# A PRELIMINARY EVALUATION OF AMDRO[1/] FOR CONTROL OF A HARVESTER ANT (Pogonomyrmex maricopa Wheeler) IN HARD RED SPRING WHEAT

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## Summary

Amdro was evaluated qualitatively for its efficacy against a harvester ant, Pogonomyrmex maricopa, in a wheat field on the south Yuma Mesa. Within 29 days post-treatment, all colonies that were treated, and 2 check colonies that were within 100 feet of a treated colony showed decreased activity. The rate of application did not appear to be a factor in the degree of control. Thirteen of the 16 treated colonies were completely controlled, i.e., no living harvester ants observed in the nest after 29 days. The pyramid ant, Conomyrma bicolor, which was a cohabitant in most of the harvester ant clearings, did not appear to be affected by the treatments.

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The harvester ant, Pogonomyrmex spp., has been known to seriously damage several types of agricultural crops in Arizona. Nichol (1931) reported that the ants were responsible for damage to pasture lands, alfalfa fields, citrus groves, cotton fields, vegetable crops, and other agricultural commodities. He states that even though the bare areas surrounding the nests frequently measure between 500 - 1250 square feet, the actual damage extends beyond the cleared area. The ants have been observed harvesting great quantities of plant material at distances from their nests without entirely killing the vegetation.

In April 1982, a similar situation was discovered in an overhead sprinkler irrigated hard red spring wheat field on the south Yuma Mesa. The 160 acre field was surveyed and photographed from the air to determine the extent of the damage. Approximately 200 colonies of P. maricopa had cleared an estimated 146 acres of wheat.

It is well known that to effectively eliminate a colony of ants, it is necessary to kill the queen, which in the case of harvester ants, lives from 2-6 feet underground (Nichol 1931). Surface applications of contact insecticides give only temporary population suppression since they are solely effective against the workers on the surface at the time of application. Amdro is a slow acting insecticide, formulated in an oil bait, that can be passed by the workers throughout the ant colony and eventually to the queen.

This preliminary investigation was designed to test whether Amdro should be more thoroughly examined as a candidate for harvester ant control in wheat fields.

## Materials and Methods

Amdro has conditional registration for the imported red fire ant, Solenopsis invicta, and is to be applied as either a broadcast or an individual mound treatment.

Twenty-four active harvester ant colonies with nest clearings ranging in size from 3-6 feet in diameter were randomly assigned to one of three treatments on April 20, 1982. The treatments were, 1) untreated check, 2) low rate of Amdro (3 tsp./colony), and 3) high rate of Amdro (6 tsp./colony). The Amdro was applied to individual colonies by sprinkling the bait on the surface of the clearing surrounding each nest.

Attempts were made to estimate the population of each colony in two ways before the treatments were applied. Both methods proved to be inadequate but will be described nevertheless.

It was assumed that a relative estimate of population size could be made by counting the number of individual workers leaving a colony in a unit of time. Ant activity was so intense, however, that it was impossible to accurately punch a counter fast enough to keep up with the ants exiting the colony. This problem was compounded by the presence of more than one entrance/exit hole to the colony.

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1/ EPA approved common name. Manufactured by American Cyanamid Company, Wayne, NJ 07470.

2/ University of Arizona, Cooperative Extension Service, Yuma, Arizona 85364

3/ American Cyanamid Company, Agricultural Division, Princeton, NJ. 08540

An attempt was made to "freeze" the workers on the surface by photographing a consistent portion of each clearing. The resulting slides were then projected on a screen and the task of counting the number of workers was eased considerably. Unfortunately, when the post-treatment slides were projected for comparison with pre-treatment slides, the quality was not sufficient to accurately distinguish living from dead workers.

## Results and Discussion

Since we did not discover a useful and practical method to sample the population of the colonies before and after treatment, the results of this preliminary test are qualitative rather than quantitative.

In our subsequent tests for the efficacy of insecticides on harvester ants, we intend to use a method described by Reil et al. 1982. They used a visual rating system on a scale of 0 to 1 (0 = no activity; 0.5 = weak colony; 1.0 = strong colony) to evaluate the efficacy of 8 insecticides to the southern fire ant, Solenopsis xyloni, and the pavement ant, Tetramarium caespitum. This system will permit us to evaluate the effectiveness of the materials tested in quantitative terms.

Table 1 provides a summary of the individual colony activity with comments. The observations were begun at 3 pm on each day of evaluation. The colonies were evaluated 3 times: April 20, pre-treatment; April 22, 2 days post-treatment; and May 19, 29 days post-treatment.

The evaluations indicate that Amdro is capable of completely killing the P. maricopa colonies found in the situation described above.

Within 2 days after treatment, large numbers of the harvester ants were killed in each of the treated colonies. Colony activity was classified as moderate, however, because the living workers were continuously carrying dead individuals out of the nest. At this time, we do not know what effects, if any, the overhead sprinkler irrigation system might have had on the activity of Amdro treatments.

