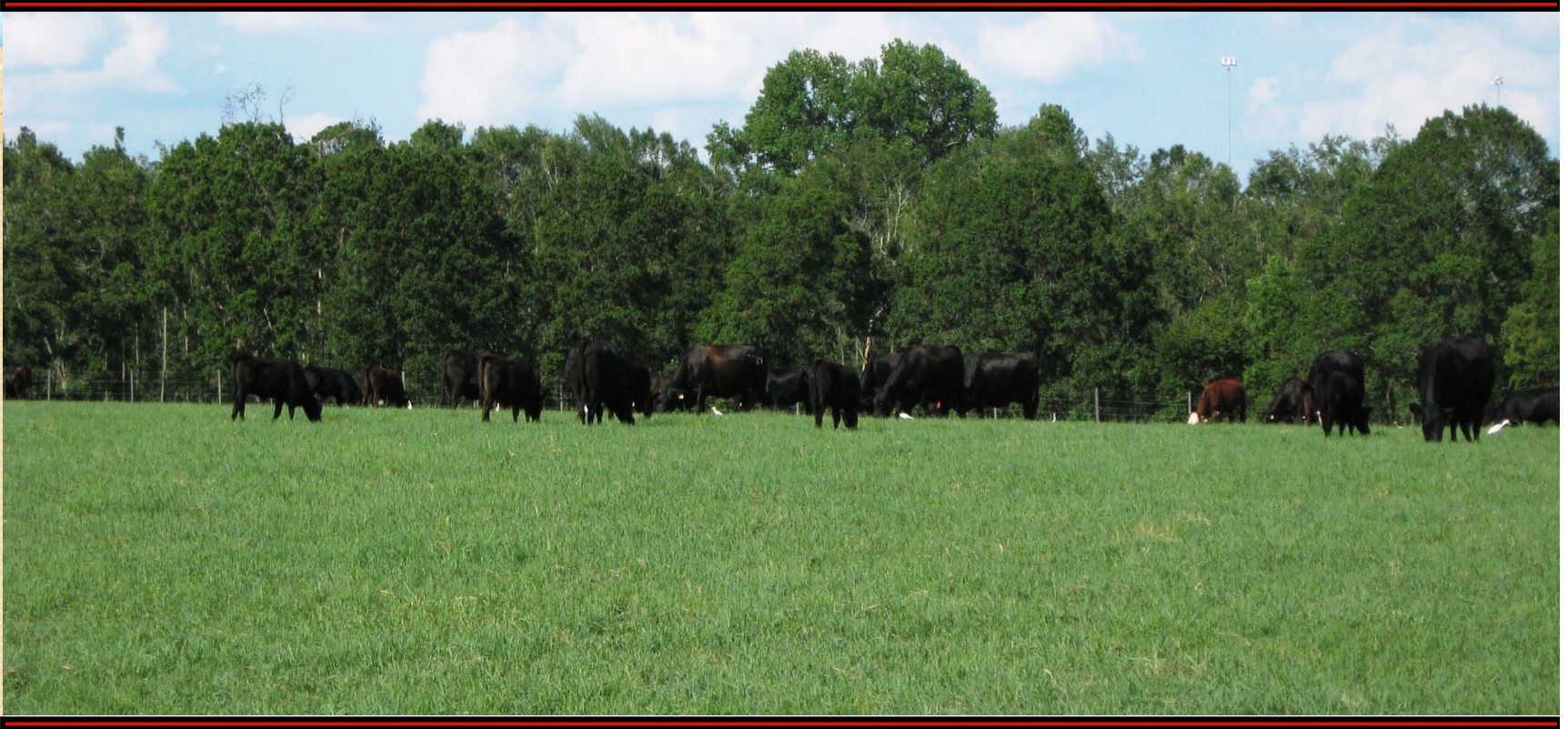


Making the Most of Your Forage Program



Kevin Ferguson
Extension Area Specialist
Farm Management
University of Tennessee Extension

Thanks to:
Dr. Dennis Hancock
Extension Forage Specialist
Crop and Soil Sciences - UGA

World Demand for Food

- Global population increases from 7 to almost 9 billion by 2040.
- The number of middle class consumers increases by 3 billion over the next 20 years.
- Demand for resources will increase exponentially
- By 2030, the world will need at least:
 - 50 percent more food
 - 45 percent more energy
 - 30 percent more water



Source: United Nations Report, "Resilient People, Resilient Planet, A Future Worth Choosing",
Pre-report Overview – January, 2012.

College Majors that are Useless

- #1 Agriculture
- #2 Fashion Design
- #3 Theater
- #4 Animal Science
- #5 Horticulture

Useless Degree #1 - Agriculture

Number of Students Awarded Degree in 2008-2009: 24,988

Typical coursework: Crops, plant diseases, animal husbandry, basic veterinary science



When schools such as the University of Idaho cut their agriculture programs, you know times are tough for this degree. The state has more than 25,000 farms, for cow's sake, according to the most recent U.S. Department of Agriculture census, in 2007.

Still, if your idea of a good day is getting up with the sun and working till it sets as an agricultural manager, a degree in agriculture might be your calling.

Just don't expect farms and ranches to be calling you, says Laurence Shatkin, Ph.D., and author of "The 10 Best College Majors for Your Personality." "It's true that farms are becoming more efficient now and so there is less of a need for farm managers," he says. That means less jobs. In fact, the U.S. Department of Labor projects 64,000 fewer jobs in this field over the next seven years.

Total Number of Agricultural Managers in 2008: 1,234,000
Projected Change in Number of Jobs 2008-2018: -64,600
Percent Change: -5



By Terrence Loose –
January 2012

Many people like to ...



“Torture the data until it confesses the answer they want!”

20 Most Useless Degrees

Newsweek - June, 2011



- 1.
- 2. Horticulture
- 3. Agriculture
- 4. Advertising
- 5. Fashion Design
- 6. Child & Family Studies
- 7. Music
- 8. Mechanical Eng.
- 9. Chemistry
- 10. Nutrition
- 11. Human Resources
- 12. Theater
- 13. Art History
- 14. Photography
- 15. Literature
- 16. Art
- 17. Fine Arts
- 18. Psychology
- 19. English
- 20. Animal Science

20 Most Useless Degrees

Newsweek - June, 2011



● # 1 Most Useless Degree

20 Most Useless Degrees



Previous

1 / 20

Next

1, Journalism

AP Photo

Median starting salary: \$35,800

Median mid-career salary: \$66,600

Change in number of jobs, 2008-2018: -4,400

Percentage Change in number of jobs, 2008-2018: -6.32

Undergraduate field of study: Communications

Number of students awarded degrees 2008-2009: 78,009

- Something to think about

“In today’s environment of instantaneous, constant and social media . . .

we have developed a culture where emotions, sympathy and fear trump science, logic and reason.”

Cattleman's MBA Summary - 2009

- Soil Test
- pH - - Lime if Needed
- Evaluate per unit Costs and Revenue
- Evaluate Weed Control / Fertility Options
 - Clovers / Reseeding Options
- Forage Utilization
 - Stocking Rates / Controlled & Extended Grazing

Food for Thought

- “I can’t afford to soil test and fertilize!”
- Remember that hay crops remove more nutrients than almost any other commercial crop!
- In pastures, approximately 80% of the nutrients are returned to the pasture.
 - Importance of rotational grazing and distribution of nutrients!

