PR-644

2012 Red and White Clover Report

G.L. Olson, S.R. Smith, G.D. Lacefield, and D.C. Ditsch, Plant and Soil Sciences

Introduction

Red clover *(Trifolium pratense L.)* is a high-quality, short-lived, perennial legume used in mixed or pure stands for pasture, hay, silage, green chop, soil improvement, and wildlife habitat. This species is adapted to a wide range of climatic and soil conditions. Stands of improved varieties generally are productive for 2½ to 3 years, with the highest yields occurring in the year following establishment. Red clover is used primarily as a renovation legume for grass pastures. It is a dominant forage legume in Kentucky because it is relatively easy to establish and has high forage quality, yield, and animal acceptance.

White clover *(Trifolium repens L.)* is a low-growing, perennial pasture legume with white flowers. It differs from red clover in that the stems (stolons) grow along the surface of the soil and can form adventitious roots that may lead to the development of new plants. Three types of white clover grow in Kentucky: Dutch, intermediate, and ladino. Dutch white clover, sometimes called "common," naturally occurs in many Kentucky pastures and even lawns. It is generally long lived and reseeds readily, but its small leaves and low growth habit result in low forage yield. The intermediate type is a cross between ladino and Dutch white clover and has been developed to give higher yields than the Dutch type and to persist better than the ladino type under pasture or continuous grazing conditions. Ladino white clover has larger leaves and taller growth than the intermediate and Dutch types and is the highest yielding of the three white clover types. Information on the grazing tolerance of white clover varieties can be found in the 2012 Red and White Clover Grazing Tolerance Report (PR-650).

Yield and persistence of red and white clover varieties are dependent on environment and pressure from diseases and insects. The most common red clover diseases in Kentucky are southern anthracnose, powdery mildew, sclerotinia crown rot, and root rots. For white clover, the most common pests are stolon rots, root rots, and potato leafhoppers. High yield and persistence (as measured by percent stand) are two indications that a red or white clover variety is resistant to or tolerant of these pests when grown in Kentucky.

This report provides current yield data on red and white clover varieties included in yield trials in Kentucky as well as guidelines for selecting clover varieties. Tables 14 and 15 show a summary of all clover varieties tested in Kentucky for the past 10-plus years. The UK Forage Extension Web site at www.uky.edu/Ag/Forage contains electronic versions of all forage variety testing reports from Kentucky and surrounding states and a large number of other forage publications.

Important Selection Considerations

Local adaptation and persistence. The variety should be adapted to Kentucky as indicated by superior performance across years and locations in replicated yield trials such as those reported in this publication. High-yielding varieties are generally also those varieties that are the most persistent. Improved red clover generally produces measurable yields for 2½ to 3 years, with the year of establishment considered as the first year. The highest yields occur in the year following establishment. White clover may persist longer than red clover, particularly in wet seasons, and has the ability to reseed even under grazing.

Seed quality. Buy premium-quality seed that is high in germination and purity and free from weed seed. Buy certified seed or proprietary seed of an

Table 1. Temperature and rainfall at Lexington, Kentucky, in 2010, 2011, and 2012.

	2010				2011				2012[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	29	-2	2.40	-0.46	29	-2	2.10	-0.76	38	+7	4.80	+1.94
FEB	29	-6	1.38	-1.83	39	+4	6.34	+3.13	40	+5	5.39	+2.18
MAR	47	+3	1.05	-3.35	47	+3	4.76	+0.36	56	+12	5.64	+1.24
APR	59	+4	2.74	-1.14	58	+3	12.36	+8.48	56	+1	3.26	-0.62
MAY	67	+3	7.84	+3.37	64	0	6.72	+2.25	69	+5	4.02	-0.45
JUN	76	+4	4.61	+0.95	74	+2	2.61	-1.05	73	+1	2.42	-1.24
JUL	78	+2	5.49	+0.49	80	+4	6.29	1.29	81	+5	2.50	-2.50
AUG	78	+3	1.54	-2.39	75	0	2.89	-1.04	75	0	1.68	-2.25
SEP	71	+3	1.14	-2.06	66	-2	5.52	+2.32	67	-1	6.40	+3.20
OCT	59	+2	1.22	-1.35	55	-2	4.10	+1.53	55	-2	2.00	-0.57
NOV	47	+2	4.58	+1.19	50	+5	9.53	+6.14				
DEC	28	-8	2.15	-1.93	41	+5	5.58	+1.60				
Total			36.14	-8.41			68.80	+24.25			38.11	+0.93

[1] DEP is departure from the long-term average.
[2] 2012 data is for the ten months through October.

improved variety. An improved variety is one that has performed well in independent trials, such as those reported in this publication. Other information on the label will include the test date (which must be within the previous nine months), the level of germination, and percentage of other crop and weed seed. Order seed well in advance of planting time to assure that it will be available when needed.

Description of the Tests

This report summarizes studies at Lexington (two in 2010 and two in 2011), Princeton (2011), Quicksand (2010), and Eden Shale (2010). Red and white clover trials were planted in the spring of 2012 in Lexington but did not establish well so they were replanted in August of 2012. The soils at Princeton (Crider), Lexington (Maury), Eden Shale (Nicholson), and Quicksand (Nolin) are well-drained silt loams. All are well-suited to clover production. Plots were 5 feet by 20 feet in a randomized complete block design with four replications with a harvested plot area of 5 feet by 15 feet.

