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Corn for Grain Variety Trials, 1998

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Recognition is given to Jessie Selvie and Jerry Nail, research technicians for the Variety Testing Program, for their assistance in packaging, planting, harvesting, and recording plot data. Statistical analyses and computing assistance were given by Eric Hudson, computer programmer, Information Services and User Support and Chip Brooks, student worker, Department of Experimental Statistics. The manuscript was prepared by Jimmie Cooper, administrative secretary for MAFES Research Support Units. It was published by the Office of Agricultural Communications; Division of Agriculture, Forestry, and Veterinary Medicine.

Notice to User

This Mississippi Agricultural and Forestry Experiment Station Information Bulletin is a summary of research conducted under project number MIS 1414 at locations shown on the second page. It is intended for the use of colleagues, cooperators, and sponsors. The interpretation of data presented herein may change after additional experimentation. Information included herein is not to be construed either as a recommendation for use or as an endorsement of a specific product by Mississippi State University or the Mississippi Agricultural and Forestry Experiment Station.

This report contains data generated as part of the Mississippi Agricultural and Forestry Experiment Station research program. Joint sponsorship by the organizations listed in Table 2 is gratefully acknowledged.

Commercial and public varieties tested in this research project (trade names, experiment code names, or numbers, etc.) and source of seed are listed in Table 2.

Procedure

Trials were conducted on Experiment Station land or on grower-cooperator fields in three geographical areas in Mississippi: Area I, located north of Interstate 20 with three locations; Area II, located south of Interstate 20 with two locations; and Area III, located in north-central Mississippi with two locations, where irrigation is available (see map). Commercial seed companies were given the opportunity to enter one or more corn hybrids in Area I, Area II, or Area III.

Plots consisted of two 30-inch rows 13.33 feet long, planted on prepared seedbeds. Weeds were controlled by cultivation and/or herbicides. Only herbicides currently registered for use on corn were used in these studies, with strict adherence to all label instructions. Lorsban 15G was donated by Dow Elanco and banded at planting for insect control. Experimental design was a randomized complete block with five replications at each location. Hybrids were divided into two maturity groups based on information provided by the sponsoring companies. Those hybrids that matured in 115 days or less were considered early maturing, while those that required 116 days or more to mature were considered late maturing.

Seed of all entries were supplied by participating companies. All seed were packaged for planting at rates suggested by the participating company and planted with a cone planter. Phosphorus, potassium, and lime were applied according to soil test recommendations. Nitrogen was applied in Areas I and II at 140 to 200 pounds per acre, and plots in Area III received 200 to 300 pounds of N per acre. Plots in Areas I and II were grown in dry land conditions, and plots in Area III were irrigated, if necessary.

Several variables were measured in the 1998 corn hybrid tests:

- **Yield:** An Almaco SPC 20 plot combine was used to harvest the total area of each plot. Harvested grain was weighed, moisture was determined, and yields were converted to bushels per acre at 15.5 percent moisture.
- **Root Lodging:** Root lodging is the percentage of plants, based on actual counts of all plants in each plot, that were leaning more than 30 degrees from vertical at harvest.
- **Stalk Lodging:** Stalk lodging is the percentage of plants, based on actual counts of all plants in each plot, that were broken below the upper ear-bearing node at harvest.
- **Ear Height:** Ear height is measured as the distance from the soil to the highest ear-bearing node.
- **Harvest Population:** Harvest population is a measure of the number of plants per acre, based on actual stand counts at time of harvest.

Use of Data Tables and Summary Statistics

The yield potential of a given variety cannot be measured with complete accuracy. Consequently, replicate plots of all

varieties are evaluated for yield, and the yield of a given variety is estimated as the mean of all replicate plots of that variety. Yields vary somewhat from one replicate plot to another, which introduces a certain degree of error to the estimation of yield potential. As a result, although the mean yields of some varieties are numerically different, the two varieties may not be significantly different from each other within the range of natural variation. That is, an ability to measure yield is not precise enough to determine what the small differences are, other than what might be observed purely by chance.

The least significant difference (LSD) is an estimate of the smallest difference between two varieties that can be declared to be the result of something other than random variation in a particular trial. Consider the following example for a given trial:

Variety	Yield (bu/A)
A	90
B	85
C	81
LSD	7

The difference between variety A and variety B is 5 bu/A (i.e. 90 - 85 = 5). This difference is smaller than the LSD (7 bu/A). Consequently we would conclude that variety A and variety B have the same yield potential, since we are not able to say that the observed difference did not occur purely due to chance. However, the difference between variety A and variety C is 9 bu/A (i.e. 90 - 81 = 9), which is larger than the LSD (7 bu/A). We would therefore conclude that the yield potential of variety A is superior to that of variety C.

