

EFFECTS OF FEEDING NAKED OATS OR BARLEY TO LIGHT WEIGHT FEEDER CALVES IN A TOTAL MIXED RATION OR WHEN CONCENTRATIONS AND FORAGES ARE FED SEPARATELY

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SUMMARY

The ND Crop Improvement Association recently released a variety of hull-less oats "Paul" in 1994. Livestock producers have expressed interest in Paul oats as a feed because of its high protein (16%) and fat (7 - 9%) content. In order to maximize daily gains and feed efficiency for feeder cattle, method of feed delivery may be important. This study will investigate the effects of naked oats compared to barley when fed in a total mixed ration or forage and concentrates fed separately to light weight feeder calves. Seventy-two Charolais crossbred calves (40 steers, 32 heifers) will be fed in 16 pens and assigned to 2 levels of treatments. Calves will receive a backgrounding diet formulated with equal quantities of either naked oats (NOAT) or barley (BRLY). Diets will then be delivered in a total mixed ration (TMR) or the concentrate and forage portions of the diet will be fed separately (FSR). The study will be conducted for 55 days beginning September 12, 1994. Calf gain, pen intake and feed efficiency will be tested for treatment effects and interactions between the two levels of treatments. Incidence of calf morbidity, mortality and bloat will also be measured. Economic costs associated with feed delivery methods and calf performance will be compared. Results from this study should provide information on the usefulness of naked oats when compared to barley in backgrounding diets. Furthermore, differences in feed delivery methods may assist producers when evaluating the purchase of a mixer wagon.

PROJECT OBJECTIVES

Compare the value and feeding properties of naked oats to barley when fed to lightweight feeder calves.

Evaluate lightweight feeder calf performance and feed efficiency as influenced by feed delivery in a total mixed ration or when concentrates and forages are fed separately.

INTRODUCTION

A market for naked oats has not been established and interest for its use as a livestock feed has been suggested. General feeding guidelines and recommendations are lacking. Furthermore, naked oats has unique qualities when compared to other cereal crops. Naked oats is high in CP (16-18%) and lipid (9%; resulting in an increased energy value, 90-94% TDN) compared to barley (84% TDN) or hulled oats (78% TDN). Nutrient composition for grains commonly fed in ND are given in [Table 1](#). The increased nutrient density of this feed may prove useful when formulating diets of light weight feeder cattle by providing required nutrients for growth with less required concentrate intake compared to other grains.

Research conducted at South Dakota State University (Wagner et al., 1988) and the NDSU Carrington Research Center (Anderson, 1992) have demonstrated benefits for feeding backgrounding or finishing cattle diets respectively, in a total mixed ration (TMR) compared to concentrates and forages fed separately. These studies have suggested both an improvement in ADG and feed efficiency. North Dakota is primarily a cow-calf beef producing state where only 30 to 40% of the calf crop is backgrounded within its borders. There may be opportunities to expand this segment of the industry and add value to calves prior to their delivery to finishing yards in other states. Provision of a TMR requires additional equipment and therefore, increased animal performance and feed utilization must compensate for these added expenses for the number of cattle being fed. Wagner et al. (1988) stated that when feeder cattle are valued at \$80/cwt and if corn, hay and corn silage were worth \$90, \$80 and \$25 per ton, respectively, producers would need to feed a minimum of 114 head for 133 days each year to pay for costs associated with owning a mixer wagon. Evaluation of feeds more commonly found on a state -wide basis for ND is needed to localize these recommendations.

Severe environmental conditions often arise where weaning earlier than the normal date can increase cow body condition prior to the winter months. This can help reduce required stored winter feed supplies needed for optimal cow reproduction the following year. Earlier weaning may also increase the potential use of a mixer wagon by spreading ownership costs over more cattle being fed.

MATERIALS AND METHODS

Seventy-two Charolais crossbred calves were stratified by weight, blocked by sex and assigned to 16 pens (5 steers/pen and 4 heifers/pen). Treatments were randomly assigned to pens in a two x two factorial arrangement. The first level of treatments were based on the concentrate portion of the diet. Diets ([Table 2](#)) were formulated with either naked oats (NOAT), or barley (BRLY) with concentrate and protein levels in the diet the same for each treatment. The second level of treatments were based on the method of feed delivery. One diet was delivered in a total mixed ration (TMR). The concentrate and roughage portions of the other diet were fed separately (FSR). This factorial arrangement of treatments resulted in four treatment combinations with 2 pens/treatment combination for each sex.

