The effect of sap-sucking by *Falconia intermedia* (Hemiptera: Miridae) on the emission of volatile organic compounds from the leaves of *Lantana camara* varieties

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Evidence from more than 100 plant species has confirmed that plants emit volatile organic chemicals (VOC) in response to herbivory (Karban & Baldwin 1997; Dicke *et al.* 2003; Arimura *et al.* 2005). Feeding-induced plant responses may result in higher levels of volatiles, and different bouquets of compounds being emitted by plants following herbivore damage (Wei *et al.* 2006). The emission of volatile chemicals may be beneficial to plants in two ways; undamaged plants may interpret the chemical signals from damaged plants and in turn prime themselves for defence (Arimura *et al.* 2000; Dicke *et al.* 2003; Agrawal 2005), or volatiles emitted by damaged plants may attract natural enemies of the herbivores, which may reduce further damage to the plants (Tumlinson *et al.* 1993; De Moraes *et al.* 1998; Dicke & Vet 1999). However, very few studies have considered these responses in relation to biological control of invasive alien plants. Heshula & Hill (2011) demonstrated the ability by some varieties of *Lantana camara* L. sensu lato (Verbenaceae) to induce physical responses following feeding by the biological control agent *Falconia intermedia* (Distant) (Hemiptera: Miridae). Results from this research prompted further questions, including whether some of the *L. camara* varieties are also able to induce chemical responses to feeding. Although volatile compounds of numerous essential oils have been isolated and elucidated from different varieties of *L. camara* (Sharma *et al.* 2007), most of this work has been commercially driven by the plant’s diverse biological and pharmacological uses (Ghisalberti 2000). We report on a preliminary investigation to ascertain whether sap-sucking by *F. intermedia* on two *L. camara* varieties induces an increase in the production of volatiles. We also set out to identify the major volatile phytochemical compounds from the headspace of plants from the two Eastern Cape *L. camara* varieties tested.

Two *L. camara* varieties found at coastal sites in the Eastern Cape Province of South Africa, ‘Whitney Farm’ (33°40'43"S 26°35'49"E) and ‘East London’ (33°00'23"S 27°54'47"E), were used in this experiment. These two varieties were among five varieties in the Eastern Cape on which *F. intermedia* individuals were released in 2001, in attempts at the biological control of *L. camara* in South Africa (Heshula 2009). *Falconia intermedia* did not establish well on the ‘East London’ variety, while ‘Whitney Farm’ *L. camara* was susceptible to *F. intermedia*, with establishment and very high population numbers throughout the year (Heshula 2009). ‘Whitney Farm’ plants have leaves that are large, broad and dark and display medium hairiness, while the main stem and shoots are spiny and the flowers are light pink with an orange throat. ‘East London’ plants have the same leaf, flower and stem characteristics, but with spiny and hairy shoots. Five plants from each variety were randomly selected for use as *F. intermedia*-infested plants while a further five plants were used as uninfested controls and all 20 plants were individually caged. Adults of *F. intermedia* (0.5 per leaf pair) were released on each of the five treatment plants of each variety. Feeding was allowed to occur continuously on the infested plants and leaves were harvested at intervals of 30, 60 and 90 days after feeding had commenced. Sampling took place early in the morning at all times to minimize variations in emission due to environmental conditions. The profiles generated from the three sampling intervals were similar, and the data were therefore combined. The leaves were placed in marked glass flasks that were immediately sealed with new rubber septa to contain the volatiles. These were taken to the Chemistry Department of Rhodes University for immediate mass spectrometry analyses.

The major components of the volatile oils from