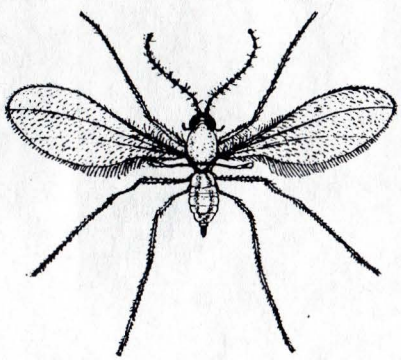
VOL 26 September- septembre, 1994 No. 3



# BULLETIN



ENTOMOLOGICAL SOCIETY OF CANADA
LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA

ENTOMOLOGICAL SOCIETY OF CANADA
LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA
# BULLETIN
VOL 26(3) - September/ septembre, 1994



Contributions and correspondence regarding the *Bulletin* should be sent to the *Bulletin* Editor. Inquiries about subscriptions and back issues should be sent to the E.S.C. at:
Faites parvenir vos contributions au *Bulletin* ou votre correspondance à l'Editeur du *Bulletin*. Pour renseignement sur l'abonnement ou les numéros passés, prière de s'adresser à la S.E.C.:

Entomological Society of Canada
393 Winston Ave.
Ottawa, Ontario
K2A 1Y8

# SOCIETY BUSINESS / AFFAIRES DE LA SOCIÉTÉ

## 44th Annual General Meeting

The Annual General Meeting of the Entomological Society of Canada will be held at the Delta Winnipeg Hotel in Winnipeg, Manitoba on October 18, 1994. Matters for consideration at this meeting should be sent to the Secretary, Dr. R.J. West.

## Governing Board Meeting

The Annual Meeting of the Governing Board will be held at the Delta Winnipeg Hotel in Winnipeg, Manitoba on October 15, 1994. If necessary, the meeting will continue on October 16. Matters for consideration at this meeting should be sent to the Secretary, Dr. R.J. West.

## 44 Réunion Générale Annuelle

La Réunion Générale Annuelle de la Société d'Entomologie de Canada aura lieu 18 octobre à la Delta Winnipeg Hotel, à Winnipeg. Tous sujets pour être considérés devont être soumis au secretaire, Dr. R.J. West.

## La conseil de direction

La conseil de direction sa réunira le 15 et 16 octobre 1994 à la Delta Winnipeg Hotel, à Winnipeg. Tous sujets pour être considérés devont être soumis au secretaire, Dr. R.J. West.

Dr. Rick West
Canadian Forest Service, Newfoundland and Labrador Region
P.O. Box 6028
St. John's, Newfoundland A1C 5X8
Fax 709-772-2576
email address: rwest@vax1.nefc.forestry.ca

The deadline for submissions to be included in the next issue (Vol. **26(4)**) is **November 1, 1994**

La date limite pour recevoir vos contributions pour le prochain numéro (Vol. **26(4)**) est le **1 novembre 1994**

Please send all correspondence concerning the *Bulletin* to:

Dr. Fiona F. Hunter
*Bulletin* Editor
Department of Biological Sciences
Brock University
St. Catharines, Ontario
L2S 3A1

Tel. (905) 688-5550 Ext. 3394
Fax. (905) 688-1855
Email: hunterf@spartan.ac.BrockU.ca

Please send all correspondence concerning Book Reviews for the *Bulletin* to:

Dr. Hugh V. Danks
Biological Survey of Canada
(Terrestrial Arthropods)
Canadian Museum of Nature
Box 3443, Stn D
Ottawa, Ontario
K1P 6P4

Tel. (613) 954-2648
Fax. (613) 954-6439

## President's Message

Recently I was reading the "President's Corner" in the *Newsletter of the Entomological Society of America* and the following comments of Dr. George L. Teetes, ESA President, prompted me to write this version of the President's Message for the September *Bulletin*.

> "There are so many things going on in ESA - so many people working for ESA. It is exciting to work with such dedicated people and with the numerous standing and special committees. I see why entomologists are so often in the lead. Almost daily, I receive letters or phone calls from individuals or organizations wanting ESA to work with them to do something. Entomology has to be the greatest profession."

From these comments, it is obvious that the ESA is a busy society doing many things and that American Entomologists are proud of their profession. This led me to ask the questions: What do Canadian Entomologists think of their profession? What are Canadian Entomologists doing for their profession? I am sure that we are all proud of our profession, but I have the impression that we are not doing much at the present time to see that it flourishes.

Dr. Teetes has received letters and telephone calls from many individuals or groups wanting the ESA to work with them to do something. During the first 9 months of my presidency, I have not received any such letters and telephone calls from ESC Members or organizations wanting the ESC to take a leadership role in any area. Why? Is everything so rosy in Canada and in Canadian Entomology that there no longer is a role for the ESC in this country? I doubt it.

In 1993 when I was Chair of the Science Policy Committee, I put a notice in the *Bulletin* asking members of the Society to send the ESC Science Policy Committee suggestions that they have for science related activities and issues that this committee may take on during the next few years (**25**(1):2-3). I received no replies to this notice. The 1994 Science Policy Committee also has not received suggestions from ESC Members. Why? Is it apathy? I hope not, because if it is, our Society and profession are on the fast track to irrelevancy and oblivion in Canada. Is no one concerned that universities and provincial and federal government agencies are not refilling positions with entomologists as entomologists retire? Is no one concerned that NSERC is gradually phasing out the individual Research Grants Program in favour of a small number of collaborative projects, run by a handful of senior researchers? Is no one concerned that the budgets of NSERC and of federal government research laboratories are getting much smaller? Or, are we becoming so efficient that such cutbacks do not affect us? I doubt it. Since the CFBS Science Policy Committee will no longer lobby on our behalf in 1995 on these science related issues, the ESC Executive, the ESC Science Policy Committee, and ESC Members will all have to become active to preserve the future of Entomology in Canada. Now is the time for Canadian Entomologists to take a leadership role to make ourselves known and to communicate the goals and directions our science and profession will be taking into the next century and beyond.

It cannot be taken for granted that Entomology will flourish forever without hard work, leadership, and active participation by all.

George H. Gerber
President
July 1994

## New *Bulletin* Editor in 1996

The Executive Council is soliciting the names of persons willing to serve as *Bulletin* Editor of the Entomological Society of Canada, **beginning January 1, 1996**. The *Bulletin* Editor is responsible for the publication of this medium and the receiving, editing, and distribution of material consistent with the object of the Society. The position requires access (and employer's permission) to use photocopying, phone, fax, computer and mail services; proficiency in word processing; working knowledge of desktop publishing and printing; and experience in editing. A working knowledge of both official languages is a desirable attribute. The new *Bulletin* Editor would likely travel to St. Catharines in November 1995 to work on the December 1995 issue of the *Bulletin* with F. Hunter. Persons willing to submit their names for consideration for this position should send a statement of their qualifications by January 1, 1995, to:

Dr. Les Safranyik
c/o Canadian Forest Service
506 West Burnside Road
Victoria, B.C. V8Z 1M5

## Illustrations sought for ESC journal covers

As many members will know, the Society is redesigning the outside covers of its publications, *The Canadian Entomologist*, the *Memoirs of the Entomological Society of Canada*, and the *Bulletin*. One new feature to give the covers visual appeal will be illustrations of insects and related forms. Therefore, a file of available artwork is being compiled to ensure that a useful variety of species will be shown over the course of future volumes.

I invite members to contribute to this file by providing suitable reproduction-quality artwork (originals or PMT's/photostats), consisting of black and white line drawings, and that is not copyrighted elsewhere.

Subjects should be species of any taxon that occurs in Canada, shown in any life stage. The renditions should be relatively detailed and the inking relatively dense so that the illustrations will have a good appearance at the intended printed size of up to 10-12 cm wide and 6-10 cm high. No labels are required, but identification to species and a very brief description of range, habitat and any other point of particular interest should be provided.

Thank you in advance for your contributions to improving the appearance of the journals.

H.V. Danks
Chair, Publications Committee
Biological Survey of Canada (Terrestrial Arthropods)
Canadian Museum of Nature
P.O. Box 3443, Station "D"
Ottawa, Ontario
K1P 6P4

## Call for Nominations - Honorary Membership

Nominations are invited for two Honorary Memberships in the Entomological Society of Canada. Honorary Members may be active members or former active members of the Society who have made outstanding contributions to the advancement of entomology.

Nominations must be signed by at least five active members of the Society and are then reviewed by the Membership Committee, who will select two names to be placed on the ballot. Nominations should include a brief biography of the candidate and a statement of her/his contributions to the advancement of entomology.

Nominations should be received by the Chair of the Membership Committee by **January 31 1995**. They should be sent in an envelope marked "Confidential" to the following address:

Dr. H.V. Danks,
ESC Membership Committee,
Biological Survey of Canada (Terrestrial Arthropods),
P.O. Box 3443, Station D,
Ottawa, Ontario, K1P 6P4
(Fax. 613-954-6439)

## Elections Committee / Le Comité des Elections

The committee was comprised of R.W. Currie, T.D. Galloway (Chair), and Steve Pernal. The committee met on 15 July, 1994 and examined ballots for the 1995 election of officers. In total, 229 ballots were received. The successful candidates were:

Le comité a compris R.W. Currie, T.D. Galloway, et Steve Pernal. Le Comité a tenu une réunion le 15 juillet 1994 à la Station de Recherche d'Agriculture Canada, à Winnipeg, Manitoba, ou il a examiné les bulletins de scrutin pour l'élection des officiers pour 1995. Un total de 229 bulletins ont été reçu. Les candidats élus sont:

| | |
|---|---|
| Second Vice-President / Le deuxième vice-président: | Steve Marshall |
| Directors-at-large / Directeurs nationaux: | Al Ewen<br>Elspeth Belton |
| Fellowship Selection Committee /<br>Comité pour la sélection des compagnons de la société: | Glenn Wiggins<br>William Turnock |
| Honorary Members: | George Ball<br>Joe Shemanchuk |

T.D. Galloway
Winnipeg, Manitoba

# Membership Trends In The Entomological Society Of Canada

**H.V. Danks**
Chair, Membership Committee, ESC; Biological Survey of Canada (Terrestrial Arthropods), Canadian Museum of Nature, Ottawa

## Introduction

This article outlines changes in membership of the ESC over the past 30 years. Such an analysis is of historical interest, and also is likely to be helpful for decisions that the Society must make about its financial and other affairs. In order to keep the article relatively succinct, detailed data and methods are given separately in an appendix. Available data are not always fully reliable, but this fact does not obscure the main trends.

## Overall pattern

The majority of members of the Society reside in Canada (over 60%, based on a sample of years), but about one third of members live in the U.S.A., including some Canadians and former Canadians working or studying there. Membership trends therefore are most strongly influenced by events in Canada. Membership in the Society (Fig. 1, expressed as a five-year running mean to smooth short-term perturbations) increased through the 1960's. Despite a modest decrease in the early 1970's, membership was maintained at nearly 1,000 (about 800 regular members plus up to 200 student members) until the early 1980's. Since then membership has declined every year, and the total number of regular plus student members in 1994 is about 525 (Appendix Table A). It is encouraging that the Society has nevertheless remained vigorous and has continued its activities in science policy during this period.

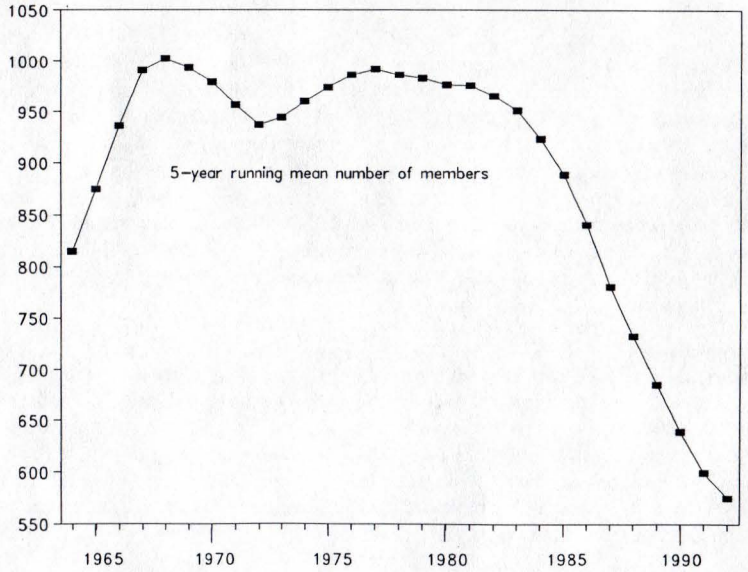



Fig. 1. Five-year running mean number of members (regular plus student) in the ESC, 1964–1992.

**Background elements**

Two major external factors appear to have influenced historical membership trends: the numbers of entomologists employed in the country, and the robustness of the economy. Fig.2 compares regular membership over the years with the number of professional entomologists employed by the Agriculture Canada Research Branch in its research establishments. Agriculture Canada has been and is a major employer of entomologists, and the numbers of Agriculture Canada research staff are an index of the numbers of employed entomologists who might be likely to join the Society. Fig. 2 also shows the annual change in personal expenditure by Canadians on goods and services (as calculated by Statistics Canada), one index of the state of the national economy and the likelihood that individuals will pay membership fees.

