



2022 Red and White Clover Report

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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 and hay fields. 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 lead to the development of new plants. Three types of white clover

Table 1. Temperature and rainfall at Lexington, Kentucky, in 2020, 2021, and 2022.

	2020				2021				2022 ²			
	Temperature		Rainfall		Temperature		Rainfall		Temperature		Rainfall	
	°F	DEP ¹	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	40	+9	3.72	+0.86	34	+3	4.51	+1.65	29	-2	4.93	+2.07
FEB	38	+3	5.14	+1.93	31	-4	4.60	+1.39	38	+3	7.69	+4.48
MAR	51	+7	3.79	-0.61	50	+6	5.12	+0.72	49	+5	4.27	-0.13
APR	52	-3	4.92	+1.04	54	-1	2.72	-1.16	55	0	3.71	-0.17
MAY	62	-2	5.69	+1.22	62	-2	4.34	-0.13	69	+5	3.84	-0.63
JUN	72	0	2.56	-1.10	73	+1	6.26	+2.60	76	+4	2.10	-1.56
JUL	79	+3	3.23	-1.77	75	-1	5.90	+0.90	80	+4	6.46	+1.46
AUG	75	0	3.41	-0.52	76	+1	6.16	+2.23	77	+2	4.27	+0.34
SEP	68	0	4.43	+-0.83	69	+1	3.03	-0.17	70	+2	1.50	-1.70
OCT	57	0	4.98	+2.41	62	+5	4.64	+2.10	57	0	0.96	-1.61
NOV	49	+4	2.18	-1.21	43	-2	2.13	-1.26				
DEC	36	0	2.27	-1.71	47	+11	4.41	+0.43				
Total			45.92	+1.37			53.85	+9.30			39.73	+2.55

¹DEP is departure from the long-term average.

²2022 data is for ten months through October.

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 frequent or continuous grazing conditions. Ladino white clover has larger leaves and taller growth than the intermediate and

Table 2. Dry matter yields, seedling vigor, and stand persistence of red clover varieties sown April 3, 2020, at Lexington, Kentucky.

Variety	Seedling Vigor ¹ June 3, 2020	Percent Stand							Yield (tons/acre)						
		2020		2021		2022			2020	2021	2022			3-year	
		Jun 3	Sep 24	Mar 24	Sep 29	Mar 22	Jul 12	Aug 15	Total	Total	May 13	Jun 14	Jul 12	Total	Total
Commercial Varieties-Available for Farm Use															
Freedom!	4.3	100	100	99	97	94	89	60	2.71	7.48	1.08	1.00	0.29	2.37	12.56*
SS0303RCG	3.9	100	100	100	96	92	91	50	2.78	7.45	1.05	0.73	0.30	2.07	12.30*
Gallant	3.8	96	97	97	96	91	83	53	2.55	7.67	0.85	0.70	0.25	1.80	12.01*
Kenland (certified)	3.9	98	98	99	94	88	69	25	2.72	6.92	1.09	0.78	0.24	2.10	11.74*
Blaze	4.6	98	98	98	97	93	90	51	2.46	7.18	0.96	0.77	0.25	1.98	11.62*
GA9908	3.9	96	96	98	88	74	56	11	2.83	6.90	0.96	0.64	0.20	1.81	11.54
Robust III	3.3	97	97	98	92	84	71	35	2.43	6.63	0.84	0.70	0.20	1.75	10.82
Renegade	4.6	100	100	100	79	53	26	3	2.69	6.93	0.64	0.46	0.10	1.20	10.81
Redkin	2.5	45	53	53	68	53	60	25	1.76	6.89	0.83	0.51	0.22	1.57	10.21
Barduro	4.0	100	99	99	60	20	2	2	2.40	5.93	0.30	0.21	0.00	0.51	8.84
Rustler	4.5	100	100	100	30	18	6	2	2.16	6.00	0.31	0.24	0.02	0.57	8.73
Common O	4.8	99	98	98	20	13	5	1	2.07	5.92	0.25	0.22	0.06	0.52	8.52
Experimental Varieties															
CW040040	3.9	97	98	98	96	93	91	51	2.78	7.69	1.15	0.89	0.26	2.30	12.78*
ISTP12	4.5	100	100	100	94	76	51	11	2.97	6.96	1.00	0.75	0.19	1.94	11.86*
BARTP10	3.6	97	97	97	96	71	78	36	2.41	7.00	0.82	0.78	0.22	1.82	11.24
GATP1412	2.3	77	87	91	88	76	48	19	2.35	7.29	0.83	0.54	0.16	1.54	11.17
CW30091	2.3	83	86	90	83	63	55	20	2.22	7.16	0.72	0.64	0.18	1.54	10.92
GATP1403	–	–	25	28	26	25	33	14	1.32	6.17	0.72	0.36	0.14	1.22	9.67
Mean	3.8	94	90	91	78	65	56	26	2.45	6.90	0.80	0.61	0.18	1.59	11.00
CV,%	15.0	6	4	4	11	16	24	43	13.66	8.18	23.62	22.83	25.82	18.61	7.61
LSD,0.05	0.8	9	6	5	13	14	19	16	0.49	0.80	0.27	0.20	0.07	0.42	1.22

¹Vigor 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.

