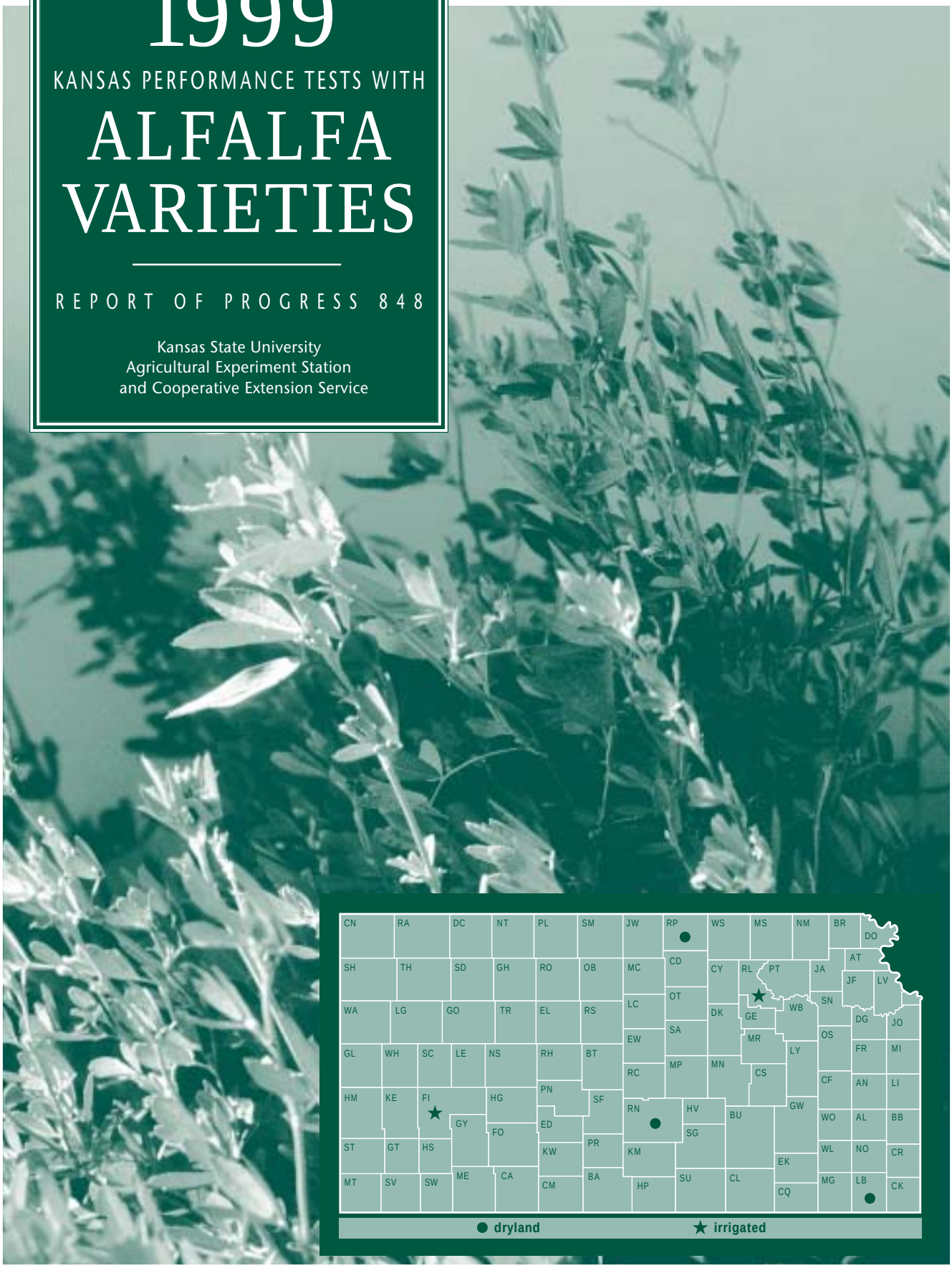
1999

KANSAS PERFORMANCE TESTS WITH

ALFALFA VARIETIES

REPORT OF PROGRESS 848

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service



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1999 KANSAS ALFALFA PERFORMANCE TESTS

INTRODUCTION

TEST OBJECTIVES AND PROCEDURES

The Kansas Agricultural Experiment Station established an official alfalfa performance testing program in 1980 to provide Kansas growers with unbiased performance comparisons on alfalfa varieties marketed in the state. Each year, 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; however, the Southeast Kansas test usually is planted in the spring. Individual tests are conducted for a minimum of 3 or 4 years. New tests are established during the final production year of the previous test.

Alfalfa tests are currently in progress at 7 locations around the state. This year, no results are included from the Sandyland Experiment Field near St. John or the Cornbelt Experiment Field near Powhattan because of variability in first-year yields. The other testing sites include the Southwest Research-Extension Center at Garden City, the Southeast Agricultural Research Center at Parsons, the South Central Kansas Experiment Field near Hutchinson, the North Central Experiment Field near Belleville, and the Ashland Research Farm at Manhattan.

The Manhattan test was established as a "no insecticide" test to evaluate variety differences in resistance and/or tolerance to infestations of insect pests such as alfalfa weevil and potato leafhopper. The susceptible check variety, Ranger, was included as a basis for comparison.

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 (35-80 ft^2) 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 1-5. 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.

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 a 1 in 20 chance of not being real. Differences equal to or greater than the 0.20 LSD have a 1 in 5 chance of not being real.

The Coefficient of Variability (CV) provides an estimate of the consistency of the results of a particular test. In these tests, CV's below 10% generally indicate reliable, uniform data, whereas CV's of 10-15% are not uncommon and generally indicate that the data are acceptable for rough comparisons. Tests with CV's over 15% may still 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 percent difference required to detect differences between varieties with 95% confidence. Many alfalfa breeders and testers agree that tests with MCV values greater than 10% are of little benefit.

