

**Ultrasound – Based Management
Pitfalls and Rewards**

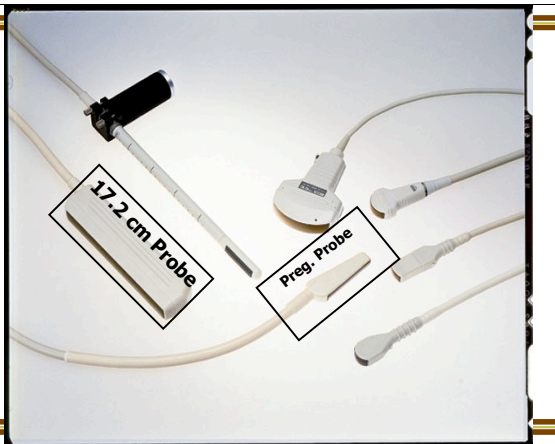


Steve Paisley

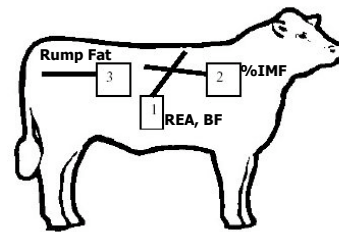
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Best way to evaluate a ribeye!!!



Scanning locations for carcass traits



Backfat Thickness

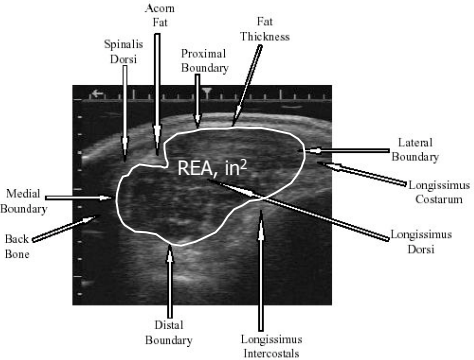
- ✦ **Strictly a linear measurement**
- ✦ **Most accurate of all ultrasound measurements**
 - **Correlations with Ultrasound vs. Actual Carcass BF .76 - .93 0.9546**
 - **Tend to overestimate BF in fatter cattle, underestimate in leaner cattle**
 - **Genetic correlations estimated at .57, with heritability of .38**

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12-13th Rib Fat Thickness and Ribeye Area



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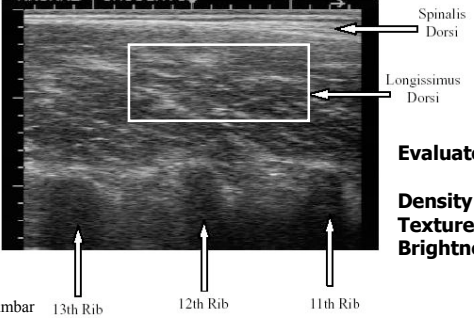
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Ultrasound REA estimates

- ✦ **Two-dimensional measurement, therefore more difficult to estimate**
 - **Correlations for REA range from .43 to .95 0.767 0.84 (Testing Avg.)**
 - **Average ABSOLUTE differences must be within 1.0 to 1.1 in²**
 - **Genetic correlation .59, heritability .29**
 - **REA very dependent on skill of technician**



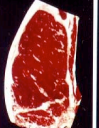

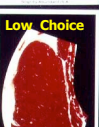
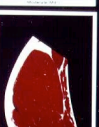
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Estimates of %IMF (Marbling)



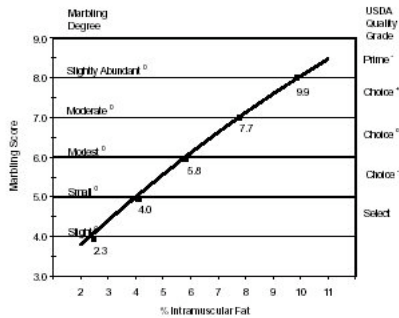
Evaluate:
Density
Texture
Brightness

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Moderately Abundant	Slightly Abundant	Moderate
 Avg. Prime	 Low Prime	 High Choice
 Avg. Choice	 Low Choice	 Traces
Modest	Small	Traces

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Conversion of %IMF to Marbling



Ability to estimate marbling

- Correlations for %IMF and actual marbling scores range from:
 - .39 (Wilson et al., '93)
 - .85 (Brethour, 2000)
 - 0.7262**
- Current minimum standard .67
 - (Range of .84 to .64)
- Accuracy has improved because of:
 - Improved equipment and software
 - The ability to collect multiple measurements/animal

Three Separate Discussions:

- Ultrasound Information Collected and Submitted to Breed Associations
 - Ultrasound data used in sire selection
 - Adjusted for mgmt, environment, herd, etc.
 - Used in EPD values
- Chuteside Ultrasound Applications:
 - Feedlot ultrasound data
 - Commercial beef herd data – repl. Hfrs.

