2020 State Silage Corn Performance Test in the Texas High Plains

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Introduction

Silage corn is a significant crop in the Texas High Plains as it supplies the vast and dominant dairy and beef industries in this region. Hybrid selection is an important decision for silage corn producers. A good silage hybrid should have strong adaptation to the local environment, appropriate maturity, high tonnage and digestibility, plus stable production performance across varying environments. Nearly all silage corn in the Texas High Plains is produced with irrigation water derived from the Ogallala Aquifer. Increased tonnage per acre and better forage quality is a good indicator of genetic improvement of crop water use efficiency and better genetics adapted to this environment.

We initiated the State Silage Corn Performance Test in the Texas High Plains in 2007 as a service to producers and the seed industry. Testing was conducted at Halfway and Etter from 2007 to 2014 and has continued at Halfway each year since. For a fee, commercial seed companies have an opportunity to enter hybrids at offered locations. To our knowledge, this is the only public comparative field testing program available in the Texas High Plains. This test provides producers with unbiased performance information regarding yield, quality, and agronomic data.

In 2020, we faced much uncertainty due to the COVID-19 pandemic. After careful consideration, we continued the testing service at Halfway, made the announcement on April 9, and requested participating seed companies to deliver their entry seed by May 1. Even with the short notice, there were sufficient entries to conduct valid and comparative testing.

Materials and Methods

The 2020 State Silage Corn Performance Test in the Texas High Plains included 26 entries: 12 hybrids submitted by seed companies, 8 experimental hybrids from the Texas A&M AgriLife

Research corn breeding program in Lubbock, and 6 commercial checks. Among them, 19 have transgenic traits and three have the brown midrib (BMR) trait (Table 1).

The test was conducted in a field with subsurface drip irrigation system at the Texas A&M AgriLife Research Station at Halfway. The test used a randomized complete block design with three replications. Each plot consisted of four rows, 18 feet long with 2 foot alleys. Row-spacing was 30 inches. The two center rows of each plot were harvested for yield.

The test was planted on May 6 and harvested on August 28, 2020. The previous crop was cotton. Pre-plant liquid fertilizers were applied on April 15 at the per-acre rate of 200 lbs. N and 80 lbs. P per acre, respectively. The fertilizers were immediately incorporated into the soil using an offset disc. An additional 150 lbs. of nitrogen per acre was applied by side dressing on June 16. A pre-emergence herbicide was applied as a mixture of Acuron at 4.0 pt./ac and Roundup at 1 qt./ac on May 7. Post-emergence herbicide Atrazine 4L at 1 pt./ac was applied to control broadleaf weeds. Chloropyrifos was applied at 6.0 lbs./a with the planter units to control corn rootworm. At the two-leaf stage, seedlings were hand-thinned to achieve the target population of 34,848 plants/a.

Performance data were recorded for stand, pollen shedding and silking dates, plant and ear height, and root and stalk lodging. A stay green rating was recorded using a 1 to 5 scale on August 28 as follows: 1 =100% leaves green, 3 = 50% leaves green, and 5 = 0% leaves green. There were no noticeable plants with root or stalk lodging detected in the field at harvest. Plant height and ear height were measured from the soil surface to the tip of a tassel and to the node where the top ear was attached, respectively. The two-center rows of each plot were harvested on August 28 (when the average milk line was 50%) with a John Deere 5200 small-plot silage chopper equipped with a Hagie silage plot weighing system. Plants were cut four inches above the soil surface. Approximately 2 lbs. of a chopped sub-sample were collected from each plot, weighed for fresh weight, dried at 50°C and weighed for dry weight. Moisture content was calculated by using the fresh and dry weight of the sub-samples. Yield was measured on a plot basis, converted to short tons per acre, and adjusted to a 65% moisture level.

Results

This test was designed to focus on hybrids with a relative maturity of 112-117 days. There was a significant difference in days from planting to pollen shedding and silking. The average number of days from planting to pollen shedding was 64, ranging from 60 days (BH8121VT2P) to 70 days (B5C2NC). Four hybrids shed pollen in 62 days, significantly earlier than the test mean; while five hybrids shed pollen much later than the test mean, ranging from 66 to 70 days (Table 1.)