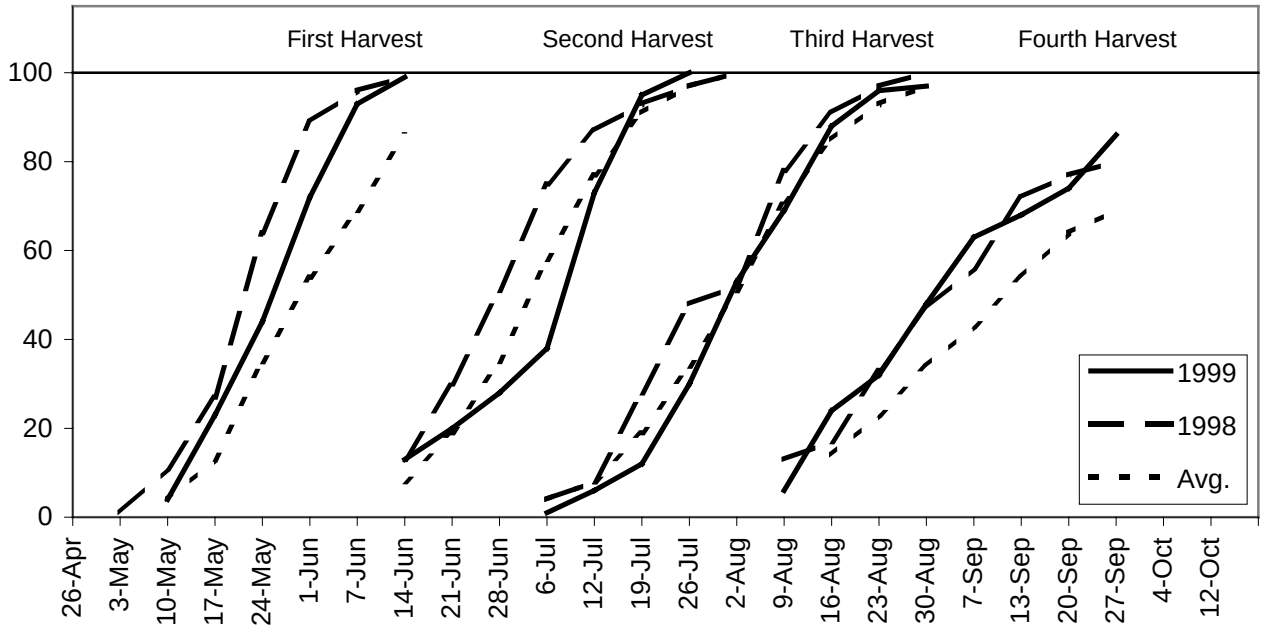

Figure 1. Progress of statewide alfalfa harvest.

1999 STATEWIDE GROWING CONDITIONS

The 1999 alfalfa crop was influenced heavily by temperature and rainfall extremes (Figures 1, 2, and 3). Heavy rains and relatively cool temperatures in May and June caused the first and second cuttings to be later than last year's. The second cutting was later than the 5-year average as well. Warm, dry conditions later in the summer speeded the third and fourth cuttings. Timing of the third cutting closely followed the 5-year average. The fourth cutting closely followed the timing of that of 1998, both of which were several days earlier than the 5-year average. (From Crop-Weather reports, Kansas Agricultural Statistics, Topeka).

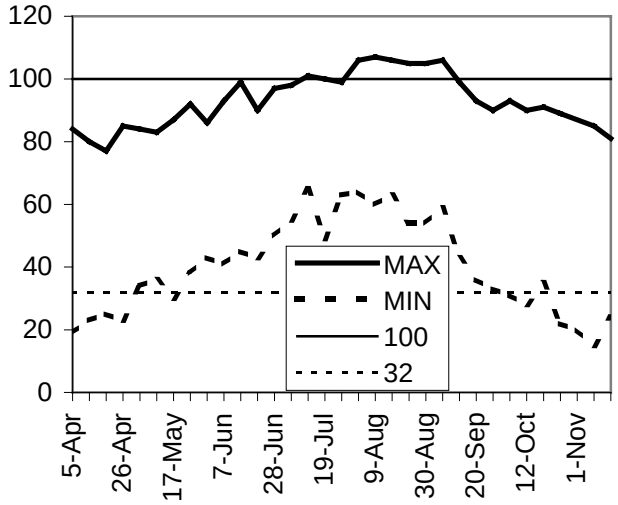

Figure 2. 1999 Kansas weekly maximum and minimum temperatures.

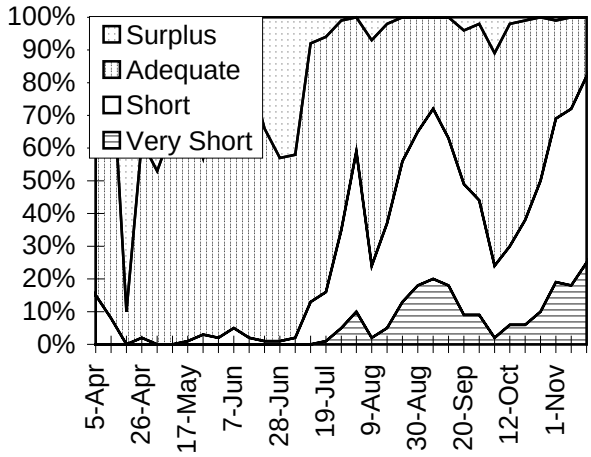

Figure 3. Status of statewide topsoil moisture.

Most of the typical insect pests and a few less common insect pests appeared in alfalfa fields in 1999. Army cutworms caused severe damage in many fields in the western half of the state in February and March, especially on new plantings. Alfalfa weevils damaged several fields in south central Kansas in April, but their numbers appeared to decline substantially in May. Several

fields required insecticide treatments to control weevils, pea aphids, and blue alfalfa aphids. Cowpea aphids were present in some fields in central and western Kansas, occasionally at levels requiring control measures. Cowpea aphids had been found in Kansas only one other time and never at damaging levels before 1999. Potato leafhoppers caused severe stunting and yellowing in many fields across the state. Garden webworms appeared in some fields and may have caused damage to seedling alfalfa later in the season. (From Cooperative Economic Insect Survey reports, Kansas Department of Agriculture and Kansas Insect Newsletter, KSU Extension Entomology).

Alfalfa stands generally started out the season in good shape but were subjected to a wide range of diseases during the 1999 season. Heavy rains and cool temperatures early in the season promoted development of *Leptosphaerulina* (Lepto) leaf spot and spring black stem. Harvest delays provided additional time for these leaf- and stem-spotting diseases to develop. KSU nematologist Tim Todd confirmed an infestation of stem nematode in irrigated alfalfa in southwest Kansas. This pest has been found in south central Kansas for several years, but this was the first confirmed instance from southwest Kansas. The above-normal rainfall in June and July provided ideal conditions for summer blackstem, alfalfa rust, and *Phytophthora* root rot. Other diseases diagnosed in the KSU Plant Pathology Diagnostic Lab included alfalfa mosaic virus, *Verticillium* wilt, and crown rot. (From Plant Disease Alerts, KSU Department of Plant Pathology).

The November 10 Kansas Agricultural Statistics report predicted total 1999 alfalfa hay production of 3.9 million tons from 850,000 acres. This is down from 4.6 million tons produced from 1,000,000 acres in 1998. The predicted average yield of 4.6 tons per acre equaled the final 1998 average.

VARIETY CHARACTERIZATION

For variety selection, producers should consider the performance of a variety in each of the current tests where 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 their situation. Tables 1-5 contain updated yield data from individual tests currently in progress. The appendix contains additional descriptive information and marketing contacts for all varieties included in the 1999 Kansas Alfalfa Performance Tests. Fall dormancy, disease resistance, and insect resistance ratings were provided by developers of each variety and were reviewed by the Association of Official Seed Certifying Agencies (AOSCA) National Alfalfa Variety Review Board (NAVRB). The Alfalfa Council uses that information to publish its annual Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties, which was used as the source of the information in the appendix. Companies submitting varieties for the tests provided ratings for some varieties not included in the Alfalfa Council publication.

