

# STRIP LOIN STEAK DIFFERENCES FROM DIFFERENT BEEF GENOTYPES

Semler M.E.<sup>1</sup>, Calkins C.R.<sup>1</sup>, Erickson G.E.<sup>2</sup>

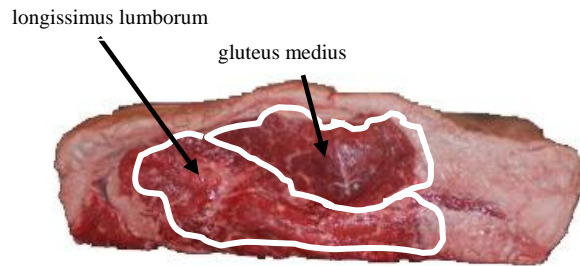
<sup>1</sup>Department of Animal Science, University of Nebraska-Lincoln, Lincoln, Nebraska 68503, USA

**Abstract** – This study was conducted to determine amount and musculature differences of strip loins from steers of different genotypes (Angus, Angus × Piedmontese, and Piedmontese). The genotypes had zero (0C), one (1C), or 2 (2C) copies of the myostatin gene with base pair deletions which cause muscle hyperplasia (n= 20, 22, and 16). All steers were fed the same diet. At 3 days postmortem 58 strip loins were collected and measured for loin weight, loin length, sirloin face width, rib face width, sirloin tail length, rib tail length and fat thickness at the rib face. Strip loins were then cut into 2.5 cm thick steaks and total number of steaks, total number of steaks without the *gluteus medius* (GM), and weights of each individual steak were noted. Loins from 0C cattle had a higher total number of steaks, both with and without the GM ( $P < 0.0001$ ) compared to 1C and 2C. This study indicates that increasing copies of the myostatin gene has no impact on the proportion of steaks containing the GM muscle within the strip loin.

**Key Words** – Beef, Myostatin, Piedmontese

## I. INTRODUCTION

The myostatin gene is a negative regulator of myogenesis and causes an increase in muscle fiber number (hyperplasia), which is the primary reason for increase in skeletal muscle mass of about 20% in Piedmontese cattle [1][2][3]. Cattle with two copies of the inactive myostatin allele possess nearly twice the number of muscle fibers than other cattle and yield an extremely lean and heavily muscled carcass [1][2]. This research was conducted to determine if cattle with 2 copies of the inactive myostatin would produce a greater number and percentage of strip loins containing the *gluteus medius* (GM) when compared to cattle with 0 and 1 copy of the inactive myostatin allele. Such steaks, called vein steaks, are lower in value than strip steaks without the GM.



## II. MATERIALS AND METHODS

### *Sample Collection*

All steers were fed the same diet individually for 182 days, and then finished in groups for 50 days, for a total of 232 days on feed. At 3 days postmortem samples were collected from the carcass (n=58 strip loins). Each strip loin was then measured for loin weight, loin length, sirloin face width, rib face width, sirloin tail length, rib tail length, and fat thickness at the rib face. The loins were then cut into 2.5 cm thick steaks and the following information was gathered for each: total number of steaks, total number of vein steaks, total number of non-vein steaks, and weight of each individual steak.

### *Statistical Analysis*

Data was analyzed by Proc Mixed procedure in SAS (Version 9.1) [4] with significant determined at  $P \leq 0.05$ .

## III. RESULTS AND DISCUSSION

Despite having a slight advantage in weight (Table 1), strip loins from 1C and 2C cattle were shorter and wider, yielding fewer total steaks and fewer vein steaks (Table 2). This was a reflection of greater mean steak weight (Table 2).

Table 1. Dimensional measurements for strip loin

Measurements	Myostatin Genotype			SEM	P-Value
	0	1	2		
Fat Thickness (in)	0.56 <sup>a</sup>	0.27 <sup>b</sup>	0.13 <sup>c</sup>	0.031	<.0001
Loin Weight (kg)	4.99 <sup>b</sup>	5.48 <sup>a</sup>	5.10 <sup>a</sup>	0.149	0.0259
Loin Length (in)	15.31 <sup>a</sup>	14.80 <sup>a</sup>	13.61 <sup>b</sup>	0.231	<.0001
Sirloin Face Width (in)	8.90 <sup>b</sup>	9.62 <sup>a</sup>	9.53 <sup>a</sup>	0.140	0.0002
Rib Face Width (in)	7.47 <sup>b</sup>	8.39 <sup>a</sup>	8.66 <sup>a</sup>	0.135	<.0001
Sirloin Tail Length (in)	2.57 <sup>b</sup>	3.00 <sup>a</sup>	2.43 <sup>b</sup>	0.137	0.0056
Rib Tail Length (in)	1.17 <sup>ab</sup>	1.25 <sup>a</sup>	1.03 <sup>b</sup>	0.059	0.0186
Fat Thickness over Loin (in)	0.62 <sup>a</sup>	0.27 <sup>b</sup>	0.15 <sup>c</sup>	0.038	<.0001

<sup>abc</sup> Means with different subscripts within the same row are different  $P \leq 0.05$

Table 2. Number, weight, and proportion of vein steaks from strip loin

Steak Trait	Myostatin Genotype			SEM	P-Value
	0	1	2		
Number of Loins Analyzed	20	22	16		
Total Steaks	14.7 <sup>a</sup>	13.77 <sup>b</sup>	12.38 <sup>c</sup>	0.233	<.0001
Number Vein Steaks	4.6 <sup>a</sup>	4.18 <sup>b</sup>	3.56 <sup>c</sup>	0.151	<.0001
Non-Vein Steaks	10.15 <sup>ab</sup>	9.5 <sup>a</sup>	8.87 <sup>b</sup>	0.238	0.0009
% of Vein Steaks in loin	31.37	30.39	28.82	1.068	0.2134
Combined Weight of Steaks (g)	4993.37 <sup>b</sup>	5446.37 <sup>a</sup>	5093.29 <sup>ab</sup>	137.653	0.0453
Total Weight of Vein Steaks (g)	1569.11	1704.30	1505.81	68.119	0.1212
% Weight of Vein Steaks	31.42	31.35	29.35	1.109	0.3027
Mean Steak Weight (g)	339.5 <sup>b</sup>	396.6 <sup>a</sup>	410.1 <sup>a</sup>	0.052	<.0001

<sup>abc</sup> Means with different subscripts within the same row are different  $P \leq 0.05$

The 2C samples had a lower number of total steaks ( $P < 0.001$ ) and number of veins steaks ( $P < 0.001$ ) than 0C and 1C. When comparing samples for 2C to 0C and 1C the number of non-veins steaks ( $P = 0.0009$ ) was greater. The numeric and weight percentages of vein steaks did not differ among genotypes (Table 2). Thus, increasing copies of the myostatin gene was not detrimental to the number or percentage of vein steaks derived from strip loin.

#### IV. CONCLUSION

These data indicate that increasing copies of the myostatin gene have no impact on the proportion of vein steaks in the strip loin. Strip loins from 1C and 2C cattle yielded fewer total steaks as they were wider, which would impact the attractiveness of steaks to consumers because they would represent a larger portion size at

equal thickness and a thinner steak if cut to constant weight.

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