

# 2009

## *Kansas Performance Tests with*

# **Alfalfa Varieties**

## *Report of Progress 1025*



**Kansas State University  
Agricultural Experiment Station  
and Cooperative Extension Service**

CN	RA	DC	NT	PL	SM	JW	RP	WS	MS	NM	BR	DO	
SH	TH	SD	GH	RO	OB	MC	CD	CY	RL	PT	JA	AT	
WA	LG	GO	TR	EL	RS	LC	OT	DK	GE	WB	SN	JF	LV
GL	WH	SC	LE	NS	RH	BT	EW	SA	MR	LY	OS	DG	JO
HM	KE	FI	HG	PN	SF	RC	MP	MN	CS	CF	AN	FR	MI
ST	GT	HS	FO	ED	PR	RN	HV	BU	GW	WO	AL	BB	LI
MT	SV	SW	ME	CA	KW	PR	KM	SG	EK	WL	NO	CR	MI
					CM	BA	HP	SU	CL	CQ	MG	LB	CK

★ irrigated

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### Entrants in 2009 Kansas Alfalfa Performance Tests

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Allied Seed (Allied) Nampa, ID 208-466-6700 <a href="http://www.alliedseed.com">www.alliedseed.com</a>	Garst Seed Co. (Garst) Greensburg, KS 620-546-5955 <a href="http://garstseed.com">garstseed.com</a>	Mycogen Seeds (Mycogen) Indianapolis, IN 317-337-7568	Syngenta Seeds, Inc. (NK) Golden Valley, MN 763-593-7324 <a href="http://www.nk-us.com">www.nk-us.com</a>
Croplan Genetics (Croplan Genetics) St. Paul, MN 800-851-8810 <a href="http://www.croplangenetics.com">www.croplangenetics.com</a>	Great Plains Research Co. (Cimarron USA) Cary, NC 800-874-7945 <a href="http://www.CimarronUSA.com">www.CimarronUSA.com</a>	NC+ Hybrids (NC+) Lincoln, NE 800-365-9804 <a href="http://www.nc-plus.com">www.nc-plus.com</a>	W-L Research, Inc. (W-L) Madison, WI 608-295-3566
Dairyland Seed Co. (Dairyland) West Bend, WI 800-236-0163 <a href="http://www.dairylandseed.com">www.dairylandseed.com</a>	KSU- Foundation Seed (KS AES) Manhattan, KS 785-532-6115 <a href="http://www.agronomy.ksu.edu">www.agronomy.ksu.edu</a>	PGI Alfalfa, Inc. (PGI) Woodland, CA 866-744-5710	
Foundation Seed Division (NE AES & USDA) Lincoln, NE 877-229-1363	Monsanto Seed (Dekalb) St. Louis, MO 800-335-2676	Pioneer Hi-Bred Intl., Inc. (Pioneer) Johnston, IA 800-247-6803 <a href="http://www.pioneer.com">www.pioneer.com</a>	

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## 2009 PERFORMANCE TESTS

### Objectives and Procedures

The Kansas Agricultural Experiment Station established an official alfalfa testing program in 1980 to provide Kansas growers with unbiased performance comparisons of alfalfa varieties marketed in the state. Every three years, private companies are asked to enter varieties voluntarily at the locations slated for establishment that year. Announcements and entry forms are mailed to private companies in June for entry in fall-seeded tests. Companies enter varieties of their choice and pay entry fees to cover part of the costs of conducting the tests. Most tests are planted in mid-August or September, but the southeast Kansas test usually is planted in the spring. Individual tests are conducted for a minimum of three years. New tests typically are established during the final production year of the previous test, or more frequently if there is enough interest.

Descriptive information is presented with the results for each test. This information, including soil type, establishment methods, fertilization, pest control, irrigation, harvest dates, and growing conditions unique to that location, can help explain test and/or variety performance.

Forage yields were estimated by harvesting four replications of each variety with a plot harvester. The amount of forage produced from a specific area (35 to 80 ft<sup>2</sup>) was weighed, and a subsample was taken to determine moisture content. This information was used to convert the plot weights to tons of dry matter per acre for each cutting, the season total, and the total for each previous season, as presented in Tables 1 and 2. The forage yield over the lifetime of a particular test is presented as the total tons of dry matter produced per acre, as the total tons of 15% moisture hay, and as a percentage of the test average.

