungal pathogen in larval populations of the green cloverworm, *Plathypena scabra*. Gerald R. Carter and Ozlem Kalkar. Dept. of Entomology, Clemson University, Clemson, SC 29634 USA.

**FP2** Fungal biocontrol of root feeding Diptera. David Chandler & Gillian Davidson. Dept. of Entomological Sciences, Horticulture Research International, Wellesbourne, Warwick, CV35 9EF, UK.

**FP3** Fungal pathogens: a second line of defence against spidermites? Gillian Davidson<sup>1</sup>, David Chandler<sup>1</sup>, Karen Russell<sup>2</sup> and Rob Jacobson<sup>2</sup>. <sup>1</sup>Dept. of Entomological Sciences, Horticulture Research International, Wellesbourne, Warwick, CV35 9EF, UK <sup>2</sup>Dept. of Entomology, Stockbridge Technology Centre, Stockbridge House, Selby, YO8 3TZ, UK.

**FP4** Identification of virulence factor genes of the insect pathogenic fungus *Beauveria bassiana*. Esther Duperchy<sup>1</sup>, Andreas Leclerque<sup>1</sup>, Hong Wan<sup>1</sup>, Gisbert Zimmermann<sup>2</sup> and Hans Ulrich Schairer<sup>1</sup>. <sup>1</sup>Zentrum für Molekulare Biologie Heidelberg, Universität Heidelberg, Im Neuenheimer Feld 282, D-69120 Heidelberg, Germany. <sup>2</sup>Biologische Bundesanstalt f. Land- und

Forst-wirtschaft, Institut f. Biologischen Pflanzenschutz, Heinrichstr. 243, D-64287 Darmstadt, Germany. **(STUDENT POSTER)**.

**FP5** *Entomophthora schizophorae* overwintering in living hosts. Jørgen Eilenberg, Lene Thomsen & Annette B. Jensen. Dept. of Ecology, Zoology Section, Royal Veterinary and Agricultural University, Thorvaldsensvej 40, 1871 Frederiksberg C, Denmark.

**FP6** Efficacy of *Beauveria brongniartii* to control *Melolontha melolontha* larvae and its persistence in the soil. J. Enkerli and S. Keller. Swiss Federal Research Station for Agroecology and Agriculture, Reckenholzstrasse 191, 8046 Zürich, Switzerland.

**FP7** The specificity analysis of entomopathogenic fungus, *Nomuraea rileyi* against three species larvae of Noctuidae. Kotaro Goda, Hajime Hiromori, and Masayoshi Hatukade. Laboratory of Applied Entomology, Faculty of Agriculture, Shizuoka University, Ohya 836, Shizuoka, 422-8529, Japan **(STUDENT POSTER)**.

**FP8** Purification and characterization of an alcohol dehydrogenase (ADH) from the entomopathogenic fungus *Metarhizium anisopliae*. Edgardo Ulises Esquivel-Naranjo, Gloria Angélica González-Hernández, Guadalupe Martínez-Cadena, Félix Gutiérrez-Corona and Juan Carlos Torres-Guzmán. Instituto de Investigación en Biología Experimental, Fac. de Química, Universidad de Guanajuato, Guanajuato, México.

**FP9** The effect of digging by adult Colorado potato beetles on *Beauveria bassiana* conidial pickup and retention. Christine Noronha<sup>1</sup> and Mark S. Goettel<sup>2</sup>. <sup>1</sup>Crops and Livestock Research Centre, Agriculture and Agri-Food Canada, Charlottetown, PEI. <sup>2</sup>Lethbridge Research Centre, Agriculture and Agri-Food Canada, Lethbridge, Alberta, Canada.

**FP10** A method for estimating growth rate, relative biomass formation and spore productivity of entomopathogenic and antagonistic fungi. Vladimir Gouli, Svetlana Gouli and Scott Costa. Plant and Soil Dept., Entomology Research Laboratory, University of Vermont, P.O.Box 53400, Burlington, Vermont 05405, USA.

**FP11** The synergism of *Nomuraea rileyi* and synthetic insecticides against Spodopteran larvae. Hajime Hiromori. Laboratory of Applied Entomology, Faculty of Agriculture, Shizuoka University, Ohya 836, Shizuoka 422-8529, Japan.

**FP12** Physiological characteristics of *Beauveria bassiana* and its UV-tolerant variants. Wen-Feng Hsiao<sup>1</sup> and Ramin Javedan<sup>2</sup>. <sup>1</sup>Dept. of Biological Resources, National Chiayi University, Chiayi, Taiwan. <sup>2</sup>Natural Science and Technology Program, Nan Hua University, Dalin, Taiwan.

**FP13** Comparison of test methods for non-target risk assessment of *Metarhizium anisopliae*: laboratory vs. field data. Q.-Q Zeng, and H.M.T. Hokkanen. ERBIC-research project (EU-FAIR5-CT97-3489) Dept. of Applied Biology, Box 27, FIN-00014 University of Helsinki, Finland.

**FP14** Studies and evaluation of entomopathogenic fungi as new biopesticide producers. Vladimir E. Likhovidov<sup>1</sup>, Faskhetdin S. Isangalin<sup>1</sup>, Richard A. Humber<sup>2</sup> and Donna M. Gibson<sup>2</sup>. <sup>1</sup>State Research Center for Applied Microbiology, Obolensk, Serpukhov Region, Russian Federation. <sup>2</sup>USDA-ARS Plant, Soil & Nutrition Laboratory, Tower Road, Ithaca, New York, USA.

## Cross-Division

**DP1** Transgenic *Spodoptera exigua*: possibilities for their use. Lonnie J.M. Gerritsen, J. Hans Visser and Maarten A. Jongsma. Plant

Research International, P.O.Box 16, 6700 AA Wageningen, The Netherlands.

- DP2** Detection of *Wolbachia* within parasitoids of the family *Pteromalidae* associated with filth flies in southern Alberta. George Kyei-Poku, Berni Benkel, Jon Davoren, Mark S. Goettel and Kevin Floate Lethbridge Research Centre, Agriculture and Agri-Food Canada Lethbridge, Alberta T1J 4B1, Canada.
- DP3** Current status of European Union registration procedures for microbial pesticides. Chris J. Lomer, Institute for Ecology, Zoology Section, Royal Veterinary and Agricultural University (KVL), Thorvaldsensvej 40, 1871 Frederiksberg C, Denmark.
- DP4** *Spodoptera frugiperda* gene expression analysis using EST. Landais, I.<sup>1</sup>, Mita, K.<sup>2</sup>, Nohata, J.<sup>2</sup>, Gimenez, S.<sup>1</sup>, Ogliaastro, M.<sup>1</sup>, Duonor-Cerutti, M.<sup>1</sup>, Feyereisen, R.<sup>3</sup>, López Ferber, M.<sup>1</sup>, Devauchelle, G.<sup>1</sup>, Fournier, P.<sup>1</sup> <sup>1</sup>UMR 5087 INRA/CNRS/Univ. Montpellier II, Pathologie Comparée. 30380 St Christol. France. <sup>2</sup>Laboratory of Insect Genome, National Institute of Agrobiological Sciences. Tsukuba, Ibaraki 305-8634, Japan. <sup>3</sup>INRA, Centre de Recherches d'Antibes, 1382 Route de Biot, 06560 Valbonne, France.
- DP5** Search for biological control of an introduced social wasp *Vespa germanica*. Andrew F. Reeson & Andrew D. Austin. Applied & Molecular Ecology, Adelaide University, Waite Campus, Glen Osmond 5064, South Australia.
- DP6** Regulatory aspects of biopesticides: Dead end or challenge? Janine van Gelder<sup>1</sup>, Jelka Appelman<sup>1</sup>, Wieke Tas<sup>2</sup>, Jacqueline Scheepmaker<sup>3</sup> & Hans Mensink<sup>3</sup>. <sup>1</sup>National Board for the Authorisation of Pesticides, The Netherlands, <sup>2</sup>Ministry of Housing, Spatial Planning and the Environment, The Netherlands, <sup>3</sup>National Institute of Public Health and the Environment, The Netherlands.

## Nematodes

- NP1** Insecticidal genes from *Xenorhabdus nematophilus*. Morgan, J. Alun W.<sup>1</sup>, Martin Sergeant<sup>1</sup>, Debbie Ellis<sup>2</sup>, Laura Baxter<sup>1</sup>, Margaret Ousley<sup>1</sup>, Sara Lee<sup>1</sup> and Paul Jarrett<sup>2</sup>. <sup>1</sup>Dept. of Plant Pathology and Microbiology, <sup>2</sup>Entomological Sciences Dept., Horticulture Research International, Wellesbourne, Warwick CV35 9EF, UK.
- NP2** Genetic variability and discrimination of isolates, inbred lines and hybrids of *Heterorhabditis bacteriophora* via RAPD-PCR. Martin Berner<sup>1</sup>, Ralf-Udo Ehlers<sup>2</sup> and Wolfgang Schnetter<sup>1</sup>. <sup>1</sup>Institute of Zoology, Dept. of Insect Pathology, University of Heidelberg, Im Neuenheimer Feld 230, D-69120 Heidelberg, Germany; <sup>2</sup>Institute of Phytopathology, Dept. of Biotechnology and Biological Control, University of Kiel, Klausdorfer Str. 28-36, D-24223 Raisdorf, Germany. (STUDENT POSTER).
- NP3** Liquid culture production of biocontrol nematodes. Ralf-Udo Ehlers<sup>1</sup> and Arne Peters<sup>2</sup>. <sup>1</sup>Inst. for Phytopathology, Dept. for Biotechnology & Biological Control, Christian-Albrechts-University Kiel & E-Nema GmbH, Klausdorfer Str. 28-36, 24223 Raisdorf, Germany.
- NP4** Temperature and nutrition affect *Steinernema feltiae* infective Juvenile's body length (Nematoda: Steinernematidae). Selcuk Hazir<sup>1,2</sup>, S. Patricia Stock<sup>3</sup>, Albrecht M. Koppenhöfer<sup>4</sup>, Harry K. Kaya<sup>3</sup> and Nevin Keskin<sup>2</sup>. <sup>1</sup>Visiting scholar, Dept. of Nematology, University of California, One Shields Ave., Davis, CA 95616-8668; <sup>2</sup>Dept. of Biology, Faculty of Science, University of Hacettepe, 06532, Beytepe, Ankara, Turkey; <sup>3</sup>Dept. of Nematology, University of California, One Shields Ave., Davis, CA 95616-8668; <sup>4</sup>Dept. of Entomology, Rutgers University, New Brunswick, NJ 08901, USA.

**NP5** Lateral movement of four entomogenous nematode species in sand at different temperatures. Attila S. Csontos and Michael G. Klein. USDA-Agricultural Research Service, 1680 Madison Avenue, Horticultural Insects Research Laboratory, Wooster, Ohio 44691, USA.

**NP6** Can *Mastrus ridibundus* and *Liotryphon caudatus* (Ichneumonidae) parasitoids of cocooned codling moth larvae discriminate between nematode-infected and healthy hosts? Lawrence A. Lacey and Thomas R. Unruh. USDA-ARS, Yakima Agricultural Research Laboratory. 5230 Konnowac Pass Road, Wapato, WA 98951, USA.

## Viruses

**VP1** *Cydia pomonella* granulosis virus: new strategies for IPM. Martin Andermatt. Andermatt BIOCONTROL AG, Stahlermatten 6, 6146 Grosse Dietwil, Switzerland.

**VP2** The influence of baculovirus infection on the transcription of endogenous transposon TCp3.2 in *Cydia pomonella*. Hugo M. Arends and Johannes A. Jehle. State Education and Research Centre Neustadt/Weinstr, Biotechnological Crop Protection, Breitenweg 71, 67435 Neustadt/Weinstr, Germany. (STUDENT POSTER).

**VP3** A coiled-coil region of a polydnavirus immune suppressor protein is involved in binding and uptake by hemocytes. Sassan Asgari and Otto Schmidt. Dept. of Applied and Molecular Ecology, Waite Campus, Adelaide University, Glen Osmond, 5064, South Australia.

**VP4** Yes Basil, Hz-1V and Hz-2V are genetically related viruses. John P. Burand<sup>1,2</sup> and Woojin. Kim<sup>1</sup>. <sup>1</sup>Depts. of Entomology and <sup>2</sup>Microbiology. University of Massachusetts, Amherst Massachusetts 01003, USA.

**VP5** A potential strategy to associate insecticidal proteins with occlusion bodies of baculoviruses. Xiao-Wen Cheng<sup>1</sup>, Erika Lingohr<sup>1</sup>, Peter J. Krell<sup>2</sup> and Basil M. Ari<sup>1</sup>. <sup>1</sup>Laboratory for Molecular Virology, Great Lakes Forestry Center, 1219 Queen St. E., Sault Ste. Marie, Ontario, Canada, P6A 5M7. <sup>2</sup>Dept. of Microbiology, University of Guelph, Guelph, Ontario, N1G 2W1, Canada.

**VP6** Apoptosis as an antiviral defense in *Spodoptera frugiperda* caterpillars. Tom Clarke and Rollie J. Clem. Division of Biology. Kansas State University, Manhattan, Kansas 66505. USA (STUDENT POSTER).

**VP7** Replication of Insect Iridescent Virus 6 (IIV-6) in whitefly (*Bemisia argentifolii*) nymphs and cultured cells. Joel Funk<sup>1</sup>, Elizabeth W. Davidson<sup>2</sup>, and Wayne Hunter<sup>3</sup>. <sup>1</sup>USDA, ARS, Western Cotton Research Laboratory, Phoenix, AZ 85040, <sup>2</sup>Dept. of Biology, Arizona State University, Tempe, AZ 85287-1501, <sup>3</sup>USDA, ARS, USHRL, 2001 South Rock Rd., Fort Pierce, FL 34945, USA.

**VP8** Genetic organization of the HindIII-D fragment of the single-nucleocapsid nucleopolyhedrovirus of *Neodiprion sertifer* (NsSNPV). Aissa Doumbouya, Alejandra Garcia-Maruniak, Jaw-Ching Liu and James Maruniak. Entomology and Nematology Dept., University of Florida, P.O. Box 110620, Gainesville, FL 32611 USA (STUDENT POSTER).

**VP9** Characterization of *enhancin* from the *Mamestra configurata* nucleopolyhedrovirus. Qianjun Li<sup>1</sup>, David Theilmann<sup>2</sup>, Cam Donly<sup>3</sup>, Lulin Li<sup>2</sup>, and Martin Erlanson<sup>1</sup>. <sup>1</sup>Saskatoon Research Centre, AAFC-Saskatoon, SK; <sup>2</sup>Pacific Agri-Food Research Centre, AAFC, Summerland, B. C. <sup>3</sup>Southern Crop Protection and Food Research Centre, AAFC, London, Ont. Canada.

**VP10** Epidemiological survey of Densovirus in the noctuid populations of lucerne fields at El-Bahareya Oasis in Egypt.

