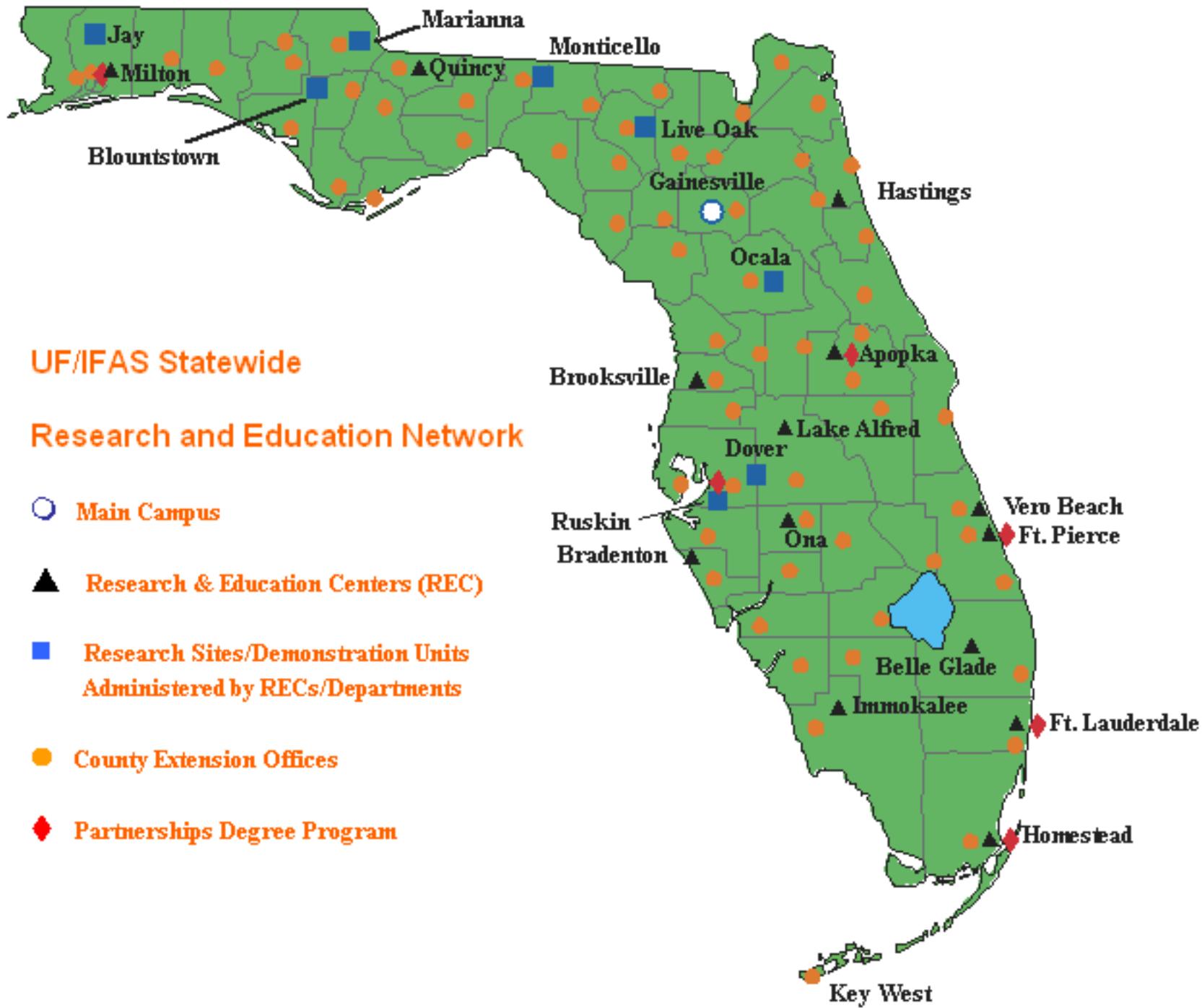


Forage species for tropical and subtropical regions

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UF/IFAS Statewide Research and Education Network

- Main Campus
- ▲ Research & Education Centers (REC)
- Research Sites/Demonstration Units Administered by RECs/Departments
- County Extension Offices
- ◆ Partnerships Degree Program



Warm-season grasses

- Vigorous growth in warm climate regions due to physiological pathway
- High concentration of cell wall
- Low concentration of nitrogen (Crude Protein)

