

Project No. 92-E6 - Ant Control in Almonds

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Objectives: 1) Use the monitoring station (developed last year) to develop data that correlates kernel damage in stations with potential harvest damage due to ants. 2) Finish the field surveys done in almond orchards to show correlations between higher numbers of damaging ant species and certain orchard factors.

Results:

1. It was determined that fire ants did not start feeding on almond kernels until about mid to late June. Monitoring stations were placed next to 15 fire ant nests in each of four orchards, for a total of 60 sites. Ten almond kernels were placed in each station, and the kernels were replaced every three days during a 30 day period. We have made evaluations of the kernel damage based upon: the percent of kernels damaged, the severity of damage to each kernel, and the weight loss (before and after feeding). Those evaluations have been done. After shaking, in hull nuts were harvested three, six, and nine days later. One hundred nuts were collected each time within a one meter (about three feet) diameter circle from each ant nest. Those samples were placed in cold storage, fumigated, and then sent to Blue Diamond Growers, who are providing the evaluation of ant damage. Those evaluations are not completed yet. There was a wide range of feeding among the different sites. So, we are hopeful that sufficient data was collected to develop the monitoring stations for predicting ant damage at harvest. We especially thank Blue Diamond for cracking out and evaluating the damage to kernels; and to Efird Farms, McFarlane Farms, S & J Ranch, and Steffen Farms for all their cooperation.
2. More orchards were surveyed in regards to the ant species present and certain orchard factors. Thief and pharaoh ants were found to feed on almonds. Pharaoh ant was only found in two orchards, but with very high populations.

Thief ant was typically found below ground, but attacked almonds in the monitoring stations. Harvester ant, which does not eat almonds, was almost always found outside the orchard in dry, sunlit areas. The field or grey ant was commonly found near the tree trunk, would forage into the tree canopy, but not eat kernels. The pyramid ant was found within the orchard, usually on the dry soil like the berms, and did not prefer to eat kernels. Almost every almond orchard older than one year had fire ants. Higher nest numbers were found in association with lighter soils (sandy), nutsedge and spurge weeds, low volume irrigation systems, and where significant sunlight hit the ground. This last factor included young orchards that were not fully grown together, orchards with small and big trees, and orchards with missing trees. By mid Summer, ants were usually found on the south side of the smaller sized pollenizer trees. During the Winter and early Spring, most ant nests, regardless of irrigation system, were found on the raised berms.

3. This last observation led us to another experiment. In late March, we found fire ant nests with the eggs and larvae (and probably the queen) within three inches of the soil's surface. All nests were found on the raised berm. We treated 20 separate nests with the maximum label rate of Lorsban in 100 gallons of water. Two months later, only four of the twenty nests showed any activity (after excavation).
4. Two granular materials were further evaluated. Logic is an insect growth regulator, and is formulated with a corn material for attracting ants. Bushwacker is a formulation of boric acid (used for cockroach control) with a seafood covering. In limited trials, both materials were picked up by ants during late summer. After eight weeks, activity and ant populations (measured by excavating the nest) dropped dramatically. We have established a plot with both those materials and Lorsban in a young citrus grove with many fire ant nests. Materials were applied in the Fall, and also will be applied in early and late Spring. Fire ants have a definite preference for certain foods during different times of the year. We thank Ciba-Geigy for grant money to work with their Logic product.
5. Five large Plexiglass ant farms were constructed and we are gradually filling them with different ant species for more in-depth studies.
6. The susceptibility of almond varieties to ant damage was repeated again. We have not cracked out all the nuts yet, but it appears that varieties with poor shell seal have higher levels of damage (similar to data last year).

We hope to finish all work by late Spring, 1993. Our most recent work suggests that Lorsban sprays in early Spring can kill whole fire ant colonies. However, it is best to identify that your ants are species that attack almond kernels and where nests are located first before any ground sprays are applied. We are working with the Almond Board and chemical companies to obtain a California registration for a granular product such as Logic. This insect growth regulator will affect the queen ant instead of just workers at or near the surface. By this Spring, we will have done all that we can towards that effort.