

Corn Silage Variety Trial in Greenlee County, 1988

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ABSTRACT

Eleven corn hybrids were grown for silage in Greenlee county in 1988. Excellent yields were recorded; the top hybrid, Northrup King's S 8505, produced nearly 40 tons per acre at 70% moisture. Laboratory analyses were run on samples from each hybrid; these analyses, plus calculations of crude protein and energy per acre were made.

INTRODUCTION

Corn silage is an important crop for the Lunt Dairy, which affects the majority of the corn crop grown in Greenlee county. Winn Johnson, agronomist for the Northrup King Co, has stated that the nutritional value of corn silage is as important as tonnage. He also said that different varieties of corn had distinctly different nutritional characteristics. This experiment was designed to test these statements.

METHODS AND MATERIALS

Eleven corn hybrids were selected from the five major corn companies selling seed in Greenlee county; some were multipurpose hybrids, others were silage hybrids. These cultivars were planted into moist soil with a John Deere 4-row plateless planter, in cooperation with the Lunt Dairy.

Crop History

Soil type: Pima clay loam
Elevation: 3500 feet above level
Planting date: 2 May 1988
Fertilizer: 200 lbs N per acre injected pre-plant
Herbicide: none
Insecticide: Thimet in furrow at planting
Harvest date: 18 August

Two replications were planted: the first had check rows every third pass; the second replication was contiguous plots. The growing season was good; however, just prior to harvest, a rainstorm flooded the field. It was impossible to get harvesting equipment into the field on a timely basis, so small plots were hand-harvested; the plants and ears were counted and weighed from each plot. The entire sample from one of the reps was then chopped and a sub-sample taken for analysis. The chopped sub-samples were refrigerated overnight and delivered to the laboratory the next day.

RESULTS AND DISCUSSION

Table 1 contains agronomic data from the field measurements; Table 2 contains the primary laboratory data; and Table 3 contains data derived from the primary laboratory and field data.

Table 1. Agronomic data from silage corn variety trial on the Lunt Dairy farm in Greenlee county, 1988.

Hybrid	Plants per acre	Percent Barren	% Ear wt. in silage	Yield @70% M (T/Ac)
S 8505\1	33581	-2.5	29.2	39.8
S 7759\1	43565	2.3	25.7	39.3
RX 905\2	29043	6.3	25.4	35.2
DeKalb 656	30859	6.7	26.3	34.9
Garst 8315	33581	0.0	27.3	34.2
Pioneer 3183	36531	9.9	27.0	33.1
Pioneer 3181	29043	-0.4	22.2	32.4
PX 9677\1	29043	3.2	21.4	31.3
DeKalb 1214	30859	0.4	25.6	30.2
Garst 8116	29043	6.7	20.8	29.0
DP 5750\3	29951	3.4	30.4	28.5

\1 Hybrids from the Northrup King Company.

\2 Hybrid from the Asgrow Seed Company.

\3 Hybrid from the Delta and Pine Land Company.

Hybrids are listed in order from the highest to the lowest silage yield per acre. Plant populations varied more than anticipated between hybrids; The highest yielding hybrid had the highest plant population. A regression analysis was run to find the relationship between plant population and silage yield. The relationship is shown in Figure 1. The relationship shown here indicates an increase of 5 tons of silage for each additional 10,000 plants per acre. The correlation coefficient of 0.40 is low, but this should be looked into more seriously to see if silage yields could be improved by increasing plant populations.

Similar regression analyses were run between plant populations and percent of barren stalks and percent of ear weight in the silage. Correlation coefficients of 0.005 and 0.114 indicated that variables were not related to one another.