Seedings were made at 12 pounds of seed per acre for red clover and 3 pounds of seed per acre for white clover into a prepared seedbed using a disk drill. The first cutting in the seeding year was delayed to allow the clover to completely reach maturity as indicated by full bloom, which generally occurs about 60 to 90 days after seeding. Otherwise, harvests were taken when the clover was in the bud to early flower stage using a sickle-type forage plot harvester. Fresh weight samples were taken at each harvest to calculate percent dry matter production. All tests for establishment, fertility, and harvest management were managed according to University of Kentucky Cooperative Extension Service recommendations. Weeds were controlled to avoid limiting production and persistence.

Table 2. Temperature and rainfall at Princeton, Kentucky, in 2011 and 2012.

	2011				2012[2]			
	Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP
JAN	32	-2	2.35	-1.45	40	+6	3.01	-0.79
FEB	40	+2	5.71	+1.28	54	+6	1.73	-2.70
MAR	50	+3	5.54	+0.60	60	+13	3.27	-1.67
APR	61	+2	16.15	+11.35	60	+1	0.62	-4.18
MAY	66	-1	7.22	+2.26	71	+4	1.36	-3.60
JUN	77	+2	4.60	+0.75	74	-5	2.38	-1.47
JUL	81	+3	2.98	-1.31	83	+5	1.40	-2.89
AUG	77	0	3.95	-0.06	77	0	4.27	+0.26
SEP	68	-3	3.86	+0.53	69	-2	5.45	+1.82
OCT	57	-2	1.35	-1.70	57	-2	2.94	-0.11
NOV	51	+4	9.12	+4.49				
DEC	42	+3	6.13	+1.09				
Total			68.96	+17.83			26.13	-15.33

[1] DEP is departure from the long-term average.
[2] 2012 data is for the ten months through October.

Results and Discussion

Weather data for Lexington, Princeton, Quicksand, and Eden Shale are presented in tables 1 through 4.

Yield data (on a dry matter basis) are presented in tables 5 through 11. Yields are given by cutting date for 2012 and as total annual production. Varieties are listed in order from highest to lowest total production (for the life of the test). Experimental varieties are listed separately at the bottom of the tables and are not available commercially.

Statistical analyses were performed on all clover data (including experimental varieties) to determine whether the apparent differences are truly due to variety. Varieties not significantly different from the top variety within a column are marked with one asterisk (*). To determine if two varieties are truly different, compare the difference between the two varieties with 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.

Certified "Kenland" continues to rank near the top of tests. It is important to note yield differences between certified

Table 3. Temperature and rainfall at Quicksand, Kentucky, in 2010, 2011 and 2012.

	2010				2011				2012[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	31	0	4.09	+0.80	32	+1	2.63	-0.66	40	+9	4.60	+1.31
FEB	32	-1	2.82	-0.77	42	+9	3.94	+0.34	42	+9	3.49	-0.16
MAR	47	+6	2.38	-1.96	48	+7	4.66	+0.32	57	+16	3.34	-1.40
APR	60	+7	2.64	-1.46	60	+7	11.65	+7.55	56	+3	2.02	-2.08
MAY	67	+5	6.00	+1.52	65	+3	6.49	+2.01	69	+7	4.29	-0.19
JUN	76	+6	4.26	+0.44	73	+3	3.73	-0.09	71	+1	0.82	-3.00
JUL	77	+3	3.06	-2.19	78	+4	4.92	-0.33	78	+4	5.20	+0.45
AUG	77	+4	3.77	-0.24	75	+2	4.09	+0.08	74	+1	3.82	-0.19
SEP	69	+3	0.63	-2.89	67	+1	3.52	0	67	+1	10.05	+6.53
OCT	57	+3	1.33	-1.58	55	+1	4.16	+1.25	55	+1	4.21	+1.30
NOV	47	+5	3.88	0	50	+8	5.15	+1.27				
DEC	29	-4	3.15	-0.99	42	+9	4.25	+0.11				
Total			38.02	-9.32			59.19	+11.85			42.29	+2.97

[1] DEP is departure from the long-term average.
[2] 2012 data is for the ten months through October.

Table 4. Temperature and rainfall at Eden Shale, Kentucky, in 2010, 2011 and 2012.

	2010				2011				2012[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	28	-2	2.38	-0.16	28	-2	1.68	-0.86	37	+7	4.42	+1.88
FEB	29	-4	1.78	-0.97	38	+5	5.32	+2.57	40	+7	2.26	-0.49
MAR	47	+4	2.92	-1.80	46	+3	3.47	-1.25	56	+13	2.31	-2.41
APR	59	+5	2.65	-1.50	58	+4	12.92	+8.77	55	+1	2.66	-1.49
MAY	66	+3	6.83	+2.43	63	0	6.96	+2.55	68	+5	6.24	+1.83
JUN	76	+5	7.64	+3.87	72	+1	5.91	+2.14	71	0	0.92	-2.80
JUL	77	+2	3.00	-1.53	79	+4	2.22	--2.31	79	+4	4.17	-0.36
AUG	77	+3	0.78	-2.95	75	+1	2.61	-1.12	74	0	4.15	+0.42
SEP	71	+3	0.21	-2.98	65	-3	5.5	+2.31	66	-2	5.15	+1.96
OCT	59	+2	1.18	-1.81	55	-2	3.61	+0.62	54	-3	2.38	-0.61
NOV	46	+1	3.80	+0.25	50	+5	6.67	+3.12				
DEC	27	-8	1.97	+0.46	40	+5	4.56	+1.13				
Total			35.14	-8.62			61.42	+17.67			34.71	-2.07

[1] DEP is departure from the long-term average.
[2] 2012 data is for the ten months through October.

and uncertified Kenland red clover. Most Kenland offered for sale is uncertified, and our tests show it is significantly lower in yield than certified Kenland. White clover varieties, as managed in these trials, yielded less than most red clover varieties but were more persistent. Again, certified seed of improved varieties is recommended.

