5 Ways to Save on Forages

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UGA Extension Forage Team

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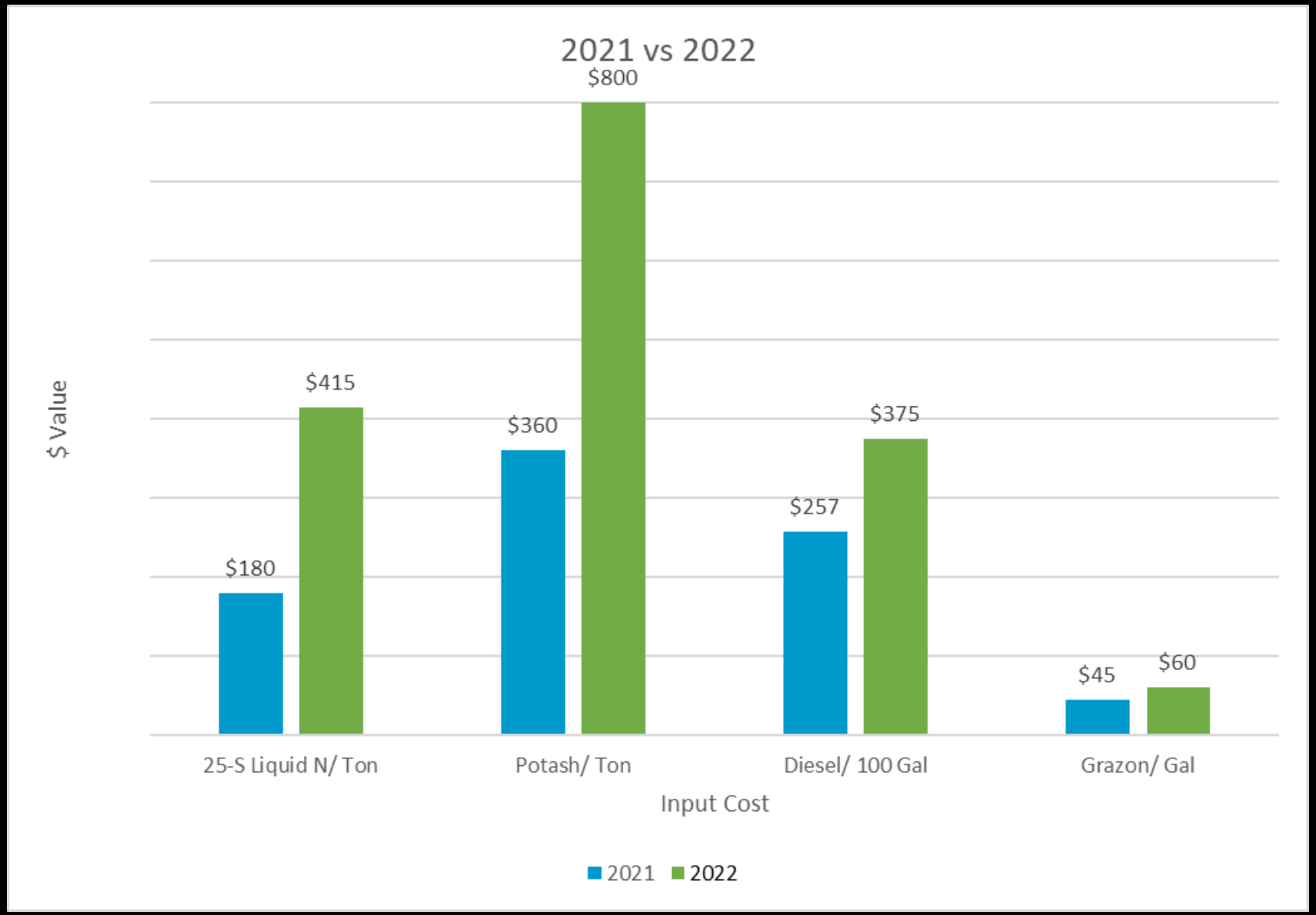
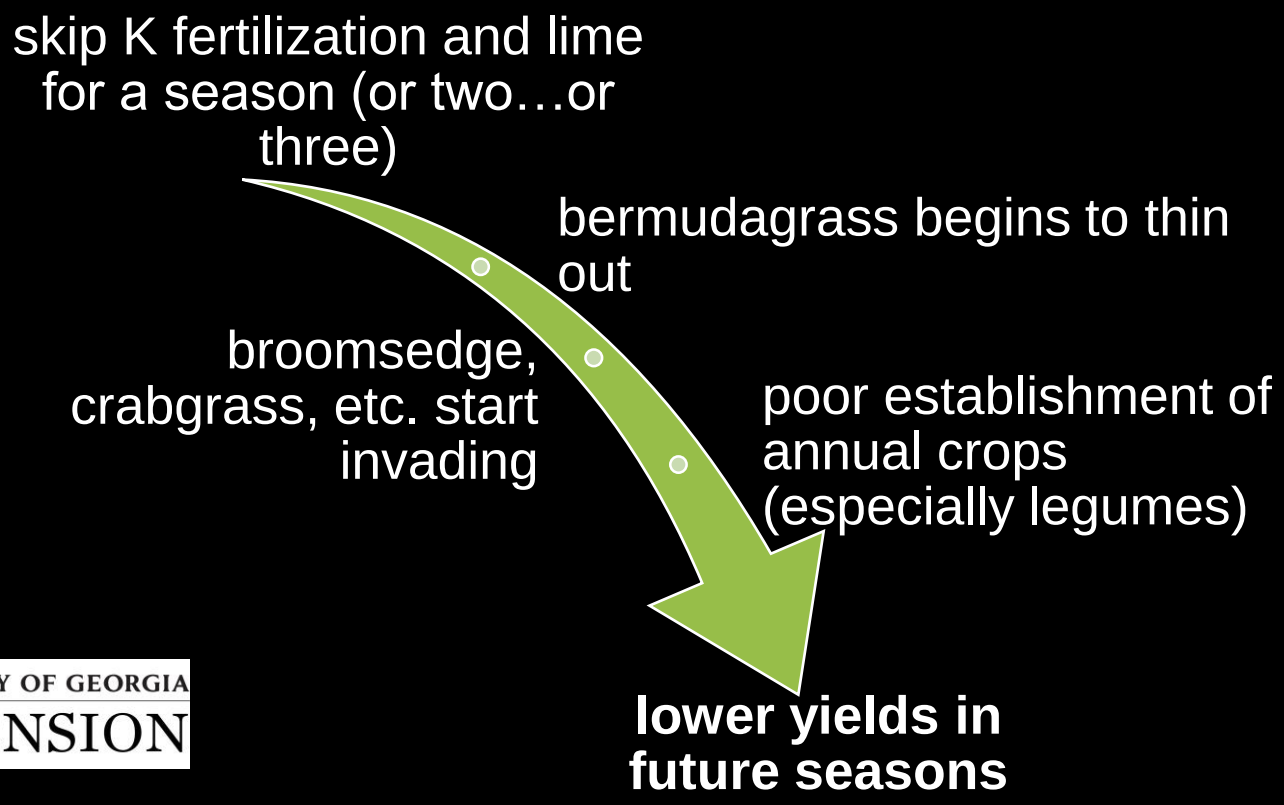


January 2022

1 Soil Testing and fertilizing according to a soil test

Low fertility in summer **can lead to bigger problems later**



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What type of lime should I use?

- Agricultural limestone is the most common, but other products (wood ash, marl, basic slag, egg shells, etc.) can be used.

Dolomitic Lime	Calcitic (Hi-Cal) Lime
calcium + magnesium	calcium
80% between 0.5 and 2 mm	smaller than 0.25 mm
	greater neutralizing value

When should I apply lime?

There is never a "bad" time to put out lime!

