

Pennyrile Grain Testing Field
1954 Corn and Sorghum Performance Tests

The cooperative corn performance tests of the University of Kentucky Agricultural Experiment Station and the Pennyrile Grain Improvement Association were continued in 1954. Results of the tests are presented in this report. The earlier tests (1946-1953) were reported annually in mimeograph publications.

Two comparative corn yield tests were conducted in 1954 as in previous years. One--the uniform performance test--was composed of commercial hybrids that are grown extensively in Kentucky and the more promising experimental hybrids. The second test was composed of commercial hybrids being grown in Western Kentucky. The rate of corn planting test was continued in 1954, also.

A grain sorghum variety performance test was conducted on the Pennyrile Field for the first time in 1954. Eleven varieties were included. Results of the test are presented on page 4 of this report.

Experimental Procedure

A cover crop of lespedeza was turned under in the spring of 1954; an application of 600 pounds per acre of 8-8-8 analysis fertilizer was broadcast before planting and 240 pounds of 4-12-8 analysis fertilizer applied at the row. Hybrids in the uniform test were compared in 2 x 10 hill plots using a simple lattice design, while those in the commercial hybrid test were compared in a simple randomized block design of five replications. The hill spacing for both variety tests was 42 inches each way, with three plants grown per hill. The rate of planting test was grown in four-row plots 35 feet long, with the spacing in the row varying for the different rates of planting. Grain sorghums were tested in four-row plots of 23 feet long.

Measures of Performance

1. Yields for corn are recorded as bushels, per acre, of shelled grain at 15.5 percent moisture. Yields for grain sorghum are recorded as bushels, per acre, of threshed grain at 13.0 percent moisture. Corrections were made in the corn tests for missing and one-stalk hills but not for minor variations in stand. Corrections for stand were not necessary in the sorghum test or in the rate-of-corn-planting test.
2. Moisture at harvest. The percentage of moisture in the corn at harvest was determined by sampling 15-20 ears from each of two replications. The average moisture percentage of the two replications sampled was used in calculating the yields.

3. Broken stalks. The percentage of broken stalks was determined by making a count of the plants broken below the ear-bearing node.

4. Root-lodged stalks. The percentage of root-lodged stalks was determined by making a count of the plants leaning at an angle of 30 degrees or more.

5. Erect plants. Percentage of plants erect is 100 minus the sum of the broken and root-lodged stalks.

6. Dead stalks were determined by examining the stalk at the base just above the crown. Structural weakness in the internodes just above the crown is indicative of premature killing due to the action of stalk-rottening organisms.

Interpretation of Results

Experimental results cannot be freed completely of an element of error. Hybrids of equal yielding capacity may vary appreciably in any one test. The data reported in the following tables have been analyzed statistically to eliminate varietal differences in yield which may be due only to chance. The computed least significant difference (L. S. D.) which is indicative of true yield difference between hybrids is found at the foot of each table. Unless the two hybrids being compared differ by as much as or more than the L. S. D., little confidence can be placed in the superiority of one over the other, insofar as yield is concerned, that is indicated by the yield data. Superior performance of a hybrid over a period of years is stronger evidence of its superiority than the results of one year. For this reason the performance of a hybrid corn in variety tests over a period of years should be studied to determine its usefulness for a particular locality or purpose.

Uniform Hybrid Test

Thirty-six hybrids were included in the uniform hybrid test in 1954. The average yield for the test was 58.2 bushels per acre, or 1.2 bushels per acre below the 1953 average. The yellow hybrids averaged 59.5 bushels per acre and the white hybrids 56.5 bushels per acre. The data for the uniform hybrid test are given in Table 1.

Twenty-one hybrids tested in 1952 and 1953 were included in the 1954 tests, 14 hybrids have been tested for four years and eight hybrids have been tested for six years. Data on hybrids tested for more than one year are presented in Table 2.