In addition to the commercially available varieties and experimental lines, selected "common" red clovers are included in the variety tests for comparison. Common red clover, generally sold as "medium red clover variety unknown," is unimproved red clover with unknown performance. Several years of testing show only about one out of every 10 common red clovers is as productive as certified or proprietary red clovers. In Kentucky, the average yield advantage of seeding better red clovers compared to common types is 3 to 6 tons of dry matter over the life of the stand.

Tables 12 and 13 summarize information about proprietors, distributors, and yield performance across years and locations for all varieties currently included in this report. Varieties are listed in alphabetical order, with the experimental varieties at the bottom. Experimental varieties are not available for farm use, but commercial varieties can be purchased from dealerships. In tables 12 and 13, an open block indicates the variety was not included in that particular test (labeled at the top of the column), and an "x" in the block means that the variety was included in the test but yielded significantly less than the top-yielding variety in the test. A single asterisk (*) means the variety was not significantly different from the highest-yielding variety based on the 0.05 LSD. Look at data from several years and locations when choosing a variety of clover rather than results from one test year, as is reported in tables 5 through 11. Make sure seed of the variety selected is properly labeled and will be available when needed.

Tables 14 and 15 are summaries of yield data from 1998 to 2012 of commercial varieties that have been entered in the Kentucky trials. The data is listed

Table 5. Dry matter yields and stand persistence of red clover varieties sown April 6, 2010, at Lexington, Kentucky.

	Percent Stand						Yield *(tons/acre)*						
	2010		2011		2012		2010	2011	2012				3-year
Variety	Aug 8	Oct 15	Mar 22	Oct 4	Mar 21	Aug 23	Total	Total	Apr 27	May 24	Jun 21	Total	Total
Commercial Varieties—Available for Farm Use													
Cinnamon Plus	92	84	93	88	87	10	0.83	2.73	1.04	0.49	0.29	1.82	5.80*
Freedom! MR	96	97	95	83	85	23	0.92	2.67	0.93	0.47	0.30	1.70	5.55*
Starfire II	98	96	92	67	80	14	0.99	2.62	0.93	0.39	0.24	1.56	5.54*
Freedom!	94	88	96	75	82	14	0.97	2.56	0.71	0.39	0.24	1.33	5.27*
Rustler	92	92	93	52	67	10	0.68	2.16	1.06	0.42	0.26	1.74	5.03*
Kenland (certified)	88	78	90	78	80	14	0.66	2.46	1.11	0.37	0.23	1.71	4.94*
Common O	95	92	88	68	60	11	0.71	2.44	0.78	0.34	0.16	1.27	4.80*
Kenland (uncertified)	69	45	68	42	33	8	0.52	2.15	0.69	0.26	0.13	1.08	4.06
GLB09	93	92	89	50	47	6	0.62	2.14	0.58	0.16	0.11	0.85	3.78
Experimental Varieties													
KY Tetraploid	95	94	98	87	87	22	0.78	3.18	1.08	0.64	0.39	2.11	6.51*
CW 30091	97	94	98	73	85	20	0.81	2.88	0.93	0.41	0.26	1.60	5.73*
CW 202	88	77	97	77	80	16	0.84	2.48	1.15	0.46	0.26	1.87	5.45*
B-9.2013	94	93	87	75	72	10	0.94	2.68	0.90	0.35	0.21	1.46	5.35*
AMP-116	98	94	82	70	73	10	0.94	2.30	1.03	0.41	0.20	1.63	5.24*
Mean	92	87	90	70	73	13	0.80	2.53	.92.	0.40	0.23	1.55	5.22
CV,%	8	18	11	28	25	56	56.59	19.21	36.92	32.70	37.57	33.05	21.65
LSD,0.05	10	22	16	33	31	11	0.65	0.82	0.49	0.19	0.13	0.73	1.90

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

Table 6. Dry matter yields and stand persistence of red clover varieties sown April 7, 2010, at Quicksand, Kentucky.

