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Use of Preplant Incorporated Herbicides for Establishment of Clovers

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Summary

Five preplant incorporated herbicides were evaluated at two rates for clover injury and weed control on rose, berseem, and subterranean clovers. Treflan at 1.0 lb ai/A, Balan, Vernam, Eptam, and Dual all caused significantly more injury to subterranean clover when rated 61 days after treatment (DAT). However, when rated 101 DAT only Treflan at 1.0 lb ai/A, Vernam at 3.0 lbs ai/A, and Dual at 3.0 lbs ai/A produced significantly more injury than the untreated check. With berseem and rose clovers, only Treflan at 1.0 lb ai/A, and Dual resulted in significantly higher injury. Broadleaf weed control was 70 percent or better with all herbicides except Treflan at 0.5 or 1.0 lb ai/A and Eptam at 4.0 lbs ai/A when rated 101 DAT.

Introduction

Pure clover stands free of weeds are desirable for seed production and management studies. Weeds compete with clovers for moisture, nutrients, and light and reduce the growth and N_2 fixation of clovers. Reports on the use of preplant incorporated herbicides in clovers are limited. Information on arrowleaf clovers (*Trifolium vesiculosum* Savi.) from tests in Georgia indicate that Tolban at 2.1 and 3.2 lbs ai/A and Eptam at 3.2 lbs ai/A resulted in some damage to clover stands (Smith and Powell 1979). Eptam at 3.0 lbs ai/A and Treflan at 0.75 lbs ai/A caused a slight reduction in the initial clover stand on subterranean clovers (*Trifolium subterraneum* L.). However, total clover production was not significantly different from untreated check (Evers 1981). Reports on the response of Bigbee berseem (*Trifolium alexandrinum* L.) and rose clovers (*Trifolium hirtum* All.) to these herbicides are nonexistent. Preemergence herbicides were selected that could be used for weed control in these clover species and provide a basis for further research to gain clearance for use by producers.

Procedure

Soil type in the test area was a Strabor loamy sand with a pH of 6.8. The herbicide treatments were applied on November 13, 1987 on a prepared seedbed. A small plot compressed air bicycle sprayer with three SS 11002 nozzles spaced 20 inches apart was used to apply the preemergence herbicides prior to planting. The sprayer delivered 20 gallons of water per acre at 25 psi pressure. A tractor driven power tiller was used to incorporate the herbicides to a depth of 2 to 2½ inches immediately after application. Herbicides evaluated included Treflan 4E at 0.5 and 1.0 lb ai/A, Balan EC at 2.0 and 3.0 lbs ai/A, Ver-

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nam 7E at 1.5 and 3.0 lbs ai/A, Eptam 6.7E at 3.0 and 4.0 lbs ai/A, and Dual 8E at 1.5 and 3.0 lbs ai/A.

The test was planted on November 19. Clover seeding rates were 12 to 15 lbs/A. The clover varieties were planted using a John Deere grain drill with a Tye seeder attachment. One hundred and fifty pounds per acre of 0-46-0 plus 150 lbs/A of 0-0-60 were applied on September 16.

Soil moisture was excellent at planting and 1.1 inches of rain fell on November 16. Experimental design was a randomized complete block with four replications. Broadleaf weed species primarily included cutleaf eveningprimrose (*Oenothera laciniata*) with some henbit (*Lamium amplexicaule*). A rating index (0 equals no injury or weed control to 100 equals complete injury or control) was used to evaluate the herbicide treatments 61 and 101 days after herbicide application.

Results and Discussion

Plots were rated 61 days after treatment (DAT) on January 13, 1988 and 101 DAT on February 22, 1988. All treatments except Treflan at 0.5 lb ai/A caused significant injury to subterranean clover when rated 61 DAT (Table 1). Forty days later, Treflan at 1.0 lb ai/A, Vernam at 3.0 lbs ai/A, and Dual at 3.0 lbs ai/A continued to show clover injury while other herbicide treatments were not significantly different from the untreated check.

Berseem clover was significantly injured by Treflan at 1.0 lb ai/A and the two rates of Dual when rated 61 and 101 DAT (Table 2). Dual at 3.0 lbs ai/A caused the most severe injury to berseem while Dual at 1.5 lbs ai/A and Treflan at 1.0 lb ai/A caused moderate clover injury.

TABLE 1. EFFECTS OF PREEMERGENT HERBICIDES ON SUBTERRANEAN CLOVER AND BROADLEAF WEEDS

		Percent Control[1]			
		13 Jan. 1988 (61 DAT)		22 Feb. 1988 (101 DAT)	
Treatment	Rate lbs ai/A	Clover	Broadleaf weed[2]	Clover	Broadleaf weed
Check	—	0 f[3]	0 d	0 c	0 d
Treflan 4E	0.5	15 ef	60 c	9 bc	70 bc
Treflan 4E	1.0	58 bc	65 bc	30 a	56 c
Balan EC	2.0	31 de	77 abc	13 bc	76 ab
Balan EC	3.0	34 de	86 ab	14 bc	81 ab
Vernam 7E	1.5	38 cd	95 a	13 bc	83 ab
Vernam 7E	3.0	58 bc	93 a	25 ab	86 ab
Eptam 6.7E	3.0	35 de	80 abc	9 bc	73 ab
Eptam 6.7E	4.0	59 b	96 a	10 bc	81 ab
Dual 8E	1.5	50 bcd	95 a	10 bc	81 ab
Dual 8E	3.0	79 a	99 a	33 a	90 a

