INFLUENCE OF KATAHDIN BREEDING ON FEEDLOT PERFORMANCE AND CARCASS CHARACTERISTICS OF FINISHING LAMBS

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Impact Statement

Our results indicate the ½ blood and ¾ blood Katahdin lambs performed adequately in the feedlot compared to Rambouillet bred lambs. We observed no decrease in average daily gain or yield and quality grades for Katahdin lambs compared to conventionally bred lambs.

Introduction

In spite of the demonstrated improvement of range and profit potential, few cattle ranchers have chosen bio-control of leafy spurge with sheep over chemical control. Sell et al. (1998) reported the reasons for this reluctance: 72% of the ranchers cited lack of proper equipment; 44% thought sheep/goats competed for the same forage as cattle; 41% felt they lacked the expertise to work with sheep/goats; and 40% thought adding sheep/goats would be too time consuming. Sell et al. (1998) also point out that no local decision makers (county or township commissioners, county agents, weed board members, and state legislators) from North or South Dakota felt that sheep or goats were very effective in controlling leafy spurge.

One alternative that may convince beef producers to include sheep in their grazing plan for the control of noxious weeds is to use a breed of sheep that does not require shearing; hence, the management of the sheep enterprise would be similar to that of managing beef. Preliminary data from the Animal and Range Science Department at NDSU indicates that the Katahdin breed is hardy, shows indications of parasite resistance, and will produce offspring which shed their fleece growth annually (data supports the need for a 75% Katahdin breed influence for shedding to be consistent; Moore et al., 2001). Additionally, the breed shows indications of potential for accelerated lambing with acceptable fertility (Wildeus, 1997). As a breed, they are smaller framed and slower growing when compared to Columbia and Hampshire sired lambs, but may have improved feed conversion (Moore et al., 2004). Carcass characteristics do not appear different from conventional breeds commonly used in commercial production in the US (Moore et al., 2004). However, one concern for lamb feeders is the possibility of a pelt discount at slaughter time due to the presence of hair instead of wool. Little published research has evaluated the influence of Katahdin breeding on lamb feedlot performance and carcass characteristics compared to contemporaries.

The study hypothesis is: 1) Katahdin influenced lambs will have lower average daily gain, feed intake, and feed:gain, and require more days on feed to achieve a similar carcass weight

compared to Rambouillet influenced lambs. This study will contribute data toward the objectives of NCR-190: Increased Efficiency of Sheep Production.

Materials and Methods

This study was conducted in conjunction with the dried distillers grain trial described in this publication. A randomized complete design was used to evaluate the influence of Katahdin breeding on lamb feedlot performance and carcass characteristics. One-hundred forty four wethers (54 ± 0.3 lbs initial BW) were stratified by weight and breed (western white-faced Rambouillet and western white-faced Rambouillet X Katahdin) and assigned randomly to 9 pens (16 wethers/pen; approximately 48 Rambouillet, 48 Rambouillet X Katahdin **[1/2 Katahdin]** and 48 Rambouillet x Katahdin X Rambouillet **[3/4 Katahdin]**). Pens were then assigned to one of three diets; Control, 15 % replacement of corn with DDG (15%), or 30% replacement of corn with DDG (30%; Table 1). Wethers were fed a finishing diet for 119 days. The control diet consisted of 73% barley and 25% alfalfa hay. Rations were formulated as to maintain a Ca:P ratio of 2:1 or greater and sulfur below the toxicity range (0.40% of diet; Table 1). Rations were mixed and ground through a grinder-mixer and provided ad-libitum via bulk feeders. Wethers were weighed on day 0, 28, 56, 84, and 119. Initial and final weights were an average of two-day weights. Following the 119 day finishing period, wethers were harvested at Iowa Lamb Corp., Hawarden, IA and carcass data collected. Feedlot performance and carcass trait data were analyzed as a randomized complete design using the GLM procedure of SAS (SAS Inst. Inc., Cary, NY). There was no interaction ($P \geq 0.32$) between breed and dried distillers grains inclusion on lamb performance, therefore, the affects of breed were analyzed without ration type included in the model. The model included breed and the experimental unit was animal. Planned pairwise comparisons (least significant difference) were used to separate breed least square means when the F-test was significant ($P < 0.10$).

Results and Discussion

Gain, average daily gain (ADG), and ribeye area were not affected ($P \geq 0.20$) by breed type (Table 2). Final weight, hot carcass weight, fat depth, body wall thickness, and quality and yield grade were affected ($P \leq 0.04$) by breed type (Table 2). Final weights and hot carcass weights were higher for ½ Katahdin than ¾ Katahdin lambs, with Rambouillet lambs intermediate. This response is largely because initial weights were highest for ½ Katahdin lambs, followed by Rambouillet and ¾ Katahdin lambs. Because of the higher final and carcass weights, carcass data followed a similar trend. Fat depth, body wall thickness, yield grade, and quality grade were highest for ½ Katahdin lambs, with Rambouillet and ¾ Katahdin lambs being similar, expect for quality grade, for which Rambouillet lambs were higher than ¾ blood lambs. The percentage of boneless closely trimmed retail cuts (**% BCTRC**) reflected the amount of fat cover for the ½ Katahdin lambs, resulting in a slight reduction in the % of BCTRC compared to Rambouillet and ¾ Katahdin lambs.

