



2001 Alfalfa Report

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Introduction

Alfalfa (*Medicago sativa*) is historically the highest yielding, highest quality forage legume grown in Kentucky. It forms the basis of Kentucky's cash hay enterprise and is an important component in dairy, horse, beef, and sheep diets. Choosing a good alfalfa variety is a key step in establishing a stand of alfalfa. The choice of variety can impact yield, thickness of stand, and persistence of alfalfa stands.

This report provides current yield data on alfalfa varieties included in yield trials in Kentucky as well as guidelines for selecting alfalfa varieties.

Considerations in Selecting an Alfalfa Variety

Local Adaptation and Persistence. High yields in variety tests over a range of years and locations are the best indication that a variety is locally adapted and persistent. Several varieties are adapted for use in Kentucky as determined from results in this report.

Winter Hardiness. Each variety has a fall dormancy rating ranging from 1 (very dormant) to 9 (non-dormant). In general, varieties with lower dormancy ratings take more warm weather in spring to initiate growth, and they stop growing sooner in the fall. This growth habit can, but does not necessarily, reduce annual yields compared to less dormant varieties. Generally, alfalfa should have a fall dormancy rating of 2 to 5 to yield well in Kentucky and have good winter survival. Ratings of 6 and above are not winter-hardy under Kentucky conditions.

Disease and Pest Resistance. In Kentucky, producers should use varieties that have at least an "MR" (moderate resistance) rating to phytophthora root rot (PRR), anthracnose (An), bacterial wilt (Bw), and fusarium wilt (Fw) as well as an "R" (resistance) rating to aphanomyces root rot (APH). Kentucky research indicates that aphanomyces root rot is a widespread problem in the state during stand establishment and that resistance is beneficial, particularly in soils also infested with phytophthora root rot.

Phytophthora root rot is a fungal disease associated with poorly drained soils or excessive rainfall. This disease causes yellowish to reddish-brown areas on roots and crowns that eventually become black and rotten. The top growth of infected plants appears stunted and yellow.

Anthracnose, also caused by a fungus, attacks the stems of alfalfa, preventing water flow to the rest of the shoot and

causing sudden wilting. These wilted shoots have a characteristic "shepherd's crook" appearance. Anthracnose can also cause a bluish-black crown rot.

Bacterial wilt and fusarium wilt are infections of the water-conducting tissues of alfalfa roots and do not cause any noticeable root rot. These diseases prevent water flow to leaves, resulting in wilting of shoots and the eventual death of infected plants. Roots infected with bacterial wilt often have a yellowish-brown discoloration of the inner woody cylinder of the taproot. Fusarium infection can be recognized by brown to red streaks in the inner woody cylinder of the taproot.

Aphanomyces root rot is another fungal disease associated with poorly drained soils or excessive rainfall. Affected seedlings will be stunted but remain upright, unlike those with symptoms of damping off. In established plants, root symptoms are not as well defined as those for phytophthora root rot, but brown lesions on the taproot indicate where lateral roots were destroyed. This disease can be associated with phytophthora root rot, and together they may form a root disease complex. Aphanomyces root rot is known to affect new seedlings in Kentucky, but it is still unclear how it affects established alfalfa.

In years with overly cool and wet spring weather, alfalfa stands have suffered great damage due to aphanomyces when planted with varieties that are susceptible to this disease.

Although certain alfalfa varieties are reported to have some resistance to sclerotinia crown and stem rot, UK research has shown that these varieties often perform poorly against the disease under Kentucky conditions.

Seed Quality. Buy high-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 that are reported in this publication or others like it. Other information on the label will include the test date, which must be within the previous nine months, the level of germination, and 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

Alfalfa variety tests were established at Lexington (1995, 1997 and 2000), Bowling Green (1996 and 1998), Princeton (1997, 1999, and 2001), and Eden Shale (1998) as part of the Forage Variety Testing Program. The soils at most locations are well suited to alfalfa, in that they are generally well-drained silt loams (Maury, Pembroke, and Crider, at Lexington, Bowling Green, and Princeton, respectively). Eden Shale has a

Nicholson silt loam soil. The Bowling Green tests are on soils that are naturally infested with both phytophthora and aphanomyces root rot pathogens, and the 1997 seeding in Princeton was found to be infested with the aphanomyces pathogen.

Plots were 5 x 15 feet in a randomized complete block design with four replications. In each test, 20 pounds of seed per acre were planted into a prepared seedbed using a disk drill. Plots were harvested with a sickle-type forage plot harvester. First cuttings in the seedling year were delayed to allow the alfalfa to completely reach maturity as indicated by full bloom. Otherwise, harvests were taken when the alfalfa was in the bud to early flower stage. Fresh weight samples were taken at each harvest to calculate percent dry matter production. Management of all tests for establishment, fertility, pest control, and harvest management was according to University of Kentucky Cooperative Extension Service recommendations. Pests (weeds and insects) were controlled so that they would not limit yield or persistence.

Results and Discussion

Weather data for Bowling Green, Eden Shale, Lexington, and Princeton are presented in Table 1. All locations had a drier than normal spring, and all but Eden Shale had below average rainfall for the year. Temperatures were above average in the spring and near normal for the rest of the growing season.

Yield data (on a dry matter basis) for all tests are reported in Tables 2 through 11. 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. Yields are given by cutting for 2001 and by year for each prior year of production.

