

Entomological Society of Canada
Société Entomologique du Canada

Bulletin

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H. J. Liu: Bulletin Editor

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GUEST EDITORIAL

Lilies that Fester

by
J. N. McNeill*

"Male insects try to mate with the spheres scattered throughout the field and inevitably die from the fatigue brought on by frustration"(1). Without resorting to such erroneous reporting or poetic license, reports exist that accurately describe the use of semiochemicals for mating suppression, mass trapping or monitoring populations to determine if or when control measures should be applied. Successes in many natural and man-made ecosystems throughout the world, clearly demonstrate the potential of semiochemicals in pest management programmes. Considerable progress has been made in the identification, synthesis and formulation, as well as the field testing, of many semiochemicals, some of which are now commercially available. However, given the importance of these chemicals in population dynamics, the ecological components of these communication systems have been rather sadly neglected, especially in the case of sex pheromones. How do biotic and abiotic factors affect both the emission and reception of these chemical messages? Does the communication system change for successive generations throughout a season? Do differences exist between geographic races of the same species? This information, together with better data for the effects of climatic conditions on the delivery systems used under field conditions, would improve the decision-making processes involved in the use of semiochemicals. Are semiochemicals a viable option and, if yes, how may they best be deployed in the management programme for a given pest species? Such an approach will require considerable time and money, investments which I believe are not only justified but essential for the future development of semiochemicals. The need to protect our renewable resources in a manner that is both effective and environmentally compatible requires that the maximum be obtained from all means of control. Shakespeare (2) stated "lilies that fester smell far worse than weeds" which, with a little poetic licence, would be an apt description of lost opportunities if we fail to develop semiochemicals, or any other control means, to their full potential.

(1) Scientists use sex to control insects (C.P.), Montreal Gazette, 4 June 1983.

(2) W. Shakespeare, 14th Sonnet.

A LAMPSON'S GUIDE TO PHEROMONES



RESEARCHERS DISCOVER THAT CHAIRS TREATED WITH MALE PHEROMONES ARE SAT ON BY A GREATER NUMBER OF WOMEN THAN THE CONTROLS



MERVIN HEARS THE GOOD NEWS FROM OUR FRIENDS ON MADISON AVENUE AND IMMEDIATELY BIDS A BATTLE



THE RESULT

McNeill

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LETTERS TO THE EDITOR

Mistaken Identity

I must point out one small error, that directly relates to me, in the list of ESC Fellows, pages 25 and 26. You have my name listed as P. F. Morris, this should read Ray F. Morris. Since we have two R. F. Morris' in ESC, which at times have caused considerable inconvenience, particularly with mails, etc., we decided to list our names as:

R. F. Morris, Fredericton, N.B.
Ray F. Morris, St. John's, NF.

Of course, R. Frank Morris has been retired for the past 8-9 years, and since he was my senior by 10 years I published under the name Ray F. Morris. For the sake of posterity, perhaps you could insert a correction in the Bulletin.

Ray F. Morris
Agriculture Canada Research Station
St. John's, Nfld. A1E 3Y3

A Note of Appreciation

Members of my executive commented at a recent meeting that the Bulletin does a great job in communicating interesting and vital news to the membership at large. Could you please convey our heartfelt appreciation of the solid efforts of your Editors over recent years — Doug Eidt, Bernard Philogène, Douglas Davies, and more recently Helen Liu, and assure them that their efforts are much appreciated way out here in the west.

John A. McLean, President
Entomological Society of British Columbia

AWARD

Freeman L. McEwen, Gold Medal Recipient



The 1983 recipient of the Entomological Society of Canada's Gold Medal for Outstanding Achievement in Canadian Entomology is Dr. Freeman L. McEwen, Professor of Environmental Biology and Dean of the Ontario Agricultural College, University of Guelph. In presenting this award the Society recognizes Dr. McEwen's accomplishments of excellence in a broad spectrum of areas, any of which would constitute an outstanding career.

Dr. McEwen is a native of Prince Edward Island and he most fortunately has retained the open, friendly, unpretentious Maritime manner. Underlying Dr. McEwen's many achievements is not only a keen intellect, an abundance of energy and sound judgement, but also the crucial ability to interact well with people and to be a most effective organizer and leader. His educational background includes graduation from Prince of Wales College, Charlottetown, and earning a B.Sc. in entomology at Macdonald College of McGill University and subsequently, a M.Sc. in entomology and a Ph.D. in entomology and plant physiology at the University of Wisconsin.

Dr. McEwen's *research accomplishments* include being the author or co-author of over 70 scientific papers. In his research endeavors Dr. McEwen has produced excellent applied work on a variety of problems of economic significance. Owing to the complexity of many of these problems and the inability to control environmental parameters, conducting work in these areas that yields high quality results is especially difficult. Dr. McEwen has also trained young scientists in research and in the past 20 years has supervised 14 M.Sc. and Ph.D. theses.

In addition to his original scientific publications he has demonstrated *outstanding achievements* in the production of chapters in several books. With G.R. Stephenson, Dr. McEwen wrote the book *The Use and Significance of Pesticides in the Environment* (1979) John Wiley and Sons Inc., 538 pp., which has been well received and is a course text at several universities including Cornell, Michigan State, Guelph, Iowa State and Georgia. Other examples of Dr. McEwen's scholastic ability are based on his stances concerning the ethics and quality of the entomological professional. These distinguish him from the individual totally committed to research and include (1) Professionalism and Ethics in Academic (1979) *Bull. Ent. Soc. Amer.*, (2) Food Production — The Challenge of Pesticides (1978) *BioScience*, (3) Entomological Manpower in Canada — Current Status and Future Projection (1976) *Bull. Ent. Soc. Can.* (with C. R. Harris and A. J. McGuinnis), and (4) An Applied Entomologist Looks at His Profession (1971) *Proc. Ent. Soc. Ont.*

Dr. McEwen's research and scholarship records stand on their own, but it should be emphasized that these were achieved in a career which has involved other substantial commitments including extensive *administrative responsibilities*. Dr. McEwen was Chairman, Department of Entomology, New York State Agricultural Experiment Station, Cornell University and Chairman, Department of Environmental Biology, University of Guelph for 3 and 10 years, respectively. After 6 months as Associate Dean, he assumed the responsibilities of Dean, Ontario Agricultural College, University of Guelph, July 1, 1983.

Dr. McEwen's *application of scientific and technological expertise* is a credit to entomology and is exemplified by two programs which he supervised in Ontario.

- 1) The implementation of pest management programs in Ontario for apples, onions, and carrots. This program involved a budget of a ca. quarter of a million dollars per year and several scientists and numerous extension personnel and seasonal scouts. This program exemplifies Dr. McEwen's vast knowledge of crop protection and his desire to culminate research into applied programs used by producers. Only an individual with Dr. McEwen's knowledge, drive and respect by producers, government and fellow scientists could allow this program to advance.
- 2) After 10 years of in-depth studies on the biology of the onion maggot and the potential of a sterile male release program, an operational control program commenced in 1982. This program is a culmination of effort by Dr. McEwen, his technicians and graduate students

and is another example of his desire to see the fruition of his labours benefit the producer.

As an *advisor to provincial, national and international agencies* Dr. McEwen has a truly outstanding record. His advisory roles include: Provincial Entomologist for Ontario; President, Canadian Pest Management Society; Director, Agriculture Institute of Canada; Chairman, Pest Control Research Committee (Ontario); Chairman, Subcommittee on Pesticides and Organic Chemicals, and member of Associate Committee on Toxicology, National Research Council; Member, Ontario Committee for prevention of Arthropod-borne Diseases; Member, Federal Minister of Agriculture Consultative Committee on the Registration Status of Captan; Member, Ontario Pesticides Advisory Committee; Member, Expert Committee on Pesticide Use in Agriculture; Member, Editorial Board, Agriculture, Eco-systems and Environment (Elsevier); a founder and former Acting Director of the Canadian Centre for Toxicology.

Extension is an important activity in Dr. McEwen's busy schedule. He is an acknowledged expert on pesticides and has spoken to the press on a variety of issues, including 2,4-D, the need for pest control, pesticide exposure in man, pesticide disposal, etc. He has published insecticide efficacy data in the E.C.P.U.A. Pesticides Research Reports and produced numerous extension fact sheets for producers in Ontario. He has also spoken at numerous grower meetings and written articles for a significant number of extension publications.

Dr. McEwen enjoys *respect from industry and the general public*. This respect by both groups has allowed him to direct rational approaches to insect control in Ontario. His leadership as President of the Canadian Pest Management Society, Director of the Agriculture Institute of Canada, and many presentations to the Canadian Agriculture Chemicals Association are indicative of Dr. McEwen's respect by industry.

Dr. McEwen has had a long, distinguished career of *dedicated service to the Entomological Society of Canada*. His many duties within the Society have included or currently include a) Former President of E.S.C., b) Co-author of the Manpower Report, c) Chairman, Committee on Destructive Insects of Canada, d) Chairman, Insect Losses Committee, e) Representative to the Biological Council of Canada, f) Chairman, Nominations Committee and g) Program Chairman, 1982 Joint Meetings of the Entomological Societies of America, Canada and Ontario. In addition Dr. McEwen has served on the Governing Board of the Entomological Society of America.

Along with several other past and current presidents, Dr. McEwen has provided a leadership which has taken the Entomological Society of Canada from an association dedicated to the publication of research results to something far more. The Society has become a political voice stating the concerns of entomologists in Canada, for example, the Manpower Report and statement on Hiring Policies, and now directs research of its own, as exemplified by the Insect Survey of Canada and the work on Destructive Insects of Canada.

The Society is pleased to present Dr. McEwen the Gold Medal for Outstanding Achievements in Canadian Entomology on October 3, 1983 at the Annual Meeting, 1983, Regina, Saskatchewan, and extends its best wishes to him for future endeavors.

NOTICE OF ANNUAL BUSINESS MEETING

The Annual Business Meeting of the Entomological Society of Canada will be held Tuesday, October 4, 1983, at the Sheraton Hotel, Regina, Saskatchewan, at 3:30 p.m.

La Réunion Annuelle d'Affaires de la Société Entomologique du Canada aura lieu le mardi, 4 octobre 1983 à l'Hôtel Sheraton, Régina, Saskatchewan.

**ENTOMOLOGICAL SOCIETY OF CANADA
— SCHOLARSHIP FUND
FINANCIAL STATEMENTS
DECEMBER 31, 1982**

Auditors' Report

To the Members,
Entomological Society of Canada.

