

**EFFECT OF PHENOTYPIC CHARACTERISTICS
AND PRECONDITIONING GAIN ON FEEDLOT
PERFORMANCE AND CARCASS
CHARACTERISTICS OF BEEF CATTLE**

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Introduction

- Preconditioning
 - Prepare the calf for a later stage of production
 - Reduce the incidence of BRD
 - Transition period
 - Evaluate calves individually

Introduction

- Preconditioning has been shown to decrease feedlot morbidity and mortality by 6% and 0.7%, respectively. (Cole, 1985)
- Market premiums have been associated with preconditioning due to the improved health status of the calves. (Minert et al., 1988)

Introduction

- Factors affecting calf value
 - Weight
 - Sex
 - Brahman percentage
 - Condition Score
 - Color
 - Color Pattern

Are any of these
factors really
predictive of future
performance?

Objectives

- Quantify the effect of preconditioning performance on feedlot performance and carcass characteristics.



Objectives

- Evaluate easily measurable and economically important traits on preconditioning performance, feedlot performance, and carcass characteristics.
 - Brahman percentage
 - Condition score
 - Color
 - Color pattern



Materials and Methods

- Calves were weaned from a South Florida cow/calf operation.
- Calves were processed on the day of weaning at a preconditioning yard in North Central Florida.

Materials and Methods

- During processing calves were...
 - Weighed individually
 - Identified electronically
 - Vaccinated
 - Fire branded
 - Sorted into uniform lots
- Calves were processed at 89 hd/hr

Materials and Methods

- Brahman percentage was estimated and categorized as
 - 0 Brahman
 - 1/8 Brahman
 - 1/4 Brahman
 - 3/8 Brahman



Materials and Methods

- Condition scores were categorized as
 - Slightly Thin
 - Average
 - Slightly Fleshy



Materials and Methods

- Colors that were present were
 - Black
 - Red
 - Yellow
 - Grey
 - White



Materials and Methods

- Color pattern was categorized as

- solid patterned
- non-solid patterned



- Non-solid patterned calves included spotted and brindle calves.

Materials and Methods

- Calves were preconditioned for 43d (34-51d) on pasture.
- A commercial supplement was fed at 3% of live body weight.
- 1100 steers and 421 heifers that comprised the large weight class were shipped to a feedlot operation in Kansas.

Materials and Methods

- Calves were harvested at a commercial meat packing facility based on 1 of 4 criteria.
 - Target Backfat
 - Cost of Gain = Sale Price
 - Minimum Weight
 - Maximum Weight

Materials and Methods

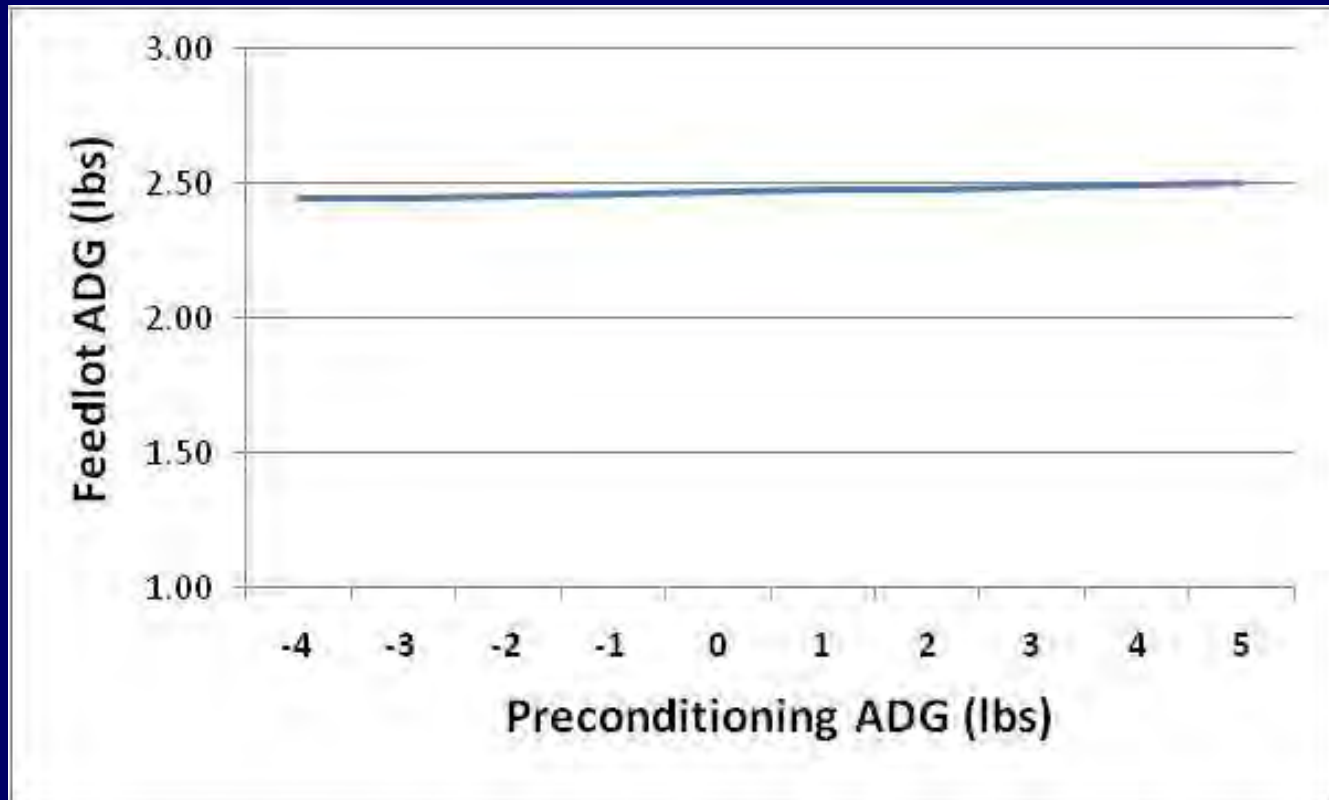
- Hot Carcass Weight
- Quality Grade
 - Prime
 - Upper 2/3 Choice
 - Low Choice
 - Select
 - Standard
- Ribeye Area/cwt and Yield Grade were calculated using data collected at the packing plant.



Preconditioning ADG

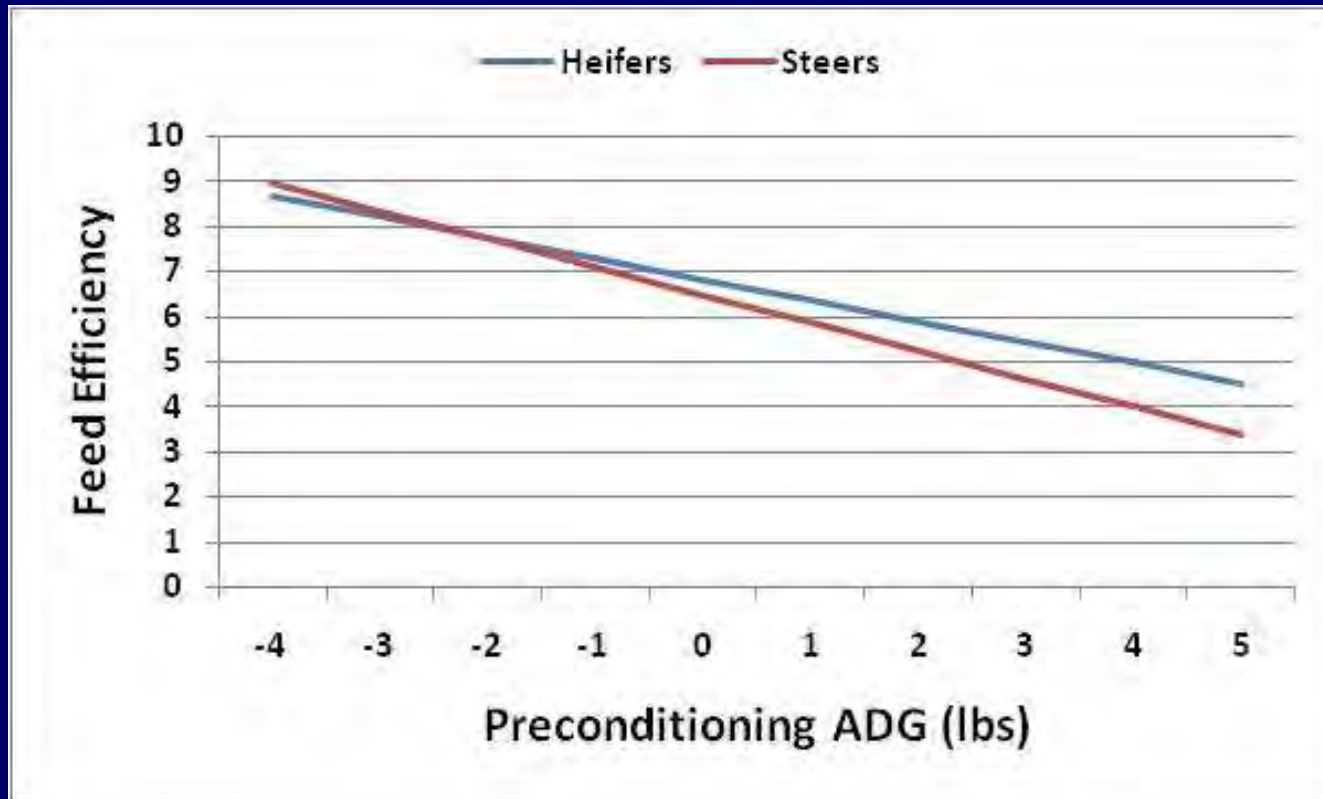


Effect of Preconditioning ADG on Feedlot ADG



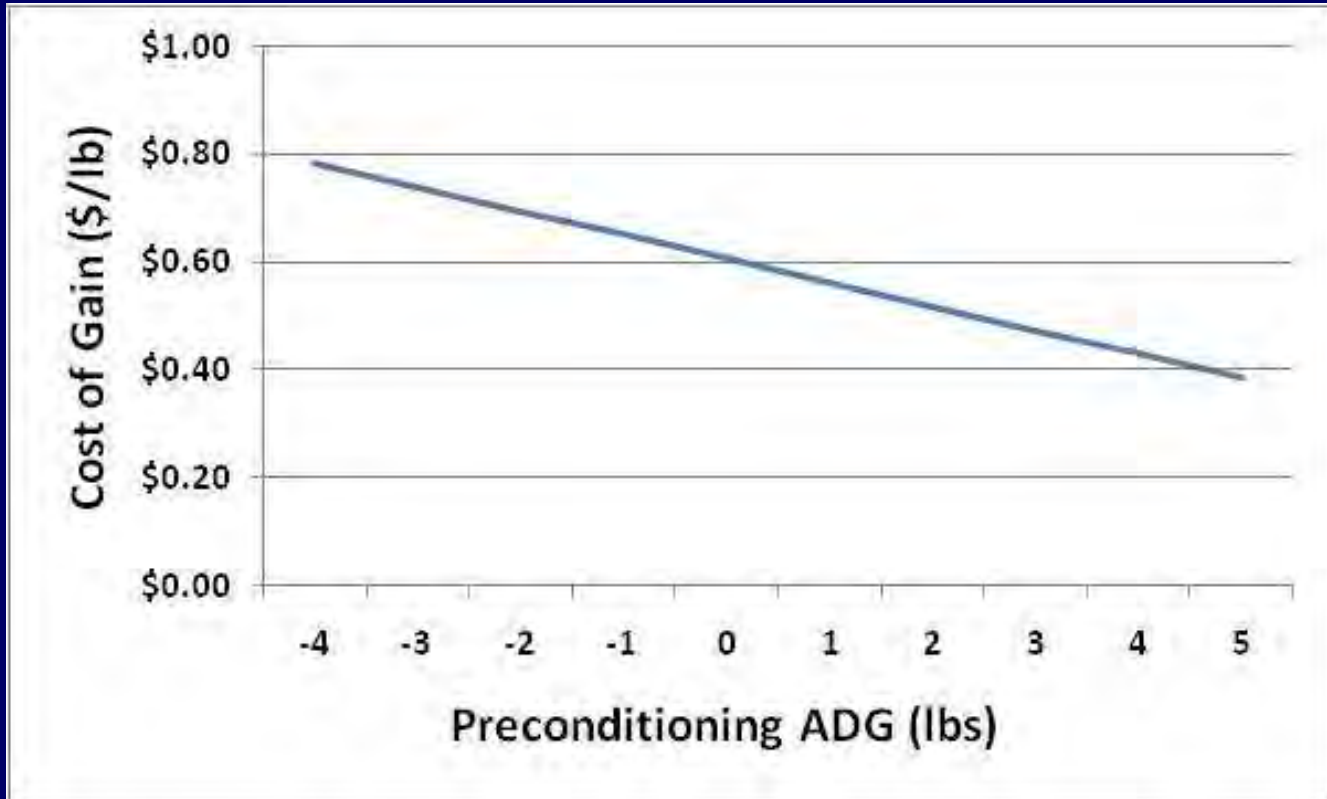
P=0.54

Effect of Preconditioning ADG on Feed Efficiency



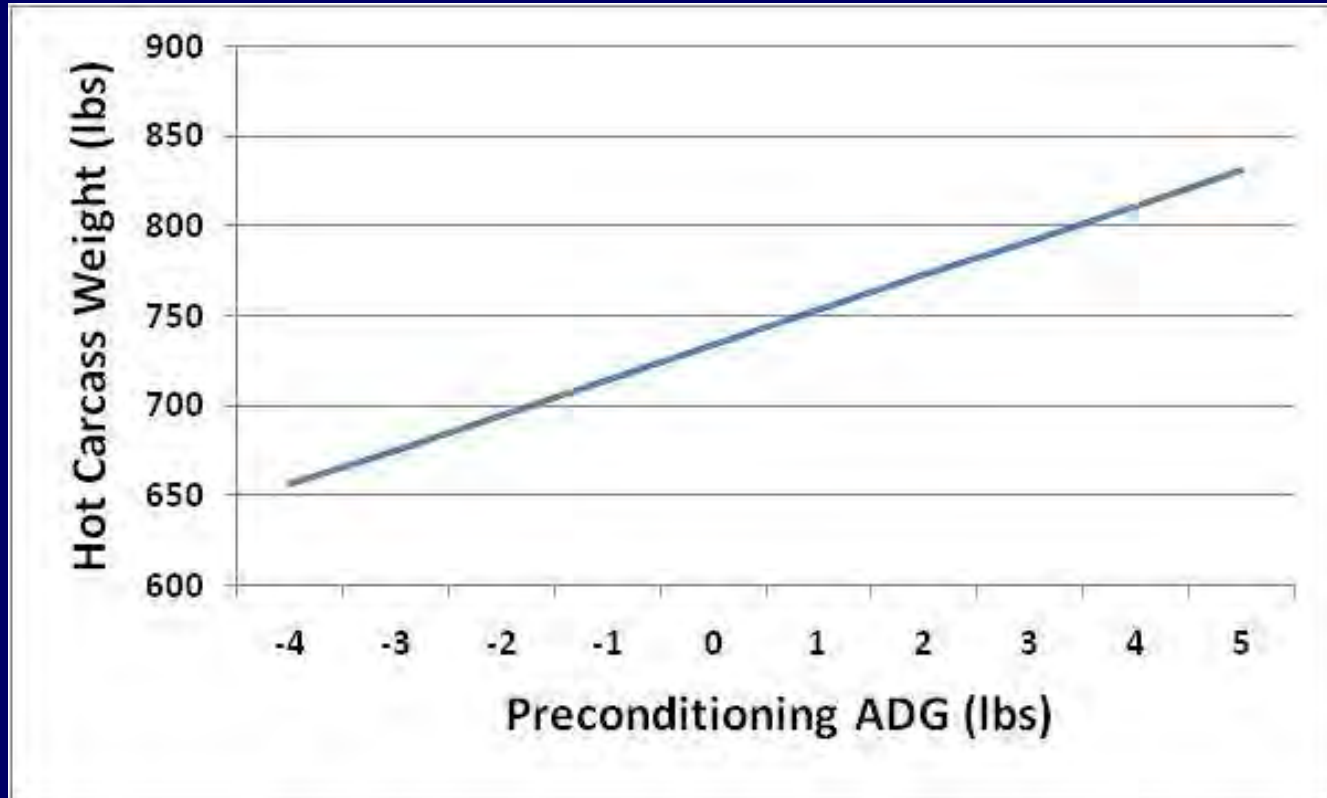
P<0.05

Effect of Preconditioning ADG on Cost of Gain



As Preconditioning ADG increased by 1 lb, Cost of Gain decreased by 4.4 cents/lb. ($P < 0.05$)

Effect of Preconditioning ADG on Hot Carcass Weight



As Preconditioning ADG increased by 1 lb, Hot Carcass Weight increased by 19.5 lbs. ($P < 0.0001$)

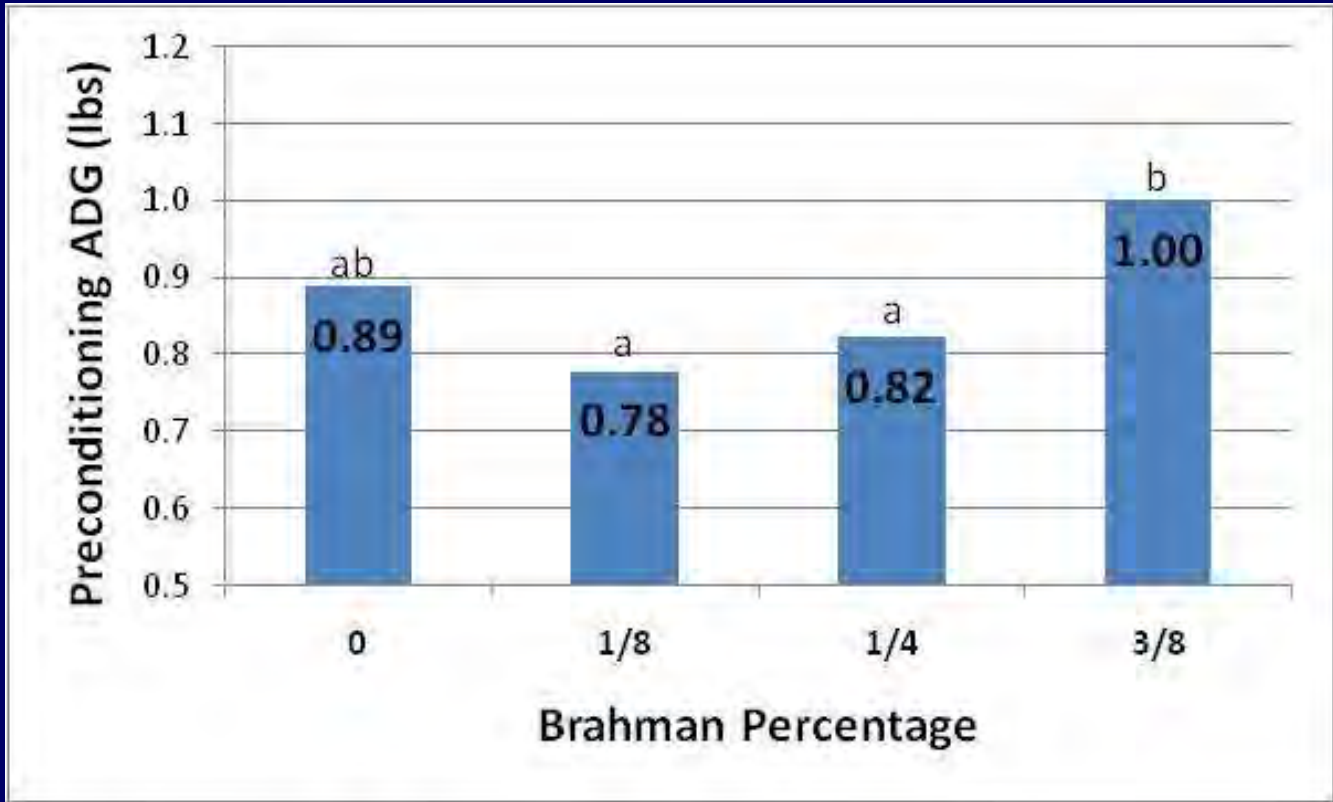
Preconditioning ADG Summary

- Preconditioning ADG was not a good predictor of Feedlot ADG
- As Preconditioning ADG increased
 - Feed Efficiency improved for steers and heifers
 - Cost of Gain was reduced
 - Hot Carcass Weight increased
 - No effect on Quality Grade or Yield Grade was observed

Estimated Brahman Percentage

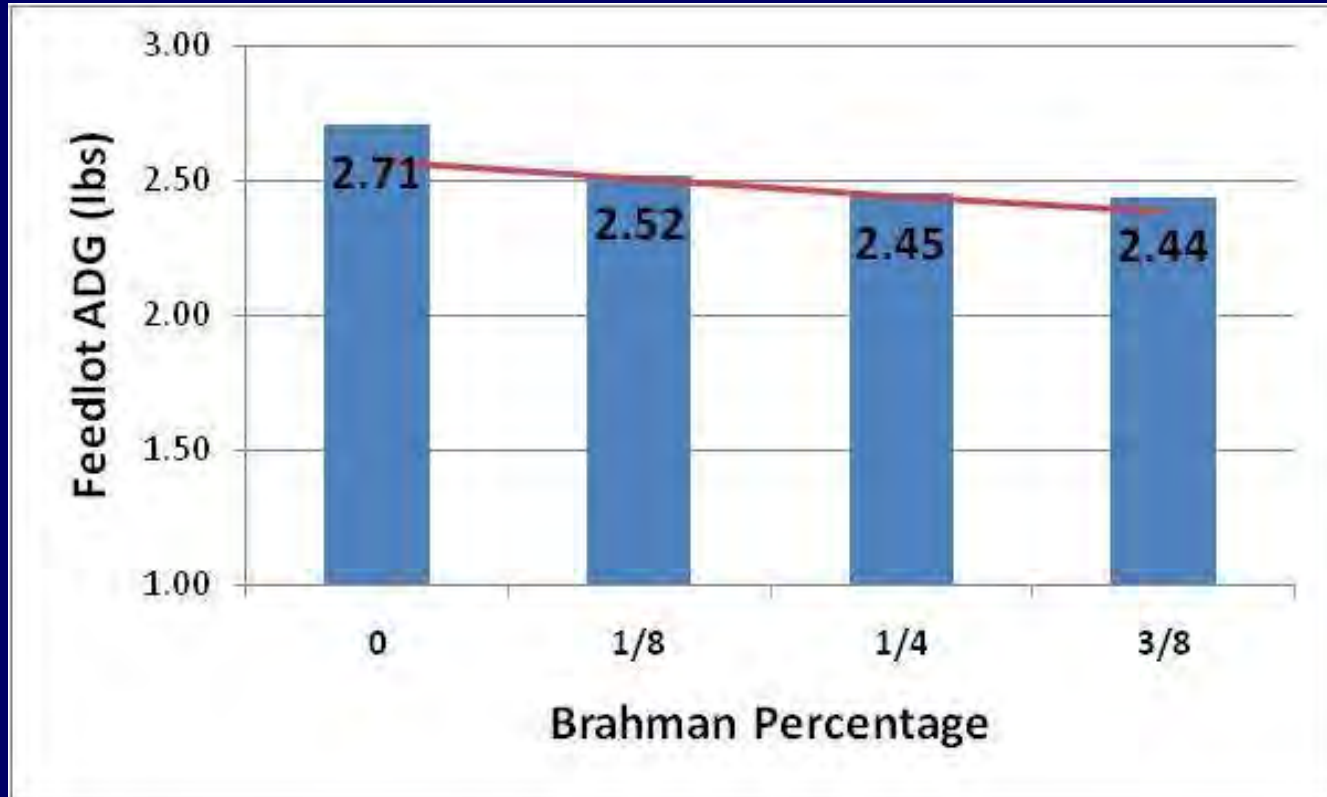


Effect of Brahman Percentage on Preconditioning ADG



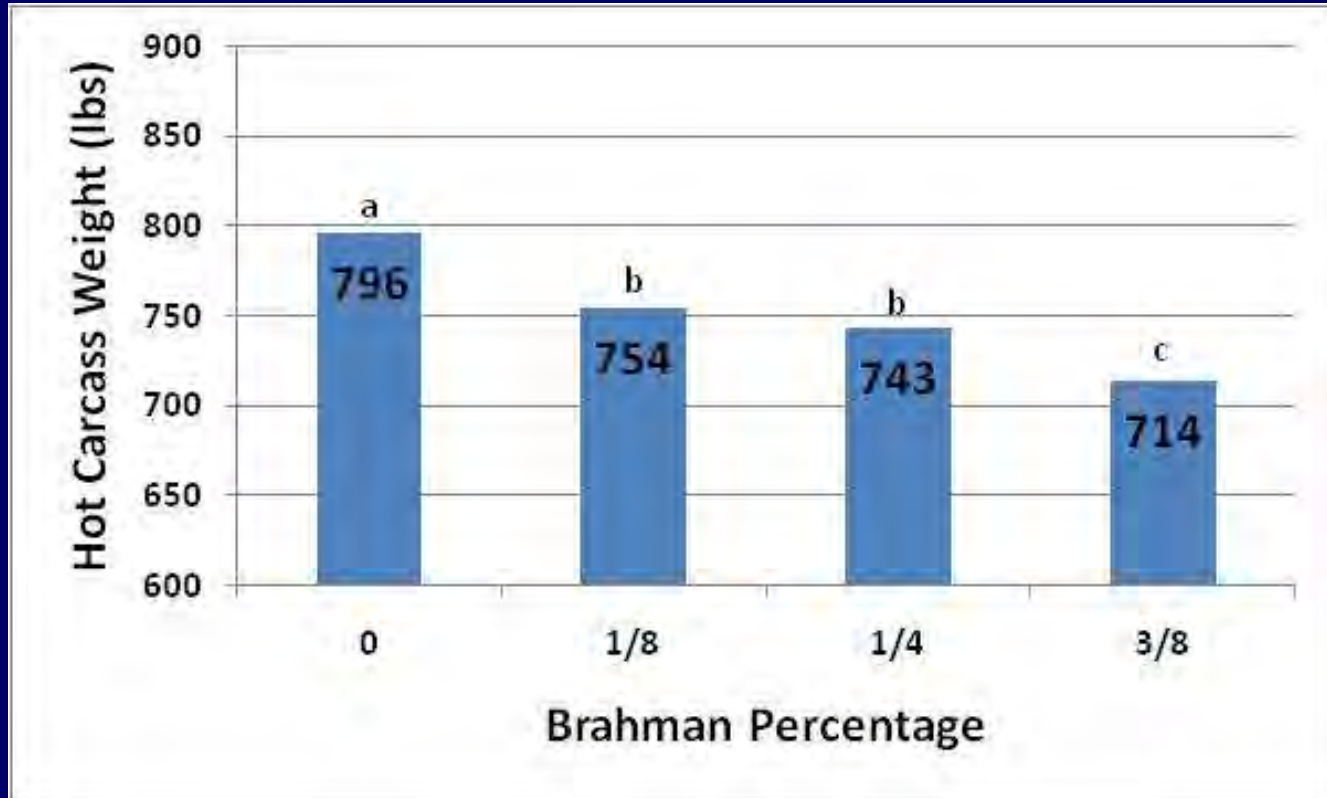
P<0.05

Effect of Brahman Percentage on Feedlot ADG



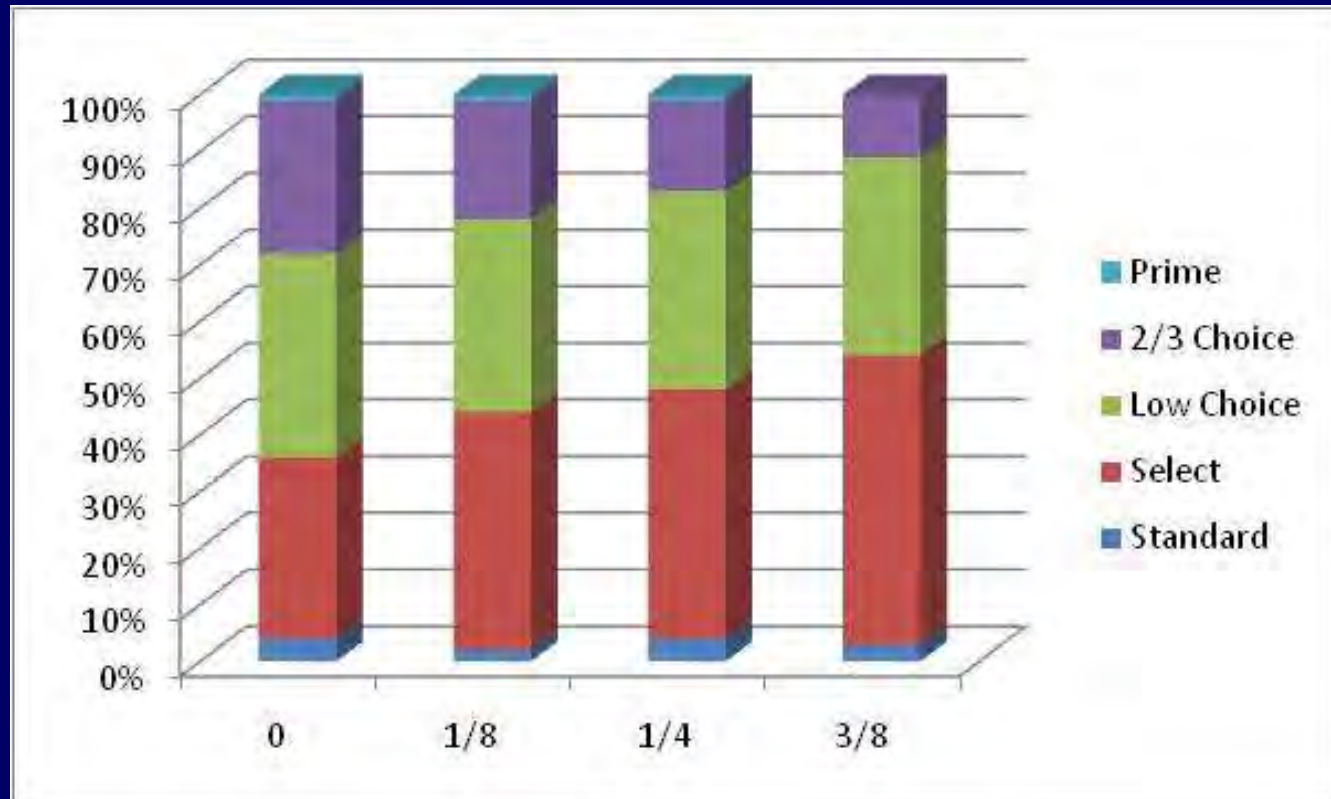
As Brahman percentage increased by 1/8, Feedlot ADG decreased by 0.07 lb/d. ($P < 0.0001$)

