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## 1975 Grain Sorghum Performance Trials

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**1975**  
**Grain Sorghum**  
**Performance Trials**

Experiment Station Circular 214

January 1976

Plant Science Department  
Agricultural Experiment Station  
South Dakota State University  
Brookings

## 1975 Grain Sorghum Performance Trials

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The relative performance of grain sorghum hybrids grown under similar environmental conditions is evaluated in this report for the 1975 season. Performance records of the hybrids harvested in 1975 and available two-, three-, four-, and five-year averages are presented. The trials were conducted under the supervision of the Crop Performance Testing Activity, Agricultural Experiment Station, South Dakota State University.

### Location of the 1975 Trials

For adequate performance evaluation, the various entries must be grown under similar environmental conditions. Crop adaptation areas in which the trials are conducted are based upon soil type, elevations, temperature, rainfall and other physical differences. The exact location of the trials and dates of seeding and harvesting are included in Table 1. Data from soil samples taken at the various sites at time of seeding and cultural practices are shown in Table 2.

### Weather and Climatic Conditions

Climatic data for the 1975 grain sorghum year, May-September, are based upon U.S. Monthly Climatological Data. Weather information from the immediate Geddes and Letcher sites is not available. At Geddes it was hot and dry most of the summer. The Geddes trial yields were so variable that results are not valid and thus omitted from this report. The trial site at Letcher received several timely showers during July to offset the demands of the hot weather and drying winds.

Rainfall during May was adequate, but did not delay seeding to any degree and germination was uniform at most locations, except Brookings. The residual effects of a chemical used on a previous crop seriously reduced the stand and caused widespread variability in the trial seeded at Brookings. The lack of precipitation in 1974 had not caused the chemical to leach through the upper levels of the soil profile. The Brookings trial was abandoned in late June.

Drought prevented or delayed heading at normally expected times in most trials. Some sites received favorable amounts of precipitation in August and the plants began to grow again. This delayed the maturity of the plants. The favorable fall permitted many fields to reach maturity and produce some yields, especially in southeastern South Dakota.

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Table 1. Location of Trials and Dates of Seeding and Harvesting of Grain Sorghum Performance Trials, South Dakota, 1975

County	Location and post office	Date Seeded	Date Harvested	Row Spacing
Aurora	Oscar Thompson Farm, Letcher	May 22	Sept. 20	36"
Brookings	Plant Science Farm, Brookings	May 27	destroyed	30"
Charles Mix	William Fijala, Geddes	May 13	Sept. 23	40"
Clay	Southeast Experiment Farm, Beresford	May 14	Oct. 2	36"
Hyde	Central Research Station, Highmore	May 21	Sept. 17	36"
Lyman	Harlan Halverson Farm, Kennebec	May 28	Sept. 22	40"
Spink	James Valley Research Center, Redfield	May 21	Oct. 1	36"

Drought injury was increased because of long periods of high temperatures of 90 degrees or more in July and August (Table 3). Some plants, especially at Geddes and Highmore, failed to head when precipitation was limited and stresses became very severe. If heads did emerge, pollination and seed set were poor and the variability quite high within plots and between replications of the same entry. Sparrow damage also occurred at some locations, especially Highmore.

The first frost did not occur over much of the sorghum area of the state until late September or early October. Even then, the temperatures were not low enough to injure the stalk and translocation continued to allow the head to fill until a killing freeze in mid-October. Lodging was not serious at any location, except Geddes.

The delays caused by periods of hot, dry weather took their toll on the quality of the grain at several locations. Test weights were quite widespread at Highmore and the Southeast Experiment Farm.

#### Hybrid Entry Procedure

Grain sorghums offered for sale in South Dakota or being produced for distribution in 1976 were eligible for entry. A closed-pedigree hybrid was entered by the permanent name and number under which it was sold by the parent company only.

Table 2. Soil Classification and Laboratory Analysis of Soil Samples Taken Prior to Seeding, and Field Preparation for the Crop Year

County and crop adaptation area	Soil classification	Laboratory analysis				Field preparation			
		Org. mat. %	P lb/A	K	pH	Method	#/A N P K		
Hyde, B2	Glenham L	1.8	59	740	6.7	plowed, disced	40-20-0		
Lyman, B3	Pierre C	3.5	16	1000+	7.6	field cult, disced & harrow			
Aurora, C1	Hou.ProspersiC1	2.6	108	710	6.0	disced & harrowed, 70# An NH <sub>3</sub>			
Spink, C1 (irr.)	Beotia SiC1	3.3	68	880	7.1	disc, field cult, harrow 40# N			
Charles Mix, C2	Highmore SiC1	3.1	21	1000+	6.5	plowed, disc & harrow			
Clay, E	Egan SiC1	3.6	74	1000+	6.2	plowed, disced	80-40-0		