By the 29th day post-treatment, 13 of the 16 treated colonies showed no signs of P. maricopa activity at all. In each one of these cases, the nests were dug up with a shovel and searched for living individuals. When the search produced no living harvester ant, the colony was classified as not active (100% control).

Three of the treated colonies were classified in the low activity category because a few harvester ants were found foraging on the surface of each of these nests. They were not observed entering the nest, however, and were assumed to be members of another colony.

On the surface of each of the treated clearings, excess bait was still evident. This indicates that a rate lower than 3 tsp./colony might be sufficient to give complete control.

Amdro appeared to have no effect on the colonies of the smaller pyramid ants, Conomyrma bicolor, that were found to be in cohabitation with 18 of the harvester ant colonies. We did find in some cases, however, that the pyramid ant appeared to have taken over a portion of the underground tunnel system of the dead harvester ants.

It was apparent after 29 days that the size of the clearing (which may be positively correlated with population size) was not a contributing factor to the degree of control. That is, colonies with large clearings around the nest experienced as much mortality as colonies with smaller clearings around the nest.

The two untreated check colonies that showed a decrease in activity after the treatment were within 100 feet of a colony that had been treated. Since this distance is well within the normal foraging range of a harvester ant, it is assumed that the foraging harvester ants from these untreated colonies were successful in bringing bait back to their respective nests.

## References Cited

Nichol, A. A. 1931. Control of the Harvester Ant. Bull. No. 138, University of Arizona, College of Agriculture, Agricultural Experiment Station, Tucson, Arizona.

Reil, W. O., W. J. Bentley, C. S. Davis, E. L. Paine, 1982. Controlling Ants in Almond Orchards. California Agriculture, University of California, 36:7, pp. 12-14.

Table 1. Summary of Harvester Ant Activity: Apr. 20 (pre-treatment), Apr. 22 (2 days post-treatment), and May 19 (29 days post-treatment).

| Treatment | Colony # | Activity: Pre-treatment | | | | | Activity: 2 days Post-treatment | | | | | Activity: 29 days Post-treatment | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | High | Moderate | Low | None | Comments[1/] | High | Moderate | Low | None | Comments[1/] | High | Moderate | Low | None | Comments[1/] |
| UNTREATED CHECK | 2 | x | | | | a | x | | | | a | x | | | | a |
| | 4 | x | | | | a | | x | | | a,b | | x | | | a,g |
| | 7 | x | | | | a | x | | | | a | x | | | | a |
| | 11 | x | | | | a | | x | | | a,b | | x | | | a,g |
| | 15 | x | | | | | x | | | | | x | | | | |
| | 18 | x | | | | a | x | | | | a | x | | | | a |
| | 20 | x | | | | a | x | | | | a | x | | | | a |
| | 24 | x | | | | a | x | | | | a | x | | | | a |
| LOW RATE (3 Tsp. Amdro/ Colony) | 1 | x | | | | | | x | | | b,c,d,f | | | | x | d |
| | 5 | x | | | | a | | x | | | a,b,c,d,e,f | | | | x | d,e |
| | 9 | x | | | | | | x | | | b,c,d,f | | | x | | d,g |
| | 10 | x | | | | a | | x | | | a,b,c,d,e,f | | | | x | d,e |
| | 14 | x | | | | | | x | | | b,d,f | | | | x | d |
| | 16 | x | | | | a | | x | | | a,b,c,d,e,f | | | | x | d,e |
| | 19 | x | | | | a | | x | | | a,b,c,d,e,f | | | | x | d,e |
| | 23 | x | | | | a | | x | | | a,b,d,e,f | | | | x | d,e |
| HIGH RATE (6 Tsp. Amdro/ Colony) | 3 | x | | | | a | | x | | | a,b,d,e,f | | | | x | d,e |
| | 6 | x | | | | a | | x | | | a,b,c,d,e,f | | | | x | d,e |
| | 8 | x | | | | | | x | | | b,c,d,f | | | | x | d |
| | 12 | x | | | | a | | x | | | a,b,d,e,f | | | | x | d,e |
| | 13 | x | | | | a | | x | | | a,b,c,d,e,f | | | x | | d,e,g |
| | 17 | x | | | | a | | x | | | a,b,d,e,f | | | x | | d,e,g, |
| | 21 | x | | | | | | x | | | b,d,f | | | | x | d |
| | 22 | x | | | | a | | x | | | a,b,c,d,e,f | | | | x | d,e |

1/ a - Clearing inhabited by 2 ants species: Harvester ant (Pogonomyrmex maricopa) and a smaller Pyramid ant (Conomyrma bicolor). The harvester ant appears to be the predominant species.

b - Dead harvester ants lying in piles in the clearing. Living workers continuously carrying dead individuals out of nest.

c - Some harvester ants observed with signs of poisoning, e.g. trembling head and legs.

d - Excess bait still on surface of clearing.

e - Smaller ant species in treated colonies apparently not affected by insecticide.

f - Abnormally large amount of fly (Order: Diptera) activity around colony.

g - An occasional living harvester ant on surface of clearing, apparently scavenging from another colony. None observed entering or exiting colony.