



Non-Conforming Beef Research Summit

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Introduction

The goal of the checkoff-funded Center for Research & Knowledge Management at the National Cattlemen's Beef Association (NCBA) is to serve as the catalyst for positive change for the beef industry using science-based information and programs. One of the major problems facing the beef industry is the number of cattle, carcasses, and cuts that miss the broad targets of the marketplace and thus cost millions of dollars in lost revenue each year. The checkoff-funded National Beef Quality Audits have provided detailed accounts of these problems, which have been termed as "non-conformities." A two-day workshop was held on the campus of Texas A&M University to allow a discussion of the non-conformity areas and to develop research needs to address them. The workshop was held on June 24-25, 2007, and key individuals from companies, associations, and universities were represented.

There are four major areas where non-conformities occur: weight, composition, color, and quality. Brief descriptions of each problem follow:

Weight – Heavy carcasses, heavy cuts, too large of cuts (i.e., ribeye areas that are too large).

Composition – Primarily yield grade (YG) 4's and 5's, too much seam fat in cuts, excess fat production.

Color – Dark cutters and other "color-challenged" beef often referred to as "muddy."

Quality – "No rolls" and other lower grading carcasses, production practices that may decrease "sensory experience."

The primary objective of the summit was to identify knowledge gaps, researchable issues, and the scope of product and/or carcass non-conformities that reduce the saleable product value of beef subprimals and portion cuts.

Background

Several speakers gave presentations regarding non-conforming beef and brief summaries follow.

Keith Belk, Dan Hale, and Jeff Savell National Beef Quality Audit information

The National Beef Quality Audit – 2005 (NBQA–2005) is the fourth such survey of the U.S. fed steer and heifer industry conducted to better understand what is being produced and where improvements need to be made. The audit had three phases:

- **Phase I:** Obtain information, via surveys with producers and uses of U.S. beef products, about the perceived quality of beef produced and identify the top ten beef quality challenges of the industry.
- **Phase II:** Characterize and quantify, numerically and monetarily, quality challenges for beef cattle, their carcasses and their dress-off/offal items via a substantive national survey in beef packing plants.
- **Phase III:** Determine, via a Strategy Workshop, which new strategies the beef industry should pursue, which goals it should try to achieve, which opportunities it should capitalize upon, and which non-conformities it should correct.



Meeting Photo

The percentages of non-conforming carcasses that were found in the NBQA–2005 were as follows: USDA Standard and lower, 5.4%; USDA YG 4 and 5, 14.1%; dark cutters, 1.9%; and excess carcass weight, 5.0%. Carcass weights continue to increase each year with 796 pounds being the average weight for the NBQA–2005. The percentages of carcasses with ribeyes greater than 16.0 square inches was 8.8% and less than 11.0 square inches was 7.6%.

Based on USDA quality grade and other quality traits found in the NBQA–2005 compared to the ideal consist, the cost of non-conformity is \$26.81/head industry-wide. Using the same logic for USDA yield grades, the cost of non-conformity is \$20.92/head, and for carcass weights, the cost is \$4.94/head for a combined cost of \$52.67/head for carcass traits alone.

End-user opinions of top beef quality defects for the NBQA–2005 were:

1. Lack of uniformity/consistency in marbling and tenderness;
2. Cuts are too large for foodservice and restaurant trade;
3. Excess fat;
4. Abscesses/lesions in cuts, trimmings and variety meats; and
5. Blood-splashed muscle.

Of the top ten quality challenges for the NBQA–2005, six of them involved non-conforming beef. These six challenges were:

- Low uniformity of cattle, carcasses, and cuts;
- Too heavy carcasses and cuts;
- Too high yield grades (low cutability);
- Inappropriate ribeye size;
- Reduced quality grade and tenderness due to implants; and
- Insufficient marbling.

- There are four top ten quality challenges identified across all four National Beef Quality Audits:
- Excess external fat;
- Inadequate tenderness;
- Insufficient marbling; and
- Excess carcass/cut weights.

Several of the industry goals for 2010 involve reducing non-conforming beef:

- Clarify beef market signals that encourage production of cattle, carcasses, and cuts that conform to industry targets.
- Minimize production of excess fat.
- Strive for uniformity/consistency in cattle production.
- Consider tenderness in genetic and management decisions.
- Target weights that optimize profitability without creating productivity or product-desirability problems.
- Recognize the importance of marbling as a value-determining trait.

