CITRUS ADVANCED TECHNOLOGY PROGRAM

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

▶ INSTRUCTIONS

(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*

Required: What is the "headline" for this report (e.g. a one-sentence "newspaper headline" describing what you accomplished)

Vapormate fumigation controls bean thrips in navel oranges

Proposal Title

Control of bean thrips in navel oranges using Vapormate fumigation for export to Australia

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
2-11-11	California Citrus Research Board	Unclassified

REPORT UPDATE (500 words; summarize your accomplishments)

The goal of this project is to develop a quarantine or phytosanitary treatment of navel oranges shipped to Australia or New Zealand that will assure control of adult bean thrips that can be found in the navels, particularly when the weather is cool. Our research of the past couple years has demonstrated excellent control of bean thrips in the navels of navel oranges by fumigation with Vapormate. Vapormate is manufactured by The Linde Group and is a formulation of ethyl formate with carbon dioxide. A heated regulator is required to dispense the fumigant into the treatment chamber. In 2010, we conducted a simulation of a commercial fumigation in a 20' marine container. Navel oranges were washed and waxed and packed into export boxes. Eight pallets of these oranges were loaded into the container. A percentage of the oranges scattered throughout the load were infested with bean thrips for a total of >1,000 bean thrips. The fruit were cooled overnight to 41F using the refrigeration unit of the container to drive the thrips deep into the navels. The following day, Vapormate was injected into the container using a heated regulator to reach a 1% ethyl formate concentration. After 1 hour, the container was vented and the pallets removed. Thrips mortality was determined the following day by close examination of each infested orange. The oranges were sliced at several depths through the navel to find the thrips. Mortality was 100%. Additional tests were conducted with a smaller fumigation chamber. These tests included nearly 6,000 bean thrips and 100% mortality was also achieved. Navel orange tolerance to Vapormate fumigation has also been tested several times. The tolerance of waxed fruit to Vapormate doses twice the concentration needed for thrips control has been good, even after 5 weeks of cold storage and simulated retail handling. We evaluated fruit firmness, peel condition, decay, soluble solids and titratable acidity and fermentative volatile levels. There were few significant and no consistent differences among the treatments. In 2010 we also began developing a dose response curve for adult bean thrips to ethyl formate. Work on this dataset will continue in 2011. This data will be used to predict the dose required for Probit 9 quarantine control.

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Organization University of California

Contract Number 5600-133

Project Duration (years) 3 *Year of Project* 4

Total Funds (current year) $50,501

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.