Florida Citrus Advanced Technology Program

QUARTERLY & FINAL REPORTS: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

Instructions Complete the fields based on your project specs. When finished, save the form to your local disk using a unique name. Then, go to **http://research.fcprac.com**, and log in with your user name and password using Researcher Login in the lower left. Find this project title and click on **Submit a Report**. Update your profile information if needed, then upload this report as directed.

2009-2010 REPORT	CATEGORY (drop-down)	TODAY'S DATE (m/d/yr)
(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*	Psyllid	7/14/10

WHAT IS THE "HEADLINE" FOR THIS REPORT (e.g. a one-sentence "newspaper headline" describing what you accomplished)

New repellent volatiles identified and field evaluation of DMDS continues

TITLE and CONTACT INFORMATION

Proposal Title Development of Effective Guava-based Repellent to Control Asian Citrus Psyllid and Mitigate Huanglongbing Disease Incidence

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Organization UF/IFAS CREC	*Total Direct Funds (current year)* 129259

REPORT UPDATE (650 words; provide details about your headline)

Asian citrus psyllids (ACP) generally rely on olfaction and vision for detection of host cues. Plant volatiles from Allium spp. (Alliaceae) are known to repel several arthropod species. Recently, we examined the effect of garlic chive, (A. tuberosum Rottl.) and wild onion (A. canadense L.) volatiles on behavior of ACP in a laboratory two-port divided T-olfactometer. Citrus leaf volatiles attracted significantly more ACP adults than clean air. Volatiles from crushed garlic chive leaves, garlic chive essential oil, garlic chive plants, wild onion plants and crushed wild onion leaves all repelled ACP adults when compared with clean air, with the first two being significantly more repellent than the others. However, when tested with citrus volatiles only crushed garlic chive leaves and garlic chive essential oil were repellent and crushed wild onions leaves were not. Chemical analysis of the headspace components of crushed garlic chive leaves and garlic chive essential oil by gas chromatography-mass spectrometry revealed that monosulfides, disulfides and trisulfides were the primary sulfur volatiles present. In general, trisulfides (dimethyl trisulfide) inhibited the response of ACP to citrus volatiles more than disulfides (dimethyl disulfide, allyl methyl disulfide, allyl disulfide). Monosulfides did not affect the behaviour of ACP adults. A blend of dimethyl trisulfide and dimethyl disulfide in 1:1 ratio showed an additive effect on inhibition of ACP response to citrus volatiles. The plant volatiles from Allium spp. did not affect the behavior of the ACP ecto-parasitoid Tamarixia radiata (Waterston). Thus Allium spp. or the tri- and di-sulphides could be integrated into management programmes for ACP without affecting natural enemies.

The current results provide evidence that volatiles from crushed garlic chive leaves inhibited the response of ACP to its normally attractive host plant volatiles. These volatiles also appeared to have inhibited the psyllid's normal geotactic and phototactic responses. Furthermore, our results suggest that the sulfur volatiles released by wounded A. tuberosum leaves affected the behavior of ACP. Our current efforts are focusing on formulating these sulfur compounds into controlled release devices for deployment in the field.

In field investigations, we continue to evaluate the effect of DMDS on psyllid populations when deployed in the field in the SPLAT release device from ISCA. In one field experiment we eliminated psyllid populations with a standard Danitol spray and subsequently applied DMDS in SPLAT to half the plots, while leaving the other half untreated. We found that it took psyllids significantly longer to re-colonize citrus plots that were first treated with Danitol and then by DMDS than those that were treated with Danitol only. We initiated another large field experiment evaluating DMDS in SPLAT in a commercially managed grove. All plots receive psyllid management sprays, but half also received additional DMDS treatments. Under this low psyllid population density situation, we have observed no additional benefit of adding DMDS. Thus, our results with applying DMDS in the field have been inconsistent to date, with certain experiments showing promise, while others showing little to no effect of the DMDS treatment. We have also discovered that DMDS is highly phyto-toxic. Application of SPLAT containing DMDS was found to kill large tree branches. We are looking into alternate formulations and application procedures to overcome this hurdle. We also have three new SPLAT-DMDS formulations for extended longevity that we are evaluating; however, those tests are ongoing.