

Forage Systems for Pasture Finishing Beef

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Improving Lives. Improving Texas.

Finishing Options

- ▣ Feeding a high-concentrate diet in dry lot
- ▣ Finishing cattle on grass with none or limited amounts of concentrates
- ▣ Growing cattle on grass then finishing them in dry lot for a relatively short period of time
- ▣ Feeding a high-roughage diet in dry lot



Animal Performance

Feedlot

- ▣ Nutritive value for ration is fixed
- ▣ Amount fed regulated daily
- ▣ No Travel required

Forage

- ▣ Nutritive value constantly changes
- ▣ Availability changes
- ▣ Travel required to “harvest” forage

Forages in the South

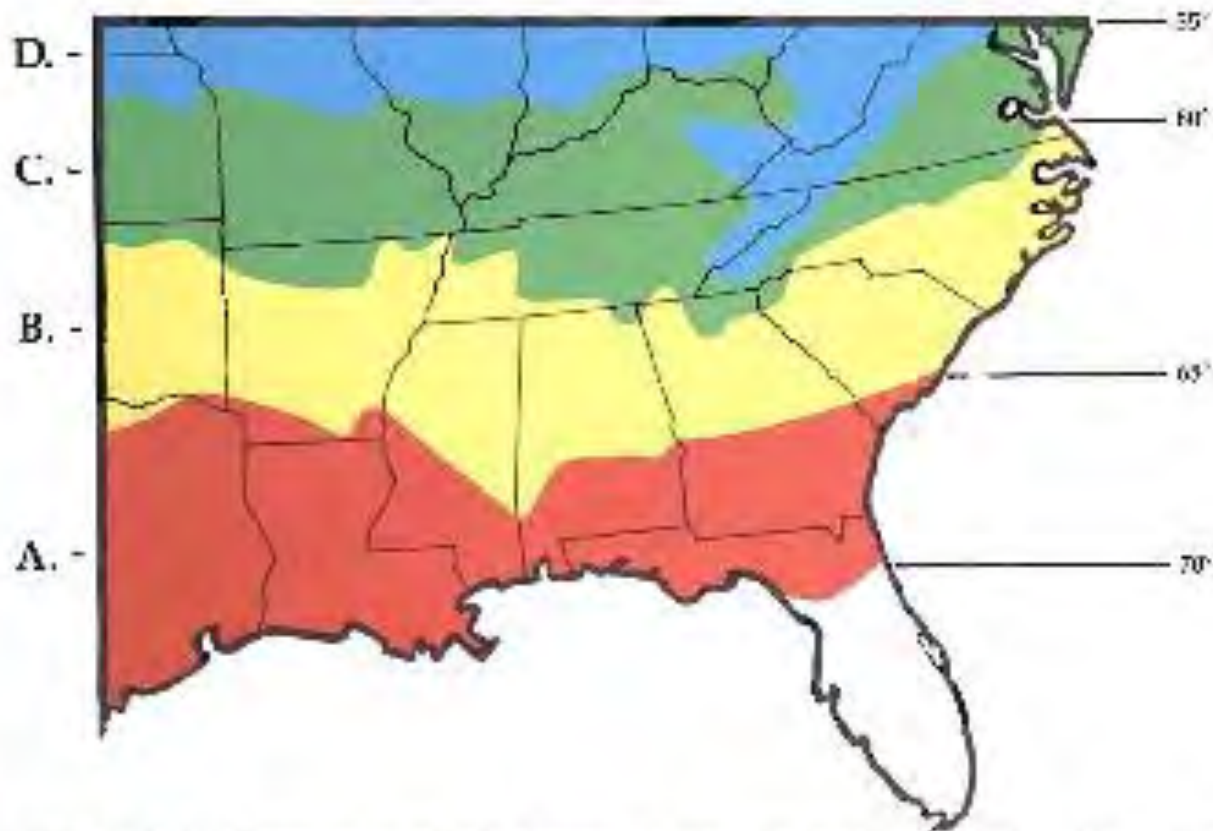


Figure 3.2. Mean annual air temperatures, °F, and adaptation Zones, A, B, C, D.

