Whole-plant corn, forage sorghum, and grain sorghum silages for growing cattle

B.S. Dalke
R.N. Sonon
S.M. Gramlich

See next page for additional authors

Follow this and additional works at: https://newprairiepress.org/kaesrr

Part of the Other Animal Sciences Commons

Recommended Citation
Dalke, B.S.; Sonon, R.N.; Gramlich, S.M.; and Bolsen, K.K. (1993) "Whole-plant corn, forage sorghum, and grain sorghum silages for growing cattle," Kansas Agricultural Experiment Station Research Reports: Vol. 0: Iss. 1. https://doi.org/10.4148/2378-5977.2114

This report is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Kansas Agricultural Experiment Station Research Reports by an authorized administrator of New Prairie Press. Copyright 1993 Kansas State University Agricultural Experiment Station and Cooperative Extension Service. Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. K-State Research and Extension is an equal opportunity provider and employer.
Whole-plant corn, forage sorghum, and grain sorghum silages for growing cattle

Abstract
Agronomic and cattle performance traits were measured for eight silages produced in 1991. The silages were: irrigated Pioneer 3377 corn; dryland (early-planted) DeKalb 535 corn; irrigated and dryland DeKalb DK 42Y grain sorghum; and dryland forage sorghums Cargill 200F, Pioneer 947, Northrup King (NK) 300, and Funk's 102F. The irrigated corn and NK 300 and Funk's 102F forage sorghums had the highest whole-plant dry matter (DM) yields per acre; early-planted corn had the lowest yield. The dryland grain sorghum had the highest grain yield and the early-planted corn, the lowest. Average daily gains (ADG) were excellent for steers fed each of the eight silage rations and reflected the relatively high grain contents of the silages and the high DM intakes (2.37 to 2.81% of body wt). As expected, the irrigated corn silage produced the fastest and most efficient gain; the late-maturing, Funk's 102F forage sorghum produced the slowest and least efficient gain.

Keywords
Cattlemen's Day, 1993; Kansas Agricultural Experiment Station contribution; no. 93-318-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 678; Beef; Silage; Corn; Forage sorghum; Grain sorghum

Creative Commons License
This work is licensed under a Creative Commons Attribution 4.0 License.

Authors
B.S. Dalke, R.N. Sonon, S.M. Gramlich, and K.K. Bolsen

This research report is available in Kansas Agricultural Experiment Station Research Reports: https://newprairiepress.org/kaesrr/vol0/iss1/711
WHOLE-PLANT CORN, FORAGE SORGHUM, AND GRAIN SORGHUM SILAGES FOR GROWING CATTLE

B. S. Dalke, R. N. Sonon, S. M. Gramlich, and K. K. Bolsen

Summary

Agronomic and cattle performance traits were measured for eight silages produced in 1991. The silages were: irrigated Pioneer 3377 corn; dryland (early-planted) DeKalb 535 corn; irrigated and dryland DeKalb DK 42Y grain sorghum; and dryland forage sorghums Cargill 200F, Pioneer 947, Northrup King (NK) 300, and Funk’s 102F. The irrigated corn and NK 300 and Funk’s 102F forage sorghums had the highest whole-plant dry matter (DM) yields per acre; early-planted corn had the lowest yield. The dryland grain sorghum had the highest grain yield and the early-planted corn, the lowest. Average daily gains (ADG) were excellent for steers fed each of the eight silage rations and reflected the relatively high grain contents of the silages and the high DM intakes (2.37 to 2.81% of body wt). As expected, the irrigated corn silage produced the fastest and most efficient gain; the late-maturing, Funk’s 102F forage sorghum produced the slowest and least efficient gain.

(Key Words: Silage, Corn, Forage Sorghum, Grain Sorghum.)

Experimental Procedures

The crops were produced near the Kansas State University campus during the 1991 growing season. The eight silages included irrigated Pioneer 3377 corn; dryland (early-planted) DeKalb 535 corn; irrigated and dryland DeKalb DK 42Y grain sorghum; and dryland forage sorghums Cargill 200F, Pioneer 947, Northrup King 300, and Funk’s 102F. The four fields used were of predominantly Reading silt loam soils. Prior to planting, anhydrous ammonia was applied at 100 lb per acre for both the irrigated and dryland corns and grain sorghums, and 80 lb per acre for the forage sorghums. The two corns were harvested at the 90% milk line stage of kernel maturity, and the six sorghums, at the very late-dough stage. All eight silages were made without a silage additive in 10 × 50 ft concrete stave silos.

The silos were opened on March 18 and 19, 1992 and were emptied at uniform rates during the next 3 months. Silage samples were taken three times weekly. Each silage was fed to 18 yearling, crossbred steers (three pens of six steers per silage) in a 70-day growing trial, which began on March 21, 1992. The complete-mixed rations were fed twice daily to appetite and contained 89% silage and 11% supplement on a DM basis. Rations were formulated to provide 12.1% crude protein, .52% calcium, and .28% phosphorus (DM basis); 250 mg of Rumensin; and 30,000 IU of
vitamin A per steer daily. Soybean meal was the main supplemental protein.