Tradition and Confusion

- “I have always used 300 pounds of triple 19 per acre!”



- *“I firmly believe that adhering to tradition is the greatest obstacle to production agriculture.”*

James A. Bennet

Former Sunbelt Farmer of the Year for Virginia

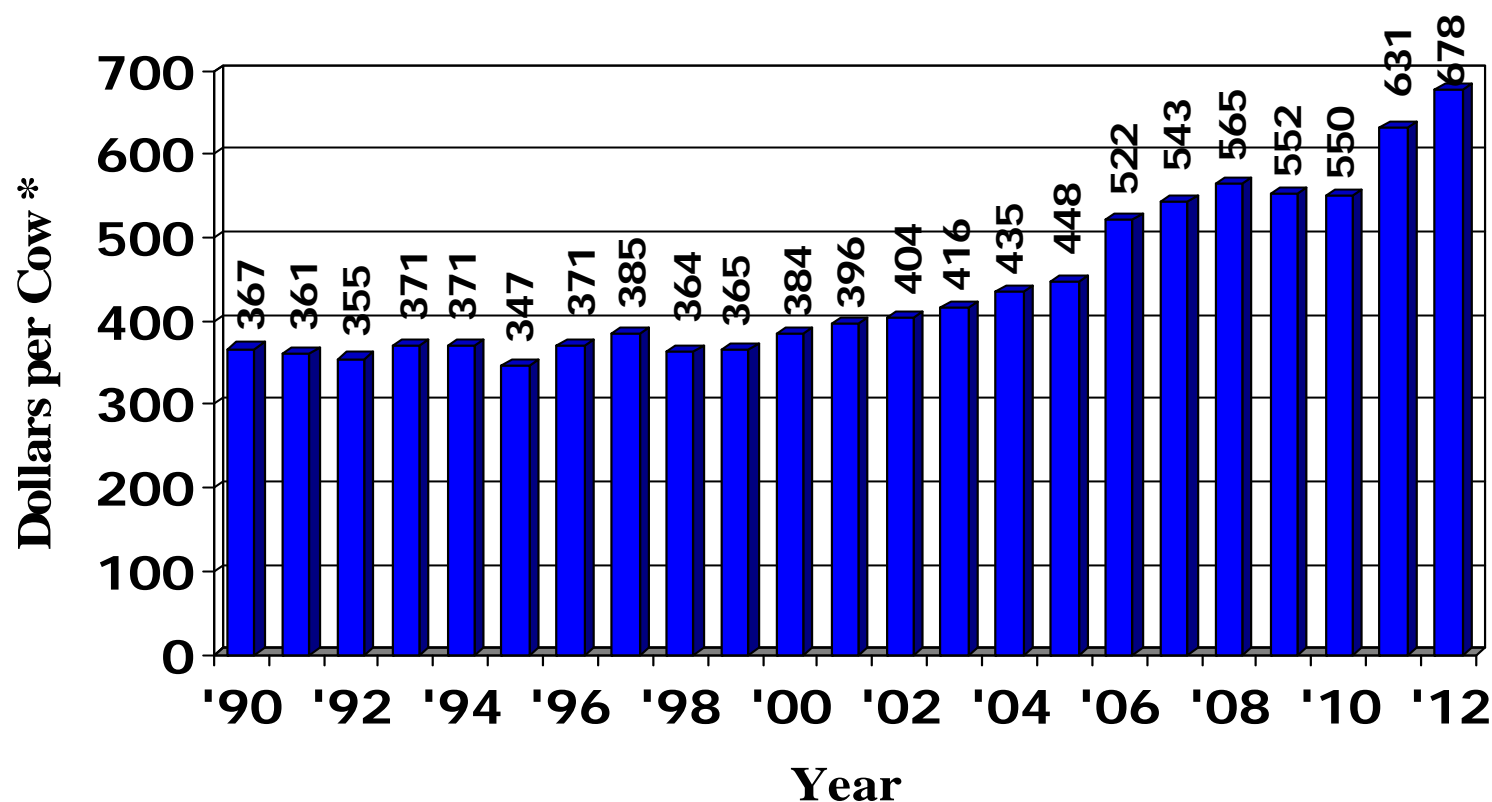
- “I’ll put 60 units of nitrate on it ...”
- “I put 50 units of ammonium nitrate on it ...”

Challenges and Opportunities

*“T’weren’t the things I didn’t know that done me in,
T’were the things I knew and didn’t do.
So, we don’t need to be taught,
Just reminded!”*

Dr. John Ikerd

U.S. Average Cow/Calf Cash Production Expenses



* Includes **interest costs and a pasture rental charge.**

Source: Livestock Marketing Information Center – Updated July 2012



Over the next few minutes....

- Improving returns on your fertilizer investment
- Getting at the root of it!
- Focusing on forage use efficiency
- Making every bite count



What affects forage cost?

$$\text{Forage Cost (\$/lb)} = \frac{\text{Total Cost (\$/Acre)}}{\text{Forage Yield (lbs/Acre)}}$$



MBA Average Fertilizer Prices 2009-2012

Average price from four suppliers (\$/ton).

	2009	2010	2011	2012
Urea (46-0-0)	440	443	489	521
Ammonium Nitrate (34-0-0)	437	339	425	463
DAP (18-46-0)	548	466	655	596
Muriate of Potash(0-0-60)	774	494	559	630
60-30-30 (\$/ac.)* Am. Nitrate	73.21	56.59	70.49	73.40

* Prices include a \$5.00 per acre application charge.

Northeast TN Fertilizer Prices (\$/ton) 2010-2012

Source: Input Supply Survey, David Bilderback, UT Extension

	June 2010	March 2011	February 2012	July 2012
Urea (46-0-0)	456	520	554	782 \$0.85/lb. N
Ammonium Nitrate (34-0-0)	411	497	518	587 \$0.86/lb. N
DAP (18-46-0)	532	711	672	677
Muriate of Potash(0-0-60)	531	613	694	707
60-30-30 (\$/ac.)* Am. Nitrate	64.79	78.78	81.03	86.41

* Prices include a \$5.00 per acre application charge.