Fall dormancy values are based on the fall canopy height measured in Minnesota. Dormancy values often are related to the speed of regrowth. The rapid regrowth types have higher values, and the slower regrowth types have lower values.

TABLE 1. RILEY CO. ALFALFA PERFORMANCE TEST RESULTS, 1999 - NO INSECTICIDES.

BRAND	NAME	Plant Height inches	Leaf Hopper Injury Rating 1-5*			Forage Yield tons/acre 1999 Dry Matter			Total, 15% Moist.	1999 Total, % of Mean
		7-8	7-8	9-10	Average	7-8	9-10	Total		
RELEASED CULTIVARS										
KS AES & USDA	Kanza	19	3.5	5.0	4.3	1.64	0.58	2.23	2.62	117
AgriPro	Feast+EV	18	3.0	5.0	4.0	1.48	0.63	2.11	2.48	110
AgriPro	Defense+EV	21	2.3	4.5	3.4	1.37	0.61	1.99	2.34	104
America's Alfalfa	Abilene+Z	21	2.8	5.0	3.9	1.36	0.62	1.99	2.34	104
NC+	Jade II	18	3.5	5.0	4.3	1.47	0.52	1.99	2.34	104
Garst	645II	20	2.5	5.0	3.8	1.32	0.64	1.97	2.32	103
Pioneer	54H69	22	2.0	4.0	3.0	1.21	0.76	1.97	2.32	103
W-L Research	ABT 400SCL	17	3.0	5.0	4.0	1.43	0.51	1.95	2.29	102
Novartis	Geneva	17	2.8	5.0	3.9	1.40	0.53	1.94	2.28	102
DeKalb	DK 131HG	21	2.0	3.8	2.9	1.29	0.62	1.93	2.27	101
NetSeeds	NetYield500	16	3.5	5.0	4.3	1.28	0.62	1.91	2.25	100
America's Alfalfa	Ameriguard 302+Z	20	2.3	4.3	3.3	1.30	0.50	1.80	2.12	94
AgriPro	Dagger+EV	20	3.0	5.0	4.0	1.27	0.46	1.73	2.04	91
NE AES & USDA	Perry	18	2.3	5.0	3.6	1.26	0.45	1.71	2.01	90
NE AES & USDA	Ranger	15	3.5	5.0	4.3	1.21	0.33	1.54	1.81	81
EXPERIMENTAL STRAINS										
ABI	ZH9844H	25	1.8	3.3	2.5	1.41	0.75	2.17	2.55	114
ABI	ZC9842A	20	2.5	4.8	3.6	1.40	0.62	2.02	2.38	106
ABI	ZG9840	18	2.5	5.0	3.8	1.41	0.54	1.96	2.31	103
America's Alfalfa	ZC9650	20	2.5	5.0	3.8	1.42	0.54	1.96	2.31	103
W-L Research	W326	18	3.8	5.0	4.4	1.38	0.57	1.96	2.31	103
ABI	ZC9841A	17	2.3	5.0	3.6	1.30	0.60	1.90	2.24	99
ABI	ZH9841H	22	2.0	3.0	2.5	1.20	0.62	1.83	2.15	96
ABI	ZC9851A	20	2.3	5.0	3.6	1.09	0.66	1.76	2.07	92
ABI	ZC9840A	19	2.3	5.0	3.6	1.17	0.58	1.75	2.06	92
KS AES & USDA	KS224	16	3.3	5.0	4.1	1.25	0.33	1.59	1.87	83
SUMMARY STATISTICS										
Average		19	2.7	4.7	3.7	1.33	0.57	1.91	2.25	100
LSD(0.05)		2	0.7	0.3	0.4	0.12	0.13	0.19	0.22	10
LSD(0.20)		2	0.5	0.2	0.3	0.09	0.10	0.15	0.18	8
CV(%)		11	20.6	4.9	8.1	7.52	19.00	8.60	8.60	9
MCV(%)		13	24.3	5.8	9.6	8.88	22.26	10.11	10.11	10

*NAAIC Leaf Hopper Resistance Ratings:
1 - No apparent injury
2 - Very minor stunting and yellowing
3 - Moderate stunting, yellowing is evident on 20-40% of leaves
4 - Significant injury; plants show significant stunting with yellowing on 40-60% of leaves
5 - Severe injury; plants show severe stunting, yellowing or reddening evident on 60-100% of leaves

LOCATION: Northeast Kansas
Site: Ashland Research Farm
County: Riley
Town: Manhattan
Soil: Haynie very fine sand

ESTABLISHMENT:
5/24/99; RCBD, 4 reps
Plots 3'x15'; 3'x12' harvested
15 lb. seed/acre

1999 FERTILIZATION:
43-111-57 applied at planting

1999 PEST CONTROL:
Insect infestations were not controlled, so that inherent resistance to insects could be evaluated.

1999 CONDITIONS:
Excessive moisture in spring delayed planting but was followed by a dry summer. The test was irrigated in mid and late summer only under conditions of high water stress. High leafhopper pressure reduced first-harvest yields and caused extreme stunting later in the summer. Plots were harvested at 10-20% bloom.

TABLE 2. REPUBLIC CO. ALFALFA PERFORMANCE TEST RESULTS, 1998-1999.

		Forage Yield tons/acre Dry Matter							
		1999							
BRAND	NAME	6-1	7-2	8-16	Total	1998 Total	98-99 Total	Total, 15% Moist.	98-99 Total, % of Mean
Released Cultivars									
AgriPro	Dominator	3.76	2.67	1.98	8.41	6.44	14.85	17.47	110
DeKalb	DK 127	3.48	2.60	2.00	8.08	6.29	14.37	16.91	107
DeKalb	DK 142	3.39	2.72	1.87	7.98	6.28	14.26	16.78	106
Germains	WL 324	3.60	2.74	1.52	7.86	6.21	14.07	16.55	104
Pioneer	5454	3.73	2.55	1.47	7.75	6.07	13.82	16.26	103
Star	Spur	3.55	2.48	1.75	7.78	6.03	13.81	16.25	103
Germains	WL 325 HQ	3.66	2.41	1.73	7.79	6.01	13.80	16.24	102
Star	Asset	3.44	2.53	1.47	7.43	6.04	13.47	15.85	100
AgriPro	Depend+EV	3.39	2.50	1.44	7.33	6.06	13.39	15.75	99
NE AES & USDA	Perry	3.56	2.30	1.43	7.29	5.72	13.01	15.31	97
KS AES & USDA	Kanza	3.24	2.33	1.88	7.45	5.50	12.95	15.24	96
Experimental Strains									
ABI	ZN9646	3.74	2.47	1.12	7.33	5.74	13.07	15.38	97
ABI	ZN9541	3.72	2.42	1.21	7.35	5.65	13.00	15.29	97
ABI	ZN9540	3.54	2.43	1.24	7.20	5.64	12.84	15.11	95
ABI	ZC9641	2.98	2.14	1.06	6.20	5.09	11.29	13.28	84
Summary Statistics									
Average		3.52	2.48	1.54	7.55	5.92	13.47	15.85	100
LSD(0.05)		0.36	0.22	0.21	0.52	0.33	0.73	0.86	5
LSD(0.20)		0.28	0.17	0.16	0.40	0.26	0.48	0.56	4
CV(%)		8.66	7.40	11.41	5.77	4.71	3.84	3.84	4
MCV(%)		10.30	8.80	13.58	6.86	5.60	5.42	5.42	5