- Gilles Fédère<sup>1</sup>, Mohamed A.K.El-Sheikh<sup>1</sup>, Rabab El-Mergawy<sup>1</sup>, Luc-Olivier Brun<sup>1</sup>, Max Bergoin<sup>2</sup> and Peter Tijssen<sup>3</sup>.  
<sup>1</sup>Center of Virology, Institut de Recherche pour le Développement (IRD), Faculty of Agriculture, Cairo University, Egypt; <sup>2</sup>Laboratoire de Pathologie Comparée, Université de Montpellier II, 34095 Montpellier, France; <sup>3</sup>Centre de Microbiologie, INRS–Institut Armand-Frappier, Université du Québec, Laval, QC, H7V1B7, Canada.
- VP11** Production of auxin binding protein (ABP) from *Sinapis arvensis* L. using a baculovirus expression system. Kristine M. Haggerty<sup>1</sup>, Hong-gang Zheng<sup>1</sup>, Peter J. Krell<sup>2</sup> and J. Christopher Hall<sup>1</sup>. Dept. of Environmental Biology<sup>1</sup> & Dept. of Microbiology<sup>2</sup>, University of Guelph, Guelph, Ontario, N1G 2W1 Canada, .
- VP12** Identification and expression analysis of *iap* genes in *Hyphantria cunea* nucleopolyhedrovirus. Motoko Ikeda, Kenichi Yanagimoto and Michihiro Kobayashi. Graduate School of Bioagricultural Sciences, Nagoya University, Chikusa, Nagoya 464-8601, Japan.
- VP13** Virulence and productivity of *Malacosoma neustria* nucleopolyhedrovirus Latvian isolates. Liga Jankevica<sup>1</sup>, Mara Kropa<sup>1</sup>, Eriks Jankevics<sup>2</sup>. <sup>1</sup>Institute of Biology, University of Latvia, Miera street 3, Salaspils, LV 2169, Latvia, <sup>2</sup>LU Biomedical Research and Study Center, Ratsupites street 1, Riga, LV 1067, Latvia.
- VP14** Genotypic analysis of *Spodoptera litura* (Lepidoptera: Noctuidae) Nucleopolyhedrovirus. Katsumi Kamiya<sup>1</sup>, Satoshi Kawamura<sup>1</sup>, Barbara A. Lavina<sup>2</sup>, Motoko Ikeda<sup>2</sup> and Michihiro Kobayashi<sup>2</sup>. <sup>1</sup>Gifu Prefectural Institute for Bioindustrial Technology, Minokamo, Gifu 505-0004, Japan; <sup>2</sup>Laboratory of Sericulture and Entomoresources, Graduate School of Bioagricultural Sciences, Nagoya University, Chikusa, Nagoya 464-0814, Japan.
- VP15** Potential biocontrol agent for the improved control of *Cryptophlebia leucotreta*. Gary J. Keane and Doreen Winstanley. Horticultural Research International, Wellesbourne, Warwick, CV35 9EF, UK.
- VP16** Induction of apoptosis in Ld652Y cell line infected with nucleopolyhedroviruses. Hiroki Ishikawa, Motoko Ikeda, Yasuhiro Katou and Michihiro Kobayashi. Graduate School of Bioagricultural Sciences, Nagoya University, Chikusa, Nagoya 464-8601, Japan.
- VP17** Selection for resistance to a nucleopolyhedrovirus in the smaller tea tortrix, *Adoxophyes honmai* (Lepidoptera: Tortricidae). Kazuhiro Takahashi, Junko Koyanagi, Akemi Okuma, Jun Takatsuka, Shohei Okuno, Madoka Nakai and Yasuhisa Kunimi. Dept. of Applied Biological Science, Faculty of Agriculture, Tokyo University of Agriculture and Technology, Saiwai, Fuchu, Tokyo, 183-8509, Japan.
- VP18** A close genomic and biological relationship between CfDEFNPV from *Choristoneura fumiferana* and the *Anticarsia gemmatalis* NPV. Hilary A. M. Lauzon<sup>1</sup>, Pablo D. Ghiringhelli<sup>2</sup>, Alicia S. de Cap<sup>2</sup>, Lillian Pavlik<sup>1</sup>, Peter J. Krell<sup>3</sup> and Basil M. Arif<sup>1</sup>. <sup>1</sup>Laboratory for Molecular Virology, 1219 Queen St. E., Sault Ste. Marie, Ontario, Canada, P6A 5M7. <sup>2</sup>LIGBCM, Departamento de Ciencia y Tecnología-CEI, Universidad Nacional de Quilmes, Saenz Pena 180, B1876BXD-Bernal, Argentina. <sup>3</sup>Dept. of Microbiology, University of Guelph, Guelph, Ontario, N1G 2W1, Canada.
- VP19** Complete genome sequence of white spot syndrome virus of shrimp. Hendrik Marks<sup>1</sup>, Jeroen Witteveldt<sup>1</sup>, Sander Peters<sup>2</sup>, Nico Kloosterboer<sup>1</sup>, Renato Tarchini<sup>2</sup>, René Klein Lankhorst<sup>2</sup>, Just M. Vlak<sup>1</sup> and Mariëlle C.W. van Hulten<sup>1</sup>. Laboratory of Virology<sup>1</sup>, Wageningen University, Binnenhaven 11, 6709 PD Wageningen, The Netherlands & Greenomics<sup>2</sup>, Plant Research

International, P.O. Box 16, 6700 AA Wageningen, The Netherlands.

- VP20** Sequence conservation of the *hr2* and *hr3* region in multiple isolated of *Helicoverpa armigera* and *H. zea* nucleopolyhedrovirus DNAs. Sehaam Khan<sup>1</sup>, Clifford Jacobs<sup>1</sup>, Burtram Fielding<sup>1</sup>, Just M. Vlak<sup>2</sup>, and Sean Davidson<sup>1</sup>. <sup>1</sup>Dept. of Microbiology, University of the Western Cape, Modderdam Road, Bellville, 7535, Cape Town, South Africa; <sup>2</sup>Laboratory of Virology, Wageningen University, The Netherlands. (STUDENT POSTER).
- VP21** Construction of a *Helicoverpa armigera* SNPV Bac-to-Bac system. Hanzhong Wang<sup>1</sup>, Fei Deng<sup>1</sup>, Gorben P. Pijlman<sup>2</sup>, Xinwen Chen<sup>1</sup>, Just M. Vlak<sup>2</sup> and Zhihong Hu<sup>1</sup>. <sup>1</sup>Joint-lab of Invertebrate Virology, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan 43007, <sup>2</sup>P.R. China<sup>1</sup> and Laboratory of Virology, Wageningen University, Binnenhaven 11, 6709 PD Wageningen, the Netherlands.
- VP22** Selection of a nucleopolyhedrovirus for biological control of three *Spodoptera* species and influence of Tinopal on its activity. Rosa Murillo, Delia Muñoz, and Primitivo Caballero. Laboratorio de Entomología Agrícola y Patología de Insectos, Departamento de Producción Agraria, UPNA, Campus de Arrosadia, 31006 Pamplona, Spain. (STUDENT POSTER).
- VP23** Identification of apoptosis-inhibiting gene in *Leucania separata* nuclear polyhedrosis virus. Yipeng Qi, Zifei Pei, Qingzhen Liu, Yanhua Peng, Yefu Wang, Fuhua Yang. Institute of Virology, Wuhan University, Wuhan, Hubei, 430072 P.R. China.

18:30-20:00 Dinner

Sunday, 20:00-22:00

Room C6

**Workshop & Business Meeting– Bacteria**

Sunday, 20:00-22:00

Auditorium

**Workshop & Business Meeting – Virus**

Sunday, 20:00-22:00

Room CX

**Workshop & Business Meeting - Fungi**

**MONDAY, AUGUST 28**

Monday, 8:00-10:00

Room Cx

**SYMPOSIUM – Advances in Molecular Biology of Entomopathogenic nematodes**

Convenor: **XX Bauman**

- 8:00 An analysis of transcriptional activity during developmental re-activation (recovery) of infective stage juveniles of *Heterorhabditis bacteriophora*. Ann M. Burnell<sup>1</sup>, Katherine M. Dolan<sup>1</sup> and John T. Jones<sup>2</sup>. <sup>1</sup>Institute of Bioengineering and Agroecology, <sup>2</sup>Dept. of Biology, National University of Ireland Maynooth Co. Kildare, Ireland and Mycology, Bacteriology and Nematology Unit, Scottish Crop Research Institute, Invergowrie, Dundee DD2 5DA, UK.

- 8:30 A comparison of the developmental profiles of two entomopathogenic Nematode species. Susan Bornstein-Forst Marian College, 45 South National Ave. Fond du Lac, WI 54935, USA.
- 9:00 Inter and intra specific genetic diversity of *Steinernema* species. Alex Reid. CABI, Bioscience, UK Center, Egham, Surrey, UK.
- 9:30 Isolation and characterization of genes involved in desiccation tolerance of *Steinernema feltiae* IS6. Tali Zitman-Gal<sup>1</sup>, Aharon Solomon<sup>2</sup>, Itamar Glazer<sup>1</sup> and Hinanit Koltai<sup>3</sup>. <sup>1</sup>Dept. of Nematology, ARO, The Volcani Center, Bet Dagan, 50250, Israel. <sup>2</sup>Dept. of Biochemistry, Molecular Biology and Cell Biology, Northwestern University, 2153 North Campus Drive; Hogan 2-100 Evanston, IL 60208-3500, USA. <sup>3</sup>Dept. of Plant Pathology, North Carolina State University, 3412 Gardner Hall, Raleigh, North Carolina 27695-7616, USA.

Monday, 8:00-10:00

Room C6

**SYMPOSIA– Insect Immunity**

Convenors: Jules Hoffman & Yechiel Shai

- 8:00 Target-mediated pore formation by amphiphilic antibiotic peptides. Hans-Georg Sahl. Institute for Medical Microbiology and Immunology, University Bonn, D-53105 Bonn, Germany.
- 8:30 Peptide-based antimalarial drugs. Lea Efron, Leonid Gaidukov, Hagai Ginsburg and Amram Mor. The Institute of Life Sciences, The Hebrew University of Jerusalem, Givat Ram 91904 Jerusalem, Israel.
- 8:50 The peritrophic membrane and its role in innate insect immunity. Robert R. Granados<sup>1</sup>, Ping Wang<sup>1</sup>, and Marc Harper<sup>2</sup>. <sup>1</sup>Boyce Thompson Institute for Plant Research, Cornell University, Ithaca, NY USA. <sup>2</sup>Pioneer Hi-Bred International, Inc., Johnson City, IA. USA.
- 9:10 From innate immunity to de novo designed antimicrobial peptides. Yechiel Shai. The Weizmann Institute of Science, Rehovot, Israel.
- 9:30 Novel approaches to study insect hemolymph coagulation. Ulrich Theopold<sup>1</sup>, Dongmei Li<sup>2</sup>, Marco Fabbri<sup>2</sup>, Christoph Scherfer<sup>1</sup> and Otto Schmidt<sup>2</sup>. <sup>1</sup>Dept. of Molecular Biology and Functional Genomics, Stockholm University, S-10691 Stockholm, Sweden and <sup>2</sup>Dept. of Applied and Molecular Ecology, Adelaide University, Glen Osmond, SA 5064, Australia.
- 9:45 Relish (in) the humoral immune response. Svenja Stöven, Marika Hedengren, Neal Silverman<sup>1</sup>, Anna Junell<sup>2</sup> and Dan Hultmark. Umeå Center for Molecular Pathogenesis, Umeå University, 90187 Umeå/ Sweden; <sup>1</sup>Harvard University, Cambridge/ USA; <sup>2</sup>Stockholm University, Stockholm/ Sweden.

Monday, 8:00-10:00

Ronde Hall

**SYMPOSIA– Environmental Impacts of Microbial Pesticides**

Convenor: H.M.T. Hokkanen,

- 8:00 Fear No Fungus. Ann E. Hajek<sup>1</sup>, Mark S. Goettel<sup>2</sup>, and Linda Butler<sup>3</sup>. <sup>1</sup>Dept. of Entomology, Cornell University, Ithaca, New York 14853, USA. <sup>2</sup>Agriculture & Agri-Food Canada, Lethbridge, AB T1J 4B1 Canada. <sup>3</sup>Division of Plant & Soil Sciences, West Virginia University, Morgantown, West Virginia 26505, USA.
- 8:25 Environmental impact of virus insecticides: host range and non-target species. Jenny S. Cory. Ecology and Biocontrol Group, Centre for Ecology and Hydrology – Oxford, Mansfield Road, Oxford, OX1 3SR, UK.

- 8:50 Environmental Impacts of Microsporidia. Leellen F. Solter. Illinois Natural History Survey, Center for Economic Entomology, 607 E. Peabody Dr., Champaign, Illinois 61820, USA.

- 9:15 Environmental impacts of bacterial biopesticides. Travis R. Glare and Maureen O'Callaghan. Biocontrol & Biosecurity, AgResearch, PO Box 60, Lincoln, New Zealand.

Monday, 8:00-10:00

Auditorium

**SYMPOSIA– Transgenic Microorganism**

Convenor: Dany Segal

- 8:00 Application of recombinant *Anabaena* PCC 7120 expressing mosquitocidal toxin genes from Bti. Sammy Boussiba<sup>1</sup>, Arturo Luisma<sup>1</sup>, Neena Karmacharya<sup>1</sup>, Aliza Zarka<sup>1</sup>, Eitan Ben-Dov<sup>2</sup> and Arie Zariisky<sup>2</sup>. <sup>1</sup>Microalgal Biotechnology, Blaustein Institute for Desert Research, Sede-Boker Campus 84990. <sup>2</sup>Dept. of Life Sciences, Beer-Sheva 841052. Ben-Gurion University of the Negev, Israel.
- 8:30 ELP-28 expressed in *Nicotiana tabacum* confers resistance to microbial pathogens and insecticidal properties to the plant. Donatella Ponti, Maria Luisa Mangoni, Giuseppina Mignogna, Donatella Barra and Maurizio Simmaco. Dipartimento di Scienze Biochimiche 'A. Rossi Fanelli' Università 'La Sapienza', Piazzale Aldo Moro 5, 00185 Rome, Italy.
- 9:00 Transgenic techniques in nematode research. András Fodor. Dept. of Genetics, Eötvös University, Budapest, Hungary.
- 9:30 Transgenic techniques in virus. Zhihong Hu. Joint-lab of Invertebrate Virology, Wuhan Institute of Virology, Chinese Academy of Sciences, China.

10:00-10:30 Coffee Break

Monday, 10:30-12:30

Room C6

**SYMPOSIA– Evolution and Functions of Entomopathogenic Fungi**

Convenor: D. Chandler

- 10:30 Understanding the evolution and function of entomopathogenic fungi – an introduction. David Chandler<sup>1</sup>, Judith K. Pell<sup>2</sup>, Nina Jenkins<sup>3</sup>, Tariq Butt<sup>4</sup>, Chris Jackson<sup>5</sup> and Naresh Magan<sup>6</sup>. <sup>1</sup>HRI Wellesbourne, Warwick CV35 9EF UK. <sup>2</sup>IACR Rothamsted, Harpenden AL5 2JQ UK. <sup>3</sup>CABI Bioscience, Scotot SL5 7TA UK. <sup>4</sup>University of Wales, Swansea SA2 8PP UK. <sup>5</sup>University of Southampton, Southampton SO16 7PX UK. <sup>6</sup>Cranfield University, Silsoe MK45 4DT UK.
- 10:50 Life history attributes of fungi - ecological function and influence on biological control strategies. Judith K. Pell<sup>1</sup> and Arthur A. Callaghan<sup>2</sup>. <sup>1</sup>Plant and Invertebrate Ecology Division, IACR-Rothamsted, Harpenden, Hertfordshire, AL5 2JQ. UK; <sup>2</sup>School of Sciences, Staffordshire University, College Road, Stoke on Trent, Staffordshire, ST4 2DE, UK.
- 11:10 Can we amplify our wisdom about the evolution and role of entomopathogenic fungi in the real world? Richard A. Humber. USDA-ARS Plant Protection Research Unit. US Plant, Soil & Nutrition Lab. Tower, Road, Ithaca, New York 14853-2901 USA.
- 11:30 Molecular evolution of fungal parasitism: evidence that this was facilitated by horizontal gene transfer from streptomycete bacteria. Raymond J. St. Leger, Florian Freimoser, Savita Bagga and Gang Hu. Dept. of Entomology, University of Maryland, Maryland 20742 USA.
- 11:50 Life history strategies of the insect pathogenic fungus *Metarhizium anisopliae*. Michael J. Bidochka. Dept. of

Biological Sciences, Brock University, St. Catharines, ON, L2S 3A1Canada.

- 12:10 Inference, imputation, induction and insect pathology. John Fenlon. Biometrics Dept., Horticulture Research International, Wellesbourne, Warwick CV35 9EF, U.K.

Monday, 10:30-12:30

Rotonde Hall

**SYMPOSIA– Bti, 25 years to its discovery**

Convenor: Dudley Pinnock

- 10:30 *Bacillus thuringiensis* subsp. *israelensis* comes of age. Arieh Zaritsky. Dept. of Life Sciences, P. O. Box 653, Be'er-Sheva 84105, and BioSan Ltd., P. O. Box 3, Ariel 44837, Israel.
- 11:00 Nahal Besor 25 years after deciphering the secrets of *Bacillus thuringiensis* subsp. *israelensis*. David J. Ellar. Biochemistry Dept., Cambridge University, UK.
- 11:30 Development and operational use of *Bacillus thuringiensis* subsp. *israelensis*. Norbert Becker. German Mosquito Control Association (KABS), Ludwigstr. 99, 67165 Waldsee, Germany.
- 12:00 The impact of Bti on Onchocerciasis campaign in west Africa. Laurent Yaméogo. The Onchocerciasis Control Programme in West Africa WHO/OCP Box 549, Ouagadougou Burkina Faso.

