

# Ultrasound and the Livestock Industry

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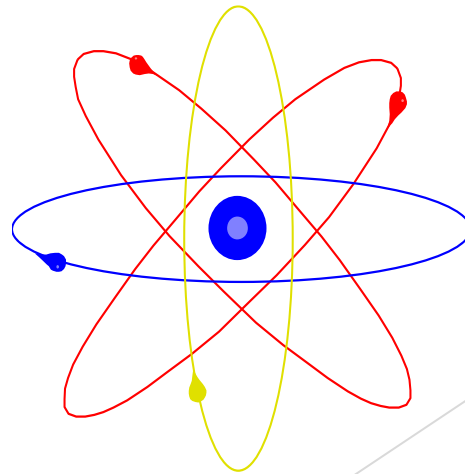
**Slides Created By:**

Kailey Barlow  
Sublette County Fair

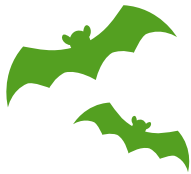
# Ultrasound Education

## What is ultrasound?

High Frequency Sound Waves!



# Examples



Bats



Moths



SONAR in  
WWII

# Use in Livestock



Used since 1950 for diagnostics



Real time ultrasound was introduced in 1984



Used extensively in the swine industry



Late 90's beef industry started to use ultrasound to generate EPD's

# Beef Cattle

- ▶ Yield Grade
- ▶ Dressing Percent
- ▶ Quality Grade



# Yield Grade

- ▶ A factor of:
  - ▶ Fat
    - ▶ Back Fat
    - ▶ Kidney, Pelvic, and Heart Fat
  - ▶ Muscling
    - ▶ Ribeye / Loineye Size

# Collecting Ultrasound Images

- ▶ Yellow Line: For ribeye and fat thickness image between the 12<sup>th</sup> & 13<sup>th</sup> ribs.
- ▶ Red Line: For IMF image across 11<sup>th</sup>, 12<sup>th</sup> & 13<sup>th</sup> ribs.