Commercial Hybrid Test

Twenty-eight corn hybrids and two popcorn hybrids were included in the 1954 commercial hybrid test. The average yield of the 28 hybrids was 57.6 bushels per acre, or an increase of 1.4 bushels per acre over the 1953 average. The yellow hybrids average 58.3 bushels per acre compared to an average of 56.8 bushels per acre for the white hybrids. Corn hybrids and popcorn hybrids may be compared on a basis of returns per acre. Data for the commercial hybrid test are given in Table 3.

Twenty-one hybrids tested in 1954 have been tested for two years, 16 have been tested for three years, eight have been tested for five years and seven have been tested for seven years. Data on hybrids tested for two or more years are given in Table 4.

Rate of Planting Test

The rate of planting test was continued in 1954 in drilled plots, with spacing between plants varying with the rate of planting. Each plot consisted of four rows 35 feet long, but only the two center rows were harvested for yield. All plots were planted with the white hybrid US 523W. In addition to the fertilizer treatment previously mentioned, nitrogen at the rate of 100 pounds of N per acre was applied as a side-dressing on June 10.

Results of the Rate of Planting Test

Plants per acre		Acre yield of shelled grain 15.5% moisture	Moisture at harvest	Nubbins produced		Total broken stalks	Root lodged stalks	Ears per plant
Intended	Actual			Weight basis	Count basis			
no.	no.	bu.	%	%	%	%	%	no.
7,110	7,929	70.2	16.1	19.8	39.8	16.4	10.4	1.20
10,668	10,135	66.9	15.8	24.2	43.3	17.5	10.5	1.00
14,223	13,264	54.3	15.9	52.0	70.8	17.4	11.2	0.89
17,774	16,535	57.1	15.6	62.8	77.8	22.2	16.5	0.81

A difference in yield of 13.4 bushels per acre is required for significance. The only significant difference existing in the test is between the lowest rate of planting and the second highest rate of planting. The lower rates of planting have resulted in higher yields for three consecutive years. Droughty conditions during the 1954 growing season probably depressed yields to a greater extent in the higher rates of planting.

Grain Sorghum Test

The grain sorghum test was grown for the first time in 1954. Eleven varieties were included in the test. Yield and agronomic data are given in the table below.

Results of the Grain Sorghum Yield Test

Variety	Yield per acre of threshed grain 13.0% moisture ^{1/}	Moisture at harvest %	Height to		Head Exsertion ^{2/}
			Top leaf in.	Top of plant in.	
Plainsman Milo	73.9	15	29	39	G
Westland	68.3	17	26	38	G
Midland	61.2	17	31	42	G-
Early Combine Hegari	61.0	15	40	50	G
Redbine-56	59.5	17	25	37	G
DD Early Hegari	58.6	19	28	36	F
Martin's Combine Milo	58.6	17	26	40	G ⁺
Early Hegari	56.6	19	38	46	F
Redbine-66	52.6	17	30	42	G
Dwarf Sagrain	46.8	23	38	46	F-
DD Hegari	38.0	21	29	38	G-

^{1/} Differences of less than 8.4 bushels per acre are not significant.

^{2/} F = fair, G = good. Based on the distance between the top leaf and the lowest branches of the head.