The decline in membership closely reflects the reduction in entomologists available to join. Declines are most marked, too, when the Canadian economy has been depressed as shown by the personal expenditure index. Recessions or especially weak economic growth (exemplified by growth in personal expenditure of less than 2%, for example) occurred in 1970, the early 1980's and in 1990 onwards. At such times, appropriations for organizations employing entomologists were reduced, one reason for the decline in employees. Grants were also restricted, and the ESC lost an NSERC grant-in-aid of publication in 1984. Costs to the Society increased markedly because the grant was lost, because the costs of printing went up, and especially because of major increases in postage, another reflection of government attempts to curtail costs. When the economy is depressed, moreover, individuals tend to review personal expenditures and are more likely to cancel their society memberships. A number of foreign members have left the Society in recent years too, chiefly in response to similar economic trends in other countries.

**Effect of Society fees**

Especially when the economy is weak, decisions whether to join or remain in the Society are made by individuals according to the cost of membership. Figs. 3 and 4 plot membership trends against the various Society fees. Page charges shown are the fees listed in the journal, although in practice charges were sometimes smaller (e.g. $50 rather than $75) because NSERC grants were obtained.

Membership is sensitive to increases in the cost of membership. Significant increases, especially the major increases of 1970 and 1989, were accompanied by a conspicuous loss of members. The number of subscriptions appears to be less sensitive to fee increases – compare 1970, for example – presumably because purchases by subscribers are not made from the funds of individuals. Nonetheless, subscriptions show a marked downward trend as government and other organizations have attempted to save money, especially since the 1980's, and as the number of entomologists employed in some establishments has declined.

**Effect of page charges**

Page charges normally are paid from institutional or grant monies, rather than personal funds. As might have been expected, therefore, the fact that page charges were reduced did not offset losses caused by increased membership fees in 1989 (see Fig. 4). Nor did more individuals take advantage of reduced fees to publish in the journal: Table 1 shows that the percentage of members publishing in *The Canadian Entomologist* since 1980 was fairly constant even as membership declined. (Nevertheless, the size of the journal has remained relatively constant, so that each author has published more pages on average: e.g. mean pages per author per year 4.96 (1980-84), 5.86 (1985-89), 6.52 (1990-93).)

Table 1 suggests that there might have been very minor increases in the percent of members publishing in the journal since 1989 (when page charges were much reduced). If these small increases are significant, they probably do not reflect higher publication rates induced by lower page charges.

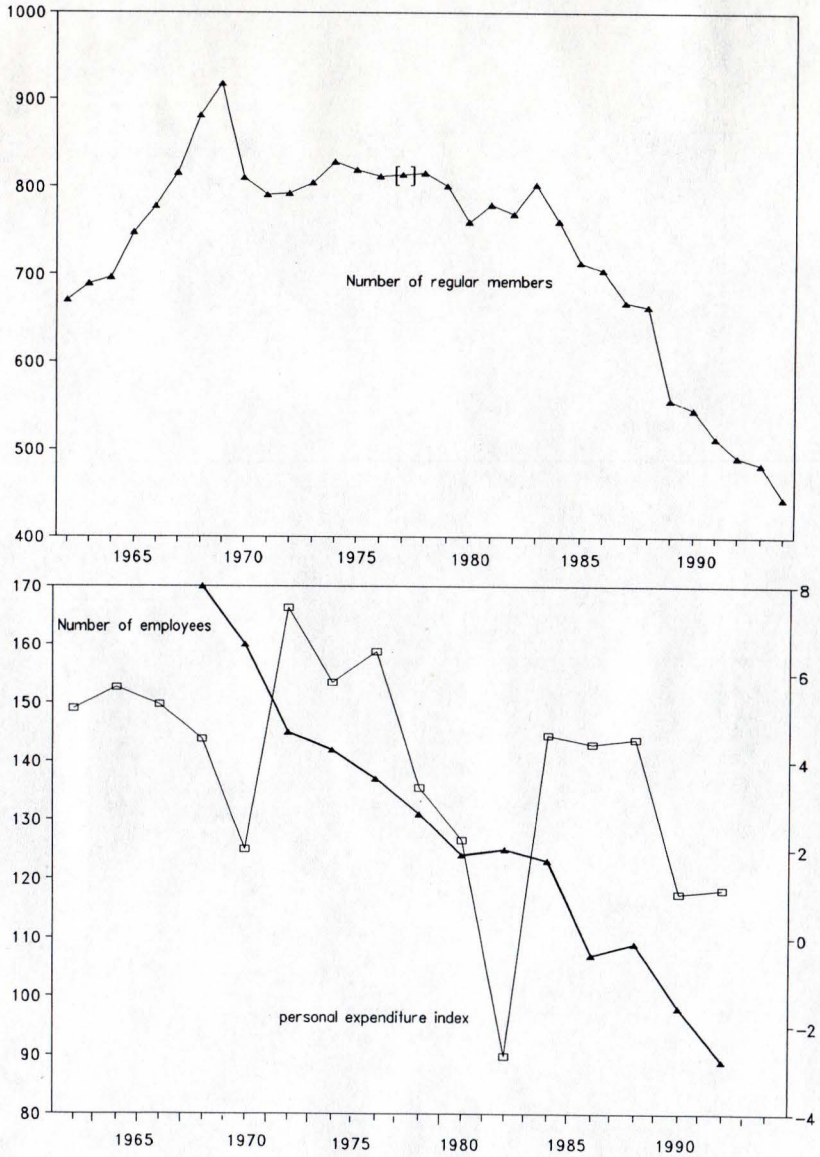



Fig. 2. Number of regular members of the ESC, 1962–1994, number of professional entomologists employed at Agriculture Canada research establishments, and annual percent change in personal expenditure per capita on goods and services in Canada.

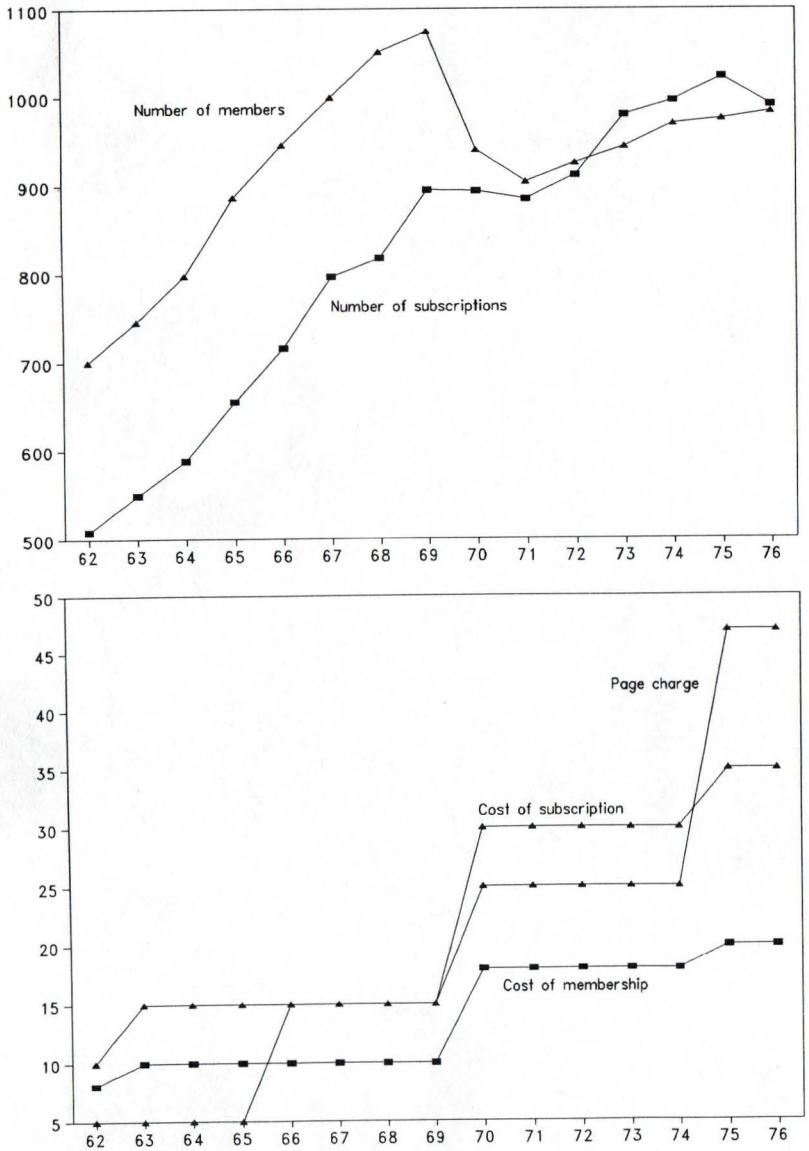



Fig. 3. Number of memberships and subscriptions to the ESC, 1962–1976, and Society fees ($).

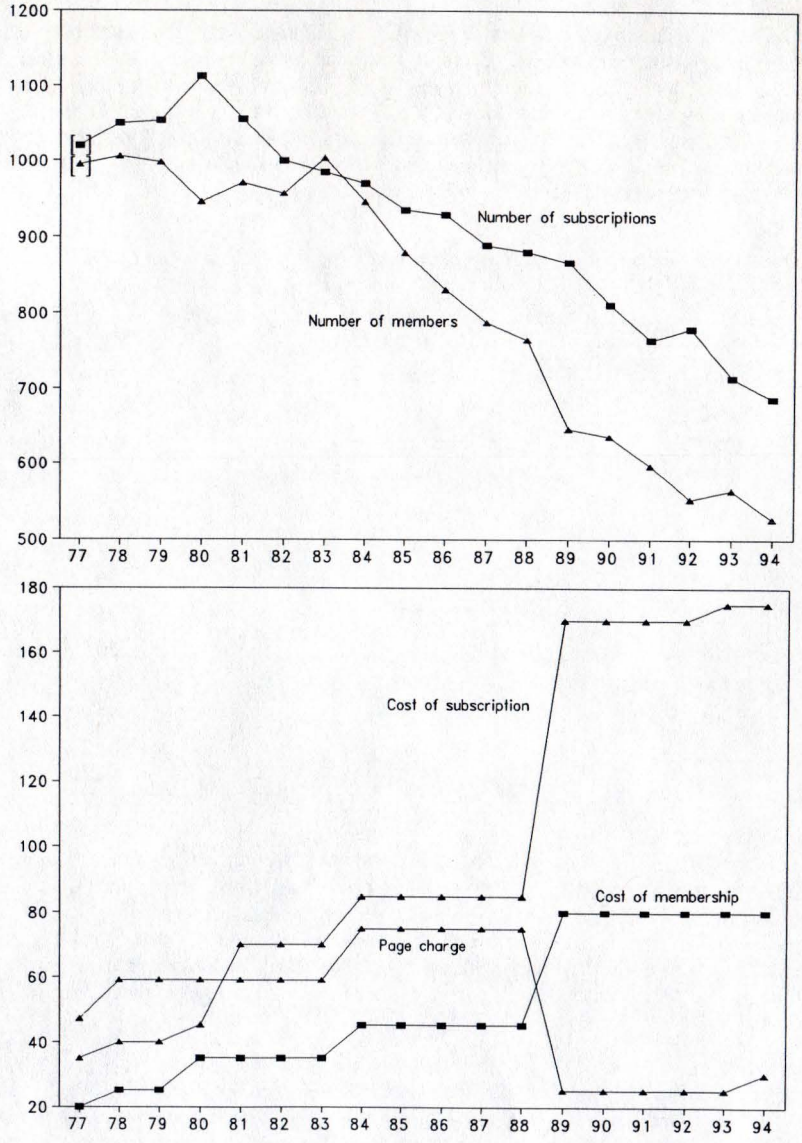



Fig. 4. Number of memberships and subscriptions to the ESC, 1977–1994, and Society fees ($).

More likely, they are due to other factors. First, many of the same established authors continue to publish, even though base membership is decreasing. Second, there has been a tendency, especially in the past few years, for authors to join for the year of publication only, a tendency that will increase the percentages of members publishing. Finally, a policy has been adopted to publish certain papers in *The Canadian Entomologist* rather than produce memoirs that are very small in size, transferring a few authorships to *The Canadian Entomologist*. Such transfers also may contribute to the increases in the mean number of pages published per author.

Table 1. Members of ESC publishing one or more papers in *The Canadian Entomologist*

| Year | No. of authors | % of members publishing |
|---|---|---|
| 1980 | 312 | 33 |
| 1981 | 296 | 30 |
| 1982 | 238 | 25 |
| 1983 | 291 | 29 |
| 1984 | 286 | 30 |
| 1985 | 284 | 33 |
| 1986 | 198 | 24 |
| 1987 | 228 | 30 |
| 1988 | 182 | 24 |
| 1989 | 196 | 30 |
| 1990 | 201 | 32 |
| 1991 | 195 | 33 |
| 1992 | 186 | 34 |
| 1993 | 190 | 34 |

**Student membership**

Student membership (Fig. 5), characteristically more than two-thirds Canadian, has shown very similar trends to regular membership. The numbers of university entomology faculty, and hence students, have also declined over the past 30 years. A reduction in student fees in 1993 helped restore some student members. Recently the number of student members has declined more slowly, coinciding with establishment of a Student Affairs Committee, now with membership on the Governing Board. Currently about half of student members pay an additional $20 student fee to receive the journal in addition to the *Bulletin*.