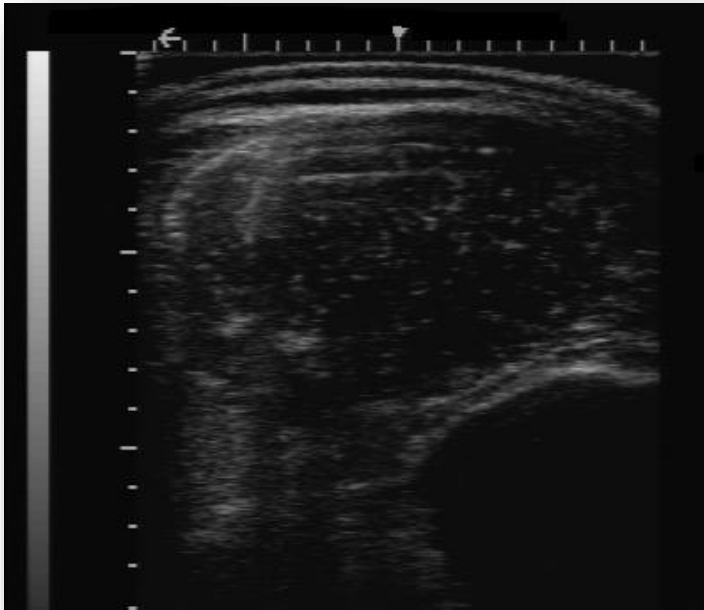


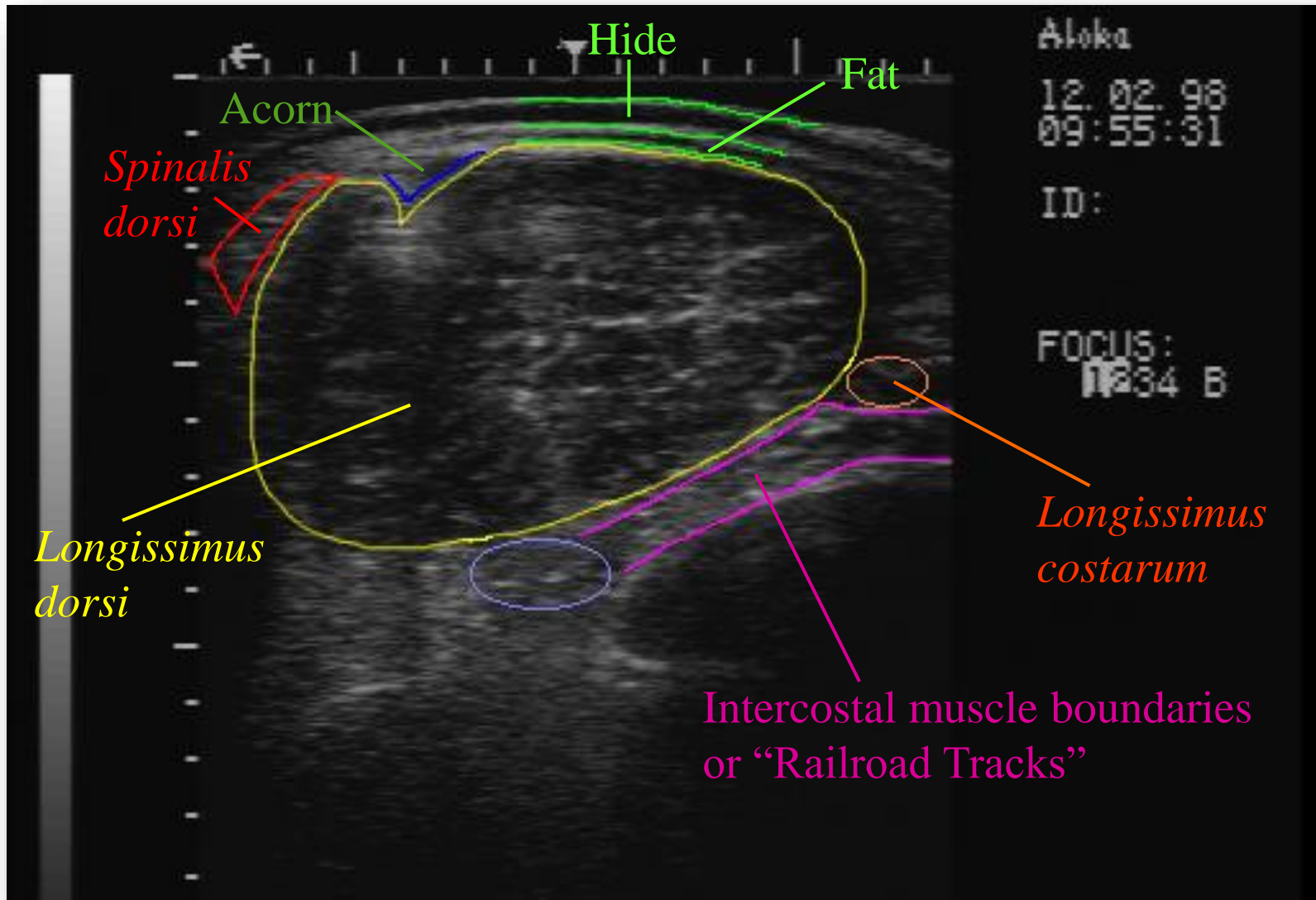
# Live Animal Carcass Evaluation

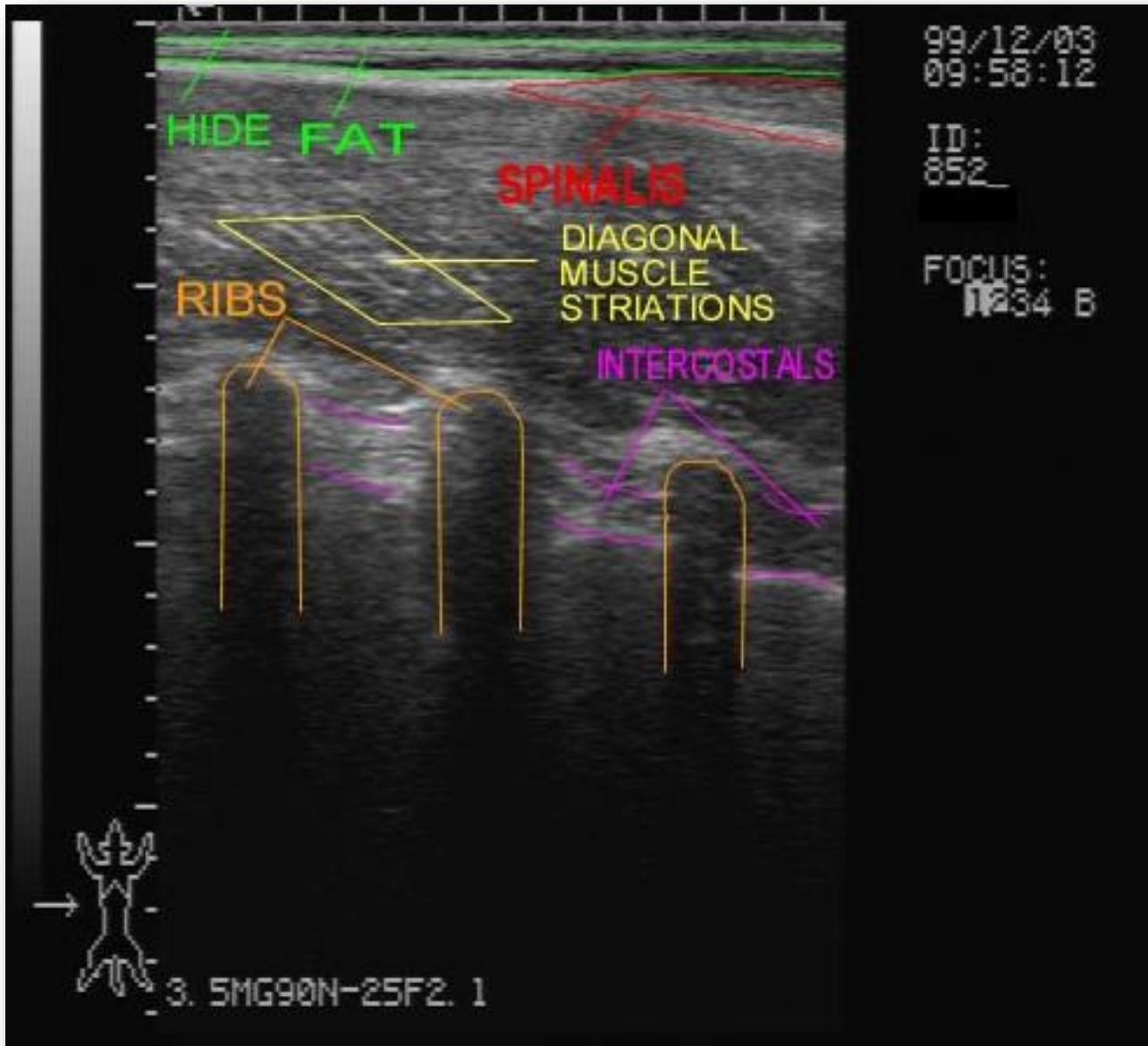
Preparing to ultrasound a steer using vegetable oil as a coupling agent.



