COMPARISON OF STEER FEEDLOT PERFORMANCE AND CARCASS TRAIT UNIFORMITY BY METHOD OF SORTING[1]

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Summary

Long yearling steers (n=997) of various biological types from two origins were used to test performance and carcass trait uniformity of unsorted cattle, visually sorted cattle, and cattle sorted by ultrasound and hip height. No significant differences (P>.05) in initial backfat uniformity were identified between sorted and unsorted groups; however, very little variation existed across all treatments (.17±.033 in.). Initial backfat had positive linear relationships with initial weight and carcass backfat and negative linear relationships with days on feed and daily gain (P<.05). These data indicate a reliable measurement of initial backfat could be useful for predicting days on feed and/or carcass backfat in long yearling steers, but economic usefulness will depend upon the variability of the cattle and the method of grouping.

(Key Words: Feedlot, Ultrasound, Sorting, Carcass Traits.)

Introduction

Feedlot managers need to be able to identify feeder cattle that will consistently produce carcasses of similar weight with acceptable yield and quality grades. In an effort to meet these needs, many managers have expressed an interest in sorting incoming feedlot cattle into outcome groups to 1) improve production efficiency, 2) improve product uniformity, 3) increase total cattle fed annually, and 4) accurately project days on feed. Previous trials conducted by Kansas State University scientists have indicated potential benefits of sorting feeder cattle by ultrasound; however, some questions remain. Among these are: 1) How does visual sorting of feeder cattle compare to sorting by ultrasound? and 2) Will sorting by ultrasound be effective with cattle of diverse genetic and management backgrounds? This trial was designed to answer these specific questions.

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Experimental Procedures

Long yearling steers (n=997) of various biological types from two origins were used to evaluate feedlot performance and carcass trait uniformity of unsorted cattle (n=100), visually sorted cattle (n=448), and cattle sorted by ultrasound and hip height (n=449). All steers were individually identified, weighed, measured for hip height (HH), and ultrasonically measured for backfat (BF) during normal feedlot processing. Four evaluators independently appraised the visually sorted steers for backfat and hip height. Sorted cattle were grouped as follows: 1) small framed (SF, ≤47 in. HH), light conditioned (LC, ≤.16 in. BF); 2) SF, heavy conditioned (HC, ≥.20 in. BF); 3) large framed (LF, >47 in. HH), LC; and 4) LF, HC. Visually sorted steers were penned according to backfat and hip height estimates of the most experienced visual evaluator. Visually and ultrasound-sorted cattle were penned separately according to the groups above into eight pens. Unsorted controls were grouped into two pens. All steers were subjected to identical management and were slaughtered by pen when a random 15% sample of cattle in each pen averaged .40 in. backfat measured by ultrasound.

Results and Discussion

Days on feed ranged from 83 to 97 d. Unsorted control cattle were fed for an average of 92.5 days. Carcass yield grades of the sorted cattle were consistent, ranging only from 2.3 to 2.8 by pen. Average yield grade for the control groups equaled 2.55.

Correlations (r) between visual and ultrasound estimates of initial backfat ranged from .24 to .37. Visual estimates of hip height were more accurate, with correlations to measured hip height ranging from .50 to .70. Ultrasonic measurement of initial backfat was more highly related to carcass backfat (r=.39) than to visual estimations of initial backfat (r=.16 to .33). Visual and ultrasonic measurements of initial backfat were negatively correlated to days on feed and were virtually identical (r=-.36 and -.33, respectively). Cattle origin had no relationship to days on feed (P>.05), but biological type (HH) was related to days on feed (P<.05).

In order to test the uniformity of performance factors and carcass traits, variances of the means were statistically tested. Table 26.1 lists these factors by method of sorting (unsorted, visual, and ultrasound).

Table 26.1. Steer Performance Factors and Carcass Traits by Method of Sorting

Item	Treatment		
	Control	Visual	Ultrasound
Initial backfat, in.	.17 ± .033	.17 ± .035	.17 ± .032
Daily gain, lb	3.9 ± .9	3.8 ± .7	3.8 ± .7
Carcass backfat, in.	.44 ± .14	.40 ± .10	.44 ± .12
Yield grade	2.5 ± .6	2.4 ± .8	2.6 ± .6

Although visually and ultrasound-sorted cattle were slightly more uniform for certain traits, no significant differences were found when daily gain and carcass uniformity were tested across treatments. This might be partially explained by the fact that these cattle had very uniform backfats upon arrival at the feedlot (average backfat = .17±.033 in. across all treatments), and thus significant

differences in feedlot performance or carcass trait uniformity were unlikely. Likewise, this initial backfat uniformity resulted in all of the treatment groups being marketed over a relatively short period of time (14 d), so an economic advantage from differences in days on feed was unlikely.

However, when carcass trait means were segregated by initial backfat (Table 26.2), negative linear relationships were seen with days on feed and daily gain. In addition, there were positive linear relationships of initial backfat with initial weight and carcass backfat ($P<.05$). It is especially interesting to note the strong linear relationship that existed between initial backfat measured by ultrasound and carcass backfat measured at the slaughter plant. A strong linear relationship also existed between initial backfat and initial weight, making it appear that initial weight might be nearly as useful as initial backfat in predicting days on feed. It is important to realize, however, that these cattle were subjected to identical management procedures on pasture for 3 to 4 mo before they entered the feed yard. This could lead to a stronger relationship between initial weight and initial backfat than one might expect in cattle coming from diverse backgrounding environments.

Table 26.2. Feedlot Performance and Carcass Trait Means by Initial Backfat

	Initial backfat, in.[a]					
Item	.08	.12	.16	.20	.24	.28
Initial wt, lb	770 ± 95	780 ± 83	796 ± 70	820 ± 65	824 ± 69	847 ± 52
Average daily gain, lb	4.13 ± 1.18	3.94 ± .73	3.80 ± .70	3.80 ± .75	3.69 ± .60	3.46 ± .05
Days on feed	93 ± 4	93 ± 4	92 ± 4	88 ± 5	88 ± 4	88 ± 1
Carcass backfat	.32 ± .10	.36 ± .10	.41 ± .10	.45 ± .11	.53 ± .12	.57 ± .06

[a]Backfat (measured by ultrasound) and weights determined at the time cattle were processed into the feedlot.

In conclusion, there was no economic benefit associated with sorting, probably because of the initial uniformity of the cattle and the method of grouping. However, it appears likely that initial backfat can be used to predict days on feed and/or carcass backfat in long yearling steers. In addition, visual sorting resulted in similar variability at slaughter to sorting by ultrasound and hip height. This might be due to the fact that when cattle were sorted by ultrasound, a single backfat measurement was used as the basis for sorting, whereas visual appraisers had the opportunity to evaluate the entire animal. Ultrasound may be helpful, however, as a training tool for inexperienced visual evaluators.