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1991 Grain Sorghum Performance Trials

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December 1991

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South Dakota

**GRAIN
SORGHUM**

PERFORMANCE
TRIALS



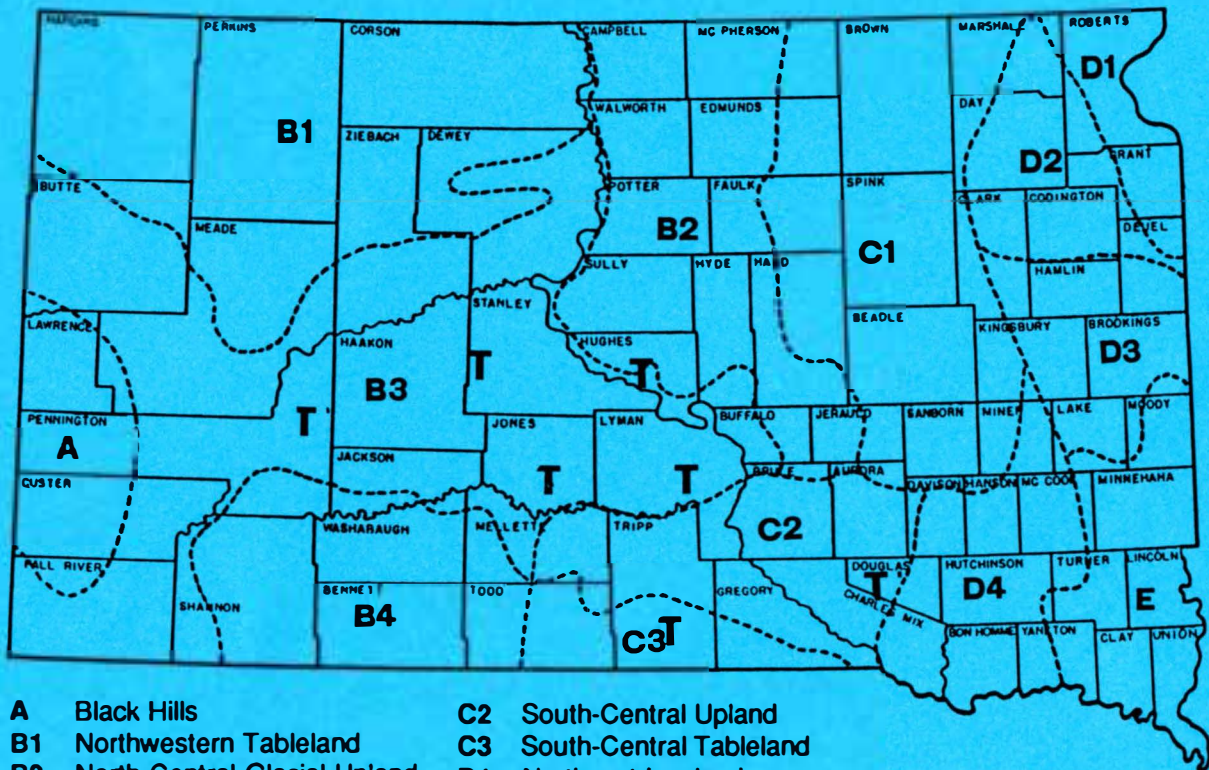
Agricultural Experiment Station
South Dakota State University
U.S. Department of Agriculture

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1991 Grain Sorghum Performance Trial Sites

Crop Adaptation Areas of South Dakota



- | | |
|--|--|
| <p>A Black Hills</p> <p>B1 Northwestern Tableland</p> <p>B2 North-Central Glacial Upland</p> <p>B3 Pierre Plain</p> <p>B4 Southwestern Tableland</p> <p>C1 Northern James Valley</p> | <p>C2 South-Central Upland</p> <p>C3 South-Central Tableland</p> <p>D1 Northeast Lowland</p> <p>D2 Northern Prairie Coteau</p> <p>D3 Central Prairie Coteau</p> <p>D4 Southern James Flatland</p> <p>E Southeast Prairie Upland</p> |
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1991 GRAIN SORGHUM PERFORMANCE TRIALS

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The relative performance of grain sorghum hybrids grown under similar environmental conditions in 1991 is evaluated in this report. The accompanying tables include grain yields in pounds per acre, test weight, moisture percentages of threshed grain sorghum immediately after first frost, and other related information. Performance records of entries harvested in 1991 and available 2-year averages are also presented. The trials reported were conducted under the Plant Science Department programs in Crop Performance Testing, Agricultural Experiment Station, South Dakota State University.

