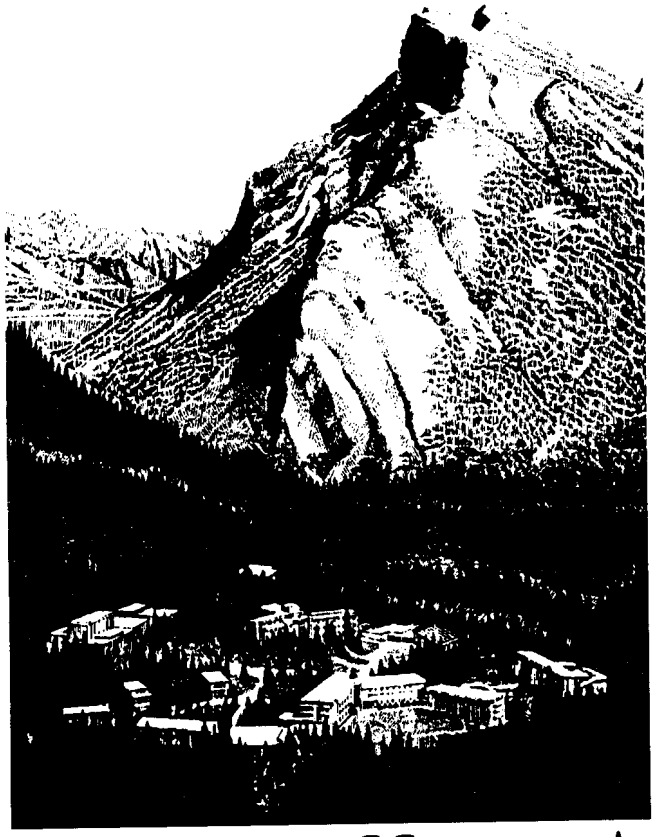
sip

NEWSLETTER

society for invertebrate pathology

VOLUME 29, NUMBER 1
February 1997

30TH ANNUAL MEETING, BANFF CENTRE, BANFF, ALBERTA, CANADA AUGUST 24 - 29, 1997



SIP Banff '97

Society for Invertebrate Pathology

The 1997 Annual Meeting of the Society for Invertebrate Pathology will take place at the Banff Centre located in Canada's first national park, Banff. The Park, one of the world's most beautiful natural areas, has been recognised as a World Heritage Site. Conference delegates are encouraged to spend additional time in the area to enjoy the breathtaking scenery.

The Banff Centre: The Banff Centre for Continuing Education is a unique Canadian institution which plays a special role in the advancement of cultural and professional life, internationally recognized for its advanced works in arts and management, and for developing and hosting conferences. The magnificent natural setting and its residential and retreat-like facilities provide an ideal environment for reflection, innovative thinking and interaction. The Banff Centre is located on the slopes of Tunnel Mountain within

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Deadline for the next Newsletter is May 15, 1997.

Banff National Park. The Banff Centre is about 10 - 15 minutes' walk from downtown Banff, which offers nightclubs, restaurants, museums, libraries, art galleries and churches.

Scientific Program: The program will follow the usual SIP format. The meeting will begin with a mixer on Sunday evening, August 24 and conclude at noon on Friday, 29 August. Scientific symposia and contributed paper sessions will begin on Monday. Divisional Business Meetings and Workshops are planned for Monday and Tuesday evenings. The Society's annual Business Meeting will be held on Thursday morning.

Symposia: The following is a tentative list of Symposia and their organizers:

1. Granulosis Viruses - Doreen Winstanley & Ian Smith
2. Viruses in their Natural Hosts - Suzanne Thiem/Virology Division
3. Pathogen Interactions: Antagonism or Potentiation - Harry Kaya
4. Ecological Applications in Microbial Control - Matt Thomas
5. Consideration of Naturally Occurring *Bacillus thuringiensis:* In relation to regulatory issues and persistence in commercial products - Robert Smith
6. Insect Gut Physiology - Jean-Louis Schwartz
7. Review of Bacterial Toxin Mode of Action - Jean-Louis Schwartz
8. Role of Women in Invertebrate Pathology - Elizabeth W. Davidson
9. Role of Haemocytes in Pathogenesis in Lepidoptera - Loy Volkman
10. Production and Formulation of Entomopathogenic Fungi - Fernando Vega

Contributed papers are solicited for all topics related to Invertebrate Pathology. Poster sessions will be held on both Tuesday and Thursday. There will be student paper and poster competitions, with generous cash awards provided by the Society. This year student competitors will be limited to one presentation each (either a poster or oral presentation, but not both).

SIP NEWSLETTER

Published by the Society for Invertebrate Pathology

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Submissions to the following sections are solicited:

Forum: More substantial articles on current issues of concern, limited to approximately five pages.
Letters to the Editor: Issues of concern can be brought to light here.
Microbial Control News: Information on new discoveries, "News Releases", formation of companies etc. pertaining to microbial control.

We also depend on our members to supply us with information for the following sections: **Obituaries, Member News** (Retirements, Awards, Promotions), **Members on the Move** (New addresses), **Positions Available/Wanted, Meeting and Workshop Announcements**, and other **News Items.**

Send all submissions directly to the Editor. Submissions via E-mail or on computer disk (WP, MSWORD or ASCII) make our lives much easier and save on costs. Please include a hard copy of any text sent via computer disk.

Deadline for next Newsletter is May 15, 1997.

Deadline for Abstract Submission: April 15, 1997. April 15 will be the deadline for receipt of abstracts for symposia, contributed papers, posters and other program information. This deadline will allow us to prepare and distribute the Program and Abstracts to all members before the meeting. Abstracts received after the deadline will not be printed. Late submissions will be accommodated as posters on a space-available basis only. If it becomes necessary, we reserve the right to request that some contributed papers be presented as a poster. Should such a situation arise, presenters will be notified well in advance of the printing of the Program and Abstracts booklet.

The Program Committee solicits your contributions of abstracts for meeting presentations. Instructions can be found in the registration package included with this Newsletter (Supplements 1 & 2). **Oral presentations will be limited to 12 minutes with an additional 3 minutes for questions**. Because of concurrent sessions, moderators will be instructed to keep strictly to scheduled times. Projection equipment will consist of Kodak carousel slide projectors (2" x 2" or 5 cm x 5 cm slides) and overhead transparency projectors. **Poster boards will be approximately 1.2 m high and 1.5 m wide.**

Organizing Committee members, Lorraine Braun, Karen Toohey and Mark Goettel search for a suitable venue for the 5-K race. Photo by Martin Erlandson, October, 1996.

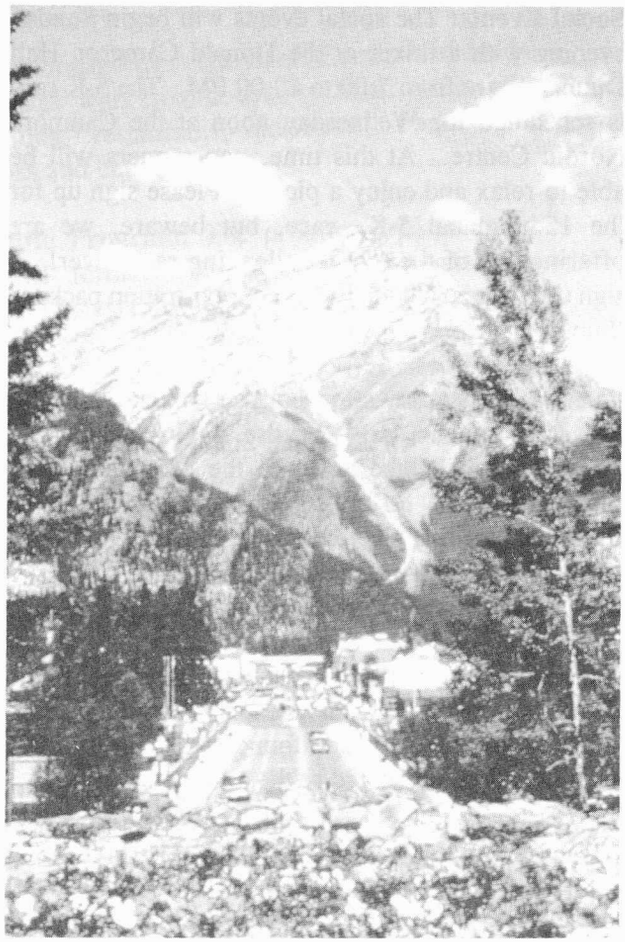
Social Events: The social events will begin Sunday evening with a mixer at the Donald Cameron Hall Dining Centre from 7:00 to 10:00 PM. The 5-K race is scheduled for Wednesday noon at the Canmore Nordic Centre. At this time, non-runners will be able to relax and enjoy a picnic. Please sign up for the 15th annual 5-K race, but beware, we are offering one of the most challenging races ever! A sign up sheet is included with the registration package (Supplement 2).

Later on Wednesday afternoon we will take a bus to visit the famous Lake Louise. On Wednesday evening we will take a bus to the Mountain View BBQ donut-tent for a great evening in Western Canadian tradition where we will enjoy a hearty meal and dance the night away to polkas, two-steps and square-dances in country and western style.

On Thursday evening, the banquet will be held in the Dining Centre of the Donald Cameron building at the Banff Centre. The student, founder's lecture and 5-K awards will be presented at the banquet.

Optional Companion Tours: Two optional companion tours at an additional cost are planned. The first tour will be a day trip on Monday to the Columbia Icefields located in Jasper National Park, north of the Banff Park. The second will be a guided tour of the famous Banff Springs Hotel. These tours will take place only if enough people register for them. Money will be refunded if a tour is cancelled. The tour of Banff Springs Hotel will be limited to the first 50 people signing up. If your companion is interested in these tours, please indicate this on the registration form (Supplement 2). Further information is provided in Supplement 1.

Accommodation: Arrangements have been made to house delegates at the Banff Centre, the venue of our meetings. For delegates wishing to extend their stay, special pre-and post-conference rates are available on a first come, first serve basis. Accommodation costs include all meals during the conference; pre- and post-conference rates include room only; however, meals may be purchased at the Centre a la carte. Only a limited number of rooms have been reserved at the Centre. **Book early to avoid disappointment.**



Banff Avenue from Cascade Garden.
Photo courtesy Banff/Lake Louise Tourism Bureau.