LOCATION: North Central Kansas
Site: North Central Kansas Exp. Field
County: Republic
Town: Belleville
Soil: Crete silt loam

ESTABLISHMENT:
9/6/97; RCBD, 4 reps
Plots 5'x15'; 3'x15' harvested
18 lb. seed/acre

1999 FERTILIZATION:
March, 1999; 36-92-0

1999 PEST CONTROL:
None

1999 CONDITIONS:
Cool, wet conditions slowed initial spring growth and delayed the first cutting by about 1 week. Insects caused little or no damage. Below-normal rainfall in August and September prevented adequate regrowth for a fourth cutting.

TABLE 3. LABETTE CO. ALFALFA PERFORMANCE TEST RESULTS, 1998-1999.

		Forage Yield tons/acre Dry Matter								
		1999							Total, 15% Moist.	98-99 Total, % of Mean
BRAND	NAME	5-10	7-6	8-3	10-22	Total	1998 Total	98-99 Total		
Released Cultivars										
Great Plains	Cimarron 3i	2.00	1.73	0.68	0.95	5.36	2.15	7.51	8.84	108
Germains	WL 324	1.72	1.69	0.67	0.88	4.95	2.25	7.20	8.47	104
NE AES & USDA	Perry	1.85	1.85	0.58	0.76	5.04	2.15	7.19	8.46	104
America's Alfalfa	Amerigraze 401+Z	1.83	1.76	0.64	0.84	5.06	2.12	7.18	8.45	103
Garst	631	1.79	1.62	0.69	0.81	4.91	2.21	7.12	8.38	103
Garst	6420	1.86	1.64	0.65	0.88	5.01	2.08	7.09	8.34	102
DeKalb	DK 141	1.65	1.78	0.55	0.82	4.79	2.25	7.04	8.28	101
Star	Stamina	1.83	1.77	0.56	0.89	5.05	1.98	7.03	8.27	101
Star	Sendero	1.63	1.68	0.56	0.97	4.84	2.19	7.03	8.27	101
MBS	ProGro	1.70	1.62	0.63	0.89	4.83	2.19	7.02	8.26	101
America's Alfalfa	Emperor	1.72	1.64	0.69	0.76	4.80	2.19	6.99	8.22	101
DeKalb	DK 142	1.68	1.64	0.68	0.86	4.85	2.11	6.96	8.19	100
Germains	WL 326 GZ	1.72	1.55	0.62	0.88	4.76	2.17	6.93	8.15	100
Pioneer	54H55	1.64	1.57	0.59	0.92	4.72	2.18	6.90	8.12	99
KS AES & USDA	Kanza	1.66	1.38	0.69	0.93	4.66	2.19	6.85	8.06	99
MBS	Gold Plus	1.59	1.61	0.59	0.83	4.61	2.09	6.70	7.88	97
Star	Spur	1.63	1.67	0.60	0.82	4.72	1.97	6.69	7.87	96
Germains	WL 325 HQ	1.65	1.45	0.51	0.78	4.38	2.03	6.41	7.54	92
Experimental Strains										
ABI	ZC9751A	1.65	1.68	0.74	0.85	4.92	2.12	7.04	8.28	101
Cal/West	CW 74013	1.69	1.69	0.66	0.80	4.83	2.20	7.03	8.27	101
America's Alfalfa	ZC9650	1.65	1.63	0.68	0.83	4.80	2.10	6.90	8.12	99
Cal/West	CW 74031	1.81	1.52	0.67	0.78	4.78	2.12	6.90	8.12	99
Cal/West	CW 5426	1.68	1.69	0.72	0.76	4.85	2.04	6.89	8.11	99
AgriPro	ZC9651	1.65	1.64	0.62	0.87	4.77	2.07	6.84	8.05	99
Cal/West	CW 74034	1.67	1.59	0.70	0.88	4.83	2.00	6.83	8.04	98
Cal/West	CW 6408	1.65	1.70	0.67	0.71	4.72	2.04	6.76	7.95	97
ABI	ZC9750A	1.60	1.56	0.70	0.87	4.72	2.03	6.75	7.94	97
Cal/West	CW 75044	1.55	1.59	0.65	0.84	4.63	2.00	6.63	7.80	96
Summary Statistics										
Average		1.70	1.64	0.64	0.84	4.83	2.11	6.94	8.16	100
LSD(0.05)		0.14	NS	0.09	0.09	0.29	0.14	0.39	0.46	6
LSD(0.20)		0.11	NS	0.07	0.07	0.23	0.11	0.25	0.29	4
CV(%)		7.16	11.59	11.99	9.18	5.12	5.73	3.96	3.96	4
MCV(%)		8.43	NS	14.10	10.79	6.02	6.74	5.62	5.62	6

LOCATION: Southeast Kansas
Site: Southeast Ag. Research Center
County: Labette
Town: Mound Valley
Soil: Parsons silty clay loam

ESTABLISHMENT:
4/14/98; RCBD, 4 reps
Plots 5'x30'; 3'x20' harvested
15 lb. seed/acre

1999 FERTILIZATION:
April 1, 1999; 20-50-200

1999 PEST CONTROL:
Sprayed April 20 with 1.5 pt/a of Lorsban to control weevils.

1999 CONDITIONS:
The first, third, and fourth harvests were cut at roughly 1/10 bloom. Excessive rainfall in April, May, and June saturated the soil and prevented a timely second harvest. Rainfall for July and August was substantially below normal, lowering third- and fourth-cutting yields.

TABLE 4. RENO CO. ALFALFA PERFORMANCE TEST RESULTS, 1997-1999.

