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2002 Red and White Clover Grazing Tolerance Report

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Introduction

Red clover (*Trifolium pratense*) and white clover (*Trifolium repens*) are both high quality forage legumes that are used primarily in mixed stands with tall fescue or orchardgrass for improving yield and quality of pastures. Stands of red clover are generally productive for two to three years, while white clover can be productive for many years. Their high palatability cause them to be overgrazed easily. This report summarizes current research on the grazing tolerance of clover varieties when subjected to continuous grazing pressure.

Description of the Tests

Red and white clover tests for grazing were established in Lexington in the fall of 2000 and 2001. Soils at the test site are well-drained silt loams and are well suited to clover production. Plots were 5 ft x15 ft in a randomized complete block design with each variety replicated six times.

Red clover was seeded at the rate of 12 pounds and white clover at 3 pounds per acre into a prepared seedbed using a disk drill. All seed lots were inoculated prior to planting. Plots were grazed continuously beginning the first spring after seeding. In general, plots were grazed from mid-April to mid-September. Supplemental hay was fed during periods of slowest growth.

Visual ratings of percent stand were made in the fall and spring after each grazing season. Fertilizers (lime, P, K, and Boron) were applied according to University of Kentucky recommendations.

Results and Discussion

Weather data are presented in Table 1. After a wet spring, the 2002 summer was the fourth hottest and driest on record.

Data on percent stand are presented in Tables 2 and 3. Statistical analyses were performed on these data to determine if the apparent differences are truly due to variety or just due to chance. Varieties not significantly different from the highest numerical value in a column are marked with one asterisk (*). To determine if two varieties are truly different, compare the difference between the two varieties to the Least Significant Difference (LSD) at the bottom of the column. If the difference is equal to or greater than the LSD, the varieties are truly different when grown under the conditions at a given location. The Coefficient of Variation (CV), which is a measure of the variability of the data, is included for each column of means. Low variability is desirable, and increased variability within a study results in higher CVs and larger LSDs.

There were differences in persistence between red clover and white clover (Table 2). Red clover entries did not tolerate continuous, heavy grazing. In contrast, there were several white clover entries that persisted after one season, and one entry had significant stand after the second grazing season. The 2002 drought may have contributed to the lack of survival of entries.

Table 4 summarizes information about distributors and persistence across two years.

Summary

These studies indicate there are white clover varieties that express tolerance to overgrazing. Red clover entries have not shown the same tolerance to overgrazing.

Although these varieties were abused during the growing season, they were allowed to rest and regrow after September 15 to prepare for winter.

This information should be used along with yield and pest resistance information in selecting the best clover variety for each individual use. It is *not* recommended that clover be continuously grazed as was done in this trial. While several varieties expressed tolerance to the level of grazing pressure used in these trials, overgrazing greatly reduces yield and therefore profitability of these clovers.

Good management for maximum life from grazing clover would include:

- allowing clover to become completely established before grazing
- using rotational grazing where animals harvest available forage in seven days or less followed by resting for 28 days before regrazing
- adding any needed fertilizer and lime
- removing grazing livestock from clover fields from mid-September to November 1 to replenish root reserves.

Table 1. Temperature and rainfall at Lexington during the 2000, 2001, and 2002 growing seasons.

	2000				2001				2002			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	° F	DEP	IN	DEP	° F	DEP	IN	DEP	° F	DEP	IN	DEP
JAN	32	+1	3.48	+0.62	31	0	0.9	-1.9	38	+7	2.12	-0.74
FEB	43	+8	4.97	+1.76	40	+5	3.2	0	38	+3	1.28	-1.93
MAR	48	+4	3.47	-0.93	40	-4	2.7	-1.7	45	+1	7.93	+3.53
APR	53	-2	4.10	+0.22	59	+4	1.7	-2.2	58	+3	4.19	+0.31
MAY	67	+3	2.96	-1.51	66	+2	4.9	+0.4	61	-3	4.36	-0.11
JUN	73	+1	3.22	-0.44	71	-1	2.0	-1.6	74	+2	2.45	-1.21
JUL	74	-2	3.42	-1.58	75	-1	5.6	+0.6	78	+2	1.10	-3.90
AUG	74	-2	3.38	-0.55	76	+1	4.8	+0.8	77	+2	0.95	-2.98
SEP	66	-2	5.47	+2.27	65	-3	3.0	-0.2	72	+4	4.90	+1.70
OCT	59	+2	0.92	-1.65	56	-1	3.6	+1.1	55	-2	5.61	+3.04
NOV	43	-2	1.59	-1.80	51	+6	2.8	-0.6	43	-2	3.76	+0.37
AVG	**57.5**	**+0.8**	**3.4**	**-0.8**	**57.3**	**+0.7**	**3.2**	**-0.5**	**58.1**	**+1.6**	**3.5**	**-0.2**