Statistical analyses were performed on all alfalfa yield data (including experimentals) to determine if the apparent differences are truly due to variety. Varieties not significantly different from the highest numerical value in a column are marked with an 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.

Table 12 summarizes information about proprietors, distributors, fall dormancy, disease resistance, and yield performance across years and locations for all the varieties currently included in the tests discussed in this report. Varieties are listed in alphabetical order with the experimental varieties at the bottom. Remember that experimental varieties are not available for farm use, while commercial varieties can be purchased through dealerships. In Table 12, shaded areas indicate that the variety was not in that particular test (labeled at the top of the column), while white or unshaded blocks mean that the variety was in the test. A single asterisk (*) means that the variety was not significantly different from the top-yielding variety based on the 5% LSD. It is best to choose a variety that has performed well over several years and locations as indicated by the asterisks. Make sure seed of the variety is properly labeled and will be available when needed.

Summary

Consistent production of high yields of alfalfa is the result of good variety selection along with the implementation of good management techniques. For further information about alfalfa management, refer to these College of Agriculture publications, available at the local county Extension office:

AGR-76: Alfalfa: The Queen of the Forage Crops

AGR-107: Alfalfa: Quality Means Profits

AGR-64: Establishing Forage Crops

AGR-90: Inoculation of Forage Legumes

AGR-18: Grain and Forage Crop Guide for Kentucky

AGR-1: Lime and Fertilizer Recommendations

AGR-148: Weed Control Strategies for Alfalfa and Other Forage Legume Crops

ENT-17: Insect Management Recommendations for Field Crops and Livestock

PPA-10d: Kentucky Plant Disease Management Guide for Forage Legumes

PPA-28: Alfalfa Varieties: Relative Disease Resistance and Winter Hardiness

AGR-137: Alfalfa Hay: Quality Makes the Difference

Table 1. Temperature and rainfall at Bowling Green, Eden Shale, Lexington, and Princeton, Kentucky in 2001.

	Bowling Green				Eden Shale				Lexington				Princeton			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
MON	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	33	-1	1.8	-2.1	30	-2	1.1	-1.5	31	0	0.9	-1.9	35	+1	1.6	-2.3
FEB	43	+5	4.4	+0.3	37	+1	1.8	-0.9	40	+5	3.2	0	44	+6	5.0	+0.5
MAR	43	-3	2.9	-2.2	40	-5	1.2	-3.1	40	-4	2.7	-1.7	44	-3	2.8	-2.1
APR	62	+5	2.3	-2.1	58	+2	1.6	-2.2	59	+4	1.7	-2.2	64	+5	2.2	-2.6
MAY	69	+3	4.3	-0.6	65	+1	5.1	+0.8	66	+2	4.9	+0.4	69	+2	2.5	-2.5
JUN	73	-2	4.4	+0.3	70	-2	4.9	+0.7	71	-1	2.0	-1.6	74	-1	4.8	+1.0
JUL	79	+1	3.7	-1.1	75	-1	8.7	+4.5	75	-1	5.6	+0.6	80	+2	5.5	+1.2
AUG	77	0	6.0	+2.5	75	0	5.0	+1.7	76	+1	4.8	+0.8	79	+2	4.0	-0.1
SEP	68	-2	2.1	-1.7	65	-4	2.5	-0.4	65	-3	3.0	-0.2	69	-2	3.5	+0.2
OCT	57	-1	4.3	+1.3	55	-2	6.7	+3.9	56	-1	3.6	+1.1	61	+2	7.5	+4.4

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

Table 2. Dry matter yields (tons/acre) of alfalfa varieties sown 6 September 1995 at Lexington, Kentucky.