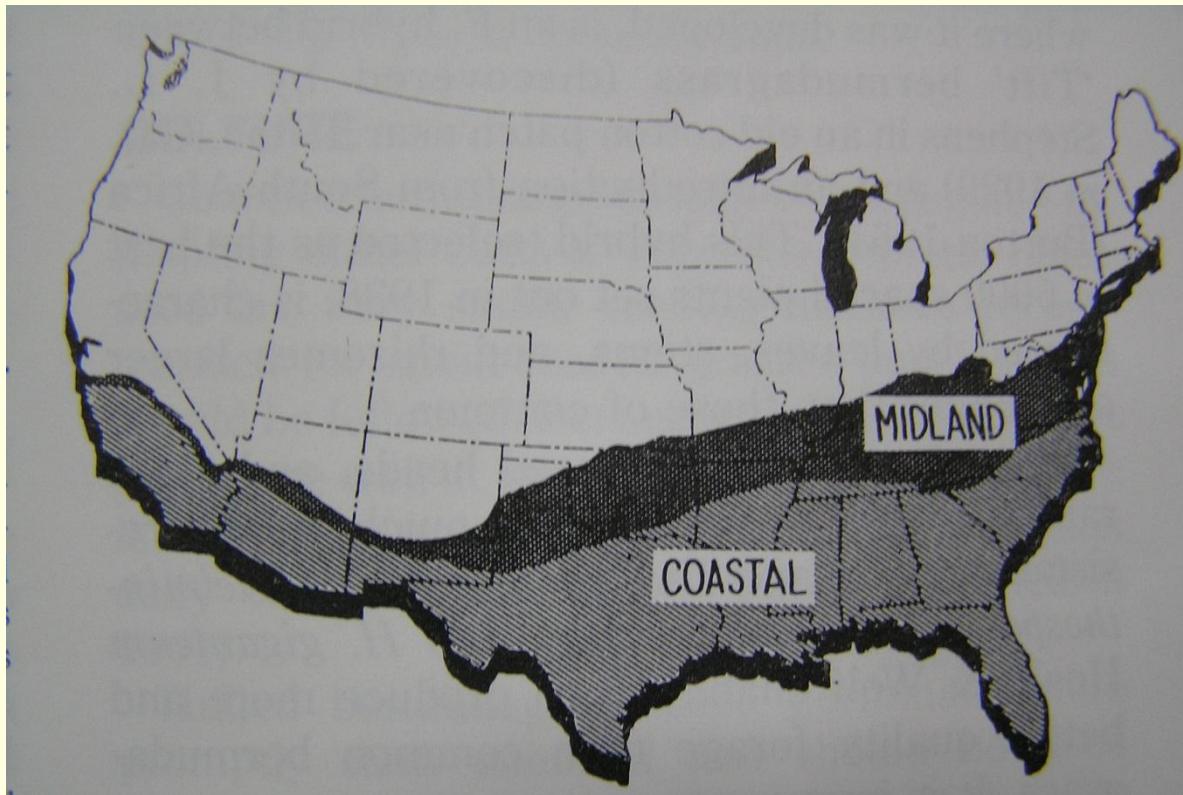


Warm-season grasses



Warm-season grasses

- The use of warm-season grasses is limited by the coldest temperature in the winter



Forage Species



Bermudagrass (*Cynodon dactylon*)



Bermudagrass (*Cynodon dactylon*)

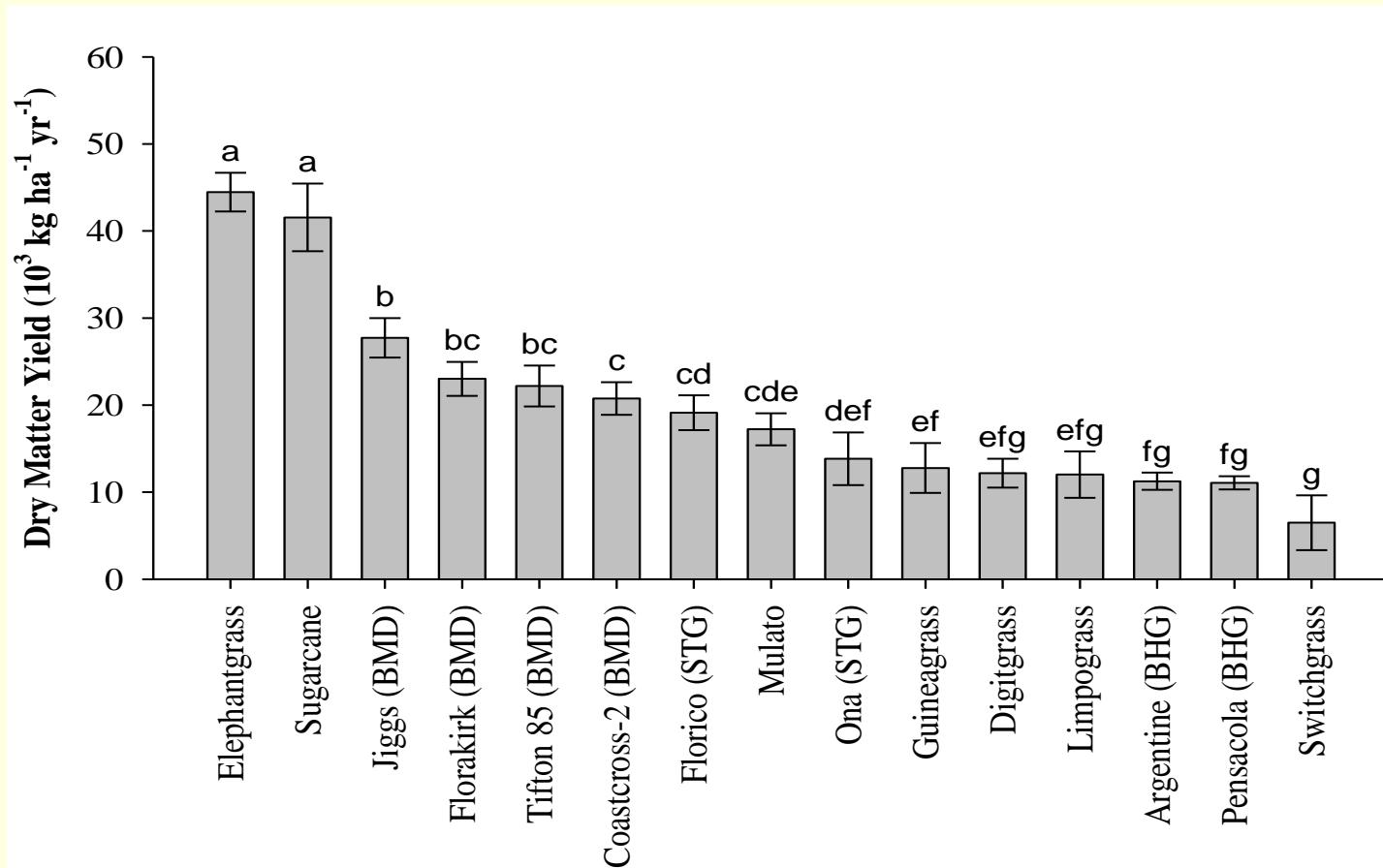
- The most planted warm-season grass in the Southeast US
- Resistant to cold temperatures compared to other warm-season grasses
- Used for grazing, hay, haylage, and silage

