2009 State Silage Corn Performance Test in the Texas High Plains

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Introduction

Texas planted 2.35 million acres of corn in 2009. Silage corn acreage in Texas has doubled from 70,000 acres since 1995. Most of this increase has occurred in the High Plains. The number of dairies located in this region has more than doubled since 2000. Seven of the top milk producing counties in Texas are now located in the region. Silage corn production will play an increasingly important role in the economic development of Texas, especially on the Texas High Plains. However, there was no variety testing and limited research for management of silage corn in the public sectors on the Texas High Plains before 2007. Producers need new hybrids adapted to local environments and information to compare and choose available hybrids. Hence, we initiated a State Silage Corn Performance Test at the North Plains Research Field at Etter in 2007 (Xu et al, 2007), and expanded it to the Texas AgriLife Research station at Halfway in 2008. Commercial seed companies have an opportunity to enter hybrids at either or both test sites on a fee basis. Our goal is to provide producers with timely and unbiased information on yield, quality, and agronomic traits.

2009 State Silage Corn Performance Test at Etter

Field operation: The test had 32 commercial hybrids and three experimental hybrids from the Texas AgriLife Research corn breeding program located in Lubbock (Table 1). All commercial hybrids carry at least one transgenic trait (RR, Bt or their combinations). There was no brown midrib silage hybrid in this test. Relative maturity is reported as indicated by the seed companies. The test used a randomized complete block design with three replications. Each plot consisted of four rows, 18 feet long at 30-inch row spacing with 2-foot alleys. The target final population was 32,912 plants/a. Rows were parallel to the pivot track, but generally oriented south to north. The previous crop was wheat, followed by summer fallow. Granular urea and mono-ammonium phosphate were broadcast on February 23 at the rate of 350 lbs N/a (64-0-0) and 100 lbs P/a (11-52-0). Fertilizer was immediately incorporated into the soil by two diskings. Seedbeds were listed on March 22 using a lister-bottom plow. Dual II Magnum ® at the rate of 1.67 pts./a, tank-mixed with Atrazine® at 0.75 lb a.i./a was broadcast applied pre-plant on March 19, 2009, and rolling cultivated to incorporate the herbicides.. Seeds were planted on April 30 using a John Deere Max-Emerge planter fitted with ALMACO cone-type planter boxes and a cable-trip system. Lorsban 15G was applied at 6.5 lbs/a through the planter units to control corn rootworm. At three-leaf stage, plant stands were hand-thinned to a uniform target population.

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On June 8, the field was sprayed with Option® at 1.5 oz per acre, 1.5 pt/a MSO and 1.5 qt/a of 32-0-0 UAN for weed control. A total of 3.7 acre-inch irrigation was pre-plant applied on March 19 and April 9. The field was irrigated three times per week at the 100 % ET level through a center-pivot irrigation system fitted with LESA emitters at 60" spacing. Total irrigation from planting to harvest was 27.62 acre-inches. The rainfall from planting to harvesting was 5.41 inches. Data was recorded on plant counts per plot, flowering dates, plant and ear heights, and root and stalk lodging. Two center rows of each plot were harvested on August 31 (average milk line at 50%) using a John Deere 5200 small-plot silage chopper equipped with a Hege silage plot weighing system. Plants were cut 5 inches above the ground. About 2 lb of chopped sub-sample was collected from each plot, weighed for fresh weight, dried at 50^0C, weighed for dry weight, and then analyzed for silage quality using NIR methods by the Dairy One Forage Lab (Ithaca, NY).

Results: Forage yields of the 35 hybrids at the Etter location ranged from 29.5 to 35.8 tons/a with an average of 32.6 tons/a at the adjusted 65% moisture level (Table 1). The yield of B-H 9078VT3 was significantly higher than the test mean, while three hybrids (X709VT3, X9089VT3, and XP9008GT) yielded significantly lower than the test mean.