**Emeritus members**

The category of emeritus member (receiving the *Bulletin* but not *The Canadian Entomologist* free of charge) was instituted in 1973. A charge ($20) has recently been implemented (1993) to defray the cost of mailing the *Bulletin* to those who wish to receive it. Detailed records of emeritus membership are not available because until recently no annual contact was made with such members as no annual fee was payable. It was not possible, therefore, to determine whether some emeritus members were no longer active. There have been about 70-75 emeritus members in recent years, two or three times

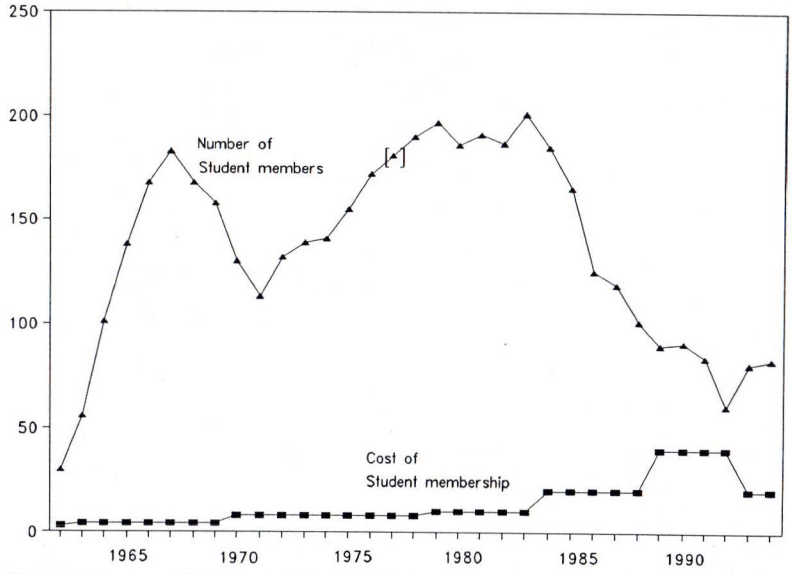



Fig. 5. Number of ESC student members and the cost of student membership, 1962–1994.

the numbers when the category was first established. Such an increase reflects the retirement of large numbers of entomologists in the past 20 years.

**Effect of recruitment drives and other initiatives**

Concerted attempts to secure more members were made in 1974-75 (by personal contact) and in 1981-82. Canadian student members were targeted especially in 1992.

These activities appear to have had some modest effect on membership trends. However, surveys of individuals who had allowed their membership to lapse (conducted by the Membership Committee in 1987-88 and again in 1992-93) suggest that most individuals elect to leave the Society to save the membership fee, given other financial commitments, and/or because the relevance of the Society and its publications to their particular interests is limited. Nevertheless, other individuals elect to remain members of the Society in support of entomology, or to attend the meetings, even if they find little of specific interest in the journal.

**Conclusions and summary of trends**

Changes in membership in the ESC have reflected chiefly the number of entomologists, especially in Canada, who might join the Society (Fig. 6). Therefore, the Society must make its strategic decisions based on the fact that the ESC is smaller than it once was, and will likely remain so until the economy improves and scientific entomological endeavours are more widely supported. It is not now possible to run a 500-member Society as though it were still a 1,000-member one. A strategic review of financial matters (e.g. cost and scale of publications and services) and of organizational matters (e.g. size of the Governing Board and number of Society committees) therefore might be appropriate.

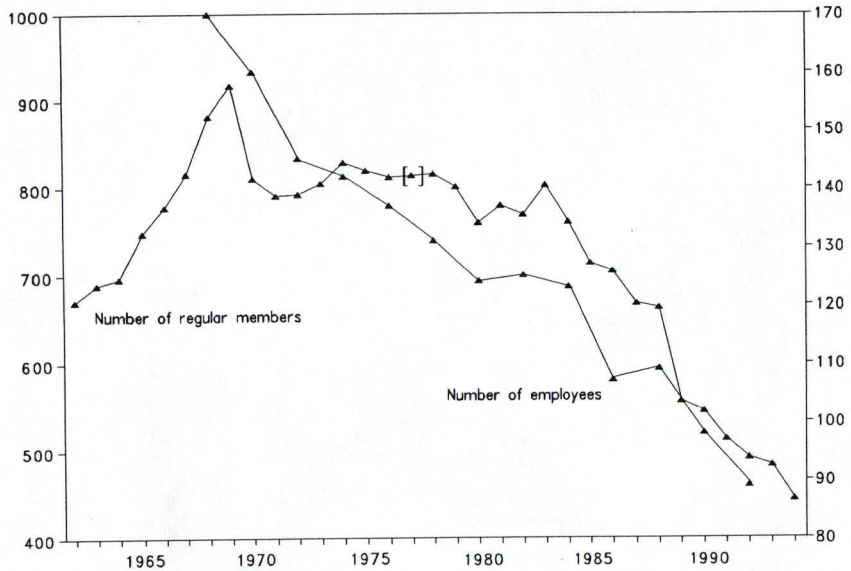



Fig. 6. Number of ESC regular members compared to the number of Agriculture Canada research branch entomologists, 1962–1994.

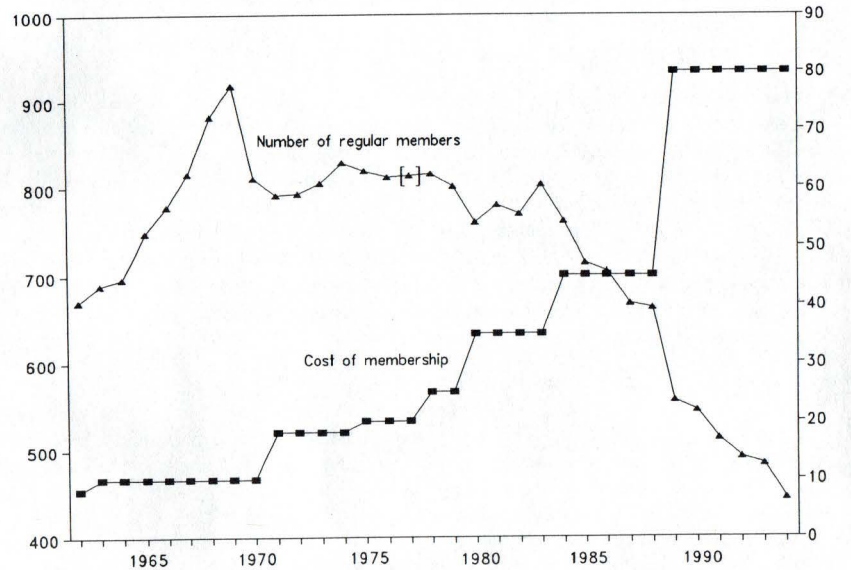



Fig. 7. Number of ESC regular members compared to the cost of regular membership, 1962–1994.

Membership is also somewhat sensitive to items under the Society's direct control, especially the cost of individual membership (Fig. 7). Tactical decisions by the Society must therefore endeavour to keep the cost of individual membership as low and stable as possible, and continue to encourage entomologists to join the Society.

Even with the smaller number of members in the 1990's than in the 1970's, the ESC remains a significant and credible organization in Canadian science, and performs many useful roles in promoting entomology and providing a forum for entomologists to exchange ideas and information. All members should therefore encourage their colleagues to join. It is also worth noting that so many members contribute actively to the Society, and that so many entomologists in North America and elsewhere support it in the broad interests of entomology, even during the current difficult economic and scientific climate in Canada.

## Appendix: Methods And Data

### Membership

Surprisingly, the ESC has kept no routine log of memberships over the years (a recommendation to this effect is now made!). Information therefore has had to be gleaned from various sources. I am especially grateful to Ms. Sandy Devine, ESC Administrative Assistant, for help in compiling the information on members and subscribers, as well as for other useful information.

Financial records kept by the ESC office provide data from 1982 onward. Some notes and information from earlier periods are also available in files at the Society office. Summaries of the numbers of *The Canadian Entomologist* mailed were published intermittently in the *Bulletin* (which started in 1969), but then were discontinued. Occasionally, numbers of members or other information were provided in the *Bulletin*, for example in reports of the Membership Committee. When figures are available from more than one source, the figures do not always agree with one another, partly because the known "number of members" changes through the year as fees are paid or resignations are notified, for example. (Moreover, until 1988 dues were not required before April 1 of the following year.) Given these inconsistencies, I have used figures from sources I deemed most likely to be accurate. In a few instances (memberships and subscriptions in 1977; subscriptions in 1981), available figures were strikingly anomalous, suggesting that an error had been made in arriving at the figure in the original source. Revised figures calculated by interpolation between the preceding and following year were substituted in these few instances. Fee structures have been printed regularly in *The Canadian Entomologist,* and so are more readily available.

Core data derived from these sources and used for analysis are listed in Appendix Table A.

Appendix Table A (overleaf): Core data on membership and fees in the Entomological Society of Canada, 1962–1994. Figures interpolated when the only available figures were highly anomalous are enclosed in brackets. The final total for subscriptions in 1994 is not yet available, because many international orders are routinely delayed. For sources see text.

| Year | Total no. of members | No. of regular members | No. of student members | Cost ($) of regular membership |
|---|---|---|---|---|
| 1962 | 700 | 670 | 30 | 8 |
| 1963 | 745 | 689 | 56 | 10 |
| 1964 | 797 | 696 | 101 | 10 |
| 1965 | 886 | 748 | 138 | 10 |
| 1966 | 946 | 778 | 168 | 10 |
| 1967 | 999 | 816 | 183 | 10 |
| 1968 | 1050 | 882 | 168 | 10 |
| 1969 | 1074 | 918 | 158 | 10 |
| 1970 | 940 | 810 | 130 | 18 |
| 1971 | 904 | 791 | 113 | 18 |
| 1972 | 925 | 793 | 132 | 18 |
| 1973 | 944 | 805 | 139 | 18 |
| 1974 | 970 | 829 | 141 | 18 |
| 1975 | 975 | 820 | 155 | 20 |
| 1976 | 984 | 812 | 172 | 20 |
| 1977 | [995] | [814] | [181] | 20 |
| 1978 | 1006 | 816 | 190 | 25 |
| 1979 | 998 | 801 | 197 | 25 |
| 1980 | 946 | 760 | 186 | 35 |
| 1981 | 971 | 780 | 191 | 35 |
| 1982 | 957 | 770 | 187 | 35 |
| 1983 | 1004 | 803 | 201 | 35 |
| 1984 | 946 | 761 | 185 | 45 |
| 1985 | 879 | 714 | 165 | 45 |
| 1986 | 830 | 705 | 125 | 45 |
| 1987 | 787 | 668 | 119 | 45 |
| 1988 | 764 | 663 | 101 | 45 |
| 1989 | 646 | 556 | 90 | 80 |
| 1990 | 636 | 545 | 91 | 80 |
| 1991 | 597 | 513 | 84 | 80 |
| 1992 | 552 | 491 | 61 | 80 |
| 1993 | 564 | 483 | 81 | 80 |
| 1994 | 527 | 444 | 83 | 80 |

| Cost ($) of student membership | Can. Ent. page charge ($) | No. of subscribers | Cost ($) of Canadian subscription |
|---|---|---|---|
| 3 | (tables) | 508 | 10 |
| 4 | (tables) | 549 | 15 |
| 4 | (tables) | 588 | 15 |
| 4 | (tables) | 654 | 15 |
| 4 | 15 | 716 | 15 |
| 4 | 15 | 796 | 15 |
| 4 | 15 | 818 | 15 |
| 4 | 15 | 895 | 15 |
| 8 | 25 | 894 | 30 |
| 8 | 25 | 884 | 30 |
| 8 | 25 | 911 | 30 |
| 8 | 25 | 980 | 30 |
| 8 | 25 | 996 | 30 |
| 8 | 47 | 1023 | 35 |
| 8 | 47 | 991 | 35 |
| 8 | 47 | [1020] | 35 |
| 8 | 59 | 1050 | 40 |
| 10 | 59 | 1053 | 40 |
| 10 | 59 | 1113 | 45 |
| 10 | 59 | [1056] | 70 |
| 10 | 59 | 1000 | 70 |
| 10 | 59 | 985 | 70 |
| 20 | 75 | 970 | 85 |
| 20 | 75 | 936 | 85 |
| 20 | 75 | 929 | 85 |
| 20 | 75 | 889 | 85 |
| 20 | 75 | 880 | 85 |
| 40 | 25 | 866 | 170 |
| 40 | 25 | 811 | 170 |
| 40 | 25 | 765 | 170 |
| 40 | 25 | 780 | 170 |
| 20 | 25 | 715 | 175 |
| 20 | 30 | (687) | 175 |

Appendix Table B: Number of professional entomologists employed in research centres, institutes and stations by Agriculture Canada, 1968–1994; annual change in personal expenditure per capita on goods and services (based on 1986 prices), 1962–1992. For sources see text.

| Year | No. of employees | % change in expenditure |
|---|---|---|
| 1962 | | 5.2 |
| 1963 | | 4.4 |
| 1964 | | 5.7 |
| 1965 | | 6.1 |
| 1966 | | 5.3 |
| 1967 | | 4.0 |
| 1968 | 170 | 4.5 |
| 1969 | | 5.1 |
| 1970 | 160 | 2.0 |
| 1971 | | 5.9 |
| 1972 | 145 | 7.5 |
| 1973 | | 7.5 |
| 1974 | 142 | 5.8 |
| 1975 | | 4.7 |
| 1976 | 137 | 6.5 |
| 1977 | | 3.2 |
| 1978 | 131 | 3.4 |
| 1979 | | 2.9 |
| 1980 | 124 | 2.2 |
| 1981 | | 2.3 |
| 1982 | 125 | -2.7 |
| 1983 | | 3.4 |
| 1984 | 123 | 4.6 |
| 1985 | | 5.2 |
| 1986 | 107 | 4.4 |
| 1987 | | 4.4 |
| 1988 | 109 | 4.5 |
| 1989 | | 3.4 |
| 1990 | 98 | 1.0 |
| 1991 | | -2.0 |
| 1992 | 89 | 1.1 |

**Employment**

Numbers of entomologists employed by Agriculture Canada were used as an index of the numbers of entomologists employed in the country. These figures were taken from the annual Agriculture Canada Research Branch Research Reports (1967–; information was provided only in separate documents for each experiment station before 1967). The numbers of professional entomologists were tabulated for alternate years for each Agriculture Canada centre, institute and research station, and totalled (Appendix Table B; compare Figs. 2, 6). In some of these places, sections were retitled or reorganized frequently, making it more difficult to identify the entomologists on staff (fortunately, I have personal knowledge of many of the employees). Chemists, for example those studying pesticide residues, were not included in the totals even if placed in an "entomology" section.

