

PROCEEDINGS OF THE

ENTOMOLOGICAL  
SOCIETY OF  
MANITOBA

VOLUME 45

1989

**Proceedings of the  
Entomological Society of  
Manitoba.**

**VOLUME 45**

**1989.**

Allen Wiens,  
Editor  
Winnipeg, Manitoba.

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Minutes of the 45th Annual Business Meeting  
of the Entomological Society of Manitoba

13:30 h, 3 November, 1989  
Freshwater Institute,  
Winnipeg, Manitoba.

The President, Dr. N.J. Holliday, presided. A quorum being present, the President called the meeting to order and asked Dr. R.J. Lamb to take the minutes in the absence of the Secretary.

Attendance:

Executive:

Mr. D. Dixon, President  
Dr. N.J. Holliday, Past-President  
Dr. R.J. Lamb, President-Elect  
Dr. M. Galloway, Regional Director to the E.S.C.

Executive Staff: none

Members:

Mary Galloway	Ian Wise
Pat MacKay	Peter Arntfield
Neil Holliday	W.B. Preston
Paul Fields	Terry Galloway
G.K. Bracken	R.E. Roughley
D. Smith	R. Ellis
S.C. Jay	W. Turnock
R.A. Brust	J. Buth
P. Pachagounder	J.E. Guthrie
F. Mwangala	Sam Loschiavo
W. Khumalo	Grant Robinson
F. Watters	Glen Wylie
R.J. Lamb	D. Dixon

1. Agenda (Appendix A).

Motion: - T. Galloway/Mackay - that the proposed agenda be adopted.

Carried

2. Minutes of the 44th Annual Meeting.

Motion: - Holliday/M. Galloway - that the minutes of the 44th Annual Business Meeting of the E.S.M., held on 5 November, 1988, be accepted.

Carried

3. Business Arising from the Minutes of the 44th Annual Meeting.  
none

4. Executive Reports.

a) President (Appendix B).

b) Treasurer (Appendix C). N. Holliday pointed out liability to the E.S.M. for certain costs of publication of Manitoba Entomologists.

c) Editor - Proceedings of the E.S.M. (Appendix D).

d) Regional Director (Appendix E). T. Galloway queried whether the number of pages published in the Can. Ent. will change with the change in publication frequency. M. Galloway indicated they would not. N. Holliday pointed out that Ent. Soc. Can. has already voted to join Can. Fed. Biol. Sci. so that comments by E.S.M. could not contribute to the decision. W. Turnock added that the E.S.C. will reconsider membership after a three year trial.

e) Endowment fund board (Appendix F).

Motion: - Ellis/Holliday - that \$500 be allocated annually from Endowment Fund to support the costs of bringing in speakers to address the E.S.M.

Motion: - MacKay/Loschiavo - that the Executive reports be received.

Carried

5. Committee Reports.

a) Finance Committee (Appendix G). G. Bracken queried an apparent increase in cost of publishing the Proceedings. D. Dixon explained that because of the timing of publication the cost of two issues will be paid in one budget year. P. Pachagounder queried budgeted receipts for membership. D. Dixon explained that membership and therefore receipts are expected to continue to decline slightly.

b) Newsletter and Publicity (Appendix H).

c) Social (Appendix I).

d) Youth Encouragement and Public Education (Appendix J).

P. Mackay suggested that the usual mall display might be mounted at the Forks if costs or other factors prevent us mounting the display at the mall. J. Guthrie suggested that K. McGinnis be sent a letter of thanks for her contributions to the activities of the committee.

- e) Insect Common Names (Appendix K).
- f) Archivist (Appendix L).
- g) Manitoba Environmental Council (Appendix M).
- h) ESM-ESC Honorary Members. W.J. Turnock reported that no candidates for Honorary membership had been identified.
- i) Student Awards Committee (Appendix N). B. Deneka and S. Pernal were jointly awarded the ESM Student Achievement Award. R. Brandt was awarded the SWAT Student Award.
- j) ESM Scholarship Committee (Appendix O). R. Lindsay was awarded the ESM Scholarship.
- k) Scientific Program Committee (Appendix P).
- l) ESM Membership Committee (Appendix Q).
- m) ESC Membership Committee (Appendix R).
- n) Fundraising Committee (Appendix S). R. Roughley reported that ESC will advertise any future T-shirt sales in the Bulletin and that national sales are likely. D. Dixon proposed repeating the T-shirt sale.
- o) Entomologists of Manitoba, ad hoc Committee (Appendix T). N. Holliday reported that the publication has been distributed and that additional copies are available from him for the cost of handling. He is concerned with the tardiness of ESC in clearing invoices for the publication costs.

Motion: - T. Galloway/Jay - that the Committee Reports be received.

Carried

6. Election Results for the 1990 Executive. A.G. Robinson reported for the scrutineer committee.

President-Elect: R. Westwood  
Member-at-large: P. Fields  
The Executive and the Society thank all participants in the

election for allowing their names to stand for office.

Motion: - Holliday/Turnock - that the ballots be destroyed.

Carried

7. Transfer of Office. D. Dixon presented the gavel to R. Lamb, who assumed the office of President.

8. Other Business.

a) R. Lamb presented honorary membership certificates to H.G. Wylie, S.R. Loschiavo, A.G. Robinson, F.K. Watters and J.E. Guthrie. P.H. Westdal will receive his certificate at a later date.

b) R. Lamb thanked the outgoing Executive and the Committees for their contributions to the Society.

c) Appointment of Auditors.

Motion: - Holliday/M. Galloway - that D. Nicholson and Co. be appointed auditors for the Society in the coming year.

Carried

d) A vote of appreciation was extended to the outgoing President.

e) R. Lamb thanked S.C. Jay and his Committee for the fine job of organizing the AGM.

9. Adjournment. MacKay (15:00 h).



## APPENDIX A

ENTOMOLOGICAL SOCIETY OF MANITOBA  
 45th ANNUAL BUSINESS MEETING  
 November 3, 1989.

AGENDA

1. Appointment of Secretary to record proceedings of the Annual Business Meeting.
2. Acceptance of Agenda.
3. Minutes of last Annual Meeting (Nov. 4, 1988).
4. Business arising from the minutes.
5. Reports - Executive, Trustees.
 

a) President	D. Dixon
b) Treasurer (Auditor)	G. Gerber
c) Editor of the Proceedings	I. Askevold
d) Regional Director to ESC	M. Galloway
e) Endowment Fund Board	R. Gadawski
6. Reports - Committees.
 

a) Finance Committee	R. Gadawski
b) Publicity, Newsletter	M. Smith
c) Social	J. Buth
d) Education and Youth Encouragement	T.D. Galloway
e) ESC Insect Common Names	A.G. Robinson
f) Archivist	A.G. Robinson
g) Manitoba Environmental Council	I. Wise
h) Honorary Members (ESC)	W. Turnock
i) Student Awards (ESM)	R. Lamb
j) ESC Scholarship Committee	G. Bracken
k) ESM Scholarship Committee	G. Bracken
l) Scientific Program and Annual Meeting Local Arrangements	S.C. Jay
m) Membership Committee (ESM)	T.D. Galloway
n) Membership Committee (ESC)	N. Holliday
o) Fund Raising Committee	R. Westwood
p) Entomologists of Manitoba	N. Holliday
7. 1989 - 1990 Election Results -  

Scrutineer Committee	A.G. Robinson
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8. Transfer of Office.

9. Other Business.

a) Presentation of honorary membership certificates to:  
J.E. Guthrie, S.R. Loschiavo, A.G. Robinson, F.L. Watters, P.H.  
Westdal, H.G. Wylie.

b) Appointment of Auditors.

10. Adjournment.

## APPENDIX B

## PRESIDENT'S REPORT.

The Entomological Society of Manitoba has completed another active and successful year. The ongoing commitments and new initiatives of the Society continue to be developed and supported by a large number of willing individuals. Most of the activities of the Society during the last year will be described in the committee reports to follow, but a few deserve mention here.

The current and longer term financial condition and management of the Society continued to be an important concern of the Executive. With the able assistance and direction provided by the Treasurer, George Gerber, and the Finance Committee, we have attempted to maintain a careful management of the Society's fiscal matters and in a few instances "fine tune" some procedures. As part of this exercise, for example, a standard protocol has been developed for committees and individuals when claiming expenses from the Society.

The Fund Raising Committee which was formed midway through 1988 has been very successful this year in raising funds to help defray costs associated with some of the Society's special events such as the Annual General Meeting. Special thanks are extended to Lynn Hancock who conceived and followed through with the very successful T-shirt sale and to Richard Westwood, the current Chairman of the Fund Raising Committee.

The Society provided encouragement and some small financial assistance for the publication, The Butterflies of Manitoba. Congratulations are extended to four of our members, P. Klassen, A.R. Westwood, W.B. Preston, and W.B. McKillop, and the Manitoba Museum of Man and Nature for this important contribution to entomology in Manitoba.

During his final remarks as President last year, Neil Holliday reported that one of his priorities in the upcoming year would be to ensure that the new President developed scrolls for the Honorary Members of the Society. I am pleased to confirm that this has been done and that the scrolls will be presented at this meeting.

I have discovered during my tenure as President that the real strength of the Society comes from those members who consistently and enthusiastically volunteer their time and energy to serve on, and support, the many committees. On behalf of the Society, I would like to thank all of these individuals. I would like to offer special thanks to our hard working Secretary, Noel White, and Treasurer, George Gerber, and to the Executive, B. Fingler, N.

Holliday, M. Galloway and B. Lamb.

I look forward to working with the new President, Bob Lamb, and his Executive.

D.P. Dixon,  
President, 1988-89.

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**APPENDIX C.**  
ENTOMOLOGICAL SOCIETY OF MANITOBA, INC.  
FINANCIAL STATEMENTS  
August 31, 1989.

AUDITOR'S REPORT

To the Directors of the  
Entomological Society of Manitoba, Inc.

I have examined the balance sheet of the Entomological Society of Manitoba Inc. as at August 31, 1989 and the statement of income for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as I consider necessary in the circumstances.

In my opinion these financial statements present fairly the financial position of the company as at August 31, 1989 and the results of its operations and the changes in its financial position for the year ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Winnipeg, Canada  
September 26, 1989

Doug Nicholson & Co.,  
Certified General Accountant



Entomological Society of Manitoba, Inc.  
Statement of Income and Expenses  
For the Year ended August 31, 1989.

