

TESTS OF HYBRID CORN UNDER IRRIGATION IN COLORADO¹

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Many corn hybrids have been tested under irrigation in northern Colorado and in the Arkansas Valley from 1937 to 1941. These tests have been conducted by the Agronomy Section of the Colorado Agricultural Experiment Station.

Northeastern Colorado

The hybrids tested by the Experiment Station at Fort Collins were compared with the Condon Strain of Minnesota 13, a standard open-pollinated variety adapted to the region.

Most Corn Belt hybrids that mature later than Minnesota 13 will outyield it during unusually long frost-free seasons. The average date of first fall frost from 1887 to 1937 has been September 18. The 1937, 1938, 1939, and 1940 seasons were characterized by late frosts, the dates of first fall frosts being October 5, October 18, September 30, and October 1, respectively. Frost occurred on September 9 in 1941 with the result that the early hybrids outyielded the late ones.

The yields for the 5-year period from 1937 to 1941 are included in table 1. The results indicated that all hybrids tested outyielded Minnesota 13 significantly.

As an average for a period of years, the grower will obtain more corn with a hybrid that is slightly later than Minnesota 13. The corn may be caught by an early frost occasionally, but even then the hybrid will probably yield as much or more than an open-pollinated variety. Iowa 3080, the high yielder, has averaged 132.8 bushels of shelled corn per acre, or 25.3 percent more than Minnesota 13 during the past 4 years. This variety is a heavy forage producer. In 1940 it yielded 18.8 percent more fodder than Minnesota 13. The grains are yellow and white mixed, but seed of an improved yellow line will be available for the 1942 season. When grown for grain, it lodges badly (20.1 percent lodging) where left in the field after November 1. This variety appears to be an excellent silage type. Other hybrids within this maturity range for Fort Collins conditions are DeKalb 240, Funk G-7, and Wisconsin 625. These varieties should mature safely in the Greeley area.

Both Wisconsin 570 and Minhybrid 403 mature as early as Minnesota 13 at Fort Collins. They yield 12 to 14 percent more. Wisconsin 455 is recommended where a variety must be even earlier than Minnesota 13, or for late planting.

Several hybrids, while too late for average seasonal conditions at Fort Collins, appear to be adapted to slightly lower altitudes (below 4,500 feet) on the warmer soils. Iowalth AP has outyielded Minnesota 13 by 24.9 percent. It is in about the same maturity class as Wisconsin 696, Pioneer 332, Iowa 939, and Funk G-19.

The yields of hybrids grown at Fort Collins during 1941 are given in table 2.

1/ A summary of the dry-land hybrid test is in the course of preparation.

Table 1.—Average yields of corn hybrids at Fort Collins for 2 to 5 years, 1937 to 1941.

Rank	Hybrid variety	Relative maturity	No. years tested	Agronomic characteristics				Yield shelled corn ¹ Bu./A. % of check		
				Days to silk		% Suckers		Hybrid	Check ²	Hybrid
1.	Iowa 3080	Slightly late	4	83.4	81.7	10.3	3.2	132.8	106.0	125.3
2.	Iowealth AP	Late	2	85.0	81.6	7.4	4.5	119.9	96.0	124.9
3.	DeKalb 240	Slightly late	2	84.2	81.6	9.3	4.5	119.7	96.0	124.7
4.	Funk G-7	Slightly late	3	84.4	81.6	3.9	4.0	127.0	103.0	123.3
5.	Iowealth A	Late	3	85.0	81.6	35.0	4.0	126.8	103.0	123.1
6.	Wisconsin 696	Late	4	86.0	81.7	7.7	3.2	129.5	106.0	122.2
7.	Pioneer 332	Late	2	89.0	81.6	1.7	4.5	116.9	96.0	121.8
8.	Iowa 939	Late	5	86.9	81.4	---	---	126.7	105.2	120.4
9.	Pioneer 330	Late	2	87.5	81.6	1.6	4.5	115.6	96.0	120.4
10.	Funk G-19	Late	5	88.8	81.4	---	---	123.5	105.2	117.4
11.	Wisconsin 625	Slightly late	3	85.6	81.6	7.8	4.0	120.0	103.0	116.5
12.	Wisconsin 570	Same as check	4	82.5	81.7	3.8	3.2	120.8	106.0	114.0
13.	Wisconsin 455	Early	4	80.4	81.7	5.2	3.2	119.5	106.0	112.7
14.	Minhybrid 403	Same as check	5	82.9	81.4	---	---	118.3	105.2	112.5
15.	Minnesota 13	Check	-	---	---	---	---	---	---	100.0

1/ Differences for significance for 2, 3, 4, and 5 years are 10.3, 7.2, 6.2, and 5.8 bushels per acre, respectively.

