Economics of Forage Legumes vs. N Fertilization

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Do Legumes have to be profitable?

What do you think the limitation is of your Cattle Production System?

- **Animal Nutrition**
- **Forage/Feed Quality**

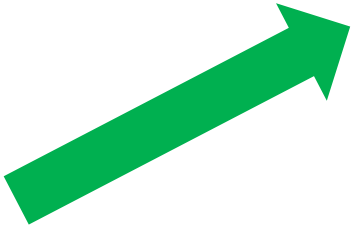
Every year that we do not plant Legumes in our pastures are we missing an opportunity?

What Impact should legumes have on the PROFIT EQUATION?

Revenue – Cost = PROFIT

Animal Performance (ADG, BCS, Grade)

Nitrogen Fixation
Soil Fertility
Nutrient Cycling
Species Diversity
Forage Growth
Distribution



$ MONEY $

Stocker Cattle

Performance and Calculated Pasture Costs

Stocker Cattle

Performance and Calculated Pasture Costs

- Provides a comparison of stocker cattle performance from several steer grazing experiments conducted in Alabama.
- Also provides pasture cost/acre and pasture cost/pound of gain information
  - Forage Cost of Gain (*FCOG*)

37 Forage Alternatives

- 14 Treatments included Legumes, 23 Treatments did not include Legumes
- Lowest Seven Total Pasture Costs/lb. of Gain involved **Legumes** out of 37 treatments.
- Eight of the Ten Lowest Total Pasture Costs/lb. of Gain involved **Legumes**

Table 2. Ten Lowest Calculated Pasture Costs/lb. of Gain

Pasture type	Line or variety	Grazing days	Grazing dates	ADG	Pasture cost/Ac	Pasture cost/lb.
tall Fescue w/ladino	‘Ky 31’/ ‘regal’	205	10/15–1/15 & 3/15–7/19	1.53	$172.26	$0.30
orchardgrass w/ladino	‘Hallmark’/ ‘regal’	238	9/5–12/5 & 3/15–7/20	1.62	$172.08	$0.30
tall Fescue w/birdsfoot	‘Ky 31’/ ‘Fergus’	194	10/15–1/15 & 3/15–7/20	1.51	$173.28	$0.44
bermudagrass w/vetch	‘Coastal’/ Hairy	161	4/4–9/27	1.29	$230.75	$0.47
sericea lespedeza	‘Au lotan’	139	4/22–9/8	1.87	$148.84	$0.49
sericea lespedeza	‘Au lotan’	139	4/22–9/8	1.65	$148.84	$0.54
sericea lespedeza	‘serala’	139	4/22–9/8	1.39	$148.84	$0.60
rye & ryegrass	ns*	153	10/24–5/15	1.36	$318.34	$0.60
bermudagrass w/rye	‘Coastal’/ ‘explorer’	161	3/19–9/27	1.30	$328.35	$0.62
rye, oats & Crim. Clover	ns*	121	10/18–5/2	1.37	$352.78	$0.65

*ns = none stated

Takeaways

- Coastal bermudagrass overseeded with hairy vetch was a significantly lower-cost treatment than any of the other warm-season perennial grass treatments, which suggests that overseeding a legume **can be a cost effective practice.**

Table 1. Production and Economic Performance Data for Stocker Steers Using Various Forage Types and Varieties[a]

Description	Item no.	Pasture	Line or variety	Calendar days grazing	Average grazing dates	Years of data	Location[b]
Warm-Season Perennial Grasses (WSPG)	1	Bermudagrass	Coastal	168	NS[g]	4	WG
	2	Bermudagrass	Coastal	168	NS	4	WG
	3	Bermudagrass	Coastal	168	NS	4	WG
	4	Bermudagrass	Coastal	168	NS	4	WG
	5	Bahiagrass	Pensacola	168	NS	3	WG
	6	Bahiagrass	Pensacola	168	NS	3	WG
	7	Bahiagrass	Pensacola	168	NS	3	WG
	8	Bermudagrass	Common	168	NS	3	WG
	9	Bermudagrass	Common	168	NS	3	WG
	10	Bermudagrass	Common	168	NS	3	WG
WSPG W/Winter Annuals	11	Bermudagrass w/vetch Bermudagrass w/rye	Coastal/Hairy	161	4/4 –9/27	8	TVS
	12		Coastal/Explorer	161	3/19–9/27	8	TVS

Takeaways

- Cool-season perennial grasses overseeded with clovers have significantly lower-cost and higher performance than any of the other cool-season perennial grass treatments, which suggests that overseeding a legume **can be a cost effective practice.**

Table 1. Production and economic Performance data for stocker steers using various Forage types and varieties