		Plant Height inches		Forage Yield tons/acre Dry Matter 1999									
BRAND	NAME	5-24	8-16	5-24	6-17	7-19	8-16	Total	1998 Total	1997 Total	97-99 Total	Total, 15% Moist.	97-99 Total, % of Mean
Released Cultivars													
Great Plains	Key	25	14	2.97	1.31	1.56	0.91	6.75	5.04	4.97	16.76	19.72	107
Casterline	ProGro 424	22	15	3.04	1.18	1.65	1.08	6.94	4.83	4.98	16.75	19.71	107
Star	Asset	23	14	2.89	1.15	1.61	1.03	6.69	5.10	4.87	16.66	19.60	106
Germains	WL 324	22	13	2.73	1.12	1.60	0.92	6.37	4.95	5.04	16.36	19.25	104
Garst	645	22	14	2.82	1.07	1.57	0.94	6.40	4.81	4.97	16.18	19.04	103
Mycogen	TMF Generation	23	13	2.67	1.00	1.56	0.98	6.21	4.83	5.13	16.17	19.02	103
America's Alfalfa	Affinity+Z	22	13	2.87	1.11	1.51	0.96	6.46	4.82	4.80	16.08	18.92	102
Great Plains	Haygrazer	23	15	2.89	1.12	1.52	0.87	6.38	4.83	4.80	16.01	18.84	102
Mycogen	TMF Multiplier II	23	13	2.62	1.13	1.51	0.94	6.21	4.92	4.81	15.94	18.75	101
Dairyland Seeds	Magnum IV	21	15	2.79	1.07	1.49	0.93	6.29	4.79	4.80	15.88	18.68	101
Star	Spur	24	14	2.67	0.96	1.27	0.91	5.82	4.90	5.12	15.84	18.64	101
AgriPro	Depend+EV	21	14	2.67	1.11	1.53	1.02	6.33	4.77	4.72	15.82	18.61	101
DeKalb	DK 127	23	13	2.57	1.10	1.53	0.96	6.15	4.84	4.78	15.77	18.55	100
Germains	WL 325 HQ	21	17	2.31	1.15	1.56	1.02	6.04	4.86	4.83	15.73	18.51	100
America's Alfalfa	Archer	23	16	2.64	1.12	1.55	0.97	6.28	4.72	4.69	15.69	18.46	100
Star	A-100	23	15	2.58	1.13	1.59	0.86	6.16	4.62	4.87	15.65	18.41	100
NE AES & USDA	Perry	22	15	2.90	0.99	1.45	0.92	6.27	4.58	4.58	15.43	18.15	98
W-L Research	WL 252 HQ	22	14	2.62	1.08	1.45	0.92	6.07	4.62	4.65	15.34	18.05	98
Sharp	Shamrock	25	13	2.74	1.05	1.40	0.86	6.06	4.69	4.57	15.32	18.02	98
Star	Excalibur II	22	15	2.58	1.02	1.45	0.84	5.90	4.74	4.67	15.31	18.01	97
Sharp	AlfaLeaf II	25	14	2.62	1.12	1.44	0.86	6.05	4.64	4.60	15.29	17.99	97
KS AES & USDA	Riley	23	15	2.67	0.98	1.46	0.97	6.08	4.51	4.68	15.27	17.96	97
Star	Stamina	22	14	2.60	1.09	1.37	0.89	5.94	4.66	4.48	15.08	17.74	96
W-L Research	WL 414	21	15	2.37	1.10	1.47	1.04	5.97	4.31	4.73	15.01	17.66	96
W-L Research	Ace	21	15	2.40	1.10	1.54	0.91	5.96	4.64	4.26	14.86	17.48	95
KS AES & USDA	Kanza	25	15	2.47	1.10	1.48	1.05	6.11	4.34	4.35	14.80	17.41	94
Experimental Strains													
Cal/West	CW 5440	21	15	2.71	1.06	1.56	1.05	6.39	4.89	4.71	15.99	18.81	102
Cal/West	CW 4429	22	14	2.54	1.12	1.51	0.95	6.13	4.74	4.62	15.49	18.22	99
Cal/West	CW 5406	21	14	2.48	1.08	1.50	1.00	6.06	4.78	4.63	15.47	18.20	98
Summary Statistics													
Average		23	14	2.67	1.09	1.51	0.95	6.22	4.75	4.74	15.71	18.48	100
LSD(0.05)		1	1	0.23	NS	0.11	0.10	0.38	0.34	0.35	0.67	0.79	4
LSD(0.20)		1	1	0.18	NS	0.09	0.08	0.30	0.22	0.23	0.44	0.52	3
CV(%)		5	8	7.41	10.86	6.19	8.65	5.22	5.03	5.25	3.02	3.02	3
MCV(%)		6	9	8.72	NS	7.27	10.17	6.14	7.16	7.38	4.26	4.26	4

LOCATION: South Central Kansas
Site: South Central Experiment Field
County: Reno
Town: Hutchinson
Soil: Ost silt loam

ESTABLISHMENT:
9/1/96; RCBD, 4 reps
Plots 5'x20', 3'x20' harvested
18 lb. seed/acre

1999 FERTILIZATION:
None

1999 PEST CONTROL:
Furadan applied for control of alfalfa weevil.

1999 CONDITIONS:
April rainfall was above normal, but temperatures were below normal. May rainfall was lower but was distributed evenly throughout the month. Relatively cool temperatures and adequate rainfall continued through July, allowing for good regrowth. High temperatures and low rainfall in August limited growth of the fourth cutting.

TABLE 5. FINNEY CO. IRRIGATED ALFALFA PERFORMANCE TEST RESULTS, 1997-1999.

