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A Strategy for Improving Consumer Perceptions of Beef and Beef Production Systems

Our Research Team

Interdisciplinary, multi-regional

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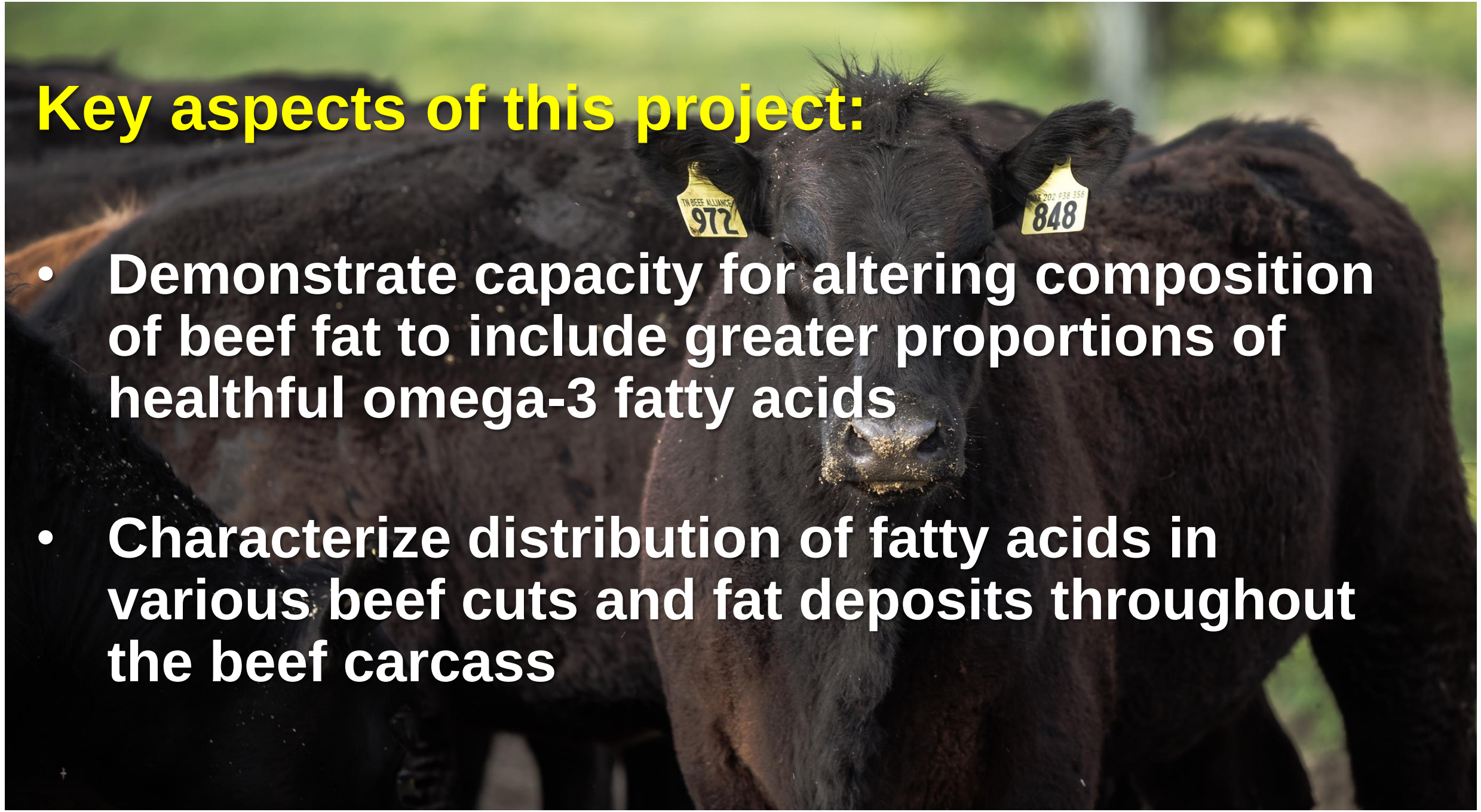
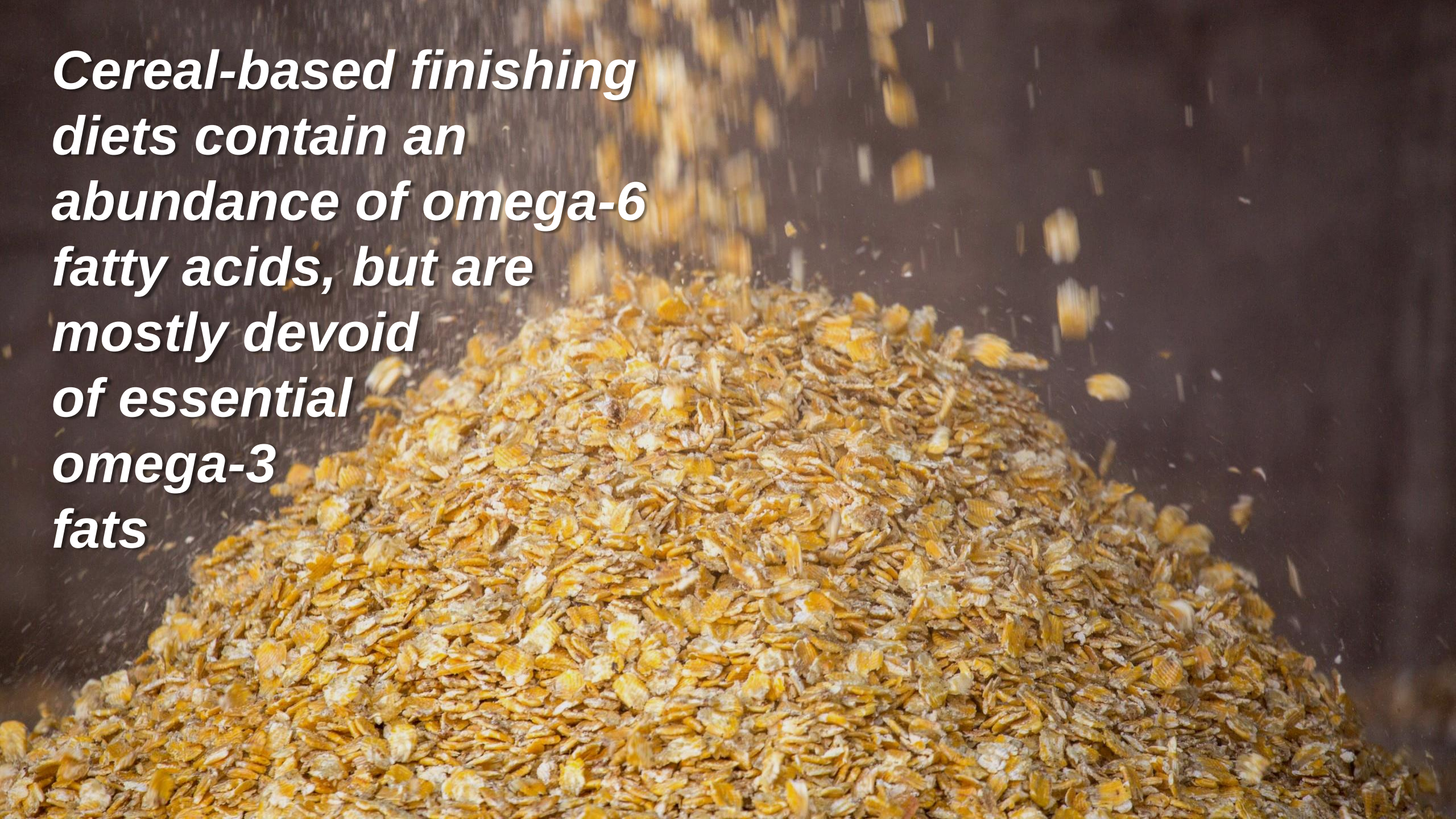
Funded by the Beef Checkoff

