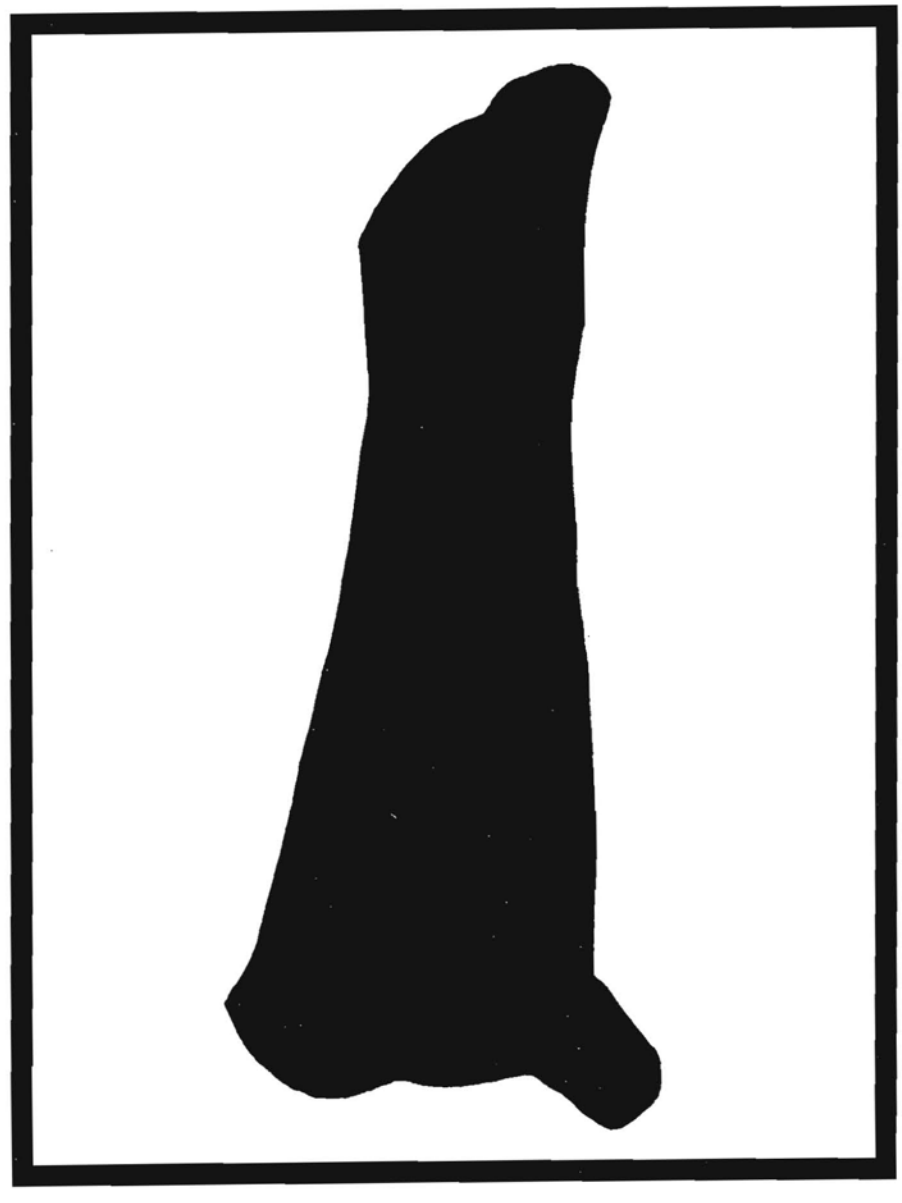
EXECUTIVE SUMMARY
NATIONAL BEEF QUALITY AUDIT

PUBLISHED BY THE NATIONAL CATTLEMEN'S ASSOCIATION
IN COORDINATION WITH COLORADO STATE UNIVERSITY
AND TEXAS A&M UNIVERSITY -- 1992



THE INDUSTRY SAYS

"American cattlemen have repeatedly hit the snooze button when the wake-up alarm has sounded regarding threats to the product beef and to their individual economic futures. Examples of these alarms include the National Consumer Retail Beef Study, the Concentration/Integration Task Force and the Report of the Value-Based Marketing Task Force. The National Beef Quality Audit is another wake-up alarm. A positive response to this report's recommendations will make beef more secure in the marketplace and beef production more efficient."
-- Fred Knopp, editor emeritus, *Drovers Journal*

"The National Beef Quality Audit provides the production industry a picture window view of what the packing industry has known, but what has not been previously shared. It's an honest look at the those areas needing attention. And, with this information, the industry can now focus on correcting and preventing the flaws that exist."
-- Dr. Dell Allen, Excel Corporation

"The Beef Quality Audit report identifies areas of needed improvement within our industry and, with proper response, will lead to beef's improved consistency and competitiveness. An example is the cost associated with the production and handling of excess fat."
-- Frank Lusk, Director of Fresh Meat Procurement, Safeway Inc.

"Everyone involved in the beef industry must read this report. It tells us where we've been and provides valuable direction on where to go from here. Its down-to-earth approach is to be applauded."
-- Fred H. Johnson, Cattle Producer, Ohio

"The National Beef Quality Audit gives us an idea of the quality short-fall costs our industry is failing to address. We can no longer address quality problems by corrective measures. We need to prevent the problems."
-- Dr. Rod Bowling, Keystone Foods Corporation

"The National Beef Quality Audit points out an alarming fact: Beef has more than $250 per head in non-productive costs. If we can reduce this cost, we can provide consumers with a more consistent product at a more competitive price with pork and poultry. Increasing market share while reducing cost of production is a 'win-win' situation for everybody."
-- Logan McClelland, Feedyard Owner, Nebraska

"The results of the National Beef Quality Audit are too dramatic to ignore. This is the proverbial '2X4 between the eyes' that tells us to wake up and get with it! If we're going to compete in the 1990s, we must take action now!"
-- Dr. Darrell Wilkes, Vice President Research and Industry Information, National Cattlemen's Association

"Beef quality is one of the cattle industry's most critical issues. It deserves the utmost attention from every segment of the industry."
-- Paul Genho, Deseret Ranches, Florida

EXECUTIVE SUMMARY

INTRODUCTION

By the year 2001, the beef industry must improve the quality and consistency of its product and become more competitive with alternative protein sources. Industry leaders believe this can become reality if the various sectors of the industry utilize results of the National Beef Quality Audit.

Funded by the industry through the $1-per-head Checkoff, the National Beef Quality Audit was conducted the summer and fall of 1991. Its No. 1 goal was "to conduct a quality audit of slaughter steers/heifers -- their carcasses, cuts and dress-off/offal items -- for the U.S. beef industry in 1991, establishing baselines for present quality shortfalls and identifying targets for desired quality levels by the year 2001." This it accomplished.

The audit consisted of three phases: 1) face-to-face interviews with packers, restaurateurs, purveyors and retailers; 2) slaughter floor and cooler audits in 28 beef packing plants; and 3) a strategy workshop involving 43 industry specialists who assigned a dollar value to the problem areas and outlined four key industry objectives. In its final analysis, the National Beef Quality Audit showed that carcass non-conformities in the beef industry cost approximately $279.82 for every steer/heifer slaughtered in the United States during 1991.

Labeled one of the most important Checkoff projects ever undertaken, the National Beef Quality Audit provides benchmark data identifying areas of non-conformity and quality shortfalls. Using these data as a measuring stick, the industry can start to manage its inconsistencies and non-conformities. And it can develop and implement additional initiatives -- such as extending the "war on fat" -- aimed at improving beef's position in the marketplace.

"We aim, as individuals and as an industry, to become more competitive in the years ahead."

Yes, the National Beef Quality Audit is a critical piece in the big picture -- Total Quality Management -- of the beef industry. It's also a natural next step in the overall picture that includes the Beef Quality Assurance Program, Value-Based Marketing, Carcass Data Collection Service, National Feedlot Quality Award, Integrated Resource Management and research projects such as gene-mapping and instrument grading. These projects all work hand-in-hand to ensure beef's future in the battle for consumer allegiance and dollars.

"These programs will help us produce more desirable products more efficiently," Eddie Nichols, a cattleman from Wauneta, Neb., said. "We aim, as individuals and as an industry, to become more competitive in the years ahead. We recognize that we have tough competition, but we expect to be an even more viable industry as we move into the next century.

