ANT MANAGEMENT IN ALMONDS

Project No.: 97-RC-o0: Ant Management in Almonds

Project Leader: Richard Coviello/Mark Freeman, University of California Cooperative Extension

Cooperating Personnel: Walt Bentley (UCCE/KAC), Mario Viveros and James Brazzle (UCCE/Kern County), Frank Zalom (UC, Davis)

Objectives:

1. To develop and validate an ant monitoring tool for orchard treatment thresholds.
2. To evaluate different techniques in teaching clientele how to locate and identify damaging ant species.
3. To evaluate the effectiveness of IGRs (insect growth regulators) for control of fire ant compared to Lorsban, and to determine optimum application timing.

Results:

1. A monitoring tool for locating ants and predicting future damage was further refined. The tool consists of a short section of PVC pipe, a cap at both ends, a metal spike to hold it in the ground, and two small holes drilled in one side (for ants). Ten Nonpareil almond kernels are placed in each station. A number of small experiments were conducted to increase the tool's effectiveness. We found that almonds were preferred over other food sources in the orchard such as spurge and nutsedge. Ants would trail up to 23 feet to reach the bait stations. The "strongest" ant colonies would cause severe damage to all almonds in a station within 24 hours during June through August. The number of station entrance/exit holes was not related to the damage level of kernels. Ant foraging was most active during cooler periods (i.e., under 90 degrees air temperature). However, ant foraging continued throughout the day where significant ground vegetation was present. Damage levels in stations at the same site were more consistent day to day when stations were replaced during hotter temperatures (afternoons). Kernel samples had to be chilled as ants were still feeding inside the stations during hot temperatures. We developed possible techniques to handle this problem. In addition, there was a question about severity of kernel damage--which damaged nuts would continue through the processor and become part of reject levels versus separated by "air legs". Ant damage to kernels could be rated by methods such as: the percentage of kernels damaged, severity of damage (visual), or severity of damage (by weight). We are concentrating on visual severity of damage. One experiment with a processor indicated that kernel damage less than 10 percent would pass through an "air leg" and thus affect reject levels. Kernel damage greater than 10 percent would be separated out from the crop. These results will be further tested when processors are finished with the present crop.

This monitoring tool is ready to be field tested with private industry next Spring and Summer. It needs further testing across different soils, orchard floor management systems, and throughout the growing season when ants are active.

There are questions why ant damage is worse in some years versus others. To answer that question, we started on a parallel project to determine if shell seal quality was a factor in the resistance of almond varieties to ant damage. In 1977, Dr. Soderstrom (USDA, Fresno) found that shell seal quality is a factor in the resistance of almond varieties to navel orangeworm. We modified the Seal Quality Meter that he used and tested samples of almonds from different areas, age of trees, vigor of trees, crop loads, and varieties. The data collected is not replicated, but there are strong trends that indicate those factors listed in the previous sentence do affect shell seal. We have developed several categories of shell seal percentages from the almond samples. Additional kernels (in shell) will be tested for damage levels due to ants (field) and navel orangeworm (USDA, Fresno laboratories) and then tested for shell seal. Hopefully, we can correlate damage levels with shell seal measurements.

2. Objective number two will be done starting in early Spring, 1998. We are working on additional training materials.

3. There are five possible IGR's, all granular, that could receive registration for use against ants. Four of them use corn as an attractant, and one uses a protein bait. We received a message that "Logic" should receive a federal registration in December, 1997. The state registration may take an additional ten months. We will work with all possible organizations to speed up the process if the federal registration occurs.

We conducted one field trial measuring the effectiveness of ant control by the five IGRs versus "Lorsban" (broadcast sprayed). All plots were monitored for a months for relative colony strength and then treatments were assigned. IGR baits were weighed and placed in the ant monitoring stations on berms of a nonbearing orchard with heavy ant populations. Ants in that orchard did not visit the bait stations to remove the IGR baits and thus we could not measure the effectiveness of control. However, three of these IGRs were tested by other researchers. Ants in those orchards did remove the bait and effective control was seen. Further work needs to be done with orchard factors affecting bait acceptance. Some work will be conducted this Winter with ant colonies in greenhouses with the assistance of Novartis and DowElanco at nearby research stations.

Lorsban recently received a registration for use with injectors of irrigation systems. We compared the effectiveness of Lorsban broadcast sprays versus injected into a micro-sprinkler system. The Lorsban broadcast sprays were the most effective, followed by the Lorsban injection, and then the control as measured by the ant monitoring tool. Blue Diamond is determining ant damage from samples taken at harvest and data will be reported when available.

Unfortunately, this project was not initiated until June, 1997, when funding became available to start the project. Testing and evaluation need to start in the early Spring and we plan to do so in 1998.