Feeder Cattle Grades, Carcass Grades, & Meat Palatability

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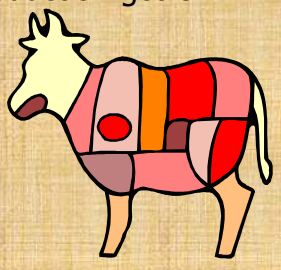
Purpose

- Review the USDA "standards", which reflect the value of cattle and meat
  - Grades of Feeder Cattle and Grades of Meat
- Review "Tenderness" of meat
- Consider how these affect your production goals.
- Focus points
  - **Muscle Thickness & Frame Sizes**
  - **Yield Grades & Quality Grades**
  - **Factors which affect tenderness**

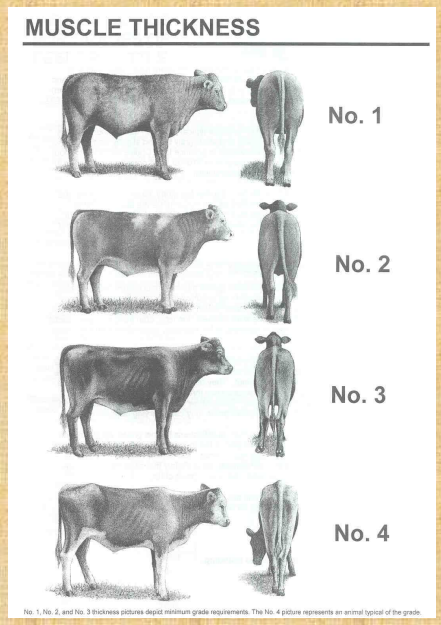


Feeder Cattle Grades

- Muscle Thickness (four categories)
- Frame Score (three categories)

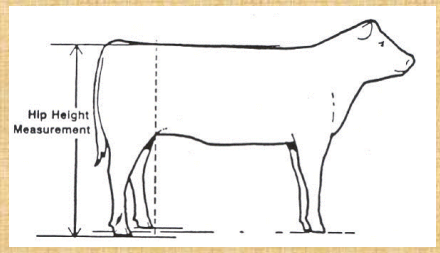
Muscle Thickness (1-4)

#1	Moderately Thick
#2	Tends to be slightly thick
#3	Thin
#4	Less thickness than minimum for #3



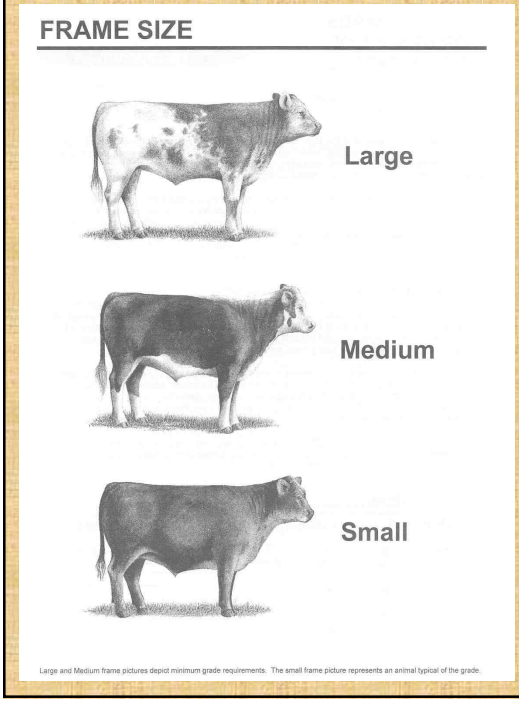
Frame Size

- Two scales
  - ❑ 1 to 9 scale for BIF (Beef Improvement Federation)
  - ❑ Small, medium and large frame (USDA scale)



Tables convert
Hip height for age → frame score

See Frame Score and Feeder Cattle Grades (CL775)



Related to the weight an animal will produce a carcass of grade "Choice"

Feeder Cattle Grades

- Muscle Thickness (four categories)
- Frame Score (three categories)
  - 12 Combinations of grades for thrifty cattle (3 frame size and 4 muscle thickness)

    For example:

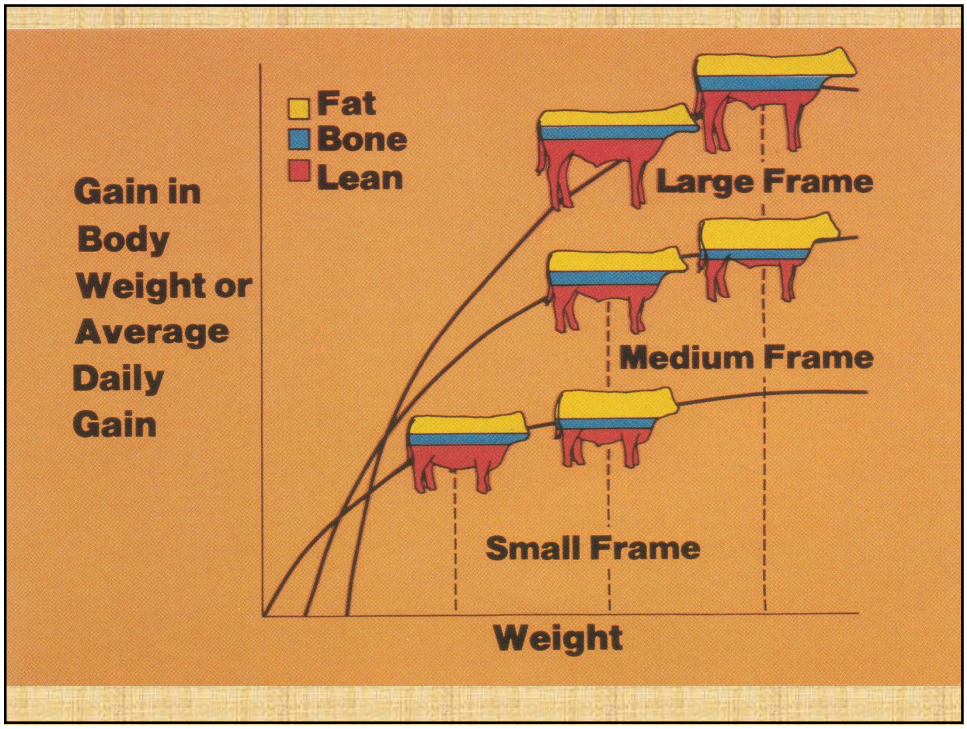
    medium frame, #2 steer

    large frame, #1 steer
  - Inferior Grade for unthrifty animals

Frame Size & Expected Weight to Grade Choice

FRAME	STEERS	HEIFERS
Large +		
Large	⬆	⬆
Large -	1250#	1150#
Medium +		
Medium	⬆	⬆
Medium -	1100#	1000#
Small +	1100#	1000#
Small	⬇	⬇
Small -		

Small, medium, and large frame steers.
To yield high and grade choice, each size must be fed to a different weight.



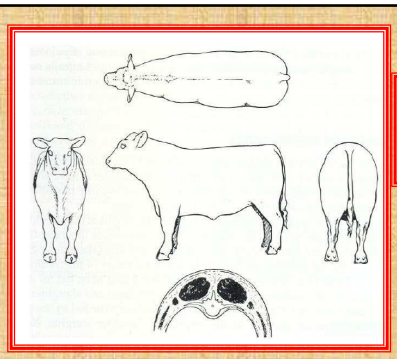
If cattle are fed to the weight represented by the middle line, the small-framed cattle are overdone, the medium-framed cattle are about the right finish, and the larger-framed cattle are underfinished.

Small, medium, and large frame steers. To yield high and grade choice, each size must be fed to a different weight.

CARCASS GRADES

Yield Grade (YG)

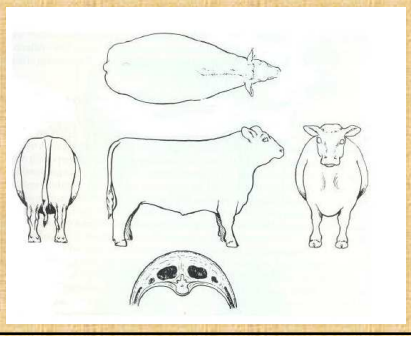
- YG = yield (cutability)
  - Percent of boneless, closely trimmed retail cuts
  - Greatly affected by amount of excess trimmable fat and muscling
- Scores range from 1 to 5
- 1 is the highest YG, 5 is the lowest YG



Yield Grade 1 & 2:

Desirable

All grades are possible on grain and/or grass rations, depending on feed quality, amount fed, and time on feed.



