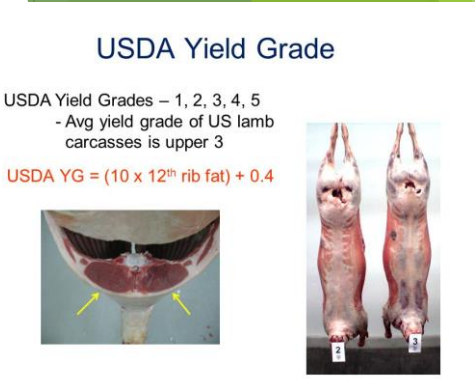
UNDERSTANDING ULTRSOUND CARCASS DATA

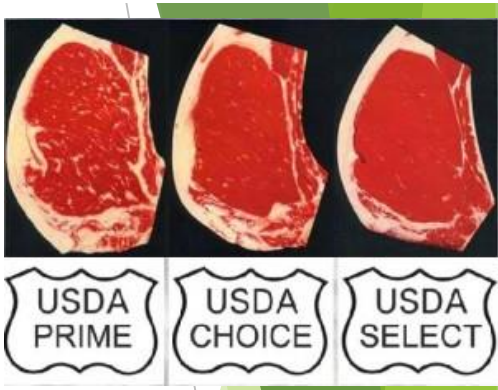
What Gives Market Livestock Value?

- Blue Ribbon
- Fat
- Muscle
- Fitting
- Genetics
- Bone
- Byproducts
- Pretty
- Productivity/Efficiency
- Eating Quality
- Showmanship

What are Industry Standards?

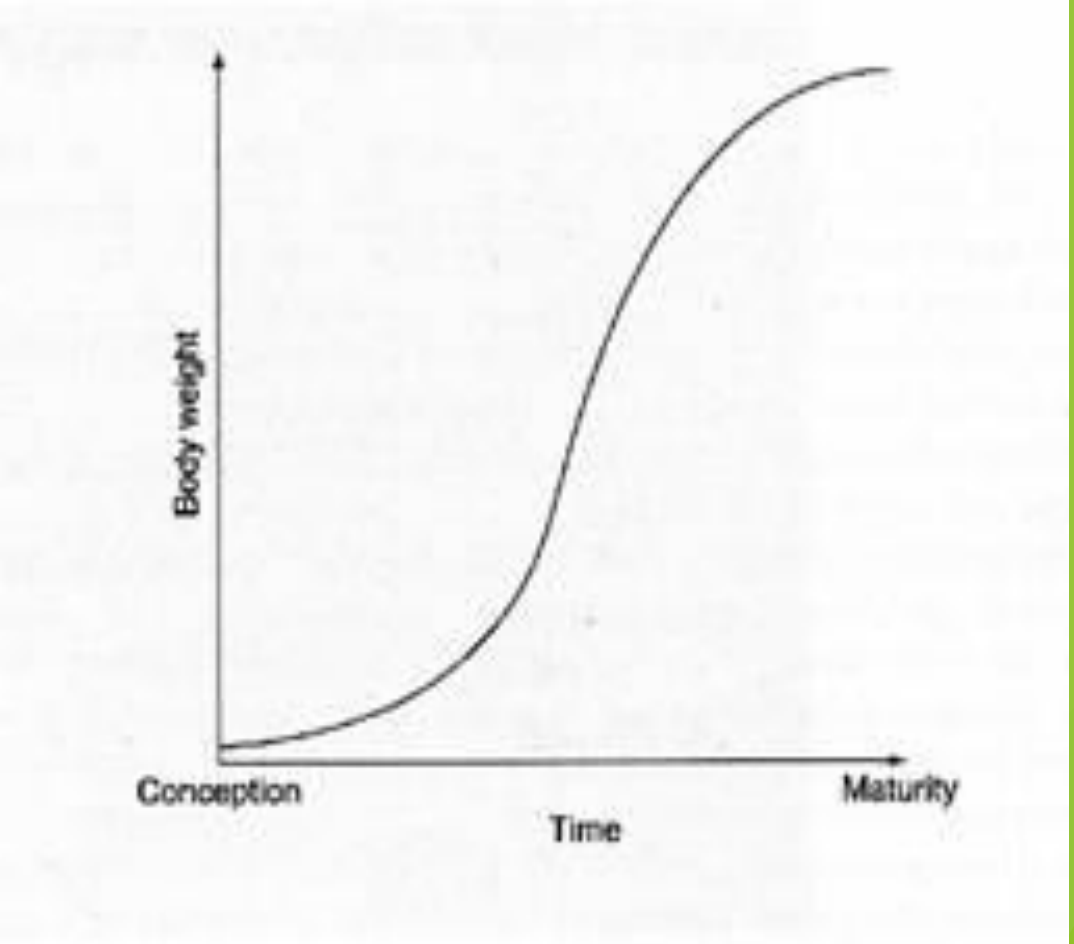
- Value Determining Characteristics
  - Established with extensive livestock and meat science research.
  - Adopted into U.S. Federal Regulations for the trade of livestock and meat- Meat Grading Standards
    - Uniform standards of acceptability for eating quality, product yield and product specifications
- Meat Quality and Cutability
  - Meat Quality: expected eating characteristics: flavor, juiciness and trendiness
  - Cutability: ratios of muscle, fat and bone
- Retail meat, wholesale cuts, carcass and live animal prices are determined from meat quality and cutability.
  - Price (quality and cutability) X weight= value





