sip newsletter

society for invertebrate pathology

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Invertebrate Pathology and Microbial Control
IIIRD INTERNATIONAL COLLOQUIUM ON INVERTEBRATE PATHOLOGY
XVTH ANNUAL MEETING; SOCIETY FOR INVERTEBRATE PATHOLOGY
University of Sussex, Brighton, United Kingdom
September 5th - 12th, 1982.

HOW TO GET THERE

From London by rail: Book your ticket to Falmer via Brighton. Frequent trains to Brighton run all day from Victoria Station, London via Gatwick. The hourly fast service takes approximately one hour, and the service to Brighton operates all night. Change at Brighton for Falmer. There are three trains an hour up to 22:00 on all days. Latest trains from Brighton to Falmer are at approximately 23:40 and 01:05. The journey time from Brighton to Falmer is 15 minutes.

A reception desk will be available at Falmer Station between 11:00 and 23:00 on Sunday 5th September to assist participants with transport to the University accommodation (3/4 mile from station).

By road: Sussex University is situated just north of the A27 at Falmer, approximately 3 miles from Brighton and 4 miles from Lewes. Southdown bus services numbers 3, 25, 128 and 729 travelling between Brighton (Pool Valley) and Lewes pass the University. Service 25/25A is particularly convenient.

By air: London Gatwick airport, which has its own railway station, is 30 minutes away from Brighton by rail or 25 miles by road. From London Heathrow there are frequent underground rail services to central London, or coach transport to a terminal some 300 metres from London Victoria railway station. There is also a coach link from London Heathrow to London Gatwick, which is quicker than travelling via central London.

By sea: Sealink car ferries operate all year between Newhaven (10 miles from Brighton) and Dieppe. The Sheerness, Ramsgate, Dover and Folkestone car ferries are within 2-3 hours by road. Portsmouth car ferry is 50 miles away and Southampton, 70 miles.

REGISTRATION

The registration desk will be open from 11:00 to 24:00 on Sunday 5th September, in Essex House Dormitory Block. Throughout the week of the conference from Monday 6th September, the conference office including registration facilities wil be in Essex House. An information desk will also be situated in the foyer outside the Molecular Sciences lecture theatre. Delegates will be expected to pay the balance of any accommodation charges (including meals) in sterling when first registering. As mentioned in the Second Circular, a surcharge of £7.50 will be required from those delegates attending the Society Banquet.

ACCOMMODATION

Delegates staying at the University Dormitory will be allocated rooms when first registering. Please vacate your room by 09:00 on the morning of your departure. Pets are not allowed. Delegates staying in self-catering accommodation at Varley Halls of Residence should first report to the registration desk at Sussex University.

MEALS

All meals will be provided in the Refectory. The provision of meals at the University will be by ticket only and meals must be booked no later than two weeks before the start of the conference. Meals will be served at the following times:

Breakfast	08:00 - 08:30	
Lunch	13:00 - 13:30	
Dinner	19:00 - 19:30	(except Thursday 9th September, when the Society Banquet will start at 19:30)

Coffee and tea will be supplied between 10:30-11:00 and 15:30-16:00 in the foyer adjacent to the Molecular Sciences lecture theatre. Facilities for making tea and coffee are available in the halls of residence.

A licensed bar will be open in the Refectory each day between 12:00-14:00 and 18:00-22:30.

FACILITIES AT THE UNIVERSITY

Two banks (Barclays and Midlands), several shops, a launderette and travel agent are on the campus. Banking hours are 9:30-15:30 Monday-Friday. For the more active delegates there is a wide range of sports facilities at the University sports centre.

PRE-REGISTRATION

As of June 24, 1982 289 delegates had pre-registered.

PROGRAMME

SUNDAY, SEPTEMBER 5TH

09:00-15:30 S.I.P. COUNCIL MEETING
19:00-20:00 BUFFET MEAL

MONDAY, SEPTEMBER 6TH

09:00-10:30 PLENARY SESSION. CHAIR: PHYLLIS T. JOHNSON
- 09:00 Welcome to Brighton. N.W. Hussey.
- 09:15 S.I.P. President Phyllis T. Johnson.
- 09:30 Founders' Lectureship: The work of Kenneth M. Smith. Speaker to be announced.
- 09:50 Keynote address: From there to here to where. C.M. Ignoffo.
- 10:20 Announcements

10:30-11:00 Break

11:00-12:30 SYMPOSIUM: ADVANCES IN GENETIC STUDIES WITH PATHOGENS OF INVERTEBRATES: BACTERIA. Convener and Chair: D.H. Dean.

- 11:00 Strategies for the improvement of industrial bacteria. F.G. Priest.
- 11:30 Recent advances in the genetics of research of *Bacillus thuringiensis*. D.H. Dean, B.D. Clark, J.R. Lohr and C.Y. Chu.
- 11:50 Recent advances in the genetics of *Bacillus sphaericus*. Elizabeth W. Davidson, J. Spizizen and A.A. Yousten.
- 12:10 The evolution, convergence and support for two seemingly unrelated programmes. I.T. Delappe.

11:00-12:30 SYMPOSIUM: APPLICATION TECHNIQUES FOR PATHOGENS USED IN AGRICULTURE AND FORESTRY. Convener and Chair: J.C. Cunningham.

- 11:00 Future trends in research on the use of pathogens for pest control. M.H. Rogoff.
- 11:30 Release of diseased or contaminated arthropods as means of dispersal of viruses. B. Zelazny.

SIP NEWSLETTER

The SIP Newsletter is produced four times a year by the Society for Invertebrate Pathology. Annual dues (U.S. funds) in the Society are: US members, including A.I.B.S. affiliation, $12.00; non-US members, $11.00; and students, $4.00. Members receive the SIP Newsletter free. Application forms for Membership in the Society may be obtained from the Treasurer, Dr. James D. Harper, Dept. of Zoology-Entomology, Auburn University, Auburn, Alabama 36849 USA. Council Officers of the Society are:

President	Phyllis T. Johnson, USA
Vice President	Wayne M. Brooks, USA
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Send news items and other contributions to:
Sardar S. Sohi, Editor
SIP Newsletter
Forest Pest Management Inst.
Canadian Forestry Service
P.O. Box 490
Sault Ste. Marie, Ontario Canada P6A 5M7

MONDAY, SEPTEMBER 6TH (Continued)

- 11:50 Parasites and predators as vectors of insect diseases. H.K. Kaya.
- 12:10 Use of baits in microbial control of insects. J.E. Henry.

12:30-14:00 Break.

14:00-15:30 SYMPOSIUM: ADVANCES IN GENETIC STUDIES OF INVERTEBRATES: FUNGI AND VIRUSES. (Continued)

- 14:00 Gene organization of the baculorvirus *Autographa californica* nuclear polyhedrosis virus. M.J. Adang, D.W. Miller and L.K. Miller.
- 14:30 Coding assignments for the genes of a cytoplasmic polyhedrosis virus. M.A. McCrae.
- 15:00 Genetic studies on fungi attacking insects. J.B. Heale.

14:00-15:30 SYMPOSIUM: APPLICATION TECHNIQUES FOR PATHOGENS IN AGRICULTURE AND FORESTRY. (Continued)

- 14:00 Use of fogs to disseminate pathogens. P. Jarrett and H.D. Burges.
- 14:18 Prospects of better deposition of microbial pesticides using electrostatic sprayers. G.A. Matthews.
- 14:36 Advances in aerial spray technology. G.W. Schaefer.
- 14:54 Advances in ground spray technology for pathogen application. D.B. Smith.
- 15:12 Use of granules and dusts to disseminate insect pathogens. L.C. Lewis.

14:00-15:30 Contributed papers: Mode of action of bacterial toxins. Chair: H.D. Burges.

- 14:00 Effect of *Bacillus thuringiensis* -stressed gypsy moth (*Lymantria dispar* L.) hosts on *Rogas lymantriae* parasitization. N.R. Dubois, W.E. Wallner and P.S. Grinberg.
- 14:15 Histo- and cytopathology of the midgut of *Pieris brassicae* infected with *Streptococcus faecalis*. M.J.A. Vanhaecke, L.E.L. de Mey and D.S.M. Degheele.
- 14:30 Studies on the mode of action of *Bacillus thuringiensis* var. *israelensis*. L.J. Goldberg, R.A. Wirtz and I. Ford.
- 14:45 *Bacillus thuringiensis* var. *israelensis* δ-endotoxin: effects on cultured insect cells and mammalian cells. W. Thomas and D.J. Ellar.
- 15:00 Nature of the toxic effect of *Bacillus thuringiensis* var. *israelensis* against *Xenopus* larvae. W. Schnetter, B. Prüfer and J. Morawcsik.
- 15:15 Factors contributing to the differential toxicity of *Bacillus thuringiensis* δ-endotoxin. R.S. Travers and C.F. Reichelderfer.