Monday, 10:30-12:30

Room Cx

**SYMPOSIA– Nematode Pathology**

Convenor: Keith Davies

- 10:30 Using *Caenorhabditis elegans* to investigate nematode-pathogen interactions. Jonathan Hodgkin. Genetics Unit, Dept. of Biochemistry, University of Oxford, Oxford OX1 3QU, UK.
- 11:00 Nematode surface: chemical composition and biological function. Yitzhak Spiegel & Edna Sharon. Dept. of Nematology, Inst. of Plant Protection, ARO, The Volcani Center, P.O. Box 6, Bet Dagan, Israel.
- 11:30 Bacterial control of plant parasitic nematodes. Alistair Bishop. School of Chemical and Life Sciences, University of Greenwich, Woolwich, London SE18 6PF, U.K.
- 12:00 The role of *Verticillium chlamydosporium* serine protease VCP1 in the infection of plant-pathogenic nematodes. Penny R. Hirsch<sup>1</sup>, C. Oliver Morton<sup>1,2</sup>, Tim H. Mauchline<sup>1,2</sup> and Brian R. Kerry<sup>2</sup> Agriculture and the Environment Division<sup>1</sup> & Plant and Invertebrate Ecology<sup>2</sup> Division, IACR-Rothamsted, Harpenden, Hertfordshire AL5 2JQ, UK.

Monday 10:30-12:30

Auditorium

**CONTRIBUTED PAPERS – Virus I**

Moderators: Doreen Winstanley & Yipeng Qi

- 10:30 Horizontal transmission of *Cydia pomonella* granulovirus in a model system. Susanne B. Steineke and Johannes A. Jehle. State Education and Research Centre Neustadt/Weinstr, Biotechnological Crop Protection, Breitenweg 71, 67435 Neustadt/ Weinstr. Germany. **(STUDENT PAPER)**.
- 10:45 Comparative field efficacy of a tetravirus and a nucleopolyhedrovirus for control of *Helicoverpa armigera* on sorghum. Peter D. Christian<sup>1</sup>, Nerida N. Gibb<sup>1</sup>, David Murray<sup>2</sup>, Karl Gordon<sup>1</sup> and Terry N. Hanzlik<sup>1</sup>. <sup>1</sup>CSIRO Entomology, Canberra, Australia. <sup>2</sup>Dept. of Primary Industries, Farming Systems Institute, Toowoomba, Queensland, Australia.

- 11:00 Enhancing the insecticidal effectiveness of *Helicoverpa armigera* SNPV by expressing an insect-toxin gene under the control of a chimaeric promoter. Xiulian Sun<sup>1, 5, 6</sup>, Hualin Wang<sup>1, 4</sup>, Xinwen Chen<sup>1</sup>, Chaomei Peng<sup>2</sup>, Dengming Pan<sup>3</sup>, Johannes A. Jehle<sup>4</sup>, Wopke van der Werf<sup>2</sup>, Just M. Vlask<sup>6</sup> and Zhihong Hu<sup>1</sup>. <sup>1</sup>Joint-lab of Invertebrate Virology, Wuhan Institute of Virology, Chinese Academy of Sciences, <sup>2</sup>General Station of Plant Protection, Hubei Province, <sup>3</sup>Chinese Agricultural Academy of Sciences, Anyang P.R. China <sup>4</sup>Biotechnological Crop Protection, Germany. <sup>5</sup>Laboratory of Crop and Weeds Ecology. <sup>6</sup>Laboratory of Virology Wageningen University, the Netherlands. **(STUDENT PAPER)**.

- 11:15 Expressing barnase gene and its pest-killing activity with recombinant *Heliothis armigera* nuclear polyhedrosis virus. Yipeng Qi, Yingle Liu, Ying Zhu, Mallam Nock Joshua. Institute of Virology, Wuhan University, Wuhan, Hubei, P. R. China.

- 11:30 Infectivity of *Epiphyas postvittana* nucleopolyhedrovirus for New Zealand leafrollers Ngairé Markwick<sup>1</sup>, Sally Graves<sup>2</sup>, Fiona M. Fairbairn<sup>2</sup>, Lisa C. Docherty<sup>1</sup>, Joanne Poulton<sup>1</sup> and Vernon K. Ward<sup>2</sup>. <sup>1</sup>Horticultural Research Institute of New Zealand, Mt Albert Research Centre, Private Bag, Auckland, New Zealand. <sup>2</sup>Dept. of Microbiology, School of Medical Sciences, University of Otago, P.O. Box 56, Dunedin, New Zealand **(STUDENT PAPER)**.

- 11:45 Sequence of the *Epiphyas postvittana* nucleopolyhedrovirus genome. O. Hyink, R. Dellow, M. Olsen, K. Caradoc-Davies, K. Drake, V.K. Ward. Dept. of Microbiology, University of Otago, Dunedin, New Zealand. **(STUDENT PAPER)**.

- 12:00 Deletion of the KDEL motif of AcMNPV chitinase increases the efficacy of the virus to *Trichoplusia ni*. Giles Saville<sup>1</sup>, Alex Patmini<sup>1</sup>, Robert Possee<sup>2</sup> and Linda King<sup>1</sup>. <sup>1</sup>School of Biological and Molecular Sciences, Oxford Brookes University, Headington, Oxford, OX3 0BP. <sup>2</sup>NERC Centre for Ecology and Hydrology, Mansfield Road, Oxford, OX1 3SR. UK. **(STUDENT PAPER)**.

12:30-14:00 Lunch

Monday, 14:00-16:00

Room B2/B4

**POSTER SESSION II**

**Bacteria**

- BP15** *In vitro* evaluation of the virulence of *Metarhizium anisopliae* strains on the cattle tick *Boophilus microplus*. E. Lopez & S. Orduz. Biotechnology and Biological Control Unit, Corporación para Investigaciones Biológicas (C.I.B) A.A. 7378, Medellín, Colombia.

- BP16** Immunolocalization and binding of the *Bacillus thuringiensis* subsp. *medellin* Cry11Bb toxin to midgut cells of mosquito larvae. Cesar Segura, Lina M. Ruiz, and Sergio Orduz. Biotechnology and Biological Control Unit. Corporación para Investigaciones Biológicas. Apartado Aéreo 7378, Medellín – Colombia.

- BP17** Distribution and characterization of *Bacillus thuringiensis* on the phylloplane of *Piper* (Piperaceae) species in three altitudinal levels. Pau Maduell<sup>1</sup>, Ricardo Callejas<sup>2</sup>, Kenneth R. Cabrera<sup>3</sup> y Sergio Orduz<sup>1</sup>. <sup>1</sup>Biotechnology and Biological Control Unit, Corporación para Investigaciones Biológicas, Medellín, Colombia, <sup>2</sup>Departamento de Biología, Universidad de Antioquia, Medellín, Colombia, <sup>3</sup>Facultad de Agronomía, Universidad Nacional de Colombia, Medellín, Colombia.

- BP18** Is the pore forming efficiency of Cry1Ac increased when the toxin binds two distinct receptors? James Pearce and David J. Ellar. Dept. of Biochemistry, University of Cambridge, UK. (STUDENT POSTER).
- BP19** Selection and characterization of *Bacillus thuringiensis* strains against *Diatraea saccharalis*. Ninfa Rosas, Magdalena Iracheta-Cárdenas, Lilia Morales-Ramos, Luis J. Galán-Wong, Hugo Luna-Olvera and Benito Pereyra-Alfárez. Dept. de Microbiología e Inmunología. Fac. Ciencias Biológicas/UANL. San Nicolás de los Garza, N. L. México.
- BP20** Shared binding sites for Cry1A and Cry1J *Bacillus thuringiensis* toxins as a common feature in Lepidoptera. Salvador Herrero<sup>1</sup>, Joel González-Cabrera<sup>1</sup>, Bruce Tabashnik<sup>2</sup>, and Juan Ferré<sup>1</sup>. <sup>1</sup>Dept. of Genetics, University of Valencia, 46100-Burjassot (Valencia), Spain. <sup>2</sup> Dept. of Entomology, University of Arizona, Tucson AZ 85721. USA. (STUDENT POSTER).
- BP21** Extremely high frequency of common H antigens between *Bacillus thuringiensis* and *Bacillus cereus*. Noriko Shisa, N. Wasano, A. Ohgushi, D.H. Lee and M. Ohba. Bioresources and Management Laboratory, Graduate School of Agriculture, Kyushu University, 812-8581, Japan.
- BP22** *Bacillus thuringiensis* toxin levels in transgenic cotton: Implications of changes with plant growth, plant structure, and nitrogen availability. John T. Trumble<sup>1</sup>, John Palumbo<sup>2</sup>, Gregory Kund<sup>1</sup> and William Carson<sup>1</sup>. <sup>1</sup>Dept. of Entomology, University of California, Riverside, CA 92521; <sup>2</sup>University of Arizona, Yuma Valley Agricultural Center, Yuma, AZ 85364 USA.
- BP23** Monovalent phage display of the *Bacillus thuringiensis* Cry9Ca1 crystal protein. Thomas Vanhercke<sup>1,2</sup>, Christophe Ampe<sup>1</sup>, Jeroen Van Rie<sup>3</sup>, Luc Tirry<sup>2</sup> and Peter Denolf<sup>3</sup>. <sup>1</sup>Dept. of Biochemistry, Faculty of Medicine; <sup>2</sup>Laboratory of Agrozoology, Faculty of Agricultural; <sup>3</sup>Applied Biological Sciences, University of Ghent, B-9000 Ghent, Belgium. Aventis Cropscience N.V., J. Plateaustraat 22, B-9000 Ghent, Belgium. (STUDENT POSTER).
- BP24** Studies of mannose-specific lectin proteins in parasporal inclusions of a Lepidoptera-specific *Bacillus thuringiensis* strain. N. Wasano<sup>1</sup>, A. Ohgushi<sup>1</sup>, H. Saitoh<sup>2</sup>, and M. Ohba<sup>1</sup>. <sup>1</sup>Bioresources and Management Lab, Graduate School of Agriculture, Kyushu University, Fukuoka 812-8581, Japan. <sup>2</sup>Biotechnology & Food Research Institute, Fukuoka Industrial Technology Center, Kurume, Fukuoka, Japan.
- BP25** Understanding Bt-toxicity: molecular and cellular analysis of Bt-resistance genes in *C. elegans*. Johanna L. Whitacre, Joel S. Griffiths and Raffi V. Aroian. Section of Cell and Developmental Biology University of California, San Diego, La Jolla, CA 92093-0349 USA.
- BP26** Highly toxic and broad-spectrum insecticidal *Bacillus thuringiensis* engineered by using the transposon Tn917 and protoplast fusion. Jianxiu Yu, Yi Pang, Fan Sun. State Key Laboratory for Biocontrol, Zhongshan University, Guangzhou, P. R. 510275, China.
- BP27** Screening and gene cloning of the new *Bacillus thuringiensis* strains. toxic to the plant Nematodes. Sun Ming Wang Qianlan Liu Bin Zou Xue Yu Ziniu. College of Life Science and Technology, Huazhong Agricultural University; Key Laboratory of Agricultural Microbiology of Ministry of Agriculture, Wuhan, Hubei 430070, P. R. China.
- BP28** Bt toxins as Nematicides. Jun-zhi Wei, Kristina Hale, and Raffi Aroian. Section of Cell and Developmental Biology University of California, San Diego La Jolla, CA 92093-0349 USA.

## Fungi

- FP15** Orthopteran thermoregulation and behavioral fever in central Alaska – A chilling prospect for entomopathogens such as *Beauveria bassiana*? Stefan T. Jaronski. USDA ARS Northern Plains Agricultural Research Lab Sidney MT 59270 USA.
- FP16** Host specificity and intraspecific variation of *Entomophthora muscae* s. str. revealed by morphological and molecular methods. Annette B. Jensen, Lene Thomsen & Jørgen Eilenberg. Dept. of Ecology, Zoology Section, Royal Veterinary and Agricultural University, Thorvaldsensvej 40, 1871 Frederiksberg C, Denmark.
- FP17** Granular formulations of *Beauveria brongniartii*. Kerstin Jung<sup>1</sup>, Andrea Horaczek<sup>2</sup>, Gisbert Zimmermann<sup>1</sup> and Helmut Viernstein<sup>2</sup>. <sup>1</sup>Federal Biological Research Centre for Agriculture and Forestry, Institute for Biological Control, Heinrichstr. 243, D-64287 Darmstadt, Germany; <sup>2</sup>University of Vienna, Institute for Pharmaceutical Technology, Althanstr. 14, A-1090 Vienna, Austria.
- FP18** Evaluation of *Metarhizium anisopliae* for control of wireworms. Todd Kabaluk<sup>1</sup>, Mark S. Goettel<sup>2</sup>, Bob Vernon<sup>1</sup> and Christine Noronha<sup>3</sup>. <sup>1</sup>Pacific Agri-Food Research Centre, Agriculture and Agri-Food Canada, Agassiz, B.C. <sup>2</sup>Lethbridge Research Centre, Agriculture and Agri-Food Canada, Lethbridge, Alberta. <sup>3</sup>Crops and Livestock Research Centre, Agriculture and Agri-Food Canada, Charlottetown, PEI, Canada.
- FP19** A *Matesia* pathogenic for stored grain beetles. Jeffrey C. Lord and Sheri A. Anderson Grain Marketing & Production Research Center USDA-ARS, Manhattan, Kansas 66502 USA.
- FP20** A preliminary review of entomogenous *Paecilomyces* from the CBS collection compared with isolates from Thailand. Jennifer Luangsa-ard<sup>1</sup>, Nigel L. Hywell-Jones<sup>1</sup> and Robert A. Samson<sup>2</sup>. <sup>1</sup>BIOTEC-Mycology, Yothi Laboratories, 73/1 Rama VI Road, Rajdhevee, Bangkok 10400 Thailand; <sup>2</sup>Centraalbureau voor Schimmelcultures, Identification service, P.O. Box 85167, 3508 AD Utrecht, The Netherlands.
- FP 21** *In vitro* evaluation of the virulence of *Metarhizium anisopliae* strains on the cattle tick *Boophilus microplus*. E. Lopez and S. Orduz. Biotechnology and Biological Control Unit, Corporación para Investigaciones Biológicas (C.I.B) A.A. 7378, Medellín, Colombia.
- FP22** Field evaluation of non-target impacts of *Metarhizium anisopliae* mycoinsecticide in oilseed rape ecosystem. Q.-Q. Zeng, H.M.T Hokkanen., and I. Menzler-Hokkanen. ERBIC-research project (EU-FAIR5-CT97-3489). Dept. of Applied Biology, Box 27, FIN-00014 University of Helsinki, Finland.
- FP23** Are pollinators at risk from *Beauveria bassiana* and *Metarhizium anisopliae* mycoinsecticide treatments H.M.T. Hokkanen, Q.-Q. Zeng, I. Menzler-Hokkanen, and H. Pasanen. ERBIC-research project (EU-FAIR5-CT97-3489). Dept. of Applied Biology, Box 27, FIN-00014 University of Helsinki, Finland
- FP24** Environmental effects of spraying Hyphomycete fungi in greenery plantations: Spatial-temporal distribution and impact on non-target invertebrates. Charlotte Nielsen, Susanne Vestergaard, Jørgen Eilenberg, Susanne Harding and Chris Lomer. The Royal Veterinary and Agricultural University, Dept. of Ecology, Thorvaldsensvej 40, 1871 Frederiksberg C., Denmark.
- FP25** Effect of UV-B radiation on conidial germination and culturability of the entomopathogenic Hyphomycetes *Verticillium lecanii* and *Aphanocladium album*. Gilberto U. L. Braga<sup>1</sup>, Drauzio E. N. Rangel<sup>1</sup>, Stephan D. Flint<sup>2</sup>, Anne J. Anderson<sup>1</sup> and Donald W. Roberts<sup>1</sup> Dept. of Biology<sup>1</sup> & Dept.



of Rangeland Resources and Ecology Center<sup>2</sup> Utah State University, Logan, Utah 84322-5305 USA.

