Corn for Grain Variety Trials

Hybrid

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Notice to User

This Mississippi Agricultural and Forestry Experiment Station information bulletin is a summary of research conducted under project number MIS 1414 and is intended for the use of colleagues, cooperators, and sponsors. The interpretation of data presented herein may change after additional experimentation. Information included is not to be construed 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. The organizations listed in Table 2 provided seed and are sincerely appreciated.

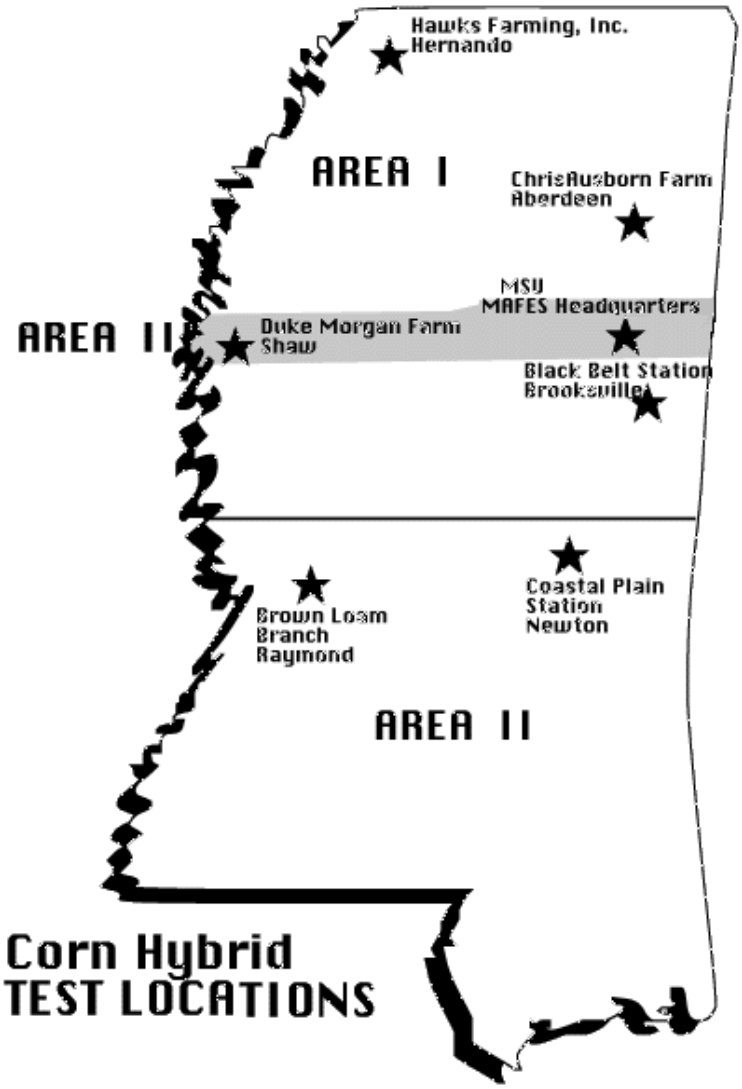
Trade names of commercial products used in this report are included only for clarity and understanding. All available names (i.e. trade names, chemical names, etc.) of products used in this research project are listed in Table 2.

Contents

Procedure

Trials were conducted on Mississippi Agricultural and Forestry Experiment Station land or on grower-cooperator fields in three geographical areas of 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. Commercial seed companies were given the opportunity to enter one or more hybrids in Area I, Area II, or Area III.

Plots consisted of two 30-inch rows, 16.75 feet long, planted on prepared seed beds. 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 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 on the basis of information provided by the sponsoring companies. Those hybrids that matured in 115 days or less were considered to be 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 (Table 2). 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 140-200 pounds per acre. Plots in Area III received 200-300 pounds of N per acre. Plots in Areas I and II were grown in dry land conditions, while plots in Area III were irrigated, if necessary.

Variables Measured in 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.

Planting rate (x 1000)	Days to maturity	Grain texture[1]	MDMV resistance[2]	MCDV resistance[2]

- **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. 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 1997 corn hybrid trials.

Location	Maturity[1]	No. of entries	Planting date	Harvest date
Area I				
• Hawks Farming, Inc. (*Hernando*)	Early Late	17 20	April 1	September 11
• Chris Ausborn Farm (*Aberdeen*)	Early Late	17 20	March 27	August 26
• Black Belt Branch (*Brooksville*)	Early Late	17 20	April 2	September 3
Area II				
• Brown Loam Branch (*Raymond*)	Early Late	15 16	April 3	September 2
• Coastal Plain Branch (*Newton*)	Early Late	15 16	March 25	August 25
Area III				
• Mississippi State University (*Starkville*)	Early Late	19 25	March 24	September 4
Duke Morgan Farm (*Shaw*)	Early Late	19 25	March 31	September 8

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

Table 2. Characteristics provided by sponsoring companies for corn hybrids entered in the Mississippi variety trials.

