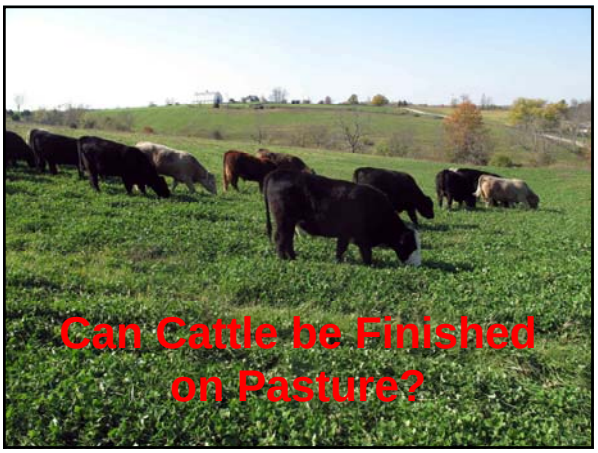
Pasture-Finished Beef Production Overview

Greg Halich
859-257-8841
Greg.Halich@uky.edu

Agricultural Economics
University of Kentucky



Finishing Animal Statistics Including Sold to Processor

Period	#	Weight (lbs)	Dress Weight (lbs)	Dress %
2012-2016	*45*	*1231*	*742*	*60.2%*

Finishing Regions (1930's)

East of Mississippi:

- Virginia
- Tennessee
- Kentucky

→ *Bluegrass pastures*

Feeds and Feeding, F.B. Morrison 1939

Estimated Finishing Weights
Pasture-Finished Cattle
Attaining .25" Backfat
(Add 65 lbs for heavy-muscled animals and subtract 65 lbs for light-muscled animals)

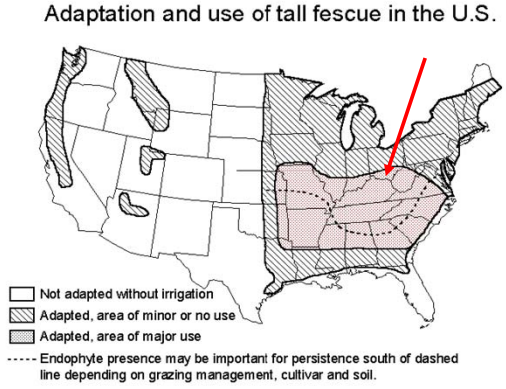
Frame Size	Frame Score	Heifer Est. Finish Wt	Steer Est. Finish Wt
Small	3	930	1020
Small/Medium	4	1010	1110
Medium	5	1080	1200
Medium/Large	6	1160	1290

Carcass Grades			
	PR	CH	SE
US Avg (2006-15)	***4%***	***64%***	***32%***
KY Farm (2014-16)	***0%***	***55%***	***45%***

Carcass Grade 2014-2016	
Grade	**Backfat (in)**
Choice	*0.35*
Select	*0.22*
Standard	*-*

Key Marbling on Pasture: *Work at Nature's Pace 25-36 Months*

Myth #2 Can't Finish on Fescue-Based Pastures



Fescue-Based Pastures

- No more than ½ diet fescue
  → *Preferably less*
- Need mix of other species
- Need excellent grazing mgt

Myth #3
Need Special
"Forage Chain"

"Forage Chain"

- Year-round production - maybe
  → *Not for seasonal production*
  → *Not efficient for small farms*

Myth #4
Need Special
Genetics

Genetics

- Important but not critical
- Too much focus on genetics

Not enough focus on:
→ *Grazing management*
→ *Overall production system*

Genetics

Cows that thrive on grass/hay:
→ *Calves that finish well pasture*

Focus genetics on:
→ *High yielding animals*

Myth #5
Need Small-Framed Cattle

Small-Framed Animals

Somewhat easier to finish
→ *1-2 months maybe*

Need to compare:
→ *reduction in meat yield*
→ *reduction in costs*

Myth #6
Can Finish Cattle in 18-22 Months on Grass

Gains Needed
Finish at 1250 lbs
Weaned 550 lbs 8 months

18 months	2.3 lbs/day
20 months	1.9 lbs/day
22 months	1.6 lbs/day
24 months	1.4 lbs/day
26 months	1.3 lbs/day
28 months	1.2 lbs/day

Paper Farming

"Farming looks mighty easy when your plow is a pencil, and you're a thousand miles from the corn field"

Dwight D. Eisenhower: Address at Bradley University, Peoria, Illinois, 9/25/56

Paper Finishing

Cherry-pick forages and gains

No accounting for:

→ *Compensatory gain*

→ *Implanted cattle*

→ *Best vs. avg. gains*

My Experience Finishing Under 24 months

Upper South:

- *Farms with fescue*

→ *Haven't seen yet*

- *Farms with no fescue*

→ *Haven't seen yet*

Other Regions???

Myth #7 Meat Will be Tough if Over 24 Months Old

Perceived vs. Measured Toughness

28 month Marbled animal vs. 18 month:

→ *Mechanical toughness higher*

→ *Perceived toughness lower*

→ *No comparison in flavor*

Myth #8 Can't Harvest Animals Over 30 Months Old

Over 30-Months

If I had to choose steak:

1) 24 month old standard grade
2) 36 month old low-choice grade

What about burger?

Myth #9
Can't Finish Well in the Fall – Washy Grass

Fall "Washy Grass"

My experience:

→ *Acceptable finishing gains / marbling*
→ *Need much lower stocking rate fall*
→ *But would like to see research*

Myth #10
Mob Grazing Works Well for Finishing Cattle

Mob Grazing

Has its Place:

→ *Cow-calf enterprise (low needs)*
→ *Great for improving ground*

Finishing Cattle:

→ *Train wreck waiting to happen*

Rest of Today:

- Forages and Grazing Mgt

Wednesday:

- Cattle, Supplements, Winter Mgt
- Marketing / Processing

Thursday:

- Producer Panel Experiences
- Profitable Finishing Systems

Forages and grazing management

John Fike
Virginia Tech
School of Plant and Environmental Sciences
jfike@vt.edu

Keys to successful forage programs

- Basic commodity is forage
- Use reliable information
- Timely management actions
- Test / fertilize soils to maintain optimal fertility
- Use adapted species and match to needs
- Maximize length of grazing season
- Choose most efficient grazing methods
- Minimize stored feed costs

The three key management practices forage producers should utilize*

- Soil test and apply appropriate fertility
- Rotational stocking/grazing
- Stockpile tall fescue (and other species)
  - ❖Manage to mitigate toxicosis

*As boiled down by Gary Bates, UT Knoxville

Key to forage finishing

Consistent, high rate of gain

- 500 lb weaned calf to >> 1100+ lb beef
- 600+ lb of gain
- 2+ lb/d for 300 days OR
- 1+ lb/d for 600 days

Intake: *the* driver of gain

(good genetics are no match for poor pasture)

Intake = function of:

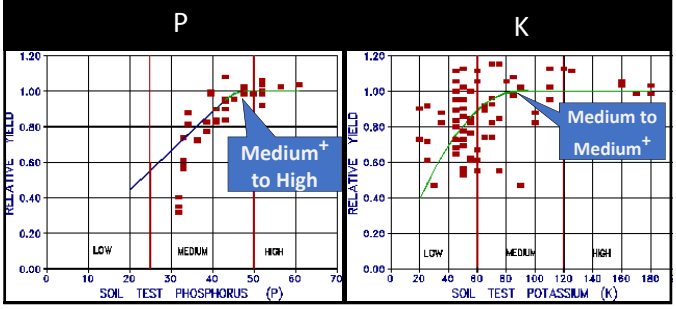
- How much the animal eats
- What the animal eats

Soil is foundational

The performance of my animals reflects the condition of my pastures and the condition of my pastures reflects the state of my soils.