Table 3. Temperature and Precipitation Data for the 1975 Grain Sorghum Growing Season in South Dakota

Location and District	Month	Temperature, degrees F				Precipitation, inches		
		Mean Av.	Departure from normal	Av. departure	Days 90 <sup>o</sup> +	Month total	Departure from normal	Total departure
Centerville <sup>a</sup> 6 SE	May	60.6	-0.1		1	2.30	-1.18	
	June	60.6	-3.6		1	4.70	0.00	
	July	76.6	+1.3		21	0.31	-2.80	
	Aug.	71.4	-2.5		6	6.70	+3.66	
	Sept.	57.0	-6.7	-2.3	2	2.71	+0.05	-0.27
		First freeze		29 <sup>o</sup> - Oct. 1				
Highmore 1 NW	May	59.7	+3.2			2.00	-0.55	
	June	67.7	-1.9		3	3.94	-0.03	
	July	79.6	+6.7		24	1.30	-1.24	
	Aug.	74.4	+2.3		15	2.35	0.00	
	Sept.	59.7	-1.4	+2.5	1	0.49	-1.12	-2.94
		First freeze		30 <sup>o</sup> - Oct. 1				
Kennebec	May	60.4	+2.3			0.94	-1.75	
	June	69.9	+2.4		6	3.69	+0.16	
	July	80.4	+5.5		25	2.31	+0.26	
	Aug.	75.7	+1.8		18	3.19	+0.85	
	Sept.	62.0	-0.8	+2.6	2	0.86	-0.66	-1.14
		First freeze		28 <sup>o</sup> - Sept. 24				
Redfield 6E	May	58.8	b			2.29	b	
	June	66.7			2	M		
	July	76.6			22	T		
	Aug.	71.6			11	1.97		
	Sept.	63.0			3	0.61		
		First freeze		26 <sup>o</sup> - Oct. 1				

a - Based upon reports of Monthly Climatological Data National Weather Service.

b - Departures are figured from 30 years data. This station has not been in operation for that long a period.

All entries maintained minimum laboratory germination of 80% as required by South Dakota Certification Standards. A nominal fee was charged for each entry in each area, except for grain sorghum entries developed by State and Federal Experiment Stations and entered by the South Dakota Agricultural Experiment Station.

#### Experimental Procedure

Each trial consisted of four or five replications. Plots of individual entries were randomly located within each replication. All trials were seeded two rows at a time, with 31-cell cone-planters mounted above flexi-planter units. A recommended herbicide for control of grassy weeds and an insecticide for greenbug

control were banded over the row at time of seeding. The various row spacings used are indicated in Table 1. The plots were two rows wide; plot lengths were dependent upon the area available at the various locations.

The harvested grain was taken from two 10-foot sections of each row in each individual plot. The heads were bagged as harvested, tagged and tied, returned to Brookings for drying and remained there for several weeks. Yields were calculated on the basis of pounds per acre (multiply by 1.121 for kg/ha). Depending upon location, either three or four replications were harvested for yield determination and one replication left for observational purposes.

Moisture determinations made at time of normal frost-free dates are generally more reliable and informative than determinations made at harvest time. Generally, these figures and test weight of the harvested grain indicate more realistically the maturity of the grain. Moisture percentages given for 1975 vary widely since stress during the season delayed growth and maturity of some entries.

Moisture samples were taken from all available observation plots at all locations during the period of September 17 and 18. Ten to twelve heads, adequate for a 400-500 gram grain sample were cut from each entry, placed in a polyethylene bag, tagged and sealed tightly. The samples were threshed and cleaned, and moisture percentages were determined with an electronic moisture meter. The upper limit of the meter is 35 percent. Material above this level is indicated as 35.+ in the tables and normally would indicate hybrids of late maturity for that area.

The extended periods of stress delayed heading and maturity of some hybrids. These conditions were most severe at Geddes and Highmore. The same situation existed at Centerville until precipitation fell in early August. The plants put forth 4-5 tillers per plant after the heavy rains. The late fall and absence of a killing frost permitted these plants to completely develop and produce some good yields on the tillers produced following the rains.

The trials at Redfield were irrigated. Water was applied by the gravity method. Four applications were made between July 9 and August 13 for a total of 12.5 inches of supplemental water.

