

Results

Table 1. Percent Control of Johnsongrass as Affected by Selected Gramicides.

| COMPANY | PRODUCT | CONCENTRATION | % CONTROL |
|---------|----------|----------------|-----------|
| ICI | Fusilade | 0.75% + 1% oil | 94.4 a* |
| Dupont | Assure | 0.9% + 1% oil | 89.8 b |
| BASF | Poast | 1% + 1% oil | 89.3 b |
| CHECK | | | 0.0 c |

* Values with the same letter are not significantly different at the .10 level using the Student-Newman-Keul's Test.

Application of Herbicides in Cotton Through Gravity Flow Furrow Irrigation

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Summary

The objective of this experiment was to evaluate the potential of applying herbicides in the irrigation water during a furrow irrigation as an alternate method of herbicide application in cotton.

Further research is needed to study this method of applying herbicides. If a program could be designed for the Arizona cotton grower, it would help reduce production costs. However before this method can be recommended the environmental impact of such a treatment must be investigated to prevent jeopardizing currently labelled herbicides in cotton.

Methods

In 1985, field research was conducted on a sandy clay loam at the University of Arizona Maricopa Agricultural Center to measure the response of 28 to 32 inch cotton and 4 to 15 inch Wright groundcherry (Physalis wrightii) to herbicides applied through the irrigation water. Deltapine 61 was planted in moisture on 40

inch beds on April 29, 1985 at the rate of 14 to 16 pounds of seed per acre. Normal cultural practices were followed to maintain a stand of cotton.

Herbicide treatments (see table) were arranged in a randomized complete block design with four replications. Herbicide suspensions or emulsions were applied on July 10 (third post irrigation) during the 4th hour of a 6 hour irrigation at the upper end of a furrow irrigation which provided 4 to 6 inches of water to the crop.

Herbicides were diluted with water and delivered to the two furrows adjacent to one cotton row for either 30 seconds (volume of X rate=25 ounces) or 60 seconds (volume of 2X rate=50 ounces) under 40 pounds per square inch of pressure. Each plot consisted of one row of cotton 610 feet long. Cotton injury and percent groundcherry control were estimated four weeks after treatment and seed cotton yields were taken at the end of the season.

Results

Wright Groundcherry Control. Diuron (Karmex), prometryn (Caparol), and fluometuron (Cotoran) applied at 2 pounds per acre provided greater than 90% control of emerged wright groundcherry and provided residual control until the cotton was harvested in December (Table 1). Control of Wright groundcherry, however was somewhat variable with respect to field location. The greatest control was obtained at either ends of the field which indicates an uneven herbicide distribution.

Most of the variability was removed when these herbicides were applied at the 4 pound per acre. Wright groundcherry susceptibility was greatest on 4 to 6 inch groundcherry and then diminished with increases in plant height. Butylate at 3.0 pounds per acre and oxyfluorfen at 1.0 and 2.0 pounds per acre had no effect on the emerged Wright groundcherry but limited germination of new seedlings.

Herbicide Effect on Cotton. Cotton injury observed with diuron, prometryn, and fluometuron at 4.0 pounds per acre was severe at the first and last 40 feet of each plot which shows the uneven herbicide distribution resulting from this method of application. Although this injury was severe in some instances, it only represented 1% of the area treated, thus on a whole plot basis the injury to cotton was considered as minimal.

Seed cotton yield obtained with these herbicide at the 2.0 pounds per acre rate was in most instances higher than the untreated check which indicates that herbicide injury obtained with prometryn, fluometuron, and diuron was less severe than the effect of late season weed competition. Groundcherry populations were light in untreated plots which downplays the effect of the successful treatments.

Table 1. Response of Cotton and Wright Groundcherry to Several Herbicides Applied Through Furrow Irrigation

| Herbicide | Formu- lation | 1/ Rate | Field position from point of application ------(feet)----- | | | | | | Seed cotton yield |
|-------------|------------------|------------|---|-----------------------|---------------------------|-----------------------|---------------------------|----------------------------|-------------------------|
| | | | 0-200 Crop injury | 2/ Weed control | 200-400 Crop injury | 2/ Weed control | 400-600 Crop injury | 400-600 Weed control | |
| | | lb/a | | % | | % | | % | lb/a |
| diuron | WP | 2 | 4 | 98 | 0 | 90 | 2 | 90 | 4550 |
| diuron | WP | 4 | 6 | 98 | 0 | 95 | 7 | 98 | 4250 |
| prometryn | LS | 2 | 3 | 95 | 0 | 95 | 4 | 95 | 4450 |
| prometryn | LS | 4 | 5 | 98 | 0 | 98 | 3 | 90 | 3910 |
| fluometuron | WP | 2 | 3 | 90 | 0 | 85 | 0 | 90 | 4130 |
| fluometuron | WP | 4 | 6 | 95 | 0 | 98 | 4 | 95 | 4660 |
| oxyfluorfen | WP | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3820 |
| oxyfluorfen | EC | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 4230 |
| butylate | EC | 3 | 8 | 10 | 0 | 0 | 7 | 5 | 4240 |
| untreated | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4210 |
| LSD (.05) | | | | | | | | | (130) |

1/ Crop injury 0=none 10=severe

2/ Wright groundcherry control 0=no control 100=complete control