Effect of Brahman Percentage on Hot Carcass Weight



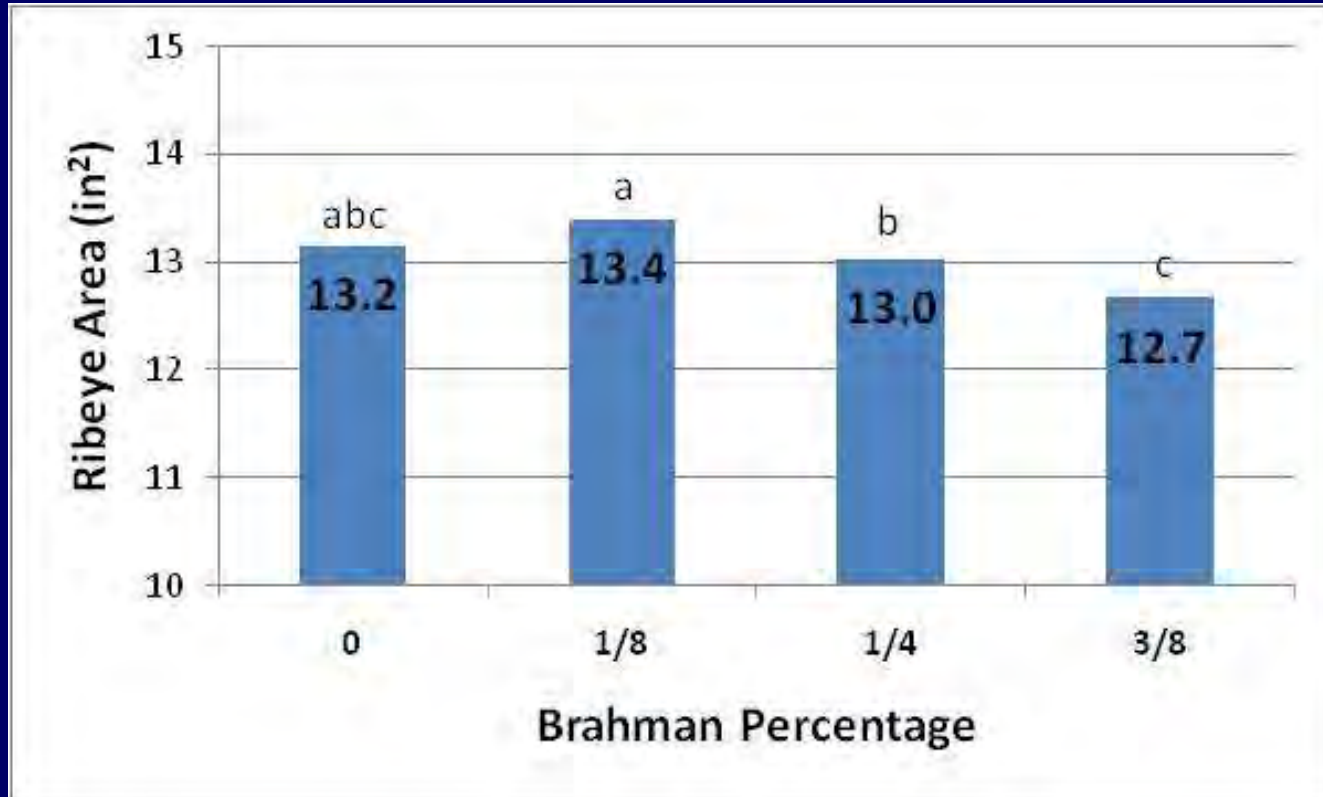
As Brahman Percentage increased by 1/8, Hot Carcass Weight decreased by 19.5 lbs. ($P < 0.0001$)

Effect of Brahman Percentage on Quality Grade

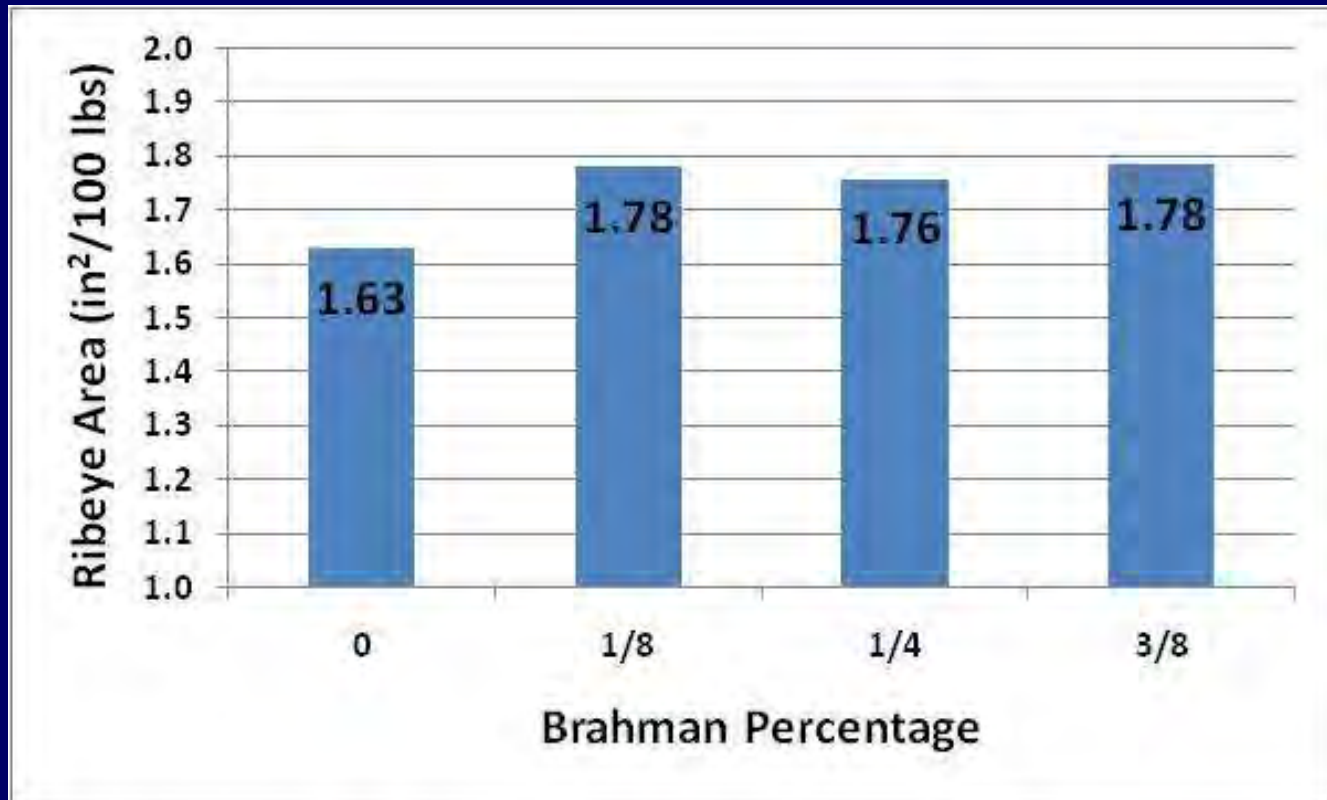


P<0.01

Effect of Brahman Percentage on Ribeye Area



Effect of Brahman Percentage on Ribeye Area/cwt



P=0.47

Brahman Percentage Summary

- As Brahman percentage increased,
 - Preconditioning ADG increased
 - Feedlot ADG decreased
 - Hot Carcass Weight declined
 - Quality Grade declined
 - No difference in REA/cwt was observed

Condition Score



Condition Score

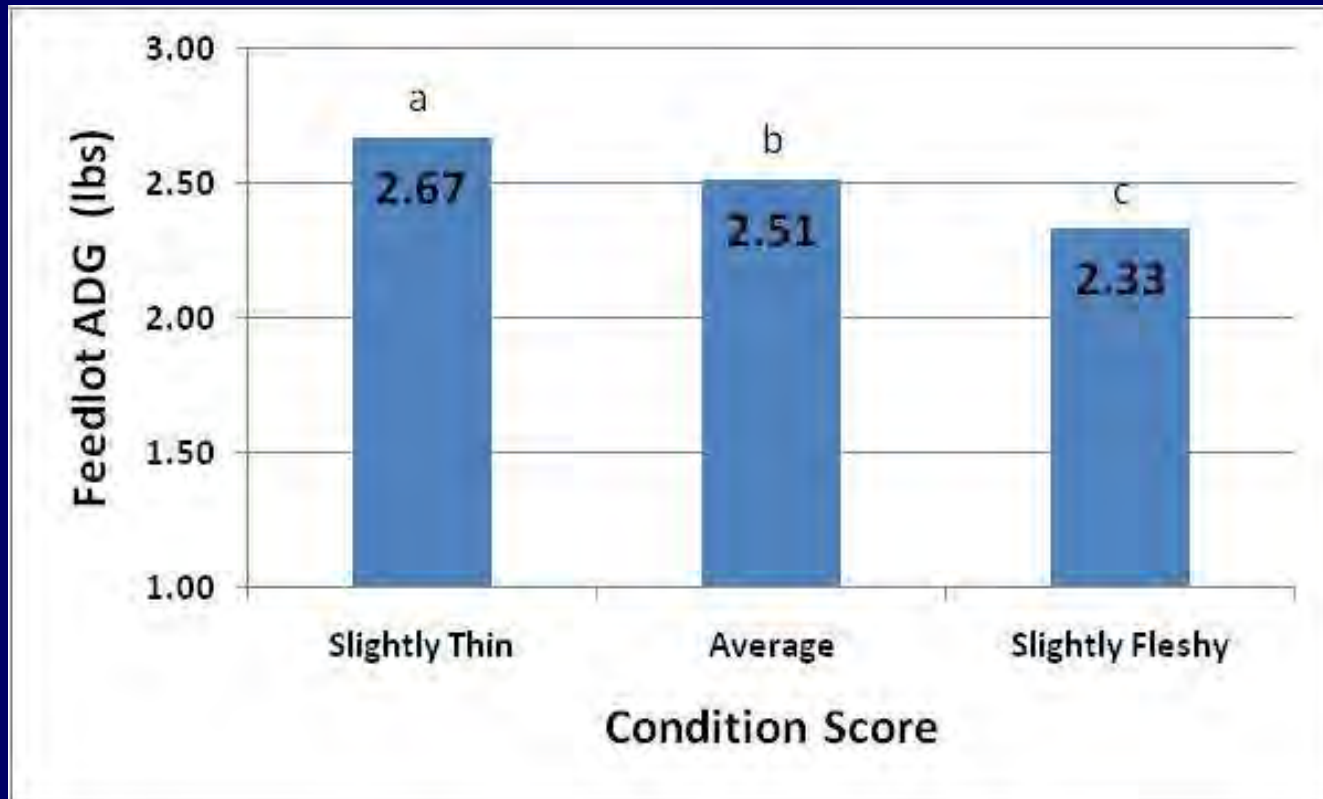


Effect of Condition Score on Preconditioning ADG



P=0.07

Effect of Condition Score on Feedlot ADG



$P < 0.0001$

Effect of Condition Score on Cost of Gain



$P < 0.0001$

Effect of Condition Score on Hot Carcass Weight



As Condition Score increased, HCW decreased by 13.4 lbs. ($P < 0.001$)

Condition Score Summary

- As Condition Score increased,
 - Preconditioning ADG decreased
 - Feedlot ADG decreased
 - Cost of Gain increased
 - Hot carcass weight decreased
 - No differences in Quality Grade or Yield Grade were observed

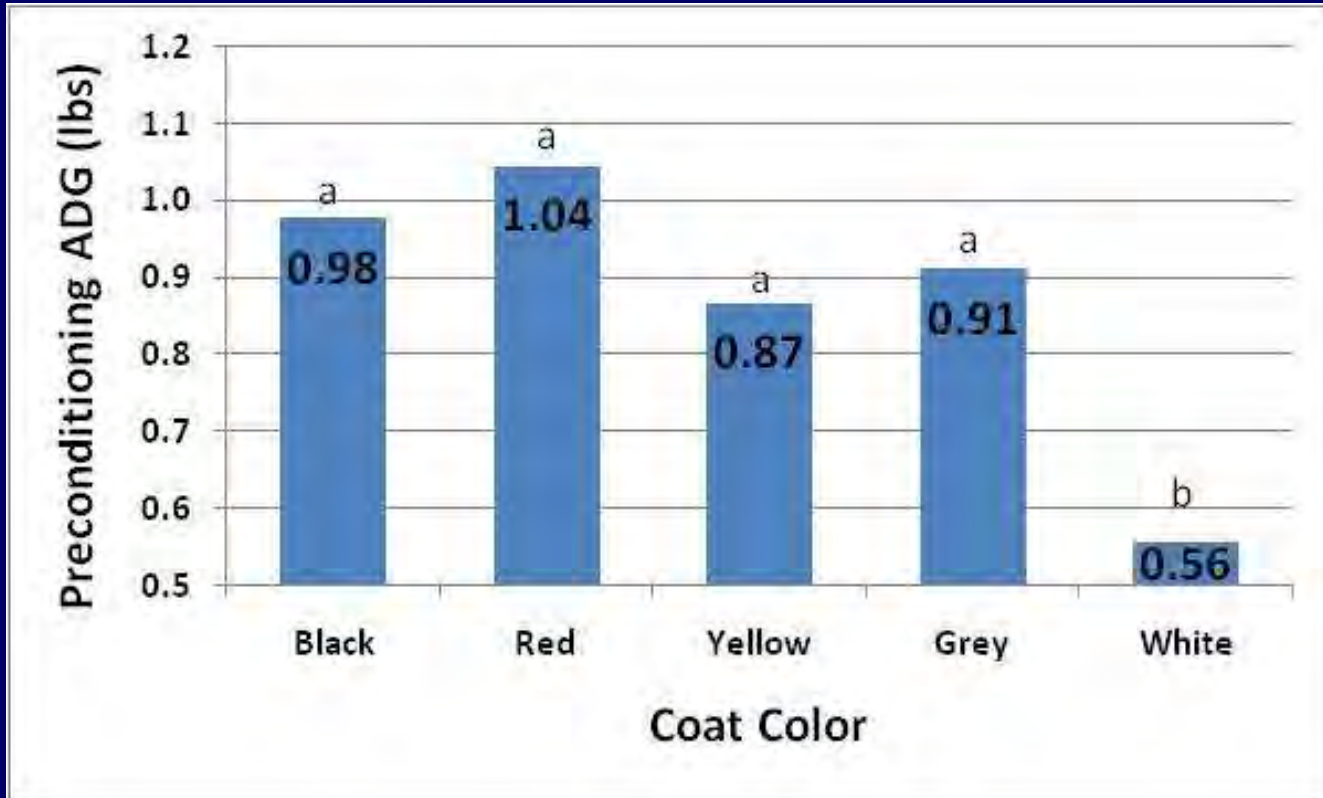
Coat Color



Coat Color

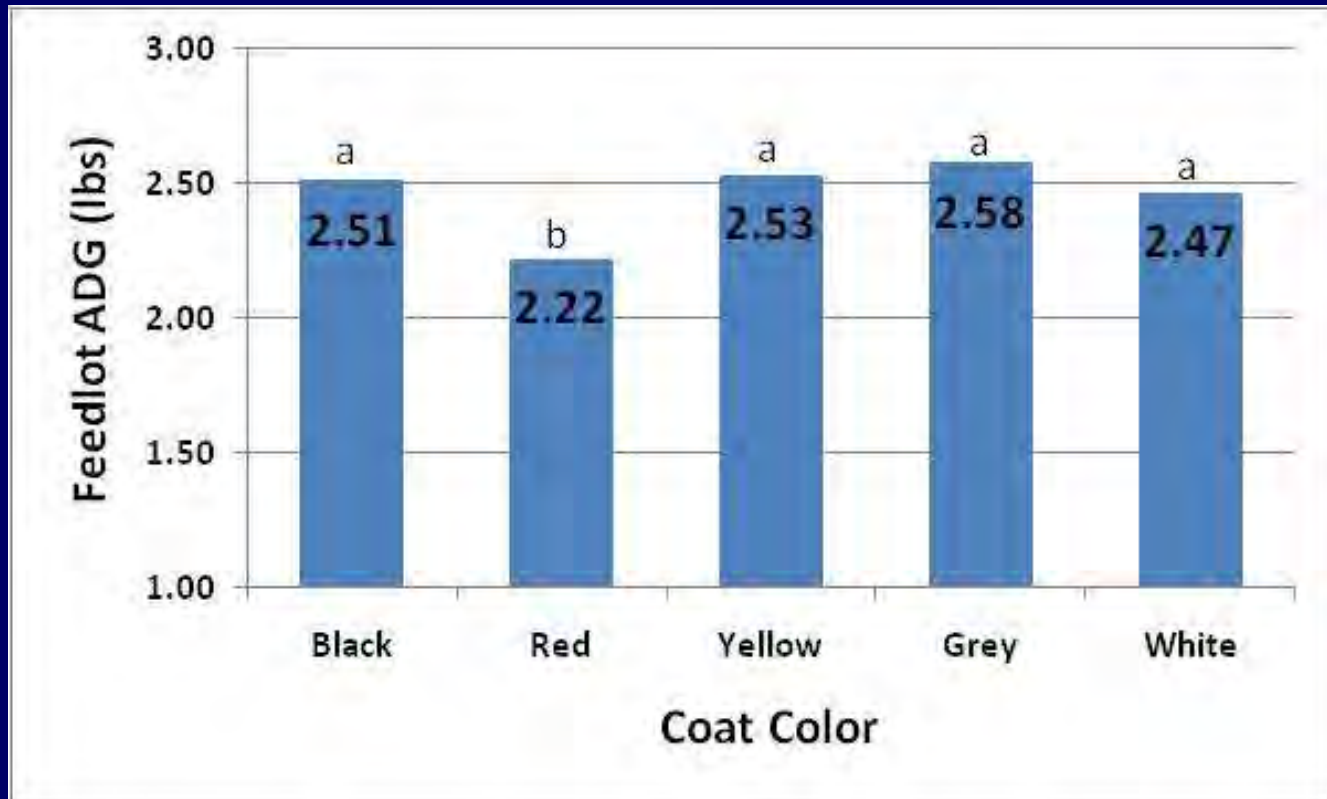
- The results presented as effects of coat color should be interpreted as including the possible effects of the breed or breed combinations that may potentially produce those colors.

