Muscle Profiling

In response to the depressed prices for beef cuts from the chuck and round in the late 1990's, down 20-30% in five years per CattleFax data, producers on the Joint Product Enhancement Committee recommended to the Beef Promotion and Operating Committee (BPOC) an initiative to profile the physical and chemical characteristics of beef muscles from the chuck and round. The BPOC authorizes expenditures from The Beef Checkoff, to which every American beef farmer and rancher and beef importer contribute. The committee's intention was to find the optimal use for each muscle, thereby generating the optimal carcass value. BPOC approval of this proposal, known as Muscle Profiling, set in motion a series of interrelated projects, extending into the present and funded through a variety of checkoff committees, to maximize carcass value for America's cattle farmers and ranchers. Perhaps more than any other checkoff investment, this initiative has required the cooperation and expertise of multiple checkoff programs ranging from Human Nutrition Research to Channel Marketing and Communications.

The beef carcass is made up of over a hundred different muscles, all with differing properties which affect processing conditions and consumer acceptability. For the last twenty-to-thirty years, most beef cuts found in the retail case have been boneless. Therefore, for cutting consistency, it is essential that the cutter have knowledge of the beef animal musculature, or myology. Other emerging industry factors also suggested the need for better understanding the carcass. Food companies were developing more pre-cooked and convenience products using single muscles, substantiating the need for greater knowledge of myology in order to identify specific muscle characteristics to produce the most desirable product.

This ambitious checkoff-funded research project was managed by Product Enhancement Research, a program now in the Research, Education and Innovation (REI) department at the National Cattlemen's Beef Association. Product Enhancement was charged with the responsibility to uncover the intricacies of the beef animal myology and collaborate with other checkoff programs to disseminate that information to packers, processors, purveyors, researchers and developers, retailers, foodservice and others to maximize value for all industry sectors. The work was conducted on fed-steer and heifer carcasses in partnership with the University of Nebraska and the University of Florida. The end-point was the characterization of 39 primary muscles in the chuck and round. The researchers focused on boning yields, physical characterization, Warner-Bratzler shear force, sensory panel tests, proximate analysis of fat and moisture, color, pigment concentration, connective tissue, pH, water-holding capacity, bind and muscle fiber type. Prior to this project, only small portions of this research had been conducted; however, this particular study represents the most extensive and comprehensive study of the chuck and round ever reported.

The results of this study make it possible for the industry to capture the highest value for the carcass. This new knowledge of the individual muscles has prompted industry experimentation and innovation to find the optimal use for each muscle in the chuck and round, ultimately increasing demand for underutilized cuts and decreasing the price pressures on middle meats.

A follow-up study profiled the muscles of cow carcasses to determine the physical, chemical, and sensory properties of the primary muscles. It also identified differences between beef and dairy cow carcasses and studied the effects of carcass weight, maturity, fat thickness, and muscling on the characteristics of beef and dairy cow muscles. This study resulted in the development of a database of information useful in upgrading the value of market cow carcasses. The data indicate that a wide range of quality characteristics exists in the individual muscles of both beef and dairy cows, making it possible to identify

This feature article in the 2011 REI Annual Update provides the reader an opportunity to see the impact of a series of research projects on numerous checkoff-funded programs. In many ways, the REI programs serve as the long-term visionaries for much of the beef checkoff plan of work. This article provides a real-time look at how these particular programs are interlinked and the definitive results of the team effort.

This article does not focus on all REI programs though most played some role in this story. Those not highlighted include Beef Quality Assurance which provides producer-focused education programs which enhance the producer's ability to produce a consistent, nutritious and safe product for the marketplace. The Beef Safety Research program provides critical information related to minimizing foodborne pathogens in the beef chain and ultimately providing the safest product in the world to our consumers. The Nutrition Research Program has long been the industry leader in providing sound science on the healthfulness and importance of beef in the diet.

The total REI program strives to "make beef the best it can be" and this is only accomplished by linking all of the REI programs with other checkoff programs through a complicated web that will ultimately drive producer profitability as well as consumer demand.





the best use for each muscle, whether for grinding or as stew meat, or even as retail or foodservice cuts. Some may be best suited for use as the raw material for pre-cooked or convenience products.

By providing the basic information for optimal product use, the results of Muscle Profiling studies are valuable in maximizing the industry's return on product development. The Bovine Myology & Muscle Profiling website *(http://bovine.unl.edu/)* illustrates, in great detail, the muscular anatomy of the beef animal.

Launching the Beef Value Cuts (BVC)

Understanding the characteristics of the muscles in fed steer and heifers was the first phase of ongoing efforts to add value to the chuck and round. The second phase involved the identification and development of those individual muscles which would add value to the carcass through alternate uses. From the original characterization of the 39 individual muscles in the chuck and the round, several "diamonds in the rough" emerged. Basically, in this phase of the program, REI's Beef Innovations Group (BIG), within the New Products and Culinary Initiatives Team, was charged with the task of using innovative cutting techniques to transform multi-muscle cuts into these more consumer-friendly, single-muscle cuts which would fall between premium steaks and ground beef in price and value.