	Percent Stand					Yield *(tons/acre)*						
	2010	2011		2012		2010	2011	2012				3-year
Variety	Oct 10	Mar 29	Nov 8	Mar 20	Nov 1	Total	Total	Apr 24	Jun 8	Jul 17	Total	Total
Commercial Varieties—Available for Farm Use												
Freedom! MR	98	99	65	68	4	1.44	3.99	0.36	1.67	0.65	2.67	8.11
Cinnamon Plus	95	95	49	60	4	1.40	3.44	0.58	1.88	0.64	3.10	7.84
Kenland (certified)	95	95	55	70	2	1.28	3.61	0.53	1.89	0.46	2.87	7.78
Freedom!	99	100	64	48	2	1.31	3.90	0.22	1.47	0.38	2.07	7.29
Starfire II	99	99	65	40	5	1.52	3.52	0.18	1.40	0.57	2.15	7.19
Rustler	98	99	35	40	1	1.38	3.24	0.18	1.25	0.26	1.68	6.30
Emarwan	98	99	43	38	0	1.17	2.97	0.26	1.47	0.39	2.13	6.28
Wildcat	99	98	23	15	3	1.26	3.38	0.11	1.16	0.31	1.58	6.22
Common O	86	86	9	17	0	0.91	2.26	0.10	0.94	0.13	1.17	4.56
Kenland (uncertified)	83	86	8	8	0	0.81	2.97	0.07	0.35	0.05	0.47	4.25
GLB09	82	82	7	7	1	0.82	2.67	0.05	0.26	0.09	0.40	3.89
Experimental Varieties												
KY Tetraploid	99	100	90	74	2	1.54	4.98	0.63	2.01	0.80	3.45	9.97*
CW 30091	100	99	41	37	1	1.15	2.98	0.22	1.44	0.38	2.04	6.16
CW 202	89	96	43	55	1	1.08	3.37	0.15	0.94	0.29	1.39	5.83
B-9.2013	96	98	29	30	2	1.08	2.88	0.13	1.10	0.36	1.59	5.55
AMP-116	100	100	16	13	0	1.16	2.41	0.07	0.59	0.06	0.73	4.30
Mean	95	96	40	38	2	1.21	3.29	0.23	1.22	0.36	1.82	6.33
CV,%	8	7	38	26	117	21.00	16.10	54.68	27.17	35.79	26.37	13.81
LSD,0.05	11	10	22	16	3	0.36	0.75	0.19	0.49	0.19	0.70	1.28

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

as a percentage of the mean of the commercial varieties entered in each specific trial. In other words, the mean for each trial is 100 percent—varieties with percentages over 100 yielded better than average, and varieties with percentages less than 100 yielded lower than average. Direct, statistical comparisons of varieties cannot be made using the summary tables 14 and 15, but these comparisons do help to identify varieties for further consideration. Varieties that have performed better than average over many years and at several locations have stable performance; others may have performed well in wet years or on particular soil types. These details may influence variety choice, and the information can be found in the yearly reports. See the footnotes in tables 14 and 15 to determine to which yearly report to refer.

Table 7. Dry matter yields, seedling vigor, and stand persistence of red clover varieties sown April 15, 2010, at Eden Shale Farm near Owenton, Kentucky.

	Seedling Vigor[1]	Percent Stand						Yield *(tons/acre)*						
	May 20,	2010		2011		2012		2010	2011	2012				3-year
Variety	2010	May 20	Oct 14	Mar 22	Sep 21	Mar 20	Oct 17	Total	Total	May 2	Jun 5	Jul 11	Total	Total
Commercial Varieties—Available for Farm Use														
Freedom!	3.5	95	87	91	86	81	35	0.95	3.13	1.00	1.22	0.36	2.58	6.65*
Kenland (certified)	2.3	91	93	92	85	83	55	1.02	3.11	0.99	1.10	0.31	2.40	6.53*
Freedom! MR	3.3	90	91	89	89	89	59	1.00	2.56	0.91	1.09	0.34	2.35	5.91*
Cinnamon Plus	3.4	91	97	93	91	88	55	0.83	2.80	0.88	0.98	0.30	2.15	5.78*
Starfire II	2.9	94	90	78	75	70	49	0.80	2.59	0.87	0.72	0.28	1.87	5.27*
Rustler	2.8	87	88	74	58	55	11	0.96	2.32	0.85	0.65	0.16	1.66	4.94*
Kenland (uncertified)	1.6	71	68	76	45	40	4	0.86	2.31	0.63	0.46	0.11	1.20	4.37
Common O	3.4	93	88	80	48	39	8	0.65	2.02	0.59	0.29	0.09	0.96	3.64
GLB09	4.1	98	93	87	36	34	6	0.66	2.11	0.22	0.52	0.06	0.80	3.57
Juliet	3.4	97	90	94	44	37	3	0.57	1.72	0.24	0.22	0.03	0.49	2.78
Quinequeli	3.0	97	89	55	31	31	4	0.86	1.18	0.35	0.25	0.07	0.67	2.70
Experimental Varieties														
KY Tetraploid	4.6	97	95	95	93	88	49	0.90	2.87	0.85	0.92	0.39	2.16	5.93*
CW202	2.5	92	89	87	84	79	39	0.73	3.02	0.91	0.86	0.30	2.07	5.82*
CW30091	3.8	95	93	80	73	69	31	0.91	2.52	0.99	0.77	0.24	1.99	5.42*
B-9.2013	3.3	95	93	89	79	63	28	0.74	2.81	0.81	0.77	0.22	1.80	5.35*
AMP-116	3.6	96	89	48	25	24	4	0.75	1.00	0.37	0.29	0.05	0.72	2.47
Mean	3.2	92	90	82	65	61	27	0.82	2.38	0.72	0.69	0.21	1.62	4.82
CV,%	31.0	7	7	20	36	34	30	25.78	34.13	52.61	50.32	66.70	45.16	32.83
LSD,0.05	1.4	9	9	23	33	29	28	0.30	1.16	0.54	0.50	0.20	1.04	2.25

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 8. Dry matter yields and stand persistence of red clover varieties sown April 7, 2011, at Lexington, Kentucky.

