

UF | IFAS Extension
UNIVERSITY *of* FLORIDA

Nutritional Benefits of Forage Legumes in Livestock Systems

Kalyn Waters – UF/IFAS Extension Holmes County

Grazing Systems



Harvested/ Supplement

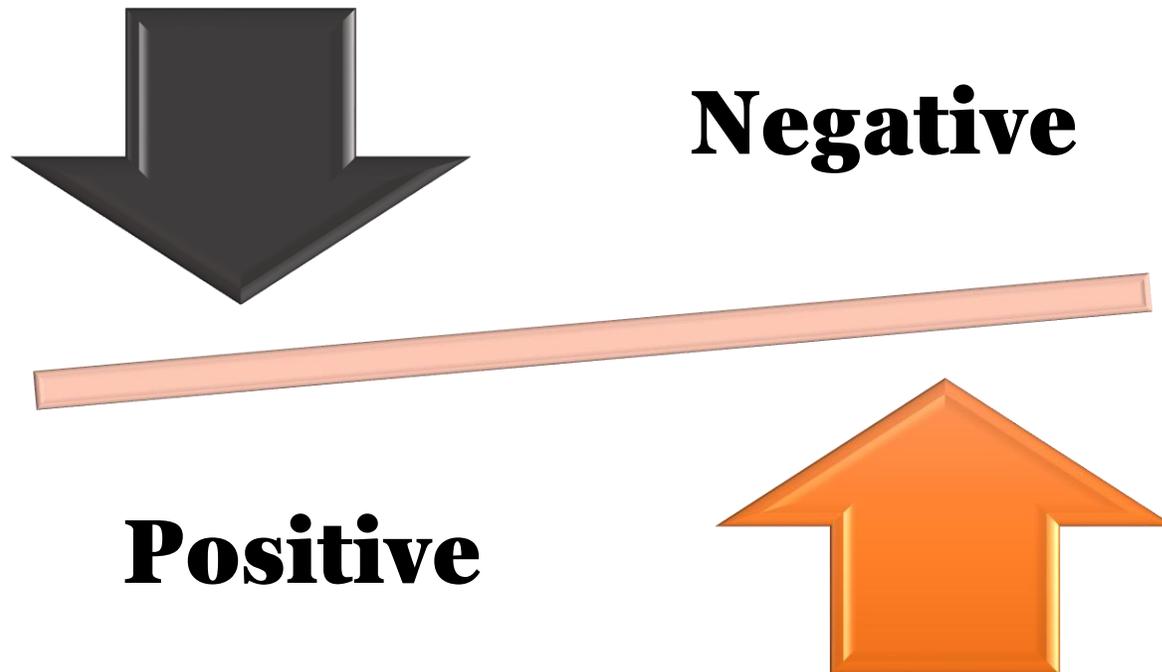


**All Feedstuffs are NOT
Created Equal**



Associative effects between forages on feed intake and digestion in ruminants

V. Niderkorn- and R. Baumont



Forage Digestion

- Higher pH
- Cellulolytic population thrives
- Increased plant matter digestion



Concentrate Digestion

- Easily fermentable carbohydrates
- Lower ruminal pH
- Decreased cellulolytic activity