- Quote from Steve Lucas, Louisa, VA

Forage yield reslationship to Melich I soil test:



P effects on calf ADG

56-d trial: grazing stockpiled fescue late winter/early spring
standard forage availability among treatments

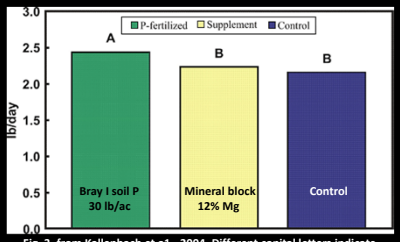
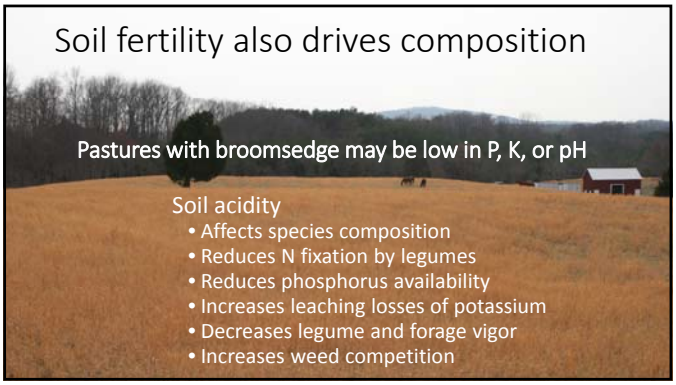


Fig. 3. from Kallenbach et a1., 2004. Different capital letters indicate treatment differences at the 0.10 alpha level.

Soil fertility also drives composition



Pastures with broomsedge may be low in P, K, or pH

Soil acidity
- Affects species composition
- Reduces N fixation by legumes
- Reduces phosphorus availability
- Increases leaching losses of potassium
- Decreases legume and forage vigor
- Increases weed competition

Rotational grazing/stocking

- Allows control of timing, frequency, and intensity of defoliation
- Affects productivity, re-growth, persistence, species composition

Figure 2. The orchardgrass plant on the left was clipped weekly to 1 inch for one month to simulate continuous grazing. The orchardgrass plant on the right was clipped at the beginning and end of the month to 3.5 inches to simulate rotational grazing. For the plant on the right, the value of rotational grazing is apparent after six days of regrowth.

Rest is essential for regrowth – *and intake!*

Animal variables		T1	T2	T3	SE	P
DM intake	kg ha^{-1}	1.07	1.65	2.03	0.18	<0.01
DM intake	kg (100 kg LW)$^{-1}$ h^{-1}	0.28	0.43	0.54	0.05	<0.01
Biting rate	bites min^{-1}	41.3	42.0	42.5	1.28	0.35
DM intake/bite	g bite^{-1}	0.45	0.65	0.85	0.08	<0.01
DM intake/bite	mg (kg LW)$^{-1}$	1.16	1.71	2.15	0.21	<0.01
DM utilization	%	74.9	68.7	56.9	5.80	<0.01

† T1, T2, and T3 represent swards of 14, 21, and 28 d of age regrowth, respectively.

Figure 11. Left: Overgrazing causes a poor soil cover resulting in water runoff, soil erosion, and poor insulation. Thus, high soil temperatures in summer and low water infiltration cause poor growth or death of plants. Right: Very dense tall vards, undergrazing, or late harvesting often kill the short leafy tillers and depress yield, quality, and later growth.

Residue management differs by species

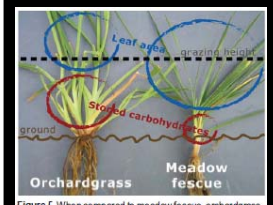
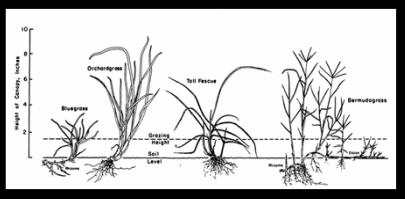
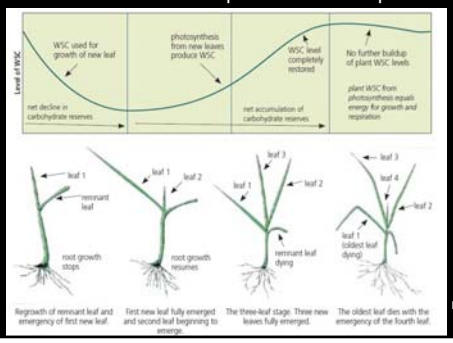


Figure 5. When compared to meadow fescue, orchardgrass exhibits slower regrowth after grazing for two reasons. The stored carbohydrates in the stem base are more likely to be eaten (and not available for regrowth) because the stem base is higher in the canopy; and there is less leaf area remaining after grazing to photosynthesize new carbohydrates.

From Geoff Brink, ARS



Time defoliation to plant development



From Guest, 2008

Defoliation effects on roots

Percent Leaf Volume Removed	Percent Root Growth Stoppage
10%	0%
20%	0%
30%	0%
40%	0%
50%	2-4%
60%	50%
70%	78%
80%	100%
90%	100%

From Crider, 1955

Defoliation effects on tall fescue roots

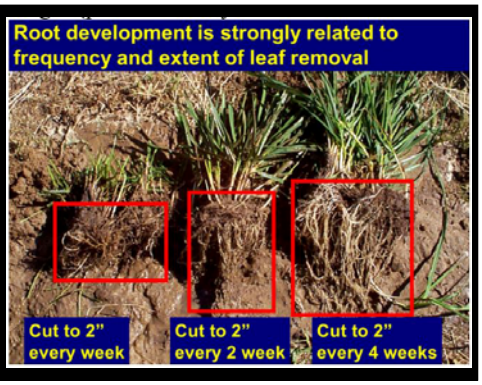


Figure from Jim Green

Other benefits of rotational stocking

- Greater water capture
  - ❖More water for plant growth
  - ❖Less runoff
- Lower canopy temperatures
  - ❖Better for cool season forages
- Increased soil C

Photos – Dale Wolf

Forage options…so what's for you?

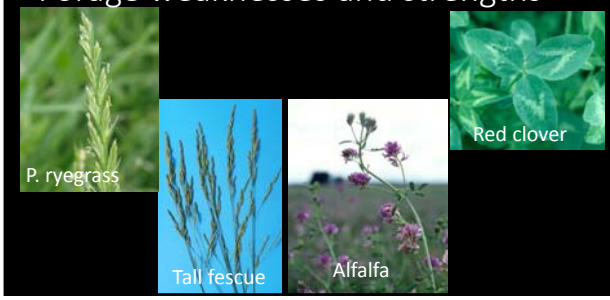
- Cool-season grasses
  - Tall fescue (NE, E–, E+)
  - Orchardgrass
  - Perennial ryegrass
  - Bluegrass
  - Timothy
  - Prairie bromegrass (e.g., Matua)
  - Smooth bromegrass
  - Annual ryegrass (A*)
  - Small grains (A)
- Cool-season legumes
  - Alfalfa
  - White clover (ladino, wildtype)
  - Red clover
  - Birdsfoot trefoil
  - Kura clover
  - Crimson clover (A)
  - Vetches (A)

*A = Annual

- Warm-season grasses
  - Corn (A)
  - Sorghum (A at latitude)
  - Millets (A)
  - SorghumXSudan (A)
  - Crabgrass (A)
  - Bermudagrass
  - Caucasian bluestem??
  - Eastern gamagrass
  - Johnsongrass
- Warm-season legumes
  - "Lucerne" CS but productive in summer
  - Annual lespedezas (A)
  - Sericea lespedeza
  - Kudzu
- Alternative forages
  - Brassicas (A) , chicory, plantain, browse

TINSTAAFL / TANSB

Forage weaknesses and strengths



Forage for all seasons?