	Percent Stand				Yield *(tons/acre)*					
	2011		2012		2011	2012				2-year
Variety	Jul 18	Oct 4	Mar 21	Oct 12	Total	Apr 27	May 24	Jun 21	Total	Total
Commercial Varieties—Available for Farm Use										
Kenland (certified)	80	84	88	56	0.62	1.60	0.47	0.25	2.32	2.94*
Freedom!	86	85	88	48	0.66	1.37	0.51	0.25	2.13	2.78*
Common O	75	66	82	38	0.45	1.26	0.43	0.26	1.96	2.40
Cinnamon Plus	86	83	83	41	0.52	1.29	0.38	0.20	1.87	2.39
Rustler	71	73	75	26	0.61	1.08	0.35	0.17	1.60	2.21
Experimental Varieties										
CW 202	92	93	93	51	0.91	1.11	0.44	0.23	1.79	2.70*
RC 0303G	76	74	76	38	0.60	1.25	0.42	0.17	1.84	2.44*
CW 30091	79	81	81	49	0.54	1.27	0.38	0.22	1.88	2.42
B-9.2013	73	73	76	39	0.71	0.86	0.32	0.18	1.35	2.07
Mean	80	79	82	43	0.62	1.23	0.41	0.21	1.86	2.49
CV,%	18	20	17	47	38.25	14.41	22.90	36.70	15.23	13.95
LSD,0.05	21	23	20	30	0.35	0.26	0.14	0.12	0.41	0.51

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

Summary

Red and white clovers can be productive components of pasture and hayfields. Choose varieties with proven performance in yield and persistence.

The following College of Agriculture publications related to the establishment, management, and harvesting of clover are available at local county Extension offices and are listed in the "Publications" section of the UK Forage Web site,www.uky.edu/Ag/Forage:

- Lime and Fertilizer Recommendations (AGR-1)
- Producing Red Clover Seed in Kentucky (AGR-2)
- Grain and Forage Crop Guide for Kentucky (AGR-18)
- Renovating Hay and Pasture Fields (AGR-26)
- Growing Red Clover in Kentucky (AGR-33)
- Establishing Forage Crops (AGR-64)
- Inoculation of Forage Legumes (AGR-90)
- Growing White Clover in Kentucky (AGR-93)
- Weed Control Strategies for Alfalfa and Other Forage Legume Crops (AGR-148)
- Insect Management Recommendations for Field Crops and Livestock (ENT-17)
- Kentucky Plant Disease Management Guide for Forage Legumes (PPA-10D)
- "Emergency" Inoculation for Poorly Nodulated Legumes (PPFS-AG-F-04)

About the Authors

G.L. Olson is a research specialist and S.R. Smith and G.D. Lacefield are Extension professors in Forages. D.C. Ditsch is an Extension professor in Feed Production.

Table 9. Dry matter yields and stand persistence of red clover varieties sown April 7, 2011, at Princeton, Kentucky.

	Percent Stand				Yield *(tons/acre)*						
	2011		2012		2011	2012					2-year
Variety	Jun 14	Sep 22	Mar 14	Oct 29	Total	Apr 18	May 22	Jun 19	Sep 14	Total	Total
Commercial Varieties—Available for Farm Use											
GLB09	97	85	94	1	0.87	2.03	0.71	0.46	0.08	3.29	4.15*
Kenland (certified)	94	85	89	15	0.91	1.90	0.67	0.44	0.16	3.17	4.08*
Cinnamon Plus	97	93	95	20	0.89	1.89	0.56	0.34	0.15	2.94	3.84*
Freedom!	95	93	97	19	0.80	1.55	0.69	0.40	0.22	2.86	3.65*
Experimental Varieties											
B-8.1500	92	84	92	2	0.80	1.65	0.70	0.46	0.06	2.88	3.67*
RC 0303G	94	95	94	19	0.99	1.67	0.51	0.33	0.15	2.65	3.65*
LS 9703	95	93	97	9	0.87	1.54	0.54	0.41	0.22	2.70	3.57*
GA9908	93	82	86	9	0.81	1.55	0.50	0.38	0.16	2.59	3.40
GA110RC	96	87	95	7	0.68	1.62	0.46	0.31	0.14	2.53	3.21
Mean	95	89	93	11	0.85	1.71	0.59	0.39	0.15	2.85	3.69
CV,%	4	11	9	85	17.62	13.04	14.89	14.83	46.72	11.12	12.06
LSD,0.05	6	15	12	14	0.22	0.33	0.13	0.08	0.10	0.49	0.65

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

Table 10. Dry matter yields and stand persistence of white clover varieties sown April 6, 2010, at Lexington, Kentucky.