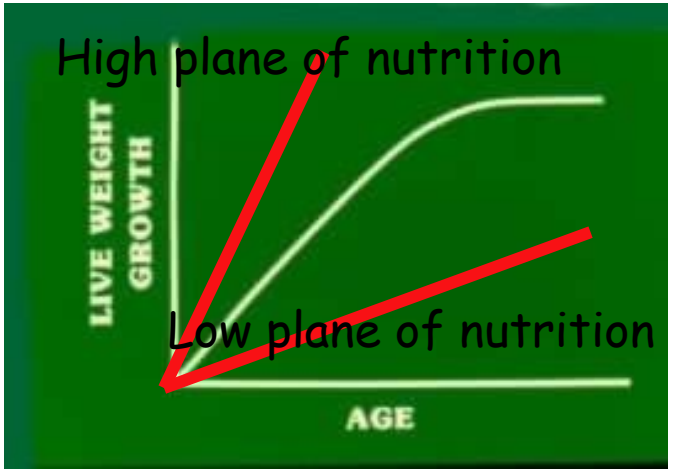
Animal Growth

- Essential Feed Nutrients
  - % Protein
  - Carbohydrates
  - Fat
  - Minerals and Vitamins
  - **Balanced diet appropriate for level of development**
- Animal Growth
  - Puberty
  - Nutrients
  - Genetics
  - Age
- End Result
  - Muscle
  - Fat
  - Bone
  - Quality