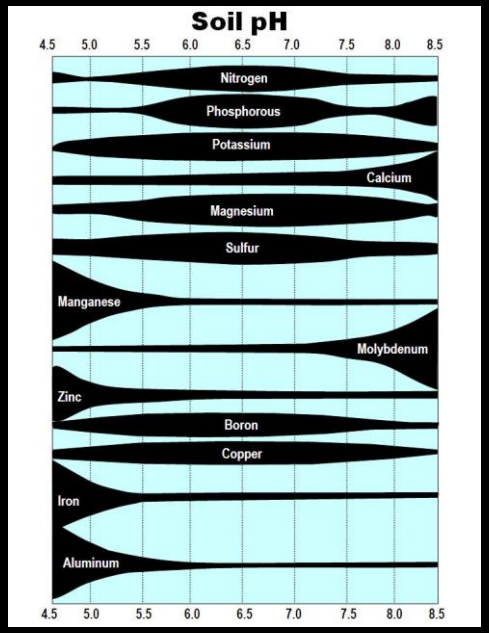
Consider applying lime during "off times" of the year to save money

Remember: it takes 6-12 months to see a substantial change in pH

- **Can take 12-18 months in heavier soils**

At a minimum: 1 ton/ac of ag lime will be needed every 3 years to offset N fertilizer

The unseen cost of not applying lime



The difference of a soil pH of 5.6 vs. 6.2:

	Amt. Used Annually	Unit Price	Dec. in Efficiency	Value of Decrease
	(Lbs./acre)	($/lb.)		($/acre)
N	200	$0.60	35%	-$42
P_2O_5	50	$0.55	50%	-$14
K_2O	150	$0.40	10%	-$6
			Total	-$62

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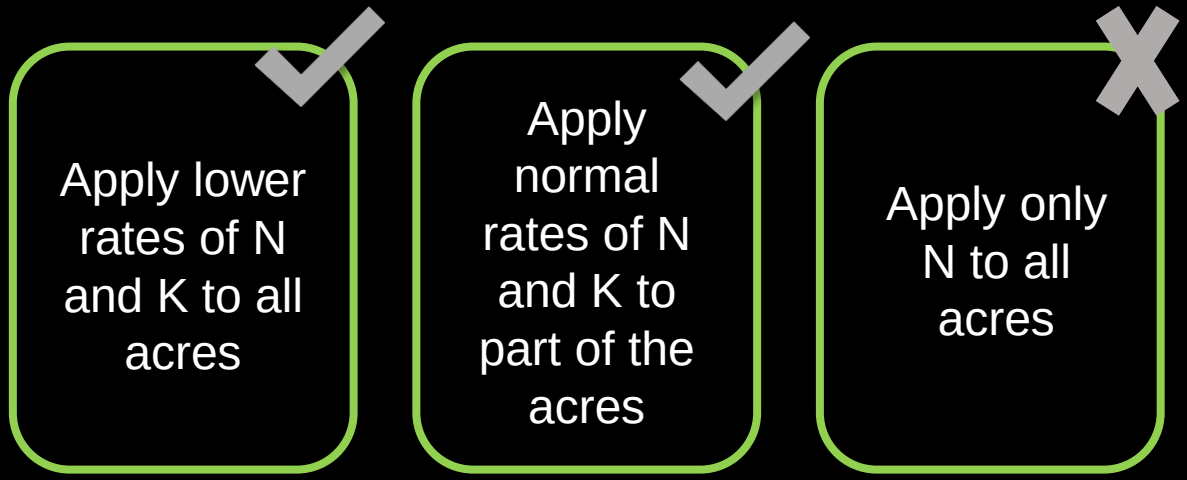
What if I can't afford to fertilize at a full rate?

- It may be tempting to cut out one or more nutrients
- It is important for plant health and stand longevity to keep nutrients in balance!



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Nitrogen fertilizer options

Fertilizer	% N	Effect on pH
Ammonium nitrate	34	↓↓
Ammonium sulfate	21	↓↓↓↓
UAN	28-32	↓↓
Urea	46	↓↓
Urea (sulfur coated)	38	↓↓↓
Broiler litter	3	↑
Cattle manure	1.5	↓
Anhydrous ammonia	82	↓↓↓

Phosphorus fertilizer options

Fertilizer	% P_2O_5	Effect on pH
Diammonium phosphate	46	↓↓↓
Monoammonium phosphate	48	↓↓↓↓
Triple superphosphate	46	
Broiler litter	2-3	↑
Cattle manure	1.5	↓

Apply P in late summer or fall

- **P can be applied any time during the year for established forage crops**
- **Purchase P fertilizer in these "off-peak" times of the year**
  - Demand for the product is low
  - Demand for spreading is low
- **Less risk for P run off in the late summer/ fall**

Potassium fertilizer options

Fertilizer	% K_2O	Effect on pH
Muriate of potash	60	
Broiler litter	2	↑
Cattle manure	1.2	↓

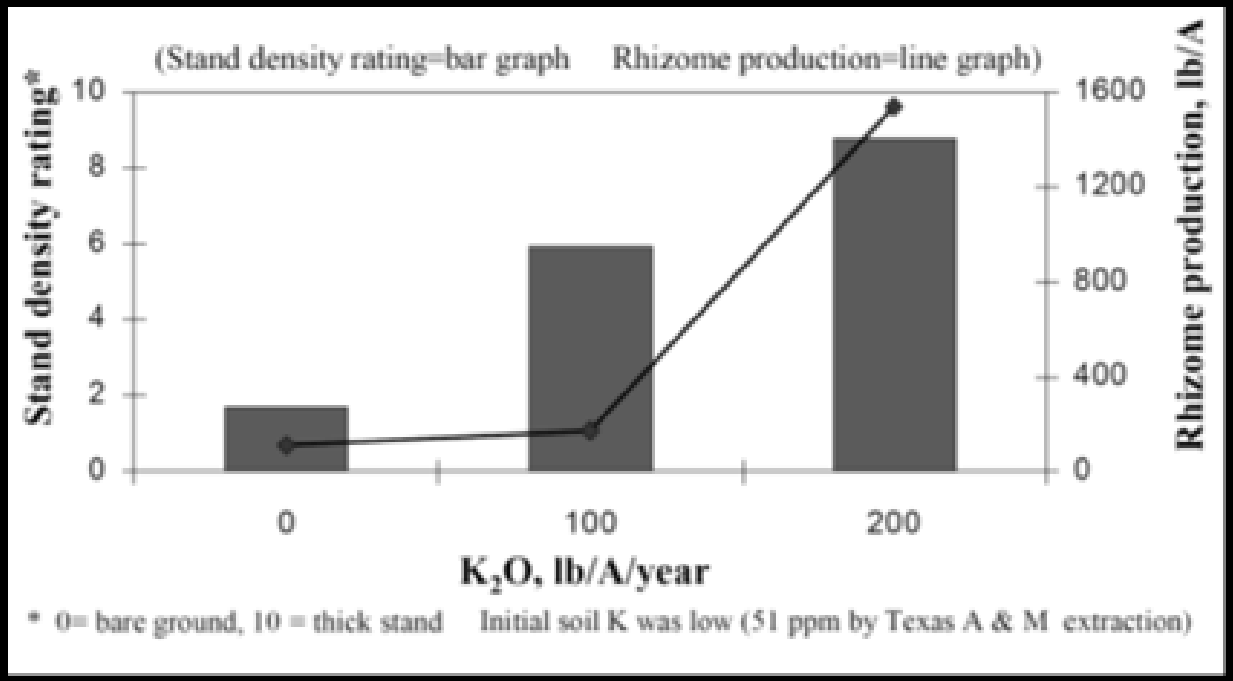
Split K Applications

Apply 40-50% in late spring and the other 50-60% in mid-late season

200 lbs. rate for 3-4 years = $200-$300 per Dr. Hancock

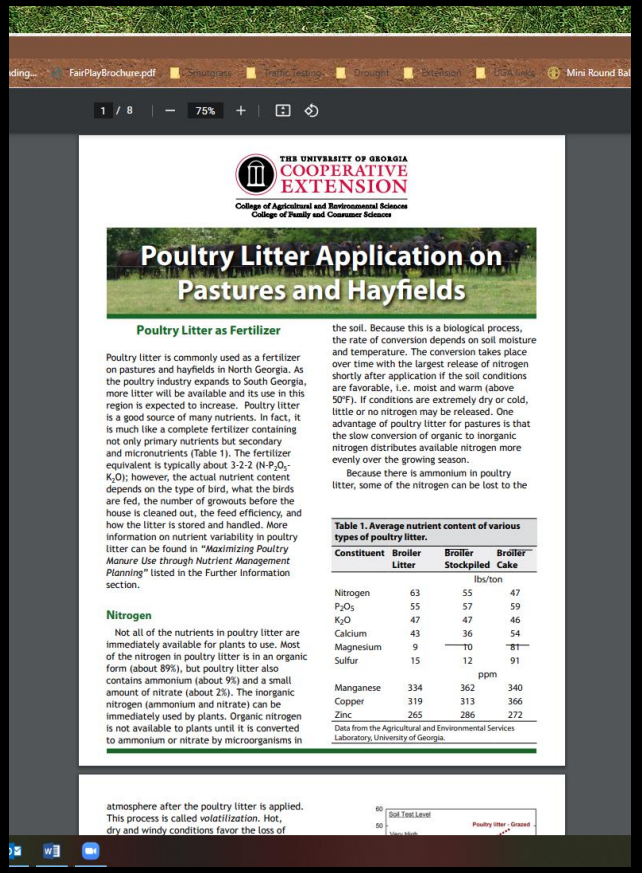
- 2022 Price of $800/ ton = $320 for 4 years.

