

NBQA-2000: SURVEY OF U.S. CATTLE CHARACTERISTICS RELATED TO QUALITY, QUANTITY, AND VALUE OF FED STEERS AND HEIFERS

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Background

The National Beef Quality Audit-1991 (NBQA-1991) (Lorenzen et al., 1993) was conducted to establish a benchmark that identified what the U.S. beef industry was producing. A subsequent audit, the National Beef Quality Audit-1995 (NBQA-1995) (Boleman et al., 1998), was conducted to monitor progress regarding the quality, consistency, and competitiveness of beef. Since the completion of the NBQA-1995, there have been a number of management and market changes that may have influenced the type of beef being produced. Most notably, a resurgence in demand for beef (NCBA, 2001), the introduction of over 47 USDA certified branded beef programs (USDA, 2001a), and an affordable, abundant supply of grain (USDA, 2001b,c,d). Such changes may influence hide, bruise, and quality and yield grade factors. The objective of the NBQA-2000 was to assess the current status of the quality and consistency of the U.S. fed steer and heifer population and pinpoint inadequacies and shortfalls that the industry needs to improve upon and track progress made since the previous audits. This phase of the audit encompassed in-plant surveys of qualitative and quantitative attributes of beef carcasses on the slaughter floor.

Objectives

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Methods

Federally inspected fed-beef packing plants ($n = 30$) were selected to represent various geographical regions of the U.S. and comprise approximately 80% of the fed steer and heifer slaughter capacity. University personnel surveyed assigned plants once during the prescribed month for the equivalent of one day's production.

Slaughter Floor. Information collected on the slaughter floor was segmented into three categories: hide-on, bruise, and condemnation. For hide-on and bruise data, 50% of each lot for each shift in each plant was surveyed, resulting in a total sample size of 43,415 and 43,595 carcasses, respectively. For condemnation data, 10% of each lot for each shift in each plant was audited, resulting in a total sample size of 8,588. Hide-on data were collected near the exsanguination area. Hide color was evaluated and classified according to primary color (black, red, yellow, gray, white, brown, brindle or Holstein) and percent saturation (100%, 85%, 84-51% or roan). Cattle that were classified as Holstein were given a saturation value of 100%. Hot-iron brand scars, if present, were evaluated for location and approximate size. Brands on the round region were classified as "butt" brands, brands on the loin and/or rib-plate regions were classified as "side" brands, and brands on the chuck and/or neck regions were classified as "shoulder" brands. Additionally, cattle were evaluated for the presence of horns and the approximate size when present (<2.54 cm, 2.54 - 12.7 cm or >12.7 cm). Mud/manure coverage was evaluated for location (no mud, mud on legs, mud on belly, mud on side, mud on topline or any combination) and amount (no mud, small, moderate, large or extreme). In addition, cattle with mud/manure in the tail region were recorded independently.

Bruises were documented according to frequency, location, and severity. Bruise data were collected and recorded in the same manner as Boleman et al. (1998) with the following modifications: brisket evaluations also included the flank and plate regions, and an extreme category (trim loss >2.28 kg to remove bruise) was added to bruise severity. Bruise locations were segmented according to primal areas on the carcass (chuck, rib, loin, round, and brisket, flank, and plate). Livers, lungs, tripe, heads, tongues, and whole carcasses were evaluated for incidence of condemnation and corresponding reasoning for condemnation. Also, the incidence of fetuses was recorded.

Statistical Analysis. Statistical analyses were performed to generate means and frequency distributions. The General Linear Model procedure of the Statistical Analysis System (Cary, NC, USA) was used to generate least squares means. When significant, least squares means were separated by the P-DIFF procedure and an alpha level of $P < 0.05$ was used to determine significance.

Results and discussion

Hide color assessment. We evaluated hide color in this audit to provide some indication of breed-type predominance within the fed steer and heifer population. Many of the USDA (2001a) certified beef programs include hide color, and our information may be useful to those who market beef based on breed-type or hide color characteristics. We found 45.1 % of the cattle to be predominantly black (at least 51%) with solid black representing 32.0% of the sample and an additional 11.7% were predominantly black with white facial markings (e.g., black baldy). We found 31.0% of the cattle to be predominantly red (at least 51%); solid red comprised 16.6% of the sample and 12.5% were predominantly red with white facial markings (e.g., Hereford breed characteristics). Other hide classifications included yellow (8.0%), Holstein (5.7%), gray (4.0%), white (3.2%), brown (1.7%), and brindle (1.3%).

Hide brand assessment. Brand sizes and locations are reported in Table 1. We found that 49.3% of the cattle were not branded. Lorenzen et al. (1993) and Boleman et al. (1998) reported 55.0% and 47.7%, respectively, of the cattle in the previous audits were not branded. Multiple brands occurred on 4.4% of the cattle surveyed. Boleman et al. (1998) reported 6.1% of the cattle surveyed in the NBQA-1995 had multiple brands, and Lorenzen et al. (1993) reported 2.1% in NBQA-1991 had multiple brands.