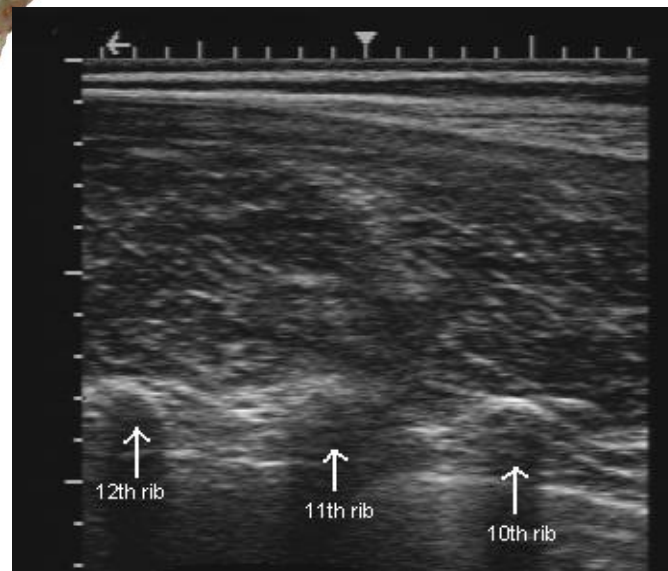
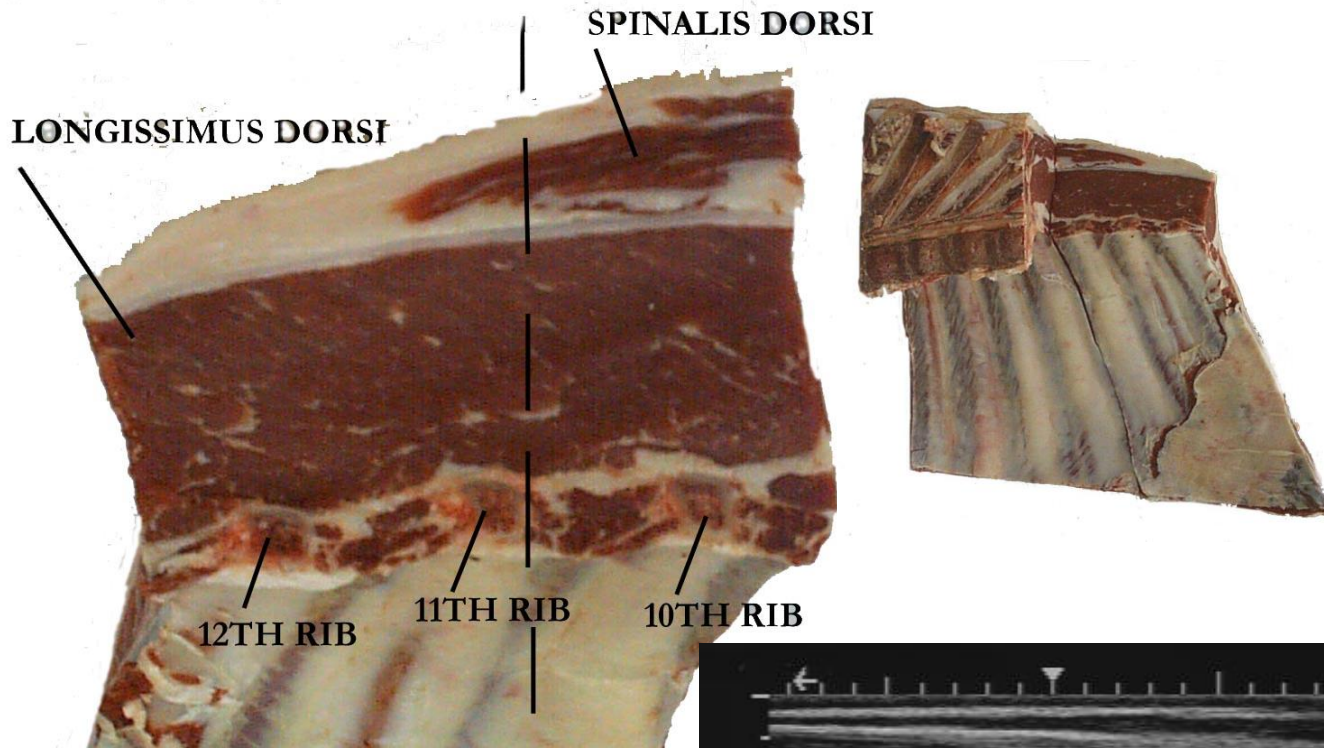
# Ribeye Image Landmarks