Effect of Coat Color on Preconditioning ADG



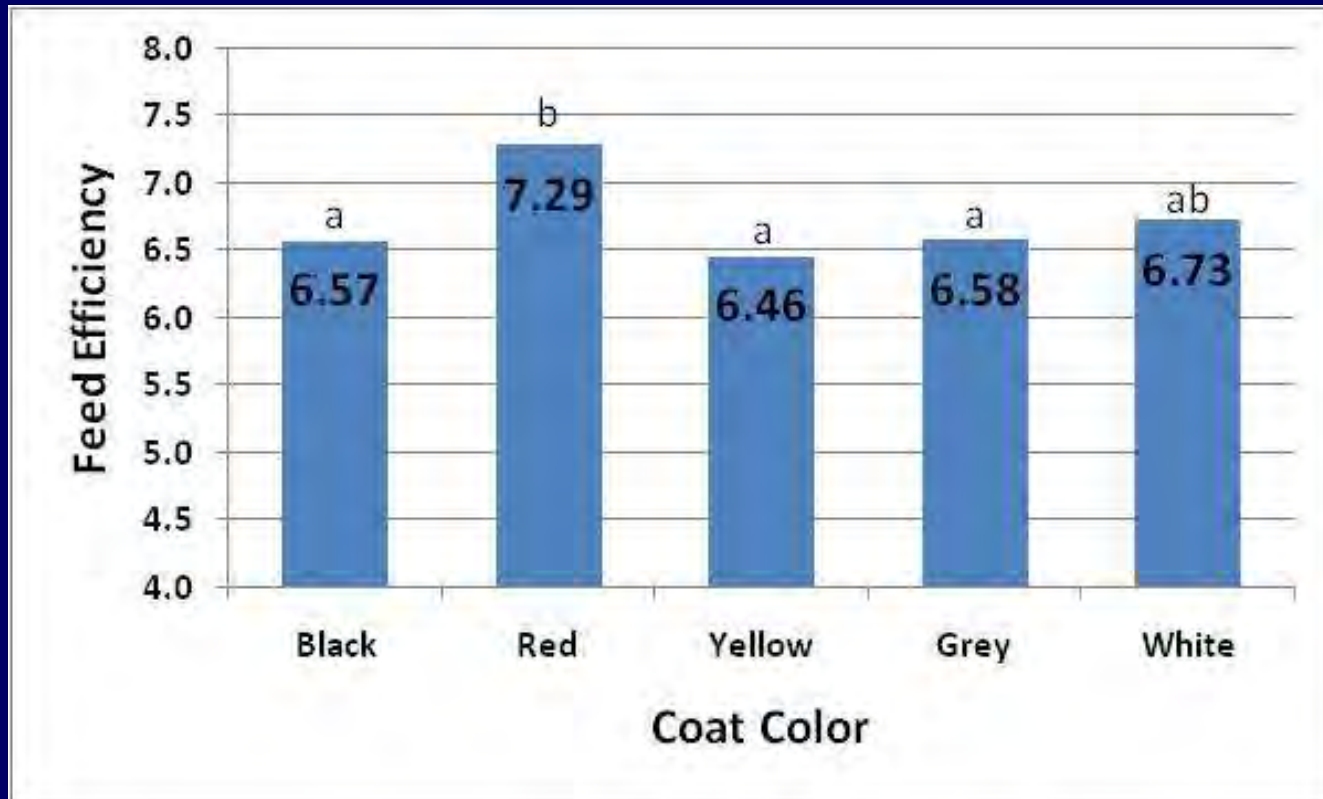
$P < 0.001$

Effect of Coat Color on Feedlot ADG



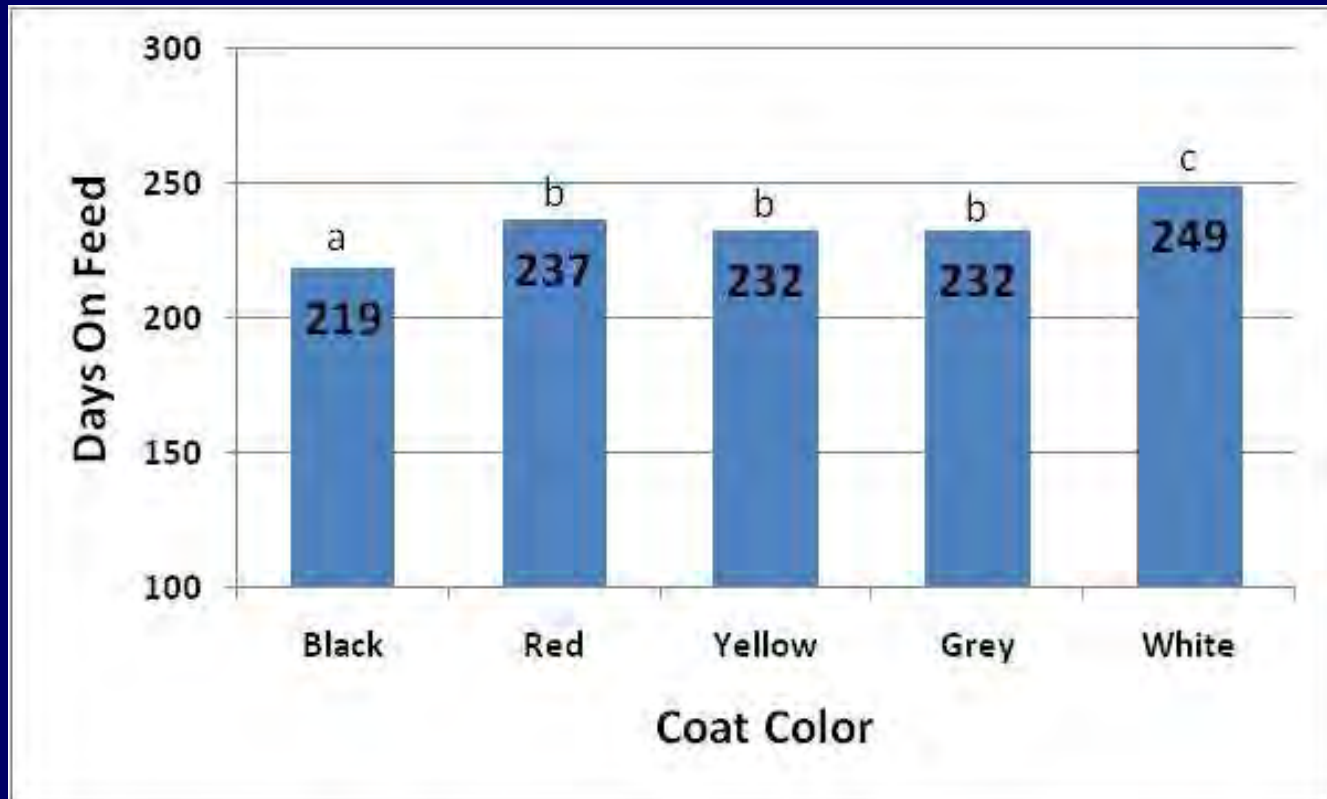
P<0.01

Effect of Coat Color on Feed Efficiency



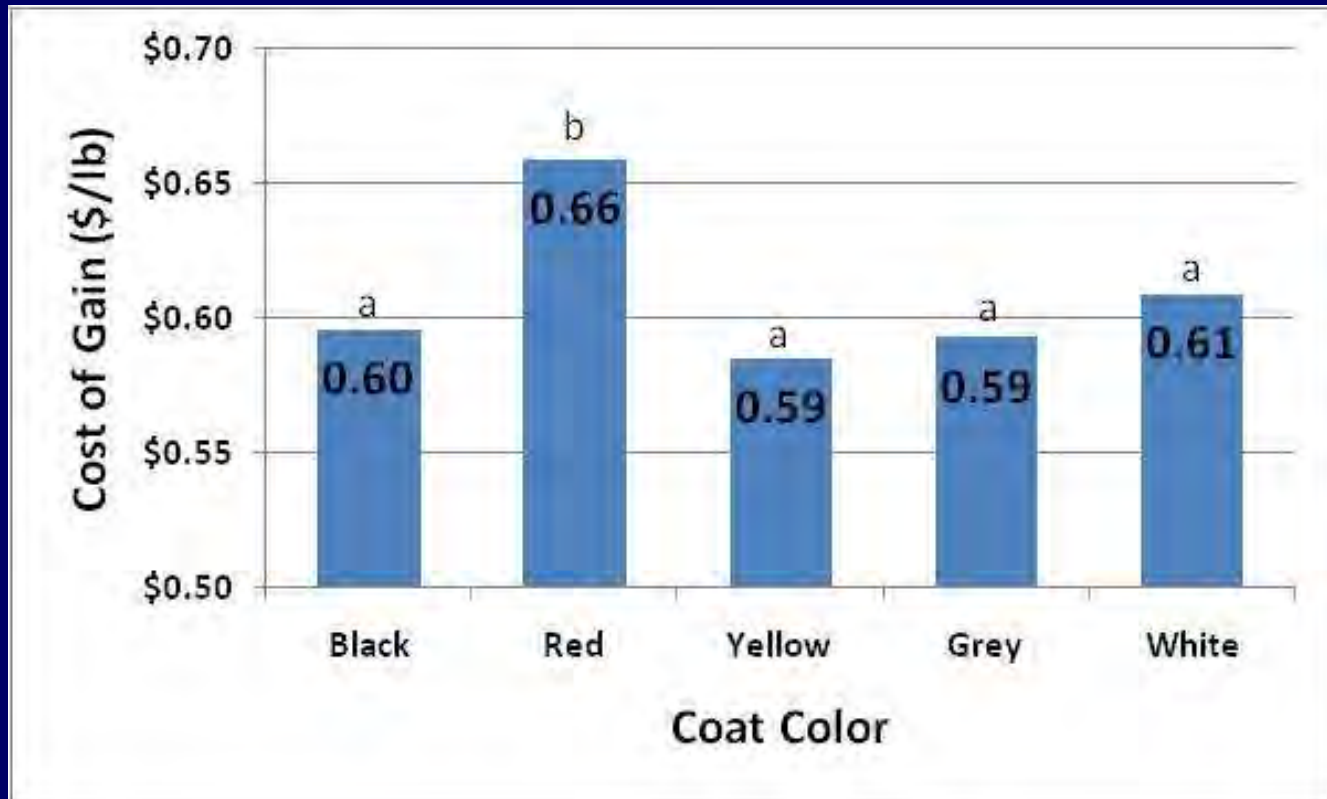
$P < 0.01$

Effect of Coat Color on Days on Feed



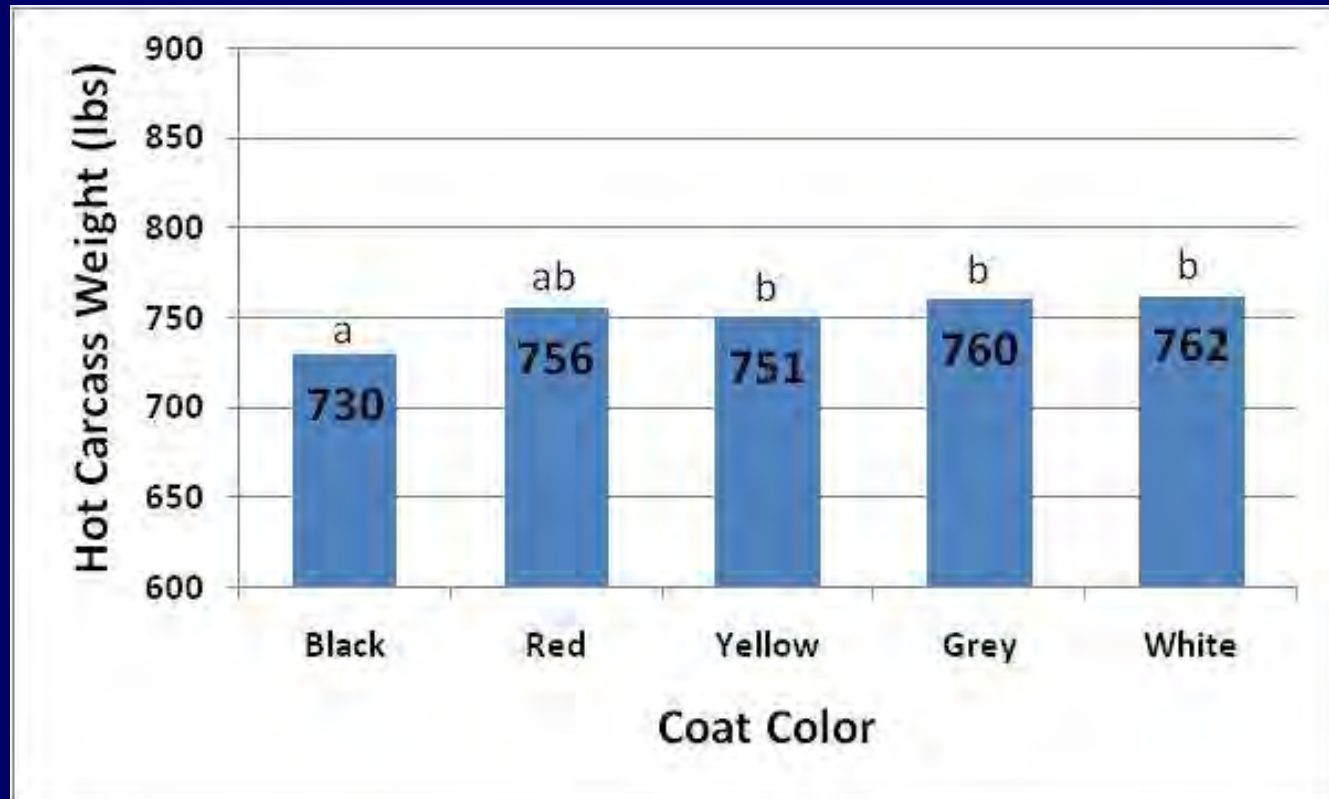
$P < 0.0001$

Effect of Coat Color on Cost of Gain



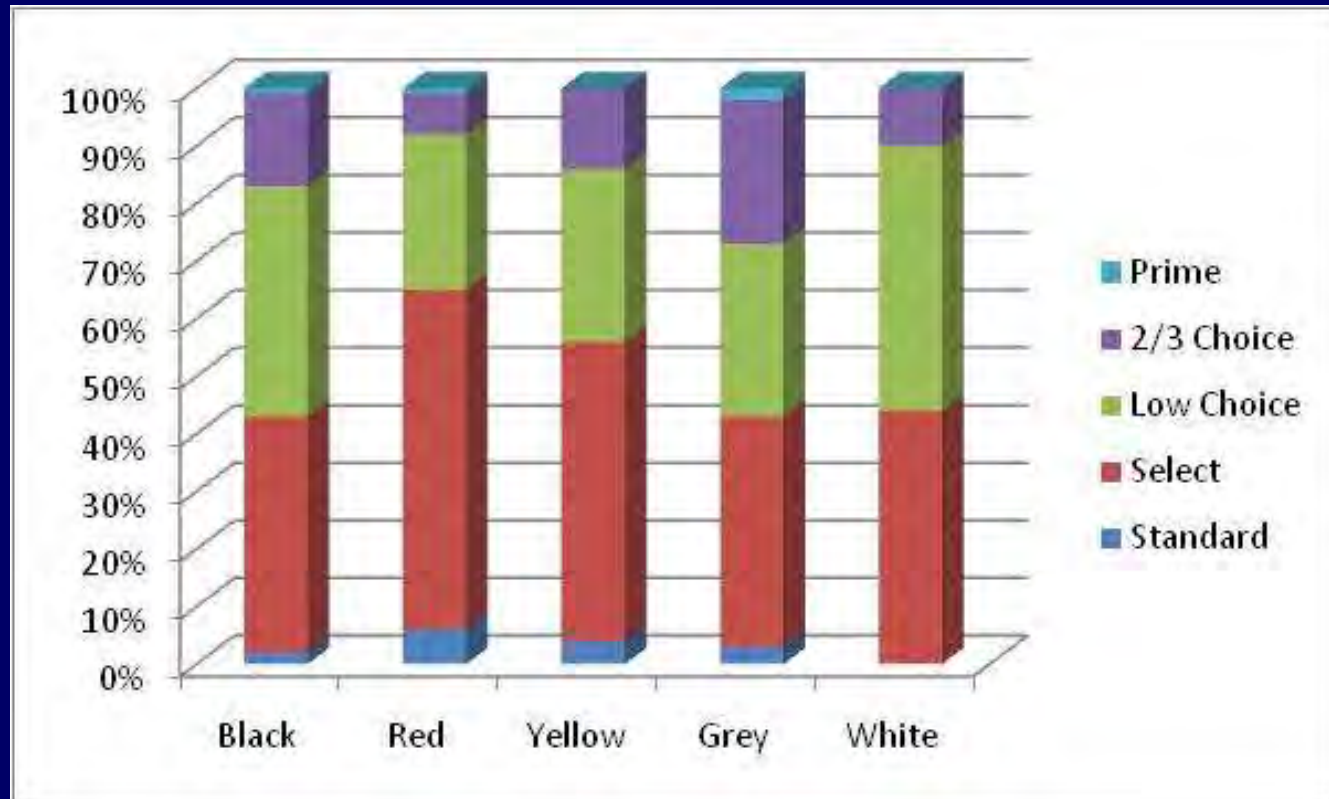
$P < 0.01$

Effect of Coat Color on Hot Carcass Weight



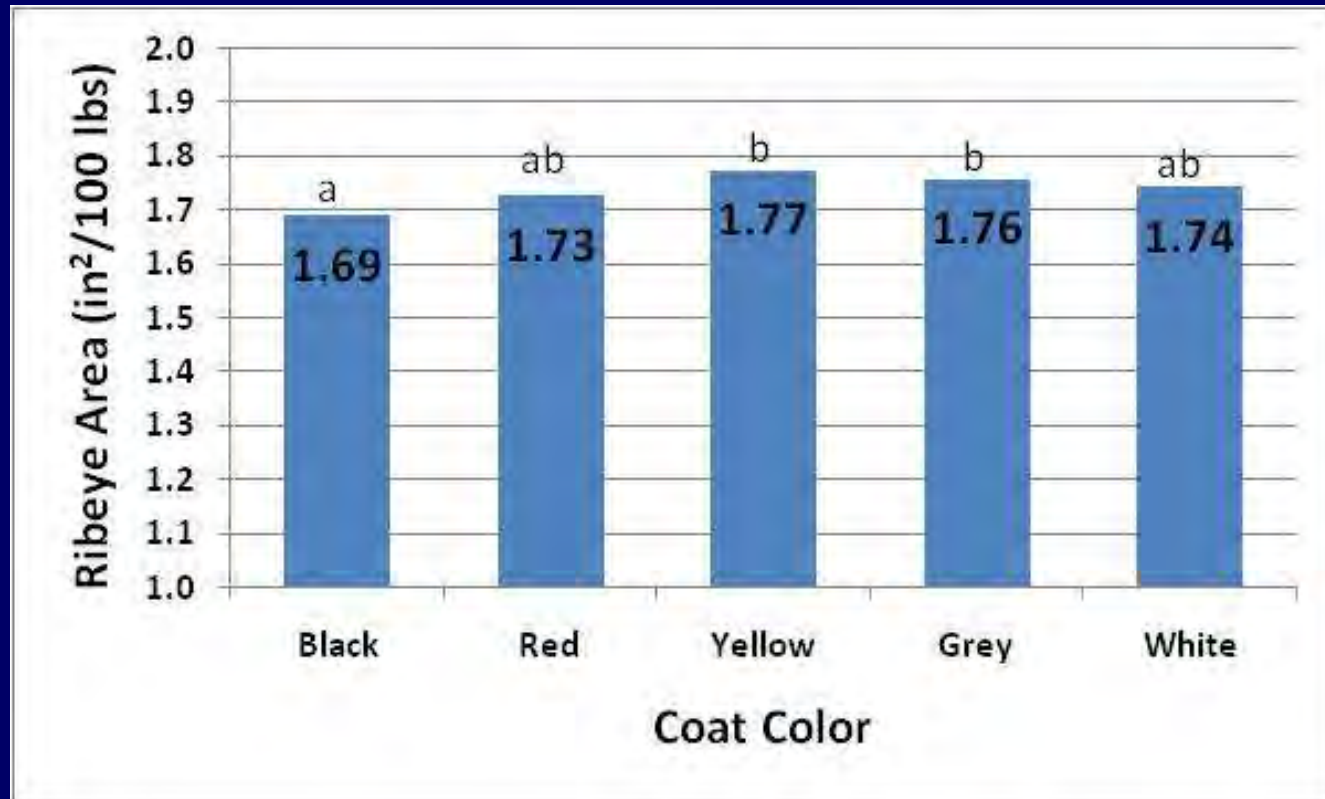
$P < 0.001$

Effect of Coat Color on Quality Grade



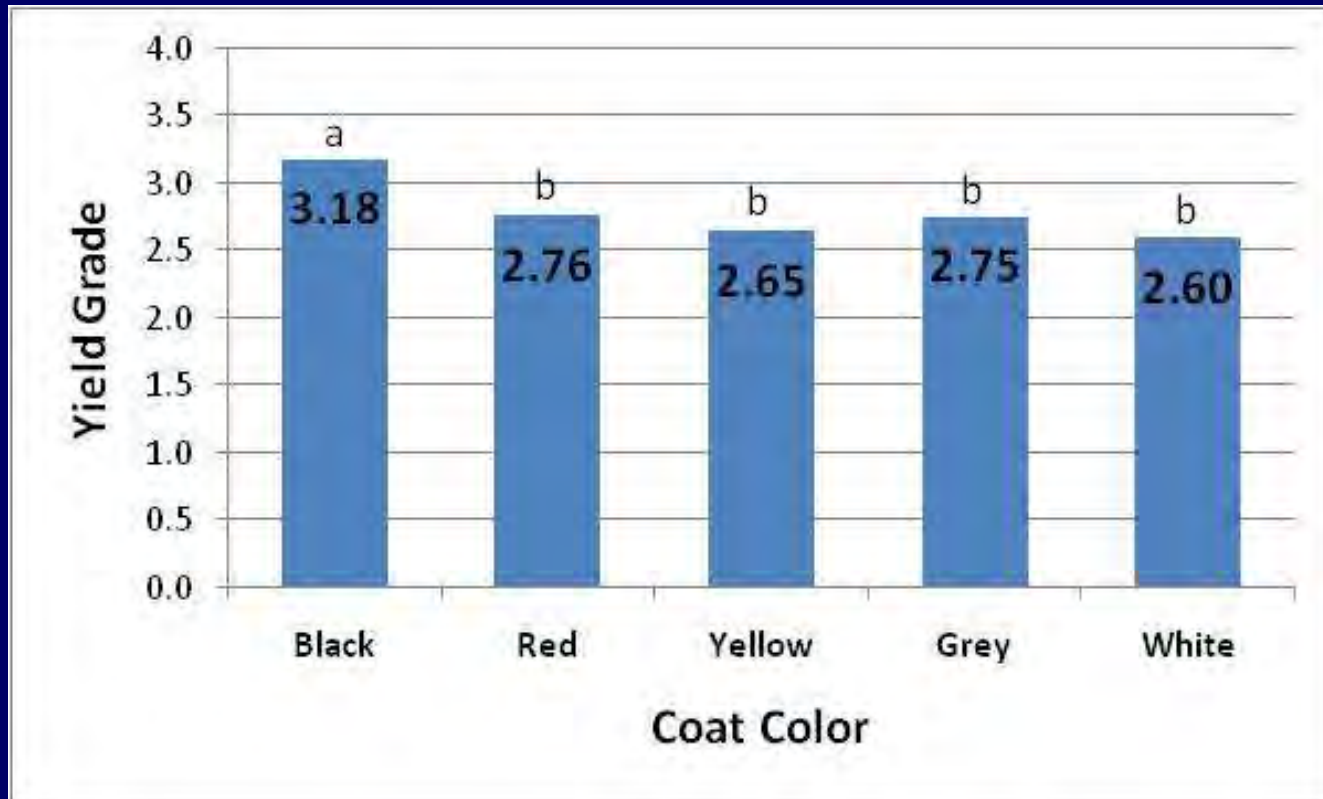
$P < 0.01$

Effect of Coat Color on Ribeye Area/cwt



P<0.05

Effect of Coat Color on Yield Grade



$P < 0.05$

Coat Color Summary

- Red cattle had lower Feedlot ADG and Poorer Feed Efficiency resulting in increased Cost of Gain
- Black cattle had smaller Hot Carcass Weight and REA/cwt, higher Yield Grade, but increased Quality Grade
- Grey cattle had larger HCW, REA/cwt, similar Quality Grade, and had lower Yield Grade than Blacks

Color Pattern



Color Pattern

- Color Pattern had no effect on...
 - Preconditioning ADG
 - Feedlot ADG
 - Feed Efficiency
 - Days on Feed
 - Cost of Gain
 - Hot Carcass Weight
 - Quality Grade
 - Ribeye Area/cwt
 - Yield Grade

Questions?



Color Pattern Summary

- These results indicate that price discrimination on the basis of color pattern is unwarranted, due to the lack of differences observed in performance between solid and non-solid patterned calves.

Implications-Preconditioning ADG

- Preconditioning ADG was not a good predictor of feedlot ADG.
- A strong improvement in feed efficiency was observed as preconditioning performance increased, resulting in a lower cost of gain and heavier carcass weights with fewer days on feed.

Implications-Brahman %

- A genotype by environment interaction existed with Brahman influenced calves having greater gains during preconditioning but lower feedlot ADG.
- As Brahman percentage increased, hot carcass weight and quality grade declined indicating that some discount on the basis of carcass performance is merited.

Implications-Condition Score

- Condition score is a good predictor of preconditioning ADG and overall feedlot performance supporting industry discrimination against fleshy calves.

Implications-Color

- Red cattle had poorer feedlot performance.
- Grey cattle perform similarly to black cattle for quality grade, but had the advantage of heavier carcasses and lower yield grades.
- Price discrimination on the basis of color pattern does not appear to be warranted in cattle that are managed similarly.

Effect of Condition Score on Ribeye Area/cwt



P<0.001

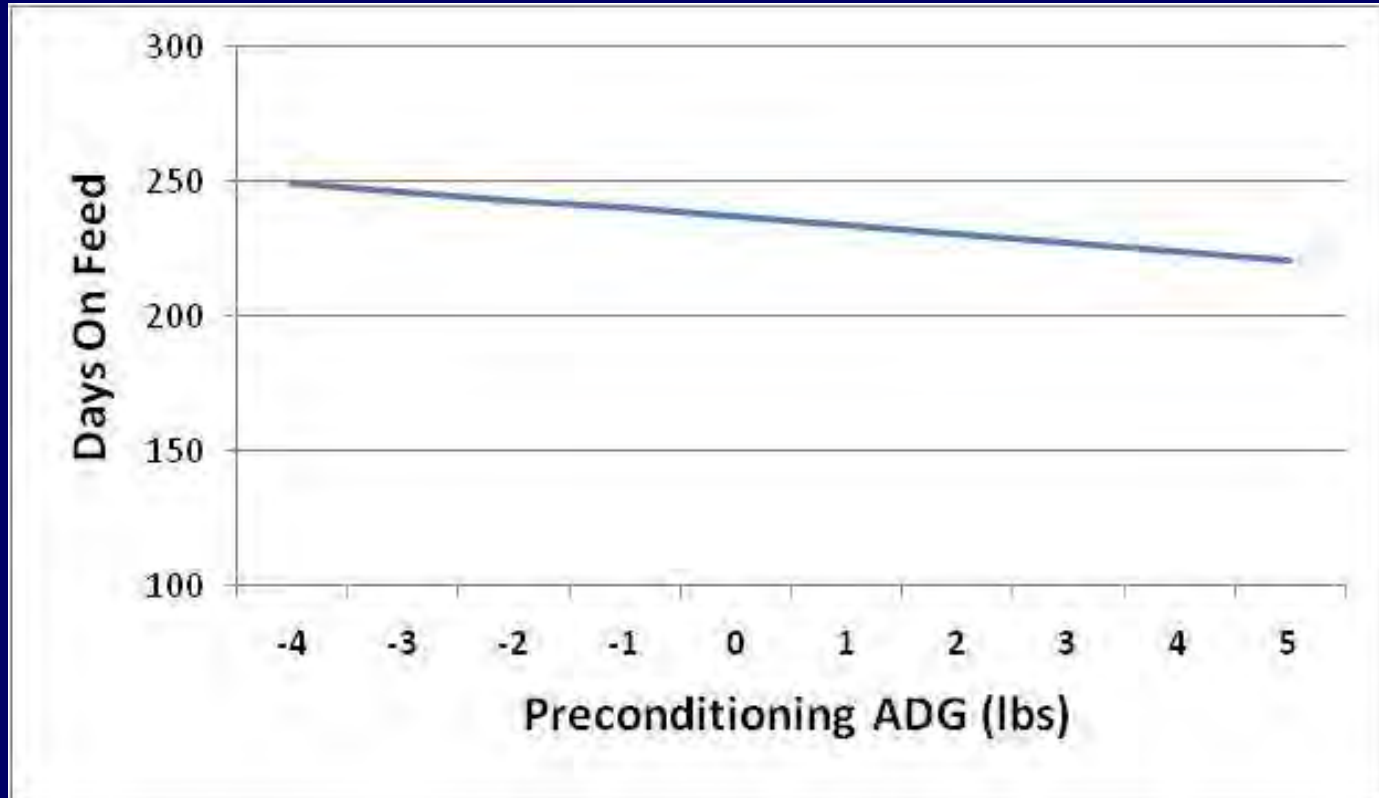
Introduction

- Preconditioning
 - Prepare the calf for a later stage of production
 - Reduce stress of weaning
 - Insure proper immunity
 - Reduce the incidence of BRD
 - Transition period
 - Nutritionally
 - Socially
 - Environmentally

Questions

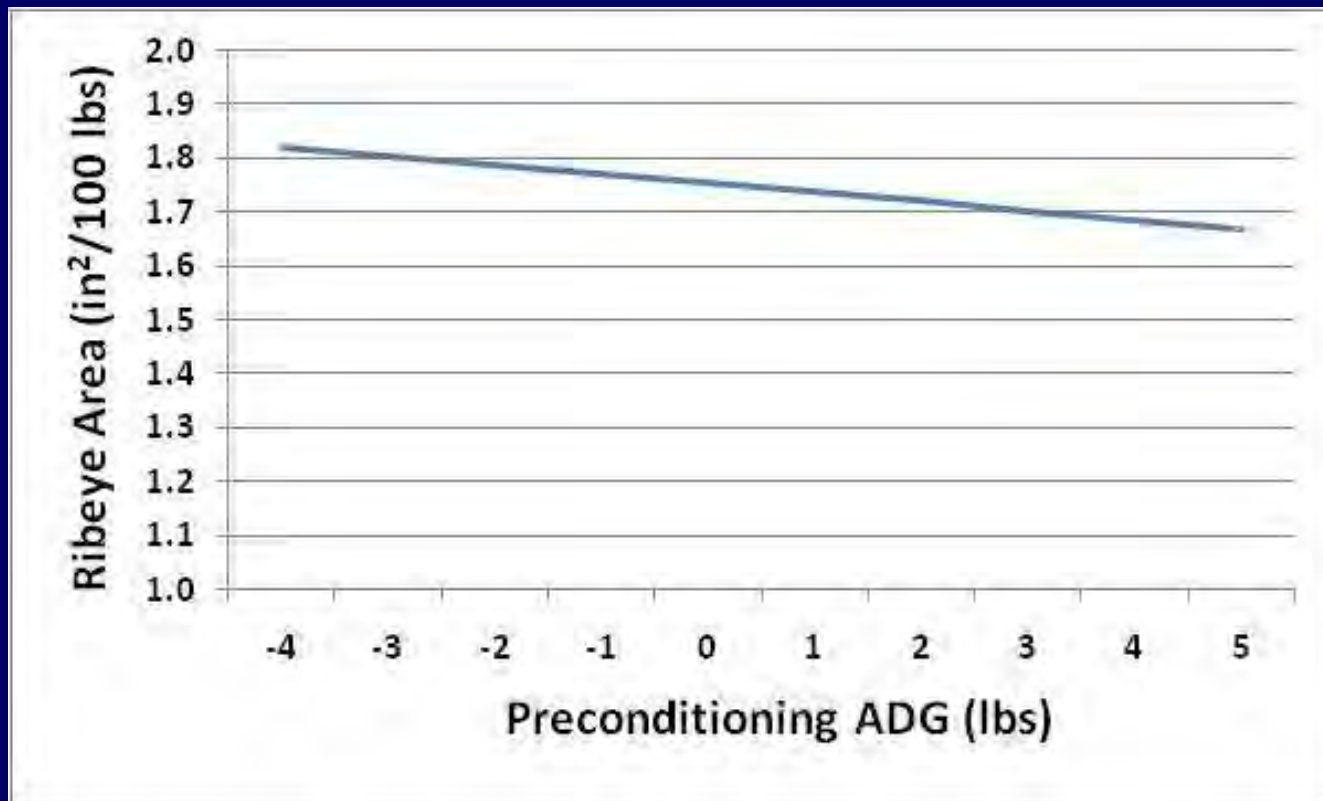


Effect of Preconditioning ADG on Days on Feed



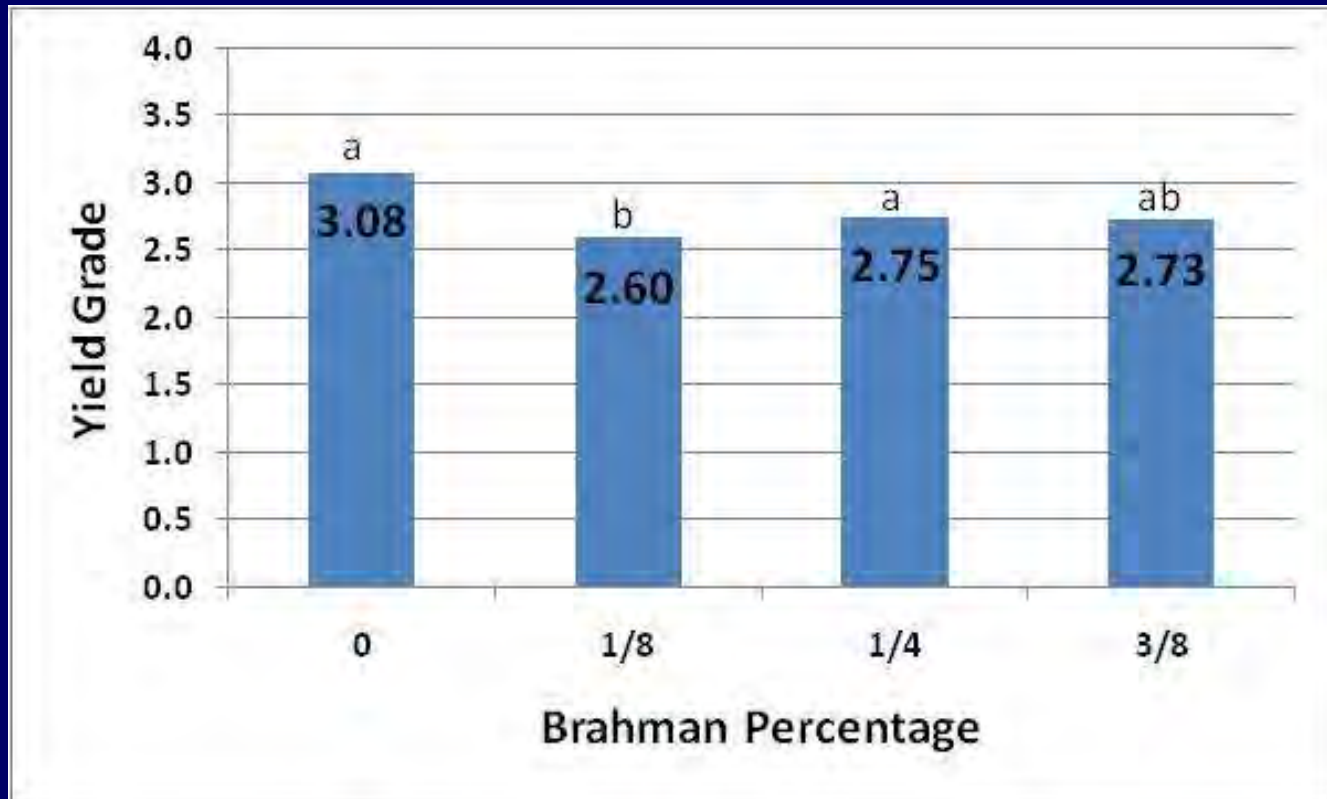
As Preconditioning ADG increased by 1 lb, Days on Feed decreased by 3.3d. ($P < 0.005$)

Effect of Preconditioning ADG on Ribeye Area/100lb



As Preconditioning ADG increased by 1 kg, Ribeye Area/100lb decreased by 0.53 cm². (P<0.01)

Effect of Brahman Percentage on Yield Grade



P<0.05

Coat Color

Breed of Sire

- Angus
- Brangus
- Charolais
- Hereford
- Red Angus

Dam Type

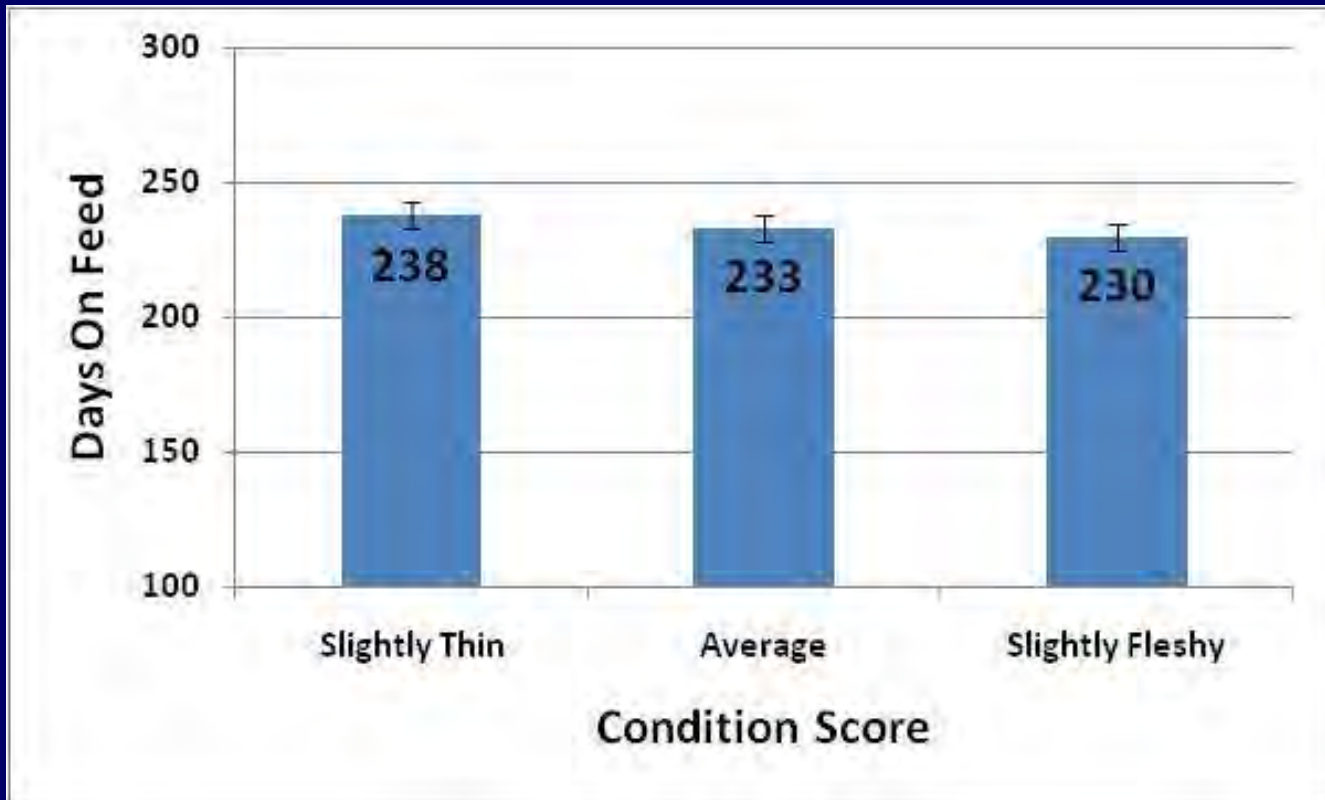
- Angus
- Braford
- Brahman
- Brangus
- Charbray
- Charolais

Effect of Condition Score on Quality Grade



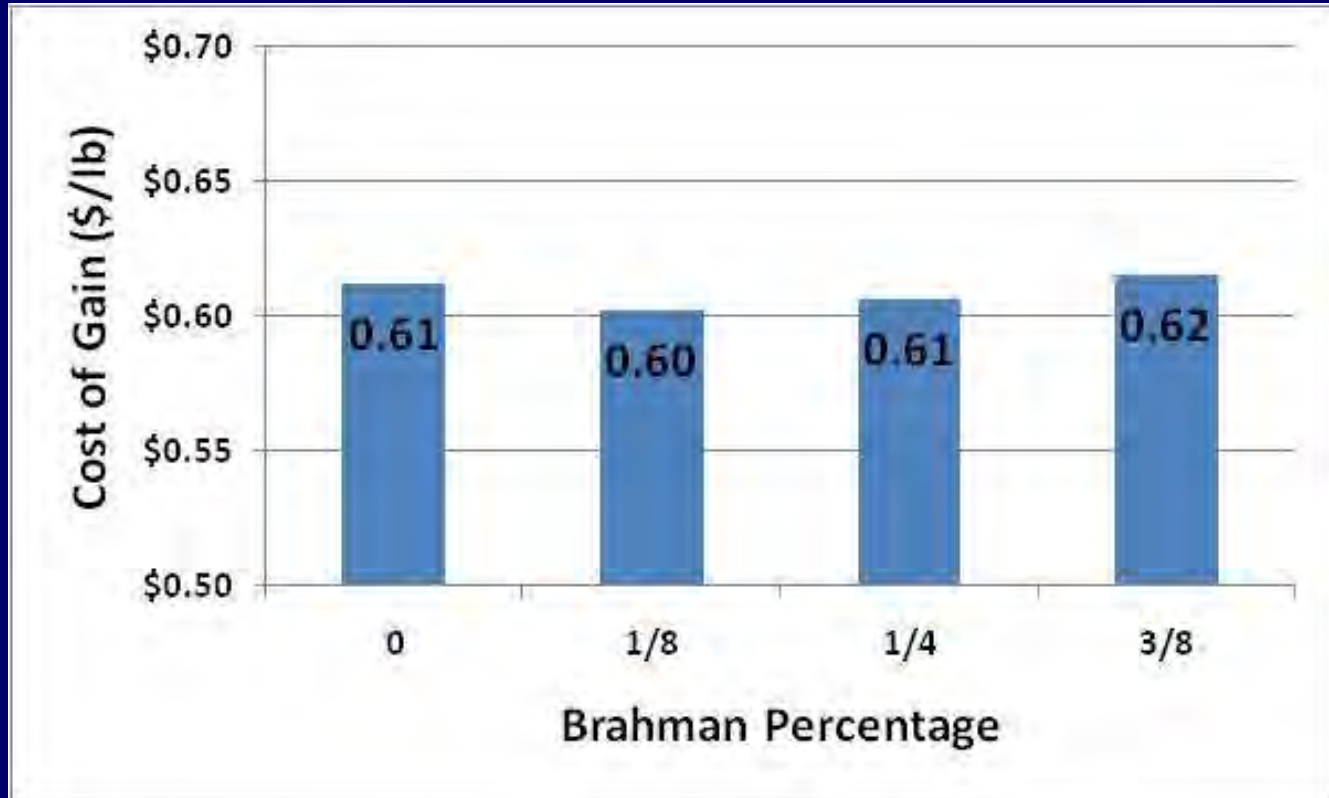
a, b means within a category differ $P < 0.05$.

