



Strategies to Reduce Fertilizer Costs in Forage Systems

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*Northwest Florida Beef
Conference
February 8, 2017*

extension
AGRONOMY

IAU
AUBURN
UNIVERSITY

Alabama Cooperative Extension Forage Budget for Bahagrass Pasture

ITEM	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	YOUR FARM
1. VARIABLE COSTS					
SOIL TEST	ACRE	1.00	0.35	0.35	
FERTILIZER					
NITROGEN	LBS.	120.00	0.77	92.40	
PHOSPHATE	LBS.	40.00	0.41	16.40	
POTASH	LBS.	40.00	0.51	20.40	
HERBICIDE (PRORATED)	ACRE	0.25	9.50	2.38	
LIME (PRORATED)	TONS	0.33	37.50	12.38	
LABOR (WAGE & FRINGE)	HOUR	1.15	10.00	11.53	
LAND RENT	ACRE	1.00	20.00	20.00	
TRACTORS & EQUIPMENT	ACRE	1.00	9.33	9.33	
INTEREST ON OP. CAP.	DOL.	92.41	0.0575	5.31	
TOTAL VARIABLE COST				190.13	

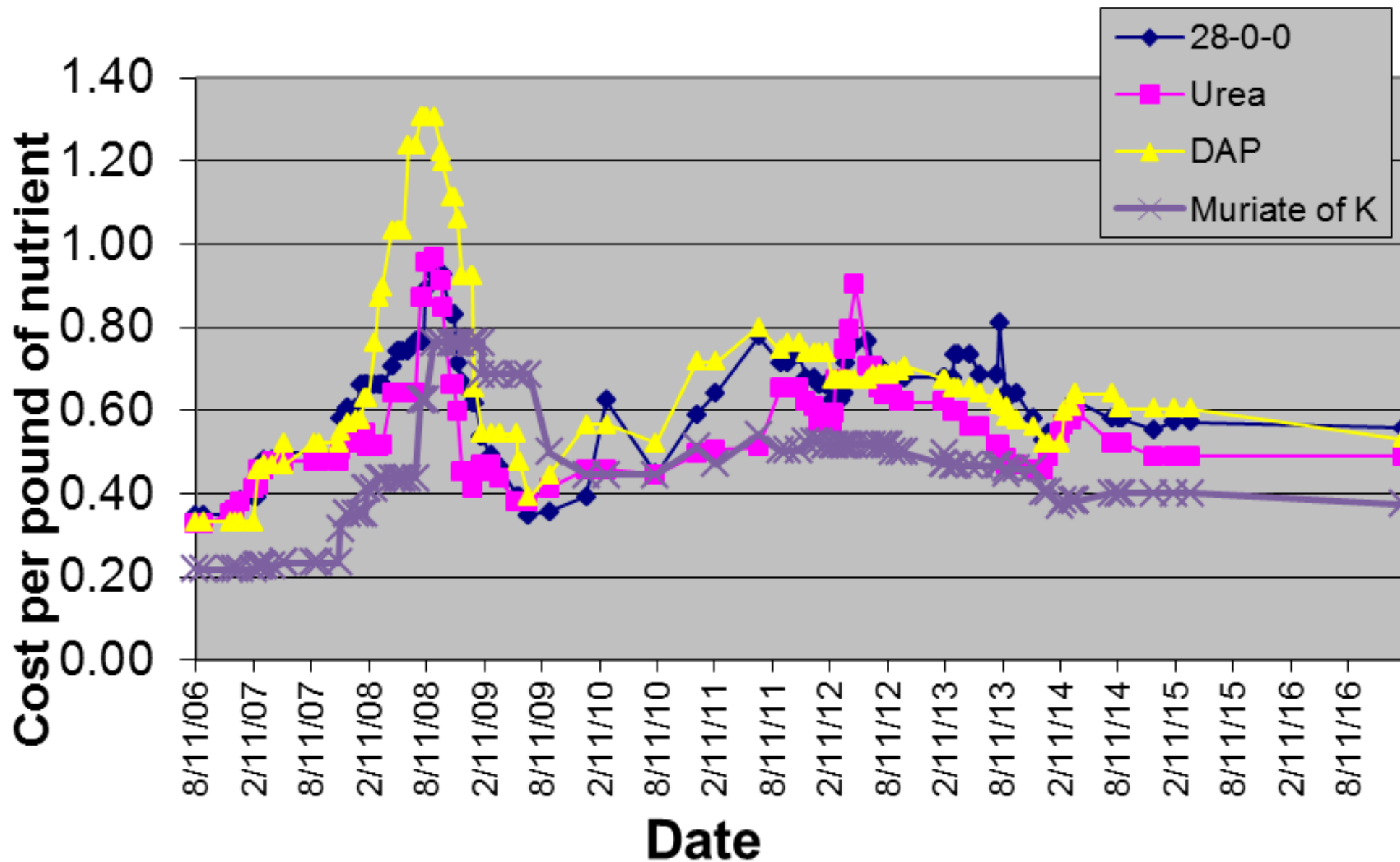
Fertilizer +
lime = 75%
of total
budget

Alabama Cooperative Extension Forage Budget for Hybrid Bermudagrass Hay

ITEM	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	YOUR FARM
1. GROSS RECEIPTS					
HAY	TONS	6.00	120.00	720.00	
2. VARIABLE COSTS					
SOIL TEST	ACRE	1.00	1.00	1.00	
FERTILIZER					
NITROGEN	LBS.	300.00	0.77	231.00	
PHOSPHATE	LBS.	50.00	0.41	20.50	
POTASH	LBS.	200.00	0.51	102.00	