We have examined the balance sheet of the Entomological Society of Canada — Scholarship Fund as at December 31, 1982. Except as explained in the following paragraph, our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In common with many non-profit entities, the Fund derives a part of its income from donations which are not susceptible to complete audit verification. Accordingly, our verification of receipts from this source was limited to the amounts recorded in the records of the Fund.

In our opinion, except for the effect of adjustments, if any, had donation receipts been susceptible to complete audit verification, this financial statement presents fairly the financial position of the Fund as at December 31, 1982 and the results of its operations for the year then ended, on the cash basis applied consistently with that of the preceding year.

Ottawa, Ontario,
March 23, 1983.

McCAY, DUFF & COMPANY
Chartered Accountants

**Balance Sheet
As at December 31, 1982**

ASSETS

	<u>1982</u>	<u>1981</u>
INCOME FUND		
Cash	\$ 4,125	\$ 3,514
Due from General Fund	814	25
	<u>4,939</u>	<u>3,539</u>
CAPITAL FUND		
Cash	1,841	2,431
Investments — bonds — at cost (Quoted market value — \$25,180)	24,495	22,525
	<u>26,336</u>	<u>24,946</u>
	<u>\$31,275</u>	<u>\$28,485</u>

EQUITY ACCOUNT

INCOME FUND		
Balance — beginning of year	\$ 3,539	\$ 1,538
Interest income	3,400	3,001
	6,939	4,539
Scholarship awardship awards	2,000	1,000
Balance — end of year	4,939	3,539

CAPITAL FUND

Balance — beginning of year	24,946	22,094
Donations received	1,390	2,852
	<u>26,336</u>	<u>24,946</u>
Balance — end of year	<u>\$31,275</u>	<u>\$28,485</u>

PRESIDENT'S MID-TERM REPORT

The Executive Council held its mid-term meeting in Ottawa, on April 12 and 13. Because of the press of other matters this report, of items thought to be of special interest to the members, was not prepared in time to be published in the June issue of the Bulletin.

The most important issue to come before Council was Scientific Editor D. C. Eldt's announcement that, for personal reasons, he wished to resign this position. On instruction of Council, the President appointed a Search Committee, with I. M. Smith as chairman, and R. J. Lamb, R. D. McMullen, and J. McNeil as members. The committee will be pleased to receive nominations, or applications from individuals who would be interested in accepting responsibilities of Scientific Editor.

The Employment Committee reported that the Second Manpower Study is proceeding: questionnaires have been mailed to Society members, and those who did not respond promptly were sent a reminder. The fifth edition of the booklet "Resumés of ESC Members in Search of Employment" was being prepared (and is now available). A comprehensive list of current employers of entomologists in Canada has been prepared and "strip lists" are available to members, on request, addressed to D. J. Madder, committee chairman.

A final report was received from the *ad hoc* Insect Losses Committee, and was forwarded to and accepted by the Research Branch, Agriculture Canada. Copies of this report (M. Stemeroff and J. A. George, authors) entitled "The Benefits and Costs of Controlling Destructive Insects on Onions, Apples, and Potatoes in Canada, 1960-1980" are available upon request, through the Society office. This analysis will be of substantial immediate value as ESC continues to press for support of entomology by government agencies. A Summary of the report is printed in this issue of the Bulletin.

Under chairmanship of First Vice-President Ray F. Morris, the Science Policy Committee met on April 11. Its report (N. J. Holliday, author) entitled "Review of Entomology Curricula in Canadian Universities" has been completed and copies have been distributed to those who contributed to its preparation. An abridged version appeared as a "green paper" in the June 1983 issue of the Bulletin. The Science Policy Committee has embarked on a study of microbial insecticides, with O. N. Morris as chairman of the study group.

To encourage sale of the Society's publications, in particular "Arctic Arthropods" by H. V. Danks, the Executive Council asked to have an advertisement prepared for insertion in the June 1983 Bulletin.

The Treasurer reported that his forecast of Society finances for 1982 had not been borne out. Instead of a loss of \$24,000, the Auditors' report showed an increase of \$9,000. Concern was expressed by members of Council, because the fee increase proposed by the Board and approved at the 1982 annual meeting, had been based on the projected loss. Council recognized the difficulty in making accurate monetary forecasts, but requested that the Financial Committee prepare a report to explain in some detail the \$33,000 discrepancy. The Finance Committee was also asked to investigate other forms of reporting finances than that which is presently used, to increase the clarity of the Society's financial position. The Finance Committee was also asked about the possibility of having two accounts designated as capital and current, rather than combining all figures into a global balance, which does not adequately convey the financial picture of the Society to the membership.

The report of the *ad hoc* committee to investigate need for and possible ways of reducing Governing Board expenses was reviewed. The committee found that Board expenses had not increased disproportionately to the general increase in costs of operating the Society. Council has recommended to the Board that action not be taken at this time to reduce Governing Board expenses, both because costs are not out of line, and because such reduction could be achieved only by more or less severely altering relationships and communication between ESC and its affiliates. The Board consists of 23 members, including 10 elected by ESC (Past-President, President, First and Second Vice-Presidents, and six Directors-at-large), and seven Directors elected by the Affiliate Societies (one by each Affiliate). The six Directors-at-large and seven Directors from the Affiliate Societies provide the variety of viewpoints required to reflect adequately the interest and wishes of the membership of the entomological societies, and of Canadian entomologists generally.

Last year, the Membership Committee undertook a drive to increase the number of Canadian members in ESC. The present committee was asked to attempt to determine results of the drive. It was also asked to prepare an advertisement with detachable application form, for publication once a year in the Bulletin. It is hoped that such a device will serve as a continuing drive for new members.

The Biological Survey of Canada (Terrestrial Arthropods), with Director H. V. Danks now on the staff of the National Museum of Natural Sciences, and with a scientific committee

approved by ESC, continues its excellent work, which has attracted international attention and praise. Following the Executive Council meetings, the Scientific Committee of the Biological Survey held its spring meeting, at which progress was reported on a variety of survey projects, including: preparation of keys to families of terrestrial arthropods; and faunistic studies of the Yukon, Newfoundland, glacial refugia, wetlands, grasslands, springs, and soil. One of the major problems facing the Survey is funding its publications. This problem is being addressed.

G. B. Wiggins noted that the Biological Council of Canada continues to be very active in those areas that are of concern to biologists, generally. For example, a brief entitled "Hiring Policies for Scientists in the Federal Government" has been completed. The BCC Executive determined to increase direct communication with members of associated organizations, and to this end, President G. R. South prepared a report which is published in this issue of the Bulletin.

First Vice-President Ray F. Morris stated that the Association for the Advancement of Science in Canada (formerly SCITEC) has initiated publication of a bimonthly newsletter, "ACCESS", about matters of interest to scientists in general, and is planning its first national conference. It was agreed that ESC should continue in 1983 as a corporate member, with S. B. Hill continuing as our observer. This organization has changed from its role as a society of scientific societies (a so-called "umbrella organization"), and now solicits individual memberships. Cost is \$25.00 per year. The address for inquiries is: AASC National Office, 805-151 Slater Street, Ottawa, Ontario, K1P 5H3.

Council was advised by P. W. Reigert that plans for the 1983 meetings in Regina were on schedule. One of the distinctive features of these sessions is inauguration of what is hoped to become an annual event: a talk about some aspect of entomological history in Canada, or about an entomologist who contributed significantly to that history. R. H. Storch reported that plans are well advanced for the 1984 meetings, to be held in St. Andrews, New Brunswick.

Council decided that the 1985 annual meetings, to be sponsored by the Governing Board, will be held in Ottawa, jointly with the Entomological Society of Ontario. An organizing committee is being assembled, with D. E. Bright as chairman. During 1985, ESC will also participate in the BCC's Congress of Canadian Biological Societies, to be held in London, Ontario, in June. G. B. Wiggins has been appointed chairman of a committee to develop the ESC contribution.

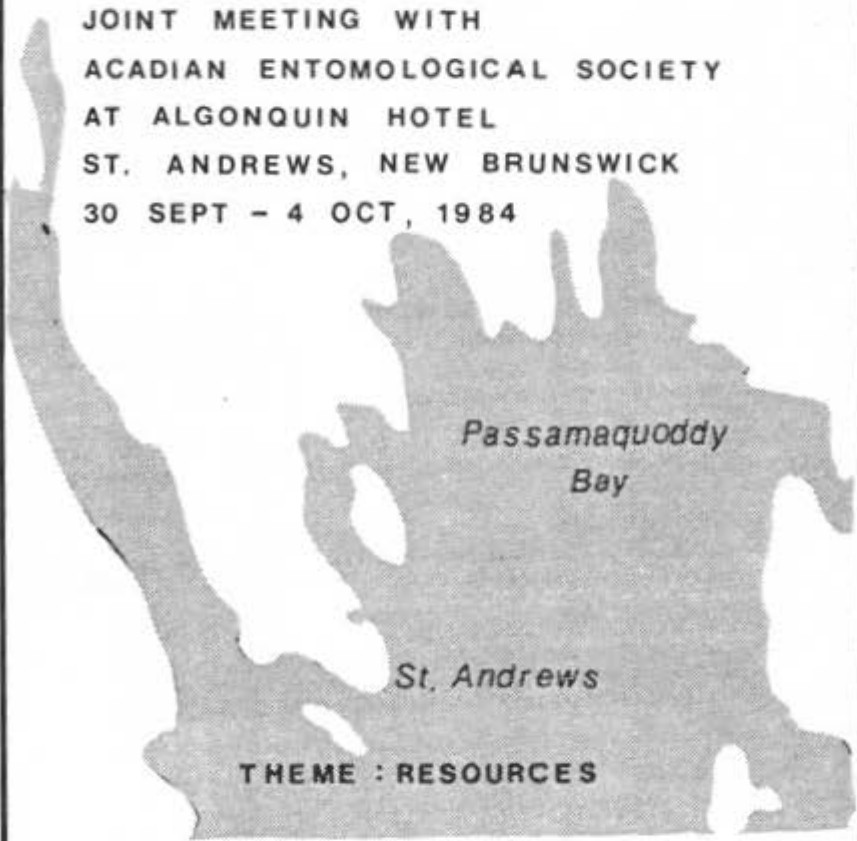
In conclusion, since the annual meeting in December, 1982, a number of reports have been completed, some new initiatives have been taken, and routine administrative matters are receiving the required attention.