Bermudagrass (*Cynodon dactylon*)

Bermudagrass production (9 year average) Ardmore, OK

Species	Herbage Yield lb DM/acre
Tifton 85	9144
Coastal	8659
Russell	8119
Cheyenne	7317
Jiggs	7245
Tifton 44	7106

Bermudagrass (*Cynodon dactylon*)



Bermudagrass (*Cynodon dactylon*)

‘Jiggs’ bermudagrass



Bermudagrass (*Cynodon dactylon*)

Forages

Response Variable	Bahiagrass	Stargrass	Mulato	Limpograss	Jiggs	Tifton 85
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HA, kg/ha	2600d	3670c	3200c	3870c	4600b	2970c
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CP, %	14.9	12.0	12.6	12.5	11.6	10.2
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NDF, %	63.6	71.7	63.2	65.7	72.2	58.0
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IVTD, %	56.3b	61.7ab	67.0a	60.1b	58.4b	63.9a
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NDFD, %	53.2b	50.0b	52.9b	44.1c	43.3c	57.0a
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Adapted from Vendramini et al. (2010)

Bermudagrass (*Cynodon dactylon*)

Herbage characteristics of ‘Jiggs’ pastures grazed by heifers

Response	Stocking Rate (AU ha ⁻¹)				
Variable	Low	Medium	High	SE	Contrast
HM, Mg ha ⁻¹	2.8	2.3	1.7	0.1	L
HAR, kg ha ⁻¹ d ⁻¹	56	58	60	6	NS
Height , cm	34	26	22	0.5	L, Q
LI, %	95	90	87	0.7	L

Bermudagrass (*Cynodon dactylon*)

Animal performance of heifers grazing 'Jiggs' pastures

	Stocking Rate (heifers ha ⁻¹)					
Response Variable	Low	Medium	High	SE	Contrast	
ADG, kg d ⁻¹	0.64	0.41	0.29	0.10	L	
GPH, kg ha ⁻¹	573	913	1092	80.9	L	
HA, kg DM kg ⁻¹ LW	1.87	0.61	0.28	0.03	L, Q	

Bermudagrass (*Cynodon dactylon*)

‘Tifton 85’ bermudagrass



Bermudagrass (*Cynodon dactylon*)

Forages

Response Variable	Bahiagrass	Stargrass	Mulato	Limpograss	Jiggs	Tifton 85
HA, kg/ha	2600d	3670c	3200c	3870c	4600b	2970c
CP, %	14.9	12.0	12.6	12.5	11.6	10.2
NDF, %	63.6	71.7	63.2	65.7	72.2	58.0
IVTD, %	56.3b	61.7ab	67.0a	60.1b	58.4b	63.9a
NDFD, %	53.2b	50.0b	52.9b	44.1c	43.3c	57.0a

Adapted from Vendramini et al. (2010)

Bermudagrass (*Cynodon dactylon*)

Performance of early weaned heifers grazing ‘Tifton 85’ pastures

Response	Concentrate (g kg ⁻¹ BW)				Orthogonal contrast [§]	SE
	0 [†]	10	15	20		
Average daily gain (kg d ⁻¹)	0.42	0.52	0.65	0.65	L, P = 0.04; Q, P = 0.13	0.02
Stocking rate (AU ha ⁻¹) [‡]	7.4	11.1	11.2	13.7	L, P < 0.01; Q, P = 0.10	0.4
Liveweight gain (kg ha ⁻¹)	700	1080	1450	1550	L, P < 0.01; Q, P = 0.30	42

Bermudagrass (*Cynodon dactylon*)

Milk production of Holsteins cows grazing ‘Tifton 85’ pastures at two stocking rates with two levels of supplementation.