Variety	Total 1996	Total 1997	Total 1998	Total 1999	Total 2000	2001 Harvests				Total 2001	6-yr Total	
						May 16	Jun 18	Jul 31	Aug 21			
Commercial Varieties – Available for Farm Use												
DK127	5.05	4.41	5.09	3.86	5.32	1.89	1.21	1.11	0.82	5.03	28.77 *	
Choice	4.54	4.10	5.01	4.17	5.83	1.96	1.20	0.99	0.74	4.89	28.53 *	
Rushmore	5.25	4.33	4.69	3.46	5.44	1.82	1.12	1.05	0.80	4.79	27.96 *	
Excalibur II	4.54	3.84	4.93	4.04	5.59	1.93	1.13	1.12	0.66	4.83	27.76 *	
DK133	4.33	3.82	5.07	3.77	5.54	1.95	1.22	1.17	0.80	5.14	27.66 *	
Supercuts	4.35	3.66	4.93	3.81	5.56	2.04	1.14	0.95	0.67	4.80	27.12 *	
Saranac AR	4.12	3.84	4.88	3.75	5.52	1.90	1.12	0.88	0.68	4.58	26.70 *	
Multiqueen	4.50	4.12	4.70	3.26	5.44	1.80	1.13	0.91	0.81	4.65	26.66 *	
WL 323	4.45	4.09	4.78	3.67	5.28	1.72	1.14	0.92	0.61	4.40	26.66 *	
Dominator	4.03	3.68	4.94	3.49	5.51	1.96	1.16	0.96	0.76	4.84	26.49 *	
Arc	4.35	3.35	4.24	3.46	5.25	1.86	1.10	1.03	0.74	4.72	25.39	
5454	4.36	3.55	4.43	3.11	4.73	1.80	1.30	0.96	0.82	4.88	25.06	
329	4.16	3.62	4.55	2.85	4.89	1.80	1.13	0.88	0.66	4.46	24.52	
630	3.31	3.15	4.35	2.96	4.91	1.74	1.14	0.75	0.71	4.34	23.03	
Legacy	4.13	3.01	4.03	2.55	4.51	1.83	1.09	0.93	0.71	4.55	22.79	
Apollo	3.55	2.79	3.77	2.46	4.14	1.50	1.02	0.88	0.57	3.98	20.69	
Experimental Varieties – Not Available for Farm Use												
ABI 9231	4.72	3.80	5.01	3.79	5.52	2.00	1.22	1.21	0.88	5.31	28.15 *	
GA-APGC	4.49	4.42	4.91	3.40	5.42	2.05	1.16	0.90	0.71	4.81	27.46 *	
ZC9346	3.96	4.15	5.14	2.91	5.20	1.92	1.22	0.93	0.83	4.90	26.27 *	
93116	4.35	3.49	4.35	3.27	4.90	1.59	1.17	0.91	0.66	4.32	24.69	
GA-MX	3.73	2.74	3.90	2.85	4.19	1.49	1.06	0.78	0.64	3.97	21.38	
Mean	4.3	3.71	4.65	3.38	5.18	1.83	1.15	0.96	0.72	4.67	25.89	
CV,%	13.7	13.93	8.69	21.22	10.34	10.26	7.15	16.37	14.92	8.02	9.13	
LSD, 0.05	0.83	0.73	0.57	1.01	0.76	0.27	0.12	0.22	0.15	0.53	3.34	

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

Table 3. Dry matter yields (tons/acre) of alfalfa varieties sown 19 April 1996 at Bowling Green, Kentucky.

Variety	Total 1996	Total 1997	Total 1998	Total 1999	Total 2000	2001 Harvests					Total 2001	6-yr Total
						Apr 27	Jun 12	Jul 24	Aug 23	Sep 22		
Commercial Varieties - Available for Farm Use												
WL 324	5.96	3.75	5.71	5.91	5.68	1.32	1.91	1.92	0.79	1.19	7.13	34.14*
631	4.96	3.88	5.24	5.69	5.89	1.51	2.17	2.06	0.98	1.34	8.06	33.72*
WL 252HQ	5.05	3.39	5.69	6.01	5.49	1.32	2.02	1.93	0.89	1.41	7.57	33.20*
Imperial	5.33	3.63	5.28	5.91	5.68	1.31	2.04	1.84	0.76	1.37	7.33	33.15*
Affinity+z	5.26	3.48	5.55	5.87	5.49	1.41	2.12	1.77	0.81	1.29	7.40	33.05*
Depend+ev	5.15	3.59	5.48	5.78	5.56	1.42	2.09	1.83	0.83	1.22	7.39	32.96*
TMF-Generation	5.22	3.80	5.45	5.89	5.31	1.36	2.03	1.80	0.79	1.30	7.27	32.95*
DK133	4.95	3.38	5.64	5.69	5.36	1.45	2.10	1.99	0.87	1.46	7.86	32.87*
Supercuts	5.02	3.76	5.18	5.75	5.70	1.37	2.08	1.82	0.83	1.27	7.36	32.78*
Choice	4.91	3.75	5.49	5.70	5.47	1.30	2.12	1.77	0.87	1.27	7.32	32.65*
645	5.46	3.54	5.34	5.56	5.44	1.36	2.07	1.78	0.83	1.24	7.27	32.60*
Gem	5.17	3.52	5.56	5.69	5.27	1.30	1.98	1.83	0.79	1.31	7.20	32.40*
Saranac AR	5.27	3.50	5.22	5.49	5.44	1.33	2.10	1.90	0.81	1.27	7.40	32.32
DK127	4.92	3.35	5.22	5.71	5.53	1.28	2.01	1.92	0.90	1.36	7.48	32.21
ABT 405	5.32	3.51	5.35	5.55	5.20	1.42	1.98	1.73	0.83	1.27	7.22	32.16
Innovator+z	4.95	3.47	5.33	5.39	5.38	1.42	2.08	1.90	0.84	1.27	7.52	32.04
Demand	5.21	3.73	5.24	5.54	5.58	1.38	1.69	1.65	0.73	1.16	6.62	31.91
WL325HQ	5.09	3.53	5.05	5.56	4.90	1.34	2.04	1.77	0.83	1.27	7.25	31.38
Rushmore	4.75	3.12	5.28	5.37	5.35	1.39	2.07	1.79	0.86	1.32	7.43	31.29
Fortress	5.30	3.56	4.84	5.40	5.11	1.28	1.81	1.79	0.84	1.22	6.94	31.14
Legacy	4.70	3.07	5.19	5.53	5.30	1.32	2.05	1.77	0.79	1.30	7.23	31.02
Apollo	5.16	2.88	5.24	5.30	5.10	1.29	1.95	1.69	0.75	1.33	7.01	30.69
Buffalo-B	5.27	2.89	4.68	5.25	5.04	1.27	1.83	1.74	0.80	1.36	7.00	30.15
Arc	5.00	2.93	4.57	4.82	5.04	1.30	1.82	1.72	0.75	1.30	6.89	29.25
Buffalo-A	4.85	2.34	4.48	4.61	4.60	1.03	1.70	1.61	0.79	1.29	6.43	27.30
Experimental Varieties - Not Available for Farm Use												
Zg9430	4.79	3.42	5.28	5.70	5.49	1.50	1.99	1.77	0.83	1.28	7.37	32.05
Zg9543	4.88	3.46	5.37	5.76	5.48	1.37	1.90	1.72	0.92	1.20	7.10	32.05
Zg9533	5.39	3.34	5.18	5.63	5.44	1.30	1.91	1.70	0.75	1.16	6.81	31.80
Zg9530	5.09	3.42	5.42	5.32	5.34	1.37	2.00	1.71	0.92	1.14	7.16	31.75
A9107	4.99	3.66	5.15	5.33	5.19	1.39	2.01	1.77	0.80	1.23	7.20	31.53
C106	4.60	3.22	5.30	5.77	5.40	1.27	1.93	1.74	0.88	1.30	7.12	31.41
93-116	5.57	3.49	5.21	5.27	5.00	1.16	1.84	1.71	0.84	1.25	6.81	31.35
Mean	5.11	3.42	5.26	5.55	5.35	1.34	1.98	1.80	0.83	1.28	7.22	31.91
CV, %	10.63	10.45	6.22	6.22	5.63	7.92	9.48	10.84	8.71	11.05	6.15	3.96
LSD, 0.05	0.76	0.5	0.46	0.49	0.40	0.15	0.26	0.27	0.10	0.20	0.62	1.78

