

The National Genetics of Carcass Merit Project: 1998-2001

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The beef cattle industry in the United States is poised at a critical juncture in its long history. We have continued to suffer from a decline in demand for our products relative to our competitors in the protein marketplace. Beef cattle producers continue to struggle economically with the squeeze between income and costs becoming tighter and tighter. The rallying charge in the industry has been: **“the industry must reduce cost of production and increase quality and consistency of beef”**. While this may seem to be an unaccomplishable feat, we do have room for improvement. However, to achieve any change, producers must have the information in their hands to address the problem, both on the cost of production side and on the end product “consumer acceptance” side. Fortunately, we are beginning to see movement in both of these areas to provide cattle producers the necessary tools to do just that. The purpose of this article is to provide some insight into a recently launched national project that deals with the end product quality and consistency issue.

There have been a number of excellent research studies completed over the past ten years in our business that have laid the foundation of our knowledge regarding how to address beef quality and consistency. We have been able to collectively conclude a number of things from these projects. In brief: 1) Approximately one in five of the beef steaks resulting from our industry are less than desirable to consumers on the basis of overall palatability, principally tenderness. 2) There is far too much variation in end product performance in our industry, both in terms of red meat yield and in terms of meat quality, although this has improved in the past five years. 3) We know that we can reduce meat tenderness variation by various treatment strategies postmortem including calcium chloride injection, electrical stimulation and aging

for at least 14 days. 4) We know that the only proven way to reduce the occurrence of tough beef down to a level less than 3 to 5% is to genetically identify outlier “tough” sires. 4) We are fortunate to have one of the largest and most diverse gene pools of cattle that exists in the world. 5) We can eliminate the vast majority of our end product quality and consistency problems **and** simultaneously reduce cost of production by the use of well designed systematic crossbreeding systems. The kicker here is that we cannot accomplish anything along these lines unless we have the information to make the correct breed and sire within breed choices relative to end product traits.

Most of these points have been stated a number of times over the past five years. In fact, some of us have said them until we have been blue in the face! The encouraging thing is that we are finally starting to see some action! This past year, the beef board approved funding for a large-scale national effort to move us down this road. This program is referred to as the National Carcass Merit (CMP) project, and is funded approximately 25% by checkoff funds, with the remainder coming from participating breed associations and from an industry partner, Perkin Elmer AgGen. The CMP was formally initiated in June of 1998 and will be completed in late 2001. This is an unprecedented project and is only possible because of extensive collaboration from breed associations, breeders, feedlot operators, packing plants, scientists at five universities, and a commercial DNA company. The project has one umbrella objective: ***“To develop a road map for individual breed associations to implement meat tenderness, measured as Warner-Bratzler shear force on rib steaks, as a new trait into their national genetic improvement programs.”***

In order for a breed association to participate in the project, they had to commit to producing a minimum of 50 progeny from each of ten widely used reference sires in their breed. Then depending on the size of the breed's population in the industry, additional sires will be included in the project to be tested with fewer progeny (20 to 25 per sire). Table 1 shown below provides a breakdown of the breeds and number of sires per breed in the project. It is important to note that we went through an open "enrollment" period for the project during the first nine months of 1998. During this period, all breeds in the industry were invited to participate, with the result being a total of 16 breeds, totaling just over 11,000 progeny, committed to the project effort. We are elated at the resulting representation of the industry's gene pool in the project, since over 90% of the U.S. purebred cattle registrations are represented.

There are several different angles that we will take in shooting at the project's overall objective. The first is to collect full carcass data on all animals in the study, including tenderness, to allow us to calculate tenderness EPDs. Since we will have all of the other performance data for these sires, we will also be able to look at what the genetic relationships are within each breed between tenderness and other economically important traits. Additionally, on approximately 3,500 of the progeny, we will also collect consumer taste panel information to provide us with additional information on tenderness, juiciness, and flavor.

A second angle being used is to evaluate how well a series of DNA marker tests, developed at Texas A&M University from the recently completed and industry funded carcass gene mapping project, will work across the breeds in the study. This is the next big step toward developing usable DNA tests for the industry. Jerry Taylor and Scott Davis at Texas A&M were successful in identifying a number of locations in the DNA of cattle which appear to be "linked" to genes

affecting performance in marbling, tenderness, dressing percentage, ribeye area, and hot carcass weight. These results were detected in families of Brahman x Angus crosses in their work. However, in order to determine if these markers will be useful for genetic improvement in these traits in other breeds, and other sire lines within the Angus and Brahman breeds, they must be evaluated in large progeny groups. We will be evaluating ten of these markers using the ten reference sires from each breed with 50 progeny observations.

A third angle of the CMP is set to look at what the optimal combination of information is for producers to utilize for increasing quality and consistency. We will be looking at EPDs for all of these traits and DNA marker information to see how we can produce "indexes" of information for use in genetic improvement programs. Simultaneously, economic costs and benefits of developing this sort of genetic evaluation information will be developed. While this may seem to be a natural thing to do, it is the first time that it has been done in the history of beef cattle genetic evaluation programs!