Each table is separated into three sections. The first lists released cultivars that are generally available on the seed market or soon will be. The second section includes experimental cultivars that were entered in the test before being released for sale. These experimental lines often represent an earlier generation of seed than that used for the released cultivars. The third section includes summary statistics unique to that test.

At the bottom of each column, the least significant difference (LSD) is listed at the 0.05 and 0.20 levels. These values indicate how large a difference is needed to be confident that one variety is superior to another. Differences between varieties that are equal to or greater than the 0.05 LSD have only a 1 in 20 chance of being due to chance or error. Differences equal to or greater than the 0.20 LSD have a 1 in 5 chance of being caused by chance or error.

The coefficient of variability (CV) provides an estimate of the consistency of the results of a particular test. In these tests, CV less than 10% generally indicate reliable, uniform data, whereas CV of 10 to 15% are not uncommon and generally indicate the data are acceptable for rough comparisons. Tests with CV greater than 15% still may be useful, but variety comparisons lack precision.

The mean coefficient of variability (MCV) is similar to the CV in that it serves as an indicator of test precision. The MCV is calculated by dividing the 0.05 LSD by the test mean (average) and multiplying by 100. The MCV reveals the percentage difference required to detect differences between varieties with 95% confidence.

### Variety Characterization

For variety selection, producers should consider the performance of a variety in each of the current tests in which it appears, its performance over time and locations relative to familiar or check varieties, and the disease and insect resistance characteristics that are potentially important in specific situations.

Tables 1 and 2 contain updated yield data from individual tests currently in progress. First-season yields for a spring-planted test often are more variable than yields in subsequent years. Season totals are important, but yield distribution during the season might differ among varieties. Examine yields from individual cuttings to determine if differences in yield distribution exist. Yield totals over many years provide the best measure of variety performance over time.

Table 3 provides winter survival, disease and insect-resistance, multifoliolate expression, and continuous grazing tolerance ratings for released varieties. These ratings were obtained primarily from the annual "Winter Survival, Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties" pamphlet published by the National Alfalfa Alliance. That report summarizes information submitted by developers of alfalfa varieties as part of the variety registration process. The Association of Official Seed Certifying Agencies National Alfalfa Variety Review Board reviewed the ratings before they were published. Companies submitting varieties for the tests provided ratings for some unregistered varieties. Experimental varieties are also listed in Table 3 for brand identification.

**Table 1. Southwest Kansas, Garden City Alfalfa Performance Test, Seeded August 30, 2006**

Monty Spangler, agronomist

Southwest Research-Extension Center, Garden City, Keith silt loam

Beneficial rain distribution led to good growing season.

