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Beef Cattle Programs

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Overall goal

- *Explore management options that impact the profitability of beef cattle enterprises in Virginia.*

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Early weaning of calves

- Usually necessitated by environmental conditions – drought

or

- Intervention to initiate post-partum cycling

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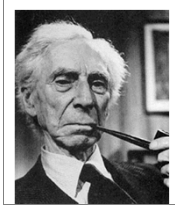
It isn't what we don't know that gives us trouble, it's what we know that ain't so.
Will Rogers



In all affairs, love, religion, politics or business, it's a healthy idea, now and then, to hang a question mark on things you have long taken for granted.
Bertrand Russell

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Metabolic Imprinting

Dörner (1975) ……permissive at discrete prenatal developmental times to the lasting effects of hormones, metabolites, and neurotransmitters.

…. could lead to long term changes in reproductive and metabolic capabilities.

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- Can metabolic imprinting prove useful in improving beef production efficiency?

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Aims

Optimize an economical metabolic imprinting program for feeder calves. Published and preliminary data strongly support the concept that metabolic imprinting of young calves promotes premature intramuscular fat deposition and advances development of various endocrine axes. The objective of the aim is to identify the appropriate feeding regime necessary for an effective metabolic imprinting management strategy that allows for producer realized profits without negatively affecting consumer preference of meat eating quality, or reduced lifetime productivity of cow herds.

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Aims (cont)

Identify the genetic and biological systems inherent to postnatal metabolic imprinting of feeder calves.

Epigenetic programming of individual tissues ultimately impacts animal physiology underlying growth and development. The objective of the aim is to assess changes in transcriptomic, proteomic and metabolomic responses in liver, muscle, fat, pituitary and immune cells resulting from metabolic imprinting.

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Calf crop- timeline

Imprinted- weaned at 105 d

- **Ultrasound**
- **Liver/ muscle biopsy**
- **Acetate challenge before & after**
- **½ steers bled 14-d intervals**
- **145 d feeding period**
- **1840 lb intake, 40% corn**

Calf crop timeline

Conventional weaned 250 d

- Ultrasound
- Liver/ muscle biopsy
- Acetate challenge
- Heifers co-mingled, grazed alfalfa
- Steers co-mingled, grazed tall fescue

Steers began feed adjustment 13 mo

serial ultrasound, harvest at .5 BF

Heifers will be time-bred at 14-15 mo

Calf management- EW

- Started on 2lb/d commercial calf starter
- After 2d started adding mixed ration 20 %CP, .57 Mcal/lb NE_g
- Feed increased every 2-3d, ad lib target
- Hay limited to ~2.0lb/d
- CP% content decreased to 14%
- Calves weighed to monitor performance

Calf feed 1st step

CORN DENT N0 2	35.0
CORN DIST GRAIN	15.0
SOYBEAN MEAL	14.0
CORN GLUTEN FEED	10.0
WHEAT MIDDS	10.0
COTTONSEED HULLS	8.0
CANE MOLASSES	6.0
LIMESTONE 38%	2.0
SALT	0.5
VITAMIN A-30,000	0.05

Calf feed- final step

• CORN DENT N0 2	41.0
• CORN DIST GRAIN	15.0
• CORN GLUTEN FEED	15.0
• WHEAT MIDDS	10.45
• COTTONSEED HULLS	10.0
• CANE MOLASSES	6.0
• LIMESTONE 38%	2.0
• SALT	0.5
• VITAMIN A-30,000	0.05

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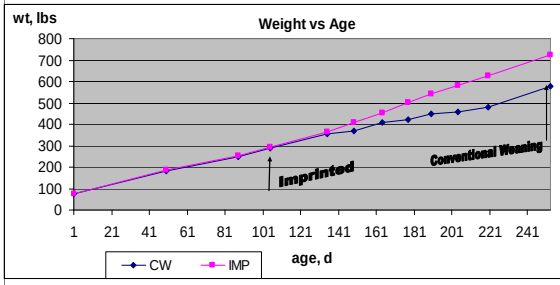
Fall born calves – 250d