As mentioned before, this project is unprecedented in our industry. Never before has the word *cooperation* been tested so much in an effort. You are fortunate that a very talented group of individuals is leading the project for the industry. In the interest of brevity I cannot list them all here, but it is important for you to recognize who the key players are. The project was actually the brainchild of two of the research leaders, Mike Dikeman at Kansas State University and John Pollak at Cornell University. Dr. Dikeman is conducting the laboratory assessment of tenderness (shear force) and sensory taste panel on all of the steaks while Dr. Pollak is responsible for managing all of the resulting information collected in the project. His team at Cornell will be assimilating all data to be made available to breed associations for EPD calculations. Three groups will be working in the

DNA portion of the effort. The DNA tests will be completed by Perkin Elmer AgGen, a commercial DNA company in Salt Lake City. Analyses of the resulting DNA marker data will be performed by Drs. Jerry Taylor and Scott Davis at Texas A&M. Our group at Colorado State University will perform a separate and independent analysis of the DNA marker information to provide a non-vested third party cross-check of the results. Economic analyses are being conducted by Dr. Steve Koontz, also of Colorado State. Carcass data collection in the packing plants is being coordinated by the Cattlemen's Carcass Data Collection Service led by Dr. Ted Montgomery at West Texas A&M University. Because of the scope and importance of this project, the beef board operating committee has also appointed a "producer steering committee" to work with the research team and to monitor the project's progress. This committee consists of Kathleen Hawkins (Michigan), James Bennett (Virginia), Rob Brown (Texas), John Grande (Montana), and Dave Nichols (Iowa).

Because this article is being prepared primarily for use by the participating breed associations, it is important for you to know who to contact

regarding questions about this project. There are three primary persons "in that loop". The first one is your breed association staff person who is coordinating the project efforts for your particular breed. The list of participating breed associations and contact persons is shown in table 2 below. Secondly, I serve in the role of "breed association liaison" for the project and can be contacted at the location shown at the end of the article. Thirdly, we are very fortunate to have a full-time staff person at NCBA coordinating the overall efforts of this project. She has proven to be a tremendous asset to us since coming on board last September. Her name is Elizabeth (Eli) Westcott and she can be reached at the NCBA headquarters in Denver at (303) 694-0305.

We look forward to moving through this project over the next few years. As this article goes to press, we are in the front end of collecting data from our first large groups of cattle in the project. Keep your ears and eyes open as we will be presenting updates and progress reports this summer at both the Beef Improvement Federation convention in June and the NCBA Mid-Year Meeting in July.

Table 1. Distribution of Progeny Across Breeds in the National Carcass Genetic Merit Project

Breed	# DNA Sires @ 50 hd each	# Addl. EPD Sires @ 25 hd each	Total # Sires
Angus	10	20	30
Beefmaster	10	5	15
Brahman	10	5	15
Brangus	10	0	10
Braunvieh	10	0	10
Charolais	10	9	19
Gelbvieh	10	7	17
Hereford	10	23	33
Limousin	10	15	25
Maine-Anjou	10	5	15
Red Angus	10	10	20
Salers	10	0	10
Shorthorn	10	5	15
Simmental	10	15	25
Simbrah	10	5	15
South Devon	10	0	10
Total # Sires	160	124	284
Total # Progeny	8,000	3,100	11,100

*EPD sires are to calculate EPD only (no DNA analyses will be performed).

Table 2. Breed Association Contact Persons for National Carcass Merit Project

Breed Association	Contact Person	Phone #
American Angus Association	John Crouch	816-383-5100
American Brahman Breeders	Todd Smith	713-795-4444
Beefmaster Breeders Universal	Wendell Schronk	210-732-3132
International Brangus Breeders	Loren Jackson	210-696-4343
Braunvieh Assoc. of America	Dean Schneider	918-783-5479
American Intl. Charolais Assoc.	Robert Williams	816-464-5977
American Gelbvieh Association	Bob Weaber	303-465-2333
American Hereford Association	Jim Williams	308-237-4450
North American Limousin Found.	Kent Andersen	303-220-1693
American Maine-Anjou Association	John Boddicker	816-474-9555
Red Angus Association of America	Bilynn Schutte	940-387-3502
American Salers Association	Paul Dykstra	303-770-9292
American Shorthorn Association	Roger Hunsley	402-393-3293
American Simmental Association	Bruce Cunningham	406-587-4531
South Devon Breeders Association	Scott Bollenbach	405-375-5440