#### Measurements of Performance

Variations in soil fertility, slope or stand may cause varieties of equal potential to yield differently. Mathematical determinations were made to determine if yield differences were caused by variations in environment or were true varietal differences. Small yield differences have no significance.

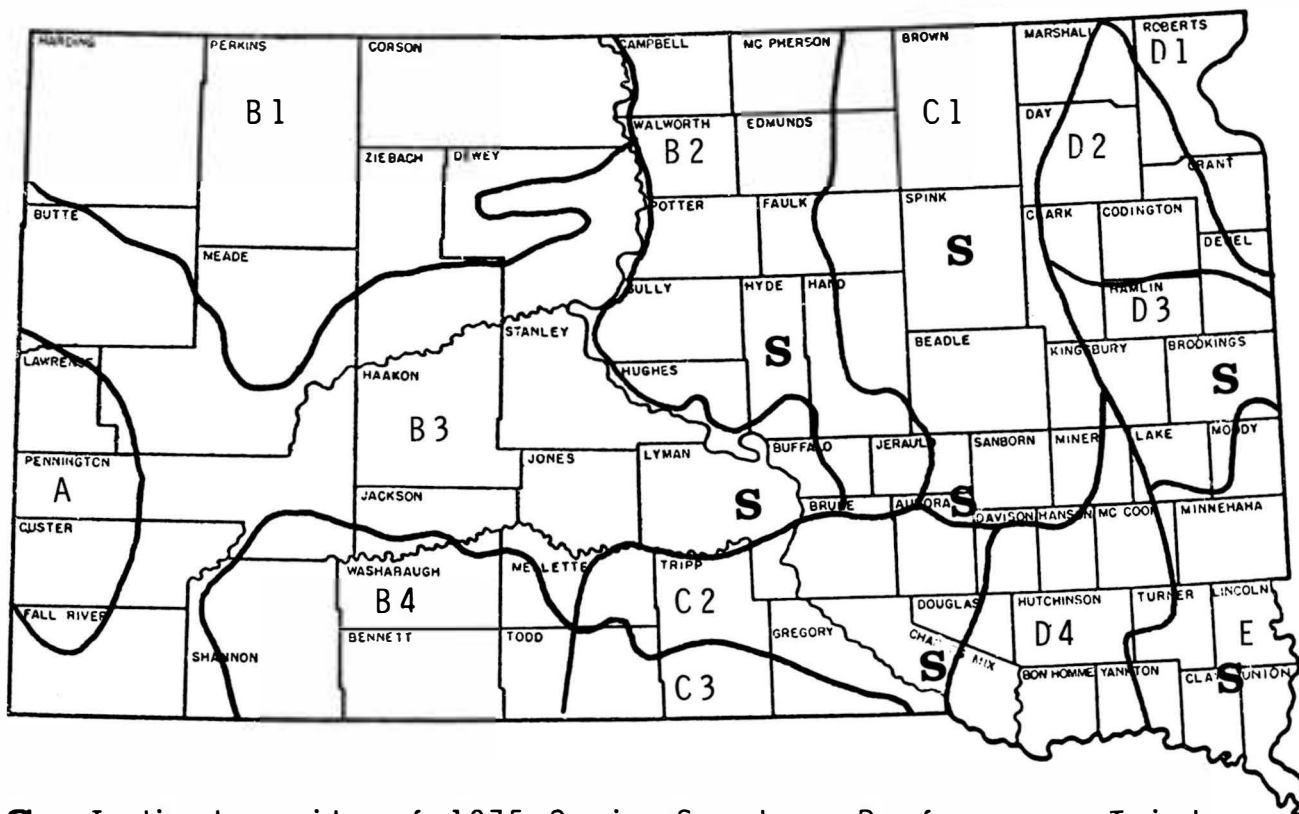
#### Discussion of Results

Grain sorghums are grown extensively in south central South Dakota and in varying amounts elsewhere around the state where it is too hot and dry for corn production. In 1975, moisture was limited at most sites during July and early August with high temperatures and wind velocities causing drought induced dormancy. This was occurring during the time of normal pollination for most hybrids grown in South Dakota. Rainfall occurred at some sites in mid-August and growth resumed to produce some grain.

The benefit of supplemental water (4 irrigations) is evident in the yields that were achieved at Redfield. The adapted hybrids, or perhaps, those hybrids that were ready to pollinate when temperatures were not so severe, produced the better yields at Redfield.

