Can We Produce an 850 lb Stocker Calf in Florida?

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"Can we produce an 850 lb stocker calf in Florida"? The easy answer to this question is yes. However, several additional questions need to considered:

- How do we do it?
- What are the best options?
- Is it cost effective?
- Are there better uses for the available forage resources?

Although numerous strategies can be utilized to put weight on stocker cattle, forage based programs generally provide the most cost effective source of gain. Consequently, this paper will focus on forage programs that require no or limited amounts of energy and protein supplementation.

Ownership Scenarios and Weight Gain

When thinking about producing stockers there are 3 basic ownership scenarios that might be considered:

- retained ownership of normal weaned calves (i.e. weaned at 6 to 8 months of age),
- retained ownership of early weaned calves (i.e. weaned at 2 to 3 months of age), and
- purchased stockers ranging in weight from 250 to 700 lbs.

Depending on which of these scenarios apply, the amount of weight gain needed to reach the goal of 850 lbs and the length of the stocker phase can be determined. Table 1 illustrates the amount of time it would take for the calf to gain 350 lbs given a range of average daily gains (ADG) from 1 to 3 lbs. When rate of gain is below 1.5 lbs/d it can take over seven months to add 350 lbs of gain. It is generally not practical to manage stockers for extended time with low rates of gain when interest, opportunity costs, and total cost of gain are considered.

When evaluating stocker programs nutrient requirements to achieve the desired ADG must be considered. Estimated requirements of total digestible nutrients (TDN), crude protein (CP), and calcium (Ca) for 500 to 800 lb Brangus-type steers are reported in Table 2. Nutrient requirements increase as ADG increases. Additionally, requirements are higher for a 500 lb calf gaining 2 lbs/d (65% TDN, 12.7% CP) as compared with an 800 yearling gaining 2 lbs/d (61% TDN, 9.5% CP). These differences must be considered when evaluating forage programs for stocker cattle.

The concept of the first limiting nutrient must also be considered when evaluating ADG potential of stockers. Simply stated this means that ADG will be limited to the level supported by the first limiting nutrient. In other words if the diet contains enough protein to support an ADG of 3 lbs/d, but only enough energy to support 2.5 lbs/d then the calf will only gain 2.5 lbs/d. Calcium is often the first limiting nutrient of stocker cattle grazing cool-season annual grasses. Florida researchers measured the mineral concentration of cool-season annual grasses in North Florida and reported that Ca concentration averaged 0.31% over the grazing season (Myer et al., 2009). As Table 2 illustrates, 0.31% Ca is not sufficient to support gains over 2.0 lbs/d. Consequently because of the high levels of TDN and CP and relatively low levels of Ca in cool-season annual grasses providing stockers with a complete mineral supplement can significantly improve ADG. Over a four-year period in Oklahoma, stockers grazing winter wheat and provided a mineral supplement gained 0.24 lbs/d more than stockers that did not receive a mineral supplement (Fieser et al., 2007).

Forage Options

Forage options for Florida stocker operations include warm-season perennials, warm-season annuals, and cool-season annuals; generally speaking there are no well-adapted cool-season perennials available in Florida (Chambliss et al.,

2001). When evaluating forage options ADG, gain/ac, grazing length, and the cost of gain must be considered.

Warm-Season Perennial Grasses. Generally speaking ADG of stockers grazing warm-season perennial grasses such as bahiagrass, hybrid bermudagrass (excluding Tifton 85), limpograss, stargrass, and digitgrass range from 0.75 to 1.25 lbs/d. Gains on stargrass are typically higher and gains on bahiagrass are generally the lowest of the forages mentioned. Given the low ADG of stockers grazing these forages they are generally better suited for cow-calf production than stocker operations.

Of the warm-season perennial grasses, Tifton 85 shows the most potential for use in stocker operations. Across three experiments at the Overton research center, gains of stocker cattle grazing Tifton 85 have ranged from 1.55 to 1.69 lb/d; gain/ac ranged from 465 to 551 lb/ac (Table 3).