The coefficient of variation (CV) is a measure of the relative precision of a given trial and is used to compare the relative precision of different trials. The CV is generally considered to be an estimate of the amount of unexplained variation in a given trial. This unexplained variation can be the result of variation between plots with respect to soil type, fertility, insects, diseases, moisture stress, etc. In general, the higher the CV the less precise a given trial is.

The coefficient of determination (R^2) is another measure of the level of precision in a trial and is also used to compare the relative precision of different trials. The R^2 is a measure of the amount of variation that is explained, or accounted for, in a given trial. For example, an R^2 value of 90 percent indicates that 90 percent of the observed variation in the trial has been accounted for in the trial, with the remaining 10 percent being unaccounted for. The higher the R^2 value, the more precise the trial. The R^2 is generally considered to be a better measure of precision than the CV for comparison of different trials.

Table 1. Location, number of entries, dates of planting, and dates of harvest for 1998 corn hybrid trials.

Location	Maturity[1]	No. of entries	Planting date	Harvest date
Area I				
• **Hawks Farming, Inc.** (*Hernando*)	Late	25	April 2	August 27
• **Chris Ausborn Farm** (*Aberdeen*)	Early Late	23 25	March 30	August 28
• **Bob Caldwell Farm** (*Brooksville*)	Early Late	23 25	March 31	August 20
Area II				

• **Brown Loam Branch** (*Raymond*)	Early Late	16 14	April 3	September 1
• **Coastal Plain Branch** (*Newton*)	Early Late	16 14	March 25 Replanted April 19	No harvest
Area III				
• **Sid Lloyd, Jr., Farms** (*Cruger*)	Early Late	38 28	March 28	August 26
Duke Morgan Farm (*Shaw*)	Early Late	38 28	March 27	August 24

[1]Early maturity = 115 days or less; late maturity = 116 days or more.

Table 2. Corn hybrid characteristics provided by sponsoring seed companies.

Company	Hybrid	Planting rate (x 1000)	Days to maturity	Grain texture[1]	MDMV resistance[2]	MCDV resistance[2]
AgraTech Seeds, Inc. 5559 N 500 W McCordsville, IN 46055	ATX725 ATX770 967	28 32 28	113 115 124	M M M	S S R	S S R
AgriPro Seeds, Inc. Southern Business Units Suite 435, 6075 Poplar Ave. Memphis, TN 38119	HS9843 AP9828 AP9829IMI AP9707 AP9909 AP9939	28 28 28 28 28 28	117 118 118 117 120 123	H MH MH MH MH M	S S S S S S	S S S S S S
Asgrow Seed Company P.O. Box 359 Marion, AR 72364	RX740 RX760 RX770 RX810 RX813 RX826 RX897 XP8897 RX913 RX938	28 28 28 28 28 28 28 28 28 32	109 109 109 112 114 114 115 115 117 119	-- -- -- -- -- -- -- -- -- --	-- -- -- -- -- -- -- -- -- --	-- -- -- -- -- -- -- -- -- --
DeKalb Genetics Corp. 3100 Sycamore Road DeKalb, IL 60115	DK687 DK683 DK706 DK714 DK626	28 28 28 28 28	118 118 120 121 112	MH MH H H M	R R MS S S	R R MS S S
Elite Seed, Inc. 969 Cloverleaf Drive Southaven, MS 38671	FFR943 FFR726	24 28	120 113	M M	MR S	MR S
Garst Seed Co. 2369 330th St., Box 500 Slater, IA 50244	8220 8222IT 8513IT	24 24 24	119 118 110	M M --	R S --	R S --
Genesis Ag Ltd P.O. Box 21085 Lansing, MI 48909	Genesis 1815 Genesis 1818 Genesis 2812	28 28 24	115 118 112	-- -- --	-- -- --	-- -- --