Birds were a problem again but not as serious as 1974. The greatest damage took place at Highmore where some entries were nearly destroyed by birds, especially sparrows. Yields and bird damage scores in Table 7 reflect loss estimates ranging from less than 20% to more than 80% in increments of 20. Bird damage was also evident to a lesser degree at Centerville, but was of no concern at other locations.

### CROP ADAPTATION AREAS



**S** - Indicates site of 1975 Grain Sorghum Performance Trial

Table 4. 1975 Grain Sorghum Performance Trial, Area B3, Harlan Halverson Farm, Kennebec, Lyman County

Brand & Variety	Yield, lb/A	Test wt. lb/B	Height, inches	Percent moisture 9/17/75
SDAES RS 506	3975	58	46	35.+
DeKalb B-35	3955	57	44	35.+
ACCO R 1014	3680	56	43	34.6
Pride P 570	3655	57	41	33.8
Northrup-King NK 180	3580	56	43	35.+
SDAES SD 503	3500	58	46	31.4
ACCO R 920	3480	58	42	27.7
Pride P 500A	3475	57	42	22.2
Western WS-206	3400	57	39	34.1
Northrup-King NK 121	3365	58	36	28.3
Funk's G-393	3325	57	42	34.5
SDAES RS 610	3315	58	43	34.7
Western WS-201	3315	57	37	26.0
Pioneer 894	3250	57	33	33.0
Pioneer B877	3250	51	36	34.7
Funk's G-251	3150	59	37	30.4
Pioneer 878	3110	58	36	32.5
Pioneer 8901	3010	56	34	28.6
Northrup-King MM52	2670	56	33	23.6
SDAES SD 106	2610	55	35	31.1
DeKalb A-25a	2360	56	28	32.4
Mean	3305			
C.V. = 16.1%	LSD (.05)	870		

Table 5. Two-, Three-, Four-, and Five-Year Average Yields of Grain Sorghum Hybrids Entered in Lyman County, 1971-1975

Brand & Variety	Average yields, pounds per acre			
	1971-75	1972-75	1973-75	1974-75
ACCO R 920	3005	3185	2760	2545
ACCO R 1014			2760	2130
Funk's G-251				2195
Funk's G-393				2005
Northrup-King NK MM52			2485	1945
Northrup-King NK 121	3130	3125	2600	2155
Northrup-King NK 180	3085	3280	2815	2175
Pioneer 878	2970	3090	2575	2155
Pioneer 894			2745	2525
Pride P 500A	3300	3490	3130	2620
SDAES SD 106			2330	1970
SDAES SD 503	3190	3355	2945	2450
SDAES RS 506	3280	3475	3030	2680
SDAES RS 610	2960	3045	2635	1990



Table 6. 1975 Grain Sorghum Performance Trial, Area C1, Irrigated, James Valley Research and Extension Center, Redfield, Spink County

Brand & Variety	Yield, lb/A	Test wt. lb/B	Height, inches	Date Headed	Percent moisture 9/17/75
Warner W-561	5640	58	43	8/04	35.+
Pride P 570	5375	58	43	7/31	33.3
Funk's G-393	5290	58	44	8/04	31.2
DeKalb B-35	5230	57	47	8/04	35.+
Northrup-King NK 233A	5150	61	46	8/01	35.+
Northrup-King NK 180	5130	58	47	8/01	33.4
ACCO R 1014	5125	57	47	8/05	34.8
DeKalb A-25a	5060	56	35	7/29	32.8
Northrup-King NK 129	5005	60	46	7/29	28.7
ACCO R 1019	4860	57	46	8/08	35.+
SDAES RS 506	4820	58	47	7/29	35.+
Warner W-601	4705	58	45	8/02	32.3
Funk's G-490	4705	54	44	8/03	35.+
SDAES RS 610	4675	59	49	8/05	34.9
SDAES SD 503	4620	58	53	7/29	23.9
Warner W-55	4515	58	41	8/04	32.8
Pride P 500A	4505	58	44	7/28	30.9
Pioneer 8901	4490	55	40	7/29	25.4
Northrup-King NK X3118	4355	57	43	8/02	35.+
Western WS-201	4330	57	44	7/26	25.6
ACCO R 920	4255	57	43	7/28	29.1
Funk's G-251	3895	59	37	7/26	27.9
Pioneer 894	3550	57	37	7/28	26.8
SDAES SD 106	3540	54	41	7/24	21.4
P-A-G 269	3280	58	44	7/26	21.1
Mean	4645				