Since Banff is an extremely popular tourist resort hosting approximately 5 million visitors per year, and since August is during peak tourist season, **it is imperative that everyone respect the deadlines as almost certainly no rooms will be available in surrounding hotels at this time.** Delegates are advised not to come to Banff unless they have confirmed reservations at the Banff Centre or elsewhere. Delegates not staying at the Banff Centre will need to purchase a Banquet ticket if they wish to attend the Banquet.

Registration: The registration fee includes coffee breaks, the Wednesday outings, and the Wednesday evening BBQ. For delegates and registered companions, there will be no extra fee for the Thursday evening Banquet. For delegates not staying at the Centre, there will be an extra charge of $50 for the Banquet (optional). **The deadline for early registration is 15 April.** There will be a late fee for registration forms received after April 15. Only payments in Canadian dollars will be accepted. Payments can also be made by major credit card.

Refund Policy: Refunds for registration fees (minus $40 handling fee) will be available with delivery of a cancellation notice **prior to July 15.** Full refund of room deposit will be made if your room reservation is cancelled 48 hours prior to arrival.

Travel Information: Banff is located 120 kilometres (80 miles), or a scenic 1.5 hr drive, west of Calgary. The Calgary International Airport services daily flights from most major centres in Canada, the United States, Europe and the Orient.

Canadian Airlines International and their regional partners have been selected as our "Official Carrier" See Supplement 2 for more information on special discount air fares.

Modern, comfortable coach service is available directly from the airport or downtown Calgary by Brewster Transportation and Tours. Departure times from the Calgary International Airport are 12:30, 3:30 and 6:00 PM daily. Major car rental companies are also located at the airport and in Calgary and Banff. Advance booking is strongly recommended. Free parking will be available for delegates staying at the Centre.

Please refer to Supplements 1 & 2 for further information.

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For matters concerning **Registration and Accommodation:**

The Banff Centre for Conferences
Box 1020, Station 15
Banff, Alberta, Canada T0L 0C0
Tel: 1-800-884-7545 (Canada) or 403-762-6308
Fax: 403-762-7502
http://www.banffcentre.ab.ca

STUDENT MEMBERS: Participate in Banff at the first-ever SIP Student Debate!

The SIP Student Debate will take place during our 1997 annual meeting in Banff, Canada (Aug. 24-29). I encourage all students who plan to attend the meeting to contact me now and join the non-competitive fun! You can form a team of two or more students from your department, or ask to join a pick-up team.

Each team will be randomly pre-assigned to give a 10-minute presentation on the background, "pro" position, or "con" position of the debate issue. These prepared statements will be presented in order, followed by 3-minute "pro" and "con" rebuttals. The audience will then join in with 15 minutes of questions and discussion.

I would welcome debate topic suggestions from students and non-students alike! Topic suggestions to date include:

* Bt-transgenic crops (OR field-released transgenic viruses): do the benefits outweigh the risks?
* Are microbial insecticides likely to become mainstream rather than niche products?

Please contact me (preferably by e-mail) by March 20th to sign up for the debate or to suggest debate topics. Thank you!

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LETTERS TO THE EDITOR

Scientific Drawings

December 1, 1996. The Cordoba logo of padre Torrubia which was described in the SIP Newsletter 28:2 is interesting from another aspect not previously mentioned. In old reports of travels and expeditions, the authors did not themselves prepare the drawings of interesting animals. They described in general terms the observed objects and the designer did his drawing without any further input from the author.

When Torrubia described a plant arising out of the wasps, the artist interpreted this sentence as plant with leaves and stem. This is the way the different dragons and monsters of the oceans were presented when given the tales by sailors etc. Proportional drawings with precise descriptions of organisms were prepared only after the taxonomy was under complete control of the taxonomists and then organisms were defined precisely. Even so, nature is rich enough with surprising forms and structures, sometimes only of microscopical or ultrastructural size.

Jaroslav Weiser, Czech Republic

Don't Forget to Pay Your Dues for 1997

Dues notices for 1997 were mailed out by FASEB last year. To ensure that your membership remains current that you continue receiving the Newsletter, **and that your name appears in the next SIP Membership Directory,** please don't forget to return your notice with payment immediately. **The next issue of the Newsletter will be sent only to paid up members.** Lapsed memberships require further action which only ends up costing the Society needlessly. If you haven't yet received your 1997 notice or have misplaced it, please contact FASEB as soon as possible EMAIL staff@dues.faseb.org.

MICROBIAL CONTROL NEWS

NBIAP/ ISB November News Report

Information Systems for Biotechnology Upgrades World Wide Website - For the past few weeks, Information Systems for Biotechnology has been preparing to convert its Internet services to a new platform that will more efficiently serve our users. The new Windows NT system now online will be easier to maintain and provide a solid base for future applications.

As frequent users know, the ISB Website is a bit different from most in that ISB maintains online searchable databases. Most of these databases use data supplied directly by other sources, such as USDA/APHIS, or they are maintained under contract to ISB. The new operating system will allow ISB to do away with the telnet-based interface that was used to access the databases. Now, all of the database access programs have been rewritten to take advantage of standard web tools. With the click of a mouse button, scrollable menus, "radio buttons", check boxes and text entry boxes make database searching easier than ever before. Search results are presented on screen in standard web format and can be printed or saved to a file automatically down loaded to your computer. Databases which are available include:

- Environmental Releases (formerly the Biomonitoring Database)
- U.S. Biotechnology Centers
- Companies in Agbiotech
- State Contacts for Federal Rules
- Institutional Biosafety Committees
- Compendium of ISB/NBIAP News Report Articles

Two of these databases have undergone extensive improvements. In the Environmental Releases database, records of notifications for field tests can now be searched separately from the entire listing that includes courtesy, import and interstate movement notifications as well. Both permit and notification records can be searched by multiple criteria such as organism, gene, phenotype, location, or institution, and date. Search results can be filtered by a "sub-search" of the data using standard browser Find or Search buttons. The Environmental Releases database also contains records of deregulated products and offers instant access to associated APHIS documents such as Environmental Assessments and Determinations.

The Compendium of ISB/NBIAP News Report Articles is a collection of over 1100 articles dating back to the earliest issues of the News Report from 1989. The database allows users to quickly search for past articles using keywords. It's especially useful for tracking the history or evolution of a particular topic, product, issue or development in agbiotech, such as Bt or the Flavr-Savr tomato.

As is the case with most good Websites, the ISB site will continue to evolve to serve the needs of its users. In the coming months, we hope to introduce better site-wide keyword search capacity, new documents, and faster access to data. But the best way for us to improve the system is to hear from you. Your suggestions, criticisms and kudos can help us provide better services to you. Please take a look at the ISB Website at http://www.nbiap.vt.edu and e-mail me at nbiap@vt.edu with your suggestions as to how we can improve our coverage of agricultural and environmental biotechnology.

Doug King, Information Systems for Biotechnology

Use of Transgenic Commodities in Foods: Resistance and Response - A trade association representing food retailers and wholesalers in 20 European countries has taken a stand against purchasing U.S. soybeans this year unless genetically engineered soybeans are clearly separated and labelled. At a news conference in Washington October 6, a spokesman for EuroCommerce warned that several of the organization's major members would not buy soybeans from the U.S. without assurance that they would not receive genetically altered ones.

The European Union (EU) has already approved entry of Monsanto's herbicide tolerant Roundup Ready soybeans, which are likely to arrive mixed in with conventional soybeans. EU approval for Bt corn is still pending, due to opposition by 13 of the 15 EU members. In Switzerland, the two biggest food retailers are likewise demanding that the U.S. producers separate transgenic soybeans so that all derivative products can be labelled. Entry into the country, a non-EU member, is being fought by Greenpeace and other environmental groups which are petitioning the Swiss government to bar imports of any genetically engineered foodstuffs.

Back in the States, the Chicago Board of Trade, the world's largest futures market, has said it would accept the genetically modified corn and soybeans to satisfy its grain contracts. Cargill and Archer Daniels Midland, major U.S. exporters, said they will accept the soybeans from growers without reservation. Officials at Central Soya Co. will accept Roundup Ready Soybeans at all six of their crushing plants, but will reserve one of their Ohio elevators for non-engineered soybeans to allow later comparative testing in processed products.

The U.S.-based Corn Refiners Association announced that food and feed products derived from Bt corn meet all current safety regulations of the FDA, USDA, EPA, and the European Union. The group's policy states that no statutory, regulatory, compositional, environmental, food or feed safety issues exist to prevent utilization of Bt corn, as approved by the U.S. government, in the corn wet milling industry.

At the same Washington news conference, consumer activist Jeremy Rifkin, head of the Foundation on Economic Trends (FET), announced that FET has targeted 10 food products for a worldwide boycott unless the makers pledge not to use any genetically modified soybeans or corn. Companies producing Kraft salad dressings, Coca-Cola, Nestle Crunch, Quaker Oats corn meal, Green Giant Harvest Burgers, Similac infant formula, Karo corn syrup, MacDonald's french fries, Fleischmann's margarine, and Fritos were warned that if their food products contained any Roundup Ready soybeans (Monsanto) or Bt corn (Ciba Seeds/Mycogen), consumers would be called to boycott the products.

Rifkin asserted that consumers may suffer allergic reactions to the genetically altered herbicide tolerant soybeans, and that their use will lead to greater applications of chemicals in agricultural fields. Widespread use of corn engineered with Bt genes for control of European corn borer, he argued, would undermine the effectiveness of a valuable biopesticide by allowing insects to become resistant to it.

SIP Home Page on the WWW

In addition to providing information regarding our Society, the page is intended to promote new membership and inform those who cruise (surf, browse) the web (internet) about invertebrate pathology. Our web sites provides information regarding the table of contents of the latest Newsletter, deadlines for submission of articles to the next Newsletter, dates when to expect receipt of the next Newsletter, schedule of meetings and the possibility to download membership application and meeting registration forms. Address:

"http://sip.home.ml.org"

Check it out!

Monsanto disputes the allegations against Roundup Ready soybeans. The company points out that the potential for allergic reactions was evaluated as part of the regulatory approval process. Reviews in Japan, Europe, and South America similarly concluded that a person not allergic to soybeans will not be allergic to the herbicide tolerant variety. The company also maintains that total herbicide usage will decrease because farmers will be able to use Roundup herbicide. In a low-key response to Rifkin's letters threatening a boycott, Monsanto has talked with the food companies to make sure they understand the product.

The Institute of Food Technologists (IFT) responded to the news conference by issuing a press release asserting that there is no scientific evidence of environmental and health risks associated with gene-spliced soybeans and corn, and that Rifkin's allegation of such hazards is without merit and his call for labelling of modified U.S. crops is unnecessary to ensure consumer safety.