	1988	1989
<b>REVENUE (note 1)</b>		
Annual meetings	\$ 2,315	1,833
Annual meeting donations	750	400
Fundraising committee (net, note 5)	651	---
Interest income	2,998	2,797
Members fees	1,615	1,625
Social committee	180	169
Subscriptions	94	940
Youth encouragement & public education	200	206
Student awards	<u>100</u>	<u>100</u>
	8,903	8,070
<b>EXPENSES (note 1)</b>		
Heritage	---	41
Awards & scholarships	1,207	1,236
Donation	500	---
Fundraising committee	36	---
Meetings	2,094	2,174
General	734	782
Newsletter	489	409
Proceedings	274	2,224
Social committee	319	523
Youth encouragement	<u>221</u>	<u>66</u>
	5,874	7,455
Excess of Income over Expenses	3,029	615
Surplus, Beginning of the Year	<u>32,837</u>	<u>32,222</u>
Surplus, End of the Year	<u>35,866</u>	<u>32,837</u>

The accompanying notes form an integral  
part of these financial statements.

Entomological Society of Manitoba, Inc.  
Notes to the Financial Statements  
August 31, 1989

Note 1:           SIGNIFICANT ACCOUNTING POLICIES:

Income and expenses are recorded on the cash basis of accounting. There are no accruals of receivables or payables at the year end. Fixed assets are written off when acquired and therefore there are no annual depreciation allowances.

Note 2:           STANDING ADVANCES:

Treasurer	George Gerber	\$	25
Secretary	Noel White		100
Editor	Ingolf Askevold		25
Social Committee	Jo-Anne Buth		200
Newsletter	Marjorie Smith		<u>200</u>
			<u>550</u>

Note 3:           CASH IN BANK:

Savings Account	4,052
Current Account	<u>6,264</u>
	<u>10,316</u>

Note 4:           INVESTMENT CERTIFICATES:

8421072	1,775.67
7053706	3,024.33
7058513	2,000.00
7058436	3,000.00
7053871	7,200.00
7053893	2,000.00
7053937	2,000.00
7053959	2,000.00
7053805	<u>2,000.00</u>
	<u>25,000.00</u>

Note 5:           FUNDRAISING:

Sale of T-Shirts	1,422.00
Cost of T-Shirts	<u>770.29</u>
Net profit	<u>651.71</u>

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**APPENDIX D**

**REPORT OF THE PROCEEDINGS EDITOR  
1989.**

Volume 44 of the Proceedings was produced using Wordperfect 5.0. Subsequent contributors could expedite production of the Proceedings by submitting a diskette containing their abstract of a submitted paper, or Report (such as this one) to the Editor of the Proceedings. This would save both typing and editing, and possibly the cost of a typist should I or Al Wiens not be carrying out the task ourselves. Production might be more expedient also.

270 copies of Volume 44 were printed at a total cost of \$688.57, or \$2.55 per copy. Rinella printers appears to continue to charge a reasonable cost, and I have continued to use them. The Proceedings and Newsletter were mailed out together, saving postage and spreading out the envelope-stuffing effort required.

There have been only a few subscription cancellations since last year, but the number of subscribers is still declining.

Ingolf S. Askevold  
November 3, 1989.

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**APPENDIX E**

**REPORT OF THE REGIONAL DIRECTOR TO E.S.C.**

Following a change in my responsibilities at the University of Manitoba I regretfully tendered my resignation as Regional Director to the E.S.C. Executive, which accepted it, effective the next E.S.M. election. Dr. R.E. Roughley attended E.S.C. Board of Directors Meetings on the Society's behalf. This report is compiled jointly.

The Annual Meetings of the Governing Board of the Entomological Society of Canada were held on September 30th, October 1st and October 4th in St. John's, Newfoundland.

The Board reminded the ESM that (1) a list of officers and their years of tenure and (2) the ESM Newsletter should be sent regularly to the Bulletin Editor.



The Board asked ESM to entertain the development of a report on endangered species of insects in Manitoba, perhaps as a standing committee of ESM.

The Canadian Phytopathological Society and ESC have agreed to produce and market a joint publication on diseases and insects of vegetables in Canada.

The Canadian Entomologist will be published bi-monthly beginning in 1990. Six issues per year rather than 12 will allow more flexibility in case of unexpected events, and savings in printing and mailing costs.

The ESC has decided to join the Canadian Federation of Biological Sciences on behalf of Canadian members. There will be no increase in ESC membership dues as a result of this for the next three years. This interval will allow sufficient time for ESC to evaluate the effectiveness of CFBS.

The ESC's Permanent Committee on Bilingualism is addressing the Society's requirements for bilingualism. Objectives the Committee are pursuing are: assistance in provision of French versions of abstracts in the Canadian Entomologist, funding from the Federal Government to cover costs of contracting out translation of abstracts and official Society documents, the requirement for Committees to submit written material in both languages, greater use of French in the Bulletin (*i.e.* editorials, book reviews in language of book reviewed), formation of a committee to respond to translation needs, appointment of a bilingual Society member for organizing committees of each annual meeting, and identification of bilingual members willing to assist in translations with the next compilation of the Society's membership list.

The 40th Annual General Meeting of ESC will be in conjunction with the E.S. Alberta and is scheduled for October 7-10, 1990 in Banff, Alberta.

Respectfully submitted:  
M.M. Galloway, Regional Director  
Entomological Society of Manitoba.

**APPENDIX F**  
ANNUAL REPORT OF THE ENDOWMENT FUND BOARD

The Endowment Fund continues to be one of the major sources of revenue for the Society. It provides a foundation of money from which the Student Scholarship (\$1,000) and the publication of the Proceedings (approx. \$700) is funded. It also provides \$400 to promote the publication of scientific papers in the Proceedings. In total, the Endowment Fund is committed to approximately \$2,100 in expenses annually.

In the 1988-89 fiscal year, \$2,998 of investment income were generated from a principal amount of \$27,000. A similar amount of revenue is projected for the 1989-90 fiscal year.

In this past year, the principal amount of the Endowment Fund was increased to \$27,000 by investing into it an additional \$2,000. Another 1-2 thousand dollar investment is anticipated in this fiscal year.

Given the financial viability of the Endowment Fund, and the expectation of continued financial well-being, it is appropriate that the Society now consider committing additional funding to other Society programs or events. The money that could be made available on an annual basis is estimated to be \$500. It is the recommendation of this Board that this matter be given consideration by the membership at the 1989 Annual General Meeting.

A description of the current Endowment Fund investments is provided below.

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GUARANTEED INVESTMENT CERTIFICATES WITH ROYAL TRUST

<u>Cert. No.</u>	<u>Amount (\$)</u>	<u>Interest Rate</u>	<u>Maturity</u>	<u>Ann. Int.(\$)</u>
705 3871	7,200.00	12.125	Nov. 1989	873.00
705 3893	2,000.00	10.875	Aug. 1990	217.50
705 3937	2,000.00	10.500	Oct. 1991	210.00
705 3959	2,000.00	9.250	Feb. 1992	185.00
705 3706	3,024.33	10.750	Dec. 1992	325.12
842 1072	1,775.67	10.750	Jan. 1993	190.88
705 8513	2,000.00	10.500	June 1993	210.00
705 8436	3,000.00	10.750	Dec. 1993	326.25
705 3805	2,000.00	11.250	Apr. 1994	247.50
<u>1200 7930</u>	<u>2,000.00</u>	<u>10.750</u>	Oct. 1994	<u>215.00</u>
Total	27,000.00	11.112		3,000.25

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October 26, 1989

Rob Currie, George Gerber, Randy Gadawski (Chairperson).

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**APPENDIX G****ANNUAL REPORT OF THE FINANCE COMMITTEE**

On October 12th, the Finance Committee met to review the Society's long-term financial situation. At this meeting it was determined that in 1988-89, revenues exceeded expenses by \$3,029.12. However, this imbalance is expected to be corrected in the current fiscal year, when the cost of publishing the "Entomologists of Manitoba" and Volumes 44 (1988) and 45 (1989) of the Proceedings is finally considered.

This year, significant accomplishments included a \$2,000 investment into the Endowment Fund, and a \$500 donation to the Manitoba Museum of Man and Nature to assist in their publication of "The Butterflies of Manitoba".

The revenues generated by the Fund Raising Committee were also significant. This committee, through the solicitation of corporate donations and the sale of T-shirts, raised revenues in excess of \$1,100. The direct benefit of these efforts is the reduced cost of registration at the 1989 Annual Meeting.

During the year the Finance Committee also had the responsibility of considering each of the committee budgets, and preparing an overall budget for the Society. Attached is an accounting of the income and expenses for 1988-89, and projection for the next two fiscal years.

## Entomological Society of Manitoba

BUDGET ITEMS	1988-89 Actual	1989-90 Actual & Projected	1990-91 Projected
Endowment Fund	27,000.00	29,000.00	30,000.00
<b>INCOME</b>			
Membership Dues	1,615.20	1,450.00	1,450.00
Proceedings	92.46	650.00	650.00
Social Committee	180.00	150.00	150.00
Youth/Education Committee	200.00	200.00	200.00
Fund Raising Committee	1,101.71	500.00	500.00
Student Awards and Scholarship Meetings	100.00	100.00	100.00
Investment Income	2,615.00	2,265.00	1,725.00
Other Committees: Heritage	2,998.38	2,900.00	3,000.00
	0.00	300.00	-
Totals	8,902.75	8,515.00	7,775.00
<b>EXPENSES</b>			
General Society Expenses	734.22	775.00	800.00
Proceedings	274.04	2,400.00	1,500.00
Newsletter	489.09	535.00	550.00
Social Committee	319.92	400.00	430.00
Youth/Education Committee	218.85	400.00	430.00
Fundraising Committee	36.04	75.00	75.00
Student Awards and Scholarship Meetings	1,207.05	1,300.00	1,300.00
Other Committees: Heritage	2,094.42	2,709.00	2,690.00
Other Committees: Heritage	0.00	2,958.54	-
Donation	500.00	-	-
Totals	5,873.63	11,552.54	7,775.00
Net Gain (loss) for Year Ending August 31st.	3,029.12	(3,037.54)	0.00

October 26, 1989  
 Ingolf Askevold  
 Rob Currie  
 Lloyd Dodsall  
 George Gerber  
 Randy Gadawski, Chairperson

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**APPENDIX H**

**ANNUAL REPORT OF THE NEWSLETTER AND PUBLICITY  
COMMITTEE, 1989-90.**

This year the Newsletter was published quarterly as in the past several years. Volume 16, Numbers 1-3, were sent out in March, July and October. It is expected that a fourth issue will be sent out near the end of 1989.

This ends my term as Newsletter editor. My thanks go out to Andy Kolach, co-editor, who has been helpful in providing Agricultural news. Thanks also to everyone who has helped in any way with the Newsletter.

Postage savings to the Society were again realized this year by combining mailings with Social Committee news, Annual Meeting announcements, the Proceedings, and "Entomologists of Manitoba".

Marjorie Henderson Smith, Chairperson,  
Newsletter and Publicity Committee,  
3 November, 1989.