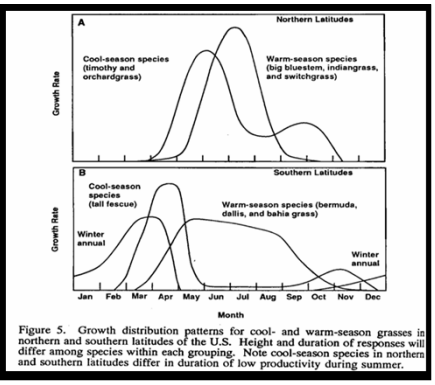


Figure 5. Growth distribution patterns for cool- and warm-season grasses in northern and southern latitudes of the U.S. Height and duration of responses will differ among species within each grouping. Note cool-season species in northern and southern latitudes differ in duration of low productivity during summer.

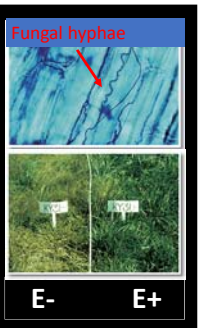
Tall fescue

- Persistent
- Adaptable to varied management
- Excellent for stockpiling
- Numerous varieties
- Endophyte issues (KY 31 and older varieties)

Tall fescue

Endophytes and alkaloids

- Endophytes – fungi "within the plant"
  - Convey agronomic benefits incl. resistance to: Drought, insects, poor fertility, overgrazing
- Alkaloids – toxins produced by "wild" endophytes
  - Reduce intake
  - Depress prolactin
    - Strong consequence to milk production
  - Vasoconstriction - affects heating and cooling
  - Concentration varies by plant part and by management



https://www.pubs.ext.vt.edu/SPES/SPES-114/SPES-114.html

Managing with toxic endophytes

https://www.pubs.ext.vt.edu/SPES/SPES-163/SPES-163.html

- Graze green leaf: Don't graze stems or seedheads
- Incorporate legumes and forbs, add pastures with other species, provide supplemental feeds
- Don't over fertilize
- Conserve as hay – in the boot stage
- Defer grazing stockpile until Jan. or later
- OR DON'T mitigate - Replace with novel, use strategically

Steer gain and behavior in response to toxic (E+) and nontoxic (E-) tall fescue

Steer Average Daily Gains

-0.8+ lb/d	E+ lb/day	E- lb/day
Alabama (grazing)	1.41	2.18
Alabama (seed)	0.44	2.12
Alabama	1.00	1.83
Georgia	1.02	1.31
Missouri	0.97	1.41
North Carolina (heifers)	0.55	1.65
Virginia	1.06	1.47
Texas	0.99	2.14

Orchardgrass

- Nutritious
- Very productive but less heat tolerant
- Close defoliation reduces persistence
- Doesn't stockpile well – eat it early
- Some varieties mature rapidly
  - Maturation timing can affect legume compatibility

Perennial ryegrass

- Premier forage grass worldwide
  - Supports high nutritional demand
- Not a good choice for warmer, drier climates
  - Lower yields & less persistence than other CS grasses
  - Routine reestablishment likely needed in VA
- Compatible with CS legumes
- Responds well to rotational stocking

Kentucky bluegrass

- Nutritive value is high when well-managed
- Better suited to higher elevations
- Grow with white clover or trefoil
- Summer production may be benefited by rotational stocking
- Dormant in dry, hot weather

Legumes in pastures

- Improve forage intake
- Add N to the production system
- Add CP and minerals to the diet
- Considered optimal at 20-40% of pasture DM

Alfalfa – queen of forages

- High nutritive value
- High yield
- Agronomics
  - Tolerates drought
  - Doesn't tolerate wet sites
  - Sensitive to soil Al, pH
  - High P, K requirements, especially if hayed
- Management
  - Can work well in mixtures
  - Hay or grazing
    - Select for grazing tolerance
    - Low lignin varieties available
  - Bloat potential
  - Weed control?
  - Insect pests – control?
  - Fungal diseases
  - Autotoxicity

Red clover

- Productive and nutritious
- Greater site tolerance than alfalfa
- Isoflavone offsets fescue toxicity effects
  - Biochanin A (vasodilator)
- Compatible with several forage grasses
- Persistence an issue (biennial)
  - Choose better varieties
  - Use routine frost seeding
- Potential for bloat

White Clover

- Generally grown in mixed stands
- Best to use new, persistent varieties of Ladino
- Bloat may need to be managed

Performance of Steers Grazing Endophyte-Infected Tall Fescue With and Without Ladino Clover In North Alabama

Pasture Type	ADG, lb	Gain/anim, lb	Gain/ac, lb
Fescue + White clover	1.53	307	582
Fescue + 150 lb N/acre	1.06	203	374

Is dilution the solution?

ADG

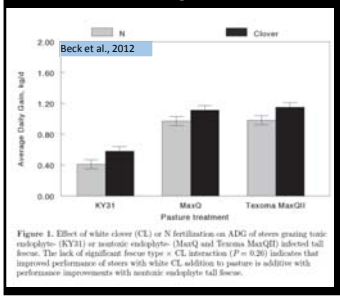


Figure 1. Effect of white clover (CL) or N fertilization on ADG of steers grazing toxic endophyte- (KY31) or nontoxic endophyte- (MaxQ and Texoma MaxQII) infected tall fescue. The lack of significant fescue type × CL interaction ($P = 0.26$) indicates that improved performance of steers with white CL addition to pasture is additive with performance improvements with nontoxic endophyte tall fescue.

Gain/ha

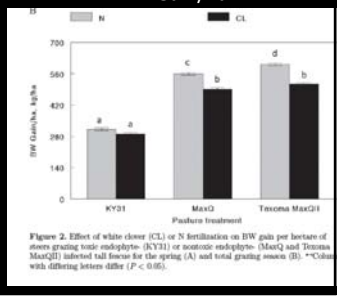


Figure 2. Effect of white clover (CL) or N fertilization on BW gain per hectare of steers grazing toxic endophyte- (KY31) or nontoxic endophyte- (MaxQ and Texoma MaxQII) infected tall fescue for the spring (A) and total grazing season (B). *Columns with differing letters differ ($P < 0.05$).

Birdsfoot trefoil

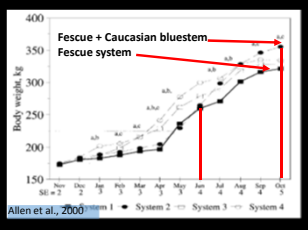
- Nutritious
  - = or > alfalfa
  - Escape N source
  - Non bloating
- Tolerant of some soil acidity
- Trickier management?
  - Regrowth from axilary buds – not crowns
  - Needs to produce seed for reseeding (2-4 yr lifespan)

Birdsfoot trefoil

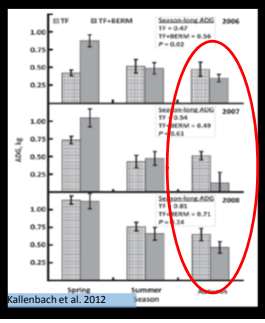
- Contains condensed tannins that may benefit:
  - Animal performance through N nutrition
  - Lower methane emissions
  - Bind fescue toxins, reducing toxicosis
- Evidence of greater digestibility and meat quality on trefoil-based pastures
- Lower yield, so better in mixes?

What about moving animals to WSG in summer?

