PUBLICATIONS
1986

Forage Research In Texas, 1986

Performance of Corn Hybrids as a Silage Crop in the West Cross Timbers

R. M. Jones and J. C. Read

Summary

Performance of 22 corn hybrids for silage production was evaluated under dryland and supplemental irrigation. There were no significant differences among the highest 18 and 16 dry matter yields of the irrigated and dryland tests, respectively. Among all parameters measured, three or four hybrids ranked significantly higher than three or four which ranked lowest. Ear weight percentage of WAC 918 and G4507A ranked among the highest four hybrids under dryland and irrigation. Crude protein was generally higher where dry matter yield was lower.

Introduction

The dairy industry in Erath and bordering counties requires large quantities of high-energy forage. Corn silage is a forage which recently has been of interest to dairymen and producers alike. Dairymen often must purchase all or a portion of their forage needs. Locally produced corn for silage may benefit dairymen as well as farmers needing a cash crop. Corn may possibly be grown without supplemental irrigation by early planting of short-season hybrids. This study was initiated to compare dry matter yields among corn hybrids.

Procedure

Separate tests of 22 hybrids were conducted under irrigated and dryland conditions. Amounts of rainfall, fertilizer, irrigation, and other conditions of the tests are given in Table 1. Plant populations and quantity of fertilizer were chosen to suit the expected moisture conditions for each test. Urea and diammonium phosphate were applied on the soil surface and incorporated by disking. Dual herbicide was applied over the beds and incorporated with a rolling cultivator. Seed were planted in rows 19.5 feet long in plots consisting of three rows (dryland) or five rows (irrigated). Populations of 18,000 and 28,000 plants per acre were intended for the dryland and irrigated tests, respectively; however, uniform populations were not achieved and plots were thinned to 17,126 and 24,572 plants per acre for the dryland and irrigated tests, respectively. Mean populations at harvest were 16,912 and 24,183 (Tables 1 and 2).

Plants were harvested from all replications of each hybrid as the grain reached early dent (soft dough). Only three of the four replications were harvested in the dryland test. A machete was used to harvest the center row of each plot by cutting the plants 3 to 4 inches above ground. Stalks and ears were weighed separately, counted, and three stalks were randomly removed for a subsample. This subsample was shredded in a lawn and garden shredder/mulcher. A 2 lb homogeneous subsample was taken and dried at 158°F to a constant weight for dry matter yield calculation. Crude protein content was determined on this subsample by the Kjeldahl method. Percentage ear weight was calculated by dividing the fresh weight of the shuck, grain, and cob for the harvested plot by the total fresh weight of the harvested plot.

KEYWORDS: Corn hybrids/performance/West Cross Timbers/silage production/irrigation.

Results and Discussion

Irrigated Test

Yields and other data calculated for each hybrid under supplemental irrigation are listed in Table 2. Yields were not significantly different among the 18 highest producing hybrids. There is no apparent correlation between dry matter yield and percent dry matter; for example, hybrids TX-34 and NS-212 had the same dry matter yield but significantly different dry matter percentage. Hybrids 6996 and SX-352 had significantly different yields but the same dry matter percentage.

Duncan's New Multiple Range Test indicated a few significant differences among plant population (Table 2). Linear regression analysis of the four highest and three lowest yields with the corresponding populations showed a significant correlation between dry matter and plant population ($p = 0.05$); however, only 18 percent of the variance in dry matter is attributable to plant population ($r = 0.43$).

Crude protein percentage generally was higher for lower dry matter yields and less as yields increased (Table 2). However, XL-72aa had both low yield and crude protein content.

Percentage ear weight for hybrid 7251 was significantly higher than all other hybrids except WAC 918 (Table 2). Hybrids WAC 918, 7251, G4507A, SX-381 and RA 1505 had significantly greater percentage of ear weight than hybrids SX-352, Pioneer 3165, TE 6996, RA 1604, 962W, and TX-34. There seemed to be little relationship between total dry matter and percentage ear weight. Ears per hundred plants ranged from 82 to 108 with a mean of 96 (Table 2). Pioneer 3192, TE 6996, and GSC 2355 had more than one hundred ears per hundred plants which was significantly higher than 7251, NS-212 and XL-72aa which had less than 90. The lower ear count was generally associated with heavier weight per ear (data not shown).

Most hybrids reached soft dough about 98 days after planting (data not shown). Pioneer 3192 reached soft dough in 92 days while 962W and H-890 required 102 days.