Variety	Seedling Vigor ¹ May 25, 2022	Percent Stand		Yield (tons/acre)			
		2022		2022			
		May 25	Sep 22	Jul 12	Aug 12	Sep 15	Total
Commercial Varieties-Available for Farm Use							
Freedom!	4.1	97	96	1.16	1.08	0.64	2.88*
Gallant	3.5	97	98	1.06	1.03	0.67	2.76*
Kenland (certified)	4.3	99	98	1.01	0.95	0.63	2.58*
GA9908	3.5	96	96	1.09	0.93	0.55	2.56*
SS0303RCG	3.8	93	98	0.98	0.95	0.62	2.54*
Common O	4.1	98	96	0.81	0.86	0.46	2.13
Blaze	3.9	98	96	0.75	0.72	0.54	2.01
Experimental Varieties							
BARTP10	3.8	98	98	1.07	1.01	0.61	2.69*
20-LA-RC-1	3.6	96	96	1.05	1.01	0.55	2.61*
CW040040	4.0	98	98	0.90	0.96	0.57	2.44*
RC08	3.5	97	99	0.89	0.90	0.56	2.35*
ISTP12	4.0	98	98	0.82	0.94	0.57	2.33*
BARTPV23	3.6	96	96	0.77	0.80	0.50	2.07
BY-RC31	4.3	98	98	0.76	0.76	0.47	1.99
GA-RXS	3.6	97	97	0.67	0.71	0.48	1.86
CW30091	2.6	58	60	0.73	0.64	0.43	1.80
PSTCLVR20825	2.8	88	89	0.40	0.75	0.39	1.54
GATP1412	2.3	68	73	0.58	0.52	0.39	1.49
BARTSRWR	2.5	91	91	0.53	0.55	0.37	1.46
PSTCLVR98121	3.5	95	96	0.44	0.61	0.37	1.42
Mean	3.4	89	89	0.80	0.81	0.50	2.11
CV,%	21.8	7	6	28.42	26.66	23.46	25.23
LSD,0.05	1.1	9	7	0.32	0.30	0.17	0.75

¹Vigor 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.

Dutch types and is the highest yielding of the three white clover types but requires rotational grazing to maintain stands. Information on the grazing tolerance of white clover varieties can be found in the 2022 Alfalfa, Red Clover and White Clover Grazing Tolerance Report (PR-822).

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 specific red or white clover variety is resistant to or tolerant of these pests when grown in Kentucky.

This report provides current yield and persistence data on red and white clover

varieties included in yield trials in Kentucky as well as guidelines for selecting clover varieties. Tables 7 and 8 show a summary of all clover varieties tested in Kentucky for the past 16 years. The UK Forage Extension website (<https://forages.ca.uky.edu>) contains electronic versions of all forage variety testing reports from Kentucky and surrounding states and a large number of other forage publications.

Table 4. Dry matter yields, seedling vigor, and stand persistence of white clover varieties sown April 3, 2020, at Lexington, Kentucky.

Variety	Seedling Vigor ¹ June 3, 2020	Percent Stand						Yield (tons/acre)						3-year Total
		2020		2021		2022		2020		2021		2022		
		Jun 3	Sep 24	Mar 24	Sep 29	May 4	Sep 22	Total	Total	May 25	Aug 12	Sep 15	Total	
Commercial Varieties-Available for Farm Use														
Will	3.8	96	97	98	100	95	95	1.78	4.75	0.66	0.46	0.24	1.36	7.88*
RegalGraze	4.6	98	99	99	100	63	84	1.92	4.68	0.42	0.44	0.18	1.05	7.65*
Dusi	3.8	97	97	98	100	76	91	1.91	4.75	0.35	0.36	0.16	0.87	7.53*
Neches	4.1	97	97	97	100	90	90	1.49	4.44	0.69	0.34	0.24	1.26	7.19*
Alice	3.1	98	98	98	100	89	94	1.80	4.12	0.54	0.44	0.22	1.20	7.12*
Cresendo	4.8	98	98	99	100	56	89	1.69	4.38	0.46	0.35	0.20	1.01	7.08*
Patriot	3.0	89	91	94	100	76	78	1.53	4.47	0.42	0.40	0.21	1.03	7.03
Apis	3.8	97	99	99	100	94	94	1.80	4.06	0.57	0.38	0.20	1.15	7.00
Rampart	2.5	75	91	91	100	80	91	1.23	4.10	0.47	0.37	0.20	1.03	6.37
Durana	2.5	89	96	97	100	88	86	1.22	3.83	0.43	0.31	0.21	0.96	6.01
Experimental Varieties														
GATR16178	3.5	98	100	99	100	61	70	1.69	4.58	0.44	0.44	0.23	1.10	7.38*
CW9501	2.8	74	79	85	100	48	60	1.40	4.85	0.38	0.41	0.19	0.98	7.24*
Mean	3.5	92	95	96	100	76	85	1.62	4.42	0.49	0.39	0.21	1.08	7.12
CV,%	18.6	9	6	5	0	19	14	12.07	10.11	30.59	20.54	28.02	21.39	8.10
LSD,0.05	0.9	12	8	6	0	21	17	0.28	0.64	0.21	0.12	0.08	0.33	0.83