30 lb seed/acre

Plots 3'x20'; 3'x20' harvested

22-100-0 lb/a of N-P-K after first cutting

NAME	Forage Yield								Total, 15% Moist.	Total, % of Mean
	tons/acre									
	Dry Matter									
	2009				2009	2008	2007	Total		
5-29	6-29	8-8	9-10							
<b>RELEASED CULTIVARS</b>										
Cimarron VL400	7.10	2.20	2.30	1.40	13.00		12.03	13.00	15.29	111
Mountaineer 2.0	6.28	2.53	2.38	1.55	12.73		12.27	12.73	14.97	109
Perry	6.23	2.55	2.38	1.53	12.68		11.63	12.68	14.91	108
4A421	5.83	2.55	2.50	1.53	12.40		12.48	12.40	14.59	106
GH 727	5.18	2.83	2.45	1.78	12.23		12.61	12.23	14.38	104
6530	5.90	2.48	2.30	1.55	12.22		12.59	12.22	14.38	104
Kanza	5.65	2.65	2.23	1.65	12.18		11.57	12.18	14.32	104
Reward II	5.70	2.43	2.33	1.73	12.18		12.48	12.18	14.32	104
WL 357 HQ	5.85	2.48	2.28	1.55	12.15		12.54	12.15	14.29	104
FSG505	5.40	2.48	2.43	1.68	11.98		12.66	11.98	14.09	102
Hybri+421	5.10	2.58	2.55	1.75	11.98		12.33	11.98	14.09	102
FSG408DP	5.10	2.60	2.43	1.73	11.85		12.14	11.85	13.94	101
Pioneer 54Q25	5.23	2.53	2.28	1.65	11.68		12.47	11.68	13.74	100
Rebound 5.0	4.75	2.55	2.43	1.78	11.50		12.82	11.50	13.53	98
Mariner III	4.85	2.65	2.38	1.58	11.45		12.59	11.45	13.47	98
Pioneer 54V46	4.70	2.48	2.40	1.75	11.33		12.42	11.33	13.32	97
WL 355 RR	4.75	2.48	2.35	1.73	11.30		12.59	11.30	13.29	96
Pioneer 54V09	4.85	2.53	2.20	1.60	11.18		12.73	11.18	13.15	95
MP04	5.33	2.10	2.18	1.53	11.13		11.39	11.13	13.09	95
4G418RR	4.75	2.40	2.23	1.73	11.10		12.27	11.10	13.06	95
6420	4.53	2.48	2.40	1.65	11.05		12.48	11.05	13.00	94
6415	4.55	2.25	2.38	1.80	10.98		12.96	10.98	12.91	94
Escalade	4.45	2.58	2.30	1.60	10.93		11.92	10.93	12.85	93
Expedition	4.10	2.70	2.38	1.65	10.83		12.59	10.83	12.74	92
Marvel	4.08	2.50	2.33	1.85	10.75		12.99	10.75	12.65	92
DKA41-18RR	4.08	2.70	2.33	1.65	10.75		12.30	10.75	12.65	92
Phoenix	4.43	2.40	2.25	1.60	10.68		11.77	10.68	12.56	91
FSG406	4.13	2.83	2.48	1.25	10.68		12.57	10.68	12.56	91
Artesian Sunrise	4.43	2.40	2.25	1.58	10.65		12.08	10.65	12.53	91
Genoa	4.08	2.50	2.35	1.73	10.65		12.61	10.65	12.53	91
WL 343 HQ	3.73	2.63	2.18	1.53	10.05		11.68	10.05	11.82	86
<b>EXPERIMENTAL STRAINS</b>										
4S419	6.83	2.63	2.50	1.88	13.83		13.30	13.83	16.26	118
I Chg 04	7.05	2.65	2.43	1.63	13.75		11.95	13.75	16.18	117
msSunstra-614	6.45	2.63	2.53	1.85	13.45		12.32	13.45	15.82	115
FG 52M146	5.70	2.60	2.28	1.60	12.18		12.72	12.18	14.32	104
msSunstra-613	4.70	2.70	2.28	1.75	11.43		12.28	11.43	13.44	97
DS961	4.35	2.60	2.58	1.83	11.35		11.48	11.35	13.35	97
DS253	4.10	2.58	2.70	1.93	11.30		11.43	11.30	13.29	96
<b>SUMMARY STATISTICS</b>										
Average	5.14	2.55	2.37	1.67	11.72		12.32	11.72	13.79	100
LSD (0.05)	1.73	0.24	0.26	0.22	1.82		0.61	1.82	2.14	16
LSD (0.20)	1.13	0.16	0.17	0.15	1.19		0.40	1.19	1.39	10
CV (%)	12.40	6.80	7.93	9.60	11.09		3.55	11.09	11.09	11
MCV (%)	17.38	9.53	11.11	13.45	15.53		4.98	15.53	15.53	16

**Table 2. Northwest Kansas, Colby Alfalfa Performance Test, Seeded August 24, 2006**

Pat Evans, agronomist

Northwest Research-Extension Center, Colby, Keith silt loam

18 lb seed/acre

Plots 3'x20'; 3'x17' harvested

14-46-0 lb/a of N-P-K before planting

Growing conditions were normal with no insect problems.

