

SIMON FRASER UNIVERSITY
Senate Committee on University Priorities
Memorandum

TO: Senate**FROM:** John Waterhouse
Chair, SCUP
Vice President, Academic**RE:** Master's of Pest Management External
Review**DATE:** July 29, 2003

Two separate reports from the members of the External Review Committee for the Master's of Pest Management Program (MPM) were submitted following the review site visit November 27 and 28, 2002. The report of the Chair, Dr. G. Khachatourians, was submitted on February 18, 2002. The second report was submitted by Drs. C. Scott-Dupree and Dr. M. Kogan, the two other external members of the review team, on March 5, 2002. The response of Z. Punja, Director for the Centre for Environmental Biology and Program Director for MPM and the MPM faculty, was received on April 18, 2002 followed by that of N. Haunerland, Chair of the Department of Biological Sciences on May 23, 2002. Comments from the Dean of Science, W. Davidson, were received on October 3, 2002. Drs. Davidson, Haunerland and Punja were invited to the November 6, 2002 meeting of the Senate Committee on University Priorities (SCUP) to provide input into the draft recommendations for the review and to respond to questions. At its December 4, 2002 meeting, SCUP approved recommendations in relation to the external review and forwarded them to the January, 6, 2003 meeting of Senate. Senate did not approve the recommendations and requested that the Department report back to SCUP by July, 2003. Subsequently, a revised program proposal for MPM has been developed and approved by the Department of Biological Sciences and the Faculty of Science and the Senate Graduate Studies Committee.

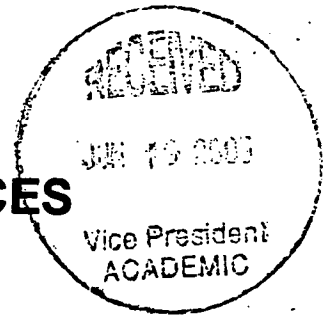
At its July 9, 2003 meeting, SCUP approved the MPM program proposal and recommended the following motion:

Motion

That Senate approve and recommend to the Board of Governors the proposal for a revised Master's of Pest Management Program in the Department of Biological Sciences in the Faculty of Science as outlined in S.03-76

encl.

- c: J. Driver, Dean of Graduate Studies
A. Harestad, Dept. of Biological Sciences
N. Haunerland, Chair, Dept. of Biological Sciences
M. Moore, Dept. of Biological Sciences
M. Plischke, Acting Dean, Faculty of Science

**SIMON FRASER UNIVERSITY
DEPARTMENT OF BIOLOGICAL SCIENCES****MEMORANDUM**

To: SCUP**From: Norbert Haunerland
Chair****Subject: MPM revision****Date: 6/18/03**

As requested by Senate on its meeting on January 6, 2003, the Department of Biological Sciences considered the recommendations by SCUP regarding the Master of Pest Management Program. Initial discussions took place in the Department Graduate Studies Committee, which sought wide input from all faculty previously involved in MPM matters. The Dean of Graduate Studies was invited to a DGSC meeting in which the recommendations were discussed. In all those discussions it was apparent that the revision of the program as recommended by SCUP was unworkable; not a single member of the Department expressed any interest in a strictly course-based professional program.

With the encouragement of the Dean, the enclosed proposal for a research-based MPM program that requires fewer resources and is carried by the whole Department was developed. Various drafts were discussed with the entire Department and the Dean of Graduate Studies. Concern was voiced about further delay in the approval, which would result in yet another year of no admissions to the program. The Dean suggested to move the revised proposal quickly through the relevant levels of approval.

The final version was approved with a strong majority at a Department meeting and subsequently by the FSGSC, as well as at a Faculty of Science meeting, and was sent to the Senate Committee on Graduate Studies. We now ask for speedy approval by SCUP and Senate, so that aggressive recruiting to the program can commence.

Through the generosity of Professor Thelma Finlayson, significant funds are available to jump-start the program. Four one semester entrance scholarships will be available on an annual base, with additional funds provided in the first year.

