

United States Standards for Grades of Carcass Beef



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USDA Seeks Input on Revisions to Beef Grading Standards

Release No.: 180.14

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WASHINGTON, August 14, 2014
(AMS) is seeking public input on recent improvements and trends in instrument grading.

When beef is voluntarily graded principally refer to flavor and satisfaction of carcasses are Prime, Choice, regimens, instrument grading current grade standard and other sources beef to purchase.

The yield grade is and is an important equation was developed yield, and AMS

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Notices

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This section of the FEDERAL REGISTER contains documents other than rules or proposed rules that are applicable to the public. Notices of hearings and investigations, committee meetings, agency decisions and rulings, delegations of authority, filing of petitions and applications and agency statements of organization and functions are examples of documents appearing in this section.

DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service

[Doc. No. AMS-LPS-14-0052]

United States Standards for Grades of Carcass Beef

AGENCY: Agricultural Marketing Service, USDA.

ACTION: Notice, request for comments.

SUMMARY: The Agricultural Marketing Service (AMS) of the Department of Agriculture (USDA) is seeking public comments on revising the United States Standards for Grades of Carcass Beef. USDA is requesting comments

contact Lawrence Yates at: Lawrence.Yates@ams.usda.gov, or (402) 621-0836.

SUPPLEMENTARY INFORMATION: Section 203(c) of the Agricultural Marketing Act of 1946, as amended, directs and authorizes the Secretary of Agriculture "to develop and improve standards of quality, condition, quantity, grade, and packaging and recommend and demonstrate such standards in order to encourage uniformity and consistency in commercial practices." AMS is committed to carrying out this authority in a manner that facilitates the marketing of agricultural commodities and makes copies of official standards available upon request. The United States Standards for Grades of Carcass Beef do not appear in the Code of Federal Regulations but are maintained by USDA. These standards are located on USDA's Web site at <http://www.ams.usda.gov/AMSV1.0/LSSTDZ>. On the right side of the Web page select Standards to locate the Beef Carcass Grade Standard. To change the United States Standards for Grades of Carcass

the palatability or eating satisfaction of cooked beef principally through the characteristics of marbling and maturity. The principal official USDA quality grades for young (maturity groups "A" and "B") cattle and carcasses are Prime, Choice, Select, and Standard.

USDA recognizes that the beef standards must be relevant to be of greatest value to stakeholders. Recommendations for changes in the standards may be initiated by USDA or by interested parties. The beef yield grade standard and equation was developed 50 years ago, and the cattle industry has undergone considerable change during those years. At that time, carcasses weighed in the 500 to 600 pound weight range. Today, carcasses average weight is in the 800 to 900 pound range, a 50 percent increase. These carcasses are clearly beyond the scope of USDA's current yield grade equation. This is illustrated by research¹ that has shown the application of the USDA's yield grade equation introduces a ribeye area bias, thereby skewing carcass values. It is imperative that the

What Led to the Request?

- The Office of the Inspector General and employees noted that the standards need to be updated to reflect how grades are assessed today
- Examples do not reflect today's carcasses
- Stakeholders have presented limited studies that question the placement of B maturity carcasses and the relation of ribeye area to yield grade
- It was deemed prudent to request comments to assess any consensus of need before moving ahead with the needed administrative revisions

Background

- Designed to provide the basis for uniformity in reporting and marketing of beef carcasses
- Promulgated by the Secretary of Agriculture on June 3, 1926
- Over the years, changes were made to:
 - Meet the needs of producers and buyers
 - Reflect research regarding effects on palatability
 - Meet the need for ensuring the uniformity of grade assessment

History of Changes

1939

- Single standards for the grading of steer, heifer and cow beef with similar inherent quality characteristics
- Grade terms Medium, Common, and Low Cutter became Commercial, Utility, and Canner

1941

- Grade terminology was established for all beef: Prime, Choice, Good, Commercial, Utility, Cutter and Canner

1949

- Elimination of fat color

1950

- Prime and Choice were combined into the Prime grade, the Good grade was renamed Choice, and the Commercial grade was divided into the Good grade and the Commercial Grade.

