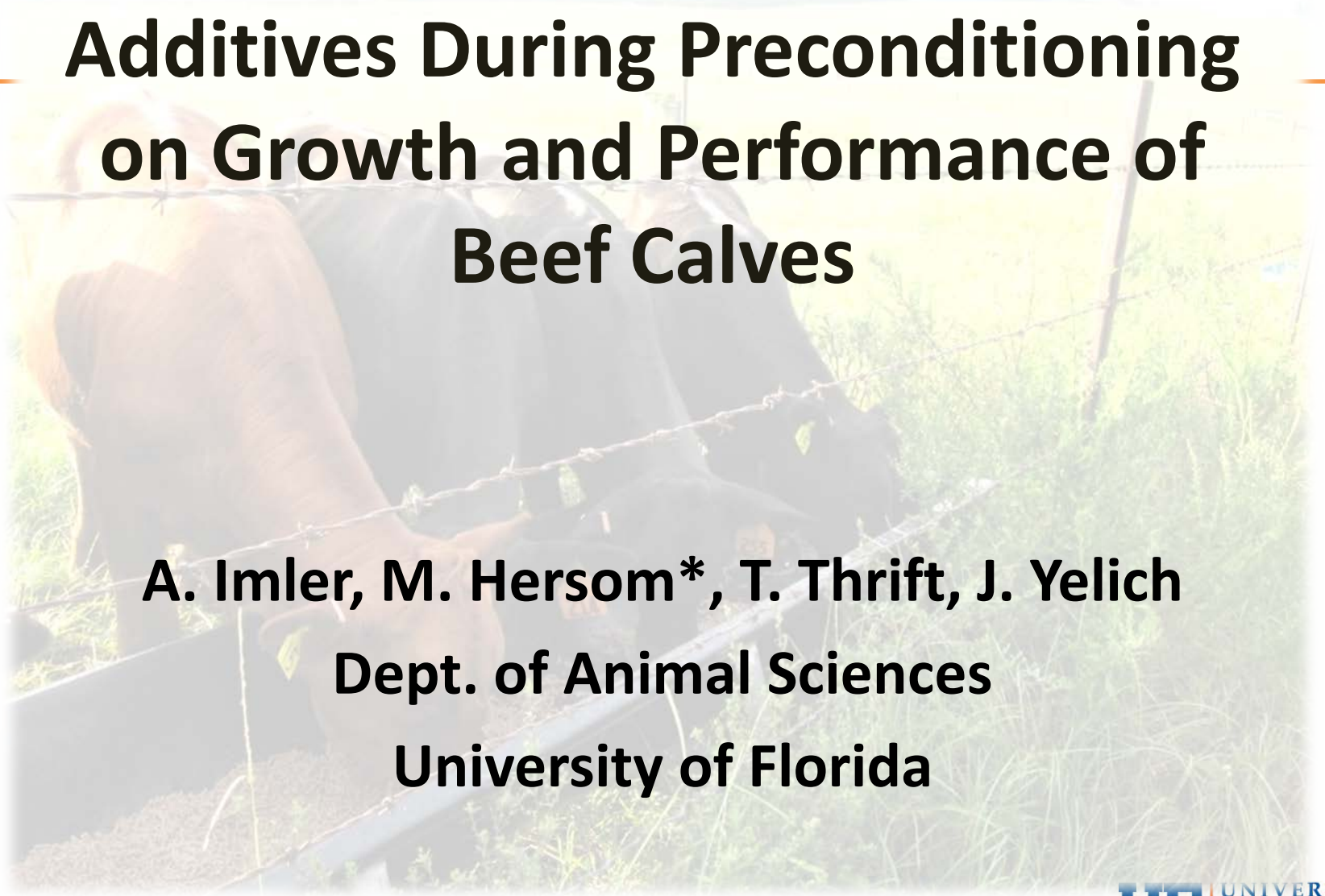
# Comparison of Feed Stuffs and Additives During Preconditioning on Growth and Performance of Beef Calves



A. Imler, M. Hersom*, T. Thrift, J. Yelich

Dept. of Animal Sciences

University of Florida

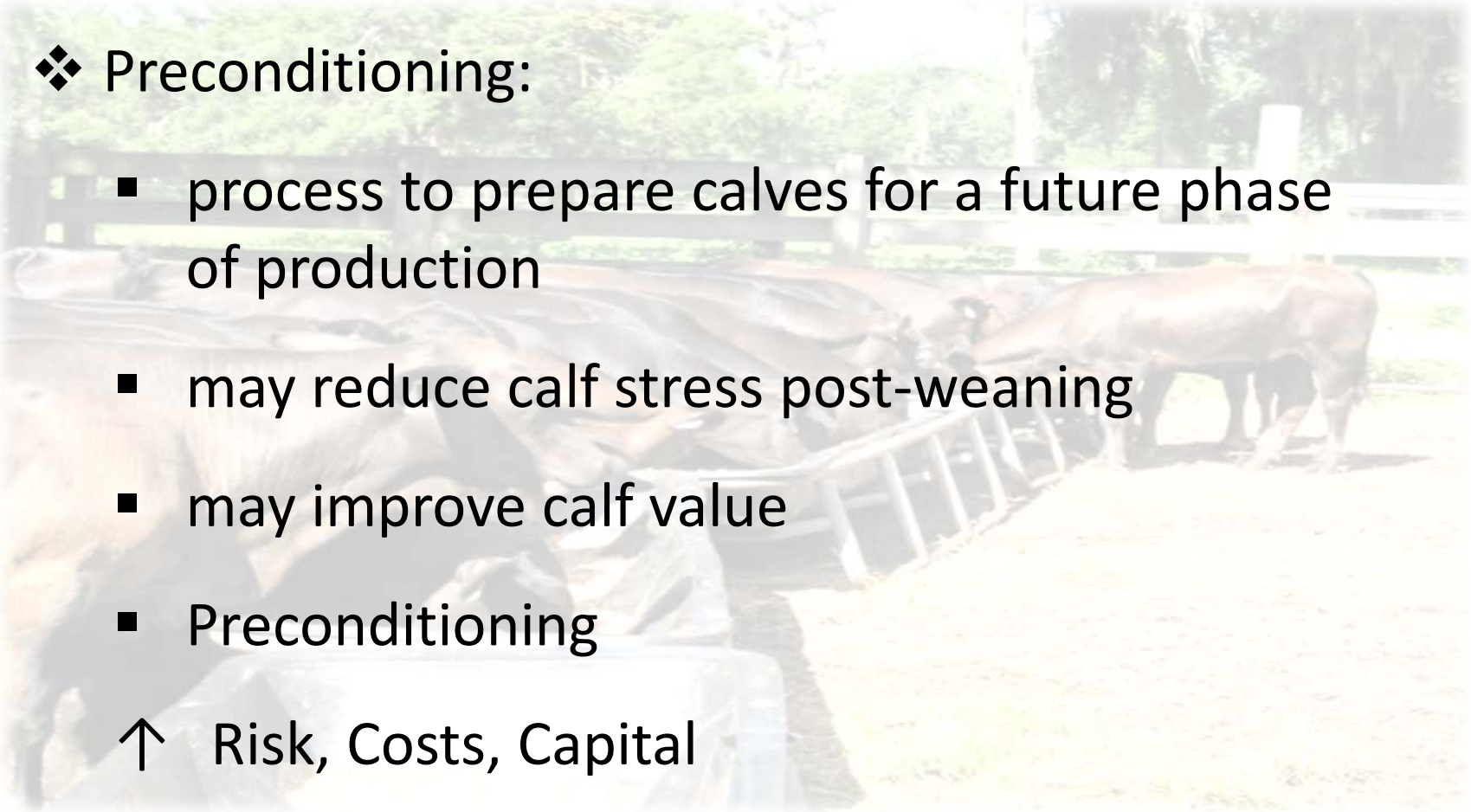
UF UNIVERSITY of FLORIDA IFAS

# UF Animal Science Beef Research Report

- http://www.animal.ifas.ufl.edu/extension/beef/pubs_beefreports.shtml

UF UNIVERSITY of FLORIDA IFAS

# Introduction



- Preconditioning:
  - process to prepare calves for a future phase of production
  - may reduce calf stress post-weaning
  - may improve calf value
  - Preconditioning

  ↑ Risk, Costs, Capital
  - Profitability not guaranteed

UF UNIVERSITY of FLORIDA IFAS

# Objectives

- Evaluate the response of weaned calves to supplemental feed additives in a preconditioning program
  - Gain and stress response post-weaning
  - Feedstuff and additive alternatives
  - Economics