Response	Stocking rate			
	10 cows/ha		7.5 cows/ha	
	0.5:1	0.33:1	0.5:1	0.33:1
HA (kg DM/kg LW)	1.2	1.2	1.6	1.6
Milk (kg/d)	17.3	14.3	16.6	13.5
Milk (kg/ha/d)	143	119	103	82
Fat (%)	3.49	3.66	3.57	3.62
Protein (%)	3.03	2.96	3.04	3.04

Fike et al. (2003)

Bermudagrass (*Cynodon dactylon*)



Bermudagrass (*Cynodon dactylon*)

Haylage

Response variables	Bermudagrass Cultivar		<i>P</i> value	SE
	Jiggs	Tifton 85		
DM (%)	40	36	0.16	1.4
CP (%)	12.3	12.3	0.97	0.36
IVTD (%)	54.2	55.7	0.23	0.82
NDF (%)	73.0	75.4	0.08	0.51
ADF (%)	38.9	43.2	0.01	0.34
NDFD (%)	37.2	41.4	0.07	0.89
pH	4.5	4.6	0.32	0.04
Lactate (%)	3.5	3.2	0.32	0.20
Acetate (%)	2.5	1.7	0.16	0.25
Ammonia (% CP)	10.3	14.7	0.13	1.90
Aerobic Stability (h)	267	268	0.96	12.1

Stargrass (*Cynodon nlemfuensis*)



Stargrass (*Cynodon nlemfuensis*)

- Similar production and nutritive value to bermudagrass
- The use of Stargrass is limited to South Florida due to lack of cold tolerance
- Used for grazing, hay, haylage, and silage

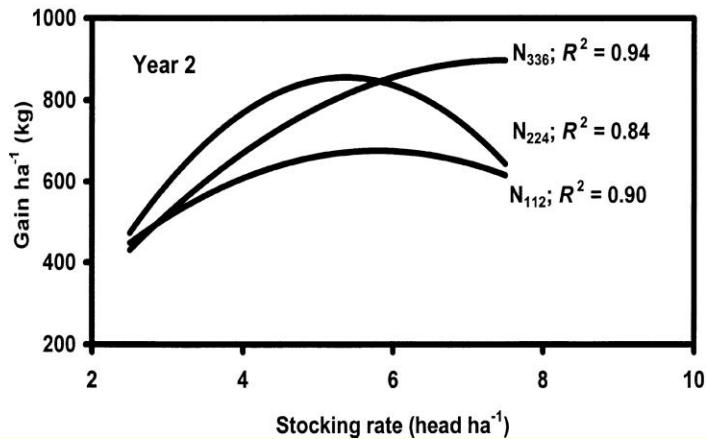
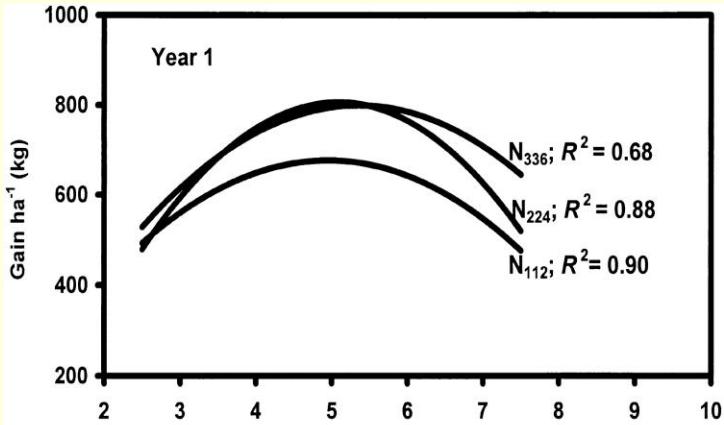
Stargrass (*Cynodon nemfuensis*)

Bermudagrass and Stargrass production (4-wk grazing interval)

Species	Herbage Yield kg DM/ha/yr
Jiggs	14200
Florona	14200
Tifton 85	13000
Okeechobee	11500

Mislevy and Miller (2007)

Stargrass (*Cynodon nlemfuensis*)



Hernandez-Garay et al. (2004)

Mulato II (*Brachiaria* spp.)



Mulato II (*Brachiaria* spp.)

- The genus *Brachiaria* is the most planted warm-season grass in the world
- Mulato was the first *Brachiaria* hybrid
- High nutritive value
- Used for grazing, hay, and haylage
- Mulato does not tolerate poorly drained soils and extended periods of cold temperatures

Mulato II (*Brachiaria* spp.)

Forage species	CP	IVDOM
----- % -----		
Pearl millet	12.9ab [†]	63c
Mulato	13.2a	68ab
Tifton 85	13.8a	63c
Sorghum	12.0b	64b
SE	0.5	16

Adapted from Lunpha et al. (2009)

Mulato II (*Brachiaria* spp.)

