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Harvesting sorghum stover

Abstract

Two types of big round balers and a small stackmaker were used to harvest grain sorghum stubble after the grain was harvested during the fall and winter months of 1975. The stubble was about 21 inches high and about 4 inches of stubble was left after windrowing.

Keywords

Cattlemen's Day, 1976; Report of progress (Kansas State University. Agricultural Experiment Station); 262; Beef; Sorghum stover; Round baler

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Harvesting Sorghum Stover

G. E. Fairbanks¹ and J. D. Hoover²

Two types of big round balers and a small stackmaker were used to harvest grain sorghum stubble after the grain was harvested during the fall and winter months of 1975. The stubble was about 21 inches high and about 4 inches of stubble was left after windrowing.

Tests for each machine were replicated four times for each set of conditions. Averages of results for each set of conditions are shown in Table 17.1.

Accurate comparisons among different forage-gathering machines in regard to package weight and density and yield are difficult because field conditions vary, machines malfunction and operating procedures are seldom standard.

Our limited tests showed that with windrowed sorghum stover the Model 5600 baler makes a denser bale than the Model 5400 but yield per acre was higher with the Model 5400. The Model 5400 baler did an excellent job of picking up windrowed material and also combine leavings which remained after a field forage harvester had been used to remove sorghum stubble. Ash content of the combine leavings harvested by the Model 5400 baler was 47% or more than twice as much as that for any other harvesting method. The ash came on soil picked up with the combine leavings that had lain on the ground and been rained on.

The low yield of windrowed material gathered by the StakHand 10 as compared to that of the two balers for the October 16 tests is not significant because the bearings on the pickup height gauging roller failed and the roller was removed. Then it was not possible to pick up the material cleanly.

In three tests of windrowed stover on October 21, that seemed even drier than the moisture percentages indicate, nearly all of the moisture was in the stems. Density of the bales for both balers was nearly the same but the yield from the Model 5400 was significantly higher than that for the Model 5600 baler. Some dry leaf material was lost from the rear of the Model 5600 baler. The Model 5400 also seemed to do a better job of picking up the dry stover.

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The height gauging roller for the Model 10 StakHand had been replaced before the October 21 tests. Yield with it compared favorably with yields from the two balers used that day. However, package density for the Model 10 StakHand was only 5.00 lb/ft³, less than half that for either of the two big balers.

Five-inch wide sorghum paddles were used December 16 and 18 on the flail type pickup of the StakHand 10 to harvest standing sorghum stubble directly without windrowing. The stems were frozen. Air temperature was 34°F and 22°F on the two dates and two stacks were made each day. Ground surface was slightly thawed December 16 so the paddles probably picked up some soil. Weight of the two stacks made December 16 was higher than normal. Row spacing was 30 inches. The width of the pickup on the StakHand 10 is 5 feet, so that only two rows of standing stubble could be harvested each trip through the field. The height of the stubble left after being beaten off by the StakHand 10 pickup device varied from 6 to 10 inches. Laboratory analysis of samples from the stacks made on December 16 and 18 were not available at the time of preparation of this report.

Thermocouples were placed in the center of each of the bales and stacks at time of harvest to monitor temperature. By mid-December temperatures had not completely stabilized. The maximum temperature measured in both bales and stacks was slightly over 150°F.

All of the methods of harvesting grain sorghum stubble stover tried in this series of tests seem to be successful. A field Queen forage harvester was also successfully used to remove and chop the sorghum stubble for storage as silage but is not covered in this report. Feeding trials are currently underway by the Animal Science and Industry Department at Kansas State University.

Table 17.1 1975 Sorghum stover harvesting data.

| Harvest Date 1975 | Sorghum Stubble Condition | Machine ² | Moisture W. B. % | Dry Matter Yield Tons/A | Bale or Stack | | Results of laboratory analysis | | | | |
|-------------------|-------------------------------|----------------------|------------------|-------------------------|---------------|---------------|--------------------------------|---------------|-------------|------------------|-------|
| | | | | | Weight lb. | Density lb/ft | % Ether Extract | % Crude Fiber | Mg N per gm | % Prot. N x 6.25 | % Ash |
| Oct. 16 | Windrowed | HB-5600 | 47.93 | 1.63 | 1558 | 12.75 | 1.65 | 25.20 | 7.06 | 4.41 | 21.87 |
| 16 | Combine Leavings ¹ | HG-5400 | 25.82 | 2.61 | 820 | 9.87 | 1.23 | 16.47 | 5.91 | 3.69 | 47.04 |
| 16 | Windrowed | HG-5400 | 46.90 | 2.06 | 878 | 8.71 | 1.61 | 29.86 | 6.41 | 4.01 | 10.96 |
| 16 | Windrowed | HS-10 | 52.42 | 1.04 | 3508 | 9.97 | 1.34 | 27.78 | 8.22 | 5.14 | 11.69 |
| 21 | Windrowed | HB-5600 | 33.19 | 0.96 | 1293 | 10.76 | 2.04 | 27.87 | 6.01 | 3.76 | 12.45 |
| 21 | Windrowed | HG-5400 | 34.73 | 1.79 | 1098 | 10.79 | 1.89 | 22.88 | 8.36 | 5.23 | 22.15 |
| 21 | Windrowed | HS-10 | 31.86 | 1.75 | 1840 | 5.00 | 1.89 | 31.51 | 7.85 | 4.91 | 10.38 |
| Dec. 16 and 18 | Standing Stubble | HS-10 | ----- | ----- | 4160 | 10.04 | ----- | ----- | ----- | ----- | ----- |

¹Material left after field forage harvester had removed sorghum stubble.

²HB-5600, Hesston Rounder Model 5600 Giant Round Baler.
 HG-5400, Hesston Rounder Model 5400 Giant Round Baler.
 HS-10, Hesston Model 10 StakHand.