15:30-16:00 Break.

16:00-17:30 Contributed papers: Bacterial genetics: plasmids. Chair: T. Iizuka.

- 16:00 Plasmid deoxyribonucleic acid in strains of *Bacillus sphaericus* and in *B. moritai*. K. Abe, R.M. Faust and L.A. Bulla, Jr.
- 16:11 Transformation and conjugal plasmid transfer in *Bacillus thuringiensis*. H.M. Fischer, Silvia Schweitzer and P. Lüthy.
- 16:22 Comparison of plasmids from isolates of *Bacillus thuringiensis* H-serotype 7. P. Jarrett.

MONDAY, SEPTEMBER 6TH
(Continued)

16:33 Isolation and partial characterization of covalently closed circular DNA from *Bacillus thuringiensis*. T. Iizuka and R.M. Faust.

16:44 Common and different features to plasmids from 11 crystalliferous strains of *Bacillus thuringiensis*. D. Lereclus, J. Ribier, A. Klier and M-M. Lecadet.

16:55 Assignment of delta-endotoxin genes of *Bacillus thuringiensis* to specific plasmids by curing and plasmid transfer analyses. B.C. Carlton, J.M. Gonzalez, Jr and Barbara J. Brown.

17:08 Evidence for plasmid-associated crystal toxin production in *Bacillus thuringiensis* subsp. *israelensis*. R.M. Faust, K. Abe, G.A. Held, L.A. Bulla, Jr and T. Iizuka.

17:19 Transformation of protoplasts of *Bacillus thuringiensis* and *Bacillus cereus* with plasmid DNA. R. Grigorova, V. Miteva and N. Shivarova.

16:00-17:30 Contributed papers: Marine invertebrate pathology. Chair: D.J. Alderman.

16:00 Patterns of parasitism in species of benthic amphipods. Phyllis T. Johnson.

16:15 Fungal diseases of cephalopods. Jane L. Polglase.

16:30 A new sporozoan parasite of the gonad of the queen scallop, *Chlamys opercularis* L. D.C. Henry and J.S. Buchanan.

16:45 A disease of the brittle star, *Ophiura texturata*. Jane L. Polglase, J.L.S. Cobb, Joan Povey and A. Richardson.

17:00 *In vitro* handling of molluscan hemocytes: control of cell loss from centrifugation effects. R.A. Robohm.

17:15 Studies of *Mercenaria campchiensis* hemocytes. S.A. Ulrich, G.E. Rodrick and W.A. Sodeman, Jr.

16:00-17:30 Divisional Meeting: Microbial Control Division: Problems relating to microbial control in developing countries. Convener and Chair: D.W. Roberts.

17:30-20:00 Break.

20:00-21:30 Divisional Meeting: Safety Division: Discussion on guidelines for safety testing. Convener and Chair: Elizabeth M. Davidson.

TUESDAY, SEPTEMBER 7TH

09:00-10:30 SYMPOSIUM: INVERTEBRATE IMMUNITY. Convener and Chair: H.G. Boman.

09:00 Introduction. H.G. Boman.

09:10 Occurrence of membrane-bound recognition molecules at the surface of hemocytes of *Helix pomatia* and of *Mytilus edulis*. L. Renwrantz.

09:30 Cellular immunity in insects. S.B. Vinson.

09:50 Control and function of the prophenoloxidase activating system. M. Ashida, R. Iwama, H. Iwahana and H. Yoshida.

10:10 Inducible antibacterial proteins in Lepidoptera. D. Hultmark, H. Steiner, A. Engström, H. Bennich and H.G. Boman.

09:00-10:30 SYMPOSIUM: PROGRESS IN THE DEVELOPMENT AND USE OF INDUSTRIALIZED MICROBIAL CONTROL AGENTS FOR INSECT PEST CONTROL IN AGRICULTURE IN THE WESTERN HEMISPHERE. Convener and Chair: L.A. Falcon.

09:00 Introduction. L.A. Falcon.

09:15 Commercial mycoinsecticides. R. Soper.

09:40 Production and commercialization of microbials: *Nosema locustae* and other protozoa. J.E. Henry.

10:05 The nematodes, *Neoaplectana carpocapsae* and *Heterorhabditis* spp., in biological control of insect pests. H.K. Kaya.

09:00-10:30 Contributed papers: Fungi 1. Chair: R.A. Hall.

09:00 Principal ultrastructural and biochemical change occurring during resting spore formation of *Conidiobolus obscurus*. J-P. Latgé.

09:15 Use of *Verticillium lecanii* ("Mycotal") to control whitefly and other pests. R.A. Hall.

09:30 Gametogenesis in *Coelomomyces dodgei* Couch. C.J. Lucarotti and B.A. Federici.

09:45 Resistance of caterpillars to *Nomuraea rileyi*. C.M. Ignoffo, C. Garcia, R. Pinnell and M. Kroha.

10:00 The role of fungus disease in the regulation of populations of *Melolontha melolontha*. S. Keller.

10:15 Application of the entomopathogenic fungus, *Aschersonia aleyrodis* in an integrated control programme against the glasshouse whitefly, *Trialeurodes vaporariorum*. P.M.C. Ramakers, M.C. Rombach and R.A. Samson.

10:30 Control of onion thrips, *Thrips tabaci*, and the red spider mite, *Tetranychus urticae*, by *Verticillium lecanii*. A.T. Gillespie, R.A. Hall and H.D. Burges.

10:30-11:00 Break.

11:00-12:30 SYMPOSIUM: INVERTEBRATE IMMUNITY (Continued).

11:00 Structure and function of the cecropins. H. Steiner, X.M. Qu, D. Hultmark, A. Engström, H. Bennich and H.G. Boman.

11:20 Insect lectin and its relation to the defence mechanism. S. Natori and H. Komano.

11:40 How a nematode can destroy insect immunity. P. Götz and A Gülzow.

12:00 What is the sense of self and non-self? H. Bennich.

12:20 Discussion.

11:00-12:30 SYMPOSIUM: PROGRESS IN THE DEVELOPMENT AND USE OF INDUSTRIALIZED MICROBIAL CONTROL AGENTS FOR INSECT PEST CONTROL IN AGRICULTURE IN THE WESTERN HEMISPHERE. (Continued).

11:00 Progress with the nuclear polyhedrosis virus of *Heliothis zea* by commercialization of Elcar®. G.T. Bohmfalk.

11:20 The baculoviruses of *Cydia pomonella* and other tortricids. J. Huber.

11:40 The baculoviruses of *Autographa, Trichoplusia, Spodoptera* and *Cydia*. L.A. Falcon.

12:00 Progress in the development and use of *Bacillus thuringiensis* for pest control in agriculture. M. Broza.

12:20 Discussion.

11:00-12:30 Contributed papers: Fungi 2. Chair: S.G. Lisansky.

11:00 Ecology of tropical entomogenous fungi. H.C. Evans.

11:15 The pathogenicity of new *Hirsutella* species for the eriophyid mite vector of ryegrass mosaic virus. R.A. Hall and G.C. Lewis.

11:30 Attempt at biological control of the lettuce aphids in glasshouses with resting spores of *Conidiobolus obscurus* Hall and Dunn and mycelium of *Erynia neoaphidis*. C.A. Dedryver and J.M. Rabasse.

11:45 *Entomophaga grylli:* biological and taxonomic implications of host range studies with grasshoppers and locusts. R.A. Humber, R.S. Soper and B.J. Martinell.

12:00 The entomogenous genus of Deuteromycetes, *Tilachlidiopsis* Keissler. B. Papierok.

12:15 The locust gut as an environment for germination of spores of the entomogenous fungus, *Metarhizium anisopliae*. R.J. Dillon and A.K. Charnley.

12:30-14:00 Break.

14:00-15:30 Contributed papers: Bacteria: expression of the crystal of *Bacillus thuringiensis* and bacteriophages. Chair: R.M. Faust.