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

Table 4. Dry matter yields (tons/acre) of alfalfa varieties sown 15 April 1997 at Lexington, Kentucky.

Variety	Total 1997	Total 1998	Total 1999	Total 2000	2001 Harvests				Total 2001	5-yr Total
					May 14	Jun 19	Aug 1	Aug 27		
Commercial Varieties - Available for Farm Use										
Stampede	2.20	5.74	5.79	6.74	1.63	1.54	1.04	1.05	5.27	25.74*
Haygrazer	2.40	6.01	5.43	6.55	1.64	1.50	0.98	1.02	5.15	25.55*
Feast	2.11	6.10	5.68	6.57	1.64	1.49	0.89	0.95	4.97	25.44*
401Z	2.18	5.97	5.73	6.45	1.62	1.52	0.94	0.91	4.98	25.30*
WL326GZ	2.29	5.80	5.27	6.59	1.63	1.54	0.94	0.99	5.10	25.04*
ABT405	2.25	5.96	5.31	6.31	1.62	1.51	0.90	0.91	4.95	24.78*
SaranacAR	2.14	5.75	5.51	5.90	1.45	1.31	0.84	0.92	4.52	23.82
Fortress	2.28	5.62	5.36	6.01	1.41	1.36	0.81	0.86	4.44	23.71
GrazeKing	2.19	5.50	4.75	6.14	1.41	1.37	0.88	0.94	4.61	23.19
AlfaGraze	1.91	5.29	4.91	6.00	1.41	1.31	0.90	1.01	4.62	22.74
Spredor3	1.94	5.44	4.97	5.48	1.49	1.31	0.76	0.74	4.30	22.12
Apollo	1.94	5.31	4.78	5.80	1.19	1.25	0.83	0.99	4.26	22.09
Arc	2.00	5.24	4.63	5.57	1.39	1.25	0.84	0.87	4.34	21.78
Experimental Varieties - Not Available for Farm Use										
Pioneer	2.39	5.78	5.06	6.91	1.61	1.65	1.08	1.10	5.44	25.57*
CAR9426	2.16	5.82	5.45	6.34	1.57	1.37	0.87	1.02	4.83	24.61*
A9508	2.36	5.74	5.13	6.30	1.60	1.53	0.93	0.92	4.97	24.50*
GAAPGC	2.07	5.56	5.23	6.11	1.56	1.48	0.95	1.00	4.98	23.96
W116	1.97	5.45	5.05	5.91	1.49	1.40	0.89	0.94	4.72	23.10
Mean	2.16	5.67	5.22	6.20	1.52	1.43	0.90	0.95	4.80	24.06
CV, %	11.79	4.13	8.98	5.41	6.71	6.86	8.39	12.84	5.09	4.18
LSD, 0.05	0.36	0.33	0.66	0.48	0.15	0.14	0.11	0.17	0.35	1.43