Company						
AgraTech Seeds, Inc. 5559 N 500 W McCordsville, IN 46055	ATX721 ATX770 ATX6714 787 967	32 32 28 32 28	114 115 117 116 124	M M H M M	S S S S R	S S S SR
AgriPro Seeds, Inc. Southern Business Units Suite 435, 6075 Poplar Ave. Memphis, TN 38119	AP9909 HS9843 HY9899V HY9919V	28 28 28 28	120 117 120 120	MH H MH MH	S S MR MR	S S MR MR
Asgrow Seed Company P.O. Box 109 Matthews, MO 63867	RX813 RX938 RX897 XP9317	28 32 28 28	111 118 115 117	-- H -- --	-- -- -- --	-- -- -- --
Cargill Hybrid Seeds	7770	28	114	M	S	S

P.O. Box 5645 Minneapolis, MN 55440	8011 8328 8311	28 28 28	114 116 117	M H H	SSS	SSS
DeKalb Genetics Corp. 3100 Sycamore RoadDeKalb, IL 60115	DK618 DK626 DK683 DK687 DK706 DK714	28 28 28 28 28 28	111 112 118 118 120 121	H M MH MH H H	S S R R MS S	S S R R MS S
Mycogen Seeds 3600 N. Columbia Plainview, TX 79072	8460	28	118	M	R	--
Pioneer Hi-Bred Int'l. 6767 Old Madison Pike Suite 110 Huntsville, AL 35806	Pioneer 3085 Pioneer 32K61 Pioneer 3163 Pioneer 3167 Pioneer 3223 Pioneer 3245 Pioneer 3260 Pioneer 3394	20 28 24 28 28 28 28 28	124 114 119 124 116 115 115 110	MH MH M M -- M M M	MR MS MR S -- MS MS S	MR MS MR S -- MR -- S
Terra International, Inc. 600 Fourth Street P.O. Box 6000 Sioux City, IA 51102-6000	TR1154 TR1157 TR1226 TR702 TR1167 TR1185 TR1106 TR1087 TR1066	28 32 28 32 32 28 32 32 32	115 115 122 120 117 118 110 108 106	M M M H M M M M M	S S R S -- -- S S S	S S R S -- -- S S S
Terral Seed, Inc. P.O. Box 826 Lake Providence, LA 71254	Terral TVX20770 Terral TV2930 Terral TV2090 Terral TV2100 Terral TVX21370 Terral 2140 TVX21570	32 28 32 32 28 32 28	105 118 107 108 111 112 115	M M M M MH H H	-- R -- -- -- -- --	-- R -- -- -- -- --
Tri-State Delta Chem. 6800 Poplar Ave., Suite 100 P.O. Box 382550 Memphis, TN 38183-2550	Funk's DG 5510A Funk's DG 5670 Funk's 5688	28 28 28	115 118 120	H M H	R R R	-- -- --

[1]M = Medium; H = Hard; MH = Medium-Hard.
[2]MDMV = Maize Dwarf Mosaic Virus; MCDV = Maize Chlorotic Dwarf Virus (corn stunt); S = Susceptible; R = Resistant; MR = Moderately Resistant; MS = Moderately Susceptible.

Table 17. Average grain production, by areas, for early-maturing corn hybrids grown in Mississippi.									
Hybrid number	Brand name	Area I[1]			Area II[2]		Area III		
		1997	2-yr. avg.	3-yr. avg.	1997	2-yr. avg	1997[3]	2-yr. avg.[4]	3-yr. avg.[5]
ATX721	AgraTech	--	--	--	--	--	132.2	--	--
ATX770	AgraTech	--	--	--	--	--	137.7	--	--
RX813	Asgrow	98.4	--	--	92.8	--	129.5	--	--
RX897	Asgrow	102.6	106.3	--	105.2	--	138.7	134.6	--
7770	Cargill	101.9	101.2	--	--	--	--	--	--
8011	Cargill	87.7	--	--	--	--	--	--	--
DK618	DeKalb	--	--	--	--	--	133.4	--	--
DK626	DeKalb	106.2	--	--	--	--	135.2	--	--
32K61	Pioneer	96.4	--	--	139.2	--	148.5	--	--
3245	Pioneer	--	--	--	118.4	109.5	143.4	143.0	135.7
3260	Pioneer	96.3	94.9	99.3	126.2	111.6	134.9	132.8	128.8
3394	Pioneer	102.8	99.0	99.7	125.0	111.9	--	--	--
TR1154	Terra	88.0	92.1	97.4	115.0	105.0	131.7	137.2	130.7
TR1157	Terra	100.5	98.8	--	120.2	--	144.3	140.0	--
TR1105	Terra	110.9	--	--	106.7	--	138.5	--	--
TR1087	Terra	100.9	--	--	109.6	--	142.8	--	--
TR1066	Terra	85.7	--	--	106.0	--	122.5	--	--
TVX20770	Terral	97.2	--	--	--	--	--	--	--
TV2090	Terra	197.1	--	--	--	--	--	--	--
TV2100	Terral	96.0	--	--	112.8	--	141.1	--	--
TVX21570	Terral	--	--	--	105.0	--	130.8	--	--
Terral2140	Terral	--	--	--	125.9	--	144.3	--	--
TVX21370	Terral	--	--	--	--	--	119.7	--	--
DG5510A	Funk's	103.0	98.6	--	119.8	--	137.1	135.9	--
Overall Mean		***98.3***	***98.7***	***98.8***	***115.2***	***109.5***	***136.1***	***137.3***	***131.7***
LSD (.10)		***11.6***	***8.8***	***8.2***	***10.9***	***8.3***	***11.1***	***9.9***	***9.4***
Error Degrees of Freedom		***192***	***144***	***72***	***112***	***48***	***144***	***100***	***69***
CV (%)		***19.6***	***20.9***	***23.7***	***12.7***	***14.2***	***11.0***	***13.7***	***16.6***
R^2		***74***	***75***	***77***	***83***	***85***	***63***	***16***	***25***

