S.73-43

SIMON FRASER UNIVERSITY

MEMORANDUM

To SENATE

From ACADEMIC PLANNING COMMITTEE

Subject GRADUATE STUDIES - MASTER OF PEST MANAGEMENT PROGRAM

Date MARCH 15, 1973

MOTION: "That Senate approve, and recommend approval to the Board of Governors, the new graduate program, as set forth in S.73-43, as follows:

1. The Master of Pest Management program, including the following new courses:

BiSc 601-3 - Urban and industrial pest management

BiSc 602-3 - Forest, wildland, and watershed pest management

BiSc 603-3 - Vegetable, cereal, and forage crop pest management

BiSc 604-2 - Fruit crop pest management

BiSc 605-1 - Management of animal disease vectors

BiSc 849-3 - Individual scholarly study in pestology.

2. The degree title be Master of Pest Management."

S.73-43

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate

From: R.D. Bradley, Chairman, Academic Planning Committee

Subject: Master of Pest Management Program

Date: March 8, 1973

At its meeting held on March 1, 1973, the Academic Planning Committee recommended approval of the proposed Master of Pest Management Program, which is attached.

The Academic Planning Committee therefore recommends to Senate that:

(a) The proposed Master of Pest Management Program be adopted, and

(b) The degree granted be Master of Pest Management.

R.D. Bradley

Attachment

APC - 13-13

SIMON FRASER UNIVERSITY

MEMORANDUM

To Prof. R. Bradley
Chairman
Academic Planning Committee

From Jon Wheatley
Dean of Graduate Studies

Subject

Date Feb. 26, 1973

The proposed program in Pest Management passed the Senate Graduate Studies Committee at its meeting today. In a separate motion it was passed that the name of the degree should be Master of Pest Management (M.P.M.). There was one small amendment made to the description of the program. On p. 11 at the end of (iii) the following words were added:

"which includes BiSci 849-5, which is an individual project."

:rj

Jon Wheatley

cc Miss Marian McGinn

APC 73-13

SIMON FRASER UNIVERSITY

MEMORANDUM

To Members, Senate Graduate Studies Committee

From (Miss) Marian McGinn
Assis. Registrar-Graduate Studies

Subject Proposed M.P.M. Program

Date February 15, 1973

Attached is the proposed Master of Pest Management Program which was approved by the Assessment Committee on February 13, 1973. This program will be discussed at a meeting of the Senate Graduate Studies Committee on February 26, 1973, at 2:30 p.m. in Room 3172, Administration Building.

M. McGinn

/cg

DEPARTMENT OF AGRICULTURE

PROVINCE OF BRITISH COLUMBIA

VICTORIA

January 30, 1973.

Dr. John Wheatley,
Dean of Graduate Studies,
Simon Fraser University,
BURNABY 2, B.C.

RE: Proposal for Master's Degree and Programme in Pest Management

Dear Dr.Wheatley:

I appreciate the opportunity to review and comment on the above proposal. The B. C. Department of Agriculture has been actively involved in several aspects of pest management over the past number of years. This has included such things as alfalfa pollination, integrated mite control, sterile male and phermone codling moth programs in co-operation with the Canada Department of Agriculture. In addition, we have perhaps the most progressive legislation in Canada regarding both the sale and application of pesticides. We believe, however, that the gains that we have made are only a beginning and that well trained people are needed to provide the know how and impetus to better pest management programs. While the training is suggested for Simon Fraser University, I would suggest that the opportunity for employment for such qualified students covers the globe. However, I do not suggest that employment opportunties will be unlimited but will grow as the science develops and management becomes aware of its values.

I would like to comment particularly on the proposed new courses to be added.

601-2 Urban and Industrial pest management. Page 86. Some consideration should be given to the inclusion of pests of institutions and associated problems, also of weed control around buildings, storage yards, schools and similar situations.

602-3 Forest, wildland and watershed pest management. Page 89. While weeds are mentioned in rights-of-way, one of the major pests is nuisance trees such as alder, willow and maple which present or retard conifer release and rapid growth. Herbicides are used extensively in such situations. Nuisance pests of recreation areas are cited. I would hope that both black fly and mosquito control would be thoroughly discussed here and also as to its need in urban situations. Problems of community pastures should not be overlooked.

605-1 Management of Animal disease vectors.
I would suggest emphasis on encephalitis and how to detect, organize and carry out a control program. There is considerable conflict of emphasis as to what and how to implement such a program.

849 Individual scholarly Study in Pestology.
I would suggest that this course be only open to those students who have already taken some of the above "600" courses. In many cases literature on pest management may not be readily available, or it may be limited. This should not necessarily exclude a suggested study but in such cases a well documented proposed pest management program, together with available literature might well be a valuable contribution to the particular segment of industry.

In conclusion, I like the concept, particularly the emphasis on field instruction wherever possible. The experience of guest lecturers should be given all possible support. Several of your staff are experts in their particular fields, but have not too much experience at "putting the pieces together" hence experienced guest lecturers, particularly during the first year would be invaluable.

Again my thanks for the opportunity to review the proposal.

Yours very truly,

C. L. Neilson
Provincial Entomologist

CLN:dr

Agriculture
Canada

. Ottawa K1A 0C6
February 9, 1973.

Your file Votre référence

Our file Notre référence

Dr. Jon Wheatley,
Dean of Graduate Studies,
Simon Fraser University,
Burnaby 2, British Columbia.

Dear Dr. Wheatley:

I have examined the proposal for the establishment of a new graduate program in Pestology and Pest Management by the Department of Biological Sciences, Simon Fraser University. I was very favourably impressed by the document.

It is a new and original approach to fulfilling a need that has long been felt in plant protection. I note that a candidate with a M.P.M. Degree will have had an excellent basis in the key elements of pest management.

I am well acquainted with the faculty as listed and deem them to be of high caliber. The fact that professionals in government laboratories are available as specialist lecturers will enhance the faculty capacity.

I am pleased to see a Canadian university developing a graduate program leading to a distinctive and descriptive degree title. I also realize that with such a background and a good balance between theory and practice graduates in Pestology and Pest Management should have better job opportunities in Federal, Provincial and other agencies.

Yours very truly,

B.B. Migicovsky,
Director General,
Research Branch.

MEMORIAL UNIVERSITY OF NEWFOUNDLAND
St. John's, Newfoundland, Canada

Department of Biology

29 January 1973

Dean of Graduate Studies
SIMON FRASER UNIVERSITY
Burnaby 2, B.C.

Dear Dr.Wheatley:

Thank you for your letter of 11 January and its enclosure.

I have to comment as follows on your Pestology Centre's "Proposal for a New Master's Degree and Programme in Pest Management."

(1) This proposal represents a logical development of the training programme initiated on the Centre's establishment in 1967, and its acceptance by SFU would assure full implementation of the graduate-level instructional activities foreseen at the award of NRC's Negotiated Development Grant.

(2) The envisaged Master in Pest Management qualification, attainable in three consecutive semesters by a student who has all the prerequisites, will fill a very real need in Canada at a time when growing enthusiasm for sophisticated, integrated pest control methodologies is far outstripping the availability of appropriately trained pest management personnel.

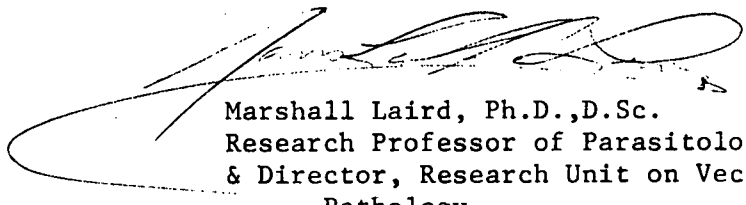
(3) From the international standpoint, such a programme at SFU would nicely supplement the similar ones being organized at the University of California at Berkeley and Mississippi State University, in filling the rapidly increasing need for personnel able to implement integrated control methodologies in both economic and public health entomology. With special regard to the latter field, the proposed new Master's Degree would be particularly relevant to the requirements of candidates from developing countries where major vector control and disease eradication programmes are under way. In this context, I am attaching a reprint of a newly-published article of mine and should like to draw your attention to the last three paragraphs - were SFU to approve the present proposal, I would certainly do my best to refer West African candidates (whose full expenses would be covered from funds at my disposal) to your Pestology Centre.

(4) My only adverse comments are minor ones. (a) "field internships" (p.11 of proposal) represents a contradiction in terms; "interns" being inmates, as of a school, "externships" are obviously what is implied - but I'd personally prefer to drop the medical parallel. (b) I would like to see the

question of "Management of animal disease vectors" (605-1, p.21 of proposal) considered at a higher level of priority than its present one - it stands last in the "Summer Semester only" alternatives, which hardly reflects the present significance of the control of arthropods of medical and veterinary importance at either the national or the international level.

In sum, my assessment of the proposal is highly favourable. I greatly hope that SFU will soon be offering the M.P.M. degree and programme set out therein.

Yours sincerely,



Marshall Laird, Ph.D.,D.Sc.
Research Professor of Parasitology
& Director, Research Unit on Vector Pathology

already been under study by Memorial University researchers for some time: *Coelomomyces* fungi of mosquitoes and midges; and two very different disease agents of mosquitoes, blackflies, and some other hosts – microsporidan protozoa and mermithid nematodes. All three groups have high priority within the mandate of the Research Unit on Vector Pathology. Initially, however, mermithid worms of blackflies will be receiving the lion's share of attention.

The first phase of the program calls for laboratory and field studies of mermithids present in natural populations of Canadian blackflies, and of relevant aspects of the biology and ecology of these insects themselves. It also calls for investigations in West Africa to examine the feasibility of using local or introduced parasites of this group against *Simulium damnosum*.

The Research Unit on Vector Pathology will employ three different categories of people. There will be a small core group, consisting of the director, a project manager, and postdoctoral research fellows, supported by secretarial, technical, and stenographic help.

Certain Memorial University personnel whose primary concern is with teaching or their personal research will participate in the program on a contractual basis, tackling specific assignments paid for from Unit funds. These assignments may be either within the province, or in West Africa – sometimes, indeed, they may involve field work in the latter area followed by laboratory studies at St John's, or vice versa.

The volunteers concerned will be designated Resident Consultants. Because of the continuity they can bring to a program lacking a regular budget that would make possible the semi-permanent recruitment of senior scientists on a full-time research basis, their role will be a vital one – the more so as local graduate student work under their supervision can also be encouraged and assisted by the Unit. One of their essential functions will be catalytic, promoting both the development of biological control in medical entomology on an international basis and the training of Canadian talent (under full departmental supervision) for later employment in a field destined to be of dominant importance in the next few decades.

The third category of participants will be Visiting Consultants, recruited (usually on a short-term basis) for highly specialized work tasks. Each of these, like each assignment undertaken by members of the core group or Resident Consultants, will constitute one tessera of a planned mosaic of collaborative research.

The program also has international components of value at least equal to Canada's interests. Thanks to the favourable reception by the International Development Research Centre of the report of a scientific advisory group sponsored by IDRC and convened at St John's in January 1972, a unique collaborative venture has been initiated (see *Preventing Onchocerciasis through Blackfly Control*, IDRC – 006e, 1972). This involves the joint participation of Memorial University's Research Unit on Vector Pathology and the Onchocerciasis Research Unit of the Mission entomologique ORSTOM/OCCGE (Office de la Recherche scientifique et technique outre-mer/Organisation de Coordination et de Coopération pour la Lutte contre les grandes endémies). The ORU has been located for some time at Bobo-Dioulasso, Upper Volta, and is in process of moving to well-equipped new headquarters at Bouaké, Ivory Coast.

With French entomological and parasitological expertise, the ORU, aided by Canadian funds furnished by IDRC, will be working in close liaison with Memorial University's research unit toward field experiments with innovative blackfly control techniques. Memorial's research unit is further supported by grants from the National Research Council of Canada, Merck Frosst Laboratories, Dorval, and Carl Zeiss (Canada) Limited. New quarters, to be occupied by late 1972, are being provided by the university. These experiments will be undertaken in association with World Health Organization research linked with regional onchocerciasis control efforts. They will provide for a type of training for local personnel that might well prove of greater value to developing countries receiving Canadian aid than some past efforts in this field, which have simply tapped off promising foreign talent into the North American labour market.

Selected candidates for technical training or graduate work will be recruited from West African francophone countries. Following any necessary English language training they will be accepted for appropriate specialized courses at institutions in Canada or elsewhere willing to receive them. Such courses will be strictly time-limited. In the case of graduate students, for example, a maximum of one year's residence at the host university will be allowed. In this period the candidate will be expected to complete any course requirements for a higher degree. He or she will then return to West Africa, and (under the immediate supervision of the director of the Onchocerciasis Research Unit) will undertake a thesis. Like the work earlier referred to, the thesis will comprise a unit of an overall mission-related program that has as its goal the hastening of the day when truly integrated control procedures become part and parcel of practical medical entomology.

Naturally, there are many unanswered questions in innovative investigations of this kind. For example, which graduate schools will accept an approach so novel that, by its very nature, it precludes peer judgments and fully representational committee appraisals at every step of a foreign student's progress toward their degrees? I will venture an answer: the maturer ones.

GRADUATE PROGRAM IN PESTOLOGY AND PEST MANAGEMENT

Moved by Dr. Reilly and seconded by Dr. Mackauer,

> "The Graduate Studies Committee of the Faculty of Science recommends that the 'Proposal for Establishment of a new Graduate Program in Pestology and Pest Management', as detailed in Paper G-72-3, be accepted."

MOTION CARRIED UNANIMOUSLY

The following items were brought out in discussion and evaluation of the proposal:

1. Financing

The Committee felt that the continuing cost of hiring a Visiting Professor was nevertheless highly desirable in order to meet the program's need for certain areas of expertise. Support costs for student transportation relating to field work was discussed and felt to be adequate by the Committee.

2. 600 Level Courses

The Committee felt the 600 level courses, embodying practical pest management, were of graduate calibre. They will not be available for credit to students outside the program and are numbered "600" merely to distinguish them from the normal graduate course offerings available to all graduate students within the Department.

3. Legal Ramifications

The Committee was told that legal aspects associated with the study of pest control would not be studied as a particular course but that students would naturally be made aware of legal problems in the course of their field work and classroom study.

4. Prerequisites

The prerequisites of the required 400 level courses are offered so frequently that students will not be held back in the program if they have to take them.

5. Level of Work Load

The Committee felt assured that the material covered in the proposed program compared favorably with a Master's Degree program at SFU. In fact, even without the 600 level courses, students in this program are normally required to complete 18 hours of 800 level course work, more than enough to satisfy course requirements for a Master's Degree.

From the Graduate Studies Committee of the Faculty of Science, Meeting of September 14, 1972.

SIMON FRASER UNIVERSITY

G-72-3

MEMORANDUM

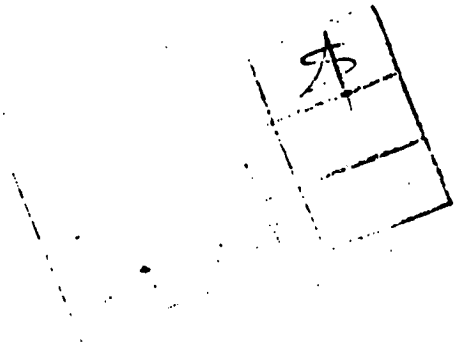
To Dr. S. Aronoff Dean of Science	From Dr. G. H. Geen, Chairman, Dept. of Biological Sciences
Subject M.P.M. Proposal	Date August 3, 1972.

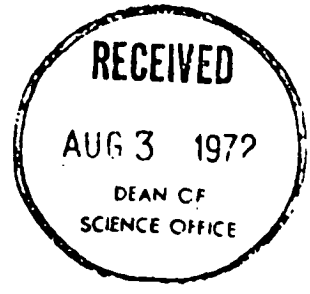
The revised Master of Pest Management proposal is attached for consideration by yourself and the Faculty Graduate Studies Committee. The document has been considered by the Department Graduate Studies Committee, approved by the Department, and the revised document considered by the DGSC. The proposal has been revised in keeping with the new Senate regulations.

I am also enclosing my comments on your memorandum of May 17, 1972. Some of the points of concern are dealt with in the revised document. However, all points have been considered to provide you with the additional information.

Glen H. Geen,
Chairman.

GHG:ct
Enclosures





SIMON FRASER UNIVERSITY

MEMORANDUM

To: Dr. S. Aronoff
Dean of Science

From: Dr. G. H. Geen
Dept. of Biological Sciences.

Subject: MPM Proposal

Date: August 3, 1972.

Reference is made to your memorandum of May 17, 1972 regarding the MPM proposal. I have considered your comments, discussed them with Dr. Beirne and summarized our views to your questions in this memorandum. The MPM proposal was approved, subject to a few editorial changes, at a meeting of the Department of Biological Sciences on May 1, 1972. It is herewith transmitted to you for consideration by the Faculty Graduate Studies Committee.

The following are my comments in the same order as in your memorandum.

1. There is of course the perennial question of whether or not finances are the concern of a curriculum committee.

2. Detailed descriptions of the new 600-level courses are appended.

3. a) There is the question of whether or not we are sufficiently academically strong to be able to make our own judgements. As an existing centre of excellence I would suggest that we are quite able to assess this program. However, some suggested external reviewers who collectively are competent to deal with both the academic value of the proposal and the extent to which it meets international, national, and typical provincial needs are:

Dr. Marshall Laird, Dept. of Biology, Memorial University, St. John's Newfoundland. (Formerly in charge of pest activities of the UN WHO, and later represented NRC re the use by SFU of the Negotiated Development Grant for Pestology.)

Dr. B. B. Migicovsky, Director-General, Research Branch, Canada Department of Agriculture, Ottawa. (Or an associate to whom he might delegate the task.)

Dr. C. R. Neilson, Provincial Entomologist for British Columbia, Douglas Building, Victoria.

b) There seems to be a misunderstanding here. The definition of pestology does not specifically exclude human or other animal aspects. In practice pestology does not overlap onto areas covered by the medical and veterinary professions, but it does cover human and livestock aspects, such as biting flies and the subjects dealt with in 605, not covered by these professions.

.../2

c) I am not clear on what is meant by the question. The following are some explanatory comments.

The 400 and 800 level courses are already available to Biological Sciences students for credit towards B.Sc., M.Sc., or Ph.D. degrees.

No proposal is made that the 600 level courses will be available for credit to anybody except M.P.M. students.

No proposal is made that the M.P.M. programme be available to Continuing Education students. The statement (p. 3) is that it is "potentially adaptable" for Continuing Education purposes; in the event that it becomes desirable at some future date to adapt it for such purposes, an appropriate proposal for adaptation would be made.

d) A prospective M.Sc. student who has an M.P.M. would still be required to meet the various defined requirements for an M.Sc. before he can be awarded the M.Sc.

e) There certainly seems to be a misunderstanding here. By specifying "content" and "approach" the intent was to infer clearly that the "level" and "depth" of the 600-level courses were markedly different from the equivalent B.C.I.T. courses. This was also intended to be inferred by the existence of the 400-level prerequisites to those courses, and by the academic stature of the course leaders. In their level and depth and in the previous training required to take them these 600-level courses are graduate courses. Other reasons why they are numbered at the 600-level are given on page 6, paragraph 6.

There is in fact no statement in memorandum that the 600-level courses probably will be used in the proposed Diploma course. To the contrary, there is a statement (page 11, note 4) that the Diploma programme is not being proposed at this time pending clarification by the University of what a Diploma should be.

f) Evidently it was not made sufficiently clear in the memorandum. The proposal is for one Supervising Committee for all M.P.M. students, on the grounds that all the students will be taking essentially the same programme and will not be doing different research theses that require supervision based on specialized knowledge.

It is suggested that each student in 849 be supervised and assisted by a faculty member in the same way we handle senior undergraduate research courses.

I can readily agree that the Chairman of the Department Graduate Studies Committee rather than the Department Chairman sit on the Pest Management Supervisory Committee. I believe that the DGSC Chairman might best serve in an advisory capacity to the Pest Management Supervisory Committee, since it is basically a sub-committee of the Department Graduate Studies Committee and reports to the parent committee on all matters relating to admission, curriculum, etc.

.../3

g) There seems to be no problem in deleting beyond "(note 27)". However, it was not our intent to require a comprehensive examination of all students but only those about whom the Supervisory Committee had some doubts as to the breadth of their background.

h) The programme has indeed certain academic deficiencies, notably for specialists in weed management and in insect pathology. These need to be filled. They could be met adequately (though not optimally) during the developmental phase by recruiting appropriate specialists temporarily into the Visiting Professor position. When it becomes clear from student enrollments and extramural support that the programme is a viable permanent entity, new continuing academic positions to meet the deficiencies are likely to be requested. To request them now would be to increase considerably the requirements for programme establishment, create difficulties in the priorities of the Department of Biological Sciences, and create continuing situations that experience over the next few years may show not to be the most desired ones. Consequently I am not in favour of requesting new continuing positions at this time, though in effect serving notice that they are likely to be requested at some future date if the programme is a success.

Glen H. Geen,
Chairman.

GHG/ms
cc Dr. B. P. Beirne

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Dr. G. Geen, Chairman, Biological Sciences Department.

From: Dr. S. Aronoff, Dean of Science.

Subject:

Date: May 17, 1972.

I should like to provide you with some comments on the proposal for an MPM degree in Biosciences as contained within the brochure provided the Faculty Graduate Studies Committee by Prof. Brian Beirne.

If I may be permitted to state our thoughts on each of three major aspects, I may then be able to summarize our present position.

1) With regard to finances and resources, we have not yet pursued this aspect at all.