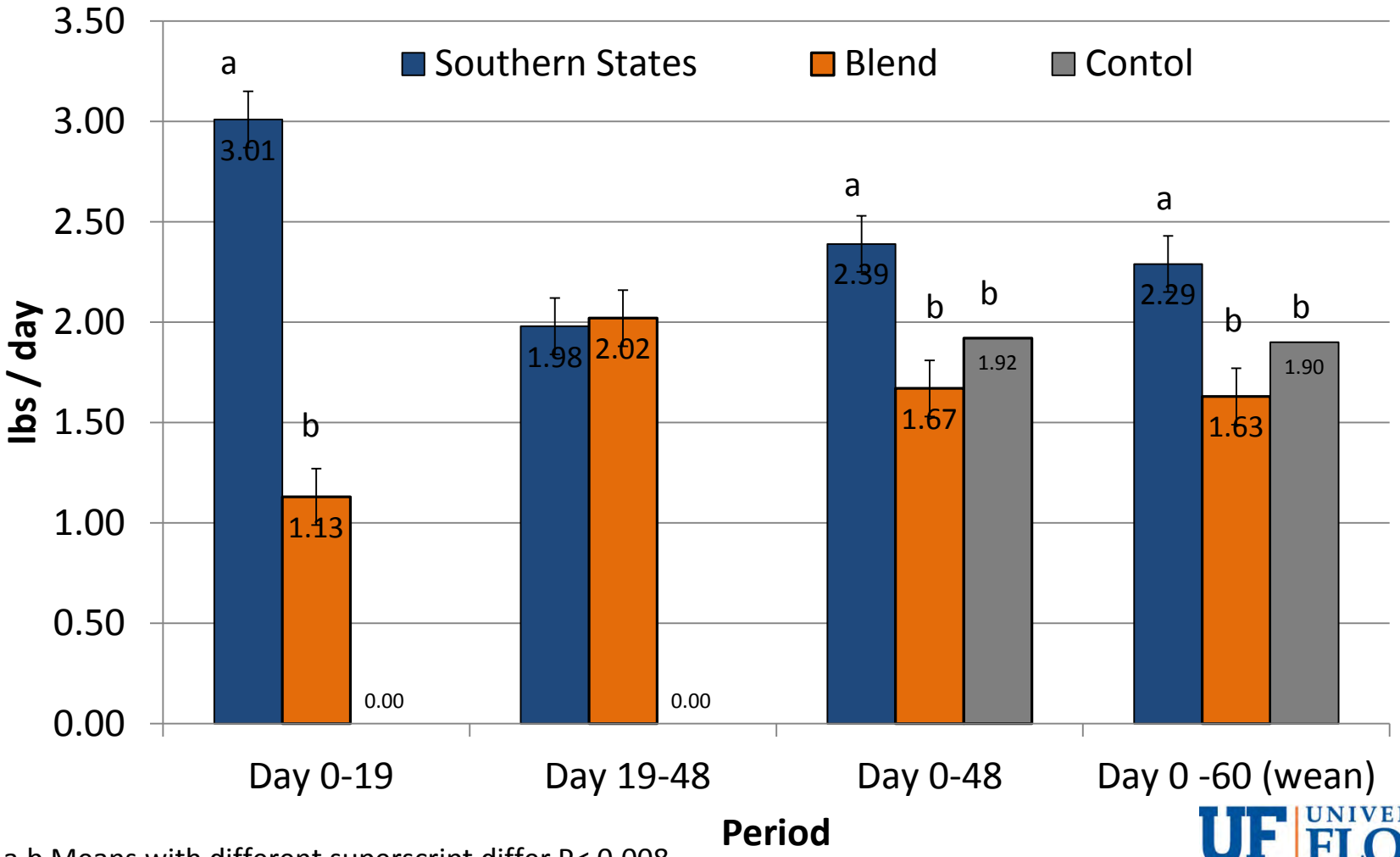
UF UNIVERSITY of FLORIDA IFAS

# Manufactured or Commodity Materials and Methods

- 42 two-year old cow-calf pairs of Angus and Brangus
- 28 weaned 60 days early
  - Manufactured supplement
    - Southern States JumpStart
  - Commodity Blend
    - Soybean hulls-Corn Gluten Feed
  - Two 2-ac pens of 7 calves for each treatment
  - Pair fed similar amount of feed
- Control calves remained with cows until normal weaning

UF UNIVERSITY of FLORIDA IFAS

# Comparison of Manufactured or Commodity Blend Supplements for Calves




a,b Means with different superscript differ P< 0.008

UF UNIVERSITY of FLORIDA IFAS

# Calf economic analysis of preconditioning program

| | Treatment | | | Standard Error | P-value |
|---|---|---|---|---|---|
| | Southern States | Blend | Control | | |
| Initial BW, lb | 310 | 300 | 302 | 15.7 | 0.87 |
| Weaning BW, lb | 448 | 398 | 416 | 20.0 | 0.19 |
| Mean supplement offered, lb/calf/day | 8.39 | 8.20 | na | na | na |
| Supplementation cost, $/calf | 77.25 | 40.27 | 0.0 | na | na |
| Initial value, $/calf | 481.79 | 465.97 | 468.25 | 23.83 | 0.87 |
| Final value, $/calf | 688.98 | 613.49 | 640.80 | 29.99 | 0.19 |
| Final profit, $/calf | 123.83[a] | 101.14[a] | 166.43[b] | 10.50 | < 0.001 |
| Post- preconditioning value, $/calf | 718.72 | 639.89 | 640.80 | 30.83 | 0.11 |
| Post-preconditioning profit, $/calf | 153.56[ab] | 127.53[b] | 166.43[a] | 11.12 | 0.05 |

[a,b] Means with different superscript differ, P<0.05.

UF UNIVERSITY of FLORIDA IFAS

# Effect of weaning time and supplement type on cow performance

| | Treatment | | | | |
|---|---|---|---|---|---|
| | Southern States | Blend | Control | Standard Error | P-value |
| Initial BW, lb | 911 | 928 | 950 | 23.2 | 0.48 |
| Initial BCS | 4.04 | 3.96 | 4.42 | 0.15 | 0.06 |
| Final BW, lb | 973 | 984 | 933 | 23.1 | 0.28 |
| Final BCS | 4.75[a] | 4.66[a] | 4.06[b] | 0.08 | < 0.001 |
| NEg Mcal to reach BCS 5[1] | 52[a] | 70[a] | 195[b] | 17.03 | < 0.001 |
| Pounds of feed to reach BCS 5[2] | 30[a] | 41[a] | 115[b] | 10.1 | < 0.001 |

[1] Net energy for gain to reach a body condition score of 5 based upon Beef Cattle NRC 2001 values estimation.

[2] Pounds of corn gluten feed to provide indicated Net energy for gain to increase cow body condition score to 5.