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**APPENDIX I**

**SOCIAL COMMITTEE REPORT 1988-89**

The New Members Social was held at the Holiday Inn South on March 3, 1989. Over 50 members were present to welcome 5 new members and listen to a fascinating and informative slide presentation by Don Dixon on "Silkworms and honeybees in southern India".

One Luncheon was held on October 12, 1989. Twenty-eight members gathered to hear Pat MacKay give a spectacular slide presentation on "Camping in Kenya".

The Annual Meeting Banquet was held at a western Canadian ranch called the Hitch'N'Post. Over 30 members dined on barbecued prime rib and were entertained by square dancers.

J.L. Buth, Chairperson  
Social Committee.

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**APPENDIX J**

**YOUTH ENCOURAGEMENT AND PUBLIC EDUCATION COMMITTEE  
ANNUAL REPORT**

The major event for 1988-89 was the Entomology display held in the central court at St. Vital Shopping Mall on 3-4 February. The basic display materials, including photographs and insect collections were upgraded, and assembled at a workshop held in the Entomology Department in January. Special thanks go to all those who offered their time and expertise at the workshop, and on the mall floor meeting the public.

The active membership list was updated this year and now stands at 111 youngsters. Visits to schools (8) and special interest groups (13) continued to be an important activity for the committee.

I would like to express my appreciation for the efforts of Kathy McGinnis, who has served as chairperson on this committee for the last two years. Kathy left Winnipeg earlier this year to pursue her entomological career in Ontario, and my role has been of a maintenance nature only. I submit this report to the Society on Kathy's behalf.

T.D. Galloway, Interim Chairperson.

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**APPENDIX K**

**REPORT OF THE COMMITTEE ON INSECT COMMON NAMES**

There have been no applications from ESM members during the past year for new common names or changes in old common names, and there are therefore no activities to report.

A.G. Robinson.

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**APPENDIX L**

**REPORT OF THE ARCHIVIST**

Archives materials of the Entomological Society are held in Room 213B of the Department of Entomology, University of Manitoba. Donations of archival material are welcome. No activities were undertaken since the Annual Meeting of 1988.

A.G. Robinson.

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**APPENDIX M****REPRESENTATIVE TO THE MANITOBA ENVIRONMENTAL COUNCIL  
ANNUAL REPORT**

One year after enactment of Bill 26, the Environment Act, that established provincial funding to the Manitoba Environmental Council, legislative changes were made to better enable the MEC to control its budget and funding options. One change made government funding less vulnerable to the vagaries of the Minister of Environment. While the Act identified certain functions of the MEC, the structure and operation of the Council was being questioned internally. A review by the former Chairperson sought to evaluate other environmental advisory councils across Canada as possible models for the MEC. No consensus to date has been reached on any structural changes. The relationship of the MEC with the provincial government in 1989 improved with the appointment of Deputy Premier the Hon. Glen Cummings to replace the Hon. Ed Connery as Minister of Environment this spring.

The MEC priorities as identified by the Executive for this past year were environmental monitoring regionally to better identify potential problems, responding to environmental issues through briefs at the Clean Environment Commission and other hearings (30-40 proposal reviews monthly), participating in the development of a Manitoba Conservation and Sustainable Development Strategy, researching and advising the Minister directly on policies and legislation, and working toward a more comprehensive and effective environmental impact assessment process for the province. The major role of working toward an increased public awareness and understanding of environmental concerns has diminished partly because of a lack of funding for publications. Some of the major issues addressed by the Council to the Minister of Environment included Repap Enterprises Ltd. environmental licencing for northern logging and effluent discharge, Consolidated Professor Mines Ltd. proposal for mining operations on Shoal Lake, repeal of Regulation MR96/88R on liquid effluent discharge from pulp and paper mills, CEC investigation of smoke problems from agricultural crop residue and peatland burning, and concerns on proposals for infrastructure upgrading in provincial parks. A number of other issues relating to pesticide container recycling, sewage disposal by cottage owners, commercialization of wildlife etc. are under review. I would be pleased to respond to any queries concerning Council activity, and to submit any environmental concerns by ESM members to the MEC.

Ian L. Wise

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**APPENDIX N**

REPORT OF THE ESM STUDENT AWARD COMMITTEE

The Committee reviewed the nominations received for the Student Achievement Award and the Swat Student Award. Ms. B. Deneka and Mr. S. Pernal were awarded the Student Achievement Award and will be presented their awards at the New Members Social. The recipient of the Swat Student Award is Mr. R. Brandt who will be presented his award at the ESM Annual Banquet.

R.J. Lamb (Chairperson)  
J. Conroy, W. Galloway, W. Preston.

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**APPENDIX O**

REPORT OF THE ESM SCHOLARSHIP COMMITTEE

There were two applications for the 1989 ESM Scholarship. The Committee has awarded the Scholarship to Mr. L.R. Lindsay of the University of Manitoba.

The winners of the 1989 ESC Scholarships, from five candidates, are Mr. G.R. Pohl of the University of Alberta and Ms H.J. Dewar of Guelph University.

G.K. Bracken (Chairman),  
R.P. Bodnaryk, P.A. Mackay

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**APPENDIX P**

E.S.M. SCIENTIFIC PROGRAM COMMITTEE

The 1989 E.S.M. Annual Meeting was held at the Freshwater Institute (University of Manitoba Campus) on 2-3 November. Dr. T.E. Rinderer was the invited speaker who presented a paper entitled: "Africanized Bees - The Exotic Pest of the 80's". Four invited speakers spoke on the theme: "Invasive Insects - A Manitoba Perspective" (see list of Symposium abstracts, below).

There were 9 submitted papers, 3 of which were presented by graduate students who took part in the Student Paper Competition. The prize of \$100.00 was won by Felix Mwangala, an M.Sc. student of Dr. Terry Galloway. During the meeting displays were set up by



the City of Winnipeg, Wild Leitz and the Museum of Man and Nature. Sixty-six individuals registered for the meetings, 15 of whom were students.

A "Meet-the-Speakers Mixer" was held at the home of Drs. Pat MacKay and Bob Lamb on 2 November, and on 3 November 41 people attended an open spit B.B.Q. at "The Hitch'n Post" near Winnipeg; this event was organized by Jo-Anne Buth.

The Scientific Program Committee thank various members who helped in the organizing of this meeting - in particular Dave Rosenberg, Terry Galloway and Barry Fingler.

S.C. Say (Chairman),  
R. Westwood  
R. Gadawski  
R. Lamb

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#### APPENDIX Q

##### MEMBERSHIP COMMITTEE

Membership application forms were distributed to potential new members in the province. New entomology students were encouraged to become members of the Society and to participate in Society activities whenever possible.

The list of amateur entomologists in Manitoba has been maintained, and is available upon request. Two such requests were fulfilled in 1988-89, and the interests of collectors facilitated.

T.D. Galloway,  
Chairperson.

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#### APPENDIX R

##### REPORT OF THE E.S.M. REPRESENTATIVE TO THE E.S.C. MEMBERSHIP COMMITTEE

The Membership Committee of the Entomological Society of Canada functions to recruit members to that Society and to facilitate the election of members of the E.S.C. to Honorary Memberhip status. Each regional affiliate Society nominates one representative to the Committee.

During the last year, membership of the E.S.C. has declined slightly, and this follows the trend of recent years. The E.S.C. had planned to hold an intensive membership drive during the year. However, the initiative to join the Canadian Federation of Biological Societies caused a deferral of the membership drive because C.F.B.S. membership would require payment of C.F.B.S. dues; it was considered unwise to begin a recruitment drive immediately before a potential major increase in dues. At the Annual Business Meeting of the E.S.C. in St. John's it was decided that E.S.C. would not pass on the cost of C.F.B.S. membership to individual members for a period of three years. Thus conditions will be appropriate for a major E.S.C. membership drive during the next year.

One Honorary Member of E.S.C. was elected this year. The new Honorary Member is Dr. Thelma Finlayson of Simon Fraser University.

N.J. Holliday

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#### APPENDIX S

##### ESM FUND RAISING COMMITTEE

Donations to 1989 Annual Meeting by companies:

14 donations @ \$50 each = \$700.00

A total of 21 companies were asked to donate to the annual meeting. Fourteen donations were received, two declined to donate and five companies and/or organizations did not respond.

Monies made for ESM via T-shirt sales:

Total T-shirts sold = 100. Income from sales approx \$630.00.

Thanks to Lynn Hancock and Ingolf Askevold.

R. Westwood (Chairperson)

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**APPENDIX T****REPORT OF THE AD-HOC COMMITTEE ON  
PROFILES OF ENTOMOLOGISTS**

The publication of condensed biographies of Manitoba Entomologists under the working title of "Profiles of Entomologists" has been in preparation for several years. During that time, the Committee's main function was to collect information, which was then passed to Dr. Riegert, Chair of the E.S.C. Heritage Committee, for editing. The result was recently published under the title "Manitoba Entomologists". A total of 1100 copies were printed, of which the Entomological Society of Manitoba received 400.

"Manitoba Entomologists" has been distributed to all members of the Entomological Society of Canada and the Entomological Society of Manitoba. In addition, copies have been distributed to any individual whose brief biography appears but who is not a member of either Society. Copies have also been sent to major Canadian and Manitoba libraries, and notices inviting requests for the publication have been sent to the Bulletins of all major English-speaking Entomological Societies.

The total cost of production was about \$4,300 and was borne jointly by the E.S.C. and by the E.S.M. However, all production costs to be borne by E.S.M. will be covered by a \$3000 grant to the Society by the Manitoba Heritage Federation Inc.

The only remaining task of the Committee is to prepare a final report to the Manitoba Heritage Federation Inc. This will be done when all documentation of the costs has been received and, at that point, the Heritage Federation will forward its 10% hold-back on the grant payment.

N.J. Holliday (Chairperson)  
T.D. Galloway, A.G. Robinson, D.L. Smith, N.D.G. White.

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**ABSTRACTS OF PAPERS PRESENTED TO THE  
ANNUAL MEETING, 1989.**

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\*           ABSTRACTS ARE PRINTED AS RECEIVED   \*  
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**SYMPOSIUM**

**INVASIVE INSECTS - A MANITOBA PERSPECTIVE**

**GEOLOGY OF MANITOBA - ORIGIN AND EVOLUTION OF THE LANDSCAPE.** James T. Teller, Department of Geological Sciences, University of Manitoba, Winnipeg. R3T 2N2.

