

TIMING

Is the Key to Johnsongrass

CONTROL

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Johnsongrass is the most serious perennial weed in Arizona's irrigated crops.

Proper use of the herbicide 2,2-dichloropropionic acid (dalapon) is our most effective and economical control for light infestations of this weed in cotton. Dalapon is applied as a spray to Johnsongrass foliage; it is translocated within the plant to the underground stems or rhizomes. Applications of dalapon usually destroy the topgrowth and most of the rhizomes of Johnsongrass.

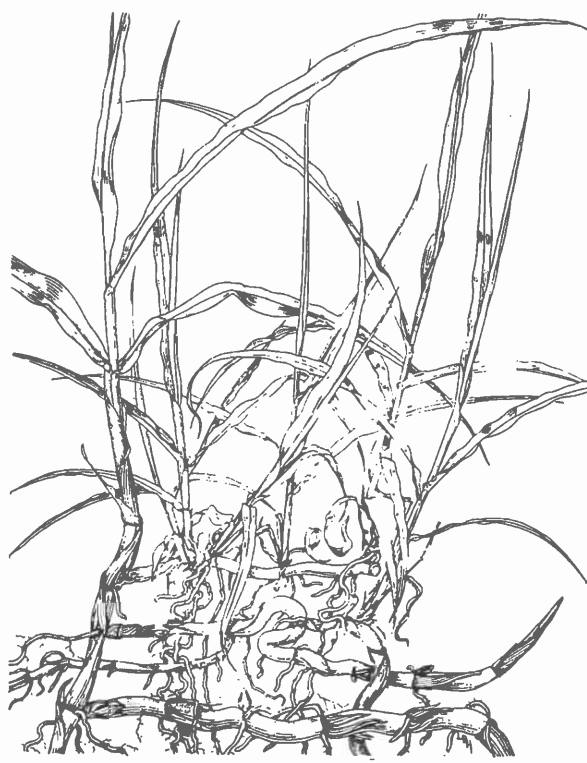
The drawing at the left shows a Johnsongrass plant six to 10 inches high, the proper stage for treatment. After treatment the topgrowth is affected at a rate dependent upon the temperature. Most of the rhizomes attached to the topgrowth die; some become dormant. Rhizomes about to emerge a few inches from the main crown continue normal or near-normal growth. This portion of rhizome is physically attached to the main system but appears to grow almost independently.

Time To Kill Survivors

The drawing at the right is the same plant two to three weeks after the first treatment. The treated foliage is dead as is much of the rhizome system. It is now time to treat the aerial stems from the surviving rhizomes.

Most established Johnsongrass plants in cotton fields emerge early in the season. They are largely destroyed by two spot treatments with dalapon. However, a few plants will not emerge until after the second spot application of dalapon. Some of the treated plants resprout later in the season. A third treatment can be timed to destroy many of these plants.

Widespread acceptance of dalapon for controlling Johnsongrass has been slowed by erratic results some growers obtained using this herbicide. During the past two years tests have been conducted on the Arizona Agricultural Experiment Station



Farm at Marana to determine some of the factors influencing applications of dalapon in cotton fields.

Study Individual Plants

In these tests the reactions of individual plants rather than groups of plants were studied. After cotton planting, individual Johnsongrass plants were located and marked with stakes soon after they emerged. To minimize the effects of cultivation, only Johnsongrass plants in the drill row were selected. Normal cotton growing practices were maintained on the study area except that Johnsongrass plants were not disturbed during hoeing. Applications of dalapon were made in May when the first spot treatments are made in cotton fields.

Thirty to 40 plants selected at random were subjected to a given treatment. All plants treated were thoroughly wet with a spray solution containing the recommended rate of dalapon. Within two days the topgrowth was clipped at the ground level. At two and three weeks after clipping the number of surviving plants, the length of the longest stem, and the number of stems per plant were determined.

In these tests the importance of timing of dalapon applications was evident. Properly-timed applications always affected the growth of Johnsongrass. In various tests single applications destroyed 30 to 90 percent of the treated plants. Two applications destroyed more than 95 percent of the treated plants.

Height Is Important

One aspect of timing is the height of Johnsongrass plants when treated. It is recommended that Johnsongrass be treated when six to 10 inches high. In one test the top growth of Johnsongrass was removed at three to four-day intervals to produce plants of different heights.



The plants were then sprayed and after two days the topgrowth was removed.

Three weeks after treatment, 60 percent of the plants sprayed when three inches high were growing. Only 10 percent of the plants sprayed when six to 10 inches high were growing. Plants sprayed when three inches high had two and one-half times as many stems on their regrowth as plants sprayed when six to 10 inches high. The regrowth was also shorter on the plants treated when six to 10 inches high.

Control of Johnsongrass taller than 10 inches with spot applications of dalapon may be possible but is not recommended. More spray is required to wet the grass and more crop plants are injured. Very poor Johnsongrass control results from treating after the flag leaf (first leaf below the flowers) is visible.

In other tests, spot applications of dalapon have been made at various times of the day with different temperatures, relative humidities, and light intensities. The time at which the application was made affected the rate at which foliage symptoms appeared, but did not affect the survival or amount of regrowth on treated plants.

For Spot Application Only

It is possible to control spot infestations of established Johnsongrass in cotton with applications of dalapon. For this method to be successful it is necessary to understand the importance of timing and to develop a control program for each field. Only fields with spot infestations should be selected for treatment. The spraying must be timed in relation to the growth of the Johnsongrass and cultural operations such as cultivation, fertilization, and irrigation. A control program should continue for several years, integrating dalapon spot treatments with cultural operations which will maintain Johnsongrass control.

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