NAME	Forage Yield								Total, 15% Moist.	Total, % of Mean
	tons/acre									
	Dry Matter									
	2009				2009	2008	2007	Total		
6-8	7-9	8-12	9-9							
<b>RELEASED CULTIVARS</b>										
Hybri+421	2.97	2.77	2.35	1.54	9.63		8.99	9.63	11.33	113
DKA41-18RR	3.39	2.70	2.23	1.22	9.53		8.47	9.53	11.22	111
Rebound 5.0	3.34	2.71	1.82	1.57	9.43		8.56	9.43	11.10	110
4G418RR	3.54	2.04	2.14	1.64	9.36		8.07	9.36	11.01	109
Mountaineer 2.0	3.23	2.16	1.88	1.51	8.77		8.57	8.77	10.32	102
Pioneer 54Q25	2.64	2.42	1.78	1.72	8.56		8.87	8.56	10.07	100
Kanza	2.99	2.26	1.79	1.51	8.55		8.62	8.55	10.06	100
WL 355 RR	2.96	2.06	1.85	1.57	8.44		8.13	8.44	9.93	99
Pioneer 54V46	3.26	2.06	1.90	1.20	8.42		8.38	8.42	9.91	98
Perry	3.18	1.77	1.94	1.45	8.34		7.85	8.34	9.82	98
Pioneer 54V09	3.00	1.83	1.99	1.34	8.17		8.59	8.17	9.61	95
4A421	2.51	2.61	1.60	1.41	8.13		8.57	8.13	9.56	95
WL 343 HQ	2.70	2.33	1.77	1.17	7.98		8.25	7.98	9.39	93
Jade III	2.65	2.28	1.51	1.27	7.71		8.14	7.71	9.07	90
6400HT	2.80	1.64	1.91	0.99	7.34		8.13	7.34	8.63	86
<b>SUMMARY STATISTICS</b>										
Average	3.01	2.24	1.90	1.41	8.56		8.41	8.56	10.07	100
LSD (0.05)	0.47	0.30	0.25	0.30	0.71		0.87	0.71	0.84	8
LSD (0.20)	0.31	0.20	0.16	0.19	0.71		0.56	0.71	10.05	8
CV (%)	11.05	9.45	9.27	15.01	5.84		7.23	5.84	5.84	6
MCV (%)	15.77	13.48	13.23	21.42	8.34		10.32	8.34	8.34	8

**Table 3. 2009 Performance test entries with disease and insect resistance ratings for released varieties\***

A A S N														A A S N																					
P S B							P P R R M							P S B							P P R R M														
Brand	W	B	V	F	A	R	A	P	A	S	H	H	K	K	P	L	G	Brand	W	B	V	F	A	R	A	P	A	S	H	H	K	K	P	L	G
Name	S	W	W	W	N	R	A	A	A	N	1	2	N	N	L	E	T	Name	S	W	W	W	N	R	A	A	A	N	1	2	N	N	L	E	T
<b>Allied</b>																		<b>NK</b>																	
Escalade	-	H	R	R	R	H	M	R	R	-	-	R	-	-	-	-	-	Expedition	3	R	H	H	H	H	R	-	-	R	H	-	-	R	-	-	
FSG406	1	H	H	H	H	H	-	R	-	R	H	-	-	R	-	H	-	Genoa	1	H	H	H	H	H	-	R	-	R	H	-	-	-	-	-	
FSG408DP	2	H	R	H	H	H	-	R	-	R	R	-	-	H	-	-	-	<b>PGI</b>																	
FSG505	2	H	H	H	H	H	R	R	-	R	H	-	-	R	-	-	-	Reward II	2	H	R	H	R	H	R	R	R	R	R	-	-	H	-	-	
Mariner III	2	H	H	H	H	H	-	R	-	R	H	R	-	H	-	-	-	<b>Pioneer</b>																	
Marvel	2	H	H	H	H	H	R	R	-	H	-	-	-	H	-	-	-	54Q25	-	H	H	H	H	H	R	R	-	H	R	-	-	H	-	-	
Phoenix	4	H	H	H	H	H	-	H	-	H	R	-	-	MR	-	-	-	54V09	-	H	H	R	H	H	R	H	-	H	R	MR	-	H	-	-	
<b>Cimarron USA</b>																		54V46																	
Cimarron	-	R	R	H	H	H	H	R	R	R	R	-	S	-	-	-	-	<b>W-L Research</b>																	
VL400																		WL 343 HQ	1	H	H	H	H	H	-	H	-	R	H	-	-	-	-	H	
I Chg 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WL 355 RR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MP04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WL 357 HQ	2	H	H	H	H	H	-	H	-	-	H	-	-	-	-	-	
<b>Croplan Genetics</b>																																			
Artesian	-	M	R	R	H	H	H	H	R	R	-	-	-	R	-	H	-																		
Sunrise																																			
Mountaineer	2	H	R	H	H	H	R	H	-	H	R	-	-	R	-	H	-																		
2.0																																			
Rebound 5.0	2	H	H	H	H	H	-	R	-	-	H	-	-	-	-	-	-																		
<b>Dairyland Seed</b>																																			
DS253	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
DS961	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
msSunstra-613	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
msSunstra-614	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
<b>Forage Genetics</b>																																			
FG 52M146	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
<b>Garst</b>																																			
6400HT	2	H	H	H	H	H	-	H	-	-	H	-	-	-	-	-	-	Y																	
6415	1	H	H	H	H	H	R	R	-	-	H	-	-	-	-	-	-	H																	
6420	2	H	R	H	R	H	R	R	-	R	R	-	-	H	-	-	-																		
6530	-	H	H	H	H	H	-	H	-	R	H	M	-	-	-	-	-																		
<b>Golden Harvest</b>																																			
GH 727	1	H	H	H	H	H	-	R	-	R	H	-	-	-	-	-	-	H																	
<b>KS AES &amp; USDA</b>																																			
Kanza	-	R	-	-	-	-	R	R	-	-	-	-	-	-	-	-	-																		
<b>Monsanto</b>																																			
DKA41-18RR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
<b>Mycogen</b>																																			
4A421	-	H	H	H	H	H	H	H	-	-	H	-	-	M	-	-	-																		
4G418RR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
4S419	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
<b>NC+</b>																																			
Hybri+421	2	H	R	H	H	H	R	R	-	R	R	-	-	H	-	-	-																		
Jade III	2	H	R	H	H	H	R	R	R	R	R	-	-	H	-	-	-																		
<b>NE AES &amp; USDA</b>																																			
Perry	-	R	-	-	L	-	M	R	-	-	-	-	-	-	-	-	-	M																	