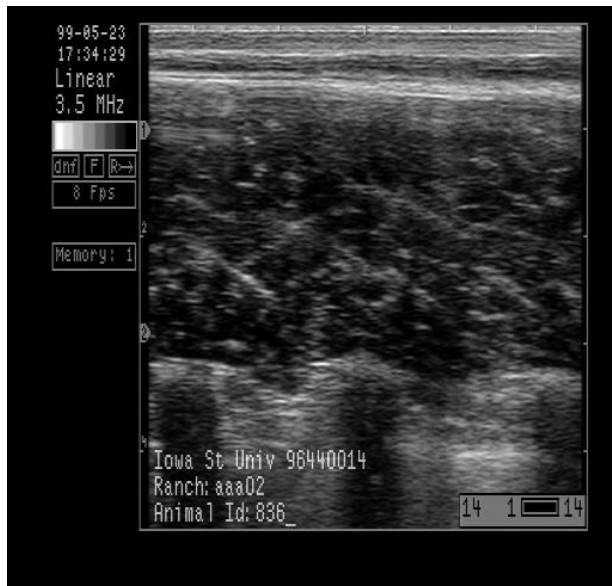




# Beef Cattle Anatomy







**IMF = 2%**



**IMF = 4%**

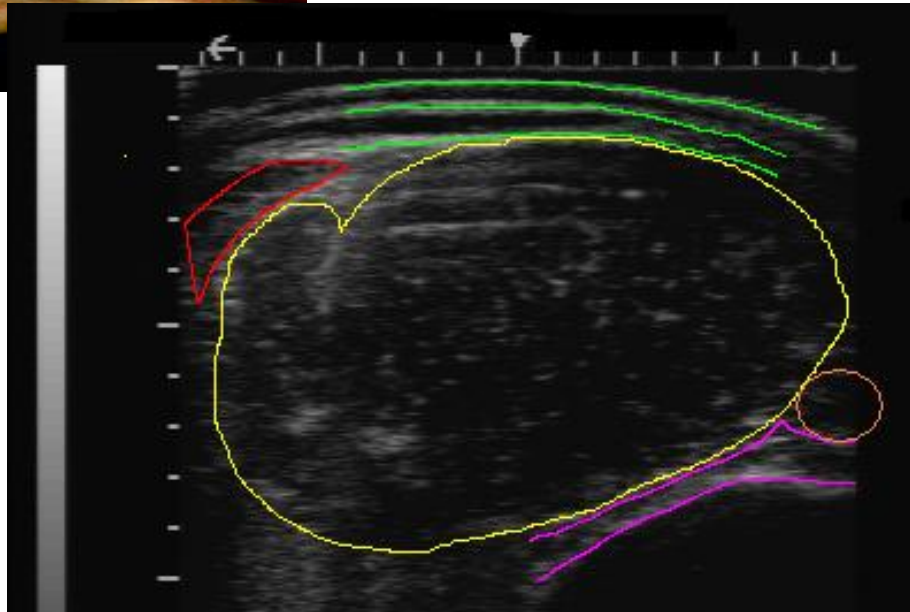
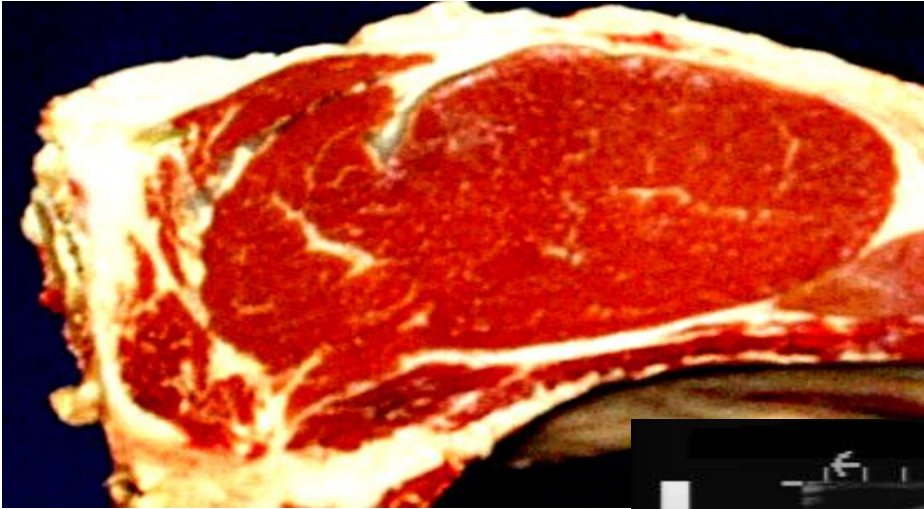


**IMF = 6%**



**IMF = 8%**

# Carcass vs Ultrasound

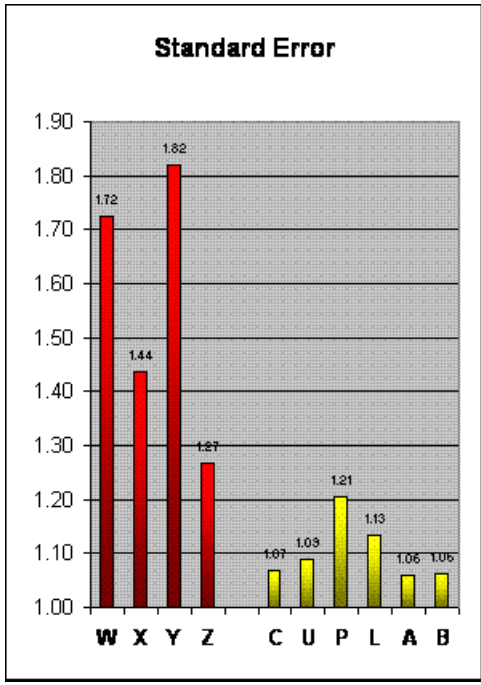
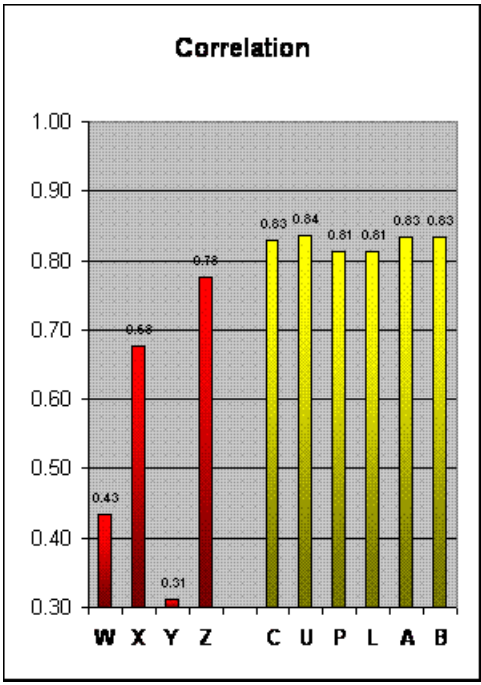


The image consists of two photographs of a ribeye steak, one above the other, showing the muscle and fat distribution. The top photograph shows a cross-section of the steak with a thick layer of white fat on the top and sides, and a large, dark red muscle area in the center. The bottom photograph shows a similar cross-section, but with a more pronounced intramuscular fat pattern, where small white flecks of fat are visible within the red muscle tissue.