	Genesis 2816	24	118	--	--	--
Douglass W. King Co. 4627 Emil Rd P.O. Box 200320 San Antonio, TX 78220	dk5445 dk5570	28 28	118 119	-- --	-- --	-- --
Mycogen Seeds 3600 N. Columbia Plainview, TX 79072	8460	28	118	M	R	--
Pioneer Hi-Bred International 6767 Old Madison Pike Suite 110 Huntsville, AL 35806	3395IR 32K61 3163 3167 3223 3245 3245IR 3394 33R87 33G26 35A19IR	28 28 24 28 28 28 28 28 24 28 28	110 114 119 124 116 115 115 110 112 112 103	-- M-H M M -- M -- M -- -- --	-- MS MR S -- MS -- S S MR --	-- MS MR S -- MR -- S S MR --
Stewart Seeds, Inc. 2230 E., Co. Rd. 300N Greensburg, IN 47240	S555 S589 S599 S605 S660 S795	28 28 28 26 28 28	110 111 111 112 115 118	M M H H M M	-- -- -- -- -- --	-- -- -- -- -- --
Terra International, Inc. 600 Fourth Street P.O. Box 6000 Sioux City, IA 51102-6000	TR1154 TR1157 TR1167 TR1185 TR1087 TR1088 E1188	28 32 32 28 32 32 32	115 115 117 118 108 108 118	M M M H M M M	S S R S -- -- --	S S R S -- -- --
Terral Seed, Inc. P.O. Box 826 Lake Providence, LA 71254	TVX20770 TV2930 TV2090 TV2100 TVX21370 2140 2543	28 24 32 28 28 28 32	105 118 107 108 111 112 113	M M M M MH H MH	-- R -- -- -- -- MR	-- R -- -- -- -- MR
Tri-State Delta Chemical 6800 Poplar Ave., Suite 100 P.O. Box 382550 Memphis, TN 38183-2550	Funk's DG5510A Funk's DG5516 Funk's 4653	32 32 32	115 118 120	H MH MH	R MR MR	-- MR MR

[1]M=Medium; H=Hard.

[2]MDMV=Maize Dwaraf Mosaic Virus; MCDV=Maize Chlorotic Dwarf Virus (corn stunt; S=Susceptible; R=Resistant; MR=Moderately Resistant; MS=Moderately Susceptible

Table 14. Average grain production, by areas, for early-maturing corn hybrids grown in Mississippi, 1998.

Hybrid number	Brand name	Area I[1]	Area II[2]	Area III[3]

		1998 yield	2-year avg.	3-year avg.	1998 yield	2-year avg.	3-year avg.	1998 yield	2-year avg.	3-year avg.
ATX725	AgraTech	--	--	--	--	--	--	162.7	--	--
ATX770	AgraTech	--	--	--	--	--	--	160.9	166.5	--
RX740	Asgrow	--	--	--	--	--	--	162.0	--	--
RX760	Asgrow	--	--	--	--	--	--	175.3	--	--
RX770	Asgrow	--	--	--	--	--	--	150.4	--	--
RX810	Asgrow	--	--	--	--	--	--	170.9	--	--
RX813	Asgrow	--	--	--	--	--	--	179.2	170.5	--
RX826	Asgrow	--	--	--	--	--	--	160.9	--	--
RX897	Asgrow	--	--	--	--	--	--	183.2	178.3	173.3
XP8897	Asgrow	--	--	--	--	--	--	171.8	--	--
DK626	DeKalb	--	--	--	114.9	--	--	175.2	172.1	--
FFR726	Elite	76.9	--	--	--	--	--	183.2	--	--
DG 5510A	Funk's	98.9	92.1	85.7	129.7	143.1	--	192.2	181.8	177.3
8513IT	Garst	72.4	--	--	--	--	--	169.1	--	--
Genesis 1815	Genesis	--	--	--	--	--	--	160.6	--	--
Genesis 2812	Genesis	--	--	--	--	--	--	164.8	--	--
3395IR	Pioneer	78.7	--	--	--	--	--	159.4	--	--
32K61	Pioneer	101.9	91.2	--	126.7	158.2	--	178.1	181.9	--
3245	Pioneer	--	--	--	122.5	139.5	117.4	200.7	189.9	186.1
3245IR	Pioneer	--	--	--	89.4	--	--	163.8	--	--
3394	Pioneer	78.5	85.6	83.5	--	--	--	166.3	--	--
33R87	Pioneer	74.2	--	--	104.0	--	--	160.9	--	--
35A19IR[4]	Pioneer	--	--	--	--	--	--	--	--	--
33G26	Pioneer	107.1	--	--	--	--	--	172.0	--	--
S555	Stewart	90.9	--	--	--	--	--	176.5	--	--
S589	Stewart	76.2	--	--	--	--	--	161.2	--	--
S599	Stewart	77.5	--	--	--	--	--	167.2	--	--
S605	Stewart	79.2	--	--	--	--	--	159.5	--	--
S660	Stewart	95.3	--	--	--	--	--	176.3	--	--
TR1154	Terra	78.9	75.6	80.1	123.6	137.1	113.3	184.5	174.5	175.8
TR1157	Terra	76.1	77.6	79.5	106.1	135.6	112.7	196.5	188.5	182.2
TR1087	Terra	79.5	84.3	--	97.2	123.8	--	186.9	182.7	--
TR1088	Terra	86.2	--	--	102.7	--	--	172.5	--	--
TVX20770	Terral	72.8	75.1	--	93.5	--	--	169.1	--	--
TV2090	Terral	69.2	70.3	--	98.0	--	--	169.0	--	--
TV2100	Terral	75.9	77.7	--	81.8	121.3	--	172.3	174.3	--
TVX21370	Terral	76.7	--	--	97.4	--	--	144.9	147.3	--
TV2140	Terral	72.8	--	--	114.8	143.2	--	182.9	181.6	--
TV2543	Terral	91.3	--	--	100.0	--	--	171.3	--	--