HERBICIDE (PRORATED)	ACRE	0.50	12.50	6.25	
LIME (PRORATED)	TONS	0.33	37.50	12.38	
LABOR (WAGES & FRINGE)	HR	13.86	10.00	138.58	
LAND RENT	ACRE	1.00	20.00	20.00	
TRACTOR & EQUIPMENT	ACRE	1.00	72.19	72.19	
INTEREST ON OP. CAP.	DOL.	150.72	0.0575	8.67	
TOTAL VARIABLE COST				612.56	

Fertilizer +
lime = 60%
of total
budget

Fertilizer Prices



Local Retail Fertilizer Material Prices

Listed

01/30/2017

Nitrogen Sources

28-0-0 (liquid)	\$0.56
46-0-0 (urea)	\$0.50
34-0-0 (Am. Nitrate)	\$0.53
82-0-0 (anhydrous)	\$0.48

Phosphate Sources

18-46-0 (DAP)	\$0.48
10-34-0 (liquid)	\$0.58

Potash Source

0-0-60 (muriate)	\$0.38
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*Source: Profit Profiles,
ACES, 2017*

Strategies to Reduce ~~Fertilizer~~ Costs in Forage Systems

Strategies to Reduce **NUTRIENT** Costs in Forage Systems

- Soil test
- Use legumes (100+ lb. N/acre)
- Use poultry litter (60-60-40 lb. N-P₂O₄-K₂O per ton)
- Use the least expensive source of N (e.g. urea)
- Recycle nutrients

SOIL TEST



CULTIVATED FIELDS



SAMPLE TO 6 INCH DEPTH OR
DEPTH OF CULTIVATION

SOD CROPS



SAMPLE TO 2 INCH DEPTH



Laboratory

- Appropriate analyses for **your soils and crop** (in- state lab)
- accurate interpretation for **your soils and crops**