# Accuracy of Ultrasound

- ▶ Fat Thickness Accuracy: 90%
- ▶ Ribeye Area Accuracy: 82%
- ▶ Intramuscular Fat Accuracy: >80%

# Accuracy of Marbling





# Beef Cattle

<b>Classic Percent IMF</b>	<b>Quality Grade</b>	<b>Marbling Degree</b>	<b>Marbling Score</b>
3.0-4.0	Select -	Slight 0-40	4.0-4.4
4.0-5.0	Select +	Slight 50-90	4.5
5.0-6.0	Choice -	Small 0-90	5.0-5.9
6.0-7.0	Choice 0	Modest 0-90	6.0-6.9
7.0-8.0	Choice +	Moderate 0-90	7.0-7.9
8.0-9.0	Prime -	Slightly Ab 0-90	8.0-8.9
9.0-	Prime 0	Moderately Ab 0-	9.0-

# Visual Evaluation



**Weight - 1225 lbs**

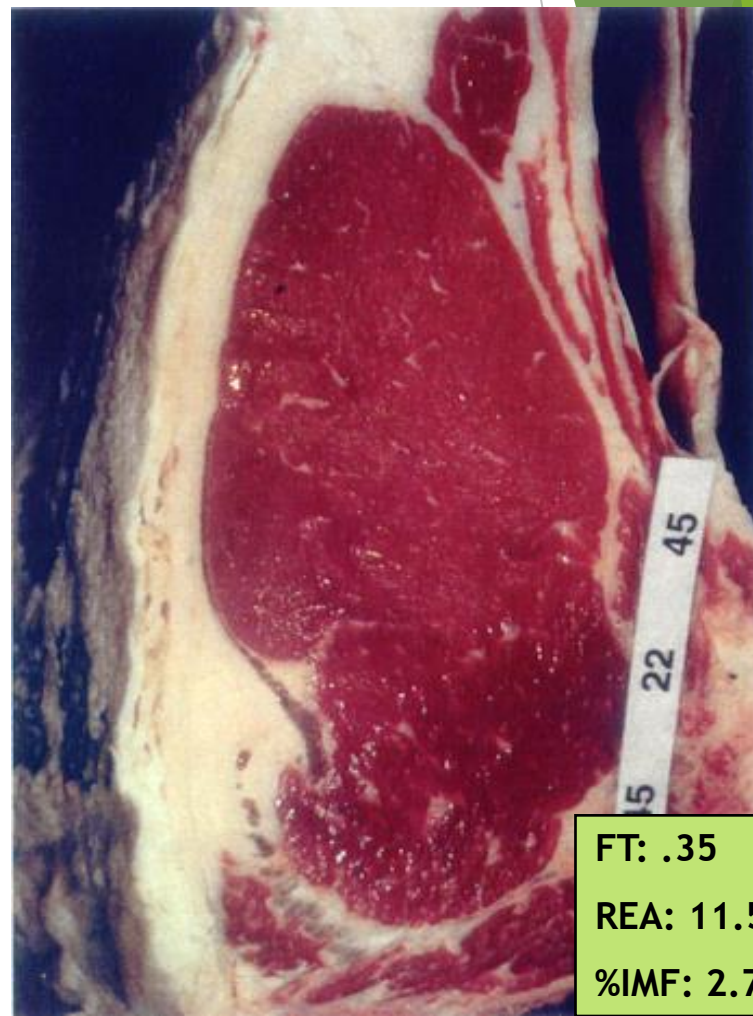