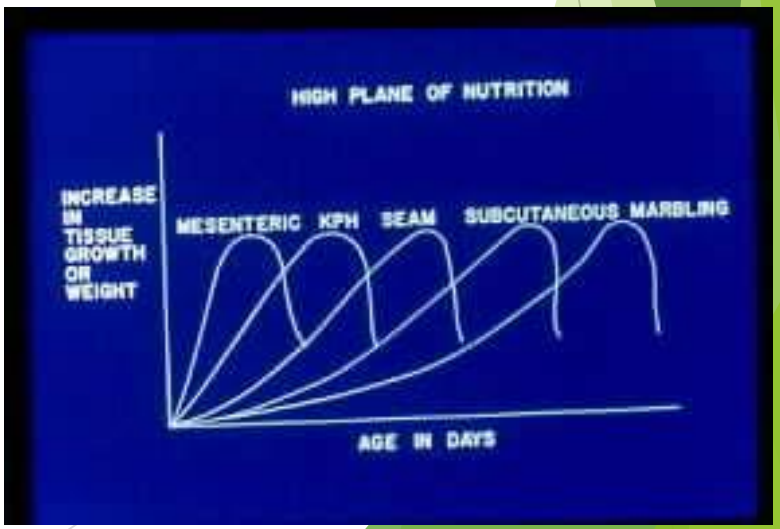


High Energy Diets Speed Growth and Provide Greater Opportunities for Marbling

- Fat Depots
  - Mesenteric
  - Kidney
  - Seam
  - Subcutaneous
  - Marbling

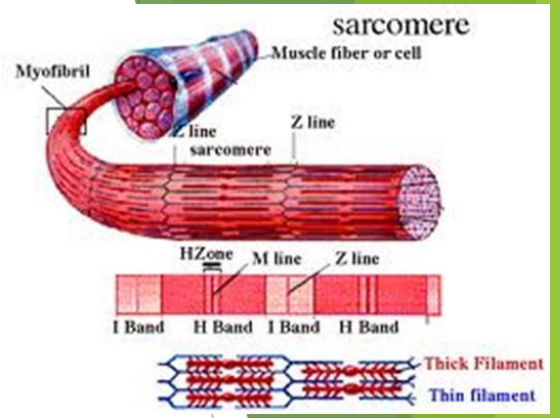


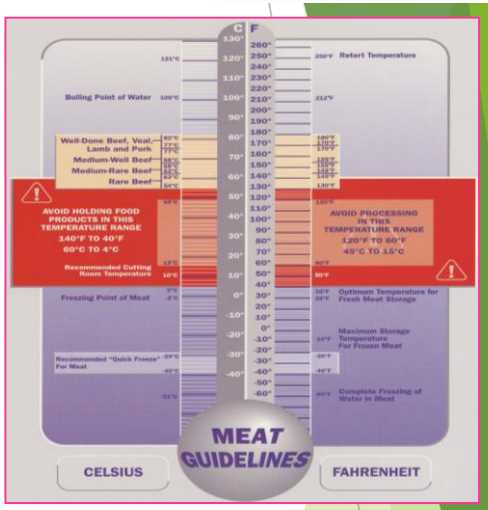
- **Goal: Raise animals to a maturity level that maximizes muscle, fat and bone development but manage fat content for cutability and quality.**
- **Providing a superior product to your buyer**



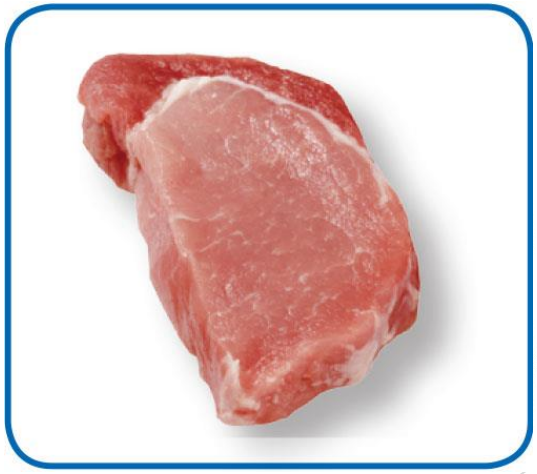
Post Mortem Effects

- Proper Chilling
  - 24-36 hour chill -Conversion of muscle meat
    - Beef Marbling
  - Internal temperature 35°F (1.7°C)
- Rapid Chill
  - Cold Shortening
  - Heat Ring
- Slow Chill
  - Very Expensive