- Quality summer forage important
- Sometimes negative fall response after period of removal from TF



Allen et al., 2000



Kallenbach et al. 2012

Switchgrass and other natives

- Natives can support good gains
- Establishment and management require some adjustment

http://nativegrasses.utk.edu/publications/default.htm

Steer gains on native grasses

Forage Treatment	ADG lb	Steer days/acre	Total Gain lb/acre
SG	2.09[a]	131	274
BB/IG	2.33[a]	84	195

May 29 to August 3, 2009 grazing season

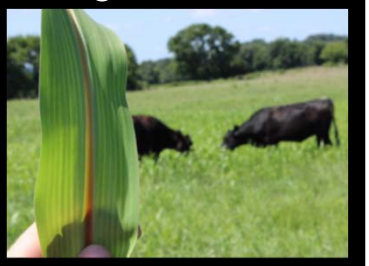
UTBEEF.COM

Switchgrass vs. tall fescue pasture.
Greenville, TN. June 2011

Millets and sudan x sorghum crosses

- Rapid growth
  - Can be hard to keep up with
- Nutritious
  - Brown mid-rib (bmr) varieties more digestible
- Use in renovation
- Annual

https://www.pubs.ext.vt.edu/SPES/SPES-88/SPES-88.html



bmr sorghum. Photo courtesy David Hunsberger

Crabgrass

- Rapid growth
- Highly palatable
- Highly digestible
- Good for disturbed sites (e.g., ring feeders)
- Several varieties available

Dairymple Farms stocker steers on 'Quick-N-Big®' Crabgrass pasture on May 27, 2010

http://www.redrivercrabgrass.com/our-seeds.html

Annual lespedeza yield

- *One of Greg's favorites...*

Annual ryegrass and small grains – fall and spring options

- Highly nutritious
- Extremely productive with N
  - Available N source?
- Easily established
- Still annuals!
- Cereals may be more cold tolerant

Annual legumes for fall and spring

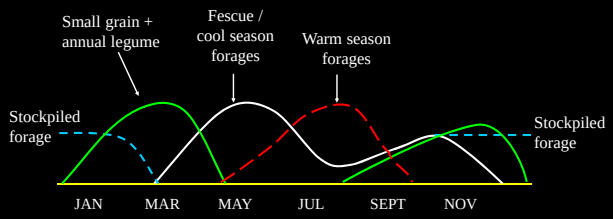
- Mix with cereals or annual ryegrass
- Overseed on crop land or permanent WS pasture
- Some options:

Forbs

- Brassicas – good fall growth
  - Use lower N, S fertilization
- Forage plantain and chicory
  - High digestibility
  - Good spring, summer growth
  - Plantain may reduce N loss to environment



Systems diversity can be good…keep it manageable



Pasture-Finished Beef Animal Selection and Feeding Management

Ed Rayburn
WVU-ANR Extension Specialist

Begin with the end in mind (your goals).

- Product satisfaction
  - For customer and producer
- Reasonable price
  - For producer and consumer
- Return customers

Components of your system

- Market
- Animal
- Climate & Weather
- Pasture
- Forage Supply and Demand
- Supplementing Supply and Demand

The Market

- What does your market want
  - Low vs high fat product
  - Cuts vs quarters
- Repeat customers
- Added value programs (requirements, costs, returns)
  - Grass-fed or Grain-on-grass
  - Organic
  - Animal welfare
  - Sustainability

EXTENSIONSERVICE Agriculture and Natural Resources

The Animal

- Breed (many work, from Angus to Jersey)
- Frame size (height and age at maturity, carcass wt., EPD)
- Muscle (steaks, roasts, burger, cutout, EPD)
- Body condition (fatness/finish, flavor, EPD)
- Maturity (flavor)
- Gender (heifers finish at lighter weights than steers)

EXTENSIONSERVICE Agriculture and Natural Resources

Pasture-based Beef Systems for Appalachia

Multi Institutional Project

EXTENSIONSERVICE

Survey of 149 pasture-finished beef producers in 46 states and Canada

(Shaw, J., J. Lozier, and E. Rayburn, 2003)

- Angus (39%), Hereford (14%), Galloway (7%), Jersey (6%), Other breeds (33%)
- Spring calving (74%)
- Rotational grazing (93%)
- Legumes used for N in pasture and hay production

EXTENSIONSERVICE

Body Conformation

- Deep body with gut capacity
- Well muscled
- Moderate frame
- Adequate length

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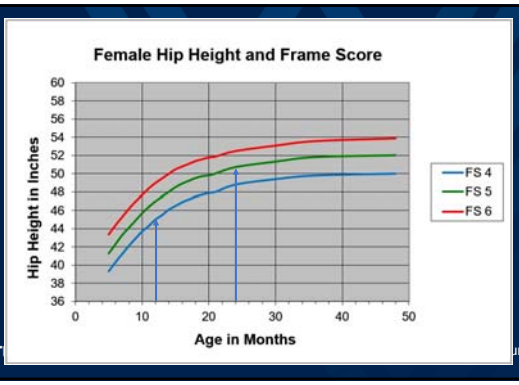
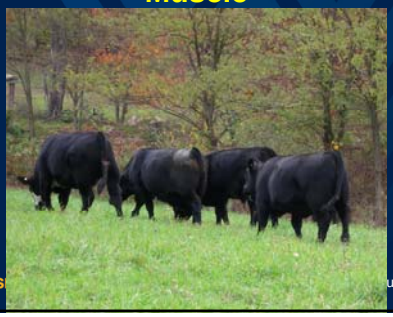
EXTE rces



Muscle



Breed cutout yield

1.0 Angus heifer = 1.33 Jersey steer at same age

(Jersey steer yielded 75% of Angus heifer)

EXTENSIONSERVICE Agriculture and Natural Resources

Selection Criteria

- Bull EPDs (average, below or above, not extremes)
  - Marbling +
  - Muscle avg to +
  - Milk – to avg
  - Yearling weight – to avg
- Visual appraisal
- Moderate size heifers (not the big fancy heifers)
- Heifers born fist 21 days of calving season

EXTENSIONSERVICE Agriculture and Natural Resources

Eye of the master finishes the cattle!

- Animal selection
  - Genetics (EPDs)
  - Phenotype (Looks)
- Manage to achieve their potential
  - Animals
  - Plants

EXTENSIONSERVICE Agriculture and Natural Resources

Body Condition Score (BCS)

(see handout for descriptions and photos)

BCS	Body fat %	Description
1	4	emaciated
2	8	very thin
3	11	thin
4	15	borderline
5	19	moderate
6	23	good
7	26	very good
8	30	fat
9	34	very fat

EXTENSIONSERVICE Agriculture and Natural Resources

Body Condition Score (BCS) Body Fat and Carcass Grade

BCS	Body fat %	Description
5	19	moderate
6	23	good
7	26	very good
8	30	fat

Body fat %	Grade	Shrunk Wt. lb.
25	Standard	1092
27	Select	1160
28	Choice	1200

EXTENSIONSERVICE Agriculture and Natural Resources

Average daily gain (ADG) effect on body condition score (BCS) achieved

(young growing steers)

Finished BWt lb	Previous ADG	BCS achieved
1030	1.6	6
	1.7	7
	1.9	8
1180	1.7	6
	1.9	7
	2.0	8

Adapted from Fox et al 1988 cited in NRC 2000 update p. 204

EXTENSIONSERVICE Agriculture and Natural Resources

Requirements for gain

(adequate CP diet, adapted from NRC 2000 update, p. 212)

BWt lb	ADG lb	TDN%	DMI %BWt	CP%
600	0.7	50	2.7	7
	2.0	60 (68)	2.8 (3.1)	10
	3.0	70	2.7	12
800	0.7	50	2.5	7
	2.0	60 (68)	2.7 (3.0)	9
	3.0	70	2.6	11
1000	0.7	50	2.4	7
	2.0	60 (68)	2.5 (2.8)	8
	3.0	70	2.5	10

EXTENSIONSERVICE Agriculture and Natural Resources

Urea energy cost (there's a handout on this)

- Energy cost to remove excess CP from the body
- Reduces ADG by about 0.25 lb ADG from predicted
- Energy equivalent to 0.5 %BWt ground shell corn DM
  - 4.4 lb air dry corn / 800 lb steer / day
- High quality grass and forbs (high TDN, low CP)
  - Spring and fall cool-season grasses and legumes
  - Summer brown-midrib sudangrass and millets

Winter Performance Impact on Gain and Carcass Yield (Neel et al.)