Effect of Condition Score on Days on Feed



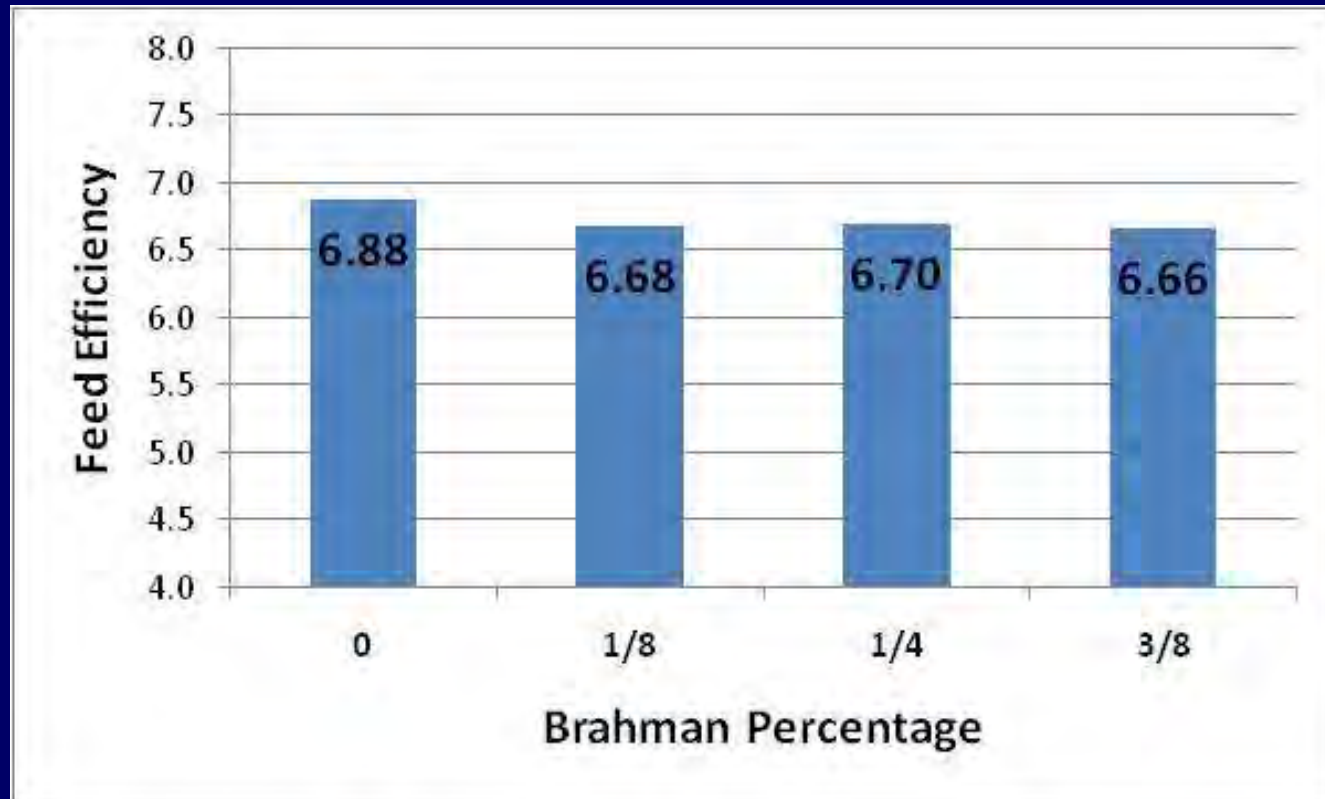
P=0.29

Effect of Brahman Percentage on Cost of Gain



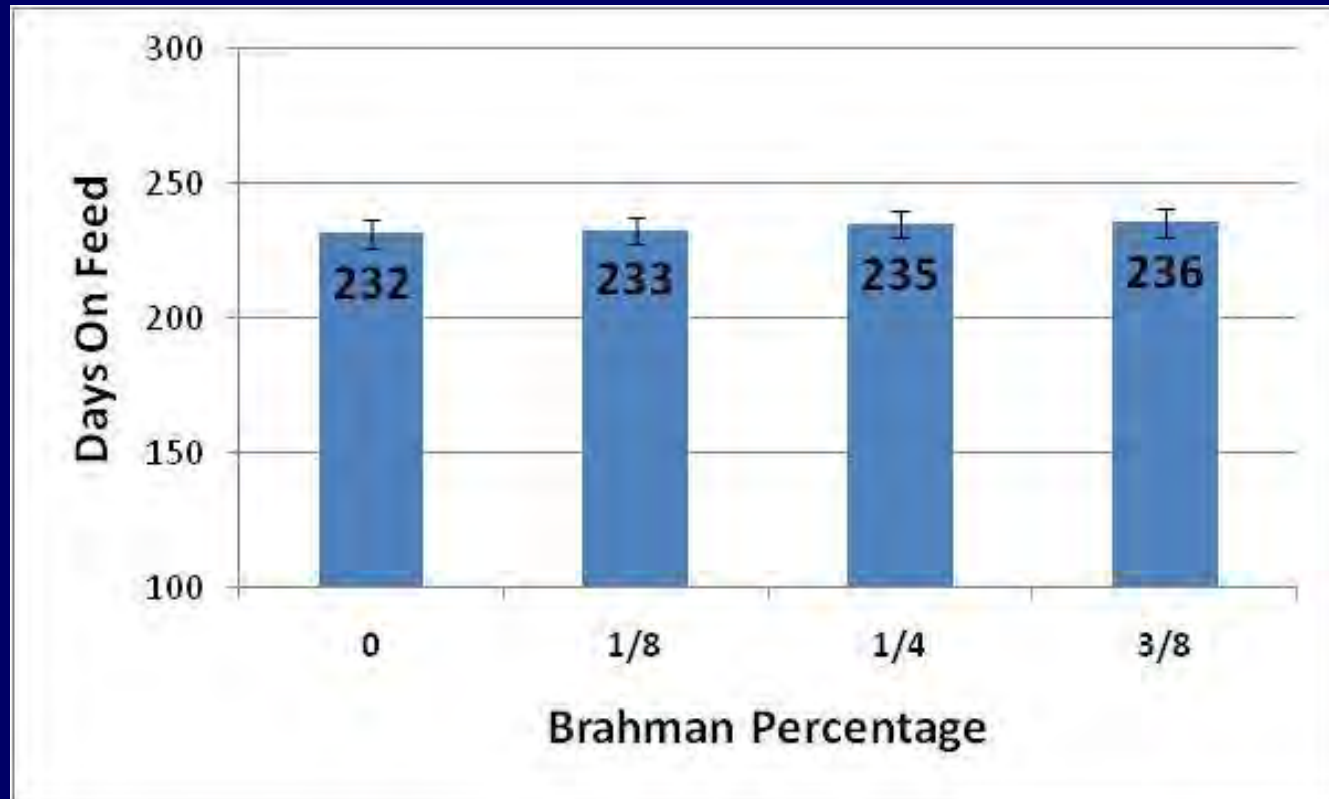
P=0.55

Effect of Brahman Percentage on Feed Efficiency



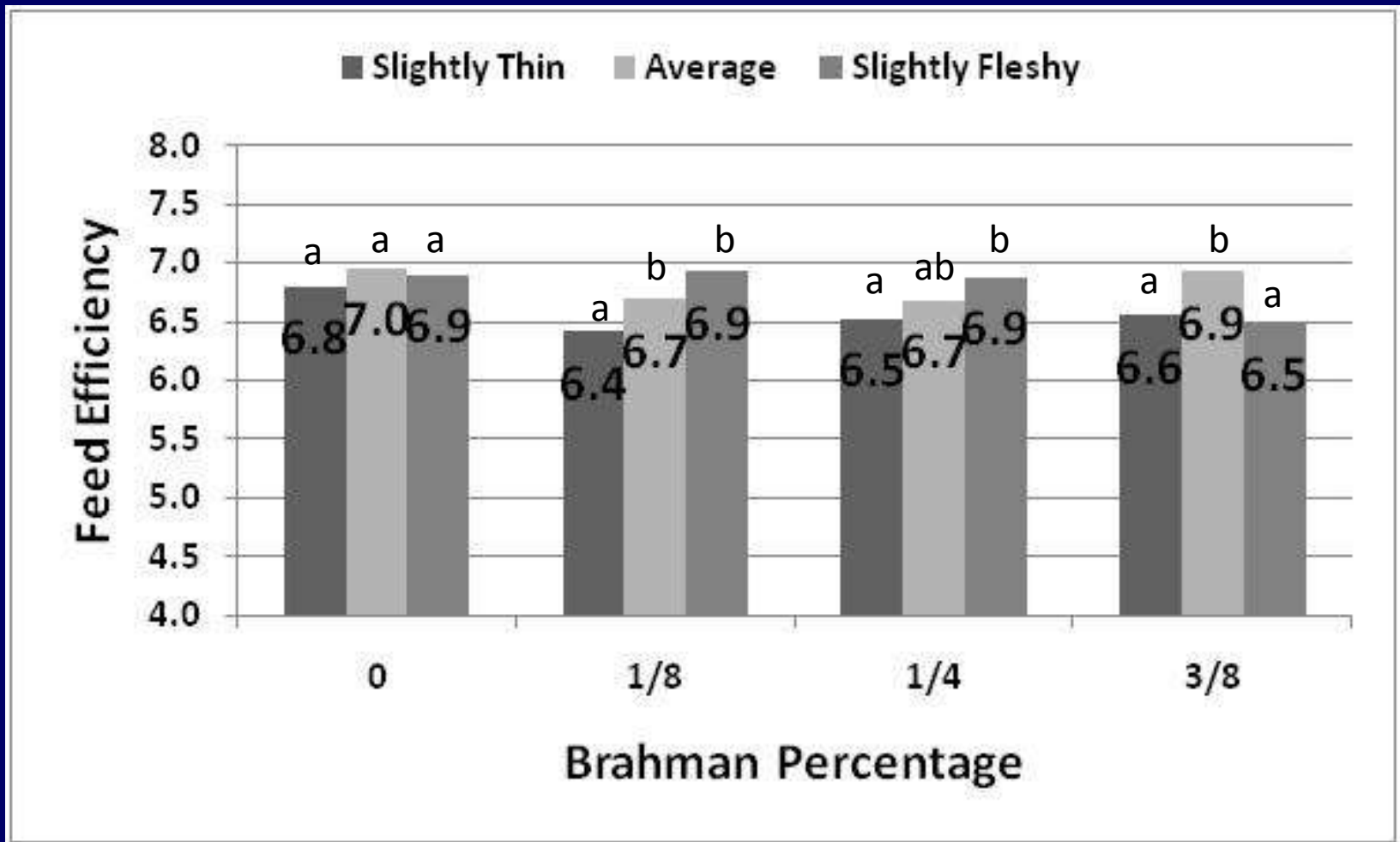
P=0.90

Effect of Brahman Percentage on Days on Feed



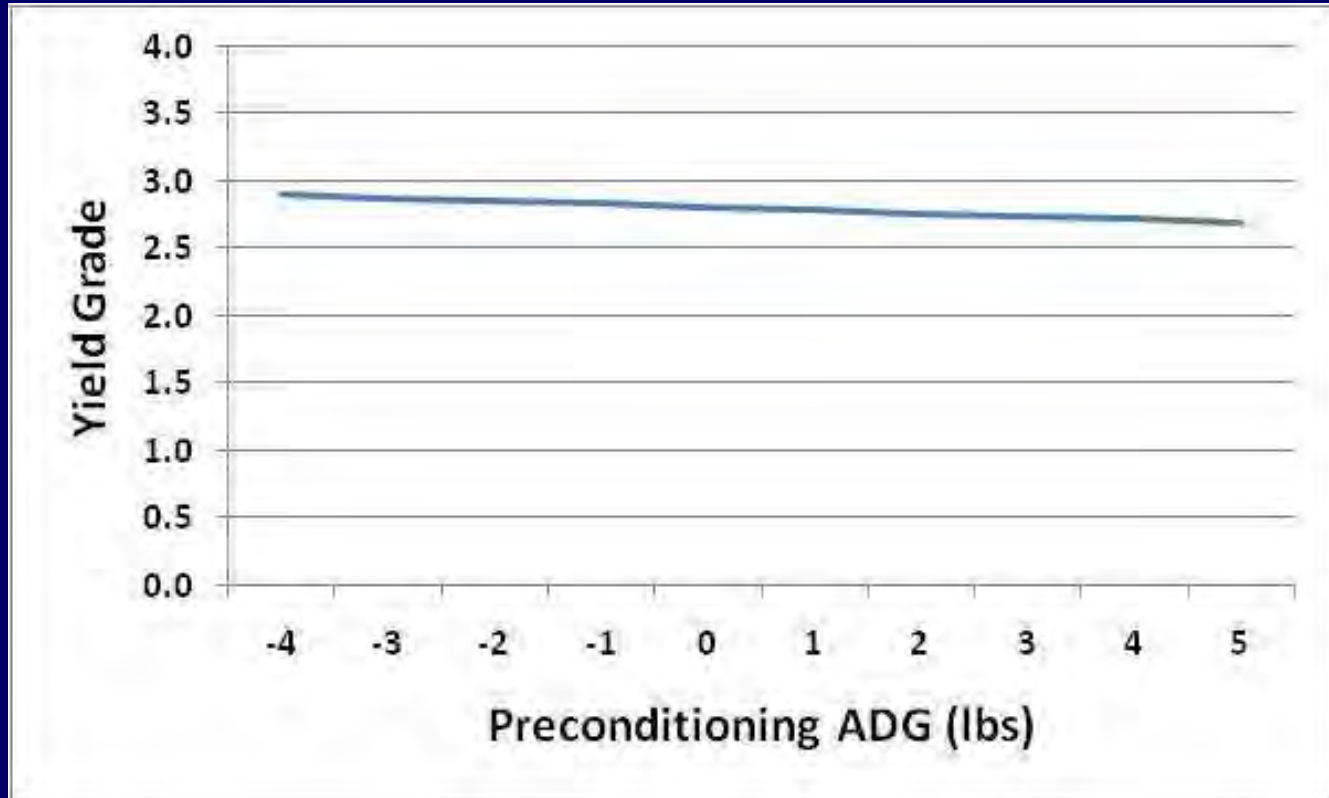
P=0.68

Effect of Brahman Percentage on Feed Efficiency



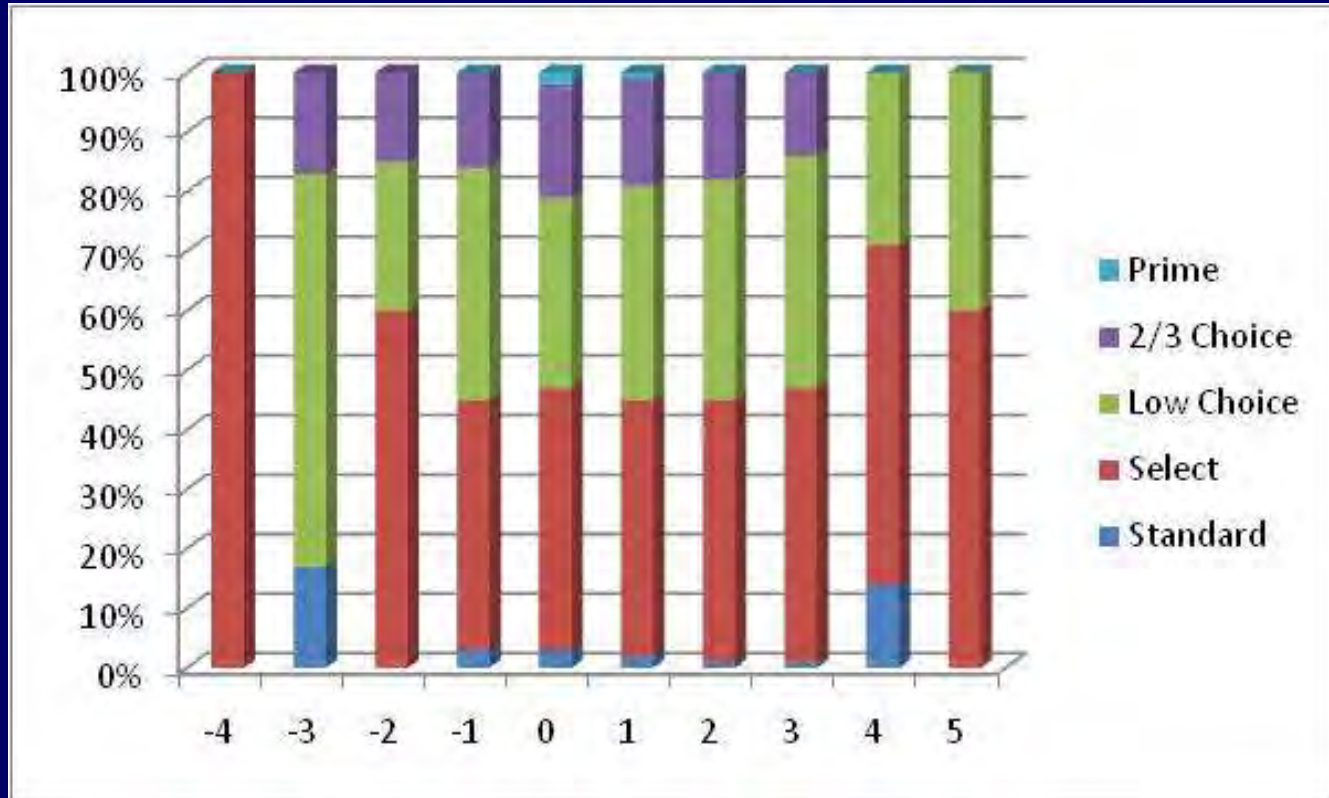
a,b means within a category differ P<0.05.

Effect of Preconditioning ADG on Yield Grade



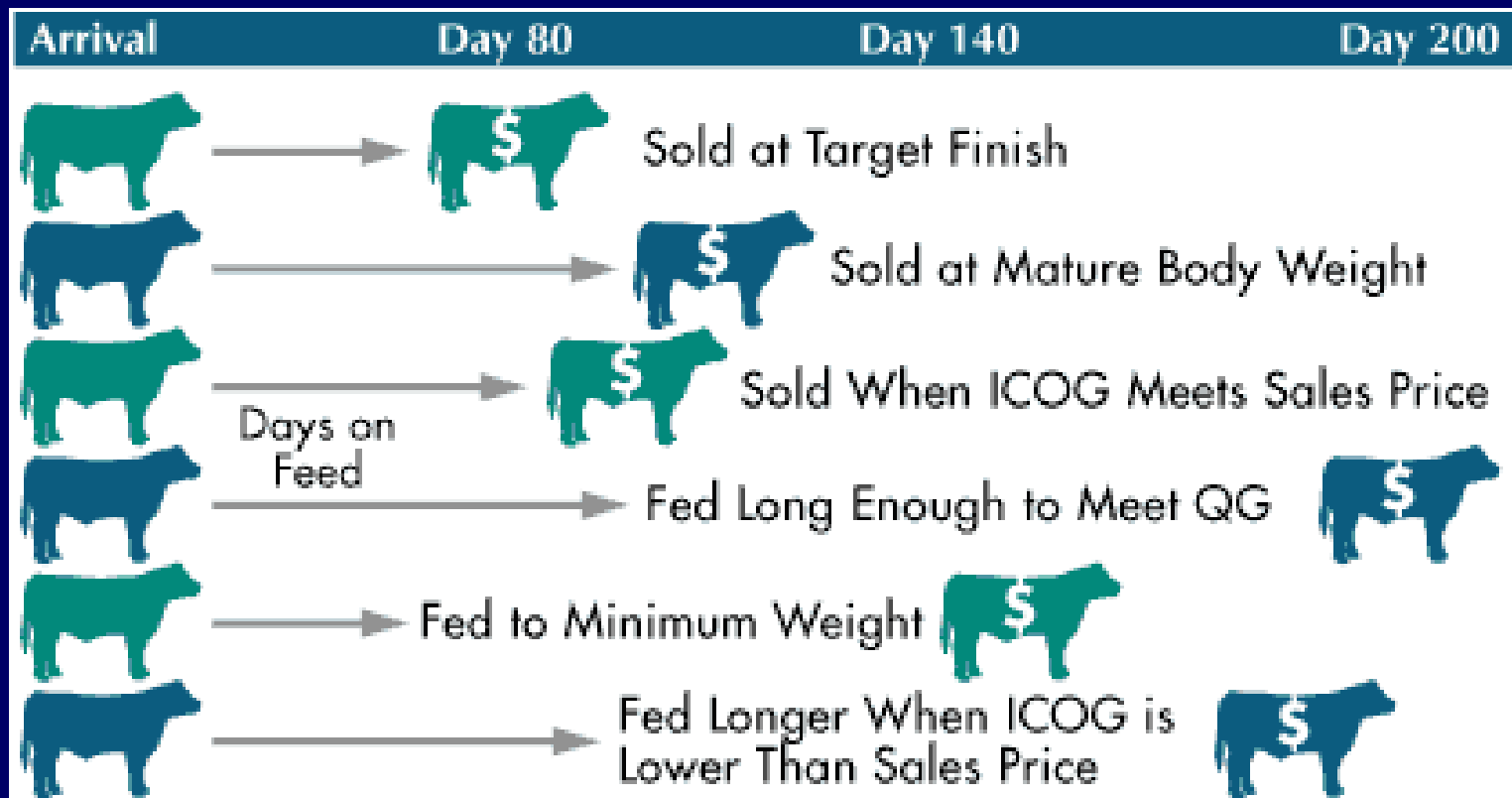
P=0.29

Effect of Preconditioning ADG on Quality Grade



P=0.24

Materials and Methods



Materials and Methods

- At the feedlot calves were...
 - Individually weighed
 - Re-vaccinated
 - Implanted
 - Processed through ECM
- Calves were reprocessed every 60d until harvest and sorted on d 120, d 180, and d 240. Pens were closed out on d 300.

Materials and Methods

- The feedlot utilized the ACCU-TRAC Electronic Cattle Management (ECM) system to measure performance, predict optimal endpoint, and sort into outcome groups.

Sequencing Station	Video Imaging	Weigh Station	Ultrasound Station	Processing Chute	2	4	6	7
1	2	3	4	5	Alley to Sort Pens			
Automatic individual animal sequencing station	Automatic measuring of external dimensions	Automatic integrated electronic scales	Ultrasound measurements of internal tissue characteristics	individual animal processing and sort selection	1	3	5	



ACCU-TRAC®

ELECTRONIC CATTLE MANAGEMENT



Materials and Methods

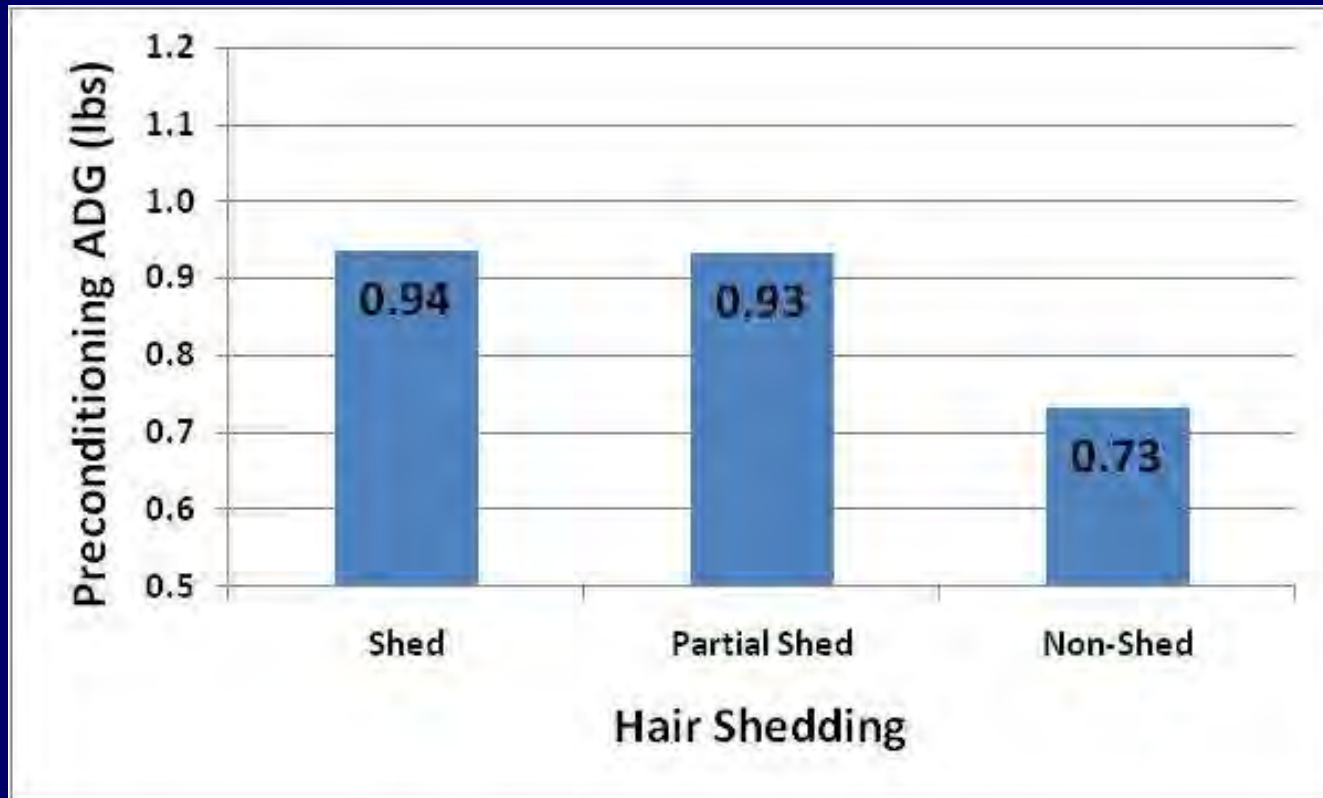
- Hair shedding characteristics were determined according to Thrift et al. (1994) and were classified as
 - Shed
 - Partial Shed
 - Non-Shed

Implications

- Although calves that have not shed their coat may be challenged in Florida, significant improvements in feedlot performance can be observed in temperate climates.
- Hair shedding characteristics do not appear to be predictive of carcass traits.

Hair Shedding Characteristics

Effect of Hair Shedding on Preconditioning ADG



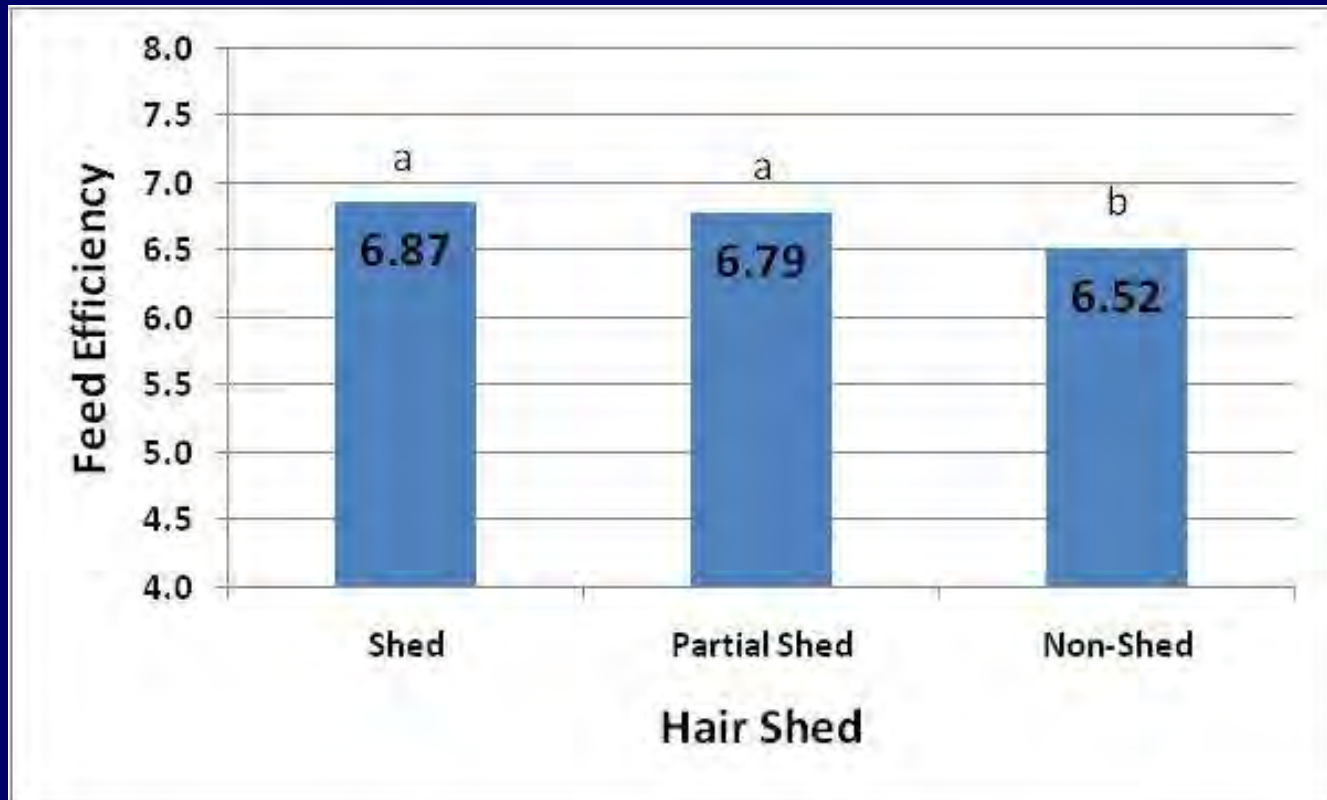
P=0.25

Effect of Hair Shedding on Feedlot ADG



a, b means within a category differ $P < 0.05$.