Warm-Season Annual Grasses. Performance of cattle grazing warm-season annual grasses is typically superior to those grazing warm-season perennial grasses. Warm-season annuals that should be considered for stockers in Florida include: crabgrass, sorghum x sudangrass hybrids, sudangrass, and pearl millet. The grazing season of these annuals is typically 60 to 120 days with ADG of 1.5 to 2.75 lbs/d. Sorghum x sudangrass hybrids, sudangrass, and pearl millet should be planted on prepared seedbeds. Crabgrass can be planted on a prepared seedbed or broadcasted over a cool-season small grain that was planted in a prepared seedbed; if broadcasted, cattle should be used to walk the seed in while grazing out the cool-season annual. Of these annual grasses, crabgrass is the lowest yielding, but has the benefits of good reseeding potential.

Sorghum x sudangrass hybrids, sudangrass, and pearl millet have the potential to produce really large dry matter yields resulting in high stocking rates; however, these yields are usually not distributed evenly over the grazing season which can result in stocking rate challenges. Brown mid-rib (BMR) varieties of these species are commercially available and should be strongly considered. Lower lignin production and increased digestibility are typical of BMR varieties; this increase in digestibility leads to increased weight gains for cattle grazing BMR as compared with non-BMR near-isogenic varieties. Experiments in Amarillo with stockers grazing sorghum x sudangrass hybrids resulted in ADG of 2.94 lb/ds for stockers grazing the BMR variety compared with 2.62 lbs/d for stockers grazing the non-BMR near-isogenic variety (Banta et al., 2001). Numerous varieties of BMR sorghum x sudangrass are available with some of these varieties exhibiting a brachytic dwarf trait which results in shorter internodes and a greater leaf:stem ratio. To date all commercially available varieties of BMR sudangrass come from the Cal/West Seeds program in California; these varieties have only been available since 2007. There appears to be only one BMR variety of pearl millet available at this time; BMR 209 hybrid pearl millet is sold by Forage First Genetics.

Cool-Season Annual Grasses. Ryegrass and the small grains, wheat, oats, rye, and triticale have and will continue to play a major role in stocker operations. Stocker cattle grazing cool-season annuals in the Southeast will typically gain 1.75 to 2.75 lbs/d over a 80 to 120 day grazing season; gain/ac is generally between 300 and 600 lbs. Over a six-year period stocker cattle at the North Florida Research and Education Center located near Marianna gained about 2.3 lbs/d with an initial stocking rate of approximately 950 lbs/ac (initial stocking rate = stocking rate x initial animal weight; Table 4).

Cool-season annual grasses can be planted in a prepared seedbed or sod-seeded into bahia or bermudagrass. Prepared seedbed offers earlier grazing, more head-days/acre, and thus greater gain/acre as illustrated from the 4 years of data presented in Table 5 (Myer et al., 2005 and 2007).

Grazing Considerations and Economics

Grazing management is a key factor in determining the success of a stocker program. In order to optimize income, both ADG and gain/ac must be optimized through proper grazing

management. As Figure 1 illustrates, ADG decreases as stocking rate (i.e. grazing pressure) increases. However, gain/ac increases as stocking rate increases until pastures become overgrazed at which time gain/ac starts to decrease. A good example of this concept is illustrated with steers that grazed rye and ryegrass pastures overseeded on bermudagrass at Overton (Table 6; Rouquette et al., 2000). The steers stocked at the lowest level had the highest ADG, whereas the steers that were stocked to heavy had the lowest ADG and produced the lowest gain/ac. There is a fine line between under grazing and over grazing and it is more economical to undergraze a little than to have pastures stocked to heavy.

While this concept sounds easy, proper grazing management can be challenging because forage production is not consistent over the grazing season especially in regards to annual grasses. Appropriate stocking rates of cool-season annual grasses can increase three fold from fall-winter grazing to spring grazing as illustrated by forage dry matter yield of cool-season annuals in Figure 2 (adapted from Myer et al., 2011). Consequently, producers should have a plan in place to deal with dramatic swings in forage production; that plan could involve using cows to graze excess forage, purchasing more stockers in the spring, purchase additional stockers in the fall and maintain them in a drylot until spring, cut hay, or make silage.

When weather conditions cooperate, grazing cool- or warm-season annual grasses can provide some of the lowest cost of gains in the industry. However, when budgets are developed it is important to realize that in some years weather conditions can result in low production or total failures of these systems and these bad years must figure into the budget.

