

BARLEY AND SUNFLOWER RATIONS FOR BACKGROUNDING STEERS

By

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North Dakota cow-calf producers have an opportunity to increase profits by retaining ownership of their calves following weaning, according to a study by Randall Little, et al (1986) of the Department of Agricultural Economics, North Dakota State University. The study, which covered the years 1958-1984, compared several programs of retained ownership, one of which, backgrounding, is commonly used in North Dakota. This is a winter feeding program which emphasizes a higher rate of gain. The calves are fed a high energy and high protein ration consisting mostly of grain and then sold as backgrounded in the spring.

As of January 1, 1986, North Dakota produced seventy percent of the nations sunflowers, thirty-one percent of the nations barley and ranked twelfth of all states in number of beef cattle on hand. Abundant sunflower production and a depressed market price could result in the use of sunflowers for cattle feed. Producers have experienced problems with ration palatability, bloat, acidosis or founder and liver abscesses when high barley rations are fed. The extra fiber, crude protein and oil in sunflower seed should compliment high concentrate barley rations, especially when fed to calves with the genetic potential for rapid gain.

Park, et al (1981) fed 10, 20 and 30 percent sunflower seeds to growing dairy heifers. There were no differences in daily gain for the treatments. However, there was a decrease in dry matter intake with each increase in seeds, with an increase in efficiency for feed conversion.

Dinusson, et al (1982) reported mixed results. In one trial, steers fed three pounds of sunflower seed (oil type) as replacement for rolled barley gained 9.4 percent faster and required 6.9 percent less feed per pound of gain for the 105 day trial. The average daily intake of sunflower seeds was 4.04 pounds. The steers fed sunflowers gained 7.8 percent less and required 5.7 percent more feed per pound of gain than did the control steers. In a second trial, after 63 days on feed, steers consuming sunflowers ate less feed than the controls.

The purpose of the present investigation is to evaluate the use of whole sunflowers as a substitute for part of the barley in high energy "backgrounding" rations for beef steers.

EXPERIMENTAL PROCEDURE:

On December 16, 1987, forty-five Charolais crossbred steers raised on the station were selected for the trials. The steers had been weaned for approximately fifty days and were consuming a fifty percent concentrate ration. The steers had been vaccinated and boosted with a seven-way colostridial vaccine and a three-way IBR, BVD and PI₃ bactrin. They had also been implanted with a long acting ear implant.

Each steer was individually identified and weighed. The steers were then stratified by weight and randomly allotted into one of nine trial pens (3 heavy, 3 medium and 3 light) with five steers per pen. Each pen of steers was housed in identical pens measuring 32' x 112'. Each pen provided a 9' high slotted board fence on the North and West for wind protection, an automatic waterer and 16' of concrete feedbunk.

The trial rations were formulated using dry rolled barley as the principle ingredient. Whole "oil type" sunflower seeds were substituted for barley on a pound per pound basis to produce 0, 5 or 10% sunflower rations. Limited amounts of chopped mixed hay, and corn silage were included in the ration mix to improve ration texture and palatability. Limestone (CaCO_3) and a Vitamin ADE premix were added to the ration to fortify the calcium and Vitamin A deficiencies commonly associated with feeding high barley feedlot rations. Feed grade sodium bicarbonate was fed throughout the trial in an effort to buffer the rumen contents and prevent acidosis. All rations were supplemented with sunflower meal to insure a minimum of 13% crude protein in the ration.

Rations were weighed and mixed in a portable feed mixer wagon equipped with electronic scales. The feed was fed free choice in the concrete bunks, with fresh feed added approximately twice a week. The feed bunks were cleaned periodically to remove "fines" or otherwise stale feed.

The steers were on trial for 113 days, with individual weights recorded every 28 days. Each steer's initial weight and final weight was calculated as the average of two days weights. Following the last weighing at the conclusion of the trial, the steers were trucked approximately twenty-five miles to a local auction market where they were sold.

A statistical analysis of variance was calculated on the individual weight gains. Duncan's new multiple range test was used to determine the least significant difference between treatment means.

The rations fed and results of the trial are shown in the following tables.

