



## Ultrasound Guidelines Council

### "THE UGC BUCKET LIST"

PATRICK WALL, EXECUTIVE DIRECTOR

JUNE 21, 2018

## 2018-2019 Highlights

- Drafted, edited, and approved Constitution & Bylaws – Nov 2018
- Performed 6 UGC Lab Technician Certifications
  - Approximately 30 UGC-certified lab technicians
- Collected Carcass Data & Ether Extract on 69 head
  - Part of the 2018 & 2019 UGC Field Technician Certification
  - 40 more head scheduled to be collected Fall 2019
- Discontinued *In Absentia* Field Certification
- Field Certification required for all 125 technicians by the end of 2020
  - Some had not had carcass data behind their equipment in 15 years
  - Many had purchased new machines with no carcass data comparisons
  - Changed from 20 head twice to 40 head once

## UGC Board of Directors



### Member breed associations (4)

- 4-year term, Vice-Chair year 3, Chair year 4

### UGC-accredited ultrasound laboratories (3)

- Limit of 3 labs, continuous term

### UGC-certified field technician (1)

- 4-year term

### Academia / Industry / Researchers (3)

- 3-year term, 1 new member annually

### Executive Director

- Paid employee, non-voting member

## Current UGC Board



- Kelli Retallick – American Angus Association (Chair)
- Matt Woolfolk – American Shorthorn Association
- Shane Bedwell – American Hereford Association (Vice-Chair)
- Breed Association Representative #4
- Mark Henry – The CUP Lab
- Becky Hays – Ultrasound Insights
- Rethel King – International Livestock Image Analysis
- Jolene Grunhaupt – Field Technician representative
- Dr. J.R. Tait – Neogen
- Dr. Dean Pringle – University of Georgia
- Dr. Sean McGrath – Canada
- Patrick Wall – Executive Director

## The Field Technician Certification Process



- Written Exam
- Collection of 1-2 Rump, 1-2 Ribeye, & 3-5 IMF Images
- Scan 40 head of cattle – NEW!
- Animals are clipped & pre-scanned
  - Cattle vary in sex, age, weight, and body condition
  - At least 75% of cattle will be harvested – NEW!
- 3 minute time limit per head
- Continuing Education program

## The same tool...



- Ribbing mistakes (butchers too)
- Cutting mistakes/knife angle
- Chill time/Bloom time per plant
- experience of the operator



## #1: Try to prove that ultrasound data for REA & Fat are NOT indicator traits!



- “Birth weight is an indicator trait for CED, ‘cause calving ease is how we get paid.”
- Ultrasound Ribeye Area is an indicator trait for REA EPD, because Carcass Ribeye Area is how we get paid.
  - What about discounts for REAs that are too big???
  - “Ultrasound REA and Carcass REA are both indicator traits of REA EPD, because USDA Yield Grade is how we get paid.”
- Ultrasound Fat thickness and Carcass Fat thickness are both EQUAL indicator traits for USDA Yield Grade
  - Both knife cut removal and hydraulic hide pullers cause error
  - Implant strategy, diet, etc.

## What about camera grading?



## The USDA Certification System

<https://www.ams.usda.gov/sites/default/files/media/ProcedureForRibeyeApproval2003.pdf>  
<https://www.ams.usda.gov/sites/default/files/media/YieldGradeStandard2005.pdf>  
<https://www.ams.usda.gov/sites/default/files/media/YieldGradeStandardAddendumA2007.pdf>  
<https://www.ams.usda.gov/sites/default/files/media/LSStandPrimer1.pdf>  
<https://www.ams.usda.gov/sites/default/files/media/LSStandPrimer1Addendum2012.pdf>  
<https://www.ams.usda.gov/sites/default/files/media/Override40%20Study.Plants%20Blind.d.20150612d.pdf>  
<https://www.ams.usda.gov/sites/default/files/media/PostImplementationOverrideStudy20160518.pdf>