Comments to the specific recommendations by SCUP (printed in cursive letters) follow:

1. Program Structure and Fees

- *The program should be a course-based Master's level degree with a project requirement, separate from the existing MSc program in the Department of Biological Sciences;*
- *The program should be no more than two years in length (excluding a co-op option);*
- *The program shall charge regular graduate tuition fees, however, a cost recovery supplementary course fee for the summer field program should be charged;*
- *The program should be encouraged to explore the possibilities of a cohort based program.*

There is no interest at all for such a program in the Department. The program would drain resources away from undergraduate teaching and research based graduate training, at a time when students expect more service in exchange for their rapidly rising tuition fees. The Department expressed strong sentiments to rather terminate the program than offering a course-based professional degree.

2. Administrative Structure

The following administrative structure is recommended:

- *MPM should be a program within the Department of Biological Sciences;*
- *The MPM Program should have a Coordinator/Director whose mandate is to oversee the students and course of study in the MPM Program and who would represent the Program on the Department's Graduate Studies Committee;*
- *The Department of Biological Sciences is responsible for hiring and allocating faculty to staff the MPM program.*

The Department agrees that MPM should be a program within Biological Sciences. However, rather than re-creating another unit within the Department, with a director and separate resources, the Department feels that is essential to mount a program that is carried by the entire unit. In fact, the fragmentation of the Department into too many units with special interests was criticized in various external reviews, and we do not want to repeat the mistakes of the past.

3. Centre for Environmental Biology

Given the proposed changes outlined above, it is advisable that the Centre for Environmental Biology (CEB) be dissolved. If faculty members decide that it is important to have the equivalent of a CEB to give them a profile outside of the University, then it is recommended that they form a Schedule A centre along the lines of the Behavioural Ecology Research Group, the Centre for Wildlife Ecology and the Chemical Ecology Research Group which currently exist within the Department of Biological Sciences.

The Department supports this recommendation.

4. Curriculum

In view of the proposed changes to the program structure and administration, SCUP recommends that the proposal for a revised curriculum be revisited with the Dean of Graduate Studies, ensuring that the needs of present and future students are considered. In addition, the MPM Program is advised to consider the introduction of a co-op option.

The revised program structure and curriculum was developed with the Dean of Graduate Studies, as recommended.

5. Recruitment and Graduation of Students

In order for the MPM Program to utilize resources most effectively, it is anticipated that an intake of 10 or more students per year would be needed. To achieve this goal, the Department will be required to undertake appropriate recruitment efforts for students and to ensure that they have sufficient course offerings for students to complete the program within the 24-month timeframe (excluding a co-op option).

Although the number of students is less critical in a research-based program with a lower course load, the Department agrees that aggressive recruitment is required to revive the MPM program. Funds have been set aside to develop a high-impact web site, and to design and distribute posters and other recruitment material within Canada and beyond.

6. Budget

The Faculty and Department need to allocate realistic budgetary resources to the MPM Program, including a sufficient number of full-time equivalent CFL faculty members, in order to ensure the success of the program.

The costs of the program and the allocation of faculty will be done in the same manner as for any other undergraduate or graduate program in the Department.

7. Reporting Requirements

SCUP requests that the Dean of Science, the Department of Biological Sciences and the Master's of Pest Management provide a joint annual report. The focus of the report will be to outline the progress that has been made with respect to the implementation of the recommendations and to identify any problems arising. The report should be presented on an annual basis to the January meeting of SCUP for a period of three years (with the possibility of an extension of this requirement if SCUP deems it necessary).

The Department feels that it should be accountable for the program in the same manner as for other programs. We feel that an annual report to SCUP is an unnecessary and

unjustified requirement unprecedented in similar programs. The evaluation of the program by Senate should be included with the next Department review. Of course, progress will continually be monitored by the Department, the Dean of Science, and the Dean of Graduate Studies, as it is common practice for all our programs.

In closing, I like to add a personal observation. While the review of the MPM program was difficult and divisive, the Senate of Simon Fraser University must be commended for facilitating a solution that is not imposed but developed by the Department. In my opinion, this is a excellent example of how Senate should work.