All hybrids had excellent plant stands, equal to or close to the target population of 32,912 plants per acre. Days to pollen shed (DTP) were significantly different among the hybrids. Six hybrids shed pollen significantly earlier than the test mean (73.7 days) and four much later than the test mean (Table 1). The correlation coefficient between yield and days to pollen shed was not significant (r = 0.33). The whole plant moisture at harvest time was 68.9% ranging from 65.3% to 73.3%, within the reasonable range for harvest

The C.V. values of 4.8% for forage yield and 2.0% for forage moisture indicated that this was a very uniform test; the field was well managed; weeds were well controlled; plant population was uniform; fertilizer, and water were sufficient. Stalk and root lodging were rare and not reported.

Silage quality estimated on NIR was significantly different among hybrids in all traits except crude protein and lignin (Table 2). Total digestible nutrients (TDN) values ranged from 67.0% to 74.0%, with NC+ 216-63VT3, BH 8668VT3, X7089VT3, and XP9008GT being highest. The *in vitro* true digestibility for 24 hr incubation in rumen fluid and buffer (IVTD24) ranged from 70.7% to 79.3% with a mean of 75.7%. No hybrid had an IVTD24 value significantly higher than the test mean, but Triumph 2288H and Wilbur-Ellis Int9701VT3 had an IVTD24 value significantly lower than the test mean. These two hybrids also had low % starch and were among the late flowering hybrids. Percent IVTD may have been higher if these two hybrids had been harvested a few days later when more starch had accumulated in the kernels. However, other hybrids such as DKC67-87 with similar flowering dates had much higher INTD24, therefore, these hybrids may produce lower grain yields than others even if they would have been harvested a few days later.

2009 State Silage Corn Performance Test at Halfway

Field operation: The test had 19 commercial hybrids and three experimental hybrids from the Texas AgriLife Research corn breeding program located in Lubbock (Table 3). All commercial hybrids carry at least one transgenic trait (RR, Bt or their combinations). There was no brown midrib silage hybrid in this test. The test used a randomized complete block design with three replications, four-row plots at 18 feet length, 40-inch row spacing, and 3-foot alleys. Planting date was April 23. The target final population was 31,844 plants/a. The previous crop

was corn. Granular urea and mono-ammonium phosphate were broadcast on March 16 at the rate of 250 lbs N/a and 100 lbs P/a. Fertilizer was immediately incorporated into the soil by two disking. Seedbeds were listed on March 17 using a lister-bottom plow. Dual II Magnum® at the rate of 1.67 pts./a, tank-mixed with Atrazine 4L® at 1.5 lbs. a.i./a was applied on April 24. Lorsban 15G was applied at 6.5 lbs/a through the planter units to control corn rootworm. At three-leaf stage, plant stands were hand-thinned to a uniform target population. On May 29, liquid nitrogen (UAN) was side dressed at a rate of 100 lbs N/a. The field was surface irrigated through furrows every 10 days. The in-season rainfall was 13.7 inches. Data collection, harvesting, and quality analyses were the same as described for the Etter location.

Results: Forage yields of the 22 hybrids at the Halfway location differed significantly, ranging from 26.1 to 34.1 tons/a with an average of 29.4 tons/a at the adjusted 65% moisture level. The yield of Wilbur-Ellis Int9701VT3 was significantly higher than the test mean, but no hybrid yielded significantly lower than the test mean (Table 3).

All hybrids had good plant stands, equal to or close to the target population of 31,944 plants per acre. The average pollen shed (DTP) was 75.1 days, slightly higher than the Etter location, due to low temperatures in late April. Seven hybrids shed pollen significantly later than the test mean and six hybrids shed pollens much earlier than the test mean (Table 3). The whole plant moisture at harvest was 60.5% ranging from 55.3% to 65.0%. The test was harvested on August 24. One of the reasons for this low moisture level was that high temperatures prior to harvesting dried the plants rapidly once irrigation was shut down in preparation for harvest. The C.V. values of 7.7% for forage yield and 3.8% for forage moisture indicated that this was, in general, a good test. Stalk and root lodging were rare and not reported.

Silage traits assayed with NIR were significantly different in all analyzed quality traits (Table 4). TDN values ranged from 69.0% to 76.0%. IVTD24 values ranged from 73.3% to 81.0%. The average quality of the Halfway test was better than the Etter test.