Cool-Season Perennial Grasses	18	Tall Fescue[i]	AU Triumph (0%)	161	10/5–12/26 & 2/28–5/27	3	BB
	19	Tall Fescue	KY 31 (1%)	161	10/5–12/26 & 2/28–5/27	3	BB
	20	Tall Fescue	KY 31 (34%)	161	10/5–12/26 & 2/28–5/27	3	BB
	21	Tall Fescue	KY 31 (90%)	161	10/5–12/26 & 2/28–5/27	3	BB
	22	Tall Fescue	KY 31(<5%)	172	10/23–12/24 & 2/26–6/16	4	BB
	23	Tall Fescue	KY 31 (94%)	172	10/23–12/24 & 2/26–6/16	4	BB
	24	Tall Fescue	KY 31 (>90%)	150	3/18–7/9 & 9/25–11/22	8	TVS
	25	Orchardgrass	Common	139	3/23–7/9 & 9/25–11/11	8	TVS
	26	Tall Fescue	KY 31 (0%)	177	10/17–12/26 & 3/7–5/19	3	BB
	27	Hardinggrass	AP-2	177	10/17–12/26 & 3/7–6/19	3	BB
	28	Tall Fescue	KY 31 (>90%)	206	10/15–1/15 & 3/15–7/19	2	SM
Cool-Season Perennial Grasses w/ Legumes	29	Orchardgrass w/Ladino	Hallmark/Regal	238	9/5–12/5 & 4/1–8/27	2	TVS
	30	Tall Fescue W/Ladino	KY 31/Regal	143	3/18–7/9 & 9/25–11/15	8	TVS
	31	Orchardgrass w/Ladino	Common/Regal	143	3/23–7/9 & 9/25–11/15	8	TVS
	32	Tall Fescue w/Ladino	KY 31/Regal	205	10/15–1/15 & 3/15–7/19	2	SM
	33	Tall Fescue w/Birdsfoot	KY 31/Fergus	194	10/15–1/15 & 3/15–7/19	2	SM

Takeaways

- Improved forage quality and reduction of the amount of fertilizer nitrogen used were factors in substantially lowering total pasture cost/lb. of gain.

- Basically, including legumes in these pasture treatments **increased animal performance by providing higher quality pasture** and/or who are **able to lower fertilizer inputs.**

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Florida Forage Systems

Tillage and Overseeding Pastures for Winter Forage Production in North Florida

- D. L. Wright, A. R. Blount, and S. George

Table 3. Total seasonal production of bahiagrass alone and with three overseeded legumes.

N Rate lbs/A	No Clover	Arrowleaf Clover	Crimson Clover	Subterranean Clover
	lbs/A Dry Matter			
0	1950	8620	7330	5340
50	3730	9410	8340	6640
100	4620	10530	10450	8030
200	8360	12480	13780	11380
400	12010	16320	16110	14420

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The Cost of Planting Forage Legumes?

Table 28. Red Clover, No-Till Drill

Grazing on Existing Pastureland **North Florida, 2014-2015**

Estimated Annual Costs Per Acre **Updated: 10/17/2014**

Item	Description	Unit	Quantity	*$/Unit*	*$/Acre*
Variable Costs/Acre					
Soil Test	(1 sample per 10 acres)	Acre	0.10	$7.00	$0.70
Seed	Red Clover	Lbs.	15.00	$2.70	$40.50
Fertilizer	Nitrgoen (N)	Lbs.	0.00	$0.70	$0.00
	Phosphorus (P_2O_5)	Lbs.	60.00	$0.32	$19.20
	Potassium (K_2O)	Lbs.	120.00	$0.41	$49.20
Custom Fertilizer Spread	Fertilizer Application	Acre	1.00	$10.00	$10.00
Lime	(Prorated over 3 years)	Tons	1.00	$35.00	$11.67
Custom Lime Spread	(Prorated over 3 years)	Acre	1.00	$10.00	$3.33
Weed Control	Chemicals	Acre	1.00	$5.00	$5.00
Mach. & Equip.	Maint., Fuel, Oil, Lube, Labor	Acre	1.00	$12.71	$12.71
Labor	(Wages & Fringe)	Hours	0.75	$12.50	$9.38
Forage Tests	(1 sample per 10 acres)	Acre	0.10	$7.00	$0.70
Misc. Expenses		Acre	1.00	$15.00	$15.00
Operating Interest		Dollars	$177.39	5.75%	$10.20
Total Variable Costs/Acre					**$187.58**
Fixed Costs/Acre					
Mach. & Equip.		Acre	1.00	$5.65	$5.65
General Overhead		Dollars	$187.58	8%	$15.01
Land Rent		Acre	1.00	$10.00	$10.00
Total Fixed Costs/Acre					**$30.66**
Total Grazing Costs/Acre					**$218.24**

