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HYBRID POPCORN PERFORMANCE TRIALS
1963

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PROGRESS REPORT 136
(Filing Code 1)

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Popcorn production in the United States in 1963 declined to the lowest level since 1957 due primarily to a 40 percent reduction in acreage. Large stocks held by processors from the record 1962 crop were largely responsible for this acreage reduction.

The growers of popcorn in Kentucky followed the national trend and reduced acreage to 12,400 acres in 1963 compared with 21,000 acres grown in 1962. The production of popcorn in Kentucky was 26 million pounds in 1963, a reduction of 11 million pounds from 1962. The per acre yield in 1963 was 2100 pounds. The value of the 1963 crop in the state was \$690,000.

Kentucky ranked fourth in the nation in both total production and value of production in 1963 behind Indiana, Iowa and Illinois. Kentucky ranked third in harvested acreage, being exceeded only by Indiana and Iowa.

Popcorn hybrids developed in the breeding program at the Indiana Agricultural Experiment Station were included in the evaluation studies in Kentucky. Land was made available for these studies by Orrin Hull, manager of the Murray State College farm, Murray, Kentucky, and by Graham Duncan, Hopkinsville, Kentucky. Their assistance and interest are acknowledged and appreciated.

Three-two-and one-year summaries are presented in Tables 1-3. The results of the individual experiments conducted in 1963 at Murray and Hopkinsville are summarized in Tables 4 and 5.

Purdue 9318W compared very favorably with P303 on the basis of three-year test results (Table 1). Purdue 9318W exhibited a higher yielding potential as well as less total lodging than did P303. Moisture content at harvest and ear placement of the two hybrids were similar. The yellow hybrids P406A and P410 were superior to P32 and P632 in yielding ability during the three-year testing period. P410 appeared to be somewhat superior to P406A in standing ability. The yielding ability of the dent-sterile hybrid, P632, was inferior to the original P32.

The two-year test results are summarized in Table 2. The experimental white hybrid 9312W yielded somewhat more than Purdue 9318W and P303 but was inferior to Purdue 9318W in standing ability. The yellow hybrids P406A, P410, P605 and P213 performed similarly during the two-year testing period. P410 and P605 seemed to have slightly less lodging.

The relative performance of P303, Purdue 9312W and 9318W in the 1963 trials was similar to the two-year results reported above (Table 3). Several of the experimental yellow hybrids from Purdue appeared promising on the basis of the 1963 evaluation studies. Purdue Exp. 2393 was the highest yielding hybrid and was equal to P410 in standing ability. It was superior to P406A in standing ability although lower yielding than P410, P213, P605 and P406A. The yellow experimental hybrids 2391 and 13172 appeared promising on the basis of lodging resistance.

EXPERIMENTAL PROCEDURES

Field Design

Each hybrid was planted in four plots at each of the two locations, with individual plots being two hills wide and five hills long. These plots were located in different parts of the testing field to minimize cultural and soil differences.

Yield

The corn from each plot was harvested and weighed individually. The yield of the hybrids was determined and is reported on the basis of pounds of ear corn per acre with a moisture content of 13.5 percent. Adjustments were made also for missing hills but not for other variation in stand. Therefore, the yields at each location reported in this report constituted an average yield of the four plots after all adjustments were made.

Moisture

The moisture content at harvest is the best measure of relative maturity of hybrids. One hybrid may be considered to be earlier than a second hybrid if its moisture content at harvest is consistently lower. Maturity thus determined is not absolute but is relative to the hybrids being compared.

The moisture content of the grain of individual hybrids was determined at harvest by removing two rows of kernels from each of eight ears selected at random from each of the first three replications. The grain from the 24 ears was thoroughly mixed, and the moisture content of a 150-gram sample was determined with a Steinlite moisture meter.

Root Lodging

Plants which leaned from the base at an angle of more than 30 degrees from the vertical were considered to be root-lodged. This character was expressed as a percentage which was obtained by counting the number of root-lodged plants and dividing by the number of plants present.

Stalk Lodging

A plant was considered to be stalk-lodged when the stalk was broken between the ear-bearing node and ground level. This attribute was computed in a manner similar to that indicated for root lodging.

Ear Height

Ear height (distance from the base of the plant to the point of attachment of the upper ear) was measured visually, using a scale with one-foot intervals. Visual ratings were made on four plots of each hybrid at each location.