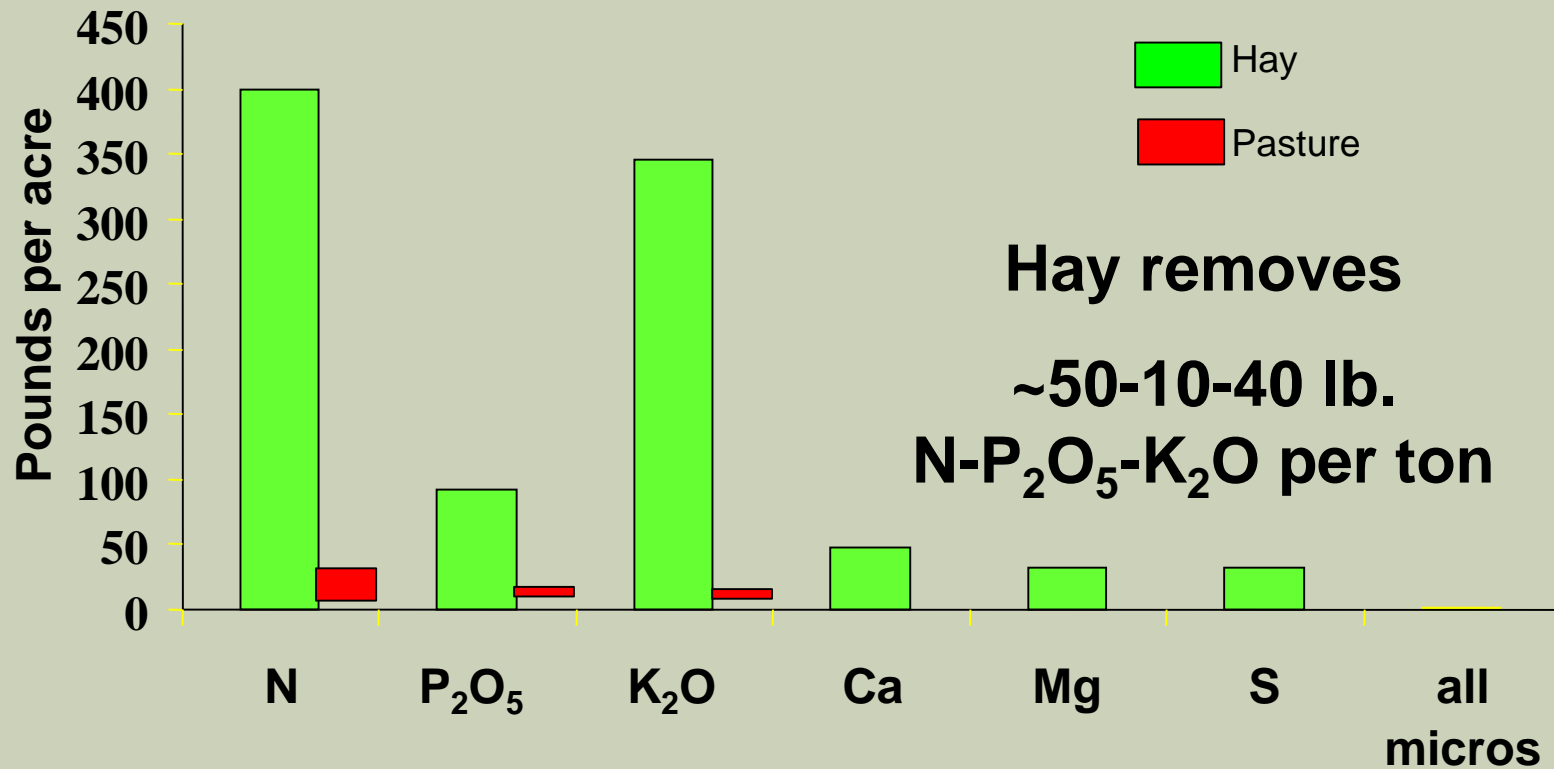


Recommendations

- Assume a high level of management
- N is most limiting for most perennial grass pastures