14:00 Oligosporogenic mutants of *Bacillus thuringiensis* serovar *israelensis* (H14) which continue to produce toxic paraspores. A.A. Yousten and K. Sonon.

14:18 Pathogenicity of crystal defective mutants of *Bacillus thuringiensis*. P. Jarrett.

14:36 Cloning and expression of the crystal protein genes from *Bacillus thuringiensis*. A. Klier and G. Rapoport.

14:54 Isolation and examination of phages naturally associated with *Bacillus thuringiensis* var. *aizawai*. D.R. Jones, V. Karunakaran and H.D. Burges.

15:12 Generalized transduction in *Bacillus thuringiensis*. Ritva Landen, Agneta Heierson and H.G. Boman.

14:00-15:30 Contributed papers: Fungi 3. Chair: B. Papierok (To be confirmed).

14:00 Propagation of *Metarhizium anisopliae* infection in termite colonies in the laboratory and in the field. H. Hanel.

14:15 Entomogenous fungi as control agents for the glasshouse leafhopper, *Zygina pallidifrons*. A.T. Gillespie, R.A. Hall and H.D. Burges.

14:30 Physiological study of the pathogenicity of *Conidiobolus obscurus*. J.P. Latgé, L. Sampedro Rosas and P.T. Brey.

14:45 *Metarhizium anisopliae* as a pathogen of the black field cricket, *Teleogryllus commodus*. S.J. Gagen and C. Reinganum.

15:00 Investigations on biological control of the black vine weevil, *Otiorhyncus sulcatus* with the fungus, *Metarhizium anisopliae*. G. Zimmermann.

15:15 Two-spotted spider mite susceptibility to the fungal pathogen, *Hirsutella thompsonii*. R.D. Oetting and W.A. Gardner.

14:00-15:30 Contributed papers: Pathogens from field insects and laboratory rearings. Chair: B.D. Selman.

14:00 Parasites of *Tachyporus* spp. (Coleoptera: Staphylinidae). P.N. Richardson.

14:13 Pathogens of June beetles (Coleoptera: Scarabaeidae) in Quebec, Canada. T.J. Poprawski and W.N. Yule.

TUESDAY, SEPTEMBER 7TH
(Continued)

14:26 Microbial pathogens affecting mosquitoes in the Philippines. B.F. Gabriel and L.E. Padua.

14:38 Light and electron microscopic studies of microorganisms parasitizing forest soil animals: a vacancy in research work as to invertebrate pathology. K. Purrini.

14:51 Pathogens recently isolated from insects in insect mass rearing facilities. J.R. Adams, C.C. Beegle and G.J. Tompkins.

15:04 Quality control of mass reared insects. A.C. Thomson and P.P. Sikorowski.

15:17 Diseases of silkworm, *Bombyx mori* in the northeast of Thailand. T. Attathom.

15:30 Oxytetracycline residues in honey from colonies of *Apis mellifera* medicated for disease control. M. Gilliam and R.J. Argauer.

14:00-15:45 Contributed papers: Viruses. Chair: N.E. Crook.

14:00 High resolution two-dimensional gel electrophoresis of structural proteins of baculoviruses of *Autographa californica* and *Porthetria (Lymantria) dispar*. S.P. Singh, R.T. Gudauskas and J.D. Harper.

14:15 Repeated DNA sequences in the genome of *Autographa californica* nuclear polyhedrosis virus (ACNPV). P. Faulkner and M.A. Cochran.

14:30 Cloning and analysis of DNA from a virus in *Campoletis sonorensis*. P.J. Kell, M.D. Summers and B.S. Vinson.

14:45 Genetic analysis of *Heliothis* spp. Baculoviruses: genotypic relationships among MNPVs, SNPVs and GVs. R.R. Gettig and W.J. McCarthy.

15:00 Some factors affecting baculovirus dissolution. I.P. Griffith.

15:15 A conserved enzyme activity in the formation of insect picornaviruses. B. Reavy and N.F. Moore.

15:30 Reovirus I of *Ceratitis capitata:* a member of a possible new genus of the Reoviridae family. N. Plus.

14:00-15:30 Discussion Session: Entomophthorales: taxonomy and systematics. Conveners: N. Wilding and R.A. Humber.

15:30-16:00 Break.

16:00-17:00 Contributed papers: Protozoa from field insects and laboratory rearings. Chair: Elizabeth U. Canning.

16:00 Flagellates infecting blowflies in Australia. D.J. Cooper.

16:15 Gregarines parasitic in Carabids. J.J. Lipa.

16:30 Comparison of seven isolates of *Nosema algerae* (Microspora: Nosematidae) using sodium dodecyl sulfate polyacrylamide gel electrophoresis of spore polypeptides. D.A. Streett and J.D. Briggs.

16:45 Ultrastructural investigation of a microsporidian infecting *Aulocara elliotti* (Orthoptera: Acrididae). D.A. Streett and J.E. Henry.

16:00-17:15 Contributed papers: Nematodes. Chair: P.N. Richardson.

TUESDAY, SEPTEMBER 7TH
(Continued)

16:00 Effect of soil type and application rate on establishment, subsequent infectivity and overwintering potential of *Romanomermis culicivorax* (Mermithidae: Nematoda) following postparasite applications. B.B. Westerdahl and R.K. Washino.

16:15 Observations on and experiments with entomopathogenous nematodes in Italy (1980-1982). K.V. Deseo and A.I. Kovacs.

16:30 Bacterial symbionts of insect pathogenic nematodes. R.J. Akhurst.

16:45 *Neoaplectana carpocapsae:* properties and purification of a toxin produced by axenic insect parasitic nematodes. A. Pye and M. Burman.

17:00 Development of a commercial scale use of the insect parasitic nematode *Neoaplectana bibionis,* to control currant borer, *Synanthedon tipuliformis.* L.A. Miller and R.A. Bedding.

16:00-17:15 Contributed papers: Viruses. Chair: J.S. Robertson.

16:00 Influence of host and environmental variables on prevalence of NPV in populations of *Spodoptera frugiperda* infesting pastures. J.R. Fuxa and J.P. Geaghan.

16:12 Activation of latent baculovirus in *Spodoptera littoralis* (Boisduval) by overcrowding and cold treatment. I. Harpaz and B. Venerzran.

16:24 Effects of propagating multiple embedded nuclear polyhedrosis viruses in alternate hosts. G.J. Tompkins, J.R. Adams and J.M. Young.

16:36 Double infection with a nuclear polyhedrosis and a granulosis virus of the turnip moth (*Agrotis segetum* Schiff., Lep: Noctuidae). I. Baumgartner.

16:48 Cross-transmission experiments with *Agrotis segetum* granulosis virus. O. Zethner and L. Ogaard.

17:00 Comparative studies on homologous and reciprocal baculovirus infections in two closely related lepidoptera. V.M. Pawar.

16:00-17:15 Discussion Session: Entomophthorales: taxonomy and systematics. (Continued).

17:15-19:15 Society for Invertebrate Pathology Business Meeting.

19:15-19:45 Break.

19:45 Coaches leave University for Official Reception for delegates and accompanying persons at the Royal Pavilion, Brighton at 20:00. No dinner will be provided at the University for those attending this reception as it will provide an opportunity to eat out in Brighton. Last coach returns to University at 23:00.

WEDNESDAY, SEPTEMBER 8TH

09:00-10:30 SYMPOSIUM: UNUSUAL VIRUSES OF TERRESTRIAL AND MARINE INVERTEBRATES. Convener and Chair: D.B. Stoltz.

09:00 Introduction. D.B. Stoltz.

09:05 Split genome ss RNA-viruses of insects. W.A.L. Crump and N.F. Moore.

WEDNESDAY, SEPTEMBER 8TH
(Continued)

09:25 Bisegmented ds RNA viruses. Danielle E. Teninges.

09:45 Unusual bee viruses. L. Bailey, B.V. Ball and H. Overton.

10:05 Unusual viruses of crustacea and arachnids. M. Bergoin.

09:00-10:30 Contributed papers: Bacteria: factors affecting application in agriculture. Chair: D. Evans (To be confirmed).

09:00 Loss of *Bacillus thuringiensis* viability in moist (PF3) soil. A.W. West, H.D. Burges and C.H.E. Wyborn.