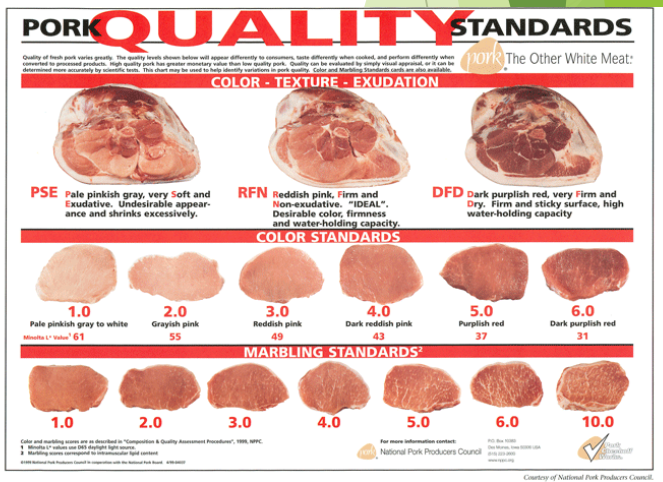




Beef: Heat Ring

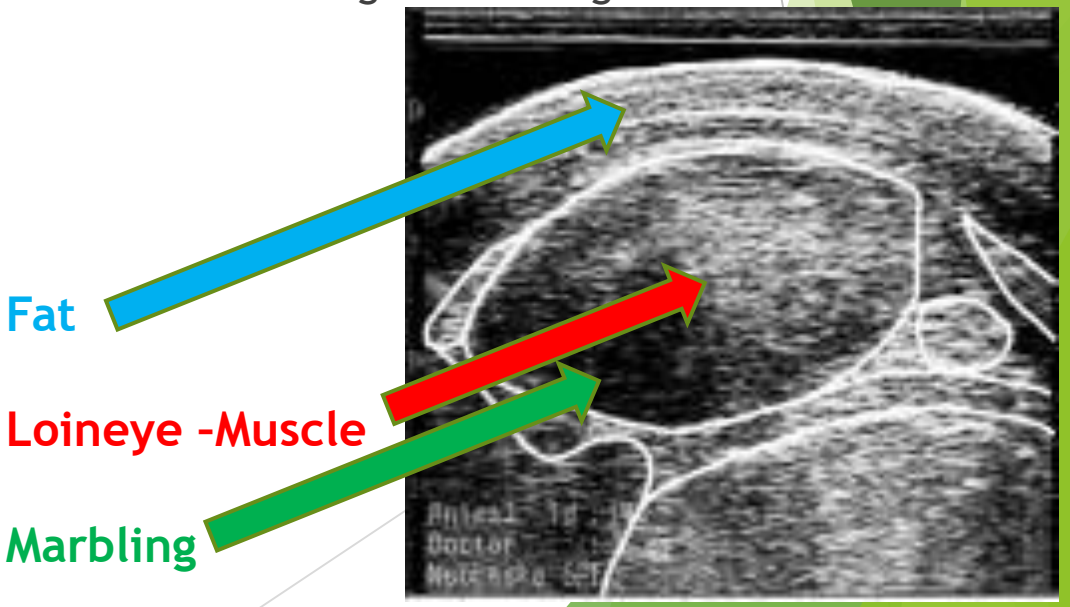


Pork: Light and Dark



Ultrasound Basis

- Ultrasound allows us to look inside the live animal and estimate carcass value.
- Carcass Weight
  - Live animal=carcass (muscle, fat and bone)+byproducts (organs, hide/skin, blood, waste fat, and meat and bone meal)+moisture loss
    - Animal are about 65% water and 35% protein, fat, minerals and vitamins
  - Carcass yield or dressing percent= carcass weight/live weight
- Measurements of Cutability
- Measurements of Quality