**Economic indexes**

Statistics Canada compiles a wide range of national economic indicators, such as personal income, spending in various categories, annual percent changes, and unemployment (Canadian Economic Observer, Historical Statistical Supplement 1992, Statistics Canada Ottawa, 1993. Cat. 11-210), as well as analysis of income after taxes (Income after tax, distributions by size in Canada 1992. Statistics Canada, Ottawa, 1994. Cat. 13-210). Most of the indexes are difficult to use for comparison, because – like incomes, for example – they normally increase anyway with time, even when adjusted for inflation, and especially because the statistics and the influences on them are complex. Annual percent change in personal expenditure per capita on goods and services (listed in Appendix Table B; compare Fig. 2), from the Canadian Economic Observer, was chosen as an adequate indicator of the willingness or ability of individuals to pay for such things as Society memberships.

**Authors in *The Canadian Entomologist***

Annual indexes for *The Canadian Entomologist* list all authors, including subsidiary authors. The number of authors publishing in each year was counted from these indexes, ignoring duplicate names (cf. Table 1).

## Call for Nominations
## Achievement Awards Committee

## Gold Medal for Outstanding Achievement in Canadian Entomology
## and
## The C. Gordon Hewitt Award

Members of the Society are invited to nominate individuals whom they regard as eligible for these awards (for the year **1995**). Nominations should be sent in an envelope marked "Confidential" to the following address:

Achievement Awards Committee
Entomological Society of Canada
393 Winston Avenue
Ottawa, Ontario
K2A 1Y8

and should comprise: (1) the name and address of the nominee(s); (2) a statement of relevant achievements; and (3) the name of the nominator and at least one seconder. To be considered by the Achievement Awards Committee, nominations must bear a postmark no later than **November 30 1994.**

The following conditions govern these awards:

1. Outstanding contributions should be judged on the basis of

(a) superior research accomplishment either as a single contribution or as a series of associated endeavours and which may be either in entomology or a related field where the results obtained are of great consequence;

or

(b) dedicated and fruitful service in the fields of Society affairs, research administration or education.

2. No more than one of each award shall be granted per year but, where circumstances warrant, more than one individual may be mentioned in a single award.

3. Recipients need not be members of the Society providing their contribution is judged to have a major impact on entomology in Canada.

4. The award may be granted on different occasions to the same recipient but for different contributions to entomology in Canada.

5. Nominees for the C. Gordon Hewitt Award must be less than 40 years of age throughout the calendar year in which the award is both announced and awarded.

## Comité des décorations

## Médaille d'Or pour Contributions Exceptionnelle à l'Entomologie Canadienne
## et
## Prix C. Gordon Hewitt

La Société invite les membres à lui faire parvenir les noms des personnes qu'ils considèrent éligibles à ces deux prix. Veuillez envoyer vos nominations (pour l'année **1995**) au:

Comité des décorations
La Société d'entomologie du Canada
393 Winston Avenue
Ottawa, Ontario
K2A 1Y8

dans une enveloppe portant la mention "Confidentiel". La nomination doit contenir: (1) le nom ainsi que l'adresse du (ou des) candidat(s) désigné(s); (2) un compte rendu des réalisations pertinentes; et (3) le nom du parrain et celui d'au moins une deuxième personne appuyant la mise en nomination. Pour être acceptées par le Comité les nominations devront porter un sceau postal d'au plus tard le **30 novembre 1994**.

Les conditions suivantes régissent le choix des récipiendaires de ces prix:

1. Les contributions exceptionelles devraient être jugées dans le contexte

(a) d'un accomplissement hors par en recherche, soit comme résultat d'une seule contribution ou d'une série d'efforts reliés, réalisés dans le secteur entomologique ou tout autre domaine connexe et ayant abouti à des résultats de grande valeur

ou

(b) de service dévoué et fructueux au profit de la Société, de l'administration de recherche, ou de l'éducation.

2. Chaque prix ne sera décerné qu'une seule fois annuellement, quoique, les circonstances le justifiant, plus d'une personne pourront collectivement devenir récipiendaires d'un prix.

3. Les récipiendaires ne doivent pas nécessairement être membres de la Société en autant que l'on juge que leur contribution a excercé un impact majeur sur l'entomologie au Canada.

4. Chaque prix peut être décerné à différentes occasions au même récipiendaire mais pour différentes contributions à l'entomologie au Canada.

5. Le candidat désigné pour le prix C. Gordon Hewitt doit être âge de moin de 40 ans pour toute la durée de l'année au cours de laquelle le prix est annoncé et décerné.

## Joint Meeting of the Entomological Society of British Columbia and the Entomological Society of Canada

15-18 October 1995 in Victoria, British Columbia
at the Victoria Conference Centre

For more information please contact:

Dr. Terry Shore (General Chair)
Canadian Forest Service, Pacific Forestry Centre, 506 West Burnside Rd., Victoria, B.C. V8Z 1M5. Tel. (604) 363-0600; Fax. (604) 363-0775; Email tshore@a1.pfc.forestry.ca

Dr. Bernard Roitberg (Chair, Program Committee)
Department of Biological Sciences, Simon Fraser University, Burnaby, B.C. V5A 1S6. Tel. (604) 291-3585; Fax. (604) 291-3496; email roitberg@sfu.ca

Dr. Lee Humble (Chair, Local Arrangements Committee)
Canadian Forest Service, Pacific Forestry Centre, 506 West Burnside Rd., Victoria, B.C. V8Z 1M5. Tel. (604) 363-0600; Fax. (604) 363-0775; email lhumble@a1.pfc.forestry.ca

# IN MEMORY

### Dr. Karun K. Nair
### 1920-1994

Karun was born on 22 December 1920 in Aleppey, India. He obtained his B.Sc. from the University of Madras, and his M.Sc. and Ph.D. from the University of Bombay. Before coming to Canada in 1965, he had a distinguished academic career in India, including the position of Professor and Head of the Department of Zoology, Wilson College, University of Bombay (1956-59) and as Head of Insect Sterilisation and Pest Control, Atomic Energy Establishment, Trombay (1959-65).

Karun joined the Canada Agriculture Research Institute, in Belleville, Ontario, in 1965 and moved to Simon Fraser University in 1967 where, with seven of his Belleville colleagues, he became one of the founder members of the centre for pest Management. Appointed as a Professor in the department of Biological Sciences, he served as Chairman from 1981 to 1985. During his tenure in that office the Department benefited from his impartial and far-sighted policies. Soon after this his health deteriorated and he had heart surgery. He retired in 1990, but continued teaching and remained active in research until his death on 1 May 1994.

Karun's research in insect physiology and biochemistry was internationally highly regarded. His particular expertise was the control and function of insect hormones and their influence on growth and development. He developed one of the first computerised microspectrophotometers in Canada and pioneered the connection of minicomputers to SFU's mainframe system. During his long and productive career, he published some 80 research articles and wrote several reviews on the cytochemistry of the corpora allata and age-related changes in cell nuclei.

Karun was a warm and dedicated person, with a strong sense of loyalty to Simon Fraser University and his department. He cared deeply for his students and took an active interest in their academic development and future careers. To his many colleagues at the University, Karun was a genuine friend. He valued their companionship, at both formal and informal occasions.

Karun Nair is survived by a son, Krish, and granddaughter in Toronto, and by his daughter, Meera, and their mother, Leila, in Burnaby.

Manfred Mackauer
Department of Biological Sciences
Simon Fraser University
Burnaby, B.C.

# NEWS OF ORGANIZATIONS

## International Commission on Zoological Nomenclature

Applications published in the *Bulletin of Zoological Nomenclature*

The following applications were published on 30 June 1994 in Vol. 51, Part 2 of the *Bulletin of Zoological Nomenclature*. Comment or advice on these applications is invited for publication in the *Bulletin of Zoological Nomenclature* and should be sent to the Executive Secretary, I.C.Z.N., c/o The Natural History Museum, Cromwell Road, London SW7 5BD.

**Case 2862 A.A.H. Lichtenstein's (1796,1797) *Catalogus musei zoologici ... Sectio tertia. Continens Insecta* and D.H. Schneider's (1800) *Verzeichniss einer Parthei Insekten ... :* proposed suppression, with conservation of some Lichtenstein (1796) names (Insecta and Arachnida)**

I.M. Kerzhner
Zoological Institute, Academy of Sciences, St. Petersburg 199034, Russia

**Abstract**. It is proposed that the very rare and usually neglected publications by Lichtenstein (1796,1797) entitled *Catalogus musei zoologici ... Sectio tertia. Continens Insecta* and by Schneider (1800) entitled *Verzeichniss einer Parthei Insekten* be suppressed for nomenclatural purposes. Despite this, the conservation as from Lichtenstein (1796) is recommended of one generaic name (*Solpuga*) and 20 specific names being in general current usage (Insecta and Arachnida).

**Case 2890 *Rhopalosiphum monardae* Davis, 1911 (currently *Hyalomyzus monardae*; Insecta, Homoptera): proposed conservation of the specific name**

David J. Voegtlin
Centre for Biodiversity, Illinois Natural History Survey, 607 E. Peabody, Champaign, Illinois 61820-6970, U.S.A.

**Abstract.** The purpose of this application is to conserve the specific name of the North American aphid *Rhopalosiphum monardae* Davis, 1911. This is threatened by the senior subjective synonym *Phorodon scrophulariae* Thomas, 1879, which has not been used in primary literature since 1903.

**Case 2929 *Bhatia* Distant, 1908 (Insecta, Homoptera): proposed confirmation of *Eutettix? olivaceus* Melichar, 1903 as the type species.**

M.D. Webb
The Natural History Museum, Cromwell Road, London SW7 5BD, U.K.

**Abstract.** The purpose of this application is to confirm *Eutettix? olivaceus* Melichar, 1903 as the type species of the leafhopper genus *Bhatia* Distant, 1908. Distant (1908) was in fact dealing not with *E. olivaceus* but with a still unnamed closely related species when describing *Bhatia*, but no instability will result from the confirmation of *E. olivaceus* as the type species.

**Case 2878 *Scarabaeus rufus* Moll, 1782 (currently *Aphodius rufus*), *Scarabaeus rufus* Fabricius, 1792 (currently *Aegialia rufa*) and *Scarabaeus foetidus* Herbst, 1783 (currently *Aphodius foetidus*) (Insecta, Coleoptera): proposed conservation of usage of the specific names**

Frank-Thorsten Krell
Eberhard-Karls-Universitaet, Zoologisches Institut, Lehrstuhl fuer Spezielle Zoologie, Auf der Morgenstelle 28, D-72076 Tuebingen, Germany

Zdzislawa Stebnicka
Polish Academy of Sciences, Institute of Systematics and Evolution of Animals, ul. Slawkowska 17, PL-31-016 Krakow, Poland

Erik Holm
University of Pretoria, Faculty of Science, Department of Entomology, 0002 Pretoria, South Africa

**Abstract.** The purpose of this application is to conserve the specific names of the scarab beetles *Scarabaeus rufus* Moll, 1782 and *S. rufus* Fabricius, 1792, which are junior primary homonyms of *S. rufus* De Geer, 1778. Despite their homonymy all three specific names have been used since publication and are currently in use; they have not been considered congeneric for 150 years. It is proposed that the name *S. scybalarius* Fabricius, 1781, a senior subjective synonym of *S. rufus* Moll which, through misidentification, has been used for the taxon correctly called *S. foetidus* Herbst, 1783, should be suppressed. *Dischista rufa* (De Geer) is a well known and widely distributed African species of the

subfamily CETONIINAE. The larvae have been found in rhinoceros dung; the adults never feed on dung but on fruit and flowers and are a common pest in beehives. A lectotype is designated. *Aphodius (Agrilinus) rufus* (Moll) and *Aphodius (Aphodius) foetidus* Herbst (subfamily APHODIINAE) are European species, frequently found in mammal dung. *Aegialia rufa* (Fabricius, 1792) (subfamily AEGIALIINAE or APHODIINAE, tribe AEGIALIINI) is also European and has been introduced into the U.S.A. and Canada; it is psammobiontic and littoral, mostly found in plant debris.

