

FINAL REPORT

PROPOSED DURATION: 3 Years

Project Title: Pear Psylla Pheromone Lures for Monitoring and Mating Disruption

PI: Christopher Adams
Organization: Oregon State University
Telephone: 541-386-2030
Email: chris.adams@oregonstate.edu
Address: 3005 Experiment Station Drive
City/State/Zip: Hood River, OR 97031

Cooperators: Pete McGhee, Pacific Biocontrol. Andy Rust, Chamberlin distributing.

Total Project Request: Year 1: \$20,000 Year 2: \$20,000 Year 3: \$20,000

Budget 1

Primary PI: Christopher Adams
Organization Name: Oregon State University
Contract Administrator: Charlene Wilkinson
Telephone: 541-737-3228
Contract administrator email address: charlene.wilkinson@oregonstate.edu
Station Manager/Supervisor: Stuart Reitz
Station manager/supervisor email address: stuart.reitz@oregonstate.edu

Item	2022	2023	2024
Salaries	\$12,475	\$12,475	\$12,475
Benefits	\$6,825	\$6,825	\$6,825
Wages			
Benefits			
Equipment			
Supplies	\$700	\$700	\$700
Travel			
Miscellaneous			
Plot Fees			
Total	Total year 1 \$20,000	Total year 2 \$20,000	Total year 3 \$20,000

- I would like to return the 2022 funds and place this project on hold.**

Objectives

1. Compare pheromone baited monitoring traps to beat tray sampling for measuring early season phenology and action thresholds (year 1&2).
2. Conduct dose response experiment to determine dispensers per acre needed to reduce catch in monitoring traps (year 2&3).

After this funding was approved, it was brought to my attention that several other projects were funded to look at pear psylla pheromone for attraction and retention to potted trees and traps. These trials were never published but the reports of the work were in the WTFRC archives. They did not have great success, so I scaled back my plans and tried to look at basic attraction of psylla to its pheromone, on a smaller scale. Moving forward I will look through the WTFRC archives as part of my literature review.

Significant Findings

- Laboratory flight cage choice tests studies to pear limbs coated with pear psylla cuticular sex pheromone, 13-methylheptacosane, was not significantly different from control limbs.
- Field tests of wood dowels coated with pear psylla cuticular sex pheromone, 13-methylheptacosane, was not statistically different from controls.

Results and Discussion

1. Cage studies were performed in a lab setting at 72 F (22 C) and 40% RH. For each of the 6 replicate, 100 mixed sex winter form pear psylla were caged with two sets of pear shoots placed at the far end of a cage. Shoots were either left untreated or coated with 13-methylheptacosane. Insect were allowed to respond to pear shoots over a 24 hour period. Data was collected by visually inspecting location of psylla on shoots without disturbing psylla. Sex of insects was not assessed because psylla were inclined to jump off shoots when disturbed.

Results

No significant difference was found between the two treatments. Only about one quarter of the psylla in the cage made it up onto one of the two treatments. Most remained on the cage floor or landed on the mess cage.

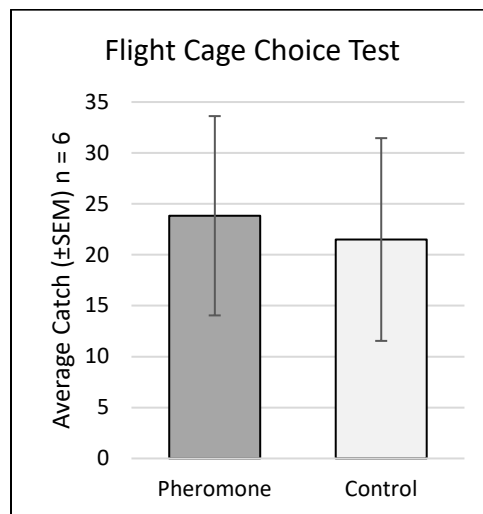


Figure 1. Cage study showing choice test of treated and control pear shoots with 100 winter form psylla. Bar chart shows average number of psylla found on shoots after 24 hours

Results and Discussion

- Field trials were conducted in managed orchard with high population of pear psylla. Wood dowels were coated with 13-methylheptacosane, or left untreated, and then coated with tangle foot insect glue. Dowels were used to simulate pear shoots that male and female psylla might use to court, mate, and lay eggs. Ten trees were randomly selected with the block, each with a single paired trial. Trial ran for one week in Early February 2022.

Results

No significant difference was found between the two treatments. Total catch was much lower than expected as beat tray samples, taken the week before the trial was set up, found ten to twenty psylla per tap in most trees in this block. Catch was most likely due to random chance and not attraction.



Figure 2. Field trials showing wood dowels treated with 13-methylheptacosane, or a control, coated in tangle foot glue. Bar chart shows catch data of psylla found in tangle foot glue.

Executive summary

Pear psylla is a major pest of commercial pears in the PNW. Even moderate psylla populations are capable of producing enough honeydew to cause black sooty mold and russetting that lowers fruit value and creates sticky conditions that negatively affect workers harvesting fruit. While pesticides can provide good control, pear psylla has developed resistance to some key chemistries (Van De Bann and Croft 1991), and the future loss of chemistries due to insecticide resistance is always a concern. Pear psylla is best managed through careful, well-timed controls and IPM practices that minimize impacts to non-target organisms and promote natural enemies.

A key IPM tool that fundamentally changed codling moth (*Cydia pomonella*) management in apple, is the development and wide-spread adoption of pheromone mating disruption and attractive monitoring traps. Pheromone communication has been well documented in Lepidoptera (Allison and Carde 2016) and these highly active chemical attractants have been used to successfully suppress insect populations for several decades (Knipling 1976).

The two trails I ran did not produce positive results. This pheromone is a close contact cuticular pheromone that is a solid at room temperature and functions differently than volatile sex pheromones produced by female moths designed to float on the wind. There are technical challenges to making a molecule as large as 13-methylheptacosane volatile at room temperature, or at the outdoor

temperatures of early February. However, the potential for developing a new tool for monitoring or disruption of early season psylla makes this pheromone worth investigating further.

I am returning the funding from 2022 and putting this project on hold until I can recruit a chemical ecologist that can devote more time to experimentation on this product. I have a relationship with the company that is producing this compound and they donated several bottles to my lab. We feel that there may still be some useful applications for this product, so we will continue to look into novel ways to apply this chemical towards the management of pear psylla.