"The National Beef Quality Audit is key to this positive move."

PHASES I, II, III

FACE TO FACE INTERVIEWS

To help cattlemen pinpoint non-conformities and quality defects -- and the relative costs associated with them, the National Beef Quality Audit interview team queried more than 100 people involved with trade organizations, government agencies, laboratories and by-product users. Additional interviews were conducted with 11 purveyors, 11 restaurateurs, 10 retailers and seven packers. Plus, the interview team studied reports from the FDA, USDA's Food Safety and Inspection Service and the National Residue Program. These interviews and reports served as the first step in the three-phase program and were not intended to result in ultimate conclusions. Summarizing and drawing conclusions could only be accomplished after Phases I and II.

Those interviewed during Phase I were asked to identify quality problems, defects, shortcomings or shortfalls associated with slaughter steers/heifers, their edible/inedible offal, their carcasses, their wholesale/retail cuts and the processed beef made from their trimmings.

After extensive interviewing and data analysis, the team concluded that beef's quality problems are not associated with its safety and wholesomeness. Both the FDA and the USDA stressed that beef is safe in terms of residues of pesticides, hormones and antibiotics. Foodborne pathogens can be found on some beef, but the numbers and incidence of those microbes is being reduced. Plus, public education programs are teaching end-users of beef how to minimize the impact of those microbes.

According to those interviewed, beef's greatest challenges trace to excess trimmable fat, inconsistency, palatability and price.

TOP 10 LIST OF CONCERNS – PURVEYORS

1. Excessive external fat
2. Too high incidence of injection-site blemishes
3. Too large ribeyes/loineyes
4. Too frequent bruise damage
5. Excessive seam fat
6. Low overall uniformity
7. Too many dark cutters
8. Low overall cutability
9. Low overall palatability
10. Low overall appearance

TOP 10 LIST OF CONCERNS – RESTAURATEURS

1. Excessive external fat
2. Too high incidence of injection-site blemishes
3. Excessive seam fat
4. Too large ribeyes/loineyes
5. Insufficient marbling
6. Low overall cutability
7. Too many dark cutters
8. Inadequate tenderness
9. Inadequate flavor
10. Low overall uniformity

TOP 10 LIST OF CONCERNS – RETAILERS

1. Excessive external fat
2. Excessive weights/box
3. Too high incidence of injection-site blemishes
4. Excessive seam fat
5. Low overall cutability
6. Low overall uniformity
7. Inadequate tenderness
8. Too frequent bruise damage
9. Too many dark cutters
10. Too large ribeyes/loineyes

TOP 10 CONCERNS

To obtain a grasp on the concerns of beef wholesalers/retailers, the National Beef Quality Audit interview team asked purveyors, restaurateurs and retailers to answer a questionnaire consisting of 28 to 31 specific quality problems, defects, shortcomings or shortfalls. Each participant assigned a score from 10 -- "severe problem" -- to 1 -- "not a problem" -- based on his or her perception of severity of that "quality" concern in carcasses or cuts. Each person also listed, in descending order, the five most serious "quality" concerns for today's beef as compared to beef in the past and to other protein-source competitors.

The Top 10 concerns of packers did not match the answers or concerns of purveyors, retailers and restaurateurs. But these concerns were top-of-mind because the seven packers interviewed were not asked to complete questionnaires. Their list of Top 10 Concerns emerged from oral interviews where they were asked to identify and rank their quality concerns.

AGGREGRATED CONCERNS OF PURVEYORS, RESTAURATEURS & RETAILERS

1. Excessive external fat
2. Too high incidence of injection-site blemishes
3. Too large ribeyes/loineyes
3. Excessive weights/box
4. Excessive seam fat
5. Low overall uniformity
6. Low overall cutability
7. Too many dark cutters
8. Low overall palatibility
9. Too frequent bruise damage
10. Insufficient marbling

TOP 10 LIST OF CONCERNS – PACKERS

1. Frequent defects in hides: problems caused by brands, insects, parasites and mud, feces and urine
2. Too high incidence of injection-site blemishes
3. Excessive carcass weights
4. Too many bruises
5. Reduced quality due to use of implants
6. Too many liver condemnations
7. Too few U.S. Choice carcasses
8. Too many YG4's and 5's
9. Lack of uniformity of live cattle and carcasses
10. Too many dark cutters

Comparing the producer-controllable concerns of packers with the aggregated producer-controllable concerns of purveyors, retailers and restaurateurs certainly identifies reasons why cattlemen could become confused about what's important and what's not important in beef production. Mixed signals are definitely being delivered from within these segments of the industry.

Consumers have said, as early as the 1986 Consumer Retail Beef Study, that they want -- and are willing to pay for -- close-trimmed beef. To date, retailers have supplied that demand by trimming beef with a knife in the back room. Hence, those sectors interacting directly with consumers -- purveyors, retailers and restaurateurs -- are most concerned about excessive trimmable fat.

Packers have traditionally supplied commodity boxed beef with up to 1 inch of fat. Therefore, they've been relatively unconcerned about excess trimmable fat.

However, this mind-set is rapidly changing. All three major packers now supply close-trimmed, further-fabricated boxed beef with 1/4-inch or less fat trim. Expectations are that, within two years, this will become the new boxed beef standard.

As packers supply more of this close-trimmed product, they will begin to buy cattle accordingly, and cattle with higher lean yield and less fat will be rewarded. Packer-buying criteria will shift from the present "dressing percentage" -- yield of carcass weight from the live animal -- to a new "red meat yield" -- yield of 1/4-inch trimmed boxed beef from the live animal. Mixed signals being sent from the retailing and packer sectors today will then be crystalized clearly to reward red meat yield and penalize trimmable fat.

PHASE II – PROCEDURE

During October, November and December 1991, Phase II of the National Beef Quality Audit took shape with a survey of federally inspected slaughter steers and heifers in 28 packing plants. These plants, representing at least 70 percent of the Federally Inspected Slaughter, were selected to include regional differences found in the United States.

The slaughter-floor and cooler audits involved four primary objectives: 1) identify value losses occurring in the beef cattle production chain, 2) examine the frequency and magnitude of the value losses, 3) provide a snapshot of the carcass quality and composition of the fed-beef supply and 4) discuss corrective action to minimize value losses.

On the slaughter floor, the packing plant audit team evaluated 50 percent of each slaughter lot for hide defects, viscera (liver, lung and heart) condemnation, head and tongue condemnation, and bruising. Viscera, head and tongue condemnations were recorded as described by FSIS personnel. Bruising, obvious injection-sites and grub damage were also noted.

After listening to concerns of packers and to put a number to hide defects, the approximate size and location of brands were also recorded. Likewise, the presence of horns and mud was evaluated.

In the cooler, the audit team evaluated 10 percent of each slaughter lot for Yield Grade and Quality Grade factors. In addition, this 10 percent had actual ribeye measurements taken, other grade factors estimated as well as sex class and breed type noted. Blood splash -- spots of blood in muscle caused by rupture of the capillaries -- was also recorded. Cooler work was performed by carcass evaluators from Texas A&M University and Texas Tech University.

SLAUGHTER-FLOOR AUDIT RESULTS

BRANDS

The National Beef Quality Audit revealed that packers' concern for hide defects -- ranked 8.29 on a 10-point scale for problem severity -- is warranted. The audit showed 29.9 percent of the cattle carried butt brands, 13.8 percent had side brands and .8 percent wore shoulder brands. Slightly more than 2 percent of the cattle population sported more than one brand. Average brand-site sizes on branded cattle were 17.2 sq. inches for butt brands, 47 sq. inches for side brands and nearly 24 sq. inches for shoulder brands, with sizes of shoulder brands varying greatly.

MUD

The audit team also found mud to be another problem area, with almost 7 percent of the cattle surveyed given a mud score. Mud's damage, which occurs primarily in late fall, winter and spring, can be devastating to a hide. Mud and manure form into "balls" which dry out on an animal's sides and become permanently affixed to the hide. Because this mud is laden with bacteria, it becomes a problem for the packer.

Hide damage precipitated by mud and manure "balls" can range from moving the hide into the lowest grades to outright rejection, by the tanner, of the hide. Other factors forcing hides to take a hit included urine damage, mange, demodectic mange and pitting caused by sucking or biting lice, ticks, flies, mosquitoes or a combination of these insects.

