BEEF CATTLE RESEARCH UPDATE

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Effect of Location in Truck on Beef Calf Health and Gain during Transportation

Transportation and handling is generally regarded as stressful to cattle.[1] Cattle transport trucks are often divided into sections and location in the truck could potentially affect cattle health and performance. Recent Kansas State University research determined potential associations between location within the transport carrier and subsequent calf wellness in the short-term (40 to 60 days) after shipment.[2] In this study, data from 21 loads of calves (average of 102 hd/load and 463 lb/hd) were included in the analysis. Cattle of southeastern United States origin were purchased and commingled in Tennessee and shipped to the KSU Beef Stocker Unit in Manhattan (approximately 675 miles). In each truckload, calves were divided among 8 compartments within the trailer (Figure 1): nose on top deck (NOT), nose on bottom deck (NOB), bottom deck middle forward (BDF), bottom deck middle rear (BDR), rear on the bottom (ROB), top deck middle forward (TDF), top deck middle rear (TDR), and rear on the top deck (ROT). Upon arrival in Manhattan, the calves were backgrounded on a high-roughage diet for an average of 47 days.

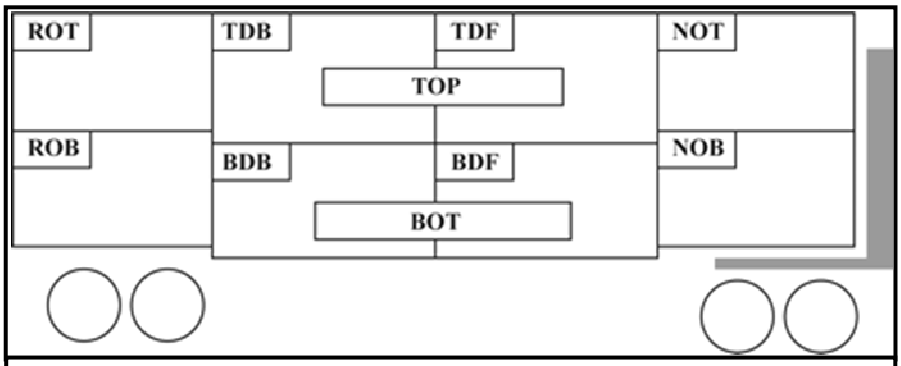

Figure 1. Depiction of compartment location within a standard cattle transport trailer. Truck compartments abbreviated as bottom deck rear (BDB), bottom deck front (BDF), bottom deck (bottom deck forward and back combined, BOT), rear on top (ROT), bottom deck nose (front, NOB), nose on top deck (NOT), rear on bottom (ROB), top deck back (TDB), top deck forward (TDF), and top deck (top deck back and forward combined, TOP). Source: White et al., 2009

These researchers reported that individual animal daily gains over the entire backgrounding period were not associated with transport vehicle compartment (average gain of 1.98 lb/day). However, period daily gains from arrival to revaccination (10 to 16 days) tended to be associated with compartment. Cattle in the rear top deck had the lowest short-term gains. Cattle in the nose sections of the truck gained faster from arrival to revaccination (4.15 lb/day) than cattle in the rear sections (3.79 lb/day) and tended to gain faster than cattle in the middle sections (3.97 lb/day). It was also reported that cattle in the nose sections were less likely to be treated at least once for sickness (12.2%) than cattle in the middle sections (16.8%). Cattle in the nose section were also less likely to be treated within the first 14 days (4.3%) compared with cattle in the middle sections (9.8%). Cattle transported with less than 15 animals in a section were less likely to be treated compared with compartments with more animals during the first 14 days after arrival and during the entire period. However, stocking density was not associated with disease risk in this study. The results of this study reveal that location within a truck may affect cattle health and performance.

Effect of Energy Supplementation of Grazing Stocker Cattle on Subsequent Feedlot Performance and Carcass Traits

Recent Kansas State University research evaluated grazing and subsequent finishing performance of 117 Angus stocker calves (519 lb initial weight and ~7 months of age) supplemented with 0, 1.81, or 3.62 lb/day of ground grain sorghum (DM basis) while grazing smooth bromegrass pastures in 2002, 2003, and 2004.[3] These supplementation rates corresponded to approximately 0, 0.25 and 0.50% of cattle body weight on a DM basis. The grain sorghum was fed daily in bunks. In each year, the cattle continuously grazed pasture at a stocking rate of 1 hd per 1.25 acres from mid-April to early November (207 day grazing phase). The forage protein content ranged from approximately 7 to 21% each year. However, the protein content was less than 10% during the majority of the grazing season. After the grazing phase, all cattle were a fed common finishing diet (80% ground grain sorghum, 15% corn silage, and 5% supplement, DM basis) for an average of 112 days each year.