2) With regard to the proposed new courses, we did not feel that the presentation was adequate for consideration by the Committee. We would require greater detail concerning course content, including a relatively complete outline of the proposed curriculum.

3) Academic aspects, details of which follow.

a) It was felt that in a new program of this nature, especially as the first professional program within this Faculty, it would be highly desirable that there be external reviewing prior to its coming to the Faculty GSC. This would add strength to the proposal and will certainly be required in any event by the APC.

b) The definition of pestology (p.1) specifically excludes human or other animal aspects. Is this purposeful and/or desirable?

c) There appears to be some confusion (p.3) concerning the restriction of the program to MPM degree students. Would this be available with or without credit to other Bioscience students or in Continuing Education and what are the arguments for the point of view developed?

d) What would be required for an MPM student to obtain an M.Sc. degree subsequently?

e) The clear inference is made (p.4) that these courses are identical in level to the BCIT diploma courses. It was indeed stated that these courses were probably to be used in the proposed diploma course here. Why then are they designated as at the 600 level?

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f) Concern was expressed with the structure of the proposed Pest. Management Supervisory Committee (p.5). It is suggested that this Committee be appointed initially immediately upon the admission of the student into the program. The two Faculty members from the Pestology Centre should then be chosen (by whatever mechanism the Department wishes) according to the area of interest of the MPM student. The Chairman of this Supervisory Committee should also be the academic advisor to the student so that the latter feels that he has a base of reference whenever it is necessary and prior to the taking of his course 849, which is a near-terminal affair. It is also suggested that the Chairman of the Departmental Graduate Studies Committee be a member of the Committee rather than the Chairman of the Department.

g) It is suggested that (p.7) in the subsections to the second paragraph beginning "-all five proposed..." all the material after "(note 27)" be deleted. The Committee believes it confusing and unnecessary. Similarly, in the same paragraph it was felt that a decision should be made initially whether or not a comprehensive examination would be required and not left to a subsequent discretionary basis. It was felt that such an examination should in fact be held at some time during the program.

h) The one resource aspect questioned was whether a Visiting Professor was in fact needed in the program. The argument was that if this reflected an academic deficiency, then this should be stated and a regular Faculty member obtained. If this is merely to add lustre, then it should be stated clearly and the benefits weighed against the costs.

As I indicated in my opening paragraph, we were not completely certain as to the status of this proposal within the Department of Biosciences, as it would normally have been forwarded to us from the Departmental Graduate Studies Committee. We are quite aware of the departmental vote taken on the matter and are thus somewhat sanguine concerning its departmental status. However, we are returning it to the Department for consideration by the Graduate Studies Committee with the analysis provided above, and, following their reconsideration and approval, plus the additional details requested for the new courses, will then consider the resources aspect.

SA:dep

c.c. Prof. B. Beirne

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Dr. G. H. Geen, Chairman,
Dept. of Biological Sciences

From: Dr. B. P. Beirne, Director
Pestology Centre, Biological Sciences

Subject: Proposal for Establishment of a new Graduate Program in Pestology and Pest Management.

Date: July 25, 1972.

Attached is the proposal for a new graduate program in the Department of Biological Sciences, with the concomitant proposals for new courses and a new degree title.

You will recall that these proposals were discussed and were approved (subject to minor amendments that have been made) by more than two-thirds of all the faculty members of the Department, at the Departmental meeting of May 1, 1972, and that the proposals were first made available to all faculty members of the Department for a Departmental meeting of July, last year, when comments on the proposals were requested.

The organization and content of the attached documents are in accordance with Senate Paper S72.83, Part III, Paragraph 3, Sections (a) to (q) as amended.

Further in accordance with that Paper, the attached documents should now go from the Graduate Studies Committee of the Department to that of the Faculty of Science and, if approved at that level, thence to the Dean of Graduate Studies for submission to the Assessment Committee of the Senate Graduate Studies Committee.

Bryan P. Beirne.

BPB:ct
Enclosure

PROPOSAL FOR A NEW MASTER'S DEGREE AND PROGRAMME IN PEST MANAGEMENT

by the Pestology Centre,

Department of Biological Sciences (per B. P. Beirne)

PROPOSAL FOR THE ESTABLISHMENT OF A NEW GRADUATE PROGRAM IN PEST MANAGEMENT

(a) Justification for the Program as a Whole

In 1971 the Academic Planning Committee of the Senate approved in principle the institution of a new Master's degree in pestology. The relevant program is proposed in this document, with the subject of the program described in Section (e).

(i) Justification for establishing the program as such is that: there are expanding new employment needs and legalistic pressures for people with broad training as general practitioners in pestology for work as pest managers (see Section (m)); and existing graduate programs do not train for those requirements appropriately because they are organized to train specialists only, e.g. as entomologists or plant pathologists, forest pestologists or agricultural pestologists, and because they tend to train primarily for employment in research or teaching.

To meet the new needs, several universities outside Canada are in the process of organizing professional programs in pest management leading to new descriptive degree titles (see Section (g)) and that are broadly similar in nature and purpose to the program proposed here.

(ii) Justification for establishing the program at Simon Fraser University is that: SFU already has most of the faculty expertise and numbers (Section (d)), the courses (Section (h)), and the facilities (Sections (j) and (k)) needed to establish and operate the proposed program, and can readily obtain the remainder at little extra cost (Section (c)).

SFU has more assets for such a program than any other Canadian university. This is because of a decision to specialize in pestology that was made by SFU in 1967. Over the next three years the Department of Biological Sciences built up a faculty of twelve pestologists in its Pestology Centre (see Section (d) ii) and the National Research Council awarded SFU a Negotiated Development Grant of $323,000 "to assist in developing the National (and, hopefully, a leading International) Centre of Excellence for graduate student training in pestology and pest management".

The program proposed here is so organized that it can be established, conducted, and evolved without major side-effects, and even terminated without major harmful residual effects. One relevant factor is that most of the courses are already being given as parts of the normal teaching loads of the faculty members involved. Another is the additional courses will be taught largely by temporary lecturers.

(b) New Positions

Existing faculty have the knowledge and experience to handle most aspects of the program (see Section (d)). The remaining aspects would be covered by visiting experts during at least the initial years of operation. Consequently, no new full-time faculty positions are being requested at this time. New positions may be requested at some future date, after the program has been in operation and after its progress and prognosis have been reviewed fully.

The following new positions are needed to implement initially the program proposed here:-

(i) Visiting Professor in Pestology. There are important aspects of pestology in which no existing faculty member is a specialist. Examples are of weeds and insect pathology. The plan is to handle such subjects initially by recruiting leading experts into the above position, normally on a one-semester basis, to teach their subjects in Special Topics [in Pestology] courses BiSc 869-3 or 879-3.

The establishment of this position was approved in principle by the Vice-President (Academic) as meeting in part the commitment made by SFU to the National Research Council in accepting the Negotiated Development Grant for the Pestology Centre.

(ii) Honorary Lecturers or Professors. Certain senior scientists in government agencies in B.C. are leading experts in pest management. It is proposed that they will take leadership of certain of the 600-level courses on practical pest management. The proposed temporary honorary titles would be given to such individuals, two initially (see Section (d) (i)). This is what is done by UBC under similar circumstances.

(iii) Demonstrator, to assist in preparing and conducting the field and laboratory work of all the 600-level courses in practical pest management. A new position is not being requested. Instead, present plans are to request the conversion of an existing Pestology Field Technician position into the Demonstrator position, with promotion of the incumbent.

(c) Finances

The probable financial returns to The University would appear to exceed the new costs.

(i) Capital costs. Most of the facilities required to mount the program are already available. The following needs are still outstanding:

- Two laboratory trailers, to be located in the SFU area in the UBC Research Forest for 600-level classroom use. Estimated cost about $12,000 if purchased new, about $6,000 if purchased used, or about $200 removal costs if redundant existing SFU laboratory trailers could be provided free.

- Pesticide application equipment, for use in 600-level courses. A minimum of $4,000 if purchased, but probably in practice largely obtainable on loan if Federal experts are appointed to honorary teaching positions related to those courses, and otherwise by gifts or rental.

In summary, capital costs could be in excess of $10,000 but may be of the order of $2,000 for contingencies.

(ii) Annual operating costs.

Salary and expenses for the Visiting Professor in Pestology	$10,000
Preparation fees and expenses for two (or three) Honorary Lecturers for the 600-level courses. If, as is probable, that they would be seconded with pay the total could be as low as $2,000, if without pay then as high as about $8,000	$ 3,500
Fees and expenses for outside experts from Federal and Provincial agencies and industry for individual lectures or seminars in 600-level and other courses (see Appendix B, course outlines)	$ 3,000
Salary for the Demonstrator in the 600-level courses and other courses (i.e. difference between salary of Field Technician and of Demonstrator)	$ 2,500

Student and faculty transportation costs, equipment rentals, and other operating costs related to field work of the 600-level courses $ 3,500

Materials, supplies, etc. $ 2,500

In summary, total new annual operating costs in the first three years would be of the order of $25,000

(iii) Revenues.

If fees were of the order of $225 per semester then 20 M.P.M. students for three semesters would pay about $13,500 annually; and if in addition there were five students who would not otherwise have come to SFU each taking two semesters of M.P.M. prerequisites the total annual returns in fees would be of the order of $16,000

The largest financial returns are likely to be indirect ones: increases under the points system of University financing in which (in B.C. 1972-73 according to the Academic Planner) an M.Sc. student is worth $11,392. It may be confidently assumed that an M.P.M. student is equivalent to an M.Sc. In this event 20 M.P.M. students would bring to the University annually about $228,000

Other possible sources of revenue are: increases under the points system if students taking M.P.M. prerequisites could be officially identified and if they are classed as equivalents of undergraduate Agriculture students (worth $5,696 each in 1972-3); overheads that are paid to the University by overseas aid agencies for certain types of students; and, eventually, possible bursaries or other forms of subsidies such as government agencies now provide to medical and veterinary science programs.

(d) Personnel

(i) The following persons wish to be involved in the proposed program. Their current areas of interest and research are indicated below, and their curriculum vitae are attached (Appendix A):

- The following are existing full-time faculty members.

Beirne, Dr. B. P. Professor of Pest Management, Director of the Pestology Centre. Philosophy and practice of biological control and of pest management; ecology of agricultural insects.

Barlow, Dr. J. S. Professor; Associate Dean of Science. General and nutritional biochemistry of insects.

Mackauer, Dr. J. P. M. Professor. Insect parasitology, especially of aphids; biosystematics of entomophagus insects; genetic controls.

Nair, Dr. K. K. Professor. Radiation entomology; insect endocrinology; ultrastructure of insect tissues.

Turnbull, Dr. A. L. Professor. Population dynamics of arthropods; taxonomy and biology of spiders; human demography.

Webster, Dr. J. M. Professor. Physiology of host-parasite relationships, especially of nematodes of plants and insects; economics of nematode infections.

Belton, Dr. P. Associate Professor. Physical controls, especially of rodents, biting flies, and stored product pests; pest behaviour; electo-physiology.

Borden, Dr. J. H. Associate Professor. Forest Insects; sex pheromones; insect sensory physiology.

Finlayson, Mrs. Thelma. Associate Professor. Insect classification; taxonomy of parasite larvae.

Sadleir, Dr. R. M. F. S. Associate Professor. Population dynamics, reproduction, and ecology of small mammals; conservation of the environment.

Oloffs, Dr. P. C. Assistant Professor. Chemical pesticides, pesticide toxicology.

Rahe, Dr. J. E. Assistant Professor. Plant pathology and physiology.

- And the following in honorary positions proposed above (paragraph (b)):

MacCarthy, Dr. H. R. Prospective Honorary Lecturer. Section Head (Agricultural Entomology), Canada Department of Agriculture. Management of agricultural insects; insect vectors of plant diseases.

Madsen, Dr. H. F. Prospective Honorary Lecturer. Section Head (Fruit Tree Entomology), Canada Department of Agriculture. Management of fruit tree pests; chemical pesticides.

Dillistone, B. H. Prospective Demonstrator. Pestology Field Technician, SFU. Field pest management procedures.

(ii) Evidences of the commitments by the above to the proposed program are:

- Professors Beirne, Barlow, Mackauer, Nair, Turnbull, Webster, Belton, and Finlayson resigned from the Belleville Research Institute of the Canada Department of Agriculture and joined the SFU Department of Biological Sciences for the primary purpose of setting up the Pestology Centre to develop such a program.

- Professors Borden and Sadleir, who were already SFU faculty members, voluntarily joined the Centre for the same purpose.

- Professors Oloffs and Rahe (and Mr. Dillistone) were recruited primarily because their specialities filled major weaknesses in the expertise of the

Centre that had to be strengthened before an adequately comprehensive program could be developed.

- Eleven of the above twelve faculty members who were surveyed individually recently reiterated their personal commitments to the proposed program.

- Drs. MacCarthy and Madsen are involved because of their support of the idea and of the support of the Canada Department of Agriculture.

- Each of the above was involved in planning the program, including preparing parts of this document.

(iii) The [M.P.M.] Graduate Program Committee (which would report to the Departmental Graduate Studies Committee) would consist of three members of the faculty of the Pestology Centre elected by ballot from among their number. Each would normally serve for three years, which means that one would be replaced every year and that in the first election the three members would be elected individually for one, two, and three years, respectively. Ultimately, this procedure might be revised to permit M.P.M. graduates to stand for election and to vote.

(e) Field of Studies

The proposed program is on pestology, which is the scientific study of pests and of methods of dealing with them, and on its application, pest management. Most pestologists are employed as pest managers of one sort or another.

Pestology is the modern, comprehensive and integrated, approach to what was hitherto (and often still is) a number of more or less segregated subjects: the study of insects, plant diseases, weeds, or harmful vertebrates; the study

of biological, chemical, or physical controls; the study of forestry, agricultural, fruit tree, stored product, or structural pests, or of pests of man or of livestock. Pestology covers all these and their interrelations.

The integrated, management-of-the-environment, approach developed because of the harm caused by the segregated, control-by-poisoning-pest-species, approaches that inherently tend to intensify existing pest problems and create new ones and that contaminate the environment progressively with harmful chemicals.

Because the responsibility for decisions and activities related to the prevention and control of pest damage is being progressively restricted by legislation to appropriately-trained and qualified people, pestology is rapidly becoming the third profession that deals with the harm caused by living organisms to people and property. The other two are the medical and veterinary professions.

(f) Relationships Between Faculty Qualifications and Subjects

This subject is covered elsewhere in this document, e.g. in Section (d), where the special interests of the persons to be associated with the program are indicated, and in Section (h), where the faculty are listed in relation to the courses of the program that they will teach.

(g) Degree

A new degree title, Master in Pest Management, is proposed. The Faculty of Science would exercise the relevant statutory power.

The main reasons for proposing the new title are: to indicate that

the degree results from a structured professional program rather than from the more typical graduate program that is based primarily on a research thesis; because there are likely to be similar new titles attached to similar programs that are currently being organized at some U.S. universities, e.g. Master in Insect Management at the University of California, Berkeley, and either Master in Pest Management or Master in Science (Pest Management) at Mississippi State University; and to provide a title that indicates by its wording the nature of the special training. There is no similar degree title or similar program at, or apparently currently being organized at, any other university in Canada.

(h) Proposed Academic Requirements for the Degree

In summary, the M.P.M. graduate will have taken a total of not less than 53 credit hours of pestology and pest management courses with a G.P.A. of 3.0. The academic requirements are also given under Section (n), Calendar Entry.

(i) Proposed prerequisites for admission into the program are that the student must:

- Meet the General and Faculty of Science Regulations for admission to graduate studies. And
- Complete with a grade point average of 3.0 not less than 18 credit hours from the following existing BiSc courses or their equivalents.

BiSc 304-3 Animal ecology (204 prerequisite). Turnbull.

317-3 Insect biology. Finlayson.

404-3 Plant ecology (202, 204 prerequisites). Brooke.

407-3 Population dynamics (304 prerequisite). Turnbull.

BiSc 408-3 Parasitic associations. Webster/Mackauer.

409-3 Field ecology (304 prerequisite). Sadleir/Geen.

417-3 Entomology (317 prerequisite). Borden.

430-3 Plant pathology (201 prerequisite). Rahe.

432-3 Chemical pesticides and the environment. Oloffs.

435-3 Introduction to pestology. Beirne.

498-3 Undergraduate research. Various.

(ii) The M.P.M. degree would not require a research thesis.

(iii) The student would be required to pass a comprehensive examination in pestology and pest management. Otherwise the examining system consists of the examinations of the individual courses, which includes BiSci 849-5 which is an individual project.

(iv) Practical experience in solving pest problems is a key feature of the program. It could be obtained through field internships - a group of proposed new courses in which the student would apply his knowledge of principles and procedures of pestology, gained from other courses, to evaluate and solve representative practical pest management problems under the guidance of specialists in the management of different kinds of pest situations. These courses are described under Section (t), New Courses, and proposed formally in Appendix B.

(v) The specific requirements for the degree are that the student must complete with a continuing and cumulative grade point average of 3.0 or better a total of 35 credit hours of graduate (600- and 800-level) courses in or related to pestology and pest management, or their equivalents.

The 35 credit hours would normally be made up of: 12 credit hours of 600-level pest management courses; a five-credit individual scholarly study

course; and 18 credit hours selected from among the other 800-level courses listed below.

The relevant graduate courses in pestology or pest management are listed below. Apart from 849 and the 600-level courses, which are new and are proposed elsewhere in this document, all the courses listed already exist and each has been given at least once:

BiSc 601-3 Urban and industrial pest management.

602-3 Forest, wildland, and watershed pest management.

603-3 Vegetable, cereal, and forage crop pest management.

604-2 Fruit crop pest management.

605-1 Management of animal disease vectors.

- A SFU faculty member, Dr. Borden, will be coordinator of all these 600-level courses, the one Demonstrator will be assigned to all, and one or more other Pestology faculty members will be involved in each.

BiSc 849-5 Individual scholarly study in pestology. Various.

840-3 Economic organisms I. Finlayson.

841-3 Economic organisms II. Rahe.

846-3 Chemical pesticides and toxicology. Oloffs.

844-3 Biology of entomophagous insects. Mackauer.

845-3 Physical controls. Belton.

847-3 Pest prevention and control systems. Beirne.

843-3 Population dynamics. Turnbull.

842-3 Internal processes. Barlow/Nair.

816-3 Biology of forest insects. Borden.

848-3 Nematology. Webster.

869-3 Special topics [in pestology]. Various.

879-3 Special topics [in pestology]. Various.

(vi) The M.P.M. program is so designed that it can be completed in three consecutive semesters by a student who has all the prerequisites. Students from outside SFU are unlikely to have all the prerequisites and therefore may have to take a total of four or more semesters.

(i) New Courses

A total of 29 courses are involved in the program. Six of them are new. They fill special needs specifically related to the program, and because of this they should normally be available for graduate degree credit only to M.P.M. students. A proposal in the prescribed form for each of the six is attached (Appendix B). The purposes and special features of each are summarized here:

- The purpose of 849-5, individual scholarly study in pestology, is to enable the student to acquire knowledge of a particular aspect of pestology in detail and depth. It would normally be the aspect in which he hopes to be employed. His study might be based on, for example, a type of pest or type of habitat, a type of control or an approach to study or management, or on any or all of these in relation to a particular geographical region.

- The main purpose of 601 to 605, the courses in practical pest management, is to enable the student to acquire, with the best expert guidance available, practical experience in how to identify and evaluate pest problems and in how to develop and use appropriate management procedures. The courses would be given largely in the field at locations where pest problems exist and where control procedures are used, for example, in part at government field stations; and wherever possible government and other experts on aspects of

pest management will be invited to participate in giving the courses (the cooperation of the Canada Department of Agriculture and some other agencies in this is already assured).

- These courses are numbered in the 600 series because: they are part of a graduate program; they differ from 800-level courses in their approach and from upper-level undergraduate courses in BioSciences in their specialized nature; proliferation of upper-level undergraduate courses in BioSciences is to be avoided at this time; the new courses resemble most nearly in general approach and nature the 600-level courses given in other departments (Chemistry; M.B.A.); and they should not be available for credit to fulfil the requirements for any graduate degree other than the M.P.M.

- The 600-level courses would be given in the Summer Semester because it is only then that most pests are best available for study and control. They would be given consecutively rather than concurrently: each would consist of two or three hours of lectures and four to six hours of field or lab work each day for up to three (for a 3-credit course) weeks. This concentrated form would enable the courses to be taught by experts seconded or borrowed temporarily from other agencies and optimum use to be made of field trips and of borrowed or rented equipment.

(j) Facilities Needed

In summary, facilities needed to mount the program mostly exist or are potentially readily available.

Most of the M.P.M. and relevant prerequisite courses exist and have already been given. Consequently the facilities needed to operate them already exist. New facilities needed are primarily for the proposed new

600-level courses.

Some of the Negotiated Development Grant funds have been used to develop field research facilities that can double as facilities for the 600-level courses, notably a fully-equipped laboratory trailer located in a Federal research orchard in the Okanagan and a fully-serviced agriculture and forest pestology research area in the UBC Research Forest, Maple Ridge.

There are requirements for pesticide application equipment, but as mentioned in Section (c), there is reason to hope that these may be met by temporary loans from governmental or other sources.

The main need that cannot be filled at the Pestology Centre level is for two laboratory trailers to be located at the SFU Pestology Experimental Area in the UBC Research Forest and used by students in the 600 level courses, as well as for research purposes. The possibility will be explored of obtaining existing SFU trailers made redundant by building programs.