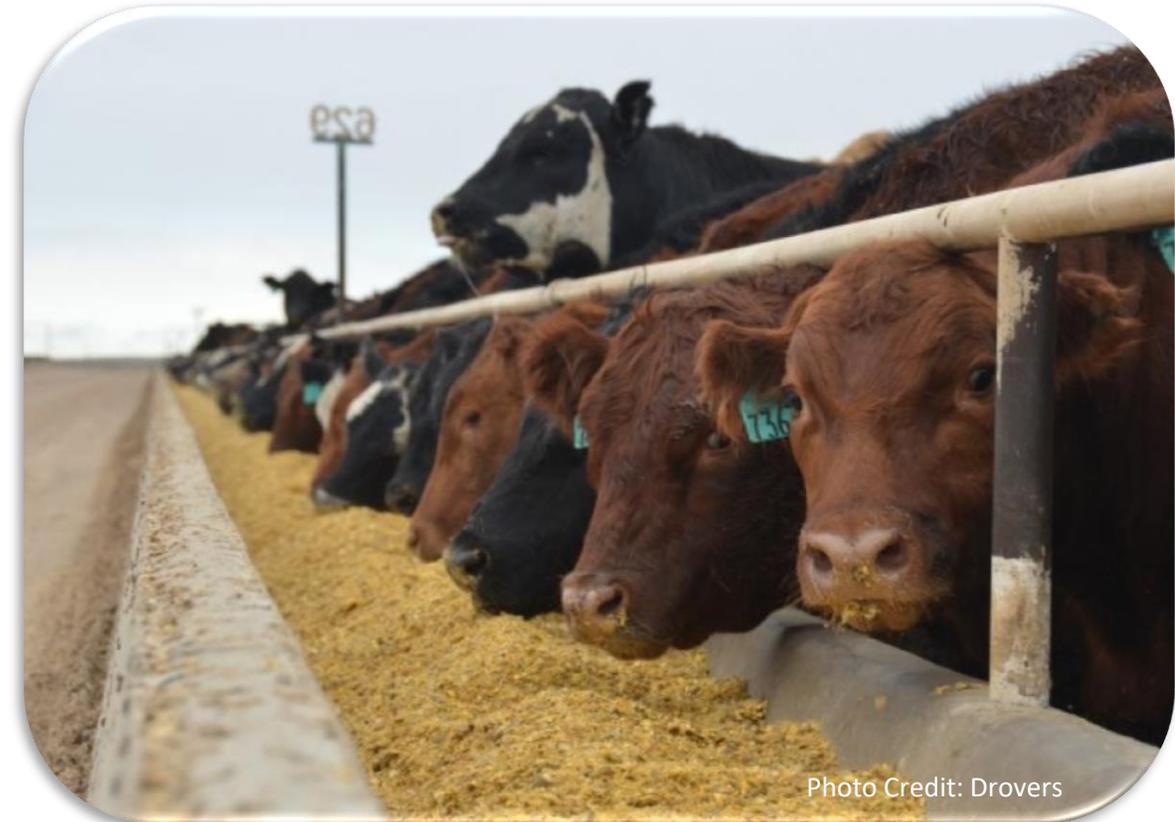


Photo Credit: Drovers

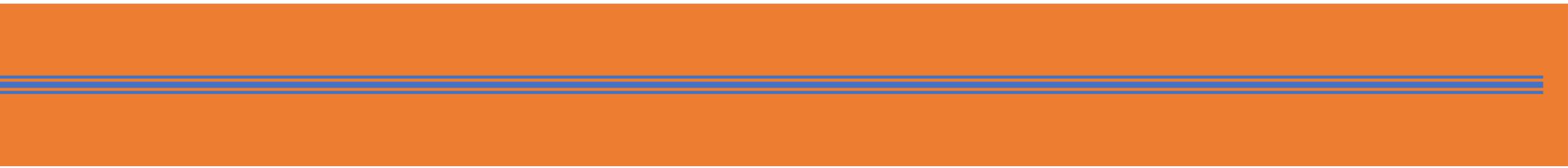
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- Saw an increase in DMI with Legume inclusion
 - Saw increase in animal performance (milk, ADG)
 - Associative Effects between low-quality forages and legumes
 - Supplementations with legumes increase feed-value of poor forage
 - Provides rumen microbes needed N (ammonia) to thrive
 - Increased rate of passage = Increased DMI

Table: Daily TDN and protein requirements for heifers.

Weight	Daily Gain	Dry Matter Intake	TDN		Crude Protein	
			Lbs	%	Lbs	%
500	1.0	12.2	7.2	59%	1.19	9.8%
500	1.5	12.6	8.1	64%	1.41	11.2%
500	2.0	12.7	8.8	69%	1.63	12.8%
700	1.0	15.8	9.3	59%	1.42	9.0%
700	1.5	16.2	10.4	64%	1.64	10.1%
700	2.0	16.3	11.2	69%	1.85	11.4%

* Nutrient Requirements for Beef Cattle, NRC 1984

Effects of feeding perennial peanut hay on growth, development, attainment of puberty, and fertility in beef replacement heifers.

K.M. Waters, T.E. Black, V.R.G. Mercadante, G. H.L Marquezini, N. DiLorenzo, R.O. Myers, A.T. Adesogan and G.C. Lamb.