Ultrasound in Seedstock applications h² Estimates for Carcass Traits

		LMA	FAT	MARB
Kemp et al.	2002	.45	.35	.42
Pariacote et al.	1998	.97	.46	.88
Gregory et al.	1994	.47	.30	.52
Koots et al.	1994	.42	.44	.36
Marshall	1994	.37	.44	.35
Arnold et al.	1991	.46	.49	.35

Genetic Correlations Between Seedstock Ultrasound and Steer Carcass Traits

Source	Ribeye		Marbling /IM
	Area	Fat	
Devitt and Wilton (2001)	.66	.88	.80
Moser et al. (1998)	.66	.69	
Reverter et al. (2000)	.46	.67	.54

Seedstock applications of Ultrasound

- Selection using carcass EPD is effective
- Greater total amount of ultrasound data vs. actual carcass data
 - Results indicate that ultrasound data can be an effective tool to complement actual carcass data in genetic evaluation programs
- Impact/interaction of individual animal maturity and ultrasound data
 - Impact of puberty on marbling

**Roberts et al., 2005 – Ft. Keogh USDA-ARS
Impact of feeding program on growth, attainment of puberty, and carcass traits**

Table 3. Values of various traits that result in predicted proportions of pubertal heifers of 25 and 45 percent

Trait	25 % pubertal	45 % pubertal
IMF, %	3.23	3.99
FT, mm	3.56	5.33
ADG, kg/d	0.59	0.81
¹ Hip Ht, cm	114.6	118.7
¹ BW, kg	303	328
¹ LM area, cm ²	53.5	61.3

¹These traits were only significant in control fed heifers.

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Predicting Marbling in Weaned Calves (Brethour, 2000)

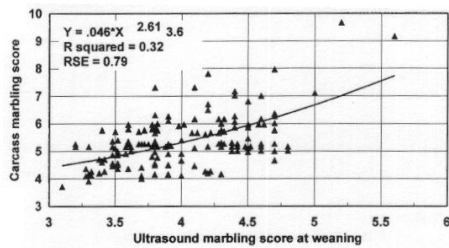
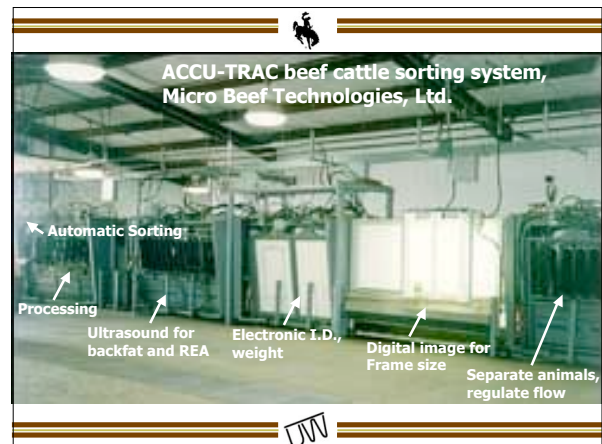
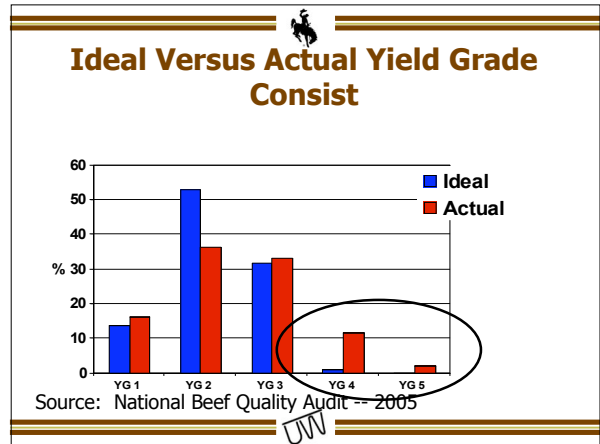
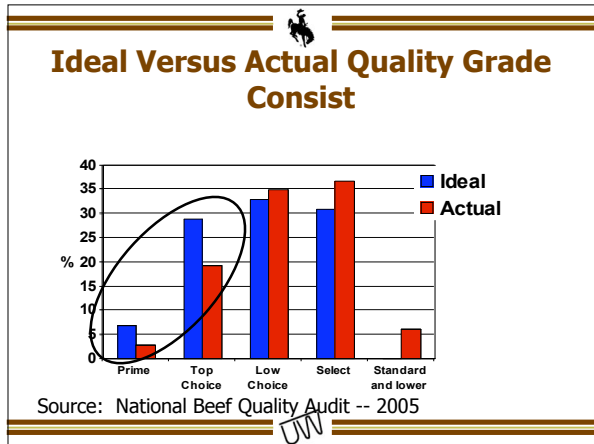