(k) Sources of Support for Students

This is a full-time professional program. Students would be informed in advance that they cannot expect financial support from University sources as full-time students are unlikely to have the time to work at part-time university duties as Teaching Assistants or research assistants. This does not mean that a student cannot or must not take part-time employment or otherwise get financial support from any source within or outside the university, if he can arrange it. But it does mean that acceptance into the program does not carry with it the commitment or the implication that the student will, or even might, receive direct financial support from university sources.

(l) Library Resources and Future Needs

No new library resources of any major significance are needed to start and to operate the program. No abnormal future library needs created by the program can be envisaged.

The reasons why the resources of The University Library are satisfactory are that the faculty members of the Pestology Centre have encouraged and guided The Library over the past five years to develop them appropriately and that various governmental agencies have presented the Centre with pestology libraries, totalling over 175 shelf feet and now in The Library.

A detailed statement on this matter is being prepared by The University Librarian and will be forwarded by him direct to the Assessment Committee.

(m) Estimated Enrollment

Present plans are to limit total enrollment to 20 to 25 students annually in the initial three years. Indications to date are that the numbers of qualified applicants are likely to exceed these figures. The nature of employment prospects are the primary reason why students would wish to enroll (and why similar programs are being developed at U.S. universities). Employment prospects and the reasons for them are as follows.

New legislation is transfering the responsibility for pest management decisions and actions increasingly from the individual to the community. The community is in practice represented by suitably-trained experts. The food production and pesticide pollution problems produce the legislation. As the relevant legislation increases the need for such experts and the levels of qualification required of them increase. The proposed program is designed to produce appropriately-trained experts, especially for:

- Private practice as consulting pestologists. This new profession does not yet exist significantly in Canada. It is developing rapidly as pest management programs are becoming increasingly refined and restrictions intensify on who uses chemical pesticides, where, and when.

- Private practice or employment in government or industry as the appliers and monitors of sophisticated and complex pest management procedures.

- Work as or supervising pest control operators or pesticide prescribers or salesmen. These are people who now are licenced by provincial governments. There are (1971) 2,238 Provincially-qualified individuals and 742 Provincially-licenced firms in B.C. Alberta has about the same numbers and Ontario larger numbers. Provincial licencing qualifications are regularly upgraded. It is to be expected that ultimately M.P.M. or similar specialized training will be in the qualification for licencing in place of the short courses that now have to be given by default by provincial government departments.

- Employment by federal, provincial, and local government agencies in extension, inspection, or regulatory duties. The numbers of such people (who total not less than 24 in B.C. at present) increase as legislation increases and the enforcement agencies expand. Present training is mainly on-the-job after a biological degree.

- Academic positions or full-time research positions, for which a broad knowledge of pestology as a whole in addition to a specialized knowledge of an aspect of it is more advantageous to the individual and his work than the specialized knowledge alone.

- Work in or related to pest management in developing countries. The M.P.M. program would be more suited to practical overseas aid needs than are M.Sc. or Ph.D. programs that train primarily teaching or research.

- And any jobs, not necessarily pestological, that holders of B.Sc. or M.Sc. degrees in biology get and which the professional degree and training might help SFU M.P.M.'s to get more readily and to handle more effectively.

(n) Adequacy of Office Space

Existing faculty members who would be involved in the program have office space. Temporary office space can be found in the Department of Biological Sciences a Visiting Professors. It is not proposed to supply M.P.M. students with office space, at least until Pestology faculty who now have research laboratory space only in temporary trailers are more suitably accommodated. Meanwhile M.P.M. students can do their studying in the Library or other areas generally available to the student body for that purpose.

(o) Possible External Assessors

It is assumed that the university regards itself as competent to assess the academic quality of the program, and that the aspects on which external advice could be useful concern the value of the proposed program in relation to (i) international, (ii) National, and (iii) typical provincial needs. On this basis appropriate assessors would be:

- Professor Marshall Laird, Department of Biology, Memorial University, St. John's, Newfoundland. (Formerly Head of Entomology for the United Nations World Health Organization).

- Dr. B. B. Migicovsky, Director-General of the Research Branch, Canada Department of Agriculture, Ottawa, Ontario.

- C. H. Neilson, Provincial Entomologist, Government Buildings, Victoria, British Columbia.

(p) Duration of the Program

The program would be continuing. It would be reviewed regularly and realigned or reorganized as appropriate. It would basically take one year and it would be given every year. The intention is to start it first not later than the Fall Semester of 1973 and desirably earlier.

(q) Proposed Calendar Entry

Master in Pest Management program.

For detailed information on the M.P.M. program contact the Director, Pestology Centre, Department of Biological Sciences.

Admission requirements:-

As in the General Regulations of the University (Graduate Studies Calendar) and of the Faculty of Science (do.) and successful completion of not less than six (18 credit hours) of the following prerequisite courses, or equivalents:

BiSc	304-3	Animal ecology
	317-3	Insect biology
	404-3	Plant ecology
	407-3	Population dynamics
	408-3	Parasitic associations
	409-3	Field ecology
	417-3	Entomology
	430-3	Chemical pesticides and the environment
	435-3	Introduction to pestology

Program requirements:-

The M.P.M. program normally will require successful completion of a comprehensive examination in pestology and pest management and of at least 35 credit hours normally obtained as follows:

Eighteen credit hours from among the following courses:

BiSc 816-3 Biology of forest insects

840-3 Economic organisms I

841-3 Economic organisms II

842-3 Internal processes

843-3 Population processes

844-3 Biology of entomophagous insects

845-3 Physical controls

846-3 Insecticide chemistry and toxicology

847-3 Pest prevention and control systems

848-3 Nematology

869-3 Special topics (in pestology)

879-3 Special topics (in pestology)

And five credit hours from:

849-3 Individual scholarly study in pestology. A supervised analysis in detail and depth of an aspect of pestology and the preparation of a scholarly paper in it.

And twelve credit hours from the following field courses on evaluation, decision making, and management of pest situations and relevant procedures and legislation. These are given only in the Summer Semester and are available for credit only to M.P.M. students:

601-3. Urban and industrial pest management.

Pests of foodstuffs and stored products, structural pests, and pests found in and near buildings, ships, and aircraft, and their management, with emphasis on insects and rodents.

602-3. Forest, wildland, and watershed pest management.

Pests and their management, of forest trees, with emphasis on weeds, and of recreational areas.

603-3. Vegetable, cereal, and forage crop pest management.

Agriculture pests and their management, with emphasis on insects, nematodes, crop diseases, and birds, and including garden and greenhouse pests.

604-2. Fruit crop pest management.

Insects, diseases, and other pests of fruit trees, including grapevines and small fruits, and their management.

605-1. Management of animal disease vectors.

Insects and other organisms that attack man or livestock or that are vectors of diseases of man or animals, and their management, including biting flies.

APPENDIX A

Curriculum vitae of faculty members who wish to be involved in the proposed program.

August, 1971.

CURRICULUM VITAE

BEIRNE, Bryan Patrick — Age 53
Canadian — Married

Professor of Pest Management, and Director of the Pestology Programme, of the Department of Biological Sciences, SFU.
Tenured

Degrees

B.Sc. (Zool., Bot., Geol.) 1938,
Ph.D. (Entomology), 1940,
M.Sc. (Entomology), 1941, and
M.A. 1942,
all from Dublin University (Ireland).

Career

1938-39. Government of Ireland Research Scholar.
1939-41. Overseas Scholar, Royal Commission for the Exhibition of 1851.
1941-42. Junior Assistant (i.e. Instructor), Department of Zoology, Dublin University.
1942-49. Lecturer in Entomology, and Assistant Director of the Museum of Zoology and Comparative Anatomy, Dublin University.
(Teaching duties in a then two-man Department were to Premedical, 2 years Agricultural, 3 years Pass Science, 4 years Honours Natural Science, M.Sc., and Ph.D. Students).
1947-48. Lecturer, summer courses to vocational school headmasters for the (Govt. of Ireland) Department of Education.
1942-49. Private practice as pest problem consultant to various government departments and legal and industrial firms and, separately, as owner and operator of a commercial pest control business.
1949-55. Research Scientist (Section Leader), Canada Department of Agriculture (CDA), Entomology Research Institute, Ottawa, Ontario.
(In charge of work in Canada of a major group of insects. Reclassified (i.e. promoted) four times).)
1955-58. Officer-in-Charge, CDA Biological Control Laboratory, Belleville, Ontario.
(Developed the centre from a biological control Laboratory to a pest management Research Institute. Research publications by the staff increased from an average of 0.3 per man per annum to 1.2 and in size from an average 3 pages to 7. At the same time total professional staff size was reduced, in part by elimination from it by 8 permanent (i.e. tenured) scientists.)
1967- Department of Biological Sciences, Simon Fraser University.
(Moved to SFU with seven colleagues from Belleville to set up the pestology programme, following the failure of attempts to persuade CDA to move the Belleville Institute to a university campus for that purpose. The Pestology Centre now has a faculty of 12.)

University activities

(a) Courses:

Biol 102-4, Introduction to Biology 68-1, 68-3, 70-1, 71-2, 72-2.
Biol 435-3, Introduction to pestology 68-3, 69-2, 69-3, 70-3, 71-2, 72-1.
Biol 840-3, Economic organisms, I. 69-3.
Biol 847-3, Pest Management Systems 71-1.

(b) Committees, etc.:

University Committee on Salaries and Promotions from 1967 until it ceased to exist.
University Tenure Committee, since its establishment (occasional acting Chairman)
Various Bio-Sciences Department, Faculty Association, and ad hoc University committees;
Acting Acting Chairman of the Bio-Sciences Department on various occasions.
Supervisor of two to four graduate students at any one time and member of supervisory committees for others.

(c) Extramural Grants Received:

1967-68.	NRC Interim Research Grant	$3,000
1968-69.	NRC Operating Research Grant	$22,050
1968-72.	NRC Negotiated Development Grant to the University for the Pestology Centre	$323,000
1969-70.	NRC Operating Research Grant	$15,000
1970-71.	NRC Operating Research Grant	$10,000
	CDA Extramural Research Contract Grant	$4,800
	NRC Publication Grant	$3,000
1971-72.	NRC Operating Research Grant	$11,500
	CDA Extramural Research Contract Grant	$5,000

Scholarly Accomplishments

(a) Total publications approximately 125, including six books, in the following main areas: taxonomy, bionomics, and morphology of butterflies and moths, of parasitic flies, and of leafhoppers, treehoppers, and cicadas; distribution and zoogeography of animals, especially insects; ecology of individual pest and other insect species; principles of biological and integrated controls and of pest management; ecology, evaluation and forecasting of agricultural pests; and miscellaneous including entomological techniques, history, and bibliography.

Scholarly Accomplishments (continued)

(b) Recent publications are:

Pest Management (Leonard Hill Books, London, 1967. 123 pp. (By invitation; refereed)

Biological Control and its Potential. World Rev. Pest Control 6 (1967): 7-20. (By invitation).

The future of integrated controls. Rep. 11th Pacific Sci. Lot 40. Mushi 39 (1967): R127-130. (By invitation; refereed).

The future of biological controls. Proc. XIII Internat. Cong. Ent. Moscow (1968) (page nos. not available). (By invitation).

The practical feasibility of pest management systems. In R.L. Rabb and F. E. Guthrie, Concepts of Pest Management (1970): 158-169. N.C. State Univ. Press. (By invitation)

Effects of sprinkler irrigation on Mcdaniel and European red spider mites in apple orchards. J. ent. Soc. Br. Columb. 67 (1970): 8-13. (With W.B. Hudson; refereed).

Effects of precipitation on crop insects. Can. Ent. 102 (1970): 1360-1373. (Refereed).

Pest Insects of Annual Crop Plants in Canada. I. Lepidoptera. II. Diptera. III. Coleoptera. Mem. Ent. Soc. Can. 78 (1971). 124 pp. (Refereed)

Pest management through people management. Proc. Tall Timbers Conf. on Ecol. Animal Control by Habitat Management. 3 (In press). (By Invitation).

Professional Societies, Conferences, Committees, and the like

(a) Society Memberships:

Member of the Royal Irish Academy
Fellow of the Royal Entomological Society of London
Fellow of the Linnean Society
Fellow of the Zoological Society
Entomological Society of Canada, member
Entomological Society of America, member
Canadian Society of Zoologists, member
International Society of Biometeorology, member
British Trust for Entomology, member
Royal Zoological Society of Ireland
American Association for the Advancement of Science, member
Entomological Society of Ontario, member
Entomological Society of British Columbia, member
(Invited addresses to most of the above and held offices on some).

(b) Invited participant in:
International Congresses of Entomology (four)
International Congresses of Plant Protection (two)
International Congress of Parasitology
International Conference of Insect Pathology and Biological Control
International Union of Biological Societies Special Conference on the International Organization of Biological Control
Pacific Science Congress
Commonwealth Agriculture Bureau Review Conferences (three)
International Conference on Integrated Controls
U.N. World Health Organization Special Conference on Disease Vectors
U.N. Food and Agriculture Organization Special Conference on Integrated Controls
American Institute of Biological Sciences Special Conference on Biological Control of Insects of Medical Importance
International Great Plains Conference of Entomologists
Entomological Society of America - American Institute of Biological Sciences Special Conference on Concepts of Pest Management
And various Canadian and U.S. regional conferences.

(c) Committees (current or recent unless indicated otherwise):
Member, Science Council of Canada Advisory Committee on Basic Biology
Chairman (former and first), International Advisory Committee on Biological Control
Member, International Biological Programme National (Canada) Use and Management Committee
Member, International Biological Programme, International Biological Control Committee
Co-Chairman (and Lead Speaker) Tall Timbers Research Foundation Conference on Ecological Animal Control by Habitat Management
Member, National Research Council of Canada ad hoc Committees on Negotiated Development Grants
Council Member (formerly), Professional Institute of the Public Service of Canada
Member, Organizational Committee, International Organization for Biological Control
Member, British Columbia Research Council
And formerly member of various Committees of societies and conferences listed above, of CDA-CDF, CDA-USDA, etc.

(d) Miscellaneous other activities:
Invited seminars at various universities and research centres in Canada, United States, Britain, Ireland, and Continental Europe
Various addresses to non-professional organizations and on radio and television, mainly in Canada but also in the U.S. and Europe
In 1946-49 promoted to the Irish and U.S. governments a plan for a national agricultural research organization in Ireland. This plan was the basis for the U.S. financing of what is now the Agricultural Institute of Ireland.

(d) Miscellaneous other activities (continued)

In 1962-67 promoted to the Canadian Government a plan for professional integration of government-university research resources in and related to pest management. This plan was not implemented at that time. One consequence was the move of myself and colleagues from government to university where we have since promoted the plan directly and through various committees with some encouraging degree of practical and potential success.

Associate Editor, Canadian Journal of Zoology, regular project referee for U.S. and Canadian granting agencies consultant to government and other agencies in entomological aspects of environmental problems, etc.

Currently planning, with colleagues, structured professional and para-professional programmes in Pest Management for SFU.

Currently, by invitation of the International Development Research Centre, organizing a meeting at SFU of experts on world pest problems to plan for Canada its overseas aid programmes in non-chemical pest control.

Currently discussing with the Canadian International Development Agency ways in which the SFU Pestology Centre might assist and collaborate in developing pest management education in developing countries.

May 1972

CURRICULUM VITAE: ADDENDA

BEIRNE, Bryan Patrick

Curriculum vitae to August 1971 attached. The following are addenda to April 1972.

University Activities

Member: faculty recruitment committees re BioSciences and PSA departments; Chairman recruiting committee re Philosophy Department; and Philosophy Department Tenure Committee.

Prepared proposals for Master in Pest Management programme.

Received research grants for 1972-73 of $11,500 from the National Research Council of Canada and $5,000 from the Canada Department of Agriculture.

Invitations

Introductory address, Summer Institute on Biological Control of Plant Diseases and Insects, Mississippi State University.

Plenary address, First International Conference on the Organic Method for Farm and Garden, San Francisco. (Invitation not accepted.)

Participant, Conference on the Integrated Control of Insect Pests, International Ecosystems University, Berkeley.

Member, Standing Committee on Entomology, Pacific Science Association.

Speaker, Annual Conference, Canadian Agricultural Chemicals Association.

Scholarly Publications (all in refereed journals)

Pest Insects of Annual Crop Plants in Canada. IV, Hemiptera-Homoptera. V, Orthoptera. VI, Other groups. Mem. Ent. Soc. Can. No. 85, 73 pp. 1972.

Pest management through people management. Proc. Tall Timbers Conf. on Ecol. Animal Control by Habitat Management 3: 1-7. 1972.

The biological control attempt against the European wheat-stem sawfly, Cephus pygmaeus (Hymenoptera) in Ontario. Canad. Ent. (In press).

A grape leafhopper, Erythroneura ziczac (Homoptera), and its mymarid (Hymenoptera) egg-parasite in the Okanagan Valley, British Columbia. Canad. Ent. (In press) (With L. M. MacKenzie).

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

May, 1972

Name: John Slaney BARLOW Age: 51

Present Faculty Position: Professor and
Associate Dean of Science

Term of Present Contract: Tenured - First Appointed August 1, 1967

Associate Dean - From 1 July 1969

Degrees:

B.S.A.	Ontario Apricultural College	1942
M.A.	University of Toronto	1948
Ph.D.	University of Toronto	1952

Career:

1942-45	Royal Canadian Air Force
1945-46	Research Scientist, Soap Chemistry, Lever Bros.
1947-50	Demonstrator, Medical Biochemistry, University of Toronto
1951-53	Research, Defence Research Northern Laboratory
1953-67	Research Scientist, Research Institute, Belleville, Canada Department of Agriculture.
1967-	Professor, Simon Fraser University.

Contributions to SFU:

a) Courses taught

301 - Biochemistry I - Fall 1967, Summer 1968, Spring 1969
401 - Biochemistry II - Fall 1967, Summer 1968, Fall 1968, 1969, Spring 1970, 1971.
842 - Internal Processes - Spring 1970
Science010 - Modern Trends in the Natural Sciences - Spring 1970, 1971, 1972

b) Other Contributions

Chairman, Biochemistry Committee
Undergraduate Standings and Admissions Committee
Associate Dean of Science

Graduate Students

C. van Netten - M.Sc., May 1969
K. Penner - M.Sc., August 1970
S. N. Thompson - M.Sc., May 1970
S. N. Thompson - Ph.D. program

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Scholarly Status:

a) Invited Addresses since 1967 - Some host-parasite relationships in fatty acid metabolism. Conference - Significance of Insect and Mite Nutrition, Carnahan House, Lexington, Kentucky.

b) Society Memberships (and offices formerly held)
Canadian Society of Biochemistry
Canadian Society of Physiology
Entomological Society of British Columbia
Entomological Society of Canada.

Scholarly Accomplishments:

a) Areas of scholarly specialization

General and nutritional biochemistry of insects
Insect physiology

b) Publications - Total 30

1966 Barlow, J. S. Effects of diet on the composition of body fat in Musca domestica L. Can. J. Zool. 44:775-779.

1966 Barlow, J. S. Effects of diet on the composition of body fat in Lucilia sericata (Meigen). Nature 212:148.

1966 Barlow, J. S. Electrolytes in tissues, red cells, and plasma of the polar bear and caribou. Can. J. Zool. 44:235-240 (with J. S. Manery and J. M. Forbes).

1967 Barlow, J. S. Fatty acid compositions of Exeristes comstockii (Cress) reared on different hosts. Can. J. Zool. 45:57-61 (with G. K. Bracken).

1970 Barlow, J. S. Distribution of long-chain fatty acids among the lipid classes of Lucilia sericata (Meigen) and Galleria mellonella (Linneaus). Can. J. Zool. 48:775-778 (with O. B. Lindsay).

1970 Barlow, J. S. The fatty acid composition of the cuticle and fat body tissue from Tenebrio molitor (L.), Periplaneta americana (L.) and Schistocerca gregaria (Forskal.). Comp. Biochem. Physiol. 36:103-106. (with S. N. Thompson).

1970 Barlow, J. S. The change in fatty acid pattern of Itoplectus conquisitor (Say) reared on different hosts. J. Parasitol. 56:845-846. (with S. N. Thompson).

1971 Barlow, J. S. Aspects of fatty acid metabolism in Galleria mellonella (L.) (Lepidoptera:Pyralidae): Isolation of the elongation system. Comp. Biochem. Physiol. 38:333-346.

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Barlow, J. S. 1971. Further characterization of the principal long-chain, unsaturated fatty acids of the blowfly Lucilia sericata (Meigen) and a preliminary investigation into their origin. J. Comp. Biochem. and Physiol. 39B: 823-832. (With O. B. Lindsay).

Barlow, J. S. 1971. An improved chemically defined diet for Lucilia sericata. Can. Ent. 103: 1341-1345.

Barlow, J. S. 1971. Incorporation of Na-1-^{14}C-acetate into the fatty acids of two insect parasites (Hymenoptera) reared on different hosts. Can. J. Zool. 49: 1297-1300. (With G. K. Bracken).

Submitted:

Barlow, J. S. 1971. Synthesis of fatty acids by Exeristes comstockii (Cress) (Hymenoptera:Ichneumonidae) and two hosts, Galleria mellonella (L.) (Lipidoptera:Pyralidae) and Lucilia sericata (Meigen) (Diptera: Calliphoridae) from ^{14}C-1-acetate. J. Insect Biochem. (with S. N. Thompson).

Barlow, J. S. 1971. Aspects of fatty acid metabolism in Galleria mellonella: The consistency of the fatty acid pattern of Galleria mellonella reared on fatty acid supplemented diets. J. Insect Biochem. (with S. N. Thompson).

Barlow, J. S. 1972. The composition and metabolishm of fatty acids in Ips paraconfusus Lanier (Coleoptera: Scolytidae). Can. J. Zool. (With K. R. Penner).

