

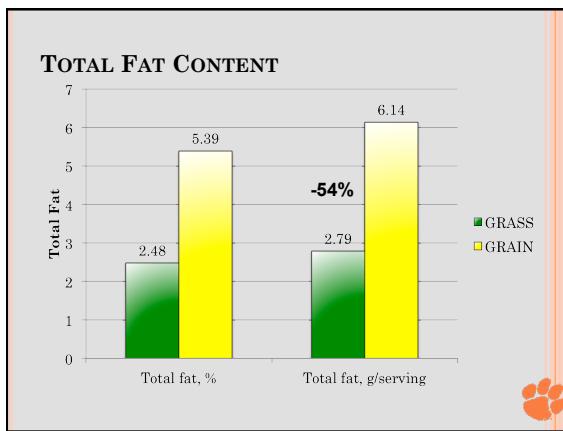
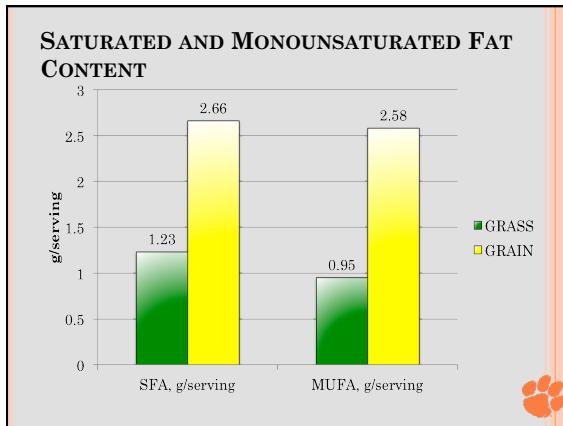
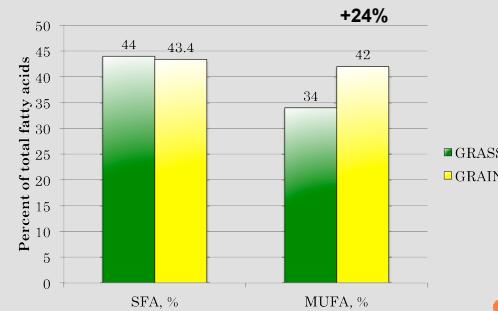
Changes in Dietary Regime Impact Fatty Acid Profile of Beef

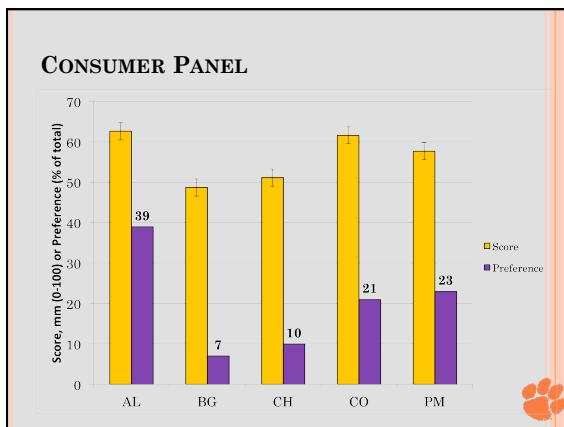
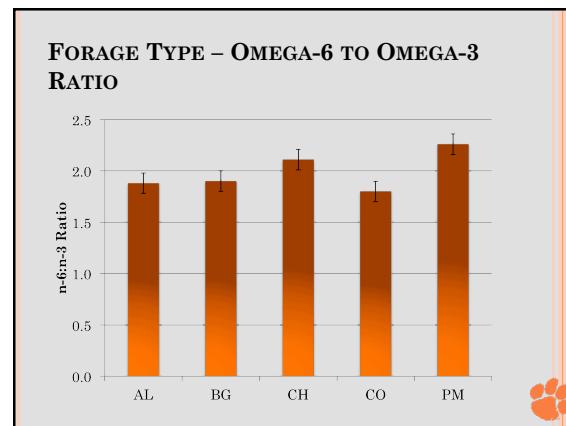
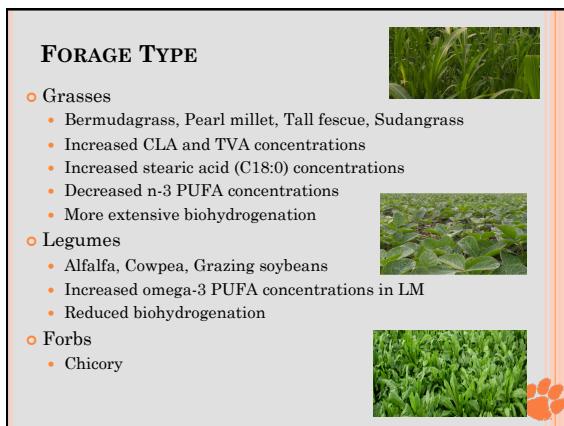
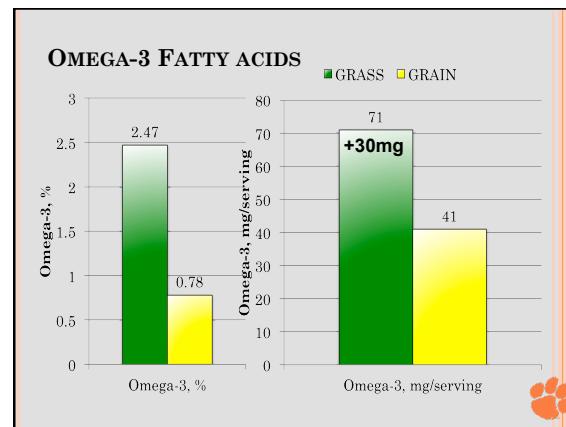
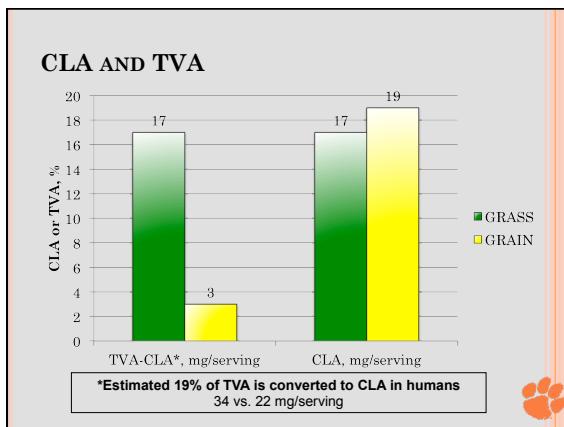