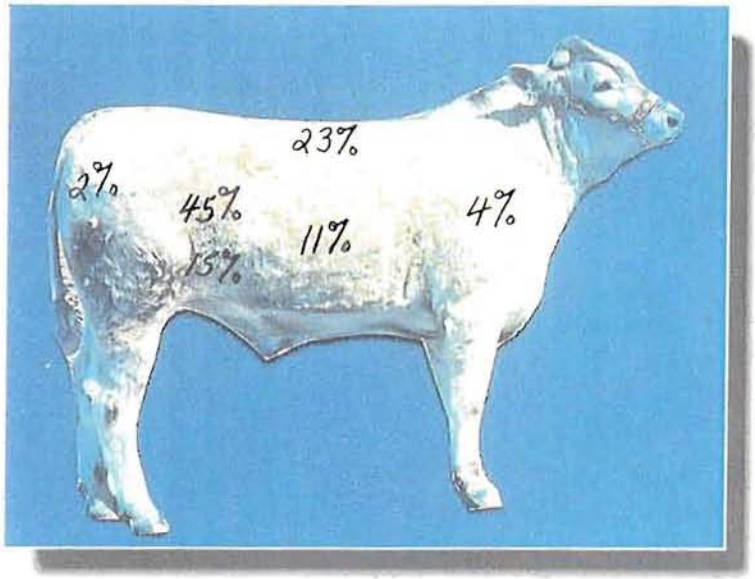
DISEASED ORGANS

The slaughter-floor audit also disclosed that 19.24 percent of the carcasses, or almost one in five, have their livers condemned. This condemnation represents an annual loss to the industry in excess of $14 million.

The incidence of condemnation of lungs, tripe and total viscera was lower than liver condemnations: 5.07 percent, 3.49 percent and .07 percent, respectively. Of the sampled cattle, slightly more than 1 percent of the heads and almost 3 percent of the tongues were condemned. While these figures may not be high, they can't be ignored. Each condemnation means lost income to the beef industry.

Additionally, USDA's Dr. Patrick C. McCaskey points out that a small but statistically -- and economically -- significant number of slaughter cattle, 7 percent in 1991, had conditions that caused the condemnation of all or part of the carcass. Carcasses were condemned for more than 30 common diseases and conditions. Five of the six most prevalent conditions were pneumonia, abscess/pyemia, contamination, septicemia and toxemia.

Location of Bruises



BRUISES

Although many cattlemen dehorn or have polled cattle, some 31.1 percent of the cattle audited by the packing plant team had horns. And, Australian research has shown that horns are responsible for high levels of bruising. (Little U.S. information targeting bruise losses in fed cattle is available.)

Although the National Beef Quality Audit found the mean for bruising "minor," almost 17 percent of the chucks had at least "superficial" bruises. Incidence of bruises was also found on the rib, loin, round and other-cut areas. Overall, these bruises, which must be trimmed out, were most prevalent in the high-priced cuts and account for a $1 per animal loss to the industry.

OTHER NON-CONFORMITIES

The audit team also examined occurrences of pregnancies among heifers. Cattlemen appear to be on top of this because less than 1 percent of the heifers contained a fetus.

COOLER AUDIT RESULTS

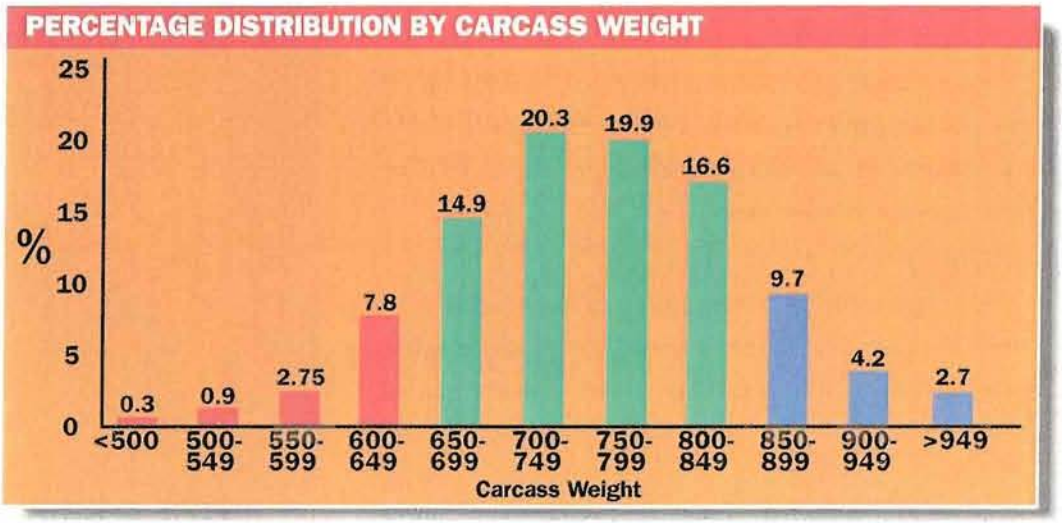
Perhaps the most revealing information from the National Beef Quality Audit emerged when the packing plant audit team assessed carcasses for Quality Grade and Yield Grade factors and summarized these data. The audit included 61.1 percent steers, 37.8 percent heifers and 1.1 percent bullocks.

U.S. BEEF COOLER AUDITS

	1991	1974
Carcass Weight	759 lbs.	679 lbs.
Fat Thickness	.59"	.58"
Ribeye Area	12.9"	11.8"
KPH Fat	2.2%	3.0%
USDA Yield Grade	3.2	3.4
Marbling Score	SM-	SM+

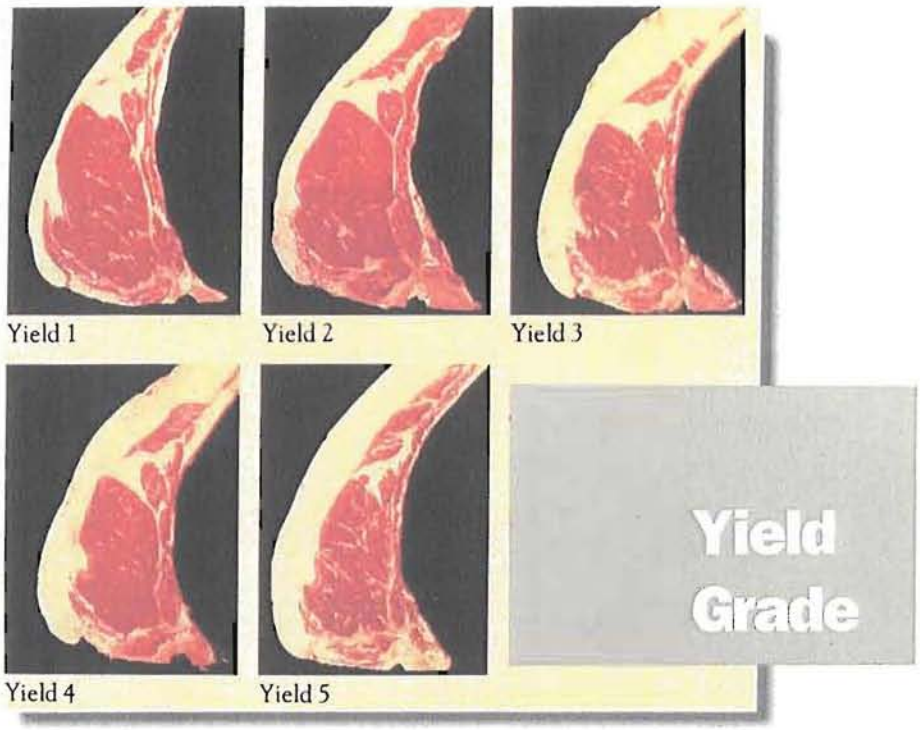
When comparing the means for the 1991 National Beef Quality Audit to a similar 1974 study, several increases and decreases come to light.

Of the carcasses audited in the current study, 40.2 percent weighed 700 to 800 pounds, with many neatly falling into today's "ideal" carcass weight of 735 to 750 pounds. On the negative side, many carcasses were either too big or too small.