**Weight - 1220 lbs**

# Carcass Evaluation



FT: .35  
REA: 12.8  
% IMF: 5.72



FT: .35  
REA: 11.5  
%IMF: 2.78

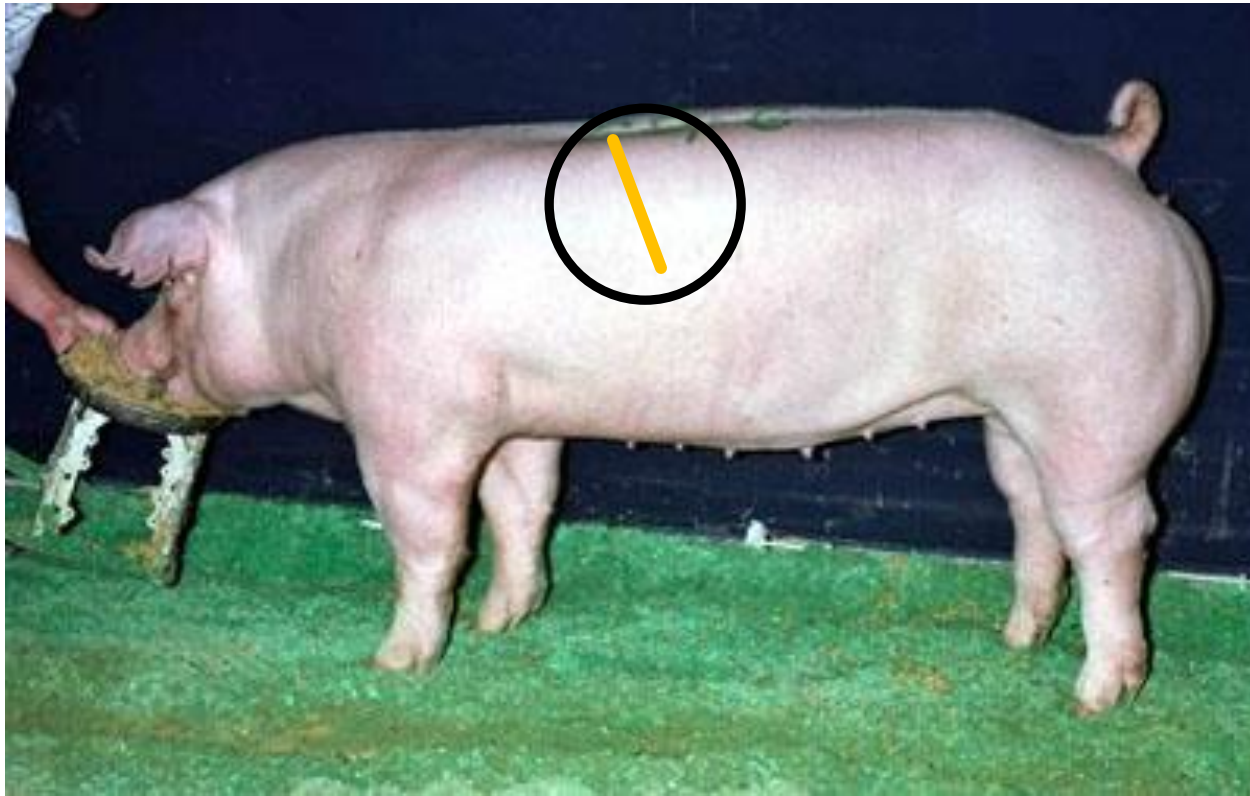
# Sublette County Fair Ultrasound Criteria

- ▶ Market Beef
  - ▶ Live Weight 1150 lbs. - 1450 lbs.
  - ▶ Fat Thickness .50inches (Maximum)
  - ▶ Ribeye Area 1 square inch/100lbs (Min)
  - ▶ % IMF 5.00% (Minimum)



# Collecting Ultrasound Images

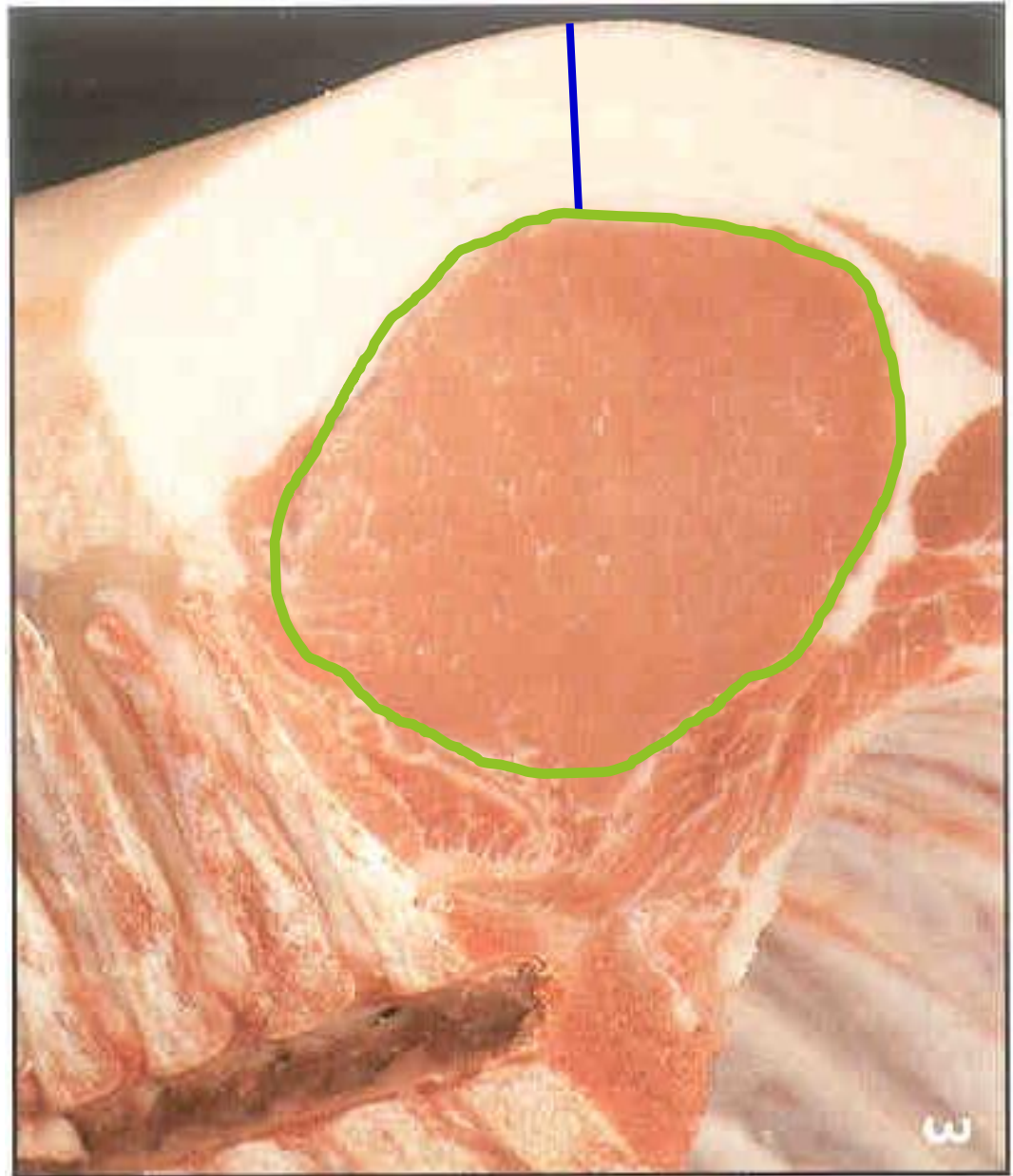
- ▶ Loin eye and back fat thickness are collected between the 10<sup>th</sup> & 11<sup>th</sup> ribs.