09:15 Effectiveness of feeding stimulants on the potency of *Bacillus thuringiensis* vs cotton pests. H.S. Salama, M.S. Foda and A. Sharaby.

09:30 *Bacillus thuringiensis* for controlling *Prays oleae* in a pest management system on olive crops. C. Yamvrias, Th. Broumas, C. Liaropoulos and P. Katsoyannos.

09:45 Application of *Bacillus thuringiensis* to bins of stored grain for moth control. Wm. H. McGaughey.

10:00 Detection of *Bacillus thuringiensis* in soil by immunofluorescence. A.W. West, N.E. Crook and H.D. Burges.

10:15 Microbial control of flies with a commercial *Bacillus thuringiensis* preparation. Gunnel Carlberg.

09:00-10:30 Contributed papers: Defence mechanisms. Chair: N.A. Ratcliffe.

09:00 The fate of bacteria injected into *Galleria mellonella* larvae. J.B. Walters and N.A. Ratcliffe.

09:15 The response of some lepidopterous insects to bacterial invasion. H. Stockdale.

09:30 The bactericidal activity of the coelomic fluid of the sea urchin, *Echinus esculentus.* M. Service and A.C. Wardlaw.

09:45 Cytopathology of eugregarine infected earthworms. W.G. MacMillan.

10:00 An ultrastructural study on the encapsulation of microfilariae of *Brugia pahangi* in the haemocoel of *Anopheles quadrimaculatus.* C.C. Chen and B.R. Laurence.

10:15 Cellular defence response to *Beauveria bassiana* in the silkworm, *Bombyx mori.* R.F. Hou and J.F. Chang.

09:00-10:30 Contributed papers: Protozoa: life cycles and use in pest control. Chair: Rosalind J. Barker.

09:00 Microsporidia of winter moth *Operophtera brumata:* host parasite relations and transmission mechanisms. Rosalind J. Barker, Elizabeth U. Canning, A.M. Page and J.P. Nicholas.

09:18 The germination of *Vavraia culicis* spores. A.H. Undeen.

09:36 Life cycle and tissue specificity of *Vairimorpha plodiae,* a Microsporidian pathogen of some Lepidoptera. Louise A. Malone.

09:54 Use of *Nosema locustae* (Microsporida) for management of grasshopper populations in Canada. A.B. Ewen and M.K. Mukerji.

10:12 Susceptibility of West African grasshoppers to *Nosema locustae.* J.L. Fowler and J.E. Henry.

WEDNESDAY, SEPTEMBER 8TH
(Continued)

09:00-10:30 Discussion Session continued: Entomophthorales: ecology and use in biological control.

10:30-11:00 Break.

11:00-12:30 SYMPOSIUM: UNUSUAL VIRUSES OF TERRESTRIAL AND MARINE INVERTEBRATES. (Continued).

11:00 Densonucleosis viruses: unique pathogens of insects. P. Tijssen, E. Kurstak, T-M. Su and S. Garzon.
11:20 Nonoccluded baculoviruses. A.M. Crawford and R.R. Granados.
11:40 Viruses of parasitoid hymenoptera. D.B. Stoltz.
12:00 Discussion.

11:00-12:30 Contributed papers: Bacteria: factors affecting application against vectors of human disease. Chair: G. White (To be confirmed).

11:00 Feeding behaviour of *Aedes vexans* larvae and *Bacillus thuringiensis* var. *israelensis* formulations. C.T. Aly, S. Engler-Fritz and W. Schnetter.
11:15 Efficacy of Bactimos®, *Bacillus thuringiensis serovar. israelensis*, for the control of *Aedes detritus* in Italy. G. Majori.
11:30 Field trials of innovative control agents in Tuvalu, South Pacific, towards an integrated methodology against *Aedes aegypti*. M. Laird, J. Mokry, A. Semese and R. Uili.
11:45 Potential of biological agents for the control of black flies *(Diptera: Simuliidae)*. D. Molloy.
12:00 The toxicity of *Bacillus thuringiensis* serotype H-14 and *Bacillus sphaericus* strain 1593 to some mosquito larvae in Thailand. S. Pantuwatana.
12:15 Laboratory and field evaluation of *Bacillus sphaericus* (ISPC-5) as a mosquito larvicidal agent. S.V. Amonkar.

11:00-12:30 Contributed papers: Defence mechanisms. Chair: A.M. Lackie.

11:00 Induction of the haemocytic encapsulation reaction in insects. How does the nature of the foreign surface affect the subsequent response? A.M. Lackie.
11:15 Cellular encapsulation and "brown body" formation in the earthworm, *Eisenia foetida*. T.M. Higgins and A.M. Lackie.
11:30 Cellular defences of the 'primitive' chordate, Amphioxus, *(Branchiostoma lanceolatum)*. C.P. Rhodes and N.A. Ratcliffe.
11:45 Presence of a beta-2-microglobulin-like molecule on earthworm, *Lumbricus terrestris* leukocyte membranes. E.L. Cooper and P. Roch.
12:00 Prophenoloxidase activation in non-self recognition by crustacean hemocytes. V.J. Smith, K. Söderhall and C.A. Stinton.
12:15 Plasmatocyte depletion factor (PDF) released following bacterial/hemocyte interaction. B.M. Chain and R.S. Anderson.

11:00-12:30 Divisional Meeting: Microsporidia Division. Microsporidan dispersion within the host. Convener: Rosalind J. Barker.

WEDNESDAY, SEPTEMBER 8TH
(Continued)

11:00-12:30 Discussion Session: Entomophthorales: ecology and use in biological control. (Continued).

12:30-14:00 Break.

14:00-18:00 FREE

Leisure programme includes a visit to the Insect Pathology Laboratories at the Glasshouse Crops Research Institute and/or a visit to the historic town of Arundel.

20:00-21:30 A showing of two natural history films prepared by Oxford Scientific Films.

THURSDAY, SEPTEMBER 9TH

09:00-10:30 SYMPOSIUM: BIOLOGICAL CONTROL OF VECTORS. NEMATODES. Conveners: B.A. Federici and H.D. Burges. Chair: Jean R. Finney

09:00 Mass production of mermithid and steinernematid nematodes with vector control potential. H.C. Chapman and J.R. Finney.
09:25 Prospects and progress towards the field use of Steinernematidae in vector control. D.M. Minter and W.J.C. Oswald.
09:45 Use of mermithid nematodes to control insect vectors of human disease. W.M. Hominick and G.A. Tingley.
10:05 Biology of mermithids and steinernematids with vector control potential. E.G. Platzer.

09:00-10:30 SYMPOSIUM: FUNGI: *IN VITRO* CULTIVATION AND VIRULENCE. ENTOMOPHTHORALES AND LABORATORY CULTURE OF FUNGI. Convener and Chair: C.M. Ignoffo.

09:00 Production of Entomophthorales. J.P. Latgé.
09:22 Entomophthorales: field use and effectiveness. N. Wilding.
09:45 Entomophthorales: virulence and bioassay design. B. Papierok.
10:07 Laboratory culture and maintenance of entomopathogenic fungi. R.A. Samson.

09:00-10:30 SYMPOSIUM: DIAGNOSTIC TECHNIQUES IN INVERTEBRATE PATHOLOGY. Convener and Chair: J. Kalmakoff.

09:00 Introduction. J. Kalmakoff.
09:05 Immunoassays for the detection of pathogens. N.E. Crook.
09:25 Cell culture techniques. R. Priston.
09:45 Restriction endonucleases as tools in Baculovirus identification. J.M. Vlak.
10:05 Genetic characterization and sequence analysis of polyhedrins. G.F. Rohrmann.

09:00-10:30 Committee Meetings. Culture sub-committees meet separately.

10:30-11:00 Break.

11:00-12:30 SYMPOSIUM: BIOLOGICAL CONTROL OF VECTORS, (Continued). PROTOZOA AND CONTROL OF MOLLUSCS. Chair: W.M. Brooks.

11:00 The production and use of protozoa for vector control. A.H. Undeen.

11:20 Life cycles and pathology of some microsporidian pathogens of mosquitoes. T.G. Andreadis.

11:45 Methods of identification of microsporidia with vector control potential. J. Weiser.

12:05 Prospects for the microbial control of molluscs. M.A. Odei.

11:00-12:30 SYMPOSIUM: FUNGI: *IN VITRO* CULTIVATION AND VIRULENCE. 2. HYPHOMYCETES. (Continued).