Effect of Hair Shedding on Feed Efficiency



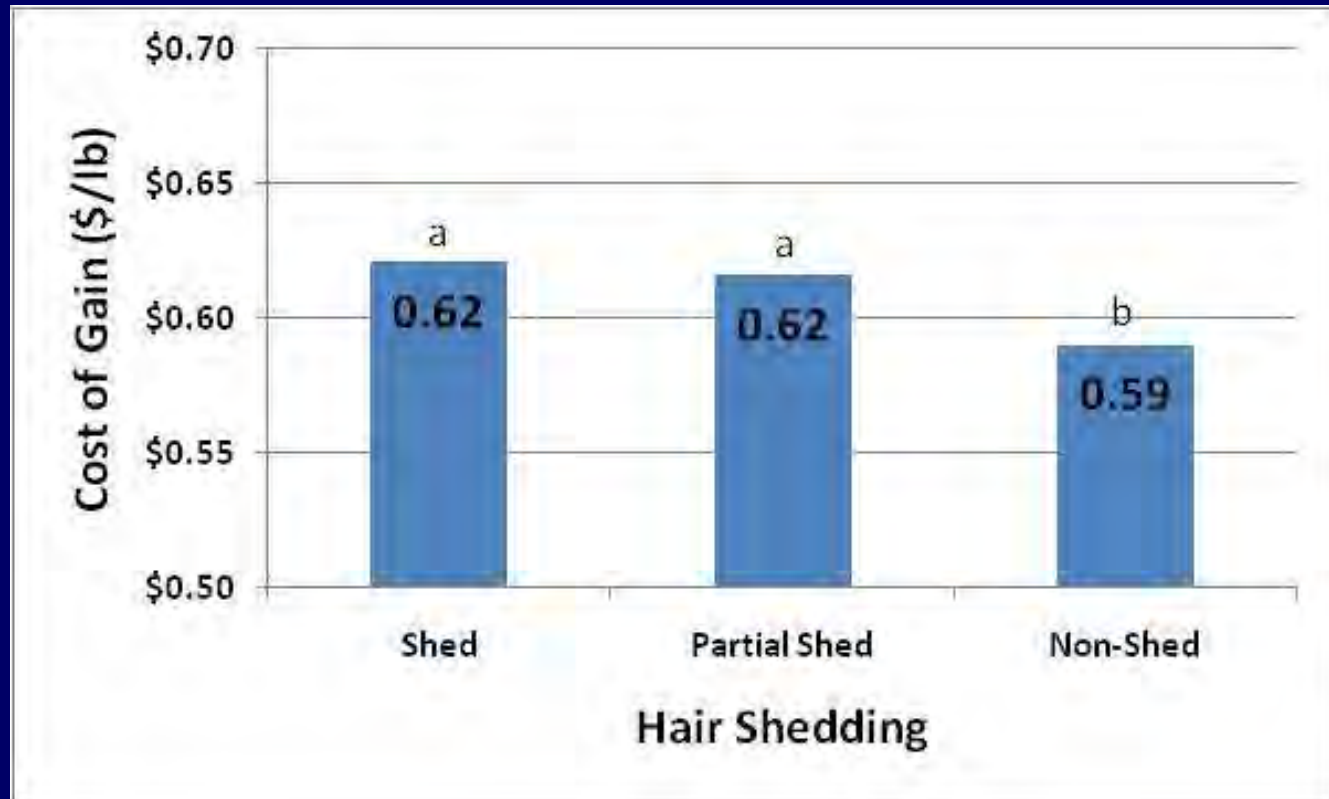
$P < 0.05$

Effect of Hair Shedding on Days on Feed



$P < 0.01$

Effect of Hair Shedding on Cost of Gain



P<0.05

Hair Shedding

- Hair Shedding had no effect on any of the carcass traits measured in this study

Hair Shedding Summary

- Non-Shed calves had
 - Better Feed Efficiency
 - Fewer Days on Feed
 - Lower Cost of Gain
- Hair Shedding Characteristics had no effect on
 - Hot Carcass Weight
 - Quality Grade
 - Ribeye Area/100kg
 - Yield Grade

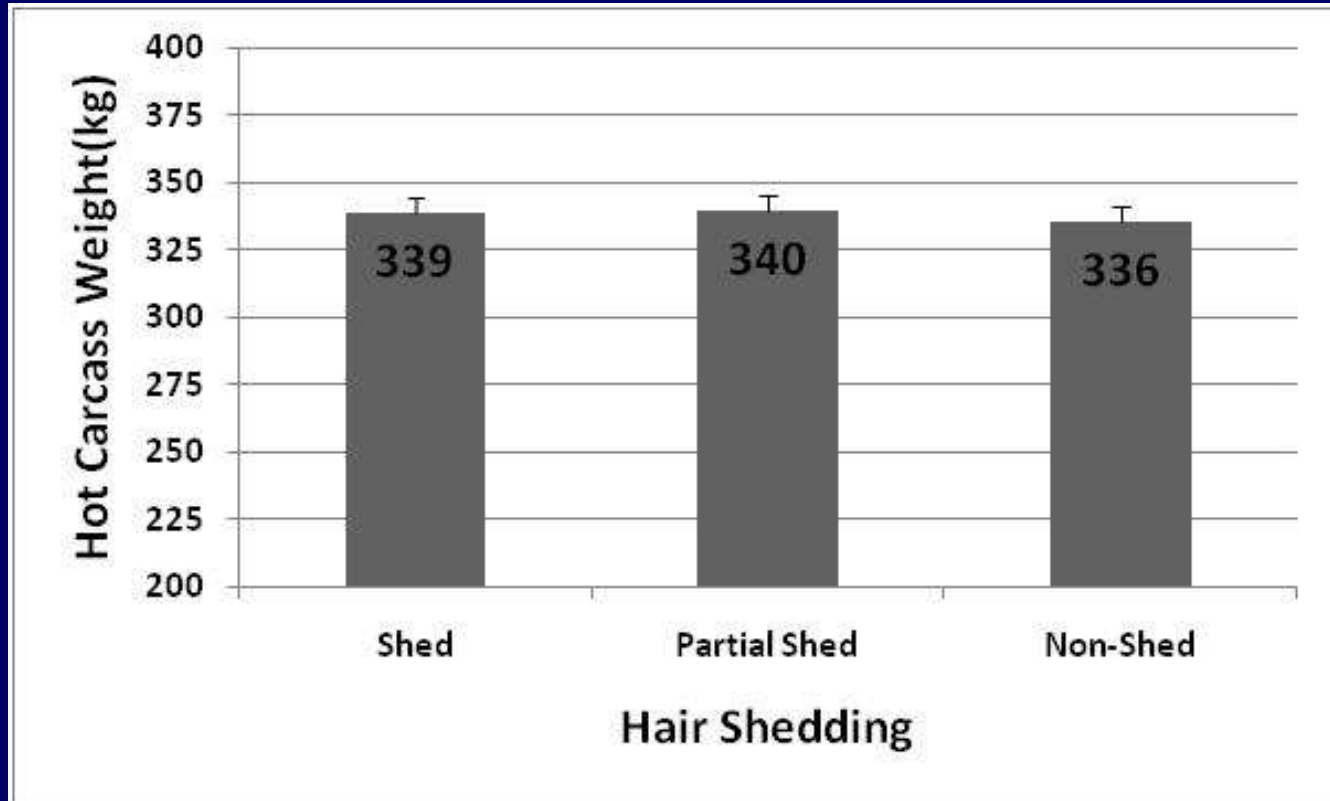
List of References

- Cole, N. A. 1985. Preconditioning calves for the feedlot. *Vet. Clin. North Am. Food Anim. Pract.* 1:401.
- Loerch, S. C., F. L. Fluharty, and P. A. Tirabasso. 2001. Effect of source and color of cattle on performance of steers in the OARDC Feedlot. Special Circular 181-01. The Ohio State Univ., Columbus.
- Minert, J. R., F. K. Brazel, T. C. Schroeder, and O. Grunewald. 1988. Feeder cattle and cow price differentials at Kansas cattle auctions, Fall 1986 and Spring 1987. Kansas State Ag. Exp. Station report of progress #547. Kansas State Univ., Manhattan.
- SAS. 2003. *SAS User's Guide: Statistics*. SAS Inst. Inc., Cary, NC.
- Sherbeck, J. A., J. D. Tatum, T. G. Field, J. B. Morgan, and G. C. Smith. 1996. effect of phenotypic expression of Brahman breeding on marbling and tenderness traits. *J. Anim. Sci.* 74:304.
- Thrift, F. A., S. M. Keeney, and D. L. Applegate. 1994. Elevated body temperature differences expressed by stocker cattle processed through a Central Kentucky stockyard. *Prof. Anim. Sci.* 10:139.

Weaning Weight

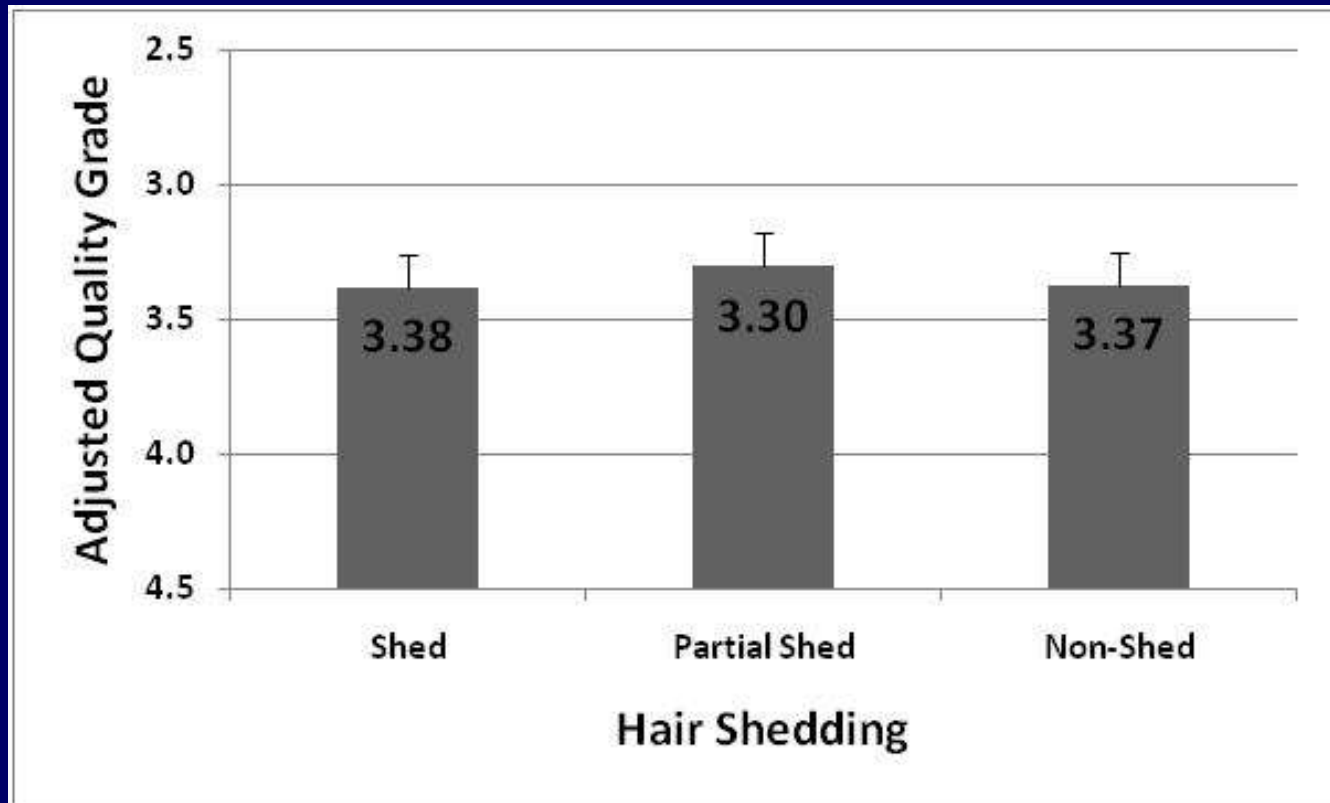


Effect of Hair Shed on Hot Carcass Weight



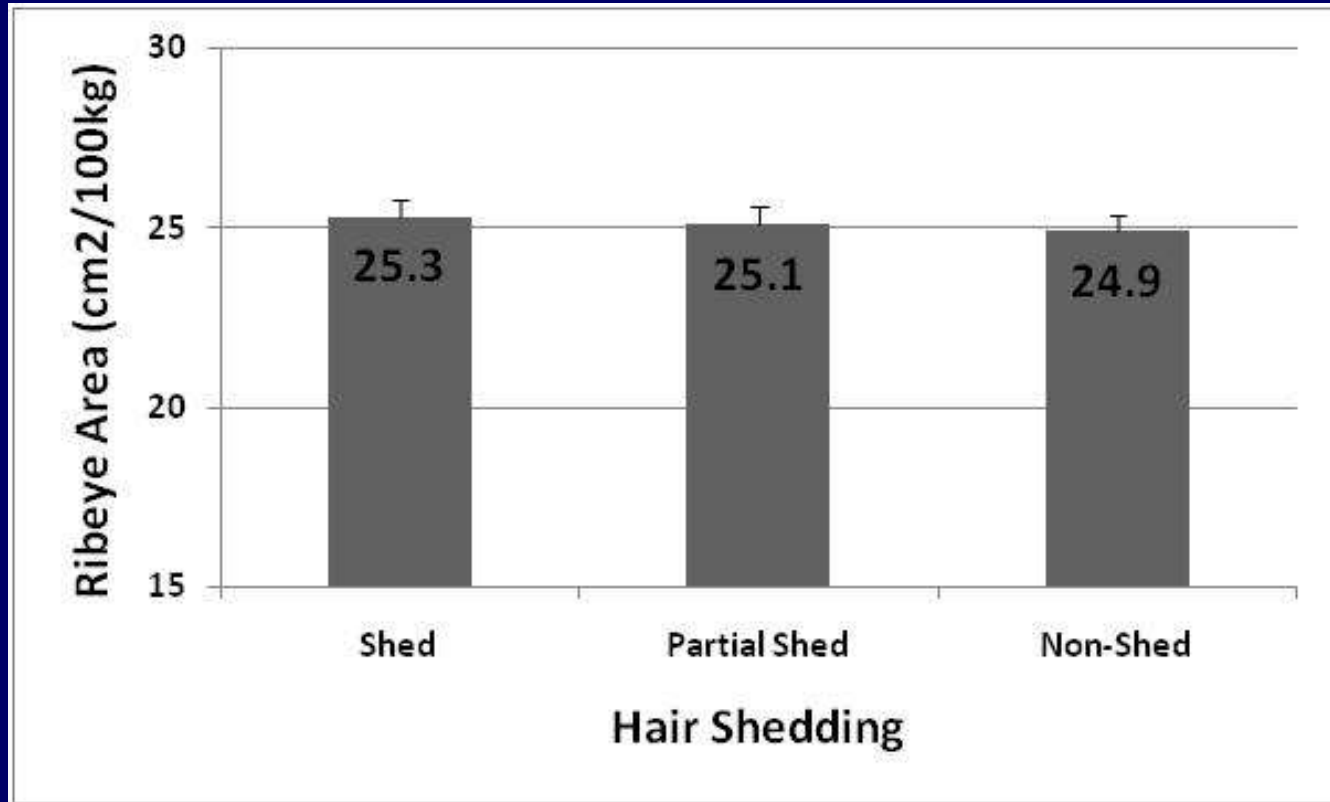
P=0.74

Effect of Hair Shed on Quality Grade



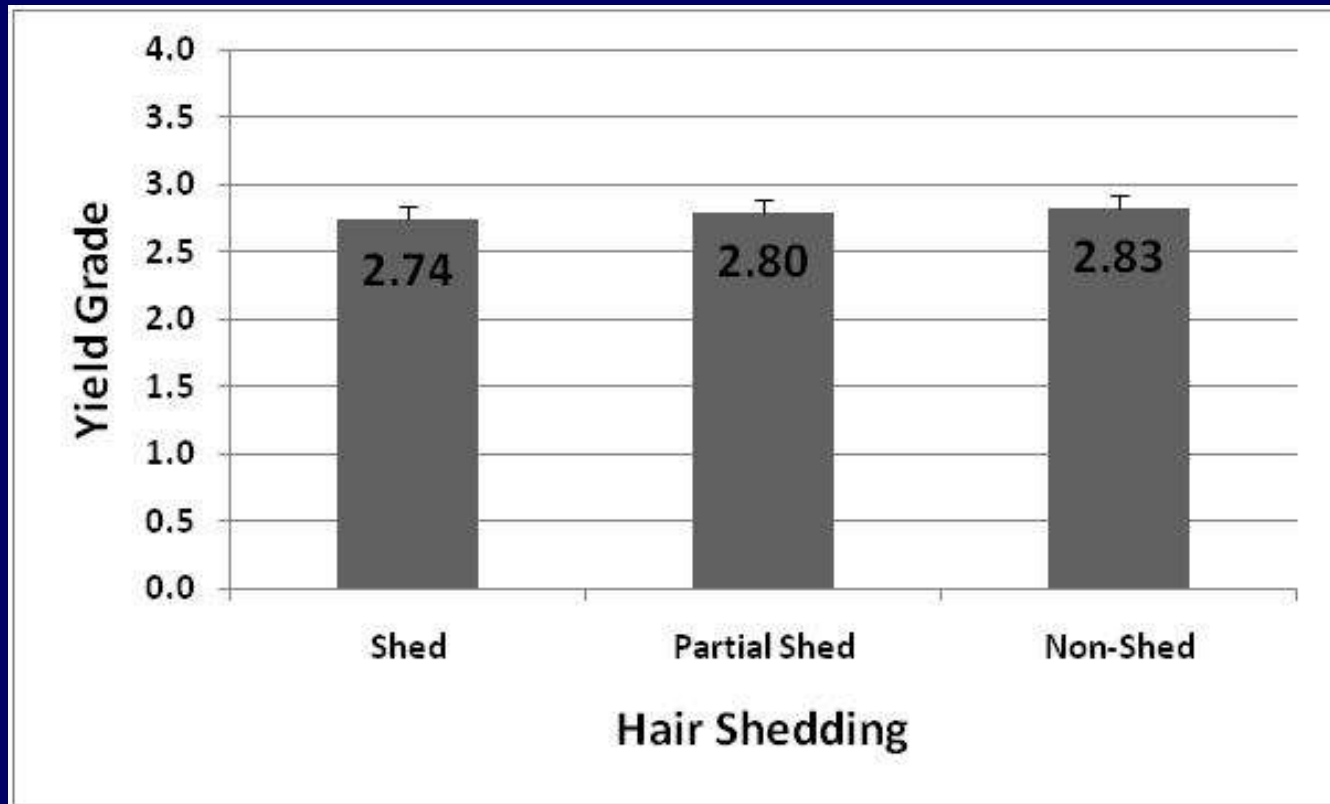
P=0.44

Effect of Hair Shed on Ribeye Area/100kg



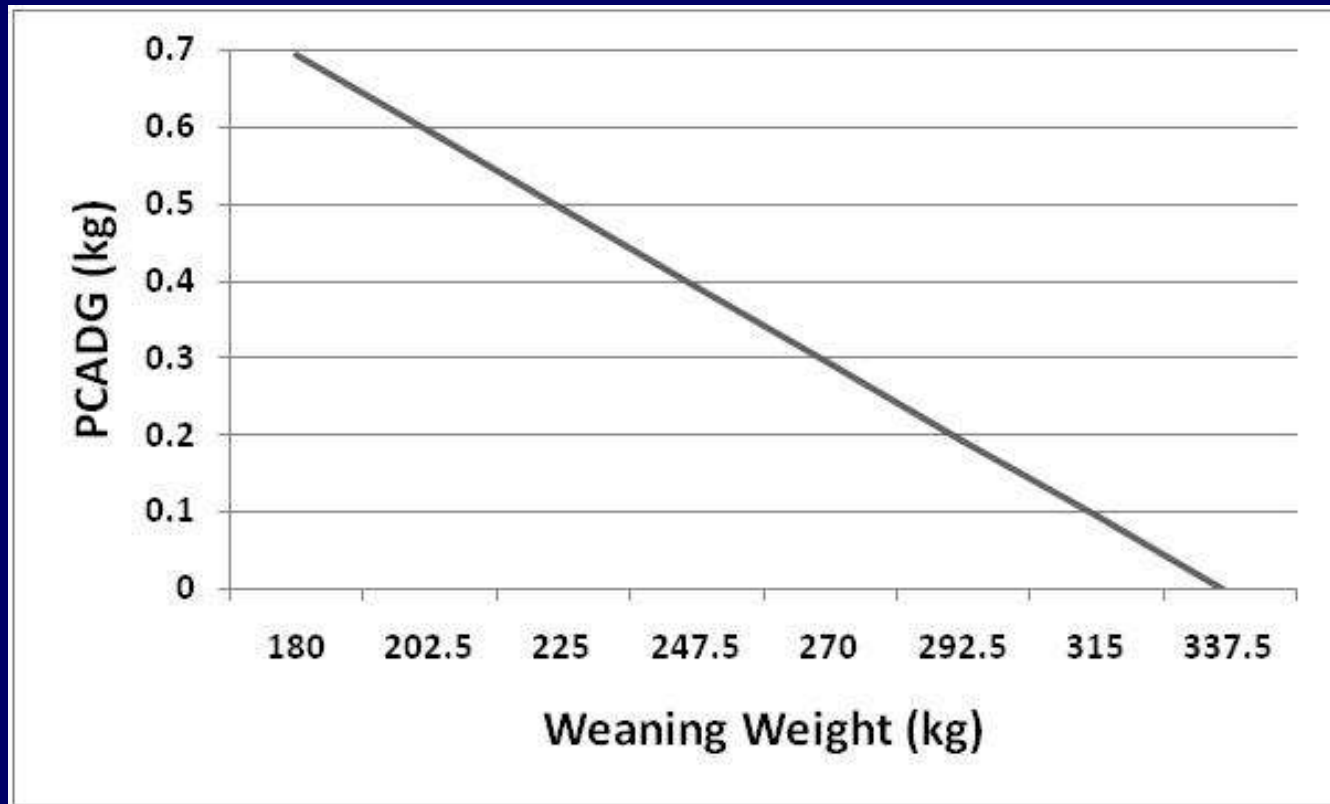
P=0.40

Effect of Hair Shed on Yield Grade



P=0.35

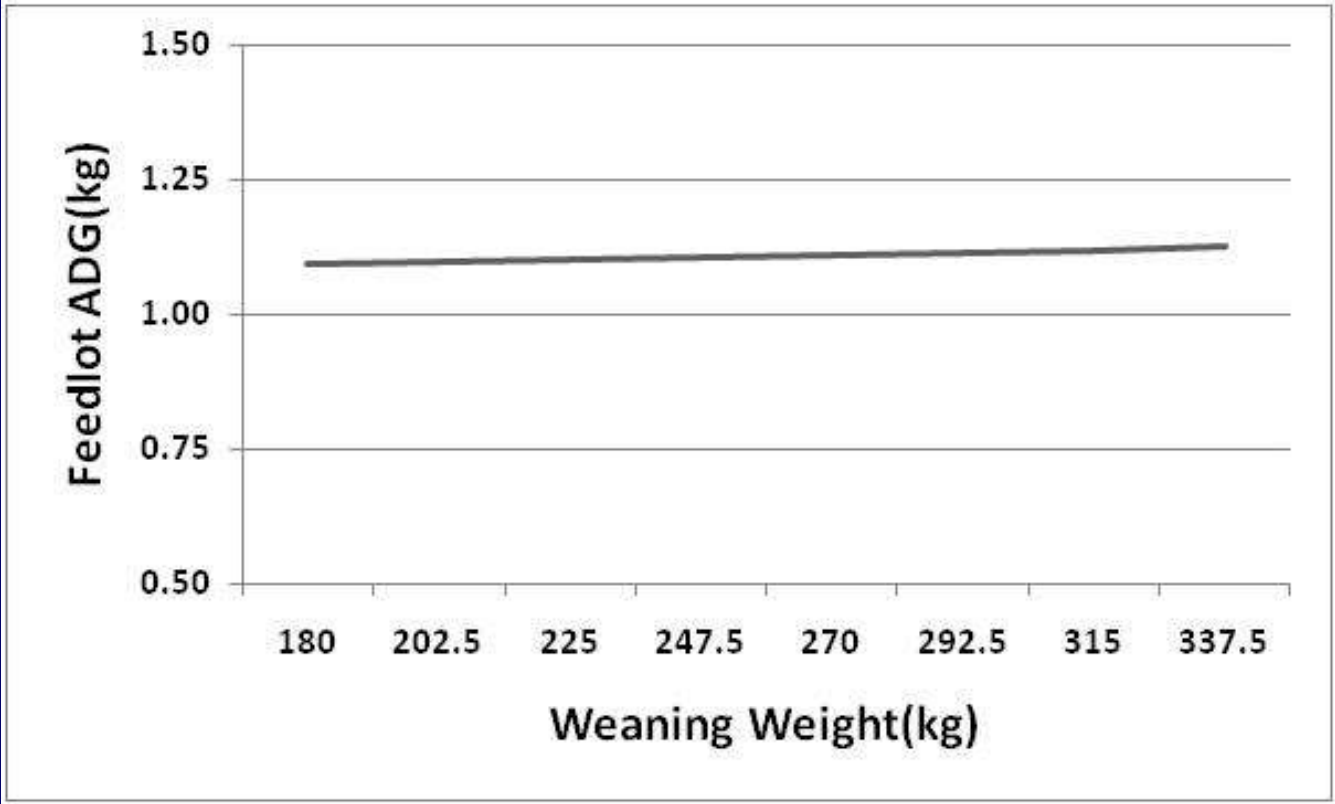
Effect of Weaning Weight on Preconditioning ADG



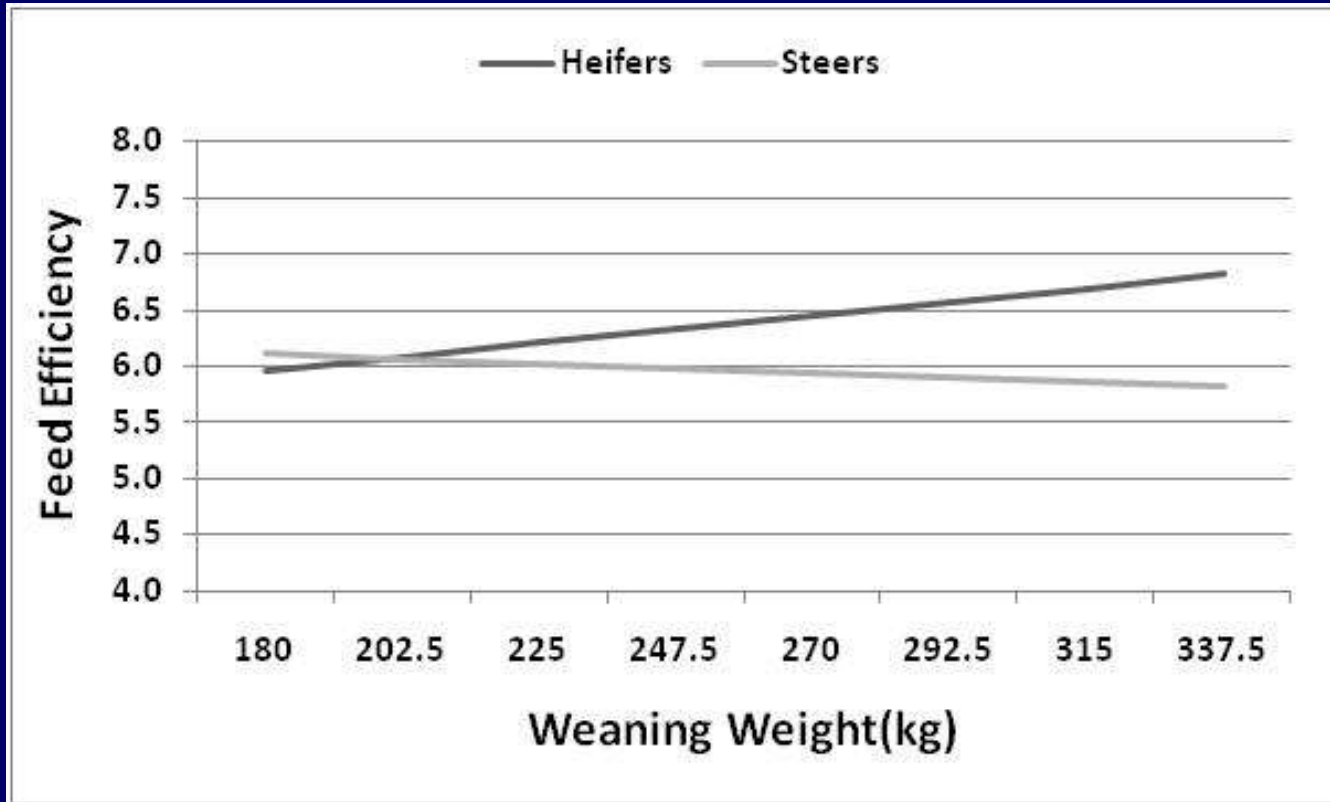
Weaning Weight

- Preconditioning ADG decreased by 0.45 kg/d as Weaning weight increased by 100 kg.