Fertilizer Calculator Spreadsheet

<http://economics.ag.utk.edu/soft.html>

Fertilizer Costs

Product	Percent N - P ₂ O ₅ - K ₂ O	Price \$ Per Ton	Nutrient	Pounds of Nutrient / Ton	Price per Pound of Nutrient
Urea	46-0-0	\$782	N	920	\$0.85
Ammonium Nitrate	34-0-0	\$587	N	680	\$0.86
Diammonium Phosphate (DAP)	18-46-0	\$677	N	360	
			P ₂ O ₅	920	\$0.74
Muriate of Potash	0-0-60	\$707	K ₂ O	1200	\$0.59

Rate of Application

		Pounds of Nutrient
Urea	N	<input type="text"/>
Am. Nitrate	N	60
DAP	P ₂ O ₅	30
Potash	K ₂ O	30

Fertilizer Application Cost per Acre

	Pounds of Nutrient/Acre	\$ / acre		Pounds of Actual Product lbs. / acre
Custom Application		\$5.00		
N from Urea	0	\$0.00	Urea	0.0
N from Am. Nitrate	48	\$41.66	Am. Nitrate	141.9
N from DAP	12		DAP	65.2
P ₂ O ₅	30	\$22.08	Potash	50.0
K ₂ O	30	\$17.68		
Total Cost per Acre		\$86.41	Total lbs. / Acre	257.2

Food for Thought

- Value of Clover

- 60lbs of N / Acre

- 2009 MBA

- N from Urea @ 0.48/lb \$28.80/Acre
- N from Am. Nitrate @ 0.64/lb \$38.40/Acre

- 2012 Northeast TN

- N from Urea @ 0.85/lb \$51.00/Acre
- N from Am. Nitrate @ 0.86/lb \$51.60/Acre



The False Economy of Shortcuts

Cost of Production Compared to Average

Yield (tn/ac)	60%	75%	90%	100%	110%	125%
8	\$45	\$56	\$68	\$75	\$83	\$94
7	\$51	\$64	\$77	\$86	\$94	\$107
6	\$60	\$75	\$90	\$100	\$110	\$125
5	\$72	\$90	\$108	\$120	\$132	\$150
4	\$90	\$113	\$135	\$150	\$165	\$188
3	\$120	\$150	\$180	\$200	\$220	\$250

Adapted from R.C. Lacy, 2008

Soil Test and Follow Fertility Recommendations



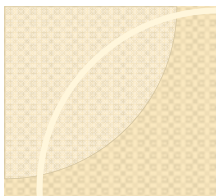
Sample hayfields every year and 1/3 of your pastures each year.

DO NOT cut back on lime!

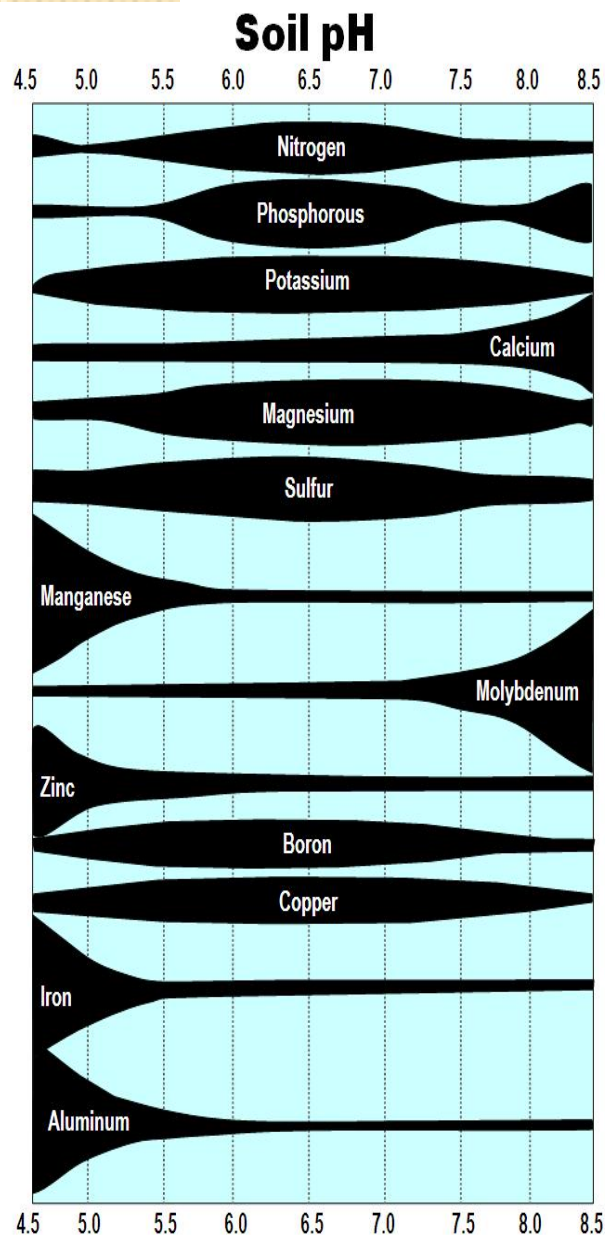


Get your priorities right!