		Forage Yield tons/acre Dry Matter									
		1999									
BRAND	NAME	6-2	7-8	8-10	9-9	Total	1998 Total	1997 Total	97-99 Total	Total, 15% Moist.	97-99 Total, % of Mean
Released Cultivars											
Germains	WL 324	4.76	2.00	2.38	1.87	11.00	11.02	9.46	31.48	37.04	103
Casterline	ProGro 424	4.89	1.97	2.37	1.95	11.17	11.20	9.08	31.45	37.00	103
Sharp	Enhancer	4.93	2.01	2.42	1.96	11.30	11.02	9.02	31.34	36.87	103
Garst	630	4.86	2.08	2.38	1.91	11.21	11.16	8.81	31.18	36.68	102
Golden Harvest	GH 755	5.03	1.85	2.32	1.83	11.02	11.07	8.99	31.08	36.56	102
Germains	WL 325 HQ	4.70	1.95	2.29	1.80	10.74	11.12	9.21	31.07	36.55	102
Mycogen	TMF Multiplier II	4.72	1.86	2.23	1.88	10.69	11.05	9.29	31.03	36.51	102
Cargill	Big Horn	4.83	1.98	2.39	1.87	11.06	10.79	9.15	31.00	36.47	102
W-L Research	WL 414	4.28	1.83	2.30	1.91	10.31	10.98	9.62	30.91	36.36	101
Star	Stamina	4.68	1.88	2.15	1.80	10.51	10.99	9.34	30.84	36.28	101
DeKalb	DK 127	4.80	1.91	2.30	1.74	10.75	10.73	9.12	30.60	36.00	100
KS AES & USDA	Riley	4.51	1.89	2.32	1.82	10.53	10.83	9.21	30.57	35.96	100
Garst	645	4.75	1.90	2.22	1.83	10.69	10.54	9.22	30.45	35.82	100
Star	Spur	4.62	1.77	2.16	1.76	10.30	10.78	9.14	30.22	35.55	99
NE AES & USDA	Perry	4.80	1.88	2.20	1.78	10.65	10.69	8.80	30.14	35.46	99
Sharp	AlfaLeaf II	4.67	1.73	2.09	1.75	10.25	10.64	9.22	30.11	35.42	99
W-L Research	WL 323	4.32	1.83	2.26	1.80	10.21	10.72	9.14	30.07	35.38	99
Dairyland Seeds	Magnum III	4.56	1.91	2.23	1.85	10.55	10.78	8.71	30.04	35.34	98
W-L Research	Ace	4.35	1.83	2.30	1.87	10.34	10.64	8.93	29.91	35.19	98
Golden Harvest	GH 766	4.47	1.81	2.19	1.76	10.22	10.82	8.78	29.82	35.08	98
Sharp	Sure	4.49	1.79	2.20	1.76	10.24	10.54	8.68	29.46	34.66	97
KS AES & USDA	Kanza	4.18	1.92	2.36	1.91	10.36	10.96	8.13	29.45	34.65	97
Star	A-100	4.10	1.66	2.13	1.77	9.65	10.58	9.17	29.40	34.59	96
DeKalb	DK 133	4.66	1.85	2.15	1.67	10.32	10.25	8.68	29.25	34.41	96
Star	Asset	4.15	1.63	2.16	1.73	9.67	10.59	8.69	28.95	34.06	95
Star	Excalibur II	4.41	1.63	2.08	1.75	9.87	10.36	8.59	28.82	33.91	94
Sharp	Shamrock	4.05	1.50	1.98	1.53	9.05	10.03	9.02	28.10	33.06	92
Experimental Strains											
DSS	DSS 5211X	5.09	2.00	2.41	2.04	11.53	11.81	9.71	33.05	38.88	108
Cal/West	CW 5440	4.88	2.11	2.44	2.01	11.43	11.10	9.55	32.08	37.74	105
Cal/West	CW 5406	4.75	2.03	2.34	1.95	11.07	11.11	9.89	32.07	37.73	105
Cal/West	CW 4598	4.25	1.95	2.41	1.93	10.54	11.12	9.56	31.22	36.73	102
Cal/West	CW 4429	4.78	1.94	2.30	1.92	10.94	10.62	9.37	30.93	36.39	101
DSS	DSS 5106X	4.62	2.03	2.37	1.97	10.99	10.73	9.01	30.73	36.15	101
Summary Statistics											
Average		4.60	1.87	2.27	1.84	10.58	10.83	9.10	30.51	35.89	100
LSD(0.05)		0.33	0.10	0.12	0.09	0.48	0.50	0.27	0.88	1.04	3
LSD(0.20)		0.25	0.08	0.10	0.07	0.38	0.39	0.17	0.57	0.67	2
CV(%)		6.02	4.69	4.57	4.09	3.87	3.90	2.09	2.04	2.04	2
MCV(%)		7.07	5.51	5.37	4.81	4.55	4.58	2.95	2.88	2.88	3

LOCATION: Southwest Kansas
Site: Southwest Res.-Ext. Center
County: Finney
Town: Garden City
Soil: Keith silt loam

ESTABLISHMENT:
8/29/96; RCBD, 4 reps
Plots 3'x20'; 3'x20' harvested
32 lb. seed/acre

1999 FERTILIZATION:
22-104-0 applied at planting

1999 PEST CONTROL:
None

1999 CONDITIONS:
The test was flood irrigated as needed. Rainfall was well spaced and abundant and favored high yields. A hailstorm on July 1 reduced second-cutting yields.

Appendix: Entrants and entries in 1999 Kansas Alfalfa Performance Tests with unverified fall dormancy and disease and insect resistance ratings

ABI

515-292-2432

ABI Alfalfa
2316 259th St.
Ames, IA 50014

	1	2	3	4	5	6	7	8	9	10	11	12	13
ZC9641	-	-	-	-	-	-	-	-	-	-	-	-	-
ZC9750A	-	-	-	-	-	-	-	-	-	-	-	-	-
ZC9751A	-	-	-	-	-	-	-	-	-	-	-	-	-
ZC9840A	-	-	-	-	-	-	-	-	-	-	-	-	-
ZC9841A	-	-	-	-	-	-	-	-	-	-	-	-	-
ZC9842A	-	-	-	-	-	-	-	-	-	-	-	-	-
ZC9851A	-	-	-	-	-	-	-	-	-	-	-	-	-
ZG9840	-	-	-	-	-	-	-	-	-	-	-	-	-
ZH9841H	-	-	-	-	-	-	-	-	-	-	-	-	-
ZH9844H	-	-	-	-	-	-	-	-	-	-	-	-	-
ZN9540	-	-	-	-	-	-	-	-	-	-	-	-	-
ZN9541	-	-	-	-	-	-	-	-	-	-	-	-	-
ZN9646	-	-	-	-	-	-	-	-	-	-	-	-	-

AgriPro

800-334-4730

AgriPro Seed
PO Box 2962
Shawnee Mission, KS 66201-1302

	1	2	3	4	5	6	7	8	9	10	11	12	13
Dagger+EV	5	H	H	H	H	H	M	H	M	R	-	-	L
Defense+EV	3	H	H	H	H	H	-	R	-	-	H	-	-
Depend+EV	4	H	H	H	H	H	M	R	S	M	R	-	-
Dominator	4	H	R	H	H	H	-	R	-	M	R	-	-
Feast+EV	3	H	H	H	R	H	-	M	-	-	H	-	-
ZC9651	-	-	-	-	-	-	-	-	-	-	-	-	-

America's Alfalfa

913-384-4940

America's Alfalfa
P.O. Box 2955
6700 Antioch
Shawnee Mission, KS 66201

	1	2	3	4	5	6	7	8	9	10	11	12	13
Abilene+Z	-	-	-	-	-	-	-	-	-	-	-	-	-
Affinity+Z	4	H	H	H	H	H	-	R	-	R	R	-	-
Amerigraze 401+Z	4	H	H	H	H	H	-	R	-	R	R	-	-
Ameriguard 302+Z	3	H	H	H	H	H	-	R	-	R	H	-	-
Archer	5	M	M	H	R	R	H	H	R	R	-	-	R
Emperor	4	H	H	H	H	H	M	R	-	-	H	-	-
ZC9650	-	-	-	-	-	-	-	-	-	-	-	-	-