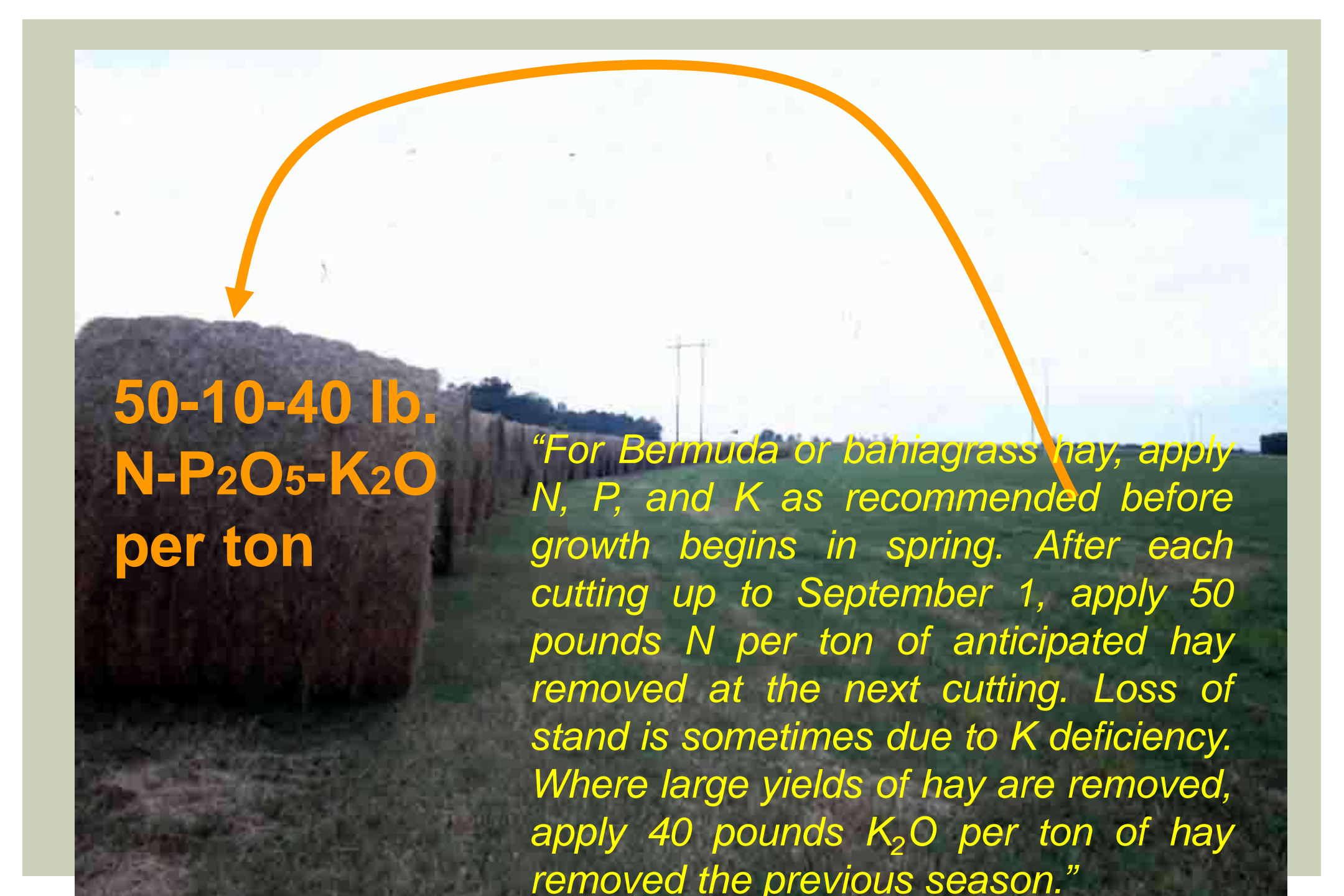
Bermudagrass

(8 tons hay/acre)





“On summer grass pastures, apply P and K as recommended and 60 pounds N before growth starts. Repeat the N application up to September 1 when more growth is desired. If less than 40 pounds N per acre is applied annually, then no P or K is needed.”



**50-10-40 lb.
N-P₂O₅-K₂O
per ton**

“For Bermuda or bahiagrass hay, apply N, P, and K as recommended before growth begins in spring. After each cutting up to September 1, apply 50 pounds N per ton of anticipated hay removed at the next cutting. Loss of stand is sometimes due to K deficiency. Where large yields of hay are removed, apply 40 pounds K₂O per ton of hay removed the previous season.”

