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ENTOMOLOGICAL SOCIETY OF MANITOBA

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Wm. Hanec
Editor-Librarian.

Proceedings of the

ENTOMOLOGICAL SOCIETY OF MANITOBA

Vol. 16 1960

CONTENTS

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Proceedings of the

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INTRODUCTION

The year 1960 was another successful year for the Entomological Society of Manitoba, although there were no spectacular or unusual events. One action taken by the Society during 1960 will eventually result in great activity among our Members. I refer to our invitation to the Entomological Society of Canada to meet with us in Manitoba in 1962. I must take this opportunity to urge all our local members to assist our 1961 Executive, and future Committees, in preparations for the National Meeting in 1962. The whole-hearted cooperation of everyone will ensure a meeting which will be a credit to Manitoba.

During the year the Society lost one of its most faithful members when Mr. W. A. Reeks moved to Ontario. To replace him we weldome Dr. Frank Webb.

All members of our Society congratulate Mr. J. B. Wallis on his election to Honorary Membership in the Entomological Society of Canada. We are pleased also to note at this time the continued good health of our Honorary President, Prof. A. V. Mitchener and to wish him many more years of peace and plenty.

An innovation this year was introduced for the Scientific Session of the Annual Meeting, when the Department of Entomology of the University of Manitoba supplied the entire programme, featuring current research in the Department.

It was an honor and a pleasure to be President of the Entomological Society of Manitoba in 1960, and any small success I may have had is due in large part to the able assistance of the Executive and all the Members.

A. G. Robinson
President.

SPRING MEETING

The spring meeting, in the form of a combined business-dinner meeting, was held at Zoratti's Restaurant, Winnipeg, May 6, 1960, under the chairmanship of A. G. Robinson.

Minutes: W. R. Allen moved that the minutes of the 1959 fall meeting be adopted as read. Seconded by T. V. Cole. Carried.

Report of the Treasurer: In the absence of the treasurer, W. B. Fox, P. H. Westdal moved that an audited treasurer's report be deferred until the fall meeting. Seconded by J. B. Wallis. Carried.

Report of the Editor: The editor, W. Hanec, gave the following report: The Proceedings of the Entomological Society of Manitoba for 1959 have now been typed and will be mailed to the members before the end of May, 1960. The contents include all the scientific papers which were presented during the fall meeting of the Society in 1959. New editions to the Society's Library, changes in the constitution of the Society as well as the list of members are also included in the Proceedings. For the first time the Proceedings were typed on an electric typewriter and we feel that this procedure will improve the format considerably. The electric typewriter was generously loaned by the IBM Company of Winnipeg. The Editor recommends that the Secretary write a letter to the IBM people, thanking them for the use of their machine. The editor moved the adoption of his report. Seconded by P. H. Westdal.

Report of the Common Names Committee: H. R. Wong was unable to attend the meeting but sent the following report to the secretary: No common name for insects or mites was submitted to the Committee since the last general meeting. No word has been received on the fate of the common name hairy mite for Glycyphagus destructor (Schrank). H. R. Wong moved the adoption of his report. Seconded by S. R. Loschiavo.

Other Business: The secretary, S. R. Loschiavo, read a letter from the Entomological Society of Canada concerning financial contributions to the Zoological Record. The Entomological Society of Alberta has voted to make an annual contribution to this publication in support of the valuable work carried on by the Zoological Society and recommended to the Entomological Society of Canada that consideration be given to making a similar contribution. The national society voted to send $100.00 to the Zoological Record and suggested that each regional society consider making individual contributions. It was moved by W. R. Allen and seconded by R. J. Heron that the Entomological Society of Manitoba defer making a decision on the question of a financial contribution to the Zoological Record until the fall meeting of the Society. Carried.

The secretary read a letter from the president of the Entomological Society of Canada, B. Hocking, informing the Manitoba Society about the list of

subjects to be discussed at meetings of the Seventh Commonwealth Entomological Conference to be held July 6 - 15, 1960. Visitors from Canada who will be in Europe for the International Congress of Entomology or for other purposes will be welcome at the open meetings. The secretary informed the meeting that the list of proposed subjects for discussion was available to interested members.

A. J. Thorsteinson moved that the secretary write a letter of appreciation to W. A. Reeks for his many years of service to the Entomological Society of Manitoba. Seconded by W. R. Allen. Carried.

A. J. Thorsteinson moved that during attendance at the meetings of the Board of Directors of the Entomological Society of Canada, our regional director invite the National Society to meet with the Entomological Society of Manitoba in 1963. Seconded by J. B. Wallis. Carried.

There being no further business the chairman adjourned the meeting.