Calves were vaccinated pre-weaning (August 15, 1994) for IBR, BVD, BRSV and PI₃. These vaccinations were repeated at weaning (Sept. 5) and calves (450 lb. BW) were treated for external and internal parasites with Ivomec. Starter diets were formulated with long-stemmed alfalfa and grass hay plus 2 lbs. of hulled oats fed per animal daily. This postweaning adjustment period ended on Sept. 11 and calves were weighed and assigned to their treatments on Sept. 12. The experiment will be conducted for approximately 55 days, ending November 7. Preliminary diet formulations are given in [Table 2](#) and have been formulated for a 485 lb. steer calf.

Delivery of the TMR treatment was made daily, with the concentrates and hay (chopped and mixed) fed using a mixer wagon. For the FSR treatment, all concentrate portions of the diet were fed twice each day in a bunk with the forage portion of the diet (long-stemmed hay) offered pre-choice in round bale feeders (n = 8 pens).

Calf weights were recorded at the beginning of the experiment and two shrunk weights will be collected over two days at the end of the experiment. The average of these two final weights will be analyzed for treatment effects. Calculated ADG, feed offered and feed efficiency for gain will also be tested. Incidence of calf morbidity (calves treated for various health problems), mortality (death loss) and bloat or acidosis (acute and chronic incidence) will be

monitored. Economic costs associated with TMR and FSR methods of feed delivery will be evaluated along with comparing the value of naked oats with barley.

RESULTS

The results of this study can lead to producer information in several areas of feeder calf management. The energy value and feeding properties of Naked Oats will be compared to Barley in backgrounding diets. The high protein and fat content of Naked Oats may have unique characteristics which could prove to be beneficial or detrimental to calves on growing diets. Furthermore, calf performance, feed efficiency and economic evaluations of feed delivery can be made. These measurements may help assist producers in evaluating the purchase of feeding equipment such as a mixer wagon. Results may also indicate what the minimum number of calves you will need to feed each year in order to justify equipment expense, if performance is enhanced with TMR feed delivery. A summary of measurements which should be tested for treatment comparisons are given in [Table 3](#).

LITERATURE CITED

Anderson, V.L. 1992. Observations on totally mixed vs hand fed rations for finishing steers. Carrington Research and Extension Center Beef Field Day Report. Pg. 13-14.

Wagner, J.J., D. Peterson, R. Hanson and H.L. Miller. 1988. Economic analysis of using mixing equipment for growing heifers. South Dakota State University Annual Beef Report. Pg. 56-60.

Table 1. Nutrient composition of naked oats compared to other feed grains reported on a percent dry matter basis.								
Feed	DM	CP	TDN	Fat	NEm ^a	NEg ^a	Ca	P
Naked Oats	92	16.5	94	9.0	1.07	.75	.07	.50
Oats	89	12.0	78	5.1	.86	.57	.07	.38
Barley	88	14.0	84	2.1	.94	.64	.05	.38

Corn	88	10.0	88	4.2	1.00	.68	.02	.34
^a Mcal/lb								

Table 2. Diet formulated for lightweight feeder calves containing either naked oats (NOAT) or barley (BRLY).		
	BRLY	NOAT
Ingredient	Pounds Per Head Per Day	Pounds Per Head Per Day
Crested Hay	8.20	8.70
Barley	6.00	----
Naked Oats	----	6.00
Soybean oil meal	1.00	.3
Mixing Mineral ^a	.10	.10
BeefMix BVT ^b	.33	.33
	15.63	15.43
^a Mineral supplement containing calcium (24%) and phosphorus (6%). ^b Ionophore supplement containing Bovatec to provide 250mg/hd/day.		

Table 3. Feeder calf performance measurements for diets containing either naked oats (NOAT) or barley (BRLY) and fed in a total mixed ration (TMR) or concentrates and forages fed separately (FSR).	
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Item	BRLY		NOAT		SE
	TMR	FSR	TMR	FSR	
Begin Wt.	DATA CURRENTLY BEING COLLECTED				
Heifers					
Steers					
Combined					
End Wt.					
Heifers					
Steers					
Combined					
ADG					
Heifers					
Steers					
Combined					
Feed Conversion (lbs/lb gain)					
Heifers					
Steers					
Combined					

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