**FP26** Physiological responses to temperature of potential fungal pathogens of *Varroa destructor* (sp.nov), an ectoparasite of the honey bee, *Apis mellifera* L. Gillian Davidson<sup>1</sup>, Kath Phelps<sup>2</sup>, David Chandler<sup>1</sup>, Katie E. Shaw<sup>3</sup>, Judith K. Pell<sup>3</sup>, Brenda V. Ball<sup>2</sup>, and Keith D. Sunderland<sup>1</sup> <sup>1</sup>Dept. of Entomological Sciences, and <sup>2</sup>Dept. of Biometrics, Horticulture Research International, Wellesbourne, Warwick, CV35 9EF, UK <sup>3</sup>Plant and Invertebrate Ecology Division, IACR-Rothamsted, Harpenden, AL5 2JQ, UK.

**FP27** Bioassays to assess the pathogenicity of mitosporic fungi to *Varroa destructor* (sp. nov), an ectoparasitic mite of the honey bee, *Apis mellifera* L. Katie E. Shaw<sup>1</sup>, Gillian Davidson<sup>2</sup>, Suzanne J. Clark<sup>3</sup>, Brenda V. Ball<sup>1</sup>, Judith K. Pell<sup>1</sup>, David Chandler<sup>2</sup> & Keith Sunderland<sup>2</sup>. <sup>1</sup>Plant & Invertebrate Ecology Division, and <sup>3</sup>Biomathematics Unit, Agriculture & Environment Division, IACR-Rothamsted, Harpenden, Hertfordshire AL5 2JQ, UK. <sup>2</sup>Entomological Sciences Department, HRI-Wellesbourne, Warwick, CV35 9EF, UK.

**FP28** Natural occurrence of insect pathogenic Hyphomycetes in the coffee leaf miner *Leucoptera coffeella* in Nicaragua. Ørjan Simonsen<sup>1</sup> Ingeborg Klingen<sup>1</sup> Falguni Guharay<sup>2</sup> <sup>1</sup>The Norwegian Crop Research Institute, Plant Protection Centre, Dept. of Entomology and Nematology, Høgskoleveien 7, N-1432 Ås, Norway. <sup>2</sup>The Tropical Agriculture Research and Higher Education Centre, Augusto Otárola Apartado Postal #4830, Km 8 1/2 Carretera a Masaya, Managua, Nicaragua.

**FP29** Biological control of *Melolontha melolontha* with Melocont<sup>®</sup>-Pilzgerste based on *Beauveria brongniartii*: Long term study in pastures from 1994-2000. Hermann Strasser<sup>1</sup> and Jürg Enkerli<sup>1</sup> <sup>1</sup>Institute of Microbiology, Leopold-Franzens University Innsbruck, Technikerstrasse 25, 6020 Innsbruck, Austria. <sup>2</sup>Swiss Federal Research Station for Agroecology and Agriculture, Reckenholzstrasse 191, 8046 Zürich, Switzerland

**FP30** Strain-specific detection of introduced *Beauveria bassiana* in agricultural fields by using sequence-characterized amplified region markers. Louela A. Castrillo, John D. Vandenberg, and Stephen P. Wraight. USDA Agricultural Research Services, U. S. Plant, Soil, & Nutrition Laboratory, Tower Road, Ithaca NY 14853 USA.

**FP31** Microbial control of scarabs and weevils in Christmas trees and greenery. Susanne Vestergaard, Jorgen Eilenberg, Charlotte Nielsen & Susanne Harding Dept. of Ecology, Royal Veterinary and Agricultural University, Thorvaldsensvej 40, DK - 1871 Frb. C, Denmark.

**FP32** Red locusts in Central and Southern Africa: the ideal target for *Metarhizium anisopliae* var. *acridum*. Sam L. Elliot<sup>1</sup>, Simon Blanford<sup>1</sup>, Matthew B. Thomas<sup>1</sup>, Justine Klass<sup>1</sup>, Christiaan Kooyman<sup>2</sup>, John Bahana<sup>3</sup>, John N. Katheru<sup>3</sup>, Roger Price<sup>4</sup>. <sup>1</sup>Leverhulme Unit, NERC Centre for Population Biology and CABI Bioscience, Imperial College at Silwood Park, Ascot, BERKS SL5 7PY, UK. <sup>2</sup>CABI Africa Regional Centre, ICRAF Complex, PO Box 633, Village Market, Nairobi, Kenya. <sup>3</sup>International Red Locust Control Organisation - CSA, PO Box 2450252, Ndola, Zambia. <sup>4</sup>Plant Protection Research Institute, Locust Research Unit, P/Bag X134, Pretoria 0001, RSA.

### Protozoa

**PP1** Life cycle, epizootiology and molecular phylogeny of *Hyalinocysta chapmani*, a microsporidian parasite of the mosquito, *Culiseta melanura* and the copepod, *Orthocyclops modestus*. Theodore G. Andreadis and Charles R. Vossbrinck. The Connecticut Agricultural Experiment Station, 123 Huntington St., New Haven, CT 06504, USA.

**PP2** Influences of Dimilin on a microsporidian isolate of the genus *Nosema*. Dörte Goertz and Andreas Linde. Fachhochschule Eberswalde, Dept. of Forestry, Applied Ecology Alfred-Möller-Str. 1, 16225 Eberswalde. Germany (STUDENT POSTER).

**PP3** Prevalence of microsporidia and other pathogens in females and males of different spruce bark beetle species (Col., Scolytidae). Uwe Handel<sup>1</sup>, Rudolf Wegensteiner<sup>1</sup>, and Jaroslav Weiser<sup>2</sup>. <sup>1</sup>Institute of Forest Entomology, Forest Pathology and Forest Protection, Univ.-BOKU-Vienna, Austria; <sup>2</sup>Institute of Entomology, Academy of Sciences, Ceske Budejovice, Czech Republic (STUDENT POSTER).

**PP4** Non-target risk from mycoinsecticide treatments: does the trophic level matter? H.M.T. Hokkanen, and Q.-Q. Zeng. ERBIC-research project (EU-FAIR5-CT97-3489). Dept. of Applied Biology, Box 27, FIN-00014 University of Helsinki, Finland.

**PP5** Light and electron microscope studies on a microsporidium of the cabbage webworm, *Hellula undalis* (F.) and epizootological studies in the Philippines. Regina G. Kleespies<sup>1</sup> and Inga Mewis<sup>2,3</sup>. <sup>1</sup>Federal Biological Research Center for Agriculture and Forestry, Institute for Biological Control, Heinrichstr. 243, 64287 Darmstadt, Germany, <sup>2</sup>Research Office, Central Luzon State University, Munoz, 3120 Nueva Ecija, Philippines <sup>3</sup>Present address: TU-Munich, Institute of Vegetable Science, Dürnast II, 85350 Freising Germany.

**PP6** Microsporidia and other protozoa in *Ips acuminatus* (Col., Scolytidae). Petra Zitterer<sup>1</sup>, Rudolf Wegensteiner<sup>1</sup>, Jaroslav Weiser<sup>2</sup> and Lawrence Kirkendall<sup>3</sup>. <sup>1</sup>Institute of Forest Entomology, BOKU-Vienna, <sup>2</sup>Insect Pathology, CAS-Ceske Budejovice; <sup>3</sup>Dept. of Zoology, University of Bergen, Norway.

### Nematodes

**NP7** Efficacy of entomopathogenic nematodes against larvae of *Diaprepes abbreviatus* affected by soil type. Clay W. McCoy, L. W. Duncan and Robin Stuart. Citrus Research and Education Center, University of Florida, IFAS, Lake Alfred, FL 33850 USA.

**NP8** Evaluations of feeding behavior with computerized electronic systems in lepidopterous larvae infested with entomopathogenic nematodes. Navon<sup>1</sup>, Vidya Nagalakshmi<sup>1</sup>, I. Glazer<sup>2</sup>, V. Alchanatis<sup>3</sup>, Y. Grinshpun<sup>3</sup>, Shlomit Levski<sup>1</sup> and Liora Salame<sup>2</sup> <sup>1</sup>Dept.s of Entomology, <sup>2</sup>Nematology, <sup>3</sup>Inst. of Agricultural engineering, ARO The Volcani Center, Bet Dagan 50250, Israel.

**NP9** Preliminary notes on the control of chestnut weevil *Curculio elephas* Gyll. (Coleoptera, Curculionidae) with entomopathogenic nematodes. B. Paparatti<sup>1</sup>, S. Speranza<sup>1</sup>, M. Ricci<sup>2</sup>. <sup>1</sup>University of Tuscia, Plant Protection Dept., Entomology Section, Via S. Camillo de Lellis, 01100, Viterbo, Italy. <sup>2</sup>BioTecnologie B.T. S.r.l., Pantalla di Todi, 06050, PG, Italy

**NP10** New bait station with *Steinernema carpocapsae* nematodes kills cockroaches. Naomi Pye<sup>1</sup>, Glenn Holbrook<sup>2</sup>, and Albert Pye<sup>1</sup>. <sup>1</sup>BioLogic Company, Willow Hill, Pennsylvania and <sup>2</sup>Dept. of Entomology, The Pennsylvania State University, University Park, Pennsylvania USA.

**NP11** Biological activities of a protease released by the entomopathogenic bacteria *Xenorhabdus nematophila*. C. Caldas, A. Cherqui, A. Pereira & N. Simões. Departamento de Biologia and CIRN, Universidade dos Açores, 9502 - 801 Ponta Delgada (Codex), Açores, Portugal.

**NP12** Oxygen limitation on *Steinernema carpocapsae* mass production. J. M. Neves<sup>1</sup>, N. Simões<sup>1</sup> and M. Mota<sup>2</sup>. <sup>1</sup>Dept. de Biologia & CIRN, U. dos Açores, 9501-801 Ponta Delgada;

<sup>2</sup>Dept. Eng. Biológica-IBQF, U. Minho, Campus de Gualtar 4710-057 Braga, Portugal.

<sup>2</sup>Human Genome Project Beijing Center, Beijing Airport Industrial Zone, Beijing, 101300, P.R.China.

**NP13** Selection of 31 entomopathogenic nematodes isolated in Azores against *Pseudaletia unipuncta* (Lepidoptera: Noctuidae) larvae. J. S. Rosa, and N. Simões. Departamento de Biologia and CIRN, Universidade dos Açores, 9502 - 801 Ponta Delgada (Codex), Açores, Portugal.

**NP14** Effect of Alginate Gel Formulations on efficacy of Entomopathogenic Nematodes against Lepidopterous Larvae. K. Vidya Nagalakshmi<sup>1</sup>, Itamar Galzer<sup>1</sup>, Amos Navon<sup>2</sup>, Shlomit Levski<sup>3</sup> and Liora Salame<sup>1</sup>. <sup>1</sup>Dept. Nematology, <sup>2</sup>Dept. Entomology ARO, The Volcani Centre, Bet-Dagan, Israel.

## Viruses

**VP24** Optimization of the production frequency of recombinant AgMNPV. Christina B. McCarthy<sup>1</sup>, Eloísa Arana<sup>1</sup>, Alicia Sciocco-Cap<sup>2</sup>, Victor Romanowski<sup>1</sup>. <sup>1</sup>IBBM, Facultad de Ciencias Exactas, UNLP, (1900) La Plata, Argentina; <sup>2</sup>IMyZA, CNIA, INTA, Castelar, Argentina. (STUDENT POSTER).

**VP25** Involvement of spindles of an entomopoxvirus (EPV) in the enhancement of the EPV infection to its host insect. Wataru Mitsuhashi, Mamoru Sato and Yoshio Hirai. National Institute of Agrobiological Sciences. Tsukuba, Ibaraki 305-8634, Japan.

**VP26** Selection of a nucleopolyhedrovirus for biological control of three *Spodoptera* species and influence of Tinopal on its activity. Rosa Murillo, Delia Muñoz, and Primitivo Caballero. Laboratorio de Entomología Agrícola y Patología de Insectos, Departamento de Producción Agraria, UPNA, Campus de Arrosadía, 31006 Pamplona, Spain.

**VP27** Influence of Tinopal on the biological activity and the genotypic composition of two *Spodoptera* nucleopolyhedroviruses. Rosa Murillo, Oihane Simón, Delia Muñoz and Primitivo Caballero. Laboratorio de Entomología Agrícola y Patología de Insectos. Departamento de Producción Agraria, Universidad Pública de Navarra, 31006 Pamplona, Spain.

**VP28** An investigation into the mechanisms of persistence in baculoviruses. Clare Nixon<sup>1</sup>, Robert Possee<sup>2</sup>, Rosie Hails<sup>2</sup>, David Hughes<sup>1</sup> and Linda King<sup>1</sup>. <sup>1</sup>School of Biological and Molecular Sciences, Oxford Brookes University, Headington, Oxford OX3 0BP; <sup>2</sup>NERC Centre for Ecology and Hydrology, Mansfield Road, Oxford OX1 3SR UK. (STUDENT POSTER).

**VP29** Viral enhancing activity of various stilbene derived brighteners for a *Spodoptera litura* (Lepidoptera: Noctuidae) Nucleopolyhedrovirus. Shohei Okuno,<sup>1</sup> Jun Takatsuka,<sup>1</sup> Madoka Nakai,<sup>1</sup> Satoshi Ootake,<sup>2</sup> Akio Masui<sup>2</sup> and Yasuhisa Kunimi<sup>1</sup>. <sup>1</sup>Dept. of Applied Biological Science, Faculty of Agriculture, Tokyo University of Agriculture and Technology, Saiwai, Fuchu, Tokyo, 183-8509, Japan; and <sup>2</sup>Agro & Fine Chemicals Res. Lab. Fine Chemicals Group, Koshikiya, Ageo, Saitama, 362-0064, Japan.

**VP30** Functional dissection of the baculovirus late expression factor-8 gene: Sequence requirements for late gene promoter activation. Jane S. Titterton, Tamara K. Nun, Kimberly J. Krager and A. Lorena Passarelli. Division of Biology, Molecular, Cellular, and Developmental Biology Program, Kansas State University, Manhattan, Kansas 66506, USA.

**VP31** Sequence analysis of the *Spodoptera litura* multicapsid nucleopolyhedrovirus genome. Yi Pang<sup>1</sup>, Jianxiu Yu<sup>1</sup>, Lihua Wang<sup>1</sup>, Xiaohui Hu<sup>1</sup>, Weidong BAO<sup>2</sup>, Gang Li<sup>2</sup>, Chong Chen<sup>2</sup>, Hua Han<sup>2</sup>, Songnian Hu<sup>2</sup>, Huanming Yang<sup>2</sup>. <sup>1</sup>State Key Laboratory for Biocontrol and Institute of Entomology, Zhongshan University, Guangzhou, 510275, P.R.China.

**VP32** A recombinant AcMNPV with two foreign gene and PE deficiency to control vegetable pests in the field. Qi Yi-peng, Yao Lun-guang, Xiao Hua-zhong, Yang Fu-hua, Liu Ying-je. Institute of Virology, Wuhan University, Wuhan 430072, Hubei, P. R. China.

**VP33** Study on transgenic insects carrying green fluorescent protein (*gfp*) gene and the infection course of recombinated baculovirus marked by *gfp* gene in larvae of cotton bollworm. Liu Zuqiang, Lv Songya and Qi Yipeng. Institute of Virology, Wuhan University, Wuhan, Hubei, P.R.China.

**VP34** Suitability of three lignin products as UV-protectants for two nucleopolyhedroviruses. El-Salamouny, S.<sup>1,2</sup>, Herz, A.<sup>1</sup> and Huber, J.<sup>1</sup>. <sup>1</sup>Institute for Biological Control, Federal Biological Research Centre, Heinrichstr. 243, D-64287- Darmstadt, Germany. <sup>2</sup>Dept. of Economic Entomology and Pesticides, Faculty of Agriculture, Cairo University, 12613- Giza, Egypt.

