UF IFAS UNIVERSITY of FLORIDA
Range Cattle Research & Education Center

Use of monensin on beef cattle grazing low-quality forages

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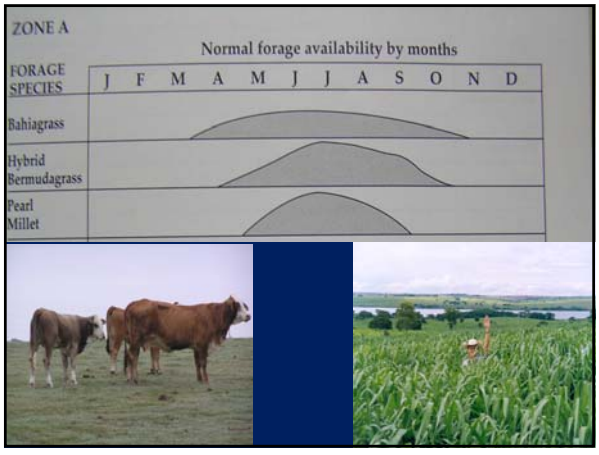
Introduction

- ✓ Cow-calf production in Florida is based on warm-season grass pastures
- ✓ Warm-season grasses have decreased production and nutritive value during late Fall and Winter



Introduction

- ✓ Supplementation is an effective management practice to overcome the periods of shortage of forage
- ✓ Additives are considered growth promoters that are not nutrients and increase animal performance and/or feed efficiency
- ✓ Monensin is an additive in the category called “Ionophores”

Introduction

- ✓ Ionophores have been widely used to increase efficiency of livestock nutrition programs
- ✓ Monensin has been an effective CH4 inhibitor and proprionate enhancer. In addition, there are reports of the benefits of monensin to reduce protein deamination in the rumen and decrease lactic acid production

Introduction

	Monensin, mg/d			
Measure	0	102	242	375
No. of Cattle	875	361	142	209
Daily gain, kg	1.08[a]	1.13[b]	1.12[b]	1.06[a]
Daily feed, kg	8.49[a]	8.36[a]	7.90[b]	7.65[b]
Feed/gain, kg/kg	7.89[a]	7.41[b]	7.08[c]	7.22[bc]
Improvement, %		6.1	10.3	8.5

Adapted from Goodrich et al., 1984

Introduction

- ✓ However, the effects of monensin in beef cattle grazing warm-season grass with limited nutritive value is not well explored

Project 1

Project 1

- Thirty heifers (BW=700 lb) were allocated on 12 bahiagrass pastures (3 acres, experimental units)
- Treatments were the factorial combination of two stocking rates (1.5 heifer or 1 heifer/acre) and supplementation with monensin (200 mg/d) or control (no monensin) with three replicates
- Grazing period: July to September 2012 and 2013
- Heifers were supplemented with 0.4 kg of concentrate (75% TDN, 14% CP) daily
- Response variables were herbage mass, allowance, nutritive value, ADG, BUN, Glucose, and IGF-1.

Project 1

Response Variable	Treatment		*P* value	SE
	2 heifers	3 heifers		
Herbage mass (lb/acre)	2800	2300	< 0.01	100
Herbage allowance (lb DM/lb LW)	1.8	1.0	< 0.01	0.09
CP (%)	8.3	8.5	0.19	0.1
IVDOM (%)	48.6	49.5	0.15	0.4

Project 1

Response Variable	Treatment		*P* value	SE
	2 heifers	3 heifers		
ADG (lb/d)	1.1	0.78	0.09	0.06
BUN (mg/dL)	18.3	18.2	0.93	1.3
Glucose (mg/dL)	75	74	0.81	5.0
Insulin (uiU/mL)	7.3	7.9	0.54	0.5
IGF-1 (ng/mL)	86.5	71.0	0.32	10

Project 1

Response Variable	Treatment		*P* value	SE
	Control	Monensin		
ADG (lb/d)	1.2	1.1	0.18	0.05
BUN (mg/dL)	16.5	20.0	0.05	1.4
Glucose (mg/dL)	76.0	73.8	0.42	2.0
Insulin (uIU/ml)	7.3	7.9	0.41	0.5
IGF-1 (ng/mL)	74.8	82.8	0.60	10.0

Project 1

Project 1

- Twenty four heifers from the grazing study were maintained in the same treatment (monesin 200 mg/d or control) and distributed in 8 drylot pens.
- Stargrass hay (9% CP and 53% IVDOM) was offered daily targeting 10% refusals
- The heifers received 0.4 kg of concentrate daily