Key aspects of this project:



- Demonstrate capacity for altering composition of beef fat to include greater proportions of healthful omega-3 fatty acids
- Characterize distribution of fatty acids in various beef cuts and fat deposits throughout the beef carcass


Our Objective:
Create value around BEEF FAT as a source of important nutrients that contribute to a healthy lifestyle


Cereal-based finishing diets contain an abundance of omega-6 fatty acids, but are mostly devoid of essential omega-3 fats

Alpha Linolenic Acid, an essential omega-3 fatty acid, is the predominant form of fat in flaxseed

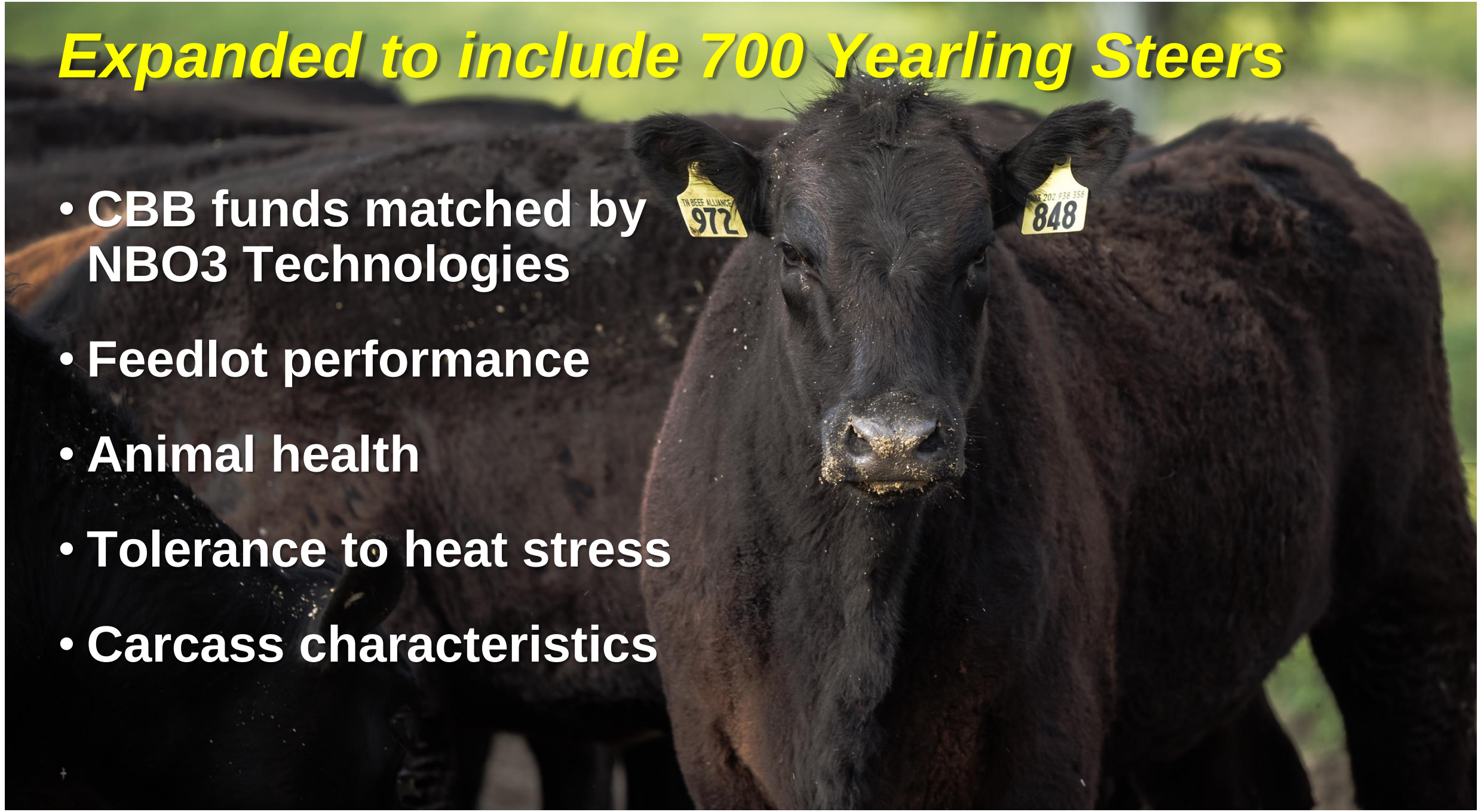
Nannochloropsis algae, like ocean-dwelling fish, contain EPA as the predominant fatty acid