Re-sprigging a field will cost at least $400/A + 6-12 months lost production if you can find a sprigger.



Should I use broiler litter?

- Get the litter tested BEFORE it is applied
- **Nitrogen**: only ~50% is available during the growing season when it is applied (very little carryover)
- **Phosphorus**: most will be available during growing season when it is applied
- **Potassium**: most will be available during growing season when it is applied



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Poultry Litter Application on Pastures and Hayfields

Poultry Litter as Fertilizer

Poultry litter is commonly used as a fertilizer on pastures and hayfields in North Georgia. As the poultry industry expands to South Georgia, more litter will be available and its use in this region is expected to increase. Poultry litter is a good source of many nutrients. In fact, it is much like a complete fertilizer containing not only primary nutrients but secondary and micronutrients (Table 1). The fertilizer equivalent is typically about 3-2-2 (N-P_2O_5-K_2O); however, the actual nutrient content depends on the type of bird, what the birds are fed, the number of growouts before the house is cleaned out, the feed efficiency, and how the litter is stored and handled. More information on nutrient variability in poultry litter can be found in *"Maximizing Poultry Manure Use through Nutrient Management Planning"* listed in the Further Information section.

Nitrogen

Not all of the nutrients in poultry litter are immediately available for plants to use. Most of the nitrogen in poultry litter is in an organic form (about 89%), but poultry litter also contains ammonium (about 9%) and a small amount of nitrate (about 2%). The inorganic nitrogen (ammonium and nitrate) can be immediately used by plants. Organic nitrogen is not available to plants until it is converted to ammonium or nitrate by microorganisms in the soil. Because this is a biological process, the rate of conversion depends on soil moisture and temperature. The conversion takes place over time with the largest release of nitrogen shortly after application if the soil conditions are favorable, i.e. moist and warm (above 50°F). If conditions are extremely dry or cold, little or no nitrogen may be released. One advantage of poultry litter for pastures is that the slow conversion of organic to inorganic nitrogen distributes available nitrogen more evenly over the growing season.

Because there is ammonium in poultry litter, some of the nitrogen can be lost to the

Table 1. Average nutrient content of various types of poultry litter.

Constituent	Broiler Litter	Broiler Stockpiled	Broiler Cake
		lbs/ton	
Nitrogen	63	55	47
P_2O_5	55	57	59
K_2O	47	47	46
Calcium	43	36	54
Magnesium	9	10	81
Sulfur	15	12	91
		ppm	
Manganese	334	362	340
Copper	319	313	366
Zinc	265	286	272

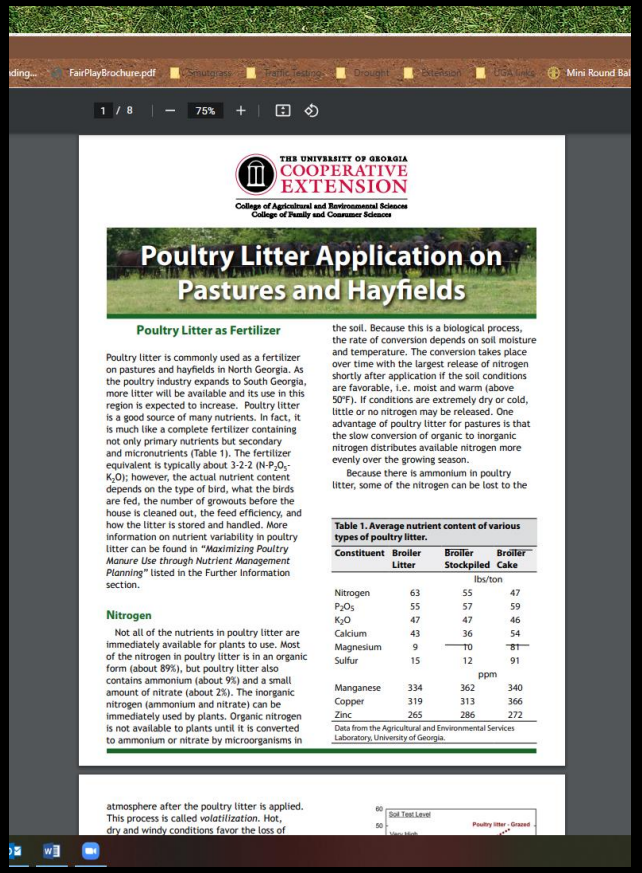
Data from the Agricultural and Environmental Services Laboratory, University of Georgia.

atmosphere after the poultry litter is applied. This process is called *volatilization*. Hot, dry and windy conditions favor the loss of

Other things to consider…

- Broiler litter does not contain the correct ratio of nutrients for forages!
  - Litter has 3:2:2 ratio
  - Forages need 4:1:3

- Apply litter to meet P recommendation
- Supplement N and K with commercial (inorganic) fertilizers to avoid environmental concerns



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#2 Utilizing Technology and Equipment Calibration

Light Bar GPS Guidance

Less overlap = fewer passes

Less time and reduced fuel consumption

Added benefit when combined with section control

Overlap increases input costs more than you think.

10% overlap → increases input costs by ~$50-70/ac

Percent Overlapped	Hayfield	Pasture
10% Overlap	$771	$574
1% Overlap	$708	$527

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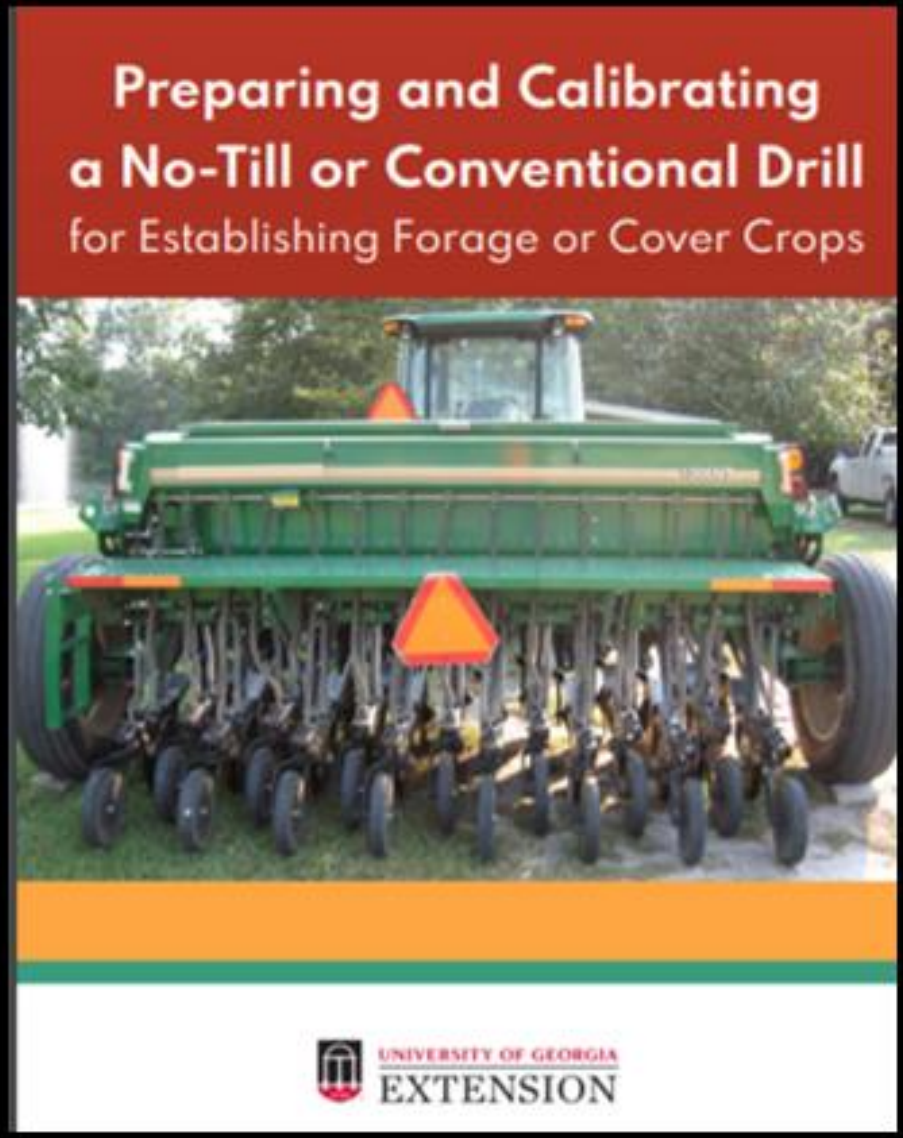
Can I afford a light bar?

