## *Research Note*

### *PARASITISM OF* TETRASTICHUS HAITIENSIS *GAHAN ON EGG MASSES OF* DIAPREPES ABBREVIATUS *IN PUERTO RICO*[1]

*Tetrastichus haitiensis* Gahan (Hymenoptera:Eulophidae) is considered one of the principal factors that control the sugarcane rootstalk borer weevil, *Diaprepes abbreviatus* L. (Coleoptera:Curculionidae). *T. haitiensis*, an insect parasite native of the Caribbean area and a primary endoparasitoid of the weevil egg masses, that oviposits through the leaves of the host plant.[2] The parasite has been reported from egg mases oviposited on citrus, pigeon pea and grasses. Rarely have these parasitoids been found in weevil eggs deposited on sugarcane leaves.[3,4] The purpose of this investigation was to study the presence of egg masses of *D. abbreviatus* and its parasitoid, *T. haitiensis*, to determine the percentage of parasitism on the weevil egg masses in selected areas of Puerto Rico.

This study was conducted from June 1980 to March 1981 in the north and northwest regions of Puerto Rico. The localities selected were Isabela (Agricultural Research and Development Center) and Arecibo (Central Cambalache). In each locality, 10 areas 50 m long by 5 m wide were selected. The greater distance was always parallel to the edge of the fields studied. The method employed for the survey was of line transects with hand collecting. Every plant in each experimental area was inspected and all weevil egg masses were collected. In the laboratory, the egg masses were placed in glass tubes with small pieces of moist cotton in the bottoms (10 cm × 2 cm) and then covered with cotton. The tubes were placed in a horizonal position at 78° F. A photoperiod of 10–12 hr was maintained. At the end of 10 days the number of adult parasites (or eggs parasitized), the number of weevil eggs and the number of neonate larvae of the weevil were determined. Percentages of parasitism were calculated from this data.

At Isabela, 117 weevil egg masses were collected, especially in pigeon pea fields (table 1). These egg masses were found mostly on the tips of leaves which were glued together, and in dry leaves. Of the total egg masses collected, only six were found in citrus and guinea grass fields (less than the 3% of the total of 5,084 eggs obtained in this locality). A total of 1,848 eggs were parasitized by *T. haitiensis*, an average parasitism of 36.3%. The percentage of parasitism was constant (35.5–38.1%) throughout the months studied except for December, when no egg masses were collected.

At Arecibo (table 2), for the months studied, only 38 egg masses were collected and these were found either on sugarcane or in other grasses, especially guinea grass. The total number of collected eggs was 1,922, and only 396 were parasitized by *T. haitiensis* (20.6%). Maximum parasitism obtained at Arecibo was 30.9% in October 1980. Most egg masses did not show

[1]Manuscript submitted to Editorial Board 16 December 1986.

[2]Beavers, J. B., S. A. Lovestrand and A. G. Selhime, 1980. Establishment of the exotic parasite *Tetrastichus haitiensis* (Hym.:Eulophidae) and recovery of a new *Trichograma* (Hym.:Trichogramatidae) from root weevil egg masses in Florida. *Entomophaga* 25 (1): 91–4.

[3]Tucker, R. W., 1936. Parasites introduced into Barbados for the control of insect pests. Dep. Sci. Agric. Barbados. Agric. J. 5 (1): 7–11.

[4]Wolcott, G. N., 1948. The insects of Puerto Rico. *J. Agric. Univ. P. R.* 32 (2): 390–97.

TABLE 1.—*Percent of parasitism of* Tetrastichus haitiensis *Gahan in egg masses of* Diaprepes abbreviatus *L. at the Isabela area, Puerto Rico (September 1980–December 1980)*[1]

| Collection dates | No. collected masses | No. collected eggs | No. parasitized eggs | Percentage of parasitism |
|---|---|---|---|---|
| September 1980 | 28 | 1440 | 548 | 38.05 |
| October 1980 | 60 | 2932 | 1041 | 35.50 |
| November 1980 | 29 | 712 | 259 | 36.38 |
| December 1980 | 0 | 0 | 0 | 0 |
| Total | 117 | 5084 | 1848 | 36.35 |

[1]Based on 10 randomly selected plots (50 m × 5 m).

TABLE 2.—*Percent of parasitism of* Tetrastichus haitiensis *Gahan in egg masses of* Diaprepes abbreviatus *L. at the Arecibo area, Puerto Rico (June 1980–March 1981)*[1]

| Collection dates | No. collected masses | No. collected eggs | No. parasitized eggs | Percentage of parasitism |
|---|---|---|---|---|
| June 1980 | 12 | 497 | 37 | 7.4 |
| October 1980 | 15 | 1074 | 332 | 30.9 |
| January 1981 | 3 | 135 | 8 | 5.9 |
| March 1981 | 8 | 216 | 19 | 8.8 |
| Total | 38 | 1922 | 396 | 20.6 |

[1]Based on 10 randomly selected plots (50 m × 5 m).

TABLE 3.—*Frequency intervals for the percentage of parasitism of* Tetrastichus haitiensis *in egg masses of* Diaprepes abbreviatus

| Frequency intervals of the percent of parasitism | No. parasitized egg masses | |
|---|---|---|
| | Isabela | Arecibo |
| 90–100 | 8 | — |
| 80–90 | 7 | — |
| 70–79 | 4 | 3 |
| 60–69 | 4 | — |
| 50–59 | 6 | — |
| 40–49 | 5 | 4 |
| 30–39 | 3 | — |
| 20–29 | 4 | 2 |
| 10–19 | 7 | — |
| 1–9 | 8 | 4 |
| 0 | 60 | 14 |
| Total | 117 | 27 |

parasitism greater than 9%. In this locality, the abundance of egg masses and parasitism does not follow a pattern as the one in the Isabela locality. No parasites were found in sugarcane.

The comparison of parasitized eggs vs. non-parasitized eggs shows that there is no direct relation between the number of eggs with the percentage of parasitism. Apparently, *T. haitiensis* cannot parasitize all the eggs of each mass, so that the percentage of parasitism is maintained constant. This is

characteristic of the parasitic wasps of the superfamily Chalcidoidea, of which the family Eulophidae is part.[5,6,7]

The frequency intervals of parasitism show that over 50% of the weevil eggs did not show parasitism (table 3). The other half show some parasitism, and only 5% of the sample shows an almost total parasitism. This study suggests that for the months and localities studied, *T. haitiensis* can accomplish only a partial control of the weevil, *D. abbreviatus*.

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[5]Askew, R. R., 1971. Parasitic insects, Chapter 8: Parasitic Hymenoptera. American Elsevier Publishing Co., Inc. N. Y. pp 113–84.

[6]Clausen, C. P., 1940. Entomophagus insects. McGraw Hill Book Co., Inc., N. Y. pp. 135–55.

[7]Doutt, R. L., 1959. The biology of parasitic hymenoptera. *Ann. Rev. Entomol.* 4: 161–62.