

# **Carcass evaluation and meat grading**

**By**

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**Mhow**

# Importance of grading

- Help the farmer (producers) to recognize their quality of animal and for better planning to improve program and produce high grade animals and carcasses.
- It helps to producer and processor to certify their animals and carcasses for class, quality and condition through authorized agencies.
- Helps the processor to select a required type according to the needs of market and consumers.

Conti.....

- By producing the quality meat, gives satisfaction to consumers over the money he/she spent on purchase of meat and meat products .
- Also helps the consumers to utilize meat more efficiently by preparing it in the manner for which it is best suited .
- The systematic way to express value and quality of carcass by sorting in to groups according to selected characteristics.

conti

- **A systemic procedure by which carcass, meat and meat products are segregated on the basis of accepted palatability or yield attributes or other economically traits.**
- **Meat evaluation is an extension of grading that identifies carcasses composition and value differences with greater precision than grades alone.**

# System of carcass evaluation and grading

- In India, grading of meat carcasses and wholesale cuts is still confined at the export level, that too as per the agreement between the exporter and importer.
- **USDA SYSTEM OF CARCASSE / MEAT EVALUATION**
  - A. Palatability or quality grades.
  - B. Cutability or yield grades.

# Factors used to establish palatability /quality grades

- Kind and class
- Maturity
- Marbling
- Firmness / texture
- Colour and structure of lean
- Confirmation , fleshing and finish

# Maturity

- The physiological age of the animal or bird that produce the carcass.
- Age has a significant effects on tenderness of meat
- Also related to texture of the meat (as an animal matures the texture of the lean changes from fine to coarse).

# Determination of the maturity in carcass

- By observing carcass bone
- By structure of cartilage (tough white flexible tissue)
- By the size shape of ribs and ossification (vertebrae ) of the bone
- Colour and texture of the lean meat
- (maturity is generally categorized as A B C D & E ).



# KIND AND CLASS

- Each species of animals is referred as a kind
- Class that are quite similar in physical characteristics.
- example:

Classes for cattle : Heifer, Cow  
Steer, Bull and Bullock .

Likewise in case of pig: Boar, Sow,  
Barrow and Gilt.

# MARBLING

Visible intramuscular fat, located in perimyseal connective between muscular fiber bundles

A positive effect on tenderness of meat possible by acting as a lubricant during chewing and swallowing

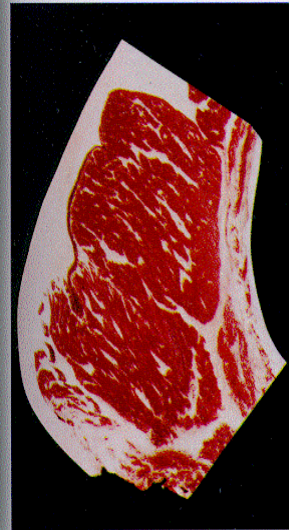
Highly desirable in any cut of meat is highly related to juiciness and flavour

## Conti.....

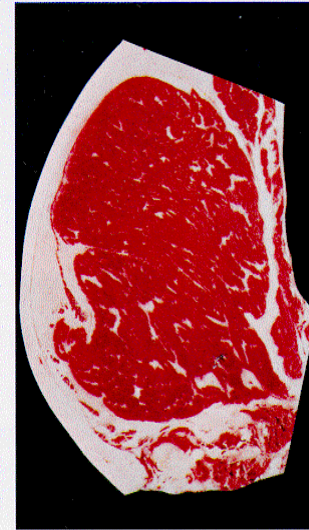
- Marbling in lamb carcass is indicated by amounts of flank streaking
- Marbling in pork carcass is indicated by fine streaks of fat visible in the intercostal muscle between the rib called as feathering
- Determination of the marbling in carcass :
- On the basis of longissimus muscle cross section at 12<sup>th</sup> rib in beef and lamb and 10<sup>th</sup> rib in pork

# Recognized levels of marbling

- Moderate abundant
- Slightly abundant
- Moderate
- Modest
- Small
- Slight
- Traces
- Practically devoid