Cc: Jon Driver, Dean of Graduate Studies
Mike Plischke, Acting Dean of Science

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate Committee on University Priorities

From: J. Driver, Dean of Graduate Studies

Subject: Curriculum Changes, Faculty of Science – MPM Revisions

The Senate Graduate Studies Committee, at their Meeting on Monday, June 23, 2003, approved the following:

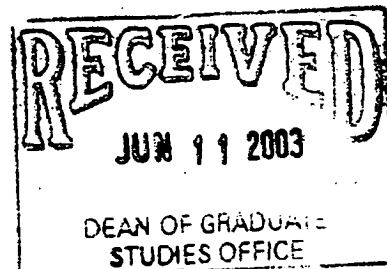
- a) Change in title and description for BiSc 842-3
- b) Change in description for BiSc 849-0
- c) Change in description for BiSc 816-3
- d) Change in description for BiSc 852-3
- e) Calendar entry change for MPM degree requirements



A handwritten signature in black ink, appearing to read "J. Driver".

J. Driver
Dean of Graduate Studies

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encl

**SIMON FRASER UNIVERSITY
MEMORANDUM**

To: J. Driver,
Dean of Graduate Studies

From: M. Plischke, Dean
Faculty of Science

Subject: MPM Revision

Date: June 10, 2003

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The Department of Biological Sciences approved the revision of the Master of Pest Management degree April 22, 2003 and the Faculty of Science approved it May 26, 2003.

The proposal and Calendar Change forms are enclosed.

Please place this on the agenda of the next Senate Graduate Studies meeting.


M. Plischke

c. R. Lockhart

Enclosures

Proposal for a Revised Master of Pest Management Program

Embracing Change to Chart a Future

Issues involving plants and animals as pests continue to occur and affect food production, forestry, health and conservation. Three recent examples are mountain pine beetles and salvage logging, mosquitoes and West Nile virus, and sea lice on farmed and wild salmon. Pests have substantial economic, environmental, health and social implications at local and international levels.

Pest problems offer opportunities for research of the biological processes involving pests. They also extend responsibility to the university to educate scientists that can provide leadership in managing these pests. The traditional M.Sc. degree focuses on research seeking to understand biological phenomena, and is less concerned with the application of such knowledge. A Master of Pest Management (MPM) Program is one way the university can meet its responsibility and allow our students to access the opportunities in the management and research of pests.

The Need for Change

While having a distinguished record, there is a need for a major revision of the existing Master of Pest Management Degree. Originally conceived as a course-based professional program, most graduate students in the past expanded their research to equal that of an M.Sc. thesis, and a research based degree remains the clear preference of students and faculty. Also, there have been dramatic changes in pest issues and technology that parallel those of other disciplines of the biological sciences. We expect such changes will continue to occur in the future. Moreover, changes to faculty associated with the MPM Program, either through retirements or in their interests, have altered the Department's capacity to offer the program in its past format. Hence, a revised program is required that matches our capacity and incorporates flexibility and adaptability to its curriculum. Revisions need to be implemented in a manner that retains opportunities for graduates of the MPM program to pursue further studies.

Distinctiveness of the Master of Pest Management

The MPM is clearly different from an M.Sc. The MPM is distinctive because it uses strong applied approaches to learning and discussion of biological principles, and it provides experience interfacing science with problems facing society. Its curriculum uses theory to guide practice but recognizes guidance must be effective and workable. A core of 800-level graduate courses is available to MPM graduate students. These courses, while theoretically based, extend the principles of biological systems to practices that reduce the impact of pest organisms. The program is made even more distinctive through its field courses where pest biology and management are examined and assessed within their environmental and human contexts.

The Master of Pest Management degree is recognized for its unique professional aspects that students gain, in part, from valuable contributions of research scientists and

managers who participate as guest instructors. The MPM curriculum will remain broad and cover diverse aspects of pest management. The MPM program provides a unique opportunity for students by offering a combination of basic research with the practical applications of pest management principles. As new technologies and skills emerge with which pest problems can be solved, there are exciting research opportunities for both students and faculty. Society is faced with formidable challenges because management of pests is becoming increasingly complex while constrained by limited resources and concerns of environmental sustainability. Hence, new and innovative approaches to management of pests are being developed that include biological control, biotechnology, and chemical ecology.