Summary

Hybrid selection is an important decision for silage corn producers. A range of silage hybrids are available on the market, including dual-type hybrids, leafy hybrids, and brown midrib (BMR) hybrids. High tonnage, high energy, and high digestibility are key factors for a good silage hybrid. A good silage hybrid should be high in the protein, starch, TDN, and IVTD24 and low in ADF, NDF, and lignin. For the hybrids in the 2009 State Silage Performance Tests at Etter and Halfway, there was no significant correlation between yield and days to pollen shed at both locations, however, the later maturing hybrids had lower forage quality. Maturity is an important factor for choosing a hybrid since the moisture level is critical for ensiling and there is a narrow window for chopping silage. The relative maturity (RM) rating of a particular hybrid by a company may be preliminary and not comparable for the tested silage hybrids. Care must be taken when selecting a hybrid based solely on its RM rating as the RM ratings for silage hybrids among commercial companies do not compare well.

These results are available at the State Crop Performance Test Program (http://varietytesting.tamu.edu) and the Texas AgriLife Research Lubbock Center websites (http://lubbock.tamu.edu). These results will help producers, extension specialists and consultants select commercial hybrids best suited to the Texas High Plains.

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Table 1. Means of forage yield adjusted to 65% moisture level, moisture, and agronomic traits of the State Silage-Corn Performance Test at Etter, Texas in 2009.

ENO	Hybrid	Company	RM	Traits	Stand	Days to pollen shed	Plant ht, in.	Ear ht, in	Moist., %	Yield, tons/a	Yield rank	Duncan's Test
1	Belle 1545VT3	Belle Southern	115	VT3	100.0	72.0	110.8	33.9	67.8	32.73	19	bcdefgh
2	Belle 1646VT3	Belle Southern	116	VT3	100.0	73.0	114.8	46.2	69.7	32.44	23	cdefgh
3	DG58V69	DynaGro	118	VT3	100.0	75.0	116.5	54.3	68.5	33.55	7	abcdef
4	GA 27Z07	Golden Acres	117	VT3	100.0	74.0	111.9	45.0	70.1	32.14	25	defghi
5	GA 28V87	Golden Acres	117	VT3	98.5	73.0	114.3	50.3	67.5	33.76	6	abcde
6	MC 590	Masters Choice	114	VT3	95.1	73.0	115.5	42.4	69.5	33.27	9	bcdefg
7	MC 573	Masters Choice	114	VT3	98.5	71.0	110.9	45.8	67.9	32.80	17	bcdefgh
8	DKC67-87	Monsanto	117	RR2,YG, CB	100.0	75.0	116.9	53.4	67.8	34.94	3	abc
9	DKC61-69	Monsanto	111	VT3	100.0	70.0	108.8	43.4	67.0	31.61	28	efghij
10	216-63VT3	NC+ Hybrids	116	VT3	97.1	71.0	105.1	39.4	65.5	31.01	31	ghij
11	218-28R	NC+ Hybrids	118	RR	98.5	73.0	114.4	38.1	68.9	33.09	12	bcdefgh
12	X709VT3	NC+ Hybrids	117	VT3	99.0	75.0	110.8	54.1	73.3	29.47	35	j
13	X710VT3	NC+ Hybrids	117	VT3	98.5	74.0	120.3	59.8	70.6	31.82	26	defghij
14	Int9682R	Wilbur-Ellis	118	RR	98.0	77.0	121.3	50.1	71.0	33.12	11	bcdefg
15	Int9691VT3	Wilbur-Ellis	119	VT3	99.5	75.0	109.3	45.8	68.7	33.09	13	bcdefgh
16	Int9650VT3	Wilbur-Ellis	115	VT3	100.0	73.0	117.1	46.9	68.6	32.89	15	bcdefgh
17	Int9701VT3	Wilbur-Ellis	120	VT3	100.0	77.0	115.9	46.5	68.3	33.86	5	abcde
18	BH 8718RR	B-H Genetics	117	RR	98.0	73.0	119.4	53.1	68.4	31.49	29	efghij
19	BH 8668VT3	B-H Genetics	114	VT3	100.0	74.0	117.3	48.8	68.4	32.52	22	cdefgh
20	BH 8895VT3	B-H Genetics	118	VT3	100.0	73.0	112.5	42.3	69.4	33.20	10	bcdefg
21	BH 9018VT3	B-H Genetics	118	VT3	98.5	76.0	111.0	49.5	69.6	32.66	20	bcdefgh
22	XP4908HX	B-H Genetics	117	HX, LL	99.0	73.0	121.8	58.3	69.4	32.90	14	bcdefgh
23	BH 9024RR	B-H Genetics	118	RR	100.0	75.0	119.9	54.9	71.1	32.79	18	bcdefgh
24	BH 8882VT2	B-H Genetics	117	VT3	99.0	75.0	115.0	51.7	69.2	32.21	24	defghi
25	X9089VT3	B-H Genetics	114	VT3	100.0	70.0	103.4	45.7	65.3	29.74	33	ij