Published under my supervision:

Thompson, S. N. and R. B. Bennett. 1971. Oxidation of fat during flight of male Douglas-fir beetles, Dendroctonus pseudotsugae. J. Insect Physiol. 17: 1555-1563

Additional Information:

a) Formerly represented Ontario Minister for Education on Board of McArthur College of Education, Kingston, Ontario.
Formerly Member and Chairman, Belleville High School Board
Formerly Member and Chairman, Belleville and Suburban Planning Board
Formerly Member, Belleville Committee of Adjustment
Formerly Alderman of the City of Belleville
1966 - Belleville Citizen of the Year.

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b) Research Grants:

1967-68	NRC Interim Research Grant	$3,000.
1968-69	NRC Operating Research Grant	5,880.
	NRC Equipment Research Grant	15,000.
1969-70	NRC Operating Research Grant	7,000.
1970-71	NRC Operating Research Grant	4,000.
1971-72	NRC Operating Research Grant	4,000.
1972-73	NRC Operating Research Grant (three year grant)	6,000.

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

May 1972

Name: Johann Peter Manfred MACKAUER **Age:** 39

Present Faculty Position: Professor

Term of Present Contract: Tenured - First Appointed August 1, 1967

Degrees: Dr. Phil. nat. (magna cum laude). - 1959
Universität Frankfurt M.

Career:

1959-61	Research Associate, Zoologisches Institut, Universität Frankfurt M.
1961-67	Research Scientist, Research Institute Belleville, Canada Department of Agriculture
1964-67	Group Leader, Research Institute Belleville, Canada Department of Agriculture
1967-	Full Professor, Department of Biological Sciences, Simon Fraser University.

Contributions to SFU:

a) Courses taught

202 - Genetics - Spring & Fall 1968, Spring 1969,1970,1971,1972.
408 - Parasitic Associations - Fall 1969 & 1970
844 - Biology of Entomophagous Insects - Spring 1969,1970,1972
859 - Aphid Biology and Damage (Special Topics I) - Spring 1971.
317 - Entomology - Summer 1971.

b) Other Contributions

Chairman, Dept. Seminar - Fall 1967 to Spring 1970

Member, Departmental Committee on Graduate Studies; Recruiting; *ad hoc* Committee on Ph.D. requirements

Served on various other Faculty of Science, Senate and University Committees

Acting President, SFU Faculty Association - July to September 1970

President, SFU Faculty Association - October 1970 to June 1971.

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Scholarly Status:

a) Invited Addresses, including:

"Status of and Concepts in Biological Control", at Institut für Phytopathologie und Pflanzenschutz, Universität Göttingen, 1967

"Biological Control as an Aspect of Pest Management", at Taiwan Agricultural Research Institute, Taipei, 1968.

"Genetic Aspects of Mass Production", at OILB-FAO International Symposium on the Implications of Permanent Insect Production, Rome, 1971.

"Biological Controls of Aphids", at 12th Pacific Science Congress (Symposium J - Interacting Organisms and Population Control), Canberra, 1971.

"The General Applicability of Evaluation Results", at 14th International Congress of Entomology (Symposium on The Quantitative Evaluation of Insect Natural Enemies), Canberra, 1972.

"The effects of the host on aphid parasites", at World Aphid Conference, Lincoln, New Zealand, 6-8 September 1972.

b) Membership in Professional Societies:

Canadian Society of Zoologists
Entomological Society of America
Entomological Society of Canada
Deutsche entomologische Gesellschaft
Deutsche Gesellschaft für angewandte Entomologie
Society of Systematic Zoology

Scholarly Accomplishments:

a) Area of Specialization

Bio-systematics of hymenopterous parasites of aphids (Hymenoptera: Aphidiidae and Aphelinidae)

Evolution and genetics of host-parasite systems

Insect parasitology, in particular interactions between host and parasite, immune reactions, parasitogenic effects on host, parasite behaviour.

Biological controls of aphids.

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b) Publications - Total number published or in press: 66

Since 1965 - (papers marked by an asterisk (*) were prepared by invitation).

Books

*1967 Mackauer, M. and P. Stary. World Aphidiidae (Hym. Ichneumonoidea). Le Francois, Paris. 195 pp. In: Index of Entomophagous Insects.

*1968 Family Aphidiidae. Dr. W. Junk N.V., 's-Gravenhage 1968, 103 pp. In: Hymenopterorum Catalogus, nova editio, 3.

Publications in Journals

1965 Two simple devices for rearing aphids. J. econ. Ent., 58:365-366. (With H. E. Bisdee).

1965 Notes on and additions to the Trioxys and Binodoxys species (Hymenoptera:Aphidiidae) of North America. Can. Ent., 97: 225-231.

1965 Histological and karyometric examinations of the oenocytes of Aphis pomi DeGeer (Hom., Aphididae). Naturwissenschaften, 52:351-352. (In German)

1965 Aphidius smithi Sharma and Subba Rao (Hymenoptera:Aphidiidae) a parasite of the pea aphid new in southern Ontario. Proc. ent. Soc. Ontario, 95:121-124. (With H. E. Bisdee).

1965 Parasitological data as an aid in aphid classification. Can. Ent., 97:1016-1024.

1965 Notes on some Danish aphid parasites (Hym., Aphidiidae). Ent. Meddr., 34:103-106. (With O. Heie).

1965 A new Aphidius species (Hym., Aphidiidae) parasitic on the blackberry aphid, Sitobion fragariae (F.) (Hom., Aphididae). Dtsch. ent. Z., N.F., 12:347-349.

1966 A new aphid parasite from West Africa (Hym., Aphidiidae). Entomologist's mon. Mag., 101:116-118.

1967 A new genus and several new species of aphid parasites (Hym. Aphidiidae). Entomophaga, 12:139-147.

*1967 Host association and parallel evolution in the parasitic Hymenoptera. I. General aspects and parasites of the Homoptera, Part I. Angew. Parasit., 8:21-39. (In German).

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1967 The hymenopterous parasites (Hymenoptera:Aphidiidae et Aphelinidae) of the pea aphid in eastern North America. Canad. Ent., 99:1051-1082. (With T. Finlayson).

*1968 The Aphidiidae of Finland (Hymenoptera). Fauna fennica, 22: 1-40. (In German).

1968 Aphidius rubifolii n. sp. (Hymenoptera:Aphidiidae), a parasitoid of Masonaphis maxima from British Columbia. J. ent. Soc. Br. Columbia, 65:34-35.

*1968 Insect parasites of the green peach aphid, Myzus persicae Sulz., and their control potential. Entomophaga, 13:91-106.

1968 Phenotypic polymorphism in Aphidius smithi Sharma & Subba Rao (Hymenoptera:Aphidiidae). Entomophaga, 13:281-287.

*1968 Zoogeographical aspects of biological control. Natur und Museum, Frankfurt M., 98:491-495. (In German).

*1969 Sexual behaviour of and hybridization between three species of Aphidius Nees (Hymenoptera:Aphidiidae), parasitic on the pea aphid. Proc. ent. Soc. Wash., 71:339-351.

1970 Effect of gene Orange on the duration of larval development in Aphidius smithi (Hymenoptera:Aphidiidae). Ann. ent. Soc. Amer., 63:342-343.

*1971 Acyrthosiphon pisum (Harris), Pea Aphid (Homoptera: Aphididae), pp. 3-10. In: Biological Control Programmes against Insects and Weeds in Canada 1959-1968. Techn. Commun. Commonw. Inst. biol. Control, 4.

1971 Trioxys acericola, n. sp. (Hym., Aphidiidae), a parasite of the aphid Drepanosiphoniella from France. Ann. ent. Soc. France, N. S., 7:885-887. (With P. Stary).

*1972 Genetic aspects of insect production. Entomophaga, 17:27-48.

The establishment of three exotic aphid parasites (Hymenoptera: Aphidiidae) in British Columbia. J. ent. Soc. B. C., 69 (in press). (With A. Campbell).

The aphid-attacking genera of Aphelinidae (Hymenoptera), including the description of a new genus. Canad. Ent. (submitted for publication).

Antennal amputation as a method for bio-marking aphids. J. econ. Entom. (submitted for publication).

Additional Information

a) Other positions

1960- Member, Centre d'Identification, International Organization of Biological Control (O.I.L.B.), Geneva.

1968- Member, Editorial Board of Journal "Entomophaga".

1968- Chairman, International Biological Programme (I.B.P.-Section UM) Core Project on "Biological Controls of Aphids".

1970- Member, Advisory Committee for Symposium J, 12th Pacific Science Congress.

1971 Member, Canadian Delegation to the XII Pacific Science Congress, Canberra, August - September.

1972 Chairman, Section on Aphid Population Dynamics, World Aphid Conference, Lincoln, New Zealand, 6-8 September 1972.

b) Scholarships Received

1959-61 Research Fellowship, German Federal Ministry of Agriculture.
1961 Special Research Grant, International Organization of Biological Control.
1961 National Research Council of Canada Post-Doctoral Fellowship (awarded but not accepted).

c) Research Grants Received at SFU

1967	NRC Interim Grant in Aid of Research	$3,700
1968	NRC Grant in Aid of Research	9,800
	NRC Major Equipment Grant	8,700
	NRC Travel Grant	1,290
1969	NRC Grant in Aid of Research	8,000
1970	NRC Grant in Aid of Research	8,000
	President's Research Grant	1,300
	I.B.P. Special Conference Grant	3,000
1971	NRC Grant in Aid of Research	8,000
	NRC Travel Grant	1,084
1972	NRC Grant in Aid of Research	8,000

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

May, 1972

Name: Karunakaran Krishna NAIR Age: 51

Present Faculty Position: Professor

Term of Present Contract: Tenured - First Appointed August 1, 1967

Degrees:

B.Sc.	1942	University of Madras
M.Sc.	1947	University of Bombay
Ph.D.	1952	University of Bombay

Career:

1956-59	Professor and Head, Zoology Dept. Wilson College, Bombay.
1959-65	Head, Dept. of Insect Sterilization and Pest Control, Atomic Energy Establishment, Trombay, Bombay.
1965-67	Research Scientist, Canada Dept. of Agriculture Research Institute, Belleville (Sub-group leader).
1967-	Professor, Department of Biological Sciences, SFU.

Contributions to SFU:

a) Courses taught

305 - Animal Physiology - Fall 1967, Summer 1968, Fall 1969, Spring 1971,Fall
448 - Experimental Techniques III - 1/3 Summer 1968, Spring 1969, 1970 197
Summer 1971,Spring 1972
810 - Ionizing Radiations and Radioisotopes in Biology - ½ Summer 1971.
842 - Internal Processes - Summer 1969, Spring 1971, 1972
490, 491, 492 - Individual Study Semester - Fall, 1971.

b) Other contributions

Member, Executive Committee, Faculty of Science 1969-1971
Member, University Radiological Safety Committee -1971
Chairman, University Radiological Safety Committee 1970-71
Member, Senate 1971 -
Member, Department Electron Microscope Committee
Member, University Selection Committee (NRC Scholarship)
Member, Senate Nomination Committee

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Serve on the Supervisory Committee of the following:

A. Barr (Major Supervisor)
D. Mahon (Major Supervisor)
R. Paulson
B. Jenks
S. Clement
V. Lai
C. Slater
C. Malloy
S. Craig
L. Beebe (Major Supervisor)

Scholarly Status:

Papers presented at conferences:

1970 Nair, K. K. and N. M. G. Bhakthan. Ultrastructural damage in the somatic tissues of gamma-irradiated house fly. IVth Int. Contress on Radiation Research, Evian, France.

Society Membership:

Life Member, Society of Animal Morphologists and Physiologists of India
Entomological Society of Canada
Canadian Society for Cell Biology
Entomological Society of America
American Mosquito Control Association

Scholarly Accomplishments

a) Areas of Research

Radiation Entomology, Developmental Physiology (Insects)

b) Publications - Total 46

1968 Rahalkar, G. W. and K. K. Nair. Influence of diapause on the radiosensitivity of Khapra beetle larvae. Isotopes and Radiation in Entomology. International Atomic Energy Agency, Vienna 149-154.

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1968 Harwalakar, M. R. and K. K. Nair. Effect of X-irradiation on post-embryonic development of the red cotton bug, Dysdercus koenigii. Ann. Entomol. Soc. Amer. 61:1107-1111.

1968 Sivasubramanian, R., G. Bhaskaran and K. K. Nair. Imaginal differentiation in X-irradiated pupae of the housefly, Musca domestica nebulo (Fabr.). Proc. of the 13th International Congress in Entomology, Moscow.

1969 Nair, K. K. and N. M. G. Bhakthan. Preliminary studies on the ultra-structural damage in the flight muscles of gamma-irradiated housefly. Int. J. Radiat. Biol. 16(4):397-399.

1969 Bhakthan, N. M. G., K. K. Nair and J. H. Borden. Occurrence of a fat body layer around the testes of Ips confusus (Coleoptera: Scolytidae). Ann. Ent. Soc. Amer. 62(6):1495-1496.

1969 Borden, J. H., K. K. Nair and C. E. Slater. Synthetic juvenile hormone: Induction of sex pheromone production in Ips confusus. Science 16: 1626-1627.

1970 Sivasubramanian, P., G. Bhaskaran and K. K. Nair. Effects of x-rays on morphogenesis in the housefly. J. Insect Physiol. 16:89-97.

1970 Sivasubramanian, P., G. Bhaskaran and K. K. Nair. Differentiation of the imaginal muscles in x-irradiated housefly pupae. Ann. Ent. Soc. of America. 63(4):1019-1022.

1970 Bhakthan, N. M. G., J. H. Borden and K. K. Nair. Fine structure of degenerating and regenerating flight muscles in a bark beetle, Ips confusus. I. Degeneration. J. Cell Sc., 6:807-820.

1971 Bhakthan, N. M. G., K. K. Nair and J. H. Borden. Fine structure of degenerating and regenerating flight muscles in a bark beetle, Ips confusus. II. Regeneration. Can. J. Zool. 49:85-89.

1972 Kearns, D. R. and K. K. Nair. Physiological studies on the effects of tepa on Schistocerca gregaria. Ann. Ent. Soc. Amer. 65:216-221.

1972 Bhakthan, N. M. G. and K. K. Nair. Fine structural changes in the somatic tissues of gamma-irradiated housefly. I. Flight muscles. Ann. Ent. Soc. Amer. 65:504-508.

1972 Nair, K. K. and M. Menon. Detection of juvenile-hormone-induced gene activity in the colleterial gland nuclei of Periplaneta by ^{3}H-actinomycin-D "staining" technique. Experientia, (in press).

1972 Menon, M. and K. K. Nair. Sex pheromone production and reproductive behaviour in gamma-irradiated Tenebrio molitor. J. Insect Physiol. (in press).

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1972 Nair, K. K. and Menon, M. Detection of juvenile-hormone-induced template activity by Feulgen microspectrophotometry. Accepted for presentation at the 4th International Congress of Histochemistry and Cytochemistry, Kyoto, Japan.

Additional Accomplishments:

Served as a consultant and panel member, International Atomic Energy Agency (Vienna) of the United Nations Organization.

Chairman, I.A.E.A./F.A.O/F.A.O. Symposium, Radioisotopes and Radiation in Relation to Agricultural Pests, Athens, 1963.

Served on the Sub-Committee of chemosterilants. Defence Research Board of Canada.

Member, Editorial Board. Journal of Animal Morphology and Physiology.

Attended the I.A.E.A./F.A.O. Symposium on Radiation Entomology at Athens, Greece as a nominee of the Canada Department of Agriculture, August, 1970.

Research Grants

1967-68	NRC Interim Operating Grant	$3,000.
	Travel Grant	840.
1968-69	NRC Operating Grant	7,840.
	NRC Equipment Grant	12,000.
1969-70	NRC Operating Grant	8,000.
	SFU President's Research Grant	1,000.
1970-71	NRC Operating Grant (3 yr.)	8,000.
1971-72	NRC Operating Grant	8,000.
1972-73	NRC Operating Grant	8,000.
	SFU President's Research Grant	1,000.
	NRC Equipment Grant	8,000.

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

May, 1972

Name: Albert L. TURNBULL Age: 55

Present Faculty Position: Professor

Term of Present Contract: Tenured - First Appointed July 20, 1967

Degrees:

B.S.F.	1951	University of British Columbia
M.F.	1953	University of British Columbia
D. Phil.	1957	Oxford University

Career:

1950-1954	Biol. Control Research Lab, Canada Dept. of Agriculture, Vancouver
1954-1967	Research Institute, Canada Dept. of Agriculture, Belleville, Ontario
1967-	Simon Fraser University

Contributions to SFU:

a) Courses taught

003-3	Ecology of Pop. Explosion - Winter 1969, 1970, 1971
304-3	Animal Ecology - Spring 1968, 1969, 1970, Winter 1970, 1971
407-3	Population Dynamics - Winter 1967, 1968, 1969, Spring 1971, 1972
804-3	Advanced Ecology - Spring 1968
843-3	Population Processes - Winter 1968
879-3	Special Topics III - Spring 1969
PDC461-471	Environmental Education- Summer 1971

Supervision of 3 graduate students.

b) Service to University

1. Senator - 3 year term commencing 1969
2. Senate Appeals Board, 1969-1970
3. Academic Planning Committee, 1969-
4. Joint Board of Teacher Education, 1971-
5. Ad-Hoc Committee on Environmental Studies Program
6. Ad-Hoc Committee on Environmental Health Program
7. Dept. of Communications (pro-tem) Curriculum Committee
8. Dean of Science Rep. on University Statistics Committee
9. Academic Committee for TV Ecology Project (Bisc 204)
10. Fac. of Education Committee for PDP 461 & 471 (Kamloops Outdoor Education Project).

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c) Service to Community

1. T. V. Programs (Channel 9 Cablevision)
   Simon Fraser University Today
   2 series of 6 hours each - Auspices of SFU Alumni Association

2. High School Ecology Lectures
   Multi-media plus 1 hour lecture
   21 High Schools in Lower Mainland

3. Elementary School Ecology Lectures
   Multi-media plus ½ hour lecture
   19 Elementary schools in Lower Mainland.

4. Nine guest appearances on hot line radio shows and innumerable addresses to local service clubs, professional bodies, etc.

Scholarly Status:

a)
1967 Seminar, Biological Control of Insects. Queen's University
1967 Seminar, Natural Regulation of Animal Populations. Guelph Univ.
1967 Seminar, The Role of Araneae in the Regulation of Arthropods in Grassland Communities. Biology Club, Harvard Univ.
1967 Seminar, Homeostasis in Animal Communities. Queen's University
1969 Seminar, The Ecological Role of Pest Animals. Green Timbers Res. Station, Tallahasee, Florida.
1970 Seminar, Environmental Ecology. University of Victoria.

b) Society Membership

British Ecological Society
Entomological Society of Canada
Entomological Society of Ontario
Entomological Society of B. C.
Canadian Society of Zoology
American Entomological Society
   1964 - Secretary of Biol. Control Section
   1965 - Vice-Chairman of Biol. Control Section
   1966 - Chairman of Biol. Control Section
Centre International de Documentation Arachnologique

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Scholarly Accomplishments:

a) Areas of Scholarly Specialization

1. Animal ecology - particularly of Arthropods
2. Population dynamics
3. Biological control of insect pests
4. Taxonomy and biology of Araneae

b) Publications - Total 23

1965 Effects of prey abundance on the development of a spider Agelenopsis potteri (Blackwall) (Araneae: Agelinidae). Can. Entomologist 97: 141-147. Refereed.

1965 The spider genus Xysticus C. L. Koch (Araneae: Thomisidae) in Canada. Can. Entomologist 97:1233-1280. (With C. D. Dondale and J. Redner). Refereed.

1966 Effects of predator and prey densities on interactions between goldfish and Daphnia pulex (DeGeer). Can. J. Zool. 44:285-289. (With D. A. Chant). Refereed.

1966 A population of spiders and their potential prey in an overgrazed pasture in Eastern Ontario. Can. J. Zool. 44:557-583. Refereed.

1966 A "quick trap" for area sampling of Arthropods in grassland communities. J. Econ. Entomology 59:1100-1104. (With C. F. Nicholls). Refereed

1967 Population dynamics of exotic insects. Bull. Ent. Soc. America 13: 333-337. Refereed - Invitation

1969 Biological control of insect pests. Chapter Prepared for Text. "Principles of Plant and Animal Pest Control", Vol. 3, Insect-Pest Management and Control, U. S. Acad. Sci., Washington, D. C. Invitation.

1969 The ecological role of pest populations. Proc. Tall Timbers Conference on Ecological Animal Control by habitat management. 1:219-232. Invitation.

An improved Berlese-Tullgren funnel and a floatation separator for extracting grassland arthropods. Can. Entomologist (in press). (With Dondal, C. D. and C. F. Nicholls).

A five year record of spider species from a meadow community in south-east Ontario. Can. Entomologist (in press).(With Dondale, C. D., J. H. Redner and R. B. Semple).

1969 Wandering of hunting spiders in a meadow. C. R. 4^{e} Cong. intern. Arachn., Paris (IV. 1968); Bull. Mus. Hist. nat., 41 (suppl. 1). (With C. D. Dondale, J. H. Redner, E. Farrell, and R. B. Semple).

1972 Ecology of Spiders. (A Review). Annual Reviews of Entom, 18. Ann. Reviews Inc., Palo Alto, Calif. (in press), Invitation.

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Additional Comments

Research Grants

National Research Council		
1967 - Interim Grant		$3,000.00
1968-69	- Operating Grant	9,800.00
	- Major Equipment Grant	5,500.00
1969-70	- Operating Grant	10,000.00
1970-71	- " "	8,000.00
1971-72	- " "	6,000.00
Leon & Thea Koerner Foundation		
1969-70	Grant for BiSci 003	1,000.00
1970-71	Grant for BiSci 003	500.00

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

May, 1972

Name: John Malcolm WEBSTER Age: 35

Present Faculty Position: Professor

Term of Present Contract: Tenured - First appointed 16 August 1967.