According to Joyce A. Nettleton, D.Sc., R.D., director of Science Communications at IFT, there is no evidence that genetic transfers between unrelated organisms pose hazards that are different from those encountered with any new plant or animal variety. Plants produced by rDNA technology, such as soybeans and corn, must meet exactly the same safety standards as unmodified plants or those genetically engineered by another method. In addition to complying with U.S. food safety standards, genetic engineering technologies in agriculture are compatible with conservation and protection of the environment as well as with sustainable methods of agricultural production.

IFT, founded in 1939, is a non-profit scientific society with 28,000 members working in food science, technology and related professions in industry, academia, and government (http://www.ift.org). The Institute believes that recombinant DNA technology will enhance public health and environmental protection by:

- increasing biological resistance to specific pests and diseases, thereby decreasing the need for synthetic chemical pesticides;
- improving plant adaptability to harsh growing conditions, such as drought, salinity, and temperature extremes;
- augmenting plant tolerance to more environmentally safe herbicides that discourage weeds but leave the desired plant unaffected without harming the environment;
- controlling more desirable nutritional or functional plant characteristics such as altered fatty acid content or lower water content;
- increasing yields to meet expanding world food needs.

How trade and consumer acceptance issues will play out is hard to say. What proportion of consumers actually want biotech foods to be labelled? Will they be willing to pay the added costs? How far should it go? If tomato sauce made with transgenic tomatoes should be labelled, what about frozen pizzas and burritos made with the sauce? If chickens are fed Bt corn, should the meat be labelled? If so, should cans of chicken soup? bouillon cubes? gravy mix? dog food? What if those chickens had been given a recombinant vaccine? Some commodities, like soybeans and corn, are processed into dozens of different forms that are used in hundreds of kinds of foods. If the technology must be labelled, where do we draw the line? Important decisions are being made that will affect us as individual consumers, as members of the biotech community, as citizens of the world. We all need to listen to what is being said and join the debate. Stay tuned.

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It's Not Just Plants Anymore -This year has brought regulatory approval for releases of genetically engineered mites and nematodes. The mites, a predatory species carrying a marker gene, are being monitored for their ability to persist in Florida, disperse from the test site, and control spider mite prey. The release will be used to monitor persistence of the molecular marker under field conditions, and to demonstrate that the transgenic strain can be

eliminated from the site at the end of the experiment by application of a registered pesticide. The field test is a necessary preliminary step in the long term process of developing transgenic arthropods with enhanced ability to control pests in agricultural IPM programs. USDA/APHIS issued a permit for the release in February of this year.

The transgenic nematodes are an insecticidal species engineered with the gfp (green fluorescence protein) marker gene and multiple copies of the hsp70 (heat-shock protein) gene. Wildtype nematodes tend to be less economical, stable, and effective than chemical pesticides. Introducing genes for traits that overcome these limitations may open the door to another class of improved biological control agents. The field release is designed to test the hypothesis that field persistence will be enhanced in the genetically modified strain. Upon reviewing the request for a field test permit, APHIS concluded that the transgenic nematodes did not present any risk of becoming a plant pest and therefore were not considered a regulated article under the Federal Plant Pest Act. As requested by the applicant, however, APHIS issued a Courtesy Permit to facilitate movement between governmental jurisdictions.

These two releases are undoubtedly the first of many resulting from the application of genetic engineering techniques to a broadening range of organisms.

In anticipation of additional field test permit requests, the Biotechnology Evaluation Unit (BE) within BSS-PPQ-APHIS-USDA is in the process of establishing mechanisms to communicate with the public their activities involving the regulation of genetically engineered arthropods, and to facilitate the participation of the public in the permitting process. Since September 1995, BE has been maintaining a site on the APHIS World Wide Web home page entitled "The Regulation of Transgenic Arthropods (and other invertebrates)" (http://www.aphis.usda.gov/bbep/bp/arthropod). The site carries permit applications received for the release of transgenic arthropods into the environment, the appropriate assessment documents subsequently prepared for each permit application, as well as other information related to the permitting of transgenic arthropods.

During the 120 day period that BE reviews and evaluates each permit application, the public also has the opportunity to review each request. BE is establishing an electronic mailing list of individuals and groups that would wish to be notified by e-mail that a transgenic arthropod permit application has been received by the agency and is now posted on the BE home page. If you want to be included in this Transgenic Arthropod Interest Group, or have other questions, send e-mail to oyoung@aphis.usda.gov.

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NBIAP/ISB December News Report

Technology Acquisition: AgrEvo Makes A Move - In a recent article, I described Monsanto's growing emphasis on biotechnology as a key piece of its agricultural arsenal, bolstered by the apparent success of recently launched products including recombinant soybean. As agricultural biotechnology continues to reveal its commercial value, other multinational agrochemical companies are aggressively investing in biotechnology as a future cornerstone of their business. An article in a recent issue of Nature Biotechnology (1) describes the acquisition of PGS International (Amsterdam, the Netherlands) by the European agri-chemical company AgrEvo. Not only does this acquisition point to the continued consolidation of the agrochemical and plant biotechnology sectors, but also the growing value that companies are placing on innovative, patent-protected, plant biotechnologies. The PGS/AgrEvo deal was valued at $730 million, representing one of the largest ever acquisitions of a privately owned biotechnology company. Over 95 percent of the purchase price represents AgrEvo's valuation of technology, as PGS's assets were worth only about $30 million. A failed 1994 attempt by PGS to go public on NASDAQ would have only valued the company at between $200-$250 million, well below AgrEvo's price.

The Nature article points to PGS's position in the *Bacillus thuringiensis* (Bt)-related insect resistant plant arena as a major attractant of PGS. AgrEvo is hoping that access to PGS patents and technology related to Bt will help it gain upwards of 15 percent market share of an estimated $6 billion global market for genetically modified plants by the year 2005. AgrEvo inherits PGS's current patent infringement suites against Ciba Seeds and Mycogen Plant Science related to Bt.

The significant price that AgrEvo was willing to pay for PGS opens the door for other plant biotechnology firms to shop their technologies, as some have started to do including European firm Mogen. Demonstrated commercial success of plant biotechnology products will also continue to enhance the value of firms working in agbiotech, and likely increase the cash flowing into the sector as investors recognize the opportunities for ample returns on investment.

References:

Ward, M. PGS-AgrEvo deal stirs up plant biotechnology. Nature Biotechnology, Vol. 14, No.10, October 1996, p.1210.

William O. Bullock
Institute for Biotechnology Information
http://www.biotechinfo.com

U.S. Grant and Funding Information on the Internet- Agricultural biotechnology research in U.S. academic institutions is supported largely by federal funding. However, it takes considerable time and resourcefulness to keep track of the multitude of grant opportunities that arise, often with short notice. Now, there is help on-line for scientists: a free e-mail service called 'FEDIX Opportunity Alert' provides scientists with periodic and customized information on research and education funding programs from the twelve participating U.S. federal agencies. To subscribe to this service, visit <http://web.fie.com/> and choose 'FEDIX Opportunity Alert'. You will be asked to provide key words that describes your personal interest profile.

The FEDIX conducts a daily search of grant announcements and automatically e-mails you with any 'hits' that match your profile. One could also conduct a search on the FEDIX web site for current grant announcements from the participating agencies or browse by 'agency' or 'subject'. The FEDIX also provides links to the web sites of many federal agencies including the USDA/CSREES (http://www.reeusda.gov/). The National Science Foundation does not participate in the FEDIX program, but you can visit the NSF site at <http://www.nsf.gov/> and click on the 'Program Areas' to learn about their grant programs.

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NBIAP/ISB January News Report

Insect Control in Agriculture: Report From the ESA Meeting- The Entomological Society of America annual meeting in December had several sessions of interest to the biotech community. The symposium on "Biotechnology and Agriculture: New Green Revolution or Recipe for Disaster," was standing-room-only for the entire morning. A few highlights are given here.

Bt Cotton: Preliminary 1996 performance reports for commercial cotton and corn varieties genetically engineered with Bt insect control genes were positive. More than 1.8 million acres of cotton resistant to bollworm, tobacco budworm and pink bollworm were planted in 1996. From the outset, genetically engineered varieties were in high demand from farmers willing to pay the $32/acre technology fee. As much as 77% of the cotton acreage in Alabama was planted to Bt varieties such as DeltaPine Land Company's NuCOTN lines. It was a good year for cotton throughout most of the southern growing regions. NuCOTN33B posted an 8-10% increase in yield over its parental line, due to the combined effects of the Bt insect control gene and the variety's improved agronomic performance.

The first year of introduction has taught the company a basic lesson in technology adoption. After determining that half of their on-farm calls this season were due to farmers getting seed mixed up, DeltaPine Land Co. began color coding their cotton seeds so that farmers can better track which fields are planted to transgenic varieties. A company spokesman estimated that within five years, 80-90% of cotton seed planted in the U.S. will be transgenic.

Bt Corn: Did Bt corn resistant to European corn borer deliver on its marketing promise? This year transgenic Northrup King lines produced anywhere from five to twelve bushels per acre more than unprotected varieties. The Bt gene itself does not confer a yield advantage, rather it protects the crop's yield potential. In a year of high insect pressure like 1996, farmers get a high benefit from Bt varieties, but in a year of low insect pressure the yield improvement over conventional varieties may only just cover the added cost. Insect pressures cycle over time and geographical areas. The U.S. corn belt is coming off two years of high European corn borer pressure, so while Bt corn did well enough this year to convince farmers to buy it next year, insect pressure is likely to decline somewhat. Before they plant their 1997 crop, farmers will try to predict how serious pest problems will be in the coming season. Many are expected to decide to pay the $7.50 per acre premium for Bt seed corn as a form of insurance against next year's uncertain losses.

Engineered Baculoviruses: Insect-specific viruses are being engineered with a variety of genes to make them more effective biocontrol agents. Genes encoding diuretic hormone, juvenile hormone, Bt delta endotoxins, and mite toxins are being added to baculoviruses to improve the killing power of these viral insecticides.

This year's field tests of a baculovirus engineered with the AaIT gene encoding a scorpion toxin provide a glimpse at the environmental fate and genetic competitiveness of the recombinant virus. The tests evaluated the efficacy of genetically-altered viruses against lepidopteran species (cabbage looper and tobacco budworm) on tobacco, cotton and leafy vegetables. No difference was seen in the physical properties of transgenic versus non-transgenic strains; they were equally sensitive to rapid degradation in sunlight, slow degradation at temperatures above 85°F, and temperature/moisture interactions.