The average yield of all 26 hybrids was 23.9 tons per acre (Table 1), ranging from 20.8 tons/a (BH8121VT2P) to 27.0 tons/ac (BH8555DG2P). However, there was no single hybrid that yielded significantly more than the average entry. The yield of eight hybrids was below the 23.17 tons/ac threshold, significantly lower than the highest-yielding BH8555DG2P. Not differing significantly from the highest-yielding hybrids were 17 hybrids, including CK5 (26.8 tons/ac),

BH8704VIP3110 (26.4 tons/ac), BH8400PCE (26.2 tons/ac), B5C2NC (26.0 tons/ac), Tx214 x NS3 (24.8 tons/ac), BH8705VIP3110 (24.8 tons/a), BH8732VT2P (24.7 tons/a), LG68C59-3330 (24.7 tons/a), Tx214 x NS1 (24.5 tons/a), BH8780VT2P (24.0 tons/a), MCT6552 (23.7 tons/a), LH195BM1 x Tx209 (23.6 tons/ac), LG66C28-3110 (23.50 tons/ac), DK7 x SS1 (23.47 tons/ac), CK1 (BH8703VIP3110, 23.2 tons/ac), Tx214 x NS2 (23.2 tons/ac), and CK 4 (23.2 tons/ac). There was no hybrid that yielded significantly lower the average entry (23.93 tons/a).

The average moisture content at harvest was 57.6%, ranging from 52.8% (BH8121VT2P, the earliest hybrid in the test) to 63.5% (DK7 x SS1, one of the latest). The moisture content in 2020 at the normal harvesting growth stage of 50% milk line was about 5 percentage points lower than the value in previous years at this test location. Weather during the entire growing season in 2020 was hot and dry. Therefore, the entire plant tissue was drier even though the plants looked mostly green as indicated by the stay green rating at harvest. The average stay green rating was 2.3, indicating the bottom quarter of leaves had senesced by harvest time. The plants were 82.8 inches tall on average and at least 10% shorter than less stressful years.

This year's testing was a uniform test as evidenced by the relatively low CV values for agronomic and yield data (Table 1). It was not surprising that the average yield was 24 tons/ac. The dry and hot weather during the entire growing season inhibited plant growth and development, led to shorter plants and lower moisture content in the whole plants. Due to the COVID-19 pandemic, the forage quality analysis was not listed in the entry form and forage quality was not analyzed.

These results are available at the Texas AgriLife Variety Testing web page (http://varietytesting.tamu.edu/silage) and the Texas A&M AgriLife Research Lubbock Center websites (http://lubbock.tamu.edu). These results assist producers, Extension specialists and consultants in their selection of commercial hybrids best suited for the Texas High Plains.

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Table 1. Means of plants per acre (PPA), days to pollen shed (DTP) and silking (DTS), plant height (PHT), ear height (EHT), stay green rating (SG), moisture at harvest (%), and forage yield adjusted to 65% moisture of the State Silage Corn Performance Test at Halfway, Texas in 2020

