

# 2003 Red and White Clover Grazing Tolerance Report

R.F. Spitaleri, M. Collins, G.D. Lacefield, N.L. Taylor, and E. Vanzant

## 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 causes 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, 2001, and 2002. Soils at the test site are well-drained silt loams and are well suited to clover production. Plots were 5 by 15 feet 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. Rainfall during the 2003 growing season was excellent and soil moisture was not a limiting factor.

Data on percent stand are presented in Tables 2, 3, and 4. 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 white versus red clover. Red clover entries did not tolerate continuous, heavy grazing (Tables 2, 3, and 4). In contrast, there were several white clover entries that persisted after two seasons, and one entry had significant stand after the third grazing season (Tables 2 and 4).

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 Sept. 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 Nov. 1 to replenish root reserves.

**Table 1. Temperature and rainfall at Lexington during the 2002 and 2003 growing seasons.**

	2002				2003			
	Temp		Rainfall		Temp		Rainfall	
	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	38	+7	2.12	-0.7	26	-5	0.96	-1.90
FEB	38	+3	1.28	-1.9	32	-3	3.59	+0.38
MAR	45	+1	7.93	3.5	47	+3	2.09	-2.31
APR	58	+3	4.19	0.3	57	+2	3.14	-0.74
MAY	61	-3	4.36	-0.1	63	-1	6.68	+2.21
JUN	74	+2	2.45	-1.2	69	-3	4.85	+1.19
JUL	78	+2	1.10	-3.9	74	-2	2.68	-2.32
AUG	77	+2	0.95	-3.0	75	0	5.26	+1.33
SEP	72	+4	4.90	1.7	65	-3	4.22	+1.02
OCT	55	-2	5.61	3.0	56	-1	1.61	-0.96
NOV	43	-2	3.76	0.4	50	+5	4.63	+1.24
<b>TOTAL</b>			<b>37.70</b>	<b>-1.9</b>			<b>39.71</b>	<b>-0.86</b>

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

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

Variety	Species	Percent Stand			
		April 9, 2001	October 15, 2001	April 2, 2002	October 14, 2002
<b>Commercial Varieties</b>					
Starfire	red clover	89	31	36	2
Red Gold Plus	red clover	86	20	33	0
Certified Kenland	red clover	86	15	31	0
<b>Experimental Varieties</b>					
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
AGRTP 101	red clover	82	5	14	2
RC 9803G	red clover	89	47	52	2
ZR 9906R	red clover	90	40	40	0
Mean	-	81.00	39.20	42.80	9.00
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.

<b>Table 3. Percent stand of red clover varieties planted September 12, 2001, in a cattle grazing study at Lexington, Kentucky.</b>		
<b>Variety</b>	<b>Percent Stand</b>	
	<b>April 4, 2002</b>	<b>October 15, 2002</b>
<b>Commercial Varieties</b>		
Emarwan	71	5*
Starfire	64	5*
Freedom!	81	3*
Duration	58	3*
Certified Kenland	77	3*
Vesna	79	2*
Uncertified Kenland	66	1
<b>Experimental Varieties</b>		
RC 9301	57	5*
KNARS	62	3*
RC 9501	67	3*
RC 9803G	64	3*
Mean	67.65	3.11
CV, %	14.90	80.88
LSD, 0.05	11.69	2.91
* Not significantly different from the highest value in the column.		

<b>Table 4. Percent stand of red and white clovers planted September 19, 2002, in a cattle grazing tolerance study at Lexington, Kentucky.</b>			
<b>Variety</b>	<b>Species</b>	<b>Percent Stand</b>	
		<b>Mar 25, 2003</b>	<b>Oct 30, 2003</b>
<b>Commercial Varieties</b>			
Tillman II	white clover	69	72*
Ivory	white clover	33	69*
Crescendo	white clover	48	63*
Cal. ladino	white clover	48	50
Regal	white clover	31	48
Cinnamon Plus	red clover	81	24
Certified Kenland	red clover	87	14
Cinnamon	red clover	84	13
Starfire	red clover	81	10
common	red clover	88	4
<b>Experimental Varieties</b>			
CW 9701	white clover	47	69*
CW 9502	white clover	62	63*
CW 9801	white clover	43	58
CW 9808	white clover	52	55
RC 9602	red clover	81	20
CW 3001	red clover	82	16
RC 9804G	red clover	78	14
RC 9103	red clover	78	11
Mean		65.09	37.30
CV, %		14.09	30.54
LSD, 0.05		10.53	13.07
* Not significantly different from the highest value in the column.			

**Table 5. Characterization and persistence of red and white clover varieties under heavy grazing pressure across years.**

Variety	Proprietor/KY Distributor	Lexington						
		2000 <sup>1</sup>			2001		2002	
		Apr <sup>2</sup> 2001	Oct 2001	Oct 2002	Apr 2002	Oct 2002	Mar 2003	Oct 2003
<b>Commercial Varieties—Available for Farm Use</b>								
Cal ladino	public							
Cinnamon Plus	FFR Cooperative						*	
Cinnamon	FFR Cooperative						*	
common	public						*	
Crescendo	Cal/West Seeds							*
Emarwan	Turf Seed, Inc				*	*		
Duration	Cisco Companies					*		
Freedom!	Barenbrug USA				*	*		
Ivory	Cebeco International Seeds, Inc							*
Kenland, certified	public	*			*	*	*	
Kenland, uncertified	public							
Red Gold Plus	Turner Seed Inc.	*						
Regal	public							
Starfire	Ampac Seed Co.	*				*		
Tillman II	Caudill Seed Co.							*
Vesna	DLF-Jenks				*	*		
<b>Experimental varieties</b>								
AGRTR 205	AgResearch (USA) Limited		*	*				
AGRTR 208	AgResearch (USA) Limited		*					
AGRTR 207	AgResearch (USA) Limited		*		*	*		
AGRTP 101	AgResearch (USA) Limited	*						
CW 3001	Cal/West Seeds						*	
CW 9502	Cal/West Seeds							*
CW 9701	Cal/West Seeds							*
CW 9801	Cal/West Seeds							
CW 9808	Cal/West Seeds							
KNARS	University of Kentucky					*		
RC 9103	FFR Cooperative						*	
RC 9301	FFR Cooperative					*		
RC 9501	FFR Cooperative					*		
RC 9602	FFR Cooperative						*	
RC 9803G	FFR Cooperative	*				*		
RC 9804G	Seed Research of Oregon						*	
ZR 9906R	ABI Alfalfa, Inc.	*						
ZR 9908R	America's Alfalfa	*						

<sup>1</sup> Establishment year.

<sup>2</sup> Date of measurement of percent stand.

Shaded boxes indicate that the variety was not in the test.

Open boxes indicate the variety was in the test but its persistence was significantly less than the top-ranked variety in the test.

\* Not significantly different from the top-ranked variety in the test.

*Mention or display of a trademark, proprietary product, or firm in text or figures does not constitute an endorsement and does not imply approval to the exclusion of other suitable products or firms.*

