Assessing a non-chemical strategy to reduce pest damage in sticky plants

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Introduction

Plants defend themselves against herbivore attack by providing food (pollen or nectar) to attract predators and parasitoids. Augmenting this food is one method of increasing biological control by beneficial insects.

Glandular trichomes are plant hairs that trap insects and protect plants. Predatory insects adapted to navigating on sticky plants feed on the trapped insects, increasing their abundance and reducing herbivore damage.

Tobacco is covered in glandular trichomes that trap arthropods and is closely associated with *Jalysus wickhami*, the most abundant predator in tobacco.

One *J. wickhami* can prevent the development of up to 1000 tobacco caterpillar pests during its lifetime.

***J. wickhami* feed on dead insects (carrion) trapped in trichomes on tobacco plants.**

Could augmenting tobacco plants with carrion increase *J. wickhami* abundance and reduce pest damage?

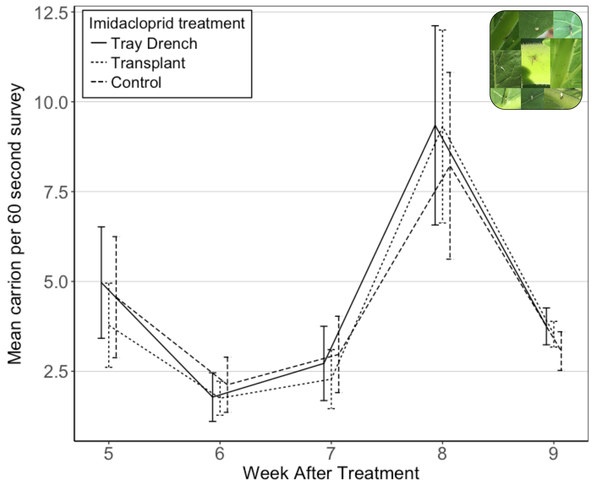
Objectives

- **Assess predator and herbivore abundance and plant damage in response to augmenting plants with arthropod carrion.**
- **Assess whether systemic Admire Pro applications disrupts predatory activity or carrion entrapment by tobacco plants.**

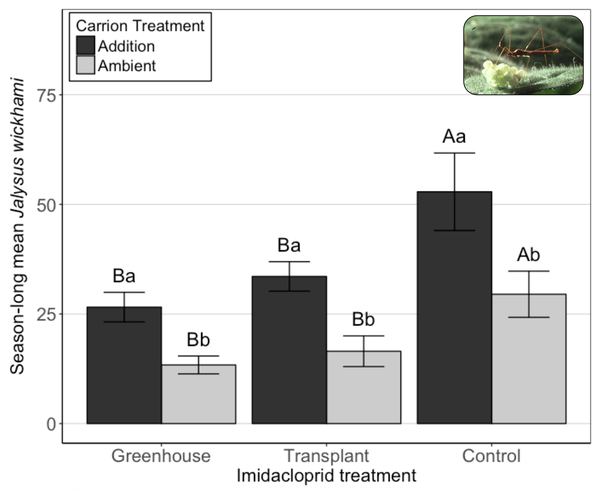
Materials and methods

- **Tobacco plants treated with Admire Pro (17.16 ml/1000 plants) planted in RCBD.**
- **Carrion addition (0.5 g frozen *Drosophila* flies) or control (ambient carrion) was assigned to split plots; carrion was added to plants weekly.**
- **Predator and pest abundance were surveyed weekly and plant damage was assessed at harvest. Carrion entrapment was assessed by inspecting tobacco plants weekly for 60 seconds.**
- **Data was analyzed with analysis of variance (ANOVA) in R Studio, means separations post-ANOVA by Tukey's procedure .**