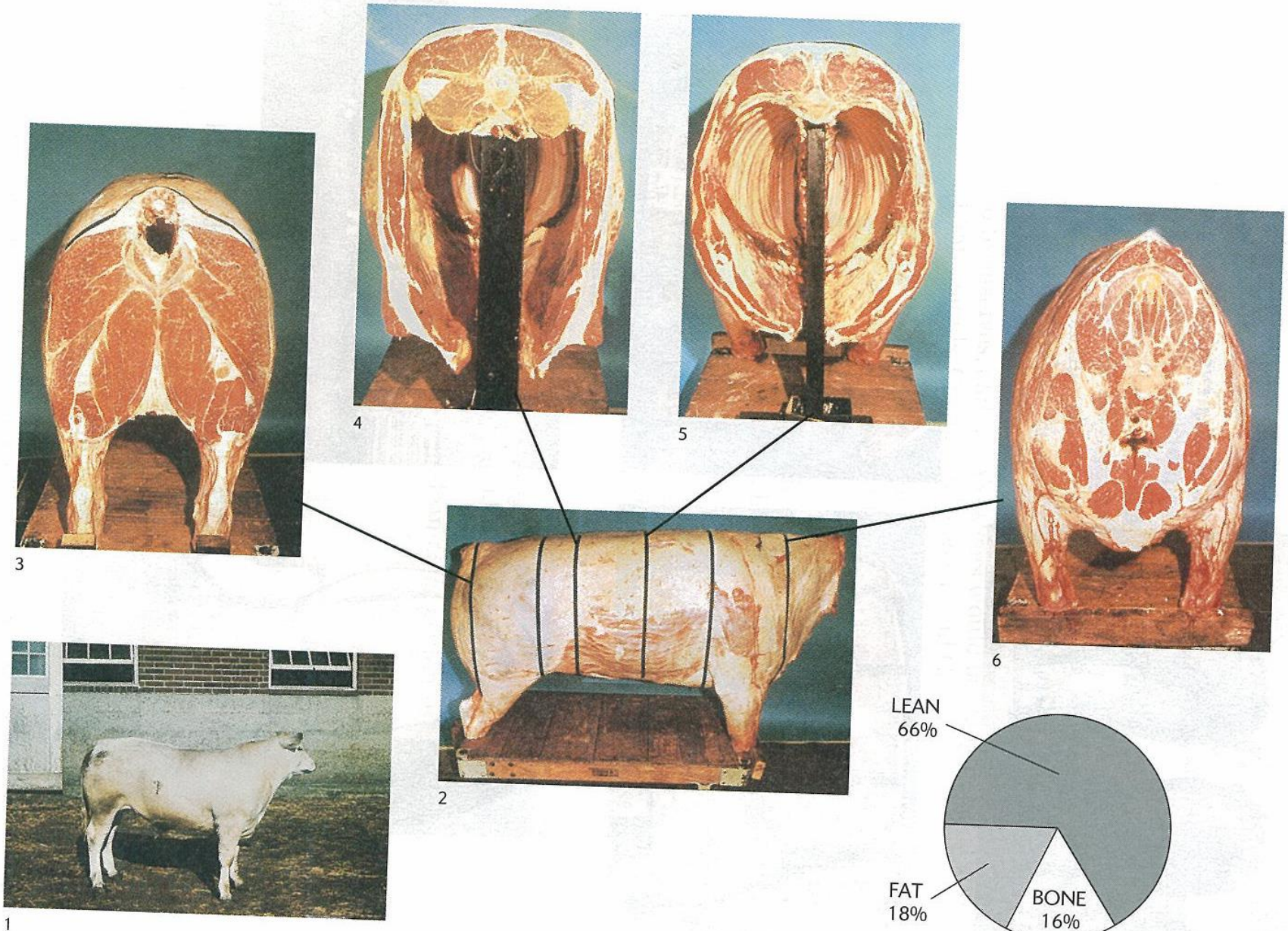
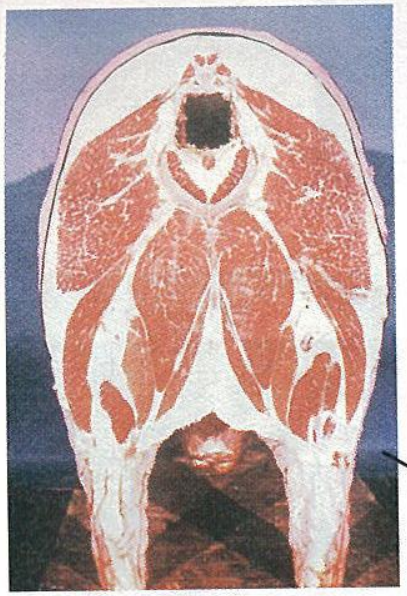


PLATE F Courtesy of Iowa State University.