The results of this study are shown in Table 1. These researchers reported that supplementation with 1.81 or 3.62 lb/day of grain sorghum increased grazing daily gains by 10.8 or 18.94%, respectively, compared with feeding no supplement (1.63, 1.81, and 1.94 lb/day for 0, 1.81, and 3.62 lb/day supplementation rates, respectively). Furthermore, supplemented cattle produced more weight gain per acre than non-supplemented cattle (267, 297, and 322 lb/acre, respectively, for 0, 1.81, and 3.62 lb/day supplementation rates). Forage mass was measured every 28 days on each pasture during the grazing season. This data showed that forage mass was not affected by supplementation suggesting that these levels of supplementation had little or no apparent effect on forage intake. A 1987 research review concluded that energy supplementation of grazing cattle reduces forage intake and digestibility and that this substitution is more pronounced at greater levels of feeding.[4] This review suggested that concentrates can be fed up to about 0.50% of body weight without causing large decreases in forage intake. In the Kansas trial, cattle supplemented with 1.81 or 3.62 lb/day of grain sorghum required 11.9 or 12.9 lb of grain sorghum (DM basis) for each additional lb of weight gain above that of the unsupplemented control cattle. These supplement conversion ratios are slightly higher than the 8 to 10 conversion ratios generally observed with energy supplementation (typically grains) on pasture. In contrast to these poor supplement conversion ratios, supplement conversion ratios generally range from about 2 to 3 with protein supplements containing approximately 38 to 44% protein.[5]

During the finishing phase of this study, no differences in weight gain or feed intake due to the grazing treatments were reported. This date indicates that cattle not supplemented while grazing had no compensatory gain in the feedlot. However, cattle that were supplemented with 1.81 lb/day of grain sorghum during the grazing phase required less ($P < 0.05$) feed per pound of finishing gain than cattle that were previously supplemented with 3.62 lb/day of grain sorghum (7.30 vs. 7.98). Cattle supplemented during grazing maintained their weight advantage through the finishing phase, yielding heavier carcasses.

Carcass fat thickness did not differ between the grazing treatments. However, cattle fed 3.62 lb/day of grain sorghum yielded carcasses with greater marbling scores and a numerically greater percentage of USDA choice carcasses than those receiving no supplement during grazing (86.8 vs. 78.5%). This increased marbling may be due the cattle receiving grain supplementation during the grazing phase. Several studies have indicated that increasing exposure to high grain (starch) diets to early weaned steers results in increased carcass quality at slaughter.[6,7,8] These studies suggest that the type of diet (grain vs forage) may affect marbling. High grain (starch) diets appear to result in greater marbling deposition.

These researchers concluded that relatively low levels of energy supplementation can increase grazing daily gains and gains per acre without having a negative impact on subsequent finishing performance. In addition, grain supplementation during the grazing phase may provide an opportunity to increase marbling scores and thereby increase carcass value. Obviously, the

decision regarding whether to provide supplemental energy to grazing cattle will be determined by economics.

Table 1. Effect of grain sorghum supplementation on grazing and subsequent feedlot performance.

	Grain Sorghum Level (lb of DM/day per steer		
Item	0	1.81	3.62
Grazing Phase			
Initial weight, lb	518	522	518
Ending weight, lb	851[a]	893[b]	919[c]
ADG, lb	1.63[a]	1.81[b]	1.94[c]
Gain/acre, lb	267[a]	297[b]	322[c]
Supplement conversion	---	11.9	12.9
Finishing Phase			
Starting weight, lb	851[a]	893[b]	919[c]
Final weight, lb	1253[a]	1304[b]	1307[b]
ADG, lb	3.57	3.68	3.46
DM intake, lb	27.6	26.7	27.6
Feed/Gain	7.71[ab]	7.30[a]	7.98[b]
Hot carcass weight, lb	744[a]	774[b]	776[b]
Fat thickness, in	0.41	0.45	0.46
Ribeye area, in^2	12.7	12.7	12.9
Yield Grade	2.7	2.9	2.9
Marbling score[*]	527[a]	537[ab]	554[b]
Percentage Choice	78.5	78.5	86.8
Overall ADG, lb	2.32[a]	2.47[b]	2.47[b]

[a,b,c] Means within a row with different superscripts differ ($P < 0.05$).

[*] Marbling score: 500 = Small; 600 = Modest.

Adapted from Lomas et al., 2009

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