2/ Average for Minnesota 13 (Condon Strain) for same years.

Table 2.—Hybrid corn yields at Fort Collins in 1941.

Rank	Hybrid variety	Time to silk (days)	Suckers (pct)	Smut (pct)	Lodged stalks (pct)	Fu. wt. (lbs)	Moisture in corn ¹	Yield per A. ² (bu)	% of check ³
1.	Iowealth S	81.0	19.6	2.7	21.0	55.5	25.7	126.4	141.5
* 2.	Iowa 3080	79.8	3.2	0.0	20.1	55.7	28.6	123.4	138.2
* 3.	Funk G-1	79.0	4.1	1.6	9.3	54.8	25.2	121.0	135.5
* 4.	Wisconsin 455	78.0	1.6	0.0	11.1	55.0	24.2	118.1	132.3
* 5.	Funk G-12	82.2	3.6	1.6	10.4	54.2	29.2	116.8	130.8
6.	Iowealth A	81.5	10.3	0.8	16.0	53.2	29.5	115.3	129.1
* 7.	Ohio 20	79.8	5.5	0.8	7.1	55.9	30.0	114.0	127.6
8.	Wisconsin 696	82.0	3.6	0.8	10.0	53.3	31.3	113.8	127.4
* 9.	Minhybrid 404	81.0	5.3	0.4	9.6	56.4	26.8	113.2	126.8
10.	Minhybrid 405	83.2	1.6	0.4	6.0	55.0	28.5	113.0	126.5
*11.	Funk G-7	81.8	4.1	0.4	13.6	53.1	30.1	110.8	124.1
*12.	Minhybrid 403	79.8	7.4	0.0	5.0	57.0	28.4	110.0	123.2
13.	Pioneer 353	83.8	1.2	0.8	7.2	54.0	30.9	109.7	122.8
*14.	De Kalb 240	81.5	2.8	0.4	19.6	55.8	30.3	109.7	122.8
15.	De Kalb 404A	85.5	0.4	2.0	5.0	52.9	33.4	108.7	121.7
*16.	Trukrost D-33	78.0	5.9	0.4	6.4	57.7	27.2	107.6	120.5
17.	Trukrost D-56	82.8	1.6	0.8	26.6	53.5	27.7	107.4	120.3
18.	Reid Natl. 1143	83.2	5.5	0.0	27.1	54.6	31.0	106.8	119.6
19.	Iowealth	82.5	5.6	2.6	18.2	53.0	30.9	105.3	117.9
*20.	Wisconsin 570	80.2	5.5	0.8	10.3	54.6	26.0	105.0	117.5
*21.	Wisconsin 625	82.8	2.1	1.2	7.2	54.0	31.8	104.9	117.5
22.	Iowa 939	83.5	3.2	1.2	29.2	52.1	34.8	104.1	116.6
23.	Pfister 368	87.0	1.6	0.4	8.4	54.0	33.9	103.7	116.1
24.	Pioneer 324	85.5	2.0	1.3	12.6	54.6	32.6	102.5	114.8
25.	Trukrost B-58	82.8	1.6	1.2	10.8	54.0	29.7	100.6	112.7
26.	Wisconsin 606	81.8	3.6	1.6	10.0	53.1	30.2	100.1	112.1
27.	Pioneer 330	86.2	0.8	0.8	4.8	50.3	38.1	99.6	111.5
28.	Wisconsin 703	85.2	5.2	0.8	19.2	52.1	32.3	99.6	111.5
29.	Hale 101	84.2	5.8	0.4	13.6	51.7	34.0	98.2	110.0
30.	Funk G-212	90.0	10.8	1.2	14.6	50.6	40.6	97.5	109.2
31.	Pioneer 322	86.2	0.4	0.4	14.3	54.0	33.9	97.4	109.1
32.	Cornhusker 26	84.2	3.4	0.0	3.0	---	39.8	96.1	107.6
33.	De Kalb 607	87.2	2.6	1.6	12.1	51.7	39.6	95.2	106.6
34.	Minnesota 13	78.8	4.6	4.8	37.1	55.6	25.1	89.3	100.0
35.	Funk G-19	86.5	3.6	0.4	14.2	53.5	43.7	88.2	98.8

Difference for significance

14.2

^{1/} Moisture in ear corn at harvest time.^{2/} Yields calculated on basis 15.5 percent moisture.^{3/} Minnesota 13 used as a check.

Contrary to previous experience, the earlier hybrids produced higher yields than the later ones in 1941 because of the early fall frost. All hybrids that yielded well were at least in the soft dough stage on September 10. In most instances the highest yields were obtained from hybrids that silked within 3 days of the Minnesota 13 check. Among the new hybrids that showed promise were: Funk G-1, Funk G-12, Ohio 20, Minhybrid 404, and Trukrost D-33.

