

study of certain little known insects. It is very important to determine these matters. In North Carolina we are attempting to make an insect survey and are preparing a tabulated list of the insects of the state. We have considerable information on hand and would be glad to furnish data that would be of interest to others. I mention this now so that any of the members may take advantage of the opportunity if they so desire.

PRESIDENT C. GORDON HEWITT: I am sure the members will welcome the spirit shown by North Carolina. I will now call for Mr. Zappe to read his paper.

EGG-LAYING HABITS OF DIPRION SIMILE HARTIG¹

By M. P. ZAPPE, *New Haven, Conn.*

This European sawfly was first found in Connecticut during the annual nursery inspection in August, 1914. At that time we found many nearly full grown larvæ and a few cocoons. During the summer of 1915 some observations were made on its life-history, but the facilities for carrying on this line of work were not very good. The following spring (1916) an outdoor insectary was built in which were planted several species of pine to be used as host plants.

OVIPOSITION

As soon as the female sawflies emerge from the cocoons in cages, they begin to run aimlessly about, going all over the pine twigs. This continues for an indefinite period of time, usually about twenty-four hours; then they begin to deposit eggs. When the female is ready to oviposit, she places herself on the pine leaf or needle facing the tip. She grasps the needle securely with her tarsi, the hind legs extending a little beyond the end of her abdomen. The ovipositor is then inserted in the edge of the needle, and she begins to saw a slit in it, working from the base toward the tip. When the incision is about one tenth of an inch long, she rests for a few seconds and then lays the egg in the slit, gradually drawing the ovipositor backward and out of the needle. This leaves a ridge of resin and sawed pulp from the leaf as a covering for the egg. The sawfly then moves forward and inserts the ovipositor immediately in front of the egg just laid and begins to saw a place for another egg. The time required to lay a single egg is about four minutes in *Pinus excelsa* and about five minutes in *Pinus densiflora*.

¹ Jour. Econ. Ent., vol. VIII, p. 379, June, 1915; vol. IX, p. 281, April, 1916.

HOSTS FOR EGG-LAYING

In captivity the female sawflies have laid eggs in several species of pine as follows:

<i>Pinus excelsa</i> , Japan or Bhotan pine	} Five needles
<i>Pinus cembra</i> , stone pine	
<i>Pinus flexilis</i> , limber pine	
<i>Pinus strobus</i> , white pine	
<i>Pinus koraiensis</i> , Korean pine	
<i>Pinus sylvestris</i> , Scotch pine	} Two needles
<i>Pinus densiflora</i> , Japanese red pine	
<i>Pinus montana</i> , mugho pine	
<i>Pinus resinosa</i> , red pine	
<i>Pinus ponderosa</i> , bull pine	
<i>Pinus laricio</i> var. <i>Austriaca</i> , Austrian pine	
<i>Pinus rigida</i> , pitch pine	Three needles

A few eggs were also laid singly on white spruce, although attempts to obtain eggs on hemlock, larch, Japanese umbrella pine, and white fir, failed. Out of doors the sawflies showed a decided preference for the five-needled pines, although larvæ have been found feeding on other species. *Pinus excelsa* seems to be preferred above all others.

PARTHENOGENESIS

Copulation was not observed and seems to be wholly unnecessary, as the eggs develop and hatch just the same if males are not present. Apparently it makes no difference as to the number of eggs laid whether or not males are present at the time the females are ovipositing. Some oviposit when males are present, others do not; the same is also true when males are absent.

In three cases the adults reared from eggs laid by virgin females were all males, but this may not hold true upon further investigation. In fact, some of the second brood 1916 cocoons are of large size and look as if they might yield females.

NUMBER OF EGGS LAID

The female sawflies usually begin to oviposit about one day after emerging from the cocoons and live for about seven days, while those individuals which do not oviposit die in four or five days. Length of life of males varies, some live longer than the females and some do not.

Upon dissecting the bodies of females from overwintering cocoons an average of 58 eggs per female was found, while the eggs in a female

of the first brood averaged 76. The highest number of eggs laid by a single female was 128. This is a larger number of eggs than we ever dissected from any female's body. The average number of eggs laid was 64. The number of eggs laid in a single needle varies from 1 to 20, the average number being 6. The eggs are usually laid in needles of the previous year's growth, if any are present. The majority of the eggs for the first brood in Connecticut hatch during the first half of May, while those for the second brood hatch early in August, but the broods overlap. It sometimes happens that some of the first brood of females are so late in emerging that the eggs which they lay do not produce larvæ until after some of the second brood eggs have hatched.

PRESIDENT C. GORDON HEWITT: Does any one wish to discuss this paper?

MR. R. L. WEBSTER: I am much interested to know that Mr. Zappe reared sawflies from unfertilized eggs. In work with *Harpiphorus maculatus*, I had a similar experience, although I secured one female from an unfertilized egg. I am wondering what the experience has been of other men who have worked with sawflies.

MR. MAX P. ZAPPE: By next spring I may know more about this as I now have several cocoons reared from eggs of virgin females from which adults have not yet emerged.

PRESIDENT C. GORDON HEWITT: In my own study with the larch sawfly, *Nematus erichsonii*, the female was quite common in that species but both sexes were reared from unfertilized eggs.

If there is no further discussion, the next paper will be given by Mr. Manter.

NOTES ON THE BEAN WEEVIL (ACANTHOSCELIDES [BRUCHUS] OBTECTUS SAY)

By J. A. MANTER, Storrs, Conn.

The common bean weevil is considered by many entomologists as the most destructive pest attacking beans. It is especially injurious in the Southern States. This beetle was first described by Thomas Say in 1831 but did not attract notice as an economic species until 1860 when infested beans were sent to Doctor Fitch from Providence, R. I. During the next ten years it was reported from several widely separated states and now is common throughout the country.

At first the bean weevil was credited with habits similar to those of the pea weevil (*Larix pisorum* L.) and the same control measures were recommended for each. When the life-history was studied it