For 1 week before the start of the growing trial, all steers were limit-fed a forage sorghum silage ration to provide a DM intake of 2.0% of body weight. Steers were then weighed individually on 3 consecutive days. For 2 days before the final weighing, the steers were fed their respective silage rations at a restricted DM intake of 2.0% of body weight. Then individual weights were taken on 3 consecutive days.

**Results and Discussion**

Agronomic performance and chemical composition of the eight silage crops are shown in Table 1. The irrigated corn and dryland forage sorghums NK 300 and Funk’s 102F had the highest whole-plant DM yields per acre; early-planted corn (DeKalb 535) had the lowest yield. The extremely dry, hot weather throughout June and July contributed to the low silage and grain yields for the early-planted corn. Grain yields of the five dryland silage crops benefitted from early-August rainfall, and the grain sorghum had the highest yield. Grain yields of the four forage sorghums were average or above, but their whole-plant DM yields were below average. The CP and ADF values for the eight silages indicated that all were of relatively high nutritive value.

Average daily gains (Table 2) were excellent for steers fed the eight silage rations and reflected the relatively high silage grain contents and their high DM intakes (2.37 to 2.81% of body wt). As expected, irrigated corn silage produced the fastest and most efficient gain; the late-maturing, Funk’s 102F forage sorghum produced the slowest and least efficient gain. However, the other five grain and forage sorghum silages compared favorably to irrigated corn silage for both agronomic and nutritive value traits.

### Table 1. Agronomic Performance and Chemical Composition of the Eight Silages in 1991

| Crop, hybrid, and growing condition | Planting date | Harvest date | Plant height, inches | Whole-plant DM, % | Whole-plant DM yield, tons/acre | Grain yield, bu/acre | Silage CP, % | ADF, % |
|-----------------------------------|---------------|--------------|----------------------|-------------------|--------------------------------|---------------------|-------------|--------|
| **Corn**                          |               |              |                      |                   |                                |                     |             |        |
| Pioneer 3377, irrigated           | May 10        | Aug. 13      | 96                   | 33.3              | 6.5                            | 120.0*              | 8.7         | 23.4   |
| DeKalb 535, dryland early-planted | Apr. 1        | July 16      | 91                   | 33.1              | 4.1                            | 18.2                | 8.7         | 28.1   |
| **Grain sorghum: DeKalb 42Y**     |               |              |                      |                   |                                |                     |             |        |
| Irrigated                         | May 29        | Aug. 28      | 49                   | 37.7              | 5.6                            | 105.3               | 10.0        | 25.1   |
| Dryland                           | May 28        | Sept. 17     | 42                   | 39.2              | 5.6                            | 122.4               | 9.8         | 20.5   |
| **Forage sorghum: dryland**       |               |              |                      |                   |                                |                     |             |        |
| Cargill 200F                       | June 6        | Aug. 16      | 70                   | 38.2              | 5.0                            | 91.5                | 9.1         | 28.8   |
| Pioneer 947                        | June 6        | Aug. 20      | 77                   | 34.1              | 5.7                            | 96.0                | 8.5         | 28.9   |
| Northrup King 300                   | June 6        | Sept. 27     | 56                   | 38.3              | 6.4                            | 101.6               | 7.9         | 29.0   |
| Funk’s 102F                        | June 6        | Oct. 9       | 83                   | 39.1              | 6.4                            | 83.4                | 7.8         | 29.8   |

1Bushels/acre adjusted to 14.5% moisture.
2CP = crude protein, ADF = acid detergent fiber, and both are reported on a DM basis.
*Estimated.
Table 2. Performance by Yearling Steers fed the Eight Silage Rations

| Item                  | Corn | Grain sorghum | Forage sorghum |
|-----------------------|------|---------------|----------------|
|                       | Pioneer 3377 irrigated | DeKalb 535 dryland | DeKalb 42Y irrigated dryland | Cargill 200F | Pioneer 947 | NK 300 | Funk's 102F |
| No. of steers         | 18   | 18            | 18             | 18 | 18 | 18 | 18 | 18 |
| Initial wt, lb        | 640  | 634           | 642            | 646 | 633 | 634 | 626 | 637 |
| Avg daily gain, lb    | 2.67<sup>a</sup> | 2.37<sup>bc</sup> | 2.43<sup>bc</sup> | 2.52<sup>b</sup> | 2.30<sup>bc</sup> | 2.35<sup>bc</sup> | 2.33<sup>bc</sup> | 2.22<sup>c</sup> |
| Daily DM intake, lb   | 18.9<sup>b</sup> | 17.0<sup>c</sup> | 19.9<sup>ab</sup> | 20.6<sup>a</sup> | 18.7<sup>b</sup> | 18.8<sup>b</sup> | 19.1<sup>b</sup> | 20.0<sup>ab</sup> |
| Feed/lb of gain, lb<sup>1</sup> | 7.1<sup>a</sup> | 7.2<sup>bc</sup> | 8.2<sup>bc</sup> | 8.2<sup>bc</sup> | 8.2<sup>bc</sup> | 8.0<sup>b</sup> | 8.2<sup>bc</sup> | 9.0<sup>c</sup> |

<sup>1</sup>100% DM basis.
<sup>abc</sup>Means in the same row with different superscripts differ (P < .05).