Performance of beef heifers grazing Mulato II in North Florida

Treatment	ADG (kg/d)	SR (AU/ha)	Gain per ha (kg)
Mulato II	0.78a	4.2b	295
Pearl millet	0.43b	8.4a	295
Sorghum-sudan	0.39b	9.2a	317
SE	0.05	0.6	28

Vendramini et al. (2012)

Limpograss (*Hemarthria altissima*)



Limpograss (*Hemarthria altissima*)

- Limpograss produces up to 40% of its total annual yield during the cool-season with considerable cold hardiness variability among varieties.
- Unlike other sub-tropical species, limpograss retains good digestibility even in later stages of maturity; however, it is low in CP
- Limpograss tolerate poorly drained soils
- Floralta limpograss is the most persistent cultivar

Limpograss (*Hemarthria altissima*)



Limpograss (*Hemarthria altissima*)



Limpograss (*Hemarthria altissima*)

Cultivar	Yield (kg/ha)	CP (%)	IVDOM (%)	Persistence (%)
FXB 1	3700	13.4	53.1	66
BXF 7	3200	13.4	53.2	65
BXF 27	3100	13.2	50.3	53
FXB 9	3700	12.8	51.9	51
FXB 10	4400	13.1	53.4	65
Floralta	4200	12.6	52.8	61
Bigalta	3500	13.0	51.3	57

Sorghum and Corn Silage



<http://animal.ifas.ufl.edu/extension/CSFD/CSFD/>

Warm-season legumes



Aeschynomene



Rhizoma Peanut

Warm-season legumes

Treatment	ADG, lb	Gain/A, lb	PUN, mg/dl
Control	0.64	370	6.0
Low CP	1.16	638	8.2
High CP	1.29	636	11.4
Aeschynomene	1.14	374	11.0

Holderbaum et al. (1991)

Stylosanthes (*Stylosanthes guianensis*)



Stylosanthes (*Stylosanthes guianensis*)

Animal performance of heifers grazing bahiagrass pastures
overseeded with stylosanthes

Response variables	Treatments			<i>P</i> value	SE
	Bahiagrass	Bahiagrass	Control		
	Overseeded	Fertilized			
Herbage allowance (kg DM kg ⁻¹ LW)	1.0b	1.3a	0.9b	0.08	0.1
Average daily gain (kg d ⁻¹)	0.15	0.10	0.10	0.60	0.1
Gain per ha (kg)	34	24	24	0.82	8
Blood urea nitrogen	21.7	20.3	19	0.49	2.3

Vendramini et al. 2012

Rhizoma Peanut (*Arachis glabrata*)



Rhizoma Peanut (*Arachis glabrata*)

Milk production of Holsteins cows grazing Rhizoma Peanut pastures at two stocking rates with two levels of supplementation.

Response	Stocking rate			
	7.5 cows/ha		5.0 cows/ha	
	0.5:1	0.33:1	0.5:1	0.33:1
HA (kg DM/kg LW)	0.8	0.7	1.4	1.2
Milk (kg/d)	17.3	15.8	18.2	16.3
Milk (kg/ha/d)	115	100	71	62
Fat (%)	3.5	3.5	3.5	3.5
Protein (%)	3.0	3.0	3.0	3.0

Fike et al. (2003)

Rhizoma Peanut (*Arachis pintoi*)

Accession	Harvest*			Annual FDMY
	1	2	3	
476132	0.79	0.75	0.98	2.52
497541	1.18	0.94	0.44	2.56
497574	1.85	3.00	2.50	7.36
604798	1.51	1.52	1.38	4.42
604799	1.35	1.74	1.60	4.69
604800	1.39	1.98	1.33	4.71
604801	0.34	1.10	0.93	2.37
604803	1.99	1.93	1.74	5.67
604804	0.06	0	0	0.06
604805	1.58	1.48	0.88	3.93
604807	1.38	0.78	0.56	2.73
604808	1.98	2.62	1.99	6.59
604809	1.47	0.38	1.14	2.99
604810	1.96	2.54	2.14	6.63
604811	1.06	1.45	1.63	4.14
604812	0.19	0.6	0.82	1.61
604813	0.98	1.72	1.01	3.71
604814	0.10	0	0	0.10
604815	2.32	2.12	2.30	6.74
604817	2.86	3.45	2.79	9.10
604856	1.12	1.90	1.56	4.58
604857	1.85	2.26	2.24	6.35
604858	1.59	2.25	1.87	5.71
604859	1.38	2.29	1.63	5.30
Arbrook	3.16	4.75	1.76	9.67
Florigraze	2.14	1.89	0.95	4.98
LSD	0.79	0.75	0.98	3.74