Rocks of many geological ages, from Precambrian to Tertiary, are present in the subsurface of Manitoba. These rocks represent a wide spectrum of ancient formative environments, ranging from shallow tropical seas (limestone, dolomite, evaporites) to swamps and turbid continental basins (coal, shale, sandstone) to deep-seated igneous and volcanic activity (granites, basalts); post-depositional changes have altered many of the rocks. Because of repeated glaciation during the past several million years, the bedrock surface of Manitoba is now draped by a 1- to 100m-thick blanket of till, sand, gravel and clay, derived from the bedrock, that commonly forms an interstratified sequence. Till, which was deposited directly by the massive, 2000m-thick continental ice sheet, is overlain in many areas by sands and gravels that were deposited by meltwater in glacier-bounded channels, along the margin of the ice sheet and within newly eroded valleys such as those of the Assiniboine, Souris and Pembina Rivers, as well as along the shores of lakes dammed by the glacier. In local areas, such as near Carberry, wind has subsequently reworked some sandy sediment into dunes.

The largest proglacial lake was Lake Agassiz, which covered 350,000 km<sup>2</sup> about 10,000 years ago, and was the largest freshwater lake in the world. Lake Agassiz was as much as 200m deep at Winnipeg, and its clayey deposits extend throughout the Red River Valley of Canada and the U.S., east to almost Lake Superior, west to the Manitoba Escarpment, and north into the Hudson Bay Lowland. Southward overflow of the lake eroded the broad valley of the Minnesota River. Eastward overflow into Lakes Nipigon and Superior carved deep canyons and affected the geological, hydrological, ecological and climatic environments of the Great Lakes, St.

Lawrence Valley and North Atlantic Ocean. After the glacial dam melted away about 8000 years ago, Lake Agassiz drained into Hudson Bay, and modern rivers and lakes were established on the old lake floor.

**HISTORICAL ORIGIN AND DEVELOPMENT OF THE INSECT FAUNA OF MANITOBA.**

R.E. Roughley, Department of Entomology, University of Manitoba, Winnipeg. R3T 2N2.

The insect fauna of Manitoba is more diverse (=species rich) than expected. All species have dispersed into Manitoba following retreat of glaciers of the last ice age about 9,000 years ago. Detailed analysis of only a few groups are available because: Manitoba is a political rather than a natural unit; physical size of this province; many areas are not or are poorly collected; the influence of topographic, floristic, faunistic (non-insect) and habitat diversity are not well understood; sampling procedure, state of classification, long or cryptic life cycles and the sheer diversity of insects all impinge on our knowledge of the fauna. Other problems include: false endemics, occasional migrants, mislabelled specimens and anthropogenic effects (introduced and endangered species). Once the diversity is known there are problems with comparisons: what should be compared and what should it be compared to and at what taxonomic rank; methods of comparison; kinds of similarity; most samples are unequal; and the validity of generalizations from studies of specific groups can be questioned.

Despite these problems there are 12 broad patterns of occurrence of insects in Manitoba grouped into three categories. Northern elements consist of circumpolar, northwestern and northeastern species. Boreal elements consist of transcontinental (Holarctic or Nearctic) species as well as species which reach their eastern or western limits here. Southern elements are more complex and consist of: species at their eastern limits, as well as eastern deciduous forest, prairie, widespread southern and introduced (mainly agricultural) species. These patterns are composed of many sub-patterns but no data is available about which patterns are contributing less or more species to our fauna. Much further research is required, but a preliminary conclusion is that the high number of patterns of distribution, each indicative of a different source area, is largely responsible for the high diversity of insects in our fauna. The fauna of the Keystone Province may be the key to understanding the dynamics of the Canadian insect fauna.

**ORIGINS AND DISPERSAL OF LYME DISEASE IN NORTH AMERICA.**

T.D. Galloway, Department of Entomology, University of Manitoba.  
R3T 2N2.

Lyme Disease is caused by the spirochaete, Borrelia burgdorferi, and may be transmitted by a variety of Ixodes spp. of ticks. The symptoms of Lyme Disease were first recognized as a distinct pathologic condition in Europe in 1909, and were variously described thereafter, especially the characteristic erythema chronicum migrans, and arthritis. The disease was not officially recognized until 1975, when a number of school children in Old Lyme, Connecticut, all came down with similar symptoms at the same time. Even then, it was not until 1982, that Willy Burgdorfer was able to prove that a spirochaete was responsible for the symptoms of the disease.

Since the identification of the Lyme Disease spirochaete, and along with increased awareness of the disease, its spread has been spectacular. By 1989, Lyme Disease had been reported in all but five U.S. states, and in Quebec, Ontario, Manitoba, Alberta, and British Columbia in Canada, accounting for thousands of clinical human cases each year. If it was not for the fact that Lyme Disease can be effectively treated using antibiotics, it would probably rank as the number one recent public health concern in North America today.

Information on the occurrence of Lyme Disease in vertebrate hosts outweighs that available on known and potential tick vectors. In some areas, anomalies exist in data reported on presumed human exposure to the pathogen, and abundance and distribution of primary vectors. Patterns in the dispersal of Lyme Disease will be discussed, and potential spread in Canada examined.

**RUSSIAN WHEAT APHID: A SOUTH-TEMPERATE APHID INVADES THE CANADIAN PRAIRIE.** R.J. Lamb, Agriculture Canada Research Station, 195 Dafoe Road, Winnipeg, Manitoba. R3T 2M9.

The Russian wheat aphid (RWA), Diuraphis noxia (Mordvilko), first entered Mexico in 1979 or 1980. In March 1986 RWA was discovered in Texas and by July 1988 it spread 1500 km north to southern Alberta and southwestern Saskatchewan. This aphid is a severe pest of wheat, barley and rye and poses a significant threat to these crops in western North America. RWA is more damaging to cereals than other aphids because it injects a powerful toxin. A small number of RWA can induce the characteristic leaf distortion and discoloration, and seriously affect the growth and survival of a young plant.

In its native habitat of south-central Eurasia, the aphid thrives under hot, dry conditions. In the Ukraine, it overwinters as a diapausing egg, as most aphids do in temperate climates. The

North American population must have originated from a southern latitude, perhaps in the middle east or North Africa, because here no diapause forms are produced. Nevertheless RWA overwinters as far north as southern Alberta. The life history of RWA and its unusual temperature and moisture responses will determine the final distribution of the aphid in North America, and its impact on cereal production in the prairie provinces. RWA has spread east slowly compared to the speed at which it spread north, perhaps because it thrives only at low relative humidities. RWA may have reached its northern limit in southwestern Alberta more because of its apparent sensitivity to moisture than cold. However, there is as yet little data on the environmental limits of the species. It is premature to conclude that RWA has reached its final distribution in North America and it may yet spread east to Manitoba.

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#### SUBMITTED PAPERS.

**THE ONSET OF WINTER: A PEA APHID'S POINT OF VIEW.** P.A. MacKay and M.A.H. Smith, Department of Entomology, University of Manitoba R3T 2N2.

Pea aphids, *Acyrtosiphon pisum* (Harris) respond to declining photoperiod in the laboratory by beginning to produce males and oviparae. The period sensitive to photoperiod is between four days prior to and four days after birth of the parent generation. At 20°C, this switch occurs at different photoperiods for different clones. For each clone, the photoperiod that induces ovipara-production is shorter than that inducing male-production. At still shorter photoperiods some summer viviparae are again produced.

The relevance of these among clone and among photoperiod differences to field-grown aphids has not been documented. To rectify this, we collected wild, field-grown 4th instar aphids and field-cage-grown, 4th instar laboratory aphids at Glenlea, Manitoba, from Aug. 15 to Sept. 21, 1989. These were reared to adulthood at 20°C and 20L:4D and 10 daily batches of progeny retained and reared in order to determine their morph.

Some wild aphids collected on Aug. 15 produced males, indicating that they perceived the photoperiod and temperature of the preceding 8 to 10 days as signalling the approach of winter. Perceived field photoperiod on Aug. 1 was between 15.3L:8.7D (sunrise to sunset) and 16.6L:7.4D (sunrise to sunset +2x civil twilight). Accumulation of degree days (above 5°C) was above the long term normal throughout July and August in 1989, therefore in Manitoba in a normal or below normal year, the switch to production

of sexuals might be expected as early as late July. By mid September, wild aphids were again producing some summer forms confirming that pea aphid clones can remain sexual if they disperse into more southern areas with milder winters. Determination of the responses of the field-cage-reared laboratory clones confirm results with field collected wild aphids and allow direct comparisons of field conditions to laboratory conditions.

**THE ROLE OF MUSTARD OILS IN HOST PLANT LOCATION BY CRUCIFER-FEEDING INSECTS.** K. Pivnick, Agriculture Canada Research Station, 107 Science Crescent, Saskatoon, Saskatchewan S7N 0X3.

A large, diverse assemblage of insects feed primarily or exclusively on plants of the family Brassicaceae and many use glucosinolates, characteristic secondary compounds of the Brassicaceae, as oviposition or feeding stimulants. Mustard oils are volatile hydrolysis products of glucosinolates, which are released by most crucifers. These compounds are moderately toxic but are attractive to many crucifer-specialists. Data on release of the most abundant mustard oil, allyl isothiocyanate, from Oriental mustard and changes which occur with plant age and damage are presented emphasizing the general implications for host plant location by insects. Response to mustard oils by two crucifer-feeding insects (the diamondback moth, *Plutella xylostella* and the crucifer flea beetle, *Phyllotreta cruciferae*) is compared to emphasize how behavioural, ecological and life history differences may affect host plant location strategies and the chemical cues involved, including compounds unrelated to mustard oils and glucosinolates.

**LYGUS SPECIES ATTACKING CANOLA IN MANITOBA.** B. Timlick, W.J. Turnock, I. Wise, Agriculture Canada Research Station, 195 Dafoe Road, Winnipeg. R3T 2M9.

Three species of *Lygus* are abundant throughout the crop growing regions of Manitoba. *Lygus lineolaris* (Palisot de Beauvois), *Lygus borealis* (Kelton) and *Lygus desertinus* (Knight) are all found in all cropping districts and have been associated with considerable damage to the seed within the Canola pods. *Lygus lineolaris* is most abundant of the three species in the interlake and lowland regions, while *L. lineolaris* and *L. borealis* are dominant in the upland and northerly locations.

*Lygus* species feed on the buds, flowers and seeds of the developing canola plant. Seed feeding, which causes individual seeds to collapse, affected 10 to 15% of seeds in samples from Manitoba fields from 1985-1989. The numbers of collapsed seeds found from plants taken from the same field.



**THE USE OF MEGACHILE ROTUNDATA (FABRICIUS) IN ALFALFA SEED PRODUCTION IN MANITOBA.** B.G. Fingler, Manitoba Agriculture, 911-401 York Ave, Winnipeg. R3C 0P8.

The alfalfa leafcutter bee, Megachile rotundata (Fabricius), has become widely used to pollinate alfalfa in Manitoba. The "loose-cell" system of leafcutter bee management allows beekeepers to manage the large populations of approximately 50,000 bees/hectare (20,000 bees/acre) that are necessary to adequately pollinate alfalfa. This system also enables them to control bee parasites, predators and disease through various management procedures and permits them to sample their current populations to obtain qualitative estimates of the numbers of viable cells, females and parasites. In some years, beekeepers may obtain excess bees, which they may use to pollinate new alfalfa fields the following year or sell to foreign or domestic markets.

