BEEF CATTLE RESEARCH UPDATE

Britt Hicks, Ph.D., PAS
Area Extension Livestock Specialist
Oklahoma Panhandle Research & Extension Center

January 2009

Effects of Source and Weaning Management on Health and Performance of Feedlot Calves

Recent Oklahoma research determined the effects of commingling calves of unknown background sources with calves obtained directly from their ranch of origin but differing in management before shipping.[1] This study used 249 steer calves from a single ranch (RANCH) and 260 steer calves purchased from multiple sources (MARKET) that were fed at the Willard Sparks Beef Research Center in Stillwater.

The RANCH calves came from a single ranch in south-central Missouri (350 miles from Stillwater) where they had been castrated, dehorned, and vaccinated with a 7-way Clostridial bacterin/toxoid at about 2 months of age. These calves were divided into three weaning management groups: 1) weaned and immediately shipped to Stillwater at about 8 months of age (WEAN), 2) weaned on the ranch for 45 days before shipping, but received no vaccinations (WEAN45), and 3) weaned, vaccinated with modified live viral vaccine, and held on the ranch for 45 days before shipping (WEANVAC45). The WEAN45 and WEANVAC45 calves were weaned in separate tall fescue grass pastures. The WEANVAC45 calves were vaccinated with one dose each of a modified live viral respiratory vaccine (Titanium 5, AgriLabs), a 7-way Clostridial bacterin/toxoid (Vision 7 with SPUR, Intervet), and a *Mannheimia (Pasteurella) hemolytica*/toxoid (Presponse SQ, Fort Dodge Laboratories) and were re-vaccinated two weeks after weaning with a modified live viral vaccine in combination with a *Leptospira* bacterin component (Titanium 5 L5, AgriLabs).

The MARKET calves were purchased through a private order buyer who acquired the steers through regular auction-market channels in the southeastern United States. The steers were assembled at a facility in Mississippi before transporting the calves to Stillwater (about 675 miles). The health and management histories of these calves were unknown.

All WEAN, WEAN45, and MARKET steers were vaccinated with Titanium 5, Vision 7 with SPUR and Presponse SQ, and de-wormed with Ivomec Plus approximately 24 hrs after arrival at the feedlot. These steers were re-vaccinated about 14 days after initial processing with Titanium 5 L5. The WEANVAC 45 steers were de-wormed but not vaccinated after arrival at the feedyard. After initial processing at the research feedlot, a portion of the MARKET calves were commingled with a portion of the RANCH calves from each weaning management group (COMM). The following experimental groups were evaluated:

- MARKET (served as experimental control)
- WEAN
- WEAN45
- WEANVAC45
- Commingled WEAN and MARKET
- Commingled WEAN45 and MARKET
- Commingled WEANVAC45 and MARKET

The effects of calf origin and commingling on animal performance and health over a 42-day receiving period are shown in Table 1. During the receiving period, RANCH calves tended to have greater average daily gains (2.95 lb/day) than MARKET and COMM calves (2.76 and 2.80 lb/day, respectively). However, feed intake and gain efficiency were not affected by cattle origin. RANCH calves experienced lower morbidity (11%) than MARKET calves (42%) and COMM calves (23%) were intermediate. In addition, sick MARKET and COMM calves received their first antimicrobial treatment earlier (day 7 and 11, respectively) than ranch calves (day 18). Mortality due to bovine respiratory disease was greater in MARKET and COMM (3.1 and 2.1%, respectively) than RANCH calves (0%). As expected, these differences in morbidity led to differences in health cost ($9.67, $13.48, and $10.70/steer for RANCH, MARKET and COMM, respectively).

Table 1. Effects of calf origin/commingling on receiving performance and health.