	Percent Stand						Yield *(tons/acre)*						
	2010		2011		2012		2010	2011	2012				3-year
Variety	Aug 6	Oct 15	Mar 22	Oct 6	Mar 21	Aug 23	Total	Total	Apr 27	May 17	Jun 20	Total	Total
Commercial Varieties—Available for Farm Use													
Will	100	97	91	85	166	39	0.95	1.82	0.57	0.42	0.26	1.24	4.01*
Regal	99	95	83	88	90	24	0.79	1.99	0.43	0.46	0.29	1.18	3.97*
Patroit	99	96	89	90	95	20	0.80	1.85	0.57	0.47	0.25	1.29	3.94*
Ivory 2	98	98	94	93	95	41	0.58	1.58	0.56	0.48	0.21	1.25	3.41*
Common	99	94	76	88	74	29	0.71	1.51	0.52	0.32	0.25	1.09	3.30*
Durana	96	97	88	88	93	35	0.58	1.40	0.60	0.45	0.26	1.30	3.28
Kopu II	100	97	72	84	86	16	0.75	1.43	0.50	0.33	0.23	1.07	3.25
Companion	98	96	75	88	86	29	0.70	1.32	0.44	0.43	0.20	1.07	3.09
Crusader II	100	96	91	58	55	28	0.84	1.34	0.40	0.29	0.16	0.85	3.02
Ocoee	99	96	76	75	82	23	0.72	1.19	0.47	0.45	0.18	1.10	3.01
Rampart	98	93	71	77	74	22	0.57	1.35	0.44	0.30	0.13	0.87	2.79
Experimental Varieties													
CW 204	98	97	79	80	91	44	0.95	1.87	0.49	0.43	0.31	1.23	4.05*
AMP-124	99	92	73	75	86	19	0.69	1.60	0.58	0.43	0.25	1.25	3.54*
CW 040041	99	99	83	74	81	33	0.82	1.50	0.59	0.36	0.21	1.16	3.48*
RD86	99	99	74	81	82	34	0.69	1.29	0.49	0.43	0.28	1.19	3.18
KY MC	98	97	68	69	74	13	0.58	1.10	0.45	0.36	0.23	1.03	2.71
Mean	98	96	80	81	88	28	0.73	1.51	0.51	0.40	0.73	1.14	3.38
CV,%	2	4	27	16	44	52	31.63	19.01	24.05	21.51	39.03	19.93	16.00
LSD,0.05	3	5	31	18	55	21	0.33	0.41	0.17	0.12	0.13	0.32	0.77

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

Table 11. Dry matter yields and stand persistence of white clover varieties sown April 7, 2011, at Lexington, Kentucky.

	Percent Stand				Yield *(tons/acre)*					
	2011		2012		2011	2012				2-year
Variety	Jul 11	Oct 6	Mar 21	Oct 12	Total	Apr 27	May 17	Jun 20	Total	Total
Commercial Varieties—Available for Farm Use										
Regal	93	93	92	59	1.15	0.43	0.36	0.11	0.90	2.06*
Will	91	94	99	73	0.90	0.53	0.43	0.14	1.10	2.00*
Jumbo II	94	98	92	63	1.00	0.45	0.42	0.10	0.97	1.97*
Patriot	91	92	95	48	0.73	0.55	0.42	0.10	1.07	1.81*
KY Select	88	94	96	33	0.74	0.57	0.37	0.05	0.98	1.72*
Ivory II	80	92	92	59	0.74	0.44	0.41	0.09	0.94	1.68*
GWC-AS10	87	89	85	45	0.72	0.40	0.38	0.12	0.90	1.63*
Ocoee	91	84	87	30	0.73	0.40	0.29	0.06	0.75	1.48*
Kopu II	85	91	88	41	0.68	0.30	0.32	0.08	0.70	1.38
Durana	76	86	89	48	0.58	0.37	0.32	0.06	0.74	1.32
WBDX	86	86	88	29	0.54	0.35	0.34	0.06	0.75	1.29
Crusader II	92	87	50	21	0.64	0.15	0.17	0.03	0.35	0.99
Experimental Varieties										
CW 040041	93	97	96	68	1.04	0.46	0.42	0.13	1.01	2.06*
CW 204	93	95	91	55	0.96	0.46	0.35	0.09	0.89	1.86*
AMP 124	84	88	90	34	0.87	0.37	0.34	0.11	0.82	1.69*
NFWC04-29	84	88	88	33	0.53	0.41	0.34	0.05	0.80	1.33
RD86	86	92	76	48	0.67	0.26	0.23	0.07	0.56	1.23
NFWC04-49	65	80	79	39	0.33	0.28	0.27	0.07	0.62	0.95
Mean	87	90	87	46	0.75	0.40	0.34	0.08	0.83	1.58
CV,%	11	9	10	37	37.28	32.40	28.53	64.73	28.82	29.40
LSD,0.05	13	11	12	24	0.40	0.18	0.14	0.08	0.34	0.66

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

Table 12. Performance of red clover varieties across years and locations.

Variety	Proprietor/KY Distributor	Lexington					Eden Shale			Princeton		Quicksand		
		2010[1]			2011		2010			2011		2010		
		10[2]	11	12	11	12	10	11	12	11	12	10	11	12
Commercial Varieties—Available for Farm Use														
Cinnamon Plus	FFR/Southern States	*	*	*	*	x[3]	*	*	*	*	*	*	x	*
Common O	Public	*	*	x	x	*	x	*	x			x	x	x
Emarwan	Rose-AgriSeed											x	x	x
Freedom!	Barenbrug USA	*	*	x	*	*	*	*	*	*	*	*	x	x
Freedom! MR	Barenbrug USA	*	*	*			*	*	*			*	x	x
Juliet	Caudill Seed Company						x	x	x					
GLB09	Public	*	x	x			x	*	x	*	*	x	x	x
Kenland (certified)	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	x	*
Kenland (uncertified)	Public	*	x	x			*	*	x			x	x	x
Quinequeli	Caudill Seed Company						*	x	x					
Rustler	Oregro Seeds	*	x	*	*	x	*	*	*			*	x	x
Starfire II	Cal/West & Ampac Seed	*	*	*			*	*	*			*	x	x
Wildcat	Brett Young Seeds											*	x	x
Experimental Varieties														
AMP-116	Ampac Seed	*	x	*			*	x	x			x	x	x
B-8.1500	Blue Moon Farms									*	*			
B-9.2013	Blue Moon Farms	*	*	*	*	x	*	*	*			x	x	x
CW 202	Cal/West Seeds	*	*	*	*	x	*	*	*			x	x	x
CW 30091	Cal/West Seeds	*	*	*	x	x	*	*	*			x	x	x
GA110RC	Univ of GA									x	x			
GA9908	Univ of GA									*	x			
KY Tetraploid	KY Agr. Exp. Station	*	*	*			*	*	*			*	*	*
RC 0303G	FFR/Southern States				*	x				*	x			
LS 9703	Lewis Seed									*	x			