1956

- Commercial grade was divided into the Standard (young) and Commercial (mature) grades

1965

- Less emphasis was placed on the changes in maturity in the younger grades
- Carcasses were to be ribbed before grading
- Yield Grade standards were adopted similar to the 1962 trial system

1973

- Separated quality grades for young beef from young bulls
- Created the Bullock grade and stag grades were eliminated

1975

- Marbling requirement reduced to the same minimum degree throughout the youngest maturity group for a given grade and eliminated conformation
- Required all carcasses to be both quality and yield graded

1980

- Required carcasses to be ribbed at least 10 minutes before grading and carcasses would be graded in the location where they were slaughtered

1987

- Good grade was changed to Select

1989

- Grades were "uncoupled" allowing for either quality and/or yield grading

1996

- Marbling level for Choice was changed to minimum Modest throughout B maturity and the Select grade was limited to A maturity

Procedure for Revising Standards

- Code of Federal Regulations, Title 7 Part 36
- Any revision should reflect the broad interest of individuals and the industry
- Based on sound technical and marketing information
- In cooperation with interested parties:
 - Determine the need for revised standards;
 - Collect technical, marketing, or other appropriate data;
 - Conduct research regarding possible revisions as appropriate; and,
 - Review all collected information, research and analyses

Procedure for Revising Standards

If it is determined that revisions are warranted, then:

- A Notice will be published in the *Federal Register*
- News release issued
- At least a 60 day comment period
- All comments will become part of the public record
- Based on the comments received, on grading, marketing, and other technical factors, and any other relevant information, AMS will decide whether the proposed revisions should be implemented

Further

- The grading system is important in the marketing of both cattle and beef
- Extensive industry input and consensus is needed since a change could dramatically impact markets
- Significant changes in production, management and grade assessment have occurred in the last 18 years; does this need to be addressed?

Revision Areas

- Administrative revisions
 - Administrative revisions will not impact the current grade standards
 - Reflect current grading practices and technologies
 - Update examples to reflect current carcass weights and factors
- Potential structural revisions
 - Beef yield grade standard
 - Carcass maturity

Comments

21 comments received

Organizations	11
Companies	6
Individuals	3
Foreign Entity	1

8 Comments strongly recommended USDA base any revisions on strong science and abundant data

Yield Grade

- AFT - Adjusted Fat Thickness
- KPH - Kidney, Pelvic and Heart Fat
- HCW - Hot Carcass Weight
- REA - Ribeye Area

$$YG = 2.5 + 2.5 \times AFT + 0.2 \times KPH + 0.0038 \times HCW - 0.32 \times REA$$

Technical note: The United States Department of Agriculture beef yield grade equation requires modification to reflect the current longissimus muscle area to hot carcass weight relationship

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ABSTRACT: With the adoption of visual instrument grading, the calculated yield grade can be used for payment to cattle producers selling on grid pricing systems. The USDA beef carcass grading standards include a relationship between required LM area (LMA) and HCW that is an important component of the final yield grade. As noted on a USDA yield grade LMA grid, a 272-kg (600-lb) carcass requires a 71-cm² (11.0-in.²) LMA and a 454-kg (1,000-lb) carcass requires a 102-cm² (15.8-in.²) LMA. This is a linear relationship, where required LMA = 0.171(HCW) + 24.526. If a beef carcass has a larger LMA than required, the calculated yield grade is lowered, whereas a smaller LMA than required increases the calculated yield grade. The objective of this investigation was to evaluate the LMA to HCW relationship against data on 434,381 beef carcasses in

the West Texas A&M University (WTAMU) Beef Carcass Research Center database. In contrast to the USDA relationship, our data indicate a quadratic relationship [WTAMU LMA = 33.585 + 0.17729(HCW) - 0.0000863(HCW²)] between LMA and HCW whereby, on average, a 272-kg carcass has a 75-cm² (11.6-in.²) LMA and a 454-kg carcass has a 96-cm² (14.9-in.²) LMA, indicating a different slope and different intercept than those in the USDA grading standards. These data indicate that the USDA calculated yield grade equation favors carcasses lighter than 363 kg (800 lb) for having above average muscling and penalizes carcasses heavier than 363 kg (800 lb) for having below average muscling. If carcass weights continue to increase, we are likely to observe greater proportions of yield grade 4 and 5 carcasses because of the measurement bias that currently exists in the USDA yield grade equation.