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

Table 5. Dry matter yields (tons/acre) of alfalfa varieties sown 18 April 1997 at Lexington, Kentucky.										
Variety	Total 1997	Total 1998	Total 1999	Total 2000	2001 Harvests				Total 2001	5-yr Total
					May 14	Jun 19	Aug 1	Aug 27		
Commercial Varieties – Available for Farm Use										
631	2.51	5.64	4.54	8.55	2.18	1.52	1.17	0.97	5.84	27.07*
Choice	2.57	5.66	4.73	8.24	1.97	1.48	1.16	0.95	5.56	26.76*
Wintergreen	1.99	5.58	4.80	8.42	2.10	1.54	1.20	1.00	5.84	26.63*
DK140	2.24	5.76	4.61	8.33	1.99	1.52	1.18	0.96	5.65	26.59*
WL 325HQ	2.19	5.46	4.35	8.51	2.03	1.55	1.26	0.98	5.82	26.32*
ABT 405	1.88	5.53	4.64	8.31	2.10	1.42	1.13	0.90	5.54	25.90*
Cimarron 3i	2.26	5.34	4.63	8.40	1.98	1.34	1.03	0.83	5.17	25.81*
ABT 205	1.88	5.45	4.60	8.26	2.10	1.45	1.03	0.89	5.47	25.65*
Gem	1.85	5.41	4.82	8.13	1.99	1.40	1.10	0.89	5.37	25.59*
DK141	2.35	5.57	4.08	8.08	1.81	1.41	1.16	1.00	5.37	25.46*
Affinity+z	2.13	5.55	4.37	8.01	2.06	1.42	1.10	0.79	5.38	25.43*
Cimarron VR	2.58	5.37	3.90	8.11	1.83	1.37	1.08	0.97	5.24	25.21*
Fortress	2.14	5.14	4.38	7.72	1.83	1.36	1.12	0.94	5.24	24.61
Saranac AR	1.95	5.29	4.42	7.68	1.82	1.30	1.04	0.92	5.07	24.42
Arc	1.82	4.82	3.98	7.23	1.73	1.12	0.96	0.87	4.68	22.52
Experimental Varieties – Not Available for Farm Use										
C231	2.29	5.43	4.86	8.67	1.87	1.49	1.17	1.01	5.54	26.78*
ZB9546	1.89	5.48	5.00	7.99	1.93	1.52	1.21	1.00	5.66	26.03*
ZC9623S	1.73	5.72	4.93	7.73	1.92	1.26	1.06	0.90	5.14	25.25*
ZC9630S	1.81	5.41	4.62	7.92	2.00	1.40	1.16	0.94	5.49	25.25*
C106	1.71	5.02	4.07	8.21	2.10	1.53	1.13	1.06	5.82	24.82
Mean	2.09	5.43	4.52	8.13	2.00	1.42	1.12	0.94	5.45	25.60
CV, %	17.07	4.92	8.94	6.02	8.08	6.48	10.40	13.00	6.03	5.18
LSD, 0.05	0.51	0.38	0.57	0.69	0.22	0.13	0.16	0.17	0.47	1.88
* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.										

Table 6. Dry matter yields (tons/acre) of alfalfa varieties sown 15 April 1997 at Princeton, Kentucky.

Variety	Total 1997	Total 1998	Total 1999	Total 2000	2001 Harvests					Total 2001	5-yr Total
					Apr 26	Jun 12	Jul 17	Aug 22	Sep 30		
Commercial Varieties – Available for Farm Use											
ABT 405	1.73	5.01	4.90	4.04	0.62	1.04	1.15	0.88	0.42	4.10	19.78*
Choice	1.91	5.07	4.99	3.88	0.58	0.88	0.97	0.86	0.36	3.65	19.50*
631	1.65	4.69	4.98	4.03	0.66	0.96	1.22	0.90	0.41	4.14	19.49*
Wintergreen	1.62	4.88	5.01	3.83	0.59	0.87	0.95	0.83	0.34	3.58	18.92*
Rushmore	1.81	4.79	4.93	3.81	0.62	0.79	0.93	0.79	0.34	3.46	18.81*
Amerigraze 401+z	1.50	4.82	4.79	3.87	0.61	0.94	0.95	0.92	0.33	3.74	18.71*
Feast	1.82	4.63	4.72	3.90	0.59	0.77	0.87	0.81	0.31	3.36	18.44*
Gem	1.37	4.84	4.68	3.61	0.64	0.87	0.93	0.85	0.29	3.58	18.08
Fortress	1.48	4.70	4.62	3.52	0.53	0.82	0.95	0.93	0.34	3.56	17.87
WL 326GZ	1.67	4.69	4.39	3.76	0.55	0.77	0.81	0.92	0.28	3.33	17.84
ABT 205	1.50	4.64	4.56	3.62	0.55	0.84	0.89	0.84	0.29	3.41	17.71
Arc	1.19	4.56	4.52	3.66	0.68	0.87	0.85	1.00	0.30	3.70	17.62
WL 332SR	1.64	4.64	4.55	3.27	0.37	0.72	0.88	0.78	0.22	2.97	17.07
Saranac AR	1.22	4.37	4.66	3.36	0.55	0.76	0.81	0.92	0.31	3.36	16.97
Experimental Varieties – Not Available for Farm Use											
ZC9651	1.88	5.09	5.04	4.17	0.66	1.08	1.13	0.88	0.41	4.16	20.34*
Mean	1.60	4.76	4.76	3.76	0.59	0.87	0.95	0.87	0.33	3.61	18.48
CV, %	26.01	9.12	9.63	6.47	16.48	12.39	17.72	18.00	19.39	12.44	8.48
LSD, 0.05	0.59	0.62	0.65	0.35	0.14	0.15	0.24	0.22	0.09	0.64	2.24

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

Table 7. Dry matter yields (tons/acre) of alfalfa varieties sown 14 May 1998 at Bowling Green, Kentucky.

