1988 ANNUAL REPORT - ALMOND BOARD OF CALIFORNIA RESEARCH PROJECTS

Project No. 88-E2 - Insect and Mite Research
Ant Chemical Control (Continuation of Project No. 87-E1)

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Objectives: Identify additional effective insecticides for ant control in almonds, particularly materials which can be applied to berms in flood irrigated orchards.

Interpretive Summary: A trial conducted in 1987 to evaluate chemical control of the southern fire ant, *Solenopsis xyloni*, in almonds indicated that sprays of Lorsban® EC directed at the berms in flood-irrigated orchards would significantly decrease the activity of the ants. However, we were unable to obtain data to show that the treatments would also reduce subsequent damage to the nuts. This year's study was an attempt to obtain such data as well as to evaluate chemical control under different irrigation regimes.

Two almond orchards, one flood-irrigated (FI) and the other one drip-irrigated (DI), were selected for the study. We compared 2 rates of water and two rates of Lorsban emulsifiable concentrate. Pounce® 3.2 EC and diazinon 14% granules were also included in the study. The rates of water were chosen to be more representative of what most growers would use than the high rate (200 GPA) used in last year's study.

Treatments in the FI orchard were applied August 9, and consisted of the following:

- Lorsban 4E @ 2 lb a.i./Acre in 20 GPA applied to the berms.
- Lorsban 4E @ 4 lb a.i./Acre in 20 GPA applied to the berms.
- Lorsban 4E @ 2 lb a.i./Acre in 40 GPA applied to the berms.
- Lorsban 4E @ 4 lb a.i./Acre in 40 GPA applied to the berms.
- Lorsban 4E @ 4 lb a.i./Acre split 2/3 on berms and 1/3 in middles.
- Pounce 3.2E @ 0.4 lb a.i. in 40 GPA applied to the berms.
- Untreated check.

The treatments were replicated eight times. Diazinon 14% granules were applied to the visibly active nests in all treatments in four of the eight replications.

Treatments in the DI orchard were applied August 6, and consisted of the following:

- Lorsban 4E @ 2 lb a.i./Acre in 20 GPA applied to the tree row.
- Lorsban 4E @ 4 lb a.i./Acre in 20 GPA applied to the tree row.
- Lorsban 4E @ 2 lb a.i./Acre in 40 GPA applied to the tree row.
- Lorsban 4E @ 4 lb a.i./Acre in 40 GPA applied to the tree row.
- Diazinon 14G sprinkled on the nests.
- Pounce 3.2E @ 0.4 lb a.i./ Acre in 40 GPA applied to the tree row.
- Untreated check.

Treatments in this orchard were replicated four times.

Southern fire ant activity seemed to be heavy in both orchards. Active nest counts averaged approximately approx. 45 per 5000 sq. ft. in the FI orchard and nearly 35 per 5000 sq. ft. in the DI site. The activity was located primarily on the berms in the FI block, however, the soil was quite sandy and within about 3-4 days nests would be visible in the middles after an irrigation. In the DI orchard, the nests were located almost exclusively within the wetted areas surrounding the emitters and nearly every emitter had a nest associated with it. There were also many colonies of the pyramid ant, *Conomyrma bicolor* throughout both orchards.

Treatments were evaluated by the amount of ant damage that was observed on harvested nuts. The nuts were allowed to lay on the ground for seven days after they were shaken. They were then windrowed and approximately ten pounds of in-hull nuts were taken from throughout each plot and examined for ant damage. The results, expressed as percent-ant-damaged nuts, are shown in Tables 1 and 2.

No statistically significant differences were found among any of the treatments or from the untreated check. The variation in damage within the trials was not overcome by the number of replications we used. The average damage encountered in the experiments fits well with the amount predicted by the U.C. IPM manual.

Numerically, there seems to be more effect from using higher rates of Lorsban than from applying more water. The results may show a pattern between the two types of irrigation regimes. In the drip-irrigated orchard, the damage where chemical was applied was lower than in the untreated areas except for the Pounce treated plots. In the flood-irrigated orchard, some of the chemically treated plots were as high or higher than the check except for the treatment made on both the berm and the middles. A possible explanation may be that, in the drip-irrigated block, fire ants did not exist outside of the treated areas because the soil was too dry. Whereas, in the flooded orchard, ants recolonized the middles after irrigation and these areas were sprayed in only one treatment. Contrary to our original hypothesis, it may be more necessary to treat both the berms and the middles in flood-irrigated orchards than in other types of irrigation, especially in sandy conditions.