Tobacco budworm larvae killed by the AaIT strain harbored ten-fold fewer viral inclusion bodies than larvae killed by the non-engineered strain. This result was expected, since insertion of the toxin gene leads to faster death of the insect host, therefore fewer viral progeny are formed. In mixed infections established with a 9:1 ratio of transgenic to nontransgenic virus, the inserted gene could not be detected by the 6th generation due to reduced reproduction.

Use of engineered viral insecticides offers several environmental benefits. The virus serves as an efficient dose delivery system in that no toxin is applied to the crop, only the toxin gene. Only in suitable insect hosts is the toxin gene expressed; when just enough toxin is produced to kill the host, the system shuts down. The AaIT toxin binds with high affinity to insect neurons, thus death is due to disruption of the nervous system rather than from massive viral infection. While crude scorpion venom does have effects on spiders, crustaceans and mice, the purified AaIT toxin protein does not. The toxin has no affinity to mammalian neurons, and neither the toxin nor the recombinant virus has any clinical effect on nontarget insects, rodents and beneficial species. Eventually, these data may help support a food use registration for similar viral pesticides.

More Options: Ciba-Geigy is working with a new class of insect control proteins produced by *Bacillus thuringiensis*. Unlike the sporulation-specific delta endotoxins found as crystals in Bt spores, Vegetative Insecticidal Proteins are secreted during log phase of growth. Like the endotoxins, these novel proteins target midgut epithelial cells, however they have a different activity spectrum. The effort to discover and develop a wider array of insect control proteins has dual benefits. If successful, it sidesteps the increasingly litigious battle over rights to the various Cry genes. From an environmental perspective, in broadening the biological arsenal used to control insects, the threat of pests becoming resistant to a single over-used compound is lessened.

Pat Traynor
Information Systems for Biotechnology
traynor@nbiap.biochem.vt.edu

Inventors: Don't Trip Over Electronic Timelines- Last October, Science Online began posting full-text articles on its web site. Such rapid access to new research findings should enhance the progress of individual projects. On the negative side, rapid electronic publication can unintentionally create "prior art" that may bar patent protection for the scientific discoveries described by an electronically published report.

In patent law, prior art is the information used to judge whether an invention is both novel and not apparent. In other words, prior art provides a standard to determine if an invention meets the legal requirements of a patentable invention. The policy behind the criteria of novelty and conspicuousness is that a patent should not remove something from the public domain that either exists as the claimed invention or exists as an obvious variation of the claimed invention. Consequently, an invention is not patentable if it was placed in the public domain before a "critical date." In the United States, the critical date is the date of invention under 35 U.S.C. Section 102(a), or one year before the patent application filing date under 35 U.S.C. Section 102(b).

The present test for determining whether any disclosure is prior art focuses on the accessibility of information rather than on the form of the disclosed information. The Court of Appeals for the Federal Circuit has stated that public accessibility is the "touchstone" in determining whether a reference constitutes a "printed publication" form of prior art (1). Therefore, the fact that a reference is printed electronically, rather than on paper, is relevant to the prior art determination only to the extent that publication in an electronic form may affect public availability. There is little doubt that information posted on a web site is "effectively part of the public domain, impossible to retrieve" (2).

The bottom line is that the description of an invention in an Internet electronic publication will initiate the countdown toward the one-year statutory bar to a U.S. patent. At the same time, patent rights outside the U.S. may be destroyed at the time that an invention is disclosed in an electronic publication before filing a patent application. This is so, because the one-year "grace period" for publication under 35 U.S.C. Section 102(b) is unique to U.S. patent practice.

It is not possible to overemphasize the importance of knowing the exact date that an article will be published on the Internet. Science, for example, posts information online on the same day that the corresponding paper version is mailed to print subscribers. This electronic publication advances the effective publication date of disclosure since, under U.S. patent law, a paper journal is effective as prior art on the date that it reaches the addressee, not on the date of mailing (3).

Other online journals publish abstracts or full texts of articles weeks before the publication date of the paper journal. Under an enlightened editorial policy, Blood Cells, Molecules & Diseases informs researchers in its "Instructions to Authors" about the relative timing of Internet and paper publication. The journal also includes the Internet posting date on each paper article as the official date of publication. According to Dr. Ernest Beutler, the editor-in-chief of Blood Cells, Molecules & Diseases, the reason that his journal "adopted the practice of accurately dating all of our articles is precisely to establish priorities both from the point of view of scientific credit and from the point of view of establishing a date of dissemination of the intellectual property" (4). Unfortunately, not all online journals advertise their relative dates of electronic and paper publication, and it may be necessary to contact the editorial office of a journal to discover its publication policies.

Another form of electronic publication that can destroy patent rights is a nucleotide or amino acid sequence stored in a publicly accessible database. In fact, public access of such information can predate both electronic and paper publications of the relevant research report. Examiners in the European Patent Office have routinely cited as prior art nucleotide and amino acid sequences obtained from electronic

databases. During the past year, it became clear that U.S. Patent Office examiners have enthusiastically adopted this practice as well.

In sum, the important point is that under patent law, "publication" means that information becomes publicly accessible regardless of the form of the information. With this thought in mind, an inventor can provide current information to further open scientific communication, while maintaining a flow of funding.

References:
(1) In re Hall, 228 USPQ 453, 455 (Fed. Cir. 1986).
(2) Religious Technology Center v. Lerma, 908 F.Supp. 1362, 1368 (E.D.Va. 1995).
(3) Carella v. Starlight Archery, 231 USPQ 644, 647 (Fed. Cir. 1986).
(4) Personal communication.

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The material in these NBIAP/ISB News Reports is compiled by NBIAP's Information Systems for Biotechnology, a joint project of USDA/CSREES and the Virginia Polytechnic Institute and State University. It does not necessarily reflect the views of the U.S. Department of Agriculture or of Virginia Tech. The News Report may be freely photocopied or otherwise distributed without charge.

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3. Use ftp to connect to ftp.nbiap.vt.edu. Use "anonymous" as your user-id.

Mycogen Sues Ecogen for Bt Gene Patent Infringement

San Diego, Calif. January 23, 1997-- Mycogen Corporation has filed suit in Federal District Court here, claiming that a new bioinsecticide developed by Ecogen Inc. infringes Mycogen patents covering *Bacillus thuringiensis* (Bt) gene technology.

Mycogen's complaint states that Ecogen's Lepinox™ bioinsecticide for fall armyworm control in sweet corn and other crops is based on a protein produced by a microorganism genetically engineered with a "cry1F" Bt gene for which Mycogen holds two U.S. patents (Nos. 5,188,960 and 5,126,133).

Mycogen Crop Protection Executive Vice President & General Manager Andrew C. Barnes said that Mycogen has developed a new product for fall armyworm control based on the same Bt protein and will soon file an application to the U.S. Environmental Protection Agency to approve it for commercial sale.

"This unique and highly specific active ingredient and the technology used to isolate and produce it were discovered and developed by Mycogen," Barnes said. "We are seeking damages and an injunction to bar Ecogen from any use of our proprietary Bt technology."

Mycogen holds more than 60 U.S. patents covering Bt genes and proteins and the CellCap® encapsulation system and other technology it uses to develop bioinsecticide sprays and transgenic crops with Bt-based pest-resistance. Mycogen Crop Protection currently markets three Bt bioinsecticides and four products based on fatty acids.

Michael Sund
(619) 453-8030
http://www.mycogen.com

Bio-Care technology launches Australia's first *Metarhizium* Product

Bio-Care Technology Pty Ltd has announced the first sales of Bio-Green Granules. BioGreen is the product developed from the research of Dr. Andrew Rath and his colleagues (formerly from the Department of Primary Industry and Fisheries, Tasmania, Australia) and uses the DAT F-001 isolate of *Metarhizium anisopilae*. BioGreen was registered in Australia on 9/9/96 for control of the pasture scarab *Adoryphorus couloni*. Brochures, labels and MSDS's are available from Andrew Rath at the address below.

Bio-Care Technology Pty Ltd
RMB 1084 Pacific Highway
Somersby NSW 2250
Australia
Fax: +61 43 402243
E-mail: biocare@ozemail.com.au

Thermo Ecotek Subsidiary Acquires Biosys

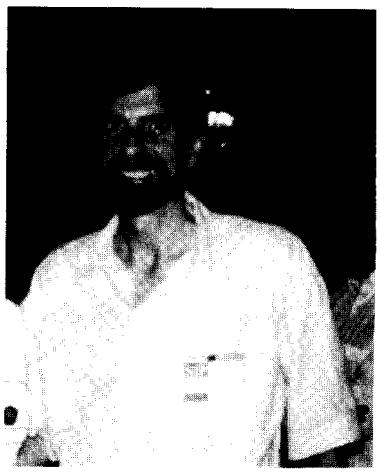
On January 20, 1997 Thermo Ecotek Corporation (ASE-TCK) announced that its wholly owned subsidiary Thermo Trilogy Corporation has acquired Biosys Incorporated, including the stock of a wholly owned subsidiary, AgriSense-BCS, Ltd., a UK company. Biosys produces pheromone, neem-azadirachtin, nematode, and virus-based biopesticide products as well as disease-resistant sugar cane.

Thermo Ecotek Corporation, is an environmental company involved in clean combustion and engineered clean fuels, as well as a range of other environmentally sound technologies. Its biopesticides subsidiary, Thermo Trilogy Corporation, has the following products line: neem/azadirachtin, neem oil, microbial fungicide *Gliocladium virens*, and microbial insecticide *Paecilomyces fumosoroseus*. Thermo Ecotek is a public subsidiary of Thermo Electron Corporation (ASE-TMO).

The new, expanded Thermo Trilogy, will have approximately 40 US employees located in six states, in addition to 60 employees of AgriSense in the United Kingdom. For more information please contact:

Ramon Georgis, Ph.D.
Director, Research And Development
Thermo Trilogy Corporation
10150 Old Columbia Road
Columbia, Maryland 21046

OBITUARY



Norman Crook
1945-1996

Several of you will already have heard the sad news of the death of Norman Crook on 31st October 1996, after a long and courageous battle against cancer. Some of you will only recently have seen him at the SIP meeting in Spain where, despite ill-health he was determined to chair the Division of Virology's first meeting and to present a Symposium paper. I regard myself as very lucky to have known and worked with Norman and, with the help of Doreen Winstanley, I hope to be able to convey something of the major contribution that Norman made to insect pathology and the life of SIP.