Location of the 1991 Trials

Trials were located at the sites marked on the accompanying map of South Dakota. Several changes or additions were made in trial site locations in 1991. The research station at Redfield was closed at the end of the 1989 crop year. In 1990 an Area B3 trial was seeded at the newly established Dakota Lakes Research Farm, 17 miles southeast of Pierre. Also, a new dryland B3 site was established in the Haakon/Stanley County area near Hayes. Additional B3 trials were started near Draper and Wall in 1991. The C2 trial was moved in 1990 from south of Geddes to west of Armour. A new C3 trial was established in 1991 near Winner in Tripp County. The exact location of each trial and date of seeding and harvesting are included in Table 1. The soil classification, laboratory analyses of soil samples taken, and fertility applied are given in Table 2.

Weather and Climatic Conditions

Climatic data (Table 3) for the 1991 grain sorghum growing season, May through September, are based upon U.S. Monthly Climatological Data (NOAA) recorded at a weather station reasonably near each trial site. The Pierre FAA data are used for the Dakota Lakes site. Data from Murdo and Wasta are used for the Draper and Wall sites, respectively. Stations are located at or near the other trial sites. Precipitation quantities could vary widely from the actual site to the recording station. However, temperatures are similar over a much wider area and are considered applicable to the trial area.

Field conditions varied over much of South Dakota for most of the growing period. The early spring was warm and very dry and seeding was off to an early start through the first third of May. The cool, wet field conditions that began after May 14 delayed any plot seeding until early June; the last trial was seeded June 16. The trial at Kennebec was abandoned because of herbicide drift over the entire area. The trials at Winner were delayed by late seeding, slow and uneven germination and damage by foraging pheasants. Timely mid-August rains were most beneficial to the Armour and Draper plots. Crop progress, heading, and pollination were delayed where precipitation was limited and temperatures above normal. Temperatures were above normal through mid-September. Over the crop season only the northeast quarter of the state received above normal rainfall.

The assistance of the following individuals is appreciated: Dwayne Beck and Clair Stymiest of the Stations; technicians Lucian Edler, Kevin Kirby, and Bruce Swan; Robert Clark, Harlan Halverson, Roger Root, Paul Patterson, Rob Renner, and Phillip Norman, farmer-cooperators; and personnel of the SDSU Data Processing Center.

Table 1. Location of Trials, Dates of Seeding, and Harvesting of Grain Sorghum Performance Trials in South Dakota, 1991

Area	County	Location	Post Office	Dates When	
				Seeded	Harvested
B3-P	Hughes	Dakota Lakes Farm, 17E	Pierre	June 11	Sept. 27
B3-H	Stanley	Phillip Norman Farm, 4W	Hayes	June 10	Oct. 2
B3-W	Pennington	R. Renner, 8N, 1/2 E	Wall	June 14	Oct. 3
B3-D	Jones	P. Patterson, 10 1/2 SE	Draper	June 13	Oct. 1
B3-K	Lyman	H. Halverson Farm, 4S, 1E	Kennebec	June 11	abandoned
C2	Douglas	Robert Clark Farm, 4W, 1S	Armour	May 14	Sept. 25
C3	Tripp	Roger Root, 4 1/2 W	Winner	June 18	Sept. 25

Freezing temperatures occurred in some portions of the state on September 18. The rest of the state had a killing frost on September 19. Grain sorghum harvest moved rapidly once it started, and over 80% was harvested by October 11. The harvest began early in those areas affected by the severe drouth and heat throughout the summer.

Lodging occurred where the stalks were weakened by heat or drouth stress, especially in Haakon County. Blackbird damage was evident at the Haakon County site also, some varieties damaged more severely than others.