Key words: beef, yield grade, longissimus muscle area, hot carcass weight

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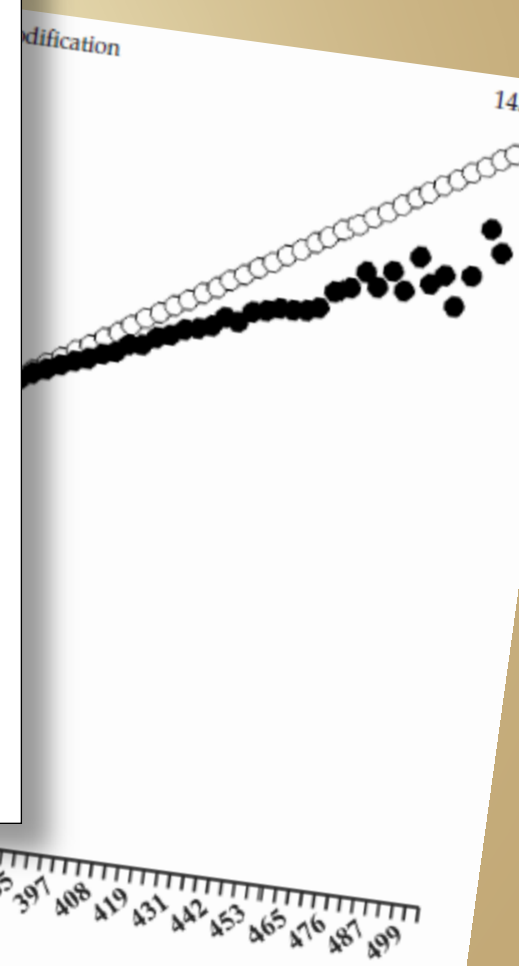
J. Anim. Sci. 2008. 96:1434–1438
doi:10.2527/jas.2007-0813

INTRODUCTION

For the majority of beef cattle slaughtered in the United States, carcass value has 3 determining factors:

Hot carcass weight and LM area (LMA) are 2 of the 4 variables used to calculate the yield grade. A linear relationship was established that required a minimum LMA per unit of HCW. This relationship is reported on

Figure 1. The USDA LM area per HCW relationship and the mean...