Marty O'Connor

Latest Figures on Non-Conforming Beef

The Agricultural Marketing Service of the United States Department of Agriculture provides grading and certification services for a variety of livestock and meat products. Most of these are fee-based programs and are voluntary in nature so not all products receive official grades or are certified. Information was presented showing the number of head officially graded (approximately 26,000,000 head for FY 2006), the trends for Prime, Choice, and Select grades (relatively constant since FY 2000), and the trends for YG 1, 2, 3, 4, and 5 (since FY 2000, slightly more YG 4 and 5 and fewer YG 2 carcasses).

For FY 2006, the number of cattle identified through live animal schedules was approximately 14,000,000 head, and the number of carcasses identified through the beef carcass schedules was approximately 6,000,000 head. Both of these numbers continue to increase over time.

Dwain Johnson

Muscle Profiling

Muscle Profiling has been a major project funded by The Beef Checkoff and conducted at the University of Nebraska–Lincoln and the University of Florida. Its primary focus has been on evaluating the usefulness of muscles from the chuck and round.

Quality, as measured by marbling, only affected 10 of the 37 muscles evaluated by two cooking methods. Tenderness, as measured by Warner-Bratzler Shear, show an interaction between grade and postmortem aging where grade-related differences were present at 7 days postmortem but not at later days of aging.

With a better understanding of what each muscle has to offer from a quality standpoint, better merchandising decisions can be made, especially in taking heavier and larger cuts of beef and reducing them into single-muscle cuts.

John Scanga Adding Value to Non-Conforming “Out” Beef Carcasses

This project funded by The Beef Checkoff was designed to discover where value could be added to those beef carcasses where the dark cutting color and size/weight was a challenge. Three levels of dark cutting carcasses were evaluated to see how products from them could be better utilized and carcasses that had different ribeye size to subprimal weight relationships were evaluated.

An online survey was used to see how people in foodservice and retailing would respond to different colors of meat. For foodservice operators, meat color could be darker than preferred by retailers.

For the ribeye to subprimal weight relationships, subprimals had different responses. With increasing ribeye areas, the acceptability of the *biceps femoris* (bottom round flat) decreased. With increasing ribeye areas, the acceptability of the *psaos major* (tenderloin) increased. The *longissimus lumborum* (strip loin) had the highest acceptability ratings when the ribeye size was intermediate with lower acceptability for both the smaller and larger ribeye areas.

In summary, with further muscle separation and marketing, both dark cutting and cuts from carcasses with small or large ribeye areas could be better utilized and would receive higher values than current markets often value them.

J. Daryl Tatum Non-Conforming Products: Feedyard to Consumer

The primary drivers of beef carcass prices/returns are:

- Carcass weight;
- Quality grade;
- Yield grade;
- Conformance and freedom from major defects; and
- Hide color.

A challenge faced by the production sector is how to best conform to packers’ targets for beef carcass specifications, while maximizing profitability. In today’s beef marketing system, weight trumps grade performance, especially when the Choice/Select spread is under \$10/cwt; however, even with a \$20/cwt spread between Choice and Select, weight still is more important than quality grade in determining carcass value.

There has been at least a twenty-year trend for increased carcass weights. Genetic trends for growth traits in major beef breeds reflect a similar pattern. Yearling weight EPD estimates show a steady increase during the past several years. However, genetic

correlations among traits suggest that selection for increased growth rate over-time would result in greater carcass weight and increased ribeye area but reduced marbling. Growth enhancers also have contributed to the increased carcass weight with negative effects on marbling. This is coming at a time where, according to Cattle-Fax, the demand for Choice, upper 2/3’s Choice, and Prime is growing and is reflected in boxed-beef price spreads between grades.

Marbling is important to consumer purchase behavior:

- Increased marbling increases the likelihood that consumers will purchase beef.
- Increased marbling increases the prices consumers are willing to pay for beef.

Efforts of cattle feeders to maximize quality grade performance have caused cattle to be fed to heavier weights and higher yield grade endpoints. Pricing grids often favor Choice YG 4 carcasses over Select YG 2 when the Choice/Select spread is high.

The current pricing signal does not effectively discourage production of non-conforming cattle and carcasses. At the present time, carcass weights are up, there are more YG 4 carcasses than in the past, the percentage of Choice carcasses is down and the percentage of Select carcasses is up. The current pricing system probably encourages production of more, rather than less, non-conforming beef.

Product Demonstration Davey B. Griffin and John Scanga

A variety of non-conforming beef products – carcasses that were too heavy or too light, dark cutting carcasses, carcasses that were too fat or too lean, subprimals that were too large, etc. – were used as to demonstrate the scope of the issues with them at the Rosenthal Meat Science and Technology Center (see photos that follow.) Participants discussed how each of these products impacted their particular part of the beef industry.