Cal/West

608-786-1554

Cal/West Seeds
R.R. 1, Box 70
West Salem, WI 54669

	1	2	3	4	5	6	7	8	9	10	11	12	13
CW 4429	-	-	-	-	-	-	-	-	-	-	-	-	-
CW 4598	-	-	-	-	-	-	-	-	-	-	-	-	-
CW 5406	-	-	-	-	-	-	-	-	-	-	-	-	-
CW 5426	4	-	-	-	-	-	-	-	-	-	-	-	-
CW 5440	-	-	-	-	-	-	-	-	-	-	-	-	-
CW 6408	4	-	-	-	-	-	-	-	-	-	-	-	-
CW 74013	4	-	-	-	-	-	-	-	-	-	-	-	-
CW 74031	4	-	-	-	-	-	-	-	-	-	-	-	-
CW 74034	4	-	-	-	-	-	-	-	-	-	-	-	-
CW 75044	5	-	-	-	-	-	-	-	-	-	-	-	-

Variety characterization codes:

1 = Fall dormancy rating
2 = Bacterial wilt
3 = Verticillium wilt
4 = Fusarium wilt
5 = Anthracnose race 1
6 = Phytophthora root rot
7 = Spotted alfalfa aphid
8 = Pea aphid
9 = Blue alfalfa aphid
10 = Stem nematode
11 = Aphanomyces root rot race 1
12 = Southern root knot nematode
13 = Northern root knot nematode

Fall dormancy ratings:

Check variety	Rating
Norseman	1
Vernal	2
Ranger	3
Saranac	4
Archer	5
ABI 700	6
Dona Ana	7
Maricopa	8
CUF 101	9
UC 1887	10

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	

Fall dormancy and disease and insect resistance ratings are from Alfalfa Varieties, a publication of the Certified Alfalfa Seed Council, or from developers of the varieties. Blank spaces indicate that the variety has not been tested adequately.

(continued)

Appendix: Entrants and entries in 1999 Kansas Alfalfa Performance Tests with unverified fall dormancy and disease and insect resistance ratings

Cargill

612-742-6731

Cargill Hybrid Seeds
P.O. Box 5645
Minneapolis, MN 55440

	1	2	3	4	5	6	7	8	9	10	11	12	13
Big Horn	4	H	R	H	H	H	R	R	H	R	H	-	-

Casterline

800-444-4137

Casterline Seeds, Inc.
Box 1377
1st & Maple
Dodge City, KS 67801

	1	2	3	4	5	6	7	8	9	10	11	12	13
ProGro 424	4	H	R	H	R	H	R	R	M	-	M	-	-

Dairyland Seeds

800-236-0163

Dairyland Seed Co.
P.O. Box 958
West Bend, WI 53095

	1	2	3	4	5	6	7	8	9	10	11	12	13
Magnum III	4	R	M	R	M	R	M	R	M	M	L	-	-
Magnum IV	4	H	R	H	R	H	M	-	M	R	M	-	M

DeKalb

815-758-9323

Monsanto
3100 Sycamore Rd.
DeKalb, IL 60115

	1	2	3	4	5	6	7	8	9	10	11	12	13
DK 127	3	H	R	R	H	H	H	H	M	R	H	-	R
DK 131HG	3	H	H	H	H	H	R	R	L	M	R	-	R
DK 133	4	H	R	H	H	H	R	R	-	M	R	-	-
DK 141	4	H	H	H	H	H	R	R	-	M	H	-	-
DK 142	4	H	R	H	R	H	R	H	-	R	H	-	-

DSS

316-275-2359

Drussel Seed and Supply
2197 W. Parallel Road
Garden City, KS 67846

	1	2	3	4	5	6	7	8	9	10	11	12	13
DSS 5106X	-	-	-	-	-	-	-	-	-	-	-	-	-
DSS 5211X	-	-	-	-	-	-	-	-	-	-	-	-	-

Garst

800-831-6630

Garst Seed Co.
2369 330th St.
Slater, IA 50244

	1	2	3	4	5	6	7	8	9	10	11	12	13
630	4	H	M	R	M	R	M	R	M	M	-	-	-
631	4	H	R	H	R	H	R	H	M	R	M	-	-
6420	4	H	R	H	-	H	R	R	-	R	R	-	H
645	3	H	R	R	H	H	M	R	-	M	M	-	-
645II	3	H	H	H	H	H	M	R	-	M	H	-	-

Germains

785-674-2062

Germain's Seed Co.
P.O. Box 373
Hill City, KS 67642

	1	2	3	4	5	6	7	8	9	10	11	12	13
WL 324	3	H	R	H	H	H	R	H	-	M	H	-	-
WL 325 HQ	3	H	R	H	H	H	R	R	M	R	R	-	-
WL 326 GZ	4	H	H	H	H	H	R	R	-	R	H	-	-

Variety characterization codes:

1 = Fall dormancy rating
2 = Bacterial wilt
3 = Verticillium wilt
4 = Fusarium wilt
5 = Anthracnose race 1
6 = Phytophthora root rot
7 = Spotted alfalfa aphid
8 = Pea aphid
9 = Blue alfalfa aphid
10 = Stem nematode
11 = Aphanomyces root rot race 1
12 = Southern root knot nematode
13 = Northern root knot nematode

Fall dormancy ratings:

Check variety	Rating
Norseman	1
Vernal	2
Ranger	3
Saranac	4
Archer	5
ABI 700	6
Dona Ana	7
Maricopa	8
CUF 101	9
UC 1887	10

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	

Fall dormancy and disease and insect resistance ratings are from Alfalfa Varieties, a publication of the Certified Alfalfa Seed Council, or from developers of the varieties. Blank spaces indicate that the variety has not been tested adequately.

(continued)

Appendix: Entrants and entries in 1999 Kansas Alfalfa Performance Tests with unverified fall dormancy and disease and insect resistance ratings

Golden Harvest

800-228-9906

J.C. Robinson Seed Co.
100 J.C. Robinson Blvd.
P.O. Box A
Waterloo, NE 68069

	1	2	3	4	5	6	7	8	9	10	11	12	13
GH 755	4	H	R	H	H	H	R	R	R	R	R	-	-
GH 766	3	H	R	H	H	H	R	R	-	R	R	-	-

Great Plains

919-362-1583

Great Plains Research Co.,Inc.
3624 Kildaire Farm Rd.
Apex, NC 27502

	1	2	3	4	5	6	7	8	9	10	11	12	13
Cimarron 3i	4	H	R	H	H	R	R	R	-	R	M	R	-
Haygrazer	4	H	R	H	R	R	R	R	-	R	M	M	-
Key	4	H	H	H	H	H	H	H	M	M	M	M	-

KS AES & USDA

785-532-6115

KSU - Foundation Seed
2200 Kimball Ave.
Manhattan, KS 66502

	1	2	3	4	5	6	7	8	9	10	11	12	13
Kanza	-	-	-	-	-	-	-	-	-	-	-	-	-
KS224	-	-	-	-	-	-	-	-	-	-	-	-	-
Riley	4	H	L	-	M	-	H	H	-	-	-	-	-