Winter Ration				
	Low	Medium	High	SEM
CP	11	11	12	
NDF	67	67	65	
TDN (IVDMD)	61	66	72	
Winter Gain				
IBWt lb	596	596	587	19
FBWt lb	682	748	814	25
ADG lb	0.64	1.14	1.74	0.09

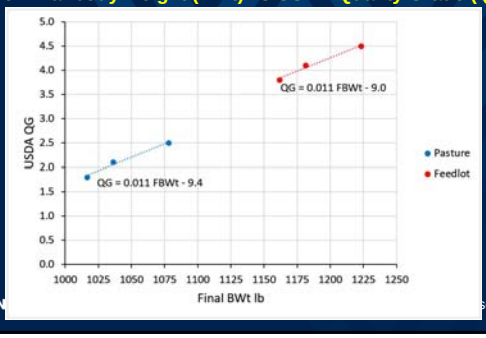
9 head / treatment, harvested in September at 18 months of age

Winter Performance Impact on Gain and Carcass Yield

Winter Gain				
	Low	Medium	High	SEM
ADG lb	0.64	1.14	1.74	0.09
Summer Gain				
FBWt lb	1016	1036	1078	43
ADG lb	2.13	1.83	1.65	0.18
Wt/day age lb	1.74	1.77	1.85	0.18
Carcass Yield and Quality				
HCW lb	519	539	572	25
REA in	10	10	11	0.57
Fat thickness in	0.17	0.19	0.20	0.05
Dressing%	53.2	53.9	54.9	0.80
USDA QG	1.8	2.1	2.5	0.47

9 head / treatment, harvested in September at 18 months of age, WPDA using 78 lb birth wt.
USDA QG 2=Low Select, 3= High Select, 4= Low Choice

Steer final body weight (BWt) vs USDA Quality Grade (QG)



Predictions for this cattle type

Feedlot steers QG 4.0 avg. 1171 lb FBWt (low choice)
Pasture steers QG 4.0 avg. 1207 lb FBWt (low choice)

Starting with a 78 lb calf, goal wt/day age =
Finish 18 months (549 d) @ 1207 lb need 2.06 lb/d age
Finish 24 months (732 d) @ 1207 lb need 1.54 lb/d age
Finish 30 months (915 d) @ 1207 lb need 1.23 lb/d age
(with no periods of stress and loss of weight)

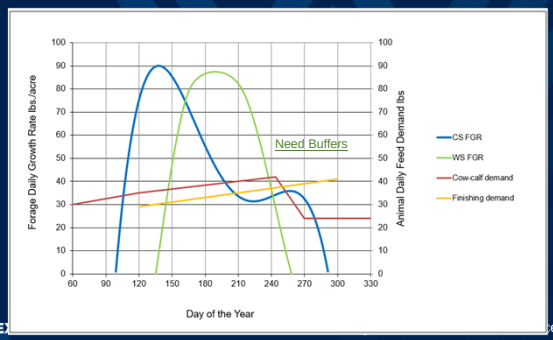
Manage Body Condition Score and Gain on Cattle by:

- Adequate pasture forage mass
- Adequate to excellent pasture forage VALUE
  - Vegetative forage
  - Available forage
  - Legume content (25-35%){forbs 10-15%}
  - Utilized forage mass (residual forage height)
  - Environment effect on forage and animal
- Weaning management of calf and cow

Forage Supply and Demand

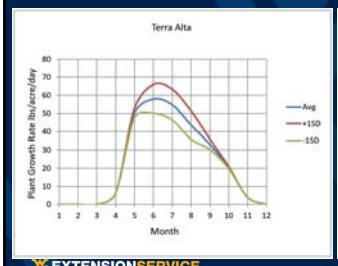
- Forage supply = plant growth rate
  - Seasonal growth rate / annual distribution
- Forage demand = animal requirement
  - DMI
  - TDN
  - CP
  - NDF
- Pasture defoliation (supply = demand)

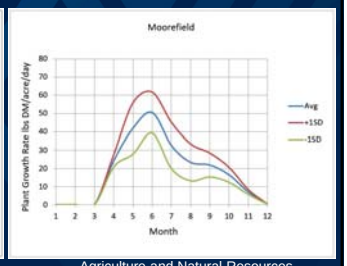
EXTENSIONSERVICE Agriculture and Natural Resources



EXTENSIONSERVICE

Climate and Weather





EXTENSIONSERVICE Agriculture and Natural Resources

Buffers to balance forage supply and demand:

- Time livestock production to forage growth cycle
- Make hay and graze aftermath
- Strategic N fertilization to stockpile forage
- Vary stocking rate, sell or move animals to feedlot
- Use legumes and deep rooted forbs
- Use warm- and cool-season forages at different times
- Feed supplemental forage or other feeds
- Waste forage or over graze
- Accept changes in animal rate of gain or body condition

EXTENSIONSERVICE

High density strip grazing aftermath hay meadow

Grazing stockpiled fescue

Measure and Budget Supply and Demand (see handout)

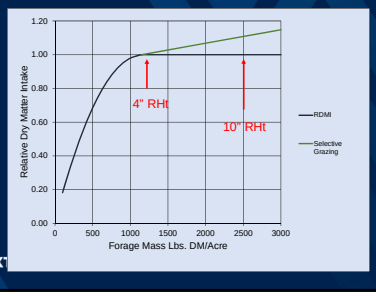
- Inventory livestock number and by size
- Inventory pasture forage mass and growth rate
- Inventory stored hay and stockpiled reserves
- Develop appropriate buffers
- Inventory pasture and hay forage quality
  - TDN, NDF, CP, CP/TDN
  - Forage sampling what the animals eat

EXTENSIONSERVICE Agriculture and Natural Resources

Measuring Pasture Height to Estimate Pasture Forage Mass
(see handout for calibration table)

EXTENSION ...l Resources

Forage mass and utilization determine selective grazing and relative dry matter intake



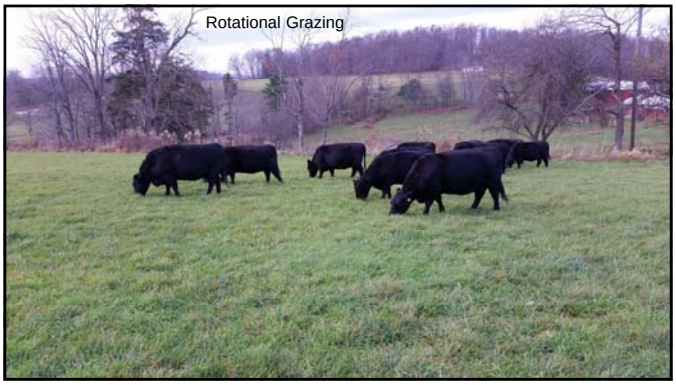
Maximum selective grazing, first few bites.

CP + 30%
TDN + 10%
NDF – 10%
NSC + 20%

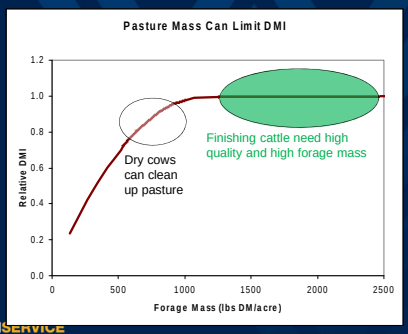
Selectivity goes to zero at high utilization levels

EX...