Phase 1: Devolvement Phase (D0- 140) with targeted gain of 1 to 1.5 lbs/day

Phase 2: Breeding Phase (D 141- 224)

Treatments- Similar caloric intakes

PPH – Perennial Peanut Hay (6 lbs/hd)

CSBM – 80% Corn & 20% Soybean Meal (44%CP)

CON- No supplement

*All cattle received free-choice access to quality bermudagrass hay (BGH)



Corn Gluten
& Soybean
Meal



Perennial
Peanut Hay



No
Supplement



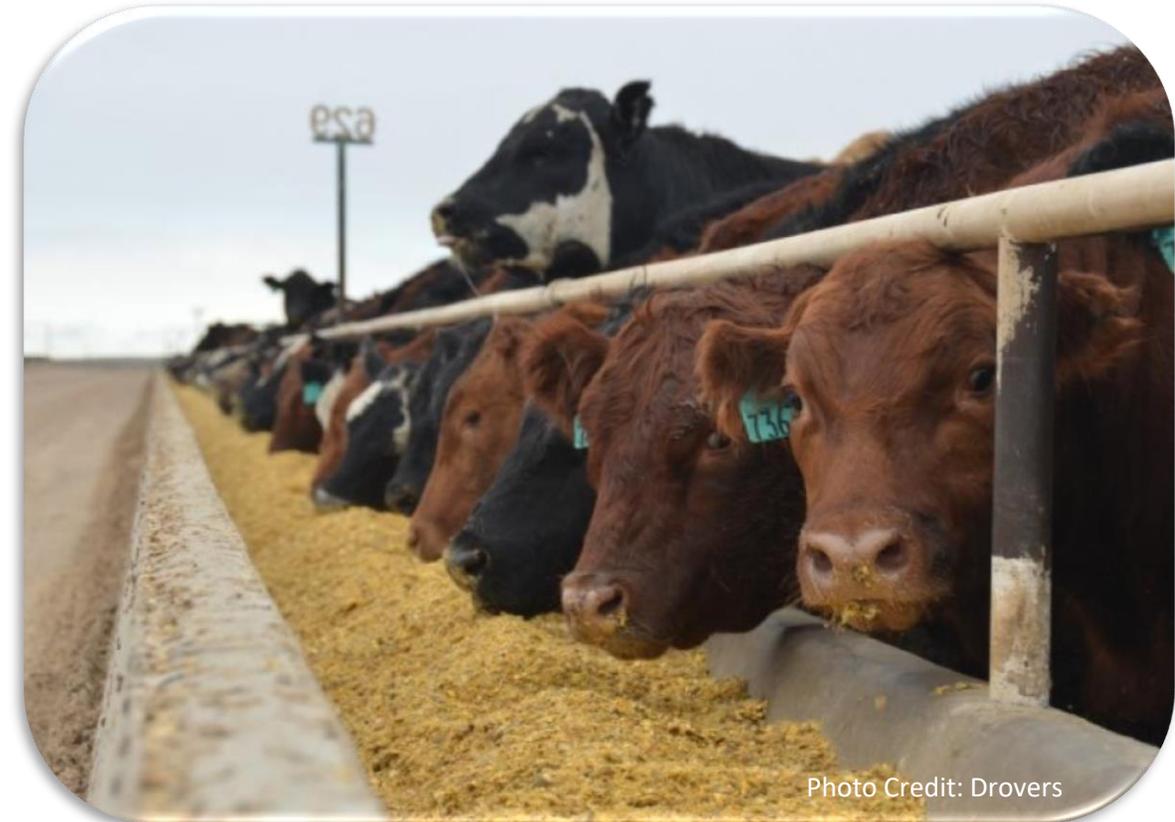
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Performance data of heifers developed on three different nutritional programs.