Warm- and Cool-Season Forages

- Perennial Grasses

- Bermudagrass, Bahiagrass, Dallisgrass, Tall Fescue

- Annual Grasses

- Hybrid pearl millet, Sorghum x Sudangrass, Crabgrass, Ryegrass, Oat, Wheat, Rye

- Annual Legumes

- Cowpea, Lablab, Natives, Aeschynomene, Clovers, Vetch

- Perennial Legumes

- Alfalfa, Perennial Peanut, Sericea Lespedeza

Role of Warm-Season Annual Forages for Finished Beef

- ▣ Higher Nutritive Value
- ▣ Creep Grazing
- ▣ High cost of production
- ▣ High management input for grazing
- ▣ Mechanical harvest component of management

Perennial Warm-Season Forages for Pasture

- ▣ Foundation for grazing systems
- ▣ Sustainable, Reliable
- ▣ Environmentally-Friendly
- ▣ Productive
- ▣ Allows over seeding of cool-season forage
- ▣ Low nutritive value

Role of Cool-Season Grasses for Finished Beef

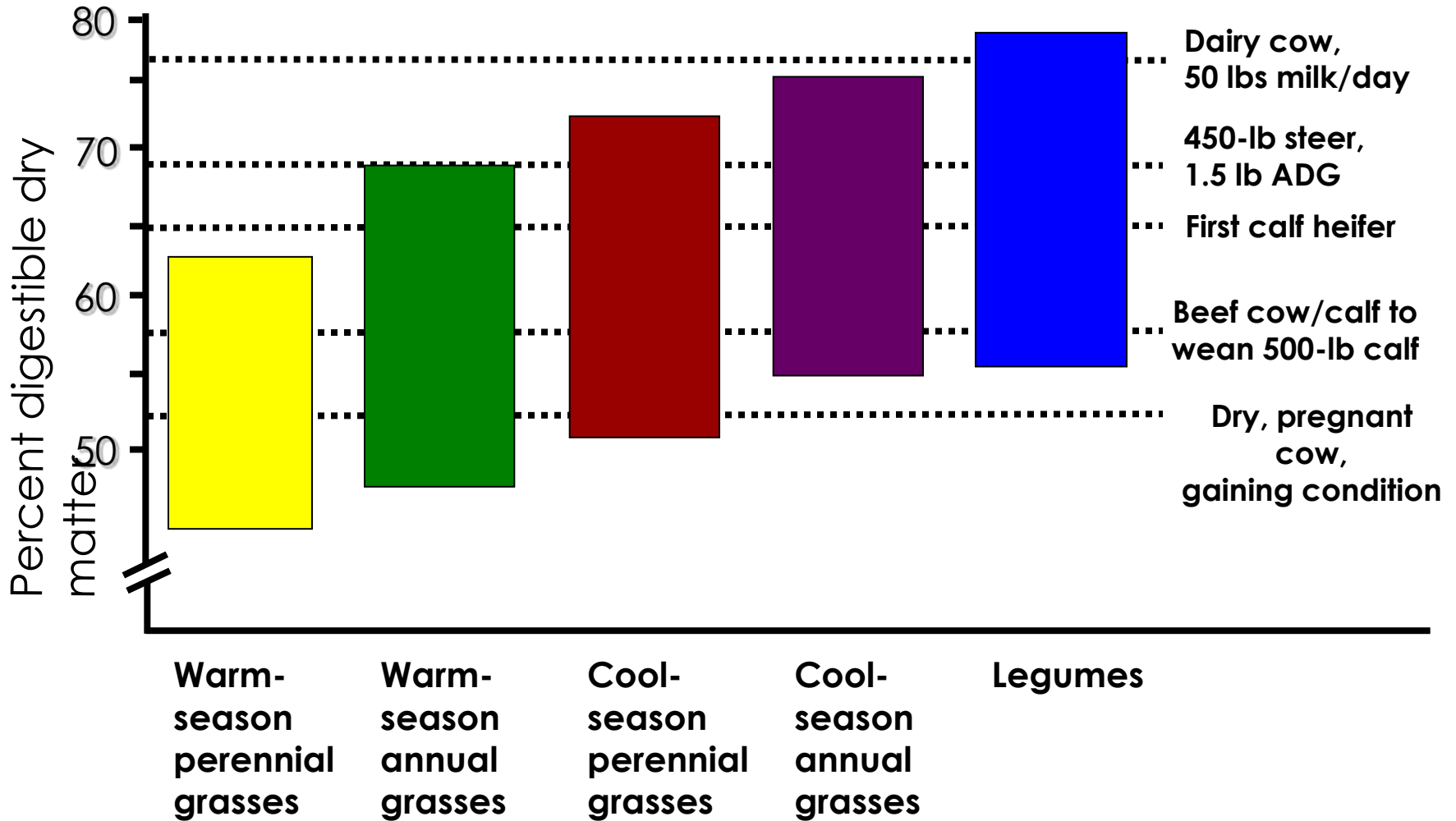
Annuals

- ▣ Higher Nutritive Value (legumes highest)
- ▣ High Cost of Production
- ▣ High management input for grazing

Perennials

- ▣ Limited cool season species