Project Overview:

- 28 yearling steers
- Two diets:
  - Conventional
  - High omega-3

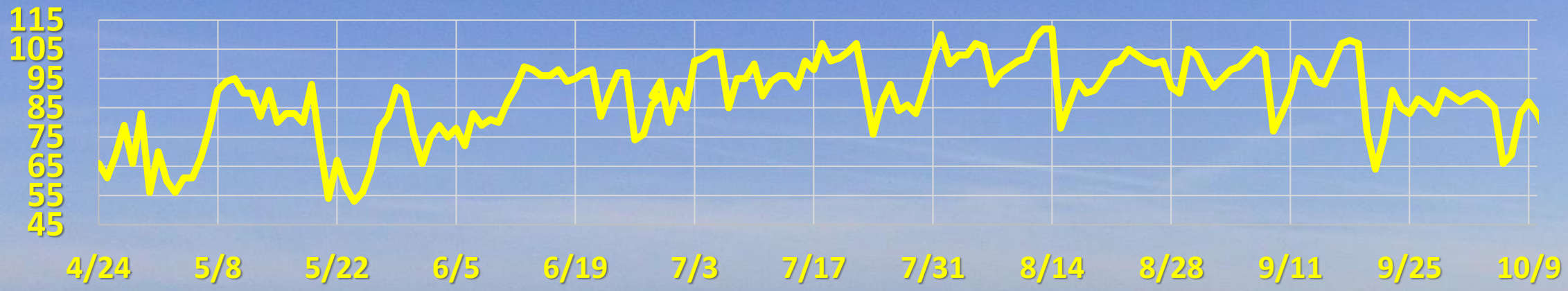
- Cattle fed ~175 days
- Harvested in Butler, MO at Hertzog Meat Co.
- Half of each carcass fabricated to obtain samples for fat testing
- Loins sent to NDSU for evaluation of muscle enzymes
- After sampling, forequarters and hindquarters sent to UG to prepare ground beef

