The Economics of Finishing Bison

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Introduction

Prices paid for bison carcasses have fallen significantly in the past few years which makes a big difference in the economics of feeding bison for slaughter. This change has had a ripple effect in the industry and has driven down the prices of feeder and breeding stock.

Over the years the standard feeding practice of bison farmers has been to background weaned bison calves over their first winter, pasture them during the next summer and fall, and finish them on a grain ration for 100-200 days starting in November or December. Several research projects have found bison to be seasonal in their feed intake and weight gains. This seasonality of feed efficiency brings into question the common practice of finishing during the winter months.

Is it more efficient to finish bison for slaughter during the summer and fall, and slaughter them at a younger age or feed them through the winter and slaughter them later? We addressed this question with a research project conducted in the fall and winter of 2002/2003.

Experiment

Eighty yearling (14-22 month old) bison bulls were used in this project. They were obtained through a cooperating ranch. Before entering the project the bison were TB tested and given injections of ivermectin and 8-way clostridial vaccine in a manner similar to what would occur in a commercial bison feeding operation

The bison were assigned to one of two treatment groups. Treatment Group A (39 head) was transported to a supplemental feeding yard designed for bison at the University of Alberta, Kinsella Ranch on September 3, 2002 and fed a feedlot ration (table 1). This group of bison was slaughtered at the Agriculture Canada Lacombe Research Centre on three different dates in the fall of 2002 after 48, 76, 97 days on feed. The last group was slaughtered on December 9.

Treatment Group B (41 head) was transported to a bison farm in southern Alberta and put on pasture until December 20, 2002 at which time they were transported to Kinsella. They were put in the same feed yard and fed the same ration as Group A. They were slaughtered in March of 2003 at Lacombe after feeding periods of 74, 82, 88, 96 days.

Table 1: Finishing Ration	
concentrate fed ad libitum	45% alfalfa pellet
	40% corn
	10% barley
	5% mineral pellet
wheat greenfeed bales fed ad libitum	

Figure 1: Bison in Kinsella Feed Yard

Results

Table 2: Bison Performance		
	Group A	Group B
Feeding period	Sept. 13-Dec.8	Jan.7-March 25
Ave. weight at start of feeding period (lbs.)	707.6	777.6
Ave. slaughter wt. (lbs.)	820.7	868.6
Ave. daily gain (lbs./day)	1.72	1.38

Table 3: Feed Efficiency		
	Group A	Group B
Greenfeed consumed (lbs.)	15,600	27,000
Concentrate consumed (lbs.)	51,446	32,000
lbs greenfeed consumed/lb of gain	3.54	7.23
lbs concentrate consumed/lb of gain	11.67	8.57
lbs total feed/lb of gain	15.21	15.80
Feed cost per lb of gain while on feed ($)[a]	1.34	1.22

a. based on feed costs of $0.05/lb for greenfeed ($100/ton) and $0.10/lb of ration (alfalfa pellets-$200/ton; corn-$200/ton; barley-$140/ton; mineral pellet-$280/ton);

Table 4: Cost per Bison		
	Group A	Group B
bison ($0.75/lb liveweight)	530.25	530.25
Processing/handling	10.00	10.00
Pasture[a]	0	120.00
Feed[b]	151.91	110.97
Yardage[c]	13.18	13.20
Total ($)	**705.34**	**784.42**

a. based on $30 per month for the months of September through December;
b. based on feed costs of $0.05/lb for greenfeed ($100/ton) and $0.10/lb of ration (alfalfa pellets-$200/ton; corn-$200/ton; barley-$140/ton; mineral pellet-$280/ton);
c. based on $0.20 per head per day.

Table 5: Estimated Value of Carcasses		
	Group A	Group B
Ave. weight of carcasses (lbs.)	462.6	494.4
Ave. value using sliding pricing ($)[a]	442.30	569.20
Ave. value using fixed pricing ($)[b]	679.30	718.70

a. The value of bison using sliding pricing is calculated at $3.30/kg of carcass for grades A1 and A2 between 250-330 kg; A1 and A2 carcasses lighter than 250 kg were discounted $0.01/kg until 210 kg; carcasses lighter than 210 kg is valued the same as grade D which was $1.25/kg; grade B carcasses were valued at $2.00/kg.
b. Fixed pricing is calculated at $3.30/kg for grades A1 and A2 with not regard to carcass weight; grade B is valued at $2.00/kg

Table 6: Economics		
	Group A	Group B
Total costs per bison ($)	705.34	784.42
Profit (loss) using sliding pricing	(263.04)	(215.22)
Profit (loss) using fixed pricing	(26.04)	(65.72)
Total Cost/pound of saleable yield	$2.11	$2.19

Meat quality tests were performed on meat samples from the bison in this experiment. The purpose of this part of the project was to determine if there was any detectable difference in the meat from younger and smaller bison compared to the older and larger bison. The results of some of the meat quality tests are summarized in table 8.