**VP35** Analysis of 10 ORFs, including predicted TATA-box binding protein in white spot syndrome virus genome of shrimp. Zhengli Shi<sup>1</sup>, Jean-Robert Bonami<sup>2</sup>. <sup>1</sup>Wuhan Institute of Virology, Wuhan, 430071; <sup>2</sup>UMR 5098, DRIM, CNRS-IFREMER, UMII, cc-80, Place E. Bataillon, Montpellier 34095, France.

**VP36** Characterization of two viral pathogens. from Chinese mitten crab *Eriocheir sinensis*. Shuyong Zhang<sup>1</sup>, Canhua Huang<sup>1</sup>, Jianhong Zhang<sup>1</sup>, Jean-Robert Bonami<sup>2</sup>, Zhengli Shi<sup>1</sup>. <sup>1</sup>Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan 430071, P.R.C.; <sup>2</sup>UMR 5098, DRIM, CNRS-IFREMER-UM2, cc-80, place E. Bataillon, 34095 Montpellier, France.

**VP37** Selection of a nucleopolyhedrovirus for control of *Spodoptera litura* (Lepidoptera: Noctuidae): genetic and biological comparison of ten isolates. Jun Takatsuka, Shohei Okuno, Madoka Nakai and Yasuhisa Kunimi. Dept. of Applied Biological Science, Faculty of Agriculture, Tokyo University of Agriculture and Technology, Saiwai, Fuchu, Tokyo, 183-8509, Japan.

**VP38** Comparative studies on the biological activity of wildtype and genetically modified *egt*-minus AcMNPV to larvae of *Spodoptera exigua* and *Heliothis armigera*. Karin Undorf-Spahn<sup>1</sup>, Eva Fritsch<sup>1</sup>, Jürg Huber<sup>1</sup>, Just M. Vlak<sup>2</sup> and Johannes A. Jehle<sup>3</sup>. <sup>1</sup>Federal Biological Research Centre for Agriculture and Forestry, Institute for Biological Control, Heinrichstr. 243, 64287 Darmstadt, Germany; <sup>2</sup>Laboratory of Virology, Wageningen University, 6709 PD Wageningen, The Netherlands; <sup>3</sup>State Education and Research Centre Neustadt/Weinstr., Biotechnological Crop Protection, Breitenweg 71, 67435 Neustadt/Weinstr., Germany.

**VP39** Characterization of the chitinase gene of *Helicoverpa armigera* nucleopolyhedrovirus. Hualin Wang<sup>1,2</sup>, Dong Wu<sup>1</sup>, Xinwen Chen<sup>1</sup>, Huiyin Peng<sup>1</sup>, Hilary Lauzon<sup>3</sup>, Just M. Vlak<sup>4</sup>, Basil M. Arif<sup>2</sup>, and Zhihong Hu<sup>1</sup>. Joint-Lab of Invertebrate Virology, Wuhan Institute of Virology, Chinese Academy of Sciences, P.R. China<sup>1</sup>, SLFA, Biotechnological Crop Protection, Neustadt/Wstr., Germany<sup>2</sup>, Laboratory for Molecular Virology, Great Lakes Forest Research Centre, Canada<sup>3</sup> and Laboratory of Virology, Wageningen University, the Netherlands<sup>4</sup> (STUDENT POSTER).

**VP40** Comparing the efficacy of wild type and a recombinant strain of CpGV using detached apple and glasshouse trials. Ruth Finch, Martin Torrance, Sylvaine Bossinot and Doreen Winstanley. Dept. of Entomological Sciences, Horticulture Research International, Wellesbourne, Warwick, CV35 9EF, UK.

**VP41** Effects of nutrition on developmental resistance of *Lymantria dispar* (Lepidoptera: Lymantriidae) to *Lymantria dispar* Nucleopolyhedrovirus. Mike Grove, Laura Behrendt, Jason Rosenzweig, Djamila Harouaka, Heather Emminger, and Kelli Hoover. Dept. of Entomology, The Pennsylvania State University, University Park, PA 1680. USA.

**VP42** Development of a rapid method to detect nucleopolyhedroviruses in virus-infected insects. Aaron Young, Imre S. Otvos<sup>2</sup>, and David B. Levin<sup>1</sup>. <sup>1</sup>Department of Biology, University of Victoria, P.O. Box 3020 STN CSC, Victoria, British Columbia, Canada, V8W 3N5; <sup>2</sup>Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, 506 Burnside Road, Victoria, British Columbia, V8Z 1M5 Canada. **(STUDENT POSTER).**

**VP43** *In vitro* propagation of a nucleopolyhedrovirus of the balsam fir sawfly, *Neodiprion abietis* (Order Hymenoptera; Family Diprionidae). Beatrice Whittome and David B. Levin. Department of Biology, University of Victoria, P.O. Box 3020 STN CSC, Victoria, British Columbia, Canada, V8W 3N5 **(STUDENT POSTER).**

16:00-16:30 Coffee Break

Monday, 16:30-18:30

Rotonde Hall

**CONTRIBUTED PAPERS – Virus II**

Moderators: Gary Blissard & Monique van Oers

16:30 The virus infection of the *Varroa jacobsoni* population in beehives. Zhang Qiansong<sup>1</sup>, Willem J. Boot<sup>2</sup>, Johan Calis<sup>2</sup>, Sophie Lecoublet<sup>3</sup>, Eberhard R. Bengsch<sup>3</sup> Jean-Mark Bonmatin<sup>3</sup> & Dick Peters<sup>1</sup>. <sup>1</sup>Laboratory of Virology; <sup>2</sup>Laboratory of Entomology; <sup>3</sup>Wageningen University, 6709 PD Wageningen, The Netherlands; Centre de Biophysique Moléculaire, CNRS, Orléans, France.

16:45 Evidence That Infection With Amsacta Moorei Entomopoxvirus Inhibits UV-Induced Apoptosis in *Lymantria dispar* Cells. Frankish, A. and King, L.A. Insect Virus Group, School of Biological and Molecular Sciences, Oxford Brookes University, Gipsy Lane Campus, Oxford, OX3 0BP, UK. **(STUDENT PAPER).**

17:00 Characterization of the White Spot Syndrome Virus structural proteins VP19 and VP15. Cesar M. Escobedo-Bonilla, Jeroen Witteveldt, Angela M.G. Vermeesch, Just M. Vlask, and Mariëlle C. W. van Hulten. Laboratory of Virology, Wageningen University and Research Centre, Binnenhaven 11, 6709 PD Wageningen, The Netherlands **(STUDENT PAPER).**

17:15 Characterization of a novel member of the Tetraviridae that infects cells in culture. Fiona M. Pringle, Karyn N. Johnson and L. Andrew Ball, Microbiology Dept., University of Alabama at Birmingham, Birmingham, AL 35294, USA.

17:30 Bioimaging of baculovirus proteins involved in cellular lysis and larval liquefaction. Alex L. Patminidi<sup>1</sup>, Giles P. Saville<sup>1</sup>, Robert D. Possee<sup>2</sup> and Linda A. King<sup>1</sup>. <sup>1</sup>School of Biological and Molecular Sciences, Gipsy Lane Campus, Oxford Brookes University, Oxford OX3 0BP; <sup>2</sup>NERC Centre for Hydrology and Ecology, Mansfield Road, Oxford OX1 3SR UK. **(STUDENT PAPER).**

17:45 Partial nucleotide sequence and phylogenetic analysis of a nucleopolyhedrovirus of balsam fir sawfly, *Neodiprion abietis*. Aaron Young and David Levin. University of Victoria, PO Box 3020 STN CSC, Victoria, British Columbia, V8W 3 N5 Canada. **(STUDENT PAPER).**

18:00 Evolutionary Origin of Polydnaviruses by Viral Symbiogenesis. Brian A. Federici<sup>1</sup> and Yves Bigot<sup>2</sup>. <sup>1</sup>Dept. of Entomology &

Graduate Programs in Genetics and Microbiology, University of California, Riverside, CA 92507 USA; <sup>2</sup>Laboratoire d'Etude des Parasites Génétiques<sup>2</sup>, U.F.R. des Sciences et Techniques, Université de Tours, Parc Grandmont, 37200 Tours, France.

18:15 Virus diseases of Harlequin *Chironomus plumosus* (Diptera, Chironomidae) from the Dnestr River. Elena Oleinikova. Moldavian Research Institute for Horticulture, Chisinau, 2019, Moldova.

Monday, 16:30-18:30

**CONTRIBUTED PAPERS – Fungi I**

Moderators: M. Samish and A. E. Hajek

16:30 Microbial control of scarabs and weevils in Christmas trees and greenery. Susanne Vestergaard, Jorgen Eilenberg, Charlotte Nielsen & Susanne Harding. Dept. of Ecology, Royal Veterinary and Agricultural University, Thorvaldsensvej 40, DK - 1871 Frb. C, Denmark.

16:45 Molecular cloning and characterization of *Beauveria bassiana* glucan synthase (BbFKS) and chitin synthase (BbCHS) gene homologues. Aurélien Tartar and Drion G. Boucias. Dept. of Entomology and Nematology. University of Florida, Gainesville, FL 32611 USA **(STUDENT PAPER).**

17:00 Long-term implementation of classical biological control using a mite pathogenic fungus in Africa: From exploration to detection of establishment. Delalibera Jr<sup>1</sup>, A. E. Hajek<sup>1</sup>, R. A. Humber<sup>2</sup>, and A. Cherry<sup>3</sup>. <sup>1</sup>Dept. of Entomology, Cornell University, Ithaca NY 14853, USA, <sup>2</sup>USDA/ARS US Plant, Soil & Nutrition Laboratory, Ithaca NY 14853, USA. <sup>3</sup>IITA, 08 BP 0932, Cotonou, Republic of Benin. **(STUDENT PAPER).**

17:15 Prevalence of *Beauveria bassiana* in California populations of *Lygus hesperus*. Michael R. McGuire. USDA-ARS, Western Integrated Cropping Systems Research Unit, Shafter, California 93263 USA.

17:30 Alternative paradigm for fruit fly management based on entomopathogenic fungi. S. Dimbi, S. Ekesi, N.K. Maniania, S.A. Lux and N. Zenz. International Centre of Insect Physiology and Ecology, Nairobi, Kenya **(STUDENT PAPER).**

17:45 Field trial of a genetically improved fungal entomopathogen. Gang Hu, Raymond J. St. Leger and Steven E. Screen. Dept. of Entomology, University of Maryland, College Park, MD 20742, U.S.A. **(STUDENT PAPER).**

18:00 Influence of thermoregulation on phagocytosis and blastospores in mycosis of the migratory locust by *Metarhizium anisopliae* var *acridum*. Robert M. Ouedraogo<sup>1</sup> Jacques Brodeur<sup>1</sup> Michel Cusson<sup>2</sup> and Mark S. Goette<sup>1</sup>. <sup>1</sup>Département de phytologie, Université Laval, Québec, QC, G1K 7P4, <sup>2</sup>Canadian Forest Service, Laurentian Forestry Center, Ste-Foy, Québec, G1V 4C7 and Lethbridge Research Centre, Agriculture. <sup>3</sup>Agri-Food Canada, Lethbridge, AB T1J 4B1, Canada. **(STUDENT PAPER).**

18:15 Field evaluation of different formulations of mycoinsecticides for the control of *Cryptocatantops haemorrhoidalis* and *Locusta migratoria* in Niger Adane Kassa<sup>1</sup>, D. Stephan<sup>1</sup>, G. Zimmermann<sup>1</sup> and S. Vidal<sup>2</sup> <sup>1</sup>Federal Biological Research Center for Agriculture and Forestry, Institute for Biological Control, Heinrichstr.243, 64287 Darmstadt, Germany. <sup>2</sup>Institute for Plant Pathology and Plant Protection, Entomology Section, Georg-August-University, Grisebachstr. 6, D-37077 Goettingen, Germany. **(STUDENT PAPER).**

Monday, 16:30-18:30

Auditorium

**CONTRIBUTED PAPERS – Bacteria I**

Moderators: Alejandra Bravo and Arieh Zaritsky

- 16:30 Formulating biocontrol bacteria for application to soil. V.W. Johnson, J.F. Pearson, M. O'Callaghan and T.A. Jackson AgResearch, PO Box 60, Lincoln, New Zealand.
- 16:45 Construction and characterization of a *Bacillus thuringiensis* strain producing Cry11B, Cyt1A and the *Bacillus sphaericus* 2362 binary toxin. Yun-Woo Park<sup>1</sup>, Dennis K. Bideshi<sup>1</sup> and Brian A. Federici<sup>1,2</sup>. <sup>1</sup>Dept. of Entomology. <sup>2</sup>InterDept.al Graduate Programs in Genetics and Microbiology University of California, Riverside, Riverside, California 92521 USA.
- 17:00 Expression of cry11Aa gene from *Bacillus thuringiensis* subsp. *israelensis* with the binary toxin gene from *Bacillus sphaericus* in the same host. Fan Sun<sup>1</sup>, Zhiming Yuan<sup>1,2</sup>, Jianxiu Yu<sup>1</sup>, Yi Pang<sup>1</sup> <sup>1</sup>Institute of Entomology, State Key Laboratory for Biocontrol, Guangzhou, 510275, P.R.China <sup>2</sup>Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, Hubei, 430071, P.R.China.
- 17:15 Degradation of *Bacillus thuringiensis* subsp. *israelensis* toxic proteins by UV-B. Robert Manasherob, Eitan Ben-Dov<sup>1</sup>, Rachel Azurel and Arieh Zaritsky<sup>1</sup> Dept. of Life Sciences, Ben-Gurion University of the Negev, POB 653, Be'er-Sheva 84105, and <sup>1</sup>BioSan Ltd., POB 3, Ariel 44837, Israel.
- 17:30 Beet Armyworm (*Spodoptera exigua*) gut gene expression responses to Bt toxin ingestion measured with a cDNA microarray. Petra Bakker<sup>1</sup>, William J. Moar<sup>2</sup>, Oscar Vorst<sup>1</sup>, and Ruud A. de Maagd<sup>1</sup>. Business Unit Cell Cybernetics, Plant Research International B.V., P.O. Box 16, 6700 Wageningen, Netherlands<sup>2</sup> Dept. of Entomology, Auburn University, 301 Funchess Hall, Auburn, AL 36849 USA.
- 17:45 Loss of a putative carbohydrate-modifying enzyme leads to Bt toxin resistance in *C. elegans* Joel S. Griffiths, Johanna Whitacre, Daniel E. Stevens, and Raffi V. Aroian. Section of Cell and Developmental Biology University of California, San Diego La Jolla, CA 92093-0349 USA.
- 18:00 Activation of Cry1Ab protoxin in vitro. Isabel Gomez<sup>2</sup>, Raul Miranda, Oswaldo Lopez, Jorge Sanchez, Alejandra Bravo and Mario Soberon. Instituto de Biotecnologia, Universidad Nacional Autonoma de Mexico, Apdo. Postal 510-3, Cuernavaca 62250, Mor. Mexico.
- 18:15 Improvement of insecticidal activity of *Bacillus thuringiensis* crystal proteins by DNA shuffling. Ruth Cong, David Cerf and Takashi Yamamoto. Maxygen, Inc., 515 Galveston Drive, Redwood City, California 94063. USA.

Monday, 16:30-18:30

Room Cx

**CONTRIBUTED PAPERS – Nematoda II**

Moderators: Arne Peters and Christine Griffin

- 16:30 Tick - pathogens and their potential use as biocontrol agents Michael Samish<sup>1</sup>, Evgeny Alekseev<sup>1</sup>, Galina Gindin<sup>2</sup> and Itamar Glazer<sup>2</sup>. Kimron Veterinary Inst.<sup>1</sup> and ARO, The Volcani Center<sup>2</sup>, Bet-Dagan, 50250, Israel.
- 17:00 Towards a better understanding of the *Heterorhabditis* spp. life cycle in order to improve the management of nematode population dynamics in liquid culture. Ralf-Udo Ehlers and Stefan Andreas Johnigk Institute for Phytopathology, Dept. for Biotechnology and Biological Control, Christian-Albrechts-University Kiel, Klausdorfer Str. 28-36, 24223 Raisdorf, Germany.
- 17:15 Dauer juvenile recovery: The key to successful mass production of *Heterorhabditis* spp. Ralf-Udo Ehlers Institute for Phytopathology, Dept. for Biotechnology and Biological Control, Christian-Albrechts-University Kiel, Klausdorfer Str. 28-36, 24223 Raisdorf, Germany.