I first met Norman in 1977 when I was fortunate enough to appoint him to a research post in the Insect Virus Section at the Glasshouse Crops Research Institute which I had joined shortly after the retirement of Anker (W.A.L.) David. While I concentrated on the biological properties of insect

viruses, Norman's research focussed on their biochemical characteristics. That was in the days when the ELISA technique and restriction enzymes were starting to demonstrate their value for virus characterization. Norman soon grasped these technologies, improved and perfected them and applied them to a series of first-rate studies on the properties of the granulosis viruses of Codling Moth and *Pieris spp.* Norman was never satisfied until the technologies that he employed in his research were honed to perfection. He was always extremely generous in the way that he lent his newly-acquired and hard-earned expertise to others. He enabled me and many others in the lab to become 'experts' in REN analysis and ELISA overnight. In this way he was a major influence at the GCRI on research programmes as diverse as studies on auxin and the immunological identification of prey in the gut contents of predatory arthropods.

Norman was a mine of information on baculoviruses in general but he will be remembered for his expertise on GVs and the significant contribution he made to GV research. Even a productive few months working in Lois Miller's renowned *Autographa californica* NPV laboratory allowed him to pursue a GV gene - it was no accident that he just happened to travel with a collection of CpGV constructs! Techniques for virus characterization, the identification of diverse genotypes and the *in vivo* cloning of GV genotypes were developed in Norman's laboratory. In recent years Norman's work focussed on CpGV. He produced a detailed map of the genome and cloned and sequenced several genes. One of his interests was in the improvement of CpGV as a bioinsecticide by genetic manipulation. He was successful in obtaining the initial funding to start this work which permitted the employment of Doreen Winstanley. This ongoing collaboration with Doreen resulted in the production of the first genetically manipulated GV, which expressed beta-galactosidase. Norman was always willing to share his extensive knowledge and was a patient teacher to students and visiting workers passing through the laboratory. He was responsible for kindling and enriching GV research in many laboratories throughout the world and as a result he established collaborations with other laboratories.

The SIP benefited greatly from his contribution, often carried out in a 'backroom' manner befitting his natural modesty. He preferred to leave Denis Burges and me to provide the 'front of shop' image for the insect pathology group at Littlehampton but was always there when needed with his marvellous blend of practicality and quiet good humour. He was a tower of strength during the preparations for the 1982 Insect Pathology Colloquium at Brighton which was perhaps the first SIP meeting to move into the era of molecular biology. Norman was also a fount of well-considered opinions on how SIP could improve its services to members. I was delighted that he had recently become even more active in SIP affairs during the recent establishment of the Division of Virology and I hope that his hard work in encouraging more virologists to rediscover the benefits of the SIP will be continued by others.

Norman's enjoyment of SIP meetings was greatly enhanced by the inclusion of the 5-k races that now form a central part of each meeting. Those of us with modest inside-leg measurements had reason to consider that Norman, with his huge stride, had an unfair advantage. However, he was a natural athlete and he fully justified the high placings that he achieved in all the races that he entered. His enjoyment of these events was only marred by a greater-than-average capacity to go off-course!

During the years when we worked together we developed a friendship that has been of great value to me since I left the bench and moved into science management. On many occasions I used him as a sounding board to see whether I was making the right decisions or the wrong ones as far as the research scientists within HRI were concerned. I could always rely on getting a straight answer and I shall miss his wise counsel.

While work was a very important part of his life he was a committed family man with a wide range of outside interests. The last time I saw Norman, a week before he died, he was receiving the love and support of his wife Linda and their three children, Hannah, Eleanor and Joseph. He was also busy at the computer link that had been installed to enable him to contribute to the sequencing studies underway

in the lab. He will be greatly missed by those of us who had the privilege of knowing him; however, he has also left many scientific and personal memories that we can celebrate.

Chris Payne
Past President

MEMBERS ON THE MOVE

Dr. Andrew Rath resigned from EcoScience Corporation (Massachusetts, USA) just prior to Christmas 1995 and took up the position of Director of Research and Development at Bio-care Technology Pty Ltd (Sydney, Australia). Andrew is responsible for all the fungal R&D and product development at Bio-Care. The *Metarhizium* program includes on-going development and support of Bio-Green Granules (the first *Ma* product to be registered in Australia - see related note on page **) as well as development of further *Ma* products (including conidia manufacture and supply for the *Ma* products of other companies and research organizations). Other fungal R&D includes testing of phosphate solubilising fungi and biocontrol agents for take-all control in wheat.

Andrew and his family took a considerable time to settle back into Australia - after packing up their Massachusetts house (surrounded by three feet of snow), the container shipping company went bankrupt leaving their container stranded in Singapore. Seven months later the container finally arrived in Sydney with almost everything in tack (four bottles of wine had lost their corks but all the other wines are actually drinking OK!). Andrew was pleased to be able to wear something different from the two pairs of pants and four shirts that he had brought in his suitcase. Andrew's new address is:

Bio-Care Technology Pty Ltd
RMB 1084 Pacific Highway
Somersby NSW 2250
Australia
Tel: +61 43 40 2246
Fax: +61 43 40 2243
E-mail: biocare@ozemail.com.au

Moving?

To ensure proper address in future Membership Directory and for receipt of SIP Mailings including the Newsletter:

1) Contact FASEB and provide both **New** and **Old** addresses at:

Society for Invertebrate Pathology
FASEB Membership Department
9650 Rockville Pike
Bethesda, MD 20814, USA
Tel. 301-530-7026
Fax. 301-530-7001
EMail staff@dues.faseb.org

2) Prepare a paragraph including information about past and present postings, new address, telephone, fax and Email address and send to your Newsletter Editor for inclusion in the Members on the Move section in the next issue of the Newsletter. Editor's address can be found on page 2.

Dr. David Theilmann has recently changed laboratory locations. The Agriculture and Agri-Food Laboratories in Vancouver, B. C. were recently closed and the Agricultural Biotechnology group moved to new laboratories in Summerland, B.C. His new address is:

Pacific Agri-Food Research Centre,
Agriculture and Agri-Food Canada,
Summerland, B. C., V0H 1Z0 Canada
Tel: (250) 494-6395
Fax: (250) 494-0755
E-mail: Theilmannd@em.agr.ca

Roberto M. Pereira has accepted a position as assistant professor of insect pathology in the Department of Entomology and Plant Pathology at the University of Tennessee, Knoxville. Roberto was previously with the University of Florida where he conducted research on microbial control of fire ants and other urban pests. This new position is a tenure-track, twelve-month appointment, starting at 100% research, but with some teaching responsibilities in

the future. His research emphasis will be on insects of vegetables and woody ornamentals.

Roberto's new address is:
Dept. of Entomology & Plant Pathology
University of Tennessee
P.O. Box 1071
Knoxville, TN 37901-1071
Phone: (423) 974-7135
FAX: (423) 974-4744

PUBLICATIONS

Manual of Techniques in Insect Pathology
L. A. Lacey (ed.)

A large number of techniques for the isolation, identification, production and evaluation of insect pathogens are scattered throughout the literature. However, a single comprehensive manual of techniques in insect pathology has heretofore not been available. When confronted with the need to work on a new pathogen group, those of us trained in a particular area of invertebrate pathology must scour the literature in search of instructions for working with the new organisms.

In the Manual of Techniques in Insect Pathology an international group of experts have brought together a broad array of techniques for the identification, isolation, propagation/cultivation, bioassay and storage of the major groups of entomopathogens. This Manual was designed to provide general and specific background to experienced insect pathologists, biologists and entomologists who are beginning work with pathogen groups that are new to them. It will also be useful as a laboratory manual for courses in insect pathology and biological control and related areas of study. It is our hope that this Manual will also provide practical information to other researchers, students, biotechnology personnel, entomologists working in integrated pest management, and government regulators concerned with the more technical side of regulatory issues. Chapters on safety testing of entomopathogens in mammals and complementary techniques for the preparation of entomopathogens and diseased specimens for more detailed study using microscopy and molecular techniques, broaden the subject matter of the Manual beyond classical insect pathology.

We have not only concentrated on the "how to" aspects of the techniques, but have also tried to provide the reader with an appreciation for why they are used as well as to provide a spectrum of supplemental literature and recipes for media, fixatives and stains. Owing to the infinite numbers of possibilities considering the diversity of pathogens and their hosts and a finite page limit for the Manual, we have had to be somewhat selective in the number of techniques that were covered and the amount of literature that could be referenced.

Chapters and authors:

1. Initial Handling and Diagnosis of Diseased Insects - L. A. Lacey & W. M. Brooks
2. Virus - H. Evans & M. Shapiro
3. Bacteria
   - -Identification, Isolation, Culture and Preservation of Entomopathogenic Bacteria - I. Thiery & E. Frachon
   - -Laboratory Bioassay of Bacteria Against Aquatic Insects with Emphasis on Larvae of Mosquitoes and Black Flies - L. A. Lacey
   - -Bioassay of *Bacillus thuringiensis* Against Lepidopteran Larvae -M. R. McGuire, L. J. Galan-Wong & P. Tamez-Guerra
   - -Bacteria of Soil Inhabiting Insects - M. G. Klein
4. Research Methods for Entomopathogenic Protozoa - A. H. Undeen and J. Vavra
5. Fungi:
   - -Identification - R. A. Humber
   - -Entomophthorales - B. Papierok & A. E. Hajek
   - -Hyphomycetes - M. S. Goettel & G. D. Inglis
   - -Oomycetes and Chytridiomycetes - J. L. Kerwin & E. E. Petersen
   - -Preservation of Cultures - R. A. Humber
6. Techniques in Insect Nematology - H. K. Kaya & S. P. Stock

7. Testing the Pathogenicity and Infectivity of Entomopathogens to Mammals- J. P. Siegel
8. Complementary Techniques:
   -Preparation of Entomopathogens and Diseased Specimens for More Detailed Study Using Microscopy - J. J. Becnel-Fluorescence Microscopy - T. M. Butt
   -The Application of Molecular Techniques to Insect Pathology with Emphasis on Entomopathogenic Fungi - R. J. St. Leger & L. Joshi

The Manual is dedicated to Professor Yoshinori "Joe" Tanada.

The volume will be spiral bound and the publication date is February 21st. The ordering information is as follows:

ISBN 0-12-432555-6

US and Canada: $110 (US dollars)
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Fax: 1-800-874-6418
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London, NW1 7DX, UK.
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Fax +44 (0) 171 267 0362

Academic Press is offering a 20% discount for the Manual to members of SIP. To receive the discount, orders from all countries must be placed with:

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Fax +44 (0)171 267 0362
Email: wildlife@apuk.co.uk

Lerry Lacey,
USDA, Yakima
llacey@gonzo.wolfenet.com

Wanted: Back Issues of the Journal of Invertebrate Pathology

The Lethbridge Research Centre Library is lacking the following issues of JIP: v.37 (1981) - v.39(1) and v.41 (1983) - v.54 (1989). If you are able to donate these, please contact the Newsletter Editor (address on page 2). Receipts for income tax purposes can be issued for Canadians.