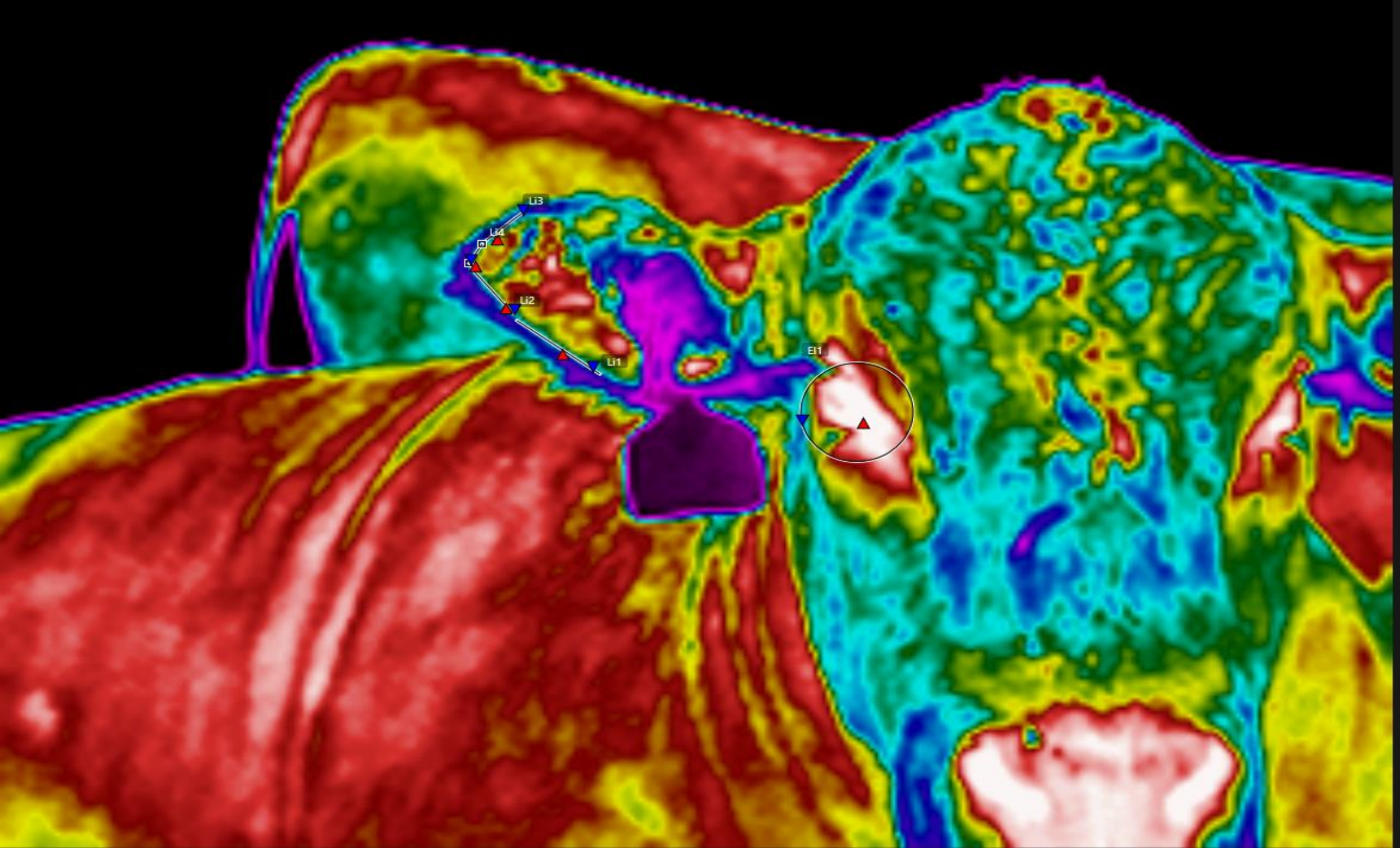
Expanded to include 700 Yearling Steers

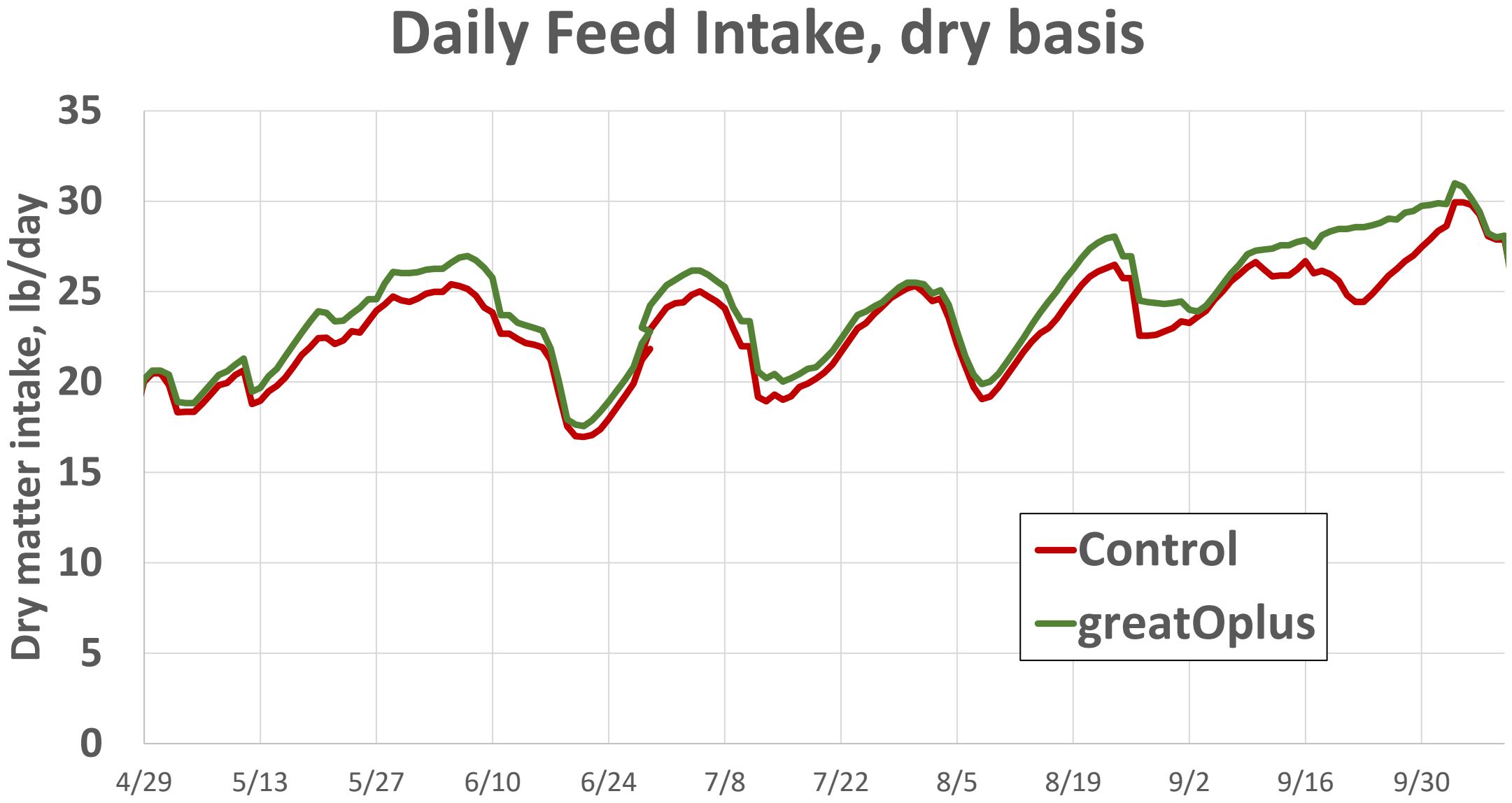


- **CBB funds matched by NBO3 Technologies**
- **Feedlot performance**
- **Animal health**
- **Tolerance to heat stress**
- **Carcass characteristics**