ENO	Hybrid	Company	RM	Traits	Stand	Days to pollen shed	Plant ht, in.	Ear ht, in	Moist., %	Yield, tons/a	Yield rank	Duncan's Test
26	X9084VT3	B-H Genetics	113	VT3	100.0	70.0	107.5	46.2	66.7	32.86	16	bcdefgh
27	BH 9078VT3	B-H Genetics	117	VT3	100.0	76.0	118.4	53.3	67.2	35.83	1	a
28	X 9030HX	B-H Genetics	118	HX, LL	97.5	73.0	109.7	45.1	69.8	34.20	4	abcd
29	XP 9008GT	B-H Genetics	119	RR	99.5	73.0	113.3	46.5	69.4	29.53	34	ij
30	2288H	Triumph	122	HX, RR	98.5	77.0	125.5	54.1	72.5	32.57	21	bcdefgh
31	1825V	Triumph	119	VT3	98.5	76.0	117.3	49.5	68.1	35.09	2	Ab
32	8539R	Triumph	118	RR	98.0	77.0	126.6	54.6	70.4	31.76	27	Defghij
33	WX9001	AgriLife (Xu)	113	YG, RR	100.0	72.0	118.9	46.6	67.4	33.52	8	Abcdefg
34	WX9002	AgriLife (Xu)	117		100.0	75.0	119.7	53.5	69.1	30.58	32	Hij
35	WX9003	AgriLife (Xu)	113		98.5	71.0	117.7	49.0	69.4	31.11	30	Fghi
		Test mean			99.1	73.7	115.1	48.5	68.9	32.58		
		CV%			1.9	1.6	3.2	9.0	2.0	4.76		
		LSD 0.05			ns	1.9	6.1	7.1	2.3	2.53		

ENO = entry number, RM = relative maturity, YG= Yield Guard insect resistance, HX= Herculex insect resistance, RR2= Roundup Ready Corn 2 herbicide resistance; VT3 = CRW + RR2 + YG.
Hybrid yields with the same letters are not significantly different from each other at 5% level.

Table 2. Forage quality of the State Silage-Corn Performance Test at Etter, Texas in 2009.

