

K.A. Perz, M.R. Whitmore, A.F. Williams, A.R. Hicks-Lynch, M. R. Herrygers, J.A. Boles, J.G. Berardinelli, and J.M. Thomson

Department of Animal and Range Sciences, Montana State University, Bozeman, Montana, USA, 59717

Abstract

The objective of this study was to evaluate differences in growth performance measures and carcass characteristics in wethers selected for high and low residual feed intake (RFI). Mixed-breed wether lambs (n = 65), approximately 4-mo-old, were placed on trial in September of 2014. A 47-d feeding trial was conducted to get an estimate of individual wether intake. Residual feed intake, an efficiency measurement based upon the difference in actual feed intake and expected feed intake, was calculated for each wether. Wethers with an RFI of one standard deviation greater (HIGH; less efficient; n = 6) or lower (LOW; more efficient; n = 6) than the mean RFI (approximately 0) of the 65 wethers were used in the present study. Wethers were processed on December 15, 2014. Carcass data were collected on December 16, 2014. Initial and final liveweights, as well as ADG, were not affected ($P > 0.05$) by RFI class, although DMI was greater in HIGH wethers ($P < 0.002$). Back fat thickness (BF) and yield grade (YG) were greater ($P < 0.03$) in HIGH carcasses than in LOW carcasses. No other carcass traits differed between RFI classes. In young, growing wethers, selection for RFI affects dry matter intake and fat deposition.

Introduction

The most costly resource in any livestock production system is the cost of feed [1]. As feed prices continue to rise, selection for efficient animals that can gain more on less feed will become more economically important. Residual feed intake (RFI) is an efficiency measurement based upon variation in metabolic differences among individual animals [2] and is often used as a selection tool when making breeding decisions. However, the physiological mechanisms that cause variation in RFI are not clear or completely understood, which can result in inadvertent selection for undesirable traits when selecting based upon RFI. The purpose of this study was to evaluate differences in performance and carcass characteristics in wethers selected for high and low RFI.

Materials and Methods

- 4-month old mixed breed wether lambs (n = 65) underwent a 47-day feeding trial to determine individual wether feed intake and ADG
- Residual Feed Intake (RFI), or the difference between expected and actual intake, was calculated following the procedure from Koch et al. [3]
- Wethers with an RFI greater than (HIGH; less efficient; n = 6) and less than (LOW; more efficient; n = 6) one standard deviation of the mean of the 65 wethers were retained
- Wethers were harvested following standard industry procedure
- Carcass data were collected by a trained evaluator following a 24-h chill
- Significance was determined at $P < 0.05$.