ENO	Hybrid	Company	RM	BMR	Biotech Traits	Plants/ac	Days to pollen shed	Days to silking	Plant ht, in	Ear ht, in	ROOT Lodging	Stalk lodging	Stay green rating	Moisture %	Yield tons/ac	% Test mean	Y-rank
7	BH8555DG2P	BH Genetics	115	NO	DroughtGard VT2P	33,088	61.7	64.0	81.9	31.1	0.0	0.0	2.0	56.6	27.0	112.7	1
25	CK5	NA	120	NO	SmartStax	33,471	63.7	65.3	79.1	31.6	0.0	0.0	2.3	56.5	26.8	112.1	2
22	CK2 (BH8704VIP3110)	BH Genetics	115	NO	Viptera3110	33,161	62.3	63.7	86.6	34.0	0.0	0.0	2.0	55.9	26.4	110.3	3
6	BH8400PCE	BH Genetics	114	NO	Power Core Enlist	34,202	64.0	67.3	82.7	33.5	0.0	0.0	2.0	57.7	26.2	109.4	4
13	B5C2NC	Texas A&M	118	NO	CNV	34,015	69.7	71.7	93.7	44.4	0.0	0.0	1.8	61.4	26.0	108.6	5
14	Tx214 x NS3	Texas A&M	116	NO	CNV	30,815	64.7	68.3	80.3	25.7	0.0	0.0	1.9	59.9	24.8	103.6	6
23	CK3 (BH8705VIP3110)	BH Genetics	115	NO	Viptera3110	32,123	64.3	67.0	95.7	38.6	0.0	0.0	2.7	55.6	24.8	103.5	7
3	BH 8732VT2P	BH Genetics	117	NO	VT2P	34,164	63.0	65.3	84.3	33.7	0.0	0.0	2.3	59.0	24.7	103.2	8
2	LG68C59-3330	LG	118	NO	VIP3330	34,364	64.0	66.3	83.9	25.6	0.0	0.0	2.4	58.6	24.7	103.1	9
16	Tx214 x NS1	Texas A&M	116	NO	CVN	28,177	65.0	68.3	82.7	28.5	0.0	0.0	2.2	56.2	24.5	102.4	10
4	BH8780VT2P	BH Genetics	117	NO	VT2P	34,848	63.3	65.7	80.7	32.9	0.0	0.0	2.1	57.5	24.0	100.2	11
11	MCT6552	Master Choice	115	NO	CNV	34,506	61.3	64.3	79.9	26.8	0.0	0.0	2.2	57.6	23.7	99.1	12
18	LH195BM1 x Tx209	Texas A&M	117	BMR	CVN	31,488	67.0	69.0	85.8	38.5	0.0	0.0	2.0	60.5	23.6	98.7	13
1	LG66C28-3110	LG	116	NO	VIP 3110	34,672	63.7	65.7	82.3	30.2	0.0	0.0	2.3	56.0	23.5	98.2	14
17	DK7 x SS1	Texas A&M	118	NO	VT2P	32,279	67.0	68.7	87.0	36.0	0.0	0.0	1.8	63.5	23.4	97.7	15
21	CK1 (BH8703VIP3110)	BH Genetics	115	NO	Viptera3110	34,335	63.7	65.7	87.4	33.2	0.0	0.0	2.4	56.7	23.2	97.1	16
15	Tx214 x NS2	Texas A&M	116	NO	VT2P	31,969	64.3	66.0	77.6	23.2	0.0	0.0	2.2	56.9	23.2	97.1	17
24	CK4	NA	120	NO	SmartStax	34,202	61.3	64.0	76.4	29.3	0.0	0.0	2.4	56.6	23.2	96.9	18
5	BH8907VT2P	BH Genetics	118	NO	VT2P	31,657	62.3	64.7	83.5	35.4	0.0	0.0	2.1	59.8	22.8	95.4	19
9	BH8712VIP3110	BH Genetics	117	NO	Viptera3110	34,682	62.0	65.0	76.4	26.5	0.0	0.0	2.3	57.0	22.7	95.0	20
26	CK6	NA	111	NO	NA	33,818	64.3	66.7	78.0	27.8	0.0	0.0	2.8	53.2	22.7	94.9	21

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ENO	Hybrid	Company	RM	BMR	Biotech Traits	Plants/ac	Days to pollen shed	Days to silking	Plant ht, in	Ear ht, in	ROOT Lodging	Stalk lodging	Stay green rating	Moisture %	Yield tons/ac	% Test mean	Y-rank
20	LH195BM1 x LH210BM1B	Texas A&M	117	BMR	CVN	34,184	67.0	68.0	78.3	37.4	0.0	0.0	2.3	60.1	22.7	94.9	22
8	BH8690VIP3110	BH Genetics	116	NO	Viptera 3111	34,335	64.3	66.0	80.3	28.6	0.0	0.0	2.5	57.8	22.7	94.8	23
19	LH195BM1 x LH210BM1A	Texas A&M	117	BMR	CVN	34,516	65.7	67.3	79.9	36.6	0.0	0.0	2.5	58.2	22.4	93.7	24
12	MCT6703	Master Choice	117	NO	CNV	33,520	62.3	66.0	86.6	35.0	0.0	0.0	2.8	56.3	21.6	90.3	25
10	BH8121VT2P	BH Genetics	111	NO	VT2P	34,516	60.0	61.7	80.7	31.0	0.0	0.0	2.5	52.8	20.8	86.9	26
	Test mean					33,350	63.9	66.2	82.8	32.1	0.0	0.0	2.3	57.6	23.9	100.0	
	CV%					4.5	1.6	1.5	1.6	3.1			13.4	4.2	9.7		
	LSD0.05					2472.2	1.7	1.6	5.6	4.1	NA	NA	0.5	4.0	3.8		