

PRESIDENT FORBES: The third paper of the series is "Insects of the Year in Iowa," by Mr. R. L. Webster.

INSECTS OF THE YEAR IN IOWA

By R. L. WEBSTER, Ames, Iowa

The following notes on insect injuries in Iowa during the past year are taken from office correspondence of Prof. H. E. Summers and from observations of the writer.

The English grain louse, *Macrosiphum granaria*, which was so common in Iowa and Minnesota last year, has been hardly noticeable during the past season. Early in the spring it looked as if this species might again threaten the wheat and oat crop, as it did last year. Winged forms of *Macrosiphum granaria* appeared in plots of winter wheat at Ames on April 11th. Just where these winged forms came from is unknown. Certainly they did not come from the young nymphs on the wheat, for only the very young progeny of the winged forms themselves were found. Had the species spent the winter on the grain there should have been some pupæ or older nymphs present. Moreover, the plots had been examined almost daily for several weeks preceding and no traces of aphids of any species had been found. The wind had been in the south for two or three days previous, so it is possible that the insect had been blown in. Were the time later in the spring, a migration from one food plant to another would be probable, but at this time of the season I do not know from what plant the aphid would migrate. Last year I found the winged forms of this species at Albert Lea, Minnesota, May 20th, the first appearance of the insect in any form in Minnesota that spring. These winged forms had also apparently only recently reached the grain from some other situation.

The spring grain aphid, or green bug, *Toxoptera graminum*, was also scarce in Iowa this year. Not until July 8th were any specimens found, at which time some apterous forms appeared on volunteer oats. These were found along the right of way of the C. & N. W. Railway, west of Ames. What was probably the same species was found at Council Bluffs on August 6th, but nowhere else in the state. Neither this nor the preceding species were found in southern Iowa in March, when a thorough search was made for them in fields of winter wheat. The wheat head army worm, *Heliothia albilinea*, was very common over the state during July, especially upon timothy. The stalk borer, *Papaipema nitela*, was also common during the summer, boring in corn and oats. The clover seed caterpillar, *Enarmonia in-*

terstinctana, has been in clover fields in the vicinity of Ames. A rather uncommon plant louse, *Aphis bakeri* Cowen, has been extremely common in clover fields around Ames, causing some serious injury. One field near the college was severely attacked by this aphid. In mid-summer the aphids were found on the heads and stems of the plants, but as the weather became colder they moved to the lower parts of the stems, where they were found late in the fall, attended by the large black ant, *Formica fusca*. The aphid was identified for me by Mr. J. J. Davis from specimens found on the stems of clover at Ames.

A strawberry root worm, *Graphops nebulosus* Lee., was reported from the eastern part of the state as causing serious injury to strawberry plants. This is the first time that this species has been noted as being injurious in this stage.

The woolly aphid, *Schizoneura lanigera*, has not been so common in the nurseries of the state as in previous years. It could scarcely be found during the season in nurseries which have had much trouble with this insect. Towards the latter part of July the apple-aphid, *Aphis mali*, became very numerous on apple stock in nurseries, as well as on young apple trees in orchards.

The apple leaf hopper, *Empoasca mali*, continues to be abundant in nurseries generally. In one large nursery at Charles City, in the northern part of the state, the apple stock was again attacked by this little hopper. From some observations made during the summer in various parts of the state, there appears to be five broods of the hoppers during the season, the young hoppers appearing about once a month, from May to September. The lesser apple leaf-folder, *Acleris minuta*, caused serious injury to apple stock in two large nurseries in the southwestern part of the state. A series of spraying experiments showed that this insect may be successfully controlled by spraying with arsenate of lead, the spraying being done when the insect was still in the egg stage. Spraying after the larvæ were old enough to fold entire leaves was of no practical value.

Chionaspis pinifoliae was noticed to be fairly common among evergreens in one of the large nurseries in southwestern Iowa, but did no appreciable damage. Black Hills spruce and Scotch pine were the varieties most affected. A much more serious pest, the San José scale, made its appearance in Iowa during the past year. This outbreak is treated more fully by Professor Summers in a separate article to be given at this meeting.

A cherry slug, presumably *Eriocampoides limacina*, stripped many cherry trees of their leaves in the town of Ames and vicinity. The second brood of this insect was especially numerous. Early in the

season the box elder aphid, *Chaitophorus negundinis*, was very common on the box elder trees in various parts of the state. The Buffalo tree-hopper, *Ceresa bubalus*, continues to be abundant on young apple trees in orchards, causing serious losses to young apple trees every year. One orchard of fifty acres of young apple trees at West Branch, Iowa, was severely injured by the work of this insect. Clean culture in the orchards is advised against this pest.

PRESIDENT FORBES: These three papers are now open for discussion.

MR. WASHBURN: The paper by Mr. Webster interests me because he deals with insects that we have in Minnesota. We have not been able to find the fall eggs of *Macrosiphum granaria* so far. Last year Mr. Vickery found females producing young under snow, about the tenth of December, and this year we have found the same thing. And in the insectary, where the thermometer had been down to five below zero, on the same date, December 10, we found the same condition, but no eggs. We have not been able so far to find any winter eggs. We find eggs of *Toxoptera* and the question arises, is *T. graminum* really a visitor from the south? We find it away up to the northern border, and the fact that the eggs survive the winter and hatch in the spring would seem to indicate that it is with us all the time.