George E. Ball
President

First Announcement

1984 MEETING
ENTOMOLOGICAL SOCIETY
OF CANADA

JOINT MEETING WITH
ACADIAN ENTOMOLOGICAL SOCIETY
AT ALGONQUIN HOTEL
ST. ANDREWS, NEW BRUNSWICK
30 SEPT - 4 OCT, 1984



*Passamaquoddy
Bay*

St. Andrews

THEME : RESOURCES

SYMPOSIA

- | | |
|-----------------------|-----------------------|
| : Resource management | : Biological control |
| : Resource modelling | : Population dynamics |
| : Chemical control | : Wetland insects |

SHORTCOURSES

FIELD TRIPS

**CONTACT : G. BOITEAU, AGRICULTURE CANADA
Box 20280, Fredericton, N.B. E3B 4Z7**

COMMITTEES

Achievement Awards Committee Gold Medal for Outstanding Achievement in Canadian Entomology and The C. Gordon Hewitt Award: Call for Nominations 1984

Nominating procedure

Members of the Society are invited to nominate entomologists whom they believe deserving of these awards. Nominations should be sent in an envelope marked "Confidential" to the

Achievement Awards Committee
Entomological Society of Canada
1320 Carling Avenue
Ottawa, Ontario K1Z 7K9

Nominations should comprise: (1) the name and address of the nominee(s); (2) an outline of the major achievements on which the nomination is based; and (3) the names of the nominator and at least one seconder. Nominations should provide complete documentation on the candidate, explaining the value of the achievements to be considered and not merely the general competence of the nominee. To be considered by the Achievement Awards Committee nominations must bear a postmark no later than November 30, of the current year.

Eligibility of nominees

Recipients of the awards need not be members of the Society, nor need they be domiciled in Canada, providing that their contribution is judged to have had a major impact on entomology in Canada.

The objective for the C. Gordon Hewitt Award is to recognize excellence among younger entomologists; nominees for this award must be under 40 years of age throughout the calendar year in which the award is both announced and made.

The awards shall be made annually, save when the Achievement Awards Committee or the Governing Board deem that no awards shall be made. No more than one Gold Medal and no more than one Hewitt Award shall be awarded each year, but, where circumstances warrant, more than one individual may be cited in connection with a single award. The award may be made on different occasions to the same recipient(s), but only for distinctly different contributions to entomology in Canada.

Criteria for the awards

Recipients shall be judged to have made an outstanding contribution to entomology in Canada on the basis, not only of demonstrated competence, but also of one or more of the following special criteria:

- a) Superior research accomplishment, either as a single contribution or as a series of associated endeavours, in entomology or in a related field in which the results obtained are of great consequence for entomology in Canada;
- b) Meritorious contribution to entomological scholarship or literature, whether or not this be based upon the recipient's own original research, and whether or not it be based upon predominantly Canadian material, providing that the contribution be identifiably Canadian in origin;
- c) Unusually valuable practical application of scientific or technological expertise in or to the credit of entomology in Canada;
- d) Outstanding contributions in the fields of advisory, extension, industrial or public relations work in or to the credit of entomology in Canada;
- e) Long, dedicated, and fruitful service in affairs of the Society or of an Affiliate, entomological education or administration in Canada.

Note: The C. Gordon Hewitt Award will not be offered in 1983.

Elections Committee: Officers for 1983

The Elections Committee consisted of Doug Barnes, Robin Stuart (for Tom Alloway) and Glenn Morris (Chairman). It met 19 July 1983 and examined ballots for the 1983 election of officers and for the proposed by-law change. Only ballots received before 15 July were tallied.

Ballots mailed: 940. Ballots cast: 408. Voting for more than the appropriate number of candidates or for both by-law options resulted in 3 spoiled ballots. On this basis rejected tallies were 3 for Second Vice-President, 1 for Directors-at-Large, 1 for Fellowship Selection Committee and 1 for Change to By-laws.

The successful candidates were:

Second Vice-President
Directors-at-Large

Fellowship Selection Committee

H. F. Madsen
R. F. Shepherd
R. G. H. Downer
J. H. Borden
W. G. Friend

The by-law change was approved: 355 in favour of the change, 33 opposed.

The Election Committee hereby certifies that all of the ballots were accurately counted and that the results are correct.

Glenn K. Morris, Chairman
Elections Committee

ARTICLES

The Benefits and Costs of Controlling Destructive Insects on Onions, Apples and Potatoes in Canada 1960-1980: Summary*

by
M. Stemeroff and J.A. George

A two-year study of the benefits and costs of insect control measures for onion, apple, and potato production in Canada demonstrated that benefits of insect control, the prevention of marketable crop loss, exceeded costs by factors of 8.0, 3.4 and 6.2 for onions, apples, and potatoes, respectively. This study was conducted by the Entomological Society of Canada in response to numerous concerns expressed by the scientific community, governments, and the general public. These concerns are related to the direct costs and returns to insect controls, and to adverse health and environmental impacts. Consequently, an analysis of the costs and returns of insect control measures was carried out to aid in planning for the most economical use of insect controls now and in the future. Also, this study provides additional information for administrators who allocate scarce research dollars among competing agricultural disciplines.

Five objectives were met:

1. Calculate and list costs of insect control for onion, apple and potato production in Canada, from 1960 to 1980.
2. Evaluate potential losses in the absence of insect control measures.
3. Evaluate crop losses incurred despite control efforts.
4. Provide a measure of benefit-cost from the control of insect pests.
5. Establish a methodology for evaluating costs of destructive insects for other food production systems in Canada.

In order that trends in benefits and costs of insect controls would be highlighted, and fluctuations in data, such as those caused by weather, would be offset, a 21-year period, 1960-1980 inclusive, was studied.

The following costs and benefits were measured:

Costs	Benefits
1. insecticide	1. total farm values of the change in marketable yields with and without insect controls
2. application	
3. pest monitoring (IPM)	
4. extension	
5. research	

Data were collected from several sources (a sample of entomologists known to have data on onions, apples, and/or potatoes, published data, extension horticulturalists, industry, and some growers), through a questionnaire and personal contacts. The collected information and data were organized from all regions in Canada in a uniform consistent manner to minimize sampling bias. By investigating a 21-year-period, the *time value of money*, or alternatively the *opportunity cost of money*, becomes an important criteria in comparing streams of benefits and costs. This recognizes that \$1 in 1960 was worth more than \$1 at some later date because of its earnings potential. For example, costs incurred in 1960 would have greater earning potential, than costs incurred in any subsequent year. Consequently, the 21-year comparison of benefit and cost streams, calculated in 1980 dollars, was adjusted for this time value each year by *discounting* to a base year (1960) with present value (PV) criteria. Two economic indicators, net present value (NPV) and the benefit/cost ratio (B/C), were applied to equate the benefit and cost streams to indicate the size of the annual and average economic contribution resulting from insect controls.

*A limited number of the complete report (96 pp., 7 Figs., 48 Tables and 51 Reference) is available from the Entomological Society of Canada, 1320 Carling Avenue, Ottawa, Ontario K1Z 7K9, (\$4.00 Can., to cover postage and handling.)

Results

1. The average annual cost of chemicals, applications, IPM, extension, and research to control insects in Canada was \$921,894 on onions (except for 4.1 percent produced on the Prairies), \$22,213,462 on apples, and \$16,559,467 on potatoes (Table 1). *

Table 1. Average annual costs of insect control, 1960 to 1980, (in 1980 dollars).

A - ONIONS						
	Quebec	Ontario	B.C.	Total*		
Insecticide cost	136,357	221,522	14,540	372,630		
(% of total cost)	(39)	(45)	(18)	(40.4)		
Application cost	107,210	155,014	20,966	283,851		
(% of total cost)	(30)	(32)	(26)	(30.8)		
IPM, extension and research costs	108,316	113,605	44,334	265,598		
(% of total cost)	(31)	(23)	(56)	(28.8)		
Total cost of insect control	351,883	490,171	79,840	921,894		
B - APPLES						
	Maritimes	Quebec	Ontario	B.C.	Total	
Insecticide cost	295,850	3,949,001	2,894,917	3,544,654	10,273,726	
(% of total cost)	(20)	(53)	(48)	(49)	(46.3)	
Application cost	116,868	3,012,536	2,533,506	2,978,988	8,296,728	
(% of total cost)	(8)	(40)	(42)	(41)	(37.4)	
IPM, extension and research costs	1,053,636	491,524	565,691	736,837	3,643,008	
(% of total cost)	(72)	(7)	(10)	(10)	(16.4)	
Total cost of insect control	1,466,354	7,453,061	6,033,568	7,260,479	22,213,462	
C - POTATOES						
	Maritimes	Quebec	Ontario	Prairies	B.C.	Total
Insecticide cost	3,612,736	1,589,720	1,460,030	1,266,317	767,038	9,337,200
(% of total cost)	(55)	(44)	(46)	(83)	(47)	(56.3)
Application cost	2,892,151	1,666,505	1,644,363	299,905	814,853	6,706,185
(% of total cost)	(43)	(46)	(52)	(15)	(50)	(40.4)
IPM, extension, and research costs	103,131	342,896	79,883	30,583	62,714	556,082
(% of total cost)	(2.0)	(10)	(2.0)	(2.0)	(3.0)	(3.4)
Total cost of insect control	6,608,018	3,599,121	3,188,553	1,529,170	1,644,605	16,599,467

*For totals only, percentages are weighted according to the relative proportion of production in each region.

2. For every dollar spent on insect control in Canada from 1960 to 1980, \$8.0 were returned from onions, \$3.4 from apples, and \$6.2 from potatoes (Table 2). With apples, there was a definite upward trend in returns to insect control expenditures over the study period (Fig. 1). However, there was a downward trend in returns to costs for potato insect controls in Ontario and the Maritimes, which produce the major share of Canada's potatoes.
3. Chemicals and their application constituted 71 percent of total cost of insect control on onions, 84 percent on apples, and 97 percent on potatoes. IPM, extension, and research together accounted for 29 percent of total cost on onions, 16 percent on apples, and only 3 percent on potatoes (Table 1).