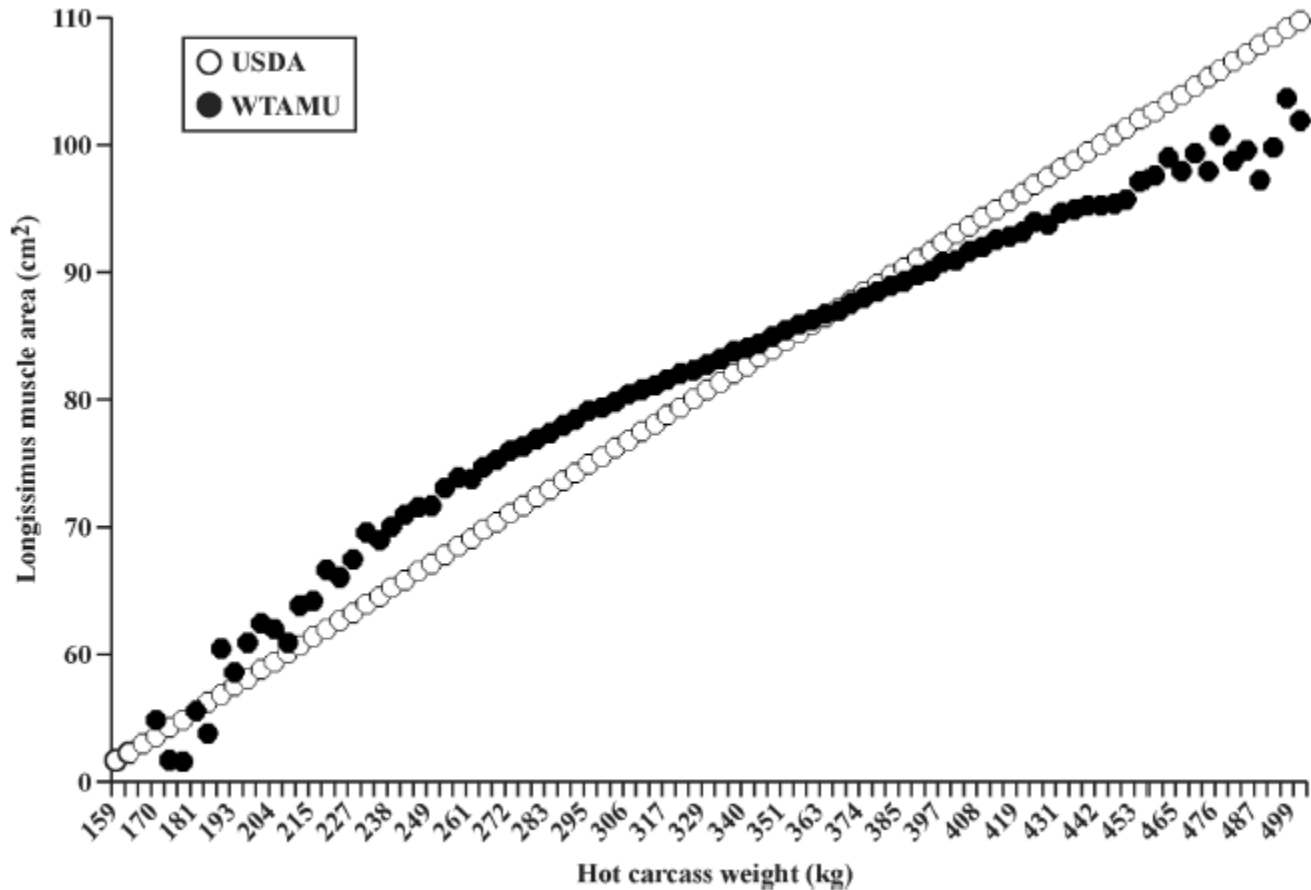


Figure 1. The USDA LM area per HCW relationship and the mean West Texas A&M University (WTAMU) LM area per HCW relationship.

Data from 434,381 carcasses collected between 1992 - 2006



Impact

HCW < 800 lbs

- Have larger REA than predicted by the YG Equation

HCW > 800 lbs

- Have smaller REA than predicted by the YG Equation

417 to 741 lbs

- Calculated YG lower by 0.1 to 0.2 units than expected

833 to 1,100 lbs

- Calculated YG higher by 0.1 to 0.5 units than expected

Yield Grade Comments

12 Supportive, 1 Not

Organizations

Producer 4 Y

Processor -

Academic 3 Y

Marketing 1 Y

Companies

Packing 3 Y

Consulting -

Other 1 Y

Individuals

Producer 1 N

KPH

1 Comment, 2 through discussions

Weekly Livestock Slaughter (head)*	563,000
Average Dressed Weight (HCW)*	820
Average KPH	2.30%
KPH Fat Produced in 1 Week (lbs)	10,618,180

2011 Beef Quality Audit, Average YG 2.9, KPH of 2.3%

1997 U.S. Standards for Carcass Beef

YG 2 Example, 800 lbs, KPH 3.5%

YG 3 Example, 800 lbs, KPH 4.5%



Maturity

A comparison of the USDA ossification-based maturity system to a system based on dentition

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ABSTRACT: Two studies using commercially fed cattle were conducted to determine the relationship of the USDA bone ossification-based maturity system to one based on the number of permanent incisors present at slaughter. These studies showed that 91.5 to 100% of cattle with zero permanent incisors (< 23.8 mo of age), 89.1 to 97.5% of cattle with two permanent incisors (23.8 to 30.4 mo of age), 75 to 82.2% of cattle with four permanent incisors (30.4 to 38.0 mo of age), 64 to 72.5% of cattle with six permanent incisors (38.0 to 45.3 mo of age), and 40% of cattle with eight permanent incisors (> 45.3 mo of age) were graded as A maturity by the USDA maturity classification system. Kappa tests revealed no statistical relationship between the dentition- and skeletal ossification-based maturity systems. Den-

tion-based maturity agreed with ossification/lean maturity for only 162 of 1,264 carcasses in Exp. 1 and only 54 of 200 carcasses in Exp. 2. Cattle with two, four, six, or eight permanent incisors were classified in more youthful categories of USDA bone ossification/lean maturity than they should have been. Male cattle were more likely to be misclassified into a younger age category by the USDA system than were female cattle. It seems that determining physiological maturity by number of permanent incisors rather than by the current USDA method of subjectively evaluating skeletal and lean maturity may prove to be a more accurate technique of sorting beef carcasses into less-variable age groups.