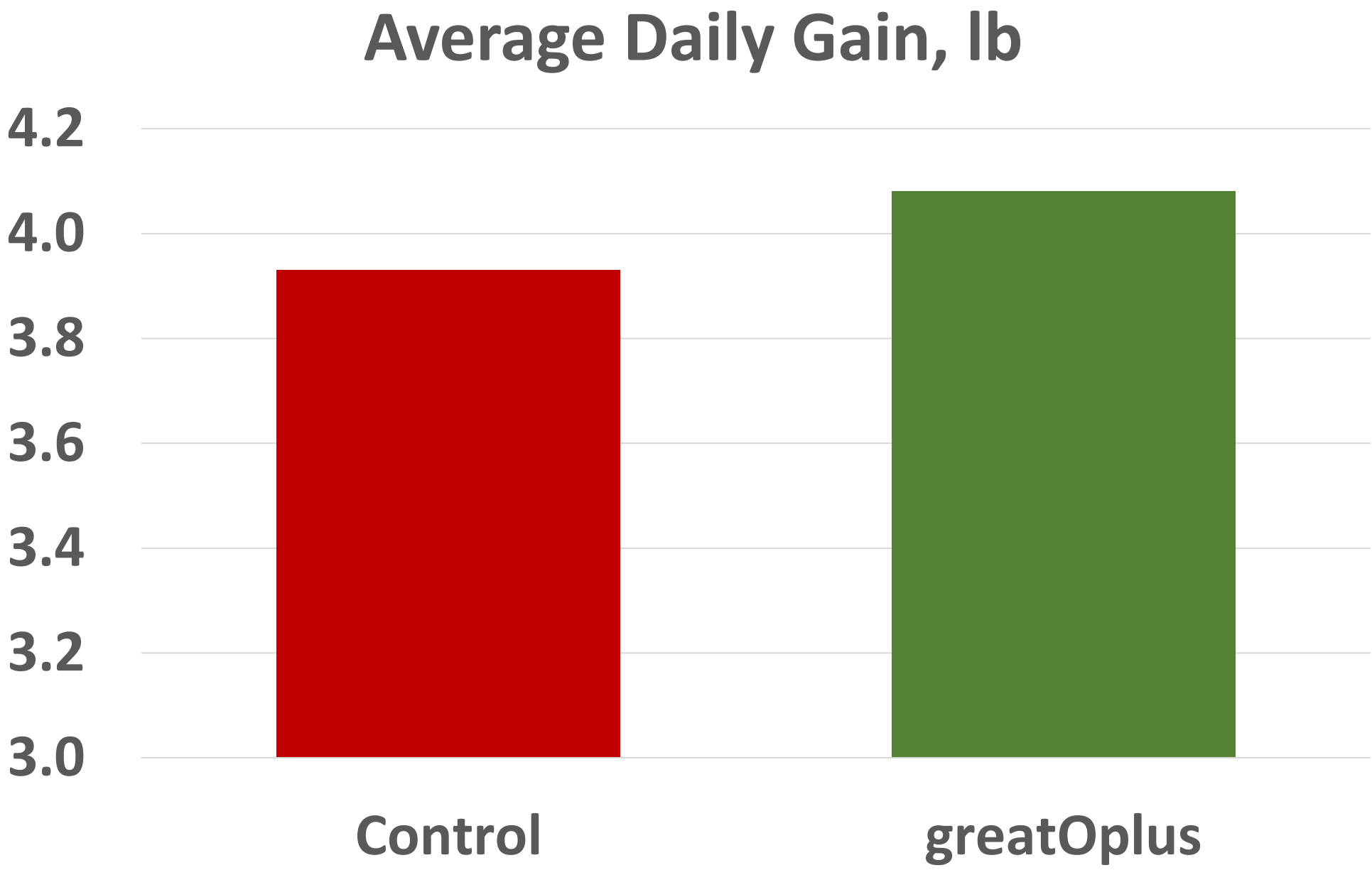
Maximum Daily Temperatures, degrees F



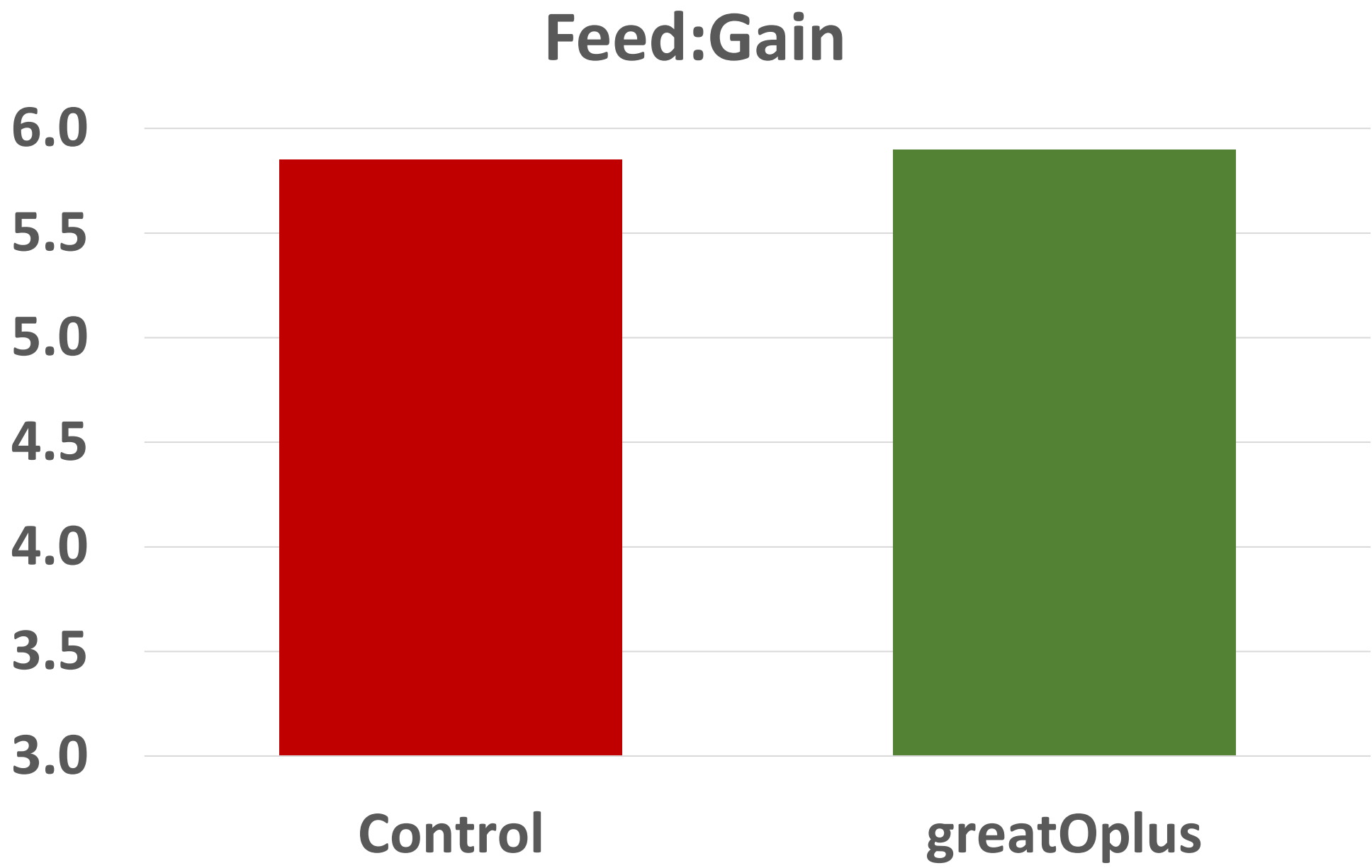

Li3
Li4
Li2
Li1
El1
35.0°C
20.0°C



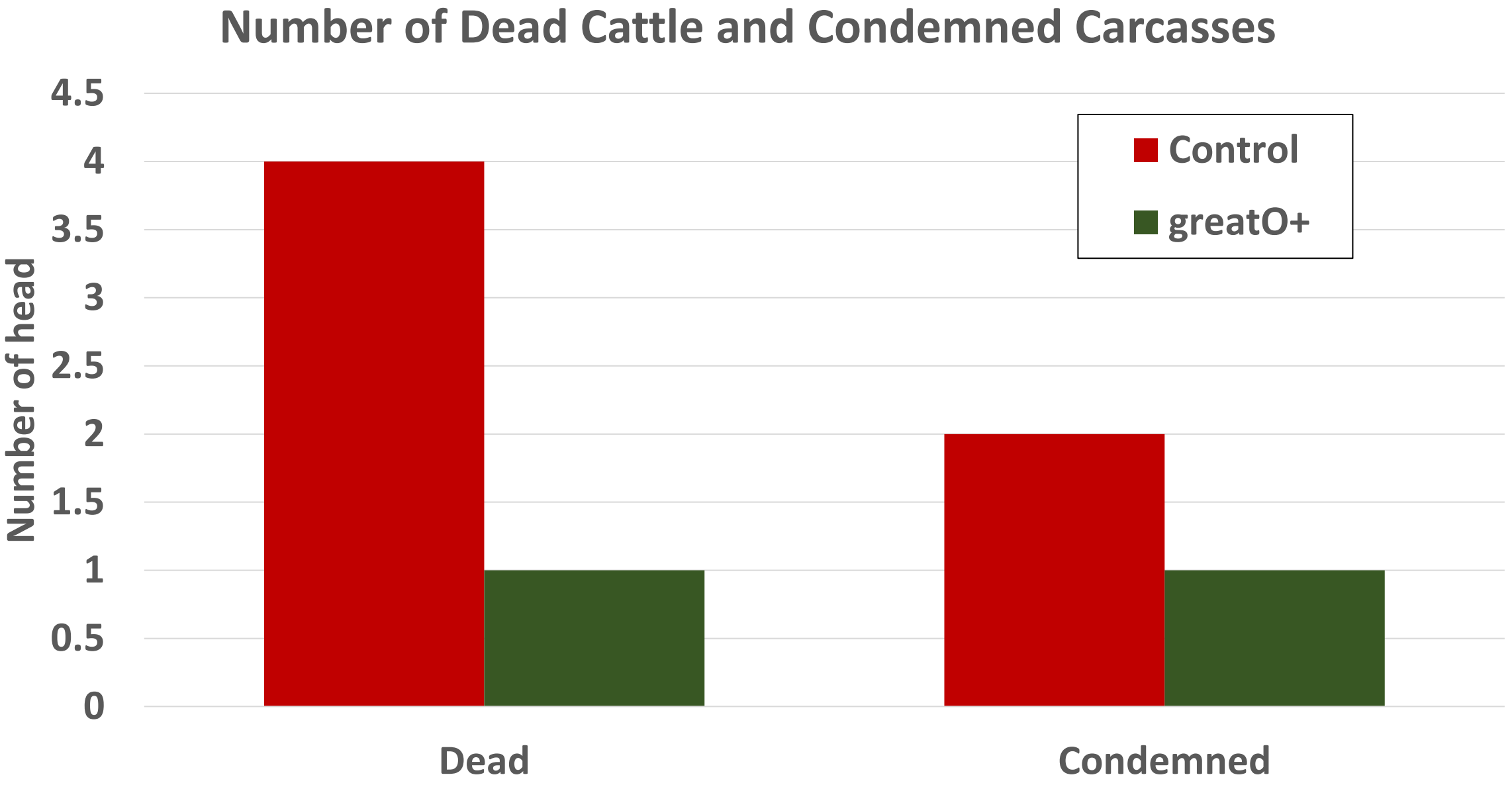
Treatments are different, P = 0.03



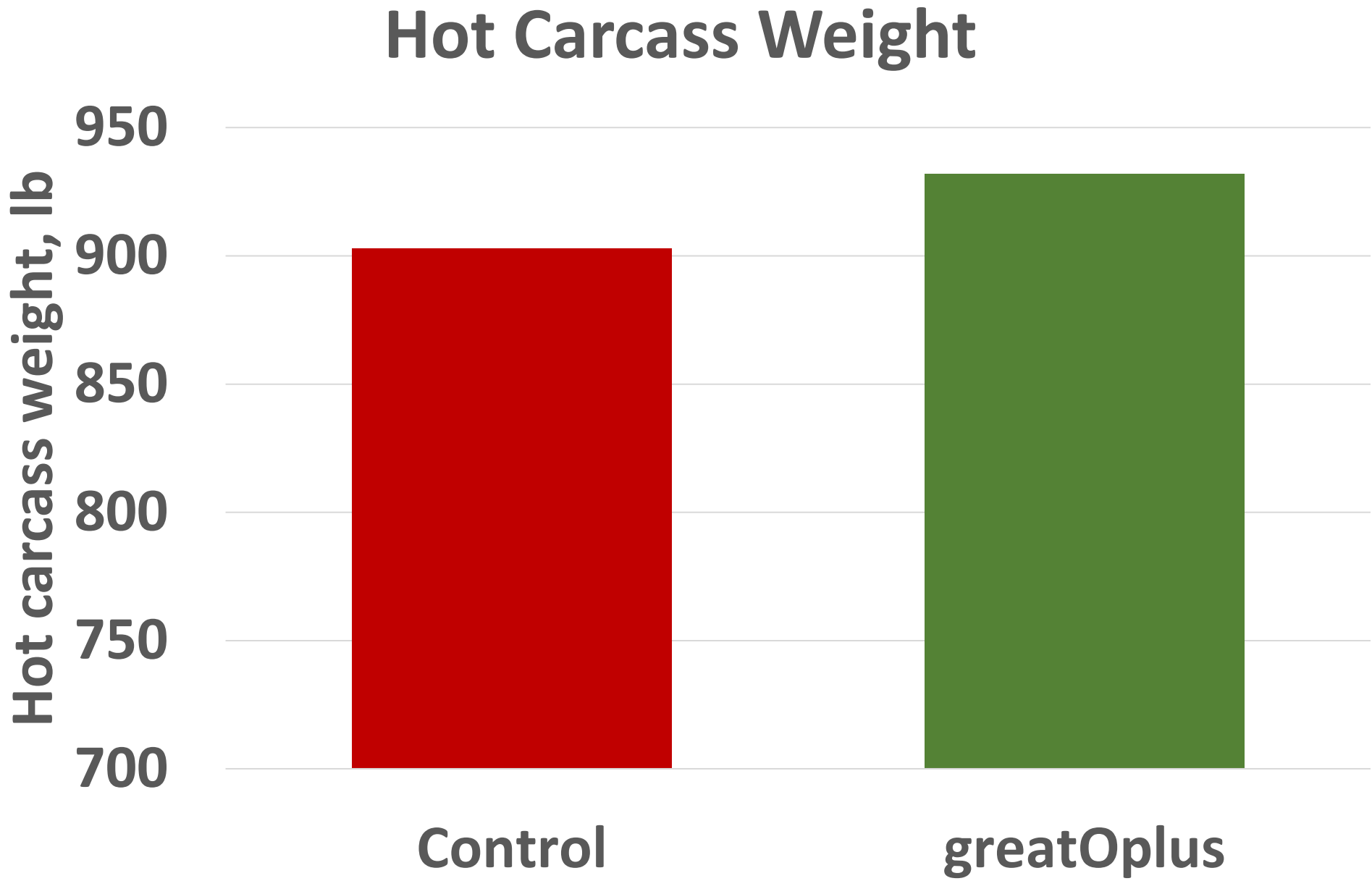