[1]Control and injury index: 0=no control or injury, 100=complete kill or injury.
[2]Predominant weed is cutleaf eveningprimrose (*Oenothera laciniata*) with some henbit (*Lamium amplexicaule*).
[3]Means within a column followed by the same letter are not significantly different at the 0.05 level of significance (Duncan's Multiple Range Test).

TABLE 2. EFFECTS OF PREEMERGENT HERBICIDES ON BERSEEM CLOVER AND BROADLEAF WEEDS

		Percent Control[1]			
		13 Jan. 1988 (61 DAT)		22 Feb. 1988 (101 DAT)	
Treatment	Rate lbs ai/A	Clover	Broadleaf weed[2]	Clover	Broadleaf weed
Check	—	0 d[3]	0 c	0 d	0 c
Treflan 4E	0.5	3 d	71 ab	6 cd	76 b
Treflan 4E	1.0	25 c	81 ab	16 bc	85 ab
Balan EC	2.0	6 d	78 ab	8 cd	82 ab
Balan EC	3.0	5 d	65 b	9 cd	76 b
Vernam 7E	1.5	0 d	76 ab	3 d	88 ab
Vernam 7E	3.0	5 d	87 ab	5 cd	95 a
Eptam 6.7E	3.0	1 d	61 b	4 cd	78 b
Eptam 6.7E	4.0	4 d	93 a	9 cd	88 ab
Dual 8E	1.5	49 b	74 ab	23 b	77 b
Dual 8E	3.0	96 a	95 a	83 a	83 ab

[1]Control and injury index: 0=no control or injury, 100=complete kill or injury.
[2]Predominant weed is cutleaf eveningprimrose (*Oenothera laciniata*) with some henbit (*Lanium amplexicaule*).
[3]Means within a column followed by the same letter are not significantly different at the 0.05 level of significance (Duncan's Multiple Range Test).

TABLE 3. EFFECTS OF PREEMERGENT HERBICIDES ON ROSE CLOVER AND BROADLEAF WEEDS

Treatment	Rate lbs ai/A	Percent Control[1]			
		13 Jan. 1988 (61 DAT)		22 Feb. 1988 (101 DAT)	
		Clover	Broadleaf weed[2]	Clover	Broadleaf weed
Check	—	0 d[3]	0 c	0 d	0 c
Treflan 4E	0.5	35 c	63 b	13 cd	61 b
Treflan 4E	1.0	80 ab	83 ab	38 b	78 ab
Balan EC	2.0	36 c	75 ab	15 cd	75 ab
Balan EC	3.0	30 cd	62 b	8 cd	73 ab
Vernam 7E	1.5	45 c	88 ab	13 cd	74 ab
Vernam 7E	3.0	55 bc	94 a	8 cd	91 a
Eptam 6.7E	3.0	25 cd	87 ab	8 cd	79 ab
Eptam 6.7E	4.0	43 c	70 ab	14 cd	66 ab
Dual 8E	1.5	54 bc	81 ab	21 c	74 ab
Dual 8E	3.0	92 a	95 a	61 a	75 ab

[1]Control and injury index: 0=no control or injury, 100=complete kill or injury.
[2]Predominant weed is cutleaf eveningprimrose (*Oenothera laciniata*) with some henbit (*Lamium amplexicaule*).
[3]Means within a column followed by the same letter are not significantly different at the 0.05 level of significance (Duncan's Multiple Range Test).

On rose clover, only Balan at 3.0 lbs ai/A, and Eptam at 3.0 lbs ai/A were not significantly different from the untreated check when rated 61 DAT (Table 3). At the 101 DAT rating, only Treflan at 1.0 lb ai/A and the two rates of Dual continued to show significant injury compared to the untreated check.

Vernam at 3.0 lbs ai/A gave excellent season long broadleaf weed control, while Dual at 1.5 and 3.0 lbs ai/A resulted in good broadleaf weed control of 74 to 90 percent. Treflan at 1.0 lb ai/A gave erratic weed control which ranged from 56 to 85 percent when rated 101 DAT. Balan at 2.0 and 3.0 lbs ai/A resulted in 73 to 82 percent control of the broadleaf weeds.

Of the preplant incorporated herbicides evaluated, Dual at 1.5 and 3.0 lbs ai/A, and Treflan at 1.0 lb ai/A caused the greatest injury to the clover species evaluated. Although Eptam is cleared for use on clovers, severe early phytotoxicity was noted. However, when rated 101 DAT, the Eptam treatments were not significantly different from untreated check. As a species, berseem clover was more tolerant to the preemergence herbicides than rose or subterranean clovers.

Literature Cited

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