Rotational Grazing



Pasture Mass Can Limit DMI



EXTENSIONSERVICE

Residual sward height for rotational stocking to maintain near maximum production

Animal	Residual sward height inches
Cows* and calves	3.0-4.0*
Weaned calves	4.5-5.0
Finishing beef	3.5-4.0
Dry beef cows	2.0-3.0
Ewes and lambs	2.5-3.0
Ewes	1.5-2.5
Lactating dairy cow	3.5-4.0
* Level of milk production	

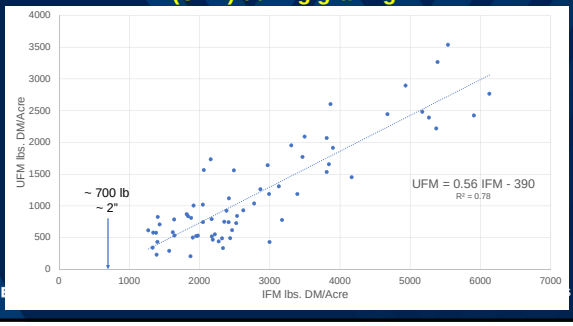
EXTENSIONSERVICE Agriculture and Natural Resources

Daily forage allowance (DFA) 2 times potential dry matter intake (PDMI) for maximal intake

PDMI %BWt	PDMI lb /1000 lb BWt	DFA x PDMI	DFA lb /1000 lb BWt
2.0	20	2	40
2.5	25	2	50
3.0	30	2	60
3.5	35	2	70
4.0	40	2	80
Same as 50% utilization			

EXTENSIONSERVICE Agriculture and Natural Resources

Initial forage mass (IFM) impacts utilized forage mass (UFM) during grazing.



EXTE

Managing to meet demand

- Animal requirements
- Forage quality and supply

EXTENSIONSERVICE Agriculture and Natural Resources

Forage sampling and testing (see handouts)

- Pasture
  - Once a month for a few years
- Hay and baleage
  - Each year each lot of hay
- Low cost information
  - Return on investment 10:1
- Feeding using text book values does not work

EXTENSIONSERVICE Agriculture and Natural Resources

Nutrient content of cool-season forage samples from the Northeast.					
Nutrient	Percentile (N > 2000 samples)				
	10th	25th	50th	75th	90th
Hay					
CP	8	9	11	13	16
TDN	50	52	54	58	62
NDF	70	69	67	62	55
Pasture, rotationally stocked, grass-legume					
CP	11	15	21	24	26
TDN	62	64	68	71	72
NDF	63	58	50	44	38

ces

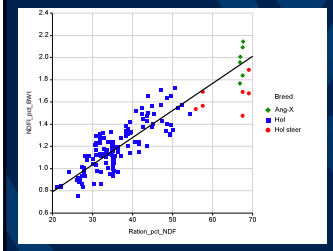
Season Impacts Energy Available From Pasture

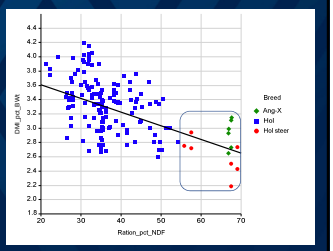
(averaged across legume contents)

May	June	July	Aug	Sep	Oct
Forage Digestibility (TDN%)					
74	66	68	69	69	72

EXTENSIONSERVICE

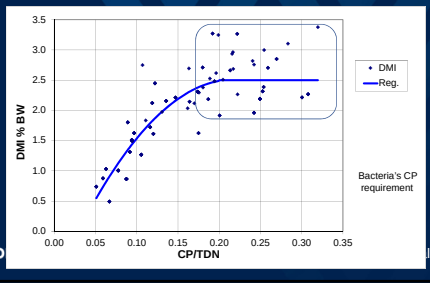
Ration NDF increases NDF intake (NDFI) and decreases DMI (Rayburn and Fox)





EXTENSIONSERVICE Agriculture and Natural Resources

Crude Protein : Total Digestible Nutrient Ratio (CP/TDN) vs. Dry Matter Intake (DMI %BW).



EXTENSIO l Resources

Supplemental Feeds					
Feed	DM	CP	TDN	NDF	CP/TDN
Barley	90	12	81	19	0.15
Corn gluten feed	89	24	73	36	0.32
Cotton seed hulls	91	8	35	80	0.23
Cotton seed, whole	91	24	77	54	0.31
Distiller's grain, dry	89	31	82	34	0.38
Hominy feed	89	10	87	17	0.12
Oats	90	12	80	27	0.16
Shell corn	89	9	88	10	0.10
Soybean hulls	91	13	63	64	0.21
Soybean meal	91	51	80	14	0.63
Soybeans, roasted	94	40	98	22	0.41
Wheat mids (bran)	91	18	73	37	0.25
Rye	89	11	81	17	0.14

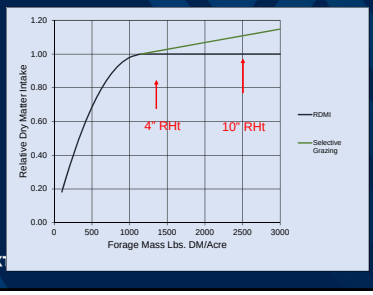
E ces

Body weight and daily gain vs dry matter intake (DMI) needed from pasture containing 68% TDN

Shrunk ADG lb	Shrunk body weight lb (NRC Update 2000)		
	660	880	1100
	DMI %BWt required for maintenance		
	2.1	1.9	1.9
	DMI %BWt required for gain (Total DMI)		
1.3	0.7 (2.8)	0.8 (2.7)	0.6 (2.5)
1.8	1.0 (3.1)	1.0 (2.9)	1.0 (2.9)
2.0*	1.2 (3.3)	1.2 (3.1)	1.1 (3.0)
2.2	1.4 (3.5)	1.3 (3.2)	1.2 (3.1)

EXTENSIONSERVICE Agriculture and Natural Resources

Forage mass and utilization determine selective grazing and relative dry matter intake



Maximum selective grazing, first few bites.

CP + 30%
TDN + 10%
NDF – 10%
NSC + 20%

Selectivity goes to zero at high utilization levels

EX

Drought Management

- Before - preparing for drought (have a plan)
  - reduce drought effects and need for recovery
- During - minimize damage
- After - recovering from drought
  - speed recover
  - make changes that prepare for the next drought

Manage Stocking Rate

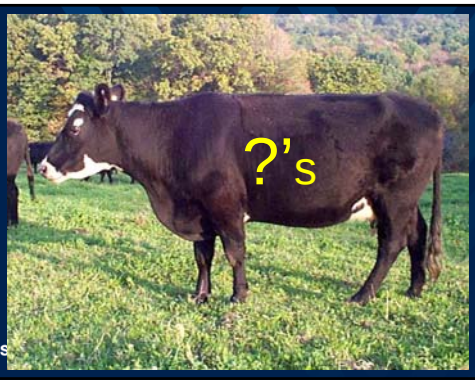
- "Stock the farm at 85% of the economic carrying capacity to manage for drought 85% of the time."
  (old Texan proverb, supported by experience in WV & VA)

Tools

("Eye of the master finishes the cattle!")

Animal Mgmt.
- EPDs
- Frame score
- Body conformation
- Ultrasound
- Body condition score
- Herd health
- Animal selection

Forage Mgmt.
(you can't starve a profit out of the cows)
- Rotational grazing
- Grazing timing & intensity
- Pasture budgeting
- Soil testing
- Lime and fertilizer
- Forage testing
- Clover, forbs, quality grasses



University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service

Presented By: Kenny Burdine
Extension Livestock Economist
UK Agricultural Economics

Marketing and Processing Considerations: Kenny Burdine and Greg Halich

FREEZER BEEF

OVERALL THOUGHTS ON FREEZER BEEF

- Expect to be in sales / service role
  - Lots of communication and logistics
- Customers are accustomed to retail prices
- Lower "revenue" potential than retail sales, but likely better return when considering all costs
- You can start small and probably should

SOME RULES OF THUMB

- Dressing Percentage = 52-62%
  - Carcass weight as percent of live weight
  - Affected by fat cover, gut fill, etc.
- Cut yield = 64%-73%
  - Retail meat as percent carcass weight
  - Greatly depends on how cutting method!