Treatments are different, $P < 0.01$



Treatments are not different, P = 0.53


Number of Dead Cattle and Condemned Carcasses
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Number of head
Control
greatO+
Dead
Condemned


HERTZOG
BEEF
PROCESSING
HERTZOG
HERTZOG



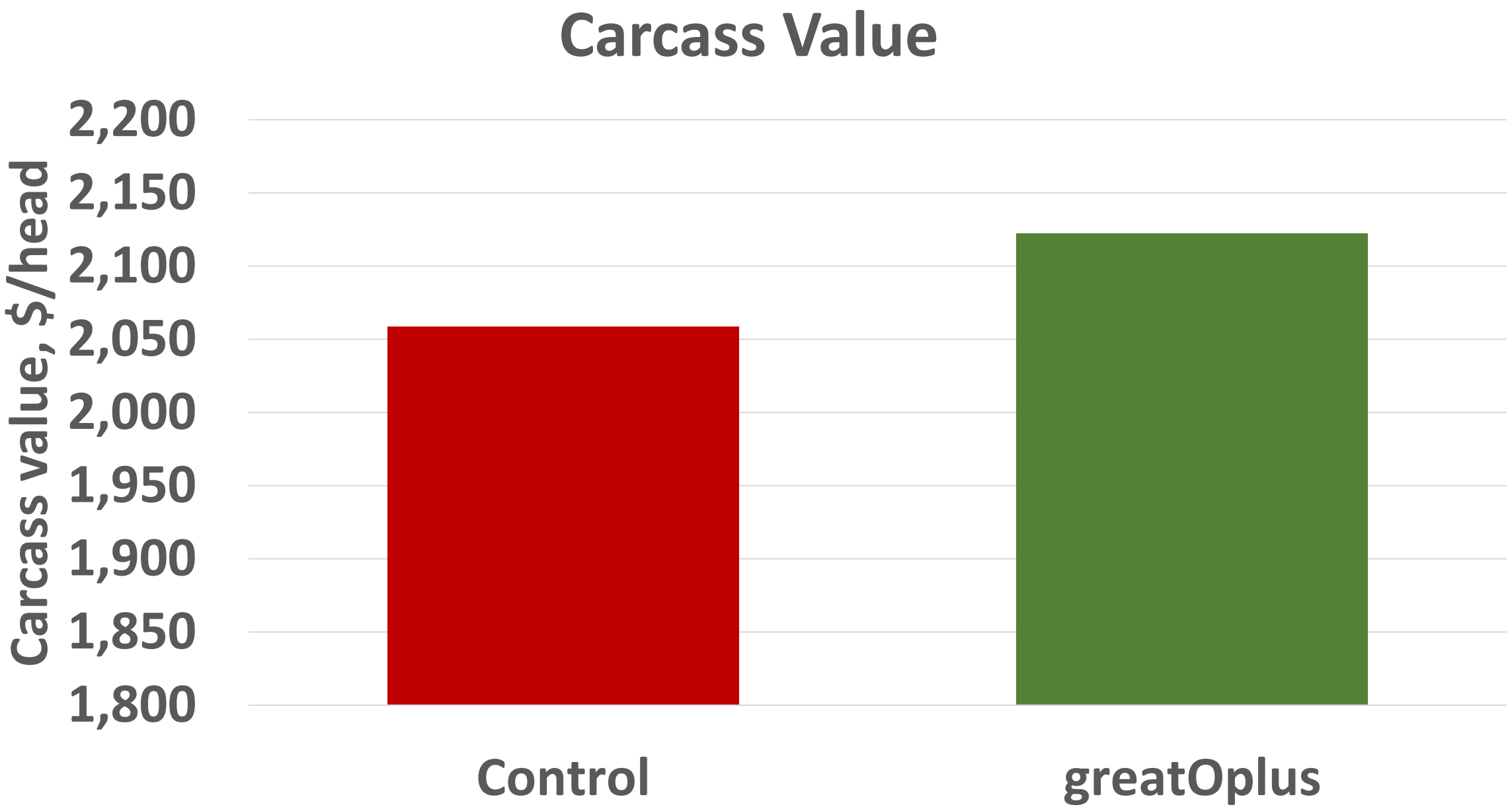
Treatments are different, P < 0.01

Carcass Traits

Item	Control	greatOplus	Standard error	P-value
Prime	2.6	3.7	0.97	<0.01
Choice	80.4	83.6	2.13	0.27
Select	14.6	11.5	1.91	0.22
Sub-Select	1.47	0.86	0.62	0.46
Dark Cutter	0.88	0.29	0.41	0.31

