STINGLESS BEES ATTENDING HONEYDEW-PRODUCING TREE HOPPERS IN GUATEMALA—(Note). Most entomologists are aware of ants that take sugar-rich honeydew from the anus of aphids; however, similar relationships exist between various Homoptera and other insects (Wilson 1971, Page 394 in The Insect Societies). Stingless bees (Trigona) have occasionally been associated with membracid treehoppers in Brazil (Laroca and Sakakibara 1976, Rev. Bras. Ent. 20(2): 71-2 and refs.), Colombia, and Panama (Salt 1929, Trans. Ent. Soc. Lond. 77: 431-68). Apparently similar relationships have not been reported from Central America. In Tikal, Guatemala, on 23 August 1976 at 4:00 p.m. I observed membracids, Antianthe expansa (Germar), on large shrubs on both sides of a dirt road. On one plant, ca. 50 bright red nymphs and 3 green adults were on the stem 6 cm below the terminal bud as well as on the petiole and midrib of a leaf connected to the stem at this point. Six stingless bees, Trigona amalthea (Oliv.), were associated with this group. On another plant, more than 100 membracids completely covered the stem for a length of 18 cm, beginning 15 cm from the terminal bud. Only nymphs were present in the upper 7 cm of the group. Two bees were associated with these. On a different branch of the same plant, ca. 20 cm from the terminal bud were approximately 40 nymphs and 7 adults of A. expansa tended by ants (Crematogaster sp.). At least 3 individuals of T. amalthea were also associated with this group.

The Trigona only interacted with the membracid nymphs. When a Trigona antennated the abdominal tip of a nymph, the latter would elevate its abdomen and exude one or more drops of liquid from the anus. The bee would absorb the liquid on its slightly extended mouthparts.

This is apparently the first record of Antianthe associated with bees, but T. amalthea has been associated with other membracids, Aethalion in Brazil and "juvenile membracids" in Colombia (Salt ibid.).

Do agonistic interactions occur between ants and bees over the honeydew resource? I observed only one ant-bee contact; the ant moved away. Further observations are necessary to determine the degree of resource defense (if any) by either species.

Thanks to S. W. Batra for bee and membracid determinations and for providing literature, to Margaret Dix for ant determination, and to L. Schuster and R. Collins for helpful comments.—JACK C. SCHUSTER, Depto. de Biologia, Universidad del Valle de Guatemala, Aptdo. 82, Guatemala, GUATEMALA (Research Associate, Florida State Collection of Arthropods, Florida Department of Agriculture and Consumer Service, Gainesville, FL 32602 USA).

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FOLIAGE CONSUMPTION BY YELLOWSTRIPED ARMYWORM LARVAE AFTER PARASITIZATION BY EUPLECTRUS PLATY- PENAE—(Note). Consumption of snapbean (Phaseolus sp.) foliage by healthy yellowstriped armyworm (YSAW), Spodoptera ornithogalli (Gue-

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nees), larvae and those parasitized by the eulophid parasitoid, *Euplectrus plathypterae* Howard, was compared in the laboratory. Earlier reports of food consumption by parasitized and nonparasitized host larvae are conflicting. One stated that hosts feed normally throughout the period of parasitoid development (J. Wilson. 1933. Fla. Ent. 17: 1-15.) and another, that larvae ceased feeding after parasitoid eggs hatched (K. C. Smith. 1927. Bull. Brooklyn Ent. Soc. 22: 128-35.).

Test insects were maintained at 26.7°C, 50±10% RH, and a photoperiod of L:D 14:10. Twenty 3rd instar YSAW were parasitized and then immediately placed singly in petri dishes, each of which contained 1 snapbean leaf. For comparison, 20 nonparasitized 3rd instar YSAW were placed in petri dishes with leaves. Moistened filter paper in the bottom of the dishes prevented the leaves from drying out. Surface area of each leaf was determined with a Licor Model LI-3000 area meter (Lambda Instr. Co.) before placing them in the petri dishes. At 2 day intervals leaves were removed, measured, and replaced by fresh ones. This procedure was continued until host larvae died or nonparasitized larvae pupated or ceased development. Parasitoid survival and development were noted. To correct for shrinkage or expansion of leaves after being placed in petri dishes, 10 control leaves were held in the same manner except that no larvae were placed on them. These leaves were also removed, remeasured, and replaced with fresh leaves every 2 days.

![Graph](image)

Fig. 1. Cumulative leaf surface area consumed by nonparasitized *Spodoptera ornithogalli* larvae and those parasitized by *Euplectrus plathypterae*. 
Differences in foliage consumption by parasitized and nonparasitized YSAW are illustrated in Figure 1. Significantly (P < 0.05) less foliage (1.23 cm²/d/larva) was consumed by parasitized larvae for every 2 day interval. Nonparasitized larvae consumed 8.85 cm² of foliage per day per larva. Fourteen of the nonparasitized larvae developed to pupation and adult emergence, but all parasitized larvae died.

Twelve of 20 parasitized hosts produced adult parasitoid progeny. This was a significantly higher percentage than that found for YSAW (33%) in an earlier study by the authors where hosts were fed and maintained on artificial media (G. L. Greene, N. C. Lepple, and W. A. Dickerson. 1976. J. Econ. Ent. 69: 487-8). This suggests that host larvae which fed on leaves were more suitable for parasitoid development than those hosts which were reared on artificial media. Therefore, a higher rate of successful parasitism (i.e. production of adult parasitoids) may occur in the field than in the laboratory where hosts are maintained on artificial media.—PATRICK PARKMAN AND MERLE SHEPARD, Dept. of Entomology and Economic Zoology, Clemson University, Clemson, SC 29631 USA.

DIVING BY THE VELIID TROCHOPUS PLUMBEUS (UHLER) (HEMIPTERA)—(Note). There is still some controversy surrounding the ability of marine water striders to dive and swim beneath the water's surface (see Andersen and Polhemus 1976. Marine insects. L. Cheng, ed. p. 187-224 for a recent review). Since most previous observations have been on Halobates (Gerridae), the present note on Trochopus (Veliidae) is provided for comparison.

In March, 1972, while examining marine invertebrates around Grassy Key, FL, a small group of ca 20 veliids was observed along the shoreline. All individuals were sheltered by a small (ca. 50x40 cm) bend of the shoreline on an otherwise exposed coast. When an attempt was made to catch them by hand, all but a single mated pair dove beneath the surface and swam away from the shoreline. Swimming was accomplished by leg movements resembling surface skating motion. Striders beneath the surface could not be followed for more than 10 cm as they quickly reached choppy waters and were lost from sight.

The above observation is similar to that of Henry (1932. Spolia Zeylanica 16: 353-4) on Halobates, and suggests that diving and subsurface swimming are escape responses. This may be particularly important for near-shore water striders—which would have greater risk from terrestrial and semiterrestrial predators than their off-shore counterparts.

I thank L. Cheng for stimulating discussions and J. Polhemus for verifying the identity of Trochopus plumbeus.—ROBERT WHARTON, Department of Entomology, Texas A&M University, College Station, TX 77843 USA.

TWO ADDITIONAL DRAGONFLY PREDATORS OF QUEENS OF THE RED IMPORTED FIRE ANT, SOLENOPSIS INVICTA BUREN—(Note). Queens of the red imported fire ant, Solenopsis invicta Buren, are subject to