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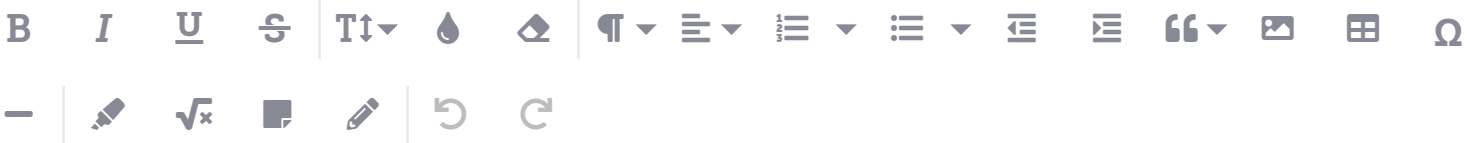
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NOTE

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Influence of prey host plant on a generalist aphidophagous predator: *Episyrphus balteatus* (Diptera: Syrphidae)

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Key words. Hoverfly, *Episyrphus balteatus*, *Myzus persicae*, *Brevicoryne brassicae*, Brassicaceae, glucosinolates, tri-trophic interactions, allelochemicals

Abstract. Secondary plant metabolites (allelochemicals) play a major role in plant-insect interactions. Glucosinolates (GLS) and their degradation products from *Brassica* species are attractants and feeding stimulants for Brassicaceae specialist insects but are generally repellent and toxic for generalist herbivores. The impact of these compounds on crucifer specialist insects are well known but their effect on generalist predators is still not well documented. The influence of the prey's host plant on both development and reproduction of an aphidophagous beneficial, the hoverfly *Episyrphus balteatus*, was determined using the cabbage aphid, *Brevicoryne brassicae* (a specialist) and the peach aphid *Myzus persicae* (a generalist) reared on two crucifer plants, *Brassica napus* and *Sinapis alba* containing low and high GLS levels respectively.

The prey and its host plant differently influenced life history parameters of *E. balteatus*. The predator's rates of development and survival did not vary when it fed on the generalist aphid reared on different host plants. These rates decreased, however, when the predator fed on the specialist aphid reared on the host plant with high GLS content plant versus the host plant with lower GLS content. This aphid host plant combination also negatively affected hoverfly reproduction; lower fecundity was observed. As a result, the fitness of the hoverfly was strongly affected. This study illustrates the importance of tritrophic relations in pest management involving predators. The host plant of the prey can have a major influence on the potential of a biological agent to control herbivore species such as aphids.

INTRODUCTION

Plants of the Brassicaceae family contain secondary substances known as glucosinolates (GLS). When the plant is damaged and the cell integrity destroyed, the enzyme myrosinase catalyses the degradation of GLS to volatile molecules, mainly isothiocyanates (ITC) (Fahey et al., 2001). The latter are attractants and feeding stimulants for several crucifer specialist insects such as *Phyllotreta cruciferae* Goeze (Coleoptera: Chrysomelidae) and *Plutella xylostella* L. (Lepidoptera: Plutellidae) (Bodnaryk, 1997). Several Pieridae species such as *Pieris rapae* L. and *P. napi oleracea* Harris (Lepidoptera: Pieridae) also use GLS as oviposition stimulants (Huang & Renwick, 1994).

In contrast to their role as kairomones for insects that specialize on crucifers, the secondary plant substances are highly toxic for non-crucifer feeders and provide an efficient defence mechanism for the plant (Fenwick et al., 1983; Porter et al., 1991; Heaney & Fenwick, 1995). Sinigrin, the allyl-ITC GLS precursor, is particularly toxic for non-adapted herbivores and induces high mortality levels of generalist herbivores (Blau et

rapae females originates from the interactions between plant and the feeding aphids. The latter absorb GLS and degrade them to ITC (Francis et al., 2001a). Here we report the allelochemical effects through the aphid prey on a generalist aphidophagous predator, *Episyrphus balteatus* De Geer (Diptera: Syrphidae). Developmental and reproductive parameters were affected depending on the prey species and its host plant. Two crucifer species, *Brassica napus* L. and *Sinapis alba* L. (with low and high GLS contents respectively) and control diet free of GLS were used to rear preys for the predator. Differential adaptations and consequences that depend on the host plant of the prey are discussed.

MATERIAL AND METHODS

Plant and insect rearing

Broad beans (*Vicia faba* L.) were grown in 20 × 30 cm trays in a mixture of perlite and vermiculite (1/1) in a controlled environment room at 20 ± 2°C and 16 h daylight photoperiod. The bean plants were used to rear *M. persicae* as control diet for hoverflies. White mustard (*Sinapis alba* L.) containing high GLS