## Case 2885 *Ischyrus* Lacordaire, 1842, *Lybas* Lacordaire, 1842, *Mycotretus* Lacordaire, 1842 and *Megischyrus* Crotch, 1873 (Insecta, Coleoptera): proposed conservation

Paul E. Skelley
Department of Entomology & Nematology, Building 970, Hull Road, University of Florida, Gainesville, Florida 32611-0620, U.S.A.

Michael A. Goodrich
Department of Zoology, Eastern Illinois University, Charleston, Illinois 61920, U.S.A.

**Abstract.** The purpose of this application is to conserve the names of the American beetle genera *Ischyrus* Lacordaire, 1842, *Lybas* Lacordaire, 1842, *Mycotretus* Lacordaire, 1842 and *Megischyrus* Crotch, 1873 in their current usage. *Ischyrus*, *Lybas* and *Mycotretus* were first used as available names by Dejean (1836), but they have long been used in the sense of Lacordaire (1842) and attributed to that authorship. Crotch (1873, 1876) designated *Erotylus undatus* Olivier, 1792 as type species of his new nominal genus *Megischyrus*; *Erotylus quadripunctatus* Olivier, 1792 as type species of *Ischyrus* (sensu Lacordaire); and *Lybas normalis* Lacordaire, 1842 as type species of *Lybas* (sensu Lacordaire). Boyle (1956) designated *Erotylus lesueuri* Chevrolat, 1835 as type species of *Mycotretus* (sensu Lacordaire). Crotch's (1873) nomenclature for *Ischyrus* and *Megischyrus*, and Lacordaire's (1842) nomenclature for *Mycotretus* and *Lybas*, are those currently used and it is proposed that they be adopted.

The following **Opinions** were published on 30 June 1994 in Vol. 51, Part 2, of the *Bulletin of Zoological Nomenclature*:

Opinion 1770. *Pachyrhynchus* Germar, 1824, *Somatodes* Schoenherr, 1840 and the specific name of *Pachyrhynchus moniliferus* Germar, 1824 (Insecta, Coleoptera): conserved.

Opinion 1771. *Cryptophagus advena* Waltl, 1834 (currently *Ahasverus advena*; Insecta, Coleoptera): specific name conserved.

Opinion 1772. METOPIINI Raffray, 1904 (Insecta, Coleoptera): spelling emended to METOPIASINI, and METOPIINI Townsend, 1908 (Insecta, Diptera): spelling emended to METOPIAINI, so removing the homonymy with METOPIINAE Foerster, [1869] (Insecta, Hymenoptera).

Opinion 1773. *Nacaduba* Moore, [1881] (Insecta, Lepidoptera): given precedence over *Pepliphorus* Huebner, [1819].

Opinion 1774. *Catocala connubialis* Guenée, 1852 (Insecta, Lepidoptera): specific name conserved.

Opinion 1775. *Banksinella luteolateralis* var. *albothorax* Theobald, 1907 (currently *Aedes (Neomelaniconion) albothorax*), *B. luteolateralis* var. *circumluteola* Theobald, 1908 (currently *A. (N.) circumluteolus*) and *A. (N.) mcintoshi* Huang, 1985 (Insecta, Diptera): specific names conserved, and *A. (N.) albothorax*: neotype designated.

## Biological Survey of Canada (Terrestrial Arthropods) - Survey Report

The Scientific Committee met in Ottawa on April 21 and 22 1994.

–Scientific projects–

*1. Arthropods of peatlands*

The proceedings of the 1991 Symposium on Arthropods of Peatlands will be published during 1994 (*Mem. ent. Soc. Can.* 169).

*2. Arthropod fauna of the Yukon*

Many of the more than 20 chapters comprising the taxonomic section of the Yukon book are essentially complete. Progress has been made with the introductory chapters, and the synthesis for the final section of the book has begun.

*3. Arctic invertebrate biology*

International liaisons and contributions to the newsletter *Arctic Insect News,* and some Canadian projects, continue. Many applications for graduate studies in the arctic have been received at the University of Victoria. Other arctic work continues from Acadia University.

*4. Arthropods of Canadian grasslands*

Several studies on grasslands are developing and have been funded. Details will appear in an issue of the Grasslands Newsletter when plans are finalized.

*5. Old-growth forests*

Consideration is being given to establishing a newsletter to encourage liaison, ways to capitalize on sample residues from existing projects, and related matters that might support work in old-growth forests.

*6. Invasions and reductions*

Several individual projects resulted from interest at the workshop on invasions and reductions in the Canadian insect fauna held at the 1993 ESC meeting.

–Other scientific priorities–

*1. Arthropod fauna of soils*

A revised version of the Survey's 1982 brief on soil arthropods will be prepared. Several graduate students are working on soil arthropods in Canada. A suite of indicators for agroecosystems, being developed by Agriculture Canada, will likely include invertebrate biodiversity indicators including soil arthropods.

*2. Workshop on Coleoptera*

An expert workshop on identification of adult Coleoptera, with Dr. J. Lawrence (Australia) and Dr. A. Slipinski (Poland) as well as Canadian coleopterists, will be held in Ottawa May 15–21, 1995.

*3. Support for collections and systematics*

Information emphasizing the need to care for collections (including those generated by studies of biodiversity) had been sent to a variety of recipients and several replies were received.

*4. Analysis of gaps in taxonomic knowledge*

Draft tabulations to document gaps in knowledge and expertise for terrestrial arthropods were discussed, and major categories for data established. Subcategories will be developed further by a subcommittee.

*5. Endangered collections*

Guidelines and recommendations about the support of collections and collection infrastructure are being developed, to be addressed to the Natural Sciences and Engineering Research Council. Entomologists and institutions will also be canvassed to provide information and assistance for placing endangered collections.

*6. Response to development of Canada's Biodiversity Strategy*

A subcommittee was established to provide commentary on Canada's Biodiversity Strategy especially as related to the need for collections infrastructure.

*7. Endangered species*

A listing of endangered species was discussed that could pinpoint the importance of certain habitats, show the need for additional Survey work, foster research on insects and habitats of concern, and so on. However, such a listing might be used with protectionist legislation to hinder research on the species. A subcommittee continues to develop ideas for a database of "endangered species".

*8. Recovery of damaged ecosystems*

The likely support and interest from policy makers and industry representatives in studies of damaged ecosystems and their recovery will be investigated.

–Secretariat activities–

The 1993 round of visits by Dr. H.V. Danks to entomological centres in Canada allowed for informal discussion about the Survey and its projects with entomologists, other biologists, and policy makers. Several formal seminars were also presented, on the Survey and on subjects related to its scientific interests.

–Liaison and exchange of information with other organizations–

*1. Canadian Museum of Nature*

Mr. G. Fitzgerald, Programme Director, National Heritage, reported that the Museum continues to develop its Centres of Knowledge. The Biosystematics Task Force report is contributing to the National Biodiversity Strategy. The Federal Biosystematics Group (CMN, Agriculture Canada, Canadian Forest Service) will potentially be supporting a studentship at Macdonald College for work at the Lyman Museum. The CMN continues liaison with the U.S. Biological Inventory. The CMN might implement a Canadian umbrella Conservation Data Centre in the Museum, if partners can be found in the Federal Government.

*2. Biological Resources Division, CLBRR*

Dr. Behan-Pelletier, on behalf of the acting Programme Chair for BRD, reported that field work and attendance at international meetings by BRD scientists are proceeding despite budget cuts. A molecular systematics laboratory has now been staffed with a technician.

*3. Entomological Society of Canada*

Dr. G.H. Gerber, President, ESC, reported on a variety of Society news including the change of editorship of *The Canadian Entomologist*, the move to require submission of reviewed manuscripts on diskette, the book on Diseases and Pests of Vegetable Crops in Canada, and the 1994 annual meeting.

*4. Canadian Forest Service*

Dr. J. Huber reported that the entomologist Dr. G. Miller has been appointed as CFS Director of Health and Sustainable Development. Dr. P. Hall, National Coordinator, FIDS and Forest Health, noted the work of FIDS, and also noted that an inventory of the biota of plots in a National Forest Health Inventory Network is being developed. These activities provide resources for addressing biodiversity issues.

Several Committee members pointed out difficulties with a contract of dubious value led by the Forest Centre at Victoria. The Committee also emphasized the need for a standardized system to ensure appropriate updates of the FIDS database when identifications are revised.

*5. Canadian Wildlife Service / Committee on the Status of Endangered Wildlife in Canada*

Mr. S. Nadeau and Ms. L. Maltby, Endangered Species and Wildlife Conservation Division, CWS, summarized the roles of COSEWIC and associated organizations, and reported that at a recent meeting COSEWIC had decided to attribute status to Lepidoptera and molluscs, as the first invertebrates to be considered by the committee.

*6. Canadian Society of Zoologists*

Dr. D. Marcogliese, Parasitology section, Canadian Society of Zoologists, reported on the activities of the developing parasitology module, including proposals for an established module made to the CMN, plans for a directory of taxonomic expertise in Canada, and ongoing studies of the parasites of yellow perch. Information and documents of interest to the Committee were also made available.

*7. Natural Sciences and Engineering Research Council*

Although no NSERC representative was present at the meeting, a number of members expressed concern about the directions being taken by NSERC: the system of peer-reviewed individual operating grants, the great strength of NSERC, might even be dismantled. The Chair will write to relevant authorities about this matter.

–Other items–

*1. Regional developments*

Members of the Committee summarized information of potential interest from various regions of the country, for example: a report on potentially rare and endangered species in British Columbia has been published, and further studies of the South Okanagan Valley are underway; the University of British Columbia's Centre for Biodiversity Research has been approved by the University Senate; a book on the butterflies of Alberta should appear during 1994; the Entomology Department of the University of Alberta becomes part of the Department of Biological Sciences on July 1, 1994; staff layoffs were avoided at the Freshwater Institute in Winnipeg by the transfer of volunteers to a group that will perform most of the work currently being done by outside contractors; plans for the IIIrd International Congress of Dipterology at Guelph (15–19 August 1994) are in place; another Hymenoptera Workshop will take place at BRD, 22–30 June 1994; a second "entomology weekend" is being organized in Newfoundland; a 1993 project in Prince Edward Island included considerable cooperation from staff of the P.E.I.

National Park; many arctic conferences and workshops continue to be held; the Science Institute of the Northwest Territories may experience some difficulties because resources are becoming more limited, and support costs may now be charged back to researchers.

*2. Other matters*

The Committee discussed the 1994 Annual Report of the Survey to the Museum, general operations of the Survey Secretariat, the need to support further studies of ectoparasites of vertebrates, and other topics.

H.V. Danks
Ottawa, Ontario

# PUBLICATIONS
# BOOK REVIEWS

**Gagné, R.J. 1994. *The Gall Midges of the Neotropical Region*. Cornell University Press, Ithaca and London. xiv + 352 pp. Hardcover $(U.S.) 54.50.**

The Cecidomyiidae are one of the most poorly understood families of flies. The group is very speciose, diverse in habit (including fungivores, predators and gall makers) and most species are undescribed. For example, in Canada I would estimate that at least 1200 species are present but only about 110 of these are named! Yet they undoubtedly play a major role in most terrestrial ecosystems; Mamaev and Krivosheina (1965) reported that larval Cecidomyiidae were the third most common group of arthropods in soils in Russia and many of the plant-feeding species within the family are important pests on a wide array of plants. As such, any work compiling previous research and pointing the way for further studies on the group should be a welcome event.

This is Gagné's second text dealing with the taxonomy and host records of New World Cecidomyiidae, following his 1989 book 'The Plant-feeding Gall Midges of North America'. The book claims to be a practical identification guide to the entire family and to the plant damage some species produce. There are six chapters; the last two form the bulk of the text (pp. 38-306).

Chapter 1 chronicles the lives of the 11 scientists who have described nine or more species from the Neotropics. These narratives provide important information on the professional connections between some of these workers and describe where some of their material is, or may be, located.

Chapter 2 gives a brief description of the external anatomy of the egg, larva, pupa and adult, providing descriptions and figures of those characters which are of taxonomic use. There is not much here that cannot be found in Gagné's earlier book or in Gagné (1981).

A few comments are warranted here. The use of Mycetophiloidea has been replaced by Sciaroidea (Wood and Borkent, 1989). Considering the presence of distinct M1 and M2 in Mycetophilidae, Sciaridae, and some Lestremiinae, it seems likely that this condition is also plesiomorphic within the Cecidomyiidae as well; Gagné's claim that his Fig. 11 represents 'the most primitive cecidomyiid wing' is probably incorrect. Under additional references on pg. 17, readers should be aware of the important

larval keys of Mamaev and Krivosheina (1965) (especially those to the Lestremiinae and Porricondylinae).