UF UNIVERSITY of FLORIDA IFAS

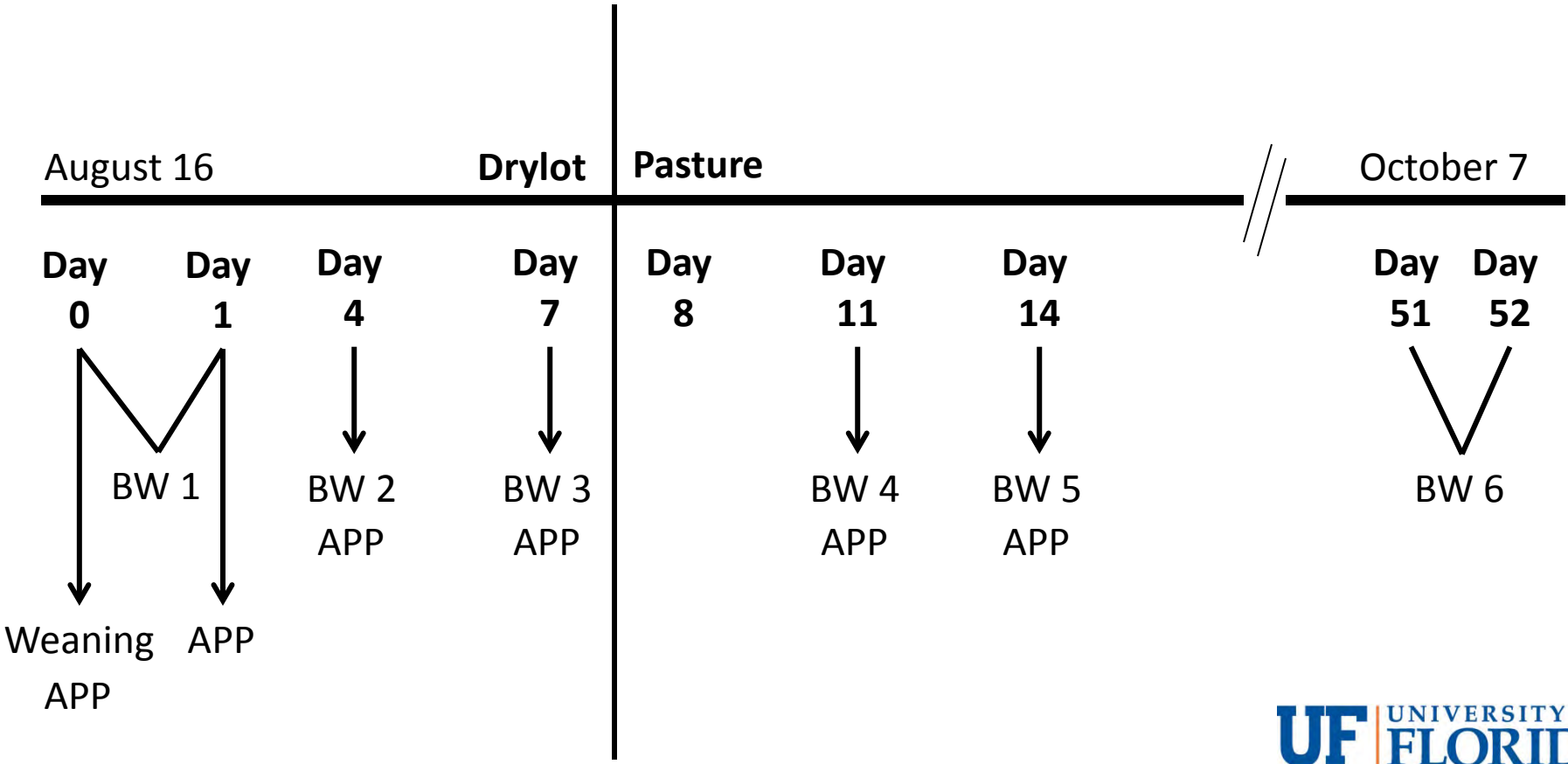
# Feed Additive Materials and Methods

- 160 Angus and Brangus calves fresh weaned in mid-August
  - 80 Heifers
  - 80 Steers
- Preconditioned 52 days at Santa Fe Beef Unit, Alachua, FL
  - 7-day drylot period
  - 45-day pasture period
  - Supplemented 4 lb•hd$^{-1}$•d$^{-1}$
- Randomly allotted to treatment:
  1. CON no additive
  2. ACT Actigen™ (5 g•hd$^{-1}$•d$^{-1}$)
  3. CTC Chlortetracycline (350 g•hd$^{-1}$•d$^{-1}$)
  4. RUM Monensin (175 mg•hd$^{-1}$•d$^{-1}$)