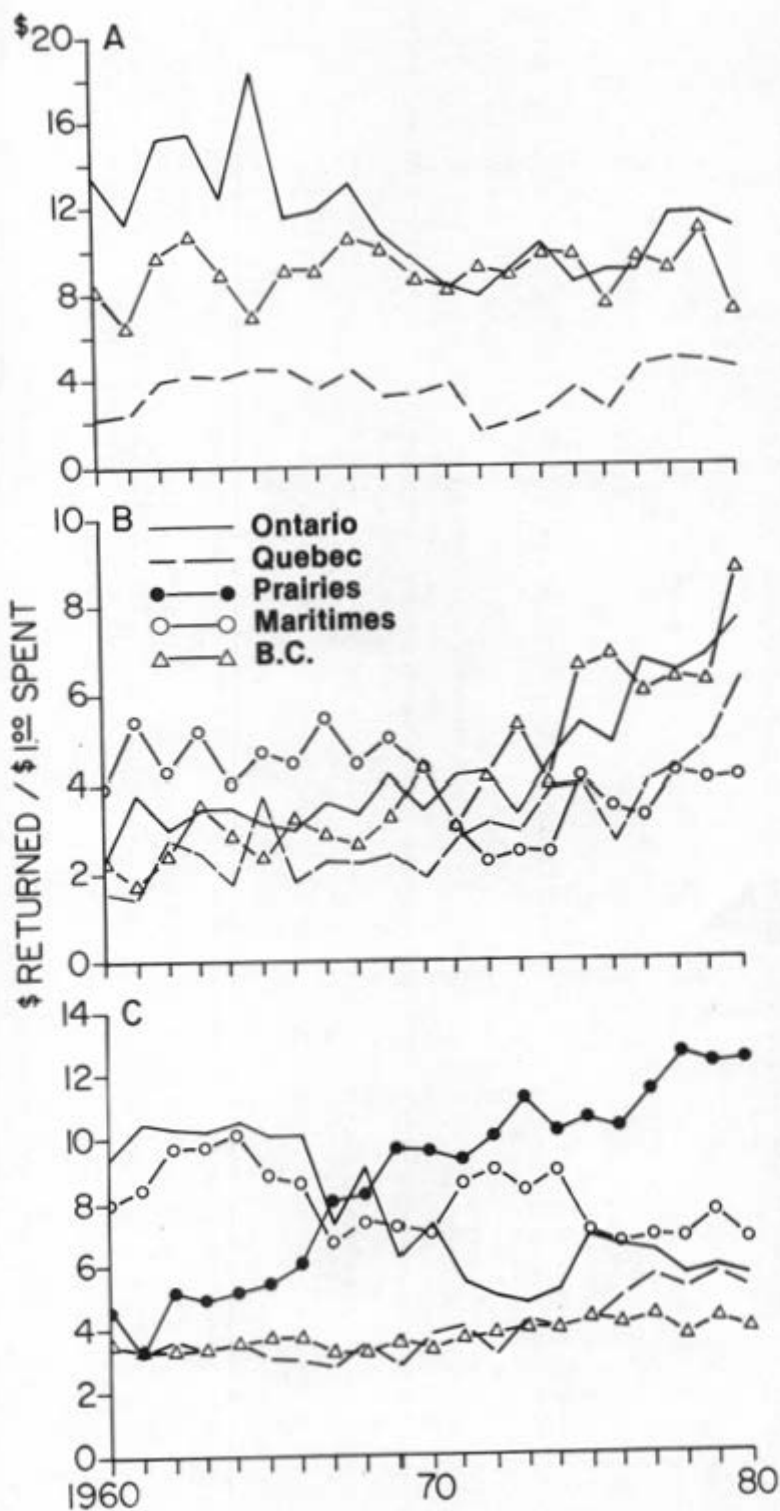


Fig. 1. Annual ratios of benefits to costs for A-onions, B-apples and C-potatoes.

Table 2. Comparison of benefits and costs of insect control from 1960 to 1980 \$(000)

	Maritimes	Quebec	Ontario	Prairies	B.C.	Total
Onions:						
a) PV of total control costs.....	—	6,030	8,352	—	1,371	15,753
(annual total control costs).....	—	(287)	(398)	—	(65)	(750)
b) PV of benefits from controls.....	—	20,316	93,880	—	12,244	126,440
(annual benefits from controls).....	—	(967)	(4,470)	—	(583)	(6,021)
c) NPV of insect controls.....	—	14,286	85,528	—	10,873	110,687
(annual net benefits to controls).....	—	(680)	(4,072)	—	(518)	(5,271)
Benefit/cost ratio.....	—	3.4/1	11.2/1	—	8.9/1	8.0/1
Apples:						
a) PV of total control costs.....	25,281	132,711	106,617	—	130,388	394,997
(annual total control costs).....	(1,214)	(6,320)	(5,077)	—	(6,209)	(18,809)
b) PV of benefits from controls.....	104,246	345,309	416,646	—	465,560	1,331,761
(annual benefits from controls).....	(4,964)	(16,443)	(19,893)	—	(22,170)	(63,417)
c) NPV of insect controls.....	78,765	212,597	313,029	—	335,172	939,563
(annual net benefits to controls).....	(3,751)	(10,124)	(14,906)	—	(15,961)	(44,741)
Benefit/cost ratio.....	4.1/1	2.6/1	3.9/1	—	3.6/1	3.4/1
Potatoes:						
a) PV of total control costs.....	120,501	64,126	54,039	26,927	28,543	294,136
(annual total control costs).....	15,738	(3,054)	(2,573)	(1,282)	(1,359)	(14,006)
b) PV of benefits from controls.....	884,163	235,554	394,277	211,384	104,851	1,830,229
(annual benefits from controls).....	(42,103)	(11,217)	(18,775)	(10,066)	(4,993)	(87,154)
c) NPV of insect controls.....	763,662	171,428	340,238	184,457	76,309	1,536,093
(annual net benefits to controls).....	(36,364)	(8,163)	(16,202)	(8,784)	(3,634)	(73,147)
Benefit/cost ratio.....	7.3/1	3.7/1	7.3/1	7.9/1	3.7/1	6.2/1

Notes:

PV = present value; this refers to the discounting of the "time value" of annual benefits and costs to a common base year, 1960.
 NPV = net present value = b - a.
 Benefit cost = b/a.

Table 3. Percentages of crop loss from insects (and mites) in onion, apple, and potato production in Canada, from 1960 to 1980

Crop	Crop			B.C.
	Maritimes	Quebec	Ontario	
Onions:				
A: % Crop Loss with Controls	—	5.0 (1960-80)	2.0 (1960-80)	5.0 (1960-80)
B: % Crop Loss without Controls	—	30 (1960-80)	60 (1960-80)	70 (1960-80)
Apples:				
A: % Crop Loss with Controls	7.0 (1960-70)	3.0 (1960-80)	3.0 (1960-80)	2.5 (1960-80)
	2.0 (1971-80)			
B: % Crop Loss without Controls	70 (1960-70)	100 (1960-80)	100 (1960-80)	100 (1960-80)
	50 (1971-80)			
Potatoes:				
A: % Crop Loss with Controls	3.0 (1960-80)	3.0 (1960-80)	6.0 (1960-70)	10 (1960-80)
			3.0 (1971-80)	
B: % Crop Loss without Controls	40 (1960-70)	40 (1960-80)	50 (1960-80)	50 (1960-80)
	30 (1971-80)			

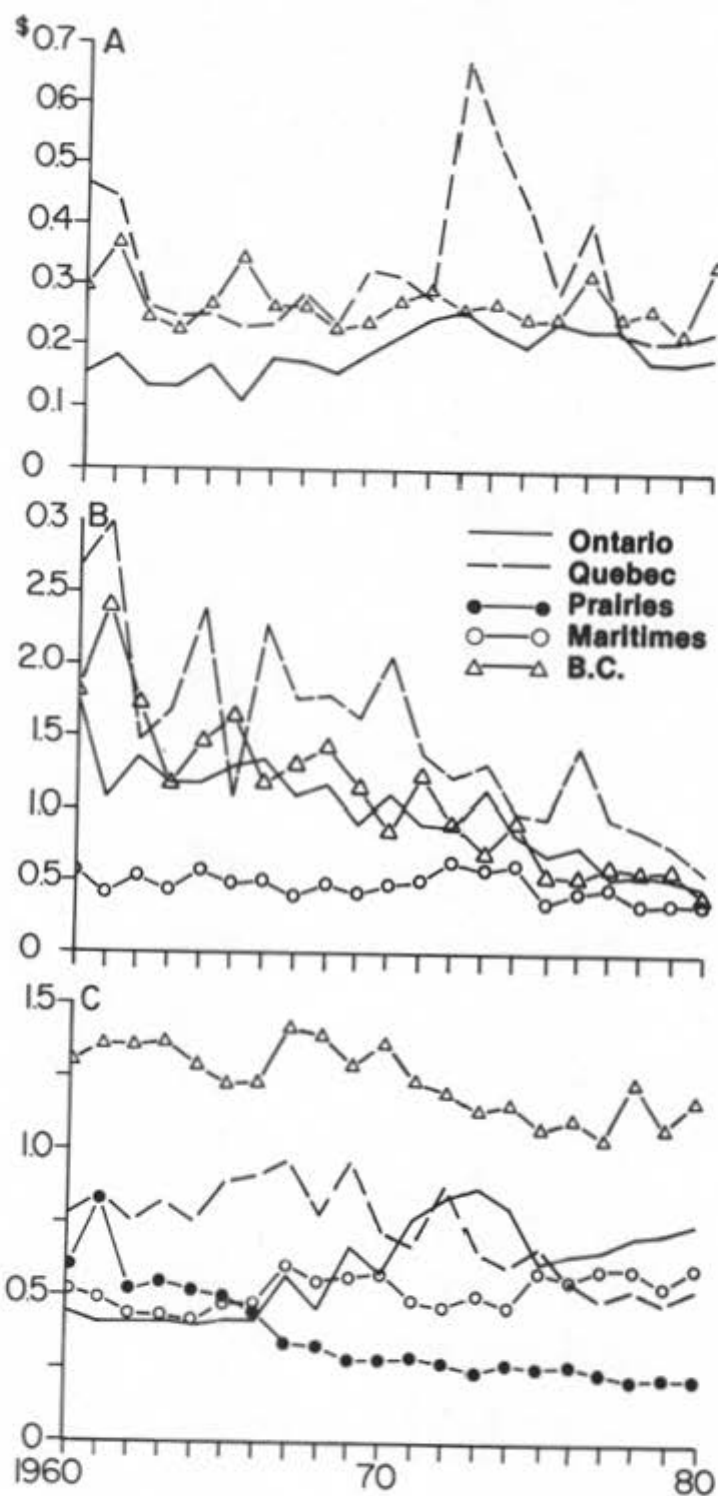


Fig. 2. Total cost of insect control per bushel in A-onions, B-apples and C-potatoes.