Project 1

Response Variable	**Treatment**		***P* value**	**SE**
	Control	Monensin		
Forage DM intake (% BW)	2.0	2.0	0.65	0.05
Total DM intake (%BW)	2.1	2.1	0.61	0.04

Project 2

Project 2

- Four rumen-fistulated steers with approximately 880 lb LW
- Treatments were the latin square arrangement of 0, 10, 20, and 30 ppm of monensin
- Steers received bermudagrass hay (53% IVDOM and 9% CP) and 0.4 kg of concentrate (75% TDN, 14% CP) daily
- 10 d adaptation period, 4 d collection rumen fluid, 2 d collection blood
- Response variables were rumen fluid pH, acetic acid, propionic acid, isobutyric acid, butyric acid, ammonia, and blood BUN, and glucose.

Project 2

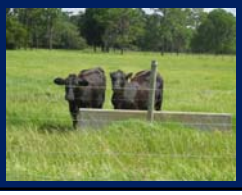
	Monensin levels (ppm)					
Rumen parameters	**0**	**10**	**20**	**30**	**Contrast *P* value**	**SE**
pH	6.6	6.6	6.7	6.5	NS, 0.19	0.07
Acetic acid (mol/100 mol)	73.6	72.9	71.7	71.3	NS, 0.07	1.1
Propionic acid (mol/100 mol)	16.9	17.9	19.1	19.4	L, 0.01	0.5
Isobutyric acid (mol/100 mol)	0.69	0.73	0.76	0.69	NS, 0.47	0.75
Butyric acid (mol/100 mol)	8.7	8.4	8.3	8.5	NS, 0.83	0.04
NH4-N (mg/dL)	7.3	6.4	6.4	7.2	NS, 0.53	0.7

Project 3

- ✓ Two Angus-crossbred heifers were allocated to twelve bahiagrass pastures (2.5 acres, experimental units)
- ✓ Heifers were early weaned at approximately 3 mo of age and grazed annual ryegrass pastures from Jan. to Apr. 2014
- ✓ Mean BW of the heifers at the initiation of the study was 410 lb BW

Project 3

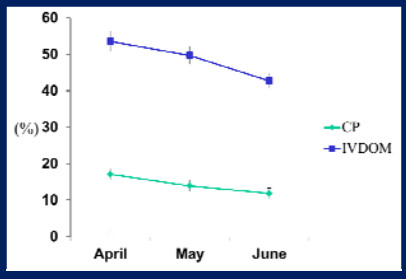
- ✓ Pastures were stocked continuously using a fixed stocking rate
- ✓ The supplement composition was 17% CP and 78% TDN



Project 3

Response Variable	Supplementation		*P* value	SE
	1.0% BW	2.0% BW		
Herbage mass (lb/acre)	4,000	4,400	0.09	100
Herbage allowance (lb DM/lb LW)	10.0	9.0	0.06	0.1
CP (%)	13.5	14.3	0.14	0.25
IVDOM (%)	48.5	48.8	0.64	0.51

Project 3



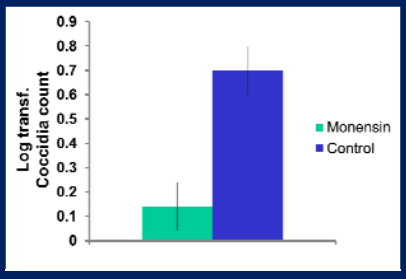
Project 3

Response Variable	Supplementation		*P* value	SE
	1.0% BW	2.0% BW		
ADG, lb/d	1.9	2.2	0.09	0.05
BUN (mg/dL)	22.3	24.4	0.54	1.3
Glucose (mg/dL)	66.4	76.3	0.07	2.3
Insulin (uiU/ml)	2.6	3.2	0.57	0.70
IGF – 1 (ng/mL)	173.1	192.2	0.07	7.26

Project 3

Response Variable	Monensin		*P* value	SE
	20 ppm	Control		
ADG, lb/d	2.2	1.8	0.05	0.05
BUN (mg/dL)	24.4	22.4	0.32	1.31
Glucose (mg/dL)	78.3	70.3	0.03	2.11
Insulin (uiU/ml)	2.84	2.25	0.44	0.52
IGF – 1 (ng/mL)	190.0	174.7	0.13	7.4

Project 3



Conclusions

- ✓ Monensin was not effective to increase performance of heifers grazing low-quality pastures with limited supplementation
- ✓ However, monensin was effective to decrease coccidia count and increase performance of young heifers grazing low-quality pastures and receiving greater levels of supplement

Thanks!

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