Partial budgets that include only seed and fertilizer cost for the small grain rye are shown in Table 7. In this scenario, when only these two expenses are considered and the assumption is made that cattle will gain 1 lb for every 10 lbs of forage produced then cost of gain ranges from $20.54 to $24.75/cwt (in reality the amount of forage needed for 1 lb of weight gain will vary considerably depending on forage quality, cattle nutrient requirements, grazing utilization, etc.). In addition to seed and fertilizer costs, a budget should also include: health costs, death loss, equipment costs, land lease or opportunity costs, labor, interest, feed, and all other appropriate expenses.

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Table 1. Days to gain 350 lbs

ADG	Days to Gain 350 lbs
1.0	350
1.5	234
2.0	175
2.5	140
3.0	117

Table 2. Estimated nutrient requirements of Brangus-type steers[1,2]

Steer Weight, lbs	ADG	% TDN	% CP	% Ca	Ca, gm	DMI, lb
500	1.0	56	10.0	0.36	20.0	12.5
	1.5	60	11.5	0.44	25.6	12.8
	2.0	65	12.7	0.55	32.2	13.0
	2.5	70	14.0	0.65	38.1	13.0
	3.0	75	15.3	0.75	43.8	13.0
600	1.0	55	9.0	0.31	20.9	15
	1.5	59	10.0	0.38	26.8	15.6
	2.0	63	11.0	0.45	32.3	15.9
	2.5	67	12.0	0.52	37.0	15.9
	3.0	72	13.1	0.60	42.7	15.9
700	1.0	53	8.0	0.26	21.3	18.1
	1.5	57	9.0	0.32	26.5	18.5
	2.0	61	10.0	0.38	31.6	18.7
	2.5	65	11.0	0.43	36.1	18.7
	3.0	70	12.0	0.50	41.7	18.7
800	1.0	53	7.8	0.25	22.0	20.0
	1.5	57	8.6	0.30	26.9	20.5
	2.0	61	9.5	0.34	31.4	20.6
	2.5	65	10.3	0.39	35.6	20.6
	3.0	70	11.1	0.44	40.6	20.6

[1]All requirements are expressed on a dry-matter basis.
[2]Estimated dietary requirements for Brangus type steer under typical production conditions (Beef Cattle NRC, 1996). These requirements will vary depending on numerous factors including body condition, health, breed, environmental factors, use of growth promotants, and others.

Table 3. Performance of stocker cattle grazing hybrid bermudagrass at Overton, TX

Study	Forge Type	Grazing Length	Initial Weight, lb	Stocking Rate, hd/ac	ADG, lb	Gain/ac, lb
1	Coastal	84	609	.	1.29	.
2a	Coastal	110	650	.	1.04	.
2b	Coastal	110	620	.	0.84	.
3a	Coastal	92	.	3	1.01	279
3b	T85	92	.	3	1.69	465
4	T85	83	~710	4.5	1.61	551
5	T85	90	759	3.5	1.55	.

Study 1: Rouquette et al., 2002a
Study 2: Grigsby et al., 1988
Study 3: Rouquette et al., 2004
Study 4: Rouquette et al., 2002b
Study 5: Woods et al., 2004

Table 4. Performance of stocker cattle grazing cool-season annual grasses in Florida

Study	Forge Type	Grazing Length	Initial Weight, lb	Stocking Rate, hd/ac	ADG, lb	Gain/ac, lb
1	R,O	114	~570	1.6	2.2	405
	R,O,RG	118	~570	1.5	2.1	375
2	O, RG	104	~591	1.7	2.24	364
	RG	90	~591	1.6	2.46	333
3	R	77	~548	2.0	2.24	364
	T	80	~548	1.7	2.46	325
	R, RG	101	~548	1.8	2.42	490
	T, RG	112	~548	1.7	2.64	497

Study 1: Myer et al., 2005
Study 2: Myer et al., 2007
Study 3: Myer et al., 2011
R = rye; O = oats, T = triticale, RG = ryegrass

Table 5. Performance of stocker cattle grazing cool-season annual grasses planted on prepared seedbed (PS) or sod-seeded (SS) into bahiagrass in Florida (Myer et al., 2005 and 2007)