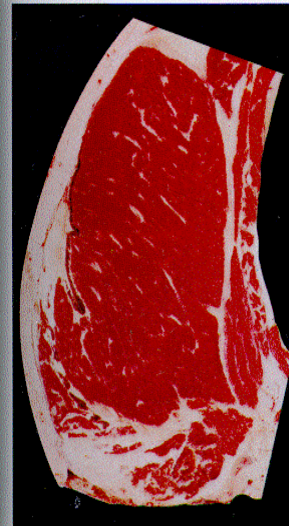
Moderately Abundant



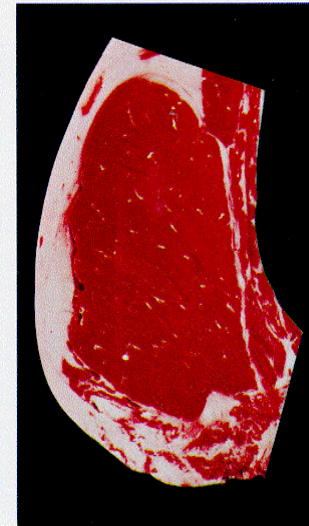
Slightly Abundant



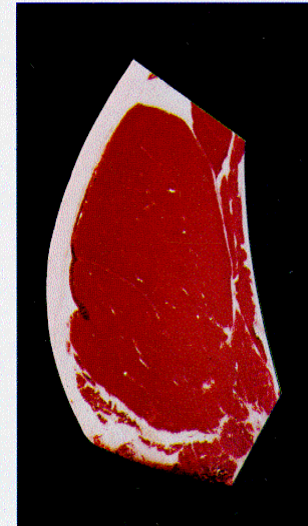
Moderate



Modest

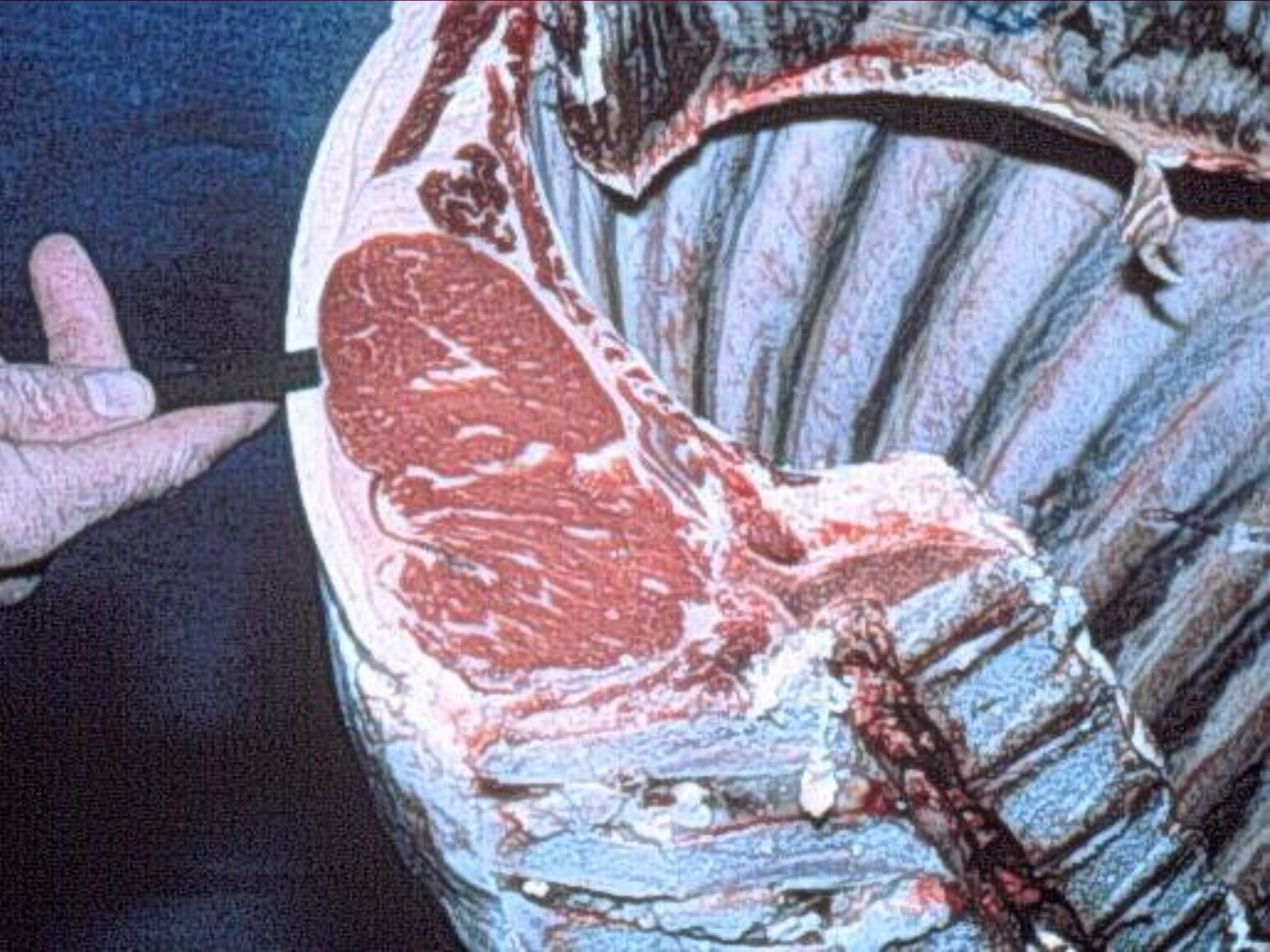


Small



Slight





# Firmness

- Refers to firmness of the muscle
- Evaluated in the flank area of carcass or cut surface of the lean meat
- Greatly influenced by the amount of fat that is present in carcass
- No direct contribution to palatability

