

Natural enemies of pentatomids affecting rice fields in Puerto Rico¹

Rosa A. Franqui, Alberto Pantoja, Silverio Medina Gaud²

ABSTRACT

Parasitoids were recovered from adults and egg masses of *Mormidea angustata* Stål and *Oebalus ypsilon-griseus* (De Geer). Three parasitoid species were recovered; the species were identified as *Beskia aelops* Walker (Diptera:Tachinidae), *Gymnocyttia* sp. (Diptera:Tachinidae), *Ooencyrtus submetallicus* Howard (Hymenoptera:Encyrtidae).

RESUMEN

Enemigos naturales de los pentatómidos de los arrozales de Puerto Rico

Se recobraron parasitoides de los adultos y masas de huevos de *Mormidea angustata* Stål y *Oebalus ypsilon-griseus* (De Geer). Tres especies de parasitoides se recuperaron: se identificaron como *Beskia aelops* Walker (Diptera: Tachinidae), *Gymnocyttia* sp. (Diptera: Tachinidae), *Ooencyrtus submetallicus* Howard (Hymenoptera: Encyrtidae).

INTRODUCTION

Little is known about the parasitoids of pentatomids attacking rice fields. Two hymenopteran species, *Ooencyrtus anasae* (Ashmead) (Hymenoptera:Encyrtidae) and *Telenomus podissi* Ashmead (Hymenoptera: Scelionidae), are known to attack *Oebalus pugnax* (F.) eggs recovered from rice plants (6,11). These parasitoids are important factors in reducing natural stinkbug populations in rice fields, especially during the late season (4,6,9,10).

Thames (12) reported *Beskia aelops* (Walker) (Diptera:Tachinidae) parasitizing *O. pugnax* adults recovered from rice fields in Florida. Wolcott (13) reported the introduction of four species of tachinids from Chile to Puerto Rico, without listing the species introduced. Under laboratory conditions the introduced tachinids attacked *Mormidea angustata* Stål,

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²Research Assistant, Assistant Entomologist and Entomologist, Department of Crop Protection, Agricultural Experiment Station, Mayagüez Campus, Univ. P. R., Río Piedras, P. R.

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Mormidea ypsilon Sailer, and *O. pugnax*, but development was not completed in these pentatomids species (1).

In Puerto Rico chemical control is the main tactic for stinkbug management in rice fields, whereas very little attention has been given to the use of natural enemies as control agents. No parasitoids have been reported for pentatomids infesting rice fields in Puerto Rico. The research reported here was initiated in an effort to identify stinkbugs' natural enemies in Puerto Rico rice fields.

MATERIALS AND METHODS

Adult pentatomids were collected from rice fields at Arecibo, Lajas, Manatí, and Vega Baja. A total of 389 samples were examined during a 6-month study. Sampling began 4 to 5 hours after sunrise. Each field was sampled weekly with a standard insect net (38.1 cm diameter). Each sample consisted of 100 randomly cast sweeps. Each horizontal stroke with the net in either direction was considered as one sweep. One sweep was completed with each forward step. Sampling began at least 10 m into the field from the roadside, and was centered between the field levees to avoid possible edge effects (4,7). Insects were placed in plastic bags and brought to the laboratory inside a plastic cooler. Stinkbug species were separated, counted, and placed in small aluminum screen cages (0.3 × 0.3 × 0.3 m).

Insects were fed the Jones et al. *Oncopeltus fasciatus* diet (8), but sunflower seed was replaced by field-collected rice kernels. Insects were monitored daily for mortality and/or parasitoid emergence. Puparia were placed individually in 30-ml plastic containers supplied with moist vermiculite.

Stinkbug egg masses observed on rice plants were hand collected and taken to the laboratory. Masses were placed in petri dishes (100 × 15 mm) supplied with a moistened filter paper (Whatman #3). The dishes were examined daily and water was supplied as needed until parasitoids emerged. Both adults and egg masses were kept under laboratory conditions (14:10 light:dark cycle, 29° C).

Adult parasitoids were identified by N. E. Woodley (Diptera) and R. W. Carlson (Hymenoptera) of the USDA Beneficial Insect Identification and Systematic Institute (BIISI) at Beltsville, Maryland. Voucher specimens were deposited at the Entomology Museum of the Crop Protection Department, Agricultural Experiment Station, Río Piedras, Puerto Rico. The voucher specimens were identified as *Besikia aelops* (Walker), PR Ac. No. 367-86; 412-86, *Gymnocyttia* sp., PR Ac. No. 368-86, *Ooencyrtus submetallicus* (How.), PR Ac. No. 495-86.

RESULTS AND DISCUSSION

A total of 172 parasitoids were recovered from a total of 12,749 pentatomids and 21 egg masses observed. Eleven were identified as *Besikia*

aelops Walker, (Diptera:Tachinidae), 71 as *Gymnocyttia* sp. (Diptera:Tachinidae) and 90 as *Ooencyrtus submetallicus* Howard (Hymenoptera:Encyrtidae). Species of *Gymnocyttia* are not identifiable (R. W. Carlson, BIISI, personal communication). *Beskia aelops* was previously reported (2,11,12) parasitizing *O. pugnax* adults collected from rice fields in the United States.

In our study *B. aelops* was recovered from *M. angustata* and *O. ypsilon-griseus*, but not from *M. cubrosa*, *O. pugnax*, or *O. griseus*. Arnaud (2) listed *Euchistus ictericus* (L.), *Mormidea pictiventris* Stål, *Nezara viridula* (L.), and *O. pugnax* as hosts of *B. aelops*. Our findings are the first report of *B. aelops* parasitizing *M. angustata* and *O. ypsilon-griseus* in Puerto Rico. Furthermore, this is the first report of any parasite affecting *M. angustata* and *O. ypsilon-griseus* recovered from rice fields.

Mormidea angustata and *O. ypsilon-griseus* egg masses were parasitized by *O. submetallicus*. This is the first time *O. submetallicus* has been recovered from pentatomid egg masses in Puerto Rico and from pentatomid eggs collected from rice plants. In the United States, Ingram (6) listed *O. anasae* and *T. podissi* as parasitoids of *O. pugnax* eggs collected from rice fields. Gahan (5) reported the recovery of *O. submetallicus* from *N. viridula* eggs collected from the island of St. Vincent without indicating the host plant from which the pentatomid eggs were collected. During 1961-63, *O. submetallicus* was introduced to Hawaii (3) for *N. viridula* control, but the parasite was not recovered from the field and *O. submetallicus* effectiveness in controlling natural stinkbug populations is still unknown. The low percentage of pentatomids affected by *B. aelops* (0.09%) and *Gymnocyttia* sp. (0.56%), suggests that parasitoids could be of little importance in controlling their populations in Puerto Rico. Additional studies are needed to establish the effectiveness of *B. aelops*, *Gymnocyttia* sp., and *O. submetallicus* in controlling pentatomid populations in Puerto Rico rice fields. Future research to determine parasitoid host range, abundance, and bionomics is needed to establish their potential as biological control agents in integrated pest management (IPM) programs.

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