[1] Establishment year.
[2] Harvest year.
[3] x in the box indicates the variety was in the test but yielded significantly less than the top variety in the test. Open boxes indicate the variety was not in the test.
*Not significantly different from the top-ranked red clover variety in the test.

Table 13. Performance of white clover varieties across years.

Variety	Type	Proprietor/KY Distributor	Lexington				
			2010[1]			2011	
			10[2]	11	12	11	12
Commercial Varieties—Available for Farm Use							
Companion	Ladino	Oregro Seeds, Inc.	*	x[3]	*		
Crusader II	Intermediate	Allied Seed, L.L.C.	*	x	x	x	x
Durana	Intermediate	Pennington	x	x	*	x	x
GWC-AS10	Ladino	Ampac Seed Co				x	*
Ivory 2	Medium leaved	DLF International	x	*	*	x	*
Jumbo II	Ladino	Ampac Seed Co				*	*
Kopu II	Intermediate	Ampac Seed Co	*	x	*	x	x
KY Select	Intermediate	Saddlebutte	x	x	*	x	*
Ocoee	Ladino	Allied Seed, L.L.C.	*	x	*	x	x
Patriot	Intermediate	Pennington	*	*	*	x	*
Rampart	Ladino	Allied Seed, L.L.C.	x	x	x		
Regal	Ladino	Public	*	*	*	*	*
WBDX	Dutch	Saddlebutte				x	x
Will	Ladino	Allied Seed, L.L.C.	*	*	*	*	*
Experimental Varieties							
AMP-124	Intermediate	Ampac Seed Co	*	*	*	*	*
CW 040041	Ladino	Cal/West Seeds	*	x	*	*	*
CW 204	Ladino	Cal/West Seeds	*	*	*	*	*
NFWC04-29	Intermediate	Noble Foundation				x	*
NFWC04-49	Intermediate	Noble Foundation				x	x
RD86	Ladino	Allied Seed, L.L.C.	*	x	*	x	x

[1] Establishment year.
[2] Harvest year.
[3] x in the box indicates the variety was in the test but yielded significantly less than the top variety in the test. Open boxes indicate the variety was not in the test.
*Not significantly different from the top-ranked white clover variety in the test.

Table 14. Summary of Kentucky red clover yield trials 2000-2012 (yield shown as a percentage of the mean of the named commercial varieties in the trial).

		Lexington											Princeton						Quicksand					Eden Shale				Mean[3]
		00[1,2]	00	01	02	03	04	06	08	09	10	11	00	03	05	08	09	11	01	03	05	08	10	00	03	08	10	
Variety	Proprietor	3yr[4]	3yr	3yr	3yr	3yr	3yr	2yr	3yr	2yr	3yr	2yr	3yr	3yr	2yr	3yr	2yr	2yr	2yr	2yr	3yr	3yr	3yr	3yr	2yr	3yr	3yr	*(#trials)*
AA117ER	ABI Alfalfa							110							87						92							96(3)
Acclaim	Allied Seed				92																							–
Arlington	WI Agr. Exp.Sta.				72																							–
Belle	Agribiotech	88			82																							85(2)
Cherokee	FL Agr. Exp. Sta.	78			65																							72(2)
Cinnamon	FFR/Sou.St.	111			108																							110(2)
Cinnamon Plus	FFR/Sou.St.					97		109	112	123	117	94			112	102	102	100			103	108	124			108	122	109(15)
Common O	Public										96	94											72				77	85(4)
Dominion	Seed Research of OR							102							95	102					93					109		100(5)
Duration	Cisco Co.			86	100														106									97(3)
Emarwan	Turf-Seed						91			117							106		101				99					103(5)
Freedom!	Barenbrug USA	108	105	127	123	96	118	91	100	108	106	109	105	110	136	107	116	95	111	103	119	106	115	102	102	100	140	110(26)
Freedom!MR	Barenbrug USA				118	115	102	114	114		112			106	101		108			94	111		128		118		125	112(14)
FSG 9601	Allied Seed						89																					–
Impact	Specialty Seeds	106	97										98															100(3)
Juliet	Caudill Seed									84						93	90									84	59	82(5)
Kenland (cert.)	KY Ag.Exp Sta.	110	111	127	139	118	117	117	99	111	99	116	104	102	92	113	106	106	111	88	105	104	123	104	98	110	138	110(26)
Kenland (uncert)	Public										82					74			83				67			66	92	77(6)
Kenstar	KY Ag.Exp Sta.		105										104															105(2)
Kenton	KY Ag.Exp Sta.	100	93	119	109	90	95	112	121				98	95	105	112	94		93	99	106	98		102	98			102(19)
Kenway	KY Ag.Exp Sta.	106	104	111	134		97	119	118				100		94	106	103		100		103	94		102				106(15)
Morning Star	Cal/West Seeds															90										90		90(2)
Plus	Allied Seed	113			113																			97				108(3)
Plus II	Allied Seed								130													97						114(2)
Prima	Public	92			74																							83(2)
Quinequeli	Caudill Seed									92							80										57	76(3)
Red Gold	Proseeds Marketing							81								89										102		91(3)
Red Gold Plus	Turner Seed		97	97			95						95						98					98				97(6)
RedlanGraze	ABI Alfalfa	95																										–
RedlanGraze II	Americas Alfalfa			91	104														93									96(3)
Redland Max	ABI Alfalfa						95																					–
Redstart	Syngenta	102			78																							90(2)
Robust	Scott Seed	92																										–
Robust II	Seed Research of OR															110										108		109(2)
Rocket	Seed Research of OR															106										108		107(2)
Rojo Diablo	Great Plains			99															101									100(2)
Royal Red	FFR/Sou.St.	108	92		91																			96				97(4)
Rustler	Oregro Seeds								83		101	87										94	99				104	95(6)
Scarlet	Dairyland	95																										–
Sienna	Great Plains			91															106									99(2)
Solid	Production Service	97	102		98	84		79					98	87	86						76			105	84			91(11)
Starfire	Ampac Seed	97	93		99								98											95				96(5)
Starfire II	Cal/West & Ampac								101		111					112						110	112			115	111	110(7)
Triple Trust 350	ABI Alfalfa							101							92						92							95(3)
Vesna	DLF-Jenks			53															96									75(2)
Wildcat	Brett Young Seeds									101							107						98					102(3)