Degrees:	B.Sc. (Special)	Imperial College, London Univ. England	1958
	Ph.D.	Imperial College, London Univ. England	1962
	DIC	Imperial College, London Univ. England	1962

Career:

1958-61	Agricultural Research Council Scholar, Imperial College.
1961-66	Scientific Officer, Rothamsted Experimental Station, Eng.
1966-67	Research Scientist, Canada Dept. of Agriculture, Research Institute, Belleville, Ontario.
1967-71	Associate Professor, Simon Fraser University.
1971-	Professor

Contributions to SFU

a) Courses taught

Biology 203 - Developmental Biology - 68-1, 69-1, 70-1, 70-3, 72-2
Biology 408 - Parasitic Associations - 69-3, 72-1
Biology 498 - Undergraduate Research - 69-1 (2 students)
Biology 841 - Economic Organisms II - 68-3, 69-3
Biology 848 - Nematology - 71-1
Biology 859 - Special Topics - 68-1, 70-1.

b) Other contributions to SFU

Graduate Student Supervision

Senior Supervisor - Paulson, R. E. (Ph.D.)
Craig, S. (M.Sc.)
Hunter, D. (M.Sc.)
Lam, A. (M.Sc.) 1967-70
Pitcher, J. (M.Sc.)
Thong, C. (Ph.D.)

On Supervisory Committee - Bollerup, G. (M.Sc.)
Gilgan, G. (M.Sc.) 1967-71
Saunders, R. (M.Sc.)
Smith, T. (M.Sc.)
Thomas, A. (M.Sc.)
Mueller, C. (Ph.D.)

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Administrative Resonsibilities

University

Interim Dean of Graduate Studies 1970-1971
Senate - elected member 1969-70
Senate- ex officio 1970-1971
Senate Graduate Studies Committee, Chairman 1970-71
Executive Ctte., Senate Graduate Studies Committee, Chairman 1970-71
Academic Planning Committee 1970-71
Search Committees for Deans of Arts, Education and Science 1971
University Tenure Committee, 1972
PSA Chairman Search Committee, 1972
Faculty Association Affairs Committee 1969
Faculty Club Committee 1969-

Department (include the following)

Electron Microscope Committee
Graduate Studies Committee 1971-
Undergraduate Curriculum Committee, Chairman 1968-70
Greenhouse Committee 1969-
Seminar Convener 1971-1972
Space Committee 1969-

Outside University

B.C. Dept. Agriculture, Crop Protection Lead Committee 1970-
West Regional Research Committee (W56 Project USA) 1969-
Pacific Science Congress, Organizational Committee, 1972-
Honors and Awards Committee of S.O.N. 1971-

Scholarly Status

a) Invited addresses

Entomophilic nematodes in a pest management programme. Indian Agricultural Research Institute, New Delhi, also at the Aligarh Muslim University.

Manipulation of the environment to enhance the control of insects by nematodes. Commonwealth Institute of Biological Control, Bangalore.

Nematodes as harmful and beneficial organisms. University of Kyushu, Japan.

Nematode Ecology - Physiology and environment. Colloquium Chairman and opening speaker. International Congress of Parasitology, Washington, D.C.

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An interpretation of the ultrastructural response of tomato roots susceptible and resistant to Meloidogyne incognita. E.P.P.O. Antibes, France.

Environmental manipulation to facilitate biological control of insects. Workshop on Nematodes for biological control, Lehigh University, Pennsylvania.

b) Membership in Professional Societies

American Society for Parasitology
British Society for Parasitology
Canadian Entomological Society
Canadian Phytopathological Society
Canadian Society of Zoology
European Society of Nematology
Institute of Biology
Nematological Society of India
Organization of Tropical American Nematologists
Society for Experimental Biology
Society of Nematologists
Society for Invertebrate Pathology

Scholarly Accomplishments

a) Proposed Research - Host parasite relationships of organisms in insects and plants.

Manipulation of the biological and physical environment of parasites during their development in order to increase the incidence of beneficial ones and decrease the incidence of harmful ones.

a) A study of the ultrastructure and physiology of the host tissue response to developing parasites using tissue culture and in vivo techniques to help ascertain (i) the mechanisms of resistance and susceptibility of plant and insect hosts to disease causing organisms and (ii) the requirements of developing parasites.
b) Modification of the host response by hormonal minipulation in order to benefit man's requirements of the host parasite relationship.
c) Increasing the infective potential of insect parasites by modifying the micro-environment.
d) Method of reception and type of response of nematodes to light and the effect of light manipulation on nematode behaviour.
e) Assessment of the importance of nematode associations (i) to the plant or insect host (ii) to the forest economy by a detailed study of the interactions of the physico-chemical environment with (a) bark beetles, fungi and nematodes and (b) forest trees, nematodes and microorganisms and (iii) in food chains in healthy and polluted environments.

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b) Total Publications - 50

Research Papers (refereed)	- 36
General Papers (refereed)	- 10
Non-refereed papers	- 3
Invited Review (refereed)	- 1

Research Papers (refereed)

1968 Webster, J. M. and J. F. Bronskill. Use of Gelgard M and an evaporation retardant to facilitate control of larch sawfly by a nematode-bacterium complex. J. Econ. Ent. 61: 1370-1373.

1968 Doncaster, C. C. and J. M. Webster. Clumping of the plant parasitic nematode Ditylenchus dipsaci in water. Nematologica, 14: 131-136.

1968 Webster, J. M. and D. J. Hooper. Seriological and morphological studies on the inter- and intra-specific differences of the plant-parasitic nematodes Heterodera and Ditylenchus. Parasitology, 58: 879-892.

1970 Paulson, Ronald E. and John M. Webster. Giant cell formation in tomato roots caused by Meloidogyne incognita and Meloidogyne hapla (Nematoda) infection. A light and electron microscope study. Can. J. Bot., 48: 271-276.

1971 Burr, A. H. and J. M. Webster. Morphology of the eyespot and description of two pigment granules in the esophageal muscle of a marine nematode: Oncholaimus vesicarius. J. Ultrastruct. Res. 36: 621-632.

1971 Gordon, R., J. M. Webster and D. E. Mead. Some effects of the nematode Mermis nigrescens upon carbohydrate metabolism in the fat body of its host, the desert locust Schistocerca gregaria. Can. J. Zool. 49: 431-434.

1971 Gordon, R. and J. M. Webster. Mermis nigrescens: Physiological relationship with its host, the adult desert locust Schistocerca gregaria. Exptl. Parasitology. 29: 66-79.

1971 Lam, A. B. Q. and J. M. Webster. Morphology and biology of Panagrolaimus tipulae n. sp. (Panagrolaimidae) and Rhabditis (Rhabditella) tipulae n. sp. (Rhabditidae), from leatherjacket larvae Tipula paludosa Meig. (Diptera: Tipulidae). Nematologica 17: 201-212.

1971 Thong, C. H. S. and J. M. Webster. The effect of gonadotrophins on the in vitro development and body length of the free-living nematode Cephalobus sp. Bastian. Can. J. Zool. 49: 1059-1061.

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1971 Nelson, H., J. M. Webster and A. H. Burr. A redescription of the marine nematode Oncholaimus vesicarium (Wieser, 1959) and observations of the pigment spots of this species and of Oncholaimus skawensis Ditlevsen, 1921. Can. J. Zool. 49: 1198-1197.

1971 Oloffs, P. C., S. Y. Szeto and J. M. Webster. Translocation of organochlorine pesticide residues from soils into carrots. Can. J. Plant Sc. 51: 547-550.

1972 Gordon, R. and J. M. Webster. Nutritional requirments for protein synthesis during parasitic development of the entomophilic nematode Mermis nigrescens. Parasitology. 64: 161-172.

1972 Hunter, D. M., R.M.F.S. Sadleir and J. M. Webster. Studies on the ecology of caterebrid parasitism in deermice. Can. J. Zool. 50: 25-29.

General Papers

1968 Webster, J. M. The effect of 2, 4-D on plant parasitic nematodes in culture and in vivo. Comptes Rendus Du VIII Symp. Internat. Nemat. Antibes, 1965, 88.

1969 Paulson, R. E. and J. M. Webster. Ultrastructural response of plant cells to gall-forming nematodes. J. Nema. 1: 22-23.

1969 Webster, J. M. and S. Craig. The direct effect of plant and insect hormones on Cephalobus sp. J. Nematology 1: 308.

1970 Gordon, R. and Webster, J. M. Some effects of the nematode Mermis nigrescens on the physiological environment of the parasite in its host, the desert locust Schistocerca gregaria. J. Parasitology, 56, Sec. II: 121.

1970 Webster, J. M. Nematodes as biological control agents. Proceedings of 21 Ann. Western For. Ins. Work Conf., Seattle 1970; 61-62.

1970 Paulson, R. E. and J. M. Webster. The cellular response of a resistant tomato plant to Meloidogyne incognita. J. Parasitology, 56 (Sec. II): 260.

1971 Gordon, R. and J. M. Webster. The nutritional requirements of the parasitic nematode Mermis nigrescens for protein synthesis. J. Nematology 3: 310.

1971 Paulson, R. E. and Webster, J. M. Light and electron microscopy of the hypersensitive reaction of tomato (Lycopersicon esculentum to Meloidogyne incognita). J. Nematology 3: 323-324.

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1972 Webster, J. M. and R. E. Paulson. An interpretation of the ultrastructural response of tomato roots susceptible and resistant to Meloidogyne incognita. Proc. E.P.P.O. Symposium, Antibes, France.

Book

1972 Webster, J. M. (Editor). Economic Nematology. Academic Press, London, 1972. 563 pp.

Invited Review

Webster, J. M. The host-parasite relationships of plant-parasitic nematodes. In Advances in Parasitology, Academic Press, 7: 1-40.

Non-Refereed Papers

1968 Webster, J. M. (Editor). Proceedings of the North Western Nematology Workshop. Integrated Control Programs for Nematode Pests. Simon Fraser University Audio Visual Centre, 45 pp.

Book Review

1970 Webster, J. M. Plant Pathology, by G. N. Agrios. Academic Press. New York, 1969, 629 pp. Nematologica 16: 158.

Publications in press

1972 Lam, A. B. Q. and J. M. Webster. Morphological characteristics for differentiating larval instars of leatherjackets, Tipula paludosa Meig. Can. J. Ent. (In press).

1972 Lam, A. B. Q. and J. M. Webster. Effect of the DD-136 nematode and of a ß-exotoxin preparation of Bacillus thuringensis var thuringensis on leatherjackets, Tipula paludosa larvae. J. Invert. Path. (In press).

1972 Paulson, R. E. and J. M. Webster. Ultrastructure of the hypersensitive reaction of tomato, Lycopersicon esculentum L. roots to infection by the root-knot nematode, Meloidogyne incognita. Phys. Plant Path. (In press).

1972 Thong, C. H. S. and J. M. Webster. A redescription of the bark beetle nematode Contortylenchus brevicomi synonym Contortylenchus barberus (Nematoda: Sphaerularidae). J. Nematol. (In press).

1972 Nelson, H., B. Hopper and J. M. Webster. Enoplus anisospiculus, a new species of marine nematode from the Canadian Pacific Cost. Can. J. Zool. (In press).

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Additional Comments

1) Member of the Editorial Board of the international journal "Nematologica".

2) Edit papers from time to time for the following journals:
Canadian Journal of Zoology
Experimental Parasitology
Journal of Nematology

3) Initiated and was prime organizer of the North Western Nematology Workshop in Spring 1968, where over 50 nematologists from B.C. and many parts of the world discussed the theme of "Integrated Control for Nematode Pests".

4) Chairman of sessions at Society of Nematology Congress at San Francisco and Ottawa and of the Western Forest Insect Work Conference at Seattle.

5) External Examiner for Ph.D. candidate of the University of Adelaide, Australia.

6) Outside Research Funds

Chemical Company Grants - 1968	$ 400.00
National Research Council - 1968-69	$13,990.00
National Research Council - 1969-70	$18,000.00
B. C. Coast Vegetable Marketing Bd. - 1969-70	$ 2,200.00
B. C. Dept. Agriculture - 1969-70	$ 1,500.00
National Research Council - 1970-71	$18,000.00
National Research Council - 1971-72	$18,000.00
National Research Council - 1972-73	$18,000.00
Canada Dept. Agriculture - 1972-73	$ 3,500.00

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

March, 1972

Name: Peter BELTON **Age:** 41

Present Faculty Position: Associate Professor

Term of Present Contract: Tenured - First Appointed 1 November 1967

Degrees:

1955	B.Sc. (Hons)	London University
1955	A.R.C.S.	Imperial College, London
1970	Ph.D.	Glasgow University

Career:

1949-50	Asst. Exper. Officer, Min. of Food, London*
1950-51	National Service R.A.F., Radio and Telecommunications (Certificate of Merit)
1955-57	D.S.I.R., Research Studentship
1957-60	Assistant Professor, Zoology, Glasgow University
1960-61	Cerebral Palsy Foundation Fellowship, Columbia Univ.
1961-67	Research Officer, Canada Department of Agriculture, Belleville*
1964-67	Group Leader, Belleville, for research on influence of physical, metarchonistic, and autocidal controls on insect behaviour and mortality.
1967-70	Associate Professor, SFU
1970-present	Associate Professor, SFU*
1971-present	Director, Academic Advice Centre, SFU

*Permanent (Tenured) Position

Contributions to SFU

a) Courses taught

101 - Introductory Biology - Spring 1970 and 1971
201 - Cell Biology and Biochemistry - Spring 1968, Fall 1968, 1970
300 - Physics and Chemistry of the Environment - Spring 1969, 1971, 1972 (part)
305 - Animal Physiology - Summer 1970
845 - Regulation and Control II - Spring 1969, 1972
826 - Electrophysiological techniques - Fall 1969, 1971
003 - Ecology and the Population Explosion (lecture) - Fall 1970, 1971
Sci 010 - Contemporary Topics in the Natural Sciences (lecture) - Fall 1970

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b) Other Contributions

Graduate Advisory Committees for
R. A. Costello (Chairman
M. P. Daem (Chairman)
K. D. Maclean (Chairman)
C. van Netten
L. J. Bennett
R. M. Willing
G. W. Gilgan
D. Mahon
S. Craig

Chairman, Senate Undergraduate Appeals Board, Feb. 1972
Faculty of Science Executive Committee, since May 1971-
Coordinator (With Drs. Sadleir and Sherwood) Burnaby Lake Survey, Opportunities for Youth, Summer 1971
Member of Simon Fraser Speakers Bureau 1968-71. Talked to service clubs, high schools, participated in several radio and television programmes.

Scholarly Status:

a) Invited to give seminars at Columbia Univ., New York; Tufts University, Medford Mass.; University of Alberta, Edmonton, Queen's University, Kingston; University of Toronto; University of Victoria; University of British Columbia.
Invitational addresses to Canadian and Ontario Entomological Societies
West Coast Conference on excitable systems
Invited as a symposium speaker "The use of sound in Insect Control" 14th International Congress of Entomology, Canberra, Australia
Invited paper and book chapter on "Analysis of Mosquito Behaviour" 14th International Congress of Entomology, Canberra, Australia

b) Society Membership

Fellow, Royal Entomology Society, London, since 1954
Member (Director 1966-67) Entomological Society, Ontario, since 1962
Member, Entomological Society, Canada, since 1962
Member, American Mosquito Control Association, since 1966
Member, Entomological Society, B. C., since 1968

c) External Examiner

University of Alberta, Edmonton.

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Scholarly Accomplishments:

a) Areas of Scholarly Specialization

Non-chemical techniques for controlling agricultural and stored-product pests. Also effects of sounds, ultrasonics, light, electromagnetic radiation, electrostatics, etc. on pests.

b) Publications - Total 26

1956 Electrical responses of certain lepidopterous tympanal organs. Nature, Lond. 177: 139-140. (with P. T. Haskell).

1958 Membrane potentials recorded from moth muscle fibres. J. Physiol. 142: 20-21.

1958 A one-valve D.C. amplifier with high impedance input. Electr. Engng. 30: 454-456.

1960 Effects of ions on potential in lepidoteran muscle fibres. Biol. Bull. 119: 289.

1961 Comparative effects of drugs on graded responses of insect muscle fibers. Fed. Proc. 20: 339. (with H. Grundfest).

1961 The ionic factors in the electrogenesis of the electrically inexcitable and electrically excitable membrane components of frog slow muscle fibers. Biol. Bull. 121: 382. (with H. Grundfest).

1962 A field test on the use of sounds to repel the European corn borer. Ent. exp. et appl. 5: 281-288. (with R.H. Kempster).

1962 The Physiology of sound reception in insects. Proc. Ent. Soc. Ontario 92 (1961): 20-26.

1962 Responses to sound in pyralid moths. Nature 196: 1188-1189.

1962 Simple switching device with phase synchronization. J. Acoust. Soc. Amer. 34: 894.

1962 Potassium activation and "K-spikes" in muscle fibers of the mealworm larva (Tenebrio molitor). Amer. J. Physiol. 203: 588-594. (with H. Grundfest).

1962 The K-permeability of the muscle fiber membrane of the mealworm (Tenebrio molitor) larva. J. gen. Physiol. 45: 590A. (with H. Grundfest).

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1963 Effects of sound on insect behaviour. Proc. ent. Soc. Manitoba 18: 22-30.

1963 Some factors affecting the catches of Lepidoptera in light traps. Canadian Ent. 95: 832-837. (with R.H. Kempster).

1963 Modification of an electric cine camera to take remote bulb exposures. Rev. Sci. Instrum. 34: 704-706.

1964 The value of Physical factors in insect control. Canadian Ent. 96: 114. (with M.G. Maw).

1966 Light-trap collections of mosquitoes near Belleville, Ontario in 1965. Proc. Ent. Soc. Ontario 96: 90-96. (with M. Galloway).

1967 Trapping mosquitoes with sound. Prof. Calif. Mosq. Contr. Assoc. 35, p 98.

1967 A device for programming the insensity of fluorescent lamps. J. Econ. Ent. 60: 883-884. (with R. H. Kempster and K.K. Nair). (Refereed).

1967 The effect of illumination and pool brightness on oviposition by Culex restuans (Theo) in the field. Mosq. News 27: 55-68. (Refereed).

1967 A comparison of different light traps for Culicoides (Diptera: Ceratopogonidae). Canadian Ent. 99: 267-272. (with A. Pucat). (Refereed).

1967 A specimen of Aedes thibaulti collected near Belleville, Ontario. Canadian Ent. 99: 1336. (with D. E. French). (Refereed).

1969 The electrical activity of cockroach rectal muscle fibres. Comp. Physiol. biochem., 28: 853-863. (With B.E. Brown). (Refereed).

1969 Innervation and neural excitation of ventral muscle fibres of the larva of the waxmoth, Galleria mellonella. J. Insect. Physiol. 15: 731-741. (Referred).

1970 An annotated list of the mosquitoes of Southeastern Ontario. Proc. Ent. Soc. Ont., 100: 200-230. (co-author).

1971 The effects of pharmacological agents on the electrical responses of cells of Nitella flexilis. (with C. van Netten). Can. J. Physiol. Pharmacol. 49: 824-832. (Refereed).

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Additional Comments:

1956-57 Glasgow University, Dept. of Zoology. Demonstrated (Laboratory) 1st year zoology to medical, dental and veterinary students.

1958-60 Glasgow University, Dept. of Zoology. Appointed as Assistant. Demonstrated (laboratory), comparative physiology and electrophysiology to 4th year zoology students. Prepared lectures and practical courses for comparative ethology and electronic technique for 4th year students.

1964-65 Queen's University, Dept. of Physiology. Prepared and demonstrated laboratory course and group conference on intracellular electrophysiology.

1962-66 Supervised the research of five high school and university students during 11 to 22 weeks in the summer.

1965-66 Carried out cooperative research resulting in publications or research reports with two graduate students (Mr. A. Carmichael, U.W.O., and Miss A. Pucat, McDonald College).

Chairman 1966- Working party on Chemosterilants, Ent. Advisory Committee, Canada Defence REsearch Board.

Leader, Glasgow University Field Investigation on Lamb Predation by birds in the Hebrides, 1957.

Member of group investingating and assessing mosquito problem on the Cayman Islands, Canada External Aid Dept. 1964

Consultrant to Ultrason International Inc., New York, 1970

Member, IDRC. Work Conference and Seminar. On-farm storage of grain in Africa. June, 1971.

External Grants

1968-69	National Research Council Grant	$18,925.
1969-	Feller Chemical Corp. (Effects of Ultrasound on pests)	874.
1969-70	National Research Council Grant	11,000.
1970-73	National REsearch Council Grant	39,000.

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

February, 1972

Name: John Harvey BORDEN Age: 34

Present Faculty Position: Associate Professor

Term of Present Contract: Tenured - First Appointed September 1, 1966

Degrees: B.S. 1963 Washington State University
M.S. 1965 University of California
Ph.D. 1966 University of California

Certification: Certified Entomologist in General Entomology and Forest Entomology, AMERICAN REGISTRY OF CERTIFIED ENTOMOLOGISTS.

Career: No previous professional positions.