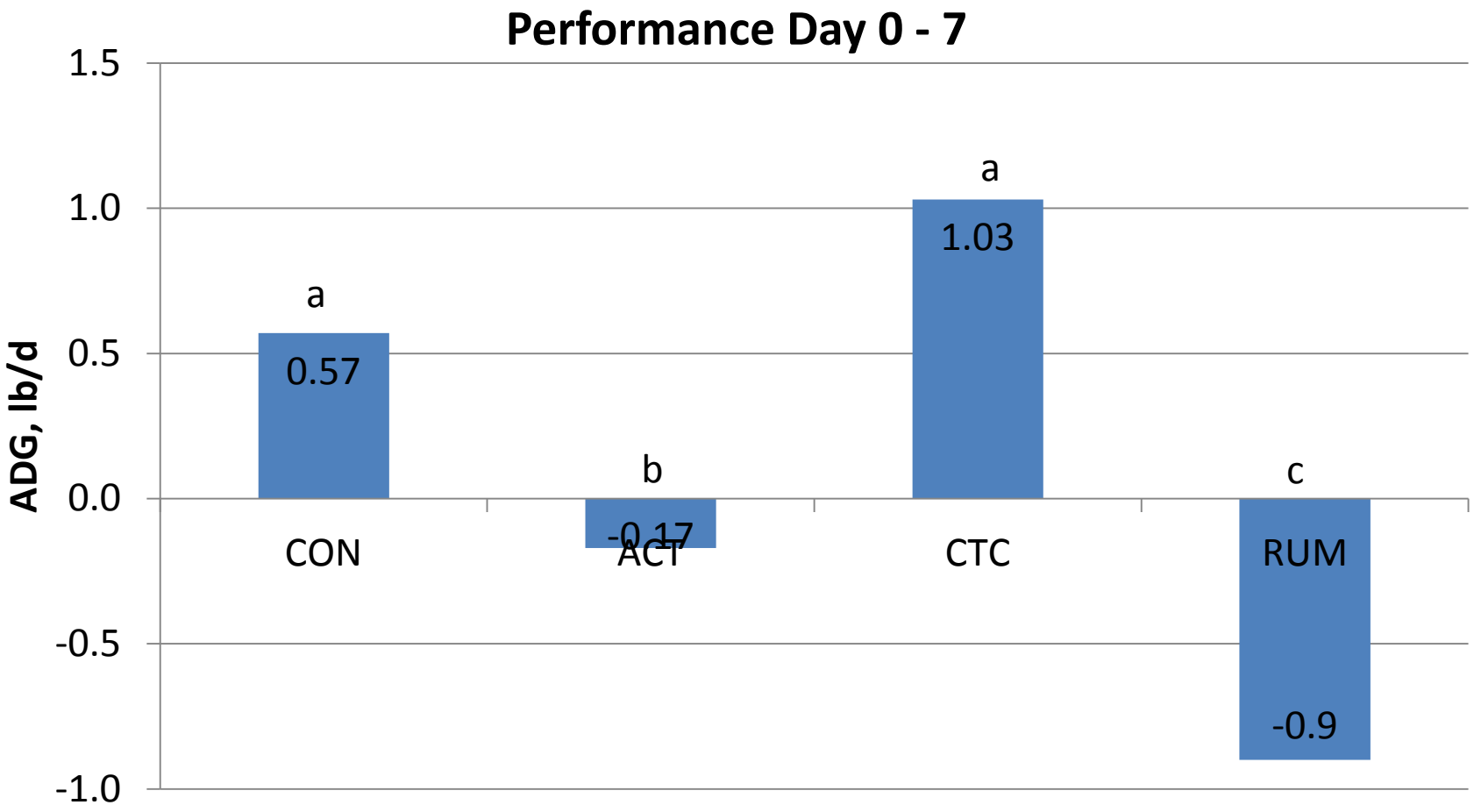
UF UNIVERSITY of FLORIDA IFAS

# Materials and Methods

- Trial Timeline



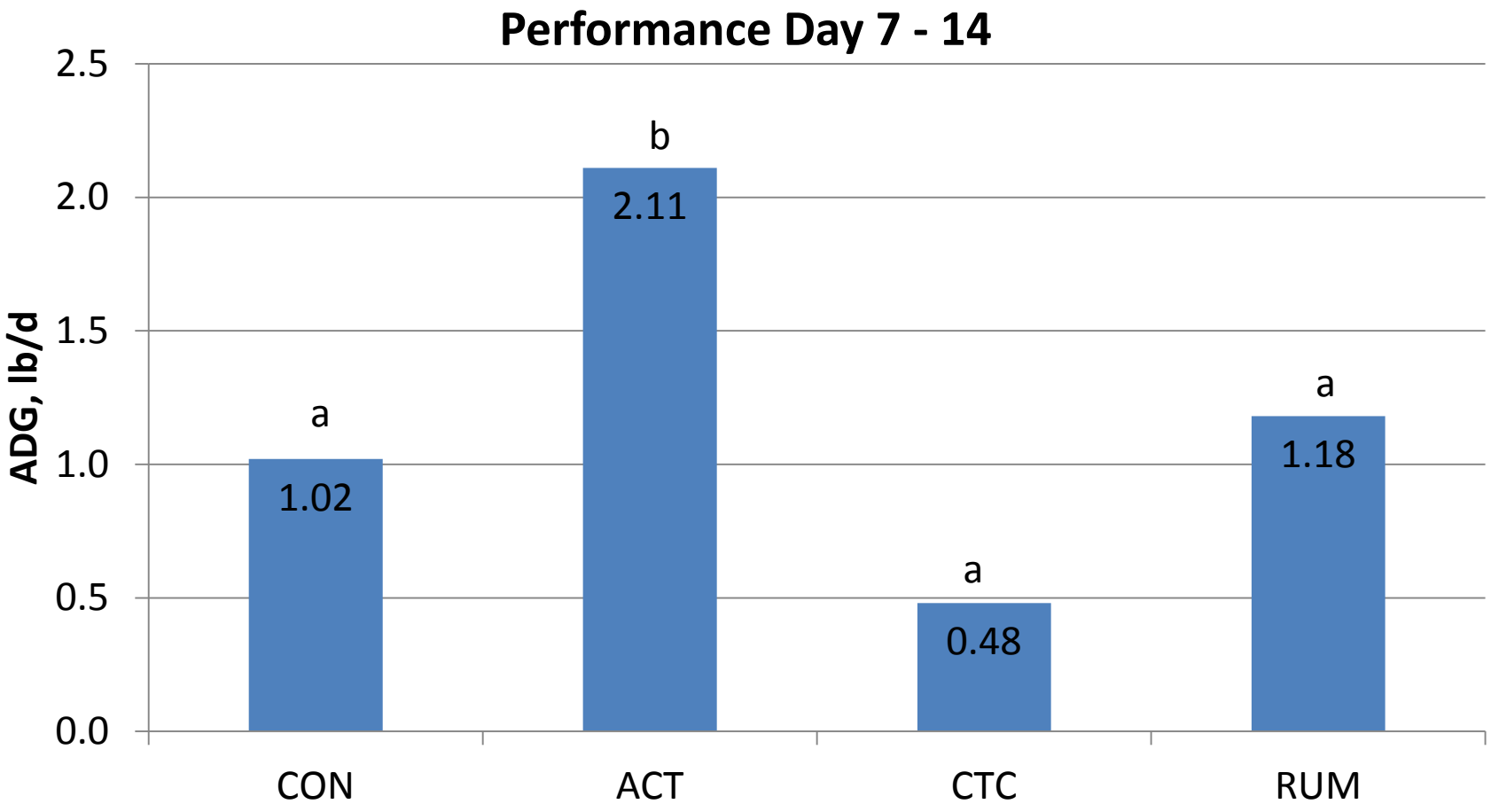
# Results




**P<0.0001**

UF UNIVERSITY of FLORIDA IFAS

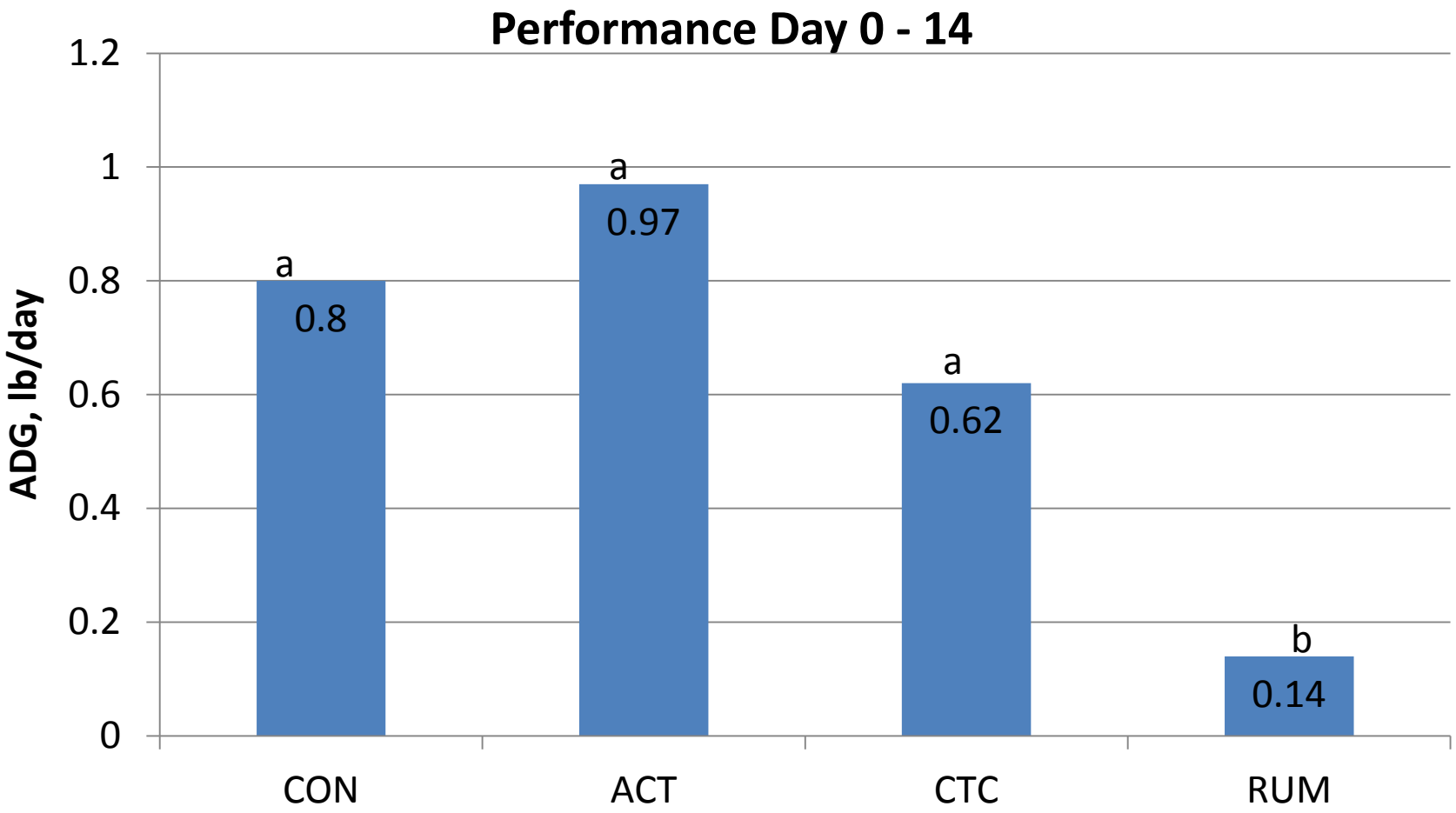
# Results




**P<0.01**

UF UNIVERSITY of FLORIDA IFAS

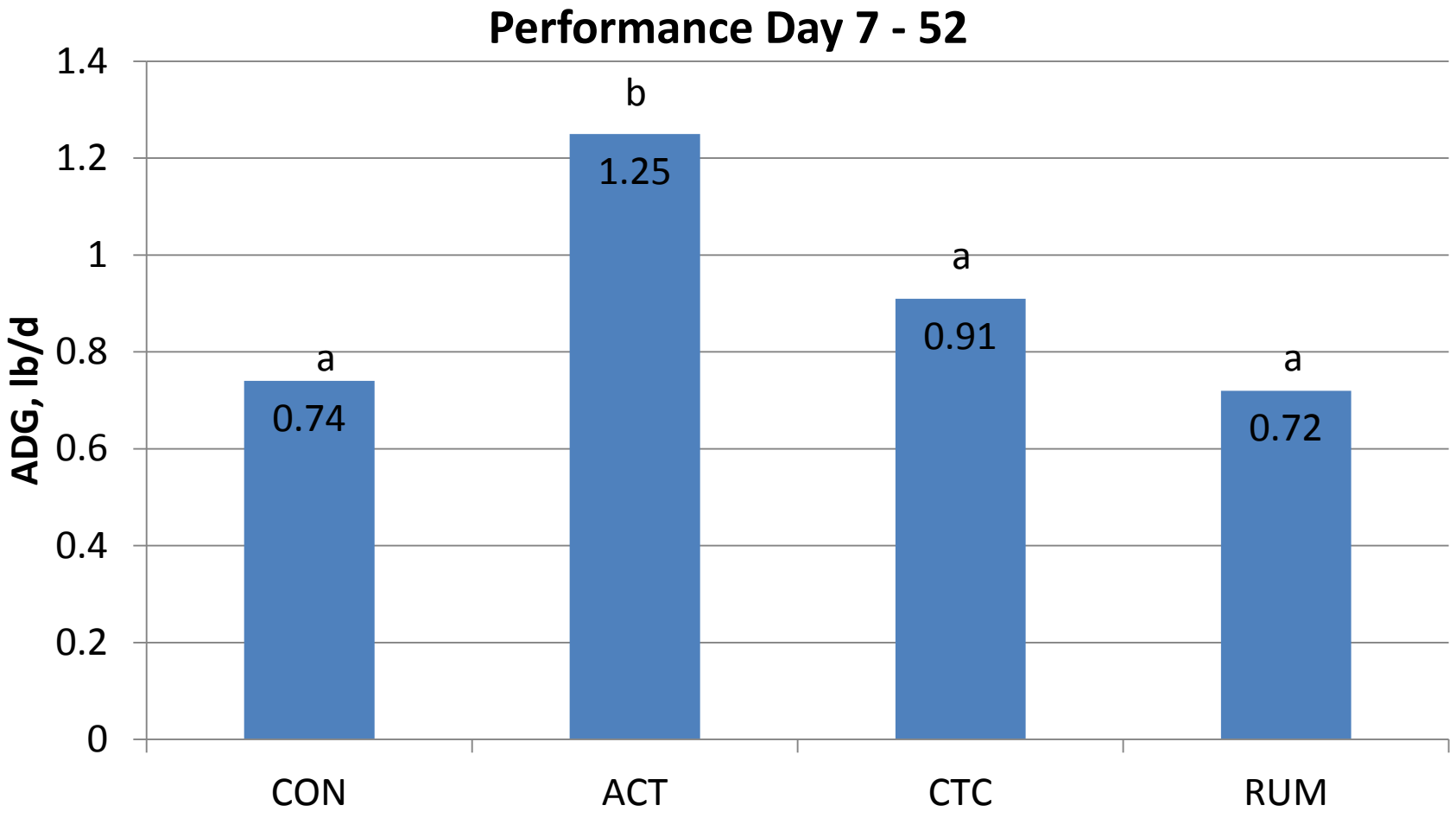
# Results




**P<0.01**

UF UNIVERSITY of FLORIDA IFAS

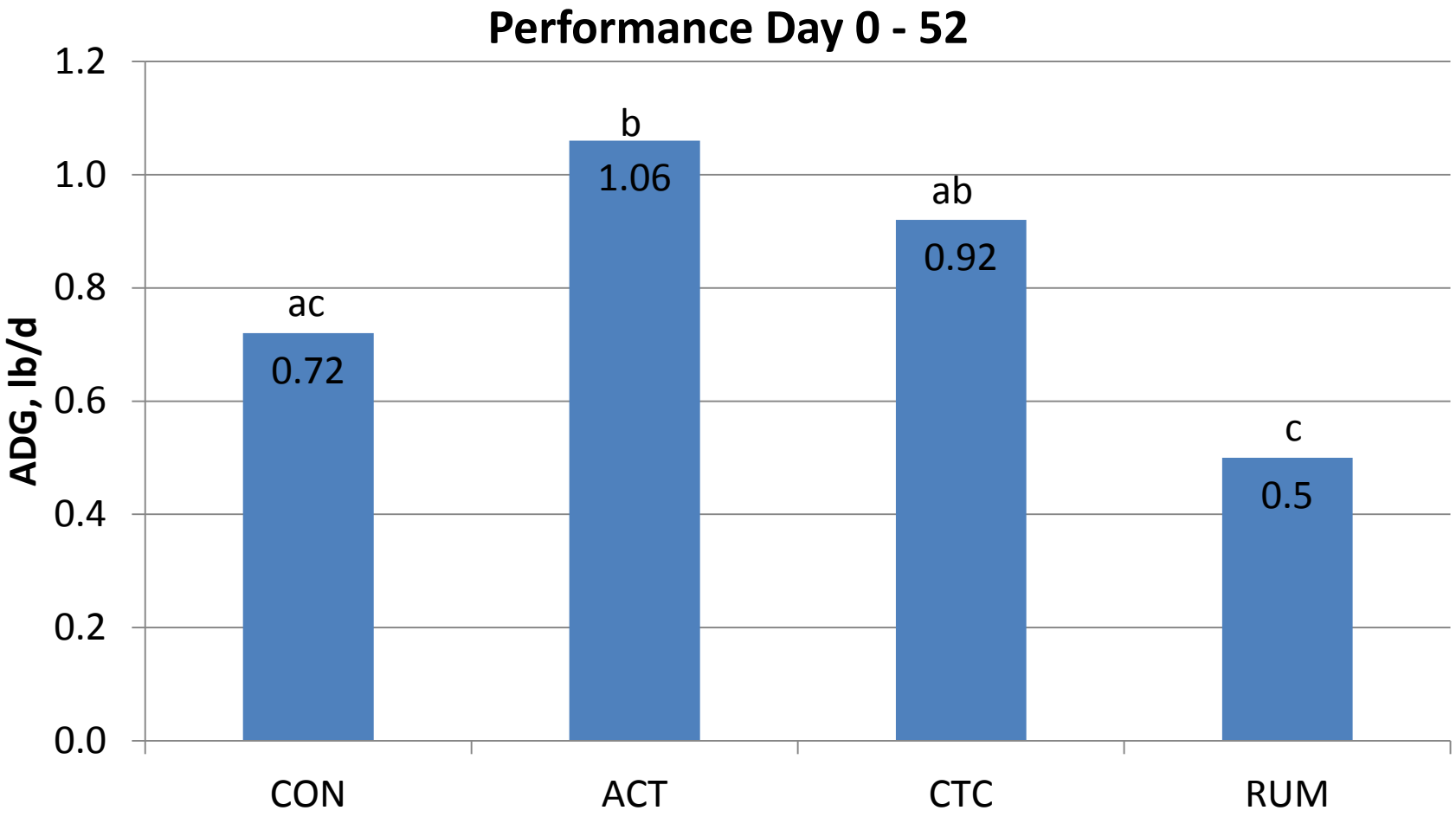
# Results




**P<0.02**

UF UNIVERSITY of FLORIDA IFAS

# Results




**P<0.002**

UF UNIVERSITY of FLORIDA IFAS

# Results

- Economics

| | Suppl. Cost $/lb | Total Suppl. Cost $/head | Total Gain lb/head | Feed COG ($/lb) | No Premium Profit/Loss $/hd | $0.24/lb Premium Profit/Loss $/hd |
|---|---|---|---|---|---|---|
| CON | 0.84 | 79.30 | 37.5 | 2.11 | -6.97 | 11.62 |
| ACT | 0.91 | 85.90 | 55.3 | 1.55 | 3.74 | 31.14 |
| CTC | 0.85 | 80.24 | 41.9 | 1.93 | -4.25 | 16.53 |
| RUM | 0.86 | 81.18 | 26.4 | 3.10 | -16.73 | -3.66 |

UF UNIVERSITY of FLORIDA IFAS

# Re-cycled Feed Materials and Methods

- 32 pastures, 16 pastures for each experiment
  - 2 ac with water and shade
  - 4 pastures per treatment
  - 10 calves per pasture
- Pastures were blocked by location