N P K N P K
200 40 160 200 40 0



Strategies to Reduce **NUTRIENT** Costs in Forage Systems

- Soil test
- Use legumes (100+ lb. N/acre)

Soil Test Level for Persistence

Very low

Low

Medium

High

Alfalfa



Lespedeza



Birdsfoot trefoil



Red clover



White clover



Cool-season grass



Warm-season grass






“Where legume covers less than 1/3 of the ground, apply 60 pounds N per acre each time forage is grazed down or cut for hay.”

Legumes can add 50 to 150 lb. N/acre to a forage system

100 lb N x \$0.53/lb = \$53/acre in savings

Strategies to Reduce **NUTRIENT** Fertilizer Costs in Forage Systems

- Soil test
- Use legumes (100+ lb. N/acre)
- Use poultry litter



3.0-3.9-2.8

60-78-56
per ton

Value of Litter (per ton) 60-78-56

	<u>2006</u>	<u>2008</u>	<u>2017</u>
N	21	53	34
P₂O₅	25	100	37
K₂O	12	38	28
TOTAL	\$ 58	\$191	\$ 99

As of 01/30/2017

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Inputs

- * fertilizer
- * manure
- * legumes (N)
- * hay & feed

Nutrient Cycle

Exports

- * calves
- * beef

Kentucky Study



25, 700-pound heifers



15-acre pasture (1.7 stocking rate)