Hybrid Entry Procedure

Only grain sorghum offered for sale in South Dakota or being produced for sale in 1991 was eligible for entry. A closed-pedigree hybrid was entered by the name and number under which it was sold by the participating company. All entries maintained a minimum laboratory germination of 80% as required by South Dakota certification standards. A nominal fee was charged for each entry in each trial. Proprietary entries included are the choice of the participating companies. A company is limited to six hybrids per site.

Experimental Procedure

Each trial consisted of four replications of two-row plots. Each plot was randomly located within each replication. All trials were seeded with cone seeders mounted above maxi-merge or Buffalo till units. An herbicide recommended for grassy weed control was applied at seeding time. Thirty-inch row spacings were used at all trial sites. Plot lengths depended upon the space available at each trial site. Seeding rates were adequate, under normal conditions, to achieve an average of 2-3 plants per foot. The trial at Pierre was seeded into no-till.

Moisture determinations were made on September 18 and 19, the dates when the first frost occurred over much of the state. This was more informative as to maturity than determinations made at harvest. Moisture and test weight of the grain realistically indicate relative maturity. Grain samples for moisture determinations were 10-12 heads, 400-500 grams, cut from each entry, placed in a polyethylene bag, tagged, and sealed. The samples were threshed and cleaned, and moisture percentages determined with an electronic moisture meter. The upper limits of the meter are 35%, and the data

Table 2. Laboratory Analysis, Soil Classification, and Fertilizer Applied to the 1991 Hybrid Grain Sorghum Performance Trials

Area	Soil Classification	% O.M.	P lb/A	K	pH	Preparation and method	Pounds/Acre		
							N	P	K
B3-P	Lowry SiL	2.1	31	600	6.7	No-till into wheat stubble	68	15	0
B3-H	Opal Cl	3.2	12	600	8.0	Fallowed wheat stubble	45	0	0
B3-W	Blackpipe SiCl	2.0	62	990	6.8	Fallowed wheat stubble	45	0	0
B3-D	Cl	3.2	15	582	8.0	Fallowed wheat stubble	45	0	0
C2	Eakin-Ethan	3.1	28	440	7.6	Sm. Grn, plowed and disced	85	20	0
C3	Millboro SiCl	3.2	15	582	8.4	Fallow	28	15	0

Table 3. Temperature and Precipitation Data for the 1991 Grain Sorghum Performance Trials, South Dakota

Location	Type of Data	Months of					Total
		May	June	July	August	Sept.	
Armour	Precip. (inches)	5.68	1.74	3.40	1.89	2.15	14.86
	Temp. (mean)	62.4	75.0	77.0	75.6	65.7	
	Mean Departure	+2.7	+5.3	+1.4	+1.9	+2.3	
First freeze - Sept. 19 - 24°							
Winner	Precip. (inches)	9.02	3.93	0.92	2.00	1.12	16.99
	Temp. (mean)	61.2	72.6	76.8	76.4	66.6	
	Mean Departure	+1.2	+2.7	+0.3	+1.8	+2.3	
First freeze - Sept. 18 - 31°							
Pierre FAA	Precip. (inches)	5.10	6.30	1.23	0.96	1.22	14.81
	Temp. (mean)	59.4	71.3	75.7	76.5	64.0	
	Mean Departure	+1.7	+3.3	+0.6	+2.9	+1.5	
First freeze - Sept. 18 - 30°							
Midland	Precip. (inches)	4.19	5.10	1.11	1.87	1.05	13.32
	Temp. (mean)	59.6	70.3	73.0	74.2	M	
	Mean Departure	+0.5	+1.4	-2.9	0	M	
First freeze - Sept. 17							
Murdo	Precip. (inches)	4.45	6.50	1.38	2.13	1.15	15.61
	Temp. (mean)	56.6	69.5	73.8	74.3	62.3	
	Mean Departure	-1.5	+1.5	-1.4	+0.7	-0.8	
First freeze - Sept. 17 - 25°							
Wasta	Precip. (inches)	6.01	3.89	1.39	1.96	1.48	14.73
	Temp. (mean)	59.4	69.8	74.4	74.4	62.0	
	Mean Departure	+1.3	+2.1	-0.5	+1.1	-0.2	
First freeze - Sept. 18 - 27°							

in the tables showing 33.0% could be that or considerably higher. Data above 30.0% would generally indicate lines of later maturity for the area. The late dates of seeding in 1991 possibly contribute to misleading results for some entries.