## USDA Online Camera Grading REA Certification Process



- ❖ Protocol was developed in 2003
- ❖ Three experienced people measure the REA, then average it.
- ❖ Three experienced people trace, then measure the REA on 600 images from the camera system
- ❖ Operational Accuracy  $R^2 = 0.85$  or greater; 95% of rib eye area observations within 2.0 square inches of the actual mean ribeye area, and the residual standard deviation (RSD) shall not exceed 1.00 square inches. Correlation = **0.92**
  - ❖ **UGC Technician Correlation to Carcass: 0.87**
- ❖ Breed Associations have historically given more genetic merit to carcass REA
- ❖ Opinion: It makes no statistical logic to take ALL of the carcass data error and give it ALL to the ultrasound trait.

## USDA Online Camera Grading Yield Grade (YG) Certification Process



- ❖ Protocol was developed in 2005
- ❖ Three experienced people calculate the YG on still carcasses, then average it.
- ❖ Three experienced people calculate the YG on 200 images from the camera system
- ❖ Operational Accuracy  $R^2 = 0.90$  or greater; 95% of predicted yield grade observations within 0.5 units of the *actual expert calculated yield grade*, and the residual standard deviation (RSD) shall not exceed 0.25 yield grade units.
- ❖ Amended the protocol in 2007 to assess PYG because the camera could not accurately assess overall carcass fat, standards were relaxed. (hide pull)

## Carcass Data Error

### Hide Pull



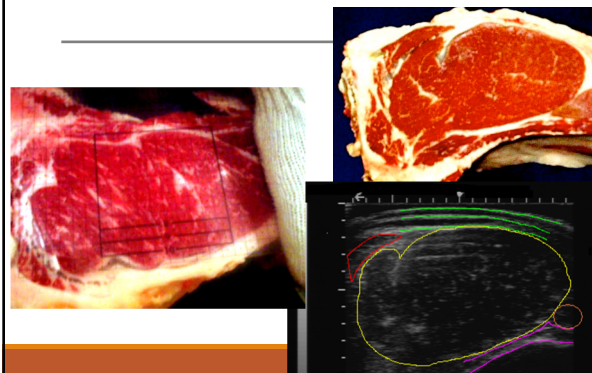
## Carcass Data Error

Ribbing mistakes – tendency to be forward on light carcasses

**5-10%**

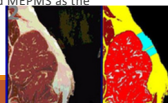


## What's the Answer Key???



## USDA Online Camera Grading Marbling Score Certification

- ❖ Protocol was developed in 2006, altered in 2012 to include all grades
- ❖ Five experienced people determine MS in 30 minutes, then average it.
  - ❖ According to carcass employees, minimum 10 minutes from knife to USDA grading
- ❖ Carcasses were eliminated if the expert panel did not agree
- ❖ Cameras were certified on 4 trials of 1,000 head
- ❖ Three images per carcass...sound familiar?
- ❖ Average residual =  $0 \pm 10$  marbling score units where the residual is the difference between the instrument marbling score and MEPMS;
- ❖ The standard deviation of the residuals (rSD) from the MEPMS  $\leq 35$  marbling score units; and,
- ❖ Slope of  $0.000 \pm 0.075$ , using the residual from the MEPMS as the dependent variable (y-axis) and the average of the instrument marbling score and MEPMS as the independent variable (x-axis).



## USDA Online Camera Grading Marbling Score Certification

- ❖ USDA Graders complained that the override tolerance was too narrow
- ❖ Camera cannot assess coarse marbling
- ❖ Inaccurate on really small or really large ribeyes
- ❖ Marbling tolerance was widened from 10 to 100, then back to 40 in 2015
- ❖ 4 plants tested
  - ❖ 5.3% were overrides
  - ❖ 89% were missed by 40 or more
  - ❖ Cameras had a positive bias to quality grade
  - ❖ Tested blindly again in 2016, override fell to 1%
- ❖ Plant-to-plant variation is why %IMF is necessary.



## #2: Rump Fat

"THE BREEDING PAD."