11:00 Production of Hyphomycetes. T.L. Couch.

11:22 Deuteromycetes: virulence and bioassay design. R.A. Hall.

11:44 Hyphomycetes: field use and effectiveness. C.W. McCoy.

12:07 Entomogenous Hyphomycetes: strains and virulence. A. Vey

11:00-12:30 SYMPOSIUM: DIAGNOSTIC TECHNIQUES IN INVERTEBRATE PATHOLOGY. (Continued).

11:00 Small RNA insect viruses: biophysical, chemical and serological properties. C. Reinganum.

11:20 Electrophoretic analysis of RNA and proteins. C.C. Payne.

11:40 Application of DNA sequence homology techniques to the analysis of entompathogenic viruses. D.W. Miller, M.J. Adang and L.K. Miller.

12:00 The application of immunofluorescence and immunoperoxidase light microscopy techniques to problems in invertebrate pathology. L. Volkman.

12:20 Discussion.

11:00-12:30 Contributed papers: Characterization of bacterial toxins. Chair: H.D. Burges.

11:00 Isolation and purification of a toxic factor from *Bacillus sphaericus* 1593 spores. Catherine Bourgouin and Régina Tinelli.

11:15 Purification of *Bacillus thuringiensis* var. entomocidus-endotoxin using gel filtration and hydrophobic resin in the presence of detergents. A. Yawetz, B. Sneh and U. Oron.

11:30 Characterization and comparison of crystalline & protoxins and alkali activated toxins from *Bacillus thuringiensis* var. *israelensis* and *Bacillus thuringiensis* var. *berliner*. W. Thomas, J. Scargill, C. Denston and D.J. Ellar.

11:45 Monoclonal antibodies: a tool for the characterization of the toxic moiety and the mode of action of the delta-endotoxin of *Bacillus thuringiensis*. Maja Huber-Lukac and P. Lüthy.

12:00 Structure and location of toxins, in particular the mosquito factor, in the parasporal body of *Bacillus thuringiensis* var. *kurstaki* T. Yamamoto.

12:15 Characterization of exotoxin produced by a shellfish-pathogenic *vibrio* sp. Carolyn Brown and G. Roland.

12:30-14:00 Break.

14:00-15:30 SYMPOSIUM: BIOLOGICAL CONTROL OF VECTORS, (Continued). HYPHOMYCETE FUNGI. Chair: J. Weiser.

14:00 The biology and pathology of the imperfect fungi with vector control potential. J.S. Pillai.

14:30 Production of Fungi Imperfecti with vector control potential. D.W. Roberts and A.W. Sweeney.

15:00 Field evaluation of fungal pathogens of mosquito larvae, with particular reference to *Culicinomyces*. A.W. Sweeney.

14:00-15:30 SYMPOSIUM: MARINE INVERTEBRATE PATHOLOGY: NEW DISEASES IN MOLLUSCS. Convener: G. Balouet. Chair: B.J. Hill.

First round table: HAEMOCYTIC PARASITOSIS IN OYSTERS

14:00 Haemocytic parasitosis in European oyster *Ostrea edulis* L.: pathology and contamination. M. Poder, A. Cahour and G. Balouet.

14:15 Evolution of haemocytic parasitosis due to *Bonamia ostreae*. H. Grizel and G. Tige.

14:30 Some aspects of the occurrence, importance and control of the oyster pathogen *Bonamia ostreae* in Dutch oyster culture. P. van Banning.

Second round table: HAEMOCYTIC NEOPLASIA IN BIVALVE MOLLUSCS

14:45 Cellular proliferative disorders in bay mussels *(Mytilus edulis)* from Oregon estuaries. M.C. Mix (presented by A.K. Sparks).

15:00 Hyaline cell proliferation in *Ostrea edulis* L.: histogenetic and oncologic approach. G. Balouet, M. Poder and A. Cahour.

15:15 A review of the evidence supporting a viral agent causing a hematopoietic neoplasm in the soft-shelled clam, *Mya arenaria*. K.R. Cooper and P.W. Chang.

14:00-15:30 Contributed papers: Viruses. Chair: C.C. Payne.

14:00 Control of *Pieris rapae* larvae with granulosis virus in P.R.C. N.C. Liu and D.R. Liang.

14:15 Control of *Spodoptera exigua* in glasshouses with a nuclear polyhedrosis virus. J.M. Vlak, D. Peters, E. den Belder and M. van de Vrie.

14:30 Aspects of the dispersal of the granulosis virus of *Plodia interpunctella*. C.M. Hinchliff.

14:45 Long term effects of the granulosis virus of the indian meal moth, *Plodia interpunctella* (Hübner) on its host. Frances R. Hunter and K. Vigneswaren.

15:00 The relative susceptibility of *Euxoa scandens* and *Euxoa messoria* (Lepidoptera: Noctuidae) to different baculoviruses. S. Belloncik and C. Lavalee.

15:15 Dosage-mortality responses of *Heliothis armigera* larvae to three nuclear polyhedrosis viruses. Ceris F. Williams and C.C. Payne.

14:00-15:30 Committee Meeting. Culture subcommittees meet together.

15:30-16:00 Break.

16:00-17:30 SYMPOSIUM: BIOLOGICAL CONTROL OF VECTORS, (Continued). FUNGI, VIRUSES AND GENERAL TOPICS. Chair: D.W. Roberts.

THURSDAY, SEPTEMBER 9TH
(Continued)

16:00 Oomycetes in mosquito control. S.T. Jaronski.

16:25 The potential use of Chytridiomycete and Zygomycete fungi in vector control programmes. J.P. Latgé and B. Papierok.

16:50 Viral pathogens of vector Nematocera and their potential for microbial control. L.A. Lacey.

17:10 Justification of early field introduction of promising vector control agents as a method for evaluating their potential. A.M. Dubitskij.

16:00-17:30 SYMPOSIUM: MARINE INVERTEBRATE PATHOLOGY (Continued). 2. MISCELLANEOUS PAPERS. Convener: G. Balouet. Chair: A.K. Sparks.

16:00 Further investigations into the pathogenicity of IPN-like viruses for oysters. B.J. Hill, K. Way and D.J. Alderman.

16:15 Velar cell lesions of larval Pacific oyster *(Crassostrea gigas)*. L. Leibovitz and M. Comps.

16:30 A protozoan disease of encapsulated embryos of the sea hare *(Aplysia californica)*. L. Leibovitz and T.R. Capo.

16:45 Ganglioneuroblastoma in a Trematode, *Otodistomum plunketi* Fyfe, 1953. J.C. Harshbarger and D.I. Gibson.

17:00 Some diseases of crabs in the Northeast Pacific. A.K. Sparks.

17:15 *Marteilia refringens* disease. The parasite and new epidemic situation in France. H. Grizel.

16:00-17:45 Contributed papers: Viruses. Chair: H. Stockdale.

16:00 Studies on the replication of a cytoplasmic polyhedrosis virus in cell cultures. M. Arella, S. Belloncik and G. Devauchelle.

16:15 Growth conditions of insect cells and NPV in suspension. A. Röder and A. Gröner.

16:30 Biological and biochemical properties of nuclear polyhedrosis viruses propagated in serum free media. A. Groner and A. Roder.

16:45 Establishment of hemocytes from *Tipula* spp. (Diptera, Tippulidae) *in vitro* and their infection with *Tipula* baculovirus. C. Griffiths and J.B. Carter.

17:00 Productive and persistent infection with the nonoccluded Baculovirus HZ-1. H.A. Wood and J.P. Burand.

17:15 Serial passage of *Spodoptera littoralis* NPV in *Spodoptera frugiperda* cells: the production of interfering virus particles. A.M. Crawford and G.M. Sheehan.

17:30 Observation on early stages of granulosis virus development *in vivo* and *in vitro*. Annemarie Blumer-Wolf.

17:30-19:00 Break.

19:00 or 19:30 Sherry reception and Banquet. After dinner entertainment.

FRIDAY, SEPTEMBER 10TH

09:00-10:30 SYMPOSIUM: BIOLOGICAL CONTROL OF VECTORS, (Continued). BACTERIA- *BACILLUS THURINGIENSIS*. Chair: P. Lüthy.

FRIDAY, SEPTEMBER 10TH
(Continued)

09:00 Chemistry and toxicity of the *Bacillus thuringiensis* var. *israelensis* crystal. K.W. Nickerson.