Stand

All tests were planted at the rate of 5 kernels per hill and the resulting plants thinned to 3 per hill. The stand percentage was computed on the basis of the total plants present divided by the number of plants which would have been present if all had survived.

Table 1. Three-year summary of agronomic data recorded on popcorn performance trials grown at Murray and Hopkinsville, Kentucky in 1961-63. 1/

Pedigree	Color	Acre yield lbs.	Moist. at harv. %	Lodging		Dropped ears %	Ear ht. ft.	Stand %
				Root %	Stalk %			
P303	W	2958	13.1	7.8	25.0	0.1	3.6	96.2
Purdue 9318W	W	3270	13.3	12.8	11.4		3.4	97.7
White Average		3114	13.2	10.3	18.2	0.1	3.5	97.0
P32	Y	3749	14.2	17.9	16.6		4.1	97.4
P406A	Y	4316	13.9	15.4	21.6	0.1	4.1	99.3
P410	Y	4291	13.6	8.0	25.5		4.0	96.3
P632	Y	3331	13.8	6.6	28.5	0.1	3.9	95.5
Yellow Average		3922	13.9	12.0	23.1	0.1	4.0	97.1
Overall Average		3653	13.7	11.4	21.4	0.1	3.9	97.1

1/ Murray data not included for 1961.

Table 2. Two-year summary of agronomic data recorded on popcorn performance trials grown at Murray and Hopkinsville, Kentucky in 1962-63.

Pedigree	Color	Acre yield lbs.	Moist. at harv.%	Lodging		Ear ht. ft.	Stand %
				Root %	Stalk %		
P303	W	2723	12.9	10.1	26.6	3.5	95.5
Purdue 9312W	W	2938	12.4	18.9	15.5	3.4	100.1
Purdue 9318	W	2777	12.5	15.1	10.3	3.3	97.3
White Average		2813	12.6	14.7	17.5	3.4	97.6
P32	Y	3355	13.9	22.8	19.4	4.0	96.6
P213	Y	3975	13.5	2.9	44.7	3.9	97.8
P406A	Y	3918	13.4	20.5	23.7	4.2	100.2
P410	Y	3838	13.0	10.3	28.2	3.9	96.0
P605	Y	3729	13.2	9.6	30.6	4.2	95.3
P632	Y	3465	13.8	8.1	27.3	4.2	94.1
Purdue 0368	Y	3534	13.0	4.0	29.4	4.0	98.2
Yellow Average		3688	13.4	11.2	29.0	4.1	96.9
Overall Average		3425	13.2	12.2	25.6	3.9	97.1

Table 3. Average of agronomic data recorded on popcorn performance trials grown at Hopkinsville and Murray, Kentucky compared in Experiments 24-25 in 1963.

Entry No.	Pedigree	Color	Acre yield lbs.	Moist. at harv. %	Lodging		Ear ht. ft.	Stand %
					Root %	Stalk %		
01	P303	W	3002	11.6	10.3	8.9	3.3	96.9
03	Purdue 9312W	W	3110	10.6	10.5	5.3	3.4	97.9
02	Purdue 9318W	W	2932	11.1	5.3	8.7	3.3	92.1
	White Average		3014	11.1	8.7	7.6	3.3	95.6
11	P32	Y	3867	12.5	22.0	15.2	4.0	93.5
08	P202	Y	3106	11.7	9.9	14.6	3.2	90.6
09	P213	Y	4306	11.7	3.0	20.2	3.9	96.2
05	P406A	Y	4104	12.2	24.9	11.6	3.8	99.0
04	P410	Y	4339	11.5	10.2	9.0	3.9	96.5
06	P605	Y	4155	11.8	12.8	13.3	3.9	92.7
07	P632	Y	3968	12.1	8.3	16.4	4.0	92.8
10	Purdue 0368	Y	3659	11.5	3.2	18.3	3.8	97.9
15	Purdue Exp. 2391	Y	3737	11.7	2.2	10.7	3.9	97.2
14	Purdue Exp. 2393	Y	4027	12.1	10.0	11.2	3.6	95.8
16	Purdue Exp. 12250	Y	3440	11.5	15.0	10.2	3.3	84.4
13	Purdue Exp. 13172	Y	3796	11.4	6.0	12.1	3.9	92.4
12	Purdue Exp. 13175	Y	3640	11.3	5.2	16.8	3.8	86.8
	Yellow Average		3857	11.8	10.2	13.8	3.8	93.5
	Overall Average		3699	11.6	9.9	12.7	3.7	93.9

Table 4. Average agronomic data recorded on popcorn performance trials compared in Experiment 24 grown near Hopkinsville, Kentucky in 1963.