1. Lime is still job #1.



How Soil pH Affects Availability of Plant Nutrients

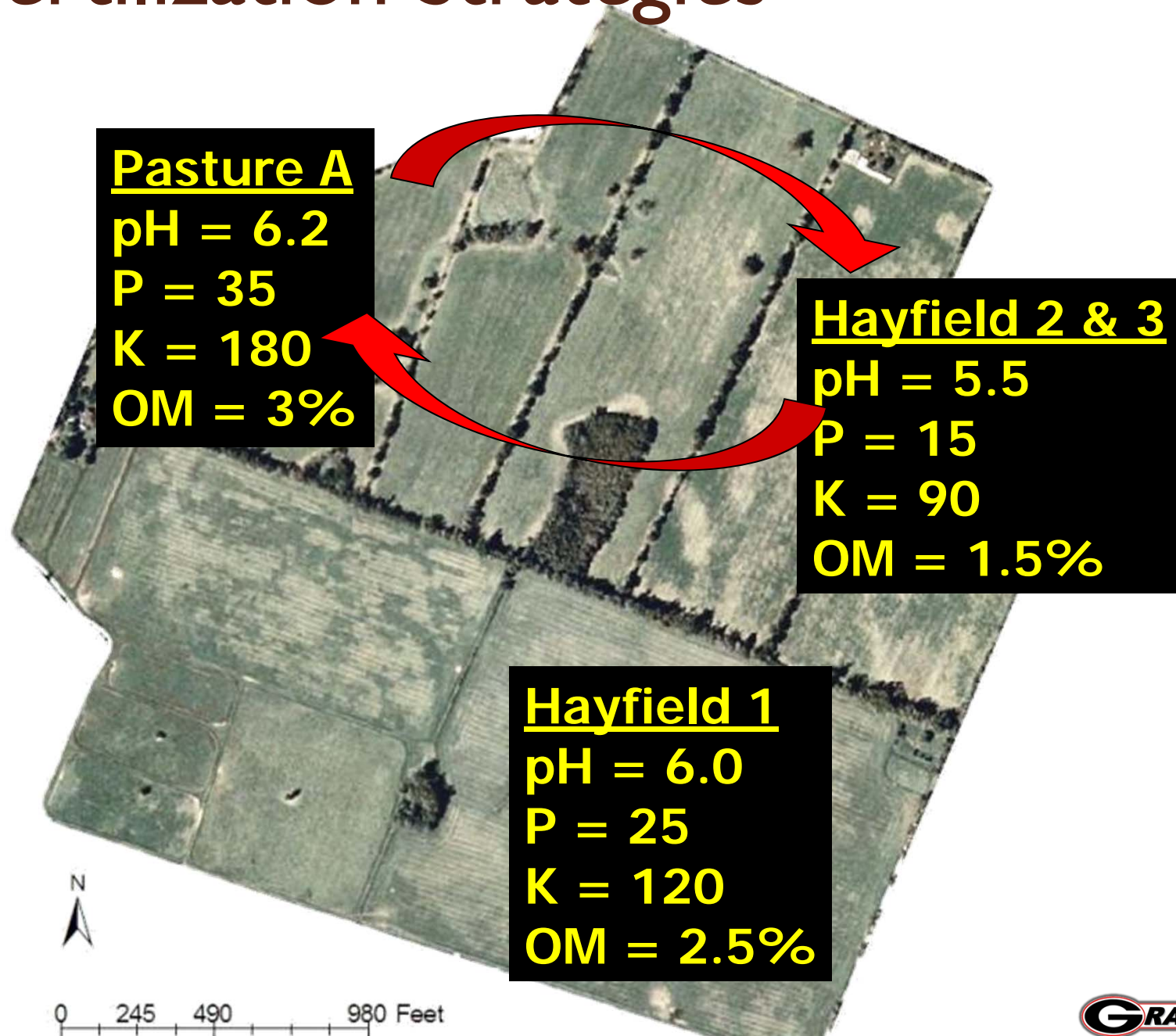


$$60-30-30 = \$86.41 \text{ per acre}$$

The difference of a soil pH of 5.6 vs. 6.2

Nutrient	Amt. Used Annually <i>(Lbs/acre)</i>	Unit Price <i>(\$/lb)</i>	Dec. in Efficiency	Value of Decrease <i>(\$/acre)</i>
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Fertilization Strategies



Low Soil pH

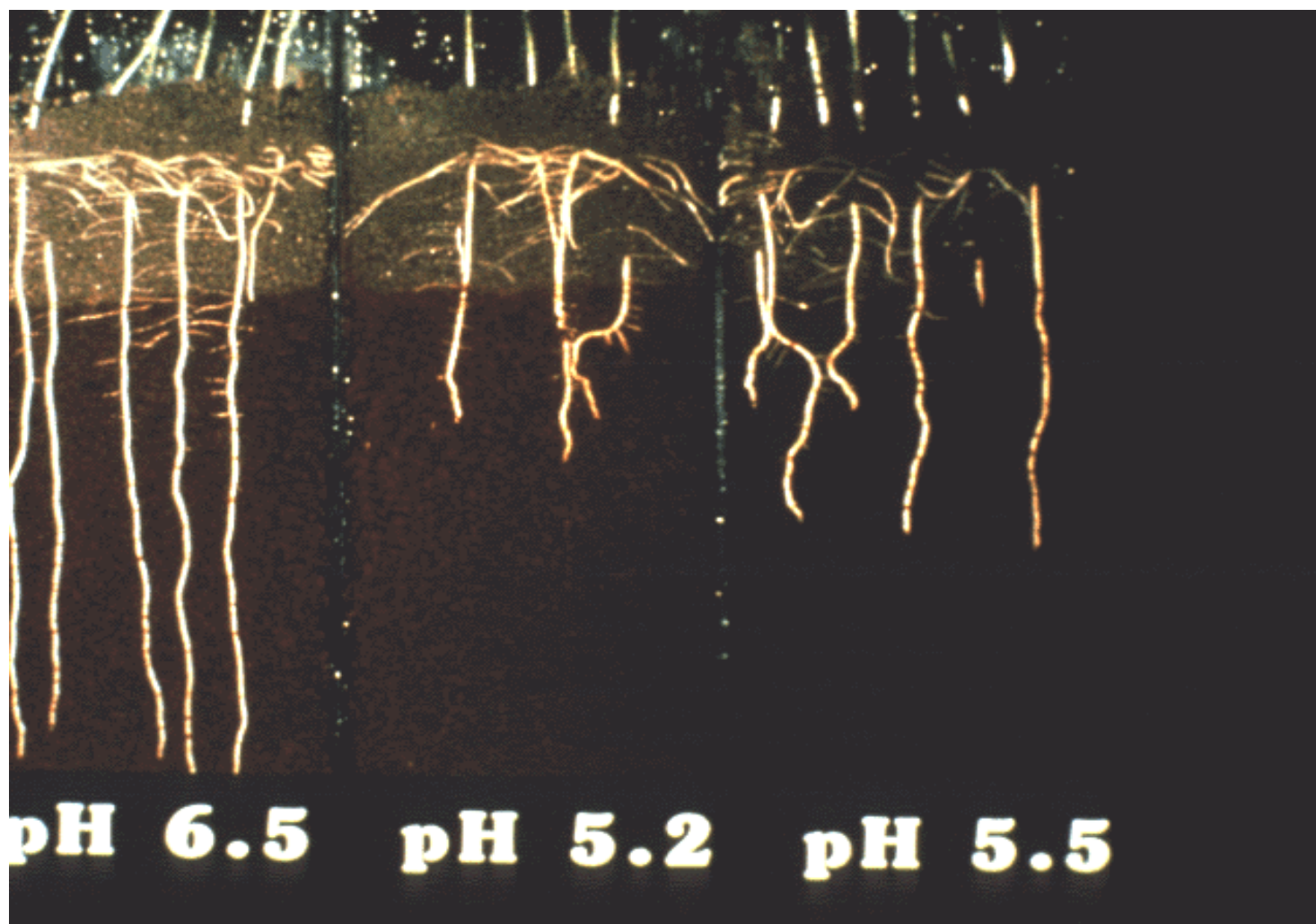


Photo credit: Auburn University

Drought Tolerance of Forage Species

Species	Water Use Efficiency	Max. Root Depth
	DM lbs/inch	inches
Coastal Bermudagrass	1646	78
Common Bermudagrass*	~1000	~50
Pensacola Bahiagrass	1194	79
Tall Fescue	1064	48
Ladino Clover	480	38
Red Clover	436	45

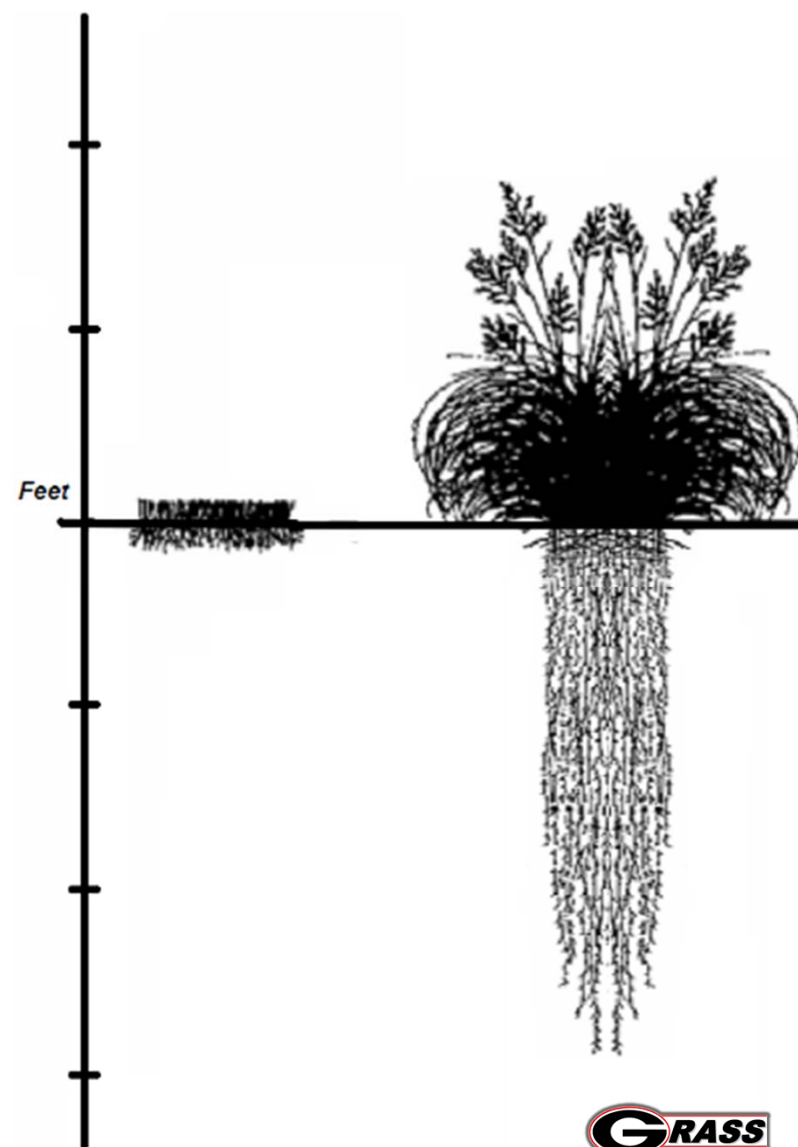
From: Southern Forages, as adapted from Doss et al. (1960; 1962; 1963)