14-day grazing period



8.5% of land covered by manure piles

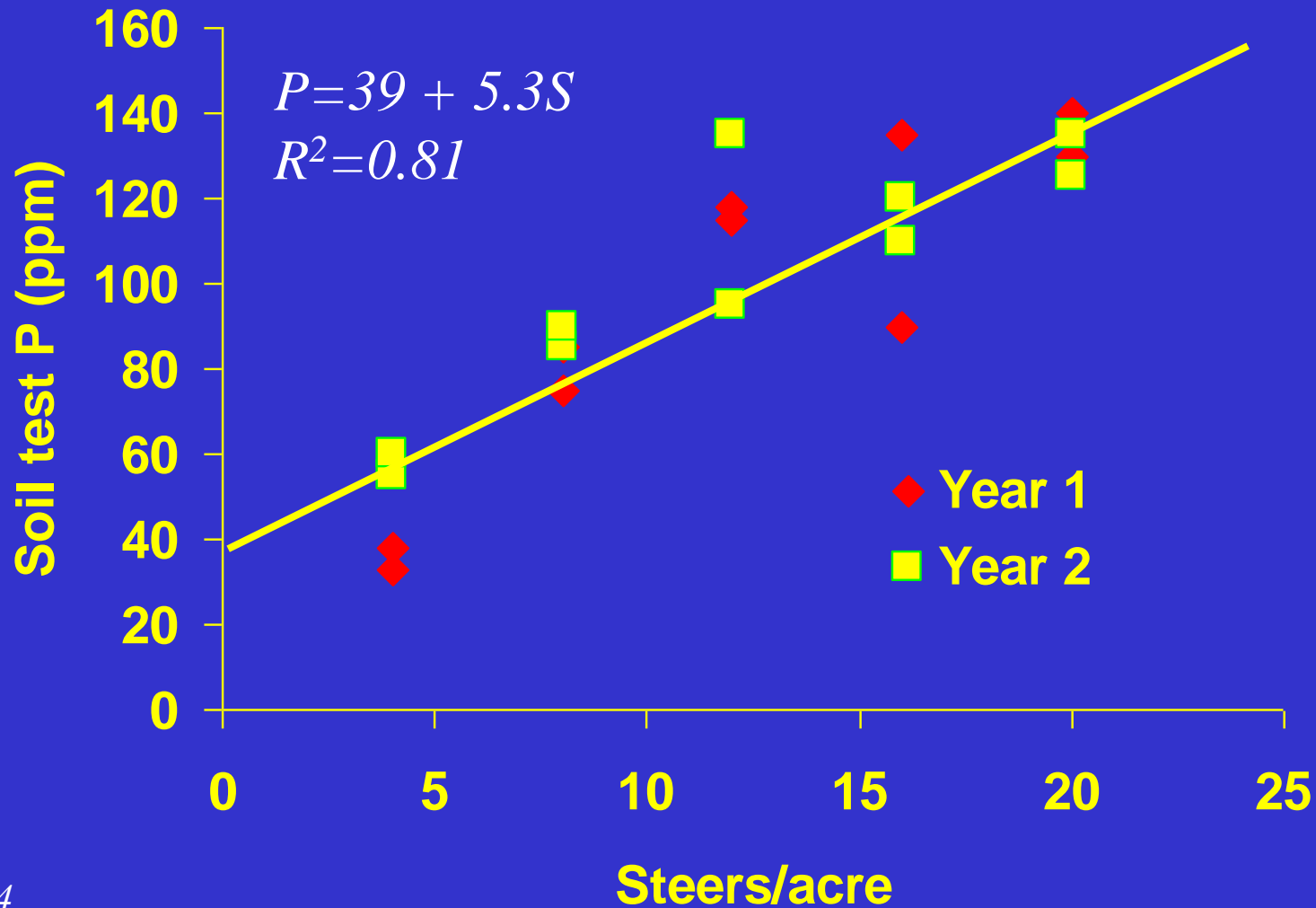


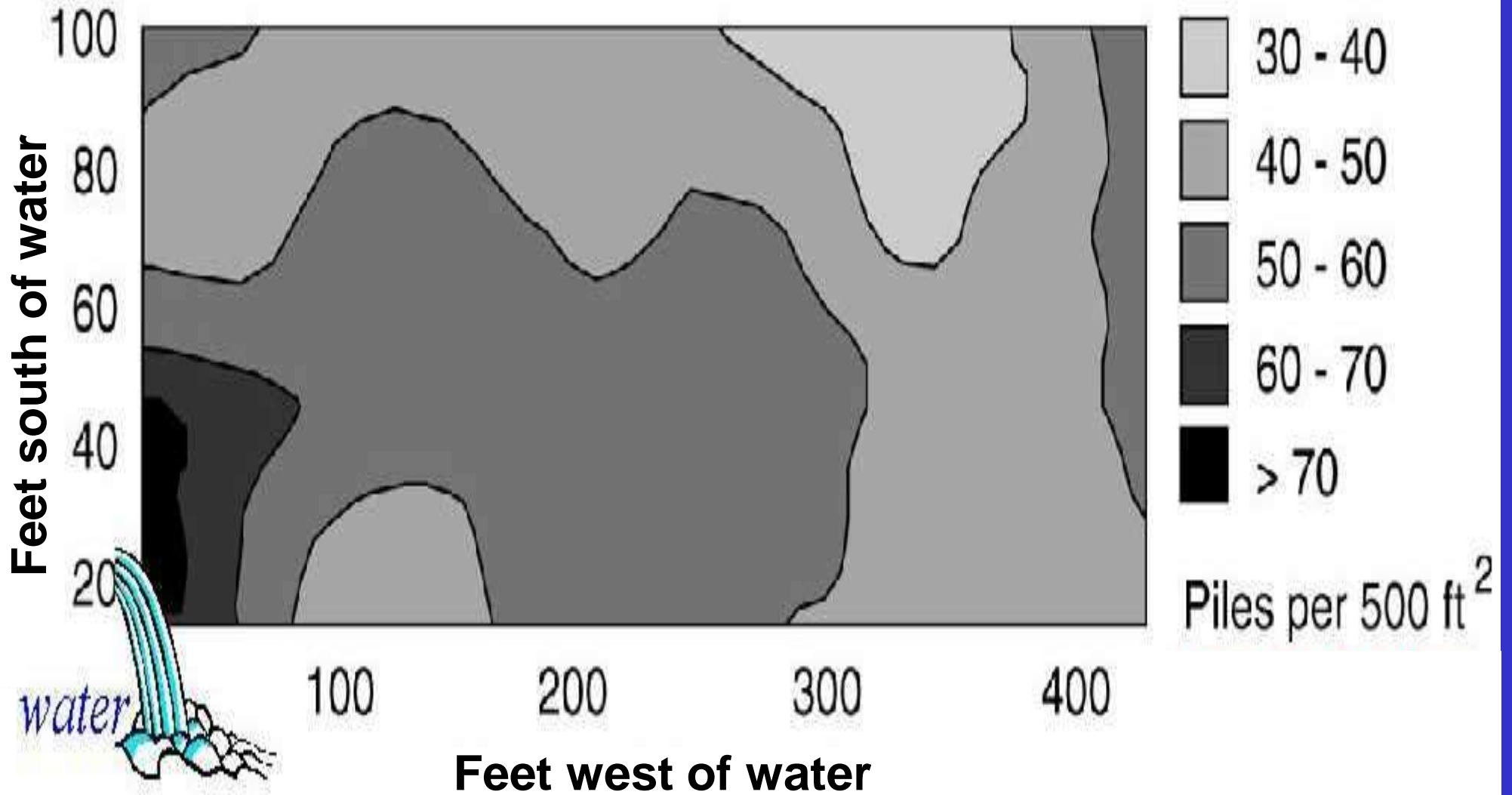
320-240-210 lb./a N-P₂O₅-K₂O



27-20-18 lb./a over the entire 15 acres

Stocking rate effect of steers fed broiler litter and grain on soil test phosphorus levels of a bermudagrass pasture in a Dothan s.l.