Poster details available from Katharine A. Perz at katharine_perz@yahoo.com

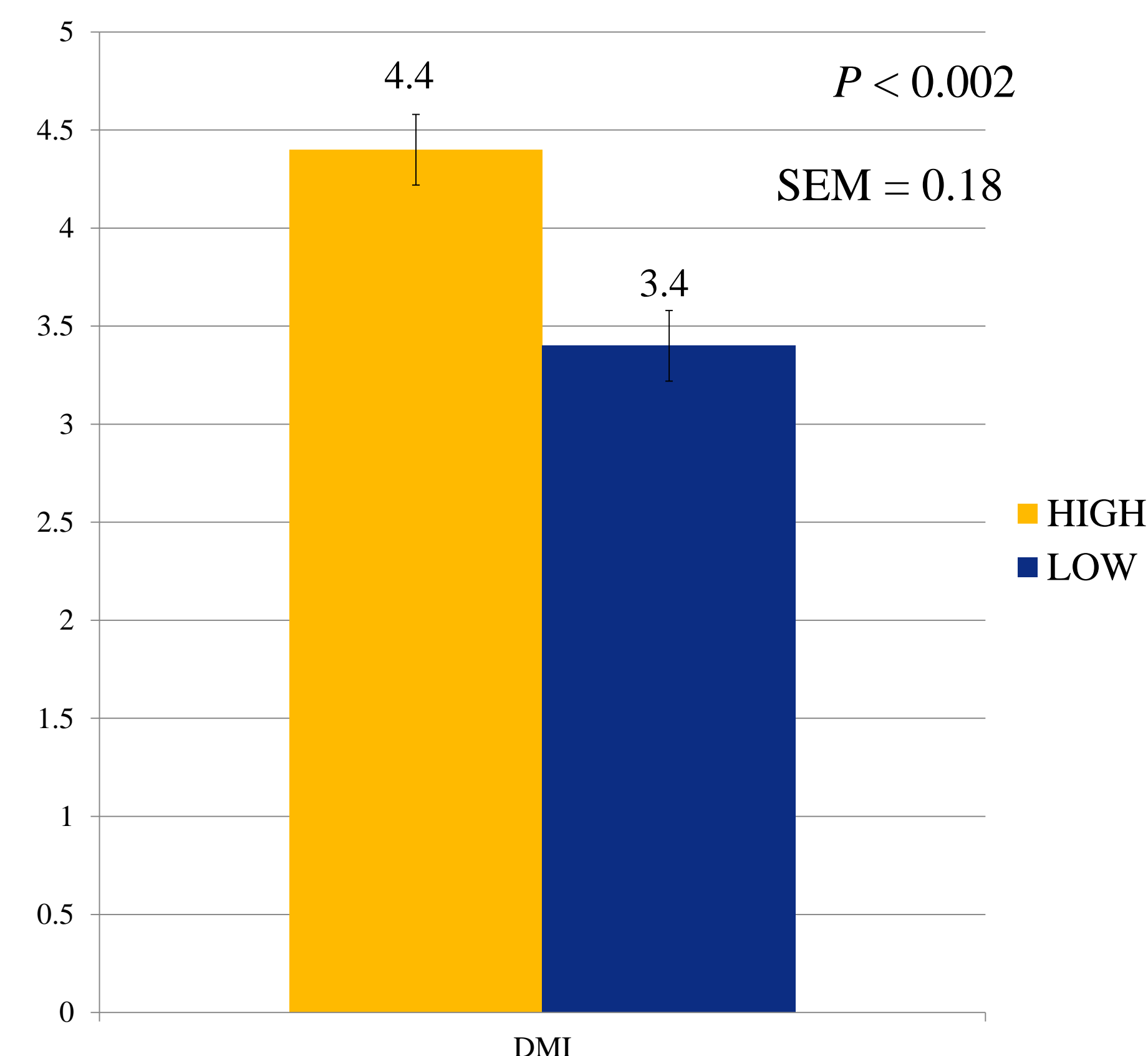


Figure 1. Average daily dry matter intake (DMI, lb/d) of HIGH and LOW efficiency wethers.