* Estimates.

The Most Popular Question in a Drought Year:

"Why are my hayfields green and my pastures brown?"

Get to the root of the problem.

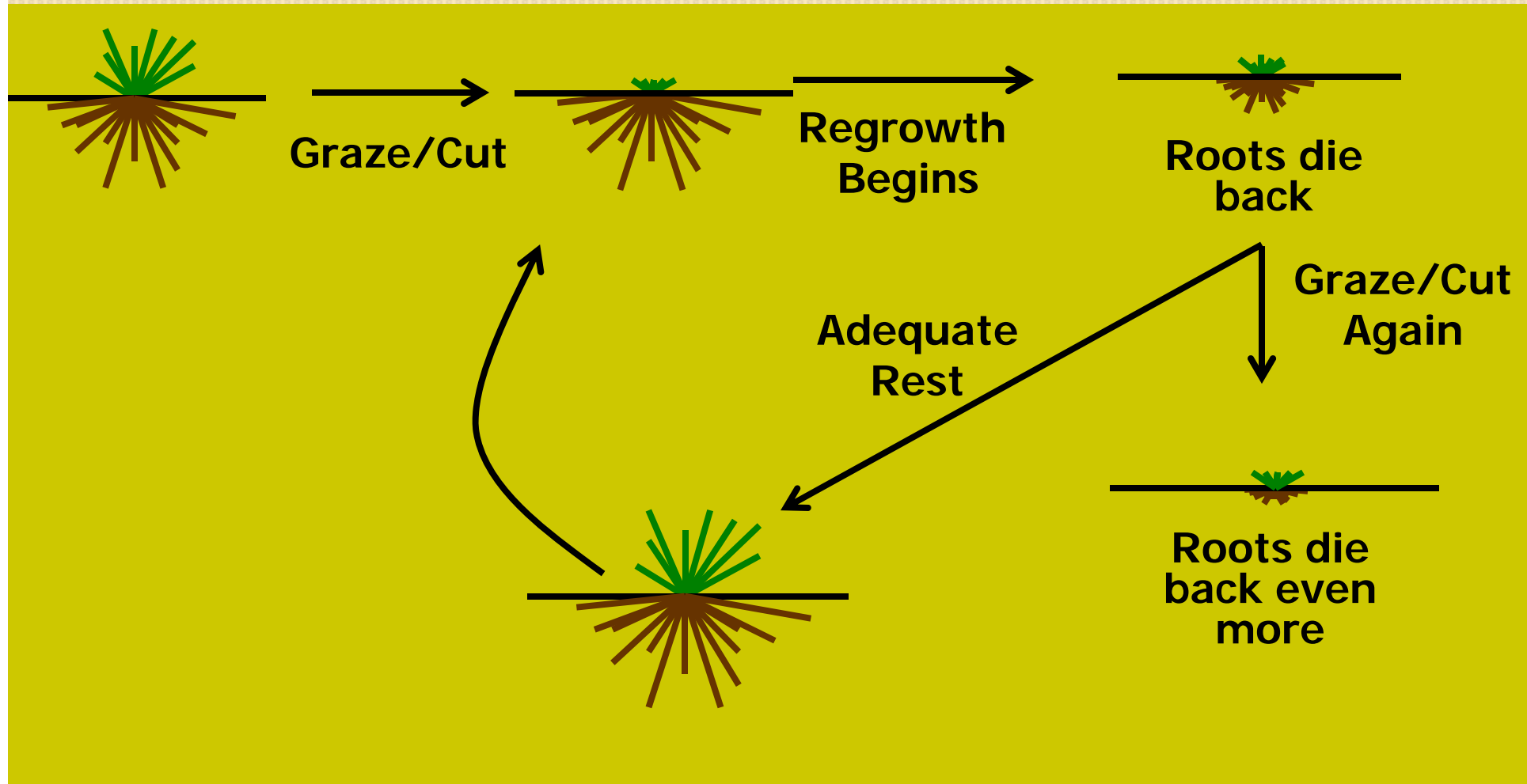


Write this down in BIG
BOLD letters!

“GRASS GROWS GRASS.”



What you don't see....



Proper Rest Following Grazing is Key!

- In continuously grazed pastures, most plants are grazed every 2 – 7 days.
- With recommended rest periods, roots will redevelop to approximately the same depth as uncut plants.

Picture staged by: C. Mackoviak, Univ. of Florida



Grazing Rules of Thumb

Crop	Target Height (inches)		Recommended Rest Period (days)
	Begin Grazing	End Grazing*	
Alfalfa (grazing types)	10-16	2-4	15-30
Annual Ryegrass	6-12	3-4	7-25
Bahiagrass	6-10	1-2	10-20
Bermudagrass	6-12	2-6	10-20
Clover, White	6-8	1-3	7-15
Clovers, Other	8-10	3-5	10-20
Orchardgrass	8-12	3-6	15-30
Pearl millet	20-24	8-12	10-20
Small grains	8-12	4	7-30
Sorghum/sudan	20-24	8-12	10-20
Switchgrass	18-22	8-12	30-45
Tall Fescue	4-8	2-3	15-30

* Height at end of grazing may need to be higher to optimize intake of quality forage or vigorous re-growth.

Be Careful of Cutting Height



Leave a Few Leaves



"If used incorrectly, this will be the biggest limit to your profitability."

Problem with “Heavy Metal”?

Let there be no doubt,

The most profitable forage-based livestock systems store very little forage.

- “The most cost-effective forage harvester has four legs.”
- Just like other harvesters, the four legged harvesters have to be driven.



Avoid KTs . . .

Just purchased our dream home and 20 acres in the country!

Farm /country living is the life for me!

Now I need a new . . .

Killer Toy



Efficiencies of Grazing Systems

System	Efficiency
Grazing	
Continuous Stocking	30-40%
Slow Rotation (3-4 paddocks)	50-60%
Moderate Rotation (6-8 paddocks)	60-70%
Strip Grazing	70-80%

Effects of rotational stocking on performance of beef cattle grazing bermudagrass and endophyte-free tall fescue in central Georgia.