Overall Mean	80.9	80.4	82.2	106.4	137.7	114.5	171.7	176.2	178.9
LSD (.10)	9.7	6.5	6.3	12.0	10.0	9.2	18.5	10.9	8.2
Error degrees of freedom	128	108	63	60	84	32	290	190	95
CV (%)	14.2	14.6	16.9	10.7	11.9	15.0	14.5	11.7	10.7
R^2 %	75	67	76	72	87	94	55	62	67

[1]Average of Aberdeen and Brooksville.
[2]Average of Newton and Raymond.
[3]Two-year average = Cruger, Shaw, and MSU; 3-year average = Cruger, Shaw, MSU, and Stoneville.
[4]Planted at Hernando Only.

Table 15. Average grain production, by areas, for late-maturing corn hybrids grown in Mississippi, 1998.

Hybrid number	Brand name	Area I[1]			Area II[2]			Area III[3]		
		1998 yield	2-year avg.	3-year avg.	1998 yield	2-year avg.	3-year avg.	1998 yield	2-year avg.	3-year avg.
967	AgraTech	--	--	--	--	--	--	153.6	--	--
HS9843	AgriPro	88.0	106.2	97.7	107.3	--	--	167.2	164.6	143.8
AP9828	AgriPro	77.7	--	--	109.6	--	--	173.7	--	--
AP9828IMI	AgriPro	76.0	--	--	104.6	--	--	166.7	--	--
AP9707	AgriPro	80.2	--	--	105.4	--	--	179.6	--	--
AP9909	AgriPro	86.9	95.0	--	--	--	--	155.8	152.9	--
AP9939	AgriPro	87.1	--	--	--	--	--	168.1	--	--
RX913	Asgrow	75.6	--	--	--	--	--	168.0	--	--
RX938	Asgrow	--	--	--	--	--	--	154.1	163.7	141.5
DK687	DeKalb	83.5	108.7	--	110.3	131.6	--	171.3	164.1	--
DK683	DeKalb	73.9	96.3	87.1	96.2	135.1	--	170.7	161.8	145.0
DK706	DeKalb	77.4	96.2	85.4	99.6	133.7	107.3	141.9	141.4	123.7
DK714	DeKalb	--	--	--	--	--	--	171.8	168.2	--
FFR943	Elite	71.5	--	--	--	--	--	172.7	--	--
DG5516	Funk's	--	--	--	--	--	--	194.0	--	--
4653	Funk's	64.0	--	--	--	--	--	--	--	--
8220	Garst	78.7	--	--	--	--	--	138.5	--	--
8222IT	Garst	73.8	--	--	--	--	--	146.8	--	--
Genesis 1818	Genesis	--	--	--	--	--	--	149.5	--	--
Genesis 2816	Genesis	--	--	--	--	--	--	136.1	--	--
dk 5445	Douglass King	86.6	--	--	--	--	--	--	--	--
dk 5570	Douglass King	88.7	--	--	--	--	--	--	--	--
8460	Mycogen	80.1	102.0	88.9	--	--	--	176.2	160.9	135.8
3163	Pioneer	85.3	109.8	95.9	113.1	138.6	115.2	178.1	170.1	147.8
3167	Pioneer	91.0	103.5	95.2	106.5	134.7	109.3	173.1	173.1	146.1
3223	Pioneer	96.8	112.5	101.4	117.6	146.5	--	184.7	182.6	--

S795	Stewart	85.8	--	--	--	--	--	169.2	--	--
TR1167	Terra	88.2	104.1	94.1	110.8	136.1	--	188.3	171.6	148.0
TR1185	Terra	78.7	97.9	87.1	103.4	126.0	--	173.4	164.4	138.9
E1188	Terra	73.2	--	--	96.6	--	--	187.7	--	--
TV2930	Terral	76.0	--	--	109.2	--	--	160.3	158.2	134.2
Overall Mean		78.4	102.9	92.5	106.4	135.2	110.6	166.6	163.9	140.5
LSD (.10)		9.2	6.7	5.6	14.6	7.7	6.3	17.6	11.5	9.9
Error degrees of freedom		300	240	288	52	84	32	211	204	258
CV (%)		19.5	15.3	17.5	12.9	9.3	10.7	14.2	13.4	16.5
R^2 (%)		74	88	79	37	89	97	51	61	52

[1]Average of Aberdeen, Brooksville, and Hernando.
[2]Average of Newton and Raymond.
[3]Two-year average = Cruger, Shaw, and MSU; 3 year average = Cruger, Shaw, MSU, and Stoneville.

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