Manure Distribution in Pastures

Years to get 1 manure pile per square yard

Rotation frequency

Continuous

27

14-day

8

4-day

4-5

2-day

2



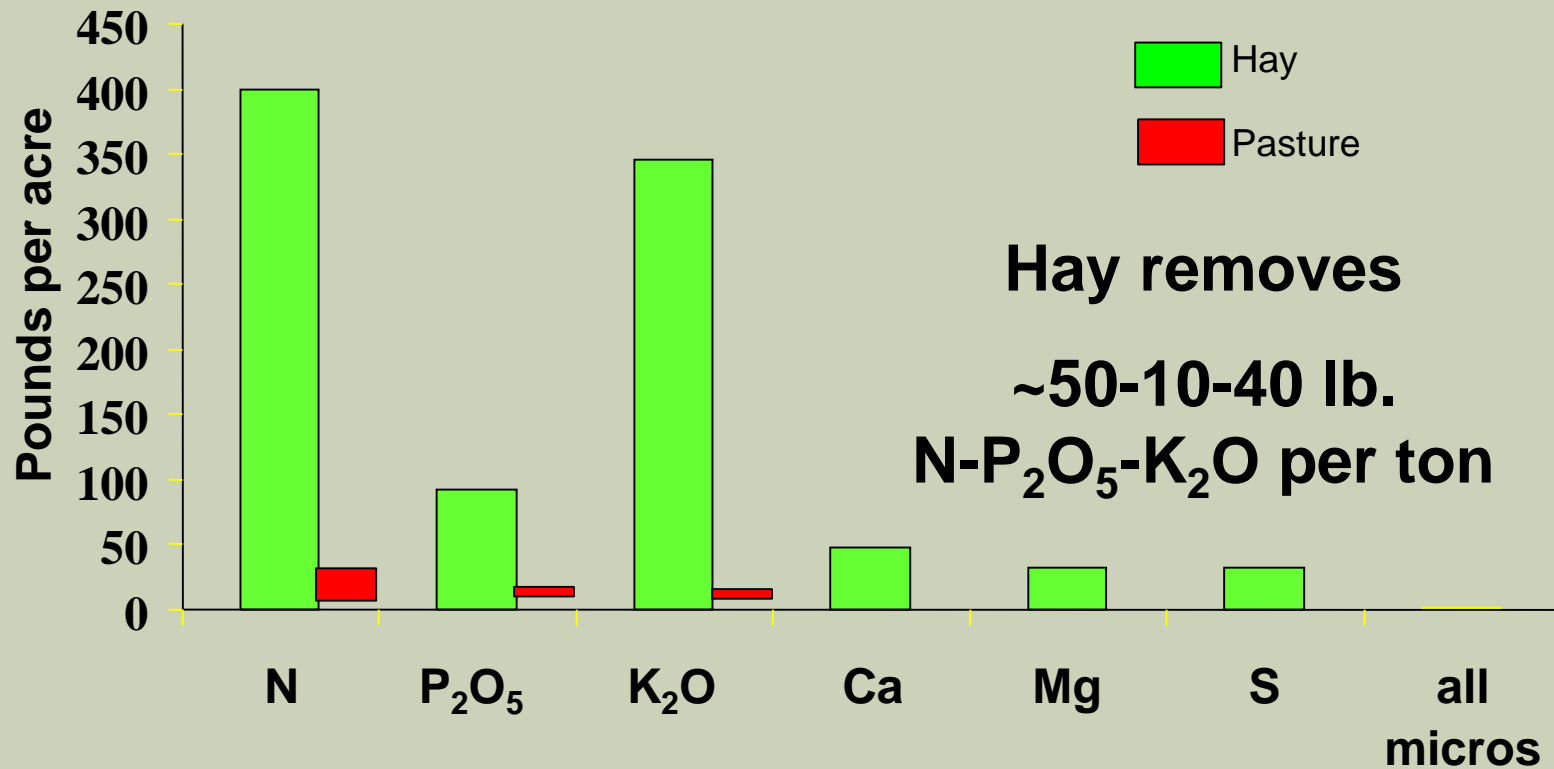
Exports


* calves

* beef

Bermudagrass

(8 tons hay/acre)



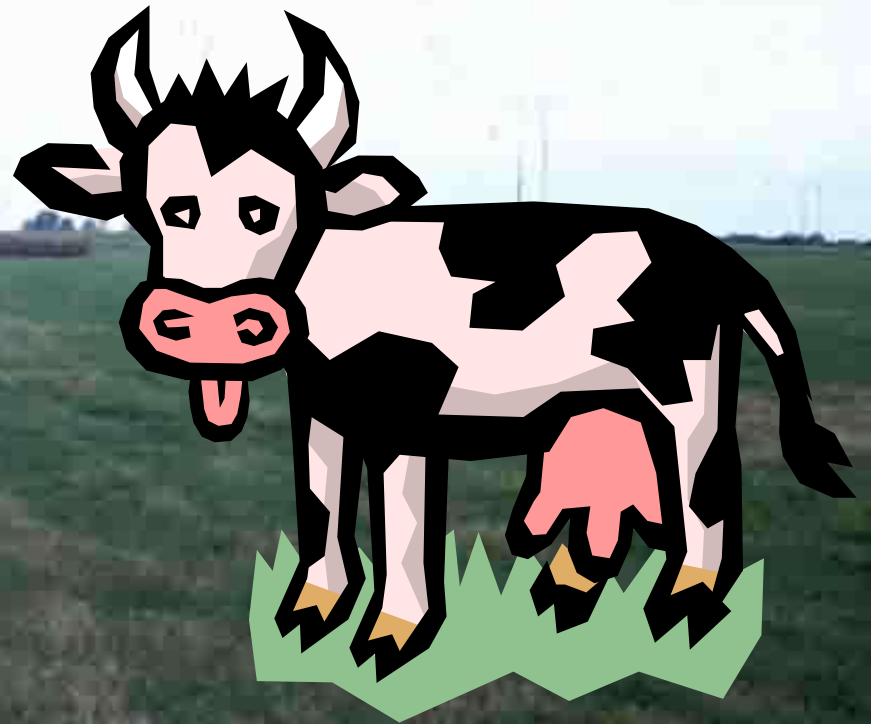


**50-10-40 lb.
N-P₂O₅-K₂O
per ton**

Exports

Inputs

- * fertilizer
- * manure
- * legumes (N)
- * feed







Strategies to Reduce Nutrient Costs in Forage Systems



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- **Use the least expensive source of N**
- **Recycle nutrients**