Susan K. Duckett
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NUTRITIONAL REGIMES

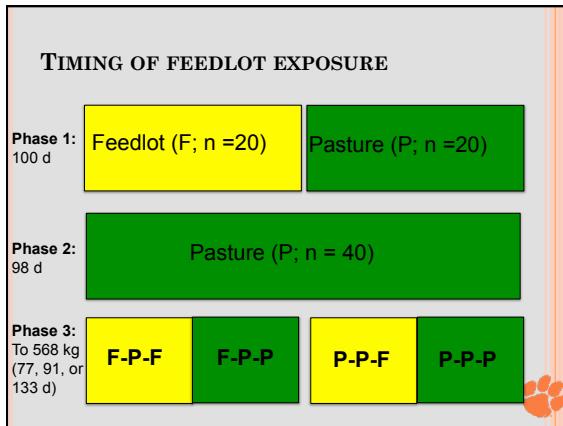
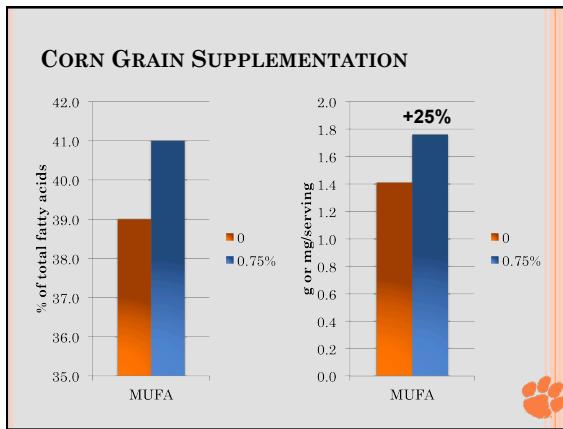
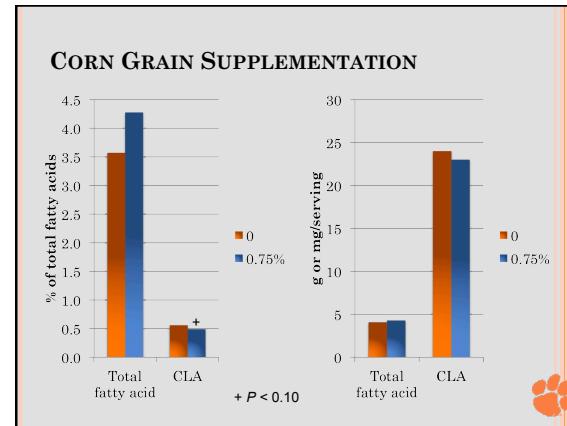
- **Grass versus Grain Finishing**
 - 671 steers evaluated in controlled, research studies comparing grass-fed vs. grain-fed, or forage species/animal age
- **Forage type for Finishing steers in SC hot summer**
 - Alfalfa, chicory, pearl millet, cowpea, soybean, sudan-grass
- **Supplementation on Pasture**
 - 0.75% corn grain supplementation
- **Timing of Grain Exposure**
 - Early exposure (after weaning) or late (short feeding before slaughter)
- **What does this mean?**
 - Real serving size
 - Human consumption

**SATURATED AND MONOUNSATURATED FAT CONTENT****CANCER FIGHTING COMPOUNDS: CONJUGATED LINOLEIC ACID (CLA) AND TRANS-11 VACCENIC ACID (TVA)**