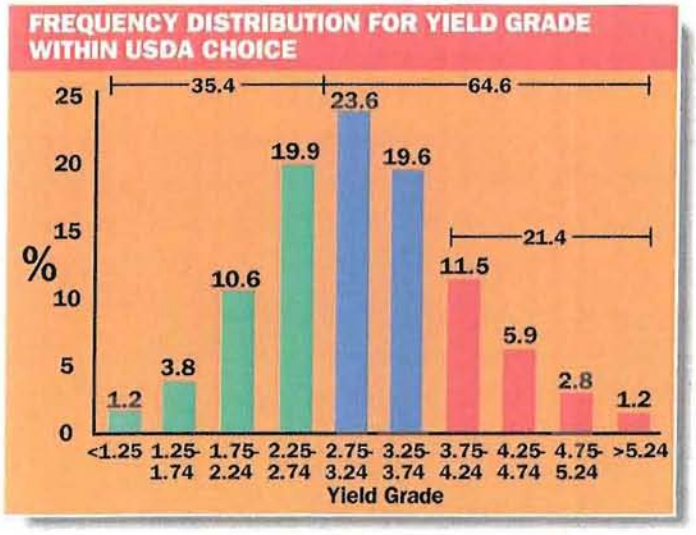


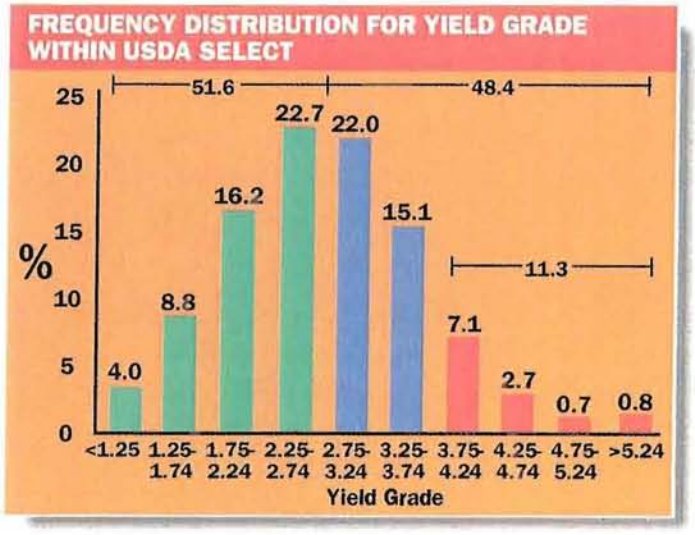
As for fat thickness opposite the ribeye between the 12th and 13th ribs, the industry may have kept the fat that it's been saying it wants to lose. This survey shows that 32.6 percent of today's carcasses have .40 to .59 inches of fat. More than one-fourth of the carcasses -- 27.6 percent -- have .60 to .79 inches of fat, while 18 percent carry .20 to .39 inches. Just 2.2 percent of today's cattle slaughtered have less than .20 inches of fat, and 12.9 percent have .80 to .99 inches of the must-be-trimmed fat.

On the Yield Grade side, 39.6 percent of the audited carcasses fell into the YG3 category. YG2's accounted for 33.9 percent of the cattle, with 10 percent of the cattle producing carcasses worthy of the YG1 classification. The remaining 16.1 percent of the carcasses wound up as YG4's, 13.6 percent, and YG5's, 2.9 percent.

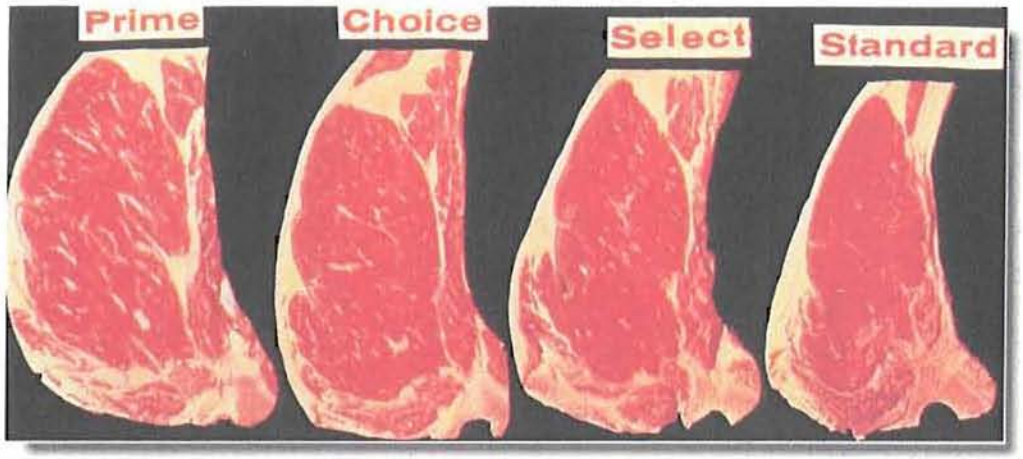


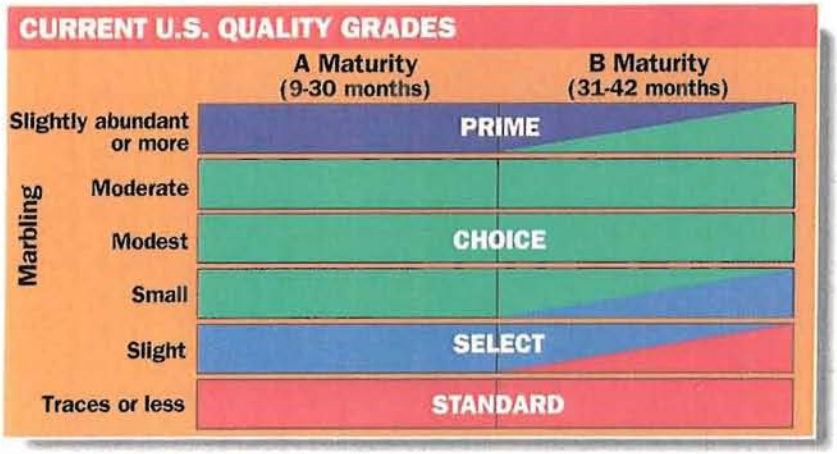
More than 11 percent of the Select carcasses were YG4 and YG5. Identifying these cattle that don't have the potential to grade Choice and targeting them to a leaner end-point would save the industry feed costs and reduced feedlot performance. On the positive side, 35 percent of the Choice cattle and more than 50 percent of the Select cattle were YG1 and YG2. The genetics exist to produce beef with acceptable marbling characteristics and reduced trimmable fat if the industry will identify and manage them accordingly.





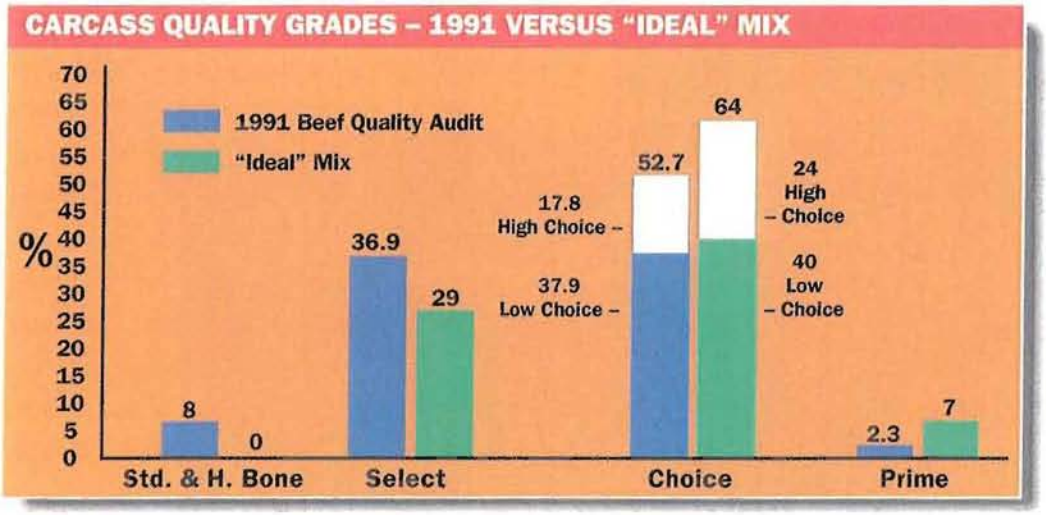
As for Quality Grade traits, the audit revealed the following means: Quality Grade of Select[86], marbling score of Small[24], lean maturity of A[63], skeletal maturity of A[75] and overall maturity of A[69]. (Note: The reported 5 percent incidence of "dark-cutters" partially explains the difference between the mean marbling score and Quality Grade of this study.)