C.V. = 11.3%

LSD (.05) 855

Table 7. 1975 Grain Sorghum Performance Trials, Area B2, Central Research Station, Highmore, Hyde County

Brand & Variety	Yield, lb/A	Bird damage score <sup>a</sup>	Test wt. lb/B	Height, inches	Date headed	Percent moisture 9/17/75
DeKalb A-25a	2510	1	56	25	7/27	21.1
SDAES RS 506	2230	2	58	33	7/27	21.2
ACCO R 920	2195	2	57	33	7/27	17.5
Northrup-King NK 180	2195	1	58	33	8/01	21.7
Western WS 201	2100	1	58	32	7/23	16.8
SDAES SD 106	2050	1	54	29	7/23	18.6
Warner W-55	1910	2	58	27	8/01	29.3
Northrup-King NK 121	1890	2	56	28	8/01	17.5
Northrup-King MM 52	1615	3	56	23	7/19	17.8
Warner W-561	1375	4	56	28	8/03	31.5
DeKalb B-35	980	2	51	30	8/01	31.8
Pioneer 8901	780	5	42	30	7/27	--b
Pioneer 878	635	5	56	28	7/31	--
Pioneer 894	625	5	52	26	7/28	25.3
Funk's G-251	515	5	53	29	7/26	--
Northrup-King NK 129	435	5	35	32	7/29	--
SDAES SD 503	430	5	44	32	7/28	--
Warner W-601	410	5	28	32	8/01	28.9
Funk's G-393	405	5	30	29	8/01	--
Mean	1330					
C.V. = 21.9%	LSD (.05)	475	a - 1=least; 5=greatest			b - taken by birds

Table 8. Two-, Three-, Four-, and Five-Year Average Yields of Grain Sorghum Hybrids Entered at Redfield, 1971-1975

Brand & Variety	Average yields, pounds per acre			
	1971-75	1972-75	1973-75	1974-75
ACCO R 920		4635	4410	5240
ACCO R 1014			4535	5330
ACCO R 1019	4550	4210	4245	4740
DeKalb B-35				5435
Funk's G-251			4070	4865
Funk's G-393			4695	5390
Northrup-King NK 129			4980	5780
Northrup-King NK 180		5465	5435	5820
Northrup-King NK 233A			5280	5685
Pioneer 894	4460	4055	3875	4520
Pride P 500A				5995
SDAES SD 106			3555	4095
SDAES SD 503	4890	4420	4365	4845
SDAES RS 506	5440	4895	4715	5565
SDAES RS 610	4975	4505	4795	4995
Warner W-55				4930
Warner W-561				6055

Table 9. 1975 Grain Sorghum Performance Trial, Area E, Southeast Experiment Farm, Centerville, Clay County

Brand & Variety	Yield, lb/A	Test		Height, inches	Date headed	Percent moisture 9/18/75
		wt. lb/B				
DeKalb C-42a	3385	52		38	8/04	30.0
ACCO R 1019	3270	54		46	8/02	26.9
Northrup-King NK 180	3105	55		44	7/21	19.6
ACCO 1029A	3035	54		46	8/01	35.+
Pioneer 878	2685	55		41	7/19	16.4
DeKalb B-35	2475	51		40	8/08	19.8
Funk's G-490	2470	50		43	8/09	21.0
Warner W-561	2445	49		41	8/09	17.2
SDAES RS 610	2320	51		42	7/26	18.5
ACCO R 1014	2245	51		42	7/28	17.8
Warner W-55	2220	52		38	7/30	18.2
Warner W-601	2165	53		43	7/21	17.0
Pioneer 866	2095	51		44	8/04	22.7
Funk's G-393	2090	54		43	7/20	16.6
Northrup-King NK X3162	2055	51		40	8/04	16.4
SDAES RS 506	2045	55		41	7/14	18.8
Northrup-King NK 222	1980	51		42	8/04	16.1
Northrup-King NK 233A	1940	51		44	7/18	16.6
SDAES SD 106	1860	48		40	7/13	15.6
Funk's G-251	1530	55		34	7/13	16.9
SDAES SD 503	1205	50		40	7/16	17.5
Mean	2315					
C.V. = 11.1%	LSD (.05)	420				

Table 10. Two-, Three-, Four-, and Five-Year Average Yields of Grain Sorghum Hybrids Entered at Centerville, 1971-1975