Entry No.	Pedigree	Color	Acre yield lbs.	Moist. at harv. %	Lodging		Ear ht. ft.	Stand %
					Root %	Stalk %		
01	P303	W	3048	11.8	1.4	14.0	3.0	99.3
03	Purdue 9312W	W	3187	10.7	1.4	6.3	3.3	100.0
02	Purdue 9318W	W	3276	11.3		12.8	3.0	92.4
	White Average		3170	11.3	0.9	11.0	3.1	97.2
11	P32	Y	4248	12.8	5.2	27.4	4.0	93.8
08	P202	Y	3324	11.9		19.4	3.0	96.5
09	P213	Y	4886	11.8		32.9	3.8	99.3
05	P406A	Y	4451	12.5	5.6	23.2	3.5	98.6
04	P410	Y	4843	11.5	1.4	12.1	3.8	97.9
06	P605	Y	5004	12.2	10.2	19.7	4.0	95.1
07	P632	Y	4437	12.2	7.4	25.2	4.0	93.8
10	Purdue 0368	Y	3983	12.1	3.5	24.3	3.5	100.0
15	Purdue Exp. 2391	Y	4226	11.6		13.9	3.8	100.0
14	Purdue Exp. 2393	Y	4570	12.3		16.4	3.3	97.2
16	Purdue Exp. 12250	Y	3792	11.7	0.7	17.4	3.0	100.0
13	Purdue Exp. 13172	Y	4497	11.4		17.9	4.0	97.2
12	Purdue Exp. 13175	Y	4326	11.6	0.7	24.8	3.8	95.1
	Yellow Average		4353	12.0	2.7	21.1	3.7	97.3
	Overall Average		4131	11.8	2.3	19.2	3.6	97.3

Source of variation	D/F	Net sum of squares	Mean square	F value	5%	1%
Reps	3	13.41	4.47	2.06		
Varieties (unadj.)	15	154.70	10.31	4.75	1.90	2.48
Error	45	97.67	2.17			
Total	63	265.78				

Difference necessary for significance at 5% level 836 pounds
C.V. = 14.3%

Table 5. Average agronomic data recorded on popcorn performance trials compared in Experiment 25 grown near Murray, Kentucky in 1963.

Entry No.	Pedigree	Color	Acre yield lbs.	Moist. at harv. %	Lodging		Ear ht. ft.	Stand %
					Root %	Stalk %		
01	P303	W	2955	11.3	19.1	3.7	3.5	94.4
03	Purdue 9312W	W	3032	10.5	19.6	4.3	3.5	95.8
02	Purdue 9318W	W	2587	10.8	10.6	4.5	3.5	91.7
	White Average		2858	10.9	16.4	4.2	3.5	94.0
11	P32	Y	3485	12.1	38.8	3.0	4.0	93.1
08	P202	Y	2888	11.5	19.7	9.8	3.3	84.7
09	P213	Y	3726	11.6	6.0	7.5	4.0	93.1
05	P406A	Y	3757	11.8	44.1	0.0	4.0	99.3
04	P410	Y	3834	11.4	19.0	5.8	4.0	95.1
06	P605	Y	3306	11.3	15.4	6.9	3.8	90.3
07	P632	Y	3499	12.0	9.1	7.6	4.0	91.7
10	Purdue 0368	Y	3335	10.8	2.9	12.3	4.0	95.8
15	Purdue Exp. 2391	Y	3248	11.8	4.4	7.4	4.0	94.4
14	Purdue Exp. 2393	Y	3484	11.9	19.9	5.9	3.8	94.4
16	Purdue Exp. 12250	Y	3088	11.2	29.3	3.0	3.5	68.8
13	Purdue Exp. 13172	Y	3095	11.3	11.9	6.3	3.8	87.5
12	Purdue Exp. 13175	Y	2954	11.0	9.7	8.8	3.8	78.5
	Yellow Average		3361	11.5	17.7	6.5	3.8	89.7
	Overall Average		3267	11.4	17.5	6.1	3.8	90.5

Source of variation	D/F	Net sum of squares	Mean square	F value	5%	1%
Reps	3	20.93	6.98			
Varieties (unadj.)	15	48.44	3.23	1.37	1.90	2.48
Error	45	105.98	2.36			
Total	63	175.35				

Difference necessary for significance at 5% level 880 pounds
C.V. = 18.9%