Contributions to SFU:

a) Courses taught

101 - Introduction to Biology - Fall 1966, 1967, 1969, Summer 1970
102 - Introduction to Biology - Spring 1967, 1969, Spring 1972
416 - Introductory Entomology - Spring 1967, 1968, Fall 1968
417 - Entomology - Spring 1970, Fall 1970, 1972
498 - Undergraduate Research - Summer 1967, 1968, Fall 1968, Spring 1970, 1971, Spring 1972
816 - Biology of Forest Insects - Spring 1968, Fall 1969, 1970, 1971
859 - Special Topics - Summer 1968
Educ. 810 - Fall 1968

b) Other Contributions

Former Committee and Executive Membership

1. Treasurer, Faculty Association Executive, 1968-69
2. Senate Committee on Admissions Policy (Ellis Report), 1969
3. Faculty of Science Nominations Committee 1969-1971
4. Departmental Tenure Committee, 1969-1970
5. High School Visitation Committee, Fall, 1971
6. Presidential Committee on Intercollegiate Athletics, 1971
7. Faculty of Science Undergraduate Curriculum Committee, 1970-71

Active Committee Membership

1. Senate Scholarship Committee, 1970-72
2. Archaeology Tenure Committee, 1969-72
3. Departmental Undergraduate Curriculum Committee, 1969-72 (Chairman, 1970-71)
4. Departmental Space Committee, 1967-72.

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Graduate Advisory or Examining Committees

Graduated: R. A. Ellis, M.Sc. (Major Advisor)
R. B. Bennett, M.Sc. (Major Advisor)
G. Hofstra, Ph.D.
R. Thompson, Ph.D.
S. N. Thompson, M.Sc.
K. Penner, M.Sc.
R. L. Fenton (Economics), M.Sc.
F. Hall (Chemistry), Ph.D.
J. V. Richerson, Ph.D. (Major Advisor)
P. Muthigani, M.Sc.

In Course: L. Bennett, Ph.D. (Major Advisor)
H. Vlug, M.Sc. (Major Advisor)
C. E.Fockler, M.Sc. (Major Advisor)
D. Ostaff, M.Sc. (Major Advisor)
H. L. Friesen (Education) M.Sc.
A. Campbell, Ph.D.
S. Craig, M.Sc.
C. Thong, Ph.D.
D. Hunter, M.Sc.

Scholarly Status:

Seminars: SFU, 1966, 1971
University of Washington, 1968
New York State College of Forestry, 1969

Invitational Papers:
Pacific Branch of the Entomological Society of America, June 1971
Entomological Society of Canada, August, 1971
National Science Teachers' Association, December, 1971

Symposia: Western Forest Insect Work Conference, April 1971, Moderator and Participant

Workshops: Western Forest Insect Work Conference, 1968, 1969, 1970, 1971, Invited Participant

Guest Lectures:
B. C. I. T., 1968
SFU, several from 1966-71

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Submitted Papers:

Entomological Society of B. C., Annual Meeting, 1968 (2)
Entomological Society of America, Annual Meeting, 1965, 1968, 1969, 197
Pacific Branch of the Entomological Society of America, Annual Meeting, 1965, 1970
Entomological Society of Canada, Annual Meeting, 1964, 1966, 1971
Federation of Canadian Biologists, 1969

Papers Reviewed for Journals (Several prior to 1971):

1971: Annals of the Entomological Society of America (3)
Canadian Journal of Zoology (1 plus one request referred to another reviewer)
1972: Annals of the Entomological Society of America (1)
Canadian Journal of Zoology (1)

Society Membership:

Entomological Society of B. C. (Director, 1969-71)
Entomological Society of Canada
Entomological Society of America
American Association for the Advancement of Science.

Honorary Societies:

Phi Beta Kappa, Phi Kappa Phi, Sigma Xi.

Scholarly Accomplishments:

a) Teaching

Introductory Biology (101 and 102), Introductory Entomology (417), Biology of Forest Insects (816), Undergraduate and Graduate Research Advising.

b) Research

Sex pheromones and biology of forest insects, insects in public school science.

Current Projects:

1. Isolation, identification and synthesis of the sex pheromones of Dendroctonus pseudotsugae and Trypodendron lineatum (with Dr. R. M. Silverstein, N. Y. State College of Forestry, Syracuse).
2. Behavior in relation to pheromones in Gnathotrichus retusus.
3. Biology of the conifer infesting fungus, Cryptoporus volvatus, and its arthropod fauna. (With Dr. M. McClaren, SFU).
4. Biology of insects associated with red alder.
5. Preparation of a book on insects for elementary school teachers. (With B. Herrin, S.F.U.).
6. Development of teaching materials for introductory biology. (Presently working on nucleic acid and chromosome models).

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Active Graduate Student Projects:

Behavioral and electrophysiological response of Dendroctonus pseudotsugae to various wavelength bands of the electromagnetic spectrum. (L. Bennett).

The effect of logging and slash burning on soil arthropod populations in a coastal B.C. forest. (H. Vlug).

Reproductive behavior and physiology of Trypodendron lineatum. (C. E. Fockler).

Sex pheromone of the western hemlock looper Lambdina fiscellaria lugubrosa (D. P. Ostaff).

c) Graduate Student Theses Directed

Ellis, R.A. M.Sc. 1969. Studies of Notonecta undulata Say (Hemiptera: Notonectidae) as a predator of mosquito larvae.

Bennett, R.B. M.Sc. 1971. Scolytid flight response to olfactory stimuli with special reference to Dendroctonus pseudotsugae Hopkins (Coleoptera: Scolytidae).

Richerson, J.V. Ph.D. 1972. Host finding mechanisms in Coeloides brunneri Viereck (Hymenoptera: Braconidae).

d) Publications, Films and Reports (Total 30, plus one book in press)

Educational Contributions

1968 Preparation of Blowfly Salivary Gland Chromosomes. (Consultant as part of 4-person team producing film which is now used in Biol. 102 and is under review for commercial distribution.)

1972 Insects in the Classroom. (With B. Herrin). (Book in Press, B.C. Teachers' Federation).

1972 An inexpensive and effective chromosome model for introductory biology instruction. (Paper in preparation).

Research Papers - Total 27 (all in refereed journals).

1965 Life history of Choristoneura lambertinana subretiniana Obraztov (Lepidoptera: Torticidae) attacking lodgepole pine. (With R. W. Stark). Can. Ent. 97:684-690.

1965 A field test of lindane for prevention and control of attack by Ips confusus (LeConte) (Coleoptera: Scolytidae) in slash. (With R. W. Stark). J. Econ. Ent. 58:994-996.

1965 Observations on mortality factors of the fir engraver beetle, Scolytus ventralis (Coleoptera: Scolytidae). (With R. W. Stark). J. Econ. Ent. 58:1162-1163.

1966 The antennal receptors and olfactory response of Ips confusus (Coleoptera: Scolytidae) to male sex attractant in the laboratory. (With D. L. Wood). Ann. Ent. Soc. Am. 59:253-261.

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1967 Emergence patterns of Ips confusus (Coleoptera: Scolytidae) from ponderosa pine. (With E. A. Cameron). Can. Ent. 99:236-244.

1967 Factors influencing the response of Ips confusus (LeConte) (Coleoptera: Scolytidae) to male attractant. Can. Ent. 99:1164-1193.

1968 Antennal morphology of Ips confusus (Coleoptera: Scolytidae). Ann. Ent. Soc. Amer. 61:10-13.

1968 Sex pheromone of Dendroctonus pseudotsugae (Coleoptera: Scolytidae): Production, bioassay, and partial isolation. (With R. M. Silverstein and R. G. Brownlee). Can. Ent. 100:597-603.

1968 Sex pheromone of Trypodendron lineatum (Coleoptera: Scolytidae): Production, bioassay, and partial isolation. (With R. G. Brownlee and R. M. Silverstein). Can. Ent. 100:629-636.

1968 Induction of flight muscle volume degeneration by synthetic juvenile hormone in Ips confusus (Coleoptera: Scolytidae). (With C. E. Slater). Z. vergl. Physiol. 61:366-368.

1969 Flight muscle volume changes in Ips confusus (Coleoptera: Scolytidae). (With C. E. Slater). Can. J. Zool. 4:29-32.

1969 Fecal filaments produced by fungus-infesting larvae of Platydema oregonense (Coleoptera: Tenebrionidae). (With M. McClaren and M. A. Horta). Ann. Ent. Soc. Amer. 62:444-446.

1969 Sex pheromone of Trypodendron lineatum: production in the hindgut-Malphighian tube region. (With C. E. Slater). Ann. Ent. Soc. Amer. 62:454-455.

1969 Observations on the life history and habits of Alniphagus aspericollis (Coleoptera: Scolytidae) in southwestern British Columbia. Can. Ent. 101:870-878.

1969 The effect of temperature and other environmental factors on Notonecta undulata Say (Hemiptera: Notonectidae). (With R. A. Ellis). Pan-Pac. Ent. 45:20-25.

1969 A continuously-recording flight mill for invetigating the effect of volatile substances on the flight of tethered insects. (With R. B. Bennett). J. Econ. Ent. 62:782-785.

1969 Laboratory rearing of Notonecta undulata (Say) (Hemiptera: Notonectidae). (With R. A. Ellis). J. Ent. Soc. B. C. 66:51-53.

1969 Occurrence of a fat body layer around the testes of Ips confusus (Coleoptera: Scolytidae). (With N. M. G. Bhakthan, K. K. Nair). Ann. Ent. Soc. Amer. 62:1495-1496.

1969 Synthetic juvenile hormone: induction of sex pheromone production in Ips confusus. (With K. K. Nair and C. E. Slater). Science 166: 1626-1627.

1970 Fine structure of de- and regenerating flight muscles of Ips confusus. I. Degeneration. (With N. M. G. Bhakthan and K. K. Nair). J. Cell Sci. 6:807-820.

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1970 Predation by Notonecta undulata (Heteroptera: Notonectidae) on larvae of the yellow fever mosquito. (With R. A. Ellis). Ann. Ent. Soc. Amer. 63:963-973.

1970 Biology of Polyporus volvatus Peck (Agaricales: Polyporaceae) in southwestern British Columbia: distribution, host species and relationship with subcortical insects. (With M. McClaren). Syesis 3:145-154.

1971 Fine structure of de- and regenerating flight muscles of Ips confusus II. Regeneration. (With N. M. G. Bhakthan and K. K. Nair). Can. J. Zool. 49:85-89

1971 Observations on Eriocampa ovata L. (Hymenoptera: Tenthredinidae) infesting red alder in southwestern British Columbia (With W. F. Dean). J. Ent. Soc. B. C. 68:26-28.

1971 Sound and vibration are not obligatory host-finding stimuli for Coeloides brunneri. (With J. V. Richerson). Entomophaga 16: 95-99.

1971 Flight arrestment of tethered Dendroctonus pseudotsugae and Trypodendron lineatum (Coleoptera: Scolytidae) in response to olfactory stimuli. (With R. B. Bennett). Ann. Ent. Soc. Amer. 64: 1273-1286.

1972 Biology of Cryptoporus volvatus (Peck) Shear (Agaricales, Polyporaceae) in southwestern British Columbia: life history, development, and arthropod infestation in the field. (With M. McClaren). Syesis (In press)

Papers submitted to Journals

1972 Host finding behavior in Coeloides brunneri (Hymenoptera: Braconidae). (With J.V. Richerson) (Submitted to the Canadian Entomologist).

1972 Morphology of a unique sensillum placodeum in Coeloides brunneri Viereck (Hymenoptera: Braconidae). (With J.V. Richerson and J. Hollingdale). (Submitted to Canadian Journal of Zoology).

1972 Host finding by heat perception in the bark beetle parasite, Coeloides brunneri. (With J.V. Richerson). (Submitted to Science).

Note: Several papers in preparation.

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Other Publications - Total 2 (refereed).

1971 Secondary attraction in the Scolytidae: an annotated bibliography. (With E. Stokkink). Canada Dept. Fisheries and Forestry Information Report BC-X-57. 77 p.

Changing philosophy in forest insect management. Bull. Ent. Soc. Amer. 17: 268-273.

Additional Accomplishments:

a) Research Grants

1966-67	President's Research Grant, SFU	$1,042.
1967-68	National Research Council	5,000.
1968-69	National Research Council	9,800.
	NRC (Major Equipment)	6,800.
	Canada Dept. of Forestry (E.M.R.)	6,000.
	B. C. Forest Industries	6,000.
	President's Research, SFU.	1,500.
1969-70	National Research Council	7,000.
	Canada Dept. of Fisheries and Forestry (EMR)	6,000.
	President's Research, SFU	1,050.
1970-71	National Research Council (3 years)	8,500.
	Canada Dept. of Fisheries and Forestry (EMR)	6,000.
	National Science Foundation (USA, 2 years)	14,625. (US)
1972	National Research Council	8,500

b) Additional Activities

1. Member, Pest Control Committee, Council of Forest Industries of B. C., 1966-71.

2. Program Chairman, Annual Meeting of the Entomological Society of B. C., 1969.

3. Member, Program Committee, Annual Meeting of the Pacific Branch, Entomological Society of America, 1970, 1971.

4. Member, Common Names Committee, Western Forest Insect Work Conference, 1971-1972.

5. In charge of registration, Annual Meeting of the Entomological Society of Canada, 1971.

External References:

Dr. K. Graham, Dept. of Forestry, University of British Columbia.

Dr. John A. Chapman, Canadian Forestry Service, Pacific Forest Research Centre, 506 West Burnside Road, Victoria, B.C.

Dr. David L. Wood, Division of Entomology, Dept. of Entomology and Parasitology, University of California, Berkeley, California.

Addendum to Curriculum Vitae, John H. Borden

(Supercedes Memo from JHB to Geen, 28 Feb. 1972)

I. Scholarly Accomplishments

a) Research, Graduate Student Projects

Sex pheromones of lepidopteran orchard pests. (J.M. Vakenti).

b) Invited to contribute chapter to proposed book on Pheromones. Elsevier/North Holland Press. Relevant correspondence attached.

c) Graduate Student Theses Directed

Fockler, C.E. M.Sc. 1972. Some aspects of the behavior and physiology of sexual activity in Trypodendron lineatum Olivier (Coleoptera: Scolytidae).

Vlug, H. M.Sc. 1972. The effects of logging and slash burning on soil Acari and Collembola in a coniferous forest near Maple Ridge, British Columbia.

d) Research Papers

Two papers now in press.

1972. Host finding behavior in Coeloides brunneri (Hymenoptera: Braconidae). (With J.V. Richerson). Can. Ent. (In press).

1972. Morphology of a unique sensillum placodeum in Coeloides brunneri Viereck (Hymenoptera: Braconidae). (With J.V. Richerson and J. Hollingdale). Can. J. Zool. (In press).

One additional paper submitted to journal.

1972. Sexual behavior and seasonal mating activity of Trypodendron lineatum (Coleoptera: Scolytidae). (With C.E. Fockler). (Submitted to the Canadian Entomologist).

II. Research Grants

1972. National Science Foundation (USA, 2 years) $12,345.00.

III. Additional Activities

6. Committee on Professional Training Standards, and Status. Entomological Society of America. 1972.
7. Nominating Committee. Western Forest Insect Work Conference. 1972.
8. In charge of operations. Annual Meeting of the Pacific Branch of the Entomological Society of America, Victoria, B.C., June, 1972.

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

May, 1972

Name: Thelma FINLAYSON (Mrs.) **Age:** 57

Present Faculty Position: Associate Professor

Senator S. McKeen Curator in Entomology

Term of Present Contract: Tenured - July, 1971

First Appointed - September 15, 1967

Degrees:

1936 Honours B.A. in Biology, Toronto
1937 Teaching Certificate, Ontario College of Education

Note: B.A. accepted as terminal degree on appointment at SFU.

Career: Research Institute, Canada Department of Agriculture, Belleville, Ontario, as:

1937-1940	Technical Officer
1942-1959	Technical Officer (various grades)
1959-1964	Research Officer (grades 2 and 3)
1964-1967	Research Scientist (grade 2)
1967-1971	Assistant Professor, Simon Fraser University
1971-	Associate Professor, Simon Fraser University

Contributions to SFU:

a) Courses taught

102 - Introduction to Biology - Spring 1968 (tutorials only), Summer 1968 (full), Summer 1969 (full), Fall 1971

317 - Insect Biology (new course given for the first time) - Fall 1969, Summer 1970, Spring 1971, 1972

840 - Economic Organisms I (new course given for the first time) - Fall 1968, 1971

Graduate Student - one Ph.D. student (part)

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b) Other contributions

1967-3	Interviewed all Biology Honours and Majors students, analyzed results, and prepared a report for the Department.
1968	Organized and chaired graduate student seminars.
1968	Member of Student Affairs Committee.
1969	Faculty Association representative on University Food Services Committee.
1970-71	Member of Department of Biological Sciences Undergraduate Curriculum Committee.
1971-	Academic Counselling
1971-72	Faculty of Science member on Univ. Appointments Committee for Faculty of Arts

Scholarly Status:

a) Recent Invitations (Since March, 1970).

1. From the Entomological Society of America, to co-author with Prof. K. Hagen, University of California, Berkeley, the section on parasitic Hymenoptera for a proposed several-volume work on the immature stages of insects.

2. From the Department of Biology, University of New Brunswick, Fredericton, to give a seminar on Biological Control.

3. From Forest Service, U. S. Department of Agriculture, to act as discussion leader at "Workshop on Research and Development Studies of Larch Casebearer in Western Larch Stands", at Moscow, Idaho.

4. From the Western Forest Insect Work Conference, to organize and act as Moderator of the session on "Problems inherent to exotic insect outbreaks: at the 22nd Annual Meeting held at Glenwood Springs, Colorado, March 1971.

5. From the Entomological Society of British Columbia, to become a director for two years.

6. Various radio and newspaper interviews.

b) Membership in Learned Societies

Entomological Society of Canada
Entomological Society of America
Canadian Society of Zoologists
American Institute of Biological Sciences
Entomological Society of British Columbia
Entomological Society of Ontario
International Organization for Biological Control (I.O.B.C.)
Sigma Delta Epsilon (Graduate Women's Scientific Fraternity)

Scholarly Accomplishments

a) Current areas of scholarly specialization

Biological control procedures and techniques
Biology and taxonomy of immature stages of parasitic insects.

b) Publications - Total-24 in Refereed Journals, 21 of them since 1957, mainly in three areas.

1) Parasites of forest insects: 6 papers, 22 pages
2) Effects of food and environmental factors on reproduction of parasitic Hymenoptera: 5 papers, 13 pages
3) Biology and taxonomy of immature stages of parsitic insects: 13 papers, 223 pages.

For the past five years, in journals with a referee system:

1966 The false cocoon of Hyposoter parorgyiae (Vier.) (Hymenoptera: Ichneumonidae). Canadian Ent. 98:139.

1967 A classification of the subfamily Pimplinae (Hymenoptera: Ichneumonidae) based on final-instar larval characteristics. Canadian Ent. 99:1-8.

1967 The hymenopterous parasites (Hymenoptera:Aphidiidae et Aphelinidae) of the pea aphid in eastern North America. Canadian Ent. 99: 1051-1082. (With M. Mackauer).

1967 Taxonomy of final-instar larvae of the hymenopterous and dipterous parasites of Acrobasis spp. (Lepidoptera:Phycitidae) in the Ottawa region. Canadian Ent. 99:1233-1271.

1969 Final-instar larvae of two hymenopterous parasites of a wood-boring beetle, Tetropium velutinum LeConte (Coleoptera:Cerambycidae). J. entomol. Soc. British Columbia 66:62-65.

1970 Final-instar larval characteristics of Coleocentrus rufus (Hymenoptera:Ichneumonidae). Canadian Ent. 102:905-907.

In preparation: 2 papers; 1 monograph; and 1 book co-authored with Prof. K. Hagen, University of California, Berkeley.

Additional Comments:

External Research Awards

1967-68	National Research Council	$3,000.
1968-69	National Research Council	5,800.
1969-70	National Research Council	3,000.
1972-73	National Research Council	2,000.

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

May, 1972

Name: Richard Michael Francis Stuart SADLEIR Age: 36

Present Faculty Position: Associate Professor

Term of Present Contract: Tenured - July 23, 1970
First Appointed - 1 April, 1967.

Degrees: B.Sc. Honours (First Class), Univ. of Western Australia, 1958
Ph.D., University of Western Australia, 1961.

Career: Postdoctoral Fellow - Univ. of British Columbia, 1961-1963.
Postdoctoral Fellow - Nature Conservancy and University of Aberdeen, Scotland, 1964.
Research Fellow - Zoological Society of London, 1964-1967.

Contributions to SFU:

a) Courses taught

102 - Introductory Biology, Fall 1970
304 - Animal Ecology - Summer 1967
316 - Vertebrate Biology - Fall 1967, Summer 1968, Spring 1969, Fall 1969, Spring 1971.
409 - Field Ecology - Summer 1969, Summer 1971.
836 - Vertebrate Reproductive Ecology - Fall 1968, Fall 1970.
879 - Modern Forest Practice - Fall 1969.

b) Member of following committees

University Search Committee for Dean of Science
University (and Departmental) Search Committee for Chairman of Department of Biological Sciences
University Committee on Animal Care
Departmental Promotion and Tenure Committee
Faculty of Science Executive Committee
Kinesiology Selection Committee

Scholarly Status:

a) Invited Addresses

To Society of Psychosomatic Research, London, U. K. November, 1967. (Unable to attend - paper read in absentia).

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Invited Addresses (continued...)

To 2nd International Conference on "Biology of Reproduction in Mammals". (Society for the Study of Fertility). Nairobi, Kenya, April 1968.