DEP is departure from the long-term average for that location.

Table 2. Percent stand of red and white clovers planted September 19, 2000, at Lexington, Kentucky, in a cattle grazing tolerance study.

		Percent Stand			
Variety Type		**Apr 9, 2001**	**Oct 15, 2001**	**Apr 2, 2002**	**Oct 14, 2002**
Commercial varieties—Available for farm use					
Starfire	red clover	89*	31	36	2
Red Gold Plus	red clover	86*	20	33	0
Certified Kenland	red clover	86*	15	31	0
Experimental varieties					
AGRTR 205	white clover	72	63*	61*	48*
AGRTR 208	white clover	60	69*	63*	30
AGRTR 207	white clover	68	68*	58*	5
ZR 9908R	red clover	88*	35	43	3
RC 9803G	red clover	89*	47	52	2
AGRTP 101	red clover	82*	5	14	2
ZR 9906R	red clover	90*	40	40	0
Mean	-	81	39	43	9
CV, %	-	11.79	24.55	19.40	70.66
LSD, 0.05	-	11.11	11.19	9.66	7.40

* Not significantly different from the highest value in the column based on the 0.05 LSD.

Table 3. Percent stand of red clover varieties planted September 12, 2001, in a cattle grazing study at Lexington, Kentucky.

Variety	Percent Stand	
	Apr 4, 2002	Oct 15, 2002 **
Commercial varieties„Available for farm use		
Emarwan	71*	5*
Starfire	64	5*
Certified Kenland	77*	3*
Duration	58	3*
Vesna	79*	2*
Uncertified Kenland	66	1
Experimental varieties		
Freedom!	81*	3*
RC9301	57	5*
KNARS (cycle 1)	62	3*
RC9501	67	3*
RC9803G	64	3*
Mean	68	3
CV, %	14.90	80.88
LSD, 0.05	11.69	2.91

* Not significantly different from the highest value in the column based on the 0.05 LSD.

** These stands were depleted due not only to intensive grazing but also to extreme drought.

Table 4. Persistence of clover varieties under heavy grazing pressure across years.

		Lexington					
		2000[1]				2001	
Variety	**Proprietor/KY Distributor**	**Apr 2001[2]**	**Oct 2001**	**Apr 2002**	**Oct 2002**	**Apr 2002**	**Oct 2002**
Commercial varieties„Available for farm use							
Duration	Cisco Companies						*
Emarwan	Turf Seed, Inc.					*	
Kenland certified	University of Kentucky	*				*	*
Kenland uncertified	Public						
Red Gold Plus	Turner Seed Inc.	*					
Starfire	Ampac Seed Company	*					*
Vesna	DLF - Jenks					*	*
Experimental varieties							
AGRTP 101	Ag Research (USA) Limited	*					
AGRTR 205	Ag Research (USA) Limited		*	*	*		
AGRTR 207	Ag Research (USA) Limited		*	*			
AGRTR 208	Ag Research (USA) Limited		*	*			
Freedom!	University of Kentucky					*	*
KNARS (cycle 1)	University of Kentucky						*
RC 9301	FFR Cooperative						*
RC 9501	FFR Cooperative						*
RC 9803G	FFR Cooperative	*					*
ZR 9906R	America s Alfalfa	*					
ZR 9908R	ABI Alfalfa	*					

* Not significantly different from the highest value in the column based on the 0.05 LSD.

1 Date study was planted

2 Date of measurement of percent stand.