- 17:30 Influence of energy reserves, size and activity on survival of *Heterorhabditis megidis*. Paul Fitters and Christine Griffin. Institute of Bioengineering and Agroecology, Dept. of Biology, National University of Ireland, Maynooth, Co. Kildare, Ireland.
- 17:45 Development of assays for a genetic selection for beneficial traits in the entomopathogenic nematode *Heterorhabditis bacteriophora*. Jesko Oestergaard, Olaf Strauch and Ralf-Udo Ehlers Institute for Phytopathology, Dept. for Biotechnology and Biological Control, Christian-Albrechts-University Kiel, Klausdorfer Str. 28-36, 24223 Raisdorf, Germany.
- 18:00 The heritability of the propagative potential *Heterorhabditis bacteriophora* in liquid culture. S. A. Johnigk, O. Strauch, S. Hollmer, and Ralf-Udo Ehlers Institute for Phytopathology, Dept. for Biotechnology and Biological Control, Christian-Albrechts-University Kiel, Klausdorfer Str. 28-36, 24223 Raisdorf, Germany.
- 18:30-20:00 Dinner

Monday, 20:00-22:00 **Division Microbial Control**

Rotonde Hall

20:00 - Business meeting, 20:30 - **Workshop: Meet the Industry**

Conveners: Wendy Gelernter & Amos Navon

Monday, 20:00-22:00

Room Cx

**Business Meeting – Nematodes**

Monday, 20:00-22:00 **Division of Microsporidia**

Room C6

20:00 - Business meeting, 20:30-**Workshop: Fear no Microsporidia, Guidelines for mass-rearing insects and other arthropods**

Convinor: Rudolf Wegensteiner

1. Microsporidia in insect mass rearings: sanitation. Jaroslav Weiser<sup>1</sup> and Rudolf Wegensteiner<sup>2</sup>. <sup>1</sup>Institute of Entomology, Academy of Sciences of the Czech Republic, Branisovska 31,370 05, Ceske Budejovice, Czech Republic. <sup>2</sup>Institute of Forest Entomology, University of Agriculture, Hasenauerstrasse 38,A-1190 Wien, Austria.
2. Impact and management of *Nosema* disease in parasitoids. C. J. Geden and J. J. Becnel. USDA, ARS, Center for Medical, Agricultural and Veterinary Entomology P.O. Box 14565 Gainesville, FL 32604, USA.

**TUESDAY, AUGUST 29**

Tuesday, 8:00-10:00

Auditorium

**SYMPOSIUM – Climate Change and Transmission of *Vibrio* Infections**

Convenors: Eugene Rosenberg and Elizabeth W. Davidson

- 8:00 Climate change in the 20th and 21st century. Peter Siegmund. Royal Netherlands Meteorological Institute (KNMI). Climate Research and Seismology Dept. Atmospheric Composition Division. Wilhelminalaan 10. 3730 AE De Bilt, The Netherlands.
- 8:30 Climate change and bacterial infectious diseases. Rita R. Colwell the University of Maryland Biotechnology Institute, 4321 Hartwick Road, Suite 550 College Park, MD 20740, USA.
- 9:10 Chironomid egg-masses: A possible reservoir of *Vibrio cholerae* Meir Broza and Malka Halpern. Dept. of Biology, Faculty of Sciences and Science Education, University of Haifa, Oranim, Tivon 36006, Israel.
- 9:30 Bacterial bleaching of corals. Eugene Rosenberg. Dept. of Molecular Microbiology & Biotechnology. Tel-Aviv University, Ramat Aviv 69978, Israel.

Tuesday, 8:00-10:00

Room C6

**SYMPOSIUM – Ecological Adaptation of EPN**

Convenor: Ralf-Udo Ehlers and Itamar Glazer

- 8:00 Ecology of natural entomopathogenic nematode populations. Albrecht M. Koppenhöfer. Dept of Entomology, Rutgers University, New Brunswick, NJ 08901, USA.
- 8:30 Entomopathogenic nematode ecology in agricultural cropping systems. Otto Nielsen. Zoology Section, Department of Ecology The Royal Veterinary- and Agricultural University Copenhagen, Denmark.
- 9:00 Nematode desiccation tolerance. Itamar Glazer. Dept. of Nematology, Volcani Center, Bet Dagan 50250, Israel.
- 9:30 Phased infectivity in *Heterorhabditis megidis*. Christine Griffin, Catherine Dempsey, Paul Fitters and Jonathon Ryder. Institute of Bioengineering and Agroecology and Dept. of Biology, National University of Ireland Maynooth, Maynooth, Co. Kildare, Ireland.

Tuesday, 8:00-10:00

Room B2/B4

**CONTRIBUTED PAPERS – Fungi II**

Moderators: Jorgen Eilenberg and Robert A. Samson

- 8:00 Conservation biocontrol with mycopathogens: *Erynia neoaphidis* and agricultural field margins Paresh A. Shah, Anna Tymon and Judith K. Pell *Plant and Invertebrate Ecology* Division, IACR-Rothamsted, Harpenden, Hertfordshire, AL5 2JQ, UK.
- 8:15 Assessment of various PCR based molecular techniques for developing diagnostic markers for *Erynia neoaphidis*. Anna Tymon, Paresh A. Shah, and Judith K. Pell. *Plant and Invertebrate Ecology* Division, IACR-Rothamsted, Harpenden, Hertfordshire, AL5 2JQ, UK.
- 8:30 Epizootiology of the entomophthorean fungus, *Furia gastropachae* n. comb. (= *F. crustosa*), in populations of the forest tent caterpillar. Melanie J. Filotas<sup>1</sup>, Ann E. Hajek<sup>1</sup> and Richard A. Humber<sup>2</sup> Dept. of Entomology, Cornell University, Ithaca, NY, USA 14853<sup>1</sup>. USDA/ARS Plant, Soil & Nutrition Laboratory, Cornell University, Ithaca, NY 14853<sup>2</sup> USA.

8:45 Manifestation of entomophthorous fungus *Neozygites freseni* in *Dactynotus nigrotuberculatus* and *Uroleucon caligatus* populations in Vermont. Svetlana Gouli and Vladimir Gouli. Plant and Soil Dept., Entomology Research Laboratory, University of Vermont, P.O.Box 53400, Burlington, Vermont 05405, USA.

9:00 Occurrence of insect pathogenic fungi in soils and the effects of bait insect, farming system and field margins Ingeborg Klingen<sup>1</sup> Jørgen Eilenberg<sup>2</sup> and Richard Meadow<sup>1</sup>. <sup>1</sup>The Norwegian Crop Research Institute, Plant Protection Centre, Dept. of Entomology and Nematology, Høgskoleveien 7, N-1432 Ås, Norway; <sup>2</sup>Royal Veterinary and Agricultural University, Dept. of Ecology, Thorvaldsensevej 40, DK-1871 Frederiksberg C, Denmark.

9:15 Testing the entomopathogenic fungus *Metarhizium anisopliae* against the cabbage aphid, *Brevicoryne brassicae* on rapeseed in Iran. Farhad Hemmati<sup>1</sup>, Shahram Farrokh<sup>2</sup> and Abdolrahim Mehrabi<sup>1</sup> <sup>1</sup>Seed and Plant Improvement Institute, Mahdasht Ave, Karaj 31585, Iran, <sup>2</sup>Plant Pest and Disease Research Institute, Tabnak Ave., Tehran 19395, Iran.

9:30 Biological control of *Melolontha melolontha* with Melocont<sup>®</sup>-Pilzgerste based on *Beauveria brongniartii*: Long term study in pastures from 1994-2000. Hermann Strasser and Jürg Enkerli. <sup>1</sup>Institute of Microbiology, Leopold-Franzens University Innsbruck, Technikerstrasse 25, 6020 Innsbruck, Austria. <sup>2</sup>Swiss Federal Research Station for Agroecology and Agriculture, Reckenholzstrasse 191, 8046 Zürich, Switzerland.

9:45 Toxicity of *Paecilomyces fumosoroseus* produced in liquid and solid medium, using a dipped leaf and topical application to larvae of Mexican bean beetle (Coleoptera: Coccinellidae). C. García-Gutiérrez<sup>1</sup>, P.Tamez-Guerra<sup>2</sup>, M. R. McGuire, M. Jackson and R.W. Behle<sup>3</sup>. <sup>1</sup>CIIDIR-COFAA IPN Unidad Durango, Durango., CP. 34220, Mexico. <sup>2</sup>Fac. de Ciencias Biológicas de la Universidad Autónoma de Nuevo León, Monterrey N.L.Mex. <sup>3</sup>USDA-ARS, National Center for Agricultural Utilization Research, Peoria, Illinois, USA. (STUDENT PAPER).

Tuesday, 8:00-10:00

Rotonde Hall

**CONTRIBUTED PAPERS – Virus III**

Moderator: Eric B. Carstens

8:00 Physical maps and partial genetic maps of two nucleopolyhedroviruses of the hemlock looper, *Lambdina fuscillaria* (Lepidoptera: Geometridae) and in vitro propagation of the western hemlock looper (*L. f. lugubrosa*) NPV. Beatrice Whittome, Roberto Alberto, and David B. Levin. Department of Biology, University of Victoria, P.O. Box 3020 STN CSC, Victoria, British Columbia, V8W 3N5 Canada. (STUDENT PAPER).

8:15 Neutralization of white spot syndrome virus infection in *Penaeus monodon* shrimp using antibodies against the major structural protein VP28. Jeroen Witteveldt, Just M. Vlak and Mariëlle C. W. van Hulst Laboratory of Virology, Wageningen University, Binnenhaven 11, 6709 PD Wageningen, The Netherlands. (STUDENT PAPER).

8:30 Fusion to green fluorescent protein improves expression of the *Theileria parva* sporozoite surface antigen p67 in insect cells. Stephen A. Kaba<sup>1,2</sup>, Vishvanath Nene<sup>2</sup>, Monique M. van Oers<sup>1</sup> and Just M. Vlak<sup>1</sup>. <sup>1</sup>Laboratory of Virology, Wageningen University, The Netherlands. <sup>2</sup>International Livestock Research Institute, Nairobi, Kenya.

8:45 Interactions Between Baculovirus P143 and LEF3 Proteins: P143 Nuclear Localization and Species Specificity. Tricia Chen, Ahmed Taha, and Eric B. Carstens. Dept. of Microbiology and

Immunology. Queen's University, Kingston, Ontario, K7L 3N6, Canada.

- 9:00 Unusual pathogenesis of the nucleopolyhedrovirus HaSNPV in the heterologous host *Spodoptera exigua* (Lep.; Noctuidae). Annette Herz<sup>1</sup>, Regina Kleespies<sup>1</sup>, Jürg Huber<sup>1</sup>, Xinwen Chen<sup>2,3</sup>, Just Vlak<sup>2</sup>. <sup>1</sup>Institute for Biological Control, Federal Biological Research Centre for Agriculture and Forestry, Heinrichstr. 243, Darmstadt, Germany; <sup>2</sup>Laboratory of Virology, Wageningen University, Binnenhaven 11, Wageningen, The Netherlands; <sup>3</sup>Joint Laboratory for Invertebrate Virology, Wuhan Institute of Virology, Chinese Academy of Sciences, 430071 Wuhan, P.R. China.
- 9:15 Taxonomy of white spot syndrome virus of shrimp. Mariëlle C.W. van Hulten, Jeroen Witteveldt, Rob W. Goldbach and Just M. Vlak Laboratory of Virology, Wageningen University, Binnenhaven 11, 6709 PD Wageningen, The Netherlands.
- 9:30 The *Neodiprion sertifer* nucleopolyhedrovirus genome. James E. Maruniak, Alejandra Garcia Maruniak, Aissa Doumbouya, Tom Merritt and Jaw-Ching Liu. Dept. of Entomology & Nematology, University of Florida, PO Box 110620, Gainesville, Florida 32611. USA.
- 9:45 *Culex nigripalpus* nucleopolyhedrovirus (CuniNPV) infections in adult mosquitoes and possible roles in dispersal. James J. Beemel and Susan White. Center for Medical, Agricultural and Veterinary Entomology. U. S. Dept. of Agriculture, Agricultural Research Service, Gainesville, Florida 32604. USA.

10:00-10:30 Coffee Break

Tuesday, 10:30-12:30

Auditorium

**CONTRIBUTED PAPERS – Bacteria II**

Moderators: Ruud A. de Maagd and Baruch Sneh

- 10:30 If spruce budworm is the problem, is Cry9C the solution? Anthony Pang, Larry Gringorten and Kees van Frankenhuyze. Canadian Forest Service, 1219 Queen Street East, P.O. Box 490, Sault Ste. Marie, Ontario P6A 5M7 Canada.
- 10:45 Characterization of two gene insect control activity in cotton: Bollgard®II efficacy against spectrum of epidopteran pests of cotton. Saku Sivasupramaniam, John Greenplate, Dough Jost, Stephen Penn, Dan Pitts and Phil Rahn. Monsanto Company, 700 Chesterfield Parkway North, St. Louis, MO 63198, USA.
- 11:00 Characterisation of a strain of cotton bollworm, *Helicoverpa armigera*, resistant to the Cry1A toxins of *Bacillus thuringiensis*. Ray Akhurst, Bill James, Lisa Bird, and Cheryl Beard. CSIRO Entomology, Canberra ACT 2611, Australia.
- 11:15 Toxin strategies to overcome Bt-resistance in a field-derived population of Diamondback Moth. Ali Sayyed<sup>1</sup>, Roxani Gatsi<sup>2</sup>, Thaleia Kouskoura<sup>2</sup>, Denis Wright<sup>1</sup> and Neil Crickmore<sup>2</sup>. <sup>1</sup>Dept. of Biology, Imperial College, UK. <sup>2</sup> School of Biological Sciences, University of Sussex, UK.
- 11:30 Laboratory culture conditions affects stability of resistance to *Bacillus thuringiensis* Cry1Ac in *Plutella xylostella* (Lepidoptera: Plutellidae). Hugo Cerda<sup>1,2</sup>, Ali Sayyed<sup>2</sup> and Denis Wright<sup>2</sup>. <sup>1</sup>Universidad Simon Rodriguez, IDECYT, Apartado Postal 47.925, Caracas, Venezuela. & <sup>2</sup> Dept. of Biology, Imperial College of Science, Technology and Medicine, Silwood Park, Ascot, Berkshire SL5 7PY, UK. **(STUDENT PAPER)**.
- 11:45 Analysis of the difference within domain between lepidopteran and coleopteran specific insecticidal Cry toxin from *Bacillus thuringiensis*. Alejandra Bravo, Jorg Sanchez, Oswaldo Lopez, Mayara Caberera, Lizbeth Cabrera, Maria-Eugenia Nunez and Mario Soberon. Instituto de Biotecnologia, Universidad

Nacional Autonoma de Mexico, Ap. Postal 510-3 Cuernavaca 62250 Morelos, Mexico.

- 12:00 Biochemical characterization of the mechanism of resistance to *Bacillus thuringiensis* in pink bollworm (*Pectinophora gossypiella*), Joel González-Cabrera<sup>1</sup>, Baltasar Escriche<sup>1</sup>, Bruce E. Tabashnik<sup>2</sup>, and Juan Ferré<sup>1</sup>. <sup>1</sup>Dept. of Genetics, Universitat de València, 46100-Burjassot (Valencia), Spain. <sup>2</sup> Dept. of Entomology, University of Arizona, Tucson, AZ 85721, USA.
- 12:15 Selection for resistance to *Bacillus thuringiensis* by a population of *Anticarsia gemmatilis* (Lep.:Noctuidae) under laboratory selection pressure. Flavio Moscardi, Fabio E. Paro and Ivanilda L. Soldorio. Embrapa-National Soybean Research Center, C. postal 231, Londrina, PR, CEP 86001-970, Brazil.

