

Weed control evaluations, made on August 18, showed that there was a serious infestation of grass in the middles, particularly the "guess rows", those middles between the four-row plots. Since each of these middles had been swept out twice as often by the sweeps, this indicated a translocation of the chemicals from the middles of the drill rows.

Incorporation methods for diuron applied before the second irrigation

This test was designed to evaluate the differences in methods of incorporating diuron when applied just prior to the second irrigation, sometimes used as a lay-by application. Diuron was applied full coverage on July 1 at the rate of 1-1/4 pounds per acre. The incorporation methods were,

- (1) Check, no incorporation
- (2) Standard sweeps
- (3) Rolling cultivator

Weed control evaluations were made on August 18. There was a significant difference between the check and the two incorporation treatments, but no difference between incorporation methods. As noted in the two previous tests the grass infestation was all in the middles, and those middles between four-row plots showed the poorest control. Operation of the sweep-type cultivator evidently moved the chemical from the middles.

One very important conclusion can be drawn from the three tests described above. When applying chemicals it is essential that they remain in place, that is, not translocated laterally by incorporation or subsequent operations.

* * * * *

Weed Control In Cotton¹

K. C. Hamilton

During 1965, the University of Arizona's cotton weed research concentrated on (1) herbicides for season-long control of annual weeds, (2) repeated foliar applications of herbicides for Johnsongrass control, and (3) effect of herbicide residues in the soil on following crops. In this program, there were 40 field tests involving over 4,000 treated plots at the Cotton Research Center, Phoenix, and the Marana, Mesa, Tucson, and Yuma Experiment Farms.

The best control of annual weeds was obtained with herbicide combinations of (1) DCPA (Dacthal), R4461 (Prefar) or trifluralin (Treflan) applied preplanting and diuron (Karmex) applied at layby and (2) diuron applied preplanting and trifluralin incorporated before the first irrigation.

Best Johnsongrass control was with repeated foliar applications of DSMA or MSMA and surfactant. Soil residues of DCPA, prometryne (Caparol), and trifluralin caused severe injury to sugar beets.

Time between application and incorporation of Trifluralin

The interval between application of trifluralin to the soil and its incorporation has been studied during 1964 and 1965. The commercial recommendation that the herbicide be disked into the soil immediately after application to reduce loss of its activity is not always possible or necessary.

Cotton Research Center tests

In March 1964, 1 pound per acre of trifluralin was applied to a flat soil surface immediately, 1, 2, 3, 4, 5, and 6 days before incorporating with a ground-driven rolling cultivator. The area was then furrowed for the preplanting irrigation. In April, cotton was planted in moist soil under a dry mulch. Weeds in this test were browntop panicum, watergrass, sprangle-top, groundcherry, and carelessweed. Weed control at harvest and cotton yields are summarized in Table 1. All preplanting applications of trifluralin stunted cotton plants for 2 to 3 months. Varying the time between application of trifluralin and incorporation into the soil from a few minutes to 6 days did not influence its effect on seedling cotton, initial weed control, weed control at harvest or final yield of seed cotton.

In March 1965, 3/4 pound per acre of trifluralin was applied to a flat soil surface immediately, 1, 2, 4, 8, 12, 16, and 20 days before incorporating with a rolling cultivator. After incorporation the soil was furrowed for the preplanting irrigation. Cotton was planted in March and replanted in April in moist soil under a dry mulch. Weed control at harvest and cotton yield are summarized in Table 2. As in 1964, all preplanting applications of trifluralin caused temporary stunting of cotton plants. Control of annual grasses was less satisfactory in 1965 than in 1964 because shaping the beds at layby exposed untreated soil in the furrow. Varying the interval between preplanting applications and incorporation of trifluralin from a few minutes to 20 days did not affect weed control, plant growth or yield of cotton.

In May and June of 1965, 1 pound per acre of trifluralin was applied as a directed spray to the soil covering the entire furrow and base of the cotton plants. Applications were made immediately, 1 hour, 6 hours, 1, 2, 4, and 6 days before incorporation with a rolling cultivator and immediately before the next irrigation. Weed control at harvest and cotton yield are

¹This report is based on cooperative investigations of the Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture and Arizona Agricultural Experiment Station.

summarized in Table 3. Varying the interval between layby applications and incorporation of trifluralin from a few minutes to 6 days did not affect weed control or cotton yield.