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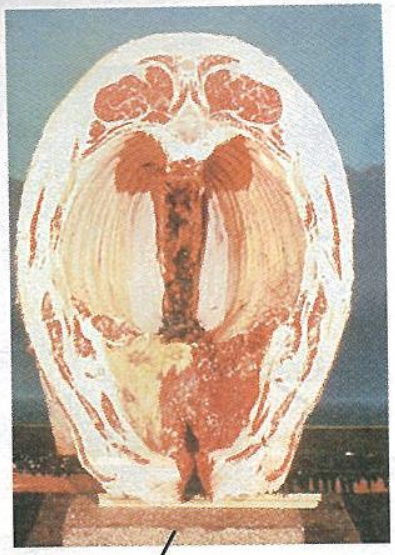

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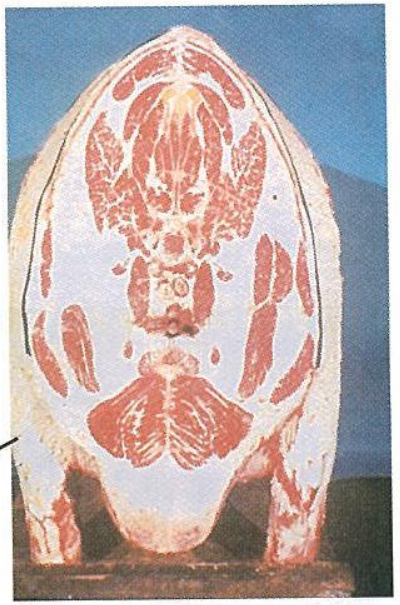

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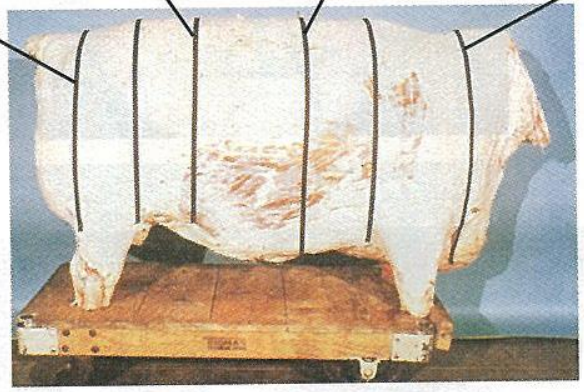

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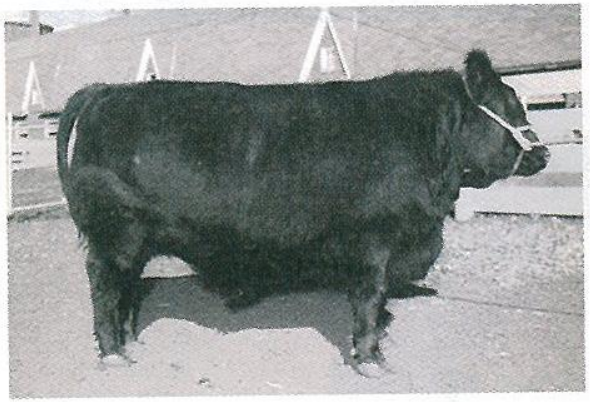