More than half of the cattle in the study graded Choice -- 52.7 percent. While 2.3 percent of the sampled cattle population was Prime and 36.9 percent was Select, an alarming statistic was the 8 percent grading Standard and "hard-boned." More than one-third of the carcasses grading Select -- 13.2 percent of all carcasses in the Quality Audit -- were in the bottom third of Select, and research indicates these and Standard carcasses are highly variable in eating characteristics.

The National Beef Quality Audit pointed out that today's mix of slaughter steers and heifers do not fit the industry's Quality Grade target as devised by the participants in the National Beef Quality Audit Strategic Workshop. Today's "ideal" breakdown of cattle by Quality Grade: 7 percent Prime, 64 percent Choice -- with 24 percent in the upper two-thirds of Choice and 40 percent in the Low Choice category – 29 percent Select and zero percent Standard and lower. Failure to hit the ideal mix creates discounts which when averaged across the entire population gives a $21.68 cost of marbling non-conformities.



The National Beef Quality Audit also concentrated on today's marbling scores. The average marbling score among the carcasses studied was "Small[24]." The mean, plus and minus one standard deviation, for marbling score created a range from "Slight[18]" to "Modest[30]."

Comparing the 1974 beef quality audit with this audit brought an interesting fact to the forefront: During the past 17 years, marbling has decreased by two-thirds of a USDA marbling score.

Almost three-fourths of the carcasses in this study scored Small or Slight for marbling. Among the Choice cattle, just over two-thirds had a marbling score of Small, qualifying these cattle in the bottom one-third of Choice.

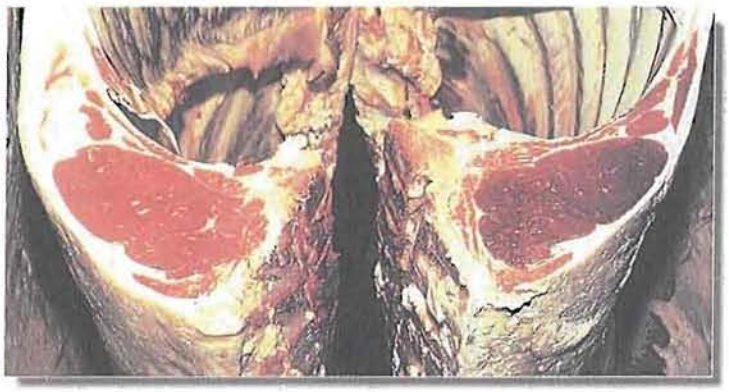
Of all the carcasses in the 1991 audit, more than 42 percent of the carcasses surveyed had marbling scores lower than "Small."

But the big surprise was the 2.2 percent of the carcasses with marbling scores of "Traces" and "Practically Devoid."

The National Beef Quality Audit also disclosed that the "dark cutting" condition affects up to 5 percent of the fed cattle. This includes meat that must be downgraded (to a lower Quality Grade) to that which can only be utilized in ground beef. Because the audit survey was conducted during the fall when dark-cutter incidence is highest, the 5 percent figure could drop to 3 percent, or 2.5 percent or even lower, during other times of the year.

Nevertheless, the cost of dark-cutters is high -- $5 for every fed steer or heifer marketed, with the incidence of dark-cutters doubling in the past five years.

Another area checked out in the cooler was the occurrence of blood splash in ribeyes. This proved not to be a major issue. This defect or nonconformity occurred just .7 percent of the time.



STRATEGY WORKSHOP

The final step of the National Beef Quality Audit focused on results gathered from Phases I and II and input from 43 industry experts recognized as leaders in their respective fields.

"QUALITY" CONCERNS – STRATEGY WORKSHOP

1. Excessive external fat
2. Excessive seam fat
3. Low overall palatability
4. Inadequate tenderness
5. Low overall cutability
6. Insufficient marbling
7. Too frequent hide problems
8. Too high incidence of injection-site blemishes
9. Excessive weights/box
10. Excessive live/carcass weights
11. Inadequate understanding of the value of closer-trimmed beef
12. Too large ribeyes/loineyes

The over-riding consensus of this group was that beef could be made more competitive in price with alternative protein-sources if it could be made more uniform and consistent. By increasing the uniformity, consistency and conformity of beef -- i.e. reducing the cost of non-conformance, now and forever -- its price/quality/value relationships could be improved.

During Phase III, the 43 participants created a Top 12 list from the quality problems identified by purveyors, restaurateurs, retailers and packers and the quality problems that emerged from the slaughter-floor and cooler audit.

From the final list, the group identified methods for solving these problems and developed strategies to implement these methods. Additionally, Strategy Workshop participants outlined four key industry objectives as well as assigned a dollar value to all quality problem areas.

When the concerns of the interviews, reports, slaughter-floor and cooler audits, and Strategy Workshop participants involved with the National Beef Quality Audit were boiled down, four specific industry objectives arose: 1) attack waste, 2) enhance taste, 3) improve management and 4) control weight.

The dollar figure attached to each of these four quality defects was $219.25 for waste, $28.81 for taste, $27.26 for management and $4.50 for weight. That's $279.82 of potential revenue gains if all cattle were perfect. However, perfection is not obtainable in a biological population – even Yield Grade 1 and Yield Grade 2 cattle have 82 pounds of trimmable fat. The $279.82 figure provides a maximum target objective. Producers will obtain varying degrees of this value through genetic change, modification of management practices and other innovative entrepreneurial initiatives.

QUALITY DEFECT	LOSS PER STEER/HEIFER
WASTE – $219.25	
Excess external fat	$111.99
Excess seam fat	$62.94
Beef trim corrected to 20% fat	$14.85
Muscling	$29.47
TASTE – $28.81	
Palatability	$2.89
Marbling	$21.68
Maturity	$3.80
Gender	$0.44
MANAGEMENT – $27.26	
Hide defects	$16.88
Carcass pathology	$1.35
Liver pathology	$0.56
Tongue infection	$0.35
Injection sites	$1.74
Bruises	$1.00
Dark cutters	$5.00
Grubs, blood splash, calloused ribeyes and yellow fat	$0.38
WEIGHT – $4.50	
Carcass weight (625 - 825)	$4.50
TOTAL	**$279.82**

AVENUES OF IMPROVEMENT

Participants in the National Beef Quality Audit's Strategy Workshop offered suggestions for improving beef's consistency, quality and competitiveness. Some of this advice is simple to follow and shouldn't take much time for beef industry players to implement. Other areas will consume more time and more thought-while-doing. Plus, certain areas will require additional research, improved technology and genetic changes in breeding programs.

INTEGRATED HERD HEALTH AND MANAGEMENT PRACTICES: $26.26

A key place to implement beef's improvement process is on the ground floor with integrated herd health and management practices. After all, numerous quality defects are associated with this sector: hide defects (brands and insect/parasite problems), $16.88; carcass pathology, $1.35; liver pathology, $.56; tongue infection, $.35; injection sites, $1.74; dark cutters, $5.00; and grubs and yellow fat, as much as $.38. These herd health related

defects total $26.26. (Note: Bruises at the cost of $1.00 are discussed later in the Transportation and Handling section.)

Because sales of hides account for about 65 percent of the total by-product credit value -- or about 6 to 8 percent of the total value of fed cattle, cattle with brands negatively impact the beef industry. And, as the degree of damage or defect in a hide increases, the total value of a hide diminishes. Based on average prices from May 1990 to May 1991, Colorado-branded and butt-branded hides were discounted $14.69 to $9.46 per hide, respectively. With a value difference of $5.23 between butt-branded and so-called Colorado-branded hides, the U.S. beef industry could recapture $39.08 million in lost value simply by switching from a rib brand to a hip brand.

The National Beef Quality Audit points out that the industry needs a viable alternative to hot-iron branding. Potential existing identification methods include freeze branding, electronic identification or a combination of permanent and temporary identification.

Cattlemen locked into hot-iron branding could continue to rib brand replacement females but could move to a butt brand for steers and market heifers. This butt brand should be as small as possible and placed high and as far back as possible. This, in turn, would minimize hide damage and decrease dollars lost to that segment of the beef industry.

