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Evaluation of 20 corn hybrids for silage agronomic characteristics

Abstract

Twenty corn hybrids were grown under irrigation and harvested at 90 % of the kernel milk line. Hybrid had a significant effect on plant height, whole-plant dry matter (DM) and DM yield, grain yield, stover yield, and plant part proportions. The highest whole-plant DM (45.9%) was for Cargill 7997, whereas the lowest was for Cargill 4327 (30.1%). Cargill 8427 and Pioneer 3245 had the highest wholeplant DM and grain yields, whereas Cargill 4327 was lowest. Grain yield and the percentage of grain in the whole-plant DM increased as the plant height increased.

Keywords

Cattlemen's Day, 1992; Kansas Agricultural Experiment Station contribution; no. 92-407-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 651; Beef; Corn; Hybrid; Silage; Yield

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EVALUATION OF 20 CORN HYBRIDS FOR SILAGE AGRONOMIC CHARACTERISTICS

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Summary

Twenty corn hybrids were grown under irrigation and harvested at 90 % of the kernel milk line. Hybrid had a significant effect on plant height, whole-plant dry matter (DM) and DM yield, grain yield, stover yield, and plant part proportions. The highest whole-plant DM (45.9%) was for Cargill 7997, whereas the lowest was for Cargill 4327 (30.1%). Cargill 8427 and Pioneer 3245 had the highest whole-plant DM and grain yields, whereas Cargill 4327 was lowest. Grain yield and the percentage of grain in the whole-plant DM increased as the plant height increased.

(Key Words: Corn, Hybrid, Silage, Yield.)

Introduction

Typically, corn hybrids grown for silage have been selected for their high grain-yield potential and not necessarily for silage traits. Therefore, our objective was to measure the agronomic characteristics important to silage-making, from 20 corn hybrids grown under irrigation in 1991.

Experimental Procedures

Twenty, high grain-yielding corn hybrids, representing a range of season lengths and wide genetic diversity, were grown under irrigation in 1991 near the Kansas State University campus. The experiment was a randomized complete block design, with each hybrid assigned to a plot and replicated three times. The hybrids were planted on May 9, in plots 33 ft. long that contained six, 30-inch rows. Two weeks after seedling emergence, plots were thinned to about 23,400 plants per acre. All hybrids were harvested just before the black layer stage of maturity (approximately 90% of the milk line of kernel development). Agronomic data included days to mid-silk, plant height, whole-plant DM percent and yield, grain and stover yields, and plant part proportions. Shortly prior to harvest, each plot was trimmed to remove border effects. Whole-plant DM yield was determined from two inside rows, and grain and stover yields and plant part proportions were obtained from the other two inside rows.

Results and Discussion

Agronomic characteristics for the 20 corn hybrids are presented in Table 1. Days to reach the mid-silk stage ranged from 58 to 62 (data not shown). The tallest hybrid was Cargill 9027 (103 inches); the shortest, Cargill 4327 and Pioneer 3417 (87 inches).

Hybrid had a significant effect on the other five agronomic measurements. The highest whole-plant DM (45.9%) was for Cargill 7997, whereas Cargill 4327 had the lowest (30.1%). The average DM was 38.8%, and 10 of the 20 hybrids had 40% DM or more. Hot, dry weather from August 10 to 30 likely contributed to these high DM values. Cargill 8427 and Pioneer 3245 had the highest whole-plant DM and grain yields, whereas the lowest yields were obtained for the two shortest and earliest-maturing hybrids, Cargill 4327 and Pioneer 3417. Whole-plant DM yield was positively correlated with plant height and grain yield, confirming our 1988 studies (KAES Report of Progress 592, page 110). Grain yield was positively correlated with grain percentage but negatively correlated with stover percentage.

Table 1. Harvest Date; Plant Height; Dry Matter (DM) Content; Whole-plant DM, Grain, and Stover Yields; and Plant Part Proportions of the 20 Corn Hybrids

Hybrid	Harvest date	Plant height,	Whole-plant DM and DM yield,		Grain yield,	Stover DM yield,	Plant part proportions		
		inches	%	T/A[1]	Bu/A[2]	T/A	grain	stover	cob
	August						-% of the whole-plant DM-		
Cargill									
4327	8	87	30.1	5.66	104.3	3.63	37.6	54.7	7.7
6227	18	98	36.2	8.23	160.5	4.17	44.8	48.7	6.5
7697	26	97	43.6	7.87	128.2	4.20	38.6	52.9	8.5
7877	18	94	35.8	8.27	135.1	4.27	39.6	52.6	7.8
7997	26	94	45.9	7.17	118.4	3.63	39.8	51.1	9.2
8427	29	94	40.0	8.93	195.0	4.47	46.1	43.9	10.0
8527	26	100	38.5	7.93	137.3	3.90	41.7	49.4	8.9
9027	27	103	43.1	8.07	143.4	4.53	40.2	53.1	6.7
DeKalb									
649	19	96	34.3	8.33	148.3	4.80	38.8	52.5	8.7
656	19	97	35.8	8.37	155.6	4.83	40.7	53.0	6.3
671	23	91	38.5	7.13	113.9	4.70	33.4	57.7	8.9
711	29	94	39.2	8.07	160.7	4.10	44.3	47.6	8.1
Pioneer									
3124	28	91	42.2	8.07	153.3	4.13	43.3	48.7	8.0
3162	29	90	41.7	8.03	160.3	4.13	44.5	47.9	7.6
3245	27	98	40.5	8.87	173.7	3.93	47.4	45.1	7.5
3377	18	94	37.5	7.57	151.1	4.03	43.3	48.1	8.6
3379	26	92	41.1	7.30	122.9	4.27	38.4	55.7	5.9
3389	19	100	36.5	8.50	149.4	4.60	40.4	52.3	7.3
3394	27	92	42.5	8.37	162.7	4.13	44.9	47.5	7.6
3417	8	87	33.2	6.67	110.7	3.50	39.1	51.5	9.4
Mean	22.5	94.5	38.8	7.87	144.2	4.20	41.3	50.7	8.0
LSD (P < .05)[3]	---	4.5	2.1	1.08	25.7	.45	4.1	4.1	1.3

[1]Tons per acre.

[2]Bushels per acre; adjusted to 14.5% moisture.

[3]The LSD (least significant difference) is valid only within a column.