Intraguild Predation among the Hoverfly *Episyrphus balteatus* de Geer (Diptera: Syrphidae) and Other Aphidophagous Predators

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Abstract

Aphidophagous predators compete for the same prey species. During their foraging activity they frequently encounter heterospecific aphid predators. These situations can lead to intraguild predation and may disrupt biological control efforts against aphids where more than one predator species is present. We investigated the behavior of larvae of the hoverfly *Episyrphus balteatus* de Geer and its interaction with three other aphid predators: the ladybird *Coccinella septempunctata* L., the lacewing *Chrysoperla carnea* Stephens, and the gall midge *Aphidoletes aphidimyza* (Rondani). Interspecific interactions between predators were examined in arenas of different sizes and in the presence of extraguild prey. The outcome of interactions between *E. balteatus* larvae and the other predators depended predominantly on the relative body size of the competitors. Relatively large individuals acted as intraguild predators, while relatively smaller individuals became intraguild prey. Eggs and first- as well as second-instar larvae of *E. balteatus* were highly susceptible to predation by all other predators, whereas pupae of *E. balteatus* were preyed upon only by the larvae of *C. carnea.* Interactions between *A. aphidimyza* and *E. balteatus* were asymmetric and always favored the latter. Eggs and first- as well as second-instar larvae of *E. balteatus* sustained intraguild predation irrespective of the size of the arena or the presence of extraguild prey. However, the frequency of predation on third-instar larvae of *E. balteatus* was significantly reduced. This study indicated that the same species can be both intraguild predator and intraguild prey. It is suggested that combinations of predators must be carefully chosen for success in biological control of aphids.

Author Keywords: intraguild predation; IG predator; IG prey; extraguild prey; aphidophagous predators; biological control; foraging arena