Mud, manure and damage from insects and parasites also cost the beef industry. The audit concluded that better conditions or methods to prevent cattle from becoming laden with mud and manure and better preventive treatments for insects and parasites would indeed help the tanners' ability to achieve greater economic gains -- and prevent tremendous losses -- from the leather products produced from the hides.

More than 30 common diseases and conditions contribute to a majority of the industry's condemned carcasses. Because many of the diseases and conditions can be avoided, the dollars lost due to carcass condemnations can be easily returned.

First, producers can practice basic disease prevention and control measures. Secondly, producers can provide their steers and heifers with high-quality feed, water and shelter, and they can minimize stresses associated with environment and transportation. Other measures include identifying, separating and treating affected animals; vaccinating susceptible animals; and determining the cause or causes of the disease and conditions found in the herd.

Cattlemen can also control the two leading causes of liver condemnation: abscesses and liver flukes. In addition to liver condemnation, abscesses can cause other economic losses via lowered weight gain and reduced carcass yield.

Liver abscesses are in too many feedlot cattle and are primary bacterium-involved. The feedlot incidence of flukes, on the other hand, is closely related to the geographic source of the cattle. Nevertheless, both abscesses and flukes can be controlled by the use of antibiotics, anthelmintics and management.

Although the primary cause for tongue infection -- abscesses caused by thorns from cacti -- is a regional problem, the two additional causes -- wooden tongue and "hair sores" -

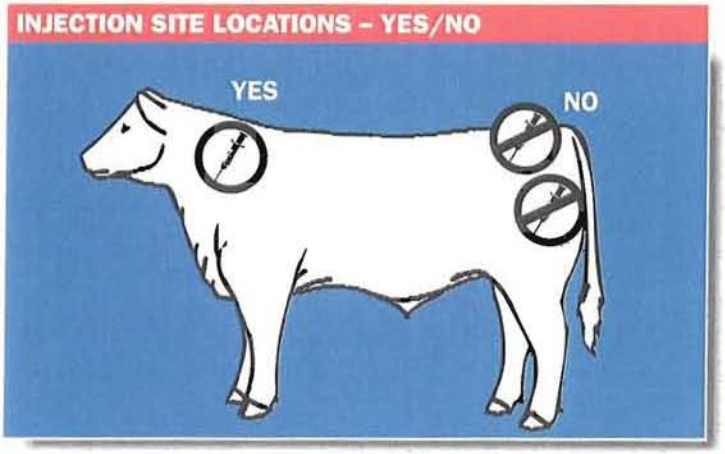
- are nationwide. And all three causes fall in the difficult-to-overcome category.

Injection-site blemishes are costly. But, thanks to the work of the Beef Quality/Assurance Task Force, incidence of injection-site blemishes is dropping dramatically. Still, the beef industry would like this problem to fall to zero frequency. For this to happen, minimizing injection of material into the muscles of calves and cattle must be considered.

In the meantime, injections should be administered in the neck and not in the areas of the more valuable, more expensive cuts. To change location or method of administration, cattlemen should work with their veterinarians.

Implants have been implicated in the incidence of "hard boned" carcasses or the acceleration of the ossification process. While this implication hasn't been scientifically documented, industry people interviewed during the audit's Phase I indicated that implants may increase the percentage of "hard boned" carcasses by as much as 5 to 10 percent in some breed-types.

In addition, some of the packers interviewed believe that animals treated with implants containing both estrogenic and androgenic compounds are more susceptible to development of the "dark-cutting" condition. With stress, implanted cattle can use too much muscle sugar while coping with the stress. As a result, the muscle remains too dark to be effectively merchandised at retail.



Cattlemen should seek the advice of their veterinarian on what implants complement their breeding programs and management systems.

Collectively, grub infestation, blood splash, calloused (filled with large, coarse streaks of fat) ribeyes and yellow fat (indicative of forage-feeding) give the beef industry a 38-cent deficit, with grubs costing the industry more than just hide damage. When grubs strike, their aftermath must be trimmed from pieces of meat -- from walnut-sized to fist-sized pieces. This costly defect can be alleviated by employing a grub-control/elimination program.

GENETIC MANAGEMENT: $248.32

The greatest opportunities for the beef industry to improve its competitive position -- through improvements in quality and consistency -- trace to genetic management. Costs associated with genetics fall into one of two categories: 1) mismanagement of acceptable genetics or 2) genetic non-conformance.

MISMANAGEMENT OF ACCEPTABLE GENETICS.

Because the current fed cattle marketing system places the same value on fat as it does on edible lean muscle -- a result of relying on gross dressing percentage as the primary pricing method -- the genetic ability of cattle to produce a desirable carcass at a leaner endpoint has had limited opportunity to be expressed.

Nevertheless, data from the Audit show one-third of all Choice cattle in today's mix are Yield Grade 2 or leaner. Likewise, half of the cattle grading Select are Yield Grade 2 or leaner.

Thus, the genetics are available to produce Yield Grade 2 carcasses with marbling levels acceptable in the marketplace. It also suggests that many cattle fed to a Yield Grade 3 end-point would have produced an acceptable mix of Choice and Select carcasses if they had been fed to a Yield Grade 2 end-point instead of a Yield Grade 3 end-point. Data are not available to determine the exact percentage of cattle that fit this scenario.

While the propensity to marble has been reduced in the beef cattle population since 1974, the extent to which this is a problem will not be fully realized until cattle are fed to a leaner end-point. In the meantime, extra days on feed -- beyond the Yield Grade 2 end-point -- compensates in part for the inherited inability on the part of many cattle to deposit marbling.

GENETIC NON-CONFORMANCE.

The Quality Audit illustrated that some cattle were "born to be misfits." These cattle simply do not have the genetic ability to produce a desirable carcass under any imaginable management scenario. This group includes light-muscled cattle, cattle that grade Standard even with 0.2 inches of fat cover, cattle that must be fed to the fattest end of YG3 to grade Select, cattle that need to be grown to a final weight of 1,500 pounds or more to achieve normal muscle-to-bone ratios, etc.

The beef industry would be well served to identify such cattle and eliminate their parents from the breeding herd.

Although cattlemen have their hands tied in certain areas of genetics because of a lack of available information, they should take advantage and use available genetic improvement tools. Implemented, these genetic practices should help eliminate some of beef's non-conformities associated with genetics: excess external fat, $111.99; excess seam fat, $62.94; beef trim corrected to 20 percent fat, $14.85; muscling, $29.47; palatability, $2.89; marbling, $21.68; and carcass weight, $4.50. These genetic-related non-conformities or quality defects account for $248.32 or almost 88 percent of the industry's total economic loss per animal slaughtered. And, the figure increases a bit more when calloused ribeyes is added. (Note: Yellow fat, calloused ribeyes, blood splash and grubs account for a $.38 industry loss. Only calloused ribeyes is genetic-related.)

Granted, not all of these eight non-conformities tie entirely to genetics. Part of the inconsistencies result from mismanagement of existing genetics.

Today the cost of excess fat production and its further handling through the beef marketing chain is the No. 1 factor affecting beef's cost-competitiveness with other protein sources. Fat alone -- including its handling and transportation -- costs the beef industry about $2 billion per year.

Currently an average of 97.4 pounds of fat is trimmed from each carcass to produce boxed-beef with 1/4-inch fat-trim specifications. If all YG5 and YG4 carcasses were eliminated from this calculation, the amount falls to 91.8 pounds. Going one step further and

taking out YG 3's causes the average weight to fall to 81.9 pounds.

It's necessary to point out that YG 1's generate 69.4 pounds of excess fat. While eliminating some of this excess fat might be possible, eliminating every ounce of fat is an unreasonable goal and isn't biologically possible.

The point -- Reducing fat must be accomplished by improving the leanness and decreasing the fat of all carcasses.

Excess fat is a problem for retailers, restaurateurs and foodservice personnel. Retailers point out that, based on current markets, they pay about $72 per head for excess fat and receive only 1.5 cents per pound as salvage. Restaurateurs and foodservice personnel stress that consumers want a product with no "plate waste" or fat. Even .18 inches of surface fat on steaks is considered excessive.

When beef carries too much fat, market share is lost. After all, retailers attempt to recoup their additional trim losses by adding it to retail prices which forces up prices consumers must pay for beef. Restaurants and foodservice businesses simply lose customers or customers choose other entrees.