Table 1. Treatments[1/] and Results: Flood-Irrigated Orchard

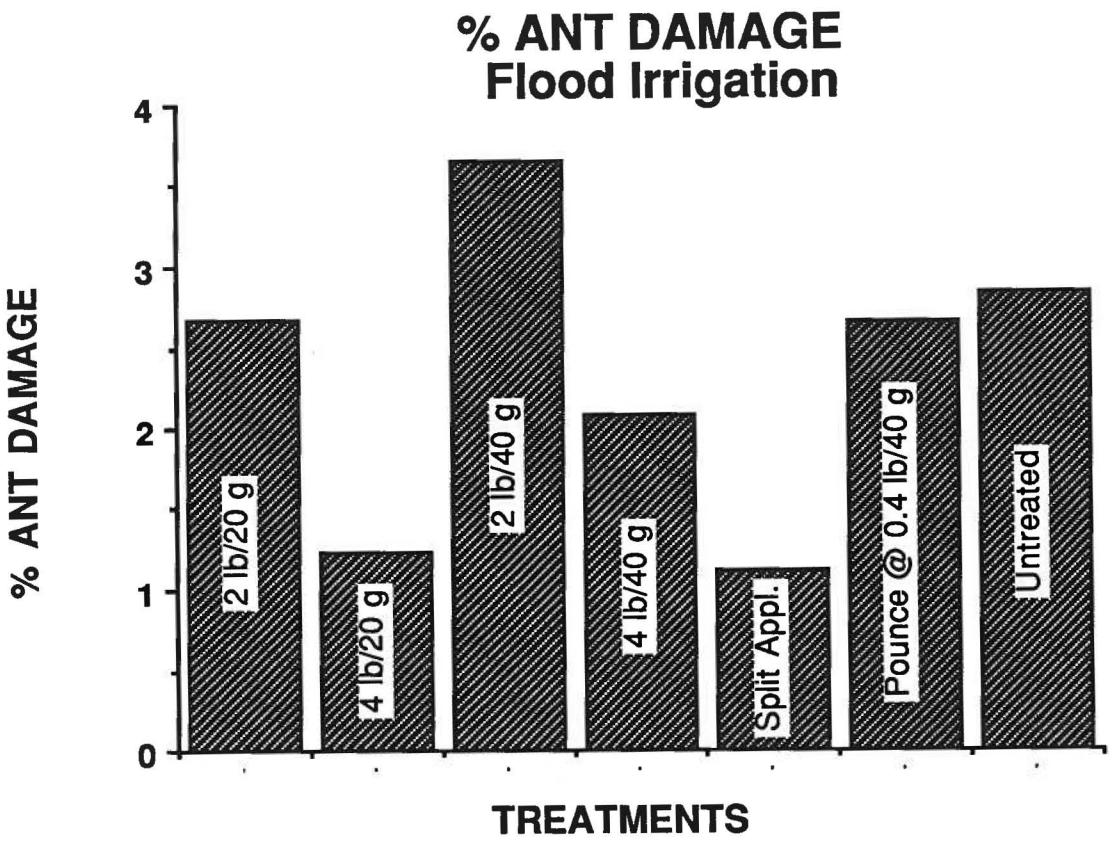
Treatments	%Damage[2/]
Lorsban 4E @ 2 lb a.i./Acre in 20 GPA applied to the berms.	2.7
Lorsban 4E @ 4 lb a.i./Acre in 20 GPA applied to the berms.	1.2
Lorsban 4E @ 2 lb a.i./Acre in 40 GPA applied to the berms.	3.7
Lorsban 4E @ 4 lb a.i./Acre in 40 GPA applied to the berms.	2.1
Lorsban 4E @ 4 lb a.i./Acre split 2/3 on berms and 1/3 in middles.	1.1
Pounce 3.2E @ 0.4 lb a.i. in 40 GPA applied to the berms.	2.7
Untreated check	2.8
Treated w/ diazinon 14G	2.3
Not treated w/ diazinon	2.4

