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Subterranean Clover Response to Preemergence, Postemergence, and Grass Desiccant Herbicides

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Summary

This study was conducted to determine the specific response of subterranean clover to various rates of eight herbicides. The upper rates for preemergence-incorporated Balan and Eptam are 2 and 3 lbs/A, respectively. A 5- to 7-day delay between Eptam application and clover planting is also suggested. Post emergence herbicides Rhonox and Basagran controlled broadleaf weeds. Basagran would be the preferred chemical because it is less phytotoxic to the clover and also controls sedges. Poast, Fusilde, Dowco 453, and CGA-82725 provided good grass control with no damage to the clover.

Introduction

Subterranean clover acreage is increasing in Texas (Evers and Dorsett, 1986). Small plot research studies fre-

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quently require pure stands of subterranean clover. Although herbicides are the most practicable means of weed control, few herbicides are cleared for clovers. Information on the response of subterranean clover to these cleared herbicides is very limited. Initial screening of herbicides at only one or two rates has shown that 2,4-DB will cause leaf deformations and stunting of clover seedlings and that high rates of Eptam and Balan may be phototoxic (Evers, 1983a; Evers, 1983b).

The predominant use of cool season annual clovers will be in mixtures with warm season perennial grasses. The most limiting factor to establishing and reseeding annual clovers in the fall is the grass competition. Some chemicals have been evaluated on dallisgrass (Evers, 1987) and Coastal bermudagrass (Grichar et al., 1987) as grass desiccants. The more promising chemicals need to be checked for postemergence phytotoxicity to the clover for their use on pastures after the clover has volunteered.

Preemergence and postemergence herbicides were evaluated on subterranean clover to provide additional information for use in weed control and as grass desiccants.

Procedure

Mt. Barker subterranean clover was planted on a prepared seedbed in 8-inch rows at 20 lbs/A on October 20, 1983. Soil type was a Lake Charles clay which was fertilized with 60 lbs P/A the day before planting. Experimental design was a randomized block with four replications. Plot size was 6 X 15 ft. Herbicides were applied with a CO_2 pressurized sprayer at 30 psi in 16.5 gal water/A. Balan and Eptam were applied and incorporated with a garden tiller immediately before planting. Postemergence herbicides were applied on November 11 when the clover seedlings were in the unifoliate to the first true leaf stage. The first rainfall after planting was 0.55 inches on October 31.

Ten seedlings were excavated at random from each plot on January 6 and dried to determine seedling weight. Plots were harvested to a 1.5-inch height with a flail mower on March 20 and April 27. Weeds on the test site were nutsedge *(Cyperus spp.)*, common chickweed *(Stellaria media)*, henbit *(Lamium amplexicaule)*, swinecress *(Coronopus didymus)*, and annual bluegrass *(Poa annua)*.

Results and Discussion

By November 17, Eptam had caused reduced stands, stunting of seedlings, and sealing of the cotyledons. The degree of damage increased with herbicide rate. There were also some phytotoxic effects on the 1- and 2-lb Basagran, 0.5- and 1.0-lb Rhonox, and 3-lb Balan treatments. The high rate of Basagran and Rhonox and 3-lb Eptam treatments resulted in significantly lower seedling weights than the control (Table 1). Seedling weight decreased as herbicide rate increased for all herbicides except Eptam and Fusilade. This same trend occurred for forage production at the first harvest. Rhonox and the high rate of Balan and Eptam produced significantly lower yields than the control. Lack of soil moisture caused the very low second harvest yields and probably prevented any significant differences than may have occurred. Only the high Rhonox rate resulted in significantly reduced forage production than the control for the season.

None of the herbicide treatments produced significantly more forage than the control because of the complex weed population. Eptam was the only herbicide that con-

TABLE 1. RESPONSE OF SUBTERRANEAN CLOVER TO VARIOUS RATES OF PREINCORPORATED AND POSTEMERGENCE HERBICIDES

Herbicide	Rate (A.I.)	Seedling dry weight	Yield		
			20 Mar	27 Apr	Total
	lb/A	grams	lb/A		
Balan	1.0	0.275	2,136	403	2,539
Balan	2.0	0.273	2,010	403	2,413
Balan	3.0	0.178	1,575	604	2,179
Eptam	2.0	0.218	1,692	403	2,095
Eptam	3.0	0.158	2,010	547	2,557
Eptam	4.0	0.178	1,508	417	1,925
Rhonox	.25	0.220	2,034	633	2,666
Rhonox	.5	0.198	1,625	561	2,186
Rhonox	1.0	0.105	1,005	676	1,681
Basagran	.5	0.200	2,002	374	2,376
Basagran	1.0	0.165	1,843	489	2,332
Basagran	2.0	0.090	1,734	619	2,353
Control		0.253	2,111	417	2,528
Poast + C.O.[1]	.5	0.240	1,843	360	2,203
Poast + C.O.	1.0	0.208	2,136	417	2,553
Fusilade + C.O.	.5	0.208	2,211	389	2,600
Fusilade + C.O.	1.0	0.233	1,943	403	2,346
Dowco 453 + C.O.	0.5	0.275	1,901	360	2,261
Dowco 453 + C.O.	1.0	0.223	1,843	432	2,274
CGA-82725 + C.O.	0.5	0.245	2,136	403	2,539
L.S.D. .05		0.088	427	379	646

[1]Crop oil at 1 qt/A.

trolled all weeds but it was also the most phytotoxic to subterranean clover. The company marketing Eptam has suggested delaying clover planting 5 to 7 days after herbicide application since half life in moist loam soil at 70 to 80°F is approximately 1 week. This has been tried and the phytotoxic effects were reduced. However, the high rate of 4 lbs/A should still be avoided with subterranean clover. The remaining herbicide treatments only removed some of the weed species, and therefore, did not completely eliminate weed competition.

Balan controlled all weeds except nutsedge. The poor clover growth at the 3-lb rate indicates that no more than 2 lbs/A should be used. Rhonox was the most damaging postemergence herbicide evaluated. Only the 0.25-lb rate would be safe but may not provide effective weed control.

Basagran had provided effective broadleaf weed control in earlier studies without harming subterranean clover. In this study the 1- and 2-lb rate reduced seedling weight. This was a temporary effect since there was no significant difference between any of the Basagran treatments and the control for yield. In previous studies Basagran was applied at 0.5- to 1.0-lb rates and applied to slightly older clover seedlings. Basagran appears to be one of the best postemergence herbicides for broadleaf weed and sedge control in clovers. Recommended rate in soybeans, peanuts, and corn is 0.75 to 1.0 lb/A. To be effective, the broadleaf weeds must be young and growing. Basagran is not cleared for clovers at this time.

Poast, Fusilade, Dowco 453, and CGA-82725 caused no damage to subterranean clover. Their potential use would be as a fall application to a warm season perennial grass after volunteer or seeded clovers had emerged. The rates used in this study are 2 to 4 times greater than would be used as desiccants. However, they do not control broadleaf weeds or sedges. Their phytotoxicity to the summer grass is also a problem (Evers, 1987). A possible broad spectrum of weed control in pure clover stands might be obtained by mixing one of these herbicides with Basagran. This hypothesis will be assessed in the future.

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