10% overlap → increases input costs by ~$50-70/ac

A light bar costs $1000-$2000
-Dr. Simer Virk

What about diesel costs? Labor? Insecticides?

Calibrating Planting Equipment



Calibrating Spray Equipment

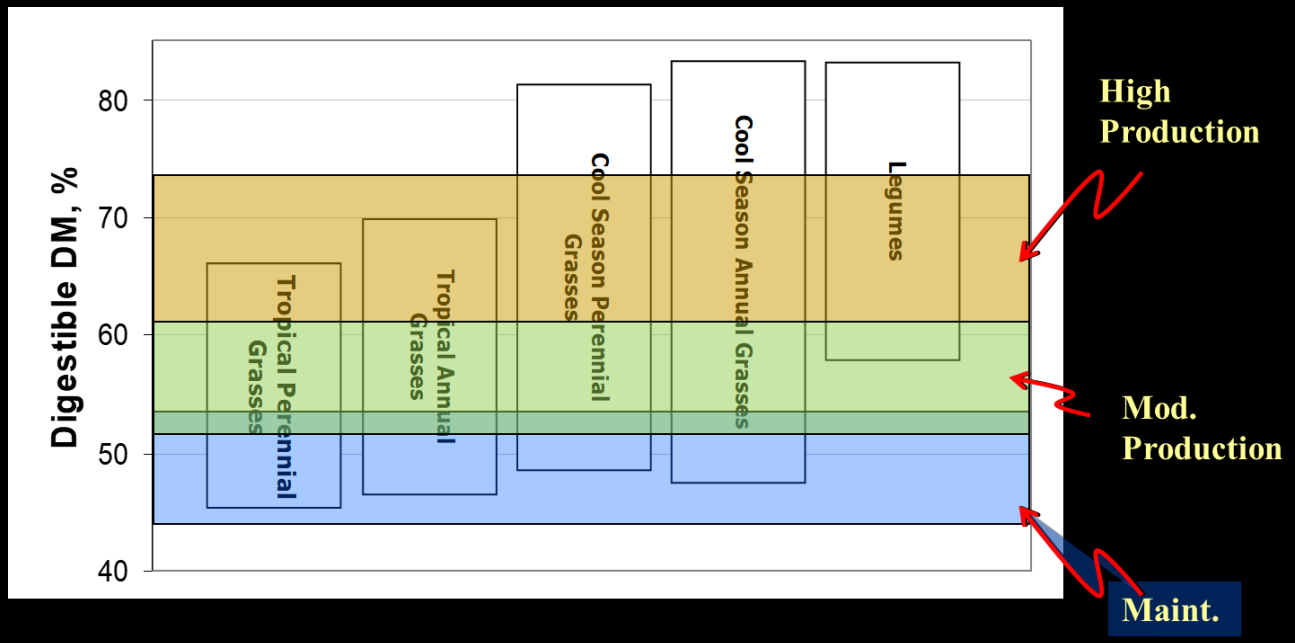
Visit our YouTube channel for videos on boom sprayer calibration and maintenance

#3 Preserving Forage Quality

Factors Affecting Forage Yield and Quality

Species	Fertility
Harvest Timing	Rain Events

Forage Species



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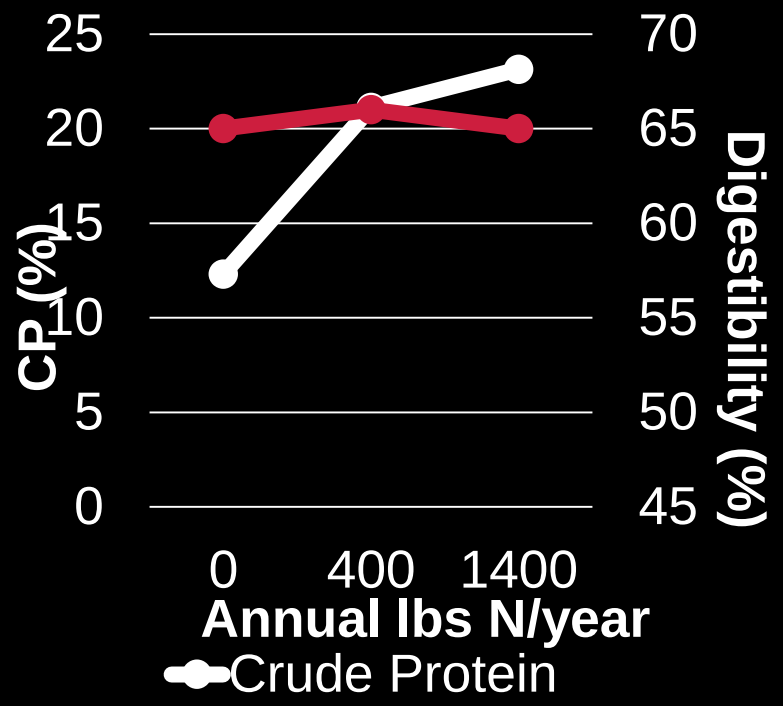
What affects forage quality more? Harvest timing or fertilization?

CP increases with fertilization, but digestibility remains unchanged.
How much of the protein is nitrates?



Burton et al.

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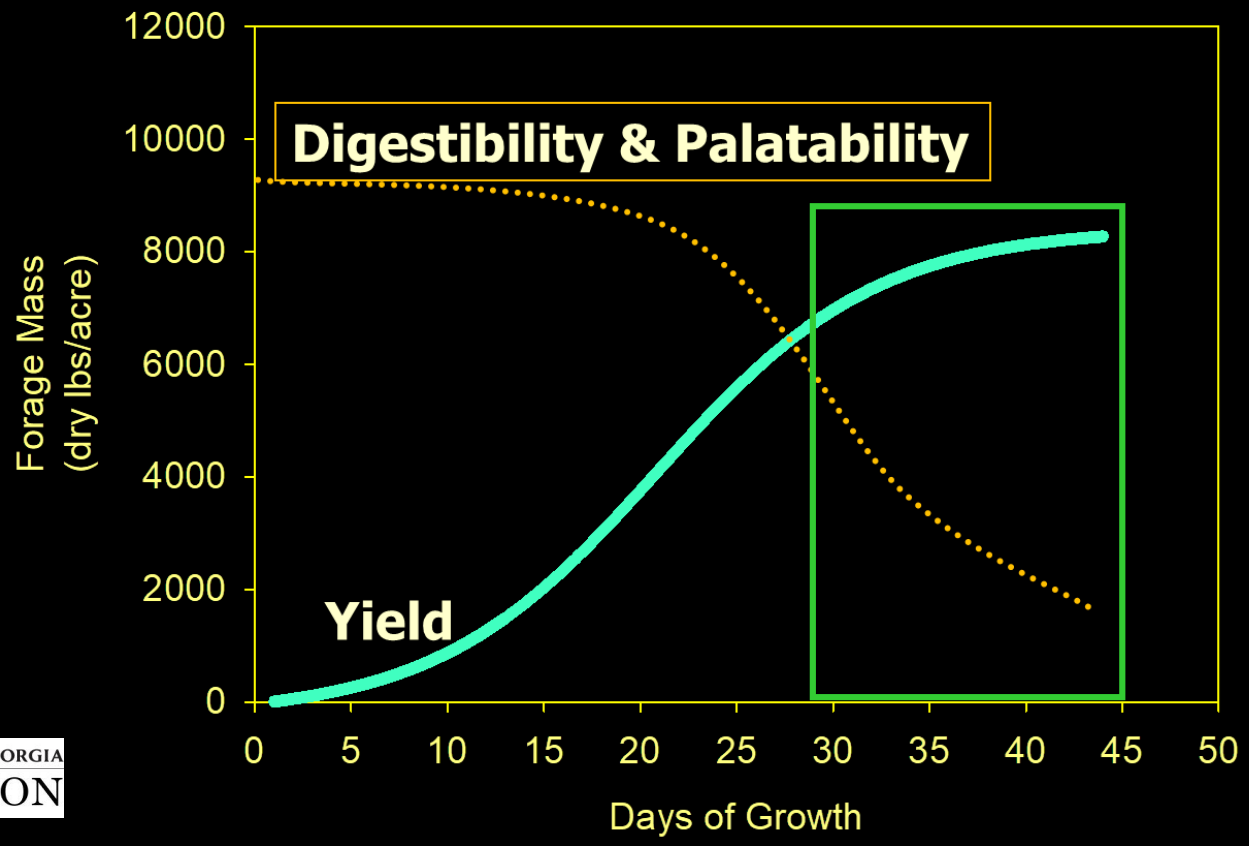
Plant Maturity