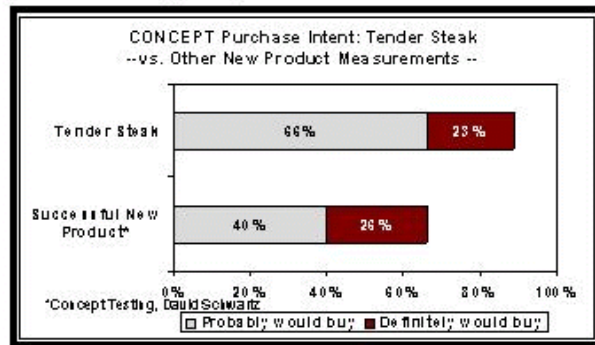
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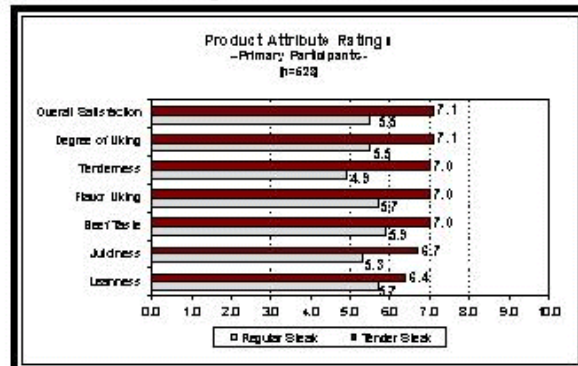
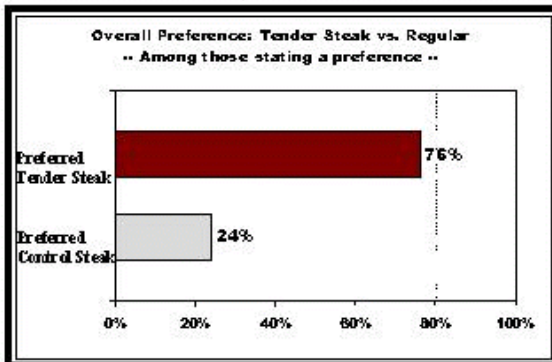
TOPLINE RESULTS

Overall a strong interest was seen for making the “Tender Select” product available

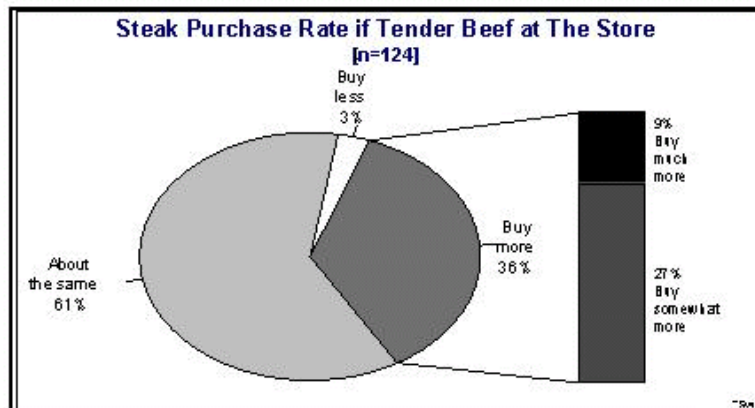
- **Overall, concept interest was remarkably high**



- **The product tested well when eaten ... outscoring a control steak on tenderness, overall satisfaction and other important measures**



- **More than one-third of all consumers say they will increase their rate of purchasing beef if tender steak is available**



- **Product tested well against light, medium and heavy beef consumers**



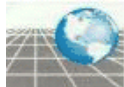
THE VALUE OF TENDER BEEF - CUSTOMER SATISFACTION II
Author: J.O. Reagan

Project Description - The objective of this project was to assess the value to the consumer of being able to buy a guaranteed tender steak, merchandised as “Tender Select”.

Consumers were invited to a Denver area King Soopers’ grocery store, where they were allowed to see “Tender Select” beef in the case. They completed a concept test, an excellent means for measuring new product appeal. They then received two unidentified steaks to try at home. One was a control steak, with a slice shear value exceeding 50 lbs, an indicator that the steak would be of average to marginal tenderness after 14 days of aging. The second, the tender steak, was tested for a slice shear value under 33 lbs.

A wealth of information was gathered, including differences in the “eating experience” for the two steaks, willingness to pay more for a tender product and impact on predicted beef purchase frequency. Demographic data on the participants was also collected so that the reactions of light, medium and heavy beef eaters could be compared.

	METHODOLOGY
STAGES	STEPS
<i>Participant Recruitment</i>	<ul style="list-style-type: none"> • 1,036 participants were recruited and screened against the following criteria: <ul style="list-style-type: none"> - Between the ages of 21 and 75 - Primary or joint responsibility for shopping - Eat beef cuts at least one time in average two week period
<i>In-Store Shopping and Tender Beef Concept Evaluation</i>	<ul style="list-style-type: none"> • Participants were asked to conduct normal shopping trip • “Tender Select” product was placed in the meat case with label and frame card • Participant interviewed regarding how appealing “Tender Select” steak would be • Participants were given two test steaks “L” and “R” to prepare at home
<i>In-Home Preparation and Follow-up Call</i>	<ul style="list-style-type: none"> • Respondents prepared two steaks simultaneously <ul style="list-style-type: none"> - Noted reaction in diaries - Follow-up call conducted to gather data - Diaries were mailed in
<i>Follow-up In-Store Shopping Trip</i>	<ul style="list-style-type: none"> • 124 participants were invited back to the store for second shopping trip



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