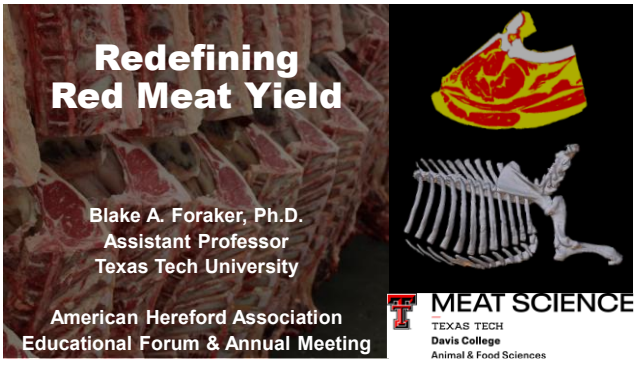
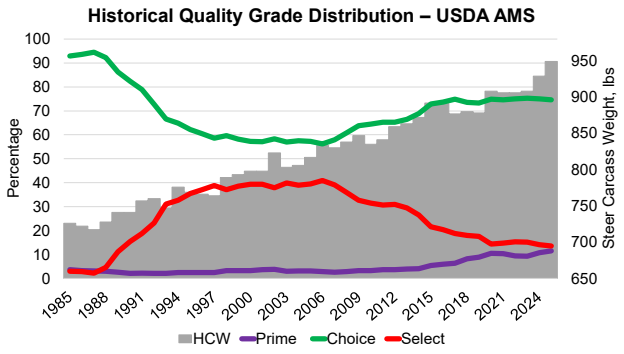
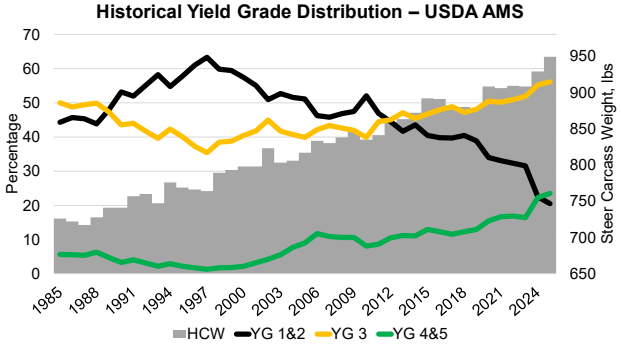
Copyright 2026 Blake Foraker. All rights reserved.