Rank in yield	Hybrid	Rank (Exp) (Y)	Yield at 15.5% moisture		Moisture at harvest		Root			
			bu.	%	%	Stand stalks %	Broken stalks %	Lodged stalks %	Dead stalks %	Erect plants %
1	Ky 1002	(Exp)	66.9	14.8	98	12.8	0	7.7	87.2	
2	Ky 2030	(Exp)	65.8	14.8	99	8.4	16.0	3.4	75.6	
3	Pioneer 301A	(Y)	62.8	14.7	100	1.7	0	6.7	98.3	
4	US 13	(Y)	62.4	14.6	99	14.3	0	5.9	85.7	
5	Ky 2105	(Exp)	62.3	14.7	100	5.0	16.7	10.0	79.3	
6	Ky 0109	(Exp)	61.5	15.0	100	9.2	28.3	6.7	62.5	
7	Ky 2001	(Exp)	61.3	14.9	100	12.5	8.3	8.3	79.2	
7	Ky 0216	(Exp)	61.3	14.4	100	10.8	6.7	4.2	82.5	
9	Broadbent 402	(Y)	61.2	15.1	100	8.3	10.8	6.7	80.9	
10	Ky 0228	(Exp)	60.9	15.3	100	13.3	29.2	2.5	57.5	
11	US 523W	(W)	60.8	15.4	100	9.2	57.5	9.2	33.3	
12	Ky 103	(Y)	60.6	14.5	100	10.0	0	7.5	90.0	
13	Ky 2111	(W)	60.1	14.8	100	7.5	10.8	1.7	81.8	
13	Pfister 347	(Y)	60.1	14.5	100	4.2	4.2	5.8	91.6	
15	Ky 1023	(Exp)	59.8	15.0	100	15.8	6.7	5.0	77.5	
16	Funk's G512W	(W)	59.7	14.7	97	9.5	19.8	5.2	70.8	
17	Ky 2018	(Exp)	59.5	15.5	100	5.0	16.7	5.8	78.3	
18	Ky 1005	(Exp)	59.0	15.1	98	10.2	0	5.1	89.8	
19	Funk's G91	(Y)	58.8	15.7	100	9.2	2.5	0	88.3	
20	Ky 0105	(W)	58.6	14.9	100	18.3	10.8	6.7	70.9	
21	Ky 9105B	(W)	58.3	15.2	99	5.0	21.8	5.0	73.2	
22	Ky 2106	(W)	57.8	14.6	99	9.2	15.1	7.6	75.7	
23	Ky 2026	(Exp)	57.3	14.8	99	23.5	37.8	3.4	38.8	
23	Ky 1110	(W)	57.3	15.0	100	7.5	24.2	4.2	68.3	
25	Ky 102	(Y)	56.2	15.0	99	26.1	1.7	14.3	72.3	
26	Stull 100Y	(Y)	56.1	14.6	94	8.8	0	5.3	91.2	
26	Ky 2004	(Exp)	56.1	15.8	93	4.5	6.3	5.4	89.2	
28	Ky 2109	(Exp)	55.1	15.0	100	1.7	4.2	6.7	94.1	
28	Stull 400W	(W)	55.1	15.0	100	6.7	14.2	3.3	79.1	
30	Ind 750B	(W)	54.6	15.0	100	9.2	8.3	7.5	82.5	
31	Funk's G134	(Y)	54.1	15.4	100	6.7	15.8	4.2	77.5	
32	Ky 9107	(W)	53.5	15.1	100	4.2	20.8	2.5	75.0	
33	Broadbent 235W	(W)	52.1	15.2	94	4.4	12.4	3.5	83.2	
34	Ky 203	(W)	51.7	15.0	100	24.2	10.0	6.7	65.8	
35	Ind 844D	(Y)	49.1	14.4	98	3.4	0	7.6	96.6	
36	Ky 1102A	(Exp)	48.8	15.4	86	6.8	9.7	7.8	83.5	
	Means	(W)	58.2	15.0	98.7	9.6	12.4	5.8	78.0	
	L. S. D.		6.4							

(Exp) = Experimentally determined; (Y) = Yield; (W) = Weight; (L. S. D.) = Least Significant Difference

Table 2. Average Performance Data for Hybrids in Uniform Hybrid Corn Test, Hopkinsville, Ky., 1949-1954