- Prior to initiation of experiment, pastures were:
  - Mowed
  - Fertilized

UF UNIVERSITY of FLORIDA IFAS

# Materials and Methods

- Experiment 1
  - 160 Angus, Brangus weaned heifer and steer calves
  - Weaned for 7 days prior to initiation of trial
  - Blocked by BW, Breed, Sex, Implant status
  - Randomly allotted to 1 of 4 treatments, 1 of 4 pens(treatment)

UF UNIVERSITY of FLORIDA IFAS

# Materials and Methods – Exp. 1

- Supplement Treatments:
  - No supplement, loose mineral supplement provided (**CON**)
  - Supplement provided at 1% of mean pen BW (**1.0%BW**)
  - Supplement provided at 1.5% of mean pen BW (**1.5%BW**)
  - Supplement provided at 2.0% of mean pen BW (**2.0%BW**)
- *Calves offered full feed amount*
- Feed delivered daily, weigh-back collected daily
- All steers implanted as nursing calves
  - ½ of steers re-implanted at weaning – paired by BW and breed
- BW collected
  - Day -7, -1, 0, 22, 44, 45

UF UNIVERSITY of FLORIDA IFAS

# Materials and Methods - Exp. 2

- Experiment 2
  - 160 Angus, Brahman and 4 combinations of An x Br weaned heifer and steer calves
  - Weaned for 7 days prior to initiation of trial
  - Blocked by BW, Breed, Sex
  - Randomly allotted to 1 of 4 treatments, 1 of 4 pens(treatment)

