

# **SOUTHWEST FEEDERS PROJECT: EFFECT OF BARLEY HAY VS. BARLEY LEVELS IN A BARLEY PEA HAYLAGE RATION ON WEANED BEEF CALVES IN A BACKGROUNDING ENVIRONMENT<sup>1</sup>**

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## **Impact Statement**

Replacing a barley pea haylage based calf backgrounding ration of 35% whole barley grain with barley hay had no negative effect on cost of gain, feed conversion, or calf gain.

## **Introduction**

If there is only a 10% increase of the available cattle retained in a backgrounding environment (56,700 head), there is in excess of \$28.6 million in added economic activity available to the agricultural community of western North Dakota associated with beef backgrounding. Statewide the potential level of economic activity exceeds \$55,000,000. Southwest Feeders is designed to actively engage the agricultural community of southwestern North Dakota in value-added livestock production through a coordinated and targeted research and education program. Southwest Feeders has demonstrated cost competitive gains with calves backgrounded on a forage based diet consisting of 65% barley pea haylage and 35% whole grain. With a prevalence of grain hays in southwest ND, the opportunity exists to include and/or replace portions of the grain component of the backgrounding diet with grain hay while still maintaining adequate calf gains and costs of production. This study was designed to evaluate the effect of replacing the standard Southwest Feeders backgrounding diet's grain component with barley hay on calf performance.



## **Materials and Methods**

A randomized complete block design was used to evaluate the effect of replacing whole barley with barley hay in calf backgrounding diets. Seventy-two head of crossbred steers ( $669 \pm 68$  lbs. initial BW) were blocked by source and stratified by weight and randomly assigned to 12 pens. Pens were assigned one of two diets; 35% whole barley grain (**Grain**) or 35% barley hay (**Forage**). Individual feed analysis is presented in Table 1. Base diets consisted of barley pea

haylage, grass hay and a custom formulated supplement (Table 2). Upon receiving, cattle were provided an 18 day acclimation period to the ration and facilities before starting the backgrounding test. Calves were fed the backgrounding diets for 41 days. Pen feed adjustments

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were based on individual bunk calls prior to cattle being fed once daily (9:00 am). Animals were individually weighed prior to the morning feeding for 2 day on-test, 28 day interim, and 2 day off-test weights. A health protocol was established through a local veterinary clinic including a monthly pen walk-through by the attending veterinarian. Pen performance data were analyzed as a randomized complete block design.

## **Results**

The effects of treatment on calf backgrounding performance are shown in Table 3. Treatment did not affect any of the variables measured ( $P \geq 0.26$ ). Average daily gain was 2.52 lbs/d for an off-test average weight of 772 lbs. Dry matter feed conversion averaged 7.66 pounds of feed per pound of gain for an average feed cost per pound of gain of \$0.27. No health problems were observed throughout the trial. While no treatment by source interaction was measured, source of cattle did have a significant impact on cost of gain ( $P=0.026$ ) and DM feed conversion ( $P=0.028$ ).

## **Discussion**

Utilizing barley hay as a replacement for whole barley in the barley pea haylage based ration had no negative effect on backgrounded calves post-weaning. The impact of source of cattle on feed conversion and cost of gain may have been due to a 107 pound difference for initial BW. The heavier calves entered the trial in a fleshier condition, perhaps limiting the post-weaning feed conversion and subsequent cost of gain as compared to the lighter weight calves. Average daily gain by source was not measurably different, a difference less than 0.1 lbs/d. Knowledge of post-weaning performance, total days to be backgrounded, environmental conditions and a targeted average daily would better determine the opportunity of utilizing an all forage ration, or the need for grain inclusion in the calf backgrounding diet. Numerically, the all forage ration provided a cheaper cost of gain while not negatively impacting feed conversion. This scenario provides an excellent opportunity for a producer to utilize 100% locally raised forages, especially in a drought year where grain yield may be dramatically reduced.

## **Implications**

As post-weaning livestock feeding continues to expand throughout southwest North Dakota, a tremendous opportunity exists for feed production on traditionally low yielding crop ground. Value added to crop ground through livestock forage production and increased value through retaining and feeding livestock in the region will have a significant impact on the rural communities. Utilizing combinations of annual forage crops in post-weaning livestock rations offers unique business opportunities to producers in the region.

**Table 1. Individual feed analysis<sup>a</sup>**

	DM %	CP %	TDN %	Ca %	P %	NO <sub>3</sub> % <sup>b</sup>
Barley Grain	90.3	16.3	85.9	0.05	0.36	---
Barley Hay	71.3	14.8	74.5	0.30	0.34	0.04
Barley Pea Haylage	28.2	14.2	72.0	0.55	0.32	0.41

<sup>a</sup>Feed analysis reported on DM basis

<sup>b</sup>Nitrate content below 0.44% (DM basis) are considered safe to feed under all conditions

**Table 2. Diet composition of grain and forage rations.**

Ingredient	Diets	
	Grain	Forage
	% DM basis	
Barley Pea Haylage	36.3	37.1
Barley Grain	35.4	
Barley Hay		34.0
Grass Hay <sup>a</sup>	24.2	24.7
Supplement <sup>b</sup>	4.1	4.2
Nutrient		
CP, %	15.5	14.9
TDN, %	73.7	69.8
DM, %	46.4	45.0

<sup>a</sup>Grass hay included to raise DM content of diet

<sup>b</sup>Supplement concentrations were: 314 ppm Fe, 1510 ppm Mn, 1504 ppm Zn, 778 ppm Cu, 25 ppm Monensin

**Table 3. Effect of barley grain vs. barley forage on calf backgrounding performance.**

Item	Treatment <sup>a</sup>		<i>P</i> -value <sup>b</sup>
	Grain	Forage	
Initial Weight, lbs	667	670	0.63
Ending Weight, lbs	775	770	0.51
Gain, lbs	107	100	0.34
Average Daily Gain, lbs	2.61	2.44	0.35
Feed:Gain, DM lbs	7.61	7.70	0.78
Feed Cost of Gain, \$/lb	0.28	0.27	0.26

<sup>a</sup>Grain = 35% barley grain DM inclusion in total diet; Forage = 35% barley hay DM inclusion replacing barley grain component.

<sup>b</sup>*P*-value for Grain vs Forage treatments.