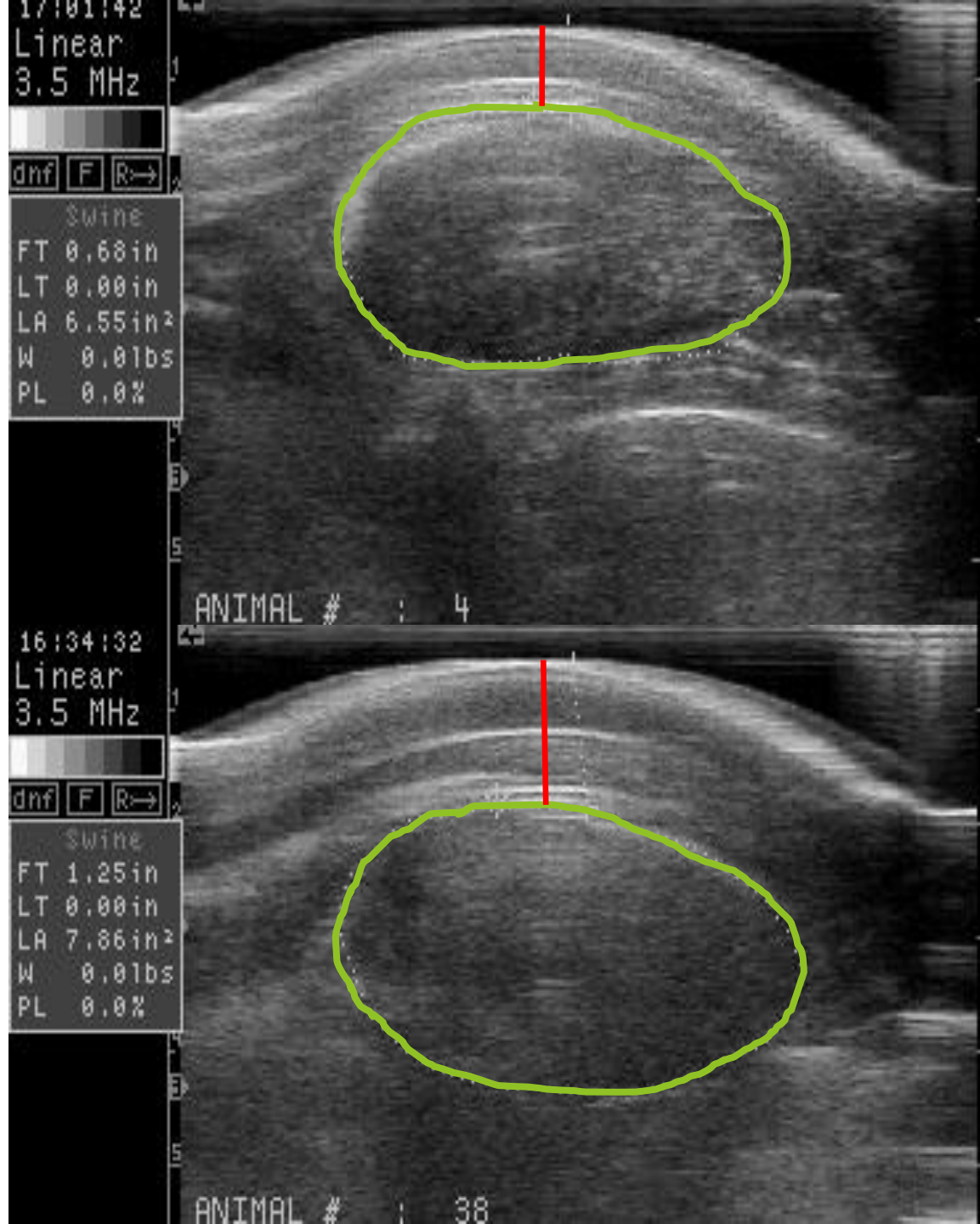


# Swine Muscle Anatomy

# Swine Muscle Anatomy



# Swine Ultrasound Evaluation



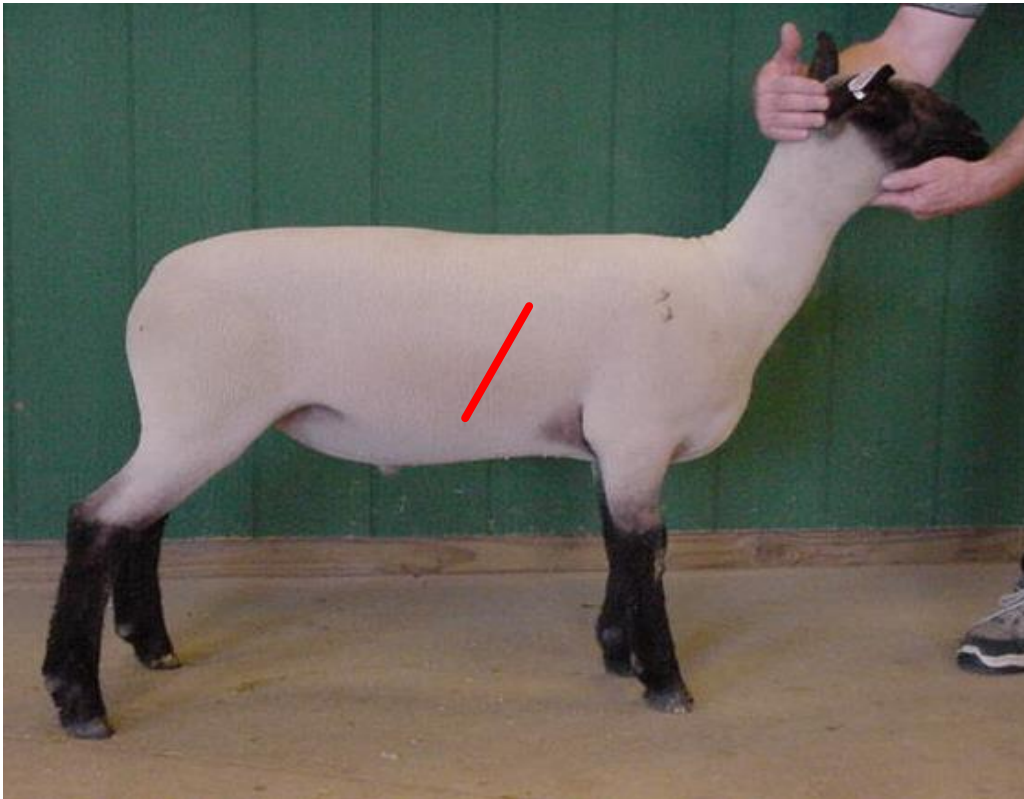


# Sublette County Fair Ultrasound Criteria

- ▶ Market Swine
  - ▶ Live Weight 1150 lbs. - 1450 lbs.
  - ▶ Fat Thickness .50inches (Maximum)
  - ▶ Ribeye Area 1 square inch/100lbs (Min)
  - ▶ % IMF 5.00% (Minimum)

# Collecting Ultrasound Images

- ▶ Ribeye area and fat thickness are collected between the 12<sup>th</sup> & 13<sup>th</sup> ribs.



# Lamb Carcass Measures



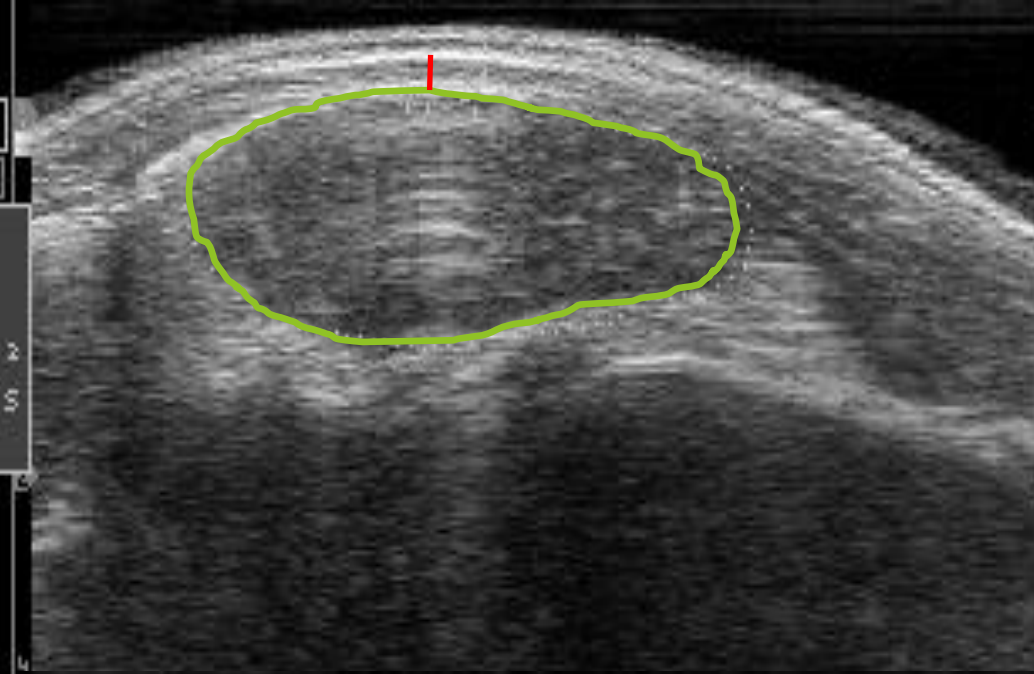
Live Weight: 129  
Fat Thickness: .30  
Ribeye Area: 2.80  
Yield Grade: 3.4



Live Weight: 132  
Fat Thickness: .14  
Ribeye Area: 3.10  
Yield Grade: 2.1

# Lamb Ultrasound Evaluation

Linear  
3.5 MHz  
dnf F R→  
Sheep  
FT 0.21in  
LT 0.00in  
LA 3.01in<sup>2</sup>  
W 0.01bs  
PL 0.0%



Linear  
3.5 MHz  
dnf F R→  
Sheep  
FT 0.19in  
LT 0.00in  
LA 2.43in<sup>2</sup>  
W 0.01bs  
PL 0.0%



# Sublette County Fair Ultrasound Criteria

- ▶ **Market Lambs**
  - ▶ Live Weight 1150 lbs. - 1450 lbs.
  - ▶ Fat Thickness .50inches (Maximum)
  - ▶ Ribeye Area 1 square inch/100lbs (Min)
  - ▶ % IMF 5.00% (Minimum)

# Carcass Correlations

Heavy Muscling vs. Marbling



Growth vs. Holding



The “Good Life” vs. Stress



Back Fat vs. Marbling

# Challenges Using Ultrasound



Fat and  
Marbling



Hair/Wool/Dirt



Water



Temperature



Facilities



Equipment



Movement



Technician

# Summary

- ▶ Ultrasound is a Tool
  - ▶ Accurate—nothing is 100%
  - ▶ Immediate
  - ▶ Cost
- ▶ Deal with the Challenges