- ▣ Easier to grow in Upper South

Forage digestibility ranges and their suitability for different classes of livestock.



Adapted from: H. Lippke and M.E. Riewe. 1976. Texas Agric. Exp. Stn. Res. Monograph RMGC:169-206.

Seasonality

- ❑ Major challenge
 - ❑ Providing a year round high quality forage supply
 - ❑ Spring born calves with annual ryegrass
 - ❑ Warm season forage: different calving seasons or different cattle
- ❑ Maximum and high quality production of forage
- ❑ Of forage production
- ❑ Of Forage quality
- ❑ Of forage-finished beef

Requirements for Acceptable Beef From Pastures

- ▣ Moderate to high ADG
 - ▣ Especially during final 90-100 days ±
 - ▣ > 2 lbs/day ±
- ▣ Young animal
 - ▣ Less than 18 months ±
 - ▣ Less than 12 months ±
- ▣ Final weight
 - ▣ 450 to 500 lbs minimum carcass wt. ±
- ▣ Reduced Stress
 - ▣ Handling procedures
 - ▣ Animal genotype

Forage-Finished Beef

Disadvantages

- ❑ Seasonal Supply
- ❑ Harvest Facilities
- ❑ USDA Quality Grade
- ❑ Lack of Infrastructure
- ❑ Market has to be created
- ❑ Niche Market