After the business meeting the chairman introduced the guest speaker, Dr. G. Voss, Director of the Assiniboine Park Zoo who delivered a fascinating address on his immediate and long - term plans for improving the Winnipeg Zoo. He illustrated his talk with photographs exemplifying good zoo management in different parts of the world and with sketches and designs for the proposed subject. Dr. Voss's dedication to his work was reflected in the enthusiasm and emphatic manner in which he gave his address. R. J. Heron thanked the speaker on behalf of the Society.

ENTOMOLOGICAL SOCIETY OF MANITOBA FINANCIAL STATEMENT

AS OF NOVEMBER 15, 1960

Receipts

Balance on hand (previous audited statment Dec. 30/59	$ 163.07
Fees	130.00
Sale of Proceedings	1.00
Interest on account No. 6519	3.58
	$ 297.65

Expenditures

Bank transfer charge	$ 1.00
Type of Proceedings	25.00
Typewriter ribbon	2.50
Banquet Speaker Dinner	2.50
Receipt book	.15
Fees to Ent. Soc. of Canada	96.00
Exchange on cheques	.30
	$ 127.45
	$170.20

Bank Balances

#6519 - Savings	$ 133.76
Current Account	36.44
	$ 170.20

W.B. Fox
Treasurer.

ABSTRACTS OF SCIENTIFIC PAPERS PRESENTED

The programme for the Scientific Session of the Society consisted of reports on current research work in the Department of Entomology of the University of Manitoba. Only abstracts of these reports are being published in this issue of the Proceedings because detailed reports will be published in scientific journals in the near future. Anyone interested in obtaining reprints is asked to contact the authors of the abstracts. Reprints will be sent out as soon as they are available.

SOME FACTORS AFFECTING THE FLIGHT BEHAVIOUR OF PRAIRIE MOSQUITOES

Wm. Hanec
Department of Entomology
The University of Manitoba

This knowledge of the meteorological factors which influence the movement of mosquitoes are important both for better understanding of the behaviour of these insects and also for control purposes especially over large areas. The problem was studied by two methods: (1) the release and re-capture of radioactive mosquitoes and (2) by trapping mosquitoes with directional traps. The catches were correlated with various meteorological data obtained from the same locality as the traps.

Larvae were treated with radioactive phosphorous and allowed to mature and emerge as adults in an area which was surrounded by mosquito traps ranging from one to three miles distant from the release point. About 400,000 larvae were tagged and only two radioactive adults (Aedes vexans) were recaptured. Both were caught five weeks after emergence and about two miles from the release point. The small number of recaptured adults does not offer much information to elucidate the dispersal behaviour of mosquitoes. It does show that the insect can live and fly for at least five weeks.

Tagging was confined to June because the remainder of the summer of 1960 was extremely dry and larval development was curtailed.

The directional trapping was done by suspending four mosquito traps to face north, west, south and east. Instruments for measuring the wind speed and direction, temperature, relative humidity and barometric pressure were located near the traps. The traps were operated from June 4 to August 10, 1960. Again, the dry summer weather caused many of the catches to be discarded because too few insects were caught in the traps. The results indicate that mosquitoes move against the wind provided that the velocity of the wind does not exceed 15 m.p.h. Actually the apparent limiting windspeed is too high because mosquitoes generally do not move when the wind blows over 3 m.p.h. However, the recording devices indicate that in many instances when the hourly average was 15 m.p.h., the speed

actually fluctuated from calm to 20 m.p.h. or more. This problem should be investigated further, perhaps by correlating the biting rate and windspeed.

THE OLFACTORY RESPONSES OF MOSQUITOES AND STABLE FLIES TO SOME NATURAL CHEMICALS

A. J. Thorsteinson
Department of Entomology
The University of Manitoba

The stable fly is a convenient laboratory insect and can be studied through the winter when other blood sucking flies are not available. A number of fatty acids have been investigated in our laboratory for repellency to this insect. Pelargonic acid is the most effective but there is some indication that it may cause dermatitis in young livestock.

The odours arising from vegetation in an insecticidal barrier may influence its success. We found that the odours of sweet clover, red clover and mustard blossoms "attract" mosquitoes (probably an arrestant effect). Extracts of rose flowers were attractive while extracts of lilac, strawberry and pure coumarin were repellant. Sweet clover honey is about twice as attractive as water while buckwheat honey is six times as attractive as water.

