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Use of Preemergence Herbicides for Establishment of Clovers

W. J. GRICHAR, G. W. EVERS, C. L. POHLER,
AND A. M. SCHUBERT

Summary

Seven preemergence herbicides were evaluated at two rates for clover injury and weed control on berseem, rose, and subterranean clovers. Surflan at 0.75 and 1.5 and Sonalan at 0.5 and 1.0 lb ai/A resulted in the least amount of clover injury when rated at 36 and 90 days after herbicide application. Clover injury at the low rate of Furloe were 31 percent or less by 3 months after applications. Dual, Lasso, Blazer, and Aatrex resulted in 60 to 100 percent injury of clover. Broadleaf weed control was 75 percent or greater for all herbicide treatments.

Introduction

Pure clover stands free of grasses and weeds are desirable for seed production and management studies. Weeds reduce clover growth and N₂-fixation through competition for moisture, nutrients, and light. Most cleared herbicides for forage legumes are limited to perennials such as alfalfa, trefoil, and white clover (Ag Consultant and Fieldman, 1986). Even for experimental purposes, data on tolerance of annual clovers to preemergence herbicides is scarce. Some information does exist for arrowleaf (Smith and Powell, 1979) and subterranean (Evers, 1981) clovers. Bigbee berseem and rose clover are two new species for Texas which are well adapted to specific soil types in the state (Evers and Dorsett, 1986). Response of these two clover species to herbicides is nonexistent. Seven preemergence herbicides were evaluated for phytotoxicity to berseem, rose, and subterranean clover species. Herbicides were identified that could be used for weed control on research studies and provide a basis for further research to gain clearance for use by producers.

KEYWORDS: Preemergence herbicides/Berseem clover/Rose clover/ Subterranean clover/weed control.

Procedure

Soil type in the test area was a Strabor loamy sand with a pH of 6.8. The test was planted on November 5, 1986. Clover seeding rates were 15 lbs/A. The clover varieties were planted on a prepared seedbed using a John Deere grain drill with a Type seeder attachment. One hundred and fifty pounds per acre of 0-46-60 was applied on November 20.

Soil moisture at planting was excellent and 0.14 inches of rain fell on November 7 and 0.22 and 0.38 inches on November 13 and 14, respectively.

Experimental design was a randomized complete block with four replications. Broadleaf weed species included henbit (*Lamium amplexicaule*) and cutleaf evening-primrose (*Oenothera laciniata*).

Herbicide treatments were applied on November 6. A small plot compressed air bicycle sprayer with three SS11002 nozzles spaced 20 inches apart was used to apply the preemergence herbicides one day after planting. The sprayer delivered 20 gallons of water per acre at 25 psi pressure. A rating index (0 equals no injury or weed control to 100 equals complete injury or control) was used to evaluate the herbicide treatments 36 and 90 days after herbicide application.

Results and Discussion

Plots were rated 36 days after treatment (December 12, 1986) and 90 days after treatment (January 29, 1987). When evaluated on subterranean clover (Table 1) only Surflan at 1.5 lbs ai/A and Sonalan at 0.5 and 1.0 lb ai/A did not cause injury significantly different from untreated check when rated 90 days after treatment (DAT). The low rate of Surflan and Furloe caused only minor injury to subterranean clover. Dual at 1.5 and 3.0 lbs ai/A, Blazer at 0.5 and 1.0 lb ai/A, and Aatrex 1.0 and 2.0 lbs ai/A caused subterranean clover injury above 77 percent.

All herbicide treatments produced broadleaf weed control of 88 percent or greater when rated 90 DAT.

Rose clover (Table 2) demonstrated a tolerance to Surflan at 0.75 and 1.5 lbs ai/A and Sonalan at 0.5 and 1.0 lb ai/A. Furloe at 2.0 lb ai/A caused moderate injury to rose clover. Percent clover kill exceeded 70 percent in the other treatments with Lasso at 3.0 lbs ai/A and Aatrex at 1.0 and 2.0 lbs ai/A resulting in complete clover kill.

On berseem clover (Table 3), the two rates of Surflan and Sonalan also produced significantly less injury at the 90 DAT rating. Dual, Lasso, Blazer, and Aatrex all caused injury of 90 percent and above. Berseem clover response to Furloe was intermediate. Broadleaf weed control was above 82 percent with all herbicide treatments.

Of the preemergence herbicides evaluated, Surflan and Sonalan showed the greatest potential for use on cool season annual clovers. Furloe may also be of some benefit if some phytotoxicity of the clover is acceptable.