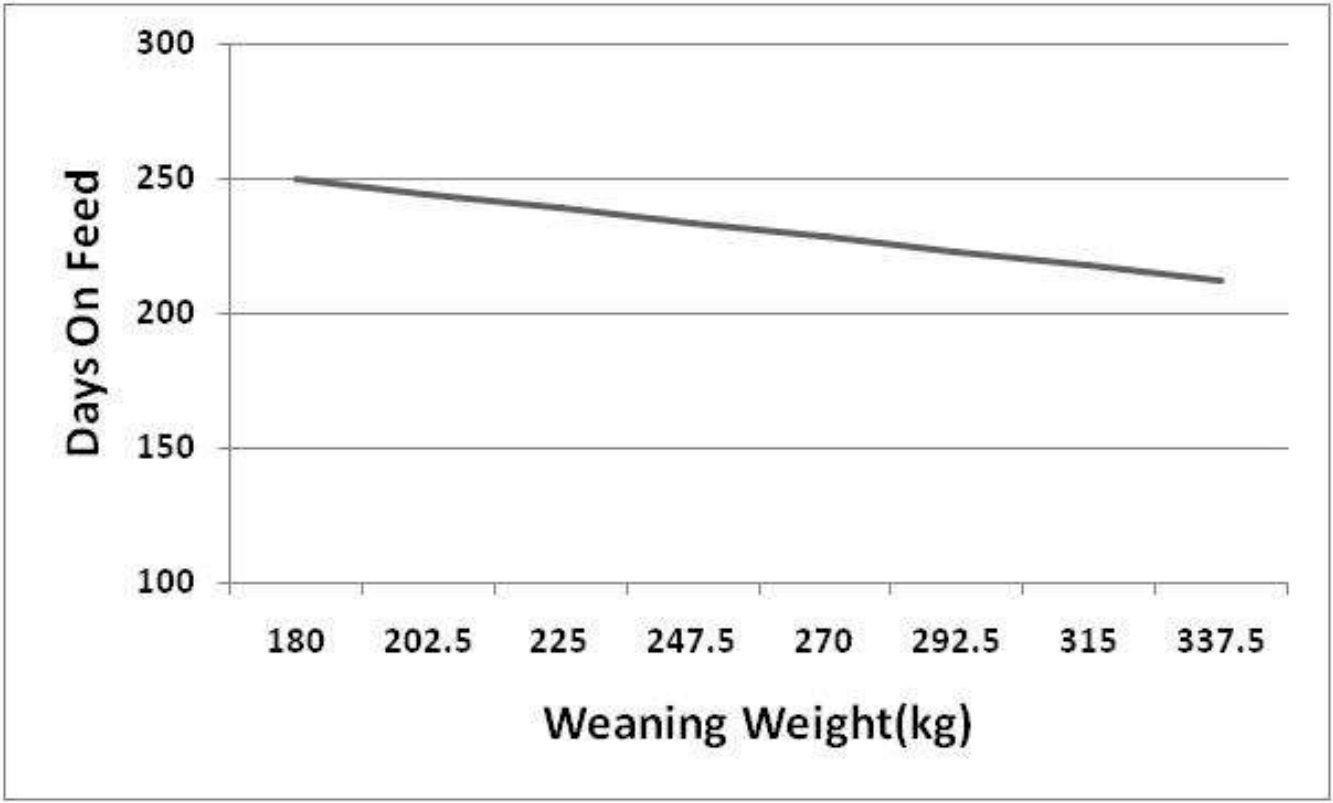
Effect of Weaning Weight on Feedlot ADG



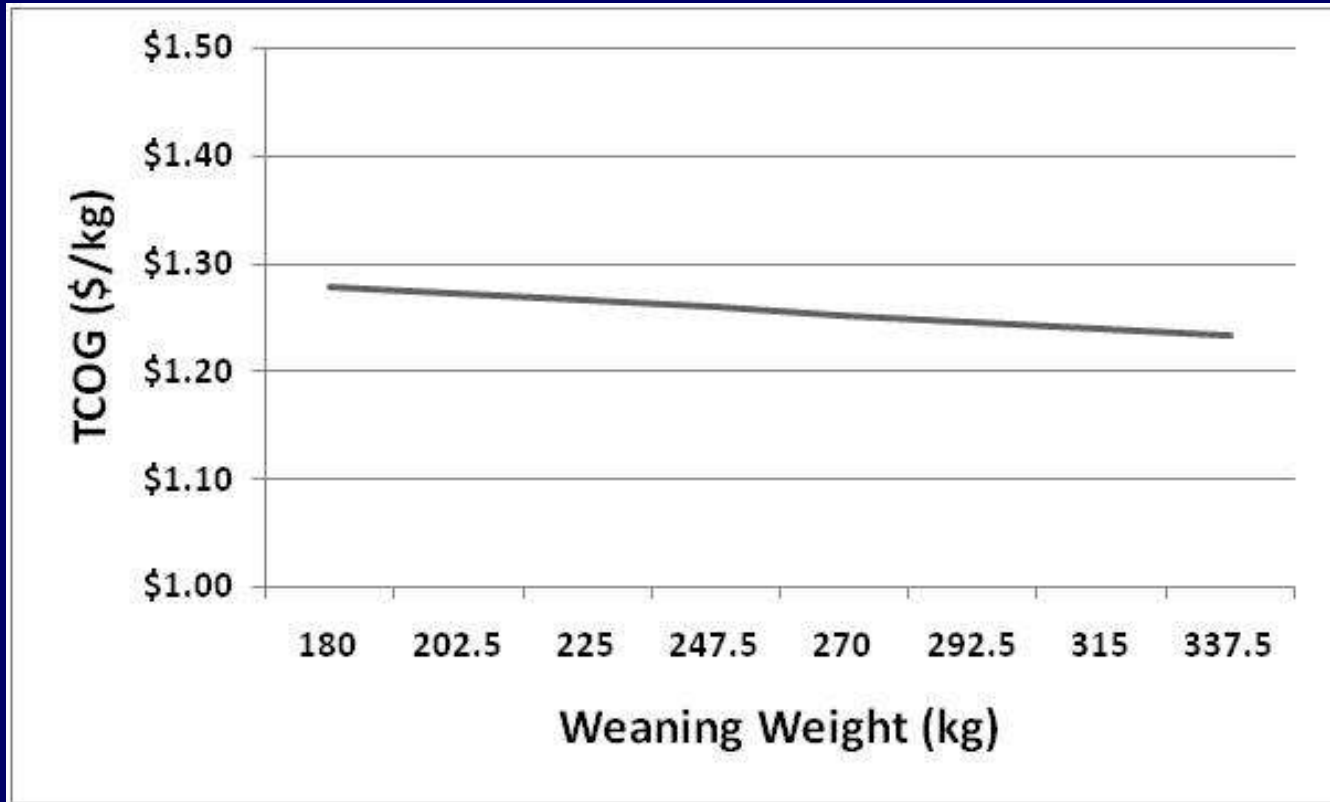
Effect of Weaning Weight on Feed Efficiency



Effect of Weaning Weight on Days on Feed



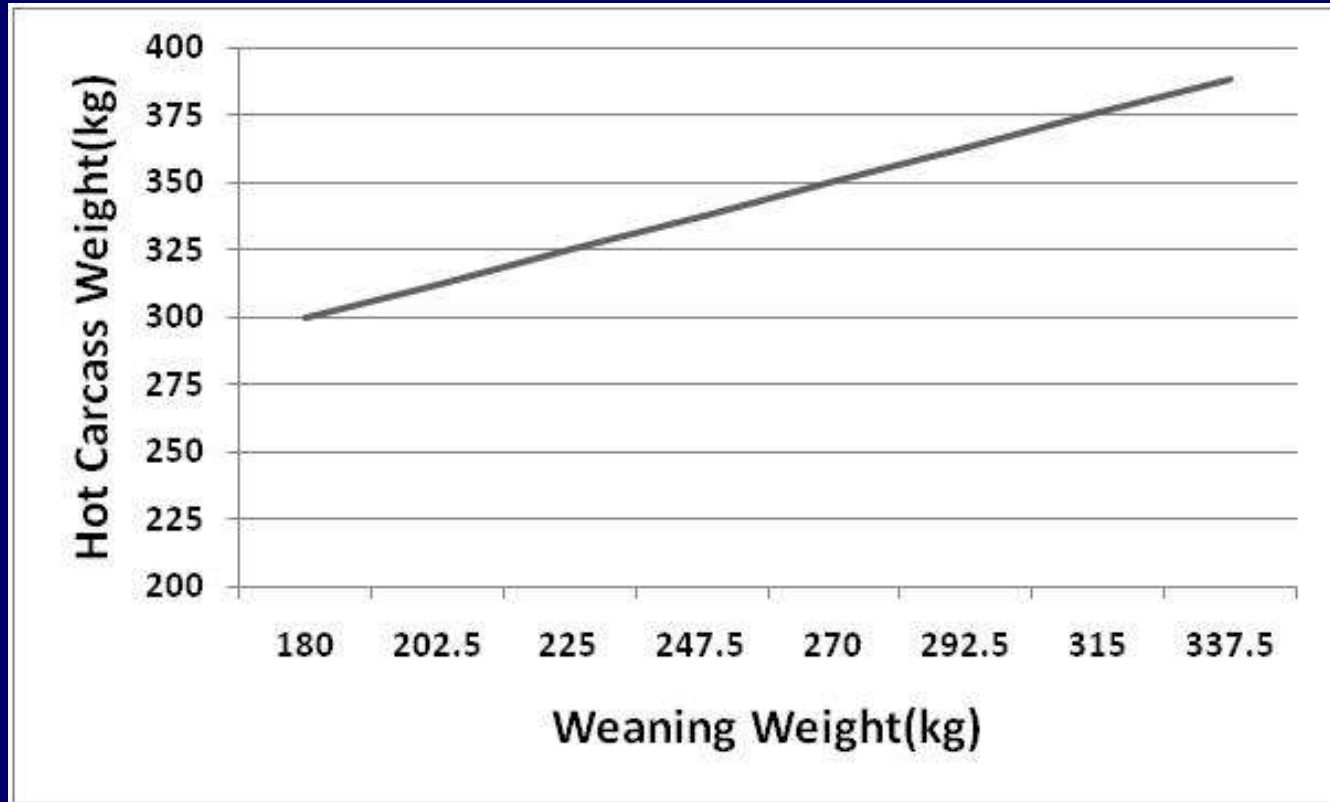
Effect of Weaning Weight on Cost of Gain



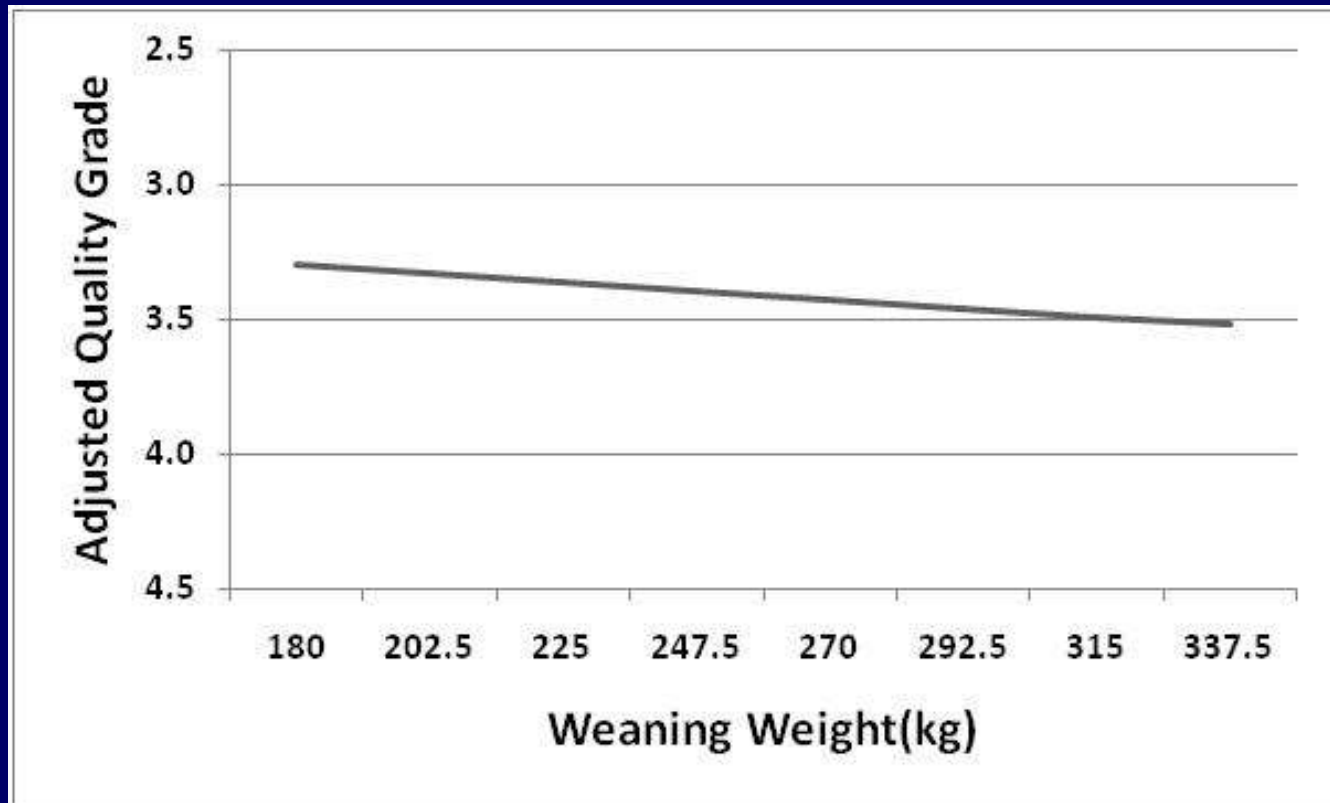
Weaning Weight

- Weaning Weight had no effect on
 - Feedlot ADG
 - Cost of Gain
- There was an interaction between Weaning Weight and Sex for Feed Efficiency
- Days on Feed decreased by 23.7 kg as Weaning Weight increased by 100 kg.

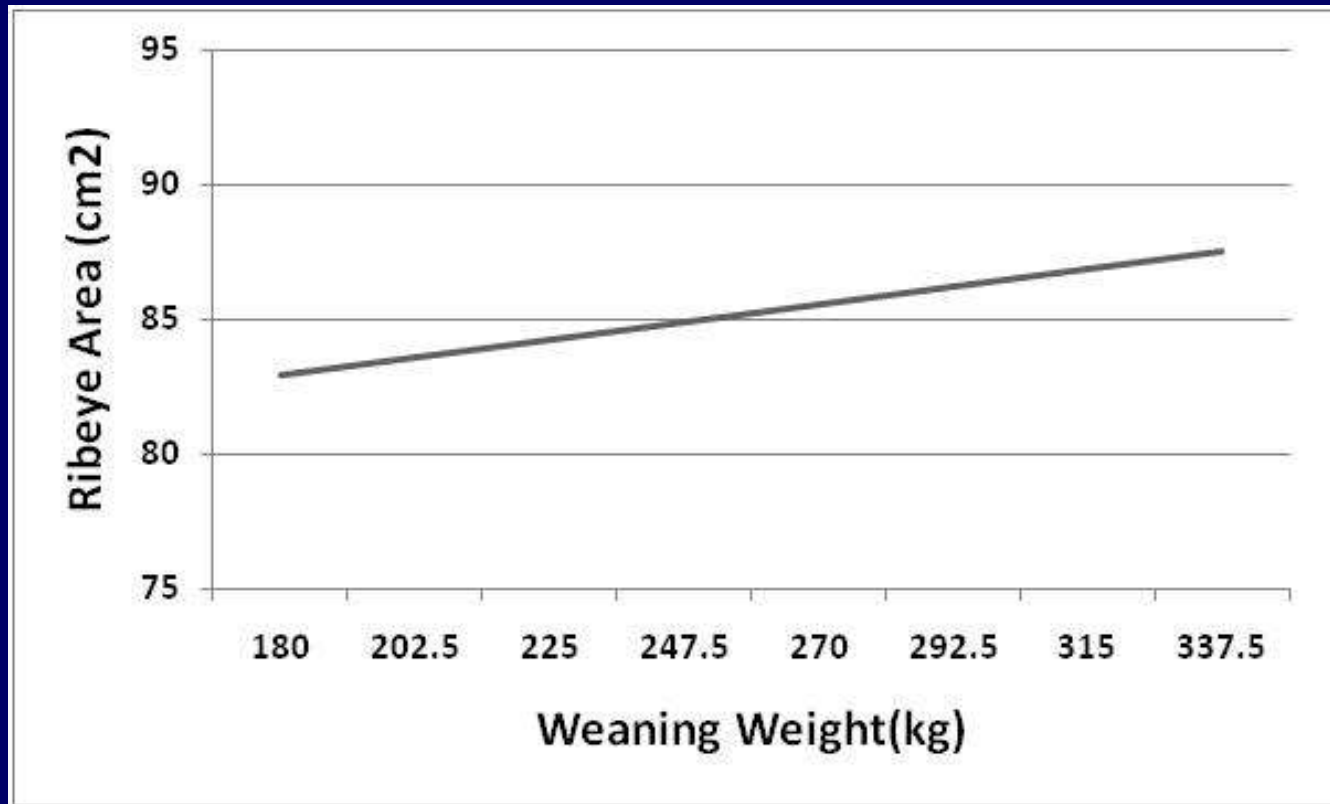
Effect of Weaning Weight on Hot Carcass Weight



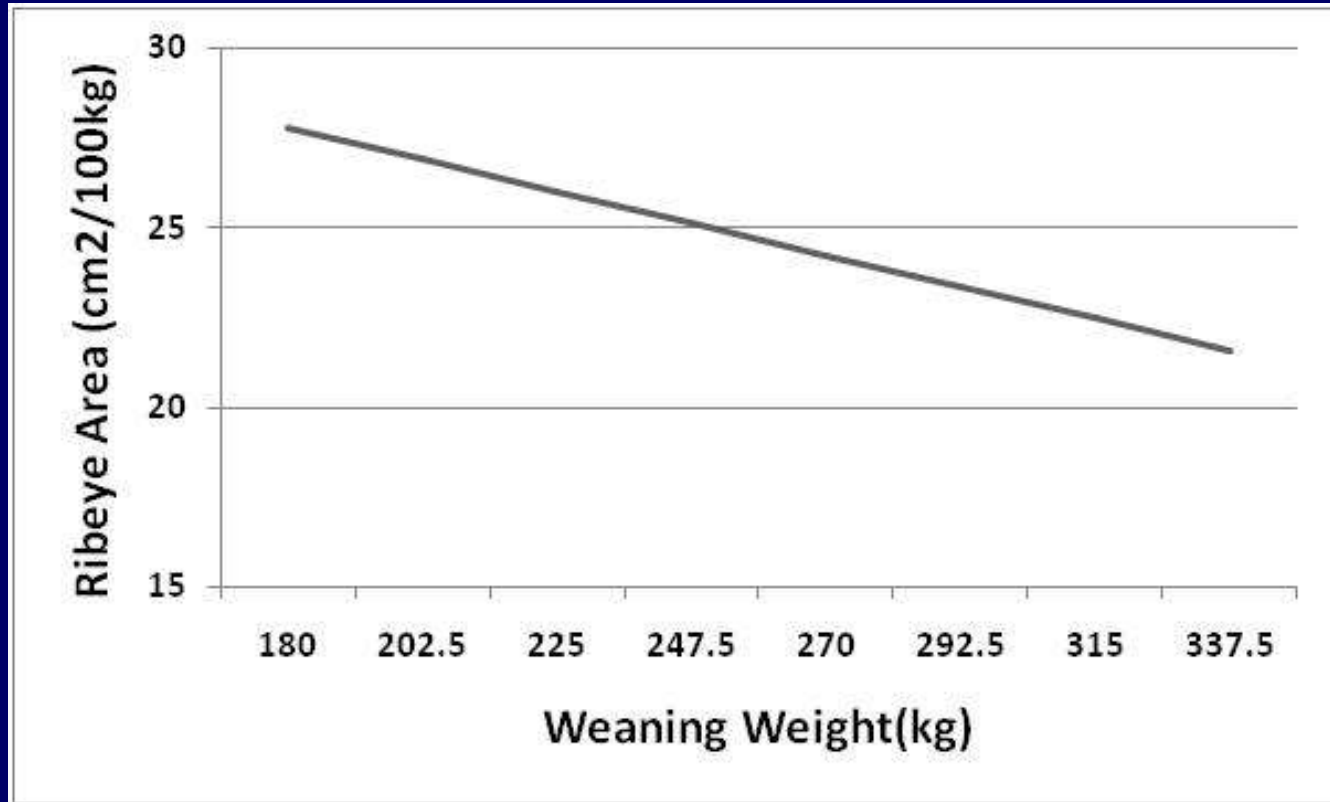
Effect of Weaning Weight on Quality Grade



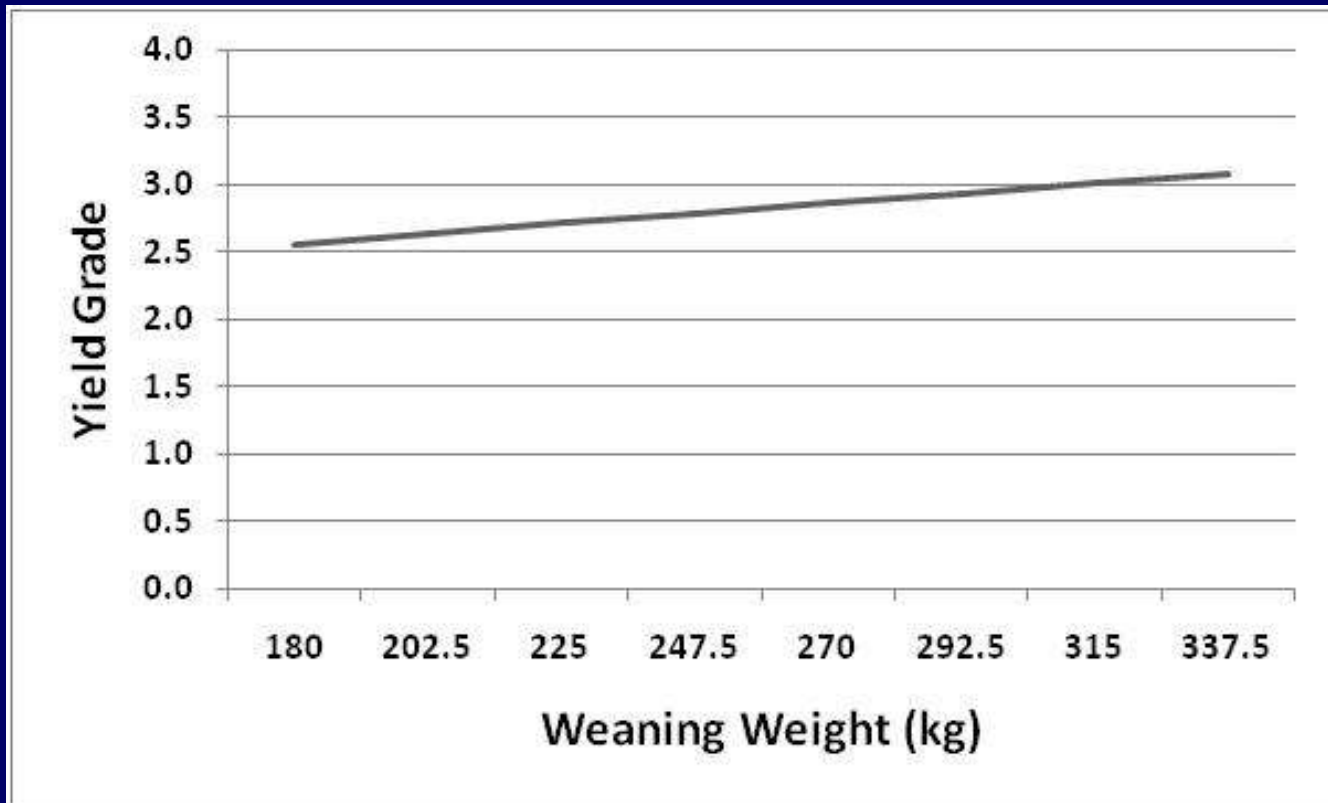
Effect of Weaning Weight on Ribeye Area



Effect of Weaning Weight on Ribeye Area/100kg



Effect of Weaning Weight on Yield Grade

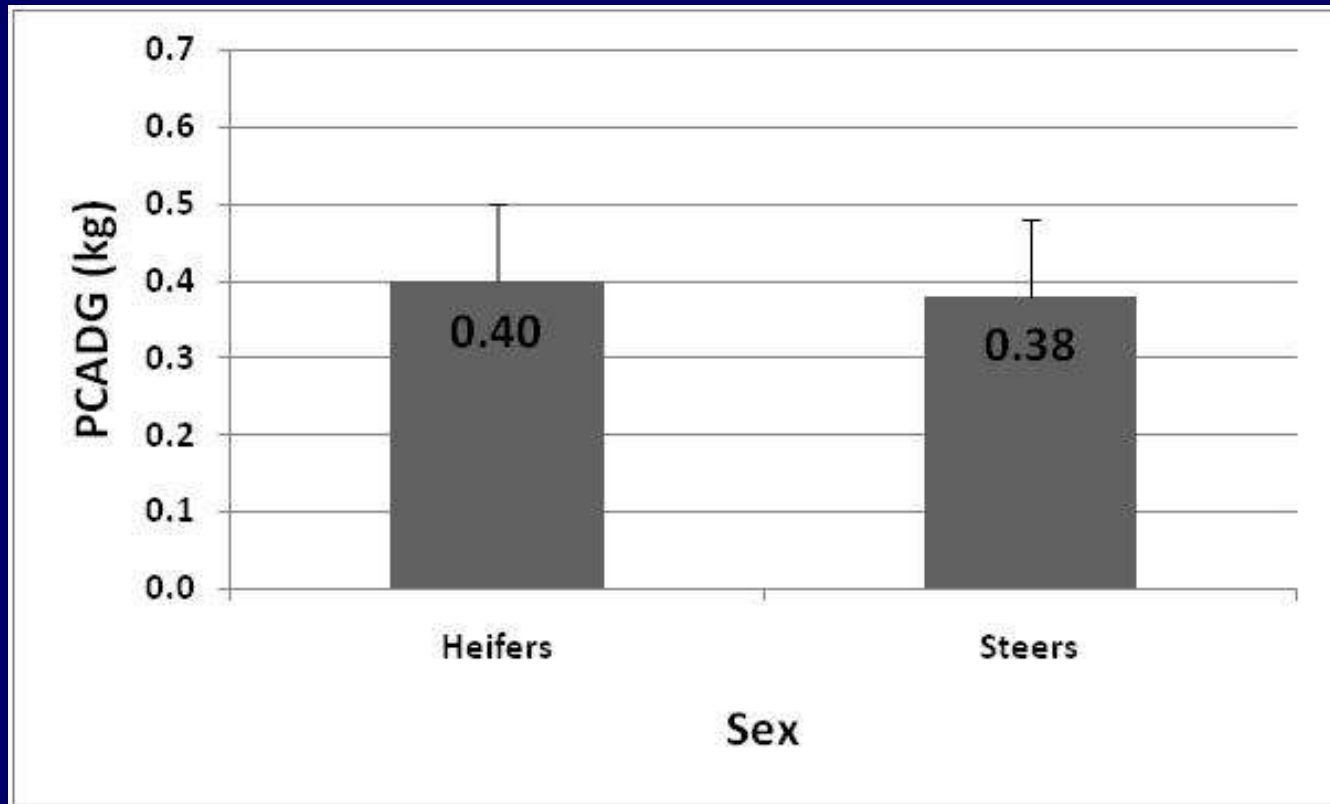


Weaning Weight

- Hot Carcass Weight increased by 56.6 kg as Weaning Weight increased by 100 kg.
- Weaning Weight had no effect on Quality Grade
- Ribeye Area increased by 2.93 cm² as Weaning Weight increased by 100 kg.
- Ribeye Area/100kg decreased by 3.94 cm² as Weaning Weight increased by 100 kg.
- Yield Grade increased by 1/3 of a grade as Weaning Weight increased by 100 kg

Sex

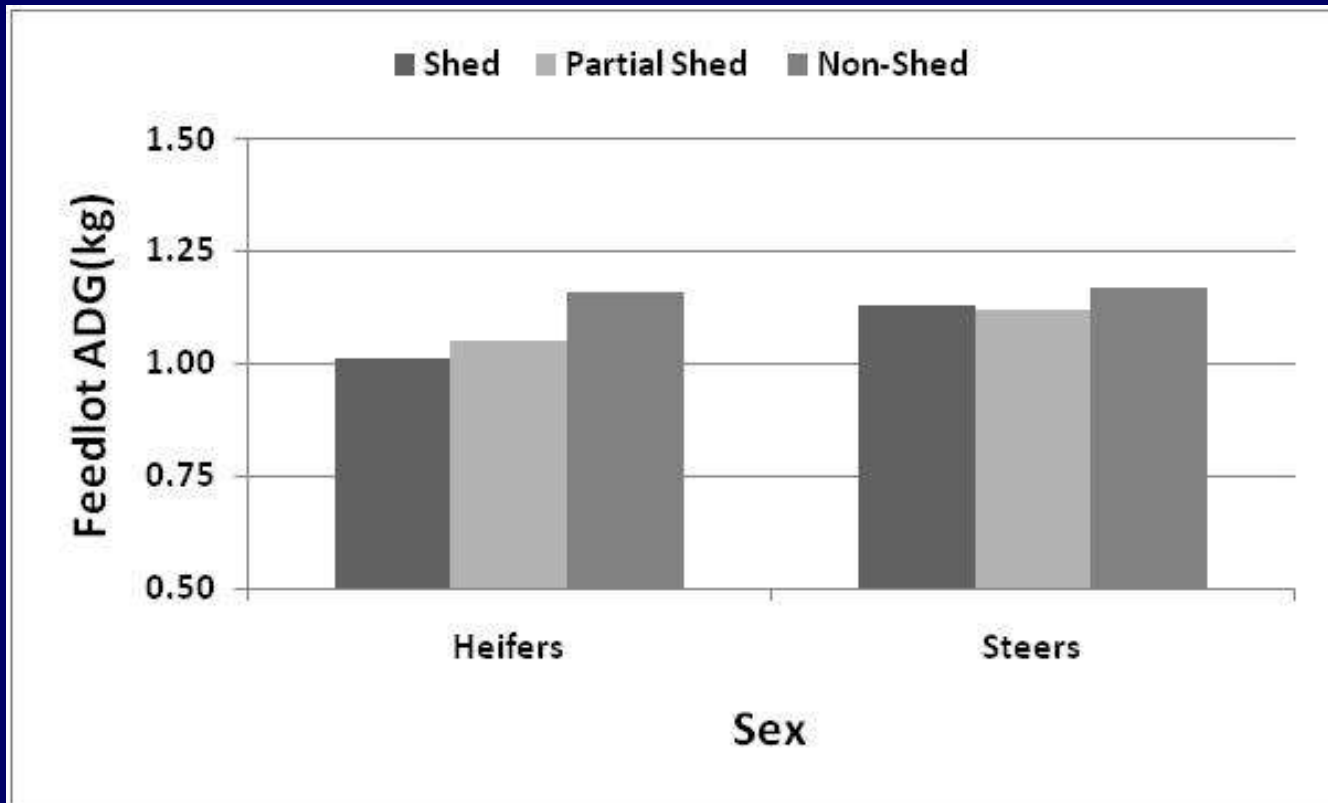
Effect of Sex on Preconditioning ADG



Sex

- Sex had no effect on Preconditioning ADG

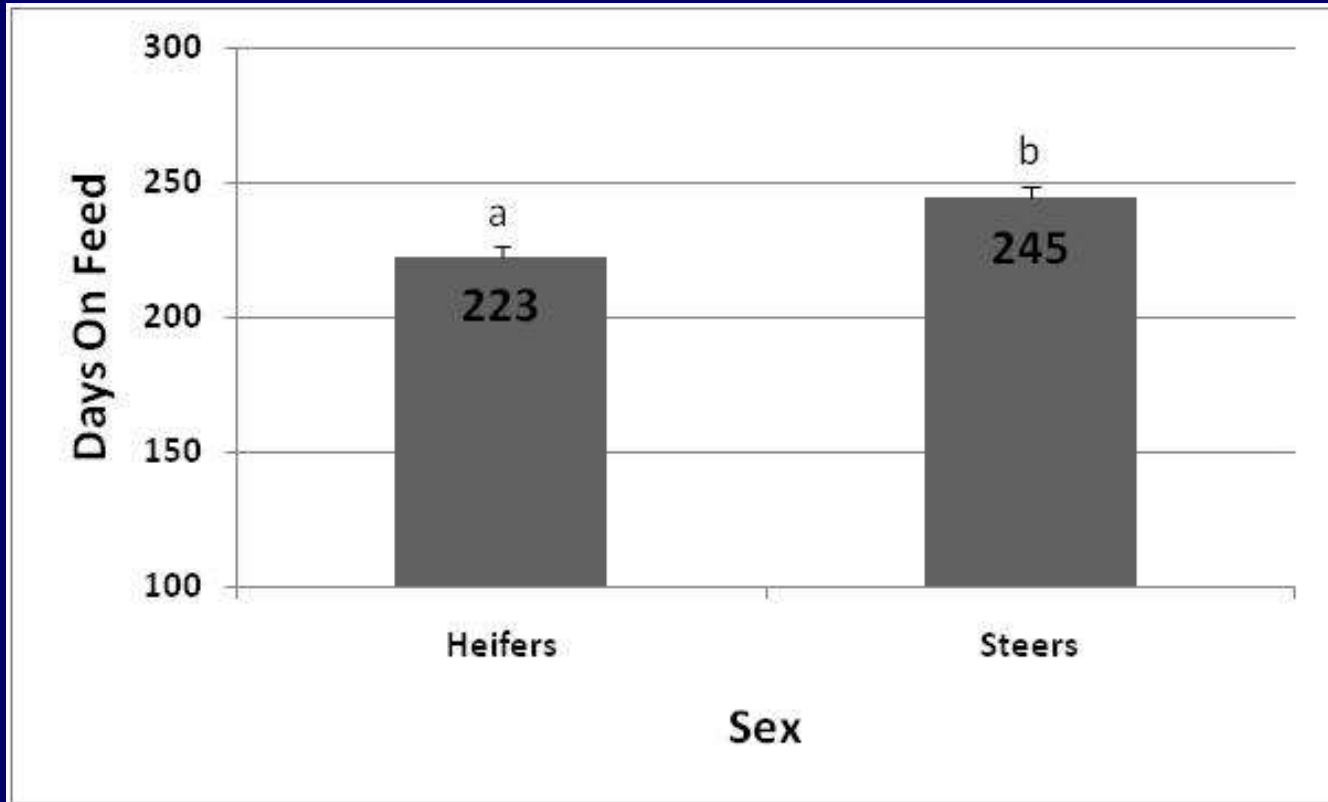
Effect of Sex on Feedlot ADG



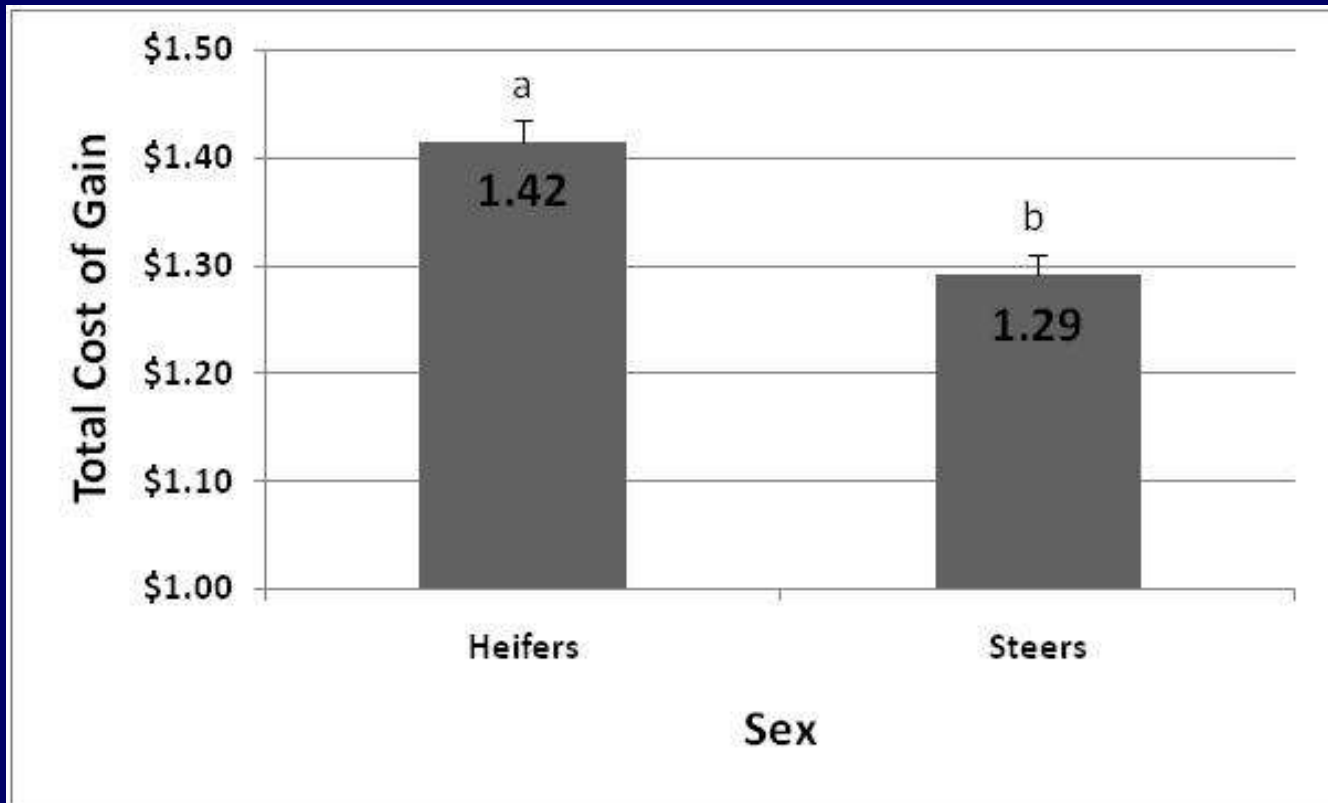
Effect of Sex on Feed Efficiency

- Interaction between Sex and PCADG for FE
- Interaction between Sex and WW for FE

