

Factors that affect predation and reproduction in
the omnivorous bug *Orius albidipennis* (Hemiptera:
Anthocoridae)

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Summary

Orius albidipennis bugs (Hemiptera: Anthocoridae) are generalist predators who also feed on plants. They are cannibalistic and they perform Intraguild Predation. These characteristics make it difficult to predict their population dynamics in agroecosystems, where they take part in the natural pest control. In this study I tested the role two factors have on the behavior of this predator, namely, the presence of a second predator in the system and the quality of the host plant. Intraguild effects of *Orius laevigatus* may include preying on *O. albidipennis* or interfering with its ovipositional behavior whereas the nutritional value of leaves may affect within plant site selection by the bugs.

The effects of a second predator was tested in the presence of bean leaves as an oviposition substrate and *Helicoverpa armigera* eggs as prey. It was found that the addition of *O. albidipennis* to an arena containing *O. laevigatus* did not result in an increase in total predation compared to *O. laevigatus* alone. As far as oviposition is considered, no negative effects were found. It is yet to be determined whether these predators alter the within plant distribution of their eggs in the presence of con-generics. In both species, an increase in female density resulted in higher oviposition rates per female.

The effects of plant quality on bug's behavior was tested in a system containing cotton plants reared under low and high nitrogen fertilization levels: fertilized and unfertilized. Nitrogen level in the fertilized plants was found to be significantly higher than that in the unfertilized plants. It was observed that *O. albidipennis* adults show a spontaneous tendency to settle in the area of vein origin on the underside of cotton leaves. It

was interesting, therefore to investigate what are the specific benefits provided by this micro-habitat to the omnivorous bug.

Nitrogen level, bug's gender and reproductive status, were found to have a significant influence on the rate of spontaneous settling and site defending. The site wasn't found to be providing physical or microclimatic shelter for the bugs; neither does it serve as a mating site. Likewise, no evidence was found to suggest facilitation of prey intake by *O. albidipennis* due to for example prey encounter rates or ease to subdue prey. The possibility that this site provides a source for nutrition for the adults could not be ruled out and therefore must be considered. A possible connection between the quality of the site and *O. albidipennis* reproduction was further investigated. Individually held females preferred to oviposit at this site irrespectively of the nitrogen level of the leaves ($F=8.88$, $p \ll 0.001$, $df=4,47$ in choice experiments; $F=7.98$, $p \ll 0.001$, $df=4,41$ in non choice experiments). In both choice and non-choice experiments, a non-significant trend towards higher oviposition on fertilized leaves was recorded. Hatching rate did not differ on fertilized and unfertilized leaves. On fertilized leaves, though, hatching rate at the vein origin was significantly higher then in other parts of the leaf ($t=2.9$, $p=0.023$, $df=7$). First instars had significantly higher survival on fertilized leaves than on unfertilized ones ($t=-2.68$, $p < 0.055$, $df=4$). Out of the individuals remaining alive, only two nymphs (22.2%) successfully molted to the second stage on unfertilized leaves, 75% did so on fertilized leaves. These results suggest that plant nutritional quality has an important role at the first stages of development. These nymphs are forced to feed on the plants because of their limited ability to disperse from their emergence site. This might be a valuable information when considering augmentive releases of *Orius* sp. A crop that provides them

with high quality plant resource may allow faster establishment and rapid population build up before the prey - pest populations outbreak.