09:25 Histopathology and pathogenesis caused by δ-endotoxin of *Bacillus thuringiensis* in vectors. J.-F. Charles.

09:45 Recent advances in serological characterization of isolates of *Bacillus thuringiensis*. H. de Barjac.

10:05 Use of numerical taxonomy to identify bacteria from vectors. O. Lysenko.

09:00-10:30 SYMPOSIUM: ENVIRONMENTAL PERSISTENCE OF PATHOGENS. Convener and Chair: J. Fargues.

09:00 Introduction. J. Fargues.

09:05 Persistence of baculoviruses on leaf surfaces. M.G. Richards and C.C. Payne.

09:25 The association of baculoviruses with the surfaces of coniferous trees. P.F. Entwistle.

09:45 The ecology of *Mamestra brassicae* NPV in soil. H.F. Evans.

10:05 The persistence of *Bacillus thuringiensis* on leaf surfaces. D.E. Pinnock.

09:00-10:30 Contributed papers: Fungi. 4. Chair: N. Wilding. (To be confirmed).

09:00 Ultrastructural studies of invasive and developmental processes of *Erynia neoaphidis* in the pea aphid *Acyrthosiphon pisum*. T.M. Butt, A. Beckett and N. Wilding.

09:12 Results of four years observations on Entomophthorales on wheat aphids. J. Coremans-Pelseneer and S. Villiers.

09:24 *In vivo* growth and development of the hyphomycete, *Nomuraea rileyi*, in the velvet bean caterpillar, *Anticarsia gemmatalis* larvae. D.G. Boucias and J.C. Pendland.

09:35 Influence of benomyl foliar sprays on the activity of 'Vertalec' on chrysanthemums. W.A. Gardner, R.D. Oetting and G.K. Stoney.

09:46 Effect of 'Ambush' on the germination of resting spores and the formation of conidia of *Conidiobolus thromboides* Drechsler I. Majchrowicz.

09:57 Spore types and other structures formed in adult housefly and medfly inoculated with *Erynia radicans* strains. A. Uziel, R.E. Kenneth and I. Ben-Ze'ev.

10:08 Preliminary work in Papua New Guinea on the infection of some insect pests of coconuts with *Metarhizium anisopliae*. C. Prior and M. Arura.

10:19 A fungus, *Coelomomyces* sp., causing high mortality of *Anopheles gambiae* larvae along the Kenya coast. W.A. Otieno.

10:30-11:00 Break.

11:00-12:30 SYMPOSIUM: BIOLOGICAL CONTROL OF VECTORS, (Continued). *BACILLUS THURINGIENSIS* H-SEROTYPE 14: FIELD TRIALS, BIOASSAY AND PRODUCTION. Chair: A. Merdan. (To be confirmed).

11:00 *Bacillus thuringiensis* H-14, a biocontrol agent for onchocerciasis control in West Africa. P. Guillet, H. Escaffre and J.M. Prud'hom.

FRIDAY, SEPTEMBER 10TH
(Continued)

11:25 Evaluation of *Bacillus thuringiensis* (H-14) against mosquitoes with emphasis on field trials. M.S. Mulla and B.A. Federici.

11:45 Industrial production, bioassay and formulation of *Bacillus thuringiensis* (H-14). H.T. Dulmage.

12:10 Factors affecting industrialization of microbial insecticides. T.L. Couch.

11:00-12:30 SYMPOSIUM: ENVIRONMENTAL PERSISTENCE OF PATHOGENS, (Continued).

11:00 Ecology of *Bacillus thuringiensis* in soil. A. West and H.D. Burges.

11:16 Factors influencing the persistence of *Bacillus thuringiensis* H-14 in simulated outdoor conditions. Isabelle Larget.

11:32 The environmental persistence of propagules of the Entomophthorales. D.F. Perry, G. Latteur and N. Wilding.

11:48 Environmental persistence of *Nomuraea rileyi*. C.M. Ignoffo.

12:04 Environmental persistence of microsporidia. W.M. Brooks.

12:20 Discussion.

11:00-12:30 Contributed papers: Viruses. Chair: C.F. Rivers.

11:00 Ultrastructural studies on the leafroller *Pandemis heparana* larvae during a diapause-like state induced by NPV infection. S. Abol Ela and G. Croizier.

11:15 Virogenesis of a unique nuclear polyhedrosis virus (Baculovirus) of the armyworm, *Pseudaletia unipuncta*. Y. Tanada, R.T. Hess and E.M. Omi.

11:30 Progress in the evaluation of the NPV of *Spodoptera littoralis* in Egypt. D.J. McKinley, C. Topper, M. Hosny *et al.*

11:45 Bioassaying *Agrotis segetum* GV (ASGV) (Baculoviridae) on *Agrotis segetum* (Lep: Noctuidae). L. Ogaard.

12:00 Safety studies for the control of baculovirus replication in vertebrates. G. Döller and A. Gröner.

12:15 Effects of a baculovirus on the biology of *Spodoptera littoralis* (Boisduval) (Lepidoptera: Noctuidae). E. Vargas Osuna and C. Santiago-Alvarez.

12:30 A critical appraisal of the nuclear polyhedrosis virus of *Spodoptera litura* and its prospects in India. N. Ramakrishnan.

12:45-14:00 Break.

14:00-15:30 SYMPOSIUM: BIOLOGICAL CONTROL OF VECTORS, (Continued). *BACILLUS SPHAERICUS*. Chair: B.A. Federici.

14:00 Bacteriophage typing of mosquito pathogenic strains of *Bacillus sphaericus*. A.A. Yousten and J.C. Hedrick.

14:25 Histopathology and characterization of the *Bacillus sphaericus* toxin. E.W. Davidson.

14:45 The biotechnology for strains of *Bacillus sphaericus* with vector control potential. S. Singer.

15:05 The efficacy, persistence and cycling potential of *Bacillus sphaericus*. L.A. Lacey.

14:00-15:30 SYMPOSIUM: EPIZOOTIOLOGY OF FOREST INSECT VIRUSES. Convener and chair: J.D. Podgwaite.

FRIDAY, SEPTEMBER 10TH
(Continued)

14:00 Passive carriage of baculoviruses in forests. P.F. Entwistle.

14:30 Mathematical models of insect-virus population interactions. R.M. Anderson.

15:00 Modeling the role of NPV in Gypsy Moth population dynamics. H.T. Valentine and J.D. Podgwaite.

14:00-15:30 Workshop on Marine Invertebrate Pathology. Virus diseases of aquatic invertebrates. Convener: D.J. Alderman.

15:30-16:00 Break.

16:00-17:30 SYMPOSIUM: BIOLOGICAL CONTROL OF VECTORS, (Continued). SAFETY, PLANNING AND IMPLEMENTATION OF MICROBIAL CONTROL OF VECTORS. Chair: J.S. Pillai. (Provisional).

16:00 Requirements for mammalian safety testing of microbial control agents. M. Vandekar.

16:18 Planning and evaluation of large-scale field trials with microbial control agents. N. Rishikesh.

16:36 Implementation of microbial agents in vector control programmes. N. Okafor.

16:54 Integrated vector control programme in developing countries and the place of biological control agents. P.K. Rajagopalan.

17:12 World Health Organization activities in the field of biological control of vectors. A.M. Dubitskij.

16:00-17:30 Contributed papers: Viruses. Chair: D.M. Glen.

16:00 The control of *Adoxophyes orana*, the summer fruit tortrix moth, with a nuclear polyhedrosis virus (AONPV) in apple orchards. D. Peters.

16:15 Ecological studies on control of codling moth by granulosis virus. D.M. Glen.

16:30 Environmental impact of spraying apple orchards with the granulosis virus of the codling moth *(Cydia pomonella)*. 1. Field studies. M.J. Bailey, Alison M. Field and Frances R. Hunter.

16:45 Environmental impact of spraying apple orchards with the granulosis virus of the codling moth *(Cydia pomonella)*. 2. Laboratory studies. M.J. Bailey and Frances R. Hunter.

17:00 Efficacy of the granulosis virus of the codling moth. R.P. Jacques and J.E. Laing.

17:15 Field evaluation of a granulosis virus for the control of the codling moth. R. Ripa.

16:00-17:30 Workshop on Marine Invertebrate Pathology, (continued). Fungal diseases of aquatic invertebrates.

17:30 onwards Free.