Variety	Total	Total	Total	2001 Harvests					Total	4-yr
	1998	1999	2000	Apr 27	Jun 12	Jul 24	Aug 23	Sep 22	2001	Total
Commercial Varieties – Available for Farm Use										
DK141	0.37	4.86	5.46	1.31	1.90	1.59	0.73	0.74	4.80	15.49*
Pasture+	0.29	4.83	5.24	1.43	1.79	1.53	0.71	0.80	4.76	15.11*
Cimmaron3i	0.33	4.70	5.23	1.26	1.76	1.50	0.65	0.64	4.53	14.79*
DK140	0.39	4.77	5.54	1.31	1.10	1.64	0.69	0.72	4.05	14.75*
ABT350	0.32	4.54	4.96	1.41	1.87	1.50	0.79	0.80	4.77	14.59*
ABT400SCL	0.30	4.52	5.02	1.34	1.85	1.43	0.73	0.76	4.62	14.45*
WL 326GZ	0.28	4.42	4.99	1.33	1.77	1.46	0.69	0.75	4.56	14.24*
Emperor	0.30	4.50	4.87	1.40	1.66	1.50	0.77	0.84	4.56	14.22*
Choice	0.27	4.49	4.90	1.31	1.77	1.46	0.71	0.78	4.54	14.20*
Geneva	0.29	4.53	4.89	1.20	1.80	1.41	0.80	0.73	4.42	14.13*
ProGro	0.23	4.02	5.14	1.35	1.82	1.44	0.66	0.70	4.62	14.00*
Baralfa54	0.25	4.28	4.81	1.30	1.67	1.41	0.64	0.72	4.38	13.72
Stellar	0.21	4.10	4.72	1.22	1.70	1.38	0.68	0.74	4.30	13.33
Certified Arc	0.19	3.91	4.71	1.30	1.83	1.33	0.65	0.74	4.46	13.26
Saranac AR	0.26	3.87	4.86	1.19	1.65	1.29	0.69	0.68	4.12	13.11
GoldPlus	0.28	4.15	4.62	1.08	1.68	1.29	0.60	0.65	4.05	13.11
Vernal	0.20	3.65	4.62	1.32	1.77	1.35	0.66	0.70	4.44	12.91
Experimental Varieties – Not Available for Farm Use										
C416	0.41	4.64	4.97	1.26	1.69	1.53	0.77	0.78	4.47	14.49*
ZC9651	0.33	4.34	5.27	1.32	1.86	1.32	0.62	0.69	4.51	14.46*
ZC9750A	0.25	4.35	5.01	1.41	1.87	1.45	0.71	0.82	4.73	14.35*
ZC9751A	0.23	4.39	5.03	1.35	1.86	1.39	0.70	0.79	4.60	14.26*
A9503	0.23	4.39	4.98	1.17	1.71	1.37	0.64	0.69	4.24	13.84
ZG9641	0.32	4.27	4.61	1.38	1.68	1.39	0.69	0.77	4.45	13.65
ZC9650	0.27	4.19	4.77	1.26	1.74	1.42	0.75	0.82	4.42	13.65
ZG9640	0.19	4.19	4.62	1.36	1.77	1.42	0.66	0.71	4.56	13.55
Mean	0.28	4.35	4.82	1.30	1.74	1.43	0.70	0.74	4.48	14.07
CV,%	36.17	11.09	6.43	9.83	22.50	11.64	11.39	12.33	11.85	8.11
LSD, 0.05	0.14	0.68	0.44	0.18	0.55	0.24	0.11	0.13	0.75	1.61

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

Table 8. Dry matter yields (tons/acre) of alfalfa varieties sown 15 May 1988 at Eden Shale, Kentucky.

Variety	Total 1998	Total 1999	Total 2000	2001 Harvests				Total 2001	4-yr Total
				May 29	Jul 2	Aug 13	Sep 20		
Commercial Varieties – Available for Farm Use									
Stampede	0.34	4.85	6.66	2.23	1.66	1.72	0.94	6.55	18.4 *
Gem	0.36	4.95	6.04	2.46	1.74	1.87	0.88	6.95	18.30*
DK140	0.34	4.69	6.27	2.18	1.81	1.82	0.89	6.70	17.99*
Wintergreen	0.37	4.64	6.15	2.47	1.72	1.72	0.91	6.83	17.98*
Choice	0.38	4.71	6.19	2.36	1.62	1.80	0.85	6.62	17.91*
Grazeking	0.39	4.45	6.24	2.32	1.68	1.85	0.90	6.75	17.83*
Amerigraze 401+z	0.41	4.64	6.23	2.41	1.62	1.56	0.93	6.52	17.80*
Geneva	0.43	4.72	5.99	2.25	1.72	1.76	0.86	6.59	17.72*
ABT 350	0.37	4.69	6.10	2.32	1.61	1.72	0.82	6.48	17.64*
Saranac AR	0.35	4.69	6.03	2.18	1.70	1.69	0.92	6.49	17.57*
Spredor 3	0.35	4.56	6.17	2.23	1.64	1.78	0.78	6.43	17.51*
Haygrazer	0.33	4.37	6.20	2.28	1.65	1.77	0.84	6.54	17.44*
Baralfa	0.32	4.86	5.75	2.18	1.61	1.69	0.83	6.31	17.24*
WL 326GZ	0.33	4.48	6.07	2.19	1.61	1.66	0.85	6.31	17.19*
Fortress	0.35	4.58	5.71	2.24	1.64	1.66	0.92	6.46	17.10
Cimarron 3i	0.30	4.24	6.00	2.21	1.53	1.74	0.85	6.33	16.87
Alfagraze	0.34	4.43	5.92	2.08	1.58	1.60	0.84	6.09	16.78
Vernal	0.35	4.49	5.64	2.10	1.59	1.75	0.84	6.27	16.75
ARC	0.29	4.32	5.38	2.37	1.60	1.60	0.83	6.40	16.39
Emperor	0.42	4.40	4.76	2.25	1.66	1.63	0.85	6.39	15.97
Mean	0.36	4.59	5.98	2.27	1.65	1.72	0.87	6.50	17.42
CV,%	19.36	7.50	8.93	12.25	6.78	8.80	11.86	6.69	5.07
LSD, 0.05	0.10	0.49	0.76	0.39	0.16	0.21	0.15	0.62	1.25