UF UNIVERSITY of FLORIDA IFAS

# Materials and Methods – Exp. 2

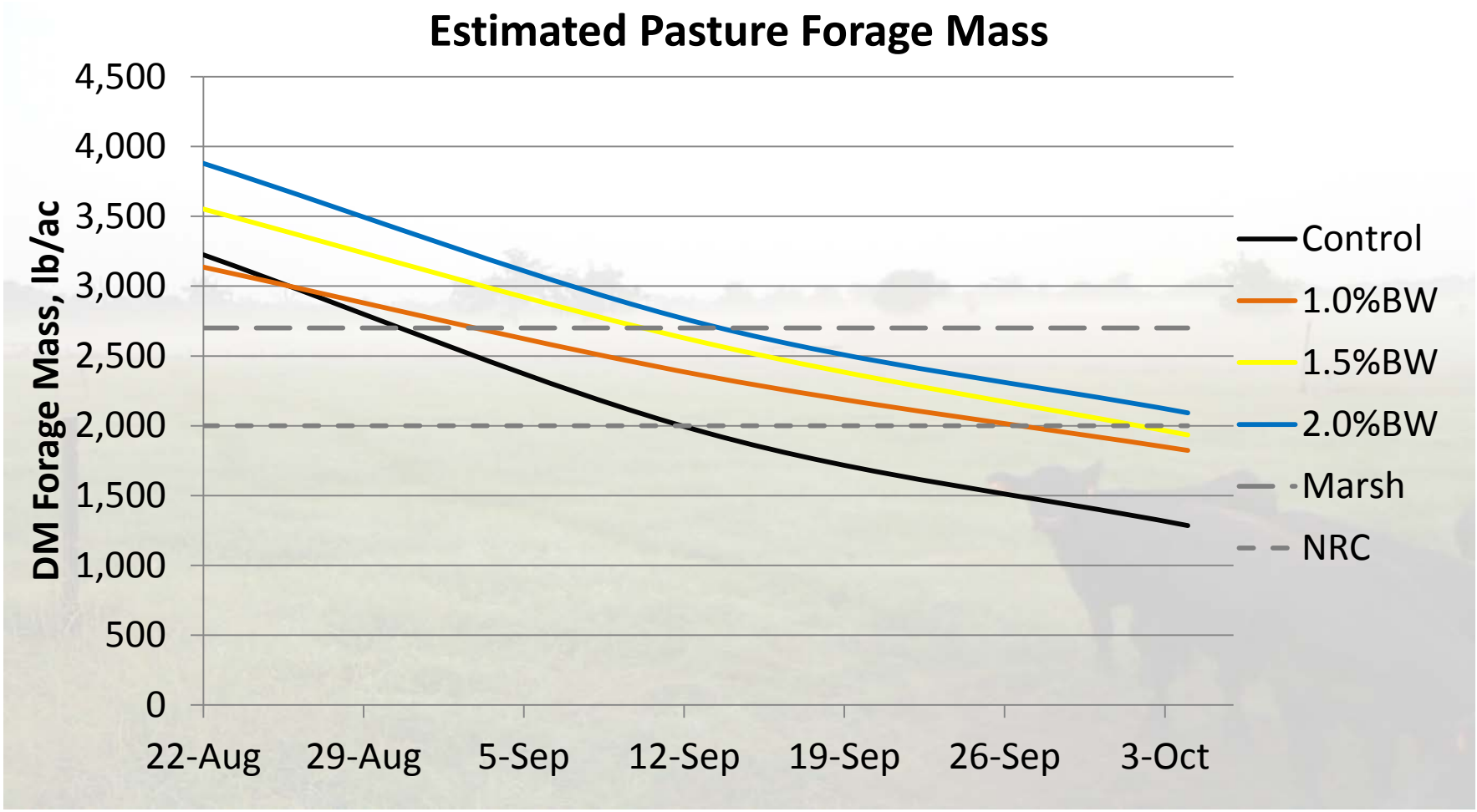
- Supplement Treatments:
  - No supplement, loose mineral supplement provided (**CON**)
  - Supplement provided at 1% of mean pen BW (**1.0%BW**)
  - Supplement provided at 1.5% of mean pen BW (**1.5%BW**)
  - Supplement provided at 2.0% of mean pen BW (**2.0%BW**)
- BW collected
  - Day -7, -1, 0, 22, 44, 45
- *Feed delivery stepped-up across 7 days*
- Feed amount delivered daily, weigh-back collected daily