Item	Continuous	Rotational	Difference*
Cow weight at calving, lbs	1037	1017	NS
Cow weight at weaning, lbs	1090	1071	NS
Stocking rate, cows/acre	0.50	0.69	+38%
Pregnancy rate, %	93	95	NS
Weaning weight, lb	490	486	NS
Calf production, lb/ac	243	334	+37%

* NS = not statistically significant

Increase in gain per acre in rotational compared to continuous grazing in studies from various southern states.

State	% Increase
Arkansas	44
Georgia	37
Oklahoma	35
Virginia	61

Manure Distribution

Rotation
Frequency

Years to Get
1 Pile/sq. yard

Continuous

27

14 day

8

4 day

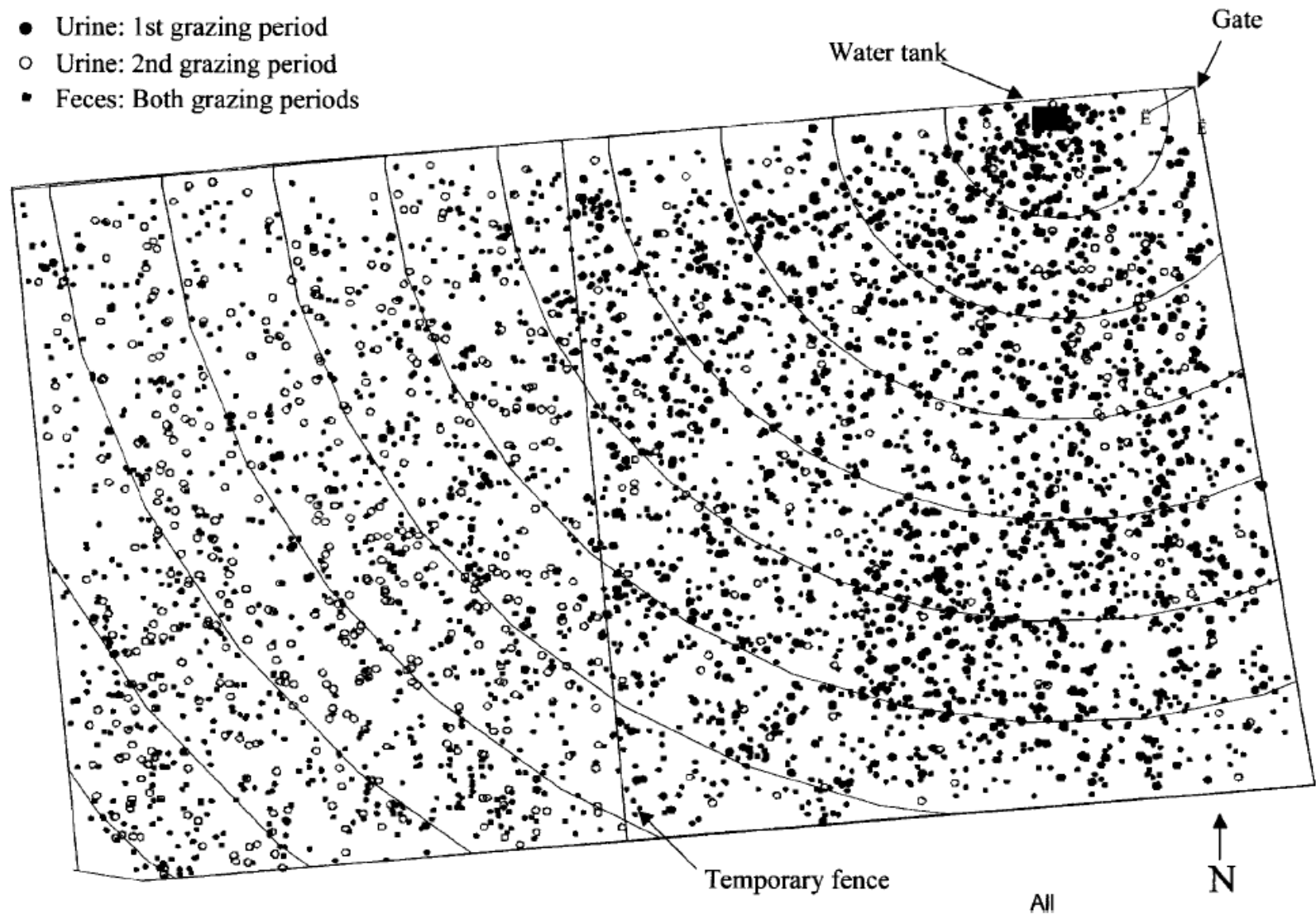
4 – 5

2 day

2

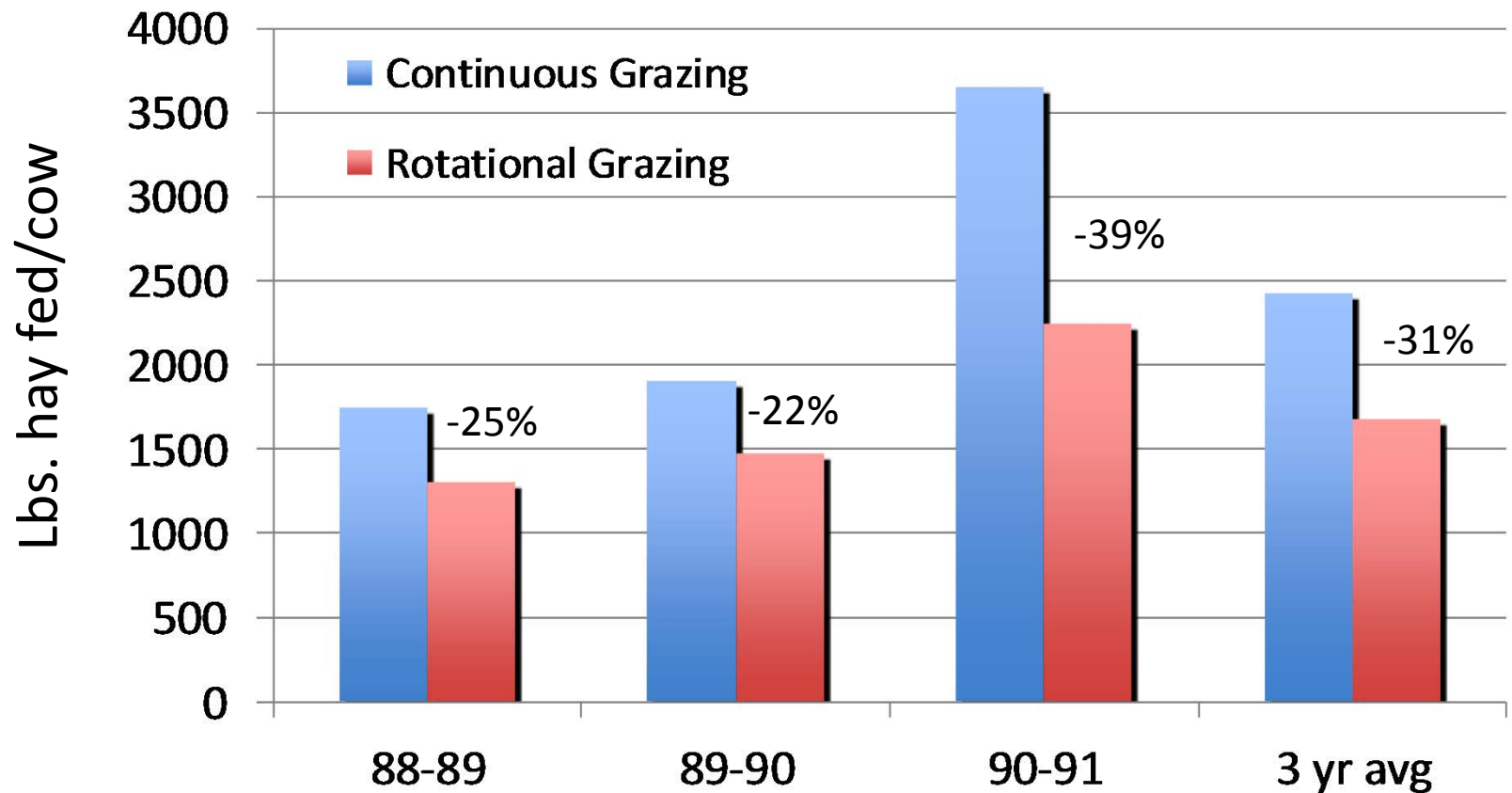
Efficiency of Four-legged Manure Spreaders