Effect of Sex on Days on Feed



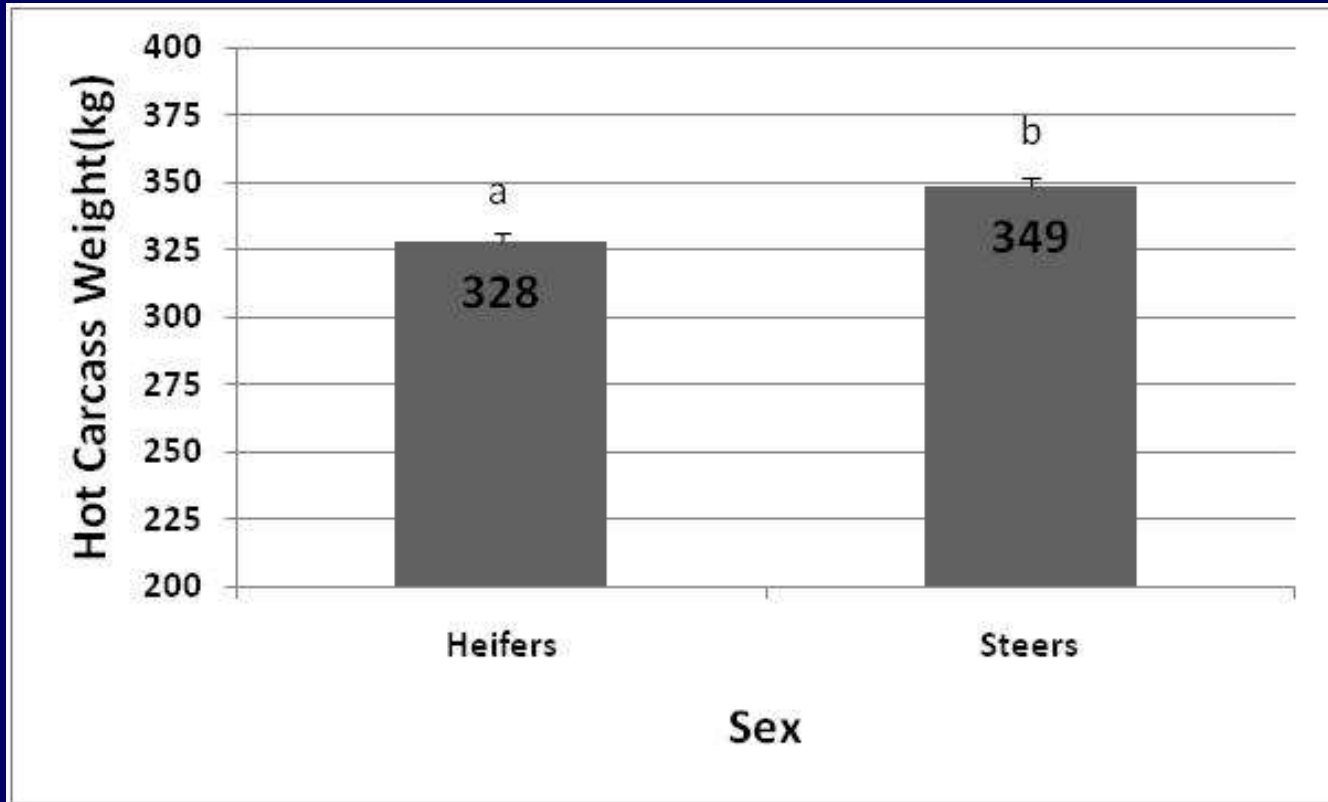
Effect of Sex on Cost of Gain



Sex

- An interaction was discovered between Sex and Coat Shedding Characteristics for Feedlot ADG
- Interactions between Sex and PCADG and Sex and WW were discussed previously
- Heifers were fed for fewer DOF than Steers
- Steers had lower Cost of Gain than Heifers

Effect of Sex on Hot Carcass Weight



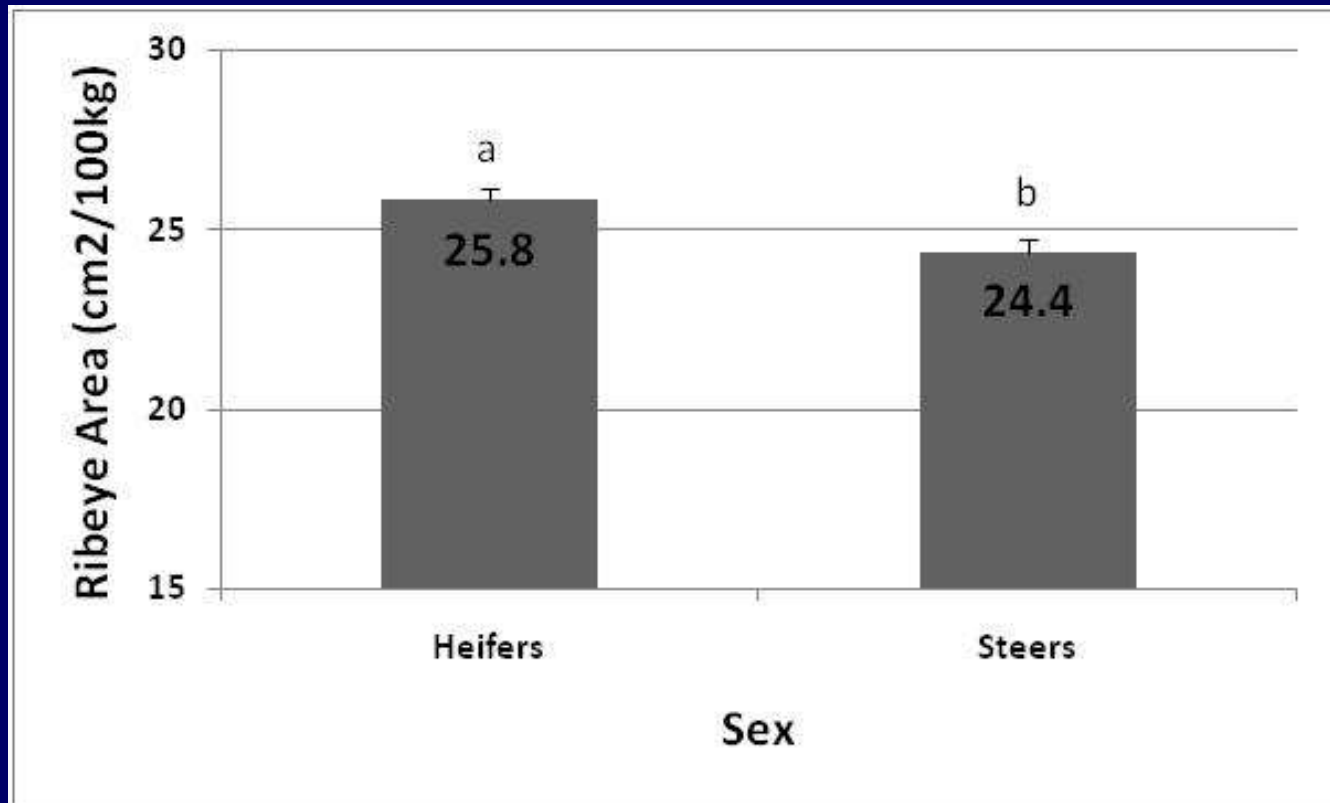
Effect of Sex on Quality Grade

- Interaction between Sex and Condition Score presented earlier

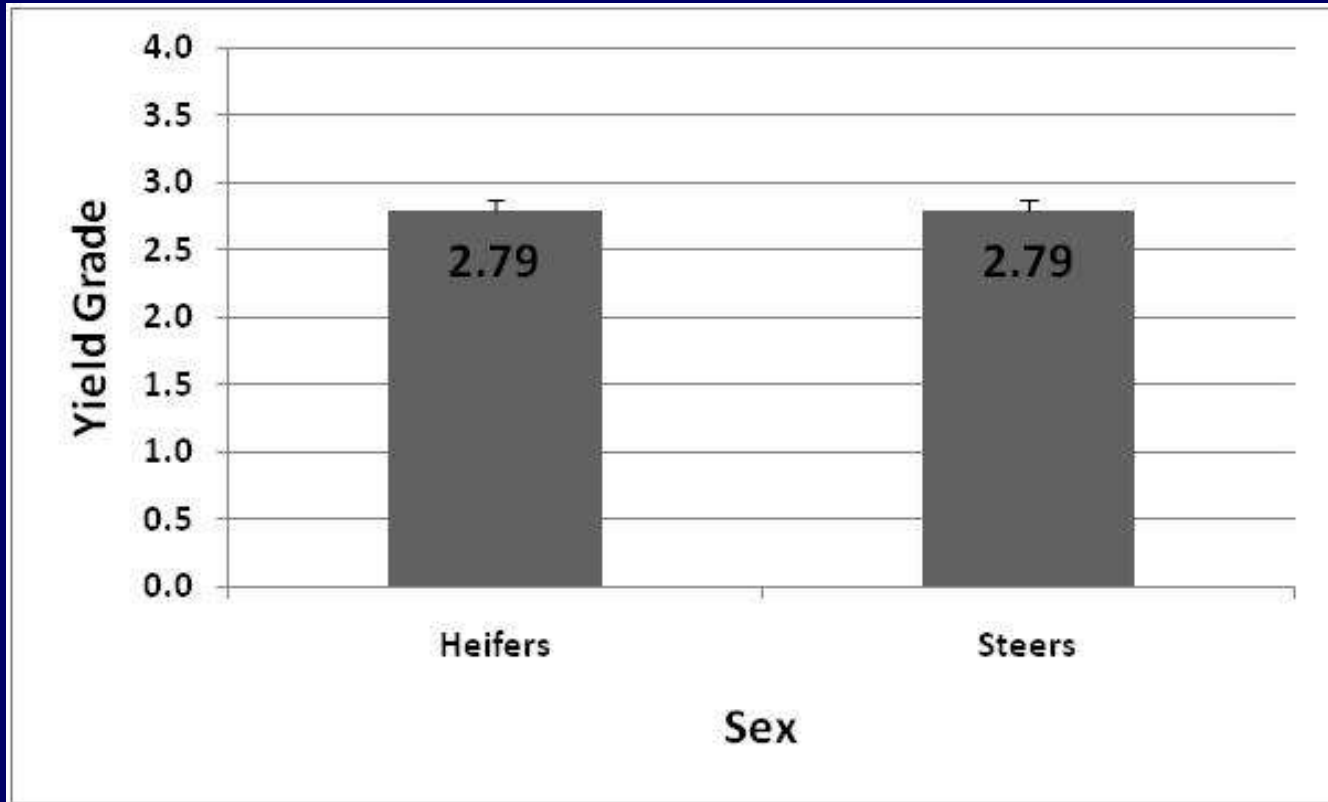
Effect of Sex on Ribeye Area

- Interaction between sex and condition score for REA discussed earlier

Effect of Sex on Ribeye Area/100kg



Effect of Sex on Yield Grade



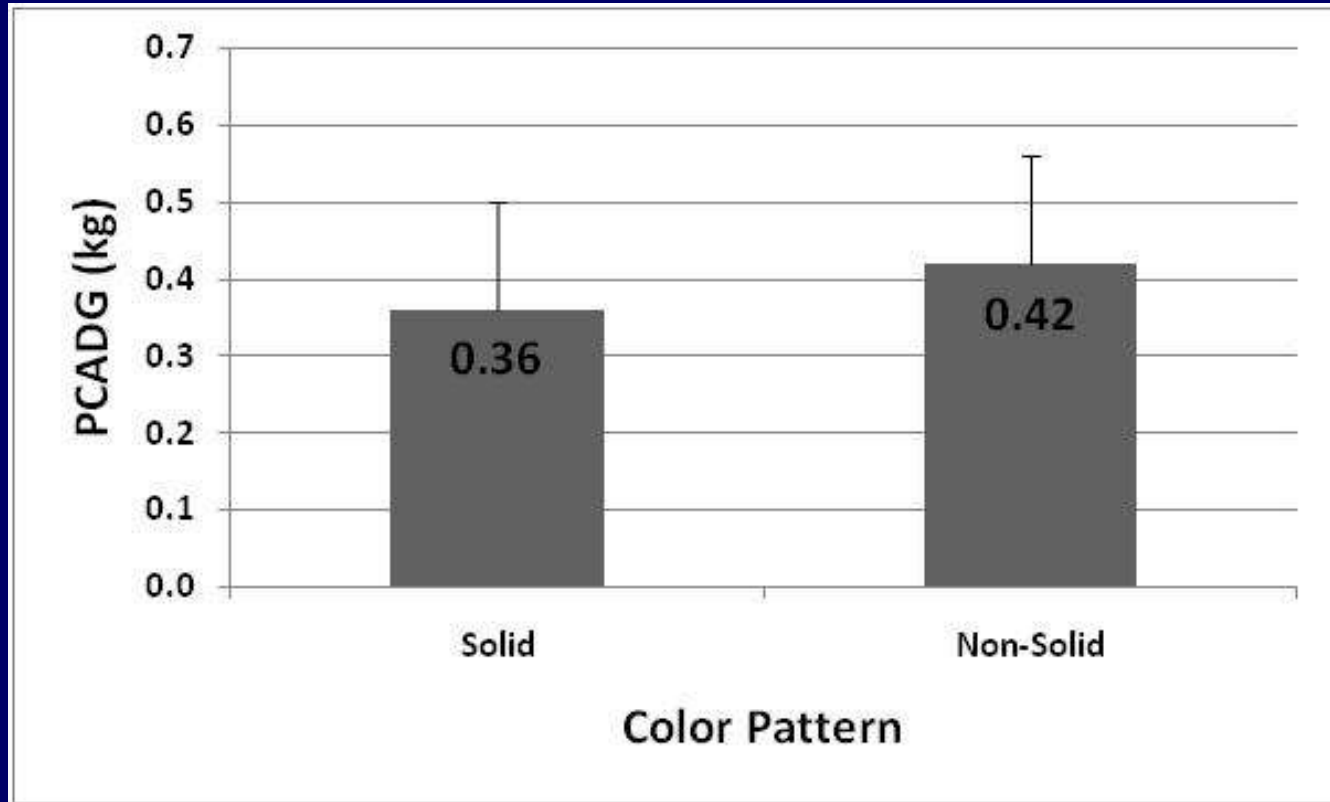
Sex

- Steers had 21 kg heavier carcasses than Heifers
- Interaction sex by Condition for AQG
- Interaction sex by condition for REA
- Steers had smaller Rea/100kg than Heifers
- Sex had no effect on YG

Color Pattern



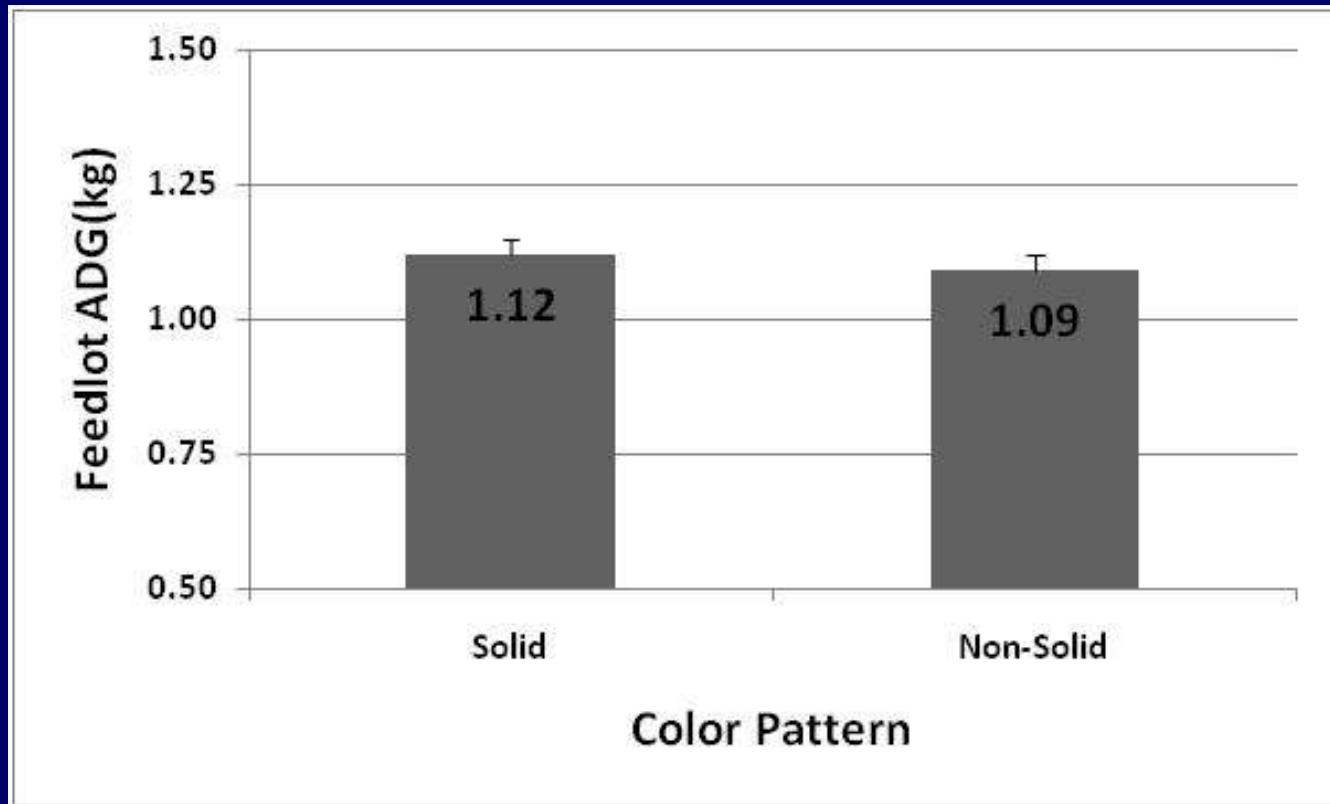
Effect of Color Pattern on Preconditioning ADG



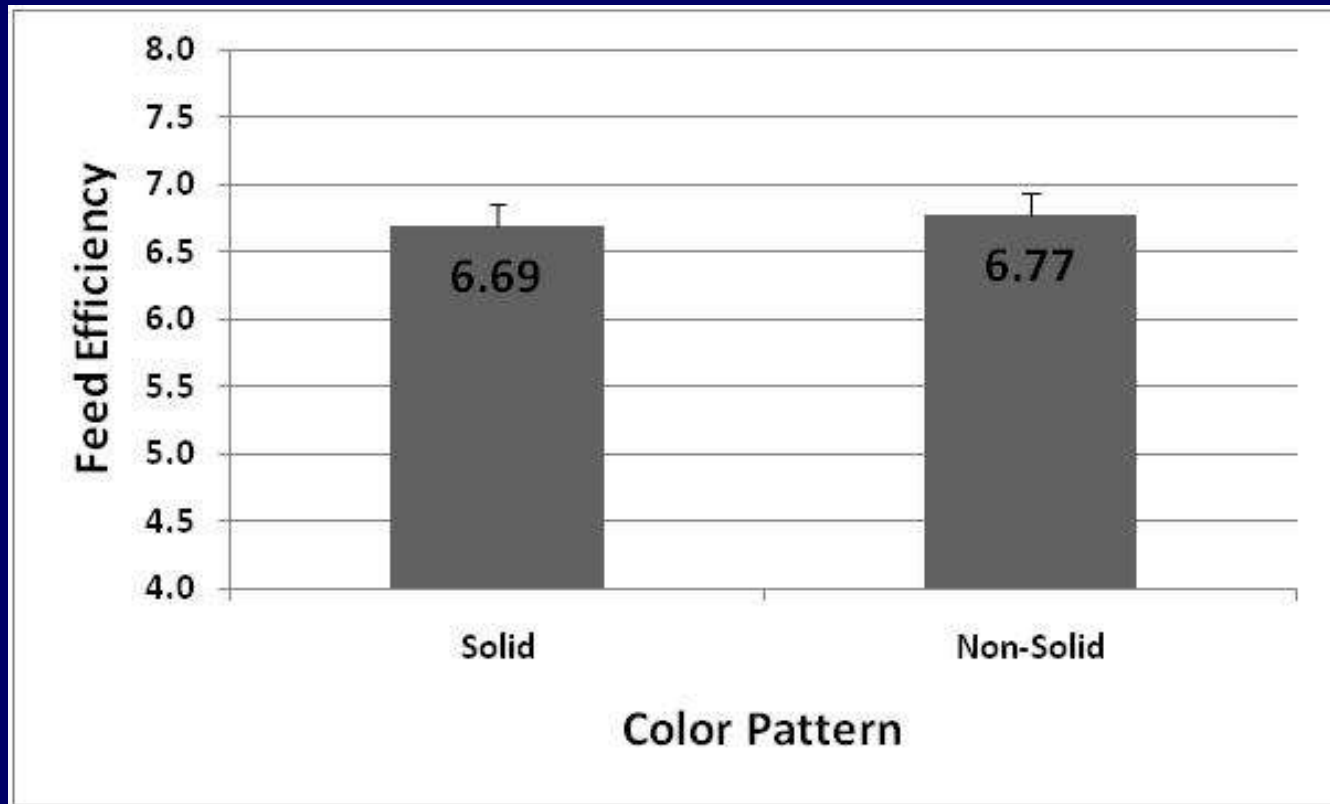
Color Pattern

- Color Pattern had no effect on Preconditioning
ADG

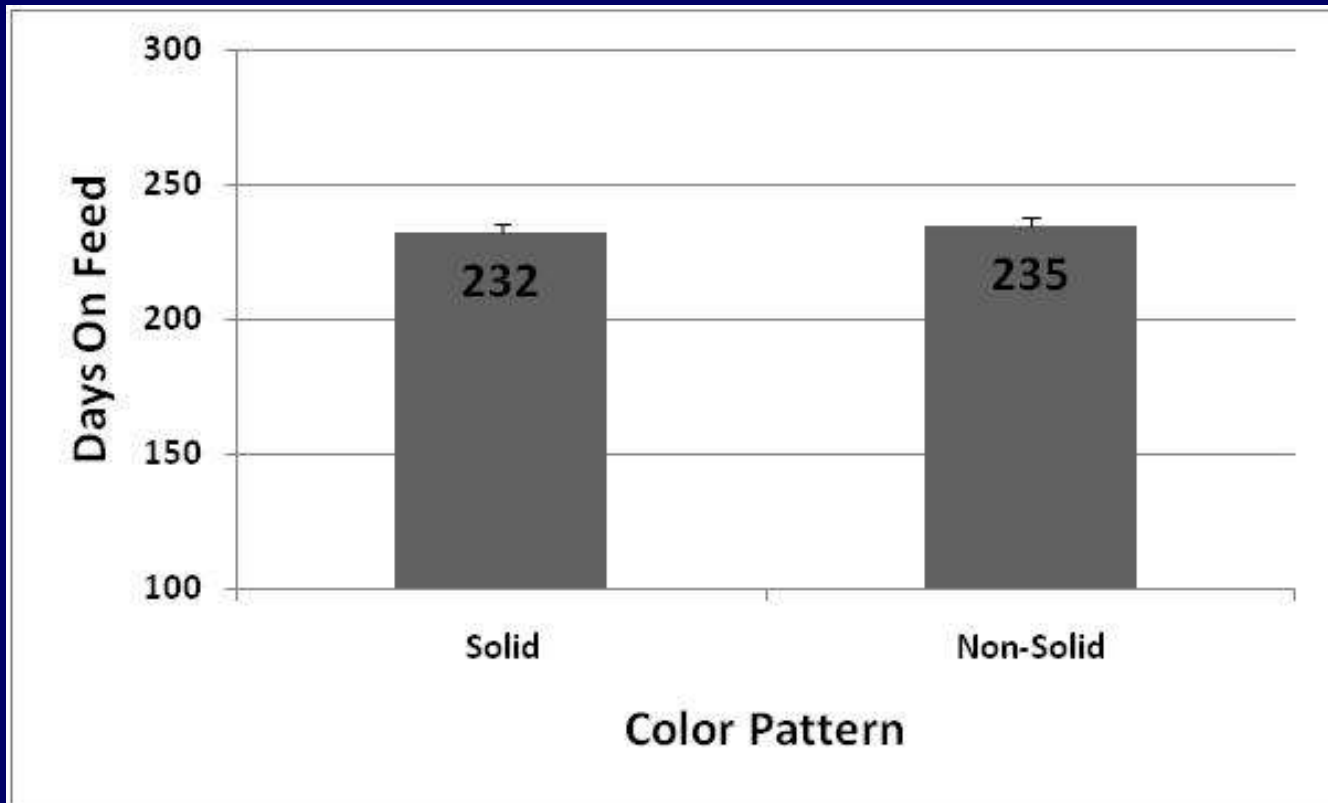
Effect of Color Pattern on Feedlot ADG



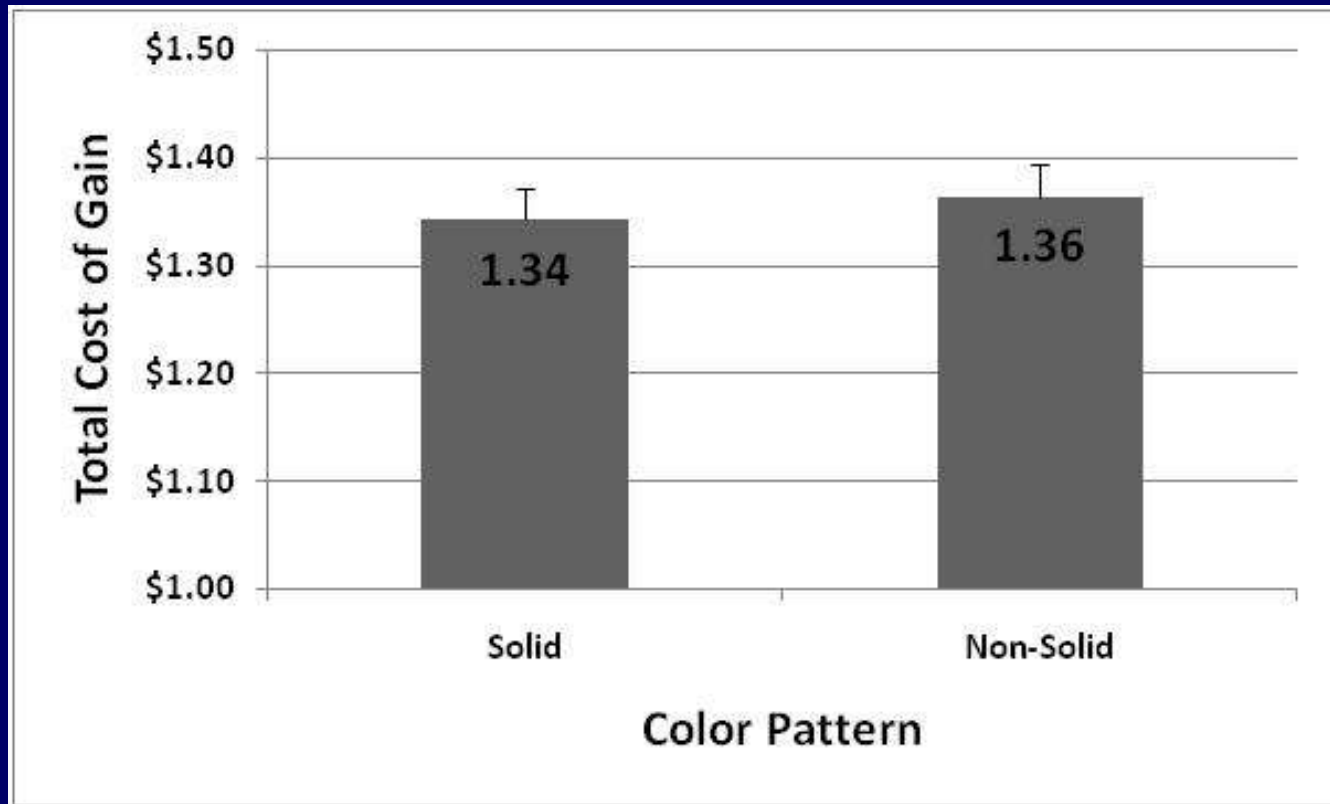
Effect of Color Pattern on Feed Efficiency