Pressure to reduce fatness is furthered by the present trend toward increasing the lean percentage of ground beef -- less fat is used in such blends. Today, ground beef is commonly 80, 85 or even 93 percent lean compared to 70 percent lean just a few years ago.

The responsibility for reducing fat lies in the hands of the producer, the feeder and the packer. First, the producer must raise a genetically leaner product. Next, the feeder must avoid putting on the fat -- managing available genetics. And, lastly, the packer must revise market signals away from traditional dressing percentage to a red meat yield concept and pay the feeder to produce muscle, not fat. Value-Based Marketing's objective of rewarding high cutability and penalizing low cutability cattle, carcasses and cuts is a must.

Lean-conscious consumers look not only at external fat but at intermuscular, or seam, fat as well. And, retail cuts with excessive seam fat are simply unacceptable to consumers -- even if all external fat has been removed.

Another factor affecting the economic loss due to seam fat is in the boneless manufacturing beef. Because consumers no longer want as much fat in ground beef and processed beef products, fat's monetary value has decreased.

Unfortunately, cattle producers, feeders and packers have no method to select cattle with less seam fat. In addition, seam fat is one of the early fat-deposition locations, occur-

ring earlier than deposition of marbling and subcutaneous fat. Thus, selecting for reduced seam fat while attempting to produce cattle to fit the higher Quality Grades is not only challenging but difficult.

Today's focus on fat has tended to de-emphasize the importance of muscling in carcasses. This overshadowing is coupled with the fact that, while Yield Grading does take into account some muscling differences, the current U.S. marketing system isn't structured to identify categorical differences in live-animal and/or carcass value stemming from differences in muscle-to-bone ratio. Nevertheless, muscling has a substantial indirect influence on value via its effects on live-animal and/or carcass weight, dressing percentage, muscle-to-bone ratio, marbling score and ribeye/loineye size.

Research shows thickly-muscled steers are worth $6.99 more per head than average-muscled steers. These average-muscled steers are also worth $128.60 more per head than thinly muscled steers.

Furnishing the industry with the most profitable cattle in terms of muscling can only be achieved through careful cattle selection.

Palatability -- "eating satisfaction" which is a composite evaluation of flavor, juiciness and tenderness -- is an exceptionally important factor affecting consumer desirability of meat cuts. Yet the consumer can't depend on beef's palatability to be consistent. One retailer in the face-to-face interviews called beef the "most inconsistent product in the case."

To give consumers a more consistent and higher quality product, several factors deserve exploration, including genetic differences.

Consumer panel testing of marbling levels in beef appears to confirm a general positive relationship between beef palatability and levels of marbling in beef loin steaks. This research shows consumers find both Choice and Select beef products acceptable. While Choice beef was preferred for taste, some considered Choice beef too fat. Select beef , on the other hand, was preferred for its leanness but consumers found consistency problems with respect to its taste and texture. Contrary to public perception, Phase II shows that nearly 50 percent of Select carcasses graded YG3 or fatter.

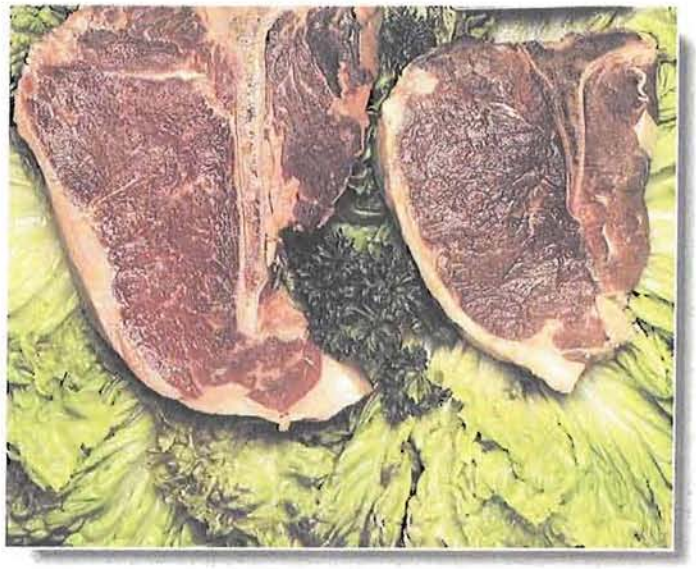
A report commissioned by the National Academy of Sciences emphasizes that beef strip steak dare not drop below the level of 3 percent intramuscular fat -- equivalent to minimum Slight, the bottom of the Select grade -- without losing consumer acceptance for beef. At the other end of the scale, beef strip steaks should not exceed 7.3 percent -- equivalent to the bottom of High Choice -- to comply with the American Heart Association guidelines.

Carcasses with inadequate marbling result in loss to the beef industry in two ways. First, the industry loses money when an insufficient number of cattle grade Choice and Prime to meet demand. Secondly, beef with inadequate marbling may compromise consumer eating satisfaction and result in loss of consumer dollars for beef.

To meet the challenge for adequate marbling, research in the areas of genetic engineering and information transfer is a must. But the opportunity to improve lies with producers too. Producers must recognize the importance of carcass traits and work to raise animals that meet the needs of the industry. Predictability must prevail.

As beef carcasses and their primal/subprimal cuts increase in weight, so does ergonomic stress. More packing plant workers are being injured lifting heavy objects and are suffering from carpal tunnel syndrome. If this continues, the Occupational Health and Safety Act agency may mandate maximums for weights of individual meat-box units.

To avoid this possible mandate, the industry needs to stay within the acceptable carcass weight range of 625 to 825 pounds. That means producing liveweight cattle in the 1,000 to 1,325 pound range.



In addition to the ergonomic stress, cattlemen must remember that today's consumer prefers a 10-ounce steak cut about 1 inch thick. If that steak is cut from a heavyweight carcass, the steak has more square inches and must be cut thinner to stay at 10 ounces. As Dr. Gary Smith of Colorado State University points out, a 10-ounce steak from a 1,500 pound steer can be paper-thin. And, the two steaks -- one from an acceptable 750-pound carcass and cut about 1 inch thick and the other from a 950-pound carcass and cut much thinner -- require different cooking times.

As for yellow fat, it's genetic in dairy cattle and management-related in forage-fed cattle. Although the condition isn't frequent, yellow fat is expensive because the entire carcass is typically ground since consumers prefer cuts with white fat.

TRANSPORTATION, HANDLING: $6.38

Learning what to look for, how to change and how to employ correct practices can lessen the quality defects associated with transportation and handling. A check of these quality defects shows that $6.38 can be realized: $1.00, bruises; $5.00, dark cutters; and as much as $.38, blood splash and calloused ribeyes.

Four segments of the beef industry -- producers, feeders, truckers and packers -- can work together to eliminate bruises. First, because horns tend to damage loins, producers and feeders can remove the horns. Next, because back bruises tend to occur on trucks, care can be taken at loading and unloading. Low-hanging bars, floors, decks and endgates on trucks and similar low-hanging elements of loading docks should be moved up. Bolts sticking out of posts and fences should also be removed.

Plus, because cattle can be bruised right up until the moment of slaughter, all practices prior to that moment should receive attention from packers.

Numerous factors contribute to the "dark-cutting" condition: fluctuating ambient temperatures, fasting, mixing of strange cattle, rough handling and, according to some researchers, implant programs. Although a single stress may not cause a "dark-cutter," combined stresses can take their toll. Plus, cattle with low glycogen stores and muscle fiber types which rapidly break down glycogen are more susceptible to the "dark cutting" condition.

Because 80 percent of the factors contributing to "dark-cutting" are outside the packing plant, cattle feeders need to address this profit-diminishing problem. One key way to

decrease "dark-cutters" is to stop mixing strange cattle, particularly young fed bulls, as cattle are moved to slaughter.

Unfortunately, not all factors connected to "dark-cutting" can be controlled by man. Research by Dr. Temple Grandin of Colorado State University shows that, during periods of fluctuating temperatures, "dark-cutters" from high-incidence feedlots can run up to 8 percent. And, fluctuating temperatures simply aren't controllable.

Nevertheless, some control of incidence of "dark-cutters" can be exerted at the packing plant. At the packing plant, factors such as rough handling and holding cattle overnight or over the weekend have been cited as causes of about 20 percent of the "dark-cutters." Precautions and different handling and holding measures can solve a majority of this problem.

