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Developing New Techniques for Managing *Phyllotreta striolata*: Analysis of Host Plant Preference and Impact of Glucosinolates

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Abstract

Phyllotreta striolata, the striped flea beetle, has a narrow host plant range restricted to the *Brassicaceae*, *Capparaceae*, and *Tropaeolaceae*. This beetle feeds on stems and leaves of many economically important crops, especially *Brassica* vegetables such as cabbage, cauliflower, radish and pak-choi. The coincidence that the preferred plant families are known to contain glucosinolates (gs) suggests these compounds may act as chemical cues for host plant acceptance in *P. striolata*. Evidence for this hypothesis comes from field studies demonstrating the striped flea beetle is attracted to allyl isothiocyanate (AITC) and other glucosinolate breakdown products. In field experiments, we have shown that AITC at a dose of 0.8 ml per trap could significantly increase trapping of flea beetles. To investigate the relationship between this pest and host plant volatiles, we examined nine different commercial *Brassica* crops (cabbage, cauliflower, broccoli, Chinese kale, Chinese cabbage, pak-choi, winter rape, Indian mustard, and radish) under free choice conditions. The *P. striolata* infestation of crops inside a net house in the field was observed for four to five weeks. In all experiments we found *Brassica oleraceae* sub-species (cabbage, cauliflower, broccoli, and kale) were significantly less preferred than the other crops. The preference for some crops, e.g. pak-choi and Chinese cabbage, changed during the growing period. We subsequently analysed the total gs content and profile of crop plants using HPLC. Chinese cabbage and pak-choi had the lowest amount of gs (< 10 mol per g dry weight) while Indian mustard and radish leaves had the highest gs content, up to 100 mol per g dry weight. Because crops with the highest as well as the lowest total gs content are preferred by *P. striolata*, we assume the total gs content is not critical for this interaction. Interestingly, sinigrin (allyl gs), the precursor of the volatile AITC, was found in both preferred and non-preferred plants. However, sinigrin was not detected in Chinese cabbage and pak-choi. The analysis to identify the bioactive compounds in *Brassica* for *P. striolata* is in progress.

Keywords: Glucosinolates, *Brassica*, *Phyllotreta striolata*, host plant preference