Effect of Color Pattern on Days on Feed



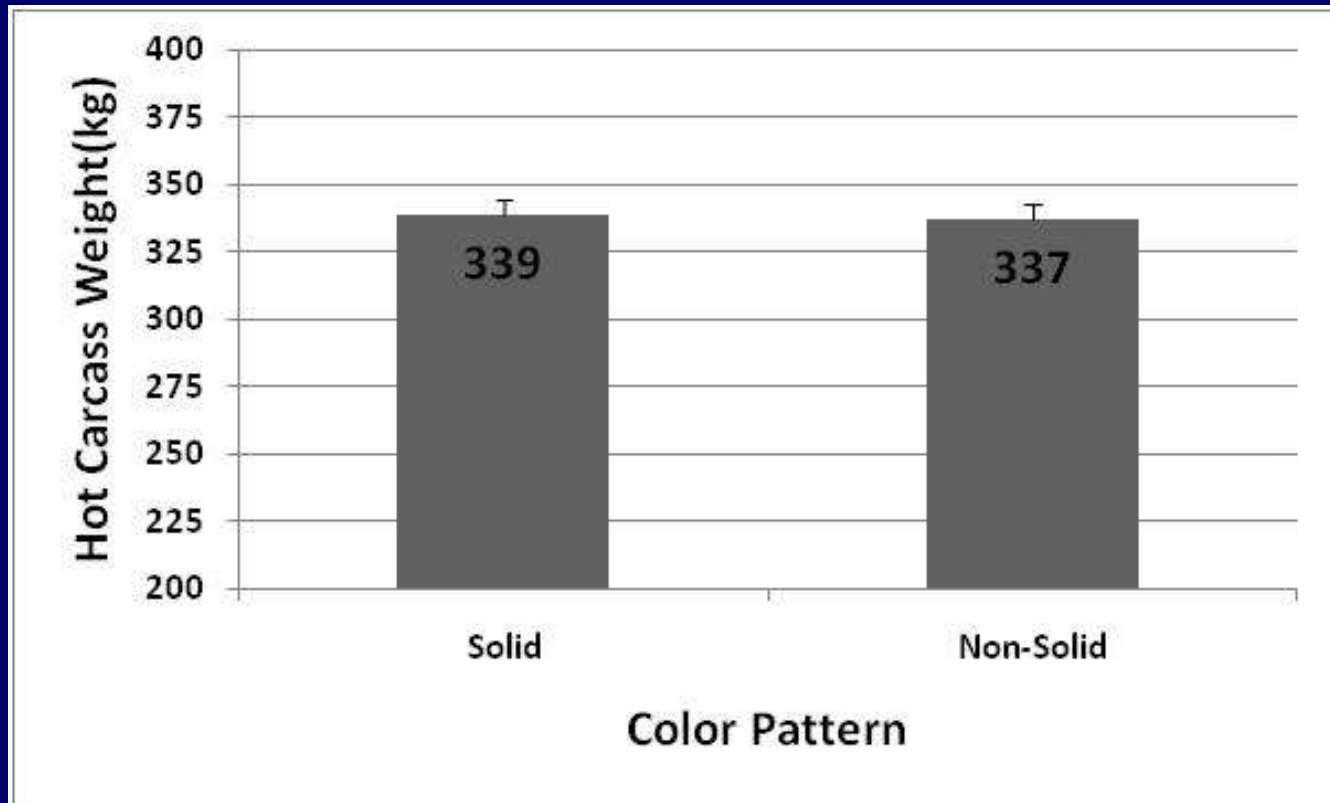
Effect of Color Pattern on Cost of Gain



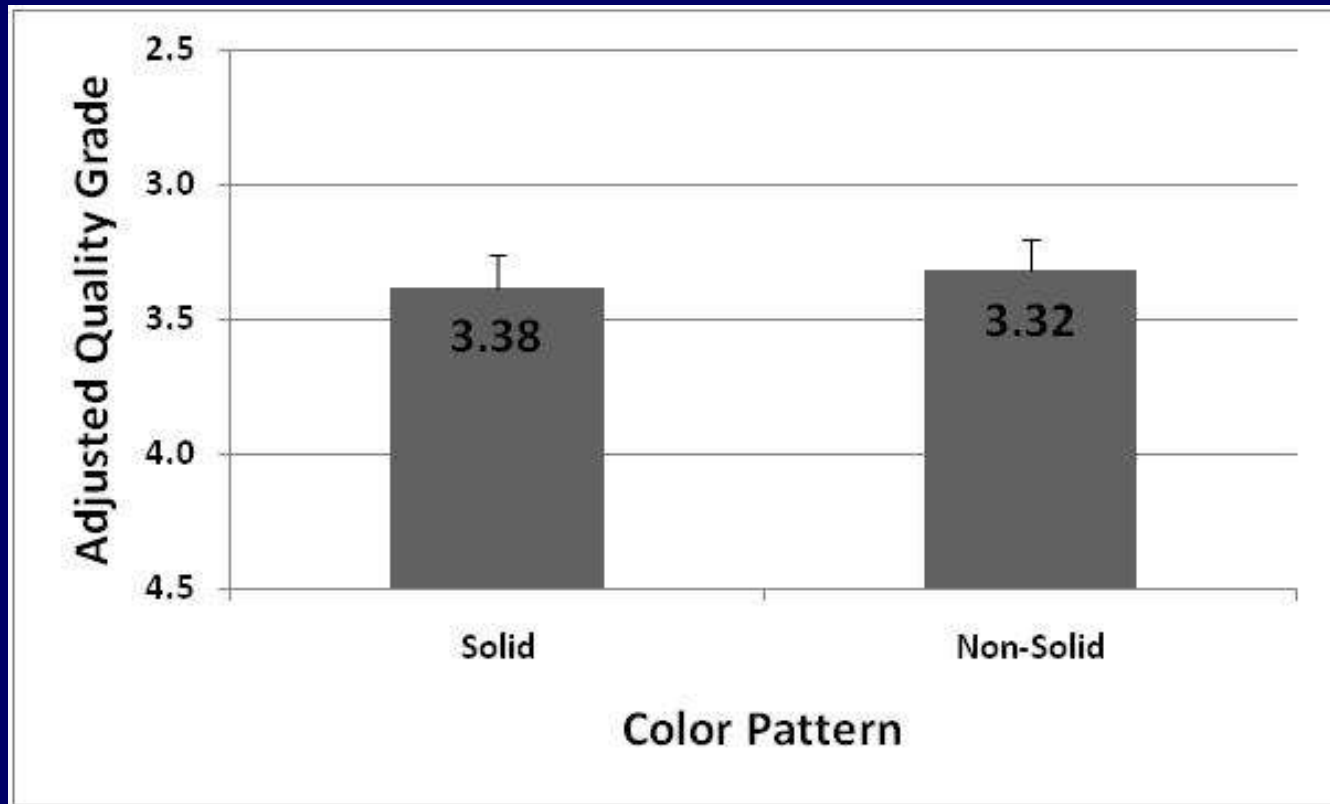
Color Pattern

- Color Pattern had no effect on any parameters measured in the feedlot phase.

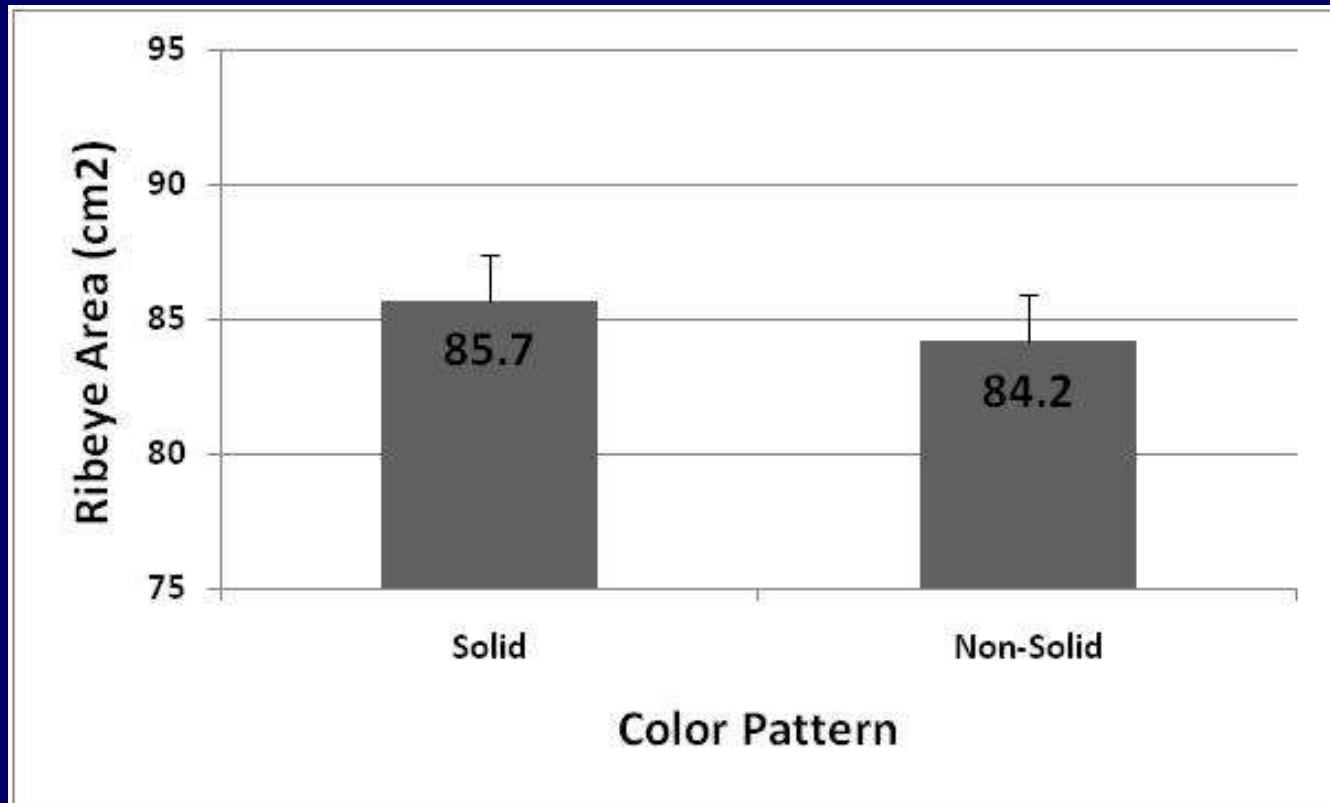
Effect of Color Pattern on Hot Carcass Weight



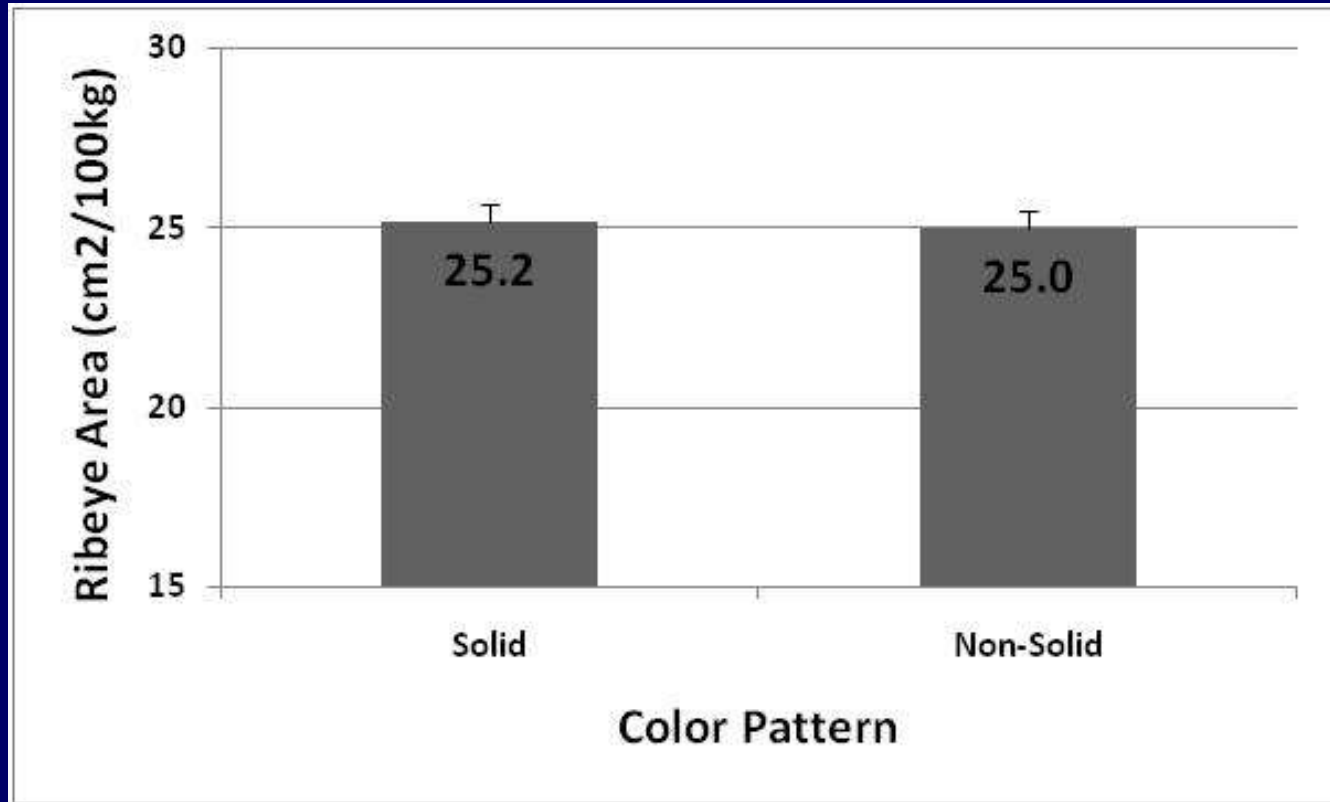
Effect of Color Pattern on Quality Grade



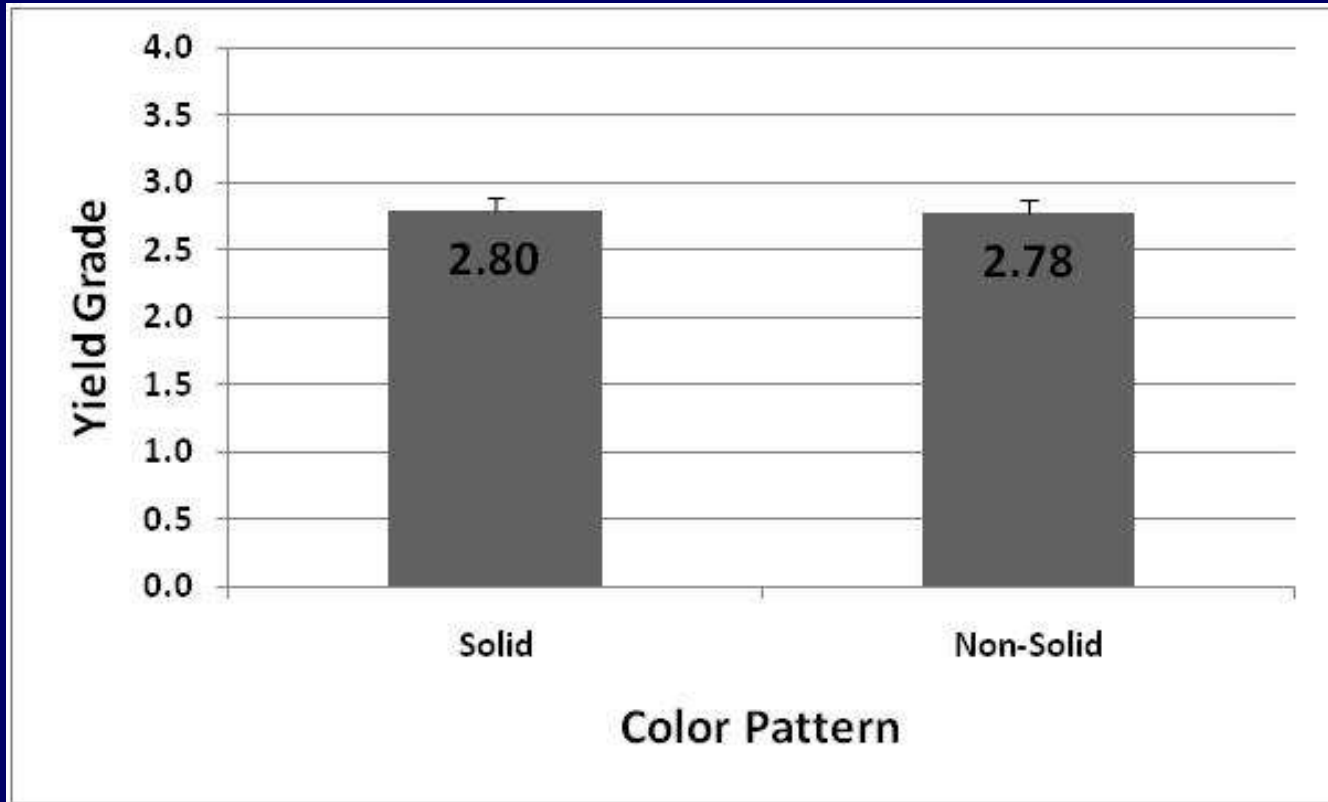
Effect of Color Pattern on Ribeye Area



Effect of Color Pattern on Ribeye Area/100kg



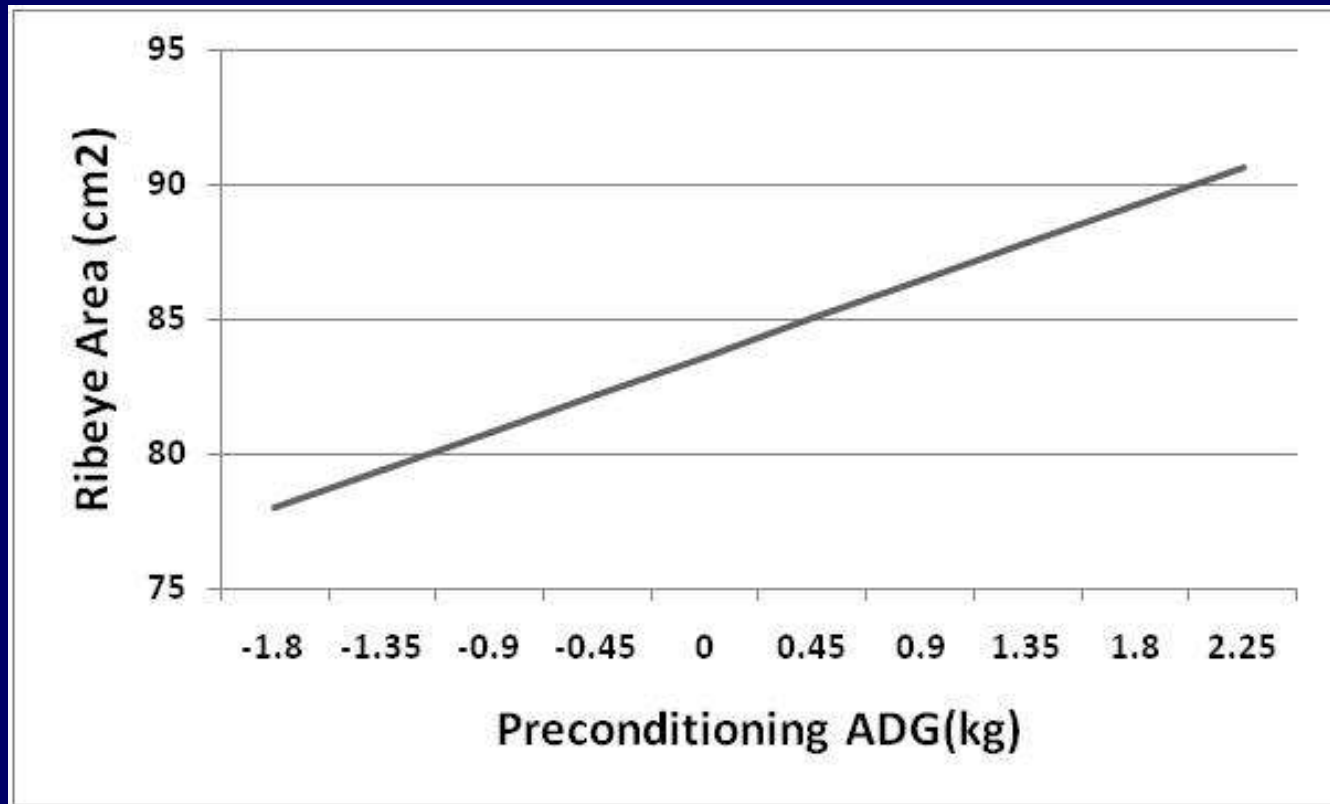
Effect of Color Pattern on Yield Grade



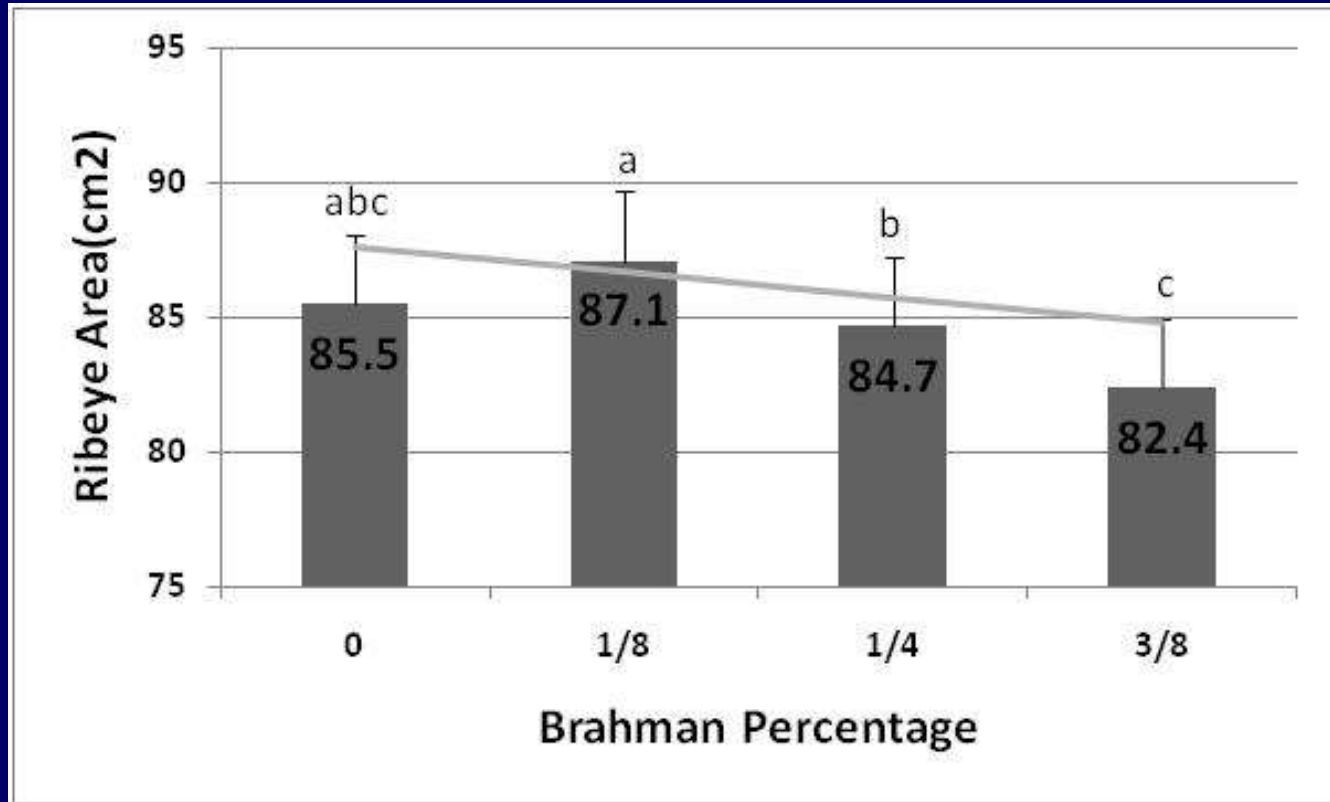
Color Pattern

- Color Pattern had no effect on any parameters measured at the carcass level

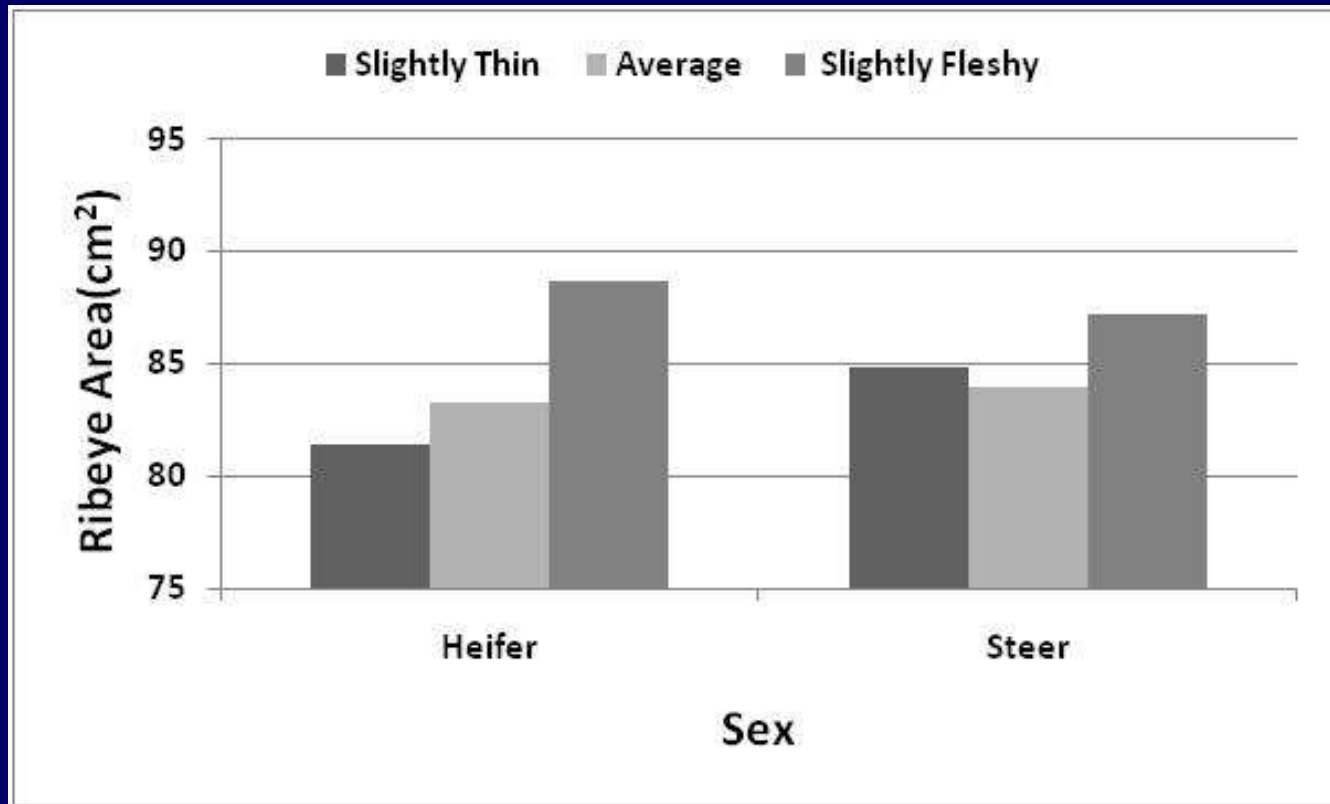
Effect of Preconditioning ADG on Ribeye Area



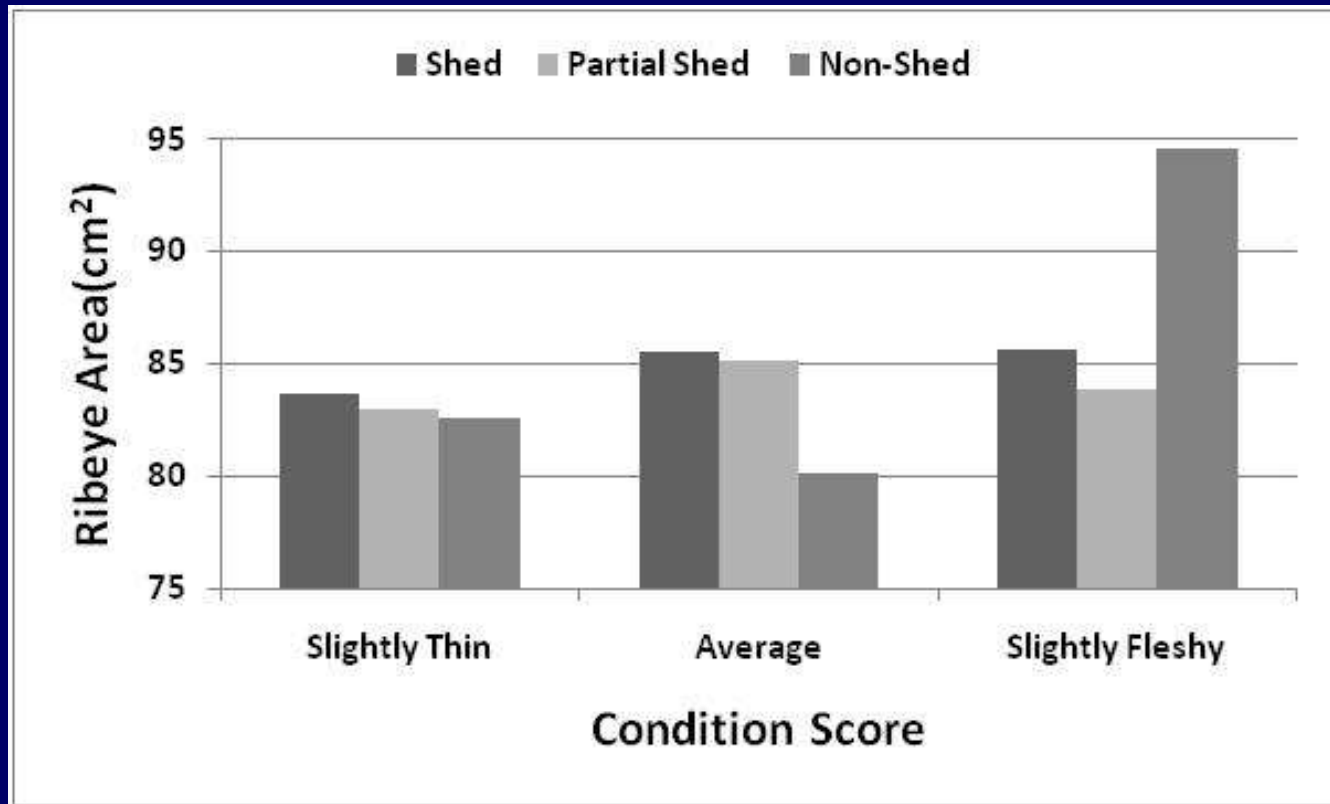
Effect of Brahman Percentage on Ribeye Area



Effect of Condition Score on Ribeye Area



Effect of Condition Score on Ribeye Area



Effect of Coat Color on Ribeye Area