UF UNIVERSITY of FLORIDA IFAS

# Recycled By-product Beef Feed

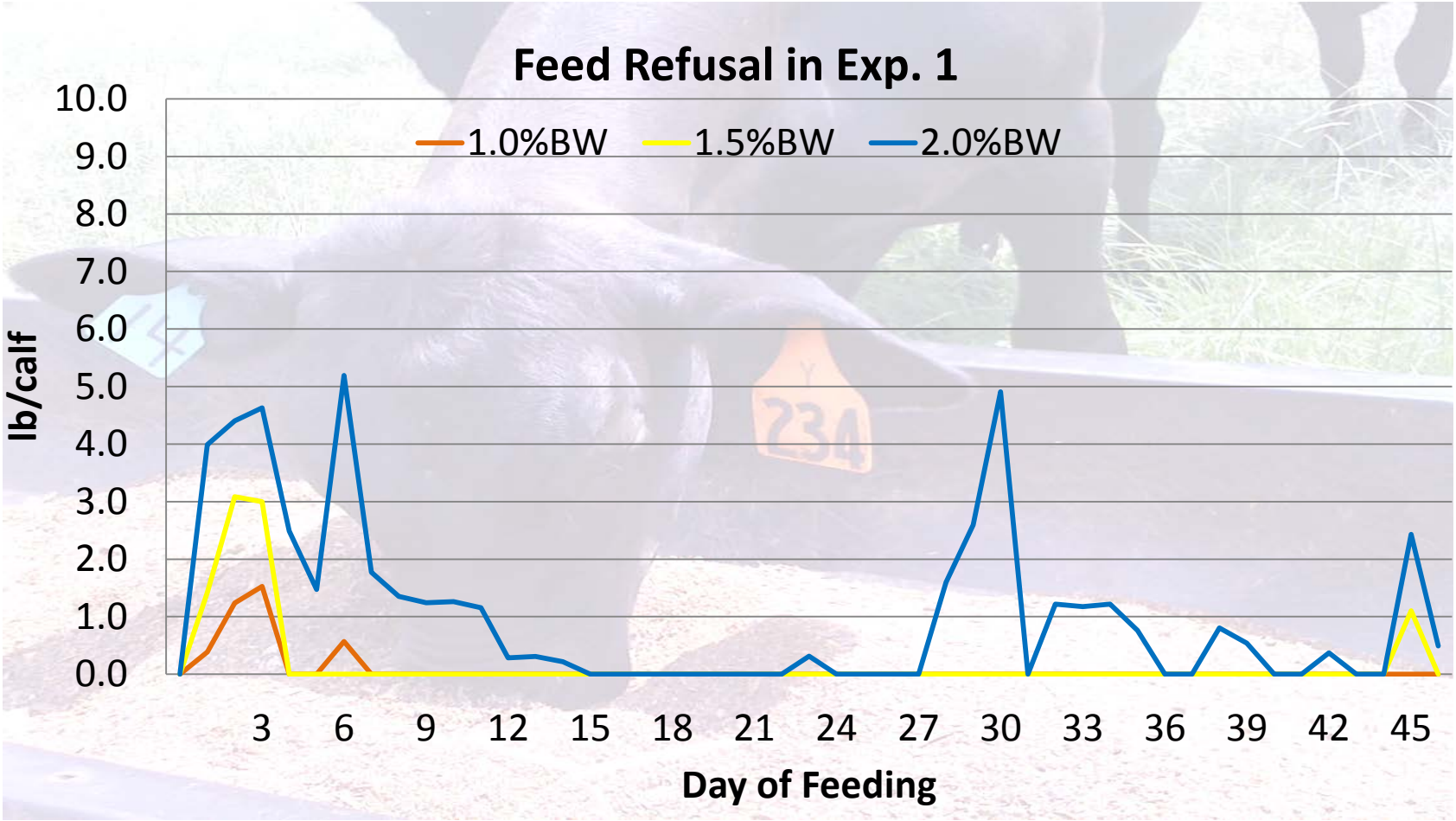
UF UNIVERSITY of FLORIDA IFAS

# Results



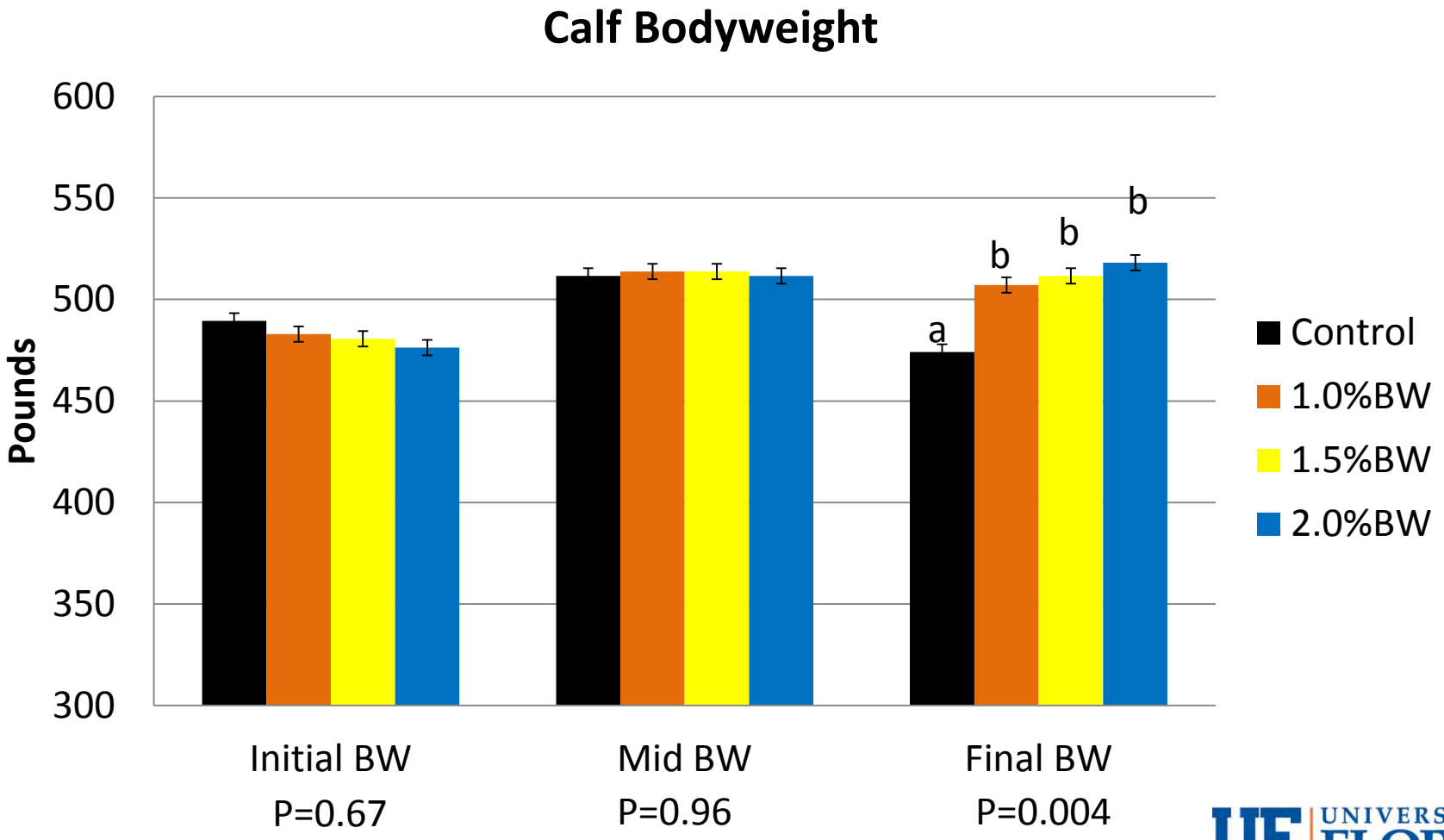

UF UNIVERSITY of FLORIDA IFAS

# Results




UF UNIVERSITY of FLORIDA IFAS

# Results – Exp. 1




UF UNIVERSITY of FLORIDA IFAS

# Results – Exp. 1

| | Supplement Treatment[1] | | | | | |
|---|---|---|---|---|---|---|
| Item | Control | 1.0% of BW | 1.5% of BW | 2.0% of BW | S.E.[2] | P-value |
| ADG 0 to 22 day, lb/d | 1.00[a] | 1.43[b] | 1.59[b] | 1.56[b] | 0.14 | 0.006 |
| ADG 23 to 46 day, lb/d | -1.45[a] | -0.35[b] | -0.14[b] | 0.38[c] | 0.17 | <0.001 |
| ADG 0 to 46 day, lb/d | -0.25[a] | 0.51[b] | 0.69[b] | 0.93[c] | 0.08 | <0.001 |
| Supplement intake, lb/calf | -- | 221.6[a] | 328.9[b] | 405.7[c] | 5.53 | <0.001 |
| Supplement G:F, lb:lb | -- | 0.105 | 0.094 | 0.101 | 0.010 | 0.77 |

[1] Supplements provided on a daily basis to 10 calves per pen. 4 pens per treatment, 40 calves per treatment.

[2] Pooled standard error, n=160.

[a,b,c,d] Means with different superscripts differ, $P < 0.05$.

UF UNIVERSITY of FLORIDA IFAS

# Results – Exp. 1

| Item | Supplement Treatment[1] | | | | | |
|---|---|---|---|---|---|---|
| | Control | 1.0% of BW | 1.5% of BW | 2.0% of BW | S.E.[2] | P-value |
| Feed cost, $/calf | 6.12[a] | 22.74[b] | 30.78[c] | 36.54[d] | 0.41 | <0.001 |
| Preconditioning value, $/calf [3] | 601.64[a] | 637.33[b] | 643.14[b] | 652.28[b] | 10.97 | 0.005 |
| Profit/Loss, $/calf [4] | 6.33[a] | 31.59[b] | 33.06[b] | 40.83[b] | 4.45 | <0.001 |
| Precond. Cost of Gain, $/calf | 5.72[a] | 2.85[bc] | 4.58[ab] | 1.51[c] | 0.84 | 0.003 |

[1] Supplements provided on a daily basis to 10 calves per pen. 4 pens per treatment, 40 calves per treatment.

[2] Pooled standard error, n=160.

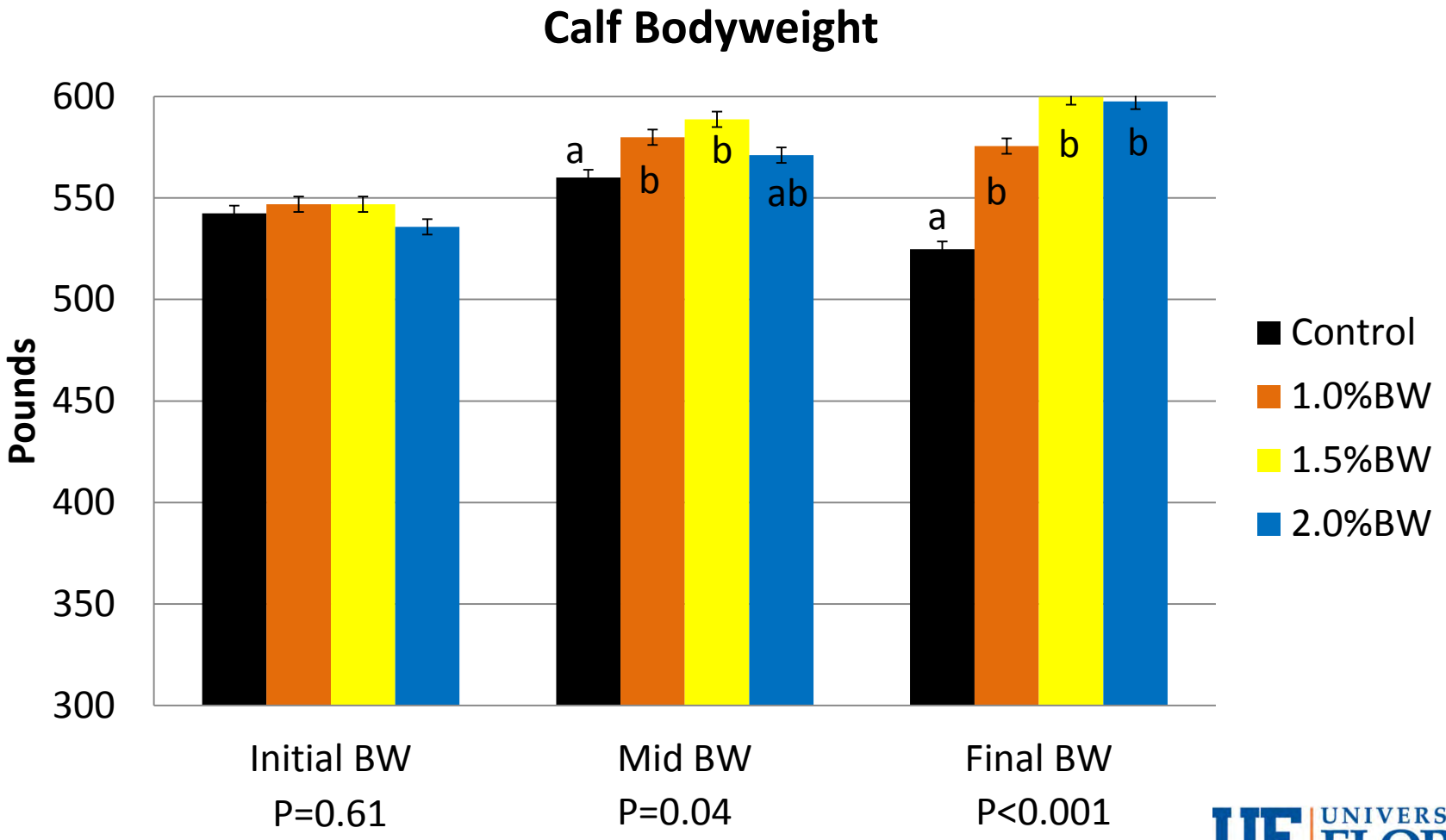
[3] Final value calculated using initial price using a $0.10/45.4 kg price slide, calves valued using a price of $119.76 for a 215 kg calf; values for a calf established on week of experiment initiation in August. Includes feed cost and pasture charge of $6.12 per calf. Final value calculated with a $6.64/45.4 kg preconditioning premium.

[4] Final value – initial value – pasture and feed cost.

[a,b,c,d] Means with different superscripts differ, $P < 0.05$.

UF UNIVERSITY of FLORIDA IFAS

# Results – Exp. 2




UF UNIVERSITY of FLORIDA IFAS

# Results – Exp. 2

| | Supplement Treatment[1] | | | | | |
|---|---|---|---|---|---|---|
| Item | Control | 1.0% of BW | 1.5% of BW | 2.0% of BW | S.E.[2] | P-value |
| ADG 0 to 22 day, lb/d | 0.81[a] | 1.57[b] | 1.97[b] | 1.61[b] | 0.20 | <0.001 |
| ADG 23 to 46 day, lb/d | -1.55[a] | -0.29[b] | 0.35[c] | 1.12[d] | 0.13 | <0.001 |
| ADG 0 to 46 day, lb/d | -0.38[a] | 0.61[b] | 1.12[c] | 1.32[c] | 0.11 | <0.001 |
| Supplement intake, lb/calf | -- | 245.5[a] | 369.0[b] | 492.0[c] | 0.32 | <0.001 |
| Supplement G:F, lb:lb | -- | 0.100 | 0.120 | 0.118 | 0.010 | 0.30 |

[1] Supplements provided on a daily basis to 10 calves per pen. 4 pens per treatment, 40 calves per treatment.