\*WS = Winter survival, 1 = superior  
 BW = Bacterial wilt  
 VW = Verticillium wilt  
 FW = Fusarium wilt  
 AN = Anthracnose race 1  
 PRR = Phytophthora root rot  
 SAA = Spotted alfalfa aphid  
 PA = Pea aphid  
 BAA = Blue alfalfa aphid  
 SN = Stem nematode  
 APH1 = Aphanomyces root rot race 1  
 APH2 = Aphanomyces root rot race 2  
 SRKN = Southern root knot nematode  
 NRKN = Northern root knot nematode  
 PL = Potato leafhopper  
 MLE = Multifoliolate expression  
 GT = Continuous grazing tolerance, Y/N

Pest resistance ratings:		
Code	Resistance class	% Resistant plants
S	Susceptible	0-5%
L	Low Resistance	6-14%
M	Moderate Resistance	15-30%
R	Resistance	31-50%
H	High Resistance	>50%
-	Not adequately tested	

Disease and insect resistance ratings are from National Alfalfa Alliance descriptions or developers of the varieties.

To access crop performance testing information electronically, visit our Web site. The information contained in this publication, plus more, is available for viewing or downloading at:

**[www.agronomy.ksu.edu/kscpt](http://www.agronomy.ksu.edu/kscpt)**

Excerpts from the  
University Research Policy Agreement with Cooperating Seed Companies

Permission is hereby given to Kansas State University (KSU) to test varieties and/or hybrids designated on the attached entry forms in the manner indicated in the test announcements. I certify that seed submitted for testing is a true sample of the seed being offered for sale.

I understand that all results from Kansas Crop Performance Tests belong to the University and the public and shall be controlled by the University so as to produce the greatest benefit to the public. Performance data may be used in the following ways: 1) Tables may be reproduced in their entirety provided the source is referenced and data are not manipulated or reinterpreted; 2) Advertising statements by an individual company about the performance of its entries may be made as long as they are accurate statements about the data as published, with no reference to other companies' names or cultivars. In both cases, the following must be included with the reprint or ad citing the appropriate publication number and title: "See the official Kansas State University Agricultural Experiment Station and Cooperative Extension Service Report of Progress 1025, '2009 Kansas Performance Tests with Alfalfa Varieties,' or the Kansas Crop Performance Test Web site, [www.agronomy.ksu.edu/kscpt](http://www.agronomy.ksu.edu/kscpt), for details. Endorsement or recommendation by Kansas State University is not implied."

## **Contributors**

### **Main Station, Manhattan**

Jane Lingenfelter, Assistant Agronomist (Senior Author)

### **Research Centers**

Pat Evans, Colby  
Joseph Moyer, Mound Valley  
Monty Spangler, Garden City

### **Experiment Fields**

Barney Gordon, Belleville  
William Heer, Hutchinson  
Larry Maddux, Topeka

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