Example:
1200 lb steer
720 lbs hanging weight (1200 x 60%)
490 lbs of actual meat (720 x 68%)

PRICING STRATEGIES FOR FREEZER BEEF

- Base price on live weight –"On the Hoof"
- Base price on carcass weight – "hanging weight"
- Base price on retail lbs or "take home meat"

PRICING ON THE HOOF

- Simplest way to price – start with a target price on the hoof
- Set price at per lb: $1.75
- Steer weighs 1,200 lb
- 1,200 lbs @ $1.75 = $2,100 and customer pays processing
  - If two customers are splitting, they each pay half of animal value and processing

PRICING BASED ON CARCASS WEIGHT

- Be sure you can easily work between live and carcass price
- Carcass price = live price / expected dressing percentage
- Example: Live price of $1.75
- $1.75 / 60% = $2.92 carcass price
- 720 lb carcass (1,200 lb x 60% dress) @ $2.92 = $2,100 per head and custom pays processing

PRICING BASED ON CARCASS WEIGHT

- Eliminates issues of shrink, gut fill, etc.
- Producer can capitalize on higher dressing percentages
- Makes selling halves and quarters a bit easier

INCORPORATING PROCESSING COST INTO PRICE

- The further you get away from selling on the hoof, the more necessary this becomes
- Makes it somewhat cleaner and easier for customers
- Potential for increased liability
  - Some producers offer "free" processing

TYPICAL PROCESSING COSTS

- Usually per head kill fee + $/lb carcass wt

→ *$25-60; $.40-75 / lb*

→ *$450-500 for our animals USDA*

- Example: 1200 lb steer and 720 lb carcass, processor charges $50 / hd and $0.65 / carcass lb

→ *$50 + (720 x $0.65) = $518*

- Custom processing could be cheaper

→ *Have heard as low as $300*

INCORPORATING PROCESSING COST INTO PRICE

- Learn to think about processing costs by quantity
  - Per animal, half, quarter, etc.
- Example: $518 estimated processing costs
  - 1,200 lb steer - $0.43 per lb liveweight
  - 720 lb carcass - $0.72 per lb carcass weight
- Just add these to your price targets

PRICING BASED ON RETAIL MEAT

- Example: 1,200 lbs steer, 720 lb carcass (60% dress)
- Estimated "cutout percentage": 68%
  - Expected meat yield of roughly 490 lbs
- Final meat yield: 40.8%
- $1.75 / 40.8% = $4.29 without processing costs
- Add another $1.06 per lb to cover $518 processing per head = $5.35
- All these have just been examples for illustration

PRICING BASED ON RETAIL MEAT

- Simple for customers to understand
- Quantity will vary greatly based on cutting instructions
  - Have a "standard cut" if you take this approach
  - Some customers will try to "game the system"
- Will allow for "packages" to be sold
  - Smaller quantities than quarters
  - Example: 50 lb package – mix of cuts
- Get insurance advice on liability concerns

Average Dressing/Cutout Percentages for Beef Cattle

	Dressing %	Cutout %	Final Meat Yield %
Grain Finished	60-64	67-73	40-46
Grass Finished	53-64	64-73	34-46

Note: These estimates assume a reasonably finished animal and can be lower for an immature animal.

ROLE OF THE PROCESSOR IS ALWAYS CRUCIAL, ESPECIALLY FOR FREEZER SALES

2 GENERAL CATEGORIES OF MEAT PROCESSORS

- USDA Inspected
  - Inspector present at harvest, drops in at other times
  - Allows for meat to be sold in most any market
    - Labeling requirements do exist
- Custom exempt
  - Provides custom service for end-user of meat
  - Can be used for direct marketing – sell live animal

THE ROLE OF THE PROCESSOR

- Provide slaughter and custom processing services
- Ensure food safety and sanitation
- Other services

  -Labeling -aging

  -Packaging -logistics?

  -value added products
- Often a major contact point for customers

FACTORS TO CONSIDER WHEN CHOOSING A PROCESSOR

- Cost
- Distance for delivery / pickup
- Quality / dependability / responsiveness
- Impression customers will get
- Ability to do value-added processing
  - Patties, brats, curing, smoking, etc.
- What sorting will they do?
  - Halves, quarters / split halves, etc

COMMON PROCESSING CHALLENGES

- Scheduling
- Fluid processing dates
- Working within pickup windows (might be narrow)
- Not cut as intended
- Part of order disappears
- Quality issues
- Packaging issues
- Don't promise organs!

THE BASICS OF LABELING

- USDA inspected product being resold will have labeling requirements
- Processors should have generic label that you can use
- Simple personalized labels can be approved by inspector on site
  - Farm name, logo, etc
- USDA-FSIS can approve sketches of labels as well
  - Label expeditors can be hired
- Be aware that many terms have specific USDA definitions that must be verified
  - "lean", "organic", "natural", etc

WHAT WILL NEW CUSTOMERS ASK?

- What will it cost?
- When will it be ready?
- How much meat will I get?
- How many lbs of what?
- How much freezer space do I need?

TYPICAL FREEZER BEEF CHALLENGES

- Processing costs – expect to pay 2-3 times what large packer cost is
  - Scale and offal challenges
- Limited freezer space for most consumers
- Significant up-front cash outlay for customers
- Collection problems
- Customs will "commit" and back-out

SELLING RETAIL

SELLING RETAIL CUTS

Sell packages:
- → Farmer's Markets
- → On-farm store / Online
- → Restaurants

Need:
- → Federally inspected processor
- → Labels
- → Storage
- → Right attitude deal with customers

EVALUATE ALL MARKETING COSTS

Account For:
- → *Time (Labor)*
- → *Transportation (full cost)*
- → *Storage*
- → *Samples and spoilage*

FARMER'S MARKETS

- Growing market
- Usually works with freezer / fridge / coolers
  - Check with local health departments
- Customers not overly price sensitive
- Product must be labeled for retail resale
- Pricing must ensure proportional cut sales

ON-FARM RETAIL

- Can be incorporated with agritourism
- Customers not overly price sensitive
- Product must be labeled for retail resale
- Pricing must ensure proportional cut sales
- Must get consumer to come to you
  - Extra stop = extra cost

CSA'S

- Subscription service where consumers get share of farm output
- Will require considerably market-savy person to do this for meat
- Potential to partner with someone who has a CSA and offers produce?

FINAL THOUGHTS ON SELLING RETAIL

- Can you get customers to come to you or do you need to go to them?
- What price points will your location support?
- Must price such that sale occur roughly in carcass proportions

WHOLESALE OPPORTUNITIES

WHOLESALE OPPORTUNITIES

- Sell live animals in bulk, typically priced live or by carcass weight
  - Aggregator: Hickory Nut Gap
  - Processor with retail / wholesale market
  - Other direct marketer of some type
- Low marketing costs – both dollars and effort
- Lower revenue potential
- Can be excellent complement to direct sales!

RESTAURANTS

- Difficult to get "direct to consumer" return
  - Restaurants accustomed to wholesale price
- A level of professionalism expected
- Excellent opportunity for high-end steaks and burger
  - Lower end steaks and roasts
- Take samples, follow-up, ask about featuring
  - Want something different, used to sales prof.