Arkansas Valley

The hybrid corn yields for the Rocky Ford substation of the Colorado Agricultural Experiment Station, which is representative of the irrigated conditions of the lower Arkansas Valley, are given in table 3. These yields are averages for 2, 3, and 5 years during the period from 1937 to 1941.

Table 3.—Average yields of corn hybrids at Rocky Ford, 1937 to 1941.

Rank	Hybrid variety	Relative maturity on Sept. 12	No. years grown	Days planting to silking		Yield shelled corn Bu./A. ¹		% of check
				Hybrid	Check ²	Hybrid	Check ²	
1.	Pioneer 307	Hard dough	3	78.7	84.8	118.8	76.3	155.7
2.	Funk G-212	Soft dough	5	82.3	84.5	115.2	75.6	152.4
3.	Funk G-135	Late milk	3	86.8	84.8	115.3	76.3	151.1
4.	Pfister 160	Hard dough	3	78.7	84.8	115.3	76.3	151.1
5.	Iowealth CI	Soft dough	3	81.4	84.8	112.5	76.3	147.4
6.	Iowealth AQ	Hard dough	5	80.1	84.5	108.9	75.6	144.0
7.	De Kalb 816	Hard dough	2	80.8	84.1	118.2	83.5	141.1
8.	Pioneer 332	Soft dough	3	83.7	84.8	103.8	76.3	136.0
9.	Reid Yellow Dent	Soft dough	3	--	--	--	--	100.0

¹/Differences for significance (5 pct. point) for 2, 3, and 5 years grown are 6.8, 5.8, and 5.7 bushels per acre, respectively.

²/Average for Reid Yellow Dent for same year.

When the results for 2 to 5 years are considered it should be noted that all hybrids outyielded Reid Yellow Dent significantly. Pioneer 307 also produced more corn than Funk G-212 under comparable conditions. The yields of Funk G-135, Pfister 160, Iowealth CI, and De Kalb 816 are approximately the same as Funk G-212. The other hybrids, Iowealth AQ and Pioneer 332, yield significantly less than Funk G-212. While Funk G-135 produced a high yield, it is objectionable as a hybrid for grain production because the ears are borne at a height of 5 to 6 feet from the ground. Of the hybrids listed, it is also the latest to mature. However, it should be a good hybrid for silage production in this area because of its rank vegetative growth.

The yields of hybrids grown at Rocky Ford during the 1941 season are given in table 4.

The yield data for 1941 indicate that all the 34 hybrids significantly outyielded Reid Yellow Dent. Two hybrids produced significantly more grain than Funk G-212, these being Pioneer 334 and Ohio 92. These hybrids

Table 4.—Hybrid corn yields at Rocky Ford in 1941.

(Hybrids arranged in order of yield)