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Rain Event

Every day after 28 days = about 0.5% drop in TDN
1 week delay to avoid ½ inch of rain = about 3.5% drop in TDN
A ½ inch rain = about 1% drop in TDN
Cut the hay.

It costs a lot of money to be cheap

Bale A

- $70/ bale
- 58% TDN
- No Supplement Needed
- $0 supplement + $70/ bale = $70 + labor

Bale B

- $65/ bale
- 51% TDN
- Requires 180 lbs. of supplement/ bale
- $27.90 supplement per bale + $65 bale = $92.90 + labor

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What if I don't feed supplements?

Bale A

58% TDN

30 lbs. DMI * 58% TDN =17.4 lbs. TDN consumed

Bale B

51% TDN

30 lbs. DMI *51 % TDN = 15.3 lbs. TDN consumed

If I had 100 cows....

2 lbs. of bale B more per head per day...

100 head= 200 lbs. Per day of hay to feed

200 lbs./ day * 120 days= 24,000 lbs. = 29- 850 lb. Hay bales * $65/ bale = $1885 for the year.

Can a cow consume that much more?

How much body condition will she lose?

What will that do to calf and reproductive performance?

Will you lose a cow or two?

#4 Preventing Forage Losses

Top yield losses in forages

Fertility	Insects	Weeds
Harvesting	Storage	Feeding

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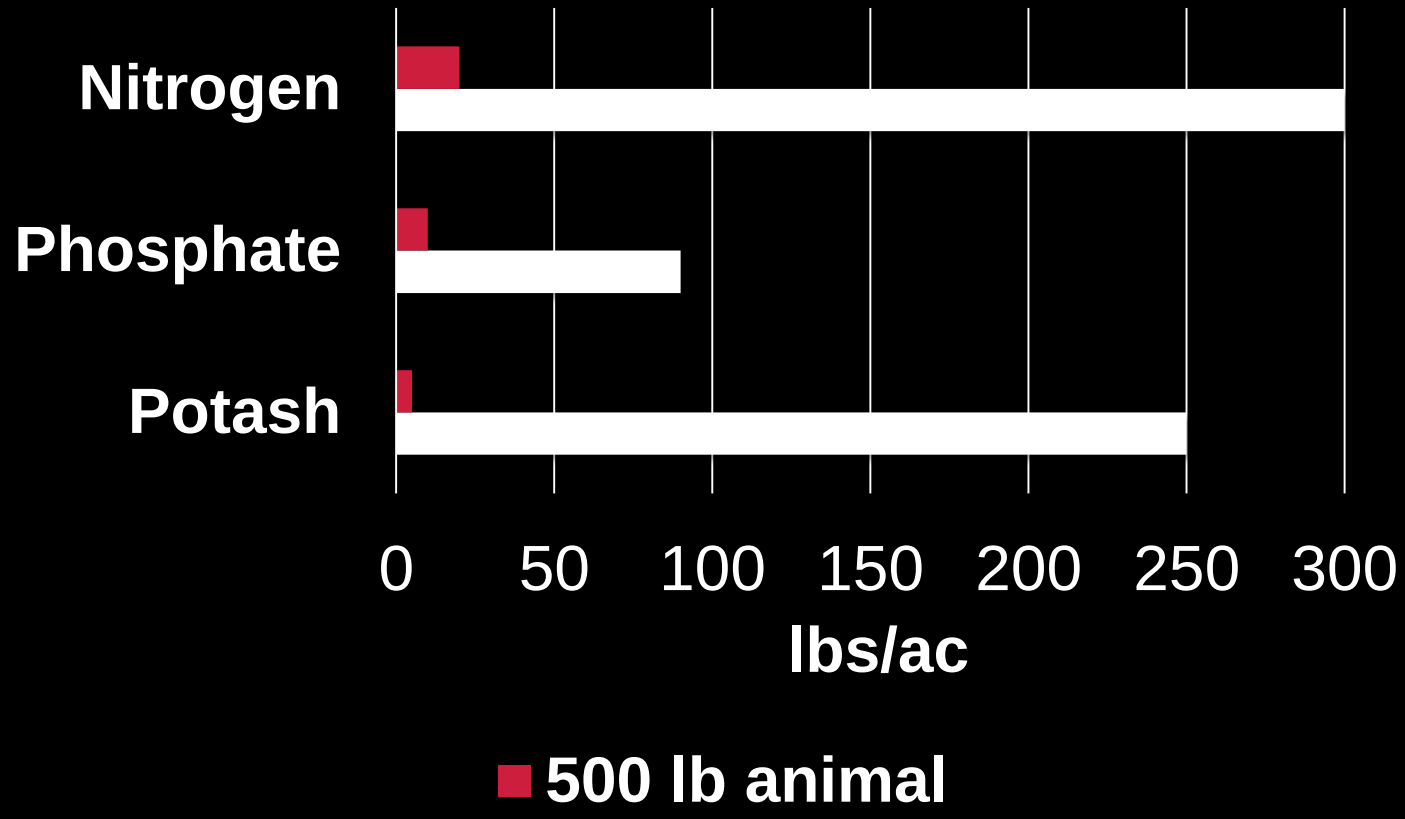
Harvesting Methods

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%

Nutrient Removal Per Acre



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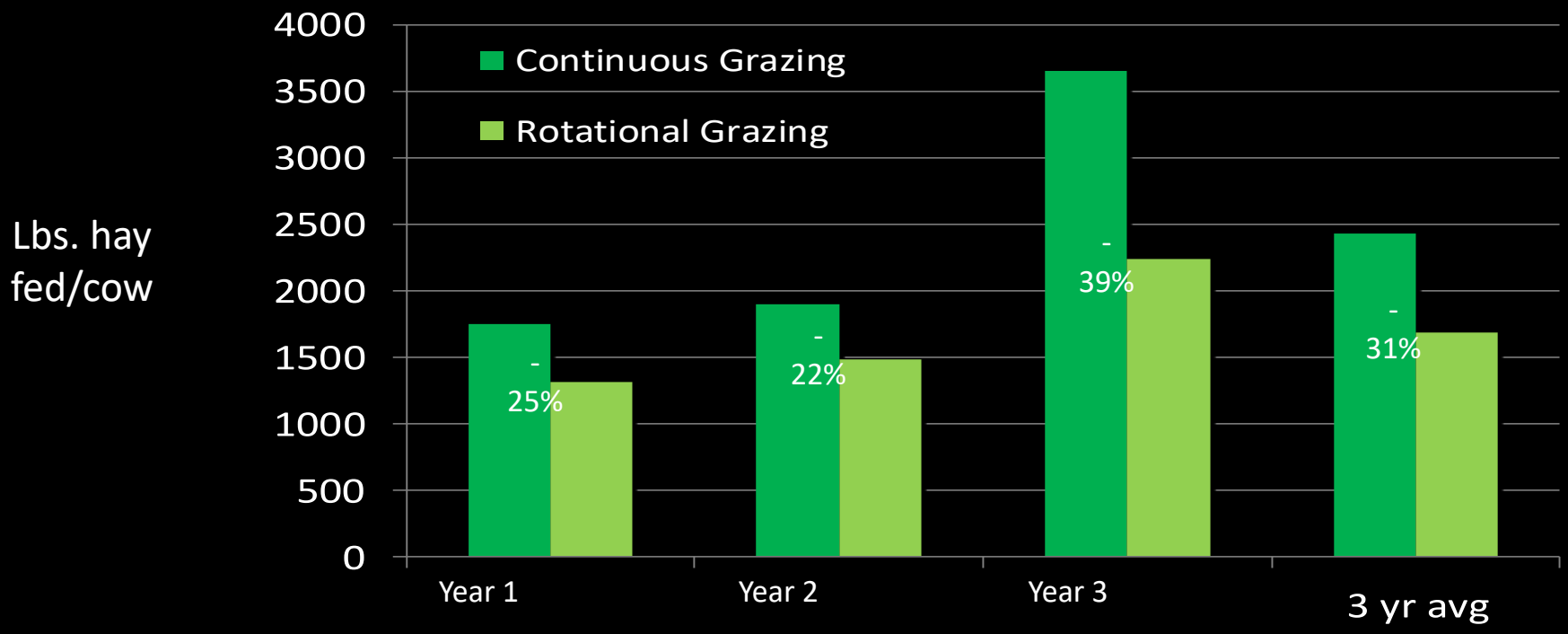
Effect of Grazing System on Hay Needs



