

## ON THE FEEDING HABITS OF PIMPLA (ITOPLECTIS) CONQUISITOR SAY<sup>1</sup>

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During recent years several instances of the feeding of hymenopterous parasites at punctures made by the ovipositor in their host have been recorded.

Dr. L. O. Howard, in an article in the JOURNAL OF ECONOMIC ENTOMOLOGY, Vol. 1, No. 5, 1908, describes the observations of Paul Marchal on the European *Tetrastichus xanthomelænx*, in which he was of the opinion that in many cases the ovipositor was used to pierce the egg in order that the parasite might suck its contents. Similar observations were made on this species by Mr. W. F. Fiske when it was imported into this country.

In a circular of the Massachusetts Agricultural Experiment Station (No. 23, July, 1909) on *Tetrastichus asparagi* Crawf., Dr. H. T. Fernald mentions the fact that one of the observers of this insect at Concord, Mass., reported seeing the parasite occasionally attack the eggs with its mouthparts, consuming the contents of the egg. This same habit was noticed by Mr. C. W. Prescott of Concord, Mass., and Mr. J. B. S. Norton of the bureau of plant industry. Their observations were later verified by Mr. A. F. Burgess of this Bureau.

In an article in the JOURNAL OF ECONOMIC ENTOMOLOGY, Vol. 3, No. 3, June, 1910, "On the Habit with Certain Chalcidoidea of Feeding at Puncture Holes made by the Ovipositor," Dr. L. O. Howard mentions observations of Dr. Paul Marchal on the habit of *Aphelinus mytilaspidis* feeding upon its host, *Aspidiotus ostreaformis*. He also mentions that these observations of Marchal were soon followed in America by Mr. J. G. Sanders, who noticed a similar habit of *Aphelinus fuscipennis* apparently feeding on its host, *Aspidiotus rapax*.

Samuel B. Doten in Technical Bulletin No. 78, September 1911, of the Agricultural Experiment Station of the University of Nevada, describes the habits of *Meraporus* sp. and *Pteromalus puparum* feeding at punctures in chrysalides of *Pontia rapæ* and of *Microbracon juglandis* feeding at punctures in the larvæ of *Ephestia kuehniella*.

While the writer was working on truck crop insects at Riverhead, N. Y., during the season of 1912, *Pimpla (Itoplectis) conquisitor* Say came under his observation as a parasite of *Autographa brassicæ*.

On October 11 and 12 two males of this species were bred from pupæ of *A. brassicæ* and on October 30, while collecting pupæ of *A. brassicæ* in the field, a female was observed trying to oviposit in a pupa of *A.*

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*brassicæ*. This appeared difficult as the pupa moved violently each time that the ovipositor touched it and the parasite did not seem to be able to pierce the pupa.

Another female was observed flying around and both were captured and taken into the laboratory.

A larva of *A. brassicæ* which had spun up but had not yet pupated was placed in a vial with one of these parasites which immediately inserted her ovipositor in it twice, the second time keeping it in the larva for 30 seconds. One oviposited in a larva which had been taken from its cocoon in 25 seconds; also one oviposited in a newly formed pupa.

An active larva was placed in one of the vials and, as the parasite crawled over it, became so violent that the parasite seemed to become frightened, leaving it immediately and not again approaching it.

A larva which had spun up but not yet pupated was next put with each parasite. After carefully examining the cocoon all over with her antennæ, the parasite in the first vial thrust her ovipositor into the larva and commenced a sort of pumping motion, working the ovipositor up and down in the larva. She kept this up for 37 seconds. At the end of that time she backed away slightly, bent her head under so as to bring her mouthparts to the puncture, and began to feed on the juices of the larva which seemed to flow quite freely from the puncture. In the meantime the tip of the ovipositor remained in the puncture. She fed in this position for 20 seconds. She then again began to work the ovipositor up and down in the same puncture. She continued this for 35 seconds and then fed for 5 minutes, this time with the ovipositor entirely withdrawn. She again started to work her ovipositor up and down in the same puncture and kept it up for 35 seconds, when she withdrew it and fed for 25 seconds, then examined the cocoon and left it.

In the other vial the parasite, after thoroughly examining the cocoon, started to feed on it as did the first. She thrust her ovipositor into the larva and worked it up and down for 3 minutes and 25 seconds, then she withdrew it and fed on the juices which came from the puncture for 1 minute and 10 seconds. She then selected a new place on the larva and, after inserting her ovipositor, worked it up and down for 20 seconds. She afterward deserted this place and returned to the first place, re-inserted her ovipositor in what appeared to be the old puncture and kept working it up and down for 1 minute and 55 seconds. After this she withdrew it and fed for 35 seconds, prodded the larva a couple of times and left it.