Table 1. Barley and Sunflower Rations (as fed/lbs.) 1987-88

Ingredient	Control	5% Sunflower	10% Sunflower
Barley, dry rolled	14.30	13.53	12.60
Sunflower, oil type	----	1.25	2.76
Hay, mixed	4.00	4.01	3.60
Corn silage	6.30	6.79	6.90
Sunflower meal	0.69	0.61	0.43
Sodium bicarbonate	0.54	0.56	0.56
Limestone	0.32	0.33	0.33
Trace mineral salt	0.07	0.08	0.08
Vitamin ADE ^{1/}	<u>0.01</u>	<u>0.01</u>	<u>0.01</u>
Total lbs. as fed	26.35	27.18	27.21
<u>Calculated feed values:</u>			
Dry matter lbs./day	19.58	20.17	20.64
Metabolizable Energy Mcal/lb.	10.47	10.76	11.02
Crude protein, lbs./day	2.55	2.66	2.75
Percent crude protein	13.00	13.20	13.30

1/ Contained: Vitamin A – 5 million USP units/lb.
Vitamin D – 1 million ICU units/lb.
Vitamin E – 500 USP units/lb.

Table 2. Trial Results from Feeding Barley and Sunflowers in Backgrounding Rations -- 1987-88

	Control	5% Sunflowers	10% Sunflowers
No. of steers	15	15	15
Days on trial	113	113	113
Total animal days	1695	1695	1695
Avg. wt. off trial	992.8	997.0	1,009.2
Avg. starting wt.	650.0	648.1	650.2
Avg. gain/hd., lbs.	342.8	348.9	359.0 ^{1/}
Avg. daily gain	3.03	3.08	3.18
Total lbs. feed/hd. (as fed)	2979	3071	3076
Avg. feed/hd./day, lbs.	26.36	27.18	27.22
Feed/cwt. gain, lbs.	868	880	856
Feed cost/cwt (\$)	3.97	4.08	4.23 ^{2/}
Avg. feed cost/hd. (\$)	118.20	125.22	130.14
Avg. feed cost/hd./day (\$)	1.05	1.11	1.14
Avg. feed cost/cwt gain (\$)	34.48	35.89	36.25

^{1/} No significant difference ($P > .05$) in animal gain between treatments. Least significant difference required = 40.8 lbs.

^{2/} Feed prices (as fed):

Barley	\$1.35/bushel
Sunflowers	\$6.00/cwt
Sunflower meal	\$8.70/cwt
Mixed hay	\$30.00/ton
Corn silage	\$15.00/ton
Sodium bicarbonate	\$21.40/cwt
Limestone	\$5.60/cwt
Trace mineral salt	\$6.50/cwt
Vitamin ADE	\$51.20/cwt
Grinding & mixing	\$25.00/ton

**Table 4. Trial Results from Feeding Barley and Sunflowers
in Backgrounding Rations – 1987-88**

	Projected Net Returns		
	0%	5% Sunflowers	10% Sunflowers
Initial value of steer @ 81¢/lb.	\$526.50	\$524.96	\$526.66
Average feed cost/head	118.20	125.22	130.14
Average combined of steer & feed	644.70	650.18	656.80
April 7, 1988 steer selling price @\$71.28/cwt	707.67	710.68	719.33
Added steer value or net return	62.97	60.50	62.53

RESULTS AND DISCUSSION:

Steers made very satisfactory gains on all rations offered in 1987-88. Feed efficiency and cost of gain were very acceptable with all rations fed. None of the steers experienced any of the common feedlot problems such as bloat, acidosis or founder.

Daily feed intake increase from 26.4 lbs./day (control) to 27.2 lbs./day when whole sunflowers made up 10% of the rations.

Average daily gain tended to increase with the addition of 5 and 10% whole sunflowers (from 3.03 to 3.17 lbs./hd./day) although the increased gain proved to be non-significant. All treatments tended to be similar in feed efficiency, averaging 8.7 pounds of feed per pound of gain.

Even though the sunflowers entered the ration at a depressed market value of \$6/cwt, their inclusion caused feed prices to increase from \$39.68 for controls to \$42.31/cwt for the 10% sunflower rations with barley priced at \$1.35/bushel. This caused the average feed cost per steer to increase from \$118.20 for the controls to \$125.22 for 5% sunflowers and \$130.14 for the 10% sunflower ration.

Actual market weight and selling price favored the 10% sunflower fed steers with an \$11.66 greater return than the control steers (\$719.33 vs. \$707.67). The 5% sunflower fed steers returned \$3.01 more than controls. Based on net returns, there was only a small difference (approximately \$2) between treatments with all steers showing a net return of between \$60 and \$62/steer fed.

The feeding of sodium bicarbonate throughout the trial may be of questionable value. Although no digestive problems or rumen acidosis developed with the rations fed, the design of the trial did not allow us to evaluate the feeding of sodium bicarbonate.

SUMMARY:

The addition of up to 10% whole oil type sunflowers in high energy barley based backgrounding rations did not adversely effect feed intake, rate of gain or feed efficiency. Barley based backgrounding rations properly supplemented with Vitamin A and calcium will allow steers to make excellent gains. Sodium bicarbonate was not adequately tested in the design of this trial.

LITERATURE CITED

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