MR. R. L. WEBSTER: I found only the winged forms of *Macrosiphum granaria* early in the year in Iowa and Minnesota. In what form did you find it first this spring?

MR. WASHBURN: I believe they were winged forms.

MR. COOLEY: Mr. President, I have an idea that there will be found an alternation of generations in *Macrosiphum*.

MR. KELLY: I think that Mr. Cooley has undoubtedly found the eggs of *Macrosiphum* at Bozeman, Montana.

MR. SANDERSON: We got the eggs in May or June in Texas, in the laboratory, from two or three different lots, but we never could find any trace of them in the field.

MR. SLINGERLAND: I was interested in the application and mixing of kerosene emulsion. I have a few stunts that I put the boys through in the practical mixing of insecticides, and you would be surprised at the arithmetic they sometimes use in making up kerosene emulsion. I believe it is very important for them to realize the necessity for accuracy in mixing kerosene emulsion.

MR. SHERMAN: If the college student has all that trouble, how

about the actual farmers, nine tenths of whom have never been to college or high school? I make a plea right here for an easy formula that any farmer can understand and use without trouble. All these complications I am inclined to think we can do away with to a large extent, and I do make a plea for simplicity in these things.

MR. J. B. SMITH: I want to express my agreement with what Mr. Sherman has said. It is the basis of my recommendations for commercial insecticides in most cases. Most farmers would pay a little more for a commercial insecticide than to make it up themselves. It was for this reason that I urged, some years ago, upon manufacturers the preparation of an oil that would be directly soluble in water. It was for that reason that I urged manufacturers of chemicals and manufacturing chemists to attempt the preparation of a commercial lime sulfur mixture. It is for that reason that another manufacturer is attempting and has actually manufactured a soluble sulfur, that is, a preparation of sulfur in the liquid form that dissolves by simply putting it in water, without any combination with lime. It is the manufacturer of chemicals that will help the entomologist out if he is given a chance, and I recommend the manufacture of commercial insecticides, and I recommend that the farmer buy his insecticides instead of trying to make them himself, for he will certainly make a botch of it if he possibly can do it.

MR. SLINGERLAND: Mr. President, I feel there is a bit of danger in some of Professor Sherman's notions, especially in regard to the methods of conducting demonstration experiments. I am a firm believer in such experiments, but can we not carry on these demonstration experiments scientifically just as easily? If a farmer sees you do it a bit slovenly, he will often go to the other extreme and do it very carelessly and thus get unsatisfactory results.

A MEMBER: Mr. President, it seems to me that kerosene emulsion has been given a rather bad reputation here in this discussion. I want to come to the rescue of kerosene emulsion as a simple insecticide. It is true that a great many orchard men fail in mixing it up, but I believe there is a chance for the elevation of the standard of our orchard men, so as to make them able to prepare kerosene emulsion and make no mistake. I have seen orchardists in one season, in one county, prepare, of their own accord largely, about 500,000 gallons of kerosene emulsion and use it successfully against woolly aphis, and I want to say that kerosene emulsion against woolly aphis, with its powers of penetration, is a splendid insecticide.

MR. SHERMAN: I maintain that the majority of the people in North

Carolina and every other state will not use these complicated mixtures if they can get anything simpler.

MR. BRITTON: Mr. President, I have been much interested in this matter and about the method of getting information before the farmers who need it. In many cases our bulletins are large and are sent to certain names on the mailing list. They may reach the farmer, but he may be too busy to read them. I wish to call your attention to a simple method which has been used by us for a few years, of getting a very brief notice quickly before the farmers. We call it the "Postal Card Bulletin." It is four by seven inches in size and is made of the same stock as the ordinary postal card. The franks and address can be stamped on the face and on the back is printed very briefly the instructions that we wish to place before the farmer. In receiving this short notice he is more likely to read it and this card is especially well adapted to information of a timely nature. We don't claim any originality for it, though we have not seen anything like it elsewhere.

After transacting the usual routine business, which has already been reported, the meeting adjourned.

A. F. BURGESS, *Secretary*.

The following papers were read by title and are herewith printed in full:

OUTLINE OF AN INVESTIGATION INTO THE USE OF HYDROCYANIC ACID AND CARBON DI-SULFID GASES AS FUMIGANTS

By W. E. HINDS, *Auburn, Ala.*

The second object as stated in the constitution of this Association is "To give opportunity to individual workers of announcing proposed investigations so as to bring out suggestions and prevent unnecessary duplication of work." Although this has long been one of the primary objects in the meetings of the Association, the records show that comparatively little has been presented at the meetings along this line. The writer believes that we may very profitably discuss proposed work in these meetings, and his principal objects in presenting the present paper are three in number. First, to announce the general plan of the investigation which is now under way; second, to give occasion for a general discussion of methods, plans and objects presented, with a view of securing suggestions as to valuable experimental work which has been done by others and as to changes in present plans which may appear advisable; and third, to get an expres-