Table 7: Meat Quality		
	Group A	Group B
Carcass Grade A	37	38
Carcass Grade B	2	3
PH (28 hours post mortem)	5.62	5.59
Colour (lightness)	31.4	30.8
Drip loss (% in package)	2.26	2.89
Taste Panel Tenderness (1-9 scale)	6.0	5.8
Taste Panel Flavour (1-9 scale)	5.8	5.8
Taste Panel Palatability (1-9 scale)	5.4	5.4

The meat quality tests showed no significant difference between the 2 groups in most of the parameters measured. A few tests showed a difference (eg. drip loss in a retail package) but in these were not considered to be economically important.

There was a difference in the amount of meat that Group B yielded as compared to Group A. This was partly due to the difference in size of the animals and partly due to fact that the older group was better muscled (table 8).

Table 8: Meat Yield		
	Group A	Group B
Hot Carcass Weight (lbs.)	462.4	494.3
Total Salable Yield (lbs.)	334.9	358.6
Total Salable Yield (% of cold carcass)	75.5	76.9
Frequency of good/very good muscling score	30	37
Frequency of borderline good muscling score	8	4

Frequency of medium muscling score	1	0

Figure 2: Lacombe Research Centre

Figure 3: Bison Carcasses at Lacombe

Discussion

Feeding bison during the drought year of 2002 was not very profitable in our experiment. We lost money and there are several reasons for this. Some of them were beyond our control and some were due to the nature in which these bison were fed at the University research facility. The main reasons for the negative returns were:

1. low price of bison due to market forces
2. high price of feed due to the drought in 2002
3. relatively expensive feed (alfalfa pellets) was chosen for the ration to fit the management style of the U of A Kinsella Ranch
4. small bison at slaughter time because the dates at Lacombe Research Centre were earlier than anticipated but were the only ones available during the experiment.

Under commercial conditions a bison producer would be able to control some of the above factors. He would likely be able to secure a less expensive feed that would give similar results. He also would have been able to adjust his slaughter dates to achieve more growth in his bison and therefore would not have been discounted as heavily for underweight carcasses.

The amount of money lost depends on how they were managed and on how the carcasses were valued at the end of the study. In this analysis 2 methods of assigning a value to the bison carcasses were used. The sliding price scale is described in the results section. It is the one used by a major processor/wholesaler in the bison industry. The calculated values for bison using this system would accurately reflect what we would have been paid if we sold our bison to this company. This system of payment heavily penalizes underweight bison (less than 250 kg or 550 lb carcasses). The fixed price system is based on the premise that the bison owner has a market for lighter carcasses and there is no penalty for underweight bison.

Another factor that influenced the economics of feeding bison is the price of feed. This project was conducted during a drought when feed prices were very high. Because of this, our cost to produce a pound of gain ($1.34 for Group A and $1.22 for Group B) was more than its value. If feed prices were low enough to allow us to produce a pound of gain for less than its value, the economics would change.

When comparing the total cost per saleable yield, meat from the fall-finished group was less expensive to produce. The total cost was $2.11 per pound as compared to $2.19 per pound for the winter-finished group. This may indicate a cost savings for the producer.

The meat quality tests showed that there is no difference in the quality of meat from bison bulls finished in the fall compared to those finished in the winter. This was especially evident in the taste panel which rated samples from each group virtually the same. The only important difference was the size of the carcass and cuts of meat. This is logical because the older bison were larger.

In this study we found that under the economic conditions of the time:

1. bison had higher rates of gain in the fall feeding period as compared to the winter feeding period. This is consistent with other studies that suggest a seasonal variation in rates of gain in bison.
2. feed efficiency was no better in the fall than in winter. This is inconsistent with several previous projects but agrees with others.
3. there is no difference in the quality of meat between the fall and winter finished bison bulls.
4. if we sold our finished bison to a meat marketer that uses a sliding scale based on carcass weight for determining the price of bison, we were better off to feed them the in traditional style of delaying their finishing period until they are older and larger.
5. if we sold our finished bison to a marketer that doesn't penalize heavily for smaller carcasses or marketed them ourselves we were better off to finish them at an earlier age and slaughter them at a lighter weight.
6. our total cost per pound of saleable bison meat was lower in the fall finished group.

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