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TELENOMOUS MEGACEPHALUS ASHM., AN EGG PARASITE OF THE GREEN PUMPKIN BUG, NEZARA VIRIDULA LINN., IN FLORIDA

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During the years 1926 and 1927 the writer found that the eggs of the common Pentatomidae, at Lake Alfred, Florida, were being attacked by an egg parasite, *Telenomous megacephalus* Ashm. The species, *Nezara viridula* Linn. and *Euschistus servus* Say, were quite common in citrus groves in Polk County and occasionally did severe damage to trees and ripening fruit. The insects feed on the leguminous cover crops until they are cut or mature, then attack the fruit on the trees. During the autumn of 1926 the insects were especially abundant and troublesome and it was at this time that eggs were found very abundantly parasitized. The writer is indebted to Dr. A. B. Gahan for the identification of the parasite as well as for his assistance in securing records of its occurrence. Dr. Gahan states, "Apparently the only reference to *Telenomous megacephalus* Ashm. in literature is the original description (Jour. Linn. Soc. Lond. Zoology Vol. 25, 1894, p. 208). This species was described from the Island of St. Vincent but is a very common parasite in the eggs of *Nezara viridula* in Florida as well as some of the West Indian Islands. I do not know what the host was in your rearing but in all probability the species is not confined to the above named hemipteron as a host."

Historical.—In a paper in 1920 Dr. C. J. Drake (Quar. Bull. State Plant Board of Florida Vol. IV No. 3 pp. 41 to 93) gives a very complete record of the life history and natural enemies of *Nezara viridula* and in it reports that an occasional egg parasite was found but not enough material was available for complete

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identification. The parasites he secured were placed by Mr. A. B. Gahan in the genus *Ooencyrtus*, family *Encyrtidae*. Another group which were all males belonged to the *Chalcidoid*, subfamily *Eupelminae*.

Collection of Eggs and Parasites.—Eggs of the *Pentatomidae* are usually deposited in large clusters on stems and leaves of growing plants. In this case *Crotalaria striata* and beggar weed (*Desmodium purpureum*) were the two plants most commonly observed and collections from these were frequently made. Since these plants were quite tall it was very easy to crawl along on the ground in the patch and find the clusters of eggs on the underside of the leaves especially when the sun was shining and caused the eggs to form a dark spot on the leaf. All the masses of hatched and unhatched eggs and egg shells were collected and those that were hatched were recorded while those unhatched were reared out in cotton-stoppered test tubes in the insectary.

As Dr. Drake explains, it is quite easy to tell the difference between an egg shell from which a nymph has hatched and one from which an adult parasite has emerged. The shell from which a bug nymph has hatched has a round hole and shows the black, three pointed egg burster very clearly, while a parasitized egg shell is gray in color and has a small, irregular hole on one side of the top surface.

The table on opposite page is a record of the egg masses of *Nezara viridula* collected.

The eggs of three species of *Pentatomidae* were found to be parasitized, *Nezara viridula*, *Euschistus servus* Say. and *Euthyrynchus floridanus* Linn. The first is by far the most common but the others are occasionally attacked. The first two, *Nezara viridula* and *Euschistus servus* Say., are plant feeding forms but *Euthyrynchus floridanus* Linn. is entirely predaceous. Eggs of these three species were identified in the field by the general shape and number of spines present on the circle around their tops.

Life History and Habits of the Parasite.—During the month of November, 1927, several egg masses of the three *Pentatomidae* were deposited in captivity. One of those from *Euthyrynchus floridanus* was chosen immediately after being deposited and was subjected to an adult egg parasite. The tiny, black female wasp walked about over the mass, vibrated her antennae very actively, touching the tops of the eggs as she passed. After about