General research areas of faculty in Biological Sciences that could participate in the MPM Program include apiculture, behavioural ecology, biological control, biotechnology, chemical ecology, chemical toxicology, insect biochemistry and molecular biology, disease vectors, plant pathology, plant stress physiology, vertebrate pests, and plant ecology. Students may study pests of agricultural crops and forests, small fruits and orchards, urban environments and recreational areas, rangeland and livestock, aquaculture fisheries, and those concerning human health.

Revised Master of Pest Management Program

This proposed revision to the Master of Pest Management Program has greatly reduced course requirements and increased research components. The program requirements are two graduate field courses, four 800-level graduate courses and a research-based thesis.

Graduate Field Courses

The field courses combine classroom lectures with field demonstrations and problem-based learning. The students are provided with an overview of pest control methods as they are currently practiced in agriculture, forestry, and urban environments. The courses include visits to working farms, commercial forest operations, grain elevators, and various research laboratories as well as the demonstration of pesticide applications. Instruction is supported by specialists from government agencies, extension services, industry, and pest control companies. When feasible, students participate in pest management activities, such as field sampling, diagnosis of pest problems, and calibration and use of equipment.

Students must take two field courses (8 days each):

BISC 601-2* Agriculture, Horticulture and Urban Pest Management

A broad range of agricultural pests and their management, with emphasis on insects, crop diseases, and weeds in greenhouses, orchards and field crops. Pest problems in urban environments, including stored products in and near buildings.

BISC 602-2* Forest Pest Management

Management of insect, microbial, vertebrate and plant pests of forests and forest products, including seed orchards, nurseries, dryland sorting areas. Emphasis is placed on diagnosis, decision-making, interactions and techniques for forest pest management.

Some aspects of these courses could be offered best during seasons when particular biological events or management practices are occurring. Besides the discipline specific information offering practical experience, current problems and realistic approaches, these courses are important to students by facilitating team building of the student cohort and networking with practicing professionals. The courses will be offered in alternating years; in this way, first and second-year MPM students will take each course as one group.

Other Graduate Courses

Academic standards comparable to other graduate degrees will be assured through four regular 800-level graduate courses. Of these, one must be BISC 847 Pest Management in Practice, and two additional 800 level courses must be selected from the following list of BISC graduate courses that are particularly relevant to pest management. Students can select one elective from other graduate courses in Biological Sciences or elsewhere with approval of their supervisory committee.

Courses of Particular Relevance to Pest Management

These 800-level graduate courses are usually offered biannually during the fall or spring semesters, depending on faculty availability and student demand. Some courses may not be offered in every two-year cycle. Faculty members who normally teach these courses are indicated.

- BISC 816-3* Biology and Management of Insects. Bionomics, ecology, economic impact, and management of the major groups of insects, based on intensive reviews of information on representative species. (Gries)
- BISC 817-3 Evolution of Social Behavior. Study of the proximate and ultimate causes and consequences of alternative social systems in non-human animals. (Crespi, Winston)
- BISC 841-3 Plant Disease Development and Control. An examination of the major factors that lead to development of soil-associated and foliar plant diseases in cultivated crops, in relation to the nature, underlying principles, application and limitations of various types of control practices. (Punja)
- BISC 842-3* Molecular physiology of insects. An examination of hormonal and nutritional factors that influence growth and development, as well as energy metabolism in insects, with emphasis on the molecular mechanisms involved in their regulation. (Haunerland)
- BISC 843-3 Applied behavioural Ecology. Concepts and methods from behavioural ecology and population dynamics are used to solve problems of an applied nature