From 1983-1989, pedigreed alfalfa in Manitoba has increased from 2,683 ha (6,630 ac) to 8,434 ha (20,841 ac). This represents a corresponding increase from 20.5% to 34.7% of the total numbers of hectares of pedigreed alfalfa grown in Canada. Alfalfa seed production (pedigreed and common seed) in Manitoba from 1983-1988 has increased from 1,302,00 kg (2,870,000 lb) to 3,493,000 kg (7,700,000 lb).

This rapid expansion of the alfalfa seed industry in Manitoba can be attributed to the following factors: (1) alfalfa seed market conditions have remained fairly stable as compared to other crop commodities, (2) the development of effective leafcutter bee management procedures have resulted in increased bee production, (3) the development of effective field management procedures have resulted in increased seed production, (4) producers, through extension efforts, have become more knowledgeable in dealing with problems associated with managing the bees and fields.

**CAUSES OF RAPID DEVELOPMENT OF PYRETHROID RESISTANCE IN HORN FLIES, HAEMATOBIA IRRITANS (L.) AT GLENLEA, MANITOBA.** F.S. Mwangala, Department of Entomology, University of Manitoba, Winnipeg R3T 2N2.

The selection pressure for resistance being exerted by pyrethroid ear tags was assessed at Glenlea. Hair samples collected on day 14, 28, 56 and 84 post-tagging from the head, neck, body and rump regions. Residue levels were determined by gas chromatography. Flies on cattle were also collected with sweepnets and bioassayed using the impregnated filter paper/petri dish method. Residue levels on hair from the head and neck were higher than residues on the body and rump. Residues found on day 14 were 75-87% higher than residues found on day 84. Residues declined by 3.6-fold per day between day 14 and 28, and by less than 2-fold between day 28 and 84. Log concentration-mortality regression

lines shifted to the right during the season. Shifts were greater early in the season which coincided with higher residues on hair. Slopes of regression lines increased during the season indicating a more homogeneous and resistant population. In spring the pre-treatment regression line shifted upwards to the left indicating a heterogeneous population including susceptible and resistant individuals. In the absence of tags, resistance to pyrethroids was stable throughout the season. It is concluded that the persistent but declining residues on cattle, stability of resistance and possible existence of resistance genes in the horn fly population at Glenlea before tag usage are among the factors responsible for rapid development of resistance to insecticidal tags.

**SEASONAL AND DAILY VARIATION IN STABLE FLY (DIPTERA: MUSCIDAE) ABUNDANCE AT GLENLEA RESEARCH STATION.** W.V. Khumalo, Department of Entomology, University of Manitoba, Winnipeg. R3T 2N2.

Stable fly abundance was studied around the animal confinement facility and pasture at the Glenlea Research Station from May to September, 1988. Stable flies were trapped with Alsynite (TM) fibreglass panel traps coated with Tanglefoot (TM). Traps were operated for nine hours per day once per week at each site. Catches were removed from the traps after a predetermined time interval of one or more hours. Stable fly catches of >100 flies per trap per day were obtained from 21 June through 19 August at the confinement site and catches of >50 flies per ady were obtained from 23 July through 5 August in pasture on each sampling occasion. Peak prevalence on a daily basis occurred during the morning hours when 60-97% of the total catch was obtained on the confinement site at the beginning of sampling until 16 August, then peak abundance occurred in the afternoon, while at the pasture about 55-76% of the total daily catch was obtained in the morning from the start of sampling until July 1 when a shift to the afternoon occurred and continued until 2 September. Throughout the sampling period, catches in the confinement site were always higher than catches in the pasture. Counts of stable flies feeding on cattle in the barn exceeded 15 flies per leg during peak fly abundance.

**DEVELOPMENT OF LYGUS SPP. POPULATIONS IN CANOLA.** J.H.M. Leferink and G. Gerber, Agriculture Canada Research Station, 195 Dafoe Road, Winnipeg, R3T 2M9.

The development of populations of Lygus spp. (Miridae: Hemiptera) was studied in field trials with canola cv. 'Westar' at Glenlea (MB) during the growing season of 1988 and 1989. The trials consisted of four treatments in the form of four seedings which were conducted at 10-day intervals, starting in early May.

Sweepnet samples were taken every third or fourth day from the time the canola reached the four-leaf stage. *Lygus* adults invaded the plots during the early bud-stage. The first *lygus* nymphs appeared at the beginning of the flowering stage. Populations of both nymphs and adults reached their peak densities during the early pod-ripening stages. In 1988 and 1989 *L. lineolaris* (Palisot de Beauvois) was the most abundant *lygus* species, making up 82.9% and 55%, respectively, of all adults collected. *Lygus borealis* (Kelton) and *L. desertinus* Knight together made up 17.1% and 45.0% of the adult population in 1988 and 1989, respectively. Nymphs collected from the trials were reared, resulting in adults of all three species. Generations were completely overlapping. At any one time, nymphs and adults were encountered together.

**CAN AQUATIC INSECTS ADVERSELY AFFECTED BY TOXICANT STRESS BE REPLACED THROUGH NATURAL SUCCESSION BY MORE TOLERANT, BUT FUNCTIONALLY SIMILAR TAXA?** D.A. Williamson, Department of Entomology, University of Manitoba, Winnipeg R3T 2N2 / Manitoba Department of Environment, Bldg. 2, 139 Tuxedo Ave., Winnipeg R3N 0H6.

Change is inevitable in all habitats, even those remote from man's influence. All communities have evolved within the bounds of this change and in response, one species may be replaced by another that is better adapted to the changed conditions. Succession of this type is also thought to occur in response to the presence of toxic materials. Replacement occurs by more tolerant organisms that continue to perform the same role within the community. However, once the disturbance exceeds a certain point, species are lost and not replaced, resulting in a simplified community with altered structure and function. The phenomenon of succession in response to disturbances allows communities a degree of resilience such that they can continue to survive and function in the presence of environmental change. However, it is also known that certain species within some communities are more important than others. Loss of these species without replacement results in the community converting to a new configuration. Environmental managers must be able to identify and protect such species. Two general methods exist for the protection of aquatic organisms. The first method is intended to provide protection to all species in all places at all times. Toxicological data representing no observed effect levels are used. The second method is based upon the premise that not all aquatic organisms require protection. Toxicological data representing no unacceptable effect levels are used. It is that a small number of organisms can be lost from most systems and the function of the lost organisms will be replaced by other, more tolerant organisms. The latter method has been adopted

for routine use in the developed regions of Manitoba. Some of the controversies associated with this method will be discussed. The use of aquatic insects to address some of the scientific uncertainties is proposed.

**EXCHANGE PERIODICALS CURRENTLY RECEIVED  
BY THE ENTOMOLOGICAL SOCIETY OF MANITOBA.**

Many of the members of the ESM may not be aware that the ESM sends a copy of the Proceedings to a number of other entomological societies around the world each year, a tradition begun with the Manitoba Entomologist which is no longer published. A list of these exchanging journals used to be published in the Proceedings, but it has been a number of years since that was last done. It was suggested recently that this list be published again. The journals listed below are received by the library, at Agriculture Canada Research Station, 195 Dafoe Road, Winnipeg.

Acta Entomologica Jugoslavica.  
Acta Entomologica Sinica.  
Acta Faunistica Entomologica Musei Nationalis Pragae.  
Acta Oecologica: Oecologia Applicata.  
Acta Oecologica: Oecologia Generalis.  
Acta Oecologica: Oecologia Plantarum.  
Acta Zoologica Cracoviensia.  
American Museum of Natural History. American Museum Novitates.  
American Museum of Natural History. Bulletin.  
Beiträge zur Entomologie.  
Bolletino dell' Instituto di Entomologia. Bologna.  
Bolletino del Laborat. Entomol. Agraria. Naples.  
Cahiers O.R.S.T.O.M. Serie Entomologie Medicale et Parasitologie.  
Cisti News. NRC Canada.  
Comunicaciones Zoologicas.  
Entomological Society of British Columbia. Proceedings.  
Entomologische Berichten.  
Ethology, ecology and evolution.  
Frustula Entomologica.  
Gembloux, Belgium - Institut Agronomique de L'État. Reprints.  
Iowa Academy of Science, Proceedings.  
Monitore Zoologico Italiano.  
Monografie Fauny Polski.  
Münchener Entomologischen Gesellschaft. Mitteilungen.  
Nachrichtenblatt der Bayerischen Entomologen.  
Natur und Museum.  
Notulae Entomologicae.  
Ökologische Entomologie in Graz.  
Poeyana  
Poljoprivredna Znanstvena Smotra.

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Polska Akademia Nauk. Inst. Zoologiczny. Annales Zoologici.  
Polska Akademia Nauk. Inst. Zoologiczny. Fragmenta Faunistica.  
Polskie Pismo Entomologiczne.  
Redia.  
Reporte de Investigacion del Instituto Ecologia Sistemática.  
Revue d'Entomologie du Québec.  
Search: Agriculture.  
Smithsonian Contributions to Zoology.  
Studi Saresesi. Sezione III. Agraria.  
Swedish Journal of Agricultural Research.  
Tropical Zoology.  
University of California. Publications in Entomology.  
Zastita Bilja (Plant Protection).

The Entomological Society of Manitoba gratefully acknowledges the generous support of this annual meeting by the following companies:

Wild Leitz	Elanco, Division of Eli Lilly Canada
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Rohm and Haas Canada	United Agri Products
Ciba-Geigy Canada	BASF Canada
Uniroyal Chemical	Chipman - ICI
May and Baker Canada.	Hoechst Canada

**A LIST OF THE ANTS OF MANITOBA**

George C. Wheeler and Jeanette Wheeler  
3358 NE 58th Avenue, Silver Springs, FL 32688, U.S.A.

Terry D. Galloway  
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Manitoba, Canada R3T 2N2

Gordon L. Ayre  
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**ABSTRACT**

This list of 52 species of ants collected in Manitoba is based on 505 records from 92 localities. The list consists of 10 species in 3 genera of Myrmicinae, 3 in 2 genera of Dolichoderinae and 39 in 5 genera of Formicinae. Of the Formicinae 23 species are in the genus Formica. A map is provided to aid in finding the localities. The biogeography of the Province is discussed briefly.

