outer covering of the egg has split and the egg has become very susceptible to destruction by the delayed winter-strength lime-sulphur and nicotine treatment. Our experience of the past three years shows that the eggs of the rosy apple aphid and of the green apple aphid have not all hatched by the time the green bud stage has been reached. We endorse the recommendation of Professor Parrott that the trees be thoroughly sprayed at the green bud stage with a mixture composed of winter-strength lime-sulphur and nicotine because the eggs which have not yet hatched are at that time in a very susceptible condition. We do not agree, however, with Professor Parrott in that the nicotine should be used at the rate of 1 to 1,000, but have been compelled, by the evidence of three years' experience, to advise adding 40 per cent nicotine to winter-strength lime-sulphur at the rate of 1 to 500. It may be that the difference between our experience and that of Professor Parrott is due to ecological difference, incident to the difference in geography.

MR. P. J. PARROTT: Do you use that one to eight?

MR. T. J. HEADLEE: We used 1 part of the commercial lime-sulphur to 9 parts of water and added to it 40 per cent nicotine at the rate of 1 to 500.

MR. C. P. GILLETTE: The peach aphid hatches very early in the season. It is not uncommon to find mothers giving birth to the young by the time the buds are open. They can be killed on any of the pit fruits such as peach, plum or cherry by an early spray. The false cabbage aphid is in Colorado an inhabitant of Cruciferous plants. The peach aphid is the most general feeder that we have as it feeds on something like 75 host plants.

Adjournment.

Morning Session, Friday, December 27, 1918, 10.35 a. m.

The association met in joint session with the Section on Horticultural Inspection. Mr. E. C. Cotton, Chairman of the Section, presided.

VICE-PRESIDENT E. C. COTTON: As I have not prepared an address for this occasion, we will listen to the papers listed on the program. The following paper will be read by Mr. E. N. Cory, on "The Status of the Oriental Peach Moth."

THE STATUS OF THE ORIENTAL PEACH MOTH¹

By E. N. CORY, *College Park, Md.*

Grave apprehensions were entertained in the last few years as to the damage which might result from the establishment of *Laspeyresia*

¹ Contribution from the Maryland State College of Agriculture.

molesta in several of the states on the Eastern Seaboard. Judging by our first information in regard to the pest, these fears were well founded. The fruit-feeding habit seemed most serious and the progress of the infestation has been carefully watched and further dissemination guarded against in some instances.

After three years' observation and investigation certain facts have come to light that lead to the belief that the pest may finally come to have approximately the same destructive status for peach as the codling-moth has at present for the apple in well-cared-for eastern orchards. At most, its destructive force should be no greater.

This estimate is based principally upon the counts made at College Park by Dr. Garman of the infested fruits and in part on the comparative growth of infested and non-infested trees.

In the face of a long standing infestation which would be rated as of considerable severity, the fruit from the following varieties showed the percentages of infestation to be quite small. Except in three cases, the per cent of infested fruits did not amount to over 5 per cent. Champion with 12 per cent infested fruit, Lyon with 13 per cent and another late variety with 35 per cent were the exceptions. The average infestation on Greensboro, Carmen, Champion, Elberta, Late Crawford, Mountain Rose, Lyon and the unknown variety was 4.3 per cent based on actual counts of over 4,000 peaches.

It may be possible to reduce this fruit infestation even more. Spraying experiments show that the dry particles of self-boiled lime sulfur will kill newly hatched larvæ that attempt to crawl through them. Dusting, therefore, may give greater control than spraying.

The comparative growth of infested and non-infested twigs on bearing trees shows only a slight advantage to the infested tree. Careful measurements show that the average growth of infested twigs for the season was 11.1 and for the non-infested twigs 8.8 inches. The difference in this case of only 2.3 inches is hardly worthy of serious consideration.

Another factor that may have a very considerable influence on the potential destructiveness of the insect is that of parasitism. Eight parasites, one of the egg and the balance of larva and pupa, during the past season contributed to the control of the pest. Approximately 60 per cent of the eggs were parasitized by *Trichogramma minuta* Riley. About 50 per cent of the larvæ and pupæ were also parasitized. This leaves a possible one fifth of the normal brood as survivors. The egg parasitism in 1917 was 80 per cent; so that it seems fair to assume that a high percentage of parasitism may reasonably be expected, particularly since *Trichogramma* is a general feeder. Five of the parasites were Hymenoptera and three Diptera.