Tuesday, 10:30-12:30

Rotonde Hall

**CONTRIBUTED PAPERS- Virus IV**

Moderators: James Slavicek & Douwe Zuidema

- 10:30 The effect of baculovirus infection on the host translational machinery. Monique m. van Oers<sup>1</sup>, Lars T.J.N. van der Veken<sup>2</sup>, Maria Doitsidou<sup>1</sup>, Adria M. Thomas<sup>2</sup> and Just M. Vlak<sup>1</sup>. <sup>1</sup>Laboratory of Virology, Wageningen University, and <sup>2</sup>Dept. of Developmental Biology, Utrecht University, the Netherlands.
- 10:45 A baculovirus fusion protein requires cleavage by furin into two subunits connected by a disulfide-bridge. Marcel Westenberg, Hualin Wang, Wilfred F.J. IJkel, Dick Peters, Rob W. Goldbach, Just M. Vlak and Douwe Zuidema. Laboratory of Virology, Wageningen University, Binnenhaven 11, 6709 PD Wageningen, The Netherlands. **(STUDENT PAPER)**.
- 11:00 The expression and intracellular localization of the *Autographa californica* nucleopolyhedrovirus (AcMNPV) ORF145 and ORF150 homologues. Renée Lapointe and David O'Reilly. Dept. of Biology, Imperial College of Science, Technology and Medicine, London, United Kingdom, SW7 2AZ.
- 11:15 Ecdysone responsive element in a baculovirus immediate early gene, ie1, promoter. Katsura Kojima, Shin-ichiro Asano and Hisanori Bando. Dept. of Applied Bioscience, Graduate School of Agriculture, Hokkaido University, Sapporo 060-8589, Japan.
- 11:30 Comparison of IE1 and IE0 activation of AcMNPV late gene expression. Ilse Huijskens<sup>2</sup>, Lulin Li<sup>1</sup>, and David A. Theilmann<sup>1,2</sup>. <sup>1</sup>Pacific Agri-Food Research Centre, Agriculture and Agri-Food Canada, Summerland, B.C., Canada V0H 1Z0, <sup>2</sup>Dept. of Plant science, University of British Columbia, Vancouver, B.C., V6T 1Z4 Canada. **(STUDENT PAPER)**.
- 11:45 The acidic activation domain of OpMNPV IE1 is essential for viral DNA replication. Joesph Ajay Pathakamuri<sup>2</sup> and David A. Theilmann<sup>1,2</sup>. <sup>1</sup>Pacific Agri-Food Research Centre, Agriculture and Agri-Food Canada, Summerland, B.C., Canada V0H 1Z0, <sup>2</sup>Dept. of Plant science, University of British Columbia, Vancouver, B.C. V6T 1Z4 Canada.
- 12:00 Pseudotyping AcMNPV with heterologous envelope proteins from diverse sources. Oliver Lung and Gary W. Blissard. Boyce Thompson Institute at Cornell University, Ithaca, NY 14853
- 12:15 The non-hr origin of DNA replication of SeMNPV rapidly accumulates in Se-301 insect cells. Gorben P. Pijlman, Angela M.G. Vermeesch, Rob. W. Goldbach and Just M. Vlak. Laboratory of Virology, Wageningen University, Binnenhaven 11 6709 PD, the Netherlands. **(STUDENT PAPER)**.

Tuesday, 10:30-12:30

Room B2/B4

**CONTRIBUTED PAPERS – Fungi III**

Moderators: Paresh Shah and Richard A. Humber

- 10:30 Characterization of cuticle degrading proteases and their evolutionary divergence in strains of *Metrahizium anisopliae* with broad and narrow host ranges. Savita Bagga<sup>1</sup>, Steven Screen<sup>2</sup> and Raymond St Leger<sup>1,2</sup>. <sup>1</sup>Dept. of Cell Biology & Molecular Genetics & <sup>2</sup>Dept of Entomology, University of Maryland, College Park, MD 20742, USA. **(STUDENT PAPER).**
- 10:45 An analysis of the Hirsutellin A toxin in *Hirsutella thompsonii*. S. Maimala<sup>1</sup>, A. Tartar<sup>2</sup>, D.G. Boucias<sup>2</sup>, and A. Chandrapatya<sup>1</sup>. <sup>1</sup>Dept. of Entomology, Faculty of Agriculture, Kasetsart University, Bangkok Thailand. <sup>2</sup>Department of Entomology and Nematology, University of Florida, Gainesville FL 32611 USA.
- 11:00 Influence of abiotic and biotic soil factors on the survival of *Beauveria brongniartii* Philip Kessler and Siegfried Keller. Swiss Federal Research Station for Agroecology and Agriculture, Reckenholz, CH-8046 Zürich, Switzerland. **(STUDENT PAPER).**
- 11:15 Implication of lipoxygenase products in mediation of *Manduca sexta* nodulation response to *Beauveria bassiana*. Jeffrey C. Lord and Sheri A. Anderson. Grain Marketing & Production Research Center USDA-ARS, Manhattan, Kansas 66502 USA.
- 11:30 Investigating the genus *Eryniopsis* using PCR-RFLP. Ann E. Hajek<sup>1</sup>, Jørgen Eilenberg<sup>2</sup>, Annette Bruun Jensen<sup>2</sup>, Lene Thomsen<sup>2</sup> <sup>1</sup>Dept. of Entomology, Cornell University, Ithaca, New York 14853-0901 USA Dept. of Ecology, <sup>2</sup>The Royal Veterinary and Agricultural University, Thorvaldsensvej 40, DK-1871 Frederiksberg C, Denmark.
- 11:45 Replicative conidia in *Eryniopsis* species with *Entomophaga*-like primary conidia. Jørgen Eilenberg<sup>1</sup>, Ann Hajek<sup>2</sup> and José Bresciani<sup>1</sup>. <sup>1</sup>Dept. of Ecology, The Royal Veterinary and Agricultural University, Thorvaldsensvej 40, DK-1871 Frb. C, Denmark. <sup>2</sup>Dept. of Entomology, Cornell University, Ithaca, NY 14853, USA
- 12:00 Analysis and classification of EST sequences from fungal insects pathogens and insight into evolution and pathogenicity. Florian M. Freimoser, Steven Screen, Savita Bagga, Gang Hu and Raymond St. Leger. Dept. of Entomology, University of Maryland, 4112 Plant Sciences Building, College Park, MD, 20742, USA.
- 12:15 Hidden species of *Cordyceps* and the use of molecular techniques to find them. Nigel L. Hywell-Jones. BIOTEC-Mycology, Yothi Laboratories, 73/1 Rama VI Road, Rajdhevee, Bangkok 10400 Thailand

Tuesday, 10:30-12:00

Room C6

**CONTRIBUTED PAPERS – Protozoa I**

Moderator: Leellen F. Solter

- 10:30 First report of a microsporide from *Hylesia metabus* (Lepidoptera: Saturniidae) larvae in Sucre state, Venezuela. Frances Osborn. Instituto de Investigaciones en Biomedicina y Ciencias Aplicadas, Universidad de Oriente, Cumaná, Estado Sucre, 1060 Venezuela.
- 10:45 A Microsporidium from the Asian Longhorned Beetle in China. Leah S. Bauer<sup>1</sup> and Charles Vossbrinck<sup>2</sup>. <sup>1</sup>USDA Forest Service, North Central Research Station, Dept. of Entomology and Center for Integrated Plant Systems, Michigan State University, E. Lansing, MI USA 48823. <sup>2</sup>Connecticut Agricultural Experiment Station, Dept. of Soil and Water 123 Huntington St., New Haven, CT 06504 USA.

- 11:00 The role of proteases in the gut of gypsy moth larvae *Lymantria dispar* (Lepidoptera: Lymantriidae) to compensate the negative effect on their growth due to the infection with the Microsporidium *Vairimorpha* spec. (Microsporidia, Burenellidae). Michael Henn<sup>1</sup>, Leellen F. Solter<sup>2</sup>, Gernot. Hoch<sup>3</sup>, Axel Schopf<sup>3</sup> and Reinhard Schopf<sup>3</sup>. <sup>1</sup>Institute of Applied Zoology, Dept. of Ecology, Technical University of Munich, Am Hochanger 13, 85354 Freising, Germany; <sup>2</sup>Illinois Natural History Survey, 607 East Peabody, Champaign, IL 61820, USA; <sup>3</sup>Institute of Forest Pathology and Forest Protection, BOKU, Hasenauerstrasse 38, 1190 Vienna, Austria.
- 11:15 Microsporidiosis causes alterations in metabolism of *Lymantria dispar* larval hosts – potential consequences for a co-occurring endoparasitoid. Gernot Hoch<sup>1</sup>, Christa Schafellner<sup>1</sup>, Michael W. Henn<sup>2</sup>, and Axel Schopf<sup>3</sup>. <sup>1</sup>Institute of Forest Entomology, Forest Pathology and Forest Protection, Universität für Bodenkultur, Hasenauerstr. 38, A-1190 Vienna, Austria. <sup>2</sup>Institute of Applied Zoology, Technical University Munich, Am Hochanger 13, D-85354 Freising, Germany.
- 11:30 First report of a microsporide from *Anopheles aquasalis* (Diptera: Culicidae) larvae in Sucre State, Venezuela. Frances Osborn and Milagro Moreno. Instituto de Investigaciones en Biomedicina y Ciencias Aplicadas, Universidad de Oriente, Cumaná, Estado Sucre, Venezuela.
- 11:45 First report of a new protozoan hyperparasite infecting the salmon louse, *Lepeophtheirus salmonis* (Krøyer, 1837): A phylogenetic study based on ribosomal DNA sequences. Mark Freeman<sup>1</sup> Andrew Bell<sup>2</sup> and Christina Sommerville<sup>1</sup> Institute of Aquaculture, University of Stirling, Scotland<sup>1</sup> IBLS Division of Infection and Immunity, University of Glasgow, Scotland<sup>2</sup>. **(STUDENT PAPER).**

**WEDNESDAY, AUGUST 30**

Wednesday, 8:00-10:00

Auditorium

**SYMPOSIUM– Diverse Insecticidal Protein Produced by Bacteria**

Convenor: Trevor A. Jackson

- 8:00 Advances in vegetative insecticidal proteins. Jeng Shong Chen. Syngenta, 3054 Cornwallis Rd, Research Triangle Park, NC 27709, U.S.A.
- 8:20 The toxin complex genes of *P. luminescens*: too big and too complex? R. French-Constant, N. Waterfield, P. Daborn and C. Au. Biology and Biochemistry, University of Bath, BA2 7AY, UK.
- 8:40 Insecticidal toxins from non-sporeforming bacteria. Travis R. Glare, Mark R.H. Hurst and Trevor A. Jackson. AgResearch, PO Box 60, Lincoln, New Zealand.
- 9:00 *Bacillus sphaericus*: Insecticidal toxins. Christina Nielsen-LeRoux and Jean-François Charles. Institut Pasteur, Bactéries et Champignons Entomopathogènes, 28 rue du Dr. Roux, 75724 Paris, Cedex 15, France.
- 9:20 *Bacillus thuringiensis* binary  $\delta$ -endotoxins that protect corn plants from corn rootworm damage. H. Ernest Schnepf. Dow AgroSciences, LLC, 5501 Oberlin Drive, San Diego, CA 92121 USA.
- 9:40 The Crystal Structure of a Coleopteran Insect-active Binary B.t. Protein Toxin Complex at 2.5 Å Resolution. Rydel, J. Sharamitaro, G.R. Brown, V. Gouzov, J. Seale, E. Sturman, R. Thoma, K. Gruys, and L. English. Plant Protection Dept., Monsanto, St. Louis, Missouri 63198, USA.

Wednesday, 8:00-10:00

Rotonde Hall

**SYMPOSIA – Virus Biology**

Convenors: Peter Krell and Primitivo Caballero

- 8:00 Changes in viral pathology associated with mite-mediated, virus spread. Brenda V. Ball. Plant and Invertebrate Ecology Division, IACR-Rothamsted, Harpenden, Herts, AL5 2JQ UK.
- 8:30 The biology of Hz-2V a non-occluded insect virus. John P. Burand. Dept. of Entomology and Microbiology University of Massachusetts, Amherst, Mass. 01003, USA
- 9:00 Tritrophic Interactions in viral pathogenesis. Kelli Hoover. Dept. of Entomology, Penn State University, University Park, PA 16802, USA.
- 9:30 Genes in host cell-baculovirus interactions. Miguel López Ferber. Laboratoire de Pathologie Comparée. UMR 5087 INRA/CNRS/Université de Montpellier II. 30380 Saint Christol les Alès. France.

Wednesday, 8:00-10:00

Room C6

**CONTRIBUTED PAPERS – Cross Division**

Moderators: Donald W. Roberts and Mark Goettel

- 8:00 Evidence that the primary symbiont of the silverleaf whitefly, *Bemisia argentifolii*, is involved in production of cysteine. Elizabeth W. Davidson<sup>1</sup>, Michelle Fay<sup>1</sup>, and Richard Medville<sup>2</sup>. <sup>1</sup>Dept. of Biology, Arizona State University, Tempe, AZ 85287-1501; <sup>2</sup>Dept. of Life Sciences, Arizona State University West Campus, Phoenix, AZ 85069-7100. USA.
- 8:15 Similarities between diseases of aquatic invertebrates and diseases of amphibians: are we missing something important? Elizabeth W. Davidson. Dept. of Biology, Arizona State University, Tempe, AZ 85287-1501 USA.
- 8:30 Genetic aspects of interaction between potato tube-worm and micro-pathogens. Anatoly V. Ivashov, Andrei P. Simchuk, Sergey G. Grigoriev. Dept. of Ecology, V.I.Vernadsky National University, Simferopol, UA 95007, Ukraine. Svetlana V. Gouli. Entomology Research Laboratory, Dept. of Plant and Soil Science. PO Box 53400 Burlington, VT 05405-34001, U.S.A.
- 8:45 Altered food intakes: a pathophysiological response to parasitism of *Manduca sexta* by *Cotesia congregata*. S. N. Thompson. Analytical Chemistry Instrumentation Facility and Dept. of Entomology, University of California, Riverside, CA 92521. USA.
- 9:00 Integrated mosquito control in urban environment. Ole Skovmand<sup>1</sup>, Thierry Baldet<sup>2</sup>, Thierry Ouedraogo<sup>3</sup>, Edith Sanogo<sup>4</sup>, Lea Toe<sup>2</sup>, Tonny Czajkowski<sup>5</sup>. <sup>1</sup>Intelligent Insect Control, Montpellier, France; <sup>2</sup>Centre Muraz, Bobo Dioulasso, Burkina Faso; <sup>3</sup>Ministere de la Santé, Programme National de Lutte contre le Paludisme, Burkina Faso; <sup>4</sup>Centre National de Recherche et Formation du Paludisme, Ouagadougou, Burkina Faso; <sup>5</sup>Ramboell, Virum, Denmark.
- 9:15 Infection of the mosquito vectors *Anopheles gambiae* s.s. and *Culex quinquefasciatus* with *Metarhizium anisopliae* in the adult stage in the laboratory. Ernst-Jan Scholte<sup>1</sup>, Bart G.J. Knols<sup>2</sup> & Willem Takken<sup>1</sup>. <sup>1</sup>Laboratory of Entomology, Wageningen University, 6700 EH Wageningen, the Netherlands. <sup>2</sup>ICIPE, Duguville, Kasarani. PO Box 30772, Nairobi, Kenya. (STUDENT PAPER).
- 9:30 Insect pathogenic fungi and brassicaceous plants. Ingeborg Klingen<sup>1</sup>, Ann Hajek<sup>2</sup>, Richard Meadow<sup>1</sup> and J.Alan A. Renwick<sup>3</sup>. <sup>1</sup>The Norwegian Crop Research Institute, Plant Protection Centre, Department of Entomology and Nematology, Høgskoleveien 7, N-1432 Ås, Norway, <sup>2</sup>Dept. of Entomology, Cornell University, Ithaca, New York 14853-0901 U.S.A., <sup>3</sup>Boyce Thompson Institute, Ithaca, New York 14853, U.S.A.

- 9:45 Infection pathology of the turnip moth - *Agrotis segetum* Schiff. (*Lepidoptera, Noctuidae*) in the Zerafshan valley (Uzbekistan). Erkin N. Abdullaev and Vladislav Gulii. Samarkand State University, University Ave. 15, Samarkand, 703004, Uzbekistan.