Rank	Hybrid variety	Time to silk (days)	Suckers (pct)	Smut (pct)	Lodged stalks (pct)	Bu. wt. (lbs)	Moisture in corn ¹ (pct)	Yield per A. ² (bu.)	% of check (pct)
* 1.	Pioneer 334	80.5	8.3	0.0	13.6	58.0	23.3	123.7	112.7
2.	Ohio 92	82.0	15.8	0.0	6.3	59.1	26.5	122.8	111.8
* 3.	Iowa 3110	81.5	4.6	0.7	30.0	57.8	25.5	118.8	108.2
* 4.	Pfister 160	80.0	10.1	0.0	6.1	60.9	23.8	118.8	108.2
* 5.	Illinois 960	80.5	8.7	0.4	12.8	60.5	24.1	118.6	108.0
* 6.	Pioneer 307	78.5	7.2	1.0	18.9	60.4	21.7	117.2	106.7
7.	De Kalb 827	82.0	17.8	1.1	13.9	59.2	24.3	115.3	105.0
8.	Pfister 380	77.0	5.1	1.4	8.2	60.0	21.4	114.2	104.0
9.	Iowa 13	84.0	31.5	0.0	19.0	58.2	23.8	113.3	103.2
10.	De Kalb 639	78.5	2.6	0.4	15.8	58.4	25.9	112.4	102.4
11.	Trukrost B-77	76.0	3.2	0.7	3.9	58.4	17.8	111.7	101.7
*12.	Pioneer 300	83.0	11.7	1.1	12.1	59.2	26.0	111.4	101.5
13.	Funk G-81	84.5	10.5	0.4	11.7	58.9	25.3	111.0	101.1
*14.	Funk G-212	84.5	10.5	0.4	19.2	59.7	25.0	109.8	100.0
*15.	U. S. 13	81.5	11.1	0.7	7.2	59.8	27.9	108.7	99.0
16.	Missouri 144	86.0	14.4	0.0	9.2	58.8	27.2	108.1	98.5
17.	Funk G-169	82.5	7.5	0.7	12.1	60.0	22.5	107.6	98.0
*18.	Ohio 18	84.0	22.3	0.4	5.8	59.0	23.3	107.3	97.7
19.	Pfister 5892	81.5	6.1	1.8	14.8	58.2	23.3	106.4	96.9
*20.	U. S. 44	83.5	11.6	1.8	16.2	60.4	21.7	105.6	96.2
*21.	Iowealth AQ	83.5	9.0	0.4	32.8	58.5	22.4	104.7	95.4
22.	Trukrost B-76	79.0	4.6	0.0	8.0	57.4	25.8	104.4	95.1
*23.	Iowealth CI	83.5	7.5	0.4	12.0	59.1	25.0	103.4	94.2
*24.	De Kalb 816	82.5	13.9	1.9	15.8	60.2	24.6	102.2	93.1
25.	Kansas 1104	86.5	15.6	4.1	23.7	59.3	31.0	102.0	92.9
26.	Pioneer 332	87.0	8.2	1.2	11.8	59.8	29.3	101.8	92.7
*27.	Trukrost D-82	82.5	10.3	1.4	6.7	59.6	22.6	101.8	92.7
28.	Funk G-135	88.5	13.2	0.7	36.0	59.6	29.6	100.9	91.9
29.	National 126	83.0	11.0	0.7	15.8	59.4	25.3	100.3	91.3
30.	Funk G-103	87.0	10.2	0.0	18.4	60.2	27.2	96.7	88.1
31.	U. S. 115	87.5	4.3	1.1	22.6	57.3	34.6	90.2	82.1
32.	Illinois 448	88.0	12.1	0.0	38.7	60.6	28.8	86.6	78.9
33.	Kansas 1466	88.0	18.9	2.2	16.8	57.7	31.0	83.8	76.3
34.	Iowealth T x I	84.0	20.2	2.7	30.1	57.7	33.1	81.7	74.4
35.	Reid Yellow Dent	87.0	17.0	2.3	34.4	55.0	30.4	63.2	57.6
Difference for significance - - - - -								13.0	

¹/Moisture in ear corn at harvest.²/ Shelled corn with 15.5 percent moisture³/Funk G-212 used as check.

*Exceptionally good plants.

yielded 123.7 and 122.8 bushels per acre, respectively. Several hybrids yielded more than the check, although the differences are not large enough to be regarded as important on the basis of a single year. In order of yield these hybrids are Iowa 3110, Pfister 160, Illinois 960, Pioneer 307, De Kalb 827, Pfister 380, Iowa 13, De Kalb 639, Trukrost B-77, Pioneer 300, and Funk G-81. U.S. No. 13, which yielded practically the same as Funk G-212, also shows promise. Several hybrids yielded significantly less than Funk G-212 for the season, these being Funk G-103, U. S. 115, Illinois 448, Kansas 1466, and Iowealth T x I.

Summary

When all the results are considered it is apparent that the farmer has a wide choice of corn hybrids for Colorado irrigated areas where corn is grown.

For northern Colorado irrigated lands, hybrids that will mature at about the same time as Minnesota 13 are Wisconsin 570 and Minhybrid 403. These hybrids will yield 12 to 14 percent more grain. Wisconsin 455 is recommended where a variety must be even earlier than Minnesota 13, or for late planting. As an average for a period of years, the grower will obtain more corn in this area from a hybrid that matures slightly later than Minnesota 13. Such hybrids are Iowa 3080, De Kalb 240, Funk G-7, and Wisconsin 625. Iowa 3080 appears desirable particularly as a silage variety.

Several hybrids, too late for Fort Collins conditions, appear to be adapted to slightly lower altitudes (below 4,500 feet) on the warmer soils. This applies particularly in southern Weld County and in the South Platte Valley. These hybrids generally are intermediate in the time required for maturity. On the basis of Fort Collins tests, hybrids that appear to be satisfactory for these conditions are Iowealth AP, Wisconsin 696, Pioneer 332, Iowa 939, and Funk G-19.

Relatively late hybrids are adapted to conditions found in the lower Arkansas Valley. From the results of tests conducted at Rocky Ford during the past 5 years, several hybrids were found to be suitable for that general region. In order of yield these hybrids are Pioneer 307, Funk G-212, Funk G-135, Pfister 160, Iowealth CI, Iowealth AQ, and De Kalb 816.

Several other hybrids show promise, but they have been tested for only 1 year.