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

Table 9. Dry matter yields (tons/acre) of alfalfa varieties sown 13 April 1999 at Princeton, Kentucky.									
Variety	Total 1999	Total 2000	2001 Harvests					Total 2001	3-yr Total
			May 9	Jun 13	Jul 17	Aug 22	Sep 30		
Commercial Varieties – Available for Farm Use									
54v54	1.94	7.00	2.02	1.91	1.50	1.00	0.49	6.92	15.86*
Affinity+z	1.85	7.00	1.91	1.97	1.45	0.99	0.51	6.83	15.68*
DK140	1.88	7.02	1.93	1.94	1.48	0.83	0.57	6.75	15.65*
Abilene+z	1.70	6.95	1.92	1.94	1.44	1.12	0.49	6.91	15.57*
ABT400 SCL	1.70	6.89	2.07	1.93	1.45	1.07	0.45	6.97	15.56*
Arc	1.93	6.92	1.89	1.86	1.39	1.06	0.47	6.68	15.53*
WL 325HQ	1.85	6.81	1.86	2.00	1.42	1.01	0.58	6.87	15.52*
Cimarron SR	1.95	6.71	1.89	1.94	1.39	0.98	0.56	6.77	15.43*
WL 327	1.95	7.05	1.81	1.83	1.36	0.94	0.48	6.42	15.41*
Geneva	1.85	6.96	1.89	1.87	1.40	0.99	0.44	6.58	15.40*
53Q60	1.90	6.84	1.86	1.83	1.44	0.97	0.46	6.56	15.30*
Amerigraze401+z	1.98	6.74	1.92	1.93	1.37	0.88	0.45	6.55	15.27*
5246	1.89	6.75	1.90	1.85	1.37	1.05	0.45	6.61	15.25*
TMF4464	1.88	6.67	1.94	1.89	1.39	0.90	0.45	6.57	15.11*
DK141	1.85	6.89	1.75	1.77	1.34	1.02	0.43	6.32	15.07*
ABT350	1.78	6.67	1.88	1.91	1.34	0.98	0.42	6.53	14.99*
Reward	1.93	6.49	1.83	1.88	1.32	1.06	0.47	6.56	14.98*
Experimental varieties – not available for farm use									
C416	1.83	7.05	1.88	1.93	1.36	1.12	0.35	6.64	15.52*
GA-AG-MPX	1.89	6.85	1.86	1.89	1.33	1.03	0.45	6.56	15.30*
W318	1.90	6.69	1.80	1.92	1.37	0.99	0.51	6.58	15.16*
A9503	1.72	6.67	1.83	1.99	1.32	1.11	0.46	6.71	15.10*
W326	1.82	6.60	1.78	1.83	1.40	0.92	0.47	6.39	14.8*
Mean	1.86	6.83	1.88	1.90	1.39	1.00	0.47	6.65	15.34
CV,%	12.42	6.89	11.43	8.20	10.48	18.21	20.31	7.54	5.80
LSD, 0.05	0.33	0.66	0.30	0.22	0.21	0.26	0.14	0.71	1.26

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

Table 10. Dry matter yields (tons/acre) of alfalfa varieties sown 26 April 2000 at Lexington, Kentucky.

Variety	Total 2000	2001 Harvests				Total 2001	2-yr Total
		May 12	Jun 20	Aug 1	Sep 28		
Commercial Varieties – Available for Farm Use							
53H81	1.87	3.91	2.00	1.39	1.28	8.58	10.46*
Magnum V-wet	1.64	3.39	2.03	1.64	1.57	8.63	10.28*
Triplecrown	1.61	3.62	1.96	1.57	1.50	8.65	10.25*
Amerigraze 401+z	1.70	3.52	1.96	1.58	1.48	8.53	10.24*
Arc	1.80	3.61	1.80	1.50	1.44	8.35	10.15*
Magnum V	1.62	3.39	1.96	1.56	1.51	8.41	10.03*
Rushmore	1.75	3.43	1.85	1.44	1.44	8.16	9.91*
Geneva	1.54	3.41	1.97	1.50	1.41	8.29	9.84*
Valueplus 1	1.47	3.54	1.98	1.44	1.42	8.37	9.83*
5312	1.57	3.40	1.94	1.48	1.40	8.22	9.79*
Abilene+z	1.62	3.39	1.88	1.48	1.41	8.15	9.77*
54V54	1.49	3.48	1.82	1.49	1.28	8.08	9.57*
Saranac AR	1.43	2.99	1.80	1.49	1.41	7.69	9.13
Experimental Varieties – Not Available for Farm Use							
ZG 9840	1.69	3.86	1.94	1.51	1.44	8.76	10.45*
ZC 9854a	1.58	3.75	2.00	1.58	1.39	8.72	10.30*
4m74	1.52	3.31	2.00	1.60	1.54	8.46	9.98*
ZH9840h	1.72	3.53	1.91	1.43	1.34	8.21	9.93*
Mean	1.65	3.50	1.93	1.49	1.41	8.33	9.98
CV,%	12.38	10.58	5.97	7.25	8.66	6.15	6.44
LSD, 0.05	0.29	0.53	0.16	0.15	0.17	0.72	0.91