To 3rd International Symposium on "Environment and Reproduction in Mammals and Birds". (Society for the Study of Fertility). Edinburgh, Scotland - March 1972.

b) Society Membership

American Society of Mammalogists
British Ecological Society
Canadian Society of Zoologists
Canadian Society of Wildlife and Fisheries Biologists
Japanese Society of Population Ecology
Society for the Study of Fertility
Zoological Society of London

Scholarly Accomplishments:

a) Research

My general research interest is the role of the environment in the reproduction of mammals. My present specific project is concerned with the effect of the alteration of forest environments by logging on reproduction in deermouse and other small mammal populations. I am also interested in vertebrates as pests and am currently collating information on this subject from all Canadian provinces.

b) Publications

Scientific Papers - 19 total (15 in refereed journals)
Books - 1 published; 1 written (to be published)
Chapters - 2

1965 Reproduction in two species of kangaroo Macropus robustus and Megaleia rufa in the arid Pilbara region of Western Australia. Proc. Zool. Soc. Lond. 145:239-61.

1965 The relationship between agonistic behaviour and population changes in the deermouse Peromyscus maniculatus (Wagner). J. Anim. Ecol. 34:331-52.

1966 The preservation of mammalian spermatozoa by freezing. Lab. pract. 15:413-7.

1966 The construction of rectal electrodes for electro-ejaculation. (With P. Healey). J. Reprod. Fertil. 11:299-301.

1966 Notes on reproduction in the larger Felidae. Inter. Zoo Yrbk. 6:184-7.

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1966 The diagnosis of infertility in a black leopard (Panthera pardus). Vet. Rec. 79:397-8.

1966 Investigations into the reproduction of larger felidae in captivity. (Abstract). J. Reprod. Fertil. 12:411-2.

1967 The toxicity of various non-electrolites to human spermatozoa and their protective effects during freezing. (With D. W. Richardson). J. Reprod. Fertil. 14:439-44.

1968 Induction of ovulation in the lion (Felis leo). (With I. W. Rowlands). J. Reprod. Fertil. 16:106-11.

1968 Reproductive responses to the environment in mammals. J. Psychosomatic Res. 12:3-9.

1969 The role of nutrition in the reproduction of wild mammals. J. Reprod. Fertil. Suppl. No. 6:39-48.

1970 The use of index trap lines to estimate population numbers of deermice (Peromyscus maniculatus) in a forest environment in British Columbia. (With B. G. Petticrew). Can. J. Zool. 48:385-389.

1970 The establishment of a dominance rank order in male Peromyscus maniculatus and its stability with time. Anim. Behav. 18:55-59.

1970 Population dynamics and breeding of the deermouse Peromyscus maniculatus on Burnaby Mountain, B. C. Syesis 3:67-74.

1970 Studies on the band-tailed pigeon (Columba fasciata) in British Columbia. I. Seasonal changes in gonadal development and crop gland activity. (With G. L. March). Can. J. Zool. 48: 1353-1357.

Books:

1969 The Ecology of Reproduction in Wild and Domestic Mammals. 321 pp. (Methuens, London)

To be published 1973: The Reproduction of Vertebrates. (Academic Press, New York and London).

Chapters "Cycles and Seasons" and "Environmental Effects" in Reproduction in Mammals. (Austin & Short, Eds.). To be published by Cambridge University Press in 1972.

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Additional Comments:

a) Awards

C.S.I.R.O. Overseas Postgraduate Studentship - 1962
N.R.C. Travel Grant to attend Nairobi Conference ($1540) - 1968.

b) Other Teaching Posts

Resident Tutor, St. Georges College, University of Western Australia, 1959-61.

External Lecturer, University of London, 1965-66.

Lecturer, Capilano College, West Vancouver, 1968.

c) External Research Awards

1967-68	NRC Interim Grant	$4,500.
1968-69	NRC Grant	$6,860.
1969-70	NRC Grant	$7,000.
1970-71	NRC Grant (1st of 3 year)	$8,000.
1971-72	NRC Grant (2nd of 3 year)	$8,000.
1972-73	NRC Grant (3rd of 3 year)	$8,000.

d) Graduate Student Supervision

1 Ph.D. student graduated 1971.
2 M.Sc. and 2 Ph.D. students currently being supervised.
Member of supervisory committee of 7 other students.

e) Continuing Education

Currently acting as Director of Television Production:
in production - fund raising film for ecology series;
in planning - scripts and organisation for producing a TV Ecology course.

External References:

Dr. D. H. Chitty, Department of Zoology, University of British Columbia

Dr. J. E. Eisenberg, Smithsonian Institute Biological Program in Ceylon, 6 Galkanda Rd., Aniwatte, Kandy, Ceylon.

Dr. I. W. Rowlands, Wellcome Institute of Comparative Physiology, Zoological Society of London, Regents Park, London, N. W. 1, England.

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

February, 1972

Name: Peter Christian OLOFFS Age: 42

Present Faculty Position: Assistant Professor

Term of Present Contract: 2 years - expires 31 August 1974

First Appointed - 1 September 1968

Degrees:

Dipl. Agr.	1956	University, Göttingen, Germany.
M.A.	1964	Dept. of Zoology, University of B. C.
Ph.D.	1968	University of Wisconsin, Madison.

Career:

1958-1963	Chemist, Later Chemicals Ltd., Vancouver, B. C.
1962-1963	Teaching Assistant, Univ. of British Columbia.
1963-1964	Sessional Lecturer, Univ. of British Columbia.
1965-1968	Research Assistant (Insect Toxicology & Residue Research), University of Wisconsin, Madison.
1968	Project Associate (Insect Toxicology & Residue Research), University of Wisconsin, Madison.
1968-date	Assistant Professor, Simon Fraser University.

Contributions to SFU:

a) Courses taught

Biology 301 - Biochemistry I - Fall 1969, Spring 1970, Fall 1970 Spring 1971

Biology 846 - Insecticide Chemistry and Toxicology - Spring 1969, 1970, 1971.

Biology 315 - Plant Physiology - Summer 1971

Repeated guest lectures in other SFU courses.

b) Other contributions

Biochemistry Committee

Faculty Association Vice-President - Fall 1970 to July 2, 1971.

President and Sponsor, SFU Tennis Club, Oct. 1968 to Summer 1970. See tennis courts built.

Member, Salary Committee, SFU Faculty Association, 1970-71.

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Scholarly Status

a) Invited Addresses

"Side effects of pesticides". Seminar, Faculty of Agriculture, University of British Columbia, 1969.

"Extracellular plant enzymes metabolizing pesticides, and factors affecting the reactions". Seminar, Faculty of Agriculture, University of British Columbia, 1970.

"Pesticides in Perspective", 2 lectures, UBC Extension Department. Note: This lecture series was cancelled at the time and place for which scheduled because of insufficient registrants - then held unofficially in form of discussion with the people who were present.

"Pesticides for the home gardener". Invitational address at Annual Meeting of B. C. Council of Garden Clubs, 1969.

"Urban and suburban use of pesticides and effects". Invitational address, meeting of Western Canada Turfgrass Association, Feb. 1970.

"Benefits and needs of pesticides". - YMCA, April, 1969.

"Pesticides - hazards from uses and misuses". Invitational address, 9th Annual Meeting, Western Canada Turfgrass Association. (See publications list).

"Pesticides". UBC courses Pharmacy 435 and Plant Science 435. Two lectures and 1 laboratory (3 hours) per week during Fall Semester 1970.

"Pestology at the university level". Invitational address, 51st Annual Meeting, Agricultural Institute of Canada, Lethbridge, Alberta, July 1971. Published in Proceedings.

"World-wide Implications of Pesticide Use". One-hour TV programme, Channel 10, Nov. 3, 1971 (With Drs. H.R. MacCarthy and A. C. Renney).

"Metabolism of Cyclodiene Insecticides". Seminar, Fac. of Agric., UBC, Nov. 16, 1971.

"Pesticides - Yes or No?" Invitational address, Ann. Convention, Nursery Trade Assoc., Harrison Hot Springs, Dec. 3, 1971.

"Pesticides and Public Health". Guest lecture, Depts. of Plant Science and Pharmacy, UBC, Dec. 9, 1971.

b) Professional Societies

Entomological Society of British Columbia
Entomological Society of America
Member: i) Membership Committee } of Pacific Branch
ii) Programme Committee }
A.A.A.S.
American Chemical Society, Pesticide Section
Agricultural Institute of Canada (AIC).
Western Canada Turfgrass Association (Honorary Member).

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Scholarly Accomplishments

a) Area of Specialization

Pesticide Chemistry, Biochemistry and Toxicology.
Note: not ecology and our once so beautiful environment.

b) Refereed Publications

1956 The transition phenomenon in relation to the penetration of water through the cuticle of an insect, Cenocorixa expleta (Hungerford). Can. J. Zool. 44: 621-630.

1969 The epoxidation of aldrin by excised pieces of plant tissue. J. Agricultural and Food Chemistry, 17(1): 143-147.

1970 Epoxidation of aldrin by cell-free pea root preparations. Pesticide Sci., 1: 228-232.

1971 The translocation of pesticide residues into carrots from various soils. Can. J. Plant Science. 51: 547-550. (With Szeto and Webster).

GLC separation of heptachlor epoxide, oxychlordane, α- and γ-chlordane. Bull. Environ. Contam. Toxicol. 7: 33-35. (With Conder and Szeto).

Organochlorine residues in human tissues. Rept. of the 6th Pesticide Residue Analysis Seminar. p. 42-46.

A new apparatus to induce hepatic cirrhosis in rats with gaseous CCl_4. In prepration. (Still in prep. as contribution of one collaborator from UBC so slow in coming). With H. Clarke, M. Noble, S.Y. Szeto).

Fate and Behaviour of Five Chlorinated Hydrocarbons in Three Natural Waters. Submitted to Can. J. Microbiol. (With L. J. Albright and S.Y. Szeto).

c) Non-Refereed Publications

1970 Interactions. Western Can. Turfgrass Assoc. "Feature Article". April, 1970. Vol. 2, #4.

1971 Pesticides - Hazards from Uses and Misuses. Proc. 9th Ann. Mtg. Western Can. Turfgrass Assoc. pp 44-62.

Pestology at the University level. Proc. 18th Annual Mtg., Agric. Pesticide Society. p. 84-92.

1972 Formulating Pesticides. Western Can. Turfgrass Assoc. "Feature Article". Feb. 1972. (In press).

Additional Comments

Member - B. C. Carrot Research Committee
Member - B. C. Pesticide Advisory Committee (Advisory Committee to Minister of Agriculture).

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Grants

National Research Council Grant - $4000.00 per annum, 1970, 71, 72

B. C. Medical Research Council Grant - $5000.00

B. C. Plant Science Lead Committee Grant. (Grant awarded to Dr. J. Webster - used to finance technician, Mr. S. Y. Szeto, for several months and to finance field work.)

Dept. of Energy, Mines and Resources Grant - $3,000.00

President's Research Grant - $1,500.00

Velsicol Chem. Corp, Chicago. - $2,000.00

Public Health. $17,920.00 for April 1972 - March 1973.

References

Dr. H. R. MacCarthy, C.D.A. Research Station, 6660 N. W. Marine, Vancouver, B. C.

Mr. G. M. MacIntyre, Professor, Faculty of Law, University of British Columbia, Vancouver 8, B. C.

Mr. Jack Later, President, Later Chemicals Ltd., 330 Lysander Lane, Richmond, B. C.

Department of Biological Sciences

Simon Fraser University

CURRICULUM VITAE

February, 1972

Name: James E. RAHE Age: 32

Present Faculty Position: Assistant Professor

Term of Present Contract: 2 yrs. 7 mos. - expires August 31, 1973

First Appointed - October 1, 1969

Degrees:

B.S.A.	1961	Purdue University
Ph.D.	1969	Purdue University

Career:

Sept. 57 - Jan. 61	Undergraduate Student, Purdue University
April 61 - Jan. 63	Platoon Leader, U.S. Army, Ft. McClellan, Alabama
Jan. 63 - June 69	Graduate Research Assistant, Dept. of Biochemistry, Purdue University
June 69 - Oct. 69	Postdoctoral Appointment, Dept. of Biochemistry, Purdue University
Oct. 69 - present	Assistant Professor, Dept. of Biological Sciences, Simon Fraser University.

Contributions to SFU:

a) Courses taught

201 - Cell Biology and Biochemistry - Spring 1972.
301 - Biochemistry I - Summer 1970, Fall 1971.
841 - Economic Organisms II - Fall 1969 (one of three instructors), Fall 1970

b) Committees

Oct 1971 - present - Chairman, Dept. Undergraduate Curriculum Committee
Nov 1971 - present - Department Tenure Committee
Jan 1972 - present - CUSO Interview Team.

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Scholarly Status:

a) April, 1971. Department of Plant Science, UBC.
"Biochemical Aspects of Induced Disease Resistance in *Phaseolus vulgaris*."

b) Society Membership:

Phytochemical Society of North America
American Phytopathological Society
American Association for the Advancement of Science
Sigma Xi

Scholarly Accomplishments:

a) Research specializtion in area of biochemical nature and control of natural and artificially induced disease resistance in plants.

b) Total publications in print: 6, submitted: 1.

1969 Correlation of phenolic metabolism with histological changes in *Phaseolus vulgaris* inoculated with fungi. Netherlands J. Plant Pathology, 75:58-71. (Invited Paper)

1969 Induced resistance in *Phaseolus vulgaris* to bean anthracnose. Phytopathology 59:1641-1645.

1970 Cinnamic acid production as a method of assay for phenylalanine ammonia-lyase in acetone powders of *Phaseolus vulgaris*. Phytochemistry 9:1009-1015.

1970 Factors affecting gene expression as a key to disease resistance in plants. Arquivos do Instituto Biologico. 37:1-7. (Invited Paper).

1970 Metabolic nature of the infection-limiting effect of heat on bean anthracnose. Phytopathology 60:1005-1009.

1972 Biochemical nature and control of induced resistance in *Phaseolus vulgaris*. I. Phytoalexin nature of heat-induced protection against bean anthracnose. Phytopathology (submitted Feb. 1972).

Other publications:

1969 A biochemical study of mechanisms of defense in *Phaseolus vulgaris* against *Colletotrichum lindemuthianum* and other fungi. Ph.D. Thesis, Purdue University, 156 pp.

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Summary of Department-Related Activities 1971-1972

Teaching

Teaching duties during the past year included BISC 301 (fall trimester); the previous two trimesters were devoted to research. An effort was made to define the content interrelationship between BISC 301 and 201. Although no definite recommendations have been formulated, Dr. Oloffs and myself are presently offering the respective courses as a succession while attempting to remain within the scope of the calendar descriptions. From this it is felt that factual data will be obtained to substantiate any proposed changes or recommendations regarding the role of these courses in the biology curriculum.

Research

During the past year research concerning the nature of artificially induced resistance to the anthracnose fungus in bean plants has yielded data which contribute significantly to current understanding of natural defense mechanisms in plants. With respect to a number of aromatic and phenolic plant constituents characteristic of metabolic response in beans it was shown that the induced defense response in susceptible cultivars is identical to the naturally occurring defense response of resistant cultivars. This was interpreted to mean that the genetic potential for resistance is present in susceptible cultivars, but under normal conditions is not adequately expressed. This data has been recently submitted for publication in Phyto-pathology.

It was previously shown that susceptible plants in which resistance has been induced are also protected against subsequent infection. During the past year data indicating that such protected plants actively respond to subsequent infection have been obtained. They respond without being induced, and in the same manner as naturally resistant cultivars. These data are presently being incorporated into two manuscripts, one of which describes the response and the other a new method for rapid quantitative analysis by thin-layer chromatography of a phenolic substance (phaseollin) characteristic of these responses and for which a direct role in resistance has been widely suggested.

The use of gaseous CO_2 to induce the resistant response in beans was discovered in our research during the past year, primarily due to the research efforts of Robert Arnold. Clarification of some details is necessary before this work can be published.

An initial NRC grant was applied for during December of 1971 to support and further the above research.

Administrative duties as Chairman of the Department Undergraduate Curriculum Committee have required a large time commitment during the past three months. This includes time spent in committee meetings, preparation of documents, discussions with faculty and students, and time spent as representative to the Faculty of Science Undergraduate Curriculum Committee.

.../4

Additional University and Community Involvement

1. CUSO interview team
2. All Saints Parish (Bingo Organization)
3. All Saints Parish (Canadian Catechism: Youth Group Leader-9th grade).

External References

Dr. Joseph Kúc,
Department of Biochemistry,
Purdue University,
Lafayette, Indiana 47906.

Dr. E. B. Williams,
Department of Botany and Plant Pathology,
Purdue University,
Lafayette, Indiana 47906.

Dr. John Tuite,
Department of Botany and Plant Pathology,
Purdue University,
Lafayette, Indiana 47906.

APPENDIX B

Descriptions of proposed new courses required by the proposed program: BiSc 849-5, 601-3, 602-3, 603-3, 604-2, 605-1.

Note: The preparation of detailed course outlines will require extensive cooperation from guest instructors and outside agencies. Such cooperation cannot be solicited until we have an approved program in which they can be formally involved. Meanwhile tentative detailed course outlines exist and can be provided if needed with the understanding that they are liable to be modified when the outside agencies and individuals become involved.

1. CALENDAR INFORMATION:

Department: Biological Sciences **Course Number:** BiSc 849

Title: Individual Scholarly Study in Pestology

Description: An analysis of an aspect of pestology or pest managmenet resulting in a scholarly paper. A mandatory course for the degree of Master of Pest Management.

Credit Hours: five (5) **Vector:** N/A **Prerequisite(s) if any:** Acceptance into M.P.M. programme.

2. ENROLLMENT AND SCHEDULING:

Estimated Enrollment: probably not over 25 **When will the course first be offered:** 1972-3

How often will the course be offered: Any semester as needed and as feasible.

3. JUSTIFICATION:

To enable students in the otherwise largely generalist M.P.M. programme to study in depth or in full detail an aspect of pestology or of pest management that is normally related to where, why, and/or on what they hope to be employed.

4. RESOURCES:

Which Faculty member will normally teach the course: Any one of the faculty members in the M.P.M. programme.

What are the budgetary implications of mounting the course: Minimal: possible costs of limited work travel and of Xeroxing.

Are there sufficient Library resources (append details): Yes

Appended: a) Outline of the Course Appended
b) An indication of the competence of the Faculty member to give the co- Appended
c) Library resources Appended

Approved: Departmental Graduate Studies Committee: _____ Date: _____

Faculty Graduate Studies Committee: _____ Date: _____

Faculty: _____ Date: _____

Senate Graduate Studies Committee: _____ Date: _____

Senate: _____ Date: _____

Outline of course BiSc 849

The scholarly study would be a research project tailored to the needs of the individual student. It would be normally based on a literature study but sometimes on data obtained directly from other sources. It may relate to aspects of pest problems and/or their management in the particular geographical region and/or type of habitat where the student hopes to work or to particular aspects of management on which he hopes to be employed or in which he plans to specialize further.

The subject would be selected by the student in consultation with a faculty member who would then become his supervisor and would have to be approved by the Pest Management Supervisory Committee. The end-result of the scholarly study would be a scholarly paper that would be graded by an examining committee of three faculty members.

Faculty members of the Pestology Centre who would supervise students taking the course are: -

B.P. Beirne, Professor of Pest Management, Director of the Pestology Centre. B.Sc. (Hons.), M.A., M.Sc., Ph.D. (Dublin), M.R.I.A.

J.S. Barlow, Professor, Associate Dean of Science. B.S.A. (Ontario Agric. Coll.), M.A., Ph.D. (Toronto).

J.P.M. Mackauer, Professor. Dr. Phil. Nat. (Frankfurt M.).

K.K. Nair, Professor. B.Sc. (Madras), M.Sc., Ph.D. (Bombay).

A.L. Turnbull, Professor. B.S.F., M.F. (British Columbia, D. Phil. (Oxford).

J.M. Webster, Professor, B.Sc., Ph.D. (London). A.R.C.S., D.I.C.

P. Belton, Associate Professor. B.Sc. (London), Ph.D. (Glasgow), A.R.C.S.

J.H. Borden, Associate Professor. B.S. (Wash. Sta.), M.S., Ph.D. (California, Berkeley).

T. Finlayson (Mrs.), Associate Professor. B.A. (Hons.), (Toronto).

R.M.F.S. Sadleir, Associate Professor. B.Sc. (Hons.), Ph.D. (Western Australia).

P.C. Oloffs, Assistant Professor. Dip. Agr. (Göttingen), M.S.A. (British Columbia), Ph.D. (Wisconsin).

J.E. Rahe, Assistant Professor. B.S., Ph.D. (Purdue).

Library resources:

In addition to the normal resources of the SFU library there are several libraries of pestology and related literature (totalling 173 shelf feet) that were recently presented to the Pestology Centre by Federal and Provincial government agencies.

Re: Covering memorandum on proposed new BioScience postgraduate courses 601 to 605.

These proposed courses have the following in common:

General: These courses form an integrated group; they are in effect segments of one large course. They are required for the proposed Master of Pest Management degree. They are classed as postgraduate courses because it is considered that they should not be available for credit toward a primary degree. They are not classed as graduate (800-level) courses proper because they are distinctive in their technological orientation.

Vector: These courses would be given consecutively rather than concurrently. This would enable each to be given by an expert seconded temporarily to the University for that purpose; it would enable each to be taken by individuals on temporary leave from jobs; it would enable optimum use to be made of field trips and borrowed or rented equipment; and it would avoid permanent commitments that might make course evolution or abolition difficult. The courses would be full-time, intensive operations in which work equivalent to one credit would be done in one week.

Prerequisites: To be defined for the individual prospective student by the proposed Pest Management Supervisory Committee.

Justification: The courses are requisites for the proposed Master of Pest Management degree. They are designed to give the student practical experience in the methods and procedures of pest management to supplement the theory and the theory of the practice that are covered in other pestology courses.