- Urine: 1st grazing period
- Urine: 2nd grazing period
- Feces: Both grazing periods



White et al., 2001 J. Environ. Qual. 30:2180–2187

Effect of Grazing System on Hay Needs



\$37.54/cow savings
using \$100/ton hay

Efficiencies of Grazing and Mechanized Harvest

System	Efficiency
Grazing	
Continuous Stocking	30-40%
Slow Rotation (3-4 paddocks)	50-60%
Moderate Rotation (6-8 paddocks)	60-70%
Strip Grazing	70-80%
Mechanical	
Hay	30-70%
Silage	60-85%
Green Chop	70-95%

LOSS ACCUMULATES WITH EACH STEP

It's not unusual to see
total losses of 70% or
greater

 **Extension**

Field curing
3 - 25% loss

Harvesting
3 - 15% loss

Storage
5 - 45% loss

Feeding
10 - 30% loss

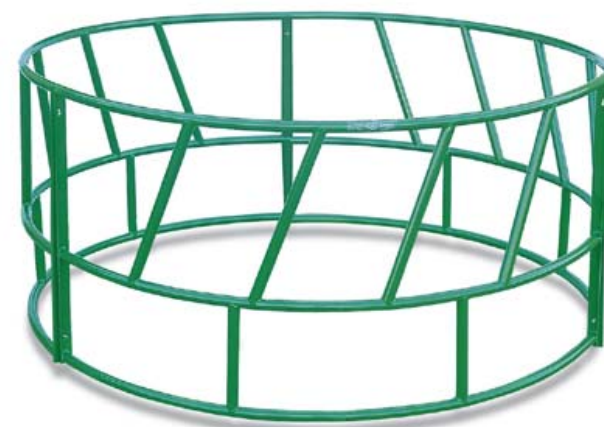


14 inches

~74% of the bales volume is contained in that 14 inches.

Feeding Losses

Item	% Waste
Cone	2 - 5
Ring	4 - 7
Trailer	10 - 13
Cradle	15 - 20



Adapted from: Southern Forages (4th ed.) and Buskirk et al., 2003. J. Anim. Sci. 81:109-115

What does a round bale weigh?

- The only way to know the weight of a bale is to put the bale on the scales.

Table 2: Average Bale Weight							
Dia	Len	Variable Chamber Baler Solid Core (High Density)			Fixed Chamber Baler Soft core (Low Density)		
		Min (9lbs/ft³)	Avg (12lbs/ft³)	Max (14lbs/ft³)	Min (5lbs/ft³)	Avg (6lbs/ft³)	Max (7lbs/ft³)
Feet		Pounds			Pounds		
4	4	450	600	700	250	300	350
5	4	700	1000	1100	400	500	550
4	5	550	750	900	300	375	450
5	5	900	1200	1400	500	600	700
6	5	1300	1700	2000	700	850	1000

Source: Dr. Buschermohle & Dr. Grandle , Professor Agricultural Engineering



Photo credit: Bobby Smith, Morgan CEC

The least used and least understood element of a good forage management plan.

Forage Quality has High Value Now

Supplementing a Lactating Beef Cow

Crop	Maturity	CP	TDN	Supplement [†]	Cost [‡]
		-- % --	-- % --	lbs/hd/day	\$/hd/day
Bermudagrass	4 weeks	10-12	58-62	0	\$0
	6 weeks	8-10	51-55	4.8	\$0.79
	8 weeks	6-8	45-50	7.5	\$1.24
Tall Fescue	Late boot	14-16	66-70	0	\$0
	Early head	11-13	60-63	0	\$0
	Dough	8-10	50-54	5.3	\$0.87

[†] Assuming 50:50 corn gluten:soyhulls supplementation for forage quality on low end of the range.

[‡] Approximate prices for August 2012 (\$330/ton).

Challenges and Opportunities

*“Change is inevitable,
adaption and survival are
optional!”*

Dee Likes
Kansas Livestock
Association

Challenges and Opportunities

“In times of change, the learners will inherit the Earth, while the knowers will find themselves beautifully prepared for a world that no longer exists!”

Eric Hoffer
American Philosopher and
Writer

What is the difference?