[2] Pooled standard error, n=160.

[a,b,c,d] Means with different superscripts differ, $P < 0.05$.

UF UNIVERSITY of FLORIDA IFAS

# Results – Exp. 2

| Item | Supplement Treatment[1] | | | | | |
|---|---|---|---|---|---|---|
| | Control | 1.0% of BW | 1.5% of BW | 2.0% of BW | S.E.[2] | P-value |
| Feed cost, $/calf | 6.12[a] | 24.53[b] | 33.80[c] | 43.02[d] | 0.004 | <0.001 |
| Preconditioning value, $/calf [3] | 648.31[a] | 707.43[b] | 735.74[c] | 735.04[c] | 9.87 | <0.001 |
| Profit/Loss, $/calf [4] | 6.36[a] | 41.83[b] | 60.48[c] | 61.37[c] | 5.90 | <0.001 |
| Precond. Cost of Gain, $/calf | 5.31[a] | 3.38[a] | 3.07[ab] | 1.01[b] | 0.85 | 0.006 |

[1] Supplements provided on a daily basis to 10 calves per pen. 4 pens per treatment, 40 calves per treatment.

[2] Pooled standard error, n=160.

[3] Final value calculated using initial price using a $0.10/45.4 kg price slide, calves valued using a price of $117.74 for a 238 kg calf; values for a calf established on week of experiment initiation in August. Includes feed cost and pasture charge of $6.12 per calf. Final value calculated with a $6.64/45.4 kg preconditioning premium.

[4] Final value – initial value – pasture and feed cost.

[a,b,c,d] Means with different superscripts differ, $P < 0.05$.

UF UNIVERSITY of FLORIDA IFAS

# Results – Exp. 2

| | Breed Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item | Angus | 75:25 | Brangus | 50:50 | 25:75 | Brahman | S.E.[1] | P-value |
| Initial BW, lb | 549 | 544 | 547 | 536 | 525 | 551 | 9.5 | 0.11 |
| Mid-point BW, lb | 582 | 576 | 576 | 578 | 562 | 580 | 10.8 | 0.58 |
| Final BW, lb | 573 | 567 | 576 | 578 | 564 | 580 | 10.8 | 0.79 |
| ADG 0 to 22 day, lb/d | 1.41 | 1.41 | 1.34 | 1.85 | 1.68 | 1.32 | 0.19 | 0.13 |
| ADG 23 to 46 day, lb/d | -0.33 | -0.24 | -0.02 | -0.008 | 0.11 | -0.02 | 0.02 | 0.15 |
| ADG 0 to 46 day, lb/d | 0.51[a] | 0.55[a] | 0.62[a] | 0.88[b] | 0.84[b] | 0.62[a] | 0.13 | 0.02 |
| Suppl G:F, lb:lb | 0.107 | 0.114 | 0.116 | 0.155 | 0.145 | 0.117 | 0.019 | 0.14 |
| Precond. value, $/calf [3] | 671.40 | 667.13 | 673.73 | 674.80 | 661.07 | 679.12 | 12.14 | 0.79 |
| Profit/Loss, $/calf [4] | -1.12[a] | 1.11[a] | 5.11[a] | 18.24[b] | 15.83[b] | 4.84[ab] | 6.59 | 0.02 |
| Precond. COG, $/calf | 2.76 | 3.53 | 3.21 | 0.77 | 1.53 | 3.02 | 1.36 | 0.52 |

[1] Pooled standard error, n=160.

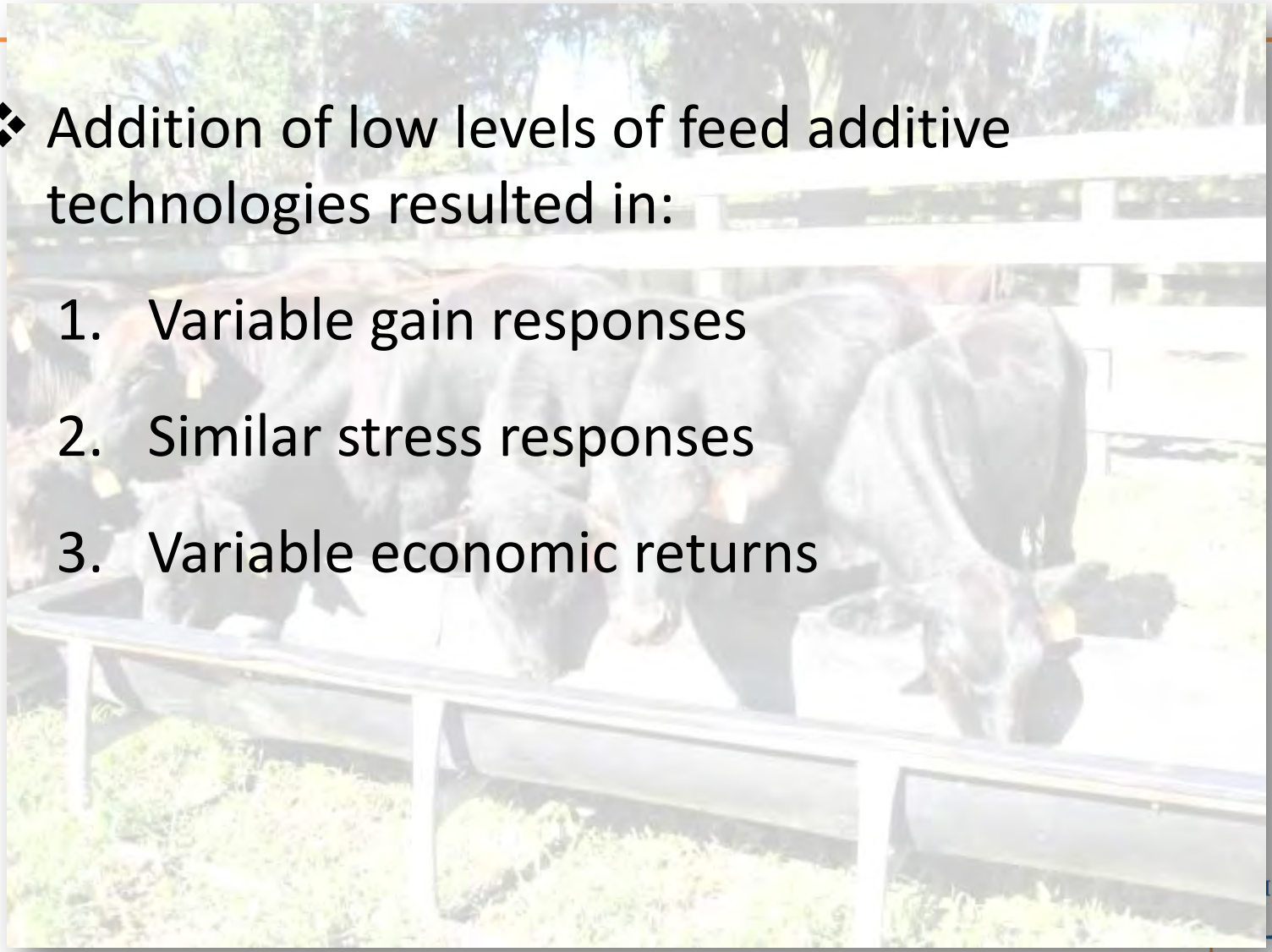
[a,b] Means with different superscripts differ, $P < 0.05$.

UF UNIVERSITY of FLORIDA IFAS

# Conclusions

- Supplemented calves performed better than control calves.
  - Exp. 1: 2.0>1.5, 1.0> Control
  - Exp. 2: 2.0, 1.5> 1.0> Control
- Preconditioning value and Profit/Loss
  - Exp. 1: Supplement > Control
  - Exp. 2: 2.0, 1.5> 1.0> Control
- Feed Cost of Gain
  - Exp. 1: variable with performance
  - Exp. 2: directly related to performance

# Implications



- Addition of low levels of feed additive technologies resulted in:
  1. Variable gain responses
  2. Similar stress responses
  3. Variable economic returns

# Outcomes and Implication

1. Variable gain responses
2. Similar stress responses
3. Variable economic returns
4. Pasture forage availability greatly affected the outcome of the experiment
5. Cattle adapted to the feed, but time was needed
6. This re-cycled feed product may not be the best feedstuff for weaned calves on pasture

UF UNIVERSITY of FLORIDA IFAS

# Questions

UF UNIVERSITY of FLORIDA
IFAS