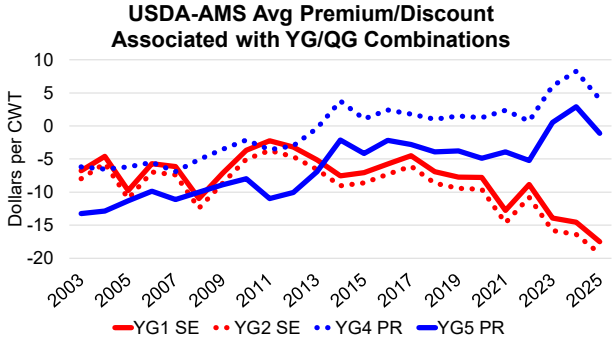
1



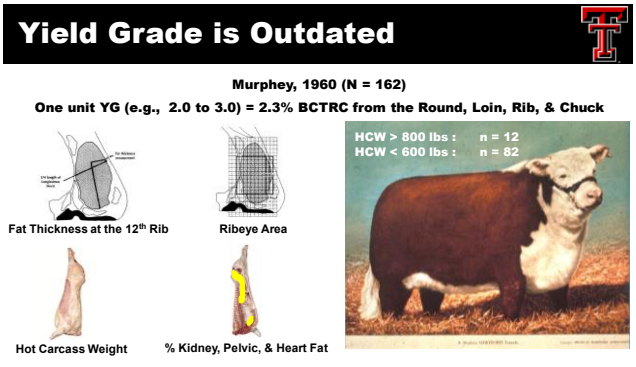
2



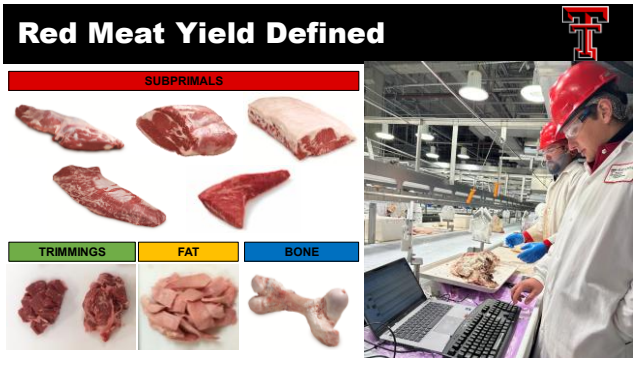
3



4



5

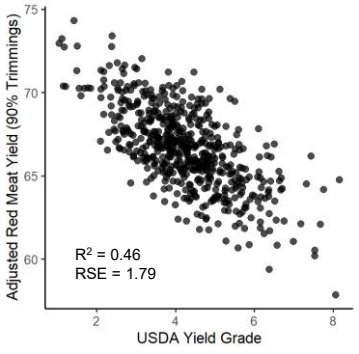


6

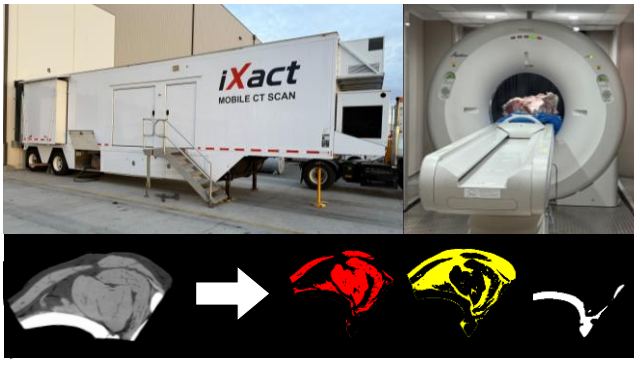
Copyright 2026 Blake Foraker. All rights reserved.

Modern-Day (2026)
Relationship of
Yield Grade
to
Packer Red Meat Yield
N = 588 carcasses





7



8



9

Digital Images

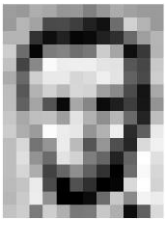


IMAGE MATRIX

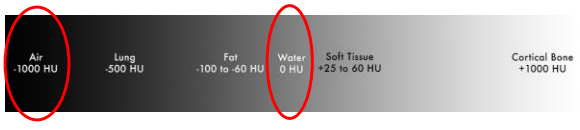
157	153	174	168	150	152	129	151	172	161	155	155	255	255
155	182	163	74	75	62	33	17	110	210	180	154	238	238
180	180	50	14	34	6	10	33	48	106	159	181	221	221
206	109	1	124	131	111	120	204	166	15	56	180	204	204
194	68	137	251	237	239	239	228	227	87	71	201	187	187
172	105	207	233	233	214	220	239	228	98	74	206	170	170
188	88	179	209	185	215	211	158	139	75	20	169	153	153
189	97	165	84	10	168	134	11	31	62	22	148	136	136
199	168	191	193	158	227	178	143	182	106	36	190	119	119
205	174	155	252	236	231	149	178	238	43	95	234	102	102
190	216	116	149	236	187	85	150	79	38	218	241	85	85
190	224	147	108	227	210	127	102	36	101	255	224	68	68
190	214	173	66	103	143	96	50	0	109	249	215	51	51
187	196	235	75	1	81	47	0	0	217	255	211	34	34
183	202	237	145	0	0	0	108	200	138	243	236	17	17
195	206	123	207	177	121	123	200	175	13	96	218	0	0

10

Hounsfield Units

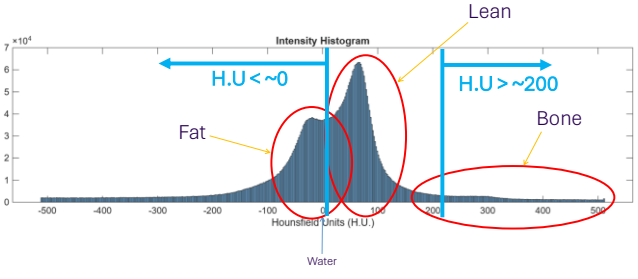
Convert X-ray absorption to numbers – intensity values (brightness)

When calibrated for X-ray and CT images – Hounsfield Units (HU)



11

Tissue Separation Using CT



12

Copyright 2026 Blake Foraker. All rights reserved.