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Table 16. Alflafa, No-Till Drill

Grazing on Existing Pastureland **North Florida, 2014-2015**

Estimated Annual Costs Per Acre **Updated: 10/17/2014**

Item	Description	Unit	Quantity	*$/Unit*	*$/Acre*
Variable Costs/Acre					
Soil Test	(1 sample per 10 acres)	Acre	0.10	$7.00	$0.70
Seed	Alflafa	Lbs.	20.00	$4.00	$80.00
Fertilizer	Nitrgoen (N)	Lbs.	0.00	$0.70	$0.00
	Phosphorus (P_2O_5)	Lbs.	80.00	$0.32	$25.60
	Potassium (K_2O)	Lbs.	120.00	$0.41	$49.20
Custom Fertilizer Spread	Fertilizer Application	Acre	1.00	$10.00	$10.00
Lime	(Prorated over 3 years)	Tons	2.00	$35.00	$23.33
Custom Lime Spread	(Prorated over 3 years)	Acre	1.00	$10.00	$6.67
Weed Control	Chemicals	Acre	1.00	$5.00	$5.00
Mach. & Equip.	Maint., Fuel, Oil, Lube, Labor	Acre	1.00	$12.71	$12.71
Labor	(Wages & Fringe)	Hours	0.75	$12.50	$9.38
Forage Tests	(1 sample per 10 acres)	Acre	0.10	$7.00	$0.70
Misc. Expenses		Acre	1.00	$15.00	$15.00
Operating Interest		Dollars	$238.29	5.75%	$13.70
Total Variable Costs/Acre					**$251.99**
Fixed Costs/Acre					
Mach. & Equip.		Acre	1.00	$5.65	$5.65
General Overhead		Dollars	$251.99	8%	$20.16
Land Rent		Acre	1.00	$10.00	$10.00
Total Fixed Costs/Acre					**$35.81**
Total Grazing Costs/Acre					**$287.80**

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Table 30. White Clover, No-Till Drill

Grazing on Existing Pastureland **North Florida, 2014-2015**

Estimated Annual Costs Per Acre **Updated: 10/17/2014**

Item	Description	Unit	Quantity	*$/Unit*	*$/Acre*
Variable Costs/Acre					
Soil Test	(1 sample per 10 acres)	Acre	0.10	$7.00	$0.70
Seed	White Clover	Lbs.	4.00	$5.60	$22.40
Fertilizer	Nitrgoen (N)	Lbs.	0.00	$0.70	$0.00
	Phosphorus (P_2O_5)	Lbs.	60.00	$0.32	$19.20
	Potassium (K_2O)	Lbs.	120.00	$0.41	$49.20
Custom Fertilizer Spread	Fertilizer Application	Acre	1.00	$10.00	$10.00
Lime	(Prorated over 3 years)	Tons	1.00	$35.00	$11.67
Custom Lime Spread	(Prorated over 3 years)	Acre	1.00	$10.00	$3.33
Weed Control	Chemicals	Acre	1.00	$5.00	$5.00
Mach. & Equip.	Maint., Fuel, Oil, Lube, Labor	Acre	1.00	$12.71	$12.71
Labor	(Wages & Fringe)	Hours	0.75	$12.50	$9.38
Forage Tests	(1 sample per 10 acres)	Acre	0.10	$7.00	$0.70
Misc. Expenses		Acre	1.00	$15.00	$15.00
Operating Interest		Dollars	$159.29	5.75%	$9.16
Total Variable Costs/Acre					**$168.44**
Fixed Costs/Acre					
Mach. & Equip.		Acre	1.00	$5.65	$5.65
General Overhead		Dollars	$168.44	8%	$13.48
Land Rent		Acre	1.00	$10.00	$10.00
Total Fixed Costs/Acre					**$29.13**
Total Grazing Costs/Acre					**$197.57**

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Table 28. Red Clover, No-Till Drill
Grazing on Existing Pastureland — **North Florida, 2014-2015**
Estimated Annual Costs Per Acre — **Updated: 10/17/2014**

Item	Description	Unit	Quantity	*$/Unit*	*$/Acre*
Variable Costs/Acre					
Soil Test	(1 sample per 10 acres)	Acre	0.10	$7.00	$0.70
Seed	Red Clover	Lbs.	15.00	$2.70	$40.50
F					0
					0
					0
C					0
L					7
C					3
V					0
M					1
L					8
F					0
M					0
C					0
Total Variable Costs/Acre					**$187.58**
Fixed Costs/Acre					
Mach. & Equip.		Acre	1.00	$5.65	$5.65
General Overhead		Dollars	$187.58	8%	$15.01
Land Rent		Acre	1.00	$10.00	$10.00
Total Fixed Costs/Acre					**$30.66**
Total Grazing Costs/Acre					**$218.24**

