

Meat Quality & Market Outlets for Grass-Finished Cattle

Dr. Chad Carr¹

¹Assistant Professor, UF/IFAS, Department of Animal Sciences, Gainesville, FL

Introduction

The expense of feed, fuel, and fertilizer has driven several beef producers to try to gain a greater portion of the available profit margin by becoming a niche meat marketer, rather than just livestock producers. Many of these prospective niche marketers are targeting grass-finishing as a way to add value to their calves. The following brief review of the differences between grain and grass-fed beef products documents the extensive work which has been conducted and also incorporates results from a pilot study recently conducted by University of Florida personnel comparing the carcass merit of grain and grass-finished Angus crossbred steers (Table 1).

Carcass data

Obviously, forage is less energy dense than concentrate this often results in less fat and protein deposition within the animal. Many reports show grass-fed beef carcasses to have less external fat and smaller ribeye areas (Bowling et al., 1978; Hedrick et al., 1983; Cox et al., 2006) and less internal fat (Bowling et al., 1977; Schroeder et al., 1980; Schaake et al., 1993) than comparable grain-fed carcasses. The low statistical significance for the differences for fatness and muscling from the present pilot study reported in Table 1 is likely due to a low number of animals per treatment (n = 12).

Many have reported grass-fed beef carcasses to have lower marbling scores than grain-fed (Reagan et al., 1977; Hedrick et al., 1983; Crouse et al., 1984). Other authors showed similar marbling scores across feeding treatment (Bowling et al., 1977; Sapp

et al., 1999; Cox et al., 2006), like those in Table 1. Though marbling scores were not statistically different, a greater proportion of carcasses from grain-fed steers graded USDA Choice (42 vs. 33%) than grass-finished steers (Table 1).

Lean and fat color

All known reports complement the findings in Table 1, that the external fat of grass-fed beef carcasses is more yellow and less white than the external fat of grain-fed beef carcasses due to the β -carotene from forage being deposited within the fat (Yang et al., 2002). Yellow fat is a disadvantage to consumer acceptance of fresh meat at retail (Kerth et al., 2007). Many researchers have reported the lean color of grass-fed beef is darker than the lean color of grain-fed beef (Bidner et al., 1986; Bennett et al., 1995; Baublits et al., 2004; Realini et al., 2004), similar to the results from the current study (Table 1). Lean color is the most important characteristic relative to a consumer's purchasing decision of fresh meat at retail, and consumers desire a bright youthful color, which they associate with freshness (Faustman and Cassens, 1990).

Tenderness

The effect of feeding regimen on cooked beef tenderness is somewhat inconclusive. Most reports indicate that steaks from grass-fed beef carcasses were tougher than comparable samples from grain-fed carcasses (Schroeder et al., 1980; Hedrick et al., 1983; Bennett et al., 1995), though some reported cooked tenderness to be similar (Sapp et al., 1999; French et al., 2000; Cox et al., 2006). The results from the current study (Table 1) show grass-fed strip steaks having numerically greater (tougher) Warner-Bratzler shear force values than

grain-fed steaks, but not being statistically different. Researchers who reported tenderness differences hypothesized some of the following reasons: grass-fed carcasses have less external fat allowing muscles to cold shorten during chilling and many grass-fed cattle will be older than their grain-fed contemporaries, potentially leading to less soluble collagen.

Cooked palatability

Results for cooked beef palatability are more conclusive, with most all researchers who conducted either trained or consumer sensory panels reporting American consumers prefer grain-fed over grass-fed beef, specifically due to fewer incidence of sensory off-flavors, more desirable beef flavor, and greater overall acceptability (Bowling et al., 1977; Schroeder et al., 1980; Hedrick et al., 1983; Crouse et al., 1984; Schaake et al., 1993; Cox et al., 2006). The difference in flavor is driven by the effect of diet on fatty acid profile (Leheska et al., 2008). However, reports by Umberger et al. (2002) and Cox et al. (2006) reported 23 and 34% of United States consumers preferred grass-fed over grain-fed beef, respectively. Producers who intend to produce grass-fed beef should identify their target customer at onset of production.

Market outlets

Producers who aspire to produce grass-fed beef can either market their animals through an established grass-fed beef program or start their own niche marketing program. The only grass-fed program within the Southeast United States which purchases outside cattle to meet their program demand is White Oak Pastures (Bluffton, GA). Interested Florida cow-calf producers should contact White Oak Pastures at <http://www.whiteoakpastures.com> to determine the documentation necessary to market calves into the White Oak Pastures program.

Those who elect to start their own program have an opportunity for greater economic reward, but also greater risk. Initially, it would be suggested to try to market carcass sides or quarters directly to consumers as freezer beef. A producer who establishes a strong relationship with a local USDA custom exempt harvest facility to provide the service of harvest, fabrication, and packaging could potentially market up to 30 grass-finished market beef annually through advertising on the internet or local newspaper. Considering a 1,000 lb grass-fed market animal with a dressing percentage of 60% will yield a 600 lb carcass, and estimating a 75% saleable yield, these 30 grass-fed market beef calculate to approximately 13,500 lbs of freezer beef to market annually, a rather sizeable volume. Note that the products generated from USDA custom exempt harvest cannot be sold as individual pieces to consumers at retail or to food service.

As a niche marketer begins to grow their clientele, careful planning needs to be made before making the transition from selling custom freezer beef to marketing USDA inspected products to retail and food service. This planning should involve careful assessment of your target customer, establishing a relationship with a USDA inspected facility to serve as a contract packer, and solidifying relationships with local retailers and foodservice to purchase your products. Potential grass-fed beef producers should also consider the additional operating capital necessary to maintain ownership of a significant portion of their calf crop an additional four to eight months, rather than marketing at weaning. Like any small business, becoming a niche meat marketing entrepreneur requires the proprietor to become married to your program and the product you produce.

Table 1. Effect of feeding system on carcass merit of crossbred steers fed in Florida.

Trait	Dietary treatment		P- value
	Grain-fed	Grass-fed	
Number of animals	12	12	---
Adj. 12 th rib fat thickness, in	0.48 ± .03	0.33 ± .03	0.09
Ribeye area, in ²	12.13 ± .43	11.05 ± .43	0.22
Hot carcass wt, lbs	654 ± 12	614.8 ± 12	0.15
Kidney, pelvic, and heart fat, %	2.3 ± 0.2	1.9 ± 0.2	0.31
USDA yield grade	2.8 ± .2	2.6 ± .2	0.40
Marbling score	Slight 92 ± 21	Slight 87 ± 21	0.88
USDA Choice, %	42	33	---
Ribeye lightness (L*) ¹	36.7 ± .7	30.1 ± .7	0.02
Ribeye redness (a*) ²	23.4 ± 1.0	24.8 ± 1.0	0.16
Fat lightness (L*) ¹	77.2 ± 1.1	72.1 ± 1.1	0.04
Fat yellowness (b*) ³	18.6 ± 0.8	23.7 ± 0.8	0.04
Warner-Bratzler shear force, lbs	8.6 ± 0.7	10.1 ± 0.7	0.26

¹L* = measure of darkness to lightness (larger value indicates a lighter color);

²a* = measure of redness (larger value indicates a redder color);

³b* = measure of yellowness (larger value indicates a more yellow color).

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