Rank in Yield	Hybrid	1953-54		3 Yr. 1952-54		4 Yr. 1951-54		6 Yr. 1949-54	
		Acres Yield ¹ / bu.	Plants Erect %	Acres Yield ¹ / bu.	Plants Erect %	Acres Yield ¹ / bu.	Plants Erect %	Acres Yield ¹ / bu.	Plants Erect %
1	Ky 0216	(Exp) 64.6	86						
2	Ky 2030	(Exp) 64.2	81						
3	Ky 1110	(Exp) 63.8	83	59.0	85				
4	Ky 1002	(Exp) 63.4	88	60.5	89				
5	Ky 0109	(Exp) 63.3	80	60.7	85	65.1	88		
6	Funk's G91	(Y) 63.0	90	58.4	93	66.2	90		
7	Ky 2001	(Exp) 61.8	78						
7	Ky 2111	(Exp) 61.8	86						
9	Ky 0228	(Exp) 61.5	65	59.6	68	66.6	71		
10	US 523W	(W) 61.4	62	57.0	67	64.9	70	77.1	79
10	Ky 2105	(W) 61.4	86	56.3	85				
12	Ky 103	(Y) 61.2	86	57.8	87	62.1	78	69.3	80
13	Ky 2018	(Y) 61.0	84						
14	Ky 1005	(Exp) 60.4	89	57.9	87				
14	Ky 2106	(Exp) 60.4	85	55.2	87				
14	Pfister 347	(Y) 60.4	94						
17	US 13	(Y) 60.2	86	57.0	90	61.1	89	68.5	88
18	Ky 9105B	(W) 59.6	84	54.6	84	61.5	86		
19	Ky 1023	(Exp) 59.4	82						
20	Ky 0105	(Exp) 58.6	72	56.3	78	61.4	78		
20	Ky 2026	(Exp) 58.6	60						
22	Funk's G512W	(W) 58.5	82	53.1	84				
23	Ky 2109	(Exp) 58.1	96						
24	Ky 2004	(Exp) 57.6	93						
25	Funk's G134	(Y) 57.5	86						
26	Stull 400W	(W) 56.5	88	53.5	84	61.8	84	75.5	86
27	Indiana 750B	(W) 56.0	90	51.5	92	57.2	93	68.9	94
28	Ky 9107	(W) 55.2	86	52.3	84	59.6	86		
29	Ky 1102A	(W) 54.6	88	56.2	89				
30	Ky 203	(W) 53.8	74	51.1	78	60.9	79	71.2	80
31	Broadbent 235W	(W) 53.6	90	52.9	88	60.4	90	69.3	91
32	Ky 102	(Y) 52.6	71	48.3	69	53.8	74	64.4	74
33	Indiana 844D	(Y) 51.8	90						
	L. S. D.	4.6		4.4		4.1		2.7	

(Y) Yellow hybrid (W) White hybrid (Exp) Experimental hybrid (Exp) Experimental hybrid, not available commercially.

¹ Differences in yields of less than the L. S. D. figure at the bottom of the table for the respective periods are not significant.