POSITIONS AVAILABLE

Insect Pathologist. The Center for Economic Entomology, Illinois Natural History Survey, ANTICIPATES having a position available as an Insect Pathologist at the rank of Assistant Professional Scientist. We anticipate that the pathologist will be expected to specialize in ecology and diagnosis of pathogen species and microbial control of insects.

Applications are not yet being accepted. When approved, the position will be announced on the Illinois Natural History Home Page, located at http://www.inhs.uiuc.edu. To receive a position announcement and be notified when applications will be accepted, please write to:

Ms. Jacqueline Sanders
Illinois Natural History Survey
607 E. Peabody,
Champaign, IL 61820
Tel: (217) 244-7790

Research Entomologist (GS-11/12). USDA/ARS Horticultural Crops Research Laboratory. Fresno,

California, is seeking an innovative research scientist. The incumbent will conduct basic and applied research in entomology. The research will be conducted as part of a team effort directed towards the development of alternatives to chemicals currently used to control stored-product and quarantine pests.

The assigned area of responsibility will specifically be to develop insect pathogens as microbial control agents of post-harvest pests with emphasis on those infecting Coleoptera. The basic biology of insect(s) will also be determined as they relate to the utilization of potential microbials. The incumbent will also work closely with other entomologists conducting research on other control methods to develop integrated management systems. Specific objectives include: 1) isolate and identify potential insect pathogens for stored-product pests and conduct research to determine their feasibility and efficacy limits; 2) determine the critical or limiting factors, both physical and biological, i.e., population level, storage conditions, etc., that affect the potential effectiveness of the candidate pathogens for use as microbial agents; 3) integrate potential microbial control agents with other pest control strategies that will minimize the use of chemical pesticides.

The successful individual will be expected to develop an innovative, vigorous independent research program, collaborate with other scientists and to publish research results in refereed publications. A high level of knowledge in general entomology, basic and applied insect pathology, microbial control, insect biology and integrated pest management is required. A general knowledge of insect population dynamics, ecology, experimental design and statistics is preferred.

Must be a U.S. citizen. A Ph.D. is highly desirable. Candidates with postdoctoral experience are preferred. Salary will be commensurate with experience ($36-$43K). Call **Dr. Patrick Vail at 209/453-3000** for further information and an opening date for the position. USDA/ARS is an Equal Opportunity Employer, women and minorities are encouraged to apply.

POSITIONS WANTED

Elena V. Oleinikova, Ph.D. 31 years old, **invertebrate pathologist**, is seeking employment in the U.S. or Canada. The doctoral thesis was "Infectious diseases of the abundant species of water invertebrates from the north of the Black Sea". Elena also has work experience with silkworms.

Elena V. Oleinikova
str. Aleko Russo 59/3
ap. 28.
Kishinev
277044. Moldova
Fax: 373.2.245533

Biologist (PhD in Entomology) with wide field and laboratory experience in biological control of insect vectors and pests with entomopathogenic fungi (influence of environmental factors) seeks **research assistant or postdoctoral position.** Presently located in Brazil but ready to relocate. Please reply to:

Christian Luz
CENARGEN (National Research Center for Genetic Resources and Biotechnology)
SAIN Parque Rural, W5 Norte, CP 02372
CEP 70849-970 Brasilia DF, Brazil
FAX: 00 55 61 340 3573
E-mail: luz@cenargen.embrapa.br

MEETING REMINDERS

More detailed information on these meetings can be found in previous newsletters or on our homepage: "http://sip.home.ml.org"

Microbial Insecticides: Novelty or Necessity?, University of Warwick, UK, 16-18 April 1997

British Crop Protection Enterprises
49 Downing Street, Farnham
Surry GU9 7PH, UK
Tel: +44 (0) 1252 733072
Fax: +44 (0) 1252 727194

Microbial Control of Pests in Sustainable Agriculture, Royal Veterinary and Agricultural University, Copenhagen, Denmark, August 10-15, 1997

Jørgen Eilenberg
Royal Veterinary and Agricultural University
Department of Ecology and Molecular Biology
Thorvaldsensvej 40
DK - 1871 Frederiksberg
Tel: +45 35 28 26 60 or 35 28 26 92
Fax: +45 35 28 26 70

Sixth International Mycological Congress IMC6, Jerusalem, Israel, August 23-28, 1998

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"www:http://Isb380.plbio.1su.edu/ima/index.html"

MEMBER NEWS

Dr. Inguelore S. de Souza

Dr. Inguelore S. de Souza took office in January, 1997, as President and Rector of the Federal University of Pelotas, Rio Grande do Sul, Brazil. Dr. de Souza will become the first woman President of a Brazilian University.

Dr. de Souza is an active SIP member, and spent research visits in the laboratory of Dr. Elizabeth Davidson at Arizona State University and Dr. A.A. Yousten at Virginia Polytechnic Institute, Blacksburg. She has attended the MacArthur Foundation short course on Biology of Vectors at Colorado State University and has attended several SIP meetings. She also was an organizer of the SICONBIOL meeting in Gramado, Brazil in 1994 and in Igausu Falls, Brazil in 1996.

EDITOR'S NOTES

We noticed a couple of errors in the last Newsletter (Vol 28. No. 3; November, 1996). On page 9 we erroneously stated that **Lawrence Lacey** was Chair of the Microbial Control Division. Instead we should have stated that the Minutes were submitted by Lerry as Secretary. The Chair of the Division is **Ann Hajek**. Secondly, on page 37, we left out reference to the photo of **Jean-Loius Schwartz** to the right of photo no. 5. Our apologies.

WHEN DID YOU RECEIVE YOUR NEWSLETTER?

In an effort to improve our service to you, we have been trying several ways to ship our Newsletters. We need to know how long it takes for the Newsletter to reach you. I just learned that the November Newsletter arrived in Brazil on 22 January!

We'd like to improve our delivery time, but at reasonable cost.

Please send me a short E-mail message or postcard if you received this Newsletter after March 15. Please include the postmark date and place which was on the Newsletter Envelope.

The Editor

Deadline for next issue. Please submit all material by **May 15, 1997** for publication in the June, 1997 issue.

30th Annual Meeting of the Society For Invertebrate Pathology

General Information

The 30th Annual Meeting of the Society for Invertebrate Pathology will take place at the Banff Centre for Conferences, Banff, Alberta, Canada between August 24 and 29, 1997.

Life at the Banff Centre is informal; casual clothing is the norm. Come prepared to enjoy the many outdoor recreational opportunities available in Banff National Park, or indoors at the Centre's Sally Borden Building. Brewster Travel maintains an on-site full service travel agency in Donald Cameron Hall. Tel.: 1-800-667-0324 (Canada and U.S) or 403-762-6361; Fax: 403-762-6363.

Banff National Park: The Park offers truly breathtaking opportunities for outdoor adventure, sightseeing and wildlife viewing. Here you may see elk, deer, coyote, bear or other wildlife. Additional information on Banff National Park may be obtained from the Banff/Lake Louise Tourism Bureau, Box 1298, Banff, Alberta, Canada T0L 0C0. Tel.: 403-762-8421, Fax: 403-762-8545. For travel information on the province of Alberta, contact Alberta Tourism, Box 2500, Edmonton, Alberta, Canada T5J 2Z4. Tel 1-800-661-8888 (North America) or 403-427-4321.

Travel: Banff is located 120 kilometres (80 miles), or a scenic 1.5 hr drive, west of Calgary. The Calgary International Airport services daily flights from most major centres in Canada, the United States, Europe and the Orient. **Canadian Airlines International** and their regional partners have been selected as "The Official Carrier" for our meetings.

North American Delegates: Canadian Airlines' Conventionair Reservations Office will guarantee you 15% off the full economy fare when you travel with them to our event. Savings of 35% off the full economy fares within Canada! Two night minimum stay and 7 day advance purchase required. Cancellation and re booking penalties apply. Advance purchase fares offer even greater savings. Should you qualify, you will be offered the lowest available fare at time of booking (certain purchase requirements apply). American delegates travelling on Canadian Airlines scheduled flights only and code shared CP. 6000 series, will be offered 15% off Full Business Class, 10% off the full economy return fares, "OR" 5% off any applicable advance purchase fares (certain restrictions apply). Simply contact Canadian Airlines' Conventionair office toll-free **1-800 665-5554** and advise them you will be attending the Society for Invertebrate Pathology Conference on 24 August '97 - 29 August '97 in Banff (Calgary). Our file registration number is **01140**. When making your reservations through your local travel agent, please ensure they register your booking with Canadian Airlines' Conventionair Office and **quote our file registration number 01140**.

International Delegates: International delegates will be granted 10% off full business fare, full economy fare, or B, H, V and Q class excursion fares on Canadian Airlines International flights. Make your reservations at your local travel agent and quote registration number **01140**.

Modern, comfortable coach service is available directly from the airport or downtown Calgary by

Brewster Transportation and Tours. Cost is $Cdn 34 one way and departure times from the Calgary International Airport are 12:30, 3:30 and 6:00 PM daily. Major car rental companies are also located at the airport and in Calgary and Banff. Advance booking is strongly recommended. For reservations call: Budget: 1-800-268-8900, National Tilden Interrent: 1-800-387-4747, Hertz: 1-800-263-0600, Avis: 1-800-879-2847 (ask for convention services for discount), Dollar: 1-800-800-4000 (North America) 1-895-256-565 (Europe), Thrifty: 1-800-367-2277. Free parking will be available for delegates staying at the Centre.

When taking the airport bus, ask that you be dropped off at the Banff Centre for Conferences. If driving by car, proceed through Calgary via the Trans Canada Highway West (No. 1) towards Banff. At the Park Gate, explain that you are attending a Conference at the Banff Centre for Conferences. Take the second exit in Banff and follow the signs to the Banff Centre. Upon arriving at the Centre, park in front of the Professional Development Centre on St. Julien Road and register at the Centre. At registration, you will be given a parking voucher and directions to a parking area.