- (e.g., pest management, harvesting policies, management of human diseases). Model building and analysis feature prominently. (Roitberg)
- BISC 844-3 Biological Controls. Principles, theory and practice of the use of living organisms in the natural regulation and the applied control of pest organisms. Emphasis will be on parasitic insects, and will include host specificity, genetic controls, and the evolution of host-parasite associations. (Roitberg)
- BISC 846-3 Insecticide Chemistry and Toxicology. The chemistry of insecticides, with emphasis on their toxicology, metabolism and molecular mechanism of action. (Nicholson)
- BISC 847-3 Pest Management in Practice. Status and special problems of research, development and implementation of pest management programs in different kinds of ecosystems; consideration of factors such as management systems, economics, communication, legal and social constraints, and ethics in the practice of pest management. (Winston, Roitberg, Harestad, Gries, Punja)
- BISC 851-3 Vertebrate Pests. Evaluation of the biology of vertebrates that are in conflict with human activities; discussion of control strategies and economic and social impacts. (Harestad)
- BISC 852-3* Biology of animal disease vectors. Physiological, molecular, and behavioural interactions between parasites of human importance and their insect vectors. Emphasis placed on current literature relating to modern approaches in reducing parasite transmission. (Lowenberger)
- BISC 884-3 Special Topics in Pest Ecology and Management. A course that provides graduate students with an in-depth analysis of a topic in pest ecology and management. The course content will change from year to year to reflect student interests and topical research, and can be taught by any faculty member of the Department of Biological Sciences.

Thesis

Students enrol in BISC 849 and write a laboratory or field-based research thesis. The thesis involves some aspect of pest biology and management. In their theses, students are encouraged to include sections where their research is interpreted to offer guidance for the management of pests. The MPM thesis has an applied orientation, which distinguishes it from the M.Sc. program.

BISC 849-0* Thesis in Pest Management. An independent research thesis based on laboratory or field-based research and focused on some aspect of pest management. The research may be supervised by any faculty member in the Department of Biological Sciences, under the same standards and procedures as M.Sc. research. The research can be conducted in collaboration with other organizations or institutions willing to sponsor the project.

Program Delivery

Although the program can be completed in 2 years, it is anticipated the normal completion time would be slightly longer (2.5 years). To ensure sufficient number and

topics of courses are offered, the Department would need to mount, on average, three relevant 800 level courses/year, as listed above. These courses will be open to M.Sc and Ph. D. students as well. Faculty in Biological Sciences normally teach one graduate course every two years; this would amount to the regular graduate teaching load of 6 faculty.

After the retirement of Dr. Rahe in 2004, eight faculty would remain who were previously affiliated with the MPM Program: Drs. Gries, Harestad, Punja, Lowenberger, McMullen, Roitberg, Nicholson, and Winston. However, Dr. Winston is currently seconded to other activities, and Dr. Nicholson, while offering a key graduate course for the program, is more aligned with the Master of Environmental Toxicology Program. Other faculty with current research interests that have implications to biology or management of pests include Drs. Elle, Haunerland, Moore, Plant, and Gail Anderson (Criminology). These faculty could contribute to the program in various ways, e.g., through graduate courses in their area of specialty or through guest lectures in BISC 847, BISC 601/602 or other courses.

When fully operational, the total enrolment would be no more than 20 students. There is sufficient capacity in the Department to ensure supervision of MPM students and offer enough 800-level courses to meet their needs. Ms. McMullen could teach the two field courses as part of her regular teaching assignment. Besides the faculty listed above, any other interested faculty member in the Department could supervise graduate students in the MPM Program, or offer a relevant special topics course.

Students would be assessed and admitted to the MPM program using the same procedures used for the M.Sc. program. A faculty supervisor must be identified prior to admission. The graduate courses and the MPM requirements will be listed in the calendar together with the Department of Biological Sciences.

MPM students will be charged regular graduate fees. For the field courses, the Department would provide transportation, but students would pay their expenses for food and lodging.

* denotes courses with changed course title or description

SIMON FRASER UNIVERSITY
Course Change Form

Existing Course Number/Title: BISC 842-3 Insect Development and Reproduction.

Please check appropriate revision(s) being recommended:

Course Number: _____	Credit Hour: _____	Title: _____ <u>x</u>
Description: _____ <u>x</u>	Prerequisite: _____	Vector: _____

From:

BISC 842-3 Insect Development and Reproduction.

Analysis of hormonal factors that influence growth, development, and reproduction in insects, with emphasis on the use of hormone analogues and anti-metabolites for population management.

To:

BISC 842-3 Molecular physiology of insects.