[1] Year trial was established.

[2] Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in forage yield between varieties. To find actual yields, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 2000 was harvested three years, so the final report would be "2002 Red and White Clover Report" archived in the KY Forage Web site at <www.uky.edu/Ag/Forage>.

[3] Mean only presented when respective variety was included in two or more trials.

[4] Number of years of data.

Table 15. Summary of Kentucky white clover yield trials 1998-2012 (yield shown as a percentage of the mean of the commercial varieties in the trial).

			Lexington									Princeton		Quicksand		Eden Shale	
			02[1,2]	03	04	06	07	08	09	10	11	03	05	98	03	03	Mean[3]
Variety	Type	Proprietor	3yr[4]	3yr	3-yr	2-yr	2-yr	3yr	2yr	3yr	2yr	3yr	3-yr	3yr	2yr	2yr	*(#trials)*
Advantage	Ladino	Allied Seed, L.L.C.		125												106	116(2)
Alice	Intermediate	Barenbrug USA											86				–
Avoca	Dutch	DLF International Seeds				59							82				71(2)
Barblanca	Intermediate	Barenbrug USA		92													–
CA ladino	Ladino	Public	100		124							103		100	98		105(5)
Colt	Intermediate	Seed Research of OR		90		57							114				87(3)
Common	Dutch	Public	100				53			98			78				82(4)
Companion	Ladino	Oregro Seeds						87	94	92							91(3)
Crescendo	Ladino	Cal/West Seeds	105			140							109				118(3)
Crusader II	Intermediate	Allied Seed, L.L.C.								90	62						76(2)
Excel	Ladino	Allied Seed, L.L.C.			100												–
Durana	Intermediate	Pennington		94		94	88	82	85	97	82	87	83		101	95	89(11)
GWC-AS10	Ladino	Ampac Seed									101						–
Insight	Ladino	Allied Seed, L.L.C.				128											–
Ivory	Intermediate	Cebeco	96														–
Ivory II	Intermediate	DLF International Seeds					86			101	104						97(3)
Jumbo	Ladino	Ampac Seed	93														–
Jumbo II	Ladino	Ampac Seed									122						–
Kopu II	Intermediate	Ampac Seed	97			97	95	95	103	96	86						96(7)
KY Select	Intermediate	Saddle Butte Ag. Inc									107						–
Ocoee	Ladino	Allied Seed, L.L.C.								89	92						91(2)
Patriot	Intermediate	Pennington		103		87	104	113	95	117	112	104	100		98	99	103(11)
Pinnacle	Ladino	Allied Seed, L.L.C.				120							111				116(2)
Rampart	Ladino	Allied Seed, L.L.C.					80	89	97	83							87(4)
Regal	Ladino	Public	99	96	92		125	100	116	118	128	107	100	100	104		107(12)
RegalGraze	Ladino	Cal/West Seeds				127	140	102	103								118(4)
Resolute	Intermediate	FFR/Southern States				63											–
Seminole	Ladino	Saddle Butte Ag. Inc			108	70	79										86(3)
Super Haifa	Intermediate	Allied Seed, L.L.C.			77												–
Tillman II	Ladino	Caudill Seed	103														–
WBDX	Dutch	Saddle Butte Ag. Inc									80						–
Will	Ladino	Allied Seed, L.L.C.	107			162	150	132	107	119	124		136				130(8)

[1] Year trial was established.
[2] Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in forage yield between varieties. To find actual yields, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 2002 was harvested three years, so the final report would be "2004 Red and White Clover Report" archived in the KY Forage Web site at <www.uky.edu/Ag/Forage>.
[3] Mean only presented when respective variety was included in two or more trials.
[4] Number of years of data.

12-2012