Weather in Banff: Banff has a cool dry climate. The area, which has an altitude of 1476 m (4,500 ft), is subject to sudden, dramatic changes in temperatures and conditions. Summer temperatures average from 20 - 25°C, but nights are significantly cooler. **The bottom line weatherwise: Come prepared for anything!** People unaccustomed to high altitudes may temporarily experience shortness of breath and dizziness, particularly with physical exercise.

Wildlife: The deer and elk on the Centre grounds are wild. Do not feed or approach them. Show respect and maintain a considerable distance. **People should be especially watchful for elk as the males will be in rut in late August!**

Social Program: The social events will begin Sunday evening with a mixer at the Donald Cameron Hall Dining Centre from 7:00 to 10:00 PM. The 5-K race is scheduled for Wednesday noon at the Canmore Nordic Centre, site of the 1988 Olympic Winter Games Nordic Ski Events. At this time, non-runners will be able to relax and enjoy a picnic. Please sign up for the 15th annual 5-K race, but beware, we are offering one of the most challenging races ever! A sign up sheet is included with the registration package (Supplement 2).

Later on Wednesday afternoon we will take a bus to visit the famous Lake Louise. Steeped in history and fabulous panoramas, our journey will take us by the Vermillion Lakes with the spectacular background setting of Mt. Rundle. Then we will continue along the #1A Highway, passing the Hole-in-the-Wall, stopping at Johnston Canyon and making a picture stop at one of the many views of Castle Mountain. At Lake Louise, where the Victoria Glacier reflects off the water, we will have time (approximately 1 hour) to sit back and enjoy the picture-perfect setting. Or one can take a walk on one of the many hiking paths near the lake. Return to Banff by 6:30 PM.

On Wednesday evening we will take a bus to the Mountain View BBQ donut-tent for a great evening in Western Canadian tradition where we will enjoy a hearty meal and dance the night away to polkas, two-steps and square-dances in country and western style.

running track, gymnasium, exercise room, squash and raquetball courts, outdoor tennis court, massage therapist, and regular firness, aerobics and aquaerobic classes. If you would like to use the facilities, remember to bring appropriate clothing and equipment. The Sally Borden Building also houses a bar overlooking the swimming pool.

Key Dates to Remember

Deadline for Submission of Abstracts: April 15, 1997.
Deadline for early Registration: April 15, 1997.
Deadline for Registration Cancellations: July 15, 1997.

Contacts

Mark Goettel, Chair, Local Arrangements Committee
Lethbridge Research Centre
Agriculture & Agri-Food Canada
P.O. Box 3000
Lethbridge, AB, Canada T1J 4B1
Tel: 403-317-2264, Fax: 403-382-3156
Internet: goettel@em.agr.ca

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Martin Erlandson, Co-Chair, Scientific Program Committee
Agriculture and Agri-Food Canada
Saskatoon Research Centre
107 Science Place
Saskatoon, SK Canada S7N 0X2
Tel: (306) 956-7276; Fax: (306) 956-7247
E-mail: erlandsonm@em.agr.ca

For matters concerning **Registration and Accommodation:**

The Banff Centre for Conferences
Box 1020, Station 15
Banff, AB Canada T0L 0C0
Tel: 1-800-884-7545 (Canada) or 403-762-6308
Fax: 403-762-7502
http://www.banffcentre.ab.ca

On Thursday evening, the banquet will be held in the Dining Centre of the Donald Cameron building at the Banff Centre. There will be an extra cost of $Cdn 50 for the banquet for those not staying at the Centre. If you're not planning to stay at the Centre and wish to attend the Banquet, make sure to include the extra fee in your registration (see registration form in Supplement 2). The student, founder's lecture and 5-K awards will be presented at the banquet.

Optional Companion Tours:

1. Monday day trip to Columbia Icefield: The Columbia Icefield, located in Jasper National Park, presents an awesome sight when first viewed from the Icefields Parkway. It is one of the largest accumulations of ice south of the Arctic Circle and one of the most interesting and accessible icefields in North America. The icefield covers an area of nearly 325 sq. km. and reaches a depth of 250-320 meters. Tour includes a ride on the Athabasca Glacier on a "Snocoach." Your route will take you on a spectacular ride in either direction, with stops at Peyto and Bow Lakes and the Crowfoot Glacier, travelling the Icefields Parkway, one of the most scenic highways in the world. Pick up a bagged lunch from the cafeteria. Depart at 8:30 AM. Return at 6:00 PM. **COST**: $ Cdn 65/person. Child (under 12 years old): $ Cdn 35/ea

2. Tuesday evening tour of Banff Springs Hotel. Romancing the Springs. Tour the historical Banff Springs Hotel and plunge through a portal in time into a world of romance and Rocky Mountain adventure. Join a costumed interpreter for an historical drama/slide presentation that embodies the spirit of the romantic West. Following the presentation, you will tour the historic Banff Springs Hotel and listen to the stories of the "Grand Old Lady of the Mountains." Depart Banff Centre by bus at 7:00 PM, return at 8:00 PM. Limited to 50 people. **COST:** $ Cdn 20

Accommodation: Arrangements have been made to house delegates at the Banff Centre, the venue of our meetings. For delegates wishing to extend their stay, special pre-and post-conference rates are available on a first come, first serve basis. Accommodation costs include all meals during the conference; pre- and post-conference rates include room only; however, meals may be purchased at the Centre a la carte. All rooms include private bath and telephones and can be basically rated as three star. Superior rooms are more luxurious. A limited number of quad rooms will be available for students. Only a limited number of rooms have been reserved at the Centre. **Book early to avoid disappointment. The Banff Centre will hold our block booking only until 24 June, after which time the rooms will be released.** We anticipate filling our block booking well before this time.

Since Banff is an extremely popular tourist resort hosting approximately 5 million visitors per year, and since August is during peak tourist season, **it is imperative that everyone respect the deadlines as almost certainly no rooms will be available in surrounding hotels at this time.** Delegates are advised not to come to Banff unless they have confirmed reservations at the Banff Centre or elsewhere. Delegates not staying at the Banff Centre will need to purchase a Banquet ticket if they wish to attend the Banquet.

Recreation: Delegates staying at the Centre will have access to the Sally Borden Building, which offers a complete range of fitness and recreational opportunities, with a 25-m swimming pool, sauna, whirlpool,

30th Annual Meeting of the Society for Invertebrate Pathology

August 24 - 29, 1997

Banff, Alberta, Canada

Registration Forms

Abstract Submission Guidelines

Membership Application Form

SIP Banff '97

Society for Invertebrate Pathology

ABSTRACT SUBMISSION GUIDELINES

Absolute Deadline for Receipt of Abstracts: April 15, 1997

Please note: To facilitate the printing of the Abstract and Program Book by FASEB and its distribution prior to the meeting, the firm deadline for receipt of abstracts is April 15, 1997. Please help us by submitting your abstracts as early as possible before April 15, 1997. Due to possible scheduling problems we will reserve the right to limit the number of submissions or request that submissions be given as a poster rather than an oral presentation.

Since abstracts will be prepared electronically, there is no fixed form to follow. Please E-mail your abstract as an attachment in WP, MSWORD or ASCII Text. If this is not possible, please mail a diskette. In addition, please ensure to mail 2 hard copies.

Please adhere to the following guidelines:

Each line must not exceed a total of 80 characters and spaces.
The number of lines for each section is limited as follows:

Title:
* **No more than 2 lines**
* **Capitalize ONLY those words that must be capitalized**

Authors:
* **No more than 2 lines**
* **Put the last (family) name of the presenting author all in CAPITAL LETTERS**
* **All other names should appear in upper and lower case letters**

Affiliation:
* **No more than 4 lines**

Abstract:
* **No more than 30 lines**

ABSTRACT SUBMISSION FORM

Name & address:_____

I am submitting ___ (how many?) abstract(s) for presentation/publication in the program.
The abstract(s) is for presentation as:

Contributed Paper	_____	Student Paper	_____
Poster	_____	Student Poster	_____
Symposium Paper	_____		

I have sent the abstract(s) by electronic mail: YES ____ NO ____ (not available) ____
I have sent the abstract(s) on diskette: YES ____ NO ____ (not possible) ____

I also enclose two printed copies of my abstract.

Submit electronic and printed copies of your abstract, together with your name, address, phone, FAX number and e-mail address, to:

Martin Erlandson, Agriculture & Agri-Food Canada,
Saskatoon Research Centre, 107 Science Place
Saskatoon, Saskatchewan, S7N 0X2, CANADA
Phone: (306) 956-7276, Fax: (306) 956-7247

E-Mail: ErlandsonM@em.agr.ca

The Banff Centre

Conference Registration and Accommodation Reservation

Conference Name: **30th Annual Meeting of the Society for Invertebrate Pathology**
Conference Dates: **August 24 to 29, 1997**

Reserve your Accommodation at **The Banff Centre** by:
Tel: Call 1 800 884 7574(Canada) or (403) 762 6308
Fax: Complete this form and fax to Conference Reservations at (403) 762 7502
Mail: The Banff Centre for Conferences
Box 1020, Station 15
Banff, Alberta
T0L 0C0 Attention: Reservations

1. Personal Data:

Family name:_____First name:_____( ) M ( ) F

Title:_____Affiliation/Company:_____

Name Desired on Registration Badge:_____

Address:_____

City/Province/State:_____

Postal/Zip Code:_____

Business Phone:_____Fax Number:_____E-Mail:_____

Emergency Contact:_____Telephone Number:_____

I am a member of the SIP: ( ) Yes ( )No

I am a full time student at:_____

Please send Confirmation to the Above Address? Yes___ No____
If no please indicate correct address:_____

2.Registration: All in Canadian Dollars

		Amount
Regular Member*	$250.00	_____
Student Member*	$125.00	_____
Non-member	$300.00	_____
Companion**	$100.00	_____
Name:_____		
5-K Runner(with T-shirt)	$25.00	_____
T-shirt only(number.....)	$15.00 each	_____
Late Fee(after April 15)	$50.00	_____
Banquet Tickets(only for those not staying at Centre)	$50.00 each	_____
Companion Tours: Monday Trip	$65.00 (child $35)	_____
Tuesday Evening Tour	$20.00	_____

2a. Total Registration in Canadian Dollars:(Enter this amount on line 4a on next page) **$_____**

Deadline for Early Registration: **April 15, 1997**. Deadline for refunds (minus $40 handling fee): **July 15, 1997**
*Registration Fee provides: Admission to all Scientific Sessions, Registration Package, coffee breaks, Sunday reception, Wednesday outings and evening BBQ, Banquet entertainment.
**Registration for Companion provides: Coffee breaks, Sunday reception, Wednesday outings and evening BBQ, Banquet entertainment.