Chapter 3, designated as 'Biology', includes synopses under each of the following headings: larval feeding habits, pedogenesis, initiation of larval feeding, postfeeding larval behaviour, dormancy, emergence of adults, flight, mating, adult feeding, roosting, host seeking, oviposition, duration of the life cycle, and mortality. Each section is short and is a combination of the very limited information from studies undertaken in the Neotropical Region, and a few papers selected from elsewhere.

Gagné notes that some cecidomyiids are found on flowers but has missed some important information provided by Young (1985, 1986) and Young et al. (1989) regarding the role of a number of genera as pollinators. Similarly, some important literature which discusses larval feeding modes has also been missed or overlooked. Borkent and Bissett (1985) and Bissett and Borkent (1988) described in some detail how the modifications of some cecidomyiid ovipositors are used to carry spores. The spores are introduced upon oviposition and grow to form the symbiotic fungi which feed the larvae in some galls. Bissett and Borkent (1988) interpreted this information in the light of cladistic relationships which are similarly not discussed. Roskam (1992) also provided important perspectives on the relationship between feeding modes and evolutionary relationships.

Chapter 4 provides a useful description of how Gagné collects, rears and prepares specimens for study. Unfortunately, because of the author's perspective (more on this below) the reader will learn only how to sample and rear those taxa which form visible galls. For those interested in understanding the family in its entirety, it will be vital to consult other texts describing more inclusive sampling and rearing methods. However, like many groups, cecidomyiids have characteristics that require special attention. For example, as a group, adult cecidomyiids are surprisingly fragile, with long legs and antennae which break off easily. Even collecting with Malaise traps demands that the collector bottles be completely topped off with alcohol to prevent sloshing and subsequent breakage during transport. Mamaev and Krivosheina (1965) provide a more comprehensive account of collecting and rearing techniques and their book is an important source of information for any serious student of the group.

The section on preparation of material is similarly limited. Critical point drying of specimens (especially adults with stouter bodies and immatures) is not mentioned. Neither is the value of pinning fresh material and placing the specimens in a freezer to dry (generally 2-3 months). This method results in excellent material of even the most fragile of adults, retaining structure, color and, depending on the species, scales. The slide-mounting technique described is reasonable but often results in somewhat crushed adult heads and thoraces. To avoid this problem, these parts can be placed in a separate drop of Canada Balsam which is left to dry overnight before a coverslip is added the next day.

Chapter 5 provides a taxonomic report on the Cecidomyiidae that have been previously described from the Neotropics. The chapter starts with a brief discussion of character states in support of a cladogram, showing relationships between the three subfamilies and the supertribes of the Cecidomyiinae. Unfortunately the author, as an expert in this family, has not discussed more explicitly the character state distributions within the family. There are a number of exceptions to the character states that he cites as evidence for monophyly and these could have been analyzed more carefully.

In the remainder of Chapter 5, keys are provided to the subfamilies, tribes and genera. These keys will be of limited use to new (or even old) students of the group because they incorporate different life stages within the key. Without reared, associated material it is impossible to key many taxa. For example,

in the key to the Lasiopteridi, couplets 1-3 will key both males and females, couplet 4 only females, couplet 5 only larvae, couplet 6 only females and larvae and couplet 7 only pupae. Nevertheless, in spite of these severe limitations, the keys provide a basis for further work in the Neotropics, where only a few keys to restricted groups or areas previously existed.

Genera are arranged alphabetically within each tribe and the following information is given for each: original citation and synonyms; a discussion of interesting features (varying between the genera); for some, an appraisal of diversity; sometimes the citation of a further useful reference(s); a list of included species with full citation, stages described, distribution and known hosts. There are a number of new taxa and nomenclatorial changes and these are conveniently listed at the end of the chapter.

There are two new tribes proposed in Chapter 5 but the justification for doing so is unclear. Gagné provides a few, apparently distinguishing, features (at least some are not unique) and fails to discuss these from a phylogenetic perspective. As is true for the new genera proposed, it appears that the presence of any distinctive character state justifies the recognition of new taxa. It seems likely that many of these will be shown later to be merely autapomorphic lineages arising from within broader groups. Gagné's use of some phylogenetic terms is strikingly lax. For example, on pg. 99 he suggests that each of the nine recognized tribes of the Cecidomyiidi "is presumably monophyletic" without providing any evidence that this is so.

There is a confusing discussion of character states found in the Asphondyliini on pp. 117-120. After a discussion of a few characters of the tribe, Gagné provides a list of 15 additional characters, most of which were polarized by Möhn (1961), and briefly discusses their structural details and/or functional significance. Following this is a second list of 14 characters, 10 of which are the same as in the previous list. Of these 14 characters, 12 are polarized (after Möhn, 1961) and two, newly presented, are not; all are presented in a matrix (confusingly presented in the midst of the first list). The information is not further used to clarify relationships. This is unfortunate, considering the detailed cladistic presentation provided by Möhn (1961) and Wünsch (1979). Particularly lamentable is that Gagné proposes changes to the classification of this tribe without building on the fine analyses of these earlier workers. Although he indicates that 'the reevaluation of other characters call for some changes in that scheme' it is entirely unclear why such changes are required, especially since Gagné does not polarize his two newly introduced characters.

Chapter 6 provides keys to the gall-making cecidomyiids through identification of their host and their galls. Plant families are arranged alphabetically and within each family, included genera are similarly arranged. To use these keys, the host genus needs to be previously identified. Recorded inquilines (species living with the gall-producing species) are also noted.

The book finishes with a short 36-word glossary that includes a puzzling selection of words. Although it would clearly be useful for those new to the group to have certain specialized terms defined (especially those dealing with structure of the midges and their galls), this glossary includes such words as apomorphy, diapause, empodium, flagellum, instar, monophagous, monophyletic and symbiont while ignoring, for example, some specialized names for types of gall (otherwise partially described earlier on pg. 205).

The figures in the text vary in quality. The illustrations of galls by E.P. Roberts are a pleasing and important addition to this book, as are those executed by D.L. Roney of adult and immature habitus.

However, many of the drawings of specific midge structures by S. Grupp are of poor quality and/or reproduction. The details in numerous figures are so coarsely reproduced that they form blackened areas. Furthermore, some structures are drawn from different angles (especially female genitalia), making it difficult for the uninitiated to grasp the significance of reported differences.

This book will be of use to a limited readership because of two further and major limitations. The first is in the nature of our present knowledge. The taxonomy of Cecidomyiidae is in such an embryonic state that a description of the fauna of the Neotropics is rife with holes and gaps. This book is of necessity a compilation of a very limited set of investigations and this ensures that there can be virtually no synthesis arising from its pages (such as zoogeographic patterns, phylogenetic diversification, patterns of host type, etc.). Even as an identification guide the book is severely handicapped. As indicated above, the keys to the cecidomyiids can often be used only when associated, reared material is available and the keys based on plant galls clearly represent only a very small percentage of what is actually present in the Neotropics.

The second difficulty lies in the taxonomic approach taken by the author himself. The book proclaims broad coverage of the Neotropical Cecidomyiidae, yet is strongly biased in favour of those species reared from galls. The vast number of Neotropical cecidomyiids known only as adults "caught in flight" are largely ignored because "the flies lack much meaning outside the context of their hosts, biology, and immature stages" (pg. 33). Although it goes without saying that associated material is of tremendous benefit for making decisions about species identity and interpreting phylogenetic relationships, it is rather a restricted perspective to suggest that unassociated material is of no or little value. Considering that only about 7% of Canadian Diptera are known as immatures (McAlpine, 1979), one wonders about where our understanding would be of the systematics, biology, zoogeography and phylogeny of this important group had it been restricted solely to reared material! Unfortunately, by largely ignoring free-living Cecidomyiidae, Gagné fails to adequately review the diversity of the Lestremiinae, Porricondylinae and many taxa within the Cecidomyiinae. Adults of these groups are very common in Malaise trap samples from the Neotropics (and readily available through colleagues) and even a cursory look would have markedly expanded the diversity reported in this book. As it stands, this book deals with the Lestremiinae and Porricondylinae in 10 pages, while the Cecidomyiinae are treated in 152 (most of these being associated with galls).

In general, books such as this should not only report what has been done in the past and reinterpret these data but also point out the holes and gaps in our knowledge that will make it easier for the next student of the group to carry the torch forward. This book fails to adequately describe how poorly we know the Cecidomyiidae and what could be done about it. For example, any student of the Cecidomyiidae who would be willing to activate an intense collecting program using Berlese funnels, Malaise traps, light traps, sweeping (very gently) and rearing would soon discover an essentially uninterpreted block of striking diversity (even in the average backyard in North America!). What an opportunity!

Bissett, J. and A. Borkent. 1988. Chapter 9. Ambrosia Galls: the significance of fungal nutrition in the evolution of the Cecidomyiidae (Diptera). pp. 203-225 In "Coevolution of fungi with plants and animals" ed. K.A. Pirozynski and D.L. Hawksworth. Academic Press, Toronto, xii + 285 pp.

Borkent, A. and J. Bissett. 1985. Gall midges (Diptera: Cecidomyiidae) are vectors for their fungal symbionts. *Symbiosis* **1**:185-194.

Gagné, R.J. 1981. 16. Cecidomyiidae. pp. 257-292 in Manual of Nearctic Diptera. Vol. 1. Agric. Can. Monogr. 27. 674 pp.

Gagné, R.J. 1989. The plant-feeding gall midges of North America. Cornell University Press, Ithaca and London, xi +356 pp.

Mamaev, B.M. and E.P. Krivosheina. 1965. Larvae of Gall Midges. Diptera, Cecidomyiidae (in Russian). Akademia Nauk USSR, Moscow. 278 pp. English translation: Roskam, J.C. 1992. A.A. Balkema Publishers, Rotterdam, The Netherlands, 304 pp.

McAlpine, J.F. 1979. 42. Diptera. pp. 389-424 In Canada and its insect fauna. *Mem. Ent. Soc. Can.* **108**, 573 pp.

Möhn, E. 1961. Gallmücken (Diptera, Itonididae) aus El Salvador.4. Zur Phylogenie der Asphondyliidi der neotropischen und holarktischen Regionen. *Senckenbergiana Biologica* **42**:131-330.

Roskam, J.C. 1992. Evolution of the gall-inducing guild. pp. 34-49 In Biology of insect-induced galls, eds. J.D. Shorthouse and O. Rohfritsch, Oxford University Press, New York, Oxford.

Wood, D.M. and A. Borkent. 1989. Phylogeny and classification of the Nematocera. Ch. 114, pp. 1333-1370, In Manual of Nearctic Diptera. Vol. 3. Agriculture Canada Monograph 32. vi + pp. 1333-1581.

Woodley, N.E. 1989. Phylogeny and classification of the "Orthorrhaphous" Brachycera. Ch. 115, pp. 1371-1395, In Manual of Nearctic Diptera. Vol. 3. Agriculture Canada Monograph 32. vi + pp. 1333-1581.

Wünsch, A. 1979. Gallenerzeugende Insekten Nordkolumbiens, speziell Asphondyliidi und Lasiopteridi (Diptera, Cecidomyiidae) aus dem Küstenbereich um Santa Marta. A. Wünsch, Waiblingen, Germany, 238 pp.

Young, A.M. 1985. Studies of cecidomyiid midges (Diptera: Cecidomyiidae) as cacao pollinators (Theobroma cacao L.) in Central America. *Proc. Ent. Soc. Wash.* **87**:49-79.

Young, A.M. 1986. Notes on the distribution and abundance of midges (Diptera: Ceratopogonidae and Cecidomyiidae) in some Central American cacao plantations. *Brenesia* **24**: 273-286.

Young, A.M., B.J. Erickson and E.H. Erickson. 1989. Pollination biology of Theobroma and Herrania (Sterculiaceae) - III.

**Michener, C.D., McGinley, R.J. and Danforth, B.N. 1994. *The Bee genera of North and Central America (Hymenoptera: Apoidea).* Smithsonian Institution Press, Washington. 209pp. Hard cover, $(U.S.) 45.00. ISBN 1-56098-256-X.**

Bees are notoriously difficult for beginners to get acquainted with for two main reasons. First, to key a bee to family usually requires that its tongue be extruded so that the various parts can be seen easily. For a pinned specimen with the tongue retracted this usually involves relaxing the specimen, opening up the mandibles and gently teasing out the tongue. This invariably results in the head of the insect being pulled off and the tongue being torn to shreds. The second problem is that most bees are, by nature, rather hairy insects. Consequently, in order to identify many of them one has to shave at least part of the specimen. Another problem, common to most taxonomic treatises and exacerbated in a long key, is that the commonest species or the most speciose genera frequently are keyed out towards the end, often in the last couplet. This makes for inefficient use of the budding taxonomists' time.

*The Bee Genera of North and Central America* follows a format that gives multiple entry points to the key to genera and thus avoids the last of these problems. It is written so clearly and is so well illustrated that the other two problems are also overcome (although one still has to shave a small portion of some bees to be able to use a few of the couplets). It is so easy to use that all hymenopterists, botanists

interested in identifying visitors to their study flowers and even the more enthusiastic of the general public will now find bee identification at the generic level an almost instantaneously gratifying experience.

This book is divided into 7 sections and 4 appendices. The first section explains how to recognize a bee, how to collect and preserve them, some cautionary notes on interpreting floral visitation data, a guide on how to use the book, comments on how to identify bees to the species level and a section on terminology for structures.