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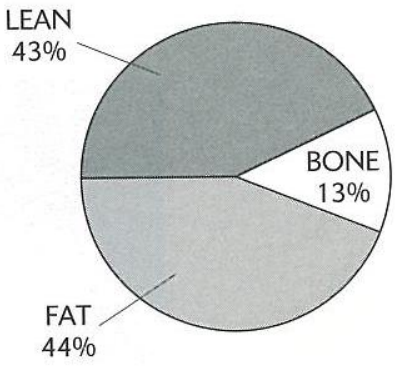
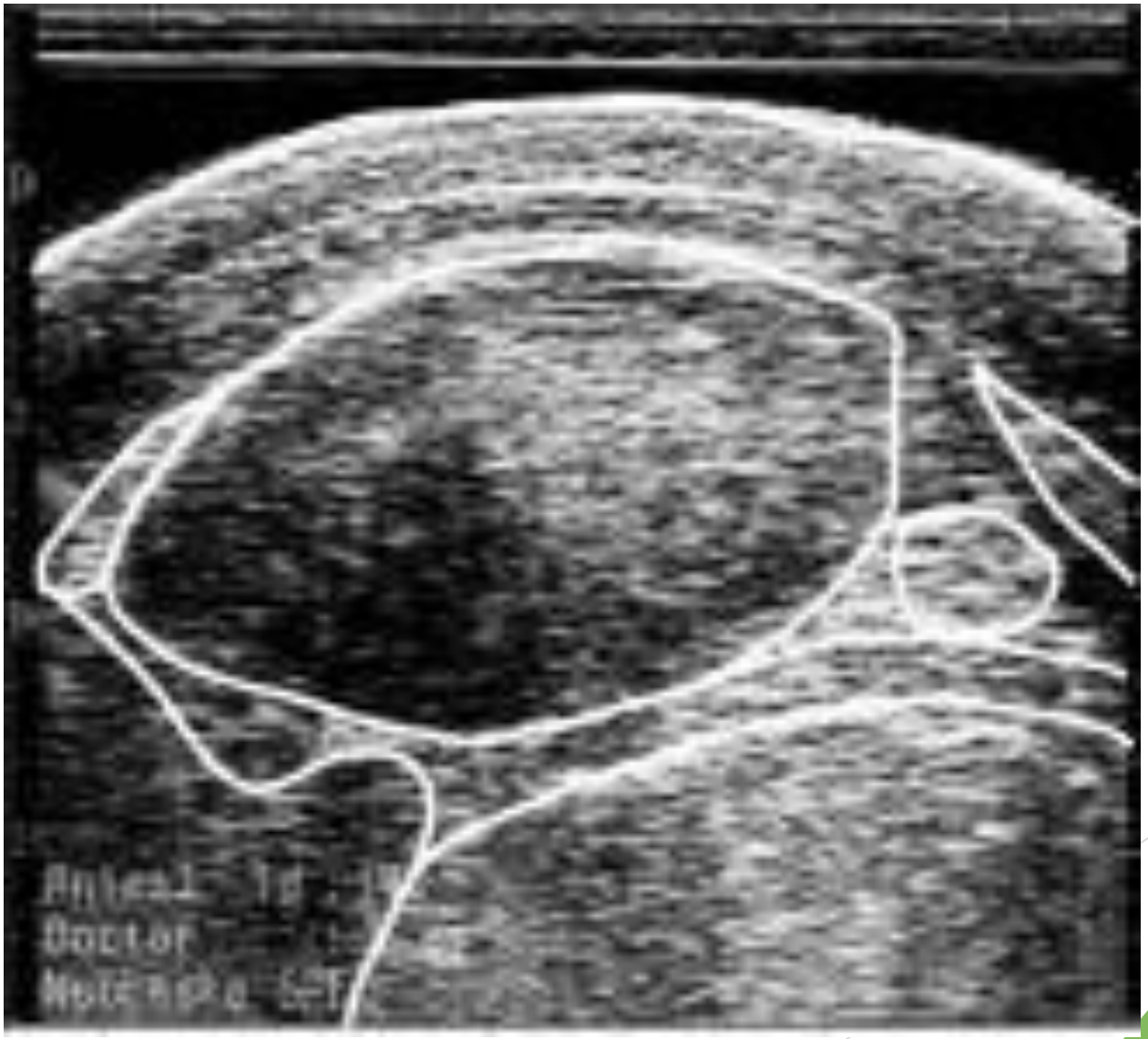