3. Accommodation Reservation: Please indicate desired room category and occupancy:

STANDARD: Single( )$168.00/night Double( )$110.00 per person per night
SUPERIOR: Single( )$210.00/night Double( )$131.00 per person per night
Companion Fee(Non delegate staying with a delegate, based on the Single room rate)
( ) $49.00/night(3 meals daily and lodging)
Student Quads: ( ) $90.00 per person per night
If sharing please indicate preferred roomates_____

Children: There is no extra charge for children under 12 in the room with their parents.
Childrens meals: 0 to 3--no charge, 4 to 12--$20.00 /day, over 12 years of age--$40.00/day

( )Smoking(limited availability) ( ) Non Smoking

Special Requests:_____

THERE IS LIMITED ACCOMMODATION AVAILABLE FOR THIS CONFERENCE. PLEASE RESERVE EARLY TO AVOID DISAPPOINTMENT. AFTER JUNE 24, 1997, RESERVATIONS WILL BE TAKEN ON A SPACE AVAILABLE BASIS ONLY.

The above rates include accommodation, conference and housekeeping gratuities, access to the Sally Borden Recreation Facility, and the following meals: Sunday night reception, breakfast, lunch and dinner on Monday and Tuesday, breakfast and lunch on Wednesday, Thursday and Friday plus Banquet on Thursday evening. Evening BBQ and excursions on Wednesday are covered in Registration fee. The above rates do not include applicable taxes (5% accommodation (room portion only) and 7% GST. GST is refundable to non-Canadian residents upon application and submission of receipts. Details on GST rebates will be available at the conference).

Pre and Post Conference Rate*: **Room only**: Standard: Single: $123.00/night Double: $65.00/person/night
Superior: Single: $165.00/night Double:$86.00/person/night
*Please note Pre and Post Conference rooms are very limited.

Arrival Date:_____ **Departure Date**:_____

Check in is after 3:00pm and Check out is by 12:00pm

4. Payment:

4a. For Registration: please remit full amount of $_____(in Canadian funds)(enter the amount from line 2a on previous page).
For accommodation: we **do not** require advance payment, however we **DO REQUIRE** your credit card information, **OR** a Cheque made payable to" The Banff Centre", equivalent to one nights stay(same as Pre and Post Conference Room only rate), in order to guarantee your reservation. Rooms that are not guaranteed will be released at 10:00 pm. No charge will be applied if your reservation is cancelled 48 hours prior to arrival.

If paying by cheque: cost of 1 nights stay(as per pre and post conference room rate) $_____
Total remitted by cheque(Registration plus room deposit) $_____

( ) American Express ( ) En route/Diners Club
( ) Visa ( ) Master Card

Name on Card:_____ Expiry Date:_____
Card Number:_____ Signature:_____

ALL FEES ARE IN CANADIAN DOLLARS ONLY. For an ESTIMATE of costs in $US, multiply the above fees by 0.73. Exchange rates vary daily. Check with your bank for the current exchange rates.

15th Annual SIP 5-K Race
Canmore Nordic Centre
12 PM,
Wednesday, August 27, 1997

Name: _____

Affiliation: _____

Address: _____

I wish to compete in the following category:

Category	Male	Female
Runner, under 35	_____	_____
Runner, 35 and over	_____	_____
Walker	_____	_____

PLEASE NOTE: The course we have chosen is challenging. There are some major elevation changes along the course so you should be prepared for a strenuous race! Elevations will range from 1375 to 1425 m.

Prizes will be awarded to fastest finishers in these categories and to a few randomly selected contestants.

CERTIFICATION: I intend to participate in the SIP 5-K race on August 27, 1997. I affirm that I am in proper physical condition to participate in this race and in consideration of acceptance of this entry, I hereby release sponsors, race officials, organizers, and organizations affiliated with this race from all claims of injury or damage to person or property, including death, resulting from my participation in this event.

Signature: _____

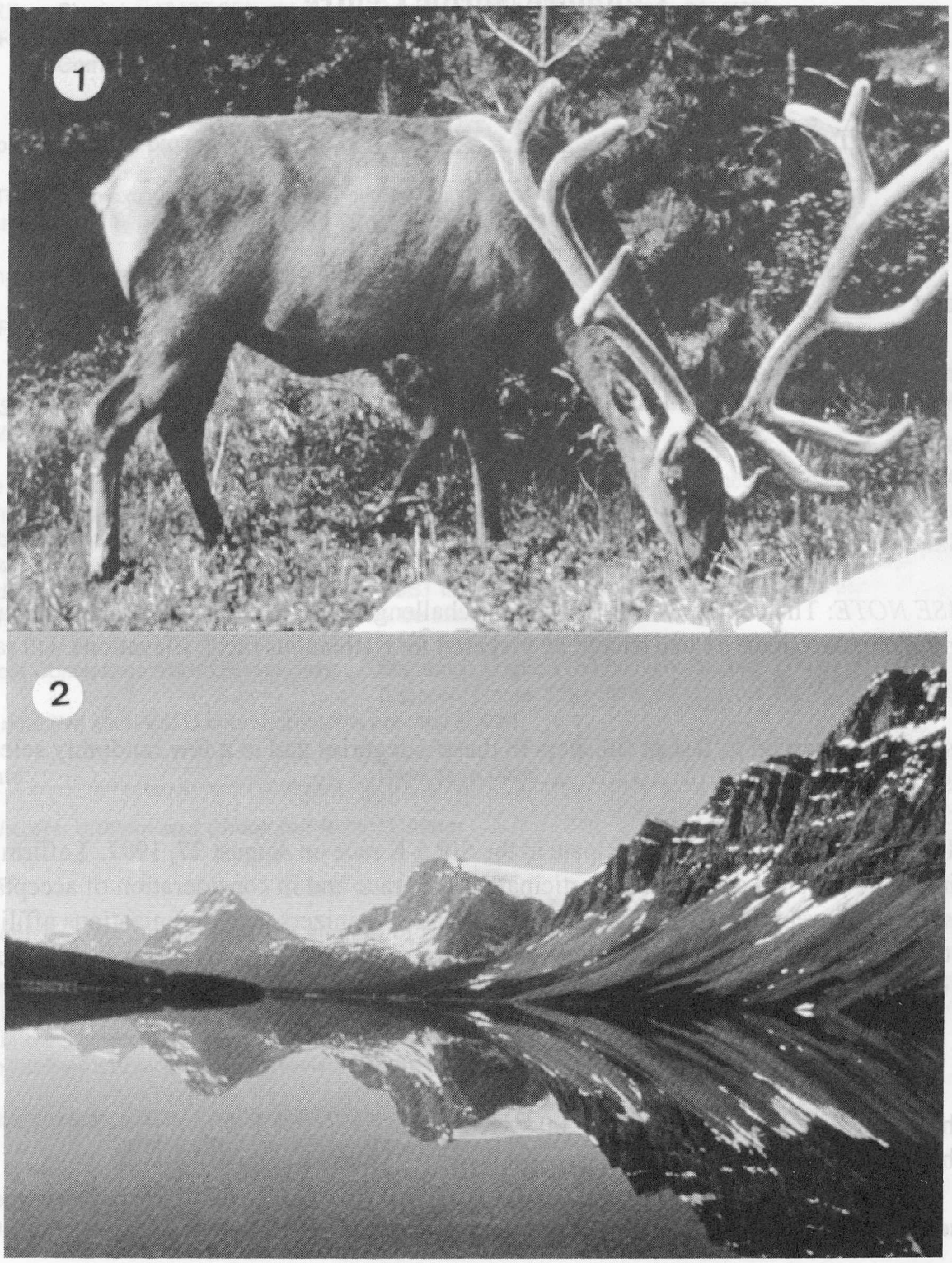
Fees: Race plus T-shirt: $25.00
T-shirt only $15.00
T-shirt size: Medium: _____ Large: _____ Extra Large: _____

Please enter the appropriate fee on the Meeting Registration Form

Submit completed form to:

Martin Erlandson, Agriculture & Agri-Food Canada,
Saskatoon Research Centre, 107 Science Place
Saskatoon, Saskatchewan, S7N 0X2, CANADA
Phone: (306) 956-7276, Fax: (306) 956-7247

E-Mail: ErlandsonM@em.agr.ca



Banff National Park. 1. Bull elk in spring. 2. Bow Lake
Photos courtesy of Banff/Lake Louise Tourism Bureau

1997 Membership Form

SOCIETY FOR INVERTEBRATE PATHOLOGY

Please Mail Form to: 9650 ROCKVILLE PIKE, MARYLAND 20814-2\3998, USA
Dues office Telephone (301)530-7026, Dues Office FAX (301)530-7001
Dues office EMAIL: staff@dues.faseb.org

BACKGROUND INFORMATION

NAME_____
first middle initial Last

ORGANIZATION _____ ADDRESS _____
street address or PO Box

ADDRESS_____
city state country zip code

PHONE _____ FAX _____ E MAIL # _____

Please check appropriate boxes: ☐ above is new address ☐ new member ☐ renewal

ANNUAL DUES

Membership (founding, charter and regular member)	☐ $30.00
Student membership (Complete Certification Below)	☐ $15.00
Division of Microsporidia	☐ $2.00
Division of Microbial Control	☐ $2.00
Division of Virology	☐ $2.00
Division of Bacteria	☐ $2.00
Journal of Invertebrate Pathology (special member price, plus $3 handling)	☐ $195.50
(Canadian subscribers add GST number + 7%)	☐ $_____
Credit card fee (applicable when paying by VISA or MasterCard)	☐ $2.00
Society contribution	☐ $_____
Endowment contribution	☐ $_____

PLEASE TYPE OR PRINT LEGIBLY

CREDIT CARD INFORMATION ☐ VISA ☐ MASTERCARD ☐ AMERICAN EXPRESS
(Must have 13 or 16 numbers) *(Must have 16 numbers)*

Card Number _____ Name on Card_____

Expiration Date _____ Authorized Signature_____

NOTE: Credit card charges will be processed by the Federation of American Societies for Experimental Biology

STUDENT MEMBERSHIP (Please Print Student's Name)

I certify that _____ is a candidate for an advanced degree in a field related to the study of Invertebrate Pathology

Institution_____

_____ Department _____

Signature of applicant's major research advisor)

To assure proper crediting of dues and processing of journal subscriptions, please remit dues promptly.

Sulphur Mountain Gondola overlooking Banff townsight (left), Banff Centre (arrow) and Banff Springs Hotel (lower centre).
Photo courtesy Banff Lifts Ltd.