We can interseed Clovers into Warm-Season and Cool-Season Perennial Grass Pastures for ~$50-$70/acre

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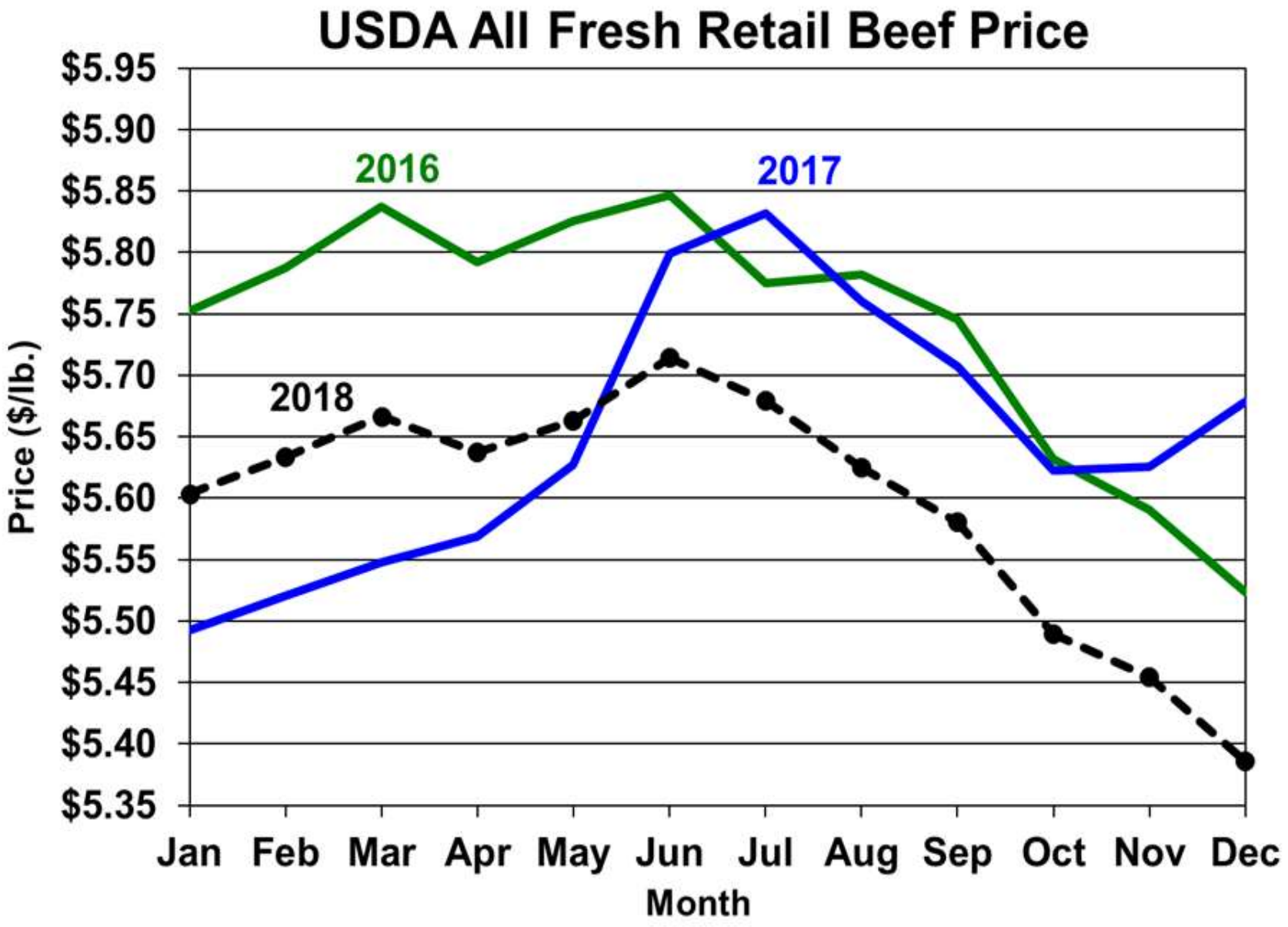
USDA All Fresh Retail Beef Price
$5.95
$5.90
$5.85
$5.80
$5.75
$5.70
$5.65
$5.60
$5.55
$5.50
$5.45
$5.40
$5.35
Price ($/lb.)
2016
2017
2018
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

Which Legumes should I plant?

1) Recommended Varieties List from Extension Specialist and Researchers

2) Other Successful Ranchers in your Area

3) There's this saying that goes like…
   "Unless you test, it's just a guess"

   20 x 20 plot, a couple acres, maybe even a few pastures

   - These experiences will lead to successes and failures