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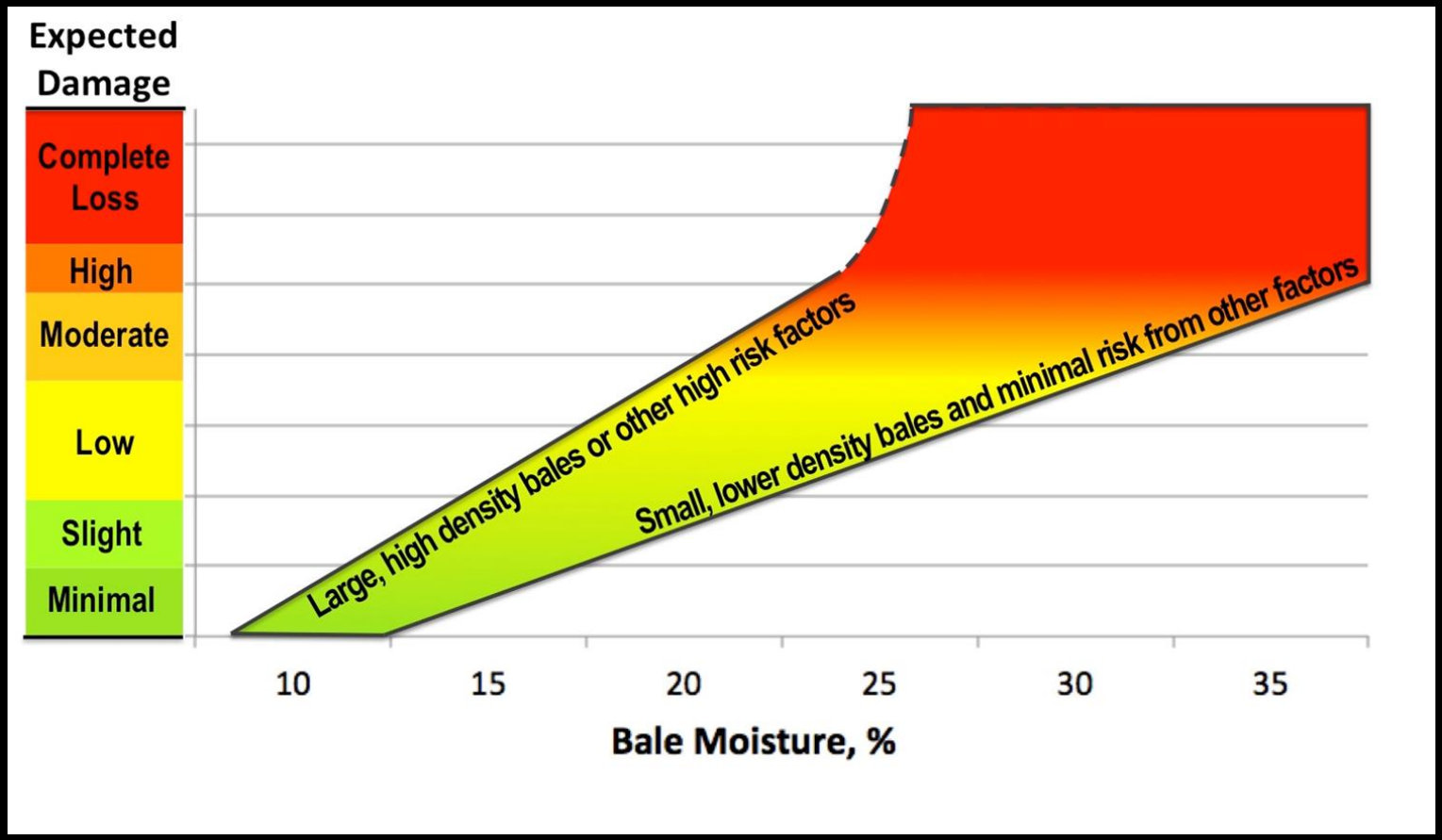
$37.54/cow savings using $100/ton hay

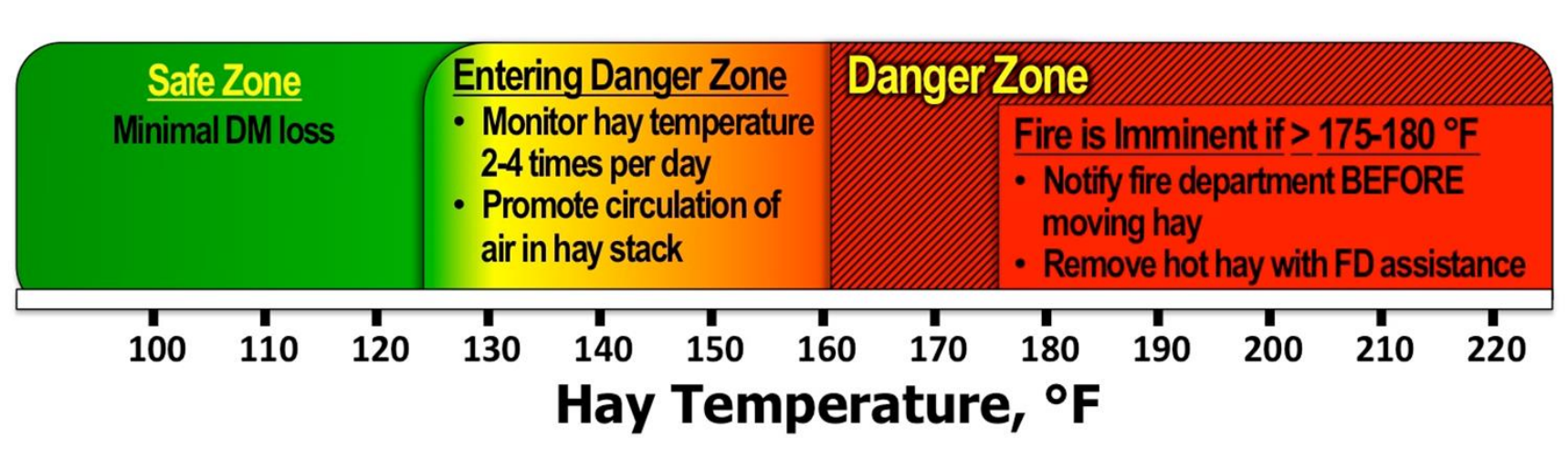
Annual Grazing

Rye + Ryegrass Conventionally Drilled: $204/ Acre

Hybrid Bermuda: $463 (does not include herbicide or insecticide application)

Summer Annuals


Expected Damage
Complete Loss
High
Moderate
Low
Slight
Minimal
Large, high density bales or other high risk factors
Small, lower density bales and minimal risk from other factors
10
15
20
25
30
35
Bale Moisture, %