Delayed harvest can contribute to higher levels of lodging or can be caught in the bad weather of the later fall. Harvesting is usually done as soon as possible after the first frost. Plot harvest was completed by October 11. The trials were harvested by small-plot combine in 1991 as all plots were mature enough to shell out readily. The harvested samples were returned to Brookings or Box Elder for drying and processing.

Yields are reported in pounds per acre (x 1.12 for kg/ha) with three or four replications harvested for yield purposes and one left for observation.

Discussion of Results

Yields were quite variable from site to site and within trials. Hundred-weight yields topped the 60's at Armour, the 40's at Draper, and the 20's at all other sites but Hayes. Moisture percentages ranged from low teens to 25% at most sites except the later seeding at Winner. The later maturity entries were most seriously set back by the lack of moisture and the late seeding. The mean average test weight ranged from 52-58% at all but two trials. The mean weight was 49 pounds at Winner and only 28 pounds at Hayes.

The quality of the grain at Hayes was extremely poor, while the grain at the other locations ranged from good to excellent. The grain moisture recorded was usually obtained the day following the first frost-nipping temperatures. Moisture was highest in the Winner trial, but it was also not seeded until mid-June. Only limited drying of grain sorghum was necessary following the harvest of 1991.

Lodging was not a serious problem at any of the locations. Limited lodging occurred at the Hayes site. Bird damage was most evident in the 1991 trial at Hayes: little damage was evident when trials were part of larger cooperators fields. Yield, quality, and test weights were affected in 1991 by the date of seeding and stage of growth when temperature or moisture effects occurred.

Measurement of Performance

Variations in factors such as 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, less than 5%, have no significance.

Yields of 1991 and other agronomic data are reported in Table 4 through Table 9. A listing of all entries is presented in Table 10.

Table 4. Grain Sorghum Performance Trials, Area C2, Robert Clark Farm,
Armour, Douglas County, South Dakota

Company/ Brand	Hybrid/ Variety	Headed 50 Pct Mo-Day	Plant Height In (cm)	Early Moist %	Stalk Lodgn %	Test Wt. Lb/Bu	Grain Yield Lb/A (Kg/Ha)
1991							
Pioneer	8855	7/14	37 (94)	12.9	0.0	57.3	4561 (5110)
DeKalb	DK-28E	7/15	33 (84)	13.4	0.0	58.2	5151 (5770)
Dahlgren	DG-27B	7/16	34 (86)	13.1	0.0	60.8	5451 (6100)
Pioneer	XS902	7/16	33 (84)	13.3	0.0	58.4	5164 (5780)
Pioneer	8771	7/18	36 (91)	13.5	0.0	57.4	5470 (6130)
Asgrow	Madera	7/19	31 (79)	14.2	0.0	59.0	4135 (4630)
Cargill	577	7/19	36 (91)	14.7	0.0	57.5	4795 (5370)
Pioneer	8877	7/19	33 (84)	14.0	0.0	58.8	4826 (5400)
Cargill	X70001	7/20	30 (76)	12.8	0.0	58.5	4512 (5050)
DeKalb	DK-37	7/20	39 (99)	16.7	0.0	59.0	6205 (6950)
Pioneer	XS905	7/20	34 (86)	13.4	0.0	58.8	5580 (6250)
Cargill	607E	7/21	35 (89)	14.6	0.0	58.8	4031 (4510)
Cargill	618Y	7/22	39 (99)	14.4	0.0	58.2	5514 (6170)
Dahlgren	DG-33B	7/22	33 (84)	14.0	0.0	58.9	4294 (4810)
DeKalb	X-033	7/22	34 (86)	17.2	0.0	56.1	4159 (4660)
Northrup King	2030	7/22	33 (84)	14.6	0.0	56.1	3590 (4020)
Cargill	630	7/24	35 (89)	15.6	0.0	58.4	4874 (5460)
Asgrow	Seneca	7/25	38 (97)	15.2	0.0	58.1	5153 (5770)
DeKalb	DK-40Y	7/25	40 (102)	19.3	0.0	57.3	4087 (4580)
Northrup King	2244	7/25	37 (94)	19.5	0.0	55.0	3529 (3950)
Entry Averages		7/20	35	14.8	0.0	57.8	4754
LSD (.05)							848
CV - %							10.8
1990 & 1991							
Pioneer	8855	7/22	39 (99)	15	0.0	58.2	4487 (5020)
DeKalb	DK-28E	7/24	37 (94)	14	0.0	58.3	5021 (5620)
Dahlgren	DG-27B	7/26	39 (99)	13	0.0	59.0	5170 (5790)
Pioneer	8877	7/26	38 (97)	15	0.0	58.8	4939 (5530)
Asgrow	Madera	7/28	38 (97)	15	0.0	58.7	4826 (5400)
DeKalb	DK-37	7/28	45 (114)	20	0.0	57.1	5599 (6270)
Dahlgren	DG-33B	7/29	40 (102)	15	0.0	59.1	5054 (5660)
Cargill	618Y	7/31	41 (104)	20	0.0	56.1	5480 (6140)
Asgrow	Seneca	8/ 1	41 (104)	21	0.0	58.9	5696 (6380)
Cargill	630	8/ 1	40 (102)	18	0.0	58.9	4868 (5450)
Entry Averages		7/27	40	15	0.0	58.3	5114
LSD (.05)							293
CV - %							12.1