Key Words: Beef, Dentition, Maturity, Ossification

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Introduction

In 1924, the USDA published the initial beef grading standards. These standards were created to provide

and cartilages, especially the split chine bones, and the color and texture of the lean. USDA standards (USDA, 1996) suggest that A maturity cattle should be less than 30 mo of age and that B maturity cattle should



Conclusion of Lawrence, Whatley, Montgomery and Perino

- Dentition would allow beef producers to determine the age of their cattle prior to slaughter
- Aid USDA meat graders in grouping cattle into less variable age categories

2 Studies involving 12,400 carcasses

Maturity and Palatability

Effects of USDA carcass maturity on sensory attributes of beef produced by grain-finished steers and heifers classified as less than 30 months old using dentition¹

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ABSTRACT: This study compared sensory properties of LM steaks from A maturity and B maturity or older carcasses that were produced by grain-finished steers and heifers classified as less than 30 mo old at the time of slaughter using dentition. Carcasses were selected to represent 2 maturity groups and 3 marbling categories within each maturity group, resulting in 6 maturity × marbling subclasses, each subclass consisting of 75 carcasses. Maturity groups consisted of carcasses classified by USDA graders as either A⁰⁰ to A⁹⁹ overall (A) maturity or B⁰⁰ to C⁹⁹ overall (B-C) maturity; marbling categories consisted of carcasses with instrument marbling scores of Slight (SL), Small (SM), or Modest⁰⁰ or greater (MT+). Carcasses were selected in pairs so that each carcass chosen to represent the B-C maturity group was paired with an A maturity carcass of the same sex and marbling score (±30 marbling units). Strip loin (LM) steaks were obtained from both sides of each carcass. After a 14-d aging period, 1 LM steak was measured for Warner-Bratzler shear force (WBSF) and slice shear force (SSF), whereas the other LM steak was used for sensory analysis by a trained descriptive attribute panel. No differences ($P > 0.05$) in WBSF, SSF,

or sensory panel ratings for tenderness, juiciness, or flavor were detected between LM steaks from carcasses classified as A maturity and steaks from B-C maturity carcasses. However, marbling categories effectively stratified carcasses (MT+ > SM > SL) according to differences ($P < 0.0001$) in LM tenderness, juiciness, meaty/brothy flavor, and buttery/beef fat flavor. Increased marbling also was associated with lesser ($P < 0.01$) intensities of bloody/serumy and livery/organy flavors and reduced ($P < 0.01$) values for WBSF and SSF. Of the traits tested, only bloody/serumy flavor was affected ($P < 0.05$) by the maturity × marbling interaction. Interaction means showed that LM steaks from B-C maturity carcasses with SL marbling had a less intense bloody/serumy flavor than did steaks from A maturity carcasses with SL marbling. Results of this study suggest that, when applied to carcasses from grain-finished cattle whose dental ages are less than 30 mo old at the time of slaughter, USDA quality grades would be no less effective in identifying eating quality differences if the A and B-C maturity groups were combined and quality grades were assigned using only marbling.

Key words: beef, carcass, grading, maturity, quality, tenderness



Conclusion of Acheson, Woerner, and Tatum

- A and B-C maturity carcasses from grain-fed cattle have similar longissimus muscle sensory attributes and shear force measurements when classified as less than 30 mo old at the time of slaughter
- Findings do not support the current use of skeletal and lean maturity characteristics to reflect age-associated tenderness differences in this subpopulation of cattle.

Maturity Comments

12 Supportive, 1 Not

Organizations

Producer	4 Y
Processor	-
Academic	3 Y, 1 N
Marketing	1 Y

Companies

Packing	3 Y
Consulting	-
Other	-

Individuals

Producer	1 Y
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Other Comments

- **Instrument Grading**
 - 5 Use more or in all Plants
 - 2 Marbling
- **Tenderness**
 - 2 Supportive
- **Meat Yield rather than Yield Grade**
 - 3 Supportive
- **Grass Fed**
 - 4 Supportive
 - 2 Not
 - 2 Separate

***8 Comments strongly recommended USDA
base any revisions on strong science and
abundant data***