Swine Ultrasound

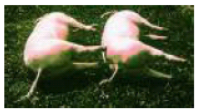


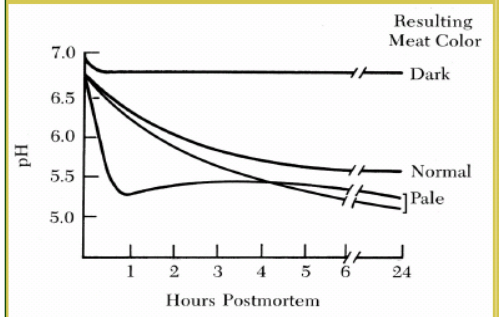
pH Management

CO_2 Stunning

Snap Chill

Pork Quality Factors



Postmortem pH Decline	Managing pH
 There is a direct relationship between pH decline and lean color, water-holding capacity, and firmness.	• Correctly managing postmortem pH is essential to producing high quality pork • Pale color, increased drip loss, and muscle softness result from a rapid pH decline postmortem • pH decline can be managed by ◦ *Improving swine genetics* ◦ *Reducing or eliminating stress prior to slaughter* ◦ *Stunning technique* ◦ *Rapidly chilling carcasses*

Source: Woerner, Colorado State University

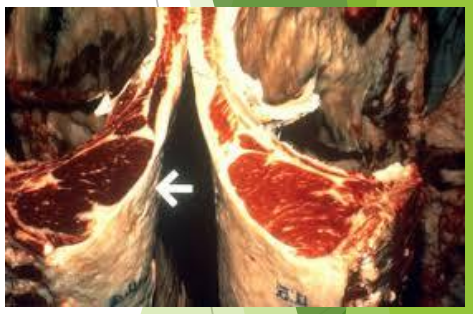
Source: Mabry, 2010 Iowa State University "U.S. Pork: a cut above in meat quality and value"

Swine

2017 DC FAIR SWINE ULTRASOUND								
Live Wt.	Sex B =1; G = 2	10th Rib Fat (cm)	10th Rib Fat (in)	LEA (cm^2)	LEA (in^2)	% Fat Free Lean	Index Value	Rank
277	1	1.60	0.63	68.60	10.63	62.54	62.04	1
240	2	1.30	0.51	61.88	9.59	64.51	62.01	2
236	2	1.30	0.51	52.11	8.08	60.23	61.23	3
245	2	1.40	0.55	63.09	9.78	64.19	61.19	4
265	2	1.30	0.51	56.60	8.77	59.87	60.87	5
276	2	1.10	0.43	50.72	7.86	57.26	58.26	11
273	1	2.10	0.83	61.52	9.54	58.33	57.83	13
281	1	1.10	0.43	45.45	7.04	54.41	55.41	28
265	1	2.90	1.14	53.39	8.28	52.76	53.76	37
275	1	1.80	0.71	45.98	7.13	52.73	53.73	38
253	1	2.00	0.79	55.72	8.64	57.57	53.57	39
249	2	2.40	0.94	46.11	7.15	52.52	53.52	40
289	2	2.60	1.02	46.11	7.15	50.09	51.09	48
281	1	1.80	0.71	45.96	7.12	52.43	50.43	49
287	1	2.80	1.10	59.38	9.20	54.41	48.91	50

How carcass data can help improve your project

- Proper selection:
  - History--Pedigree
  - Skeleton-Weight
  - Muscle
- Feeding
  - Proper balance between acceptable fat level and quality
    - Cattle: sufficient high energy feed to produce marbling
    - Under feeding vs. over feeding
  - Fat provides some shape and appearance on the live animal



- **Providing a superior product to your buyer**
  - **Hitting industry standards for quality and cutability**
  - **Feeding prior to departure**
    - **Provides muscle energy**
    - **Minimize stress induced meat problems such as dark cutting and PSE**