ENO	Hybrid	Company	CP	ADF	NDF	Lignin	NFC	Starch	TDN	IVTD24	NDFD24	MILK1	MILK2	Ash
1	Belle 1545VT3	Belle Southern	7.4	23.0	39.0	3.5	47.0	37.5	72.0	76.3	39.3	2832.0	3136.0	5.20
2	Belle 1646VT3	Belle Southern	7.2	23.0	37.9	3.3	48.0	37.4	72.0	77.3	39.7	2856.0	3159.0	5.50
3	DG58V69	DynaGro	8.2	23.0	38.7	3.5	46.0	35.8	73.0	77.7	41.7	2901.0	3192.0	5.80
4	GA 27Z07	Golden Acres	7.5	23.0	38.1	3.6	48.0	37.7	73.0	77.7	41.7	2885.0	3191.0	5.60
5	GA 28V87	Golden Acres	7.9	22.0	36.7	3.6	49.0	39.2	73.0	77.7	40.0	2912.0	3229.0	4.80
6	MC 590	Masters Choice	7.5	23.0	37.4	3.5	49.0	38.5	73.0	77.7	40.7	2894.0	3206.0	5.10
7	MC 573	Masters Choice	7.2	25.0	42.5	3.5	44.0	33.5	72.0	75.3	41.0	2880.0	3152.0	4.90
8	DKC67-87	Monsanto	7.6	23.0	38.3	3.7	48.0	37.5	70.0	75.7	36.0	2749.0	3053.0	5.00
9	DKC61-69	Monsanto	8.0	24.0	39.7	3.6	46.0	35.6	72.0	76.3	40.3	2867.0	3156.0	5.20
10	216-63VT3	NC+ Hybrids	7.9	20.0	33.7	3.3	52.0	41.8	74.0	79.3	39.0	2921.0	3260.0	4.90
11	218-28R	NC+ Hybrids	7.6	26.0	42.1	3.8	44.0	32.8	69.0	73.7	37.3	2724.0	2990.0	5.40
12	X709VT3	NC+ Hybrids	7.7	26.0	42.2	4.1	44.0	33.8	68.0	72.7	35.3	2618.0	2891.0	5.40
13	X710VT3	NC+ Hybrids	7.4	23.0	38.9	3.6	47.0	37.2	70.0	75.0	36.0	2717.0	3018.0	5.10
14	Int9682R	Wilbur-Ellis	7.8	26.0	41.6	4.0	44.0	33.9	69.0	74.0	38.0	2726.0	3000.0	5.40
15	Int9691VT3	Wilbur-Ellis	7.8	26.0	43.1	3.9	43.0	32.2	69.0	73.7	39.3	2754.0	3015.0	5.50
16	Int9650VT3	Wilbur-Ellis	7.7	22.0	37.8	3.4	48.0	37.2	73.0	78.0	41.3	2928.0	3229.0	5.20
17	Int9701VT3	Wilbur-Ellis	7.6	28.0	45.4	4.0	41.0	30.8	67.0	71.3	37.3	2623.0	2872.0	5.60
18	BH 8718RR	B-H Genetics	7.5	25.0	41.0	3.7	45.0	33.7	70.0	75.0	39.7	2797.0	3070.0	5.20
19	BH 8668VT3	B-H Genetics	7.7	21.0	35.5	3.4	51.0	40.8	74.0	79.0	41.0	2923.0	3255.0	5.00
20	BH 8895VT3	B-H Genetics	7.3	21.0	36.0	3.5	51.0	39.7	73.0	78.0	40.0	2916.0	3238.0	4.70
21	BH 9018VT3	B-H Genetics	7.9	26.0	43.4	4.0	43.0	31.1	68.0	73.0	37.3	2715.0	2968.0	5.20
22	XP4908HX	B-H Genetics	7.7	26.0	43.9	3.3	42.0	32.9	70.0	74.0	40.0	2797.0	3064.0	5.40
23	BH 9024RR	B-H Genetics	7.9	26.0	42.1	4.0	43.0	33.7	70.0	74.7	40.3	2805.0	3078.0	5.60
24	BH 8882VT2	B-H Genetics	7.7	24.0	39.3	3.5	46.0	36.4	71.0	76.0	40.0	2812.0	3107.0	5.50
25	X9089VT3	B-H Genetics	7.7	20.0	34.8	3.4	52.0	42.2	74.0	78.7	39.0	2909.0	3251.0	4.60