The second through fifth sections are aids to identification. This third section is the heart of the book as it is a key to the 169 genera that the authors recognise as occurring in North and Central America. Use of this 233-couplet-long key is made immeasurably easier by the other three identificatory sections. The second section is a series of seven locators. One chooses which locator to use from a list of statements most of which concern the nature of the pollen collecting apparatus; consequently they work mostly only for females. The locators then serve to take the user to an appropriate entry couplet in the main key. Twenty-seven genera (or portions thereof) can be keyed out straight from these locators without recourse to the main key.

For those capable of identifying bees of either sex to the family level, or if one is keying a specimen with the tongue extruded and thus capable of using the key to families in section four, section five serves as a locator once family level identification has been achieved. As with the locators in section two, one is taken well into the body of the key to genera after having used the family-specific locator of section five.

All four sections serving to identify taxa are provided in both English and Spanish.

The sixth section treats each genus with a brief description, biogeographical information, references to species level revisions (if any) and, where relevant or not too laborious an undertaking, keys to subgenera. This section also includes photographs of 57 genera (some represented by two species or by a male and female; all but two are lateral views) and two-tone drawings of 18 genera (mostly from the dorsal view).

The seventh section deals with comparatively recent classificatory and nomenclatural changes.

Appendix A provides a complete classification of North and Central American bees down to the subgeneric level; B lists the taxa used in the figures in the keys; C adds a genus (the Augochlorine *Megommation*) to the work and D suggests some anticipated classificatory changes (although, as noted in a footnote, by the time the book was in press the anticipated changes had been formally published). The reference list and index are extensive.

I tested this guide with bees from Arizona and New Mexico choosing genera that I had not seen previously. Using the locators or the keys based upon family level recognition, the book proved remarkably easy to use. For example, it took only a couple of minutes to key out *Pseudopanurgus* and *Heterosarus* - genera that appear in the last couplet of the key to genera. Almost every character is illustrated diagramatically and the illustrations are usually on the same page as the couplet that refers to them. The key statements are unusually ambiguity-free.

I tested the book on two undergraduate students (Hazel Symonds and Nuria Ribas), neither of

whom had taken an entomology course. With 13 bee species from southern Ontario in their sample they keyed to genus 12 species correctly with only a minimal introduction from me on how to use the book. Not only did they key their bees out quite quickly and with accuracy, they really enjoyed doing it! How many taxonomic treatises can claim to be so user friendly for the novice that their use is experienced as enjoyable?

I have two minor criticisms of this book. The lateral habitus photographs are often of bees with their legs retracted obscuring the view of legs and other features. A section on how to study bees in the field, or at least noting references thereto would have been beneficial. I detected one minor error: in couplet 72 where *Caenohalictus* comes out as having hind tarsomeres 1 and 2 articulated and free. Although these articles look as if they are free to articulate, in all of the 30 or so species I have looked at, this juncture is incapable of flexion.

In summary, this book sets a new standard for taxonomic works. With just about every key character illustrated, great clarity and multiple entry system for the main key to genera it makes keying bees a joyous experience even for the novice. I am confident that with more taxonomic guides like this one, more students will find themselves attracted to systematic and faunal survey work and the "biodiversity crisis" would be more adequately documented as a result. The authors are to be commended on producing such a fine work and one eagerly awaits (with tongue in cheek) a species level treatment or global level generic study of bees of this quality.

Laurence Packer
Department of Biology and Faculty of Environmental Studies
York University, 4700 Keele St., N. York, ONT., M3J 1P3
with help from Hazel Symonds and Nuria Ribas.

**Griffiths, G.C.D. 1991-93. *Flies of the Nearctic Region. Vol. VIII, Pt. 2, Nos. 7-10, Cyclorrhapha II (Schizophora: Calyptratae), Anthomyiidae*. E. Schweizerbart'sche Verlagsbuchandlung, Stuttgart (American agent: Lubrecht & Cramer, RD1, Box 244, Forestburgh, N.Y. 12777). No. 7, 1991, pp. 953-1048, figs. 1153-1233, US $83.00; No. 8, 1991, pp. 1049-1240, figs. 1234-1439, US $135.00; No. 9, 1992, pp. 1241-1416, figs. 1440-1599, US $112.50; No. 10, 1993, pp. 1417-1632, figs. 1600-1763, US $150.00. Softcover.**

This review could be very short - an excellent work, quite as good as the first six parts -would suffice. But as these parts are, for applied entomologists, the most important of the entire work, a more explicit account is desirable.

There are two reasons for the very high quality of this work: the author is an excellent and extremely careful taxonomist, and he has studied extensively the biology of two of the five most important pest species in the genus. These two qualifications seldom occur together.

The four numbers have been arranged so that they contain the entire treatment of *Delia*, the largest and economically the most important genus in the family. The first page includes the last three couplets of the key to females of *Alliopsis*. The treatment of *Delia* begins with a list of 16 generic synonyms. None of these have been used in the North American literature; most species here have been referred to *Hylemya* or, more recently, to *Hylemya (Delia)* and now to *Delia*. This is followed by a cladistic analysis based

on variation in the expression of 24 adult characters, and a division into a hierarchy of groups (sections, subsections, and infrasections). Each of these is discussed further in the text, where a further division into superspecies is given and where additional Palaearctic species are listed. The author expresses occasional doubts about the significance of characters and the validity of groups, about the specific status of certain forms, about association of sexes, and about other subjective subjects. Too many authors fail to do so and thereby give the impression that all problems have been solved.

A general introduction discusses the apparent monophyly of the *Delia* genus group and of the genus itself but unfortunately does not give a diagnosis of the genus; other works, e.g. the generic key of Huckett in the *Manual of Nearctic Diptera, Vol. II*, must be used to determine whether a specimen belongs to the genus. World distribution of the genus is outlined; richness of subarctic and subalpine faunas is mentioned and is supported by the individual province and state records given for each species. Of 162 Nearctic species, 73 are known from Alaska plus Yukon, 61 from California, 19 from Nearctic Mexico, 25 from Ontario, and four from Georgia. Of these 162 species, 49 are described as new and 11 Palaearctic species are recorded from North America for the first time (for a total of 45 Holarctic species). Ten of the new species are known from single specimens so more new species are likely to be found.

The treatment of each species gives complete Nearctic references and important references from other regions (including those to immatures and biology), detailed descriptions of males and of known females with excellent drawings or occasionally photographs of significant taxonomic characters, distribution data (maps for 82 species, full locality data for the others), notes on type specimens and synonymy, and discussion of distinguishing characters, of previously published misidentifications and often of species relationships. Summaries of available information on chromosomes, immature stages, hosts, damage done by larvae, phenology, oviposition, and other features of adult behaviour and biotic relationships are given. For almost all but the 14 species of major or minor pests such information is lacking. Only chemical control measures have been omitted from these summaries; this seems reasonable as available and acceptable insecticides change frequently.

I believe that apart from a few comparatively unimportant leaf-mining species of *Pegomya*, all Anthomyiidae of economic importance are species of *Delia*. Five are of major significance: *Delia radicum* (Linnaeus) and *D. floralis* (Fallén) on roots of crucifers (both treated in No. 7), *D. antiqua* (Meigen) on cultivated species of *Allium, D. florilega* (Zetterstedt) on germinating seeds of beans and other legumes and on roots of crucifers and many other plants, and *D. platura* (Meigen) on germinating seeds of *Zea mays*, beans and other plants, on roots, in fungi, and in animal matter (last three species treated in No. 10).

Eight species are less important pests of roots, shoots and stems, leaves or seed pods (crucifers, spinach, carnations, lupines, and wild or cultivated grasses are the main hosts). Finally, *D. coarctata* (Fallén), first collected in North America in 1954 and now known from southeastern Quebec, the four Atlantic provinces, and northern Maine, is a serious pest of winter wheat and related cereals in Europe. It could be an important pest if it spread to winter wheat areas in southern Ontario and the NE United States.

I think few groups of congeneric species of major agricultural importance have been so often confused or misidentified or have had as many changes of name as the five mentioned above. Taxonomic

studies and type examinations by European workers during the last 20 years have now almost certainly produced a stable nomenclature. However, three of the name changes have only gradually been adopted in North America so it may be useful to list these:

| Previous Name(s) | Present Name |
|---|---|
| *Hylemya* (or *Delia) brassicae* Bouché | *Delia radicum* (Linnaeus) |
| *Hylemya trichodactyla* (Rondani) or *H.* (or *Delia) liturata* (Meigen) | *Delia florilega* (Zetterstedt) |
| *Hylemya cilicrura* Rondani or *H. cana* Macquart | *Delia platura* (Meigen) |

Separate keys to males and to the known females (ca. 90 spp.) follow the taxonomic section; like the keys in the preceding parts of the work they seem to be based as much as possible on characters other than those of the terminalia. Three reference lists are given as supplements to the first general list on pp. 397-415 (in No. 3, 4) of this work. In No. 7 is a list for the three pest species of the *radicum* subgroup treated in that number, and in No. 10 another for the three pest species of the *platura* subsection. A list with additions to the first list of No. 3, 4 is given at the end of No. 10.

The text treats 162 species and mentions many synonyms and many Palaearctic species. An index to the specific names would have been a welcome addition to an oustanding work.

J.R. Vockeroth
Agriculture and Agri-Food Canada
Centre for Land and Biological Resources Research
Biological Resources Division
Ottawa, Ontario

# UPCOMING MEETINGS / RÉUNIONS À VENIR

**Annual Meeting of the Entomological Society of Ontario**
September 23-25, 1994, Brock University, St. Catharines, Ontario
Two symposia are planned: (1) Behavioural Ecology of Insects; (2) Current Approaches to IPM
CONTACT: (1) Dr. Fiona F. Hunter, Department of Biological Sciences, Brock University, St. Catharines, ON, L2S 3A1. Tel (905) 688-5550 ext 3394; Fax. (905) 688-1855; email: hunterf@spartan.ac.BrockU.ca; (2) Dr. Howard Thistlewood, Agriculture Canada, Vineland Research Station, Box 6000, Vineland, ON, L0R 2E0. Tel. (905) 562-4113; Fax. (905) 562-4335; email: thistle@onrsvi.agr.ca

**The A.J. Nicholson Centenary Meeting: On the Frontiers of Population Ecology**
April 18-22, 1995, Canberra, Australia
CONTACT: Mrs. L. Lawrence, CSIRO Division of Entomology, GPO Box 1700, Canberra, ACT 2601, Australia

**47th International Symposium on Crop Protection**
May 9, 1995, University of Gent, Belgium
The following topics will be treated: Insecticides, Nematology, Applied Soil Zoology, Semio-chemicals; Fungicides, Phytopathology, Phytovirology, Phytobacteriology; Herbicides, Herbology, Plant Growth Regulators; Biological and Integrated Control; Residues, Toxicology, Formulations, Application techniques.
CONTACT: Dr. ir. L. Tirry, Faculty of Agricultural and Applied Biologial Sciences, Coupure links 653, B-9000 Gent (Belgium). Tel. 32 (0) 9 264.61.52; Fax. 32 (0) 9 264.62.39.

**American Society of Zoologists**
January 5-8, 1995, St. Louis, Missouri
There will be two important symposia being planned for the forthcoming annual meeting of the American Society of Zoologists: (1) Risk Sensitivity in Behavior; (2) The State of Experimental Ecology: Questions, Levels, and Approaches
CONTACT: (1) Peter Smallwood Tel. (215) 526-5091; Fax. (215) 526-5086; E-mail psmallwo@cc.brynmawr.edu or Ralph Cartar Tel. (403) 220-7622; Fax. (403) 289-9311; E-mail rcartar@acs.ucalgary.ca; (2) Joe Bernardo Tel. (919) 684-2567; Fax. (919) 684-6168; E-mail jb@mendel.zoo.duke.edu or Bill Resetarits (Tel. (314) 553-6221; Fax. (314) 553-6223; E-mail swjrese@umslvma.umsl.edu.

**International Plant Protection Congress**
July 2-7, 1995, The Hague, The Netherlands
The theme of the congress will be *Sustainable crop protection for the benefit of all.*
CONTACT: XIII International Plant Protection Congress, c/o Holland Organizing Centre, Parkstraat 29, 2514 JD The Hague, The Netherlands. Tel. (+31-70) 365-78-50; Fax. (+31-70) 361-48-46.

**7th International Symposium on Pollination**
June 24-28, 1996, Lethbridge, Alberta, Canada
*Pollination: from theory to practise.* General topics will include: Implications of evolutionary theory to applied pollination ecology; Modelling pollination; Pollination techniques/methods/standardization; Pollinator foraging behaviour; Commercial bumble bee management for pollination; Native bee management for pollination; Role of pollinators in species preservation, conservation, ecosystem stability and genetic diversity
CONTACT: Dr. Ken Richards, Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge, Alberta, Canada T1J 4B1. Tel. (403) 327-4561; Fax. (403) 382-3156; Email: Richards@abrsle.agr.ca.