4. The percentage loss of marketable yield caused by insects when control measures were used from 1960 to 1980 in Canada was approximately 3 percent in onions, apples, and potatoes, with marginal variation (1-7 percent) in each growing region. Hence, prevention of potential losses has been remarkably high (Table 3).
5. The percentage of loss of marketable yield caused by insects in the absence of control measures in Canada would have been between 30-70 percent in onions, 50-100 percent in apples, and 30-50 percent in potatoes, depending on the region (Table 3).
6. The present value of loss in marketable yield in the absence of adequate control measures would be \$6.0 million in onions, \$63.4 million in apples, and \$87.2 million in potatoes, per year (Table 2).
7. On a per bushel basis, the total cost of insect control for onion production in Canada was about the same in 1980 as it was in the early sixties. For apples, it was much lower in Quebec, Ontario and B.C., and remained consistently low in the Maritimes. For potatoes, it increased in the Maritimes and Ontario, (which together produced 63 percent of the potatoes in Canada), and decreased in the other regions, (Fig. 2).
8. Costs of insect control trends on each crop were sensitive to changes in yields, chemicals used, and frequency of application. Anything that affects these three parameters such as increased insect resistance could cause dramatic changes in both costs and benefits of control.
9. For these three crops, the greater their value, the smaller the proportion of costs spent on IPM, extension, and research (Table 1). Indeed, the person-years devoted to entomological research declined for each crop during the 21-year period.
10. The procedure developed in this study, whereby the benefits and costs of insect control over time were analyzed to reveal average annual benefits and costs, and their trends is applicable to other crop production systems.
11. The successful implementation of benefit-cost analyses for other crops is dependent upon uniform and consistent measurements of crop loss from all pests, in terms of changes in marketable yields. Also, data on the use of all crop protection inputs, including chemicals, application, machinery, labour, extension, and research, are required.
12. It is recommended that research continue on measuring the returns achieved from pest control both on a micro- and macro-economic level.

Some Responsibilities of Pest Managers

by
B.P. Beirne*

This is an abridged version of an invited address to the Pacific Branch, Entomological Society of America, Spokane, Washington, 22 June, 1983.

The professional status and credibility of pest managers, which includes most economic entomologists, can be harmed by consequences of antagonisms from segments of the community. This can also retard the development or application of optimum programs. Three kinds of situations illustrate what can happen. They also illustrate the existence of ways that have been used to reduce or evade the harmful consequences. The antagonists in the three situations are: pesticide protestors; the employers of a pest manager; and a pesticide firm or government agency. The pest manager becomes the target because, respectively, he does not do right, he tries to stop wrong-doing by others, and others feel that he has harmed their interests.

First is a common situation that is too often mishandled. The pest manager has to defend a proposed major chemical pesticide spray program that has attracted the attention of the pesticide protestors. It is mishandled when the manager does not reveal potential hazards and then discounts them, as this tends to arouse suspicions, sometimes valid, of a cover-up, when he is arrogant and attacks the knowledge and motives of the protestors, and especially when he misuses his position to tell lies. The end result is antagonism, polarization, and confrontation. A consequence can be a political decision to modify or abandon the spray program to avoid further undesirable publicity.

Such a secretive, defensive, and arrogant attitude by managers is incorrect in several ways. It is morally wrong because it is aimed at exposing the public to harm or hazard without its knowledge. It is short-sighted because it tends to intensify opposition by the protestors, who are strongly motivated because they believe themselves to be morally right in doing what they can to protect the health of their children, themselves, and the environment. It is unintelligent because nowadays protestors cannot be validly discounted as uninformed and hysterical individuals and with ulterior motives: they are in fact increasingly well-informed and organized and often with good factual bases for their protests. Moreover, there is nowadays wide disbelief in the dogma that an official with a title or a Ph.D. must be an expert whereas a person with neither cannot possibly be one. Finally, the attitude is destructive as the suspicion and mistrust it creates in the public eye can reflect on all pest managers and control programs. Arrogant tactics used to win individual battles with protestors can prolong the war by intensifying the activities of existing protestors and by creating new ones.

The responsible way of handling such a situation is to defuse it as far as it is feasible by disarming the protestors in advance with full, open, and unbiased information. The public should be told why the proposed spray program is essential and why it is the best compromise, what the hazards of the pesticide may be and why they are considered acceptable, and when and where the spray will be applied and how long its effects last so that the public can make individual decisions on whether to endure or to evade it. In other words, instead of treating protestors as a pest problem that can be cured by massive unselective treatment, apply intelligent integrated pesticide protestor management. There will of course always be some problems that cannot be cured because there will always be some fanatics on both sides.

In the second kind of situation the pest manager becomes aware that there is serious wrong-doing in progress in the organization that employs him and which justifiably must be stopped for the public good. It may be, for instance, distortions or the concealment of relevant facts in ways designed to mislead the public about the safety of hazardous pesticides, or it may be a major misuse of public funds that is not merely an error of judgement.

It is a moral responsibility of the pest manager to do what he can to stop such dangerous or unsavory activities. If he does not do anything he is in effect condoning it and becomes an accessory. The straightforward alternative is to publicize the wrong-doing. This may be proper and idealistic. But it is not realistic because the whistleblower is liable to be punished as a disloyal troublemaker, unless he has the protection of powerful friends and supporters. He is likely to be fired, or at least not promoted, and his reputation defamed outside so that he may have difficulty in getting another job in the same field or region. The whistleblower who may be dead right may find himself professionally dead. This has happened, and fear of it is an important deterrent to speaking out.

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But the wrong-doing cannot be allowed to continue. The only personally safe route left to the responsible individual is to be an anonymous informant. Precautions that have been used to protect an informant and to ensure that remedial action is taken are as follows: Copies of relevant documents are provided to demonstrate what is going on. The informant makes sure that the copies cannot be traced back to him, though this has the disadvantage that innocent colleagues may come under suspicion. The documents are provided to some official or agency that has both the interest and power to investigate or act or to put pressure on others to do so: a top man in the organization, provided that it is clear that he does not know what is going on and will stop it when he does; or, depending on the nature of the wrong-doing, an official agency concerned with law enforcement, taxation, or protection of public or environmental health, or an auditor-general or an appropriate investigatory committee of a legislature.

Only if these fail or are not available should more public routes be used, such as informing politicians of the opposition party or environmentalists. Publicity tends to cause polarization and confrontation which, as with a spray program attacked by protestors, may not lead to the best or quickest solution. A direct approach to the press should be a last resort.

The anonymous informant approach is underhand. It can be in part dishonest when it involves communicating private or confidential documents. But it is the use of a lesser evil in an attempt to eliminate a much greater one. It means that the informant places responsibility to his family, to his personal career, and to the public above responsibility to his employer.

In the third kind of situation the pest manager publicizes objective research results or development conclusions that causes a pesticide company, or the pesticide industry as a whole, to regard him as an enemy because his conclusions could have the effect of reducing pesticide sales, or that antagonize a government agency because they cast doubts on the validity of a policy or program.

There is a rather typical pattern of reaction to such an enemy. He is first ostracized and ignored. Then his reputation may be defamed in that his knowledge and motives may be questioned by lumping him with the allegedly uninformed and emotional pesticide protestors. There may be invidious attacks aimed at denigrating his scientific credibility, sometimes including distortions of facts. Usually it is difficult to counteract such actions because it is difficult to identify the individuals responsible. However the facts will speak for themselves, sooner or later.

The next stage that has been sometimes attempted is to try to put pressure on the employer to muzzle the alleged dissident and even to fire him. The pressure is usually an implied financial inducement, that research grant or contract funds may be withheld or increased if the individual can be silenced. Such pressures seem to be applied especially against universities, because in general only academics are sufficiently influential to warrant being targets. Universities that receive much funding from industry are especially vulnerable.

Muzzling or firing an academic for expressing honest conclusions based on research requires the cooperation of a university official who has the appropriate power. Freedom of speech and of controversy are basic to the university system. Any university administrator who tries to suppress the objective views of a colleague for the short-term financial benefit of his institution betrays his basic responsibility to protect and support the principle and practice of academic freedom and is a traitor to the independence and integrity of the university system.

In each of the three kinds of situations discussed here the pest manager is susceptible to being attacked, the intensity of which is often a measure of the effectiveness of what he has done to cause it. In the first situation he contributes to causing the attack by not being sufficiently honest, fair, and open. In both the second and third he becomes liable to attack when he is open, fair, and honest. He therefore pragmatically but regrettably must use means that are not open, or are devious, to protect himself from the effects.

Attacks on dissenters, and negative effects of unobjective bias by scientists that coincides with the interests of agencies that give them money, may benefit individuals in the short term. But in the long run they are short-sighted because their negative influence in public perceptions of objectivity, fairness, and integrity harms everybody involved, the scientists in particular. Publicity, including names, is the best deterrent: the best single control procedure is publicity about specific instances; and the best single preventive measure the fear of consequences of publicity.

NEWS OF ORGANIZATIONS

Biological Survey of Canada

CONFERENCE ON AQUATIC INSECTS OF PEATLANDS AND MARSHES TO BE HELD AT THE 1984 MEETING OF THE ESC

ST. ANDREWS, N.B.

SPONSORED BY THE BIOLOGICAL SURVEY OF CANADA (TERRESTRIAL ARTHROPODS)

The need to study aquatic insects of Canadian freshwater wetlands was outlined by Rosenberg (1981, *Bull. Ent. Soc. Can.* 13: 151-153). A registry of entomologists interested in wetlands was started in response to this article, and attempts were made by the Biological Survey to begin cooperative studies in various parts of Canada. Nevertheless, studies of the aquatic insects of these habitats remain relatively diffuse. The objectives of the proposed conference will be to summarize current knowledge, to identify research needs, and to initiate cooperative programs to fulfill these needs. The conference will deal with peatlands (bogs and fens)¹ and marshes¹ because these habitats are widespread and important wetlands in Canada.

The conference will take a full day. Invited speakers will participate in a morning session devoted to abiotic and biotic characterizations of bog, fen, and marsh regions of Canada, reviews of the status of systematic and ecological studies on major groups of aquatic insects in bogs, fens, and marshes, and a synthesis which will include consideration of future needs and potential cooperative research. The afternoon session will comprise submitted papers: treatments of other aquatic insect and non-insect groups, techniques for studying aquatic invertebrates in wetlands, ecological studies, and other contributions are welcome. Provisional plans are to publish part or all of the proceedings.

If you are interested in participating in this conference, please contact one of the undersigned. Further details will appear in future issues of the Bulletin.