2-D Images to 3-D Volumes



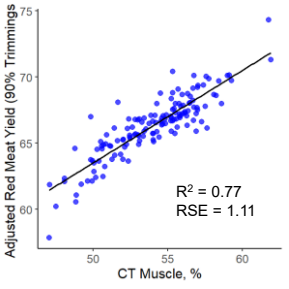
13

CT Composition and Yield Data (N = 143)

FABRICATION YIELDS		
% RMY	% FAT	% BONE
66.3 ± 2.33	16.7 ± 2.84	17.0 ± 1.21

CT COMPOSITION		
% MUSCLE	% FAT	% BONE
54.0 ± 2.93	31.8 ± 3.72	14.2 ± 1.30

BEEF
Funded by the Beef Checkoff



14



15

WHAT IS RED MEAT YIELD WORTH?

AVERAGE CARCASS COMPOSITION MEASURED BY CT

54% MUSCLE	32% FAT	14% BONE
$367.83 / CWT (CHOICE CUTOUT, COLD WT)	32%	14%
- $17.60	×	×
- $2.80	$55 / CWT (INDUSTRY)	$20 / CWT (INDUSTRY)
$347.43	=	=
÷	$17.60	$2.80
54%		

$681.20 / CWT (VALUE OF CHOICE MUSCLE)

FORAKER

16

RED MEAT YIELD x QUALITY GRADE

USDA National Comprehensive Boxed Beef Cutout - All Fed Steer/Heifer Sales
Agricultural Marketing Service, Livestock, Poultry, and Grain Market News
October 19, 2026
LM_XB463
Email us with accessibility issues regarding this report.

	PRIME N = 6	BRANDED N = 60	CHOICE N = 61	SELECT N = 13
% CT Muscle	51.3	53.0	54.8	55.9
Fat, $ / CWT	$ 55.00	$ 55.00	$ 55.00	$ 55.00
Bone, $ / CWT	$ 20.00	$ 20.00	$ 20.00	$ 20.00
Muscle, $ / CWT	$ 795.20	$ 709.90	$ 672.00	$ 620.10

17

RED MEAT YIELD x QUALITY GRADE
PREMIUM / DISCOUNT @ 1,000 LB HCW COMPARED TO BASE CHOICE

MUSC %	FAT %	BONE %	PRIME	BRANDED	CHOICE	SELECT
50	36	14	[illegible]	($58)	($247)	[illegible]
52	34	14	RANGE $740	$73	($123)	
54	32	14		$204	$0	$565
56	30	14		$335	$123	
58	28	14	+30%	$466	$247	
60	26	14	[illegible]	$597	$370	[illegible]

18

Copyright 2026 Blake Foraker. All rights reserved.



19



23

National Reference Sire Program
Red Meat Yield Measurement & Live Animal Prediction Project

Nov 2025
Visual Muscle Scores
SizeR Measurement + Live Wt

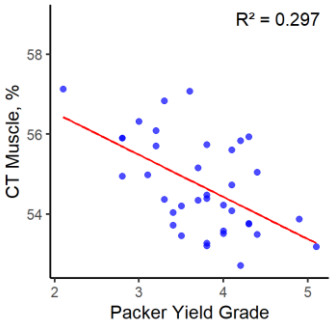
Dec 2025
Visual Muscle Scores
SizeR Measurement + Live Wt

Jan 2026
Terminal Selection
Visual Muscle Scores
SizeR Measurement + Live Wt
Slaughter, Grading, CT Scanning

24

National Reference Sire Program

Relationship of
Yield Grade
to
CT Muscle %
N = 37 carcasses

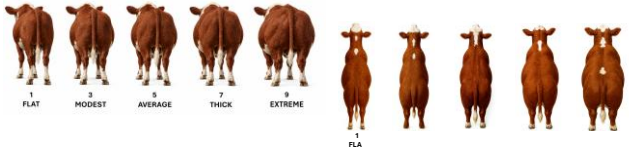


25

Visual Muscle Scoring



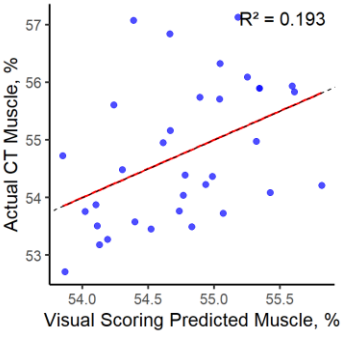




26

National Reference Sire Program

Relationship of
Visual Scores + Weight at 3 Time Points
to
CT Muscle %
N = 34 carcasses