# Texture

- Related to size of muscle fiber bundles and thickness of perimyseal connective tissue between fiber bundles
- 9 recognized levels firmness

1. <b>FIRM</b>	4. <b>Slightly soft</b>	7. <b>Soft and Slightly watery</b>
2. Moderately firm	5. . Moderately soft	8. Soft and watery
3. Slightly firm	6. Soft	9. Very soft and watery

# Colour and structure of lean

- Practically the only criterion the consumer can use to judge the acceptability of most meat at purchase.
- Extreme colour and structure are undesirable
- 3 Attributes of color
  1. Hue-Normally thought colour
  2. Chrome- purity or saturation of colour
  3. value-overall light reflectance of colour

Beef	Bright cherry red colour
Fish	Gray white to dark red colour
Lamb and Mutton	Light red to brick red colour
Pork	Greyish pink
Veal	Brownnish pink
Poultry	Grey white to dull red



# Conformation, fleshing and finish

- Fleshing :

also called as muscling.

refers to the development of skeletal muscle

Finish :

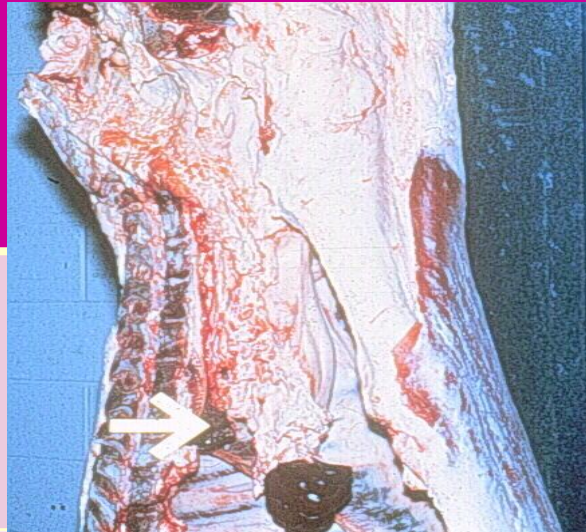
refers to the amount, character and distribution of external, internal and intramuscular fat either in carcass or wholesale cuts

# Conti.....

- Refers to proportionate development of carcass part or wholesale cuts and to the ratio of muscle to bone
- Describe general built, form, shape, contour or outline of carcass, sides or cuts which yields greatest quality of edible meat

# Factors used to establish yield grades of different species

## For Beef



a. Fat thickness

b. Rib eye area (12<sup>th</sup> rib, longissimus dorsi muscle)

c. Percent kidney, heart and pelvic fat

## For lamb / Goat

a. Fat thickness

b. Percent kidney and pelvic fat

c. Leg conformation (fullness of legs)

# For pork

- 1. Class (barrow, gilt sows etc)
- 2. Back fat thickness
- 3. Muscling
- 4. Carcass weight
- 5. Belly thickness

# Muscle development

- Rib eye area / lion eye area –cross sectional area of longissimus muscle
- Beef and lamb- between 12<sup>th</sup>-13<sup>th</sup> rib
- Pork – between 10<sup>th</sup> -11<sup>th</sup> rib
- Lion eye area is not used in grading of lamb and pork carcass because in industry practice pork and lamb carcass are not ribbed

# Fat Depth / Thickness

- Located off the midline at a point  $3/4^{\text{th}}$  of the width of the longissimus muscle from the medial side and between 10<sup>th</sup> -11<sup>th</sup> rib (pig)
- For beef  $3/4^{\text{th}}$  longissimus width position between 12<sup>th</sup> -13<sup>th</sup> rib
- For lamb over the midpoint of longissimus muscle width between 12<sup>th</sup> – 13<sup>th</sup> rib

# Live Weight

- Live weight (LW) is the actual weight of an animal at the time of evaluation or slaughter.
  - Beef average: 1200 lbs (Normal Range: 950 - 1500 lb)
- Shrink loss should be taken into account.
  - Beef 3 – 5%

# Dressing %

- Beef average: 63% (choice steers, bullocks and heifers)
  - Normal Range: 55 - 67% for steers, bullocks, and heifers
  - Calculation:  $(CCW/LW)*100$



# What Affects Dressing %

- Amount of fill
- Degree of Muscling
- Degree of fatness
- Commercial Setting (Mud, Dags, etc.)

# REA

- Live evaluation an estimation of the width and depth of the loin.
- Carcass evaluation actual dimensions in  $\text{in.}^2$  using a grid.

# Quality Grade

- Marbling: the intermingling of fat within the muscle
  - intra-muscular (IM) fat
- Evaluated at the ribbing site (12th rib)
  - Average: Slight to Modest
  - Normal Range: Traces – Abundant

Thank you