Horn evaluation. We found that 22.7% of the cattle had horns, which is numerically lower than Lorenzen et al. (1993) reported in NBQA-1991 (31.1%) and Boleman et al. (1998) reported in NBQA-1995 (32.2). Horns are a concern for the industry because they may cause bruising during transportation and handling, which would adversely affect dressing percentage and, if severe enough, product value. Of the cattle with horns, 10.1% had horns <2.54 cm in length, 75.5% were between 2.54 and 12.7 cm, and 14.4% had horns that were >12.7 cm.

Mud/manure evaluation. We found that 18.0% of cattle had no visible mud/manure, 55.8% had a small amount, 23.0% had a moderate amount, 3.6% had a large amount, and 0.2% had an extreme amount. Location of mud/manure on the hide was highly variable; 18.8% of the cattle had mud/manure coverage over their entire hide, 8.5% had mud/manure concurrently on their legs, belly, and side, 25.3% had mud/manure on both their legs, and belly, 8.9% had mud/manure on their legs only, and 8.1% had mud/manure on their belly only. Carcass

contamination from mud/manure along the legs and belly is a concern during hide removal; heavy coverage can increase the risk of contamination and can decrease dressing percentage. Mud/manure was present in the tail region of 33.3% of the cattle; presence of fecal material in this region is a concern because of increased risk of contamination during bunning, evisceration, and hide removal.

Carcass bruises. Bruise data showed that 53.3% of the carcasses were not bruised, 30.9% had one bruise, 11.4% had two bruises, 3.5% had three bruises, and 0.9% had four or more bruises. Bruising incidence has not changed since the last audit; Boleman et al. (1998) in the NBQA-1995 reported the following occurrences of bruises: none (51.6%), one (30.9%), two (12.8%), three (3.7%), and four or more bruises (1.0%). Location of bruises were: chuck (28.2%), loin (25.9%), rib (19.4%), round (14.9%), and brisket, flank, and plate (11.6%). We found fewer bruises in the loin region compared to the 41.1% incidence rate reported in the NBQA-1995 (Boleman et al., 1998). In contrast, there were higher percentages of bruises reported in the round and brisket, flank, and plate (the evaluation of the flank and plate was not included in previous audits). Bruises, however, appeared to be less severe than those found in NBQA-1995. For NBQA-2000, we found minor, major, and critical/extreme bruises, respectively, for the round (83.0%, 14.3%, 2.6%), loin (70.0%, 24.9%, 5.1%), rib (73.6%, 19.6%, 6.7%), chuck (76.6%, 19.7%, 3.9%), and brisket, flank, and plate (71.1%, 24.9%, 4.0%). For NBQA-1995, Boleman et al. (1998) found these minor, major, and critical bruises, respectively, for the round (51.3%, 39.7%, 9.0%), loin (48.1%, 41.4%, 10.5%), rib (39.0%, 45.7%, 15.4%), chuck (43.6%, 45.5%, 11.0%), and brisket (50.0%, 50.0%, 0.0%).

Offal and carcass condemnations. We found incidence rates for USDA-FSIS viscera condemnations were livers (30.3%), lungs (13.8%), and tripe (11.6%). Liver condemnations were for abscesses (44.8%), flukes (21.7%), and miscellaneous reasons such as contamination, cirrhosis, and carotenosis (33.6%). Lung condemnations were for pneumonia (27.0%) and miscellaneous reasons such as contamination, and abscesses (73.0%). Additional USDA-FSIS condemnations were for heads (6.2%), tongues (7.0%), and carcasses (0.1%). Heads were condemned for problems with lymph nodes (17.0%) and miscellaneous reasons (83.0%). Tongues were condemned for hair sores (34.8%) and miscellaneous reasons (34.5%). Of the heifers in the audit, 3.8% had fetuses. Condemnation rates of liver, lungs, tripe, heads, and tongues were higher than the rates reported in NBQA-1991 (Lorenzen et al., 1993) and NBQA-1995 (Boleman et al., 1998). This may be explained partially by the inclusion of contamination data in the miscellaneous category. In our previous audits, contamination was considered a packer related issue and was not included as a cause of condemnation. We included condemnation in this survey because this information better represents total condemnation of offal products. Even if contamination is not included, it appears that condemnation rates for offal were higher than in our past surveys.

Conclusions

The NBQA-2000 continues the process of obtaining updated information on various production factors that affect the value of live cattle and their carcasses. Compared to previous audits, severity of bruising has declined, but little progress has been made in reducing the number or location of brands, especially side brands, which significantly affect the value of hides. This information adds to the existing knowledge base of beef quality and consistency factors, and will be a useful reference for various educational and research endeavors in the beef industry.

Pertinent literature

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Table 1. Characteristics of branded hides

Brand Site	% of Sample ^a	Mean, cm ²	Brand Size		
			SD	Minimum, cm ²	Maximum, cm ²
Shoulder	3.6	210.1	228.5	19.4	2580.6
Side	13.7	456.8	478.1	6.5	5806.4
Butt	36.3	154.6	138.8	12.9	2580.6

^a49.3 % hides had no brands and 4.4% of hides had multiple brands (≥2).