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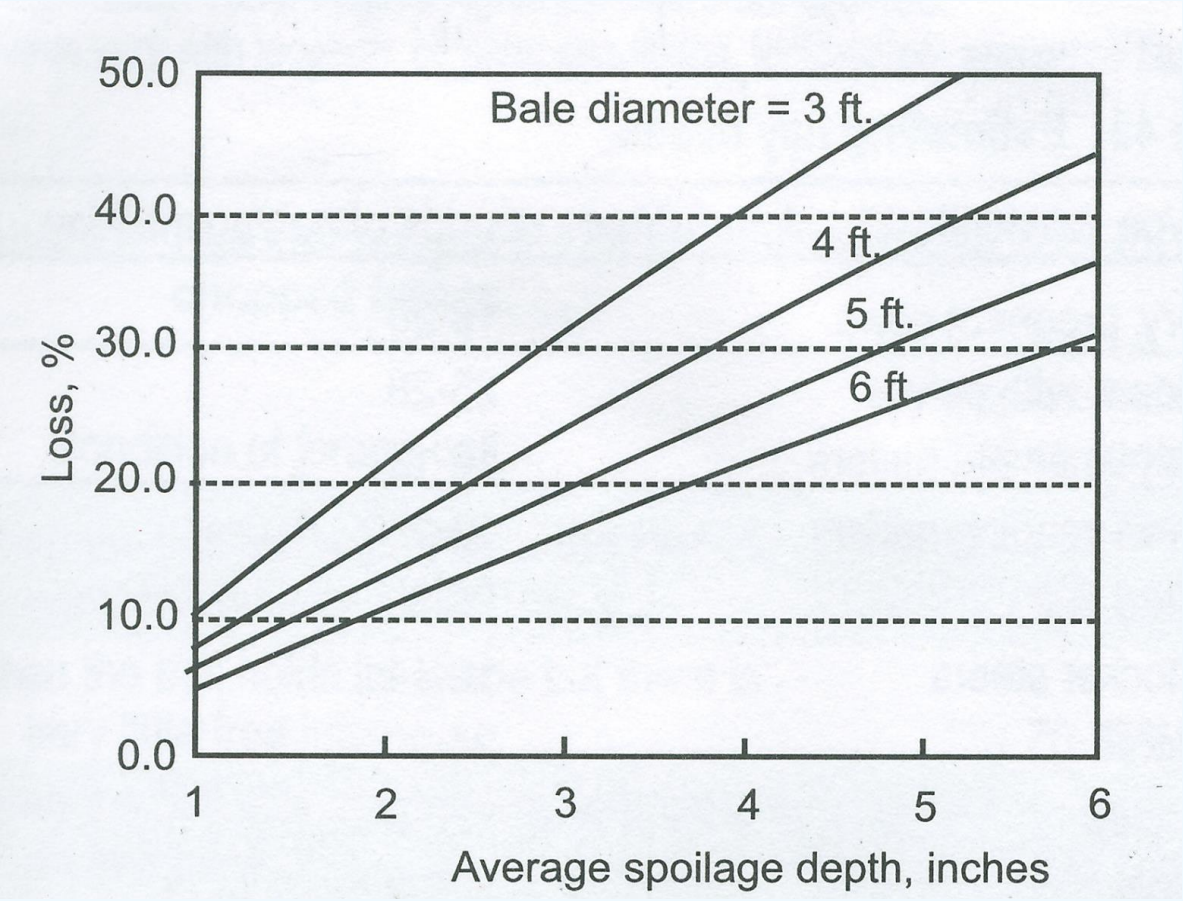
Typical Hay Storage Losses

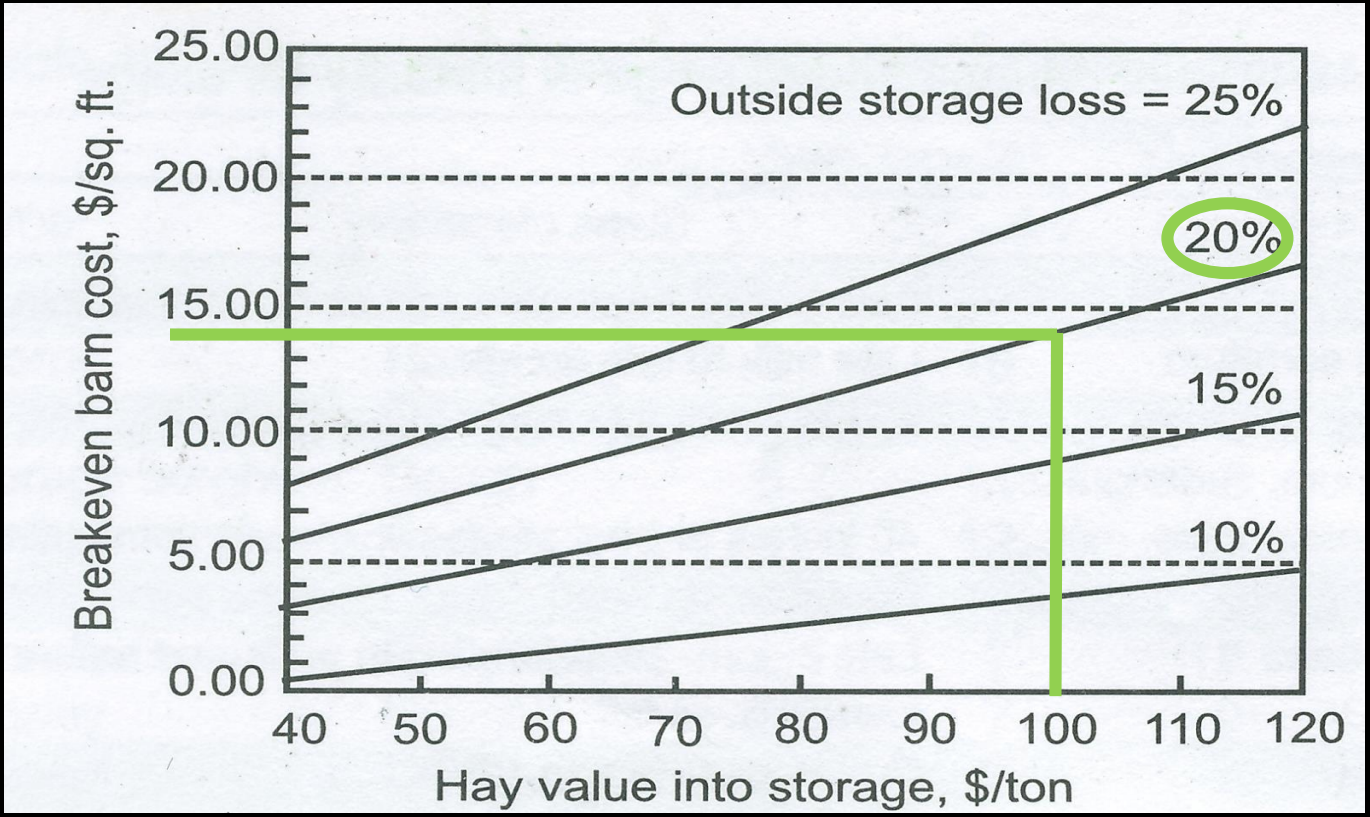
Storage Method		Twine	Net wrap
		(% of dry weight)	
Pole barn		2-5%	2-5%
Hoop structure		2-5%	2-5%
Tarp		5-10%	5-8%
Stack pad,			
	covered stack	5-10%	5-8%
	uncovered stack	15-40%	10-30%
Plastic wrap		5-10%	N/A
Outside on ground,			
	well-drained	20-40%	15-40%
	poor drainage/shaded	30-60%	30-45%

Storage Losses



Source: Forage Crop Pocket Guide

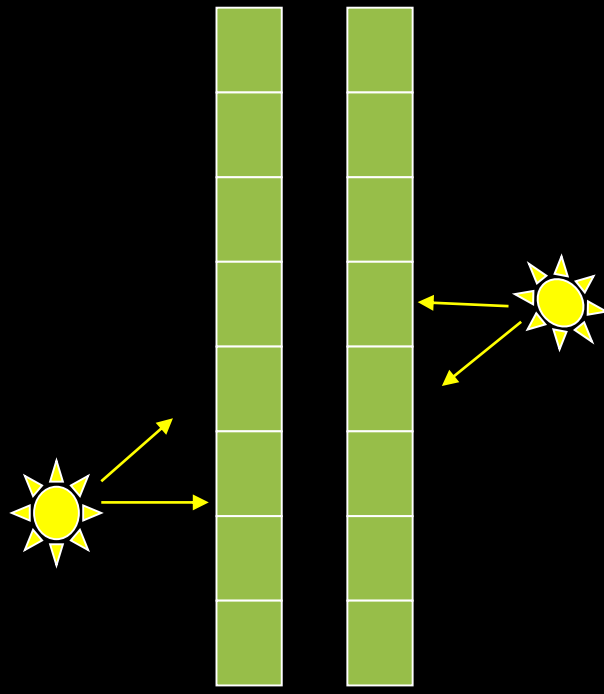
Can I afford to build a barn?