[1]Average of Hernando, Aberdeen, and Brooksville locations.
[2]Average of Raymond and Newton locations (2-year average = 1995 & 1997; no 3-year average).
[3] Average of Shaw and Mississippi State University locations.
[4] Average of MSU, 1997 Shaw, and 1996 Delta Branch.
[5] Average of MSU, 1997 Shaw, and 1995 & 1996 Delta Branch.

Table 18. Average grain production, by areas, for late-maturing corn hybrids grown in Mississippi.									
Hybrid number	Brand name	Area I[1]			Area II[2]		Area III		
		1997	2-yr. avg.	3-yr. avg.	1997	2-yr. avg	1997[3]	2-yr. avg.[4]	3-yr. avg.[5]
ATX6714	AgraTech	--	--	--	--	--	108.3	--	--
787	AgraTech	--	--	--	--	--	127.0	--	--
967	AgraTech	--	--	--	--	--	128.1	121.1	116.6
AP9909	AgriPro	82.5	--	--	--	--	119.9	--	--

RX938	Asgrow	105.0	94.8	--	105.7	96.4	138.7	135.2	124.3
XP9317	Asgrow	85.2	--	--	108.8	--	125.6	--	--
8328	Cargill	106.6	100.3	--	--	--	--	--	--
8311	Cargill	98.1	--	--	--	--	--	--	--
DK683	DeKalb	95.0	93.6	99.9	123.7	104.7	122.4	132.2	128.4
DK687	DeKalb	107.2	--	--	113.3	--	125.5	--	--
DK706	DeKalb	91.9	89.4	95.8	120.7	104.0	112.8	114.6	111.6
DK714	DeKalb	--	--	--	--	--	131.8	--	--
HS9843	HyPerformer	99.5	102.5	103.4	--	--	129.6	132.1	128.0
HY9899V	HyPerformer	88.7	84.6	91.6	--	--	125.6	116.0	111.1
HY9919V	HyPerformer	95.5	99.7	--	--	--	133.5	126.3	--
8460	Mycogen	99.0	93.3	99.1	101.5	96.0	116.5	115.6	111.5
3085	Pioneer	82.2	84.1	90.4	103.9	93.7	126.2	126.3	114.4
3163	Pioneer	107.4	101.2	109.4	121.1	109.0	129.6	132.7	119.1
3167	Pioneer	92.8	97.2	100.0	119.0	108.4	138.4	132.6	120.0
3223	Pioneer	102.5	103.7	114.1	128.8	116.4	114.5	145.1	137.6
TR1226	Terra	84.2	--	--	87.7	--	119.4	--	--
TR702	Terra	80.4	89.8	93.1	100.1	99.4	119.0	123.3	115.0
TR1167	Terra	96.0	97.0	101.8	119.1	108.8	123.9	127.8	122.0
TR1185	Terra	93.7	91.4	95.1	109.9	99.4	124.4	121.7	115.8
TV2930	Terral	--	--	--	--	--	124.9	121.2	114.5
5670	Funk's DG	--	--	--	105.2	--	115.5	110.8	--
5688	Funk's	--	--	--	86.3	--	117.0	--	--
Overall Mean		***94.7***	***94.8***	***99.5***	***109.7***	***103.3***	***125.1***	***125.6***	***119.3***
LSD (.10)		***10.2***	***8.3***	***7.1***	***9.9***	***7.2***	***11.0***	***10.7***	***10.0***
Error Degrees of Freedom		***228***	***336***	***396***	***120***	***160***	***192***	***298***	***393***
CV (%)		***17.8***	***20.6***	***20.7***	***12.1***	***13.4***	***11.9***	***16.4***	***19.6***
R^2		***81***	***72***	***78***	***83***	***85***	***72***	***23***	***31***

[1]Average of Hernando, Aberdeen, and Brooksville locations.
[2]Average of Raymond and Newton locations (2-year average = 1995 and 1997; no 3-year average).
[3]Average of Shaw and Mississippi State University locations.
[4]Average of MSU, 1997 Shaw, and 1996 Delta Branch.
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