Since fertilizer and plant populations were chosen to suit the expected moisture conditions, the direct effects

TABLE 1. TEST CONDITIONS FOR 1985 HYBRID CORN EVALUATION FOR SILAGE PRODUCTION

	Irrigated	Dryland
Fertilizer	300-70-0	200-70-0
Row Spacing	36 inches	36 inches
Planting Rate	24,000	18,000
Planting Date	April 2	April 10
Irrigation	3.5 inches	0
Rainfall	14.93	14.88
Harvest Dates	July 12-24	July 12-22
Soil Name	Windthorst fine sandy loam	
Herbicide	Dual 8E	Dual 8E

TABLE 2. PERFORMANCE OF CORN HYBRIDS FOR SILAGE UNDER SUPPLEMENTAL IRRIGATION AT STEPHENVILLE[1]

Hybrid	Company	Tons/A DM	DM %	Crude Protein %	Ear weight %[2]	Ear Count[3]	Plants/A
3165	Pioneer	7.3 a	38.5 bcde	6.1 bcde	43.8 efg	99 abc	25,131 ab
6996	Taylor-Evans	7.2 ab	37.6 cde	5.5 e	43.7 efg	105 ab	24,014 abc
PX-83	Northrup-King	7.1 ab	42.3 abc	6.3 bcd	45.7 cdef	99 abc	25,131 ab
8990	Paymaster	7.0 ab	38.7 bcde	6.6 bc	44.8 cdef	98 abc	24,014 abc
4673A	Funk	6.7 abc	40.0 abcde	6.4 bcd	46.3 cde	96 abc	24,014 abc
RA 1502	Ring Around	6.7 abc	38.8 abcde	6.5 bcd	46.3 cde	98 abc	24,945 abc
GSC 2355	Gro Agri	6.7 abc	39.4 abcde	6.5 bcd	44.8 cdef	104 ab	24,014 abc
SX-383	PAG	6.6 abc	41.6 abcd	6.0 cde	47.9 bcd	98 abc	25,317 ab
962W	Asgrow	6.6 abc	38.6 bcde	6.3 bcd	42.5 fg	94 bcd	22,525 c
XL-73	DeKalb-Pfizer	6.5 abc	39.6 abcde	6.5 bcd	45.0 cdef	97 abc	24,945 abc
NS-212	Gro Agri	6.5 abc	43.8 a	6.1 cde	45.6 cdef	85 cd	22,897 bc
TX-34	TAES	6.4 abc	35.3 ef	6.5 bcd	40.8 g	93 bcd	25,875 a
RA 1604	Ring Around	6.4 abc	38.0 cde	6.6 bc	43.7 efg	97 abc	24,758 abc
RA 1505	Ring Around	6.3 abc	39.3 abcde	6.4 bcd	47.5 cd	97 abc	25,131 ab
G4507A	Funk	6.3 abc	39.7 abcde	6.0 cde	48.3 bc	95 abcd	23,455 abc
SX 2434	Browning	6.1 abcd	38.8 abcde	6.7 bc	44.6 def	93 bcd	22,897 bc
890	Horizon	5.8 abcd	36.5 de	6.9 b	45.5 cdef	97 abc	23,642 abc
WAC 918	SeedTec	5.8 abcd	40.7 abcd	6.8 bc	50.9 ab	98 abc	24,200 abc
XL-72aa	DeKalb-Pfizer	5.6 bcd	42.5 abc	5.8 de	46.9 cde	82 d	23,828 abc
3192	Pioneer	5.3 cd	31.5 f	7.5 a	44.5 def	108 a	24,014 abc
7251	Paymaster	4.7 cd	43.6 ab	6.4 bcd	51.6 a	88 cd	23,455 abc
SX-352	PAG	4.7 d	37.6 cde	6.4 bcd	43.9 efg	92 bcd	23,828 abc
Mean		6.3	39.2	6.4	45.7	96	24,183

[1]Duncan's NMRT (P=0.05). Means followed by the same letter are not significantly different.
[2]Fresh weight of shuck, cob, and grain as percent of total fresh weight.
[3]Ears per 100 plants.