POSTER SESSIONS

Space for the following posters is available during the week. Each poster will be set up for at least two days (Mon.-Tues. or Thurs.-Fri.). Details of the presentation of posters have been sent to appropriate delegates. Please contact the registration desk on arrival for further details. Each poster should be manned at least between 10:30 to 11:00 and 15:30 to 16:00 on each day.

Bacteria

1. Efficacy of *Bacillus thuringiensis* Berliner formulations on three lepidopterous pests of cotton in the laboratory. T. Adejare Fadare.
2. Host-vector systems in *B. thuringiensis:* mapping studies through CP-54 Ber mediated transduction. Aspects of protoplast transformation. M-M. Lecadet, M-O. Blondel and D. Lereclus.
3. Analysis of the delta endotoxin of *Bacillus thuringiensis* serovar *israelensis* by electron microscopy and polyacrylamide gel electrophoresis. J. Boisvert, M. Boity, G., Charpentier and S. Garzon.
4. Pathogenicity of *Bacillus thuringiensis* serovar *israelensis* against black fly larvae (Diptera: Simuliidae). J. Lacavsière, J. Boisvert and G. Charpentier.

Defence mechanisms

1. Levels of self/non-self recognition in crustacea. M.P. Rossa and N.A. Ratcliffe.
2. Comparison of acquired resistance of *Galleria mellonella* to a protease and a bacterium. Liliane Croizier and G. Croizier.
3. Characteristics of amoebocytes involved in the defence reactions of the mollusc, *Biomphalaria glabrata.* A. Jocky, M. Matricon-Gordran, J. Benex and G. Jacobelli.
4. An *in vivo* cellular immune response to bacteria in the polychaete *Arenicola marina.* S.W. Fitzgerald and N.A. Ratcliffe.

Fungi

1. New fungal pathogens of arthropods in tropical rain forests. R.A. Samson and H.C. Evans.
2. Host invasion and conidium production by *Entomophthora muscae.* P.J. Brobyn.
3. The mosquito pathogen, *Tolypocladium cylindrosporum.* G.G. Soares.
4. Comparative studies *in vitro* on various species of the entomopathogenic genus *Aschersonia.* R.A. Samson, M.C. Rombach, H.C. Evans and G. Riba.
5. Biosystematics of *Coelomomyces* spp.: redescription of incorrectly described forms and descriptions of new species. C.E. Bland and J.N. Couch.
6. Use of *Verticillium lecanii* to control glasshouse whitefly. R. Quinlan.
7. Small-scale production of the entomopathogenic fungus, *Aschersonia aleyrodis.* M.C. Rombach and R.A. Samson.
8. *Verticillium lecanii* as an aphicide: genetical aspects. Christopher W. Jackson and J.B. Heale.
9. Conidial morphology and ecology in species of *Entomophthora* from aquatic locations. E. Descals and N.L. Mywer-Jones.

General

1. On application tactics of microbial preparations for direct control of phytophagous insects. V.V. Gulij and S.Y. Rybina.
2. Commercial aspects of the development of entomopathogens. S.G. Lisansky.
3. Disruptive effects of parasitism by the braconid wasp *Apanteles congregatus* on the endocrine physiology and development of the tobacco hornworm. N.E. Beckage and L.M. Riddiford.
4. Metabolic variations in *Gryllus bimaculatus* (Insecta: Orthoptera) during experimental rickettsian disease and starvation: sterols. Bernadette Boulbes, C. Vivarès and G. Meynadier.

Marine invertebrate pathology

1. Crustacean shell disease: A preliminary epidemiological and bacteriological survey. V.J. Smith, L.J. Hillman and A.C. Wardlaw.
2. Cellular response to an algal pathogen by its gorgonian coral host. W.M. Goldberg and J.C. Makemson.
3. A new haplosporidian parasite of the flat oyster *Ostrea edulis.* M. Brehélin, C. Vivarès, F. Cousserans and J.-R. Bonami.

Viruses

1. Presence of alkaline protease in the inclusion bodies of baculoviruses isolated from some lepidoptera. V.M. Pawar.
2. Cross infectivity of two baculoviruses of castor semilooper *Achoea janata* (Noctuidae: Lepidoptera) to silkworms. P.S. Joshi and V.M. Pawar.
3. Persistence of viruses of *Tipula* spp. in host populations. J.B. Carter, E.I. Green, A.J. Kirkham and J. Overend.
4. Persistence of ASGV (*Agrotis segetum* granulosis virus - Baculoviridae) in field soil. L. Ogaard and O. Zethner.
5. The use of viruses to control the insect pests of vegetables in Thailand in 1982. D.J. McKinley and P. Aneekul.
6. Efficacy of simultaneous and sequential treatments of cytoplasmic polyhedrosis virus, nuclear polyhedrosis virus and permethrin on *Euxoa scandens* (Lepidoptera: Noctuidae) larvae. S. Belloncik, E.W. Rud and L. St.-Amand.
7. The association of viruses with other parasites of honey bees. B.V. Ball and L. Bailey.
8. A cell-line derived from the scarab beetle *Heteronychus arator.* A.M. Crawford.
9. Protein characteristics of a densonucleosis virus of the silkworm, *Bombyx mori.* S. Maeda, T. Kawai and H. Watanabe.
10. New baculovirus and pico virus-caused diseases of penaeid shrimp. D.V. Lightner, R.M. Redman, C.A. Stapleton, T.A. Bell and R. Williams.
11. Rapid and specific detection of *Autographa californica* nuclear polyhedrosis virus by using a monoclonal antibody directed against the 42K protein of this baculovirus. W.L. Naser and H.G. Miltenburger.
12. Cytogenetic investigations in mammalian cells *in vivo* and *in vitro* after treatment with insect pathogenic viruses (Baculoviridae). R. Reimann and H.G. Miltenburger.
13. Comparative characterization of DNA from *Agrotis segetum* Schiff. nuclear polyhedrosis and granulosis viruses. G.M. Maslich and L.M. Tarasevich.
14. Field tests of double virus infection of nuclear polyhedrosis and granulosis of *Agrotis segetum* Schiff. and *Amathes* c- *nigrum* L. V.S. Kitik and R.V. Vibornov.
15. The influence of nuclear polyhedrosis and granulosis *Amathes* c- *nigrum* L. R.V. Vibornov, V.S. Kitik and L.M. Tarasevich.
16. Prophylaxis of viral infections in socially beneficial insects. P.L. Talpalatskiy.
17. Electron microscopic investigation of viral preparations destruction during storage. M.G. Tchukhry, V.V. Gulij, E.J. Simsinova, N.I. Nikitina and N.G. Ungurianu.
18. Control of cutworms (*Agrotis* spp.) by granulosis virus - a joint research venture between Pakistan and Denmark. O. Zethner, M.I. Chaudhry, H. Gul, S. Khan, I. Ahmed, H.U. Khan, L. Ogaard and B. Bolet.
19. Attempted propagation of granulosis viruses in cell cultures resulting in activation of an occult nuclear polyhedrosis virus. J.A. Saldahna and F.R. Hunter.
20. Isolation of NPV DNA from *Spodoptera littoralis* larvae and cultured cells and comparisons with other Baculovirus DNAs. N. Kislev and M.D. Summers.

LEISURE PROGRAMME

During the week of the conference, four half day trips are planned to places of local interest. It may be neces-

sary to limit the number for some of the visits so please book early to avoid disappointment.

Monday September 6th

10:00 Applied Sciences Lecture Theatre, University of Sussex; a meeting of those interested in the leisure programme, to outline the week's events and other local places of interest.

14:00 A coach tour of Brighton and the surrounding area plus a guided tour of Brighton Pavilion.

Tuesday September 7th

14:00 A visit to 'Drusillas', which combines a variety of attractions including wine cellars, gift shops specializing in traditional crafts, a small zoo, children's playground, etc.

19:45 Coaches leave University for Official Reception at the Royal Pavilion, Brighton.

Wednesday September 8th

13:00 A visit to the historic town of Arundel whose attractions include a castle (guided tour available), bird reserve and several small museums.

20:00 A showing of two natural history films prepared by Oxford Scientific Films.

Thrusday September 9th

14:00 A relaxing afternoon visit to Parham House, an Elizabethan mansion.

19:00-19:30 Sherry reception prior to the Banquet. After dinner entertainment.

Friday September 10th

FREE.