Source: Forage Crop Pocket Guide

If it has to be outside…

Orientation	Store bales with north to south orientation
Location	Don’t store under trees
Density	Make dense bales
Elevation	Elevate the bales



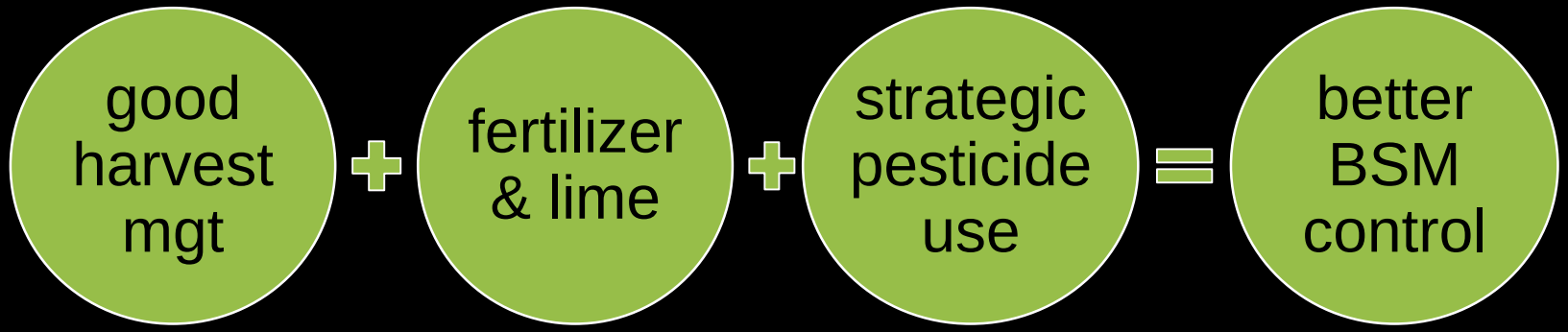
Feeding Losses

Adapted from: Southern Forages (5th ed.); Buskirk et al., 2003. J. Anim. Sci. 81:109-115; Ball et al., 1998; and Hancock, unpublished data.

Feeding Method	Feeding Period (days)	% Waste
Mechanical hay feeder/unroller	≤ 1	2 - 7%
Cone hay ring	1-3	2 - 7% (only 5.4% by day 7
Hay ring	1-3	4 - 8%
Hay trailer	1-3	10 - 15%
Hay cradle	1-3	15 - 20%
Bale, no protection	1-3	20%+
Bale, unrolled	4+	20%+ (43% by day 7)

#5 Managing Chemical Inputs

More competitive the forage = less impact from BSM



A strategic IPM and forage management plan is key!

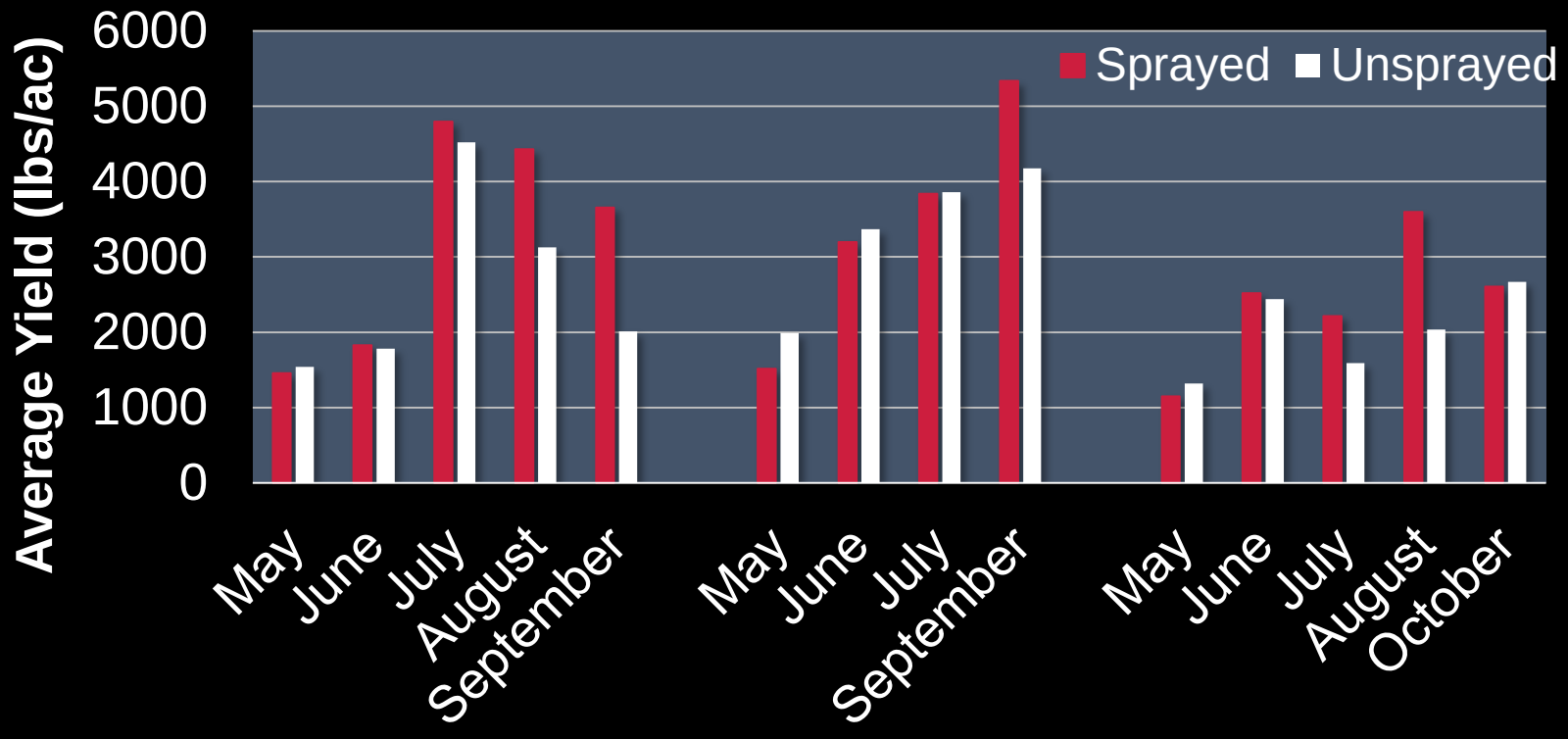
Bermudagrass Stem Maggot

- BSM may cause yield and economic losses, but unnecessary insecticide applications are more costly! How do those applications affect resistance in armyworms?
- Weekly insecticide applications would result in:

~$13,000 seasonal ***net loss*** for a 100-ac hay producer despite 15-20% yield increase in finer varieties during peak season

If left entirely unsprayed, the same producer would have still generated ~$4,000 in ***profit***

We do not have to spray at every harvest.



BSM damage is most severe in late July to mid-September!

Use the fly's behavior to your advantage!

Time	Avg. # flies from 60 swings
11:00 AM	25
2:00 PM	13
5:00 PM	14

	Sticky card ht.		
Time	8"	16"	24"
11:00 AM	3.3	1.1	0.3
2:00 PM	2.6	0.7	0.3
5:00 PM	2.1	1.2	0.5

applied with at least 12-15 gal. of water

boom height is set low

sprayed before 9:00 am

PREs are more cost effective than you think!

- Does not include application costs (assume $12-15/ac)
- Prowl H2O = 2-4 applications
- Rezilon = 1-2 applications

Herbicide options	Cost/ac
Prowl H2O (4.1 qts/ac/yr)	$76
Rezilon (3 oz/ac for crabgrass; 6 total)	$30-60

POST costs can add up!

- Does not include application costs (assume $12-15/ac)
- Mowing would use even more fuel than spraying!

Herbicide options	Cost/ac
Pastora (1.25 oz/ac)	$25
2,4 – D (up to 1 gallon/yr)	$18
GrazonNext (20 oz/ac/yr)	$14

The quickest way to save money without extra inputs can be done in these 5 steps.

Soil testing and following those recommendations

Utilizing technology and properly maintaining your equipment

Preserving your forage quality

Preventing forage losses...cut the hay...plant annuals

Managing chemical inputs without the kitchen sink

Questions?

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