Figure 1. Ultrasound marbling estimate on calves (average age = 210 d) and carcass marbling scores 252 d later.

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Example Grid: Premiums and Discounts

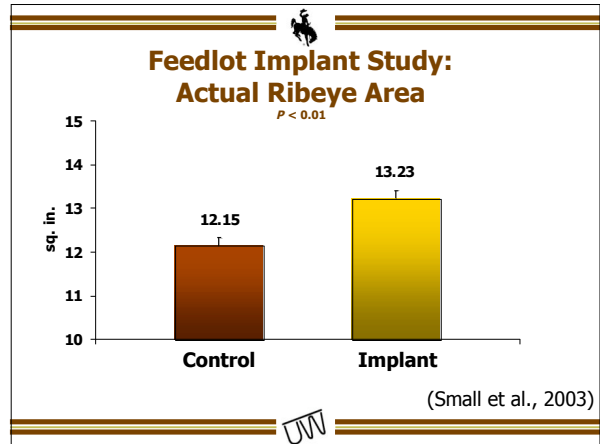
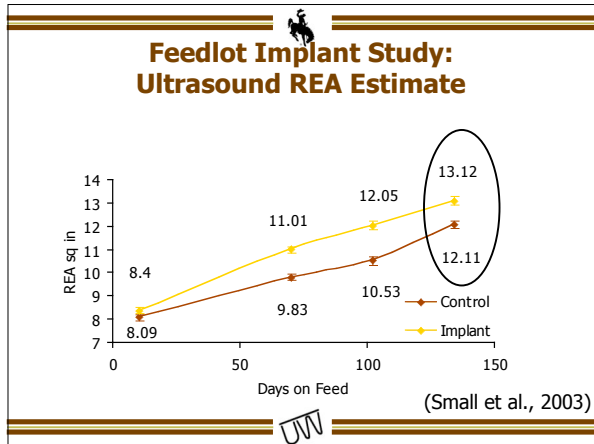
Carc. Attributes	Yield Grade				
	1	2	3	4	5
Prime	+9.50	+9	+6.50	-13.00	-18.00
CAB	+5.50	+4.00	+2.50	N/A	N/A
Choice	+3.00	+1.50	Base	-20.00	-25.00
Select	-2.00	-3.50	-5.00	-25.00	-30.00
Standard	-23.00	-23.00	-23.00	-28.00	-33.00

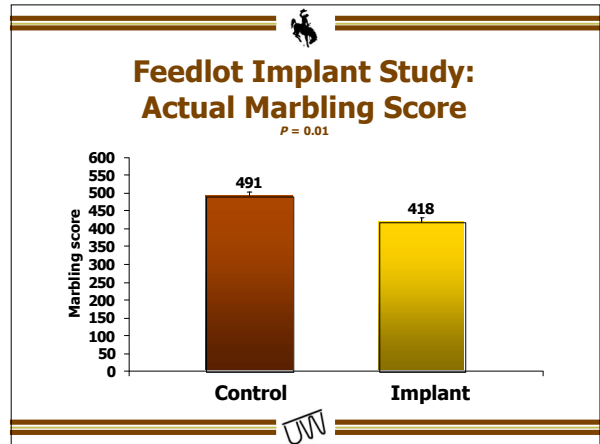
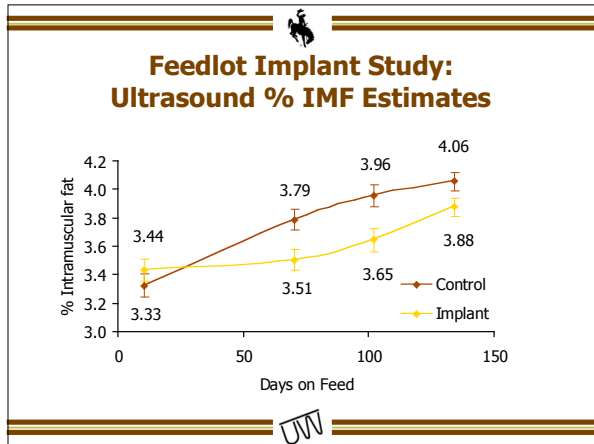
Dk. Cutter	-35.60
Light Carc (<600)	-28.60
Heavy (>900 lb)	-23.60