Yield Grade 4 or 5:

Over-Finished

Yield Grade From Carcass Measurements

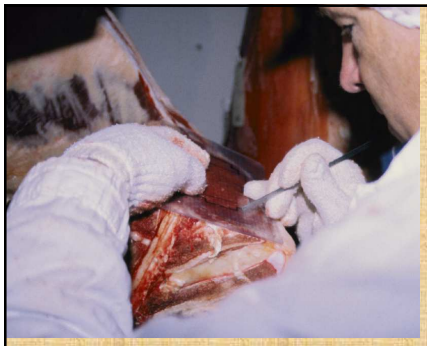
- Amount of fat, measured in tenths of inches, over the rib-eye muscle (back fat or BF).
- Kidney, pelvic, & heart (KPH) fat, which is estimated as a percentage of carcass weight.
- Area of the rib-eye muscle, which is measured in square inches (REA).
- Hot carcass weight. Carcass weight reflects the amount of inter-muscular fat.

Yield Grade =

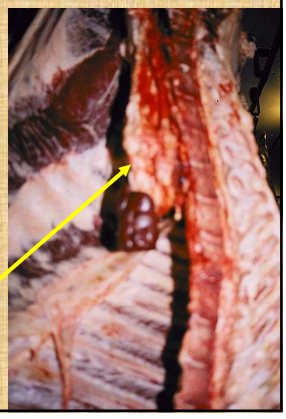
= 2.50 + 2.50 (inches of fat at 12th & 13th rib)
+ 0.20 (% kidney, heart & pelvic fat)
+ 0.0038 (lb hot carcass weight)
- 0.32 (square inches of rib eye muscle)

Carcass Measurements

BF = Back fat measured at the
12th & 13th rib (tenths of an inch)



Rib-eye area
= REA (sq. in.)