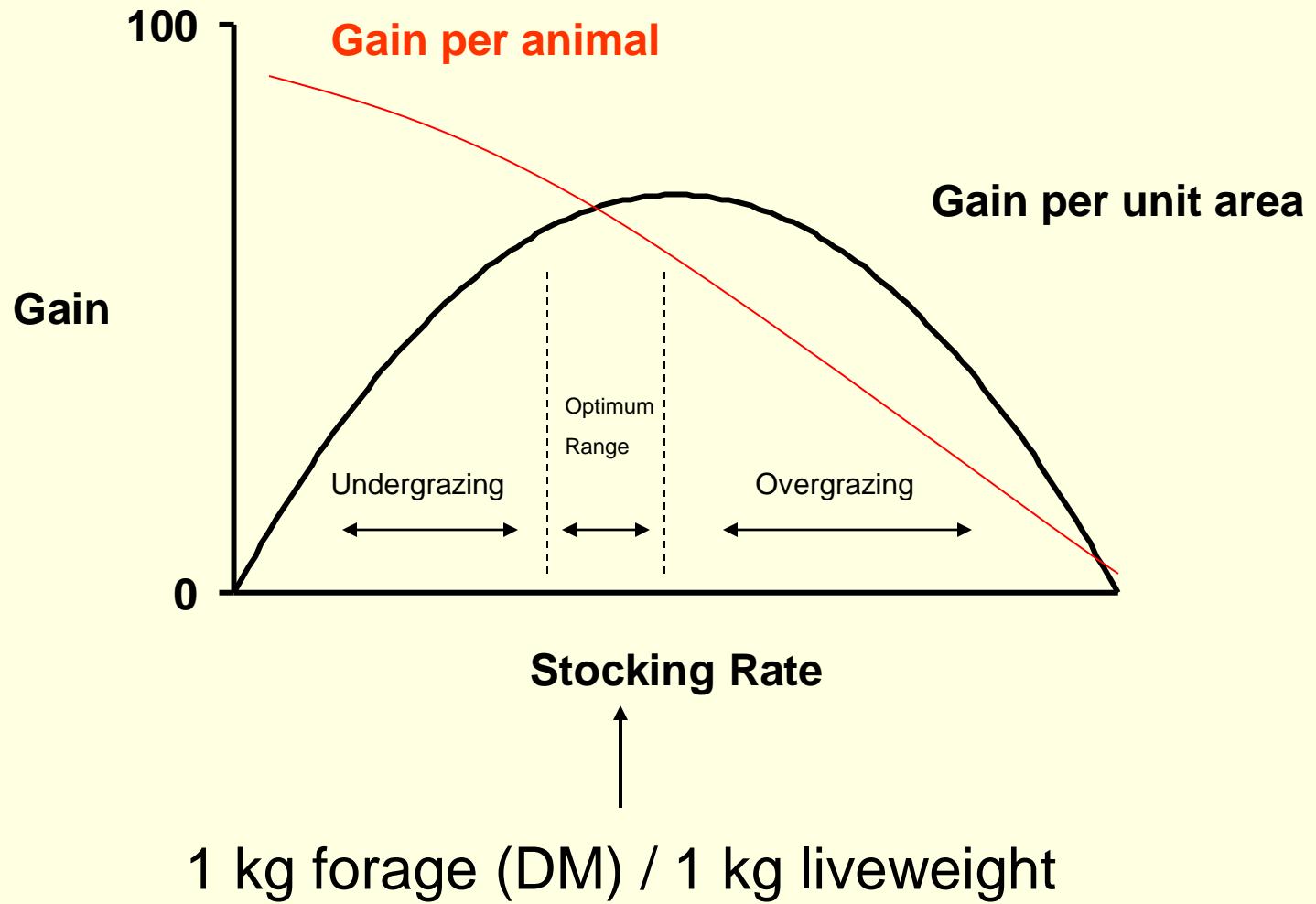
Rhizoma Peanut (*Arachis pintoi*)

Accession	CP (g kg ⁻¹)	IVOMD (g kg ⁻¹)
476132	178	690
497541	147	630
497574	184	640
604798	170	680
604799	189	700
604800	139	700
604801	188	730
604803	195	670
604805	151	690
604807	156	680
604808	189	620
604809	148	620
604810	187	610
604811	189	690
604812	183	600
604813	166	660
604815	194	690
604817	212	670
604856	180	710
604857	222	720
604858	225	720
604859	173	710
Arbrook	153	690
Florigraze	172	740