ORIENTATION BEHAVIOUR OF TABANIDS AND BLACK FLIES TO COLORED SILHOUETTES OF VARIOUS SHAPES

Wm. Hanec
Department of Entomology
The University of Manitoba

Horse flies are attracted to certain colors and avoid others. The wavelengths of light corresponding to black, blue and red are the most attractive. Green and yellow colours are least attractive. This reaction can be explained in terms of reflectance differences between the silhouette colour and the background. One tabanid species, T. illotus, was attracted to both dark and white silhouettes.

Horse flies also show a definite preference for three dimensional silhouettes with a curved surface such as spheres and cylinders. Two dimensional or flat silhouettes are less attractive.

The trap developed for the field studies on horse flies has been found useful also for investigations of black flies in the Whiteshell area of Manitoba. The same colours and shapes of silhouettes attractive to horse flies are also attractive to black flies.

The scope of the study is extensive and included trials of insecticides and repellants but is mainly concerned with an experimental study of the behaviour patterns of horse flies and black flies. Information about behaviour is basic to successful control with chemicals. For example, it is intended to apply these findings to lure horse flies to powerful insecticides.

SEASONAL ACTIVITIES OF HORSE FLIES AND BLACK FLIES

G. K. Bracken
Department of Entomology
The University of Manitoba

During the investigation of the host orientation of these biting flies, data was obtained on the species present, the seasonal activity of the adults and to a lesser extent their regional distribution. This information was obtained by the use of traps.

Twenty-nine species of horse flies have been identified from trap captures. Twenty-five of these were represented in the Whiteshell area, eight in the Interlake region, and five in the La Salle area. Sharp regional restrictions in some of the more prevalent species were evident. For example in 1959 Tabanus typhus made up 47.3% of the horse flies captured in the Whiteshell area but no specimen of this species was taken in the other areas. Conversely Tabanus similis (= T. lineola scutellaris) was prominent in the Interlake region but was not found in the Whiteshell area. Chrysops aestuans was much more abundant at Raeburn than at Lake Francis only 35 miles away.

Although the seasonal distribution of individual species varies horse flies generally appear in the latter part of May, reach a peak in June and persist into mid-August.

The seasonal activity of black flies in 1960 reached a peak in mid-June in the Whiteshell area but fell off by mid-July. In 1959, however, black flies were prevalent in this area well into September. The extremely dry weather during the summer of 1960 could possibly account for this difference. Simulium decorum, S. vittatum and S. venastrum were the prevalent species taken in the Whiteshell. Only larvae of Cenephia decotensis, a non-biting species, were found in this area. In the La Salle area Cenephia decotensis was the most abundant species. Some specimens of the other three species were also taken. Specimens of S. vittatum and S. decorum were taken in the Interlake area in 1960.

CHEMOSENSORY INFLUENCE OF ODOUROUS PLANT CONSTITUENTS ON SOME PHYTOPHAGOUS INSECTS

A. J. Thorsteinson
Department of Entomology
The University of Manitoba

Grasshopper Research

In our studies we have found that grasshoppers possess a well developed sense of taste and smell. In particular, certain chemical constituents of plants such as alkaloids are deterrent to grasshopper feeding. Canadian chemists have established that alkaloids occur in some varieties of barley. We have established that the barley alkaloids, hordenine and gramine reduce grasshopper feeding. We have also screened 4,200 barley seedlings including 32 varieties and have selected 85 apparently resistant plants. The progeny of these plants tend to be more resistant than the varieties from which they were selected. Some of the selections were obtained from adapted malting and feed barley varieties such as Parkland, Montcalm and Vantmore.

Our studies indicate further that the odour of crop plants is significantly involved in the susceptibility or resistance of crop plants to grasshoppers. This is seen most clearly in the resistant sorghum variety Hegari 392 which produces a volatile repellent substance. We have found that some alcohols and aldehydes found in leaves are repellent and others are attractive. We are seeking to apply this information in our studies of insect resistance of plants.

Sweet Clover Weevil Investigations

Laboratory and field studies established that the sweet clover weevil flies readily only when temperature and light intensity are high and wind speed and humidity are low. The weevils are exposed to these conditions only in May before the crop growth is much advanced. We would expect mass flights that would threaten infestation of new plantings only at this time. A simple trap baited with coumarin (sweet clover odour) was developed. The use of this trap confirmed that the main flights occur in May. This trap can also provide a means for prompt detection of weevil hazard to sweet clover crops and thereby increase the value of control with insecticides.

Flea Beetles

Traps baited with mustard oil (allyl isothiocyanate) caught large numbers of flea beetles in 1960 several days before infestations of these insects were discovered in fields of rape. This is another example of the potential use of "early

warning" surveys based on baited traps. It is hoped that this method can be extended to detection of other insects, for example root maggot flies. Experimental studies on the sense of smell of insects in the laboratory and the field are planned with this object in view.

