



# 2000 Alfalfa Grazing Tolerance Variety 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. 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. Although some yield data are presented, the focus is on plant stand survival.

## Description of the Tests

Alfalfa variety tests for grazing tolerance were established in Lexington in the fall of 1997 and 1998. 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. The 1997 and 1998 studies were harvested in May 1999 for yield using a sickle-type mechanized harvester. Fresh weights were measured in the field and converted to dry matter production using sub-samples taken at harvest and oven dried. Plots were allowed to regrow to 6 to 8 inches and were then grazed down to below 4 inches quickly by cows and/or heifers and kept at that height or below for the remainder of the grazing season. Supplemental hay was fed during periods of slowest growth. In 2000, to put more pressure on the tests, grazing was started in April rather than after a yield harvest.

Animals were removed from alfalfa plots annually on September 15. 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. The 1998 growing season was wet during the first half but drier than normal the last half. 1999 was a drought year with above-average temperatures and reduced forage growth. In 2000 temperature and precipitation were close to normal.

Data on percent stand and on dry matter yield 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.

Two years of grazing pressure were sufficient to severely deplete the stands of Apollo in each trial. In the 1998 planting, stands of all commercial varieties were depleted after two years.

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. In addition, newer grazing-tolerant varieties have significantly improved yields over Alfagraze. It should be noted, however, that 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 1. Temperature and rainfall at Lexington during the 1998, 1999, and 2000 growing seasons.**

	1998				1999				2000			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
MON	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	41	+10	3.96	+1.10	36	+5	5.64	+2.78	32	+1	3.48	+0.62
FEB	41	+6	2.54	-0.67	40	+5	2.32	-0.89	43	+8	4.97	+1.76
MAR	46	+2	3.40	-1.00	40	-4	3.27	-1.13	48	+4	3.47	-0.93
APR	54	-1	6.20	+2.32	56	+1	1.87	-2.01	53	-2	4.10	+0.22
MAY	67	+3	6.14	+1.67	65	+1	1.35	-3.12	67	+3	2.96	-1.51
JUN	73	+1	10.81	+7.15	74	+2	3.89	+0.23	73	+1	3.22	-0.44
JUL	75	-1	7.98	+2.98	80	+4	1.00	-4.00	74	-2	3.42	-1.58
AUG	76	+1	0.29	-3.64	75	0	1.31	-2.62	74	-2	3.38	-0.55
SEP	74	+6	0.61	-2.59	69	+1	1.03	-2.17	66	-2	5.47	+2.27
OCT	58	+1	2.41	-0.16	57	0	1.91	-0.66	59	+2	0.92	-1.65

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

**Table 2. Dry matter yields (tons/acre) and percent stand of alfalfa varieties sown 2 September 1997 at Lexington, Kentucky, in a grazing-tolerance study.**

Variety	Harvest May 12, 1999	% Stand		
		Nov 9, 1999	Mar 21, 2000	Oct 20, 2000
<b>Commercial Varieties—Available for Farm Use</b>				
Alfagraze	1.44 *	70.0 *	73.3 *	58.3 *
Abt 205	1.55 *	70.0 *	73.3 *	45.0
Abt 405	1.36	70.0 *	73.3 *	36.3
Amerigraze 401+ z	1.61 *	66.7	63.3	30.8
Wintergreen	1.32	58.3	66.7	18.3
Haygrazer	1.40	51.7	56.7	16.8
Grazeking	1.15	58.3	61.7	14.2
Apollo	1.20	51.7	53.3	9.2
<b>Experimental Varieties—Not Available for Farm Use</b>				
ZG9632	1.55 *	80.0 *	80.0 *	54.2 *
ZG9641	1.57 *	76.7 *	80.0 *	52.5 *
ZG9631A	1.50 *	75.0 *	80.0 *	51.7 *
ZG9633	1.53 *	73.3 *	71.7 *	48.3 *
ZG9640	1.48 *	70.0 *	70.0 *	35.0
BARUSA 96-54	1.31	56.7	66.7	14.2
A9201	1.41	60.0	63.3	8.0
A9303	1.29	48.3	55.0	6.3
Mean	1.42	64.8	68.0	31.2
CV, %	11.15	9.3	13.4	35.7
LSD, 0.05	0.18	10.7	10.5	12.8

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

**Table 3. Dry matter yields (tons/acre) and percent stand of alfalfa varieties sown 15 September 1998 at Lexington, Kentucky, in a grazing-tolerance trial.**