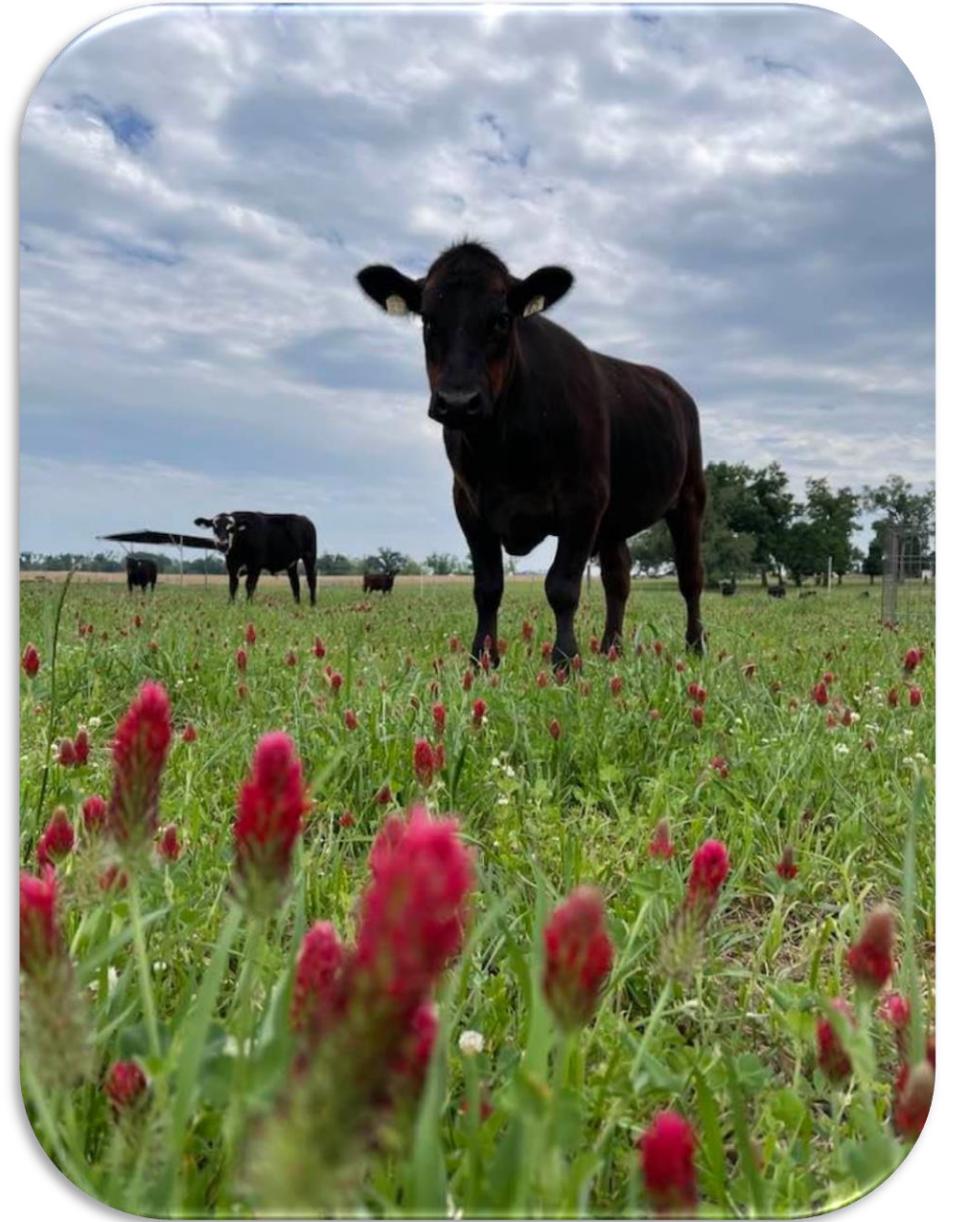
	Control	CGSM	PPH
ADG on treatment, lbs	0.39	1.05	1.01
Age at Puberty, d	446	423	439
WT at Puberty, lbs	640	695	712
D on Treatment to Puberty, d	183	163	175
Pregnancy Rate, %	65%	78%	88%

Total DMI Across Treatments

- CON heifers (only Hay) = Least Total DMI (TDN + CP)
- PPH heifers = Greatest Total DMI
 - Greatest % BW Consumed
 - Positive Associated Effect of Legume Inclusion
- Efficient use of crude protein leading to nutrient synchrony
 - Blood Urea Nitrogen levels (BUN)

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How do we
MAXIMIZE the
nutritional **VALUE** of
LEGUMES
in a production system?



Creep Grazing



Photo Credit: Teagasc @teagasc



Photo Credit: Irish Farm Journal

Immature Green Leaves

(New Growth + Regrowth)



Mature Green Leaves



Green Stems



Mature Dry Leaves



Dry Stems

(Low Palatability)



Nutrient Requirements by Production Phase

	Mature Cow		1 st Calf Heifers	
	TDN	CP	TDN	CP
Calving	59.2% (14)	10.5% (2.4)	60.6% (13)	10.5% (2.2)
Breeding	55.1% (13)	8.7% (2.1)	57.0% (12)	8.9% (1.9)
Dry/Bred	47.4% (11)	6.6% (1.6)	50.9% (11)	7.3% (1.5)
Heavy Bred	54.6% (13)	8.6% (2.1)	58.3% (12)	9.0% (1.9)

- On a dry matter basis
- Based on dry matter intake of 2.0% of body weight
- 1200 lbs mature cows and 1050 1st calf heifers (lbs required)

Take to the Field

- **Increase value of all forages in diet**
- **Inclusion results in increase performance**
- **Viable option to meeting nutrient requirement for all stages of production**
- **Fertilizer Cost is SUPER high this year...**





A fertile soil alone does not carry
agriculture to perfection.
-E. H. DERBY