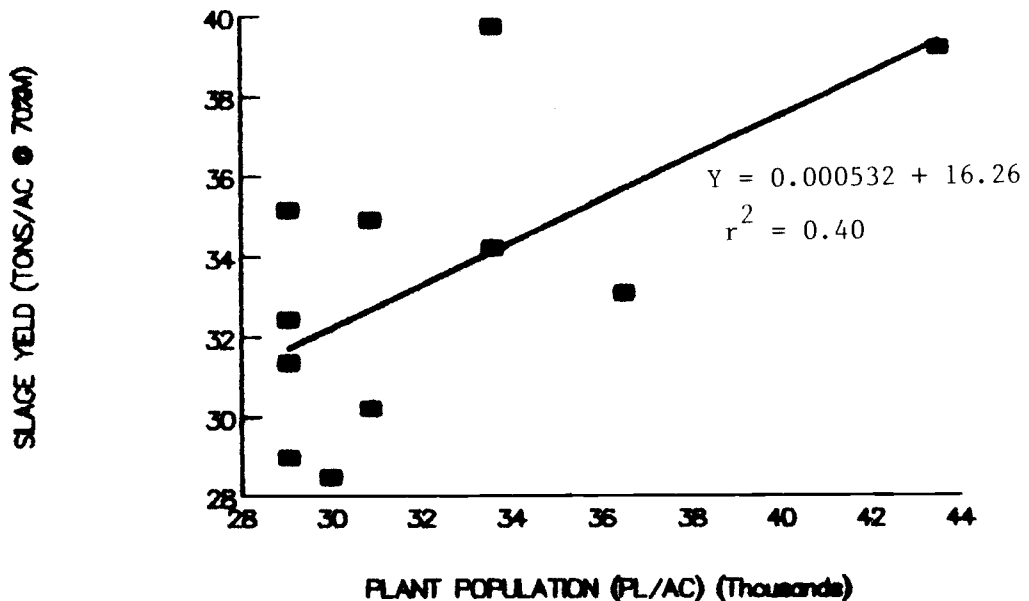


Figure 1. Relationship between plant population and silage yield per acre for hybrids grown in the Lunt Dairy silage trial, Greenlee county 1988.

Table 2. Primary analytical data from the Chandler Analytical Laboratories on chopped corn samples from the Lunt Dairy in Greenlee county, 1988.

Hybrid	Percent					
	Moisture	ADF\1	NDF\2	Nitrogen	Phosphorus	Calcium
S 8505	73.3	30.5	47.0	1.37	0.15	0.48
S 7759	74.5	28.9	46.3	1.21	0.12	0.15
RX 905	74.0	30.9	48.8	1.02	0.13	0.33
DeKalb 656	74.1	28.5	46.2	1.12	0.13	0.28
Garst 8315	77.4	35.2	51.4	1.22	0.13	0.40
Pioneer 3183	76.1	32.5	52.1	1.16	0.12	0.32
Pioneer 3181	74.4	29.2	46.7	1.06	0.11	0.28
PX 9677	78.1	35.5	54.5	1.24	0.12	0.42
DeKalb 1214	77.5	34.8	52.8	1.15	0.13	0.33
Garst 8116	78.5	34.5	52.6	0.95	0.11	0.31
DP 5750	76.7	33.0	51.9	1.06	0.12	0.28

\1 Acid detergent fiber.

\2 Neutral detergent fiber.

The hybrids were kept in the same order as in Table 1. It is assumed that the hybrids with the higher percent moistures were less mature at harvest than those with less moisture. Percent Nitrogen was converted to percent crude protein by multiplying it by 6.25; Acid Detergent Fiber was converted to percent crude fiber by multiplying it by 0.79. Energy (Table 3) was calculated using the following formula:

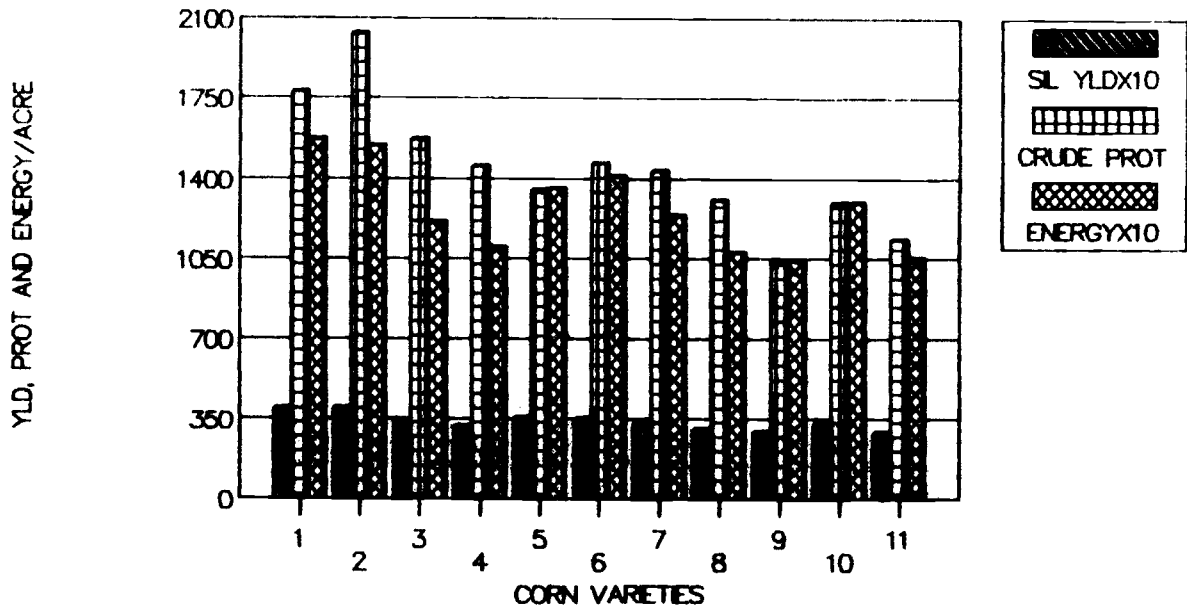
$$\text{Energy} = 1.044 - 0.013 * \text{ADF (Mcal per lb of dry matter)}$$

This value was converted to Mcal per acre by multiplying it by the number of pounds of dry matter produced per acre.

Table 3. Percent crude protein, percent crude fiber and energy per acre determined from values in Table 2, and pounds of crude protein per acre from values in Tables 1 and 2.

Hybrid	Crude Protein Percent	Crude Fiber Percent	Energy Mcal/ac	Crude Protein lbs/ac
S 8505	8.53	24.12	157.25	2036.2
S 7759	7.53	22.87	154.39	1773.6
RX 905	6.39	24.39	135.55	1348.6
DeKalb 656	7.00	22.48	141.19	1466.9
Garst 8315	7.65	27.78	120.45	1569.9
Pioneer 3183	7.22	25.63	118.80	1413.5
Pioneer 3181	6.64	23.07	129.21	1290.5
PX 9677	7.72	28.08	109.44	1451.7
DeKalb 1214	7.19	27.50	107.20	1303.8
Garst 8116	5.96	27.22	103.59	1035.4
DP 5750	6.63	26.09	104.95	1132.4

In Table 3, the hybrids are listed in order of silage yield, as in the previous two tables. No strong correlation exists between the crude protein and fiber percent and silage yield, even though higher yielding hybrids tend to have higher percent protein and lower crude fiber. Figure 2 shows the relationships between silage yield (at 70% moisture), energy per acre and protein per acre by hybrid. To allow all three items to be shown on the same graph, silage yield and energy are multiplied by a factor of 10.



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|-----------|---------------|----------------|
| 1. S 8505 | 5. Garst 8315 | 9. DeKalb 1214 |
| 2. S 7759 | 6. Pio 3183 | 10. Garst 8116 |
| 3. RX 905 | 7. Pio 3181 | 11. DP 5750 |
| 4. DK 656 | 8. PX 9677 | |

Figure 2. Silage yield, crude protein and energy per acre by corn hybrids grown on the Lunt Dairy in Greenlee county in 1988.

The two Stauffer hybrids now in the Northrup King collection appeared to produce more of what is needed for milk production than any of the other hybrids under the conditions of this test.