On the following day, October 31, one of these parasites oviposited in three spun-up larvæ and two newly-formed pupæ in succession, the

time required for oviposition being 50, 45, 40, 50, 40 seconds, respectively. She then started feeding on a newly formed pupa which was put in the vial. After inserting her ovipositor in the pupa she kept working it up and down for 1 minute and 5 seconds. She then withdrew it and fed for 40 seconds at the puncture, after which she inserted the ovipositor in the same puncture and worked it up and down for 40 seconds, when she again withdrew it and fed for 40 seconds on the juices which came from the puncture. Then she worked her ovipositor in the pupa for 20 seconds, fed for 25 seconds, worked for 5 seconds and fed for 10 seconds more. She then examined the pupa and left it.

A few hours later this same parasite oviposited in 5 pupæ in 1 minute, 10 seconds; 1 minute; 45 seconds; 40 seconds; 2 minutes, 5 seconds; respectively. The other parasite during the day parasitized two spun-up larvæ and 5 pupæ without feeding on any, the time required being 1 minute; 50 seconds; 35 seconds; 1 minute, 35 seconds; 40 seconds; 5 minutes, 45 seconds; 2 minutes, 45 seconds.

On November 1 one oviposited in a pupa in 2 minutes and 5 seconds. A pupa was then left in the vial for a few hours and when again examined showed that the parasite had fed on it. She immediately parasitized a fresh pupa placed in the vial, taking 1 minute and 45 seconds to complete the oviposition.

A fresh pupa was put in and the parasite started feeding on it. After making a thorough examination she thrust her ovipositor into the pupa and kept working it up and down, as in previous instances, for 1 minute and 15 seconds, after which it was withdrawn and she fed at the puncture for 30 seconds, afterward again inserting the ovipositor in the same puncture and working it up and down for 45 seconds. Then she withdrew it and fed for 30 seconds; worked for 45 seconds, fed for 30 seconds, worked for 35 seconds, fed for 20 seconds, then she went to a new place on the pupa and inserted her ovipositor and kept working it up and down for 1 minute and 40 seconds, then she fed for 35 seconds, worked 45 seconds and fed for 30 seconds. She then examined the pupa and left it.

During the day 6 pupæ had been placed in the vial with the other parasite and she was observed to oviposit in all of them but feed on none. This parasite died during the next 3 or 4 days, which were quite cold, and the other parasite showed little activity. However, on the morning of November 6 it was noticed that she had fed on a pupa which had been left in the vial over night. A spun-up larva was placed in the vial and she oviposited in it in 1 minute and 25 seconds. When she withdrew her ovipositor she placed her mouth parts to the puncture and fed a few seconds. This seemed to stimulate a desire to feed, for she immediately attacked the larva in a new spot and, after insert-

ing the ovipositor, she kept working it up and down for 40 seconds, and then she fed at this puncture for 1 minute and 30 seconds, when she left the larva. After feeding on this larva she parasitized 4 pupæ.

On the following day she fed on another spun-up larva, working the ovipositor up and down in the larva for 2 minutes, fed for 1 minute and 15 seconds; worked for 1 minute and 35 seconds; fed for 1 minute and 10 seconds; worked for 35 seconds; fed for 3 minutes and 30 seconds; and then left it.

On November 8 a pupa that had been left over night in the vial with the parasite had been fed on. After parasitizing two pupæ she fed on the third one that was put in the vial. She worked her ovipositor up and down in the pupa for 2 minutes and 45 seconds, then fed for 1 minute and 40 seconds and then left it. This parasite was destroyed by a mouse on the following night.

On November 8 four more females of this species were taken in the field and brought into the insectary. Three of them were very small and appeared weak and after trying for 9 or 10 minutes to oviposit in a pupa, they usually left it. They only lived for a day or two in the insectary. The fourth one was nearer normal size and during the five days she lived she parasitized 9 and fed on 2 pupæ.

The last pupa that this parasite parasitized was on November 13 and after puncturing the pupa with her ovipositor she kept it in the pupa for over 14 minutes before she oviposited. On this date she appeared quite sluggish, as if about ready to die, and on the following morning was found dead.

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## IMAGINATION AND FACTS

Imagination is of great service to the scientific man. The formulation of important hypotheses has depended in large measure on the judicious exercise of this faculty. We present below a reprint of a leaflet forwarded through the courtesy of a collaborator and showing the results of allowing imagination free reign—cerebration unembarrassed by facts. The scientific attitude toward spontaneous generation, if suspected in the slightest degree by the writer, is cheerfully ignored. The fundamental biological law, like produces like, is suspended. Nature is depicted as creating an organism destined to perish without providing for the perpetuity of the species. The succession of stages observed in so many insects is disregarded. Our friend sees no advantage in food stored in the seed.

### COW PEA WEEVILS

These germinate inside the pea itself, they do not, as many think, come from an egg laid on the outside of the seed by some insect.