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

Table 11. Dry matter yields (tons/acre) of alfalfa varieties sown 19 April 2001 at Lexington, Kentucky.				
Variety	2001 Harvests			Total 2001
	Jul 18	Aug 23	Sep 30	
Commercial Varieties – Available for Farm Use				
Arc	2.07	1.88	1.04	4.99*
FK 421	2.05	1.87	1.03	4.95*
Reward II	2.12	1.82	0.97	4.91*
Hybridforce-400	2.02	1.81	1.02	4.85*
Triple Crown	2.12	1.68	1.03	4.83*
DK 140	2.07	1.78	0.96	4.80*
Geneva	2.01	1.79	0.96	4.76*
Ameristand 403T	2.04	1.76	0.90	4.70*
54V54	1.94	1.71	0.92	4.57*
WL 342	1.84	1.78	0.92	4.53
Saranac AR	2.04	1.53	0.96	4.53
Pegasus	1.80	1.72	0.97	4.49
Experimental Varieties – Not Available for Farm Use				
BY 421	2.23	1.97	1.05	5.25*
SX1004A	2.23	1.74	0.93	4.91*
SX1005A	2.16	1.77	0.96	4.90*
SX1002A	2.02	1.77	1.06	4.86*
FG4M76	2.01	1.77	1.07	4.85*
SX1003A	1.99	1.70	1.03	4.71*
SX1001A	1.89	1.73	1.02	4.64*
Mean	2.03	1.76	1.00	4.79
CV,%	14.69	10.90	13.86	10.13
LSD, 0.05	0.42	0.27	0.19	0.69

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

Table 12. Characterization and performance of alfalfa varieties across years and locations.

Variety	Variety Characteristics ¹								Bowling Green ²										Princeton									
	FD ⁵	Bw	Fw	An	PRR	APH	98	99	1998 ⁴	Owenton				Lexington				Bowling Green ²				Princeton						
									1998 ⁴	1995	1997	1998	1999	2000	1997a	1997b	2000	1996	1997	1998	1999	2001						
Commercial Varieties -- Available for Farm Use																												
329	3	HR	HR	HR	HR	R																						
5246	2	R	R	HR	HR	MR																						
53Q60	3	HR	R	HR	HR	R																						
5312	3	HR	HR	HR	HR	HR																						
53H81	3	HR	HR	HR	HR	R																						
54H69	4	HR	HR	HR	HR	R																						
5454	4	R	HR	HR	HR	LR																						
54V54	4	HR	HR	HR	HR	HR																						
630	3	HR	HR	MR	R	-																						
631	4	HR	HR	R	HR	MR																						
645	4	HR	R	HR	HR	MR																						
ABT 205	2	HR	HR	HR	HR	R																						
ABT 350	3	HR	HR	HR	HR	HR		*	*	*												*	*	*	*	*		
ABT 400SCL	4	HR	HR	HR	HR	HR																						
ABT405	4	HR	HR	HR	HR	R																						
Ablene+Z	5	HR	HR	HR	HR	R																						
Afinity+Z	4	HR	HR	HR	HR	R																						
Aflagaze	2	MR	R	MR	LR	-		*	*	*																		
Amerigraze401+Z	4	HR	HR	HR	HR	R		*	*	*													*	*	*	*		
Ameristand 403T	4	HR	HR	HR	HR	HR																						
Apollo	4	R	R	LR	R	-					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Arc	4	LR	MR	HR	-	-					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Baralfa 54	-	R	HR	HR	HR	HR		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Buffalo A	-	-	-	-	-	-																						
Buffalo B	-	-	-	-	-	-																						
Choice	4	HR	R	R	HR	R		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Cimarron SR	4	HR	HR	HR	HR	MR																						
Cimarron VR	5	HR	HR	R	R	MR					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Cimarron 3i	4	HR	HR	HR	HR	MR		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Demand	3	HR	HR	HR	HR	R																						
Depend+EV	-	-	-	-	-	-																						
DK-127	3	HR	HR	HR	HR	-					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
DK133	4	HR	HR	HR	HR	R					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
DK140	4	HR	HR	HR	HR	HR		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
DK141	4	HR	HR	HR	HR	H					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Dominator	4	HR	HR	HR	HR	R					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Emperor	4	HR	HR	HR	HR	HR		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Excalibur II	4	HR	HR	HR	HR	R					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
FK 214	4	HR	H	H	H	H					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Feast	3	HR	HR	MR	HR	R					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Fortress	3	R	R	R	R	HR		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Geneva	4	HR	HR	HR	HR	HR		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		

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