Variety	Harvest May 18, 1999	% Stand		
		Nov 9, 1999	Mar 21, 2000	Nov 20, 2000
<b>Commercial Varieties—Available for Farm Use</b>				
Wintergreen	1.18 *	86.7 *	83.3	22.5
Spreader 3	1.36 *	83.3	83.3	22.5
WL 326 GZ	1.33 *	85.0 *	88.3 *	18.3
Pioneer 98	1.13	88.3 *	88.3 *	13.5
Amerigraze 401+ z	1.24 *	86.7 *	86.7 *	12.2
Apollo	1.09	90.0 *	88.3 *	12.0
Baralfa 54	1.12	88.3 *	90.0 *	7.7
Gold Plus	1.22 *	85.0 *	80.0	5.8
Pro Gro	1.20 *	86.7 *	85.0 *	5.2
Alfagraze	1.17 *	88.3 *	88.3 *	4.5
<b>Experimental Varieties—Not Available for Farm Use</b>				
ZG9740	1.12	88.30 *	88.33 *	65.00 *
ZG9741	1.33 *	90.00 *	86.67 *	55.00 *
Mean	1.21	87.2	86.4	20.35
CV, %	14.11	5.06	6.29	48.16
LSD, 0.05	0.20	0.51	6.28	11.34

\* Not significantly different from the highest numerical 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>					1997 <sup>3</sup>			1998		
			BW	FW	AN	PRR	APH	Nov <sup>5</sup> 1999	Mar 2000	Nov 2000	Nov 1999	Mar 2000	Nov 2000
<b>Commercial varieties—Available for Farm Use</b>													
ABT205	ABT/Scott Seed/Sphar Seed	2	HR	HR	HR	HR	R	*	*				
ABT405	ABT/Scott Seed/Sphar Seed	4	HR	HR	HR	HR	R	*	*				
Alfagraze	America's Alfalfa/Scott Seed/SS	2	MR	R	MR	LR	-	*	*	*	*	*	
Amerigraze401+Z	ABI/America's Alfalfa	4	HR	HR	HR	HR	R				*	*	
Apollo	ABI/America's Alfalfa/Scott Seed	4	R	R	LR	R	-				*	*	
Baralfa54	Barenbrug	5	R	HR	HR	HR	-				*	*	
Gold Plus	MBS Inc.	4	HR	HR	HR	HR	R				*		
Grazeking	FFR/Southern States	5	MR	HR	HR	R	S						
Haygrazer	Great Plains Research	4	HR	HR	R	R	MR						
ProGro	MBS Inc.	4	HR	HR	R	HR	MR				*	*	
Spredor 3	Novartis	1	HR	HR	R	MR	S						
Wintergreen	ABI Alfalfa/Renk Seed (Wisconsin)	3	HR	HR	HR	HR	R				*		
WL326GZ	W-L Research Inc./Green Seed	4	HR	HR	HR	HR	HR				*	*	
<b>Experimental varieties—Not Available for Farm Use</b>													
A9201	FFR Cooperative	4	HR	HR	HR	HR	R						
A9303	FFR Cooperative	4	R	HR	R	HR	R						
BARUSA96-54	Barenbrug	HR	R	HR	HR	HR	HR						
I97PE98	Pioneer/Experimental	2	-	-	HR	MR	MR				*	*	
ZG9631A	ABI Alfalfa/Experimental	3	HR	HR	HR	HR	HR	*	*	*			
ZG9632	ABI Alfalfa/Experimental	3	HR	HR	HR	HR	HR	*	*	*			
ZG9633	ABI Alfalfa/Experimental	3	HR	HR	HR	HR	HR	*	*	*			
ZG9640	ABI Alfalfa/Experimental	4	HR	HR	HR	HR	HR	*	*				
ZG9641	ABI Alfalfa/Experimental	3	HR	HR	HR	HR	HR	*	*	*			
ZG9740	ABI Alfalfa/Experimental	4	HR	HR	HR	HR	HR				*	*	*
ZG9741	ABI Alfalfa/Experimental	4	HR	HR	HR	HR	HR				*	*	*

<sup>1</sup> Variety Characteristics: FD=Fall Dormancy BW=Bacterial Wilt FW=Fusarium Wilt AN=Anthracnose PRR=Phytophthora Root Rot APH=Aphanomyces Root Rot  
<sup>2</sup> Disease Resistance: S=Susceptible LR=Low Resistance MR=Moderate Resistance R=Resistance HR=High Resistance  
<sup>3</sup> Establishment Year  
<sup>4</sup> Fall Dormancy 2 Vernal 3 Ranger 4 Saranac 5 DuPuits  
<sup>5</sup> Date of measurement of percent stand.  
 Shaded boxes indicate that the variety was not in the test.  
 Open boxes indicate the variety was in the test, but its persistence was significantly less than the top-ranked variety in the test.  
 \* Not significantly different from the top-ranked variety in the test.