ENO	Entry	Company	CP	ADF	NDF	Lignin	NFC	Starch	TDN	IVTD24	NDFD24	MILK1	MILK2	Ash
26	X9084VT3	B-H Genetics	7.6	22.0	36.7	3.3	49.0	39.5	72.0	77.0	37.3	2829.0	3149.0	5.00
27	BH 9078VT3	B-H Genetics	7.8	24.0	40.2	3.8	46.0	35.6	70.0	75.0	38.7	2721.0	3010.0	5.70
28	X 9030HX	B-H Genetics	7.6	24.0	41.0	3.5	45.0	33.5	71.0	75.3	39.3	2861.0	3133.0	4.90
29	XP 9008GT	B-H Genetics	7.8	23.0	38.8	3.5	47.0	36.8	74.0	78.3	44.0	3006.0	3305.0	5.00
30	2288H	Triumph	8.3	30.0	48.7	4.1	37.0	24.9	67.0	70.7	39.7	2689.0	2891.0	5.80
31	1825V	Triumph	7.9	25.0	40.9	4.0	44.0	33.7	69.0	74.7	37.7	2715.0	2988.0	5.80
32	8539R	Triumph	7.8	26.0	41.7	3.8	44.0	32.6	69.0	74.0	37.7	2707.0	2971.0	5.70
33	WX9001	AgriLife (Xu)	7.1	26.0	44.2	3.9	43.0	30.3	71.0	74.0	41.3	2854.0	3099.0	4.60
34	WX9002	AgriLife (Xu)	7.8	25.0	41.5	3.6	44.0	34.3	70.0	74.7	38.7	2782.0	3061.0	5.50
35	WX9003	AgriLife (Xu)	7.8	25.0	41.3	3.6	44.0	33.6	72.0	76.3	43.3	2936.0	3209.0	5.70
		Test mean	7.7	24.1	40.1	3.7	45.9	35.4	71.0	75.7	39.4	2816.0	3102.7	5.27
		CV%	5.0	9.9	8.8	9.3	7.3	10.8	3.7	3.5	6.6	4.6	4.8	7.63
		LSD 0.05	ns	3.9	5.8	ns	5.4	6.2	4.2	4.3	4.2	212.3	244.9	0.66

1. IVTD24: *In vitro* true digestibility (IVTD) after 24 hours of incubation in rumen fluid. It measures digestibility and can be used to estimate energy. A higher value of IVTD 24 hr presents a better forage quality.
2. Forage nutritional values based on NIR analysis.

ADF: Acid detergent fiber, a measure of cellulose and lignin. ADF is negatively correlated with overall digestibility.

CP: Crude protein, the total protein in the sample including true protein and non-protein nitrogen.

Lignin: undigestible plant component and has a negative impact on cellulose digestibility.

NDF: Neutral detergent fiber, a measure of hemicellulose, cellulose and lignin representing the fibrous bulk of the forage. NDF is negatively correlated with intake

NFC: Percentage of non-fibrous carbohydrates; estimates the amount of rapidly digestible carbohydrates in a forage.

NDFD24: Percentage of NDF that is digestible by *in vitro i*ncubation.

MILK 1: Estimated lbs. of milk produced per ton of dry matter.

MILK 2: Estimated lbs. of milk produced per ton of processed dry matter.

Starch: primarily in the grain, later maturing hybrids have lower starch since all hybrids were harvested at the same time.

TDN: Total digestible nutrients. It represents the sum of the digestible protein, digestible nitrogen-free extract, digestible crude fiber and 2.25X the digestible fat.

Milk lbs./ton of DM: an estimated potential milk yield per ton of forage dry matter based on digestibility and energy content of the forage.

Table 3. Means of forage yield adjusted to 65% m oisture level, moisture, and agronomic traits of the State Silage-Corn Perfor mance Test at Halfway, Texas in 2009.