Grazing



Stocking Rate



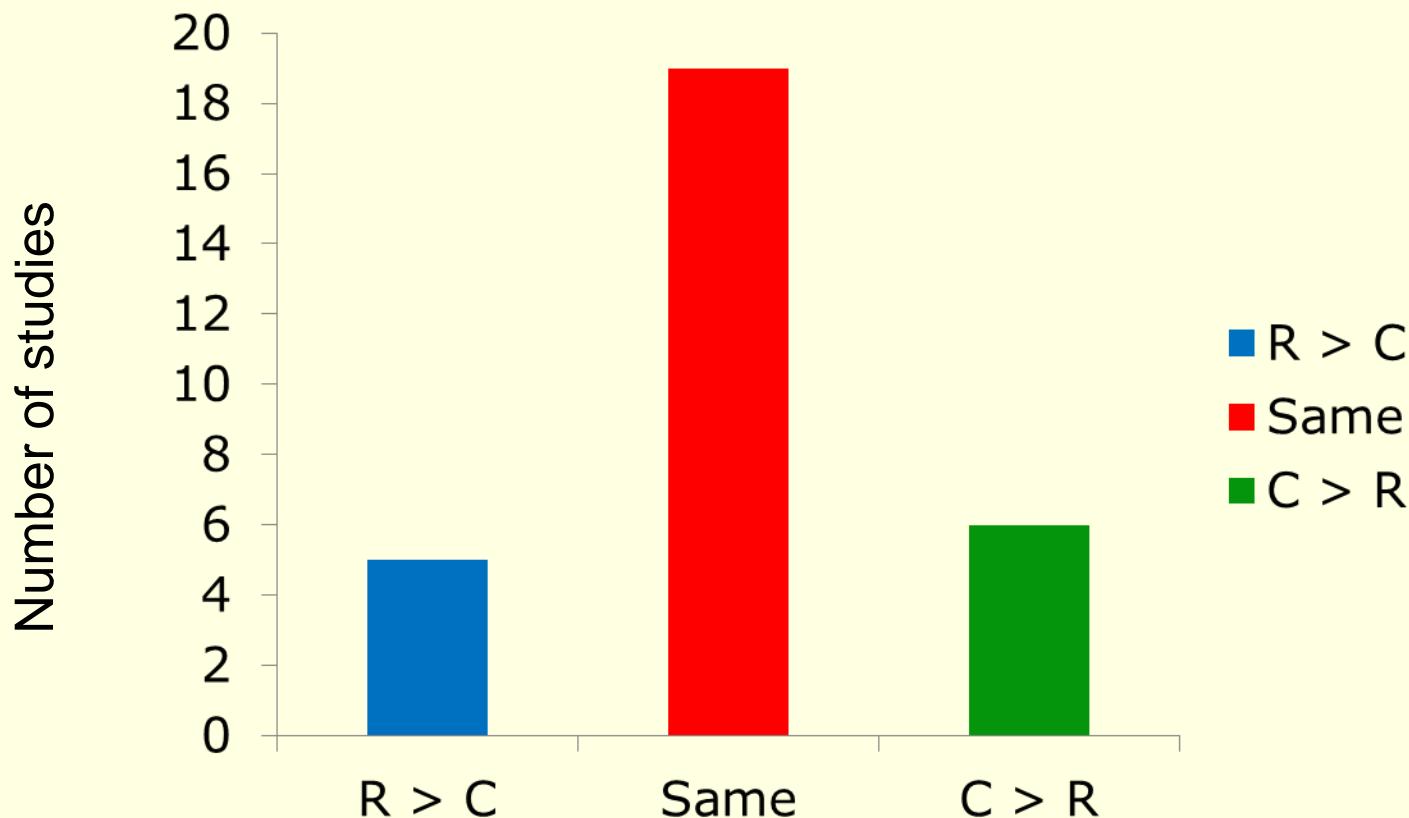
Grazing

- Rotational stocking

Treatment	Herbage accumulation (kg of DM per ha per day)
Rotational	
1 day	58
3 days	61
7 days	64
21 days	67
Continuous	37

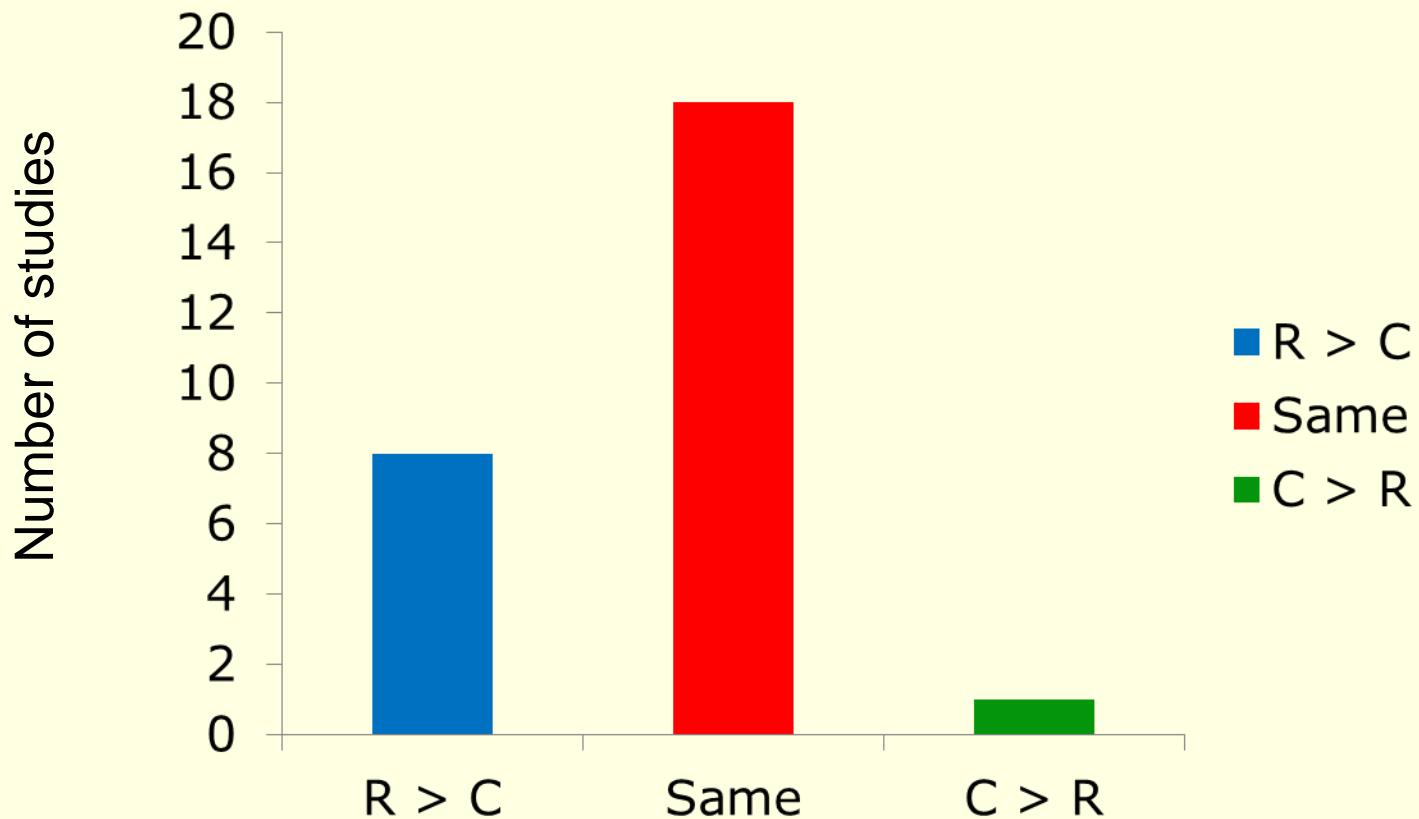
Adapted from Stewart et. al., (2005)

