

## **Project Summary**

### **Merchandising the Ribeye and Striploin from Carcasses with Non-conforming Carcass Weights and Longissimus Muscle Areas**

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# Merchandising the Ribeye and Striploin from Carcasses with Non-conforming Carcass Weights and Longissimus Muscle Areas: Project Summary

## Background

Carcasses for which ribeyes are too large are undesirable because of an inability to produce steaks of desirable portions from the middle-meat subprimals, and the difficulty of marketing extremely large steaks cut from such carcasses. Furthermore, to achieve specified steak weights for certain foodservice customers, oversized ribeye must be cut extremely thin. Steaks that are cut too thin are more likely to have poor sensory characteristics due to the increased potential to over-cook. This study was designed to discover new fabrication approaches for merchandising ribeye rolls and striploins to foodservice providers from carcasses with oversized ribeyes and to develop mean yields of saleable product from those oversized subprimals.

## Methodology

Forty USDA Choice beef carcasses were identified at a commercial beef processing facility in Colorado. Carcass selection criteria was based upon ribeye area (REA) size such that carcasses were selected to fit subclasses as follows: <15.0 in<sup>2</sup> REA (NML; n=10); 15.0 to 15.9 in<sup>2</sup> REA (LRG; n=10); 16.0 to 16.9 in<sup>2</sup> REA (KLG; n=10) and >16.9 in<sup>2</sup> REA (OUT; n=10). The NAMP #112A ribeye rolls (RR) and NAMP #180 striploins (SL) were collected from one side per carcass and transported to the Colorado State University meat lab for dissection and yield data analysis. Subprimals were fabricated into innovative cuts developed from merchandising ideas of Certified Angus Beef, LLC and further expanded upon using professional chef focus groups. Individual cuts were weighed and dimensions were recorded. Aggregate fabrication times for the fabrication of traditional subprimals into innovative subprimals were collected and recorded.

The #112 ribeye roll was first transformed into a NAMP #112 ribeye roll (lip-off) by removing the fat lip via the natural seam that lies ventral to the *longissimus* muscle (LM). The ribeye cap (NAMP #112D PSO 1) was next removed from the LM via the natural seam that lies between the cap and the LM. The LM was then trimmed practically free of fat and cut into three sections; blade eye, dorsal eye and ventral eye. The blade eye was fabricated and removed from the rest of the LM by making a cut perpendicular to the longitudinal axis of the LM at the point where the posterior end of the *complexus* muscle terminates. The remaining LM was fabricated into the dorsal and ventral eyes by making a longitudinal cut of the LM so that it bisects the muscle into two long pieces. The *complexus* muscle was removed from the cap muscle complex via the natural seam. The cap muscle complex ultimately was bisected at the halfway point of the longitudinal axis of the muscle fiber creating an anterior and posterior steak. Remaining lean and fat were dissected, separated and weighed as lean and fat trimmings.

The 180 striploin was initially trimmed to a maximum fat thickness of 1/8<sup>th</sup> inch. The lip was removed from the ventral side of the subprimal. A cut was made perpendicular to the longitudinal axis at the anterior point of the *gluteus medius* (GM) muscle to remove the vein roast. The resulting LM was fabricated into dorsal and ventral center-cut loineyes by making a longitudinal cut (anterior to posterior) that bisected the muscle into two long pieces. The vein roast was then further fabricated into the two respective muscles by removing the *gluteus medius* from the LM via the natural seam. Volume was measured via water displacement in accordance with Archimedes' Fourth Theorem.

Linear dimensions, volume and density calculations for the innovative cuts from oversized ribeye rolls and striploins that were used to estimate steak thickness and the number generated at differing portion sizes. The first calculation was to estimate the surface area of the face of each cut. Assuming that each cut had consistent shape, mean volume was divided by maximum length of the cut to compute surface area. Once surface area was calculated, it was utilized in an equation along with density to develop the thickness required for a 170.1 g (6 oz.) and 226.8 g (8 oz.) steak.