SUPPLEMENTATION ON PASTURE

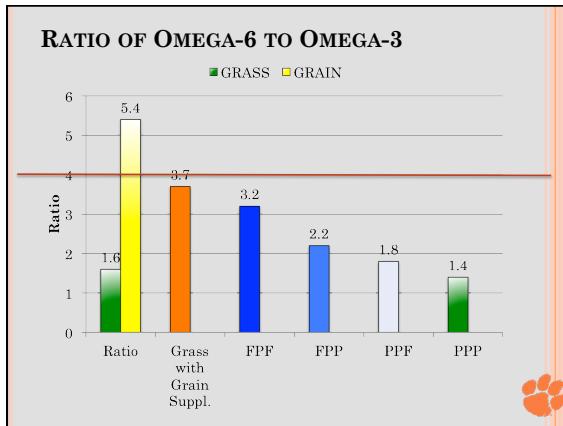
- 0.75% BW/hd/d corn grain + rumensin
- Legume or Grass pastures

LONGISSIMUS MUSCLE FATTY ACIDS

| Phase 1 | F | F | P | P |
|-------------------------|-------|-------|-------|-------|
| Phase 3 | F | P | F | P |
| Treatments | F-P-F | F-P-P | P-P-F | P-P-P |
| Marbling score* | 581 | 531 | 508 | 472 |
| Total fatty acids, % | 3.63 | 3.60 | 3.41 | 3.32 |
| SFA, % * | 44.47 | 44.53 | 46.26 | 45.12 |
| MUFA, % + | 44.64 | 42.91 | 43.63 | 42.72 |
| PUFA, omega-6, % * | 3.20 | 3.23 | 2.84 | 2.48 |
| PUFA, omega-3, % ** | 0.98 | 1.53 | 1.57 | 1.82 |
| Omega-6:omega-3 ratio # | 3.28 | 2.18 | 1.83 | 1.36 |
| TVA# | 0.84 | 1.49 | 1.29 | 1.43 |
| CLA ⁺ | 0.35 | 0.47 | 0.39 | 0.46 |

* Phase 1 ($P < 0.05$)
+ Phase 3 ($P < 0.05$)
Phase 1 x Phase 3 Interaction ($P < 0.05$)



SUMMARY

- Grass vs. Grain
 - Leaner
 - Higher concentrations of n-3 PUFA and CLA/TVA
 - Lower concentrations of MUFA
- Supplementation on Grass (0.75% BW/d)
 - Increased MUFA
 - No change in CLA or n-3 PUFA
- Forage Type
 - Minor differences in fatty acid composition
 - Grasses – increased biohydrogenation
- Early exposure to corn grain
 - Short period in feedlot = n-6:n-3 ratio lower than all feedlot
 - Early exposure increases marbling

OMEGA-3 FATTY ACIDS

- 2 - 3 oz. serving of beef/day – 142 vs. 82 mg/d (+60 mg/d)
- 2, 3 oz. servings of beef/day/week - 994 vs. 574 mg (+420 mg/wk)
- How does this compare?
 - MegaRed Krill oil
 - 300 mg total fat with 90 mg omega-3/capsule
 - Tuna, canned in water
 - 500 mg total fat with 120 mg omega-3/serving
 - Fish oil capsule
 - 1000 mg total fat with 300 mg omega-3/capsule
 - Salmon
 - 4 g total fat with 940 mg omega-3/serving
 - Flax seed oil
 - 14 g total fat with 7700 mg omega-3/serving (1 Tbsp)

WHO EATS A 3 OZ. SERVING?



| | Grass-fed | Grain-fed |
|---|---|--|
| Lunch, 7.6 oz. burger (217 g total; 192 g beef) | 23 g fat 0.58 g omega-3 0.28 g CLA* | 29 g fat 0.23 g omega-3 0.10 g CLA* |
| Supper, 12 oz. ribeye (342 g) | 10 g fat 0.25 g omega-3 0.12 g CLA* | 21 g fat 0.16 g omega-3 0.07 g CLA* |
| Total (534 g) | 33 g of fat (49% DV) 14 g SFA (64%) 0.83 g n-3 (83%) 0.4 g CLA* (133%) | 50 g of fat (75% DV) 22 g saturated (100%) 0.39 g omega-3 (42%) 0.17 g CLA* (57%) |

DV = Daily Value; if 2000 kcal diet, < 30% from fat (67 g fat)
 Saturated fat < 10% of total calories (22 g)
 Health Professionals = 1 g omega-3 per day
 CLA = 0.3 g/d recommended

BEEF CAN BE A SOURCE OF OMEGA-3 FATTY ACIDS

- Australian beef is grass-fed
- High per capita consumption of beef
 - 71.5 lbs/person/year (+21 lbs lamb)
- 48% Omega-3 fatty acids came from dietary meat intake
- Red meat supplied over 70% of total dietary DPA
 - DPA = C22:5, omega-3 fatty acid
 - Kuopio study: men with the highest proportion of serum DHA+DPA had a 44% reduced risk (P=0.014) of acute coronary events compared with men with the lowest (Rissanen et al., 2000, Circulation 102:2677).