TABLE 3. PERFORMANCE OF CORN HYBRIDS FOR SILAGE GROWN UNDER DRYLAND CONDITIONS AT STEPHENVILLE[1]

Hybrid	Tons/Acre Dry Matter	% Dry Matter	% Crude Protein	% Ear Weight[2]	Ear Count[3]	Plants/Acre
SX-352	4.8 a	32.8 abcd	7.2 cd	38 def	101 b	16,878 ab
GSC 2355	4.6 ab	32.0 abcd	7.5 c	37 efg	100 bc	16,878 ab
4673A	4.6 ab	30.0 bcde	7.4 c	37 efg	93 bcd	17,623 a
TX-34	4.4 abc	28.5 de	7.4 cd	33 g	92 bcd	18,119 a
8990	4.3 abc	32.5 abcd	6.5 de	39 cdef	96 bcd	16,382 ab
G4507A	4.2 abc	34.8 ab	7.2 cd	42 abcd	100 bc	17,126 ab
TE 6996	4.1 abc	29.8 cde	8.4 ab	39 cdef	96 bcd	18,119 a
7251	4.1 abc	31.6 abcd	7.2 cd	40 bcdef	95 bcd	16,382 ab
3192	4.1 abc	30.4 bcde	7.8 bc	43 ab	121 a	17,374 a
XL-73	4.1 abc	33.7 abc	7.5 c	40 bcde	98 bcd	16,630 ab
RA-1505	4.0 abc	30.7 bcde	7.1 cd	39 cdef	94 bcd	17,126 ab
PX-83	4.0 abc	30.3 bcde	7.2 cd	36 fg	93 bcd	17,374 a
3165	4.0 abc	29.5 cde	6.5 de	39 cdef	92 bcd	17,623 a
962W	4.0 abc	31.6 abcd	6.3 e	39 cdef	91 bcd	17,126 ab
RA 1502	4.0 abc	31.6 abcd	7.7 bc	38 cde	83 d	17,871 a
XL-72aa	3.9 abc	34.1 abc	7.5 c	38 def	87 bcd	16,382 ab
WAC 918	3.8 bc	36.0 a	7.1 cde	45 a	99 bcd	16,878 ab
SX-2434	3.7 bc	33.9 abc	7.3 cd	40 bcdef	84 cd	16,382 ab
SX 383	3.7 bc	33.0 abcd	7.1 cde	38 def	97 bcd	14,892 b
NS-212	3.7 bc	31.7 abcd	7.6 bc	43 abc	95 bcd	15,883 ab
890	3.5 c	28.4 de	7.4 c	37 efg	95 bcd	15,883 ab
RA 1604	3.4 c	26.3 e	9.1 a	37 efg	90 bcd	17,126 ab
Mean	4.0	31.5	7.4	39 b	95	16,912

[1]Duncan's NMRT (P=0.05). Means followed by the same letter are not significantly different.
[2]Fresh weight of shuck, cob, and grain as percent of total fresh weight.
[3]Ears per 100 plants.

of irrigation cannot be determined. Studies are in progress to assess the effects of irrigation as well as plant population.

Dryland Test

Yield of SX-352, GSC 2355, and 4673A were significantly greater than H-890 and RA 1604 under dryland conditions (Table 3). There were no significant differences among the 16 highest producing hybrids. Interestingly, SX-352 produced the lowest dry matter yield in the irrigated test and highest in the dryland test. Yields of 8990, 4673A, GSC 2355, and XL-73 ranked among the top 10 in both tests. Slightly higher yields would have been achieved if about half the hybrids in the dryland test had been harvested later. Mean percentage dry matter at harvest was 31.5 percent, which was 3.5 percentage units below the preferable content for quality silage as well as higher yield.

Plant population was nearly uniform with only SX-383 having significantly lower population than seven other hybrids (Table 3). However, regression of population on yield for the three lowest and three highest populations shows that only 33 percent of the variance in dry matter yield may be attributed to population. Crude protein content of RA 1604 was higher than all hybrids except TE 6996 probably because it had the lowest percentage dry matter and lowest yield (Table 3). Other hybrids did not exhibit a strong relationship between crude protein content and lower yield.

Percentage ear weight for WAC 918, Pioneer 3192, NS-212, and G4507A was significantly greater than for GSC 2355, H-890, RA 1604, 4673A, PX-83, and TX-34 (Table 3). Ear weight percentage of WAC 918 and G4507A ranked among the highest four hybrids in both tests. Means for the irrigated and dryland tests were 45.7 percent and 38.9, respectively.

Ear count for Pioneer 3192, SX-352, G4507A, and GSC 2355 was significantly greater than for SX 2434 and RA 1502 (Table 3). High ear count for Pioneer 3192 and G4507A may have contributed to the high percentage ear weight. Lower ear count was generally associated with greater ear weight. Pioneer 3192 had the highest ear count in both tests.