

# 2002 Alfalfa Grazing Tolerance Variety Report

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## Introduction

Alfalfa (*Medicago sativa*) is 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. Recent emphasis on its use as a grazing crop and the release of varieties reported to be tolerant of heavy and even continuous grazing have raised the following question: Do varieties differ in tolerance to overgrazing?

This report summarizes current research on the grazing tolerance of alfalfa varieties when subjected to continuous, heavy grazing pressure during the grazing season.

## Description of the Tests

Alfalfa variety tests for grazing tolerance were established in Lexington in the fall of 2000 and 2001. The soils at this location are well-drained silt loams and are well suited to alfalfa. Plots were 5 x 15 feet in a randomized complete block design with each variety replicated six times. In each test, 20 pounds of seed per acre were planted into a prepared seedbed using a disk drill. All seed lots were treated with metalaxyl and inoculated if not supplied with these treatments. Plots are grazed continuously beginning the first spring after seeding. Grazing pressure is maintained to keep plant height to less than 3 inches. In general, plots are grazed from mid-April to mid-September. Animals were removed on September 16, 2002, because of extreme drought. Supplemental hay or soy hulls were fed during periods of slowest growth. Visual ratings of percent stand were made in the fall and spring after each grazing season. Pests (weeds and insects)

were controlled so they would not limit yield or persistence. Fertilizers (lime, P, K, and Boron) were applied as needed. Included in each trial were Alfagraze as the grazing-tolerant check variety and Apollo as the grazing-susceptible check variety.

## Results and Discussion

Weather data for Lexington are presented in Table 1. After a wet spring, the 2002 summer was the fourth driest and hottest on record. When rains returned in September, several alfalfa entries responded with excellent survival in spite of drought conditions.

Data on percent stand are presented in Tables 2 and 3. Statistical analyses were performed on all alfalfa yield data (including experimentals) 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 varietal differences in grazing tolerance in the 2000 and 2001 seedings (Tables 2 and 3). In general, grazing types such as ABT 405 and FK 421 tolerated grazing abuse more than hay types such as Apollo or Saranac AR. Apollo is the nationally accepted variety to show grazing intolerance.

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

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

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

Therefore, it is a consistent measure of the severity of the grazing pressure applied to plots. Two grazing seasons reduced stands of Apollo to less than half of the best varieties (Table 2).

Table 4 summarizes information about distributors, fall dormancy, disease resistance, and persistence across years and locations for all varieties in these tests.

## Summary

These studies indicate alfalfa varieties have been developed that express tolerance to overgrazing without going out of stand, compared to standard hay-type alfalfas. However, although these varieties were abused during the growing season, they were allowed to rest and regrow after September 15 to prepare for winter.

This information should be used along with yield and pest resistance information in selecting the best alfalfa variety for each individual use. It is *not* recommended that alfalfa 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 alfalfas.

Good management for maximum life from grazing alfalfa would include:

- allowing grazing alfalfa 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 alfalfa fields from mid-September to November 1 to replenish root reserves.

**Table 2. Percent stand of alfalfa varieties planted September 19, 2000, at Lexington, Kentucky, in a cattle grazing tolerance study.**

Variety	Percent Stand			
	April 9, 2001	October 17, 2001	April 2, 2002	October 14, 2002
<b>Commercial Varieties — Available for Farm Use</b>				
115 Brand	90	65	69	71*
ABT405	89	54	61	63*
Amerigraze 401+Z	90	57	64	58*
Alfagraze	89	76	76	56
Feast	89	62	63	53
ABT350	88	33	49	48
Haygrazer	88	32	55	41
Apollo	83	20	38	31
<b>Experimental Varieties</b>				
FOO-501	88	74	74	71*
ZG9840	90	70	72	67*
CW54056	88	51	58	53
5M85	90	13	35	18
Mean	88.6	51.1	59.6	52.4
CV, %	3.5	41.2	13.6	22.7
LSD, 0.05	3.6	24.4	9.4	13.8

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

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

Variety	Percent Stand	
	April 4, 2002	October 15, 2002
<b>Commercial Varieties — Available for Farm Use</b>		
FK421	90	75*
ABT405	90	73*
Alfagraze	90	65*
Amerigraze 401+Z	90	60
Grazeking	90	57
Apollo	90	53
Saranac AR	90	51
<b>Experimental Varieties</b>		
PHI exp1	90	72*
CW 83053	90	67*
Mean	90.1	63.5
CV, %	0.36	16.0
LSD, 0.05	0.38	11.8

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

**Table 4. Characterization and persistence of alfalfa varieties under heavy grazing pressure across years and locations.**

Variety	Proprietor/KY Distributor	Variety Characteristics <sup>1</sup>						Lexington					
		FD <sup>4</sup>	Disease Resistance <sup>2</sup>					2000 <sup>3</sup>				2001	
			BW	FW	AN	PRR	APH	Apr 2001 <sup>5</sup>	Oct 2001	Apr 2002	Oct 2002	Apr 2002	Oct 2002
<b>Commercial Varieties — Available for Farm Use</b>													
115 Brand	Monsanto Global Seed	3	HR	HR	R	HR	R	*	*	*	*		
ABT350	several	3	HR	HR	HR	HR	HR	*					
ABT405	several	4	HR	HR	HR	HR	R	*			*	*	*
Alfagraze	America's Alfalfa	2	MR	R	MR	LR	-	*	*	*		*	*
Amerigraze 401+Z	ABI/America's Alfalfa	4	HR	HR	HR	HR	R	*			*	*	
Apollo	ABI/America's Alfalfa	4	R	R	LR	R	-					*	
Feast	ABI/AgriPro	3	HR	HR	MR	HR	R	*					
FK421	Donely Seed Co.	4	HR	HR	HR	HR	HR					*	*
Grazeking	FFR/Southern	5	MR	HR	HR	R	S					*	
Haygrazer	Great Plains	4	HR	HR	R	R	MR	*					
Saranac AR	public	4	MR	R	HR	LR	-					*	
Wintergreen	ABI Alfalfa	3	HR	HR	HR	HR	R						
<b>Experimental Varieties</b>													
5M85	Forage Genetics International	-	-	-	-	-	-	*					
CW54056	Cal/West Seeds	-	-	-	-	-	-	*					
CW 83053	Cal/West Seeds	-	-	-	-	-	-					*	*
FOO-501	FFR Cooperative	-	-	-	-	-	-	*	*	*	*		
PHI exp1	Pioneer Hi-Bred Int'l	-	-	-	HR	R	LR					*	*
ZG9840	ABI Alfalfa	4	HR	HR	HR	HR	HR	*	*	*	*		

1 Variety Characteristics: FD = Fall Dormancy, BW = Bacterial Wilt, FW = Fusarium Wilt, AN = Anthracnose, PRR = Phytophthora Root Rot, APH = Aphanomyces Root Rot.

2 Disease Resistance: S = Susceptible, LR = Low Resistance, MR = Moderate Resistance, R = Resistance, HR = High Resistance.

3 Establishment Year.

4 Fall Dormancy: 2 = Vernal, 3 = Ranger, 4 = Saranac, 5 = DuPuits.

5 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.

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