Item	Fall 2001 & Fall 2002[1]		Fall 2003 & Fall 2004[2]	
	PS	**SS**	**PS**	**SS**
Forage, lb/ac	4,879[a]	3,306[b]	3,636[a]	3,056[b]
Start of grazing		-58		-42
Length of grazing, d	137[a]	92[b]	115[a]	80[b]
Grazing d/ac	226[a]	126[b]	174[a]	131[b]
ADG, lb	2.3[a]	2.0[b]	2.42	2.31
Gain/ac, lb	530[a]	250[b]	407[a]	289[b]

[1]Means within a row without a common superscript differ ($P < 0.05$).
[2]Means within a row without a common superscript differ ($P < 0.05$).

Table 6. Effect of stocking rate on performance of stockers grazing a mix of rye and ryegrass overseeded on bermudagrass at Overton (average of 2 years; Rouquette et al., 2000)

Item	Low	Medium	High
Stocking rate, hd/ac	1.6	2.2	2.8
Stocking rate, initial lbs/ac	960	1,320	1,680
ADG, lbs	2.95	2.12	0.96
Gain/ac, lbs	743	740	436

Table 7. Partial budgets for the small grain rye; only seed and fertilizer costs are included

Forage Species	Rye	Rye (higher yield)	Rye (need P & K)
Seed, $/bag	$15.00	$15.00	$15.00
Planting rate, lbs/ac	100	100	100
Seed cost, $/ac	$30.00	$30.00	$30.00
lbs of Nitrogen	125	175	175
Fertilizer (N only), $/ac	$81.25	$113.75	$113.75
Fertilizer (P and K), $/ac	$0.00	$0.00	$29.50
Total fertilizer, $/ac	$81.25	$113.75	$143.25
Total cost, $/ac	$111.25	$143.75	$173.25
DM yield, lbs	5,000	7,000	7,000
Forage cost, $/ton	$44.50	$41.07	$49.50
Cost of gain, $/cwt[1]	$22.25	$20.54	$24.75

[1]Assumes 1 lb of gain for every 10 lbs of forage produced (in reality this will vary considerably depending on forage quality, cattle nutrient requirements, grazing utilization, etc.).

Figure 1. Effect of grazing pressure on ADG and gain/ac (as adapted by Hersom, 2011 from Mott and Moore, 1970)

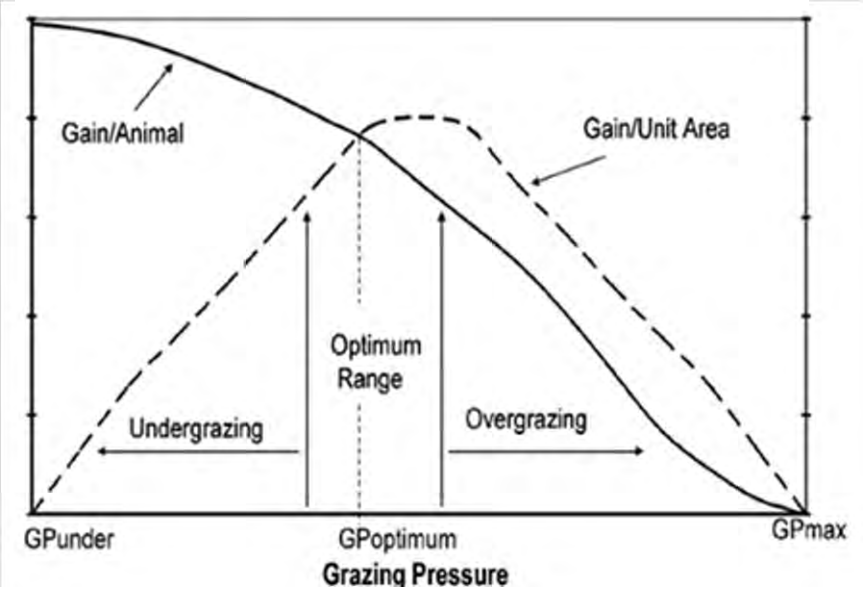

Figure 2. Average pasture forage dry matter yield measured every 3 weeks during the grazing season (adapted from Myer et al., 2011)