David M. Rosenberg
Freshwater Institute
501 University Crescent
Winnipeg, Manitoba
R3T 2N6

Hugh V. Danks
Biological Survey of Canada
(Terrestrial Arthropods)
National Museum of Natural Sciences
Ottawa, Ontario K1A 0M8

1 "Bog", "fen", and "marsh" are described by Tarnocai (1980, p. 12-13, in: Rubec and Pollett, ed. *Proceedings of a workshop on Canadian wetlands. Environ. Can. Ecol. Land Classification Ser. 12. Supply and Services Canada Cat. No. En. 73-3/12*), as follows:

"A bog is a peat-covered or peat-filled wetland, generally with a high water table. The water table is at or near the surface. The bog surface is often raised, or level with the surrounding wetlands, and is virtually unaffected by the nutrient-rich ground waters from the surrounding mineral soils. Hence, the ground water of the bog is generally acid and low in nutrients. The dominant peat materials are sphagnum and forest peat underlain, at times, by fen peat. The associated soils are Fibrisols, Mesisols and Organic Cryosols. The bogs may be treed or treeless and they are usually covered with Sphagnum and feather-mosses, and Ericaceous shrubs."

"A fen is a peat-covered or peat-filled wetland with a high water table which is usually at or above the surface. The waters are mainly nutrient-rich, minerotrophic waters from mineral soils. The dominant peat materials are shallow to deep, well to moderately decomposed fen peat. The associated soils are Mesisols, Humisols and Organic Cryosols. The vegetation consists dominantly of sedges, grasses, reeds and brown mosses with some shrub cover and, at times, a scanty tree layer."

"A marsh is a mineral or a peat-filled wetland which is periodically inundated by standing or slowly moving waters. Surface water levels may fluctuate seasonally, with declining levels exposing drawdown zones of matted vegetation or mud flats. The waters are nutrient-rich. The substratum usually consists dominantly of mineral material, although some marshes are associated with peat deposits. The associated soils are dominantly Gleysols with some Humisols and Mesisols. Marshes characteristically show a zonal or mosaic surface pattern of vegetation comprised of unconsolidated grass and sedge sods, frequently interspersed with channels or pools of open water. Marshes may be bordered by peripheral bands of trees and shrubs, but the predominant vegetation consists of a variety of emergent non-woody plants such as rushes, reeds, reed-grasses, and

sedges. Where open water areas occur, a variety of submerged and floating aquatic plants flourish."

SURVEY REPORT

The Scientific Committee met in Ottawa on April 14-15, 1983. Some highlights are summarized below; a fuller account of the meeting appears in the fall 1983 Newsletter of the Biological Survey of Canada (Terrestrial Arthropods).

Scientific projects

1. Illustrated keys to the families of insects and related arthropods in Canada. A key to the families of myriapods in Canada should be completed during 1983.
2. Arthropods of Canadian grasslands. A newsletter has been started by Dr. John Spence and was distributed during March 1983. Field work continues, and full descriptions of some study sites are being prepared.
3. Aquatic insects of freshwater wetlands. A conference on aquatic insects of bogs and marshes will take place during October 1984 Annual Meeting of the Entomological Society of Canada/Acadian Entomological Society (see preliminary announcement in this issue of the Bulletin).
4. Arthropod fauna of freshwater springs. A sampling format circular has been developed to respond to enquiries to the article introducing this project (Bull. Ent. Soc. Can. 15(1): 30-34). Some contacts have been established with agencies responsible for a general inventory of springs in Canada.
5. Soil Arthropods. A conference on the effects of invertebrates on the microstructure of soils will take place during June 1984 at the University of Alberta. Further details will appear in the Bulletin.
6. Other scientific projects. Fieldwork in the Yukon and on the Queen Charlotte Islands continues during 1983. The Committee endorsed a new project on the taxonomy of mayflies in Canada.

General developments

1. Publications of the Biological Survey. Subcommittees of the Survey are attempting to start a series of publications on the fauna of Canada by establishing a continuing Trust Fund within the National Museum of Natural Sciences, initiated by private donations.
2. Liaison with United States entomologists. The meeting was attended by an observer invited from the Committee on Systematics Resources of the Entomological Society of America. This group is developing plans for an insect fauna of North America project (for a faunal series only rather than for a broader undertaking like the Biological Survey of Canada). This project was supported in principle by the Scientific Committee.
3. Environmental impact assessment. A brief on the role of entomology in environmental impact assessment is being prepared.
4. Field stations. A letter will be sent to the Natural Sciences and Engineering Research Council about the value of northern field stations.

Other items

Summaries of the scientific projects of the Survey are being prepared to inform amateurs about the Survey's work and to encourage cooperation. Topics for a Biological Survey symposium as part of the ESC's participation in the Biological Council of Canada's Canadian Congress of Biology (June 1985) were discussed. The Scientific Committee was also reminded of the BCC's concern about the marked under-representation of biologists on the NSERC (one biologist among 22 members of Council). The Committee supported a plan by the NMNS to hold a symposium on the state of systematics in Canada as part of the 1985 events celebrating 75 years of occupation of the Victoria Memorial Museum Building in Ottawa. Dr. Danks' appointment to the staff of the NMNS as Head of the Biological Survey Secretariat was confirmed.

Biological Council of Canada

The Biological Council of Canada (BCC) is an umbrella organization representing the following biological societies in Canada: The Canadian Botanical Association, The Canadian Phytopathological Society, The Canadian Society of Plant Physiologists, Canadian Society

of Zoologists, The Genetics Society of Canada, Entomological Society of Canada and the Canadian Council of University Biology Chairmen. The purpose of the Council is to "provide an organization through which member societies can cooperate or take joint action in assuming the role and major function of initiating policy that affects Biology in Canada". Normally the Council meets twice a year, once in the spring and again in the fall. The most recent meeting was held on 21 April 1983 at Carleton University in Ottawa. Present at the meeting were G.R. South (President), K.G. Davy (Past President), G.B. Wiggins (Vice President), J.R. Nursall (Vice President), L. Lapierre (Treasurer), D.B. Walden (Member-at-large), M.B. Fenton (Secretary). Represented were: The Canadian Botanical Association (J.H. Soper, W.G. Barker, J. McNeill), The Canadian Society of Plant Physiologists (John King), Canadian Society of Zoologists (J.R. Nursall), The Genetics Society of Canada (D.B. Walden), Canadian Committee of University Biology Chairmen (John King, H.G. Merriam), Entomological Society of Canada (S.B. McIver, R. Downer), and the Canadian Phytopathological Society (C.B. Willis, C.B. Aube).

The meeting, which started at 11:00 h and ended at 17:00 h, covered a wide range of topics of concern to biologists in Canada. Some of these have been treated in more detail in the BCC President's Report to the annual general meetings of constituent societies, a copy of which can be obtained from society presidents.

The most recent BCC publication entitled *A Statement on Hiring Policy for Scientists in the Federal Government* is a detailed commentary on current government procedures for recruitment of scientific staff. Of particular concern to the BCC is the policy of not advertising available positions widely to the scientific community, with the consequent possibility of not finding the best possible, as opposed to a suitably qualified candidate. Anyone interested in obtaining a copy of this report should contact Dr. G.R. South, Department of Biology, Memorial University, St. John's, Newfoundland, A1B 3X9.

The BCC is co-operating with the Science Council of Canada, the Canadian Committee of University Biology Chairmen, and the Canadian Council of University Field Stations in preparing an inventory of Canadian Biology Field Stations. The initial part of this survey which deals with university-related facilities has been completed by the CCUBC. By the end of September 1983, the survey of government facilities should also be completed. The purpose of the inventory is to provide an indication of the extent of this resource for people working in field biology and to give a base from which policy recommendations concerning these facilities can be prepared. Anyone interested in more information about this project should contact Dr. M.B. Fenton, Department of Biology, Carleton University, Ottawa, Ontario, K1S 5B6.

A nominating committee presented to the BCC its recommendation for the recipient of the first BCC Gold Medal. The BCC Gold Medal is awarded for "outstanding contributions to the advancement of Biology in Canada". The first recipient will be Dr. Michael Shaw, nominated by the Canadian Phytopathological Society.

The BCC received some updated information about the circulation of and reaction to an earlier publication, *Biological Research in Federal Laboratories*. This report has been widely circulated and is receiving considerable positive attention from some politicians.

From 23 to 29 July 1985, the BCC will host the Canadian Congress of Biology at the University of Western Ontario, in London, Ontario. This will bring together the membership of the BCC and offer a forum for a wide exchange of ideas. Anyone interested in more details about the Congress should contact Dr. D.B. Walden, Department of Plant Sciences, University of Western Ontario, London, Ontario, N6A 3K7.

The BCC unanimously agreed to support the newly formed AASC (Association for the Advancement of the Scientific, Engineering and Technological Community of Canada). SCITEC has been an active lobbying organization, on behalf of the scientific community. An important operation of AASC is COPSE (Committee of Parliamentarians, Scientists and Engineers) which meets regularly in Ottawa and provides an opportunity for people in these three groups to exchange views.

The next BCC meeting will be held in November.

ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE IN CANADA (AASC)

The need for a national science organization has long been recognized; Canada now has one. If AASC is to succeed, it needs time to grow, and it requires the wholehearted sup-

port of the scientific community and those who recognize the critical importance of a national appreciation of science and its benefits and impacts on society.

Membership includes: *ACCESS*: An issue oriented newsletter dealing with any of the wide range of topics encompassed by science, engineering and technology.
Voting rights at the Annual General Meeting.
Symposia and meetings to be organized on a national level.

Individual membership	\$25
Student membership	\$10
Association membership	\$75

For applications and information, write to:

Association for the Advancement of Science in Canada (AASC)
151 Slater St., Suite 805
Ottawa, Ontario K1P 5H3
or Phone (613) 232-0240

International Commission on Zoological Nomenclature

Reference Number: ITZN 11/4 (A.N.(S.) 126

The Commission hereby gives six months notice of the possible use of its plenary powers in the following cases, published in the *Bulletin of Zoological Nomenclature*, volume 40, part 2, on 15 July 1983, and would welcome comments and advice on them from interested zoologists.

Correspondence should be addressed to the Secretary, if possible within six months of the date of publication of this notice.

Case No.

- 2367 *Larentia capitata* Herrich-Schäffer, 1839 and *Phalaena coracina* Esper, 1805 (Insecta, Lepidoptera): proposed conservation.
- 2127 *Mya Rondani*, 1850 and *Somomya Bertoloni*, 1861 (Insecta, Diptera): designation of type species and proposed suppression of *Somomya* under the plenary powers.
- 2280 *Ancistroceroides* Saussure, 1855: proposed change of type species in order to preserve the well-established name *Paralastor* Saussure, 1856 (Hymenoptera, Vespoidea, Eumenidae).
- 2431 *Allygus* Fieber, 1872 (Insecta, Homoptera): proposed designation of type species.
- 2333 *Caeciliidae* in Amphibia and Insecta (Psocoptera): proposals to remove the homonymy.