FINAL THOUGHTS

- It's often smart to start small
  - You don't want to get stuck with finished cattle
- Careful planning is a must!
- Expect things to change / be flexible
- Explore insurance options
  - Start with existing policy
  - Be honest with agent about what you are doing

CONTACT INFORMATION

Kenny Burdine
UK Ag Economics
(859) 257-7273
kburdine@uky.edu
@KYCattleEcon

Putting it all Together: Profitable Finishing Systems

Greg Halich
859-257-8841
Greg.Halich@uky.edu

Agricultural Economics
University of Kentucky

Manage for Clover

- Correct pH (Calc) and P levels
  → *pH: 6.0 min*
- Good grazing management
- Clip low in mid-May early June
- Frost-Seed to maintain stands

ARS (USDA) research shows red clover counteracts fescue toxicosis

Bias Against Bluegrass

- Roy Blazer Research 1970-80's
  → *Bluegrass highly productive*
- Needs high fertility
  → *Soil organic matter*
- Clip pastures tight in May

Orchardgrass

- Persists with good rotational grazing
  → *Almost as well as fescue*
- *Grazing-mowing low will lose stand*
- *Drill in the fall*
- *Broadcast Feb-March*
  → *slightly damaged pasture*

Warm Season Perennial Grasses Comparison (16)

Johnsongrass:

- #1 protein
- #2 energy

→ Heavily fertilized/managed bermudagrass #1 energy

Noble Foundation 1999-2001 Study

Crabgrass

- Summer annual
- Very high quality
- *Easy to manage*
- *Broadcast late winter or spring*

→ *slightly damaged pastures*

Annual Lespedeza

Historically used for finishing cattle in KY

"Fat cattle from lespedeza fields are now recognized by the large packing companies as having the finest quality of white fat or tallow"

Kentucky New Era. Oct 2, 1936

Annual Lespedeza Quality

- As high or higher in feed value for cattle as alfalfa or red clover

  → *Feeds and Feeding, F.B. Morrison 1939*

  → *Illinois Agr. Exp. Station Bull. 416, 1935*
- ***Production July-August when other forage quality and quantity declines.***

Annual Lespedeza
Unsung Forage

"Low Yielding" or "Relatively Low Yielding"
→ *Univ. TN, Univ. Georgia, Univ. KY*
1950's most widely planted crop fescue belt
→ *6 million acres in Missouri alone*
High fertility: yields can exceed 4 tons/acre
→ *Mississippi State*

Instruments
vs.
Orchestra

Grazing and Forage Mgt

- Possibly the most important attribute
- Need high selectivity
  → *Don't force finishers to clean up*
  → *40-50% utilization max per rotation*
- Forages need to be vegetative
  → *Use your bush-hog or cow-herd*

Grazing Mistake #1:
Force Cattle to
Clean Up the Pasture

Negative Effects
Increased Utilization
(beyond a point)

1) Reduced animal performance
2) Slower regrowth of pasture

Pasture Clipping/Mowing

Especially critical high-fescue pastures
→ *Mowing low May/June "resets" plant*
→ *Results in much more leafy plant*
→ *Lower the better*

Rotational Grazing High Selectivity
→ *Fescue tends to become dominant*

Grazing and Forage Mgt With Cow Herd

- Do not recommend one grazing herd
  → *Keep growing animals separate*
- Need different grazing mgt
  → *Will take much longer to finish*
- Cow quality pasture won't work

Small Number Finishing Animals

Select Best Quality Pastures:

- Weekly rotations work well
  → *Need maximum selectivity*
  → *Utilize 33-40%*
- Sacrifice grazing efficiency for mgt

Stocking Rates My Experience

60 acres of actual productive pasture:
→ *Finish 15-20 steers per year*
→ *35-45 steers on farm early summer*
Finish portion of steers by July
→ *Helps balance forage growth*

Estimated Finishing Weights
Pasture-Finished Cattle
Attaining .25" Backfat
(Add 65 lbs for heavy-muscled animals and subtract 65 lbs for light-muscled animals)

Frame Size	Frame Score	Heifer Est. Finish Wt	Steer Est. Finish Wt
Small	3	930	1020
Small/Medium	4	1010	1110
Medium	5	1080	1200
Medium/Large	6	1160	1290

Realistic Gains
Avg. Grazing Season

Yearlings:

1.25 – 1.50 lbs/day

Two-Year Olds:

1.5 – 2.0 lbs/day

Feeds and Feeding, F.B. Morrison 1939

Compensatory Gain
Two Winters/Summers

Wintering Gains	Winter Gains	Final Weight 2nd Grazing Season
Low	-	-
Med	*+54*	*+5*
High	*+130*	*+37*

Note: Steers 2.5 Years old at finish; Yearbook of Agriculture 1939, USDA.

Winter Gains

Going back on Pasture:

- Recommends .5-1.0 lbs/day

→ .5 lbs/day ensures frame devp

→ 1.0 lbs/day maintain flesh

Feeds and Feeding, F.B. Morrison 1939

Realistic Gains Winter

Good Alfalfa or Clover Hay:
1.0 lbs/day

Good Mixed-Grass:
.50 – .75 lbs/day

Production Systems

Spring-Born Calves

	End Weight
Weaning	550 lbs
1st Winter	650 lbs
1st Grazing Season	950 lbs
2nd Winter	1050 lbs
Finish July-Aug	1250 lbs

→ *26-28 months old*

Spring-Born Calves

	End Weight
1st Winter	650 lbs
1st Grazing Season	950 lbs
2nd Winter	1050 lbs
Finish July-Aug	1250 lbs

→ *26-28 months old*

Spring-Born Calves

- Feb-March born gives best flexibility
  → *Finish by early July*
  → *Advantage to destock then*
- May-June born will take more time
  → *Likely Sept-Oct finish*

Fall-Born Calves

	End Weight
Weaning	525 lbs
1st Grazing Season	825 lbs
1st Winter	925 lbs
Finish Sept-Nov	1200 lbs

→ *24-26 months old*

Fall-Born Calves

- Hard to finish by second fall (24 mo.)
  → *True fall born even more so*
- Keep until May-June (over 30 mo.)
  → *Increase yield and grade*
  → *Help balance forage curve*
- Finish on winter annuals Mar-April

Annual Forages

Advantages:

- Help balance forage distribution
- Higher overall stocking rates
- Higher gains (lbs/day)
  → Spring born: Late winter
  → Fall born: mid-late summer
- Winter finishing possible

Annual Forages

Disadvantages:

- ***Cost***
  → ***Small-scale***
- Risk (establishment and growth)
- ***Management***

Biggest Mistake I See?

Spring-Born Calves

	End Weight
Weaning	550 lbs
1st Winter	650 lbs
1st Grazing Season	950 lbs
2nd Winter	1050 lbs
Finish July-Aug	1250 lbs

→ *26-28 months old*

Spring-Born Calves

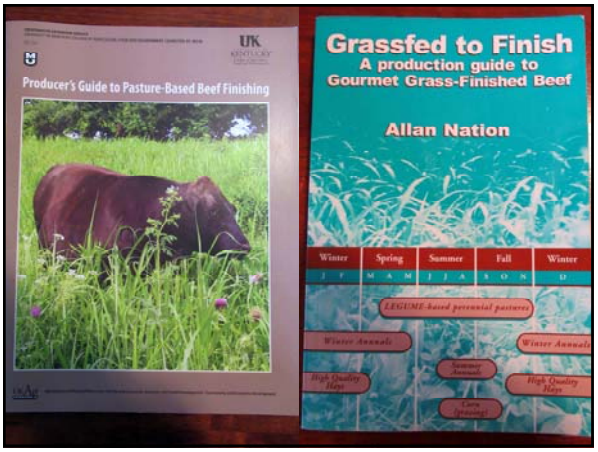
	End Weight
Weaning	550 lbs
1st Winter	650 lbs
1st Grazing Season	950 lbs

→ *"Finished" 19-21 months old*

Maturity Effects

Weight (lbs)	Dressing Weight (lbs)	Total Meat (lbs)	Meat % of Liveweight
1270	*760*	*523*	*41%*
1218	*750*	*514*	*42%*
950	*570*	*354*	*37%*
984	*561*	*373*	*38%*

Key to Profit on Pasture:
Work at Nature's Pace
25-36 Months



Producer's Guide
Pasture-Based Beef Finishing:
https://www.uky.edu/Ag/Forage/ID224-Final.pdf

Pasture Finishing Planning Tool:
http://www.uky.edu/Ag/AgEcon/pubs/BeefPastureFinishing.xlsx

Discussion

Greg.Halich@uky.edu
859-321-9957 cell