Table 5. Grain Sorghum Performance Trials, Area B3, Phillip Norman Farm,
Hayes, Stanley County, South Dakota

Company/ Brand	Hybrid/ Variety	Headed 50 Pct Mo-Day	Plant Height In (cm)	Early Moist %	Stalk Lodgn 1-5	Test [*] Wt. Lb/Bu	Grain [*] Yield Lb/A (Kg/Ha)
1991							
DeKalb	DK-18	8/ 3	36 (91)	22.5	3.0	32.0	335 (380)
Pioneer	894	8/ 3	35 (89)	15.9	1.0	43.0	691 (770)
Pioneer	8855	8/ 4	38 (97)	17.1	1.3	33.5	395 (440)
DeKalb	DK-28E	8/ 6	35 (89)	16.5	2.0	27.1	428 (480)
Pioneer	XS902	8/ 7	36 (91)	15.5	1.0	28.3	476 (530)
Cargill	X70001	8/10	35 (89)	12.3	1.0	28.9	360 (400)
Cargill	577	8/10	40 (102)	20.4	1.3	25.1	496 (560)
Golden Acres	Chico	8/10	38 (97)	19.1	1.0	32.7	492 (550)
Pioneer	8877	8/10	39 (99)	13.7	2.3	24.4	392 (440)
Asgrow	Madera	8/11	36 (91)	9.5	1.0	26.4	552 (620)
Dahlgren	DG-33B	8/13	36 (91)	18.4	1.5	24.6	380 (430)
Asgrow	Seneca	8/15	35 (89)	28.2	1.0	20.3	376 (420)
Entry Averages		8/ 8	36	17.4	1.3	28.8	451
LSD (.05)							N.S.
CV - %							22.8

1990 & 1991							
DeKalb	DK-18	8/ 3	34 (86)	24	.	44.5	1184 (1330)
Pioneer	894	8/ 3	33 (84)	20	.	49.9	1560 (1750)
Pioneer	8855	8/ 4	36 (91)	24	.	45.0	1258 (1410)
Cargill	577	8/10	38 (97)	27	.	37.9	1342 (1500)
Pioneer	8877	8/10	36 (91)	21	.	40.9	1341 (1500)
Asgrow	Madera	8/11	34 (86)	21	.	41.0	1525 (1710)
Asgrow	Seneca	8/15	34 (86)	30	.	36.9	1187 (1330)
Entry Averages		8/ 8	35	23.8	.	42.3	1342
LSD (.05)							N.S.
CV - %							6.2

* - Blackbird damage also affected yield and quality of harvested grain.v

Table 6. Grain Sorghum Performance Trials, Area B3, Dakota Lakes Research Farm, Pierre, Hughes County, South Dakota