**INTRODUCTION**

The ant fauna of Manitoba has never been catalogued, despite treatments of nearby assemblages (e.g. North Dakota by Wheeler and Wheeler 1963; central and southern Alberta by Sharplin 1966). For the students of Manitoba ants Gregg's 1973 article is of limited application. In the first place it was based on "an ecological framework provided by Merriam's life zones," a system long since replaced by the Biome System. He collected at four localities in Manitoba but did not name them. The most important part of the article was the account of his trip to Churchill. He did name the four ant species collected there and gave good descriptions and excellent photographs of the tundra. Ayre (1977) published a short note on nine introduced ant species in Manitoba, collected in a Winnipeg apartment (1 species), and in the tropical house at Assiniboine Park Zoo in Winnipeg (8 species). He speculated that these species were unlikely to become a serious problem in Manitoba, and they are not included in our subsequent treatment. In 1978, Ayre published "Ants", in which he gave an account of ants in general and Manitoba ants in particular. It is illustrated by photographs of four named species, but only one species (Formica obscuripes Forel) was named in the text. The most extensive published account specifically on Manitoba ants is that of O'Neill and Robinson (1977) in which they listed 27 species of ants associated with aphids in the province. Bradley and Hinks (1968) also examined ant-aphid associations and recorded 19 species of ants present in Sandilands Provincial Forest.

Manitoba is a biogeographically diverse province, and has long been of special interest to us (GCW and JW). When we lived in North Dakota, we made two trips of myrmecological interest into Manitoba, 19-22 July 1957 and 26 July 1962. In our collection of Nearctic ants we have 75 records of 27 species for the province. Both Ayre and Galloway began collecting ants in Manitoba in the 1970's, and it was by chance that we had the opportunity to combine our efforts and produce the following checklist of Manitoba ants.

#### The Province of Manitoba

**CLIMATE:** Manitoba's southern and northern boundaries are on the 49° and 60° parallels respectively. This places it in the higher-middle latitudes, which are characterized by great seasonal changes in temperature. At 60°, the solar radiation reaching the earth's outer atmosphere in June is about 20 times that in December. "This is the main reason for Churchill's large annual range of 40 C° based on a July average of 12.6°C and a January average of -27.4°C" (Shaykewich and Weir 1977). Another reason is that the province's midcontinental longitude removes it from oceanic mitigation. To be sure, Hudson Bay is a large body of water, but because of its lee position it has a minimal effect. Furthermore it is frozen for nine months of the year and its water is very cold even in summer (Shaykewich and Weir 1977).

**ELEVATION:** The northeastern two-thirds of Manitoba is lowland, *i.e.*, below 450 m (1500'); the remainder is upland. The lowland is a land of many lakes and rivers and much of it is poorly drained and covered with marsh and bog (muskeg). Along the western and southwestern borders of the province there are five elevated areas: Porcupine Mountain, Duck Mountain (reaching the provincial maximum elevation of 831 m [2726'] at Mount Baldy), Riding Mountain, Turtle Mountain and Pembina Mountain (Shaykewich and Weir 1977).

**BIOMES:** According to Odum's map (1971) three biomes are represented in the province: grassland, coniferous forest and tundra. In "A Naturalist's Guide to the Americas" Connell (1926) separated the vegetation of the province into: (1) The Prairie; (2) The Transition Zone of grassland and deciduous forest (poplar-savanna); (3) The Northern Coniferous Forest; (4) Tundra. Danks and Footitt (1989) mapped four major vegetation zones: prairie, parkland, boreal forest and subarctic. The three systems are really the same, but they differ in nomenclature. The Grassland Biome (= prairie) occupies a very small area forming the southwestern corner of the province. The grasses are tall and deep-rooted mesophytes. "Typical flood plain forests of ash, Manitoba maple, poplar and willow occur along the stream courses. Alkali sloughs are frequent" (Connell 1926). Northeast of the Grassland Biome lies the Ecotone (= transition zone = poplar-savanna = parkland). This is a narrow zone 80 to 160

kilometers (51 to 100 miles) wide. The vegetation is principally mixed grasses with scattered areas of aspen and balsam poplar trees. "This area together with the prairies is the agricultural section of the Province and contains the bulk of the population" (Connell 1926). Next to the Ecotone is the Northern Coniferous Forest Biome, which occupies most of the provincial area. The climax trees are black spruce (*Picea mariana* (Mill.) BSP), white spruce (*Picea glauca* (Moench) Voss) and balsam fir (*Abies balsamea* (L.) Mill.). The tundra is limited to a zone about 280 kilometers (175 miles) wide lying along Hudson Bay and across the northern boundary of the Province. That portion (perhaps a third the width) bordering the Bay and the boundary is described by Danks and Footitt (1989) as continuous permafrost and the remainder as discontinuous permafrost. North of Latitude 55°, there are few towns or highways but many lakes. North of 57° there are no towns, except on the railroad going north to Churchill, and no highways; lakes are extremely numerous.

Gregg (1972: 1084) gave a good description of the tundra and told where ants could be collected near Churchill. "It appeared that rocks of small to moderate size were the most productive, and this can be attributed probably to the greater speed at which they are heated during the daylight hours. Larger stones and boulders lie deeper in the soil and remain permanently cold underneath. Below the ridge, where land levels off and the general topography is very flat, muskeg is present and large areas are covered with melt water. Such locations are probably the least attractive to ants. None were found there. Away from the muskeg and in the areas where ants were collected, the vegetation is in general described as tundra heath. The stature of the plants is, of course, very low, in keeping with the usual nature of tundra vegetation. Most species are only a few inches high, but others may grow a foot or more, and several of the dwarfed and shrubby species may reach 2 to 2½ ft [0.6-0.75 meters]. The floristic composition includes arctic dryad, arctic blueberry, crowberry, Labrador tea, arctic sunflower, arctic daisy, arctic laurel, arctic cotton, arctic birch, several arctic willows, bearberry, grasses, sedges, mosses and crustose, foliose, and fruticose lichens."

#### Sources of Records in Species List

- A = G.L. Ayre coll., Agriculture Canada Research Station, 195 Dafoe Rd., Winnipeg, MB R3T 2M9. The assistance of Frank Matheson is gratefully acknowledged.  
BH = Bradley and Hinks (1968)  
F = A. Francoeur (1973).  
G = T.D. Galloway coll., J. B. Wallis Museum of Entomology, Dept. of Entomology, University of Manitoba, Winnipeg, MB R3T 2N2.  
H = C.G. Hewitt coll., Dominion Entomologist, 1885-1920.



N = Canadian National Collection, Biosystematics Research Centre Agriculture Canada, Ottawa, ON K1A 0C6. The assistance of J. Huber is gratefully acknowledged.

OR = M.C.A. O'Neill and A.G. Robinson (1977), J. B. Wallis Museum of Entomology, University of Manitoba, Winnipeg, MB R3T 2N2.

W = G.C. Wheeler and J. Wheeler coll., 3358 NE 58th Ave., Silver Springs, FL 32688.

#### Plan of the List

The sequence of the subfamilies and genera is that of the Wheelers (1986). The species of each genus are arranged alphabetically. Under each species all the Manitoba localities (=records) are also listed alphabetically. After each locality the name of a collector (or collectors), collection or published source is indicated by an abbreviation in parentheses. To aid in finding the localities we have provided a map of the Province (Fig. 1). A grid is superimposed on this outline. With the aid of the legend one may locate approximately any record in the list. The horizontal lines of the map are close to parallels of latitude. The vertical lines are entirely arbitrary. The only localities north of 57° are in or near Churchill, which is labeled.

Keys for the identification of Manitoba ants are provided by Wheeler and Wheeler (1963;1977).

#### SUBFAMILY MYRMICINAE

##### Myrmica americana Weber

Aweme (N), Glenlea (A), Rennie (N), Sandilands Provincial Forest (BH), Spruce Woods Provincial Park (A), Stockton (G).

##### Myrmica brevinodis Emery

(= incompleta Provancher)

Baldy Mountain (A), Brokenhead River (E. of Sandilands) (G), Churchill (G, Gregg 1972), Crandall (G), Dauphin (N), East Blue Lake (G), Grahamdale (G), Lake Katherine (A), near Portage la Prairie (G), Pine Falls (N), Riding Mountain National Park (W).

##### Myrmica brevispinosa Emery

Baldur (A), Beaconsia (OR), Binscarth (A), Birds Hill Provincial Park (OR), Darwin (N), East Blue Lake (G), Garson (W), Glenlea (G), Lake Katherine (A), Lake Minnewasta (N), Laurie Lake (A), Morden (OR), Pine Falls (N), Portage la Prairie (G, OR), Riding Mountain National Park (W), Riverton (N), Sandilands Provincial Forest (G), Spruce Woods Provincial Park (A, G), Telford (N), Winnipeg (A, G).

Myrmica emeryana Forel

Birds Hill (OR), Birds Hill Provincial Park (OR), Cooks Creek (OR), East Blue Lake (G), Glenlea (A), Lake Katherine (A), Pinawa (A), Riding Mountain National Park (W), Rosa (A), St. Malo (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (OR, W), Spruce Woods Provincial Park (A, G), Telford (N), Whiteshell Provincial Park (OR).

Myrmica fracticornis Emery

Glenlea (A), Lake Katherine (A), La Salle (G), Morden (G), Pine Falls (N), Portage la Prairie (G), Rennie (N), Richer (A), Sandilands Provincial Forest (BH), Sanford (G), Telford (N).

Myrmica monticola Wheeler

Spruce Woods Provincial Forest (W).

Solenopsis molesta (Say)

Birds Hill Provincial Park (OR), Richer (A, G), Rosa (A), Spruce Woods Provincial Park (A).

Leptothorax ambiguus Emery

St. Malo (A).

Leptothorax hirticornis Emery

(=Formicoxenus hirticornis of Francoeur and Loiselle 1985)  
Richer (A).

Leptothorax muscorum (Nylander)

Carberry (N), Churchill (Gregg 1972), Glenlea (A), Lake Katherine (A, G), Morden (G), Richer (A), Riding Mountain National Park (W), Rosa (A), Sandilands Provincial Forest, Spruce Woods Provincial Park (A), Whiteshell Provincial Park (OR).

## SUBFAMILY DOLICHODERINAE

Dolichoderus plagiatus (Mayr)

Birds Hill Provincial Park (OR), Pinawa (OR), Rathwell (OR), Spruce Woods Provincial Forest (W).

Dolichoderus taschenbergi (Mayr)

Aweme (N, OR), Carberry (OR), 2 mi. N. of Forrest (N), Glenlea (A), Richer (A), St. Malo (A), Sandilands (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (G), Telford (N), Treesbank (H, N).

Tapinoma sessile (Say)

Agassiz Provincial Forest (OR), Aweme (N), Baldur (A),

Binscarth (A), Birds Hill Provincial Park (G), East Blue Lake (G), Pelican Lake (A), Pinawa (A), Portage la Prairie (G), Richer (A, G, OR), Rosa (A), St. Malo (A), Sandilands (G), Sandilands Provincial Forest (OR), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Whiteshell Provincial Park (OR), Winnipeg (N).

#### SUBFAMILY FORMICINAE

##### Acanthomyops coloradensis (Wheeler)

Richer (A), Rosa (A), Spruce Woods Provincial Forest (W).