Rank in yield	Hybrid	Yield at 15.5% moisture bu.	Moisture at harvest %	Stand %	Broken stalks %	Root lodged stalks %	Dead stalks %	Erect plants %
1	US 523W	69.4	14.0	100	7.5	25.8	1.7	66.7
2	Pfister's 484Y	65.7	14.3	98	19.7	0.0	2.6	80.3
3	DeKalb 910W	63.5	14.4	100	11.7	15.0	7.5	73.3
4	Stull 100Y	63.1	13.5	98	0.8	0.0	2.5	99.2
5	Pfister's 620W	62.1	13.5	100	8.3	22.5	1.7	69.2
5	SS Pocahontas	62.1	13.8	97	3.4	4.3	4.3	92.3
7	Pioneer 309A	61.3	14.5	100	13.3	0.0	2.5	86.7
8	Broadbent 402Y	61.2	14.3	99	17.6	5.0	1.7	77.4
9	US 13	60.6	13.3	100	8.3	7.5	7.5	84.2
10	SS Mohawk	59.7	13.8	93	6.3	11.6	3.6	82.1
11	Funk's G91	59.4	13.8	98	5.9	4.2	4.2	89.9
12	Dixie 33	59.2	15.2	97	15.5	6.9	0.9	77.6
13	Funk's G512W	59.0	14.1	100	9.2	13.3	5.0	77.5
14	Pfister's 347	58.9	13.5	98	5.1	5.1	10.3	89.8
15	Ky 103	58.4	13.7	95	11.4	0.0	3.5	88.6
16	DeKalb 817A	56.7	13.3	98	5.1	0.0	3.4	94.9
17	Pioneer 510W	56.4	13.9	103	4.1	7.3	3.3	88.6
18	Broadbent 600Y	56.2	13.5	98	5.1	0.0	3.4	94.9
19	Stull 400W	56.1	13.6	92	5.5	10.9	0.9	83.6
20	Ky 203	56.0	13.7	99	16.8	5.9	3.4	77.3
21	Funk's G134	55.5	13.8	99	2.5	6.7	0.0	90.8
21	Meacham's M5	55.5	14.5	102	9.8	12.3	5.7	77.9
23	Meacham's M33	55.2	14.0	96	5.2	3.5	7.0	91.3
24	Pioneer 505	55.1	13.9	100	5.8	10.8	0.8	83.4
25	Broadbent 235W	52.9	14.3	100	4.2	5.0	3.3	90.8
26	Ind 750B	47.4	14.1	100	7.5	5.0	1.7	87.5
27	Neal's Paymaster	46.3	14.8	93	16.2	43.2	1.8	40.6
28	Jar. Gol. Prol.	41.0	14.9	98	16.9	13.6	2.5	69.5
	Means	57.6						
	L. S. D.	7.9						
	Purdue 38	2706	12.7	97	16.4	15.5	10.3	68.1
	Purdue 32 (Kan. K4)	2138	13.0	101	6.6	14.9	4.1	78.5

1/ Yield for popcorn is reported in pounds of ear corn per acre at 13.5% moisture.

Table 4. Average Performance Data for Hybrids in Commercial Hybrid Corn Test - 1948-1954

Rank in Yield	Hybrid	2 Yr. 1953-54		3 Yr. 1952-54		5 Yr. 1950-54		7 Yr. 1948-54	
		Acre Yield	Plants Erect	Acre Yield	Plants Erect	Acre Yield	Plants Erect	Acre Yield	Plants Erect
		bu.	%	bu.	%	bu.	%	bu.	%
1	US 523W	(W) 65.9	74	65.7	74				
2	Stull 100Y	(Y) 65.4	96	59.3	93				
3	Broadbent 402Y	(Y) 62.6	82	58.3	85				
4	Funk's G91	(Y) 61.2	90	60.8	93				
5	Pfister 347	(Y) 61.0	89						
6	US 13	(Y) 60.0	78	59.4	83	65.4	81	72.6	86
6	SS Mohawk	(Y) 60.0	89						
8	Meacham's M33	(Y) 59.9	94	55.4	95				
9	Dixie 33	(W) 58.6	84						
10	Pioneer 510W	(W) 58.3	92	57.4	94	66.7	93	74.9	95
11	Stull 400W	(W) 57.6	86	60.5	87	72.3	87	78.2	90
12	Ky 103	(Y) 57.2	80	58.0	82	64.2	76	71.9	81
13	Funk's G512W	(W) 57.0	84	56.5	83				
14	Funk's G134	(Y) 56.6	92						
15	Ky 203	(W) 56.3	78	56.6	82	65.1	78	74.0	83
16	DeKalb 817A	(Y) 55.3	94	51.4	93				
17	Ind 750B	(W) 55.0	88	57.1	88	65.8	89		
18	Broadbent 235W	(W) 54.8	90	55.6	89	64.5	91	73.1	93
19	Meacham's M5	(W) 52.6	84	53.8	81	62.4	81	72.0	86
20	Neal's Paymaster (OP)	(W) 42.0	62	43.0	66				
21	Jar. Gol. Prol. (OP)	(Y) 39.0	74	41.4	76				
	L. S. D.	11.2		7.1		3.3		2.4	

(Y) Yellow hybrid (W) White hybrid (OP) Open-pollinated variety.

1/ Differences in yields of less than the L. S. D. figure at the bottom of the table for the respective periods are not significant.