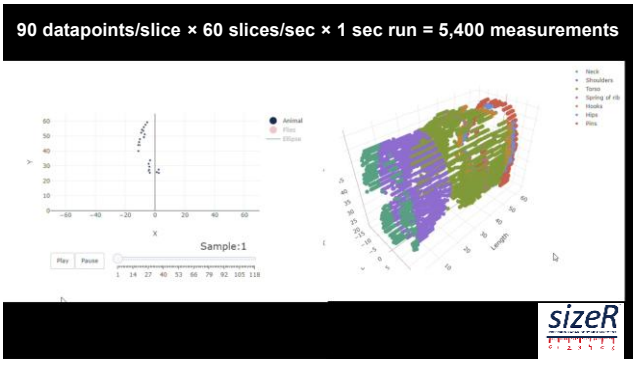


27

Copyright 2026 Blake Foraker. All rights reserved.



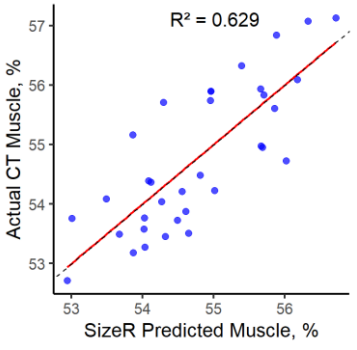
28



29

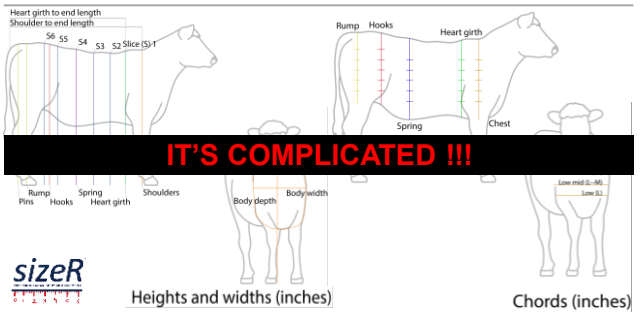
National Reference Sire Program

Relationship of
SizeR Measurements at 3 Time Points
to
CT Muscle %
N = 34 carcasses



30

WHAT TRAITS MATTER MOST?



31

COMBINATIONS OF SIZER TRAITS THAT INCREASE CT MUSCLE %

Combination Trait	Trait 1	Trait 2	Trait 3	Trait 4	Trait 5
PC10 – Time 1	↓ Rump depth	↑ Third width	↑ Volume/tube ratio	↑ Spring depth	↑ Third depth
PC17 – Time 3	↑ Heart girth high width	↑ Rump mid width	↓ Rump high width	↑ Spring low width	↓ Heart girth low width
PC26 – Time 3	↓ Heart girth low width	↑ Heart girth mid width	↓ Spring low-mid width	↑ Sixth width	↓ Spring low width
PC13 – Time 3	↓ First height	↓ Second width	↑ Second depth	↑ Sixth width	↑ First width
PC4 – Time 3	↓ Rump width	↓ Hook low width	↓ Rump low-mid width	↓ Prior-to-hooks width	↓ Rump low width

IT'S COMPLICATED !!!

32

COMBINATIONS OF SIZER TRAITS THAT INCREASE CT MUSCLE %

Combination Trait	Trait 1	Trait 2	Trait 3	Trait 4	Trait 5
PC10 – Time 1	↓ Rump depth	↑ Third width	↑ Volume/tube ratio	↑ Spring depth	↑ Third depth
PC17 – Time 3	↑ Heart girth high width	↑ Rump mid width	↓ Rump high width	↑ Spring low width	↓ Heart girth low width
PC26 – Time 3	↓ Heart girth low width	↑ Heart girth mid width	↓ Spring low-mid width	↑ Sixth width	↓ Spring low width
PC13 – Time 3	↓ First height	↓ Second width	↑ Second depth	↑ Sixth width	↑ First width
PC4 – Time 3	↓ Rump width	↓ Hook low width	↓ Rump low-mid width	↓ Prior-to-hooks width	↓ Rump low width

33

Copyright 2026 Blake Foraker. All rights reserved.