Severe discounts that cattle owners & managers must avoid

Use of Ultrasound in cattle feeding:

- Based on initial estimates of BF, REA and %IMF can we:
 - Manage cattle differently to
 - Decrease number of discounts
 - Improve overall carcass merit
 - Improve uniformity



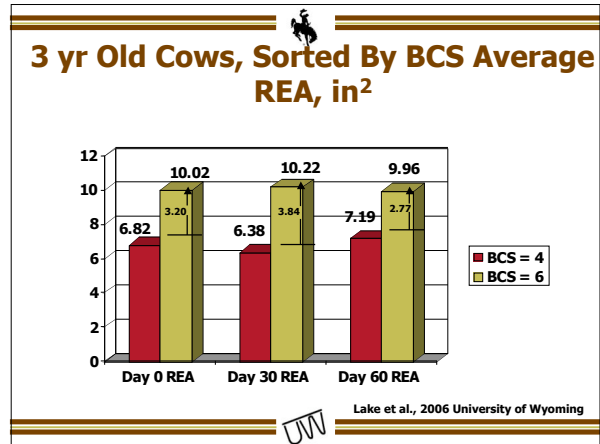
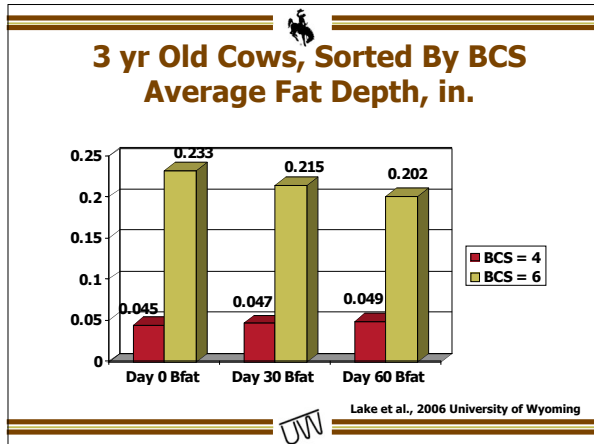


Possible Management Tool:

- ▣ Ultrasound as initial sorting tool
- ▣ Implant strategies according to initial IMF
- ▣ More uniform marketing group
- ▣ Target grids

Beef Cattle Body Condition Scoring

- ▣ Estimate of body reserves
- ▣ Used as a management tool to evaluate nutritional program
- ▣ Addition of Ultrasound to improve observations
 - ▣ ND, K-State, NMSU all use ultrasound to estimate backfat



Additional Opportunities: Cow-calf Nutr/mgmt.

- ❑ Evaluating potential replacement heifers
 - Evaluate REA, %IMF
 - Adjust REA for weight of heifer (REA/cwt)
 - What type of heifer would work best in your production environment?
 - Can we remove the bottom 10% inferior animals?

Chuteside Ultrasound – Potential Cautions:

- ❑ Ribeye area must be evaluated in the correct context:
- ❑ Ultrasound, and Carcass EPD's must be a subset of many traits evaluated
- ❑ From a commercial application, it a "point in time" measurement
 - Compare similarly managed cattle only
 - Difficult to compare to other cattle, situations

Benefits for Commercial Producers

- ❑ Aids in removing in-herd variation
 - Small ribeye (potential YG 4's if retaining ownership)
 - Can assist in positive improvement in marbling
- ❑ If considering retaining ownership:
 - Evaluate heifers to remove variation, also getting an estimate of carcass merit for herd
- ❑ Should be used in the correct context

Additional Opportunities: Backgrounding / Feedlot

- ❑ Effect of weaning date/management on development of BF, REA, IMF
- ❑ Combining Ultrasound and genetic markers as selection tools



Thank You!