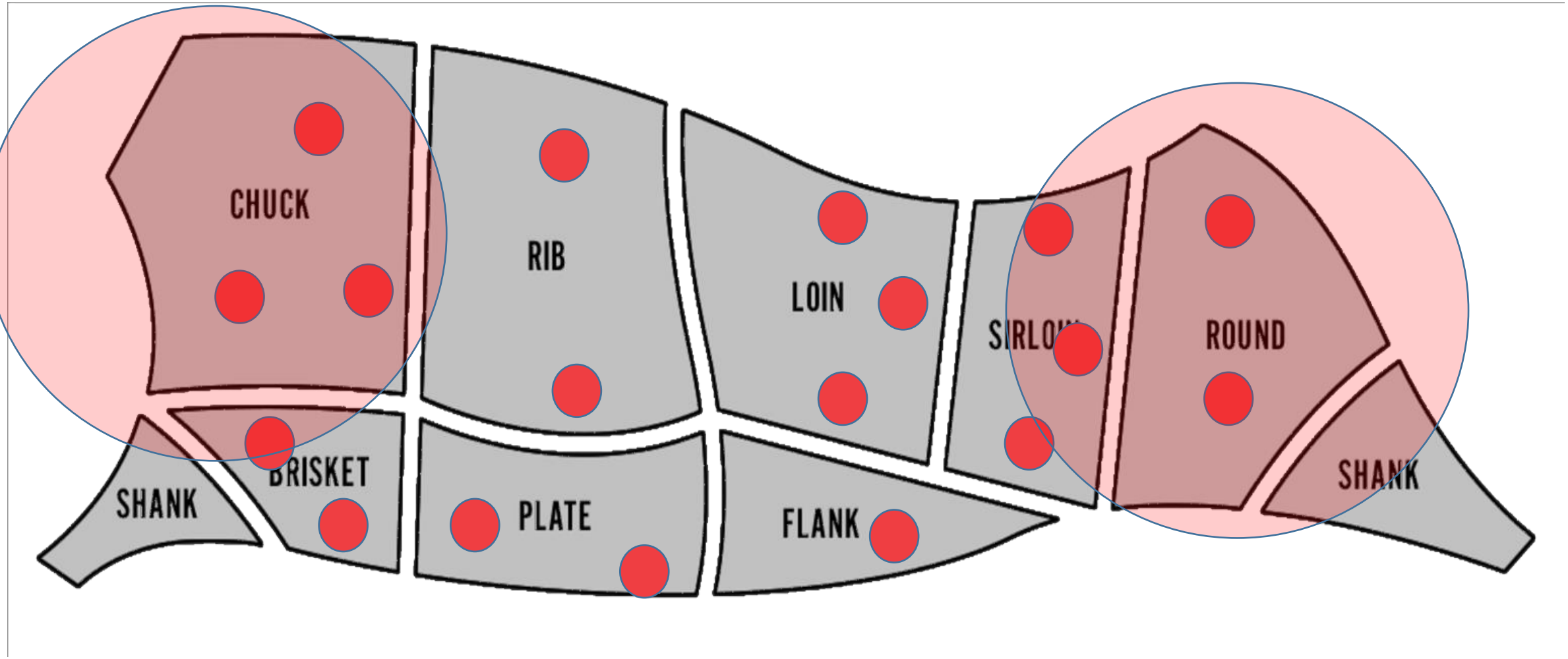
Carcass Traits

Item	Control	greatOplus	Standard error	P-value
Yield grade 1	2.3	1.4	0.73	0.39
Yield grade 2	33.2	28.1	3.71	0.14
Yield grade 3	53.2	51.1	3.27	0.58
Yield grade 4	10.8	17.8	2.40	>0.01
Yield grade 5	0.9	2.0	0.89	0.23



Treatments are different, $P < 0.01$

Original Protocol Included Lean and Fat Samples from 20 Locations



- Rib
  - Longissimus lean
  - Rib cap
  - Subcutaneous fat
  - Seam fat
  - Intercostal meat
- Plate (split into top and bottom halves)
  - Subcutaneous fat, top of plate
  - Subcutaneous fat, bottom of plate
  - Intercostal tissue (finger meat) top plate
  - Intercostal tissue (finger meat) bottom plate
  - Inside skirt
  - Outside skirt
- Tenderloin
  - Outside fat
  - Lean
- Brisket
  - Subcutaneous fat
  - Seam fat
  - Point lean
  - Flat lean
- Sirloin
  - Subcutaneous fat
  - Top sirloin cap
  - Top sirloin center cut
  - Bottom sirloin ball tip
  - Bottom sirloin flap
  - Bottom sirloin tri-tip
- Chuck
  - Petite tender
  - Chuck tender
  - Chuck eye
  - Triceps brachii
  - Flat iron
  - Denver cut
- Round
  - Eye of round
  - Rump
  - Outside round
  - Cap
  - Semimembranosus
  - Rectus femoris
- Hanging tender
  - Lean
- Shank
  - Foreshank
  - Hindshank
- Ground Beef
  - Ground chuck (80/20)
  - Ground round (80/10)
- Variety Meats
  - Tongue
  - Heart fat
  - Heart lean
  - Liver
  - Kidney
  - Kidney knob (i.e., fat)
  - Cheek meat
  - Oxtail

What's Next?

- Complete sensory and display studies
- Process samples for laboratory assays
- Analyze tissues for fatty acids

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