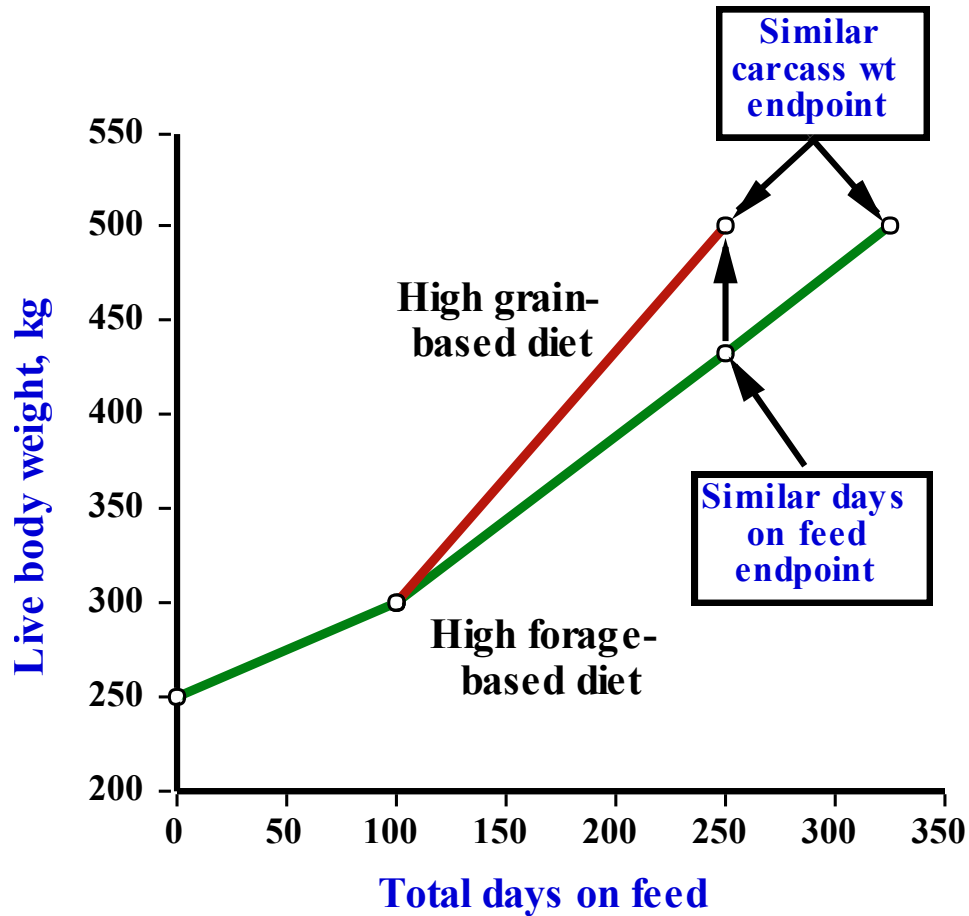
Advantages

- ❑ Lean
- ❑ Flavorful
- ❑ Natural product
- ❑ Customer potential
- ❑ Niche Market

Making Comparisons

- ▣ Comparisons of forage-finished and grain-finished beef have been made
- ▣ Problem with such comparisons is that of establishing the appropriate slaughter endpoint.
 - ▣ Slaughtered on a time-constant basis
 - ▣ Differences in fatness
 - ▣ Slaughtered at the same degree of fatness
 - ▣ Differences in maturity

Forage- vs grain-based beef production systems



Summary of forage- vs grain-fed beef studies—Equal days on feed

- ▣ Carcass weight
 - ▣ Fat thickness
 - ▣ Marbling
 - ▣ Lean Color
 - ▣ Fat color
 - ▣ Shear force
 - ▣ TP-tenderness
 - ▣ TP-juiciness
 - ▣ TP-flavor
- ▣ 26% lighter
 - ▣ 66% less fat
 - ▣ 42% less marbling fat
 - ▣ 13% darker lean color
 - ▣ 20% more yellow color
 - ▣ 27% tougher
 - ▣ 21% less tender
 - ▣ 6% less juiciness
 - ▣ 14% less flavor

Summary of forage- vs grain-fed beef studies—Equal carcass weight

- | | |
|------------------|-------------------------|
| ▣ Carcass weight | ▣ 2% lighter |
| ▣ Fat thickness | ▣ 23% less fat |
| ▣ Marbling | ▣ 10% less marbling fat |
| ▣ Lean Color | ▣ 17% darker lean color |
| ▣ Fat color | ▣ 20% more yellow color |
| ▣ Shear force | ▣ 7% tougher |
| ▣ TP-tenderness | ▣ 0% less tender |
| ▣ TP-juiciness | ▣ 0% less juiciness |
| ▣ TP-flavor | ▣ 3% less flavor |

Utilizing Pastures for Finishing Cattle

- ❑ Feeding grain on pasture depends on:
 - ❑ Quality of forage
 - ❑ Condition of cattle
- ❑ Carrying capacity of pastures will vary
 - ❑ Weather (rainfall, etc)
 - ❑ Fertilizer
- ❑ Economic constraints warrant evaluation
- ❑ Species of grasses or legumes will vary
 - ❑ Ecoregion

Two-year performance for Bonsmara crossbred steers stocked on Tifton 85 with corn gluten supplement (SUP) and pasture only (PAS)

Item	2006	2007
Initial Weight	676	770
60-d ADG (lb/d)		
PAS Only	1.56	1.79
0.8% BW-SUP	2.26	2.03
Total ADG (lb/d)		
PAS Only	0.99	1.07
0.8% BW-SUP	1.74	1.59
Final Weight (lbs)		
PAS Only	784	889
0.8% BW-SUP	848	944

Rouquette et al., 2007 Beef Cattle Research in Texas.