Teachers: A Pestology Centre faculty member, Dr. J.H. Borden, would be in charge of all the courses in a supervisory directorial capacity and would teach one of them. Each of the others would be given by an expert from outside the University (usually from a Federal government research centre in B.C.). Each of the five courses would have at least one Pestology Centre faculty member as an advisor and back-up teacher. All five would have the one individual as Demonstrator.

Budgetary Implications: The chief costs would be: fees to the (non-SFU) course leaders who want them, calculated at approximately a $500 preparation fee and $500 per credit hour; travel costs (bus rental or car mileage, and lodging) to and from SFU for field trips; and possible rental costs of some equipment. Trailers will be required for classroom use at the SFU agricultural experiment area in the UBC Research Forest.

Library Resources: Adequate, especially with the recent gifts from Federal and B.C. Provincial Government agencies of 173 shelf feet of pestology and related literature and gifts of full sets of pestology extension literature from other Canadian and U.S. government agencies.

Course Outlines: In all five courses the student will learn by doing to diagnose, prescribe, apply, and evaluate in relation to the characteristics of the pests, the properties of the control agents and procedures, safety precautions, and legal and economic restrictions. The proposed

general outline that will apply to each course is this: -

1) Survey and Detection a) Is there a pest organism present? Methods of survey and identification, sampling methods, use of keys. b) Could there be a pest problem in the future? Assessment of the situations in which pests may occur and conditions favouring their development.

2) Damage Assessment and Prediction a) What damage is the pest organism causing? Recognition of damage caused by important pests. Methods of estimating impact of damage on crop, structure or environment. b) What damage could the pest cause in the future? Means of predicting population increase of pests and correlation with eventual damage.

3) Decision Making a) What should be done, if anything, to control the pest? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most effective and ecologically compatible control method. b) What should be done, if anything, to prevent the occurrence of a pest which would cause damage in the future? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most appropriate environmental modification or preventive controls.

4) Application of Controls and Preventive Methods a) How should a control be applied to achieve maximum effectiveness? Timing, dosage, dispersal, application methods for controls. b) What methods will minimize the chance of pest occurrence and damage? Methods of environmental modification, e.g. cultural methods, building modifications, elimination of pest habitat, introduction of lethal agent into habitat (baits, attractants, sterile individuals, poisons, etc.), sanitation.

5) Assessment of Controls or Preventive Methods a) How effective was the control used? Repeat sections 1) and 2). b) How effective were any preventive measures taken? Repeat sections 1) and 2).

6) Legislation and Safety Controls a) What legal considerations must be made? Legislation regarding pest import and export, quarantines, pesticide usage, use of disease organisms, property rights, inspection, residues, etc. b) What safety precautions must be taken? Medical or public health impact of the pest, toxicity of pesticides and safety procedures when applying them.

1. CALENDAR INFORMATION:

Department: BioSciences (Pestology) Course Number: BiSc 601

Title: Urban and Industrial Pest Management

Description: Procedures and methods used in preventing damage by pests (sensu lato) in and around buildings and vehicles.

Credit Hours: Three Vector: 8-0-20 (see covering memo) Prerequisite(s) if any: N/A (See covering memorandum)

2. ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 25 (limited by facilities) When will the course first be offered: Summer 197

How often will the course be offered: Every Summer Semester

3. JUSTIFICATION:

See covering memorandum

4. RESOURCES:

Which Faculty member will normally teach the course: Visiting lecturer or Dr. P. Belt

What are the budgetary implications of mounting the course: Up to $2,000 honoraria for lecturer; about $1,000 for travel; about $500 for miscellaneous and contingencies.

Are there sufficient Library resources (append details): Yes

Appended: a) Outline of the Course Appended; and see covering memorandum
b) An indication of the competence of the Faculty member to give the c
c) Library resources See covering memorandum Appen

Approved: Departmental Graduate Studies Committee: Date:

Faculty Graduate Studies Committee: Date:

Faculty: Date:

Senate Graduate Studies Committee: Date:

Senate: Date:

Biological Sciences 601-3. Urban and Industrial Pest Management.

Detailed Course Description

Course Description

A 3-credit, lecture and laboratory course to be held in a 3-week period. Lectures will be primarily in a 2-hour period in the early morning, followed by extensive field, laboratory and project work for the duration of each day. In some cases lectures may be concentrated into more than 2-hour periods to allow whole-day field trips or project work.

The course will cover insects, mites, fungal diseases, rodents and birds that cause harm to or are pests in or around houses, warehouses, ships, other industrial or residential structures, greenhouses and gardens in an urban environment. The course will be taught in part on location in and around Vancouver, with the cooperation of various municipal, Federal, and provincial government and semi-government agencies as appropriate.

Outline

For the pests and environment listed above, the course will cover the following subject areas.

1) Survey and Detection a) Is there a pest organism present? Methods of survey and identification, sampling methods, use of keys. b) Could there be a pest problem in the future? Assessment of the situations in which pests may occur and conditions favouring their development.

2) Damage Assessment and Prediction a) What damage is the pest organism causing? Recognition of damage caused by important pests. Methods of estimating impact of damage on crop, structure or environment. b) What damage could the pest cause in the future? Means of predicting population increase of pests and correlation with eventual damage.

3) Decision Making a) What should be done, if anything, to control the pest? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most effective and ecologically compatible control method. b) What should be done, if anything, to prevent the occurrence of a pest which would cause damage in the future? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most appropriate environmental modification or preventive controls.

4) Application of Controls and Preventive Methods a) How should a control be applied to achieve maximum effectiveness? Timing, dosage, dispersal, application methods for controls. b) What methods will minimize the chance of pest occurrence and damage? Methods of environmental modification, e.g. cultural methods, building modifications, elimination of pest habitat, introduction of lethal agent into habitat (baits, attractants, sterile individuals, poisons, etc.), sanitation.

Biological Sciences 601-3 (continued)

5) Assessment of Controls or Preventive Methods a) How effective was the control used? Repeat sections 1) and 2). b) How effective were any preventive measures taken? Repeat sections 1) and 2).

6) Legislation and Safety Controls a) What legal considerations must be made? Legislation regarding pest import and export, quarantines, pesticide usage, use of disease organisms, property rights, inspection, residues, etc. b) What safety precautions must be taken? Medical or public health impact of the pest, toxicity of pesticides and safety procedures when applying them.

Faculty

General supervision: Dr. J. H. Borden, Associate Professor, Pestology Centre.

Primary course teacher: outside expert not selected at this time.

Advisors: Dr. P. Belton, Associate Professor, Pestology Centre (and primary course teacher if a suitable outside expert not available) and Dr. K. K. Nair, Professor, Pestology Centre; Dr. R.M.F.S. Sadleir, Associate Professor, Pestology Centre.

1. CALENDAR INFORMATION

Department: BioSciences (Pestology) Course Number: BiSc 602

Title: Forest, Wildland, and Watershed pest management.

Description: Procedures and methods used in preventing damage by pests (sensu lato) to forest trees and in and around rural recreational situations.

Credit Hours: Three Vector: 8-0-20 (see covering memo) Prerequisite(s) if any: N/A (see covering memo)

2. ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 25 (limited by facilities) When will the course first be offered: Summer 1973

How often will the course be offered: Every Summer Semester

3. JUSTIFICATION:

See covering memorandum

4. RESOURCES:

Which Faculty member will normally teach the course: Dr. J. H. Borden

What are the budgetary implications of mounting the course: About $1,000 for travel and related expenses; about $500 for miscellaneous and contingencies.

Are there sufficient Library resources (append details): Yes

Appended: a) Outline of the Course Appended; and see covering memo.
b) An indication of the competence of the Faculty member to give the co Appended
c) Library resources See covering memo.

Approved: Departmental Graduate Studies Committee: Date:

Faculty Graduate Studies Committee: Date:

Faculty: Date:

Senate Graduate Studies Committee: Date:

Senate: Date:

Biological Sciences 602-3. Forest, Wildland and Watershed Pest Management.

Detailed Course Description

Course Description

A 3-credit, lecture and laboratory course to be held in a 3-week period. Lectures will be primarily in a 2-hour period in the early morning, followed by extensive field, laboratory and project work for the duration of each day. In some cases lectures may be concentrated into more than 2-hour periods to allow whole-day field trips or project work.

The course will cover insects, mites, nematodes, plant diseases, weeds, rodents and other mammals which are pests in lands principally managed for timber production, recreation or as watersheds. Includes pests of forest trees, control of weeds on right-of-ways and the control of insect pests such as mosquitoes and blackflies which originate in freshwater on forest and wildland areas. The course will be taught mainly in the field and will extensively utilize the resources of the U.B.C. Research Forest, Maple Ridge, B.C.

Outline

For the pests and environment listed above, the course will cover the following subject areas.

1) Survey and Detection a) Is there a pest organism present? Methods of survey and identification, sampling methods, use of keys. b) Could there be a pest problem in the future? Assessment of the situations in which pests may occur and conditions favouring their development.

2) Damage Assessment and Prediction a) What damage is the pest organism causing? Recognition of damage caused by important pests. Methods of estimating impact of damage on crop, structure or environment. b) What damage could the pest cause in the future? Means of predicting population increase of pests and correlation with eventual damage.

3) Decision Making a) What should be done, if anything, to control the pest? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most effective and ecologically compatible control method. b) What should be done, if anything, to prevent the occurrence of a pest which would cause damage in the future? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most appropriate environmental modification or preventive controls.

4) Application of Controls and Preventive Methods a) How should a control be applied to achieve maximum effectiveness? Timing, dosage, dispersal, application methods for controls. b) What methods will minimize the chance of pest occurrence and damage? Methods of environmental modification, e.g. cultural methods, building modifications, elimination of pest habitat, introduction of lethal agent into habitat (baits, attractants, sterile individuals, poisons, etc.), sanitation.

Biological Sciences 602-3 (continued)

5) Assessment of Controls or Preventive Methods a) How effective was the control used? Repeat sections 1) and 2). b) How effective were any preventive measures taken? Repeat sections 1) and 2).

6) Legislation and Safety Controls a) What legal considerations must be made? Legislation regarding pest import and export, quarantines, pesticide usage, use of disease organisms, property rights, inspection, residues, etc. b) What safety precautions must be taken? Medical or public health impact of the pest, toxicity of pesticides and safety procedures when applying them.

Faculty

General Supervision: Dr. J. H. Borden, Associate Professor, Pestology Centre.

Primary course teacher: Dr. Borden.

Advisor: Dr. A. L. Turnbull, Professor, Pestology Centre.

1. CALENDAR INFORMATION:

Department: BioSciences (Pestology) Course Number: BiSc 603

Title: Vegetable, cereal, and forage crop pest management

Description: Procedures and methods used in preventing damage by pests (sensu lato) to annual crop plants.

Credit Hours: Three Vector: 8-0-20 (see covering memo) Prerequisite(s) if any: NA (see covering memo)

2. ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 25 (limited by facilities) When will the course first be offered: Summer 197

How often will the course be offered: Every Summer Semester

3. JUSTIFICATION:

See covering memorandum

4. RESOURCES:

Which Faculty member will normally teach the course: Visiting lecturer

What are the budgetary implications of mounting the course: Up to $2,000 honorar for lecturer; about $1,000 for travel; about $500 for miscellaneous or contingenc

Are there sufficient Library resources (append details): Yes

Appended: a) Outline of the Course Appended, and see covering memorandum.
b) An indication of the competence of the Faculty member to give the c
c) Library resources See covering memorandum. Appended.

Approved: Departmental Graduate Studies Committee: Date:

Faculty Graduate Studies Committee: Date:

Faculty: Date:

Senate Graduate Studies Committee: Date:

Senate: Date:

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Biological Sciences 603-3. Vegetable, Cereal and Forage Crop Pest Management.

Detailed Course Description

Course Description

A 3-credit, lecture and laboratory course to be held in a 3-week period. Lectures will be primarily in a 2-hour period in the early morning, followed by extensive field, laboratory and project work for the duration of each day. In some cases lectures may be concentrated into more than 2-hour periods to allow whole-day field trips or project work.

The course will cover insects, mites, plant diseases, weeds and birds that cause harm to annual vegetable, cereal and forage crop plants and their products in the field (damage to products in storage is dealt with in 601). Course to be taught in part at the SFU agricultural experiment area in the U.B.C. Research Forest, Maple Ridge, and in part at government experimental and private farms in the Lower Fraser Valley.

Outline

For the pests and environment listed above, the course will cover the following subject areas.

1) Survey and Detection a) Is there a pest organism present? Methods of survey and identification, sampling methods, use of keys. b) Could there be a pest problem in the future? Assessment of the situations in which pests may occur and conditions favouring their development.

2) Damage Assessment and Prediction a) What damage is the pest organism causing? Recognition of damage caused by important pests. Methods of estimating impact of damage on crop, structure or environment. b) What damage could the pest cause in the future? Means of predicting population increase of pests and correlation with eventual damage.

3) Decision Making a) What should be done, if anything, to control the pest? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most effective and ecologically compatible control method. b) What should be done, if anything to prevent the occurrence of a pest which would cause damage in the future? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most appropriate environmental modification or preventive controls.

4) Application of Controls and Preventive Methods a) How should a control be applied to achieve maximum effectiveness? Timing, dosage, dispersal, application methods for controls. b) What methods will minimize the chance of pest occurrence and damage? Methods of environmental modification, e.g. cultural methods, building modifications, elimination of pest habitat, introduction of lethal agent into habitat (baits, attractants, sterile individuals, poisons, etc.), sanitation.

Biological Sciences 603-3 (continued)

5) Assessment of Controls or Preventive Methods a) How effective was the control used? Repeat sections 1) and 2). b) How effective were any preventive measures taken? Repeat sections 1) and 2).

6) Legislation and Safety Controls a) What legal considerations must be made? Legislation regarding pest import and export, quarantines, pesticide usage, use of disease organisms, property rights, inspection, residues, etc. b) What safety precautions must be taken? Medical or public health impact of the pest, toxicity of pesticides and safety procedures when applying them.

Faculty

General Supervision: Dr. J. H. Borden, Associate Professor, Pestology Centre.

Suggested primary course teacher: Dr. H. R. MacCarthy, B.A. (UBC), Ph.D. (U. California, Berkeley), Head, Entomology Section, Research Station, Canada Department of Agriculture, Vancouver, Honorary Lecturer in Plant Science (Entomology), UBC.

Advisors: Dr. J. E. Rahe and Dr. P. C. Oloffs, Assistant Professors, and Dr. B. P. Beirne, Professor, Pestology Centre.

1. CALENDAR INFORMATION

Department: BioSciences (Pestology) Course Number: BiSc 604

Title: Fruit crop pest management

Description: Procedures and methods used in preventing damage by pests (sensu lato) to orchard trees and small fruits.

Credit Hours: Two Vector: 8-0-20 (for two weeks) Prerequisite(s) if any: N/A (see covering memo)

2. ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 25 (limited by facilities) When will the course first be offered: 1973

How often will the course be offered: Every Summer Semester

3. JUSTIFICATION:

See covering memorandum

4. RESOURCES:

Which Faculty member will normally teach the course: Visiting lecturer

What are the budgetary implications of mounting the course: Up to $1,500 honoraria for lecturer; about $3,000 in travel and lodging costs for field trips; about $500 for contingencies.

Are there sufficient Library resources (append details): Yes

Appended: a) Outline of the Course Appended, and see covering memo.
b) An indication of the competence of the Faculty member to give the c
c) Library resources See covering memo. Appended

Approved: Departmental Graduate Studies Committee: Date:

Faculty Graduate Studies Committee: Date:

Faculty: Date:

Senate Graduate Studies Committee: Date:

Senate: Date:

Biological Sciences 604-2. Fruit Crop Pest Management.

Detailed Course Description

Course Description

A 2-credit lecture and laboratory course to be held in a 2-week period. Lectures will be primarily in a 2-hour period in the early morning, followed by extensive field, laboratory and project work for the duration of each day. In some cases lectures may be concentrated into more than 2-hour periods to allow whole-day field trips or project work.

The course will cover insects, mites, plant diseases, rodents, and birds that cause harm in orchards, vineyards, and hop gardens, and to small fruits. Course to be taught as far as possible on location in the Okanagan Valley from the SFU Pestology Laboratory located at the Federal Department of Agriculture Research Station there and in government and private orchards.

Outline

For the pests and environment listed above, the course will cover the following subject areas.

a) Survey and Detection a) Is there a pest organism present? Methods of survey and identification, sampling methods, use of keys. b) Could there be a pest problem in the future? Assessment of the situations in which pests may occur and conditions favouring their development.

2) Damage Assessment and Prediction a) What damage is the pest organism causing? Recognition of damage caused by important pests. Methods of estimating impact of damage on crop, structure or environment. b) What damage could the pest cause in the future? Means of predicting population increase of pests and correlation with eventual damage.

3) Decision Making a) What should be done, if anything, to control the pest? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most effective and ecologically compatible control method. b) What should be done, if anything, to prevent the occurrence of a pest which would cause damage in the future? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most appropriate environmental modification or preventive controls.

4) Application of Controls and Preventive Methods a) How should a control be applied to achieve maximum effectiveness? Timing, dosage, dispersal, application methods for controls. b) What methods will minimize the chance of pest occurrence and damage? Methods of environmental modification, e.g. cultural methods, building modifications, elimination of pest habitat, introduction of lethal agent into habitat (baits, attractants, sterile individuals, poisons, etc.), sanitation.

5) Assessment of Controls or Preventive Methods a) How effective was the control used? Repeat sections 1) and 2). b) How effective were any preventive measures taken? Repeat sections 1) and 2).

6) Legislation and Safety Controls a) What legal considerations must be made? Legislation regarding pest import and export, quarantines, pesticide usage, use of disease organisms, property reights, inspection, residues, etc. b) What safety precautions must be taken? Medical or public health impact of the pest, toxicity of pesticides and safety procedures when applying them.

Faculty

General Supervision: Dr. J. H. Borden, Associate Professor, Pestology Centre.

Suggested primary course teacher: H. F. Madsen, A.B. (San Jose), Ph.D. (U. California, Berkeley), Head, Entomology Section, Research Station, Canada Department of Agriculture, Summerland, and formerly Associate Professor, Division of Entomology, University of California, Berkeley, and State Entomologist for California.

Advisor: Dr. A. L. Turnbull, Professor, Pestology Centre.

1. CALENDAR INFORMATION

Department: BioSciences (Pestology) Course Number: BiSc 605

Title: Management of Animal Disease Agents

Description: Procedures and methods used in controlling pests that cause or transmit disease to man and his domestic animals.

Credit Hours: One Vector: 8-0-20 Prerequisite(s) if any: N.

2. ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 25 (limited by facilities) When will the course first be offered: Summer 1977

How often will the course be offered: Every summer semester.

3. JUSTIFICATION:

See covering memorandum.

4. PLANNING:

Which Faculty member will normally teach the course: Dr. J.P.M. Mackauer and Dr. J. M. Webster.

What are the budgetary implications of mounting the course: About $500.00 for local travel and miscellaneous expenses.

Are there sufficient Library resources (append details): Yes

Appended: a) Outline of the Course Appended, and see covering memorandum.
b) An indication of the competence of the Faculty member to give the c
c) Library resources See covering memorandum. Appe

Approved: Departmental Graduate Studies Committee: Date:

Faculty Graduate Studies Committee: Date:

Faculty: Date:

Senate Graduate Studies Committee: Date:

Senate: Date:

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Biological Sciences 605-1. Management of Animal Disease Agents.

Detailed Course Description

Course Description

A 1-credit, lecture and laboratory course to be held in a 1-week period. Lectures will be primarily in a 2-hour period in the early morning, followed by extensive field, laboratory and project work for the duration of each day. In some cases lectures may be concentrated into more than 2-hour periods to allow whole-day field trips or project work.

The course will cover insects, arachnids, helminths, and some other organisms that cause or transmit disease to man and livestock or that poison or cause allergies. Emphasis will be on public health implications of environmental changes that result from management programmes and from contacts with disease agents caused by movements of people and animals.

Outline

For the pests and environment listed above, the course will cover the following subject areas.

1) Survey and Detection a) Is there a pest organism present? Methods of survey and identification, sampling methods, use of keys. b) Could there be a pest problem in the future? Assessment of the situations in which pests may occur and conditions favouring their development.

2) Damage Assessment and Prediction a) What damage is the pest organism causing? Recognition of damage caused by important pests. Methods of estimating impact of damage on crop, structure or environment. b) What damage could the pest cause in the future? Means of predicting population increase of pests and correlation with eventual damage.

3) Decision Making a) What should be done, if anything, to control the pest? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most effective and ecologically compatible control method. b) What should be done, if anything, to prevent the occurrence of a pest which would cause damage in the future? Economics of pest damage and control, i.e. cost-benefit analysis, selection of most appropriate environmental modification or preventive controls.

4) Application of Controls and Preventive Methods a) How should a control be applied to achieve maximum effectiveness? Timing, dosage, dispersal, application methods for controls. b) What methods will minimize the chance of pest occurrence and damage? Methods of environmental modification, e.g. cultural methods, building modifications, elimination of pest habitat, introduction of lethal agent into habitat (baits, attractants, sterile individuals, poisons, etc.), sanitation.

Biological Sciences 605-1. (continued)

5) Assessment of Controls or Preventive Methods a) How effective was the control used? Repeat sections 1) and 2). b) How effective were any preventive measures taken? Repeat sections 1) and 2).

6) Legislation and Safety Controls a) What legal considerations must be made? Legislation regarding pest import and export, quarantines, pesticide usage, use of disease organisms, property rights, inspection, residues, etc. b) What safety precautions must be taken? Medical or public health impact of the pest, toxicity of pesticides and safety procedures when applying them.

Faculty

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