No.	Egg in Mass	Date Collected	No. of Eggs Hatched	No. of Parasites Emerged	Eggs Unhatched and Unparasitized
1	57	10/15/26	0	50	7
2	79	10/15/26	27	52	0
3	95	11/16/26	94	0	1
4	114	11/16/26	22	92	0
5	45	11/16/26	0	45	0
6	103	11/16/26	0	103	0
7	140	11/16/26	0	140	0
8	111	11/16/26	0	111	0
9	89	11/16/26	60	29	0
10	81	11/16/26	0	81	0
11	70	11/16/26	0	70	0
12	126	11/16/26	0	126	0
13	97	11/16/26	97	0	0
14	77	11/16/26	0	2	75
15	16	11/16/26	0	16	0
16	90	11/16/26	0	90	0
17	128	11/16/26	0	31	97
18	97	11/16/26	18	4	75
19	24	11/20/26	24	0	0
20	111	11/23/26	0	111	0
21	78	11/23/26	0	78	0
22	91	11/23/26	0	91	0
23	28	11/23/26	8	20	0
24	96	11/23/26	0	96	0
25	101	12/8/26	0	101	0
26	87	12/8/26	0	87	0
27	88	12/8/26	0	88	0
28	43	12/8/26	0	43	0
29	120	12/8/26	0	8	112
30	26	3/15/27	25	0	1
31	41	3/15/27	15	26	0
32	39	3/25/27	0	39	0
33	29	3/25/27	28	0	1
34	51	4/20/27	29	22	0
35	43	5/15/27	0	43	0
Total	2711		447 (16.4%)	1895 (70.0%)	369 (13.6%)

two minutes the parasite was found near the edge of the egg mass pushing her abdomen down over the edge of an egg. The tip of her ovipositor was now brought to touch the side of the egg and then by means of a quick jab, the tip of the ovipositor was thrust into the side of the egg about $\frac{1}{3}$ the way down from the top. The wasp now remained very quiet with the antennae folded down on the head very similar in appearance to a man holding his hands over his eyes. The process of depositing the egg required from two to four minutes and after the first egg had been deposited the parasite moved on to the next and repeated the process. This continued until the entire mass of eggs had been parasitized.

The attack on the eggs was begun at 3 P. M., Nov. 18 and on December 12 at 8 A. M. the first adult parasite appeared from

the mass. A tiny irregular hole near one side of the top of the egg was formed and from this came the parasite. By noon on the same day all the parasites had emerged from the egg mass. The entire life history of the parasite consumed 23 days.

Immediately after emergence the parasites were quite active, mating began in a very short time and the process of copulation occupied only a few seconds. The life of the adults was quite short in captivity and they were not observed to feed. In test tubes they very rarely lived more than one or two days.

Economic Importance.—It is very evident that a parasite that is so active and destroys as many eggs of the Pentatomidae as *Telenomus megacephalus* is very beneficial and should aid very greatly in the control of these insects. As is the case with every parasitic insect, if too thorough a control is effected the parasite itself is headed toward extinction because of lack of food material. For this reason one can expect that the peaks of abundance of the Pentatomidae and its egg parasite in this section will occur in cycles with the parasites always a little in the rear. Even though this is the case the peaks of abundance of the destructive bugs will not reach the height they would if the parasite were not present.

NOTES ON THE CYPRESS SPHINX (*Isoparce cupressi*)

By MARSTON BATES

- Sphinx cupressi* Boisduval, Spec. Gen. Lep. Het. i. p. 102, n. 41, t. 2, f. 3, 4, 5 (1879).
 Edwards, Can. Ent., XIX, p. 146 (1887).
 Palm, Journ. N. Y. Ent. Soc. I, pl. I, f. 6, p. 20 (1893).
Isoparce cupressi Rothschild and Jordan, Rev. Sphingidae, p. 110 (1903).
 Holland, Moth Book, p. 48, fig. 23 (1903).
 Grossbeck, Bull. Am. Mus. Nat. Hist., XXXVII, p. 38.
 Dukes, Bull. Brook. Ent. Soc., XVII, no. 4 (1922).

Larva: Head rounded, green, with two elliptical black lines converging dorsally; around these lines is a yellowish area, bordered laterally by a pair of lighter lines. First thoracic segment green, with four small longitudinal yellowish-white lines on the dorsum, between which is a variable amount of shining black; laterally with a diagonal yellowish-white line extending in the opposite direction to the white patches on the other segments. Rest of body green, reddish brown dorsally, with the usual oblique lateral stripes interrupted between the segments to form two rows of white patches, converging posteriorly. Thoracic legs