Diamond-back Moth Studies

Oviposition responses to natural and artificial substrates were investigated. More eggs were deposited on plants that contain isothiocyanates (natural hosts). Depletion of isothiocyanate content by sulfur-deficient plant nutrition appears to reduce attractiveness of host plants as egg substrates. Eggs are laid preferentially in concavities of leaves or stems. Significantly more eggs are laid on dimpled than smooth polyvinyl plastic surfaces. On both types of plastic substrate more eggs are laid if allyl isothiocyanate or mustard leaf juice is added. Mustard leaf juice contains allyl isothiocyanate but is more stimulating to oviposition indicating that other factors contribute to the total effect.

Although the coumarin in Melilotus sp. tends to inhibit oviposition, Plutella may be induced to increase egg deposition on such plants by treating them with allyl isothiocyanate. Unknown inhibitory constituents in tomato leaves prevent egg laying even in the presence of allyl isothiocyanate. It was that inhibitory chemical influences as well as positive chemical stimuli and texture of the surface are all significant factors.

EFFECT OF SOME HERBICIDES AND PLANT GROWTH REGULATORS ON THE PEA APHID CAGED ON TREATED BROAD BEAN PLANTS

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The University of Manitoba

The data from this research project have already been presented elsewhere (Robinson 1959, 1960) or are to be published (Robinson, 1961).

This study was initiated to determine possible effects of the widespread use of herbicides on the arthropod fauna. It is reasonable to assume that the various chemical companies concerned have tested the herbicides for insecticidal activity, otherwise they would probably be offered for sale as insecticides. However, one can also assume that they have not been tested against very many species of insects on a wide variety of plants, under field conditions. Also their effects on fecundity of insects would not have been determined. One might conjecture that some of them are perhaps beneficial in some way to insects feeding on the treated plants, particularly with those herbicides which act as plant hormones.

The test animal chosen was the pea aphid, Acyrthosiphon pisum (Harris), and the plants to be treated were broad beans, Vicia faba L. The broad beans were grown in soil until 3 - 4 inches tall, and then transferred to vermiculite in 3 - 1/2 inch clay pots. Plants were treated with the herbicides or plant growth regulators by two methods, root absorption and leaf dipping. The aphids used were all from a clone. The wingless summer form, the apterous vivipara, was used. They were for any one test approximately the same age (within 48 hours). All tests were conducted in the greenhouse, or in a Plant Growth Cabinet at 70°F.

The final data were counts made on fecundity and possible mortality to pea aphids caged on treated plants for 5 days.

In all, thirty herbicides or plant growth regulators were tested for their effects on the pea aphid on treated broad beans, each by root absorption and by dipping lower leaves. The thirty were chosen to represent all herbicides commonly in use or under test in western Canada at present, and also to represent as wide a range of chemicals as possible. In twenty - seven of the thirty, there was no significant mortality to the pea aphids after five days caged on treated plants, and no significant increases or decreases in fecundity. The three which showed some differences were maleic hydrazide (MH), amitrole (amino triazole) and Zytron (a phosphoro-amidothioate).

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Robinson, A. G. 1959. Note on fecundity of the pea aphid, Acyrthosiphon pisum (Harris), caged on broad bean, Vicia faba L., treated with various plant growth regulators. Canadian Ent. 91: 527-528.

Robinson, A. G. 1960. Effect of maleic hydrazide and other plant growth regulators on the pea aphid Acyrthosiphon pisum (Harris), caged on broad bean, Vicia faba L. Canadian Ent. 92: 494-499.

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APHID RESISTANCE IN BARLEY VARIETIES

Sze-Jih Hsu and A. G. Robinson
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Aphid resistance in barley varieties is being investigated by the senior author both in the greenhouse and in field plots at the University of Manitoba. Some explanatory tests were conducted in 1960, and the results reported here must be regarded as very preliminary in nature. The species of aphid was identified by Dr. W. R. Richards, Ottawa, as the oat-birdcherry aphid, Rhopalosiphum padi (L.). It is regarded as an efficient vector of the virus disease barley yellow dwarf.

1. Resistance of barley varieties in field plots to the oat-birdcherry aphid, Rhopalosiphum padi (L.)

Seeds of 270 varieties of barley were obtained from Dr. K. Buchannon of the Canada Department of Agriculture Research Laboratory, Winnipeg. These were planted in the spring of 1960 in hills in the field and 268 varieties germinated. Two weeks after seeding, two adult apterous viviparae were placed on one plant in each hill, and covered with an organdy cage. Counts of progeny produced in the cages during the first seven days are shown in Table I. Plant resistance in terms of aphid fecundity was measured in six groups.