ENO	Hybrid	Company	RM	Traits	Stand	Days to pollen shed	Plant ht, in.	Ear ht, in	Mois t%	Yield tons/a	Yield rank	Duncan's Test
1	Belle 1545VT3	Belle Southern	115	VT3	97.3	73.0	113.6	37.0	60.0	29.34	13	cbde
2	Belle 1646VT3	Belle Southern	116	VT3	95.1	75.0	113.9	44.6	61.9	29.09	14	cbde
3	DG58V69	DynaGro	118	VT3	94.7	75.0	114.0	48.3	60.3	29.53	10	cbde
4	GA 27Z07	Golden Acres	117	VT3	99.2	75.0	110.8	45.9	59.3	30.34	7	bcd
5	GA 28V87	Golden Acres	117	VT3	95.8	73.0	117.8	51.4	59.6	30.80	4	abc
6	MC 590	Masters Choice	114	VT3	96.2	75.0	116.8	50.1	62.7	30.39	6	abcd
7	MC 573	Masters Choice	114	VT3	97.7	74.0	112.5	43.7	57.3	27.95	18	cbde
8	DKC67-87	Monsanto	117	RR2, YG, CB	100.4	74.0	117.5	49.1	59.8	29.55	9	cbde
9	DKC61-69	Monsanto	111	VT3	98.9	71.0	106.0	35.4	55.4	26.07	22	e
10	216-63VT3	NC+ Hybrids	116	VT3	96.2	73.0	107.5	36.6	56.3	26.71	20	de
11	218-28R	NC+ Hybrids	118	RR	95.1	73.0	117.5	42.9	58.4	31.53	2	ab
12	X709VT3	NC+ Hybrids	117	VT3	94.7	77.0	109.1	50.5	64.0	27.38	19	cde
13	X710VT3	NC+ Hybrids	117	VT3	92.8	78.0	117.5	55.8	65.0	28.50	17	cbde
14	Int9682R	Wilbur-Ellis	118	RR	86.0	79.0	121.9	58.4	63.8	29.67	8	cbde
15	Int9690VT3	Wilbur-Ellis	119	VT3	95.8	76.0	107.9	44.8	60.3	30.66	5	abc
16	Int9650VT3	Wilbur-Ellis	115	VT3	95.1	75.0	117.8	43.6	63.1	26.19	21	e
17	Int9701VT3	Wilbur-Ellis	120	VT3	100.8	78.0	112.6	50.8	55.3	34.07	1	a
18	2288H	Triumph	122	HX, RR	94.7	77.0	123.4	57.1	62.5	31.26	3	ab
19	7546H	Triumph	119	VT3	97.3	80.0	124.3	42.8	63.2	28.88	16	cbde
20	WX9001	AgriLife (Xu)	113	YG, RR	92.8	74.0	119.3	51.3	60.1	28.95	15	cbde
21	WX9002	AgriLife (Xu)	117		93.6	77.0	124.9	53.9	61.6	29.47	12	cbde
22	WX9003	AgriLife (Xu)	113		97.0	72.0	113.6	56.7	61.8	29.48	11	cbde
	Test mean				95.8	75.1	115.5	47.8	60.5	29.36		
	CV%				3.1	1.0	3.6	10.6	3.8	7.69		
	LSD 0.05				4.9	1.3	6.9	8.4	3.8	3.72		

ENO = entry number, RM = relative maturity, YG= Yield Guard insect resistance, HX= Herculex insect resistance, RR2= Roundup Ready Corn 2 herbicide resistance; VT3 = CRW + RR2 + YG. Hybrid yields with the same letters are not significantly different from each other at 5% level.

Table 4. Forage quality of the State Silage-Corn Performance Test at Halfway, Texas in 2009.