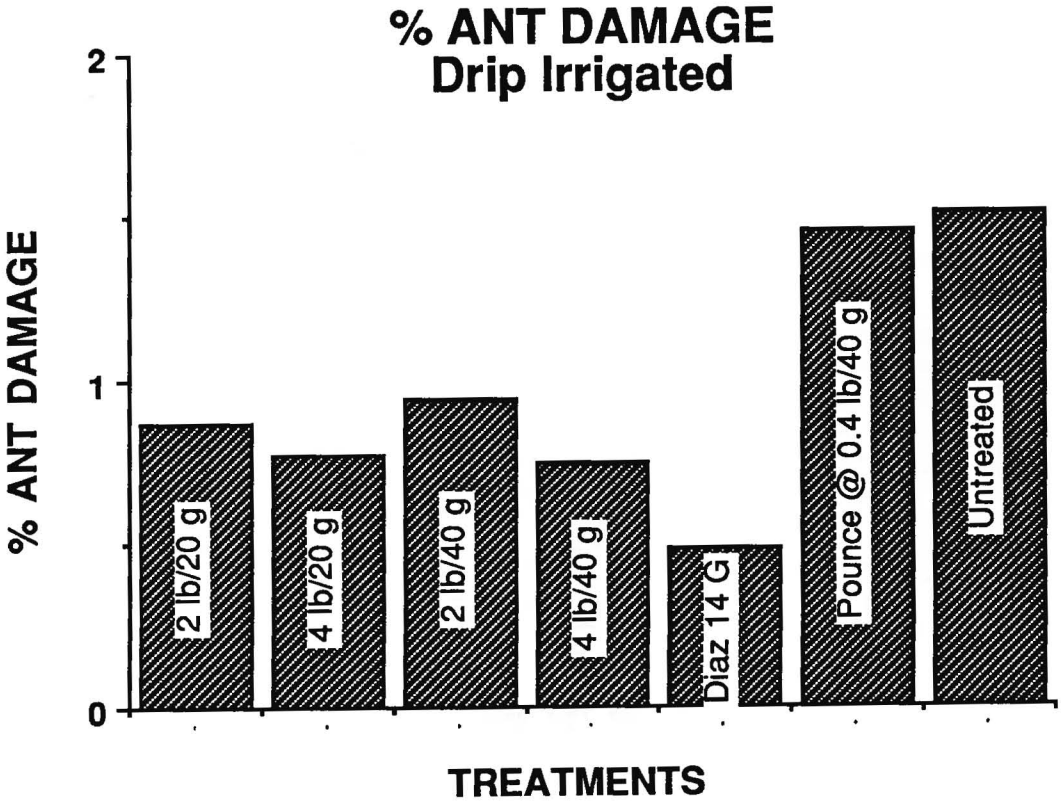
1/ Applied August 9, 1988.
2/ Means are not significantly different (P=0.5%).

Table 2. Treatments[1/] and Results: Drip-Irrigated Orchard

Treatments	%Damage[2/]
Lorsban 4E @ 2 lb a.i./Acre in 20 GPA applied to tree row.	0.9
Lorsban 4E @ 4 lb a.i./Acre in 20 GPA applied to tree row.	0.8
Lorsban 4E @ 2 lb a.i./Acre in 40 GPA applied to tree row.	0.9
Lorsban 4E @ 4 lb a.i./Acre in 40 GPA applied to tree row.	0.7
Diazinon 14G sprinkled on the nests	0.5
Pounce 3.2E @ 0.4 lb a.i. in 40 GPA applied to tree row.	1.5
Untreated check	1.5

1/ Applied August 6, 1988.
2/ Means are not significantly different (P=0.5%).


% ANT DAMAGE
Flood Irrigation
% ANT DAMAGE
4
3
2
1
0
2 lb/20 g
4 lb/20 g
2 lb/40 g
4 lb/40 g
Split Appl.
Pounce @ 0.4 lb/40 g
Untreated
TREATMENTS


% ANT DAMAGE
Drip Irrigated
% ANT DAMAGE
2
1
0
2 lb/20 g
4 lb/20 g
2 lb/40 g
4 lb/40 g
Diaz 14 G
Pounce @ 0.4 lb/40 g
Untreated
TREATMENTS