Company/ Brand	Hybrid/ Variety	Headed 50 Pct Mo-Day	Plant Height In (cm)	Early Moist %	Stalk Lodgn %	Test Wt. Lb/Bu	Grain Yield Lb/A (Kg/Ha)
1991							
Pioneer	88558	7/25	40 (102)	14.5	0.0	55.9	2621 (2930)
Northrup King	1210	7/25	38 (97)	14.6	0.0	52.3	2367 (2650)
DeKalb	DK-18	7/26	38 (97)	16.9	0.0	56.1	2382 (2670)
Pioneer	8877	7/28	36 (91)	17.7	0.0	54.6	2258 (2530)
Cargill	X70001	7/29	36 (91)	19.0	0.0	54.5	2663 (2980)
Dahlgren	DG-27B	7/29	39 (99)	21.9	0.0	51.6	1710 (1910)
DeKalb	DK-28E	7/29	38 (97)	24.5	0.0	53.9	2451 (2740)
Pioneer	XS902	7/29	39 (99)	16.7	0.0	54.0	2635 (2950)
Cargill	577	7/30	40 (102)	19.5	0.0	50.4	2076 (2320)
Asgrow	Madera	7/31	38 (97)	20.6	0.0	49.6	2623 (2940)
Dahlgren	DG-33B	8/ 2	40 (102)	23.1	0.0	52.6	2305 (2580)
Asgrow	Seneca	8/ 7	35 (89)	24.3	0.0	54.2	2053 (2300)
Entry Averages		7/31	38	19.4		53.2	2345
LSD (.05)							N.S.
CV - %							25.6

Table 7. Grain Sorghum Performance Trials, Area B3, Paul Patterson Farm, Draper, Jones County, South Dakota

Company/ Brand	Hybrid/ Variety	Headed 50 Pct Mo-Day	Plant Height In (cm)	Early Moist %	Stalk Lodgn %	Test Wt. Lb/Bu	Grain Yield Lb/A (Kg/Ha)
1991							
DeKalb	DK-18	8/ 1	41 (104)	13.1	0.0	56.6	3667 (4110)
DeKalb	DK-28E	8/ 3	39 (99)	13.2	0.0	58.4	4082 (4570)
DeKalb	X-109	8/ 4	39 (99)	12.7	0.0	59.1	3920 (4390)
Pioneer	XS902	8/ 4	41 (104)	12.8	0.0	58.9	3816 (4270)
Pioneer	8855	8/ 5	44 (112)	12.8	0.0	58.2	4276 (4790)
Dahlgren	DG-27B	8/ 6	42 (107)	12.9	0.0	57.3	4240 (4750)
DeKalb	X-110	8/ 7	42 (107)	12.7	0.0	56.5	3779 (4230)
Pioneer	8877	8/ 7	43 (109)	13.2	0.0	59.8	3233 (3620)
Golden Acres	T-E Chico	8/ 8	42 (107)	13.1	0.0	58.2	4364 (4890)
Cargill	X70001	8/ 9	43 (109)	13.4	0.0	57.6	3517 (3940)
Cargill	577	8/ 9	45 (114)	13.2	0.0	58.3	4133 (4630)
Asgrow	Madera	8/10	39 (99)	12.7	0.0	58.5	4885 (5470)
Dahlgren	DG-33B	8/12	43 (109)	13.3	0.0	58.1	4097 (4590)
Asgrow	Seneca	8/15	40 (102)	13.4	0.0	57.3	3381 (3790)
Entry Averages		8/ 7	42	13.0		58.0	3956
LSD (.05)							656
CV - %							9.9

Table 8. Grain Sorghum Performance Trials, Area C3, Roger Root, cooperatoor,
Winner, Tripp County, South Dakota