ENO	Hybrid	Company	CP	ADF	NDF	Lignin	NFC	Starch	TDN	IVTD 24	NDFD 24	MILK1	MILK2	Ash
1	Belle 1545VT3	Belle Southern	7.9	23.0	37.5	3.6	47.0	34.3	73.0	78.0	41.7	2906.0	3184.0	6.20
2	Belle 1646VT3	Belle Southern	7.8	21.0	35.5	3.4	50.0	38.1	74.0	79.3	42.7	3003.0	3312.0	5.50
3	DG58V69	DynaGro	8.3	23.0	37.7	3.6	47.0	35.2	74.0	78.3	43.3	2982.0	3267.0	6.10
4	GA 27Z07	Golden Acres	7.4	20.0	34.0	3.2	52.0	41.6	76.0	81.0	43.7	3043.0	3380.0	5.30
5	GA 28V87	Golden Acres	8.1	22.0	36.6	3.6	48.0	36.2	73.0	78.0	40.3	2928.0	3221.0	5.80
6	MC 590	Masters Choice	8.0	23.0	37.9	3.5	47.0	35.0	73.0	78.3	42.7	2962.0	3245.0	6.10
7	MC 573	Masters Choice	7.7	20.0	33.5	3.0	52.0	42.2	76.0	80.7	42.0	2993.0	3335.0	5.60
8	DKC67-87	Monsanto	7.7	25.0	41.7	3.7	44.0	29.1	70.0	74.7	40.3	2755.0	2991.0	6.00
9	DKC61-69	Monsanto	7.0	24.0	40.4	3.4	46.0	34.4	71.0	75.3	39.7	2852.0	3130.0	5.40
10	216-63VT3	NC+ Hybrids	7.8	20.0	35.0	3.4	50.0	40.5	75.0	79.0	40.3	2989.0	3317.0	5.20
11	218-28R	NC+ Hybrids	8.1	22.0	37.1	3.6	48.0	36.5	74.0	78.3	41.7	2974.0	3270.0	5.60
12	X709VT3	NC+ Hybrids	8.3	21.0	35.4	3.4	49.0	38.7	74.0	79.7	41.7	2964.0	3277.0	5.70
13	X710VT3	NC+ Hybrids	7.9	25.0	40.9	3.8	44.0	31.6	70.0	75.7	40.7	2822.0	3078.0	6.40
14	Int9682R	Wilbur-Ellis	7.9	28.0	45.5	4.3	40.0	27.2	69.0	73.3	41.3	2745.0	2965.0	6.30
15	Int9690VT3	Wilbur-Ellis	8.4	22.0	38.1	3.7	46.0	35.3	74.0	79.0	43.7	3029.0	3315.0	5.90
16	Int9650VT3	Wilbur-Ellis	8.4	21.0	35.1	3.5	49.0	36.9	76.0	80.3	44.3	3106.0	3405.0	5.90
17	Int9701VT3	Wilbur-Ellis	7.4	25.0	41.2	3.9	45.0	34.7	70.0	75.0	39.3	2772.0	3054.0	5.30
18	2288H	Triumph	7.4	26.0	44.3	3.9	42.0	29.3	70.0	74.0	41.0	2817.0	3055.0	5.70
19	7546H	Triumph	8.1	25.0	40.1	3.7	45.0	31.1	71.0	76.7	42.0	2875.0	3127.0	6.20
20	WX9001	AgriLife (Xu)	7.2	25.0	42.4	3.6	44.0	30.6	70.0	74.3	39.7	2803.0	3051.0	5.30
21	WX9002	AgriLife (Xu)	7.3	27.0	44.6	3.8	41.0	26.6	69.0	73.3	40.7	2720.0	2936.0	5.90
22	WX9003	AgriLife (Xu)	7.7	26.0	42.2	3.9	43.0	31.9	70.0	75.0	41.0	2791.0	3049.0	6.40
		Test mean	7.8	23.4	39.0	3.6	46.3	34.4	72.4	77.2	41.5	2901.4	3180.2	5.81
		CV%	6.0	12.0	10.7	9.1	8.4	13.6	3.8	3.7	4.8	4.7	5.2	8.87
		LSD 0.05	0.8	4.6	6.9	0.5	6.4	7.7	4.6	4.7	3.3	225.8	274.4	0.85

1. IVTD24: *In vitro* true digestibility (IVTD) after 24 hours of incubation in rumen fluid. It measures digestibility and can be used to estimate energy. A higher value of IVTD 24 hr presents a better forage quality.
2. Forage nutritional values based on NIR analysis.
ADF: Acid detergent fiber, a measure of cellulose and lignin. ADF is negatively correlated with overall digestibility.

CP: Crude protein, the total protein in the sample including true protein and non-protein nitrogen.

Lignin: undigestible plant component and has a negative impact on cellulose digestibility.

NDF: Neutral detergent fiber, a measure of hemicellulose, cellulose and lignin representing the fibrous bulk of the forage. NDF is negatively correlated with intake

NFC: Percentage of non-fibrous carbohydrates; estimates the amount of rapidly digestible carbohydrates in a forage.

NDFD24: Percentage of NDF that is digestible by in vitro incubation.

MILK 1: Estimated lbs. of milk produced per ton of dry matter.

MILK 2: Estimated lbs. of milk produced per ton of processed dry matter.

Starch: primarily in the grain, later maturing hybrids have lower starch since all hybrids were harvested at the same time.

TDN: Total digestible nutrients. It represents the sum of the digestible protein, digestible nitrogen-free extract, digestible crude fiber and 2.25X the digestible fat.

Milk lbs./ton of DM: an estimated potential milk yield per ton of forage dry matter based on digestibility and energy content of the forage.

Reference

Wenwei Xu, Bruce Spinhirne, Thomas Marek, Brent Bean, and De nnis Pietsch. 2007. Silage corn hybr ids for the Texas High Plains. TAES-Lubbock Center Technical Publication No.07-2. pp.2.