Literature Cited

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TABLE 1. EFFECTS OF HERBICIDE TREATMENTS ON BROADLEAF WEEDS AND SUBTERRANEAN CLOVER

Treatment	Rate lbs ai/A	Percent Control ¹			
		12 Dec. 1986 (36 DAT)		29 Jan. 1987 (90 DAT)	
		Clover	Broadleaf weeds	Clover	Broadleaf weeds
1. Check	—	0 d ²	0 c	0 d	0 c
2. Dual 8E	1.5	75 b	98 a	77 ab	97 a
3. Dual	3.0	80 b	100 a	77 ab	97 a
4. Lasso 4E	1.5	71 b	99 a	70 b	97 a
5. Lasso	3.0	77 b	99 a	62 b	96 ab
6. Blazer 2L	0.5	99 a	100 a	99 a	97 a
7. Blazer	1.0	100 a	100 a	98 a	99 a
8. Aatrex 4L	1.0	100 a	100 a	100 a	100 a
9. Aatrex	2.0	100 a	100 a	100 a	100 a
10. Surflan (4#/gal)	0.75	13 d	99 a	27 c	96 a
11. Surflan	1.5	0 d	91 b	22 cd	97 a
12. Sonalan (3#/gal)	0.5	15 d	95 ab	20 cd	88 b
13. Sonalan	1.0	2 d	89 b	12 cd	94 ab
14. Furloe 4EC	2.0	36 c	94 ab	27 c	91 ab
15. Furloe	4.0	87 ab	95 ab	75 b	98 a

¹Control and Injury Index: 0 = none, 100 = complete.

²Means 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 HERBICIDE TREATMENTS ON BROADLEAF WEEDS AND ROSE CLOVER

Treatment	Rate lbs ai/A	Percent Control or Injury ¹			
		12 Dec. 1986 (36 DAT)		29 Jan. 1987 (90 DAT)	
		Clover	Broadleaf weeds	Clover	Broadleaf weeds
1. Check	—	0 d ²	0 d	0 c	0 c
2. Dual 8E	1.5	82 a	96 a	62 ab	96 a
3. Dual	3.0	93 a	99 a	73 a	82 ab
4. Lasso 4E	1.5	89 a	89 ab	70 a	75 b
5. Lasso	3.0	98 a	100 a	100 a	99 a
6. Blazer 2L	0.5	98 a	97 a	94 a	94 a
7. Blazer	1.0	90 a	98 a	67 a	90 ab
8. Aatrex 4L	1.0	100 a	100 a	100 a	100 a
9. Aatrex	2.0	100 a	100 a	100 a	100 a
10. Surflan (4#/gal)	0.75	17 cd	65 c	10 c	95 a
11. Surflan	1.5	18 c	92 ab	26 c	93 ab
12. Sonalan (3#/gal)	0.5	0 d	65 c	0 c	82 ab
13. Sonalan	1.0	5 cd	77 bc	3 c	83 ab
14. Furloe 4EC	2.0	61 b	80 abc	31 bc	92 ab
15. Furloe	4.0	83 a	92 ab	73 a	95 a

¹Control and Injury Index: 0 = none, 100 = complete.

²Means 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 HERBICIDE TREATMENTS ON BROADLEAF WEEDS AND BERSEEM CLOVER

Treatment	Rate lbs ai/A	Percent Control or Injury 1			
		12 Dec. 1986 (36 DAT)		29 Jan. 1987 (90 DAT)	
		Clover	Broadleaf weeds	Clover	Broadleaf weeds
1. Check	—	0 d ²	0 c	0 d	0 c
2. Dual 8E	1.5	95 a	98 a	90 a	97 a
3. Dual	3.0	97 a	100 a	99 a	93 ab
4. Lasso 4E	1.5	97 a	100 a	97 a	99 a
5. Lasso	3.0	100 a	100 a	99 a	99 a
6. Blazer 2L	0.5	100 a	100 a	99 a	100 a
7. Blazer	1.0	100 a	100 a	99 a	100 a
8. Aatrex 4L	1.0	100 a	100 a	100 a	100 a
9. Aatrex	2.0	100 a	100 a	100 a	100 a
10. Surflan (4#/gal)	0.75	21 c	84 b	15 cd	82 b
11. Surflan	1.5	10 cd	98 a	11 cd	98 a
12. Sonalan (3#/gal)	0.5	2 cd	92 ab	17 cd	87 ab
13. Sonalan	1.0	12 cd	84 b	5 d	93 ab
14. Furloe 4EC	2.0	50 b	99 a	25 c	96 a
15. Furloe	4.0	81 a	97 a	65 b	97 a

¹Control and Injury Index: 0 = none, 100 = complete.

²Means followed by the same letter are not significantly different at the 0.05 level of significance (Duncan's Multiple Range Test).