Tucson tests

In February, April, and June of 1965 flats filled with soil were placed on the surface of a plowed field and treated with 1 pound per acre of trifluralin. Soil was removed from the flats, mixed, and replaced immediately, 15 minutes, and 1, 2, 3, 6, and 9 days later. The flats were then placed in a greenhouse, 25 seed of RS610 sorghum planted, and the soil was subirrigated. Data on the emergence and average height of sorghum plants two weeks after planting are summarized in Tables 4 and 5. Delaying incorporation of trifluralin 1 or 2 days did not alter its effectiveness in reducing sorghum emergence. Trifluralin reduced growth of emerging sorghum even when incorporation was delayed 9 days. Roots on sorghum planted in trifluralin-treated soil were greatly reduced. If these plants were exposed to field conditions they probably would not have survived.

These six tests indicate that when trifluralin is applied to dry soil immediate incorporation is not essential. However, long delays between application of trifluralin and incorporation should be avoided. Immediate incorporation involving added expense would not be justified compared to incorporation with normal tillage operations within 1 or 2 days.

Table 1. Weed control and cotton yield following preplanting applications of trifluralin incorporated at intervals after treatment. 1964.

Time from application of 1 lb/A of trifluralin to incorporation	Weed control Percent estimated September 30, 1964 Broadleaved Grasses		Yield ^{1*} as percent of check
Immediate	76	81	246a*
1 day	69	89	264a
2 days	66	91	254a
3 days	61	87	286a
4 days	69	85	272a
5 days	69	90	283a
6 days	69	91	278a
Not treated - check	0	0	100 b

¹Yield of seed cotton on checks averaged 290 lb/A.

*Values followed by the same letter are not significantly different.

Table 2. Weed control and cotton yield following preplanting applications of trifluralin incorporated at intervals after treatment. 1965.

Time from application of 3/4 lb/A of trifluralin to incorporation	Weed control Percent estimated October 13, 1965		Yield ¹ as percent of check
	Broadleaved	Grasses	
Immediate - check	75	35	100
1 day	82	48	103
2 days	68	58	104
4 days	85	38	95
8 days	78	48	101
12 days	95	40	103
16 days	90	39	87
20 days	78	45	96

¹Yield of seed cotton on checks averaged 2,060 lb/A.

Table 3. Weed control and cotton yield following layby applications of trifluralin incorporated at intervals after treatment.

Time from application of 1 lb/A of trifluralin to incorporation	Weed control Percent estimated October 13, 1965		Yield ¹ as percent of check
	Broadleaved	Grasses	
Immediate - check	48	58	100
1 hour	12	55	99
6 hours	52	58	95
1 day	10	51	98
2 days	38	50	99
4 days	30	42	100
6 days	52	48	93
Irrigation only	35	42	93

¹Yield of seed cotton on checks averaged 2,390 lb/A.

Table 4. Emergence of sorghum from soil having trifluralin incorporated at intervals after application.

Time from applica- tion to incorpora- tion	Number of seedlings per flat			
	Date			
	March 15	May 7	June 28	Average
Immediate	11-bc*	12--c	8--c	10
15 minutes	9--c	14-bc	11--c	11
1 day	11-bc	17ab	9--c	12
2 days	11-bc	17ab	15-b	14
3 days	13-bc	21a	19a	18
6 days	16-bc	19a	22a	19
9 days	17ab	21a	21a	20
Not treated - check	22a	21a	22a	22

Table 5. Height of sorghum growing in soil having trifluralin incorporated at intervals after application.

Time from applica- tion to incorpora- tion	Average height of seedling in inches			
	Date			
	March 15	May 7	June 28	Average
Immediate	0.6-b*	0.5---d	0.6--c	0.6
15 minutes	0.3-b	0.7---d	0.7--c	0.6
1 day	0.3-b	1.2--cd	0.5--c	0.7
2 days	0.4-b	1.6-bc	1.1--c	1.0
3 days	0.5-b	2.1-b	1.7--c	1.4
6 days	1.0-b	2.1-b	3.0-b	2.0
9 days	1.1-b	2.2-b	4.5-b	2.6
Not treated - check	5.5a	6.5a	9.0a	7.0

* Values in the same column followed by the same letter are not significantly different.

* * * * *