However, the introduction of each value cut into the retail and foodservice markets required the launch of a multi-faceted merchandising plan developed and implemented by all REI checkoff teams as well as the checkoff Marketing and Communications teams. This phase of the initiative to add value to the chuck and round continues into 2011. To date, 13 value cuts have hit the market, with the latest introduced in 2008. The 13 cuts are:

- Flat Iron, Petite Tender, Petite Tender Medallions, and Ranch Steak (from the shoulder clod)
- Sirloin Tip Side Steak, Sirloin Tip Center Steak, Western Griller Steak, and Western Tip (from the round)
- America's Beef Roast, Boneless Country-Style Beef Chuck Ribs, Delmonico Steak, Denver Cut, and Sierra Cut (from the chuck roll)

The Beef Innovations Group took the lead position in compiling the data, developing the materials and extending the news to the appropriate industry segments. Finding the muscles and identifying the optimal cutting techniques was only the beginning. The next step was to educate the fabricators and processors on the potential economic advantages. For the products to reach the market, the REI checkoff teams determined they must pull the products through the system by starting with consumers. They enlisted the support of the market research team to test all new cuts with consumers on taste, use, recipes, and names, thus providing evidence of consumer acceptance of the new cuts.

Using the Muscle Profiling results to understand each muscle's expected performance, the Culinary Innovations Team determined optimal cooking temperatures and developed both foodservice and/or consumer recipes depending on the audience identified for each cut. The Human Nutrition Research program commissioned checkoff-funded nutrient analyses of the new value cuts. The data for the clod and the chuck have been published in the USDA National Nutrient Database for Standard Reference, Release 23, the authoritative food composition database for most foods, including beef. This information allows industry to market as "lean" those cuts that meet the government guidelines for the "lean" designation. Eight of the 13 new Beef Value Cuts meet the criteria, including Petite Tender, Petite Tender Medallions, Ranch Steak, Sirloin Tip Side Steak, Sirloin Tip Center Steak, Western Tip, Western Griller Steak and America's Beef Roast.



Denver Cut Steak



America's Beef Roast



Boneless Country-Style Ribs

The successful launch of each cut required the development of a series of public relations and marketing materials including:

- How to Cut, including downloadable cutting guides
- How to Prepare
- Sell Sheet
- Recipes
- Nutritional Profile of the cut
- Myology of the cut and the Research supporting the suggested use



The BIG team, with support from state beef councils, had face-to-face meetings to share this information with meat processors, foodservice chefs, and retailers, as well as government agencies to obtain necessary approvals. All of these materials are available on the BIG website, *www.beefinnovationsgroup.com*.

Success of the Beef Value Cuts

Over the years, this initiative has required the expertise of several national beef checkoff programs as well as the support of state beef councils, producer leadership and industry joint committees. While the checkoff has devoted considerable resources to this effort, the return on the investment has proven, and continues to prove, the value of this initiative. The shoulder clod cuts were the first to be launched and required 10 years to achieve full market penetration. Technomic Inc. (*www.technomic.com*) reports the 2009 foodservice volume of Flat Iron as 86 million pounds compared to 19 million pounds of Porterhouse and 44 million pounds of T-Bone. In addition, 40 million pounds of Petite Tender and 27 million pounds of Ranch Steak passed through the foodservice channel in 2009. These three cuts are seen on menus in 20,000 restaurants. Per FreshLook Marketing (*www.freshlookmarketing.com*), they have also enjoyed substantial success at retail with more than 14 million pounds being sold in 9,900 grocery stores in 2009. CattleFax estimates the industry added value of the new shoulder clod cuts to be $50 to $70 per head.

Fortunately, their success has made the acceptance and adoption of the new chuck roll and round cuts an easier sell. The chuck roll cuts are rapidly gaining momentum and checkoff teams are optimistic they will achieve similar success as the clod cuts. In addition to the carcass added value of the clod cuts, CattleFax estimates the value of the new chuck roll cuts, when selling nationally, will be $40 to $50 per head for the industry.

Six new value-added round cuts, coming from three of five subprimals as opposed to one each for the clod and the chuck roll, were unveiled in the fall of 2010. The number of subprimals involved, and the fact that fourteen muscles are within the round, make communications to the industry more complex than with the previous value cuts. Additionally, while the focus of the work with the clod and chuck roll was to increase the number of steaks available, the current focus with the round is to determine the best use and value for the characteristics of each new cut. As a result, the highest value for each muscle may be in its use by different segments of the industry. For example, five muscles in the top round are sold today as roast beef or London Broil but, if the muscles are separated, the product options range from a fine-dining steak to fajita meat for further processing. The BIG team is currently working with state beef councils to educate packers and further processers to gain support for the new products from the round. The team anticipates their successful distribution through the foodservice chain. In fact, one processor has already started distributing new cuts from the top round and anticipates a noticeable increase in volume in upcoming years. CattleFax estimates the eventual return on this investment in the round to be $20 to $30 per head.

This long-term initiative, beginning with the original Muscle Profiling research in the late 1990s to the education effort currently being conducted with packers and processors, illustrates the benefits of The Beef Checkoff to the industry. No single segment or individual company in the beef chain has the incentive or capacity to initiate and implement such a ground-breaking strategy, potentially adding value for all industry players. Beef checkoff Research, Education and Innovation programs span all sectors of the industry from farm to fork. With program integration, REI is able to focus on all aspects of a product development opportunity to increase beef demand. Ultimately, the success of these efforts increases profitability for beef producers and all other participants in the beef chain.