

Factors Affecting the Feeding Value of Sorghum Silage, 1962-63 (Project 623).

F. W. Boren, E. F. Smith, D. Richardson and G. E. Fairbanks

This is the third year of an experiment designed to investigate factors that affect the feeding value of sorghum silage. Data reported in Circular 383, 1960-61, indicated that almost without exception, average daily gain, silage dry matter consumption, and silage dry matter percent were positively correlated. Pounds of silage dry matter required to produce a pound of gain were negatively correlated with average daily gain, silage dry matter and daily dry matter consumption. Winter gains also ranked in the same order as the percentage of grain in the silage, i.e., the higher the grain content, the greater the gain. However, digestion coefficients, using steer calves, were lower with the high-grain silage, suggesting the possibility of appreciable nutrient loss in undigested grain.

In Bulletin 447, 1961-62, data were reported on the effects of silage dry matter, stage of maturity, grain versus no grain, and ground-heads silage on winter gains. Gains were directly related to silage dry matter and daily silage dry matter consumption and also to the grain content of the silage. Grain on the silage crop increased gain approximately 32%. Forage sorghum cut at 10 days past full bloom and having only 20% dry matter produced unsatisfactory gains. It appears that silage with less than 25% dry matter will not produce satisfactory gains in the type beef calves used in these tests. Grinding the heads did not improve gains; however, it appeared that silage dry matter and silage consumption affected average daily gain.

Experimental Procedure

The 1962-63 experiment was designed to study further the value of grinding heads of forage sorghum for silage. It appeared from previous experiments that this practice might be beneficial. Two forage sorghum varieties, DeKalb FSIA and White Sourless, were used. DeKalb FSIA is described as nonjuicy, nonsweet, heavily grained, and mid-season maturity. White Sourless is very sweet, very juicy, lightly to moderately grained, and mid-season maturity.

This experimental design was used.

| Lot no. | Variety | Silage treatment |
|---------|----------------|---|
| 1 | DeKalb FSIA | Heads removed at medium to hard-dough stage of maturity, ground in a hammermill and combined with chopped forage at a uniform rate and ensiled. |
| 2 | DeKalb FSIA | Conventional silage made at same maturity as Lot 1. |
| 3 | White Sourless | Same as Lot 1. |
| 4 | White Sourless | Same as Lot 2. |

Upright, 50-ton concrete stave silos were used to ensile the forage sorghum. They were provided through the courtesy of Salina Concrete Products, Inc., Salina, Kansas.

Forty head of choice-quality Hereford heifer calves, weighing about 350 pounds each, were randomly allotted, 10 head to a lot, and randomly assigned to each of the four types of silage. Silage was fed free choice and 1.25 pounds of soybean oil meal were fed per head daily. Dicalcium phosphate was fed daily in the soybean oil meal. Salt was kept before the calves at all times.

Observations

The performance of the calves is shown in Table 13. Average daily gains made by the heifers were not significantly different. As in previous experiments, gains increased as dry matter consumption increased. Grinding the heads of DeKalb FSIA increased gain about 10%, whereas there was no benefit from grinding the heads of White Sourless sorghum.

Table 13
Factors affecting the feeding value of sorghum silage (progress report).
November 20, 1962, to March 14, 1963—114-day wintering period.

| Lot no. | 3 | | 4 | | 5 | | 6 | |
|---|--------------|--|----------------|--|--------------|--|---------|--|
| | DeKalb FSIA | | White Sourless | | Ground heads | | Control | |
| No. heifers per lot | 10 | | 10 | | 10 | | 10 | |
| Silage variety | DeKalb FSIA | | White Sourless | | Ground heads | | Control | |
| Silage treatment | Ground heads | | Control | | Ground heads | | Control | |
| Silage dry matter content, % | 32.8 | | 32.4 | | 28.1 | | 29.6 | |
| Initial wt. per heifer, lbs. | 350 | | 351 | | 354 | | 348 | |
| Av. gain per heifer, lbs. | 140 | | 134 | | 131 | | 152 | |
| Final wt. per heifer, lbs. | 490 | | 485 | | 485 | | 500 | |
| Av. daily gain per heifer, lbs. | 1.23 | | 1.18 | | 1.15 | | 1.33 | |
| Av. daily ration, lbs., as-fed basis: | | | | | | | | |
| Silage | 27.41 | | 27.38 | | 30.10 | | 30.37 | |
| Soybean oil meal | 1.25 | | 1.25 | | 1.25 | | 1.25 | |
| Av. daily ration, lbs., dry-matter basis: | | | | | | | | |
| Silage | 9.00 | | 8.87 | | 8.46 | | 8.99 | |
| Soybean oil meal, 90% dry matter | 1.13 | | 1.13 | | 1.13 | | 1.13 | |
| Total dry matter consumed daily, lbs. | 10.13 | | 10.00 | | 9.59 | | 10.12 | |
| Lbs. dry matter per cwt. gain | 823.6 | | 847.5 | | 842.6 | | 760.9 | |
| Feed cost per cwt. gain, as-fed basis: | | | | | | | | |
| Silage | \$ 7.81 | | \$ 8.12 | | \$ 9.16 | | \$ 7.99 | |
| Soybean oil meal | \$ 3.88 | | \$ 4.02 | | \$ 4.14 | | \$ 3.57 | |
| Total feed cost per cwt. gain | \$11.69 | | \$12.14 | | \$13.30 | | \$11.56 | |

t. Feed prices: Silage, \$7 per ton; soybean oil meal, \$3.80 per cwt.

The Effects of Adding Protein to Dry-rolled Sorghum Grain Fattening Rations, 1961 (Project 370).

F. W. Boren, E. F. Smith, D. Richardson, R. P. Cox

Previous work (Bulletin 447) indicated that sorghum grain fattening rations supplemented with 0.5 pound per head per day of soybean oil meal produced gains minimal in efficiency and carcasses equal to those from heifers fed 1 pound of protein per head daily. With each increase of 0.5 pound of protein (0, 0.5, 1.0) came a 0.20-pound increase in average daily gain, an increase in feed efficiency, and an increase in profit over feed cost.

This experiment repeated a portion of the previous experiment with modifications, as shown below, for a 140-day fattening period:

- Lot 13. One half pound of soybean oil meal per head daily.
- Lot 14. One pound of soybean meal per head daily.
- Lot 15. One and one half pounds of soybean meal per head daily.
- Lot 16. One half pound of soybean meal per head daily for the first 28 days, then increasing one half pound each 28 days for the 140 days.
- Lot 17. Two and one half pounds of soybean meal per head daily for the first 28 days, then decreasing one half pound each 28 days for 140 days.