Reference Number: ITZN 59

The following Opinions have been published by the International Commission on Zoological Nomenclature in the *Bulletin of Zoological Nomenclature*, vol. 40, part 2, on 15 July, 1983:

Opinion No.

- 1247 (p. 77) *Dactylopius* Costa, (Nov. 1829) and *Pseudococcus* Westwood, 1840 (Insecta, Homoptera): designation of type species.
- 1248 (p. 81) *Lethocerus* Mayr, 1853 (Insecta, Hemiptera): conserved.
- 1250 (p. 85) *Gyrohypnus* Samouelle, 1819, ex Leach MS, *Xantholinus* Dejean, 1821, ex Dahl, and *Othius* Stephens, 1829, ex Leach MS (Insecta, Coleoptera): type species designated for these genera.
- 1255 (p. 97) *Lespesia* Robineau-Desvoidy, 1863 (Diptera, Tachinidae): designation of type species.

The Commission regrets that it cannot supply separates of Opinions.

R. V. Melville,
Secretary,
c/o British Museum (Natural History),
Cromwell Road,
London SW7 5BD, England

PERSONALIA

Susan B. McIver has been invited to give the "von Hofsten Memorial Lecture" at the Zoological Institute, University of Uppsala, Uppsala, Sweden. This is an annual lecture given by an internationally recognized scientist in honour of the late Professor von Hofsten. Dr. McIver's lecture, "Neurological Basis of Behavior of Mosquitoes", will be given October 10, 1983.

D. Jim Madder and *Mark Sears*, Department of Environmental Biology, University of Guelph, were visited by *Stanley Finch* of the National Vegetable Research Station, Wellesbourne, England. Dr. Finch, who has been studying root maggots in vegetable crops in England, observed the management program for pests of onions and carrots which is being conducted in the Bradford Marsh and associated marshes of Ontario.

MISCELLANEA

Ward Neale, writing in *Geoscience Canada*, presents a brilliant solution to a difficult problem. The problem: 'grotty, unreadable slides' at meetings. Solution: 'The main duty of session chairmen will be to identify the most poorly illustrated paper given in each session and to announce the name of the culprit to the audience. At the final wind-up evening the names of all offenders will be read out, samples of their slides flashed on the screen, and the poorest identified by audience reaction. The fate of the supreme loser could be left to the local committee.' I'd go a long way to attend a meeting where the perpetrators of long columns of typed figures were pilloried like that, as they should be... The word grotty is not in my dictionary, but as used by Neale it's admirably expressive.

Robert L. Bates, *Geotimes* (1981), vol. 26

A story in last week's issue (p. 242) [*Science* (1983), vol. 221] reporting additional evidence that bees are involved in yellow rain, was missing a crucial "i" in the headline. The headline should have read "The Apiology of Yellow Rain." A bug evidently entered our system and created an apology.

Science (1983), vol. 221

MEETING ANNOUNCEMENTS

Joint Meeting *Entomological Society of Canada and Entomological Society of Saskatchewan*, at the Sheraton Centre, Regina, on 3-5 October 1983.

CONTACT: P. W. Riegert, Department of Biology, University of Regina, Regina, Saskatchewan S4S 0A2. Telephone (306) 584-4224.

Joint Meeting *Entomological Society of Canada and Acadian Entomological Society*, at the Algonquin Hotel, St. Andrews, New Brunswick, on 30 September - 4 October, 1984.

CONTACT: G. Boiteau, Agriculture Canada Research Station, P.O. Box 20280, Fredericton, New Brunswick E3B 4Z7. Telephone (506) 452-3260.

Entomological Society of Manitoba, Annual Meeting at the Freshwater Institute, Winnipeg, on 3-4 November, 1983.

CONTACT: G. H. Gerber, Agriculture Canada Research Station, 195 Dafoe Road, Winnipeg, Manitoba R3T 2M9. Telephone (204) 269-2100.

Entomological Societies of Alberta and British Columbia, at the Penticton Lakeside Hotel, Penticton, B.C., on 20-22 October, 1983.

CONTACT: N. Angerilli, Agriculture Canada Research Station, Summerland, B.C. Telephone (604) 494-7711.

Entomological Society of Ontario, at the University of Guelph, Guelph, Ontario, on 27-28 October, 1983.

CONTACT: S. A. Marshall, Department of Environmental Biology, University of Guelph, Guelph, Ontario N1G 2W1. Telephone (519) 824-4120.

La Société Entomologique du Québec, tient ses réunions, le 3-4 novembre, 1983 au pavillon Ringuet de l'université du Québec à Trois-Rivières.

Veuillez prendre contact avec: Jean-Pierre Bourasse,

Département de Chimie-biologie, Université du Québec à Trois-Rivières, C.P. 500, Trois-Rivières, Québec G9A 5H7. Téléphone (819) 376-5641.

North American Plant Protection Organization Conference, at the Banff Springs Hotel, Banff, Alberta, on 10-14 October, 1983.

CONTACT: Wes Reid, Plant Quarantine, Agriculture Canada, Ottawa, Ontario K1A 0C6. Telephone (613) 995-7900.

Entomological Society of America Annual Meeting, in Detroit, Michigan, on 28 November - 2 December, 1983.

CONTACT: W. Darryl Hansen, Entomological Society of America, 4603 Calvert Road, College Park, MD 20740, U.S.A.

Society of Environmental Toxicology and Chemistry, Annual Meeting at the Hyatt Regency Hotel, Crystal City, Arlington, Virginia, on 6-9 November, 1983.

CONTACT: SETAC, POB 352, Rockville, MD 20850, U.S.A. Telephone (301) 468-6704.

The following *Western Committee* meetings will be held at the Delta Lakeside Hotel, Penticton, B.C., on 17-20 October, 1983:

Western Committee on *Crop Pests*. (Contact R. S. Vernon, Agriculture Canada Research Station, Vancouver, B.C.).

Western Committee on *Livestock Pests*. (Contact F. J. H. Fredeen, Agriculture Canada Research Station, Saskatoon, Saskatchewan).

Western Committee on *Plant Disease Control*. (Contact P. Platford, Manitoba Agriculture, Winnipeg, Manitoba).

Western Committee on *Vertebrate Pests*. (Contact F. S. Tompa, British Columbia Ministry of the Environment, Victoria, B.C.).

Aquatic Toxicity Workshop, at the Lord Nelson Hotel, Halifax, N.S. on November 7-10, 1983.

CONTACT: R. F. Addison, Marine Ecology, Laboratory, Bedford Institute of Oceanography, Dartmouth, N.S. B2Y 4A2 Telephone (904) 426-3279.

III International Working Conference on Stored-Product Entomology, at Kansas State University, Manhattan, Kansas, on 23-27 October, 1983.

CONTACT: Conference Office, Kansas State University, Division of Continuing Education, 1623 Anderson Avenue, Manhattan, KS 66506, U.S.A.

XVII International Congress of Entomology, in Hamburg, West Germany, on 20-26 August, 1984.

CONTACT: Dr. Thomas Tischler, Zoologisches Institut der Universität, Abt. Angewandte Ökologie Küstenforschung, Biologiezentrum, Olshansenstr. 40/60, D-2300 Kiel 1, West Germany.

X International Congress of Plant Protection, in Brighton, Sussex, U.K., on 20-25 November, 1983.

CONTACT: Mrs. R. A. Bishop, Frank Bishop (Conference Planners Ltd.), 144/150 London Road, Croydon, Surrey CRO 2TD, U.K.

XI International Congress for Tropical Medicine and Malaria, in Calgary, Alberta, on 16-22 September, 1984.

CONTACT: Secretariat XI ICTMM, University of Calgary, Calgary, Alberta T2N 1N4.

COURSE

Scanning Electron Microscopy and X-Ray Microanalysis: Theory and Practice, at Lake Mohonk, New Paltz, New York, on 17-21 October (Materials Science), 24-28 October (Biology and Medicine), 24-28 October (Advanced SEM/X-Ray Microanalysis), 1983.
CONTACT: A. V. Patsis, Director, Materials Research Laboratory, State University of New York, New Paltz, NY 12561, U.S.A. Telephone (914) 257-2175.

POSITION AVAILABLE

Director General of the Commonwealth Agricultural Bureaux

Applications are invited for the post of Director General, Commonwealth Agricultural Bureaux, which will become vacant in 1985.

The Commonwealth Agricultural Bureaux (CAB) is a corporate body supported and controlled by Commonwealth Governments through the Executive Council. Overall management of CAB's Information, Identification and Biological Control Services is discharged by the Director General who is responsible to the Executive Council.

The successful candidate would preferably have a record of achievement in agricultural science, although related fields of science will be considered. He/she should have a record of leadership and management and an appreciation of the role of information in agriculture.

It would be an advantage to have some experience of commercial activities, and an appreciation of the needs of developing countries.

The position of Director General is one of the more important Commonwealth appointments. The salary would be of the order of £25,000 - £30,000 p.a. but this would be negotiable.

It is expected that an appointment would be made in 1984 and duties taken up early 1985.

Further details obtainable from the Executive Director, Commonwealth Agricultural Bureaux, Farnham House, Farnham Royal, Slough SL2 3BN. Applications to be submitted by 31 December 1983.

PUBLICATIONS

The Canadian Entomologist: Peer Review

Reviewers do not accept and reject papers for the *Canadian Entomologist* but admittedly influence the Editors. Associate Editors recommend, and have a powerful influence, but only the Assistant Editor and the Scientific Editor can accept or reject papers because they are Trustees. This is because Trustees are responsible for the property of the Society according to the Corporations Act, under which the ESC is incorporated. People who feel they have been treated unjustly or who see papers published that should not be, can appeal or grieve to the Chairman of the Publications Committee, and if they do not get satisfaction, to the Board or the President. This is preferable to settling for a second rate, non-referred journal, a lab report or private publication, because the work of people who consistently use these media is often suspect.

If you look on the Trustees (which includes the Secretary and the Treasurer) as the civil service appointed by the elected government of the Society, then they can be made to act wisely or be removed from office. Science has to govern itself, because if it does not the politicians will do it.

D. C. Eidt
Scientific Editor
The Canadian Entomologist

Book Notices

Otte, Daniel and Richard D. Alexander, 1983. *The Australian Crickets (Orthoptera: Gryllidae)*. Monograph 22. Academy of Natural Sciences of Philadelphia, Philadelphia, PA 19103 U.S.A., iii + 477 pp. Paper bound, \$ U.S. 45.00.