Item	RANCH	MARKET	COMM	P-value
Body Weight, lb				
day 1	534	498	516	0.28
day 42	642	633	635	0.06
Performance, day 1 to 42				
Daily Gain, lb	2.95	2.76	2.80	0.06
DM Intake, lb	16.10	15.85	16.03	0.85
DM Intake, % of BW	2.51	2.50	2.53	0.91
Gain:Feed	0.186	0.174	0.174	0.11
Morbidity, %	11.1[a]	41.9[b]	22.6[c]	<0.001
1st treatment day	17.9[a]	7.2[b]	10.6[c]	0.001
Mortality, % respiratory	0.0[a]	3.1[b]	2.1[b]	0.03
Health Costs, $/hd	9.67[a]	13.48[b]	10.70[b]	0.02
Total Cost, $/hd	57.89[a]	61.05[b]	57.73[a]	0.004
Cost of Gain, $/lb	0.64	0.76	0.69	0.22

[a,b,c] Means within a row with different superscripts are different (P<0.05).
Source: Step et al., 2008.

The effects of weaning management performance and health over a 42-day receiving period are shown in Table 2. MARKET, WEAN45, and WEANVAC45 calves consumed more feed than WEAN calves. However, daily gain and gain efficiency were not affected by weaning management. Morbidity was greater in MARKET (42%) and WEAN (35%) calves compared with WEAN45 (6%) and WEANVAC45 (10%) calves. In addition, MARKET calves were pulled and treated earlier in the receiving period (day 7) than WEAN and WEAN45 calves (day 13 and 18, respectively), while WEANVAC45 calves were intermediate (day 12). Mortality did not differ between treatments. Health costs were greater for MARKET and WEAN steers ($13.54 and 13.24/hd, respectively) than WEAN45 or WEANVAC45 steers ($8.30 and 8.93/hd, respectively).

Table 2. Effects of weaning management on receiving performance and health.

Item	MARKET	WEAN	WEAN45	WEANVAC45	P-value
Body Weight, lb					
day 1	498[a]	509[a]	498[a]	567[b]	0.01
day 42	635	637	642	637	0.46
Performance, day 1 to 42					
Daily Gain, lb	2.76	2.84	2.84	2.93	0.46
DM Intake, lb	15.81[a]	15.10[b]	16.63[c]	16.49[ac]	<0.001
DM Intake, % of BW	2.50[a]	2.38[b]	2.60[a]	2.59[a]	<0.001
Gain:Feed	0.175	0.188	0.177	0.173	0.17
Morbidity, %	41.9[a]	35.1[a]	5.9[b]	9.5[b]	<0.001
1st treatment day	7.2[a]	12.5[b]	18.0[b]	11.6[ab]	0.004
Mortality, % respiratory	3.1	0.0	0.0	0.0	0.16
Health Costs, $/hd	13.54[a]	13.24[a]	8.30[b]	8.93[b]	<0.001
Total Cost, $/hd	61.03[a]	59.00[b]	57.81[b]	58.15[b]	0.009
Cost of Gain, $/lb	0.75	0.74	0.60	0.66	0.07

[a,b,c] Means within a row with different superscripts are different (P<0.05).
Source: Step et al., 2008.

As would be expected, these data showed that MARKET steers exhibited greater morbidity rates than ranch-origin steers, while those in commingled pens exhibited intermediate morbidity rates. In addition, within commingled pens, MARKET steers had greater morbidity than RANCH steers. Furthermore, days to first treatment for respiratory disease were earlier in MARKET steers in commingled pens than for RANCH steers.

In summary, these researchers concluded that weaning calves on the ranch for 45 days (preconditioning) before transporting to a receiving facility results in improved health and performance and less health costs during the subsequent receiving and feeding period compared

with weaning and transporting calves immediately, or purchasing calves of high health risk. This experiment also suggested that weaning alone is as beneficial as weaning and vaccination for calves held on the ranch of origin for 45 days. In addition, commingling preconditioned calves has less potential negative effects than commingling calves that are weaned and immediately transported to a feedyard.