Control experiments are quite variable in their results. The question of how much arsenical spray a peach tree will stand as well as the actual value of its application is involved.

The effect of various insecticides on the egg is interesting. Nicotine sulfate at 1-500 or 1-800 alone gives about 70 per cent mortality and in combination with self-boiled lime sulfur, arsenate of lime and lime caseinate is equally as effective in laboratory tests. Field tests show that even better results may be obtained. In one instance only three infested twigs were found on a sprayed tree while thirty were taken from a tree of the same size along side of the sprayed tree. Apparently the timely application of the proper insecticide will control the pest but the question of economy in spraying and the possible results to the tree will bear close scrutiny.

One of the most serious points to be considered is the feeding in apples by the late broods. Apparently this is one of the greatest sources for over wintering forms, at least in young trees adjacent to apple orchards.

The confining of the pest to its present limits seems to be scarcely possible owing to the fact that infested fruit serves as the greatest potential source of dissemination. Measures of quarantine that disregard fruit are not likely to be successful in checking the spread of the pest. Nursery stock usually has smooth bark and probably is seldom used for pupation. Pupation is more likely to occur in the ground than on smooth bark trees.

In view of the facts set forth, it would seem that unless unforeseen circumstances alter the present habits of the pest, that it is little to be feared. The insect should be considered in the same light that we consider the codling-moth as far as the orchard is concerned and in nurseries it should be treated as any other nursery pest. That is to say that every precaution of inspection should be utilized to prevent its dissemination on the stocks.

VICE-PRESIDENT E. C. COTTON: This is one of our new pests and I trust this paper will be thoroughly discussed.

MR. P. J. PARROTT: I am wondering if there are any of the Federal workers here who can report what they found in their effort to determine the destruction of the species. One agent visited Geneva, N. Y., and spent a number of days inspecting nurseries and orchards in that vicinity. He then visited Rochester and Buffalo, but I haven't heard as to the results of the examinations that were made.

MR. W. B. WOOD: I do not have the records here, but as I remember it, I think I can give you practically the way the inspection results

stand. The inspections were made throughout most of the states. There were a few that we were not able to touch. In the eastern states the pest was found in the vicinity of Washington, both in Maryland and Virginia, and in the vicinity of Baltimore. It was found in southern Pennsylvania, east of the middle of the state; it was found in New Jersey, in the southern end of New York state; it was found on Long Island, and at one point in Connecticut. Outside of these localities the insect was not found. It was not found in northern or western New York, although we found there what we term "typical injury." This same type of injury was found in a great many other places that were inspected, but I believe that the injury is caused by *Anarsia lineatella* in these cases.

This insect injures the trees in exactly the same manner, and we feel that we are unable to tell from the injury which insect causes the trouble. The results of the inspection that we have made were based altogether on the insects that were collected. In no place did we report the insect as being found where it was not collected but where typical injury was present. It may be established in other localities that were missed, but as far as we know, this was the general result—the insect being present only in a few of the states along the eastern seaboard, from Connecticut south to Virginia, a short way south of Washington.

VICE-PRESIDENT E. C. COTTON: The fact that the insect was not found, of course, was no proof that it does not occur there, because as I understand it, the surveys were made in a general manner rather than in a thorough manner.

MR. W. B. WOOD: The surveys were made in most cases very generally, and the insect could very well be missed.

MR. S. M. FROST: I would like to ask if the injury might not be due to the tarnished plant bug on peach, or could it not be attributed to a Lepidopterous insect?

MR. W. B. WOOD: In the case of the boring of the Lepidopterous insect, *Laspeyresia molesta*, the twigs are, I think, always hollowed out on the inside; with the injury from the plant bug I don't believe this would be the case. I have often noticed injury that was attributed to the plant bug, and it was quite different from that caused by *molesta*, the twigs always being hollowed out by the latter insect.

VICE-PRESIDENT E. C. COTTON: The next title is "Control Work Against the Japanese Beetle," by W. H. Goodwin.

CONTROL WORK AGAINST THE JAPANESE BEETLE

By W. H. GOODWIN, *New Brunswick, N. J.*

(Withdrawn for publication elsewhere.)