TABLE I

Resistance among 268 varieties of barley to Rhopalosiphum padi (L.) as shown by fecundity of two females caged for seven days on single plants

Group	1	2	3	4	5	6
No. of nymphs per plant in 7 days	0-20	21-40	41-60	61-80	81-100	100+
No. of varieties in group	145	65	15	11	3	29

The data in Table I indicate that varieties in Groups 3, 4, 5 and 6 are more susceptible than those in Groups 1 and 2.

The same aphids were allowed to remain in the cages and total counts of aphids present when plants were headed out were recorded. Counts were also made on single plants not enclosed in cages, which had become naturally infested. These populations were subject to attacks by parasites and predators. Because of very large populations present on some plants, plant resistance in terms of aphid fecundity was measured as N = no aphids present, S = less than 100 aphids, M = 100 - 200, and L - more than 200 aphids (or none, small, medium, large). These data are recorded in Table II from plants of the 268 original varieties which survived.

TABLE II

Resistance among surviving plants of the 268 varieties of barley to Rhopalosiphum padi L., as shown by total counts of aphids present when plants were headed out, on both caged and uncaged single plants

	Aphids enclosed				Aphids not enclosed			
Groups	N	S	M	L	N	S	M	L
No. of varieties in group	5	151	33	78	24	171	33	35

2. Susceptibility of nine common barley varieties in the field to Rhopalosiphum padi

Nine barley varieties commonly grown in western Canada were seeded in single rows nine feet long. When the plants were at the four leaf stage, ten single plants of each variety were infested each with two adult apterous viviparae and covered with an organdy cage. At intervals of five days the number of young was counted, and then the same procedure was repeated using two new aphids on a new plant, ten plants for each variety. This continued at five day intervals until harvest time.

Population counts were also made at harvest time on the other plants which had not been used for cage experiments. Numbers of aphids present were rated as High = more than 200 aphids per plant; Intermediate = 100 - 200; and Low = less than 100 aphids per plant. Results are shown in Table III.

TABLE III

Susceptibility of nine varieties of barley to Rhopalosiphum padi, as indicated by total populations from natural infestations present at harvest time

	High (200 +)	Intermediate (100-200)	Low (0-100)
Varieties	Gartons Swan Parkland Traill	Husky Montcalm O. A. C. 21	Vantage Herta

These natural infestations were subject to parasites and predators, and this could account for the low susceptibility indicated for Vantage and Herta varieties.

3. Studies of resistance to Rhopalosiphum padi in 39 varieties of barley in the greenhouse.

Forty varieties of the two-hundred and seventy mentioned above were planted in pots in the greenhouse, and thirty-nine germinated. One adult apterous vivipara was caged on a single plant, replicated five times for each variety, and progeny counted at the end of seven days. Results are shown in Table IV.

TABLE IV

Resistance of 39 barley varieties in the greenhouse to Rhopalosiphum padi, based on number of progeny counted at the end of 7 days

No. of nymphs present at end of 7 days	0-20	21-40	41-60	61-80	81-100	100+
No. of varieties	7	8	11	3	6	4

All seven of the varieties in the 0-20 group in Table IV also occur in the 0-20 group of varieties with low susceptibility shown in Table I.

Using the same 39 varieties as above, aphids were allowed to reproduce freely inside cages on the plants, until the barley headed out. Table V shows the results, with S = less than 100 aphids per plant, M = 100-200, and L = more than 200 aphids per plant.

TABLE V

Resistance of 39 barley varieties in the greenhouse to Rhopalosiphum padi, based on total progeny produced by heading time

No. of aphids per plant	S (0-100)	M (101-200)	L (200+)
No. of varieties	2	33	4

4. Observations on an infestation of corn leaf aphid, Rhopalosiphum maidis (Fitch), on barley varieties of the world germ plasm.

An examination of 2,285 varieties of barley of the world germ plasm being increased by Canada Agriculture Research Laboratory was made on July 19, 1960. A heavy natural infestation of corn leaf aphid was present. The varieties were in clumps or hills, and were to be sprayed with malathion next day, so there was no opportunity to examine individual plants in the time available. Three arbitrary categories of severe, moderate and light were created. Parasites and predators were abundant. of the 2,285 varieties, 1,787 were regarded as severe, 493 as moderate, and 5 as light. Infestations on these five varieties might have been reduced to the light category by parasites and predators.

Future plans for this research project include investigations of resistance (antibiosis and tolerance) in barley varieties of the Canadian Genetic Collection of Barley. Material from this collection has been very kindly made available by Dr. R. Loiselle, Ottawa.