Feeding Responses of Euthyrhinchus floridanus (Hemiptera: Pentatomidae) to Brown Marmorated Stinkbug (Hemiptera: Pentatomidae) Adults and Nymphs

Authors: Arellano, Rubí, Medal, Julio, Arellano, Gregorio, and Pérez, Juan

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Feeding responses of *Euthyrhinchus floridanus* (Hemiptera: Pentatomidae) to brown marmorated stinkbug (Hemiptera: Pentatomidae) adults and nymphs

Rubí Arellano¹, Julio Medal²,*, Gregorio Arellano³, and Juan Pérez⁴

*Euthyrhinchus floridanus* (L.) (Hemiptera: Pentatomidae), is a native predator that is common throughout the yr in many agro-ecosystems. It preys on a diversity of crop pests, including immature beetles, lepidopterous pests, and true bugs including plant-damaging pentatomoids (Mead 1976; Logan et al. 1987; Medal et al. 2018). The distribution range includes the central and southeastern USA, Mexico, Central, and South America into southern Brazil (Ables 1975; Mead & Richman 2013). Adults and nymphs tend to be aggregated and have a low level of cannibalism (Mead personal observation). Both nymphs and adults capture prey of different sizes, and feed individually or in aggregations. Since the discovery of the brown marmorated stink bug in Pennsylvania in 1996 (Hoebke & Carter 2003), attempts have been made to use parasitoids and predators (Dieckhoff & Hoelmer 2014; Lara et al. 2016) as a sustainable management option of this new invasive polyphagous Asian immigrant (Hamilton et al. 2008; Haye et al. 2015; Leskey & Nielsen 2018) that has been reported in 44 states, including a limited Asian immigrant (Hamilton et al. 2008; Haye et al. 2015; Leskey & Nielsen 2018) that has been reported in 44 states, including a limited

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These studies indicated that the feeding responses of *E. floridanus* male, female, and third nymphal instar to brown marmorated stinkbug generally were affected by the prey developmental stage (Tables 1 & 2). The percent mortality of brown marmorated stinkbug adults or nymphs due to *E. floridanus* male, female, or intermediate nymph differed significantly (X² = 25; df = 7; P = 0.036584738). Females had a preference to feed on brown marmorated stinkbug second to fourth nymphal instar, whereas males did not show any difference in the feeding response to the brown marmorated stinkbug nymphal instar (Table 1). The *E. floridanus* female was more effective than males, showing higher prey mortality of brown marmorated stinkbug male or female (df = 3; P = 0.021). The feeding responses (30–40%) by *E. floridanus* third nymphal instar to brown marmorated stinkbug second to fourth nymphal instars were significantly different (df = 3; P < 0.05) than those obtained on the fifth nymphal instar (Table 2). Mortality of brown marmorated stinkbug nymphs ranged from 30 to 100% for *E. floridanus* females, and from 50 to 70% for *E. floridanus* males. *Euthyrhinchus floridanus* males were not able to feed on brown marmorated stinkbug females, probably due to the larger size of the female prey than the male predator. This was contrary to the female predators, which fed an average of 80% on female prey (Table 1). A possible explanation for the lower feeding response, in addition to the difference in size, may be related to the defense mechanism of larger prey sizes when attacked by

1Universidad Autónoma Chapingo, Carretera México-Texcoco, Km. 38.5, Texcoco de Mora 56230, Estado de México, Mexico; E-mail: dayanerubi@outlook.com (R. A.); jforestal1991@gmail.com (J. P.)
2Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, Florida 32608, USA (former address); E-mail: medal@ufl.edu (J. M.)
3Colegio de Posgraduados, Carretera México-Texcoco, Km. 36.5, Montecillo, Texcoco 56230, Estado de México, Mexico; E-mail: arellano@colpos.mx (G. A.)
*Corresponding author; E-mail: medal@ufl.edu

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Means were considered statistically different at P < 0.05. Brown marmorated stinkbug mortality data were not adjusted because of low (< 5%) mortality in controls. These studies were conducted during 2015 and 2016. Predation rate of *E. floridanus* to brown marmorated stinkbug has not been reported previously in the literature.
a predator. Results indicated that *E. floridanus*, as an effective predator of the brown marmorated stinkbug, may complement other control strategies to reduce its population in infested regions.

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### Summary

The Florida predatory stink bug, *Euthyrhynchus floridanus* L. (Hemiptera: Pentatomidae), is a generalist predator native to North America that feeds on a broad range of lepidopterous and heteropterous key pests in a great diversity of crops and non-crop situations. Feeding tests conducted in the laboratory to determine the most susceptible stage of the brown marmorated stink bug, *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae), to third nymphal instar, and male and female *E. floridanus*, indicated that this predator has great potential for biological control of *H. halys* nymphs and adult stages.

**Key Words:** Heteroptera; biological control; predator; agriculture pest

### Table 1. Mortality (% ± SD) of brown marmorated stinkbug, *Halyomorpha halys* caused by *Euthyrhynchus floridanus* male and female.

<table>
<thead>
<tr>
<th>Predator gender</th>
<th>Prey growth stage</th>
<th>Prey mortality % (± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Nymph second instar</td>
<td>80 ± 10 b</td>
</tr>
<tr>
<td>Female</td>
<td>Nymph third instar</td>
<td>80 ± 8 b</td>
</tr>
<tr>
<td>Female</td>
<td>Nymph fourth instar</td>
<td>100 ± 0 a</td>
</tr>
<tr>
<td>Female</td>
<td>Nymph fifth instar</td>
<td>30 ± 10 d</td>
</tr>
<tr>
<td>Male</td>
<td>Nymph second instar</td>
<td>60 ± 8 c</td>
</tr>
<tr>
<td>Male</td>
<td>Nymph third instar</td>
<td>60 ± 6 c</td>
</tr>
<tr>
<td>Male</td>
<td>Nymph fourth instar</td>
<td>50 ± 10 c</td>
</tr>
<tr>
<td>Male</td>
<td>Nymph fifth instar</td>
<td>70 ± 10 bc</td>
</tr>
<tr>
<td>Male</td>
<td>Female prey</td>
<td>0 e</td>
</tr>
<tr>
<td>Female</td>
<td>Female prey</td>
<td>80 ± 6 b</td>
</tr>
<tr>
<td>Male</td>
<td>Male prey</td>
<td>70 ± 4 c</td>
</tr>
<tr>
<td>Female</td>
<td>Male prey</td>
<td>90 ± 10 ab</td>
</tr>
</tbody>
</table>

Means % followed by the same letter in the column for each treatment did not differ significantly (P ≥ 0.05); 20 replications.

### References Cited