**XX International Congress of Entomology**
August 25-31, 1996, Palazzo dei Congressi, Florence, Italy
CONTACT: Organizing Secretariat, OIC, Via A. La Marmora, 24, 50121 Florence, Italy
Fax. ++39-55-5001912

# SCHOLARSHIPS AND GRANTS

## Entomological Society of Canada Graduate Research-Travel Grants Invitation for Applications

**Preamble**

To foster graduate education in entomology, the Entomological Society of Canada will offer two research-travel grants, awarded annually on a competitive basis. The intent of these grants is to help students increase the scope of the graduate training. These grants, up to a maximum of $2,000, will provide an opportunity for students to undertake a research project or to do course work pertinent to their thesis subject that could not be carried out at their own institution.

**Eligibility**

To be eligible, a student must:

1) be enrolled as a full-time graduate student
2) be an active member of the Entomological Society of Canada

**Format of the Application Form**

The application form will be in the format of a grant proposal, where the applicant will provide the following information: 1) the subject of the thesis; 2) a pertinent review of the literature in the field; 3) a concise presentation of the status of the ongoing thesis research; 4) a description of the research or course work to be undertaken, clearly indicating a) the relevance to the overall goal of the thesis, b) an explanation of why such work cannot be carried out at the student's own university and c) the justification of the site where the research/course work will be carried out; 5) a budget for the proposed project; 6) anticipated dates of travel and date on which grant money is needed.

The application form should also be accompanied by: 1) an up-to-date C.V.; 2) a supporting letter from the senior advisor; 3) When appropriate, a support letter from the scientist or Department Head at the institution where the applicant wishes to go.

**Evaluation Procedure**

The scientific merit of each application will be evaluated by a committee that has the option of sending specific projects out for external review by experts in the field. A constructive written report, underlining the positive and negative aspects of the proposal, will be returned to the applicant.

**Timetable and Application Procedure**

Application forms, which may be obtained from the Secretary of the Society, must be completed and returned to the Secretary of the Society by **15 January 1995**. The committee will evaluate all applications by 30 April 1995 and determine if, and to whom, grants will be awarded. The successful applicants will be informed immediately, thereby providing sufficient time for students wishing to start in the fall to make necessary arrangements. Grants must be used in the 12 months following the award.

Recipients must provide a short final report, as well as a detailed list of expenses, in the three months that follow the trip. Any money not spent must be returned to the Society.

# La Société d'entomologie du Canada Allocations de Voyage pour Étudiants Gradués

## Appels pour Allocations

**Préambule**

Afin the promouvoir les études graduées en entomologie, la Société d'Entomologie du Canada offrira deux bourses de voyage associées à la recherche. Celles-ci seront décernées annuellement sur une base compétitive. Le but de ces bourses est de permettre aux étudiants gradués d'élargir les horizons de leur formation. Les bourses, d'une valeur maximale de $2,000 permettront à des étudiants de réaliser un projet de recherche, ou de suivre des cours pertinents à leur sujet de thèse qui ne peuvent être entrepris dans leur propre institution.

**Éligibilité**

Afin d'être éligible, l'étudiant doit:

1) être inscrit à temps plein comme étudiant gradué
2) être un membre actif de la Société d'Entomologie du Canada

**Format du Formulaire de Demande**

Le formulaire de demande sera dans le style d'une demande d'octroi et l'étudiant devra fournir les renseignements suivants: 1) le sujet de la thèse; 2) une présentation de la littérature pertinente au domaine d'étude; 3) une présentation concise du statut du projet de recherche en cours; 4) une description de la recherche ou des cours qui seront entrepris, indiquant clairement a) la pertinence des objectifs généraux de la thèse, b) les raisons pour lesquelles ce travail ne peut être entrepris à l'université où l'étudiant est inscrit, et c) une justification concernant le choix de l'endroit où la recherche/les cours seront entrepris; 5) un budget pour le projet proposé; 6) dates prévues pour le voyage et date pour laquelle la bourse sera requise.

La demande devra aussi être accompagnée: 1) d'un C.V. complet mis-à-jour; 2) d'une lettre de recommendation du directeur de thèse; et 3) lorsque convenable, une lettre d'appui d'un administrateur de l'institution que le candidat désire fréquenter.

**Évaluation**

La valeur scientifique de chaque demande sera évaluée par un comité qui aura l'option d'envoyer des demandes spécifiques pour évaluation par un lecteur externe, expert dans le domaine. Un rapport écrit, contenant une critique constructive, faisant ressortir les aspects positifs et négatifs de la demande, sera retourné à chaque candidat.

**Échéances et Procédures**

Les formulaires de demande, qui peuvent être obtenus du Secrétaire de la Société, doivent être remplis et retournés pour **le 15 janvier 1995** au Secrétaire de la Société. Le comité évaluera toutes les demandes pour le 30 avril 1995 et déterminera si, et à qui, les bourses seront décernées. Les candidats choisis seront contactés immédiatement, cela afin d'allouer suffisamment de temps pour les préparatifs nécessaires à un départ possible à l'automne. La bourse doit être utilisée dans les 12 mois suivant l'octroi.

Les récipiendaires devront préparer un court rapport final, en plus d'une liste détaillée de leurs dépenses, dans les trois mois suivant le voyage. Tout argent non dépensé devra être remis à la Société.

Volume 26 (3), September - septembre, 1994

# NOTES

**ENTOMOLOGICAL SOCIETY OF CANADA**
**LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA**
393 Winston Ave., Ottawa, Ontario K2A 1Y8
**Application for membership - (new members only)**
**Demande d'adhésion (nouveaux membres seulement)**

Name and Address (please print):
Nom et Adresse (lettres moulées):

telephone (bus.) / téléphone (au travail):

Fax:

Electronic mail address / Adresse electronique:

Key words describing interests (up to six):
Décrivez vos intérêts en utilisant jusqu'à six mots clés:

MEMBERSHIP DUES / COTISATION

Regular member [1] / Membre actif [1] ..... $80.00 *
US & Other .... $74.00 US

Student member [1] / Membre étudiant [1] ..... $40.00 *
US & Other .... $36.00 US

Student member - *Bulletin* only / Membre étudiant - *Bulletin* seulement ..... $20.00 *
US & Other .... $18.00 US

[1] includes *The Canadian Entomologist* and *Bulletin*
[1] incluant l'abonnement au *The Canadian Entomologist* et au *Bulletin*

Endorsement / Signature du professeur_____
Students - ask your professor to endorse form/demandez l'appui de votre professeur

MEMOIRS (including discount for members) ..... $20.00 *
MÉMOIRES (incluant l'escompte pour les membres) US & Other .... $18.00 US

* Canadian members, add 7% GST ..... $____
* membres canadiens, ajouter 7% TPS

Total ..... $____

If you need an official receipt please check:
Si vous désirez un reçu officiel, indiquez, s'il vous plaît: ☐

Enclose cheque or money order payable to: Entomological Society of Canada
Inclure un chèque ou mandat payable à: Société d'Entomologie du Canada



Please copy and distribute to interested non-members. Thank you.

# ENTOMOLOGICAL SOCIETY OF CANADA - 1994
# LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA - 1994

## Executive Council - Conseil Exécutif

***President/Président***

G.H. Gerber
Agriculture Canada Research Station
195 Dafoe Road
Winnipeg, Manitoba R3T 2M9
Tel. 204-983-1460
Fax. 204-983-4604

***First Vice President/Premier Vice-Président***

L. Safranyik
Forestry Canada, Pacific & Yukon Region
506 West Burnside Road
Victoria, B.C. V8Z 1M5
Tel. 604-363-0600
Fax. 604-363-0775

***Second Vice President/Second Vice-Président***

G. Boivin
Agriculture Canada Research Station
430 Boul. Gouin
St Jean sur Richelieu, Quebec J3B 3E6
Tel. 514-346-4494
Fax. 514-346-7740

***Past President/Président sortant***

P. W. Riegert
Department of Biology
University of Regina
Regina, Saskatchewan S4S 0A2
Tel. 306-584-1160 or 585-4224
Fax. 306-586-9862

## Trustees - Fiduciaires

***Treasurer/Trésorier***

R.G. Foottit
393 Winston Ave.
Ottawa, Ontario K2A 1Y8
Tel. 613-725-2619 or 613-996-1665
Fax 613-725-9349 or 613-995-7283

***Secretary/Secrétaire***

R.J. West
Canadian Forest Service
P.O. Box 6028
St. John's, Nfld., A1C 5X8
Tel. 709-772-2386
Fax 709-772-2576

***Scientific Editors/Editeur Scientifique***

*The Canadian Entomologist*

P. Kevan
Dept of Environmental Biology
University of Guelph
Guelph, Ontario N1G 2W1
Tel. 519-824-4120

*Memoirs*

V. Behan-Pelletier
Centre for Land and Biological Resources
Research, Agriculture Canada
Ottawa, Ontario K1A 0C6
Tel. 613-996-1665
Fax 613-995-6833

*Bulletin Editor*

F.F. Hunter
Department of Biological Sciences
Brock University
St. Catharines, Ontario L2S 3A1
Tel. 905-688-5550 Ext. 3394
Fax 905-688-1855

*Assist. Scientific Editors/Assists. de l'editeur scientifique*

C.H. Craig
R.H. Elliot

## Directors - Administrateurs

***Directors-at-Large***: J. Turgeon (1994), S. Marshall (1994), S. Smith (1995), H.V. Danks (1995), H. Thistlewood (1996), C. Gillott (1996)

***Regional Directors/Directeurs régionaux***: T. Shore (ESBC), B.K. Mitchell (ESA), J. Soroka (ESS), P.G. Fields (ESM), R.S. MacDonald (ESO), D. Coderre (SEQ), J. Sweeney (AES).

## OFFICERS OF AFFILIATED SOCIETIES 1994

*ENTOMOLOGICAL SOCIETY of BRITISH COLUMBIA*

| | |
|---|---|
| President | S. Fitzpatrick |
| President-Elect | L. Gilkeson |
| Past-President | T. Shore |
| Secretary | S. Clements<br>Agriculture Canada<br>Vancouver |
| Treasurer | S. Li |
| Editor (Journal) | P. Belton |
| Editor (*Boreus*) | E. Belton |
| Regional Director to ESC | T. Shore |

*ENTOMOLOGICAL SOCIETY of ALBERTA*

| | |
|---|---|
| President | A.S. McClay |
| Vice-President | A. Keddie |
| Past-President | R.A. Butts |
| Secretary | L. Dosdall<br>Alberta Environment<br>Centre, Bag 4000,<br>Vegreville, Alberta<br>T0B 4L0 |
| Treasurer | J. Jones |
| Editor (Proceedings) | D.W. Langor |
| Regional Director to ESC | B.K. Mitchell |
| Directors-at-Large | H. Carcamo<br>T.J. Lysyk<br>R.G. Holmberg |

*ENTOMOLOGICAL SOCIETY of SASKATCHEWAN*

| | |
|---|---|
| President | B. Neill |
| President-Elect | C. Franke |
| Secretary | O. Olfert<br>Agriculture Canada<br>107 Science Crescent<br>Saskatoon, Sask.<br>S7N 0X2 |
| Treasurer | D. Murrell |
| Editor (Proceedings) | K. Roney |
| Regional Director to ESC | J. Soroka |

*THE ENTOMOLOGICAL SOCIETY of MANITOBA*

| | |
|---|---|
| President | R. Gadawski |
| President-Elect | R. Roughley |
| Past-President | N.D.G. White |
| Secretary | L. Manaigre<br>5 Alderwood Rd.<br>Winnipeg, Manitoba<br>R2J 2K7 |
| Treasurer | L. Grenkow |
| Editor (Proceedings) | A.R. Westwood |
| Regional Director to ESC | P.G. Fields |
| Member-at-Large | A. Weins |

*ENTOMOLOGICAL SOCIETY of ONTARIO*

| | |
|---|---|
| President | J. Hollebone |
| President-Elect | Y. Prevost |
| Past-President | D. Wallace |
| Secretary | B. Lyons<br>Natural Resources<br>Canada, Canadian<br>Forest Service,<br>Ontario Region<br>P.O. Box 490<br>Sault Ste. Marie<br>Ontario, P6A 5M7 |
| Treasurer | R.S. MacDonald |
| Editor (Proceedings) | P.G. Kevan |
| Regional Director to ESC | R.S. MacDonald |
| Librarian | D. Hull |

*SOCIÉTÉ D'ENTOMOLOGIE DU QUÉBEC*

| | |
|---|---|
| Président | R-M Duchesne |
| Vice-président | G. Chouinard |
| Secrétaire | M. Mailloux<br>472, rue Maissoneuve<br>St-Jean-sur-Richelieu<br>Québec, J3B 1G2 |
| Trésorier | C. Bouchard |
| Présidente sortante | G. Boivin |
| Editeur (Rev. d'ent. du Qué.) | D.J. Lewis |
| Rédacteur (Bull. de la SEQ) | C. Hebert |
| Délégué à la S.E.C. | D. Coderre |

*ACADIAN ENTOMOLOGICAL SOCIETY*

| | |
|---|---|
| President | E. Gibbs |
| Vice-President | E. Groden |
| Past President | J. Stewart |
| Secretary/Treasurer | F. Drummond<br>University of Maine |
| Editors (Proceedings) | L. Hale & J. Stewart |
| Regional Director to ESC | J. Sweeney |

Bulletin Editor: F.F. Hunter
Cover Design: R. Thiebaux
Published by: The Entomological Society of Canada / La Société d'entomologie du Canada