KPH = % kidney,
pelvic, and heart fat

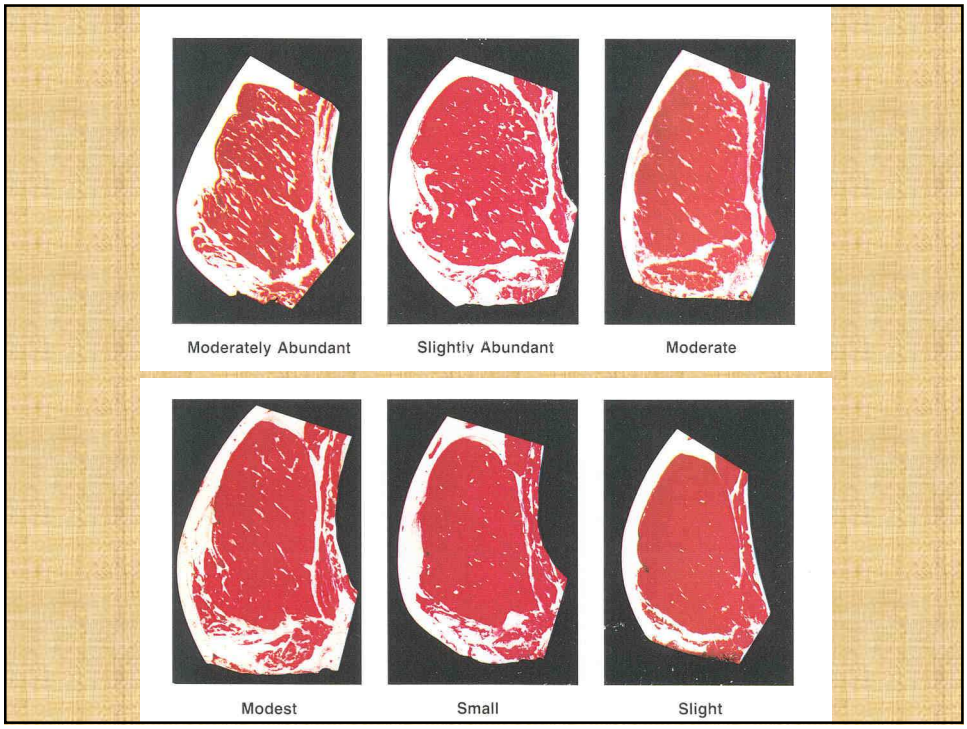
Quality Grades

- Prime
- Choice
- Select
- Standard
- Utility

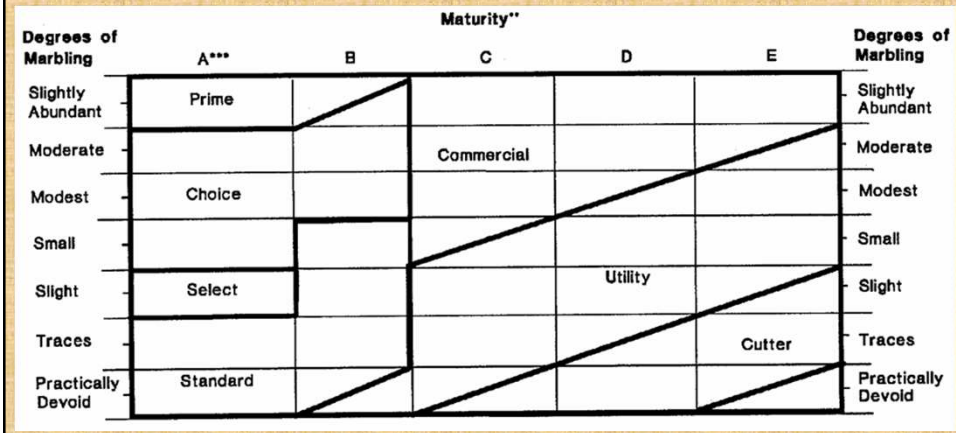
Quality Grades

Indicating characteristics are

- Maturity
  - A < 30 months of age
  - B from 30-42 months of age
- Marbling
- Texture of the lean
- Firmness of the lean & fat
- Color of the lean & fat



Quality Grading Chart



Palatability of Meat

(not in official grade)

- Tenderness, juiciness, and flavor (eating quality)
- Tenderness has the most variability among steaks
- Amount and solubility of connective tissue, and amount of intramuscular fat (marbling), have been associated with meat tenderness.

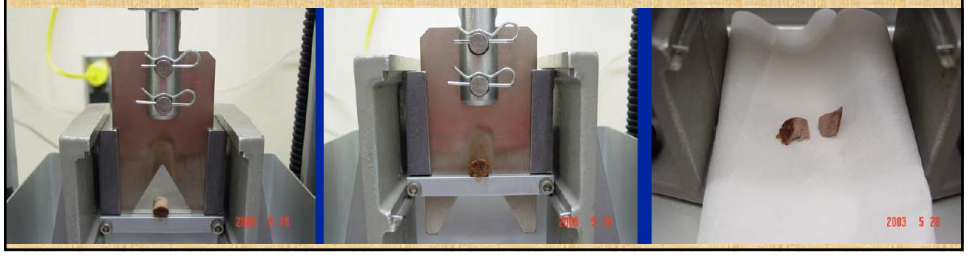
Richard J. Epley (Univ. of Mn); D. Koohmaraie (USDA MARC)

Meat tenderness - factors

- Genetics (h^2 ~45% of the variation) ☆☆☆
- Age of the animal
  - collagen ⇧ complexity and strength with age
  - > 30 mo, more pronounced
- Not a function of feed type
  - grain vs. grass
  - indirect effect of age at harvest

Measuring Meat Tenderness

- Warner-Bratzler Shear force
  - Core and shear cooked meat
  - Measure force to shear
- Trained panels



Meat tenderness - factors

- Location of the cut
  - Tenderloin vs. fore shank
  - Connective tissue needed for locomotion
- Processing
  - Tenderness improves with postmortem storage
  - Amount of stretch or tension upon hanging
  - Hind leg, pelvic or hip bone methods
  - Electrical stimulation
  - Chilling rate

Meat tenderness - factors

- Chill Rate
  - tender beef → rigor mortis meat (6 – 12 hr)
  - "cold shortening" - chill to < 60° F before rigor
  - "thaw rigor" - frozen before rigor
  - <0.5" back fat – problems with chill rate
- Aging
  - Done after rigor mortis, natural enzymatic process, improves tenderness
  - Complete at 35°, for 7 – 10 days post slaughter

Meat tenderness - factors

- Pre-cooking and Cooking
  - Dissolves/degrades collagen and elastin (connective tissue proteins)
  - Slow thawing, grinding, chemicals (salting, marinating, vegetable enzymes), etc…
- Method of cooking and Degree of doneness
  - Quality grades (marbling) and cuts of meat need to be considered.