##### Acanthomyops latipes (Walsh)

Sandilands Provincial Forest (BH), Spruce Woods Provincial Forest (G, W), Spruce Woods Provincial Park (A).

##### Acanthomyops occidentalis (Wheeler)

Spruce Woods Provincial Forest (W).

##### Acanthomyops subglaber (Emery)

Garson (W), Giroux (A), St. Malo (A), Spruce Woods Provincial Park (A).

##### Formica altipetens Wheeler

La Salle (G).

##### Formica argentea Wheeler

Garson (W), Glenlea (A), Grahamdale (G), Hecla Island (A), Lake Katherine (A), Northwest Angle Provincial Forest, Richer (A), Rosa (A), Sandilands (G), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Vita (F), Whirlpool Lake (A).

##### Formica bradleyi Wheeler

Aweme (Halverson et al. 1976, N), Carberry (G, N), Onah (G), Portage la Prairie (G), Spruce Woods Provincial Forest (G), Spruce Woods Provincial Park (A, G).

##### Formica dakotensis Emery

Hartney (A), Rosa (A), St. Malo (A).

##### Formica exsectoides Forel

Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A).

##### Formica fossiceps Buren

Pinawa (A), Rennie (N), Sandilands Provincial Forest (BH).

##### Formica fusca Linnaeus

Agassiz Provincial Forest (OR), Aweme (OR), Birds Hill

Provincial Park (OR), Cedar Lake (F), Cormorant Lake (F), Holland (A), La Salle (G), Northwest Angle Provincial Forest (OR), Pelican Lake (A), Pinawa (OR), Pine Falls (N), Richer (OR), Riding Mountain National Park (W), Rosa (A), Sandilands (G), Sandilands Provincial Forest (BH, F, OR), Seven Sisters (G), Spruce Woods Provincial Forest (W), Twin Lakes near Churchill (G), Whiteshell Provincial Park (OR).

Formica hewitti Wheeler

Birds Hill Provincial Park (OR), Churchill (N), Hecla Island (OR), Northwest Angle Provincial Forest (OR), Sandilands Provincial Forest (F, OR).

Formica lasioides Emery

Birds Hill Provincial Park (N), Glenlea (A), Rathwell (OR), Rennie (OR), Riding Mountain National Park (W), Pinawa (OR), Sandilands Provincial Forest (BH, OR), Stony Mountain (OR), Whitemouth Lake (G, OR).

Formica limata Wheeler

Sandilands Provincial Forest (BH).

Formica montana Emery

(= canadensis Francoeur)

Aweme (F), Winnipeg (F, OR).

Formica neogagates Emery

Aweme (G), Birds Hill Provincial Park (N), Portage la Prairie (G), Spruce Woods Provincial Park (A).

Formica neorufibarbis Emery

Aweme (F), Cedar Lake (F), Churchill (F, Gregg 1972, N, OR), Churchill (Rocket Range Road, Mile 3-4) (G), Cormorant Lake (F, N), Fort Churchill (F), Gillam (F), Pine Falls (F, N), Riding Mountain National Park (W), Rennie (F), Riverton (N), Seddons Corner (F), Telford (F, N), Twin Lakes, near Churchill (G).

Formica obscuripes Forel

Aweme (G), Birds Hill Provincial Park (OR), Carberry (OR), Clear Lake (A) Giroux (A), Lake Minnewasta (OR), Langruth (G), Lewis (OR), Miami (A), Morden (OR), Portage la Prairie (OR), Richer (A), Riding Mountain National Park (A), St. Malo (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Park (A), Stony Mountain (OR), Treesbank (H, N).

Formica obscuriventris Mayr

Agassiz Provincial Forest (OR), Lake Minnewasta (OR), Morden (OR), Sandilands Provincial Forest (BH), Spruce Woods Provincial Park (A), Winnipeg (N).

Formica oreas Wheeler

Agassiz Provincial Forest (OR), Aweme (N, OR), Birds Hill (OR), Birds Hill Provincial Park (OR), Carberry (OR), Garson (W), Hartney (A), Lake Minnewasta (OR), Pelican Lake (A), Pleasant Valley (A), Riding Mountain National Park (W), Rosa (A), St. Malo (A), Sandilands (G), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (OR, W), Spruce Woods Provincial Park (A), Stockton (A), Treesbank (H, N), 5.7 km NW of Treesbank (G), Virden (G), Whitemouth Lake (OR).

Formica pergandei Emery

Sandilands Provincial Forest (BH).

Formica puberula Emery

Riding Mountain National Park (W), St. Malo (A), Sandilands Provincial Forest (BH), Spruce Woods Provincial Forest (W).

Formica spatulata Buren

Rathwell (OR), St. Malo (A), Spruce Woods Provincial Park (A).

Formica subintegra Emery

Gillam (N).

Formica subnuda Mayr

Baldur (A), Baldy Mountain (A), Binscarth (A), Birds Hill (OR), Birds Hill Provincial Park (OR), Carberry (OR), East Blue Lake (G), Fortier (OR), Grahamdale (G), Grand Rapids (G), Hartney (A), Hecla Island (OR), Lake Katherine (A), La Salle (G), Laurie Lake (A), Northwest Angle Provincial Forest (OR), Pelican Lake (A), Pinawa (A, OR), Rennie (OR), Richer (A, OR), Riding Mountain National Park (W), Rosa (A), Rosser (G), St. Malo (A, N), Sandilands Provincial Forest (BH, OR), slave raid, 6 km W of Portage la Prairie (G), Spruce Woods Provincial Forest (OR, W), Spruce Woods Provincial Park (A), Whirlpool Lake (A), Whiteshell Provincial Park (OR), Winnipeg (G).

Formica subsericea Say

(= glacialis Wheeler = podzolica Francoeur)

Aweme (F, OR), Baldur (A), Birds Hill (G, OR), Birds Hill Provincial Park (OR), Carberry (OR, W), Dauphin Lake (F), East Blue Lake (G), Glenlea (A), Goose Creek (G), Hartney (F), International Peace Garden (G), Lake Minnewasta (OR), Lewis (OR), Mafeking (F), Morden (OR), Northwest Angle Provincial Park (OR), Paint Lake Provincial Park (G), Pinawa (OR), Rennie (OR), Richer (A, OR), Riding Mountain National Park (A, W), St. Malo (A), Sandilands Provincial Forest (F, OR), slave raid, 6 km W of Portage la Prairie (G), Spruce Woods (F), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Stony Mountain (OR), Swan River (F), Telford (F), Thompson (A, OR), Whitemouth Lake (OR), Whiteshell

Provincial Park (OR), Winnipeg (G, OR).

Formica ulkei Emery

Cooks Creek (OR), Lake Katherine (A), La Salle (G), Portage la Prairie (G), Riding Mountain National Park (W), 5 km E. Seddons Corner (G), Telford (N), Winnipeg (M).

Lasius alienus (Foerster)

Agassiz Provincial Forest (OR), Birds Hill (OR), Carberry (OR), Morden (OR), Pinawa (OR), Portage la Prairie (OR), Rennie (OR), Sandilands (G), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Whiteshell Provincial Park (OR).

Lasius crypticus Wilson

St. Malo (A).

Lasius flavus (Fabricius)

Garson (W), Spruce Woods Provincial Forest (W).

Lasius neoniger Emery

Hartney (A), Portage la Prairie (G), Richer (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Park (A), Telford (N).

Lasius sitkaensis Pergande

(= pallitarsis (Provancher))

Aweme (N), Fortier (OR), Glenlea (A), near Portage la Prairie (G), Riding Mountain National Park (W), St. Agathe (A, G), St. Malo (A), St. Norbert (A, G), Sandilands Provincial Forest (OR), Spruce Woods Provincial Forest (OR), Spruce Woods Provincial Park (A), Stony Mountain (OR), Treesbank (H, N), Whiteshell Provincial Park (OR), Winnipeg (A, G, N, OR).

Lasius subumbratus Viereck

Aweme (N), Spruce Woods Provincial Forest (OR).

Lasius umbratus (Nylander)

Glenlea (A), Hartney (A), Spruce Woods Provincial Park (A).

Polyergus breviceps Emery

Riding Mountain National Park (W), Spruce Woods Provincial Forest (W).

Camponotus herculeanus (Linnaeus)

Churchill (Gregg 1972, N, OR), Darwin (N), Fort Churchill (HBR mile 445) (N), Gillam (N), Goose Creek (G), Hecla Island (A), Lake Katherine (A), Morden (OR), Northwest Angle Provincial Forest (OR), Pikwitonei (N), Pine Falls (N), Pinawa (A, G, OR), Rennie (N, OR),

Riding Mountain National Park (W), Riverton (N), Sandilands (G), Sandilands Provincial Forest (BH), Seddons Corner (N), Seven Sisters (G), Spruce Woods Provincial Forest (OR, W), Teulon (N), Winnipeg (A).

Camponotus nearcticus Emery

Darwin (N), Dauphin (N), Riverton (N), Sandilands Provincial Forest (OR), Seddons Corner (N), Winnipeg (M).

Camponotus noveboracensis (Fitch)

Agassiz Provincial Forest (OR), Aweme (N, OR), Birds Hill Provincial Park (OR), Camp Morton (OR), Dacotah (OR), Darwin (N), Garson (W), Glenlea (A), Hargrave (A), Hecla Island (OR), Hnusa (OR), LaBarrière Park, Winnipeg (OR), Lewis (OR), Morden (OR), Northwest Angle Provincial Forest (OR), Pinawa (A, OR), Portage la Prairie (OR), Rennie (N, OR), Riding Mountain National Park (W), Riverton (N), St. Malo (A), Sandilands Provincial Forest (BH, OR), Spruce Woods Provincial Forest (W), Spruce Woods Provincial Park (A), Stony Mountain (OR), Telford (N), Whitemouth Lake (A, G, OR), Whiteshell Provincial Park (OR), Winnipeg (A, OR).

Camponotus vicinus Mayr

Pinawa (A).

**Biogeography of Manitoba ants**

Latitudinal diversity is an interesting aspect of biogeography. This is manifest in most taxa by the decreasing gradient in number of species away from the equator. We have taken as an example the number of species of Formicidae in Costa Rica and the states and provinces touching the 100th Meridian. (See Table I.) Although the westernmost edge of Costa Rica is only 85°, we chose it because we could make a satisfactory list of species from Kempf's 1972 catalogue. Because Texas is so large we have eliminated the species from the extreme west, i.e. west of 103°.

Manitoba occupies a unique position: it is "at the end of the line". Even within the province there is a gradient: the 52 species are concentrated in the southern half; north of that there are only four species at Churchill, and after that, no records in Manitoba.

Table 1. Number of species recorded in subfamilies of Formicidae.