Grazing



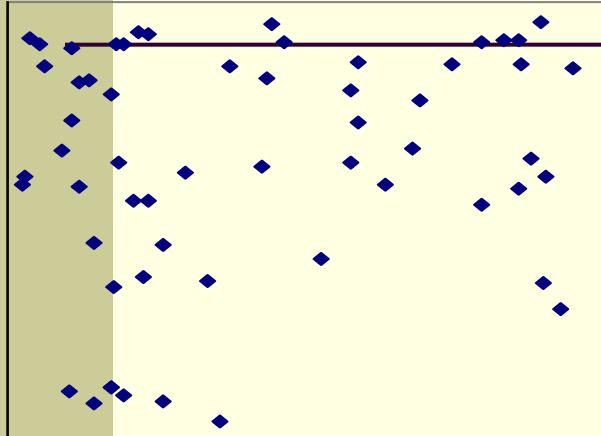
Efeito do metodo de pastejo em desempenho animal (Kallenbach, 2011)

Grazing

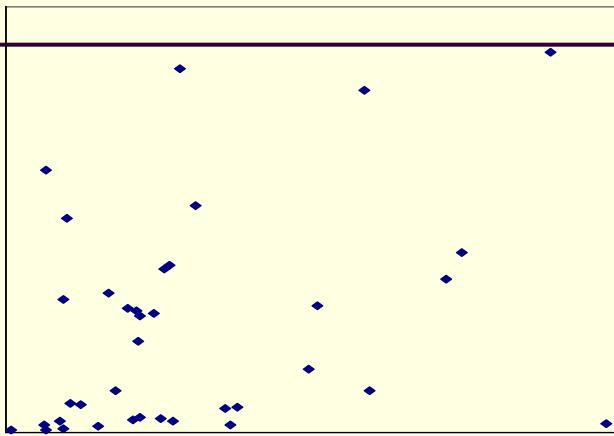


Efeito do metodo de pastejo em desempenho animal por unidade de area (Kallenbach, 2011)

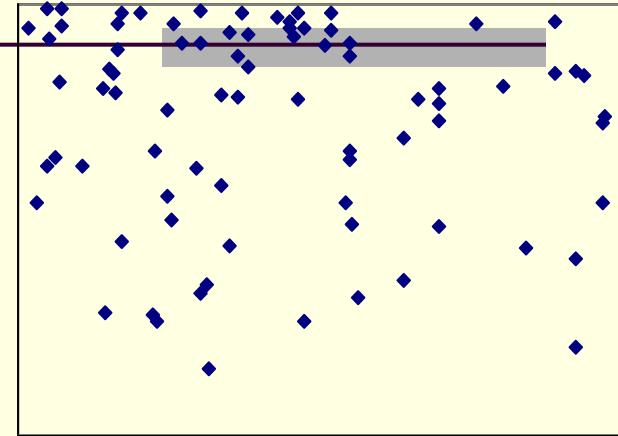
Lotação contínua vs. Lotação rotacionada



Rot. 1-d



Cont.



Rot. 7-d

1-d Rot seguiu distribuição de Poisson

7-d e Cont. seguiram distribuição binomial negativa

Grazing

- Stubble height
-

Species	Target Stubble height (cm)
Bahiagrass	5
Bermudagrass	10-15
Mulato	15-20
Stargrass	15-20
Limpograss	25-30

Proverbio Africano

“Toda manha na Africa, a gazela acorda sabendo que tem que correr mais do que o leao mais rapido da tundra, ou ela sera morta.

Toda manha na Africa, o leao acorda sabendo que tem que correr mais do que a gazela mais lenta, senao ele morrera de fome.

Em resumo, nao importa se voce e leao ou gazela, qdo amanhecer, e melhor voce sair correndo.”

Thank you for your attention



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