An examination of hormonal and nutritional factors that influence growth and development, as well as energy metabolism in insects, with emphasis on the molecular mechanisms involved in their regulation.

Rationale:

The course content has been expanded to include molecular mechanisms of hormone action in insects. The course is revised as part of the revision of the MPM program.

Does this course duplicate the content of a previously approved course to such an extent that students should not receive credit for both courses. If so, please specify.

Effective date: Calendar or September 2003

SIMON FRASER UNIVERSITY
Course Change Form

Existing Course Number/Title: BISC 849-0 Master of Pest Management Thesis.

Please check appropriate revision(s) being recommended:

Course Number: _____ Credit Hour: _____ Title: _____

Description: _____ x _____ Prerequisite: _____ Vector: _____

From:

A supervised individual analysis in detail and depth of an aspect of pest management and the preparation of a scholarly paper on it.

To:

An independent research thesis based on laboratory or field-based research and focused on some aspect of pest management. The research may be supervised by any faculty member in the Department of Biological Sciences.

Rationale:

The thesis is based on independent research in an area of interest to pest management of greater depth than suggested by the original description. There is no longer an extended essay option. The description is revised as part of the revision of the MPM program.

Does this course duplicate the content of a previously approved course to such an extent that students should not receive credit for both courses. If so, please specify.

Effective date: Calendar or September 2003

SIMON FRASER UNIVERSITY
Course Change Form

Existing Course Number/Title: BISC 816 Biology and management of forest insects

Please check appropriate revision(s) being recommended:

Course Number: _____ Credit Hour: _____ Title: _____ x

Description: _____ x _____ Prerequisite: _____ Vector: _____

From:

Biology and management of forest insects

Bionomics, ecology, economic impact, and management of the major groups of forest insects, based on intensive reviews of information on representative species.

To:

Biology and management of insects

Bionomics, ecology, economic impact, and management of the major groups of insects, based on intensive reviews of information on representative species.

Rationale:

The course content has been expanded to include economically important insects in agriculture as well. The course is revised as part of the revision of the MPM program.

Does this course duplicate the content of a previously approved course to such an extent that students should not receive credit for both courses. If so, please specify.

Effective date: Calendar or September 2003

SIMON FRASER UNIVERSITY
Course Change Form

Existing Course Number/Title: BISC 852-3 Medical and Veterinary Entomology.

Please check appropriate revision(s) being recommended:

Course Number: _____	Credit Hour: _____	Title: _____ <u>x</u> _____
Description: _____ <u>x</u> _____	Prerequisite: _____	Vector: _____

From:

BISC 852-3 Medical and Veterinary Entomology.

Analyses of problems in the management of insects and related organisms that directly harm or that carry diseases of man or livestock.

To:

BISC 852-3 Biology of animal disease vectors.

Physiological, molecular, and behavioural interactions between parasites of human importance and their insect vectors. Emphasis is placed on current literature relating to modern approaches in reducing parasite transmission.

Rationale:

The course content has been updated to include molecular mechanism of disease transmission by insects. The course is revised as part of the revision of the MPM program.

Does this course duplicate the content of a previously approved course to such an extent that students should not receive credit for both courses. If so, please specify.

Effective date: Calendar or September 2003

The Calendar entry should occur under Department of Biological Sciences (p 376)

Admission – Msc, MPM, and PhD

See "Graduate General Regulations" on page 298 for admission requirements

MSc and PhD requirements.... (*unchanged*)

MPM requirements

The Master of Pest Management is a research-based degree distinct from an MSc in its strong applied approaches to learning and discussion of biological principles, and in interfacing science with problems facing society. The MPM program requires a thesis based on original research with relevance to Pest Management (BISC 849).

Each MPM student must complete the following courses:

BISC 601-2, BISC 602-2, and BISC 847-3

Two courses selected from the following list:

BISC 816-3, BISC 817-3, BISC 841-3, BISC 842-3, BISC 843-3, BISC 844-3,
BISC 846-3, BISC 847-3, BISC 851-3, BISC 852-3, BISC 884-3.

One additional 800-level elective (3 credits).