Calloused ribeyes stems from mechanical trauma to the nerves that servide bundles of fibers in the muscle. These nerves can be damaged by a whip across the back, possibly by use of pour-on medications, by the back hitting a truck bar at loading time, etc. An easy cure. But whatever the cause, Dr. Gary Smith claims severe callousing can reduce the value of the carcass by as much as $100.

An excessively long stun-to-stick interval -- time lapse between stunning the animal and severance of the carotid arteries and jugular veins -- can result in blood splash. Another easily cured situation if the packer pays attention to detail.

OTHER MANAGEMENT-RELATED AREAS: $4.24

The industry average of "hard-boned" cattle appears to be about 1 percent of the total slaughter cattle population -- a loss of $34-plus million or $1.29 per head.

Advanced maturity problems trace primarily to two factions: imported cattle from Mexico and heifers. The unknowns about the actual ages of cattle imported from Mexico make it almost impossible to prevent this quality defect with those cattle. On the other hand, heiferettes going into the feedlot mix also contribute to the incidence of "hard-boned" cattle. The value of heiferettes is primarily a market factor related to the supply and price of feeder cattle.

Heifers going to the feedlot should be open, not bred. Heifers that are bred and then slaughtered can result -- depending on stage of pregnancy -- in significant decreases in dressing percentage.

While no differences exist for Quality Grades when comparing steers and heifers, bullocks do cause a $.44 per head loss to the industry. Bullocks occur when someone -- or everyone -- fails to castrate male cattle prior to finishing. Until market signals suggest need for intact males, all males should be castrated, preferably at first processing time and -- at the latest -- at weaning.

Although palatability can be linked to genetics, it is also tied to finishing diets and time-on-feed. Both these items can be controlled and managed.

One possible immediate solution is appropriate fabrication techniques. Although the meat industry has encouraged retailers to use innovative fabrication styles and marketing

schemes, many retailers have been oversold and/or have misused these tools. It's the industry's role to teach meat retailers about how to cut, and not cut, beef.

INFORMATION FLOW

The beef industry's non-conformities cannot be corrected without increasing the extent to which information-sharing occurs among the sectors. Whether the problems relate to genetics, health programs, transportation/handling or other causes, producers must be aware of problems created during their tenure of ownership and address the causes of the non-conformities. For example, duplication of injections -- and injection-site damage -- could be eliminated if feedyard processors knew what injections had been administered prior to delivery.

Some packers have begun to monitor the incidence of non-conformities from various suppliers and supply report cards on that information to feedlot management. As cattle supplies increase, packers will become more discriminating in their buying practices. Those feeders best able to correct non-conformities will become "select suppliers." They will be able to market their cattle to the packer on a regular basis in a customer-supplier relationship.

Feeders with a history of problems and unwillingness to address non-conformities will find packers no longer interested in their cattle or only interested at a deep discount. Suppliers who correct non-conformities and problem areas now will have a competitive advantage in the future.

The Carcass Data Collection Service, state-managed "ranch-to-rail" programs, Strategic Alliances and the Beef Quality Assurance Program provide seedstock suppliers, producers and feeders the means to gather additional information about the consumer-acceptability of their product. Those individuals who begin to modify breeding programs and management practices, now, to target a consumer market segment, will have an edge.

"And, now that the National Beef Quality Audit has given the beef industry a measuring stick, the industry can – and should – monitor its progress."

REPEAT NATIONAL BEEF QUALITY AUDIT

With non-conformities in the beef industry costing it up to $279.82 per animal slaughtered, every segment of the industry should become involved in eliminating problems relating to its respective area. This should be a joint effort, and one that deserves immediate and long-term attention.

And, now that the National Beef Quality Audit has given the beef industry a measuring stick, the industry can -- and should -- monitor its progress.

Yes, a second National Beef Quality Audit should be conducted within five years to determine the degree of progress the industry has made toward delivering a consistent, competitive product to consumers.

CONCLUSION -- TOTAL QUALITY MANAGEMENT, STRATEGIES

For beef to become a more competitive protein-source, it must take advantage of available cost-saving practices and give consumers a consistent, high-quality product. The best way for the beef industry to achieve this goal is via Total Quality Management, the impetus behind the National Beef Quality Audit.

As stressed in W. Edwards Deming's Total Quality Management programs, the industry must "reduce the cost of non-conformance, now and forever."

Beef's non-conformance in consistency and quality can be improved. And, in turn, so will beef's competitiveness.

According to Strategy Workshop participants, the 10 best strategies for improving this consistency, competitiveness and quality of beef are 1) encourage quarter-inch as the new "commodity" fat-trim specification for beef primals/subprimals; 2) change live-to-carcass price logic -- from the present "dressing percentage" (untrimmed carcass weight divided by live weight times 100) to a new "red meat yield" (weight of carcass trimmed to quarter-inch fat-trim divided by live weight times 100); 3) keep the "heat" on communicating cutability to retailers and packers by improving understanding of the value of closer-trimmed beef; 4) go after, and correct, management practices that create non-conformity; 5) eliminate biological types of cattle -- not breeds per se -- that fail to conform; 6) institute quality-based marketing; 7) identify outlier-values -- too large or too small ribeyes, too low marbling, too heavy or too light weights, etc.; 8) design and conduct the "Strategic Alliance Field Studies" that partner cow/calf producers, feeders, packers, retailers and purveyors as demonstrations of Total Quality Management principles; 9) use the National Beef Carcass Data Collection Program, plus DNA fingerprinting and determination of shear force requirements for cooked-beef samples, to identify superior seedstock.

"Beef's non-conformance in consistency and quality can be improved. And, in turn, so will beef's competitiveness."

The final and No. 10 strategy was to repeat the National Beef Quality Audit at periodic intervals to assess progress and identify new opportunities for improvements in consistency and competitiveness of beef.

"We are confident that cattlemen, from seedstock producers to feeders, can improve their performance, and increase profits, if they and partnering processors and marketers will put together needed programs," stated Dr. Gary Smith, a National Beef Quality Audit project leader from Colorado State University. "And, as more individual producers and businesses do a better job, the industry collectively will be more competitive and potentially more profitable.

"For years, the beef business, and remaining producers, have survived by shrinking total per capita supplies enough to command prices that cover average costs. Survival and profitability in the future will depend on supplying the kinds of products which today's consumers demand and doing it still more efficiently than in the past.

"The individuals who effectively initiate needed changes will be those who profit the most."

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Dr. J. Daryl Tatum, Colorado State University
Dr. Jim W. Wise, AMS-USDA & Colorado State University

PURVEYORS INTERVIEWED

The Bruss Company, Illinois
Del Monte Meat Co., California
Del Pero Mondon/Excel, California
Granada Foods, Texas
J&J Food, Pennsylvania
K&N Meats, Washington
Lombardi Brothers Meat Packers, Colorado
Lone Star Foodservice, Texas
Monfort Portion Plant, Colorado
Tyson Foods, Beef Division, Iowa
Wasatch Meats, Utah

RESTAURATEURS INTERVIEWED

A.A. Hotel and Restaurant Supply Inc., Missouri
Certified Angus Beef, Ohio
Frontier Meat and Food Service, Texas
Hilltop Steakhouse, Massachusetts
Keystone Foods Corp., Pennsylvania
Luby's Cafeterias, Texas
Otto and Sons Inc., Illinois
Shoney's Inc., Tennessee
Starmark Food Distributors Inc., Texas
Taste of Texas Restaurant, Texas
Trail Dust Restaurant, Colorado

RETAILERS INTERVIEWED

The Albertson Company, Colorado
The H.E. Butt Company, Texas
Fleming Companies Inc., Oklahoma
The Great Atlantic & Pacific Tea Co. Inc., New Jersey
The Kroger Food Corporation, Ohio
Raley's Supermarkets, California
Safeway Stores, Colorado
Steele's Markets, Colorado
Topco Associates Inc., Illinois
Wynn-Dixie Stores Inc., Florida

PACKERS INTERVIEWED

ConAgra Red Meat Companies, Colorado
The Excel Corporation, Kansas
Harris Ranch Beef, California
IBP Inc., Nebraska
Packerland Packing Company Inc., Wisconsin
Sunland Beef Company, Arizona
Washington Beef Company, Washington

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Funded by BEEF PROMOTION AND RESEARCH BOARD
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