SUBFAMILY	Costa Rica	Texas	Okla.	N. Dak.	Man.
Ponerinae	66	14	7	1	-
Cerapachyinae	1	1	-	-	-
Dorylinae	29	16	8	-	-
Pseudomyrmecinae	24	-	-	-	-
Myrmicinae	124	94	38	22	10
Dolichoderinae	32	9	7	5	3
Formicinae	53	47	28	58	39
TOTAL	329	181	88	86	52

If the family is broken down into its subfamilies, there is a tendency for the Formicinae, which is second in number to switch with the Myrmicinae which ranks first in the Neotropical and Nearctic faunas. The gradient is reversed at the generic level, due largely to the increasing northern dominance of the genus *Formica*. In Costa Rica there is none; in Texas there are 8 species of *Formica*, which is 4% of the total; Oklahoma has 3 (3%); North Dakota has 34 (39%); Manitoba has 23 (44%).

#### **Especially Interesting Manitoba ants**

Farthest North: *Leptothorax muscorum* is a small and elusive ant about 3 mm long. Nevertheless it is quite a distinguished species, for it ranges farther north than any other ant species in the Western Hemisphere. It is recorded from Richard Island, Kiduit Bay, in the Arctic Ocean, at lat. 69° 32', long. 133° 47', in Mackenzie Territory (Brown 1955: 49). "Of all the ants occurring in North America, *Leptothorax muscorum* is the species best able to survive in extreme Arctic-alpine conditions. Throughout boreal and alpine North America within the limits of the timbered area, *L. muscorum* is found in company with *Camponotus herculeanus* (Linnaeus) and *Formica rufibarbis* Emery, the two dominant ants of the region." (Brown 1955: 47)

Churchill at lat. 58° 45' is at the northern limit for ants



recorded in Manitoba. It is far south of the continental limit, but its ant fauna comprises only four species: the three mentioned above plus Myrmica brevinodis.

**The Sand-Hill Ant:** Few ants are limited to a particular kind of soil. Formica bradleyi, however, is found only in very sandy soil, where it nests at the base of pioneer grasses. Galloway has found it in the sandy, beach-ridge habitat on the west side of glacial Lake Agassiz. The records for the Portage la Prairie area are from an old delta, including some of the black Olmassippi sands. He has always found the workers associated with aphids, which were aggressively defended by the ants. An extensive study of this interesting species was published by Halverson et al. (1976).

**Thatching Ants:** Most of the nest is underground but it is surmounted by a dome-shaped mound. A typical mound is about 63 cm (25 inches) in diameter and 30 cm (12 inches) high. It is constructed of twigs, grass blades, dried herbaceous stems or any other slender bits of material assembled by the workers from the neighbouring vegetation. The thatching ants reported from Manitoba are Formica obscuripes, F. obscuriventris and F. oreas.

**Mound-Builders:** The mound-builders in Manitoba are Formica exsectoides and F. ulkei. They are usually found in openings in forests. The conoidal mounds are composed of excavated soil and are covered by a thin crust of freshly mined soil particles mixed irregularly with plant debris brought in by the ants and that which has fallen onto the surface. The mounds of F. ulkei were extraordinarily abundant in Dunn County, North Dakota, where they measured from 25 cm (10 inches) in diameter and 8 cm (3 inches) high to 293 cm (117 inches) by 85 cm (34 inches) (Wheeler and Wheeler 1963).

**Obligatory Slave-Makers:** Obligatory slave-makers are incapable of performing any of the nest functions and are therefore wholly dependent upon their slaves. The story of how they raid the nests of some species of Formica to get their slaves is fascinating but too long for this essay (see Wheeler and Wheeler 1986). The only Manitoba slave-maker is Polyergus breviceps, which has been taken only twice in Manitoba: Spruce Woods Provincial Park with Formica argentea as slaves and Riding Mountain National Park with Formica neorufibarbis as slaves.

**Facultative Slave-Makers:** These are in the genus Formica and their slaves are other species of Formica. They are, however, capable of performing all necessary nest functions; hence they can, and often do, get along without slaves. The following species of this group have been taken in Manitoba: F. pergandei, F. puberula,

F. subintegra and F. subnuda.

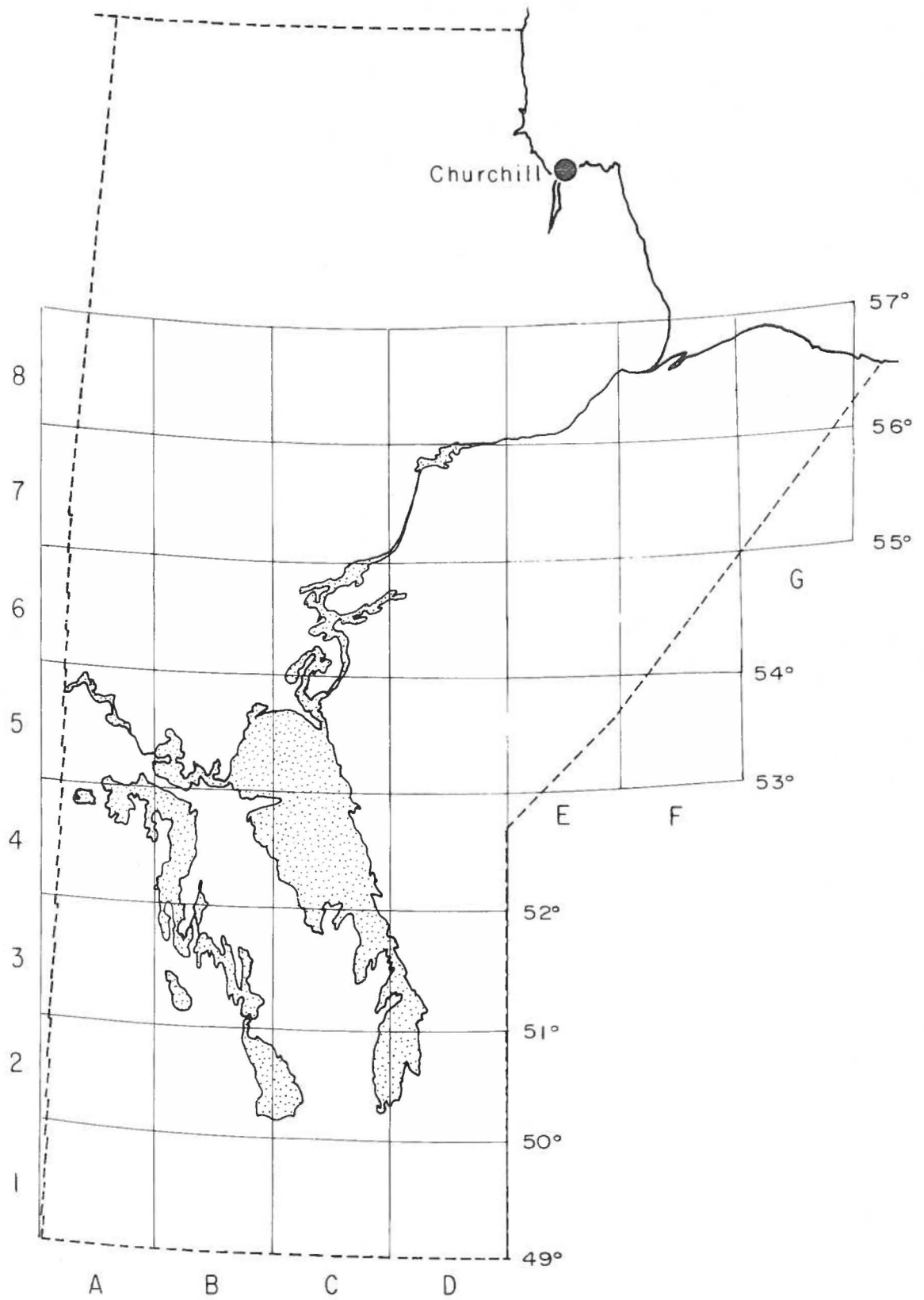
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**FIGURE 1.** Map for localities of ants collected in Manitoba. The letter-number combination on the left of the name is the square in which the locality may be placed; more precise location can then be determined on a conventional map. Horizontal lines represent approximate parallels of latitude; the vertical lines are entirely arbitrary. The only localities north of 57° are in or near Churchill, which is labeled.

D2 Agassiz Provincial Forest	C3 Hnaua
B1 Aweme	B1 Holland
B1 Baldur	A1 International Peace Garden
A3 Baldy Mountain	C1 Labarriere Park, Winnipeg
D2 Beaconia	B2 Lake Katherine
A2 Binscarth	C1 Lake Minnewasta
C1 Birds Hill	B2 Langruth
C1 Birds Hill Provincial Park	C1 La Salle
D1 Brokenhead River	A3 Laurie Lake
(Sandilands Provincial Forest)	C1 Lewis
C2 Camp Morton	A4 Mafeking
B1 Carberry	B1 Miami
B5 Cedar Lake	C1 Morden
58°45'N, 94°10'W Churchill	D1 Northwest Angle Provincial Forest
B2 Clear Lake	B1 Onah
C1 Cooks Creek	C7 Paint Lake Provincial Park
A5 Cormorant Lake	B1 Pelican Lake
A2 Crandall	D7 Pikwitonei
C1 Dacotah	D2 Pinawa
D1 Darwin	D2 Pine Falls
B3 Dauphin	A3 Pleasant Valley
B3 Dauphin Lake	C1 Portage la Prairie
A3 East Blue Lake	B1 Rathwell
(in Duck Mountain Provincial Park)	D1 Rennie
B2 Forrest	D1 Richer
C1 Fortier	A-B2 Riding Mountain National Park
58°45'N, 94°5'W Fort Churchill	C3 Riverton
D2 Garson	D1 Rosa
D8 Gillam	C1 Rosser
D1 Giroux	C1 St. Agathe
C1 Glenlea	C1 St. Malo
58°50'N, 94°6'W Goose Creek	C1 St. Norbert
(20 km S. of Churchill)	D1 Sandilands
B5 Grand Rapids	D1 Sandilands Provincial Forest
A1 Hargrave	C1 Sanford
A1 Hartney	D2 Seddons Corner
D3 Hecla Island	D2 Seven Sisters

B1 slave raid, 6 km  
    W. of Portage la Prairie  
B1 Spruce Woods  
B1 Spruce Woods Provincial Forest  
B1 Spruce Woods Provincial Park  
B1 Stockton  
C2 Stony Mountain  
A4 Swan River  
D1 Telford  
C2 Teulon  
C7 Thompson  
B1 Treesbank  
B1 5.7 km NW. of Treesbank  
58°38'N, 93°49'W Twin Lakes  
A1 Virden  
B1 Vita  
A2 Whirlpool Lake  
D1 Whitemouth Lake  
D1-2 Whiteshell Provincial Park  
C1 Winnipeg



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