- JR Tait, PhD. piloted the research.
- Attempted to increase % retail product EPD prediction.
- All done on *bos taurus* cattle.
- Can we use Rump Fat to better assess eared cattle, heifers only, or use a % of it in the Fat EPD?
  - Graders use it, but it's visual!
- Should we relook at it or discontinue collecting it altogether???



## Ultrasound never makes a mistake here!

-USDA protocol now includes dentition as an approved form of aging.

RELATIONSHIP BETWEEN MARBLING, MATURITY, AND CARCASS QUALITY GRADE*					
Degrees of Marbling	Maturity				
	A	B	C	D	E
Slightly Abundant	PRIME				
Moderate			COMMERCIAL		
Modest	CHOICE				
Small					
Slight	SELECT		UTILITY		
Traces					
Practically Devoid	STANDARD			CUTTER	CANNER

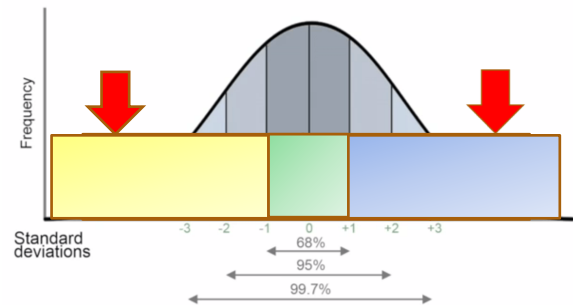
## Quotes from the “answer key” ...



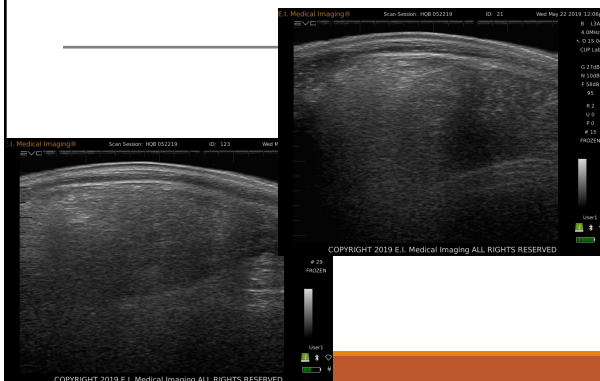
- > “If we’re short on Premium Choice, I usually just rail off about 5 head in the first hour...he gets mad, but he stamps them all after that.”
- > “We do rock-paper-scissors when the Louisiana guy (USDA Grader) hits the line. We continually stuff the re-grade rails...but he doesn’t seem to know why.”
- > “We start discounting at 950lbs. (HCW)...but they’re not actually considered ‘out’ cattle until 1050.”
- > “I don’t carry a knife because he’s always right!”

## #3: The Marbling Bell Curve

> Are we asking too much of an ultrasound machine?



## #4 The struggle with Fat & Prime



## #5 The struggle with technology

- ❖ In humans, ultrasound images are impacted by skin tone, nationality, body condition, etc.
  - ❖ Technicians alter gain settings, magnification, and focus to get the clearest picture
  - ❖ Machines are laptops or up to large platforms and can detect blood flow
- ❖ In agriculture, ultrasound machines are largely getting smaller and more portable, few are willing to manufacture a carcass probe



## Summary

- ❑ UGC will try to mirror the USDA procedure for validating carcass data when testing or certifying technicians or software.
- ❑ Opinion: BIF should consider adopting the USDA certification protocol for carcass data collection.
  - ❑ OR alter the genetic “value” given to ultrasound vs. carcass data
- ❑ When all 125 technicians have carcass data behind their machine, UGC will send summary data to participating breed associations.
  - ❑ At that point, we may be able to address Item #1 on the UGC Bucket List
- ❑ Breed associations need to individually decide on Item #2: Rump Fat
- ❑ #3: Should UGC will work with *bos indicus* breeds to pursue %IMF models?
- ❑ #4 & #5: The battle continues...