COMBINATIONS OF SIZER TRAITS THAT INCREASE CT MUSCLE %

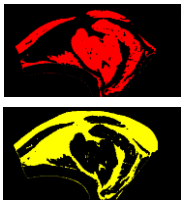
Combination Trait	Trait 1	Trait 2	Trait 3	Trait 4	Trait 5
PC10 – Time 1	↓ Rump depth	↑ Third width	↑ Volume/tube ratio	↑ Spring depth	↑ Third depth
PC17 – Time 3	↑ Heart girth high width	↑ Rump mid width	↓ Rump high width	↑ Spring low width	↓ Heart girth low width
PC26 – Time 3	↓ Heart girth low width	↑ Heart girth mid width	↓ Spring low-mid width	↑ Sixth width	↓ Spring low width
PC13 – Time 3	↓ First height	↓ Second width	↑ Second depth	↑ Sixth width	↑ First width
PC4 – Time 3	↓ Rump width	↓ Hook low width	↓ Rump low-mid width	↓ Prior-to-hooks width	↓ Rump low width

34

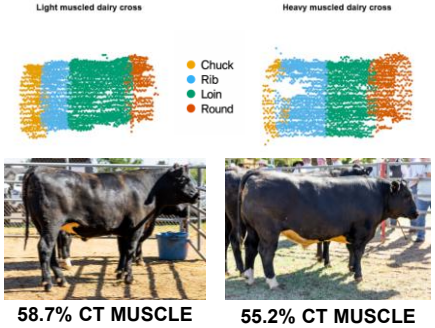
COMBINATIONS OF SIZER TRAITS THAT INCREASE MUSCLE %

Combination Trait	Trait 1	Trait 2	Trait 3	Trait 4	Trait 5
PC10 – Time 1	↓ Rump depth	↑ Third width	↑ Volume/tube ratio	↑ Spring depth	↑ Third depth
PC17 – Time 3	↑ Heart girth high width	↑ Rump mid width	↓ Rump high width	↑ Spring low width	↓ Heart girth low width
PC26 – Time 3	↓ Heart girth low width	↑ Heart girth mid width	↓ Spring low-mid width	↑ Sixth width	↓ Spring low width
PC13 – Time 3	↓ First height	↓ Second width	↑ Second depth	↑ Sixth width	↑ First width
PC4 – Time 3	↓ Rump width	↓ Hook low width	↓ Rump low-mid width	↓ Prior-to-hooks width	↓ Rump low width

35



MUSCLE % IS DEPENDENT ON FAT %



58.7% CT MUSCLE 0.50 in RIB FAT

55.2% CT MUSCLE 0.75 in RIB FAT

36

National Reference Sire Program

CT Muscle % by Sire

Sire	n	Mean CT Muscle %	Backfat, in
A	1	55.7	0.53
		55.0	0.59
		54.9	0.72
		54.9	0.67
		54.9	0.65
		54.8	0.59
		54.6	0.64
		54.3	0.76
		54.2	0.61
J	2	54.0	0.74

1.7% Diff

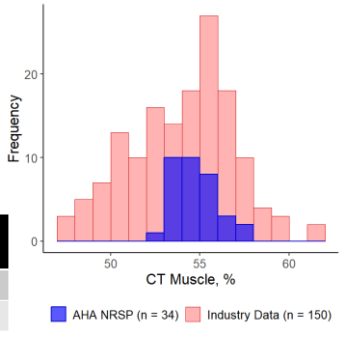
$105 per hd on 1000 lb HCW

37

National Reference Sire Program

Comparison of AHA NRSP to Industry Avg

	AHA NRSP	Industry Avg
HCW, lbs	901	1030
Backfat, in	0.636	0.866

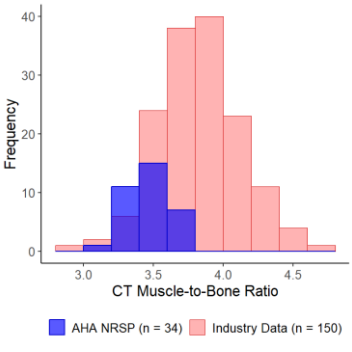


38

National Reference Sire Program

MUSCLING MATTERS





39

Copyright 2026 Blake Foraker. All rights reserved.

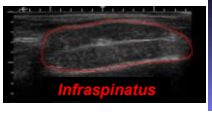
RMY – Live Phenotype Project

FORAKER, RATHMANN, WOERNER, WEABER, PARMAR, U.S. MARC

OBJECTIVES:

1) Identify subjective and objective measures of live cattle (N = 1,000) with the strongest predictive relationship to RMY measured by computed tomography (CT).
2) Provide high-throughput protocols for collecting RMY phenotypes suitable for integration into existing beef cattle genetic evaluation systems.

BEGINS NOV 2026







40



MEAT SCIENCE
TEXAS TECH
Davis College
Animal & Food Sciences

Blake A. Foraker, PhD
316-619-5678
Blake.Foraker@ttu.edu

41