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MICROSPORIDA DIVISION

The proposed topic for discussion at the workshop during the Brighton SIP Meeting this year is "Microsporidan dispersion within the host". However, I understand that many members will not be attending the conference due to financial constraints. I should be most grateful if members would contact me with their views on the topic and if those who are coming would be prepared to contribute to the discussion. With many thanks,

Rosalind J. Barker
Vice-Chairperson

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ELECTION RESULTS

Ballots for the election of the new slate of SIP Executive Council members were accepted up until June 1, 1982. A total of 173 ballots were returned from SIP Members. Of these 71 were postmarked from outside North America. The scrutineers were Drs. Jean Percy and Gary Wilson of the Forest Pest Management Institute, Sault Ste. Marie who recorded the votes as follows:

President	
Wayne Brooks	165
Vice-President	
K. Aizawa	74
H.D. Burges	97
Secretary	
J.R. Adams	111
Max Bergoin	62
Treasurer	
S.Y. Feng	75
Aaron Rosenfield	92
Trustees	
Robert S. Anderson	63
J.E. Henry	97
L.A. Vasiljevic	66
H. Watanabe	104

Therefore, our new Executive Officers are W. Brooks (President), H.D. Burges (Vice President), J.R. Adams (Secretary), A. Rosenfield (Treasurer), and J.E. Henry and H. Watanabe (Trustees).

On behalf of the incumbent executive and the membership, I want to thank the new executive for their willingness to serve the Society, and give them our best wishes for carrying out their new responsibilities.

On the question of SIP policy regarding abstracts of papers presented at the SIP Annual Meetings, 96 votes were recorded for Option A (i.e., An abstract may be cited as a personal communication with the permission of the author) and 56 were recorded for Option B (i.e., No resolution should be made regarding citability of Abstracts). Twenty-one members were undecided or did not vote on the question.

Lastly, I would like to express my pleasure at having been able to serve the Society for the past two years, and I hope the next Secretary will find her job as rewarding as I did mine.

Oswald N. Morris
Secretary, S.I.P.

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PAPERS BY INSECT PATHOLOGISTS AT AUSTRALIAN MEETINGS

Papers on Insect Pathology Topics were presented at the Annual Meetings of the Australian Entomological and Australian Microbiological Societies at Canberra and Hobart, respectively in May, 1982.

A) The following papers were presented at the session on 'Biological Control by Pathogens' of the Aust. Ent. Soc.

1. Assay of potato moth granulosis virus. S. Uren, W.E.P. Williamson, and I.P. Griffith, Vic. College of Pharmacy, 381 Royal Pde, Parkville, Vic. 3052.
2. Studies on *Beauveria bassiana* (Bals.) Vuille infecting false and true wireworms (F. Tenebrionidae and F. Elateridae). N.W. Forrester, Dept. of Agric., N.S.W., Tamworth, N.S.W. 2340.
3. Development of *Metarhizium anisopliae* as a biological control agent of the black field cricket *Teleogryllus commodus*. S.J. Gagen, Plant Res. Inst., Swan St., Burnley Vic. 3121.
4. Laboratory studies on the pathogenicity of the mosquito fungus *Culicinomyces* to various species in their natural waters. R.C. Russell, C. Panter and P.I. Whelan, Comm. Inst. of Health, A27, Uni. of Sydney, Sydney, N.S.W. 2006.
5. *Verticillium lecanii* as a fungal pathogen of aphids. R.J. Milner, C.S.I.R.O. Div. of Ento., P.O. Box 1700, Canberra City, A.C.T. 2601.

B) Papers presented in the Biological Control Symposium organised by the Aust. Microbiological Soc. included:

1. Interrelationships between nematodes and microorganisms and their use in control of insect pests. R. Bedding, C.S.I.R.O., Div. of Ento., Hobart, Tas., 7000.
2. Dimorphism and antibiotic production of *Xenorhabdus* spp. R.J. Akhurst, C.S.I.R.O., Div. of Ento., Hobart, Tas., 7000.
3. The selection of bacteria and fungi for insect pest control. R.J. Milner, C.S.I.R.O., Div. of Ento., Hobart, Tas., 7000.

and

4. The potential of viruses and protozoa for insect control, D.E. Pinnock and D.J. Cooper., Waite Agric., Res. Inst., Uni. of Adel., Glen Osmond, S.A. 5064.

R.E. Teakle
Regional Correspondent

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USE PERMIT GRANTED FOR AcNPV

The U.S. Environmental Protection Agency granted an experimental use permit on May 13 for the biological product SAN 404 I WDC - a preparation of a nuclear polyhedrosis virus (NPV) of *Autographa californica* - for tussock moth control in Pacific Northwest forests. The permit results from cooperative efforts of Sandoz, Inc. of San Diego and the Behavioral and Microbial Agents for Managing Western Forests Insects Project in Corvallis.

Scientists in Corvallis have tested the activity of several strains of NPVs pathogenic for larvae of the Douglas-fir tussock moth. A strain recently isolated from the alfalfa looper, *A. californica,* was very virulent for the tussock moth. This new strain of *Baculovirus* has been produced experimentally by Sandoz, Inc. and tested both in the laboratory and with aerial application simulator by researchers Mauro E. Martignoni and Milton J. Stelzer and technicians Paul Iwai and Lucille Clark in Corvallis.

The new permit will allow Sandoz and the Forest Service to test this product in the forest this summer. Sandoz has produced enough of the biological product to treat more than 300 acres of Douglas-fir and true fir forests. If the tests planned this year show favorable results, large scale application could be considred during the next outbreak of the tussock moth, perhaps in 1983-84. The new *Baculovirus* strain looks promising because it can be produced in a relatively simple biological system, it is less expensive than other biological controls, and it can be produced by private industry. This is the first and only experimental use permit granted by EPA for a *Baculovirus* strain isolated from *A. californica.*

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ANNOUNCING TWO NEW VOLUMES IN CELL CULTURE

Advances in Cell Culture, Volume 2. Edited by Karl Maramorosch, Publication Date: October, 1982. Approximately 315 pages. ISBN 0-12-00790-X. Academic Press.

Table of Contents

V.J. CRISTOFALO, B.M. STANULIS-PRAEGER - Introduction and Expression of Foreign DNA Sequences in Mammalian Cells.
G.J. McGARRITY - Detection of Mycoplasmal Infection of Cell Cultures.
J. MITSUHASHI - Media for Insect Cell Cultures.
D.F. WENT - Insect Ovaries and Follicles in Culture: Oocyte and Early Embryonic Development in Paedogenetic Gall Midges.
H. OBERLANDER, D.E. LYNN - Morphogenesis in Insect Tissue Culture.
B.F. MATTHEWS, G.W. SCHAEFFER - Agricultural Applications of *in Vitro* Plant Cultivation.
K. WOLF, W. AHNE - Fish Cell Culture.

Invertebrate Cell Culture Applications. Edited by Karl Maramorosch and Jun Mitsuhashi. Publication Date: May, 1982. 263 Pages. ISBN 0-12-470290-2. Price: $23. Academic Press.

Table of Contents

T.D.C. GRACE - Development of Insect Cell Culture.
J. MITSUHASHI - Determination of Essential Amino Acids for Insect Cell Lines.
Y. KURODA - *Drosophila* Tissue Culture: Retrospect and Prospect.
C. BARIGOZZI - Chromosomal Phenomena in Cell Lines of *Drosophila.*
K.R. TSANG, M.A. BROOKS, T.J. KURTTI - Culture Conditions Regulating the Infection of Cells by an Intracellular Microorganism.
M. PUDNEY, C.J. LEAKE, S.M. BUCKLEY - Replication of Arboviruses in Arthropod *in Vitro* Systems: An Overview.
T.J. KURTTI, U.G. MUNDERLOH - Tick Cell Culture: Characteristics, Growth Requirements, and Applications to Parasitology.

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POSITION AVAILABLE

A two-year assistantship is currently available in the field of insect pathology at the university of Florida for research related to the transmission of diseases of vertebrate animals by mosquitoes infected with insect pathogens. Candidates with a background or interest in medical entomology, insect pathology, parasitology, or protozoology interested in this one-third-time assistantship ($5,800 and out-of-state tuition fee waiver) should apply to Dr. D.A. Dame, ARS, USDA, P.O. Box 14565, Gainesville, Florida 32604 (telephone (904) 373-6701).

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