Brand & Variety	Average yields, pounds per acre			
	1971-75	1972-75	1973-75	1974-75
ACCO R 1014			3810	3330
ACCO R 1019	5340	5270	4560	4115
DeKalb B-35				3525
DeKalb C-42a	5380	5395	4860	3975
Funk's G-251				2950
Funk's G-393				4710
Funk's G-490				3265
Northrup-King NK 180		5150	4410	3885
Northrup-King NK 222	5055	4790	3955	3065
SDAES SD 106			3505	2855
SDAES SD 503	4620	4325	3420	2670
SDAES RS 506	5150	4960	4110	3445
SDAES RS 610	5155	4995	4205	3580
Warner W-55				3235
Warner W-561				3710

Table 11. 1975 Grain Sorghum Performance Trial, Area C1, Oscar Thompson Farm, Letcher, Aurora County

Brand & Variety	Yield, lb/A		Test wt. lb/B	Height, inches	Percent moisture 9/17/75
	1975	1974-75			
ACCO R 1014	3320		56	34	35.+
Funk's G-490	3115		57	31	35.+
Northrup-King NK 233A	2920	1810	58	33	33.4
DeKalb A-25a	2880		57	26	22.0
DeKalb C-42a	2815	1875	58	32	35.+
DeKalb B-35	2740	1815	57	30	35.+
Northrup-King NK X3118	2710		58	29	34.8
Pioneer 878	2665	1750	57	33	33.6
Funk's G-393	2625	1670	59	28	22.1
Northrup-King NK 180	2585	2045	57	34	31.9
Pride P 500A	2540	1765	58	31	18.9
Pioneer 866	2490	1765	56	38	33.4
SDAES SD 503	2425	1405	57	34	22.7
Northrup-King NK 222	2360	1710	58	30	32.5
SDAES RS 506	2360	1745	58	32	25.9
Pride P 570	2360	1840	56	29	17.1
SDAES RS 610	2250	1620	57	30	35.+
ACCO R 920	2150	1570	58	30	18.9
Western WS-201	2110		57	30	18.8
Funk's G-251	2015	1240	58	26	19.7
SDAES SD 106	1645	1290	51	30	26.8
Mean	2530				
C.V. = 20.4%      LSD (.05)      N.S.					

Table 11. Entries Submitted for the 1975 Grain Sorghum Performance and Tables Where Results Appear

Company & Brand	Variety	Tables	Company & Brand	Variety	Tables
Asgrow Seed Co. 4244 Clinton Street Des Moines, IA 50310 "Asgrow"	Dorado E Super Red	not reported	Agricultural Experiment Station So. Dak. State Univ. Brookings, SD 57006 "SDAES"	SD 106 SD 503 RS 506 RS 610	4,5,6,7,8,9,10,11 4,5,6,7,8,9,10,11 4,5,6,7,8,9,10,11 4,5,6,8,9,10,11
DeKalb AgResearch, Inc. Rt. 1, Box 225 Glensvil, NE 68941 "DeKalb"	A-25a B-35 C-42a	4,6,7,11 4,6,7,8,9,10,11 9,10,11	Pride Co., Inc. Glen Haven, WI 53810 "Pride"	P 500A P 570	4,5,6,8,11 4,6,11
Northrup, King & Co. 1500 Jackson St. NE Mpls, MN 55413 "NK"	NK 121 NK 129 NK 180 NK 222 NK 233A NK MM52 NK X3118 NK X3162	4,5,7 6,7,8 4,5,6,7,8,9,10,11 9,10,11 6,8,9,11 4,5,7 6,11 9	King's Western Seeds 205 Wyoming St. SW Huron, SD 57350 "Western"	WS-201 WS-206	4,6,7,11 4
ACCO Seed Box 1630 Plainview, TX 79072 "ACCO"	R 920 R 1014 R 1019 R 1029A	4,5,6,7,8,11 4,5,6,8,9,10,11 6,8,9,10 9	Geo. Warner Seed Co. Box 1448 Hereford, TX 79045 "Warner"	W-55 W-561 W-601	6,7,8,9,10 6,7,8,9,10 6,7,9
P-A-G Seeds 1200 Northstar Stn. Mpls, MN 55402 "P-A-G"	354 429 269	not reported 6	Funk Seeds Internat'l 719 26th St. Lubbock, TX 79404 "Funk's"	G-251 G-393 G-490	4,5,6,7,8,9,10,11 4,5,6,7,8,9,10,11 6,9,10,11
			Pioneer Seed Co. 1206 Mulberry St. Des Moines, IA 50308 "Pioneer"	866 878 883 894 8901 B877	9,11 4,5,7,9,11 not reported 4,5,6,7,8 4,6,7 4