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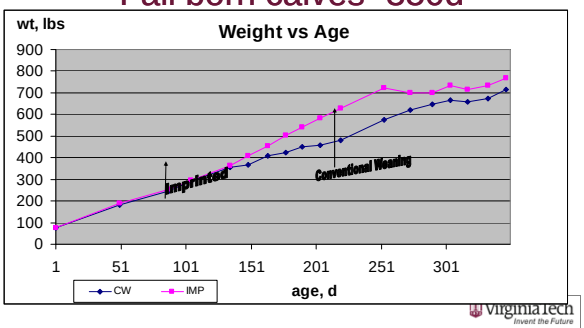
Fall born calves -350d



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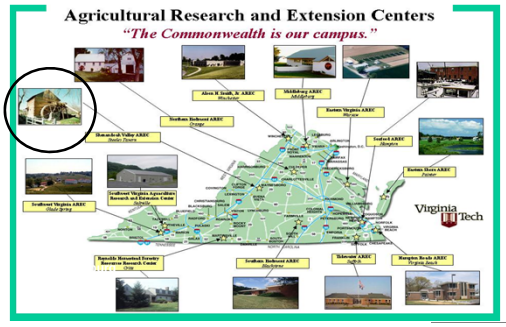
Agricultural Research and Extension Centers

"The Commonwealth is our campus."



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Feedlot Management

- Calves sent to feed at ~ 400d of age
- Finished on corn silage/ grain mix
  - Transitioned from 75% to 25% silage
  - Daily feed intake recorded
- Weight gain monitored
- Ultra-sounded at 75d to set harvest groups
- No implant

Feedlot supplement

CORN GLUTEN FEED	37.0
CORN DENT N0 2	50.0
WHEAT MIDDS	10.0
LIMESTONE 38%	2.40
SALT	0.250
VITAMIN A-30,000	0.017
RUMENSIN	0.018

Steer Performance

	CW	MI	
Early Weaning wt 105d, lbs	289	295	NS
Conventional Weaning wt, 250d	576	751	P<.01
Post-graze wt, lbs	806	870	P<.01
Harvest age, d	507	518	NS
Harvest wt, lbs	1138	1244	P<.01

Carcass Measures

	CW	MI	
Hot Carcass wt, lbs	673	736	P<.01
12th rib fat, in	.45	.44	NS
Rib Eye Area, in^2 ^	12.7	13.0	NS
KPH,%	2.3	2.4	NS
Yield Grade	2.80	2.59	NS
Marbling Score*	519	644	P<.01
Quality grade	CH●	CH+	

^ Covariate analysis, HCW

*** Small=400, Modest=500, Moderate=600**

Spring calf crop timeline

Imprinted- weaned at 104 d
- Ultrasound
- 101 d feeding period
- 1200 lb intake, 40% corn

Conventional weaned 205 d
- Ultrasound
- Heifers co-mingled, grazed alfalfa
- Steers co-mingled, grazed tall fescue

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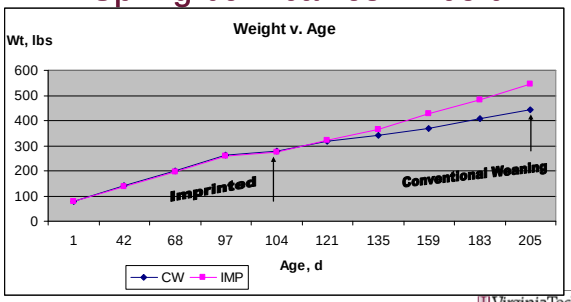
Spring born calves – 205 d



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Summary

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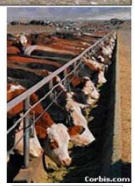
Can We Maintain Productivity While Minimizing Grain/Starch Use?

- Nutrient Programming
  - Optimum time and amount
- Nutrient Partitioning
  - Optimum composition
- Continuous Input : Output Relationships
  - Nutrients → Lean
  - Nutrients → Fat
  - Nutrients → GHG
  - $$$$ → $$$$
- Optimum is a moving target



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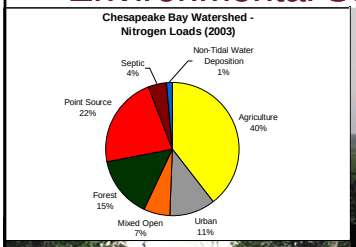
Remaining Questions- when?

-starch vs energy content

-interaction w/ breed or type

-interaction w/implant

Environmental Sustainability



Income – Expenses = Profit

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