Our responses for performance are not similar to those observed by other researchers. Moore et al. (2004) reported a decrease in ADG for Katahdin influenced lambs compared to lambs sired by Columbia and Hampshire rams. Direct comparisons of Katahdin feedlot performance between trials are difficult because of breed differences between Columbia and Hampshire sired lambs and Montadale/Rambouillet sire lambs. However, the differences observed between trials clearly indicate a need for additional research to determine the interactions between other breed

types and Katahdin on feedlot performance. Additionally, future research is needed to determine what affect Katahdin breeding has on carcass characteristics and percent retail product. Our results for carcass characteristics are not consistent with results reported by Moore et al. (2004).

Implications

As beef producers and land managers continue the struggle for the control of noxious weeds, the need for a low-input sheep breed becomes of increased importance. Additionally, because of the lack of shearers, especially for small "farm flocks", a need for an alternative to wool breeds is needed. The Katahdin breed of hair sheep, possibly bred to a traditional wool ewe, may become an alternative that is appealing to beef producers as they require little to no shearing. This breed alternative may make a sheep enterprise more appealing to beef producers by decreasing the input and labor costs that have traditionally been the limiting factor for including sheep in a beef operation. Currently, our results indicate the ½ and ¾ blood Katahdin lambs performed adequately in the feedlot compared to Rambouillet bred lambs.

Literature Cited

Moore, B.L., P.T. Berg, R.G. Haugen, W. Limesand, D.A. Redmer, and A. Grazul-Bilska. 2001. Evaluation of Katahdin and Wiltshire Horn (hair sheep breeds): Their effectiveness in low input management schemes. Western Dakota Sheep Day. 42:72-76.

Moore, B.L., P.T. Berg, W. Limesand, and D. Tufte. 2004. Evaluation of Katahdin hair sheep: Their use in North Dakota Management Schemes. Western Dakota Sheep and Beef Day. 45:44-49.

NRC. 1985. Nutrient Requirements of Sheep (6th Rev. Ed.). National Academy Press, Washington, DC.

Sell, R.S., D.A. Bangsrud, F.L. Leistritz, and D.J. Nudell. 1998. Ranch operators' perception of leafy spurge. Ag. Econ. Report 400-S. In: Western Dakota Sheep Day Report. 39:83-90.

Wildeus, S. 1997. Hair sheep genetic resources and their contribution to diversified small ruminant production in the United States. J. Anim. Sci. 75:630-640.

Table 1. Dietary ingredient and nutrient composition of diets fed to Katahdin x Rambouillet and Rambouillet lambs

	Diets[a]		
Ingredient	Control	15%	30%
	%, DM basis		
Corn	73.0	61.5	50.1
Dried distillers grain	---	11.25	22.5
Alfalfa	25.0	25.0	25.0
Ammonium Chloride	0.49	0.49	0.49
Trace mineral[b]	0.49	0.49	0.49
CTC[c]	0.60	0.60	0.60
Limestone[d]	0.50	0.70	0.90
Nutrient Concentration			
CP, %	11.7	14.6	18.4
TDN, %	82.2	82.8	84.6
ADF, %	9.5	10.6	11.8
Sulfur, %[e]	0.14	0.21	0.30
Ca, %	0.65	0.77	1.19
P, %	0.27	0.36	0.43

[a]Control = 0% replacement of corn with dried distillers grains; 15 = replacement of 15% of corn with dried distillers grains; 30 = replacement of 30% of corn with dried distillers grains.
[b]Trace mineral: 95.5% NaCl, 3,500 ppm Zn, 2,000 ppm Fe, 1,800 ppm Mn, 350 ppm Cu, 100 ppm I, and 60 ppm Co.
[c]CTC (4G) was formulated to provide 48 g/ton chlortetracycline.
[d]Limestone addition was formulated to maintain a Ca:P of 2.0 or greater.
[e]Sulfur may be toxic at 0.40% of diet.

Table 2. The influence of Katahdin breeding on feedlot lamb performance and carcass characteristics

	Breed[a]				
Item	Rambouillet	½ Katahdin	¾ Katahdin	SEM[b]	*P* value[c]
Gain, lbs	70	72	66	3	0.21
Final Wt, lbs	127[y]	139[z]	104[x]	3	< 0.001
Average Daily Gain, lbs/day	0.58	0.61	0.55	0.02	0.20
Hot Carcass Weight, lbs	68[y]	76[z]	59[x]	1	< 0.001
Fat Depth, in	0.29[x]	0.38[y]	0.28[x]	0.02	< 0.002
Body Wall Thickness, in	0.95[x]	1.10[y]	0.91[x]	0.03	< 0.001
Ribeye Area, in^2	2.5	2.6	2.4	0.1	0.20
Quality Grade[d]	11.6[y]	12.0[z]	11.2[x]	0.1	0.002
Yield Grade	3.3[x]	4.2[y]	3.2[x]	0.2	0.002
% BCTRC[e]	45[y]	44[x]	45[y]	0.4	0.03
Mortality	0.3[xy]	0.1[x]	0.7[y]	0.2	0.04

[a]1/2 Katahdin = Katahdin x Rambouillet; ¾ Katahdin = ½ Katahdin x Rambouillet; Rambouillet = Rambouillet.

[b]Standard Error of Mean; n = 9 .

[c]*P*-value for Katahdin vs Rambouillet.

[d]1 = utility; 2 = good; 3 = choice; 4 = prime.

[e]% boneless closely trimmed retail cuts (49.936-(0.0848*D5)-(4.376*E5)-(3.53*F5)+(2.456*G5)).

[xyz]Within a row, means without a common superscript differ ($P < 0.10$).