Beef Grading

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Assistant Professor
Meat Judging Team Coach
Inspection

- Wholesomeness
- USDA
  - Food Safety Inspection Service
- Veterinarian
- Mandatory
- Taxpayer funded

Grading

- Value – Quality and Yield
- USDA
  - Agricultural Marketing Service
- Grader
- Voluntary
- Packer pays per hour
Grading

- The process of dividing a commodity into groups which differ in the marketing process

**Grades:**

- Must be based on factors that are important to buyers and sellers
- Should reflect the final use of the product
- Should be practical and conform, as closely as possible, to existing trade practices
Dressing Percentage

- HCW/LW * 100
- Steers & Heifers = 61 – 66%
- Cows = 48% (very variable)
- Affected by:
  - Fill
  - Finish (fat)
  - Muscling
  - Mud, Horns, Etc.
Yield Grading

- USDA YG 1, 2, 3, 4 or 5
- To predict CUTABILITY
- Percent boneless, closely trimmed retail cuts from the round, loin, rib, and chuck
- 1 = highest cutability (more muscle; less fat)
- 5 = lowest cutability (less muscle; more fat)
Yield Grading Factors

- Fat Thickness = Preliminary Yield Grade (PYG)
- Hot Carcass Weight (HCW)
- Ribeye Area (REA)
- Kidney, Pelvic & Heart Fat % (KPH)
Ribbing

- Between the 12\textsuperscript{th} & 13\textsuperscript{th} Rib
- Bloom Time = approx. 15 min for oxygenation of the ribeye
Fat Thickness (PYG)

- ¾ Distance opposite the ribeye
- Can measure as fat thickness or PYG
- Must convert if use fat thickness
- Also, make adjustments based on fat of entire carcass
Fat Thickness to PYG

- 0.0” fat = 2.0 PYG
- For every 0.1” increase in fat increase PYG 0.25
  - 0.1” = 2.25 PYG
  - 0.2” = 2.5 PYG
  - 0.3” = 2.75 PYG
  - 0.4” = 3.0 PYG
  - 0.6” = 3.5 PYG
  - 0.8” = 4.0 PYG
  - 1.2” = 5.0 PYG
PYG 2.0
PYG 2.5
PYG 3.5
PYG 4.0
PYG 5.0
Hot Carcass Weight & Ribeye Relationship

- 600 lbs carcass requires an 11.0 sq. in. ribeye
- Each 100 lbs increase in carcass weight requires an additional 1.2 sq. in. REA
  - 700 lbs carcass requires 12.2
  - 800 lbs carcass requires 13.4
  - 500 lbs carcass only requires 9.8
## HCW/REA Schedule

<table>
<thead>
<tr>
<th>HCW</th>
<th>REA</th>
<th>HCW</th>
<th>REA</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>09.8</td>
<td>700</td>
<td>12.2</td>
</tr>
<tr>
<td>525</td>
<td>10.1</td>
<td>725</td>
<td>12.5</td>
</tr>
<tr>
<td>550</td>
<td>10.4</td>
<td>750</td>
<td>12.8</td>
</tr>
<tr>
<td>575</td>
<td>10.7</td>
<td>775</td>
<td>13.1</td>
</tr>
<tr>
<td>600</td>
<td>11.0</td>
<td>800</td>
<td>13.4</td>
</tr>
<tr>
<td>625</td>
<td>11.3</td>
<td>825</td>
<td>13.7</td>
</tr>
<tr>
<td>650</td>
<td>11.6</td>
<td>850</td>
<td>14.0</td>
</tr>
<tr>
<td>675</td>
<td>11.9</td>
<td>875</td>
<td>14.3</td>
</tr>
</tbody>
</table>
HCW/REA adjustment

- If larger than needed, subtract from PYG
- If smaller than needed, add to PYG
- For every 0.3 difference from needed size add or subtract 0.1 to PYG

Examples:
- 600 lbs/11.0; measures 12.2; -0.4 to PYG
- 800 lbs/13.4; measures 12.5; +0.3 to PYG
- 750 lbs/12.8; measures 16.8; -1.3 to PYG
Kidney, Pelvic & Heart Fat Percentage

- Based on percentage of HCW
- 3.5% = 0.0 adjustment
- For every 0.5% deviation from 3.5 +/- 0.1 adjustment to PYG
- If more than 3.5%, add to PYG
- If less than 3.5%, subtract from PYG
KPH

- 5.0% = +0.3
- 4.5% = +0.2
- 4.0% = +0.1
- 3.5% = 0.0
- 3.0% = -0.1
- 2.5% = -0.2
- 2.0% = -0.3
- 1.5% = -0.4
KPH examples

KPH Fat

1⅓%  2⅓%  3⅓%  4⅓%
Determining USDA YG

- Determine PYG
- Make Adjustments to PYG
  - HCW
  - REA
  - KPH
- Examples!!!
HCW = 700
PYG = 2.7/2.8
REA = 15.5
KPH = 2.0%
YG = 1.5
HCW = 784
PYG = 3.0/3.2
REA = 14.4
KPH = 2.5%
YG = 2.6
HCW = 801
PYG = 4.3/4.5
REA = 13.1
KPH = 3.0%
YG = 4.5
HCW = 738
PYG = 4.8/5.2
REA = 12.0
KPH = 4.0%
YG = 5.5
Quality Grading

- Estimates palatability
  - Tenderness, Juiciness & Flavor
- Based:
  - Maturity (Physiological)
  - Marbling Score