Two highlights of this demonstration show how identifying non-conforming beef may be difficult. One ribeye subprimal that was from a dark cutting carcass was cut into steaks. As the steaks were being cut from the 12th rib end towards the 6th rib end, the muscle began to be lighter in color and appeared not to be dark cutting. Several of the participants commented that sometimes dark colored meat may come from a normal-appearing carcass and sometimes a dark cutting carcass may produce normal colored subprimals. The second demonstration showed an eye of round from a 700-pound carcass that was extremely large and probably unacceptable in the marketplace. Even though the subprimal came from a carcass that had an acceptable weight, it still did not meet the needs of the retail market because of its size.

Grid pricing was discussed and the USDA Market News Reports for Premiums and Discounts (see attached Carlot Report) was covered to show the economic impact of how non-conforming beef impacts carcass values.



Dark Cutter



Heavy Weight



Too Fat



Too Lean



Insufficient Marbling

Research Needs

The second day of the summit was spent in breakout sessions where the four non-conforming areas were discussed and research needs were generated. Based on the breakout sessions, group reports and discussion, and final prioritization of research needs, major areas for research were developed by the participants for use by the Product Enhancement, Research & Knowledge Management group of the National Cattlemen's Beef Association. The research needs for the four non-conformity areas follow.

Beef Non-Conformity Research Needs

Weight

- Compare shape and dimension versus weight and determine the impact on utilization and value of beef cuts.
- Identify alternative/innovative fabrication styles to increase value from heavier weight/larger frame carcasses.

Composition

- Develop merchandising strategies for beef cuts where seam fat is more prevalent.
- Determine appropriate cutability endpoint(s) that reflect carcass composition and value differences within the industry.
- Identify measurable traits related to composition and value and determine appropriate technology to assist with this prediction.
- Enhance the value of fat and bone through development of alternative applications.

Color

- Define “muddy” color characteristics, functional properties, tenderness, and reason for occurrence.
- Determine prevalence of “muddy” carcasses and ways to mitigate the problem.
- Identify dark cutter carcasses on the harvest floor.

Quality

- Develop a system that would evaluate the “sensory experience” at chain speed at the packing plant (“sensory experience” is both flavor and tenderness).
- Develop a system approach to reduce sensory variation (e.g., temperament, genetics, growth promotants, beta-agonists, postmortem technologies, etc.).
- Standardize tenderness evaluation and sensory protocol.
- Conduct a survey of consumer expectations at the retail, foodservice, and international markets in order to relay market signals back through the beef chain.
- Develop methods to better utilize “no roll” carcasses (“no roll” carcasses are those not assigned a USDA quality grade).

A Web site was developed to house the various presentations by the speakers and for any other material that may need to be included related to non-conforming beef. The address for this Web site is <http://meat.tamu.edu/nonconform/>. A copy of this summary is posted at <http://www.beefresearch.org> along with a link to Summit presentations.

Weekly National Carlot Meat Report, Week of June 23, 2007

Quality grade, brand, breedtype or other category	Premiums and discounts, cwt
Prime	+\$9.68
Choice	----
Select	-\$7.19
Standard	-\$16.00
Certified Angus Beef	+\$3.20
Dairy	-\$1.82
Bullock	-\$26.42
Hardbone	-\$28.55
Dark cutter	-\$27.82
>30 month	-\$12.86
Yield grade category	
1.0 – 2.0	+\$2.92
2.0 – 2.5	+\$1.38
2.5 – 3.0	+\$.96
3.0 – 3.5	-\$.08
3.5 – 4.0	-\$.08
4.0 – 5.0	-\$13.75
5.0 +	-\$19.17
Weight ranges	
400 – 500 pounds	-\$24.91
500 – 550 pounds	-\$15.82
550 – 600 pounds	-\$2.33
600 – 900 pounds	---
900 – 950 pounds	-\$1.82
950 – 1000 pounds	-\$4.73
> 1000 pounds	-\$19.17



Participating Organizations/Companies:

Agricultural Marketing Service, United States Department of Agriculture

Agricultural Research Service, United States Department of Agriculture

Cargill Meat Solutions

Certified Angus Beef

Coleman Natural Meats

Colorado State University

Freedman Foodservice

JBS-Swift

National Beef Company

National Cattlemen's Beef Association

Nolan Ryan's Guaranteed Tender Meats

Oklahoma State University

Outwest Meat Company

Southwest Meat Association

Standard Meat Company

Synergy Beef Company

Sysco Foods

Texas A&M University

Texas Beef Council

University of Florida

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