¹Vigor 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.

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 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 2020 and one in 2022). The soil at Lexington (Maury) is a well-drained silt loam. 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 per acre for red clover and 3 pounds 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 (P, K, and lime based on regular soil tests), and harvest management were managed according to University of Kentucky Cooperative Extension Service recommendations. Weeds

were controlled to avoid limiting production and persistence.

Results and Discussion

Weather data for Lexington is presented in Table 1.

Yield data (on a dry matter basis) are presented in tables 2 through 4. Yields are given by cutting date for 2022 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 and uncertified Kenland red clover. Most Kenland offered for sale is uncertified and is likely common or VNS seed falsely advertised as Kenland. Our tests show uncertified Kenland 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

Table 5. Proprietors of red clover varieties in current trials in Kentucky.

Variety	Proprietor/ KY Distributor
Commercial Varieties-Available for Farm Use	
Barduro	Barenbrug USA
Blaze	Mountain View Seeds
Common O	Public
Freedom!	Barenbrug USA
Gallant	Turner Seed
GA9908	Smith Seed
Kenland (certified)	KY Agric. Exp. Station
Redkin	DLF Pickseed
Renegade	DLF Pickseed
Robust III	Blue Moon Farms
Rustler	Oregro Seeds
SS-0303RCG	Southern States
Experimental Varieties¹	
BARTP10	Barenbrug USA
BARTPV23	Barenbrug USA
BARTSRWR	Barenbrug USA
BY-RC31	BrettYoungSeeds
CW040040	Barenbrug USA
CW30091	Barenbrug USA
IS-TP-12	DLF Pickseed
GA-RXS	Univ. of GA
GATP1403	Univ. of GA
GATP1412	Univ. of GA
PSTCLVR20825	Caldbeck Consulting
PSTCLR98121	Caldbeck Consulting
RC08	Bailey Seed & Grain
20-LA-RC-1	Ampac Seed

¹Experimental varieties are not available commercially, but provide an indication of the progress being made by forage breeding companies.

Table 6. Proprietors and clover type information of white clover varieties in current trials in Kentucky.

Variety	Type	Proprietor/KY Distributor
Commercial Varieties-Available for Farm Use		
Alice	Intermediate	Barenbrug
Apis	Ladino	Smith Seed
Cresendo	Ladino	Barenbrug USA
Durana	Intermediate	Pennington
Dusi	Ladino	Barenbrug USA
Neches	Intermediate	Barenbrug USA
Patriot	Intermediate	Pennington
RegalGraze	Ladino	Cal/West Seed
Rampart	Ladino	Oregro Seeds
Will	Ladino	Allied Seed, L.L.C.
Experimental Varieties¹		
CW9501	Ladino	Barenbrug USA
GATR16178	Intermediate	Univ. of GA

¹Experimental varieties are not available commercially, but provide an indication of the progress being made by forage breeding companies.

of seeding improved red clover varieties compared to common types is 3 tons to 6 tons higher of dry matter/acre over the life of the stand.

Tables 5 and 6 show information about proprietors/distributors for all varieties included in the tests discussed 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. 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 2 through 4. Make sure seed of the variety selected is properly labeled and will be available when needed.

How to Interpret the Summary Tables

Tables 7 and 8 are summaries of yield data from 2001 to 2022 of commercial varieties that have been entered in the Kentucky trials. The data is listed 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 7 and 8, 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 7 and 8 to determine which yearly report should be referenced.

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 website (<https://forages.ca.uky.edu>):

- 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)
- Managing Legume-Induced Bloat in Cattle (ID-186)
- Kentucky Plant Disease Management Guide for Forage Legumes (PPA-10D)
- “Emergency” Inoculation for Poorly Nodulated Legumes (PPFS-AG-F-04)

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