USDA Prime
USDA Choice
USDA Select
USDA Quality Grades

- “Young” – cattle < 42 mos.
  - Prime
  - Choice
  - Select
  - Standard

- “Old” (Hardbone) – cattle > 42 mos.
  - Commercial
  - Utility
  - Cutter
  - Canner
USDA Quality Grade Factors

- Maturity – A, B, C, D, E
  - Lean Maturity
    - Lean Color
    - Lean Texture
  - Skeletal Maturity
    - Bone Ossification
    - Shape & Color of Ribs

- Marbling
  - Amount & Distribution of Intramuscular Fat
Lean Maturity
Thoracic Buttons
# Ossification of Thoracic Buttons

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Thoracic</th>
<th>Sacral</th>
<th>Lumbar</th>
<th>Ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A^0</td>
<td>0%</td>
<td>Distinct Separation</td>
<td>None</td>
<td>Red &amp; Round</td>
</tr>
<tr>
<td>B^0</td>
<td>10%</td>
<td>Complete</td>
<td>Nearly Complete</td>
<td>Slightly Wide &amp; Flat</td>
</tr>
<tr>
<td>C^0</td>
<td>35-75%</td>
<td>Complete</td>
<td>Complete</td>
<td></td>
</tr>
<tr>
<td>D^0</td>
<td>75-95%</td>
<td>Complete</td>
<td>Complete</td>
<td>Moderately Wide &amp; Flat</td>
</tr>
<tr>
<td>E^0</td>
<td>95-100%</td>
<td>Complete</td>
<td>Complete</td>
<td>Wide &amp; Flat (White)</td>
</tr>
</tbody>
</table>
A Maturity Thoracic Buttons
B Maturity Thoracic Buttons
C Maturity Thoracic Buttons
D Maturity Thoracic Buttons
E Maturity Thoracic Buttons
Marbling Scores

- Abundant
- Moderately Abundant (Mab)
- Slightly Abundant (Slab)
- Moderate (Md)
- Modest (Mt)
- Small (Sm)
- Slight (Sl)
- Traces (Tr)
- Practically Devoid (Pd)
- Devoid (D)
Marbling

Slight

Small

Modest

Moderate

Slightly Abundant

Moderately Abundant
# Quality Grading Chart

<table>
<thead>
<tr>
<th>Degrees of Marbling</th>
<th>A***</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Degrees of Marbling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slightly Abundant</td>
<td>Prime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Slightly Abundant</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td>Commercial</td>
<td></td>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Modest</td>
<td></td>
<td>Choice</td>
<td></td>
<td></td>
<td></td>
<td>Modest</td>
</tr>
<tr>
<td>Small</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>Small</td>
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<tr>
<td>Slight</td>
<td></td>
<td>Select</td>
<td></td>
<td></td>
<td></td>
<td>Slight</td>
</tr>
<tr>
<td>Traces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Utility</td>
<td>Traces</td>
</tr>
<tr>
<td>Practically Devoid</td>
<td></td>
<td>Standard</td>
<td></td>
<td></td>
<td>Cutter</td>
<td>Practically Devoid</td>
</tr>
</tbody>
</table>
Determining the Quality Grade

- Determine Lean & Skeletal Maturity
- Balance Maturities
- Determine Marbling Score
- Determine Final Quality Grade
A Maturity

- Ab = Pr+
- Mab = Pr⁰
- Slab = Pr⁻
- Md = Ch⁺
- Mt = Ch⁰
- Sm = Ch⁻
- Sl⁵⁰ & up = Se⁺
- Sl⁴⁹ & down = Se⁻
- Tr = St⁺
- Pd = St⁻
B Maturity

- Must have enough marbling to make up for degree of maturity
  - B\(^{30}\) maturity would need Slab\(^{30}\) to be Pr-
  - B\(^{30}\) & Slab\(^{20}\) = Ch+
- If B maturity overall & Small or Slight marbling then USDA Standard!!!!!!
C, D, E Maturity

- Must have enough marbling to make up for degree of maturity
- Can only be Commercial, Utility, Cutter or Canner
- Remember C⁰ needs Sm⁰ to be Cm⁻
<table>
<thead>
<tr>
<th>Quality Grade</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cm+</td>
<td>Md</td>
<td>Slab</td>
<td>Mab</td>
</tr>
<tr>
<td>Cm°</td>
<td>Mt</td>
<td>Md</td>
<td>Slab</td>
</tr>
<tr>
<td>Cm-</td>
<td>Sm</td>
<td>Mt</td>
<td>Md</td>
</tr>
<tr>
<td>Ut+</td>
<td>SI</td>
<td>Sm</td>
<td>Mt</td>
</tr>
<tr>
<td>Ut°</td>
<td>Tr</td>
<td>Sl</td>
<td>Sm</td>
</tr>
<tr>
<td>Ut-</td>
<td>Pd</td>
<td>Tr</td>
<td>SI</td>
</tr>
</tbody>
</table>
Prime+ (Ab)
Prime° (Mab)
Prime- (Slab)
Choice+ (Md)
Choiceº (Mt)
Choice- (Sm)
Select+ (Sl+)
Select- (SI-)
Standard+ (Tr)
Standard- (Pd)
Ranking Beef Carcasses & Cuts

- Carcasses, Ribs, Shortloins, Loins
  - Quality First
    - Then Cutability
- Rounds
  - CUTABILITY
Ranking of Quality Classes

- Determine QG
  - Prime, Top Choice, Low Choice, Select, Standard
  - Standards always go LAST!
- Determine differences in cutability
- Rank accordingly
Questions?