Company/ Brand	Hybrid/ Variety	Headed 50 Pct Mo-Day	Plant Height In (cm)	Early* Moist %	Stalk Lodgn 1-5	Test Wt. Lb/Bu	Grain Yield Lb/A (Kg/Ha)
1991							
Asgrow	Madera		39 (99)	33	2.0	53.1	2810 (3150)
Dahlgren	DG-33B		39 (99)	33	2.0	50.6	2657 (2980)
Cargill	607E		41 (104)	33	1.5	52.8	2401 (2690)
Golden Acres	Chico		36 (91)	33	2.5	52.4	2318 (2600)
Pioneer	XS905		39 (99)	33	2.5	50.4	2172 (2430)
Cargill	618Y		39 (99)	33	1.0	42.3	2037 (2280)
Cargill	X70001		39 (99)	33	1.5	49.7	2019 (2260)
Pioneer	8877		40 (102)	33	1.0	51.8	1999 (2240)
Dahlgren	DG-27B		38 (97)	33	2.0	52.6	1988 (2230)
Pioneer	8855		40 (102)	33	1.5	53.7	1946 (2180)
DeKalb	DK-40Y		35 (89)	33	4.0	44.0	1922 (2150)
Asgrow	Seneca		37 (94)	33	2.5	47.6	1763 (1970)
Cargill	577		41 (104)	33	3.5	49.0	1615 (1810)
Cargill	630		39 (99)	33	2.0	48.9	1526 (1710)
Pioneer	XS902		42 (107)	33	1.0	54.8	1486 (1660)
DeKalb	DK-28E		41 (104)	33	3.5	52.4	1369 (1530)
DeKalb	DK-37		42 (107)	33	2.5	49.0	1284 (1440)
DeKalb	X-033		38 (97)	33	1.0	41.6	1155 (1290)
Entry Averages			39	33	2.1	49.8	1914
LSD (.05)							N.S.
CV - %							22.8

* - Rain delayed seeding until June 16, then limited rainfall delayed growth even further.

Table 9. Grain Sorghum Performance Trials, Area B3, Robert Renner Farm,
Wall, Pennington County, South Dakota

Company/ Brand	Hybrid/ Variety	Headed 50 Pct Mo-Day	Plant Height In (cm)	Early Moist %	Stalk Lodgn 1-5	Test Wt. Lb/Bu	Grain Yield Lb/A (Kg/Ha)
1991							
DeKalb	DK-18	8/ 7	37 (94)		1.5	52.9	3285 (3680)
DeKalb	DK-28E	8/10	34 (86)		1.5	52.3	2859 (3200)
Pioneer	8855	8/11	39 (99)		1.5	54.7	3362 (3760)
Cargill	577	8/12	38 (97)		1.5	51.4	2674 (2990)
Pioneer	XS902	8/12	38 (97)		1.5	52.9	2719 (3040)
Pioneer	8877	8/13	37 (94)		1.5	54.0	3032 (3400)
Asgrow	Madera	8/14	34 (86)		1.0	53.3	2637 (2950)
Cargill	X70001	8/15	36 (91)		1.5	51.5	2316 (2590)
Asgrow	Seneca	8/30	35 (89)		1.0	48.7	1739 (1950)
Entry Averages		8/14	36		1.2	52.4	2735
LSD (.05)							739
CV - %							15.8

Table 10. Entries Included in the 1991 Grain Sorghum Trials and Tables where the Results Appear.

Company and Brand	Entry	Tables	Company and Brand	Entry	Tables
Asgrow Seed Company 7000 Portage Road Kalamazoo, MI 49001 "Asgrow"	Madera Seneca	4,5,6,7,8,9 4,5,6,7,8,9	DeKalb Plant Genetics Rt. 1, Box 225 Glenvil, NE 68941 "DeKalb"	DK-18 DK-28E DK-37 DK-40y X-033 X-109 X-110	5,6,7,9 4,5,6,7,8,9 4,8 4,8 4,8 7 7
Cargill Hybrid Seeds PO Box 5645 Minneapolis, MN 55440 "Cargill"	577 607E 618Y 630 X70001	4,5,6,7,8,9 4,8 4,8 4,8 4,5,6,7,8,9	Northrup King Co. 920 Heritage Drive, #231 Moorhead, MN 56560 "Northrup King"	1210 2030 2244	6 4 4
Dahlgren & Co. PO Box 609 Crookston, MN 56716 "Dahlgren"	DG-27B DG-33B	4,6,7,8 4,5,6,7,8	Pioneer Hi-Bred, Int. 1000 W. Jefferson St. Tipton, IN 46072 "Pioneer Brand"	894 8771 8855 8877 XS902 XS905	5 4 4,5,6,7,8,9 4,5,6,7,8,9 4,5,6,7,8,9 4,8
Taylor-Evans Seed Co. PO Box 68 Tulia, TX 79008 "Golden Acres"	Chico	5,7,8			

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