MBS

515-733-5274

MBS, Inc.
225 West 1st St.
Story City, IA 50248-1657

	1	2	3	4	5	6	7	8	9	10	11	12	13
Gold Plus	4	H	R	H	H	H	H	H	-	H	R	-	-
ProGro	4	H	R	H	R	H	R	R	M	-	M	-	-

Mycogen

800-380-7282

Mycogen Seeds
1340 Corp Ctr Crv
PO Box 21428
Eagan, MN 55121-1233

	1	2	3	4	5	6	7	8	9	10	11	12	13
TMF Generation	4	H	H	H	H	H	-	R	-	-	R	-	-
TMF Multiplier II	-	-	-	-	-	-	-	-	-	-	-	-	-

NC+

402-467-2517

NC+ Hybrids
P.O. Box 4408
1300 N. 79th
Lincoln, NE 68504

	1	2	3	4	5	6	7	8	9	10	11	12	13
Jade II	4	H	R	H	R	H	R	R	M	-	M	-	M

NE AES & USDA

402-472-4290

Foundation Seed Division
University of Nebraska-Lincoln
3115 North 70th
Lincoln, NE 68507-2104

	1	2	3	4	5	6	7	8	9	10	11	12	13
Perry	3	R	-	-	L	-	M	R	-	-	-	-	-
Ranger	-	-	-	-	-	-	-	-	-	-	-	-	-

NetSeeds

515-331-0939

NetSeeds
9001 Hickman Rd. Suite 320
Urbandale, IA 50322

	1	2	3	4	5	6	7	8	9	10	11	12	13
NetYield500	4	H	R	H	R	H	R	R	-	R	M	-	-

Variety characterization codes:

1 = Fall dormancy rating
2 = Bacterial wilt
3 = Verticillium wilt
4 = Fusarium wilt
5 = Anthracnose race 1
6 = Phytophthora root rot
7 = Spotted alfalfa aphid
8 = Pea aphid
9 = Blue alfalfa aphid
10 = Stem nematode
11 = Aphanomyces root rot race 1
12 = Southern root knot nematode
13 = Northern root knot nematode

Fall dormancy ratings:

Check variety	Rating
Norseman	1
Vernal	2
Ranger	3
Saranac	4
Archer	5
ABI 700	6
Dona Ana	7
Maricopa	8
CUF 101	9
UC 1887	10

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	

Fall dormancy and disease and insect resistance ratings are from Alfalfa Varieties, a publication of the Certified Alfalfa Seed Council, or from developers of the varieties. Blank spaces indicate that the variety has not been tested adequately.

(continued)

Appendix: Entrants and entries in 1999 Kansas Alfalfa Performance Tests with unverified fall dormancy and disease and insect resistance ratings

Novartis

612-593-7395

Novartis Seeds, Inc.
7500 Olson Memorial Hwy
Golden Valley, MN 55427

	1	2	3	4	5	6	7	8	9	10	11	12	13
Geneva	4	H	H	H	H	H	R	H	L	R	H	-	-

Pioneer

515-270-3342

Pioneer Hi-Bred Intl., Inc.
Box 287
7305 NW 62nd
Johnston, IA 50131

	1	2	3	4	5	6	7	8	9	10	11	12	13
5454	4	R	M	H	H	H	R	R	S	M	L	-	-
54H55	-	-	-	-	-	-	-	-	-	-	-	-	-
54H69	-	-	-	-	-	-	-	-	-	-	-	-	-

Sharp

316-398-2231

Sharp Bros. Seed Company
Box 140
Healy, KS 67850

	1	2	3	4	5	6	7	8	9	10	11	12	13
AlfaLeaf II	4	R	R	H	H	H	R	H	-	R	R	-	-
Enhancer	4	H	R	H	R	H	R	-	-	-	M	-	-
Shamrock	-	-	-	-	-	-	-	-	-	-	-	-	-
Sure	-	-	-	-	-	-	-	-	-	-	-	-	-

Star

785-346-5447

Star Seed
101 Industrial Ave.
Osborne, KS 67473

	1	2	3	4	5	6	7	8	9	10	11	12	13
A-100	-	-	-	-	-	-	-	-	-	-	-	-	-
Asset	4	H	R	R	R	H	R	R	-	-	M	-	-
Excalibur II	-	-	-	-	-	-	-	-	-	-	-	-	-
Sendero	-	-	-	-	-	-	-	-	-	-	-	-	-
Spur	4	H	R	H	H	H	R	H	-	M	R	-	M
Stamina	4	H	R	H	H	H	H	H	-	H	R	-	H

W-L Research

608-882-4100

W-L Research, Inc.
8701 Hwy. 14
Evansville, WI 53536-8752

	1	2	3	4	5	6	7	8	9	10	11	12	13
ABT 400SCL	4	H	H	-	H	H	R	H	-	M	H	-	M
Ace	4	H	R	H	H	H	M	R	R	H	R	-	-
W326	5	H	R	H	H	H	R	R	-	-	R	-	-
WL 252 HQ	2	H	R	H	H	H	M	R	L	R	L	-	-
WL 323	4	H	R	H	H	H	M	R	-	H	R	-	-
WL 414	6	R	R	H	R	H	H	H	H	R	-	R	-

Variety characterization codes:

1 = Fall dormancy rating
2 = Bacterial wilt
3 = Verticillium wilt
4 = Fusarium wilt
5 = Anthracnose race 1
6 = Phytophthora root rot
7 = Spotted alfalfa aphid
8 = Pea aphid
9 = Blue alfalfa aphid
10 = Stem nematode
11 = Aphanomyces root rot race 1
12 = Southern root knot nematode
13 = Northern root knot nematode

Fall dormancy ratings:

Check variety	Rating
Norseman	1
Vernal	2
Ranger	3
Saranac	4
Archer	5
ABI 700	6
Dona Ana	7
Maricopa	8
CUF 101	9
UC 1887	10

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	

Fall dormancy and disease and insect resistance ratings are from Alfalfa Varieties, a publication of the Certified Alfalfa Seed Council, or from developers of the varieties. Blank spaces indicate that the variety has not been tested adequately.

ELECTRONIC ACCESS

For those interested in accessing crop performance testing information electronically, try visiting our World Wide Web site. Most of the information contained in this publication is available for viewing or downloading. The URL is http://www.ksu.edu/kscpt.

Excerpts from the

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Permission is hereby given to Kansas State University 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 825 '1998 Kansas Performance Tests with Soybean Varieties', or the Kansas Crop Performance Test website, http://www.ksu.edu/kscpt, for details. Endorsement or recommendation by Kansas State University is not implied."

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NOTE: Trade names are used to identify products. No endorsement is intended, nor is any criticism implied of similar products not named.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan 66506

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