Numerous other reports have shown that it is beneficial to vaccinate, wean, and hold calves on the ranch for 45 days prior to shipment (VAC 45 programs). Data collected from the Superior Livestock Auction video sales from 1995 through 2005 showed the premium paid for VAC 45 calves ranged from a low of $2.47/cwt in 1995 to a high of $7.91/cwt in 2004 (Figure 1)[2]. However, these reports generally do not compare weaning only with weaning plus vaccination in preconditioning programs. This Oklahoma data suggest that the primary benefit of preconditioning is due to weaning and holding calves for some time prior to shipment.

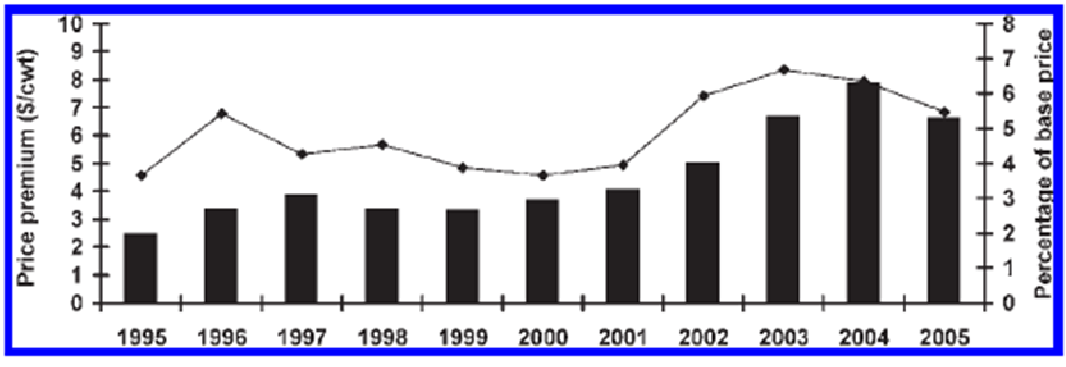

Figure 1. Price premiums paid (bars) and the percentage that those premiums represented of the base price (line) for beef calves in the V45 certified health program that were sold through a livestock videotape auction service from 1995 through 2005. Source: King et al., 2006.

In a recent University of Florida study, the effects of pre-shipping management on performance of beef steers during feedlot receiving were evaluated.[3] In this study, calves weaned 45 to 53 days prior to shipping to the feedlot (hauled ~994 miles) gained faster (2.56 vs 1.94 lb/day) and consumed more feed (2.84 vs 2.50% of body weight) during a 29 day receiving period than calves weaned at shipping. These performance results follow the same pattern reported in the Oklahoma study. No morbidity was observed in this study. The pre-weaned calves were provided free-choice access to a concentrate supplement over the pre-shipment period (average DM intake of 8.9 lb/day). The vaccination programs used in this study were not reported.

---

[1] Step, D. L., C. R. Krehbiel, H. A. DePra, J. J. Cranston, R. W. Fulton, J. G. Kirkpatrick, D. R. Gill, M. E. Payton, M. A. Montelongo, and A. W. Confer. 2008. Effects of commingling beef calves from different sources and weaning protocols during a forty-two-day receiving period on performance and bovine respiratory disease. J. Anim. Sci. 56: 3146-3158.

[2] King, M. E., M. D. Salman, T. E. Wittum, K. G. Odde, J. T. Seeger, D. M. Grotelueschen, G. M. Rogers, and G. A. Quakenbush. 2006. Effect of certified health programs on the sale price of beef calves marketed through a livestock videotape auction service from 1995 through 2005. J. Am. Vet. Med. Assoc. 229: 1389-1400.

[3] Arthington, J. D., X. Qiu, R. F. Cooke, J. M. B. Vendramini, D. B. Araujo, C. C. Chase Jr., and S. W. Coleman. 2008. Effects of preshipping management on measures of stress and performance of beef steers during feedlot receiving. J. Anim. Sci. 86: 2016-2203.