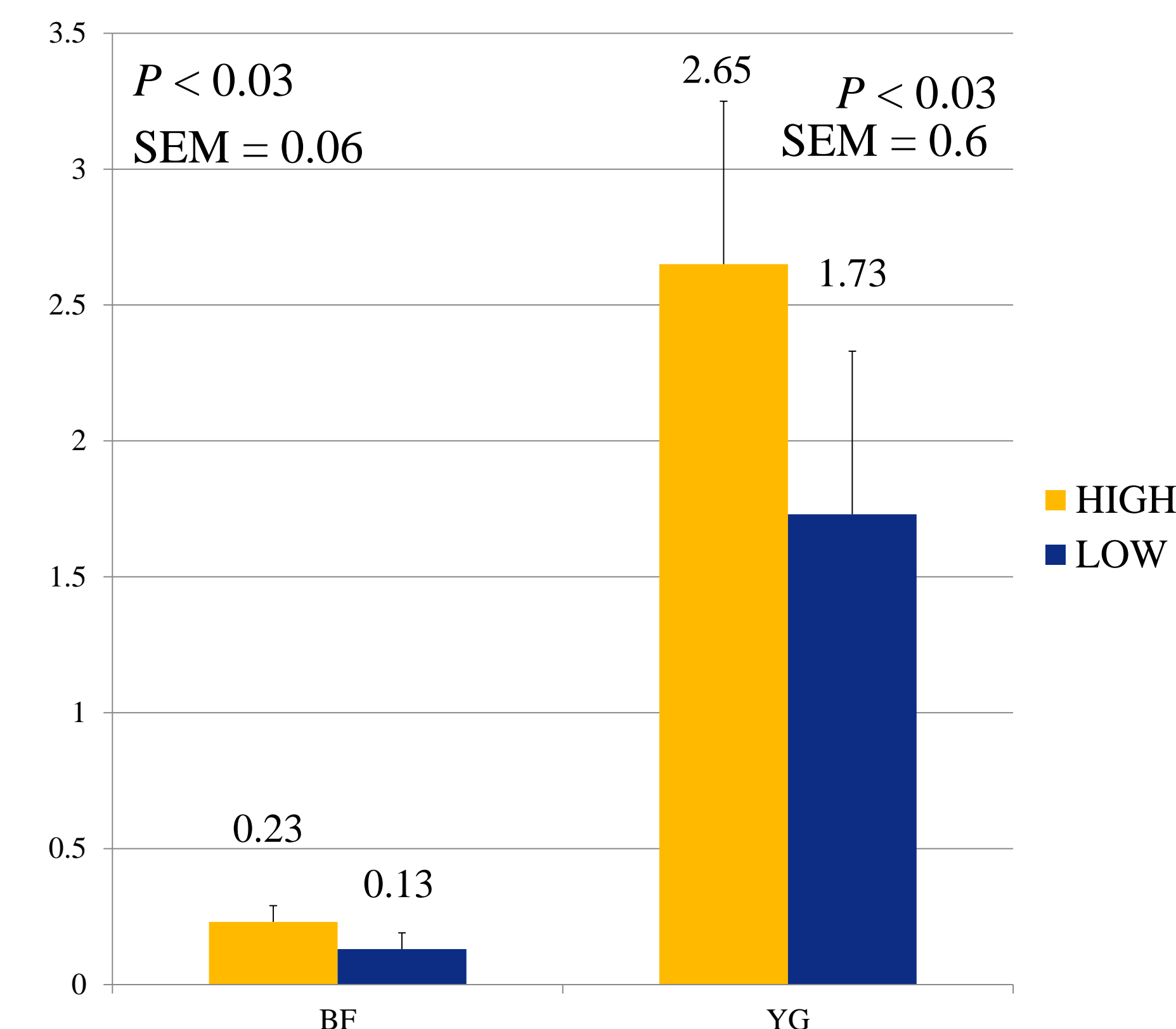


Figure 2. Effect of RFI classification on backfat thickness (BF, in) and yield grade (YG = [10*back fat thickness (in)] + 0.4) of carcasses from HIGH and LOW efficiency wethers.

Table 1. Initial liveweight (lb), final liveweight (lb), average daily gain (ADG; lb/d) and RFI of HIGH and LOW efficiency wethers

Item	RFI Classification		SEM	P-value
	HIGH RFI	LOW RFI		
Initial liveweight, lb	64.3	68.1	6.9	0.38
Final liveweight, lb	99.3	101.4	9.2	0.70
ADG, lb/d	0.60	0.57	0.1	0.62
Average group RFI	0.19	-0.28	0.02	-

Table 2. Hot carcass weight (lb), ribeye area (in²), leg score, maturity, conformation, flank streaking, and quality grade of carcasses from HIGH and LOW efficiency wethers

Item	RFI Classification			P-value
	HIGH RFI	LOW RFI	SEM	
Hot Carcass Weight, lb	46.2	45.8	4.4	0.9
Ribeye area, in ²	2.26	2.22	0.41	0.87
Leg score ¹	9.3	9.3	1.2	1.00
Maturity ²	1.67	1.8	0.47	0.5
Conformation ¹	9.3	9.3	1.21	1.00
Flank Streaking ³	225	245	104.1	0.75
Quality Grade ¹	9.3	9.2	1.87	0.88

¹ Utility = 7, High Good = 9, Low Choice = 10, Average Choice = 11, High Choice = 12; ² A⁰⁰ to A³³ = 1, A³⁴ to A⁶⁷=2; ³ Practically devoid = 100-199, Traces = 200-299, slight = 300-399, small = 400-499.

Results/Discussion

- RFI classification did not influence initial or final bodyweights, or ADG (Table 1)
- Average DMI was lower for efficient wethers ($P > 0.002$; Figure 1)
- RFI classification did not affect any muscling or quality grade measurements (Table 2)
- Less backfat was deposited in carcasses from efficient wethers ($P < 0.03$) resulting in a lower yield grade ($P < 0.03$; Figure 2)

Implications

- Selection for high and low RFI influenced dry matter intake without affecting other performance parameters in young wethers
- Selecting for increased efficiency alters backfat deposition in growing wethers. This is a novel finding that has not previously been reported in wethers this young.
- More work is necessary to understand the physiological processes affected by RFI in young, growing wethers



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