10:00-10:30 Coffee Break

Wednesday, 10:30-11:30

Auditorium

**CONTRIBUTED PAPERS – Fungi IV**

Moderators: John Vandenberg and Judith K. Pell

- 10:30 Physiological characteristics of *Beauveria bassiana* and its UV-tolerant variants Wen-Feng Hsiao<sup>1</sup> and Ramin Javedan<sup>2</sup>. <sup>1</sup>Dept. Biological Resources, National Chiayi University, Chiayi, Taiwan. <sup>2</sup>Natural Science and Technology Program, Nan Hua University, Dalin, Taiwan.
- 10:45 Influence of host-plant species, relative humidity and their interaction on whitefly mycosis Ellis T.M. Meekes<sup>1,2</sup>, Nina N. Joosten<sup>1</sup>, Joanne J. Fransen<sup>1</sup> and Joop C. van Lenteren<sup>2</sup>. <sup>1</sup>Applied Plant Research, Division Glasshouse Horticulture, Aalsmeer, The Netherlands; <sup>2</sup>Laboratory of Entomology, Wageningen University, Wageningen, The Netherlands.
- 11:00 Geographical distribution and host range of Entomophthorales infecting the green spruce aphid *Elatobium abietinum* Walker in Iceland. Charlotte Nielsen<sup>1</sup>, Jørgen Eilenberg<sup>1</sup>, Susanne Harding<sup>1</sup>, Edda Oddsdóttir<sup>2</sup> and Guðmundur Halldórsson<sup>2</sup>. <sup>1</sup>The Royal Veterinary and Agricultural University, Dept. of Ecology, Thorvaldsensvej 40, 1871 Frederiksberg C., Denmark. <sup>2</sup>Iceland Forest Research Station, Mógilsá, IS-270 Mosfellsbær, Iceland.
- 11:15 Role of phyllosphere climate on different host plants in the interaction between entomopathogenic fungi and two pest species. Ellen A.M. Beerling<sup>1,2</sup>, Ellis T.M. Meekes<sup>1,3</sup>, Nina N. Joosten<sup>1</sup> and Joanne J. Fransen<sup>1</sup>. <sup>1</sup>Applied Plant Research, Division Glasshouse Horticulture, Aalsmeer; <sup>2</sup>Institute of Biodiversity and Ecosystem Dynamics, Section Population Biology, University of Amsterdam, Amsterdam; <sup>3</sup>Laboratory of Entomology, Wageningen University, Wageningen; The Netherlands.

Wednesday, 10:30-11:30

Rotonde Hall

**CONTRIBUTED PAPERS – Virus V**

Moderator: Johannes A. Jehle

- 10:30 A Few Polyhedra mutant of AcMNPV persists as a stable polymorphism in infected insects. James C. Bull<sup>1</sup>, H.C.J. Godfray<sup>2</sup> and David R. O'Reilly<sup>1</sup>. <sup>1</sup>Dept. of Biology, Imperial College of Science, Technology and Medicine, Imperial College Road, London, SW7 2AZ, U.K., <sup>2</sup>NERC Centre for Population Biology, Imperial College at Silwood Park, Ascot, Berks, SL5 7PY UK.
- 10:45 Generation and analysis of an AcMNPV *lef-11* knockout virus. Guangyun Lin, Jeffrey M. Slack, and Gary W. Blissard. Boyce Thompson Institute at Cornell University, Ithaca, NY 14853. USA.
- 11:00 Evolution of Ascoviruses from Iridoviruses. Karine Stasiak<sup>1</sup>, Sylvaine Renault<sup>1</sup>, Marie-Véronique Demattei<sup>1</sup>, Yves Bigot<sup>1,2</sup>, Brian A. Federici<sup>1,2</sup>. Laboratoire d'Etude des Parasites Génétiques<sup>1</sup>, U.F.R. des Sciences et Techniques, Université de Tours, Parc Grandmont, 37200 Tours, France, Dept. of Entomology<sup>2</sup> & Graduate Programs in Genetics and Microbiology, University of California, Riverside, CA 92507 USA.



11:15 Comparison of Ascovirus isolates from Indonesia and the United States. Gerald R. Carner<sup>1</sup>, Xiao-Wen Cheng<sup>2</sup> and Yayi Kusumah<sup>1</sup>. <sup>1</sup>Dept. of Entomology, Clemson University, Clemson, South Carolina, USA 29634. <sup>2</sup>Laboratory for Molecular Virology, Great Lakes Forestry Center, 1219 Queen St. E., Sault Ste. Marie, ON. P6A 5M7 Canada.

Wednesday, 11:30-12:30  
Rotende Hall

**SIP GENERAL BUSINESS MEETING**

12:30-14:00 Lunch

Wednesday, 14:00-16:00  
Room C6

**SYMPOSIUM – Evolution of Microsporidia**

Convenor: James J. Becnel

14:00 Overview and History of the Microsporidia. Jaroslav Weiser. Insect Pathology, Institute of Entomology, Academy of Sciences of the Czech Republic. Branisovska 31, 370 05 Ceské Budejovice, Czech Republic.

14:30 Microsporidia molecular phylogenetics and the fungal link. Robert P. Hirt. Dept. of Zoology, The Natural History Museum, Cromwell Rd, London SW7 5BD, UK.

15:00 Ribosomal DNA sequences localize the origin of microsporidia within the fungal order of the Entomophthorales. Florian M. Freimoser<sup>1</sup>, Urs Tuor, and Markus Aebi. Institute of Microbiology, ETH Zürich, Schmelzbergstr. 7, CH-8092 Zürich, Switzerland. <sup>1</sup>present address: Dept. of Entomology, University of Maryland, 4112 Plant Sciences Building, College Park, MD, 20742, USA.

15:30 General discussion, Convenor: James J. Becnel

Wednesday, 14:00-16:00  
Auditorium

**SYMPOSIUM – Novel Receptors for Insecticidal Toxins**

Convenor: David J. Ellar and Yasunori Nagamatsu

14:00 *Bacillus thuringiensis* Cry1 toxin receptors in *Heliothis virescens*. Daniela I. Oltean, Meibao Zhuang and Sarjeet S. Gill. Environmental Toxicology Graduate Program, Dept. of Cell Biology and Neuroscience, University of California Riverside, Riverside, CA 92521. USA.

14:30 *Bombyx mori* protocadherin receptor for Bt Cry1A toxin. Yasunori Nagamatsu, Takashi Koike, Akiko Kimura, and Kazuhiro Sasaki. Dept. of Applied Biochemistry, Faculty of Applied Biological Science, Hiroshima University, Higashi-Hiroshima 739-8528, Japan.

15:00 Functional expression of the mosquito receptor (Cpm1) for the *Bacillus sphaericus* binary toxin. Isabelle Darboux<sup>1</sup>, Yannick Pauchet<sup>1</sup>, Claude Castella<sup>1</sup>, Christina Nielsen-LeRoux<sup>2</sup>, Jean-François Charles<sup>2</sup> and David Pauron<sup>1</sup>. <sup>1</sup>Institut National de la Recherche Agronomique, U.M.R. R.O.S.E., 123, Boulevard Francis Meilland, 06606 Antibes Cedex, France; <sup>2</sup>Institut Pasteur, Laboratoire des Bactéries Entomopathogènes, 25 rue du Dr. Roux, 75724 Paris Cedex 15, France.

15:30 The Bt toxin receptor BTR-270 in gypsy moth is a highly acidic carbohydrate-rich molecule which binds Bt toxins with affinities that correlate with toxicity. Algimantas P. Valaitis. USDA Forest Service Delaware, Ohio 43015-8640 USA.

Wednesday, 14:00-16:00

Rotonde Hall

**SYMPOSIUM – RNA Viruses**

Convenors: Brenda Ball & Karl Gordon

14:00 The nodaviruses: model systems for studying RNA replication, virion structure and assembly. K. N. Johnson, B. D. Price, L. D. Eckerle, K. L. Johnson, C. G. Albarino, and L. A. Ball. Dept. of Microbiology, 845 19th Street South, University of Alabama at Birmingham, Birmingham, AL 35294, USA.

14:30 Cricket paralysis-like viruses: Unique genome organization and strategy for capsid protein expression. Nobuhiko Nakashima. National Institute of Agrobiological Sciences, Owashi, Tsukuba, Ibaraki 305-8634, Japan.

15:00 Characterisation of an isometric virus isolated from the mite *Varroa jacobsoni*. Juliette R. Ongus, Wageningen University, Laboratory of Virology, Binnenhaven 11, 6709 PD, Wageningen, The Netherlands.

15:30 The tetraviruses: their diversity and potential for control of lepidopteran pests. Karl Gordon. CSIRO Entomology, GPO Box 1700, Canberra, ACT 2601, Australia.

16:00-16:30 Coffee Break

Wednesday, 16:30-18:30

Room C6

**SYMPOSIUM – Mycopathogens Stability Enhancement**

Convenor: Jeffrey C. Lord

16:30 Temperature, moisture content and fluctuating conditions - development and validation of a model for *Metarhizium* and *Beauveria* conidia survival in storage. Nina E. Jenkins<sup>1</sup>, Tran D. Hong<sup>2</sup>, Dave Moore<sup>1</sup>, Jane Gunn<sup>1</sup> and Richard H. Ellis<sup>2</sup>. <sup>1</sup>CABI Bioscience, Silwood Park, Ascot, SL5 9EH, UK. <sup>2</sup>Dept. of Agriculture, The University of Reading, Earley Gate, PO Box 237, Reading RG6 6AR, UK.

17:00 Stabilization & formulation of PFR-97 for commercial development. Guido Sterk. Biobest NV, Ilse Velden 18, 2260 Westerlo, Belgium

17:30 Factors affecting the desiccation tolerance and storage stability of blastospores of *Paecilomyces fumosoroseus*. M.A. Jackson<sup>1</sup>, W.J. Connick<sup>2</sup>, S.M. Erhan<sup>3</sup>, F.E. Vega<sup>4</sup>, S. Cliquet<sup>5</sup> and A.R. Payne<sup>1</sup>. <sup>1</sup>USDA-ARS, Nat. Ctr. for Agricultural Utilization Res., Peoria, IL, 61604., <sup>2</sup>USDA-ARS, Southern Reg. Res. Ctr., New Orleans, LA 70179, <sup>3</sup>D.A. Stuart Co., Warrenville, IL 60555, <sup>4</sup>USDA-ARS, BARC West, Beltsville, MD 20705, <sup>5</sup>Institut Universitaire Professionnalise, Quimper, 29000 France.

18:00 Improving dry-powder formulations of *Metarhizium anisopliae* blastospores. G. Mercadier, C. Quimby, W.G. Meikle<sup>1</sup>, J. Fargues and F. Vega<sup>2</sup>. <sup>1</sup>European Biological Control Laboratory. USDA – ARS Campus International de Baillarguet, CS 90013 Montferrier sur Lez, 34988 St. Gely du Fesc CEDEX France; <sup>2</sup>Insect Biocontrol Laboratory, USDA, ARS, Beltsville, Maryland 20705, USA.

Wednesday, 16:30-18:00

Rotonde Hall

**CONTRIBUTED PAPERS – Virus VI**

Moderators: David Theilmann & Victor Romanowski

16:30 The role of the p47 gene product in transcriptional regulation in *Autographa californica* nucleopolyhedrovirus (AcMNPV) and *Choristoneura fumiferana* (CfMNPV). Ayesha Misquith, Renee LaPointe, Qingquan Ding, Eric B. Carstens. Queens University, Dept. of Microbiology and Immunology, Kingston ON, Canada, K7L 3N6.

16:45 Analysis of *Choristoneura fumiferana* multicapsid nucleopolyhedrovirus (CfMNPV) unique ORFs. Jondavid de Jong<sup>1</sup>, Basil M. Arif<sup>2</sup>, and Peter J. Krell<sup>1</sup>. <sup>1</sup>Depat. of Microbiology, University of Guelph, Guelph, Ontario, Canada,

NIG 2W1. <sup>2</sup>Canadian Forest Service, Sault Ste. Marie, Ontario, P6A 5M7 Canada.

Microbiology, Ministry of Agriculture, Wuhan, Hubei 430070, P. R. China.

17:00 Analysis of the expression, localization, and function of LdMNPV enhancing proteins 1 and 2. Holly J.R. Popham and James M. Slavicek. USDA Forest Service, Forestry Sciences Laboratory, 359 Main Road, Delaware, 43015, Ohio.

**20:00 Banquet**

17:15 A mutation in the LdMNPV p24 gene causes synthesis of abnormal polyhedra. James M. Slavicek, N. Hayes-Plazolles, and Mary Ellen Kelly. USDA Forest Service, Forestry Sciences Laboratory, 359 Main Road, Delaware, Ohio 43015. USA

**THURSDAY MORNING, AUGUST 30**  
**End of the meeting**

17:30 Analysis of the complete *Adoxophyes orana* granulovirus (AoGV) genome sequence. Sally L. Wormleaton and Doreen Winstanley. Horticulture Research International, Wellesbourne, Warwick, CV35 9EF, UK.

17:45 Gene organization and genome sequencing of the redheaded pine sawfly, *Neodiprion lecontei*, nucleopolyhedrovirus. Hilary A.M. Lauzon<sup>1</sup>, Lillian Pavlik<sup>1</sup>, Chris Lucarotti<sup>2</sup>, Kees van Frankenhuyzen<sup>1</sup> and Basil M. Arif<sup>1</sup>. <sup>1</sup>Laboratory for Molecular Virology, 1219 Queen St. E., Sault Ste. Marie, Ontario, Canada P6A 5M7. <sup>2</sup>Atlantic Forestry Centre, Fredericton, New Brunswick, Canada.

Wednesday, 16:30-18:15

Auditorium

**CONTRIBUTED PAPERS – Bacteria III**

Moderators: Brian A. Federici & Juorg Huber

16:30 100th Anniversary of *Bacillus thuringiensis* Berliner

16:40 Markedly improved recombinant *Bacillus thuringiensis* subsp. *israelensis* that synthesizes a high level of the *Bacillus sphaericus* binary toxin. Brian A. Federici<sup>1,2,3</sup>, Dennis K. Bideshi<sup>2</sup>, Hyun-Woo Park<sup>2</sup>, Margaret C. Wirth<sup>1</sup>, William E. Walton<sup>1</sup> and Jeffrey J. Johnson<sup>1</sup>. Department of Entomology<sup>1</sup> and Graduate Programs in Genetics<sup>2</sup> and Microbiology<sup>3</sup>; University of California, Riverside Riverside, California 92521 USA.

17:00 ET80-ET76: a new binary toxin from *B. thuringiensis* toxic to *Diabrotica*. Jim Baum, Greg Brown, Laura Foster, Ken Gruys, Victor Gouzov, Joe Huesing, Oliver Ilagan, Barbara Isaac, Tom Malvar, Matt Walters and Todd Weber. Plant Protection Department, Monsanto Company, 700 Chesterfield Parkway North, GG4270, St. Louis, Missouri 63198 USA

17:15 Insect Resistance Management (IRM) intransgenic Bt-maize: Monitoring the susceptibility of European Corn Borer in Germany. Christiane Saeglitz, Jörg Mascher, Thomas Mücher, Claudia Zahn, Detlef Bartsch & Ingolf Schuphan. Aachen University of Technology RWTH, Dept. of Biology V. (Ecology, Ecotoxicology, Ecochemistry), Worringerweg 1, 52056 Aachen, Germany.

17:30 Effects of pollen from transgenic Bt-maize on non-target butterflies. Martin Felke, Gustav-Adolf Langenbruch and Norbert Lorenz. Federal Biological Research Centre for Agriculture and Forestry, Institute for Biological Control, Heinrichstraße 243, 64287 Darmstadt, Germany.

17:45 A Phenylalanine epitope in the toxic action of *Bacillus thuringiensis* cry1Aa  $\delta$ -endotoxin. Oscar Alzate and Donald H. Dean. Biochemistry Dept. The Ohio State University. Columbus. OH 43210 USA.

18:00 Parasporal crystal protein of *Bacillus thuringiensis* strain CTC is S-layer protein. Ming Sun, Chenguang Zhu, and Ziniu Yu. College of Life Science and Technology, Huazhong Agricultural University; Key Laboratory of Agricultural