This long-awaited volume is by far the most comprehensive work on crickets of Australia. It covers a total of 492 species in 85 genera, of which 376 species and 41 genera are described as new to science. Synonymy is given (where necessary), as well as ranges, recognition characters including analysis of stridulation for most species, habitat and data on type localities and types, whether new or previously described.

The work is well illustrated and the illustrations by Otte are, as usual, excellent. Distribution is plotted on maps. Illustrations and maps are found with or near the taxa to which they pertain, which is a great advantage to the reader. A complete taxonomic index is included.

It is unfortunate that the authors' concept of the suprageneric classification appears to have taken a step backward from that which is generally accepted. Taxa which are widely recognized as Family groups have been relegated to subfamily status (mole crickets, which are now regarded as a separate superfamily, are also given subfamily ranking). This ultra-conservatism in classification tends to undervalue degrees of difference between so-called "subfamilies" and provides a distorted view of actual diversity within the crickets.

The Gryllidae (more properly Grylloidea) are included in this work in the Order Orthoptera, despite the fact that they are widely recognized as belonging in the Order Grylloptera, particularly by European and Canadian workers. In the recent prestigious publication, *The Locust and Grasshopper Agricultural Manual* (1982) by the Centre for Overseas Pest Research, London, the Orthoptera and Grylloptera are recognized as separate orders.

V.R. Vickery

Lyman Entomological Museum & Research
Laboratory
Macdonald College, McGill University

Hoy, M.A., Editor. 1982. *Recent advances in knowledge of the Phytoseiidae*. Proceedings of a formal conference of the Acarology Society of America held at the Entomological Society of America Meeting, San Diego, December 1981. Univ. of Calif., Div. Agric. Sciences, Publ. 3284. v + 92 pp. Soft cover. \$ U.S. 8.00.

Not since the series of fine review papers co-authored by Huffaker, McMurtry and van de Vrie in 1969-72, on the ecology of spider mites and their natural enemies, has international research conducted on phytoseiid mites been subjected to an overall review, with needs for future research indicated. The present compilation represents the proceedings of four of apparently five review papers given at the conference. Arranged as chapters, their titles are adequate descriptors of the various research areas covered:

1. Advances in knowledge of the biology of the Phytoseiidae (L. K. Tanigoshi).
2. The use of phytoseiids for biological control: progress and future prospects (J. A. McMurtry).
3. Recent advances and new directions in phytoseiid population models (J. A. Logan).
4. Genetics and genetic improvement of the Phytoseiidae (M. A. Hoy).

Each of these chapters is valuable both for its review of the subject considered for the past ten years and for introducing the reader to the considerable literature accumulated on these subjects. The four chapters together cite well over 500 papers, though a considerable number of these are duplicated. One cannot help but notice how few papers published in foreign languages are cited — less than 5% of the total. Does this represent a bias on the part of a group of anglophonic authors, or a reality in the preponderance of research results being published in English? A bit of both, probably.

The four chapters are preceded by a 1-page introduction by Dr. Hoy, half of which is a summary of the fifth paper, given by Dr. D. A. Chant at the conference but inexplicably not included in the proceedings. A 3-page summary with recommendations for future research and implementation, by S. C. Hoyt, concludes the proceedings but seems to have missed one of the most important points. Hoyt belabors the need for "unification of generic designations", which Chant, an eminently qualified acarological systematist and ecologist, asserted was of secondary importance. At the same time, Hoyt did not emphasize the very pressing

problem of species-level systematic research necessary for unqualified identification of phytoseiids. Whereas Hoyt allows that "several of these [more than 1200] species may be synonymous with previously described species," Chant (personal communication) estimates that 30% of the nominal species of world Phytoseiidae may be synonyms! In addition, many other species continue to be referred to the wrong names. For example, until recently, among the more important species that come to mind, *Typhlodromus longipilus* Nesbitt was mistakenly accepted as occurring in western North America, and *T. occidentalis* Nesbitt in the east; the Eurasian *Amblyseius umbraticus* (Chant) was erroneously thought to occur in North America; and *Typhlodromus caudiglans* Schuster has been mistaken for the Eurasian *T. rhenanus* (Oudemans) in North America. Our knowledge of the real distributions of phytoseiid species, their geographic origins, their habitat tolerances and preferences, and their feeding behaviors and preferences — all depend on a world revisionary approach to the systematics of this important group of predatory mites.

Some haste is evident on the covering pages: the *Acarological Society* is misnamed on the inside cover; the title of chapter 1 is incomplete on the contents page; and "*Tetranychus urticae* Koch" should not have parentheses around the author in the caption for the cover photo. These shortcomings do not detract from the importance of these proceedings in reviewing advances in our biological knowledge of phytoseiid mites, particularly as related to their actual and potential use in biological control and pest management programs. The editor and publisher are congratulated for having these proceedings published within a year of the meeting.

Evert E. Lindquist,
Biosystematics Research Institute,
Agriculture Canada, Ottawa.

Rose, A.H. and O.H. Lindquist. 1982. *Insects of Eastern Hardwood Trees*. Environment Canada, Canadian Forestry Service. Cat. No. Fo64-29/1982. Canada \$14.95, other countries \$17.95.

This handbook is the last of a series of four describing insects that damage eastern Canadian trees. The term "hardwood" means deciduous as opposed to needle-bearing trees treated in the first three handbooks. About 450 species of insects and mites causing noteworthy damage to hardwood trees are included. Their identification is initially based on the kinds of tree damaged which are grouped under 20 tree genera. Within each host tree section, flow chart keys are provided to determine the insects or mites, and each species is illustrated by full-color photographs and its life cycle is shortly sketched.

The authors and editorial board must be congratulated for their excellent work which will be greatly appreciated by amateurs, as well as by students and professionals. The 304 pages (over 200 pages with full-color photographs) printed on a nice glossy paper for only \$14.95 represent these days a very good bargain.

Laurent LeSage
Biosystematics Research Institute
Agriculture Canada, Ottawa.

Chvala, M. 1983. *The Empidoidea (Diptera) of Fennoscandia and Denmark II*. Fauna Entomologica Scandinavica Vol. 12, 279 pp.

This is the second volume on the "Empididae" in this series on the insects of Scandinavia, both by the same author. The first volume, which dealt with the subfamily Tachydrominae, was reviewed in the *Bulletin* (8)(3) 18, 1976. In this volume major changes are proposed in the higher classification of the old family Empididae by elevating to family rank three lesser categories under the previous system, namely, Hybotidae (including subfamilies Hybotinae, Ocydrominae and Tachydrominae), Atelestidae and Microphoridae. This was deemed necessary because of the apparent closer relationship of the members of these taxa to the Dolichopodidae than to the remainder of the Empididae. Remaining in the family Empididae are the subfamilies Hemerodromiinae, Ceratomerinae, Clinocerinae, Oreogotoninae, Empidinae and Brachystomatinae. These will be treated in subsequent volumes of this series.

Justification for the above taxonomic changes is presented in the first part of this volume. This involves first a comparative morphological discussion of the members of the

superfamily that provides the basis for the following cladistic argumentation to show the necessity of the changes. Although this discussion is rather disjointed and difficult to follow, the cladogram and phylogenetic tree seem to show rather convincingly the necessity for the taxonomic changes.

A section on the general life history and behaviour of the Empidoidea, exclusive of the Dolichopodidae, is well-presented and the zoogeography of the group in Fennoscandia and Denmark is discussed in general and specific terms.

The remaining greater portion of the volume is reserved for the systematics of the three families in this region. Keys, descriptions and special comments on distribution and biology of the 18 genera and 52 species that potentially or actually occur in the region are provided. The descriptions are detailed and the keys seem to work well. But, as in many such publications, there are some loose wording and errors. One example of the latter is that *Trichinomyia fuscipes*, based on the antennal figures given, will not go through couplet five in the key to genera and tribes of Ocydrominae.

The volume is well-illustrated with 639 simple and accurate line drawings. It should be in the library of all students of the Empidoidea.

H. J. Teskey
Biosystematics Research Institute
Ottawa, Ontario

Thorp, Robbin W., Donald S. Horning, Jr., and Lorry L. Dunning. 1983. *Bumble bees and cuckoo bumble bees of California (Hymenoptera: Apidae)*. Bull. California Insect Survey 23, VII + 86 pp. University of California Press, 2223 Fulton Street, Berkeley, California 94720. Soft cover \$ U.S. 19.00.

Bees of the tribe Bombini form the subject of this contribution. The genus *Bombus*, with 24 Californian species, comprises the 3-caste bumble bees, all of which are valued pollinators and some of which are domesticated in legume (mainly red clover) fields. The three species of *Psithyrus* (cuckoo bumble bees) are "inquilines or social parasites without worker castes, which usurp bumble bee nests and propagate themselves at the expense of their bumble bee hosts".

This book is essential for anyone working on the systematics or biology of bees. Five species range from the Pacific coast to the Atlantic, and nearly two-thirds of the total occur widely west of 100° W longitude. *Bombus balteatus* and perhaps *B. sylvicola* are Holarctic. Species that are apparently replaced to the north, east, or in high mountains by close relatives are indicated as problems for future investigation. The debate over higher classification of these bees is not entered.

Life histories, floral associations, and mimicry are treated in a general way at the beginning of the work, and further details are given under the species. Range maps give both the California localities and an indication of the Nearctic range. The illustrations include black and white photographs of colonies.

C. D. Dondale
Biosystematics Research Institute
Ottawa, Ontario

Update on Publications

Mound, Laurence A., and Annette K. Walker. 1982. *Fauna of New Zealand. Number 1. Terebrantia (Insecta: Thysanoptera)*. Science Information Division, DSIR, P.O. Box 9741, Wellington, N.Z. Soft cover. 113 pp. N.Z. \$8.50 (plus \$1.50 for overseas customers).

McColl, H. Pauline. 1982. *Fauna of New Zealand. Number 2. Osoriinae (Insecta: Coleoptera: Staphylinidae)*. Publisher as above. Soft cover. 89 pp. N.Z. \$8.50 (plus \$1.50 for overseas customers).

Holloway, B. A. 1982. *Fauna of New Zealand. Number 3. Anthribidae (Insecta: Coleoptera)*. Publisher as above. Soft cover. 264 pp. N.Z. \$10.00 (plus \$1.50 for overseas customers).

These three books form the vanguard of a projected series on the non-marine invertebrates of New Zealand. The purpose of the series is to make the New Zealand fauna known to specialists and non-specialists alike. A further 27 contributions are either in press, in

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