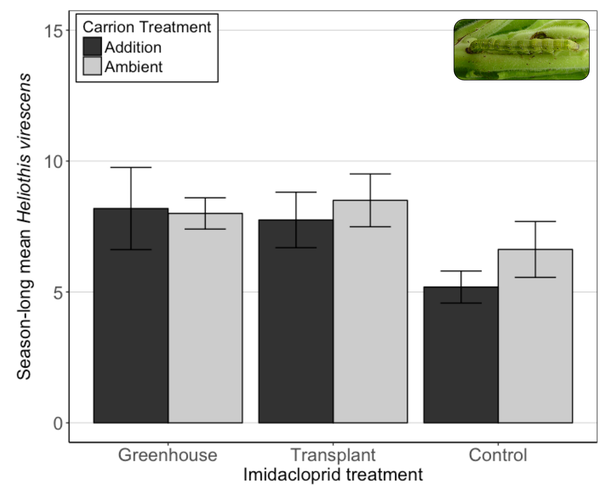
Results



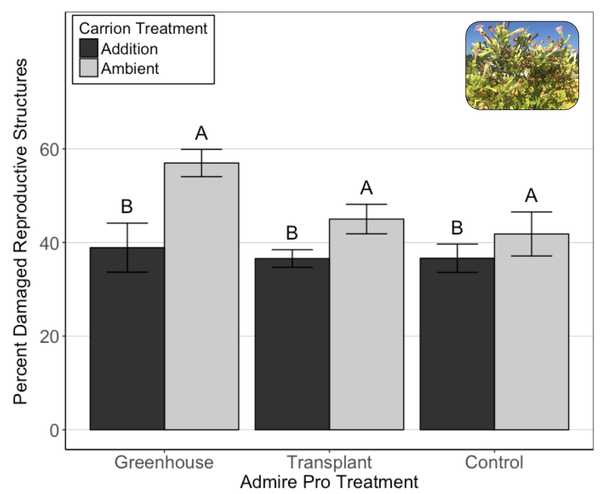
Arthropod carrion entrapment did not differ between Admire Pro treatments.



Carrion additions increased *J. wickhami* abundance regardless of Admire Pro treatment, α=0.05.



***Heliothis virescens* abundance did not differ between carrion treatments.**



Damage to seed capsules was significantly reduced by carrion additions, α=0.05.

Discussion

- **Carrion additions increased *J. wickhami* abundance but did not reduce caterpillar abundance.**
- **Carrion additions decreased plant damage, possibly due to *J. wickhami* influencing caterpillar behavior. This interaction warrants further investigation.**
- **Admire Pro did not disrupt tri-trophic interactions between tobacco plants, arthropod carrion, and *J. wickhami.***
- **A diverse group of economically important plants trap insects on their surface, suggesting this tactic may have widespread potential.**

Common name	Binomial name
Okra	*Abelmoschus esculentus* (L.) Moench
Pigeon pea	*Cajanus cajan* (L.) Millsp.
Marijuana	*Cannabis sativa* L.
Chickpea	*Cicer arietinum* L.
Cucumber	*Cucumis sativus* L.
Garden geranium	*Pelargonium x hortorum* L.H.Bailey
Soybean	*Glycine max* (L.) Merr.
Pima cotton	*Gossypium barbadense* L.
White-flowered gourd	*Lagenaria siceraria* (Molina) Standl.
Alfalfa	*Medicago sativa* L.
Oregano	*Origanum x intercedens* Rech.
Petunia	*Petunia spp. Juss.*
Scarlett runner bean	*Phaseolus coccineus* L.
Lima bean	*Phaseolus lunatus* L.
French bean	*Phaseolus vulgaris L.*
Bush bean	*Phaseolus vulgaris* L. var. Sortex process
Azalea	*Rhododendron macrosepalum* Maxim., 1870
Rose	*Rosa hybrida* L.
Sage	*Salvia officinalis* L.
Clary sage	*Salvia sclarea* L.
Cassabanana	*Sicana odorifera* (Vell.) Naudin
Potato	*Solanum tuberosum* L. x berthualtii
Tomato	*Solanum lycopersicum* L.
Sorghum	*Sorghum bicolor* (L.) Moench
Cocoa	*Theobroma cacao* L.
Grape	*Vitis romanetii* Rom.Caill.

Economically important plants that trap arthropods on their surface via trichomes

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