Performance of forage- and silage-finished beef produced year-round

Item	Finishing Treatment	March	May	July	Sept	Nov	Jan
Daily gain (lb)	Silage	2.16	2.43	2.32	2.16	2.32	2.14
	Forage	1.79	2.05	1.76	1.21	1.63	1.76
Final wt (lb)	Silage	964	990	1025	1052	1036	977
	Forage	926	948	944	961	968	953

- 120-d on corn silage or forage
- Minimum final target weight of 900 lbs
- Forage finished
 - Ryegrass-clover mixtures from Nov-May
 - Bermudagrass, warm season annuals, grass-clover mixtures, and grain-on-grass from June-Oct

Finishing with Grain

- Feeding steers concentrates increases the yield grade
 - Tatum et al. (1980), Schroeder et al. (1980), and Hedrick et al. (1983)
- Increasing time on a concentrate diet will increase marbling scores and quality grade.
 - Harrison et al. (1978), Schroeder et al. (1980), and Skelley et al. (1978)
- Wise et al. (1967) reported that a concentrate supplement was necessary to produce good and choice grading carcasses.
 - Indicated grain on grass will increase the profitability of a cattle finishing system
 - Chapman et al. (1967), Suman and Woods (1966) and Carpenter et al. (1968)

Grain on Grass

- ❑ Winter annual pastures have been used extensively to grow stocker cattle and to a limited extent as a finishing diet.
- ❑ Roberts et al., 2009
 - ❑ Finished steers on annual ryegrass with varied levels of corn
- ❑ Forage DM increased with each increase in grain
- ❑ Increasing the amount of grain of finishing cattle
 - ❑ Decreased days on feed
 - ❑ Increased ADG

Grain on Grass

Item	No Corn	Corn	Corn + Corn Oil	P-value
Steers #	9	14	14	-
Initial BW	414.2	387.6	387.8	<0.04
112-d ADG, kg	1.07	1.65	1.62	<0.0001
HCW, kg	288.1	321.4	326.0	<0.0001
QG	9.78	10.57	10.29	<0.28
YG	1.89	2.29	2.43	<0.10

QG: 9=US Select -; 10=US Select; 11=US Select +
Corriher et al., 2009

Finishing with Harvested Forages

- ❑ Could fill in gaps of lower quality forage
- ❑ Environmental Constraints
- ❑ Costs
- ❑ Storing and handling



Harvested Forages

- A 3-yr study evaluating finishing steer performance on corn silage and small grain pasture resulted in no difference in ADG (Utley et al., 1973)
- Steers that were fed a corn silage and cottonseed meal diet had lower HCW than steers grazing oat and rye pastures.

Costs & Value

- Feed costs are a major proportion of total variable costs in beef systems:
 - Efficiently managed grazed grass can be a cheaper feedstuff (O’Riordan & O’Kiely, 1996)

- Value of beef from grass-finished cattle is often discounted:
 - Percieved differences in tenderness (Chrystall, 1994)
 - Color (Baardseth et al., 1988)
 - Juciness (Hutchings et al., 1988)
 - Flavor (Melton, 1990)



The Goal

- ❑ To fit into niche market:
 - ❑ Growth potential of the animals should be achieved with max inclusion of forage
 - ❑ Without impairment of sensory quality



Forage Finishing Beef

- ❑ Forage-grain feeding regimens allows growth and development on forages
 - ❑ Completion of the finishing phase with grain increases product acceptability and consistency.
- ❑ The selection of the best system will vary geographically as well as yearly.
- ❑ No one set strategy that will fulfill the needs of all.
- ❑ Matching of the production system within a given environment while maintaining a marketable product and fulfilling the needs of the consumer.

Problems with Forage Finishing

- ❑ Decreased ADG
- ❑ Longer finishing period to reach target endpoint
- ❑ Reduced dressing percentage
- ❑ Less acceptable lean and fat scores
- ❑ Less quality grade
- ❑ Palatability issues as a beef product



Forage Finished Beef Data Needs

- ▣ Harvest logistics
- ▣ End point, Age-Weight
- ▣ Product Merchandising
- ▣ Quality assurance
 - ▣ Tenderness
 - ▣ Flavorful
- ▣ Variation in breeds
- ▣ Grain on grass?
- ▣ Stored forages feasibility?
- ▣ Match forages to animals