In statistical analysis, the model main effect was REA size categories. Yield weights and product dimensions were compared by carcass REA size categories and innovative LM cuts from the ribeye roll. The model included main effects for the REA size categories and innovative LM cuts, REA size category by innovative LM cut interaction and a random effect for carcasses nested within REA size category.

### Findings

Mean fabrication time for the RR with and without rib fingers were  $181.34 \pm 19.78$  and  $130.27 \pm 6.65$  seconds respectively. Mean SL fabrication times for commodity and 3 mm fat trim were  $93.61 \pm 11.96$  and  $73.21 \pm 12.74$  seconds respectively.

Weights of cuts derived from the LRG, XLG and OUT classes of REA were found to be significantly larger than cuts from the NML class of carcasses for the response variable 112A ribeye, 112 ribeye, 112C ribeye, dorsal LM, ventral LM, ribeye lean and vein roast GM. The NML group had mean *complexus* muscle weights significantly heavier than the remaining three classes of carcass REA. The classes XLG and OUT had significantly heavier posterior spinalis dorsi, lip-off 180 striploins, vein roasts and vein roast LM than NML; whereas, the LRG carcasses did not differ from any other class of carcass REA with regard to weight. The OUT carcasses had heavier mean striploin dorsal LM than the NML carcasses. The LRG and XLG carcasses did not differ from any other class of carcass REA in regards to striploin dorsal LM weight.

Volumes from cuts derived from LRG, XLG and OUT carcasses were larger than the same cuts from the NML class of carcass with respect to the response variables of the 112A ribeye roll, 112C ribeye, ribeye dorsal LM and vein roast GM. Vein roast LM volumes from the XLG and OUT classes of carcasses were greater than those from the NML class of carcass. Vein roast LM mean volume from LRG carcasses did not differ from those vein roast LM obtained from any other class of carcass REA. Vein Roasts from the XLG class of carcass were larger in volume than those from NML and LRG carcasses. The OUT carcasses generated Vein roasts larger than those from the NML carcasses. The classes NML and OUT both generated greater volume of ribeye lean trimmings than the LRG carcass class.

The mean width of blade LM and whole *spinalis dorsi* were larger for OUT than NML within cut. Mean maximum width of the ribeye ventral LM of the NML class was smaller than the same measure for both the LRG and XLG carcasses. Mean maximum height of the *complexus* from the XLG class of carcass REA was greater than for all other groups of REA. Mean maximum height of the 180 striploin (1x1), 180 striploin (lip-off) and striploin ventral LM for the OUT group were greater than the same cuts from the NML and LRG carcasses, and the mean maximum height of those same cuts from the XLG group were larger than those of the NML respective cuts.

No significant differences were found within cuts between classes of carcass REA. In addition, no significant interactions were found between REA class factor and the innovative cuts out of the RR. Differences were found between NML and the remaining class of carcass REA for both weight and volume; no differences were found between the remaining classes of carcass REA. No differences were reported between the dorsal and ventral pieces of the ribeye LM demonstrating the ability to produce consistent retail cuts from both pieces. The NML ribeye LM cuts were shallower in maximum height than LM cuts from the other three classes of carcass REA. Dorsal ribeye LM was found to be larger in maximum height than the ventral or blade ribeye LM; ventral and blade ribeye LM were not different. The ribeye blade LM was much shorter in length than the dorsal and ventral ribeye LM cuts.

### **Implications**

This study suggests that ribeye rolls and striploins from carcasses with ribeye areas of 15 in<sup>2</sup> or larger are suitable for innovative fabrication styles. Useful retail products for oversized ribeye rolls and striploins have been successfully developed by utilizing basic innovative merchandising techniques developed by Certified Angus Beef, LLC and subsequent chef focus groups. The innovative cutting styles will allow oversized ribeye rolls and striploins to be marketed in such a way as to better accommodate the appropriate portion sizes required by today's foodservice providers. Chefs who have had the opportunity to work with the innovative products have been pleased with the consistency and lack of wasteful fat associated with these products.

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