

The Economics of Flax Screenings For Backgrounded Steer Calves

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North Dakota produces millions of bushels of small grains each year. For each ton of grain harvested, approximately one ton of residue is left (Peeverly et al., 1979). Ruminants such as cattle and sheep are capable of utilizing lower quality forages and residues (Han, 1978). The grain must be cleaned, either by the farmer or an elevator, before resale. What is cleaned from the grain, screenings, represents a byproduct which can be fed to livestock. The screenings consist of cracked and broken kernels, weed seeds, chaff, and dirt. Screenings are usually abundant and relatively low cost. They may be similar in protein to the grain they originated from, but are lower in energy value and have higher levels of fiber and ash (Macgregor, 1987). Screenings quality can vary greatly from mostly cracked small grain kernels to almost all chaff and dirt.

MATERIALS AND METHODS

An unreplicated study was conducted during the winter of 1987-1988 to compare a diet containing flax screenings to a more conventional diet of small grains for backgrounding steer calves. One hundred head of crossbred steer calves from the Central Grassland Research Station were used in this trial. The trial started on November 17, after a 31-day post weaning preconditioning period.

The steers were weighed and randomly assigned to either a barley/oats control diet or a barley/flax screenings diet. Oats and flax screenings had similar crude protein levels at 14.2 percent and 14.4 percent, respectively. The flax screenings consisted of about 70 percent pigeon grass seed, 15 percent flax, 10 percent other weed seeds and 5 percent dirt and chaff. Weed seeds normally comprise 1 percent to 5 percent of the grain delivered to country elevators (Harold and Nalewaja, 1977).

The diets were formulated as least-cost rations with flax screenings substituting for oats in Diet 2 (NRC, 1984). The flax screenings were tested for prussic acid and found to be within safe feeding levels. The feed grains were coarsely ground through a hammer mill, while the flax screenings were finely ground. The alfalfa-grass hay was coarsely ground in a tub grinder. The calves were fed once daily to appetite in adjoining pens with fence line bunks. The rations were blended thoroughly in a mixer wagon before feeding.

Table 1. Diets on a dry matter basis.

| | Diet 1 | Diet 2 |
|----------------------|-----------------------|------------------------|
| | Barley/Oats (control) | Barley/Flax Screenings |
| Barley | 41.8% | 41.8% |
| Oats | 22.3% | — |
| Flax screenings | — | 22.3% |
| Corn silage (35% DM) | 21.2% | 21.2% |
| Alf-grass hay | 14.2% | 14.2% |
| Limestone | 0.5% | 0.5% |

RESULTS AND DISCUSSION

Both groups of steers performed above expectations. Table 2 gives a summary of the 78-day trial. The calves on the control diet gained slightly faster and were more efficient than those on the ration with flax screenings. Bath et al. (1980) recommended that screenings be no more than 15 percent of the ration for feedlot cattle. This suggestion is probably more suited to cattle on finishing rations than on growing rations. According to Morrison (1948) the best grades of screenings resemble oats in composition and may nearly equal grain in feeding value. However, some of the poor quality screenings more closely resemble straw in composition and feeding value. Lower quality screenings should certainly be a minor ingredient of a diet.

Table 3 is an economic comparison of feeding the two diets. It was assumed the steers were purchased at \$87 per hundredweight. Feed costs were estimated at: barley, \$1.30 per bushel; oats, \$1.40 per bushel; flax screenings, \$10 per ton; corn silage, \$15 per ton; alfalfa-grass hay, \$35 per ton; and limestone, \$110 per ton. The steers were sold at the conclusion of this trial and brought \$81.75 per hundredweight.

Although the steers that received the barley/oats control diet gained slightly more weight and required less dry matter per pound of gain, the ration they consumed was more expensive and the total feed costs were almost \$10 per head more than the barley/flax screening diet. The barley/flax screening diet had a \$3.21 per head advantage over the control diet. At 22 percent or less of the ration on a dry matter basis, flax screenings can be substituted for oats in rations for backgrounding steer calves.

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Table 2. Animal performance of barley/oats and barley/flax diets.

| Item | Diet 1 | Diet 2 |
|----------------------------------|--------------------------|---------------------------|
| | Barley/Oats (control) | Barley/Flax Screenings |
| Number of head | 50 | 50 |
| Starting wt. (lbs.) | 564 | 564 |
| Final wt. (lbs.) | 777 | 769 |
| Average daily gain | 2.73 | 2.63 |
| Feed consumptive (DM lbs/day) | 16.71 | 17.55 |
| Feed conversion (DM/lb gain) | 6.12 | 6.67 |
| Feed cost/cwt. gain | \$18.54 | \$14.51 |

Table 3. Economic analysis of the barley/oats and barley/flax screening diets.

| Item | Diet 1 | Diet 2 |
|------------------------|--------------------------|---------------------------|
| | Barley/Oats (control) | Barley/Flax Screenings |
| Feeder steer cost/head | \$490.68 | \$490.68 |
| Total feed cost/head | 39.50 | 29.75 |
| Gross return/head | 635.20 | 628.66 |
| Net gain | \$105.02 | \$108.23 |
| difference | | +\$3.21 |

SUMMARY

One hundred head of crossbred steer calves were used in a study to evaluate animal performance and economics for feeding flax screenings. The calves were divided equally into two pens. The rations were similar except for one diet containing 22.3 percent oats (DM basis) and the other diet containing 22.3 percent flax screenings (DM basis). The cattle were fed the diets for 78 days. The calves consuming the oats diet gained 0.1 pound faster per day than the calves on the flax screening diet. The flax screening diet, however, returned \$3.21 per head more to labor and management.

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