- 
- 1) Digestible energy
 - 2) How much can be eaten

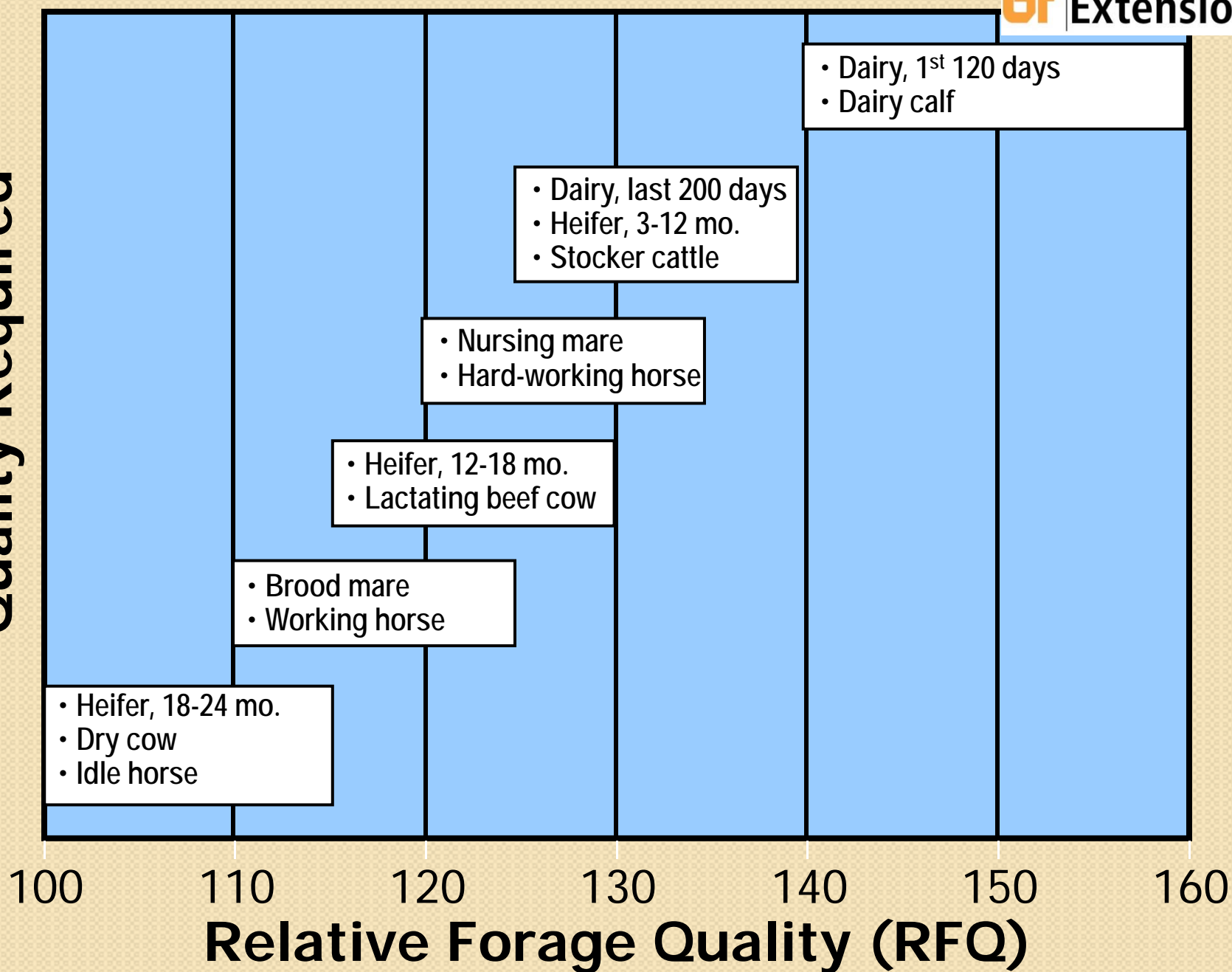
What is “high quality forage?”

- Forage that is highly digestible (i.e., high TDN)
- Large amounts of the forage can be consumed (i.e., high DMI).
- Relative Forage Quality (RFQ) =

$$\text{TDN} * \text{DMI} / 1.23$$

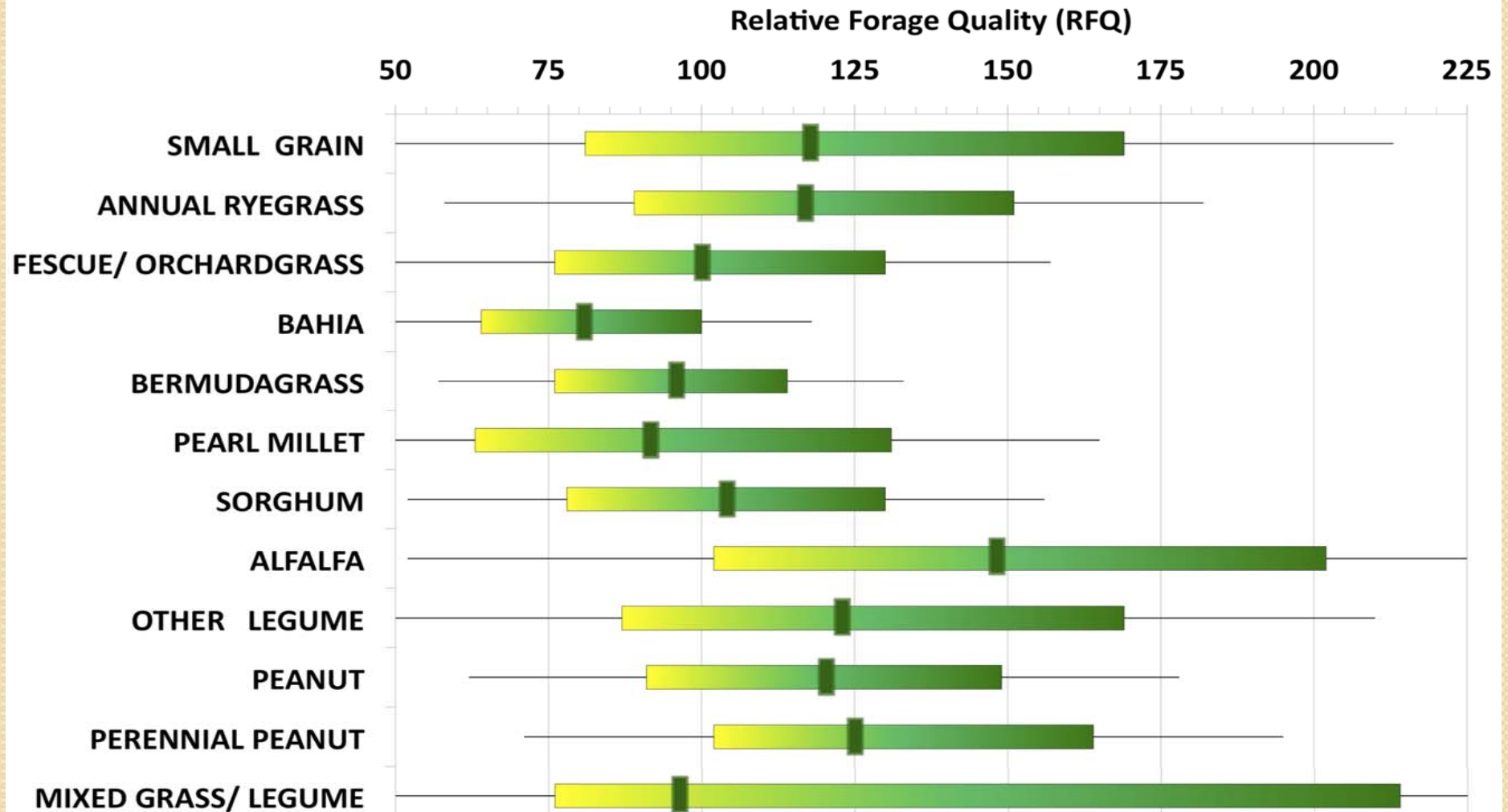


Quality Required



Adapted from Undersander et al., 2011.

Typical Range in Quality of Common Forages



Typical expected range (color bars), median (dark green vertical lines) and the extent of what is typically considered exceptionally low or high for a species (extent of horizontal black lines represents two std. dev. away from the mean). Based on statistic from samples submitted to the UGA FEW Lab between July 2003 – February 2011.

Cattleman's MBA

Forage Plan of Action - 2012

- Soil Test
- pH - - Lime if Needed
- Evaluate per unit Costs and Revenue
- Evaluate Weed Control / Fertility Options
 - Clovers / Reseeding Options
- Forage Utilization
 - Stocking Rates / Controlled & Extended Grazing

A Real Cowboy ... Has NO FEAR!



QUESTIONS?



<http://forages.tennessee.edu>



www.georgiaforages.com