Effects of Weaning Date and Deworming on Post Weaning Performance of Beef Heifers Grazing Native Range

M.D. Hudson and D.L. Lalman

Story in Brief

The objective of this study was to determine the effects of late summer endectocide treatment and weaning date on performance of yearling fall-born heifers grazing native range and receiving a protein supplement. In two successive years, sixty-three predominantly Angus heifers were allotted to a 2 x 2 factorial comprised of two weaning dates: (1) normally-weaned at 210 d of age in April (Treatment=NW) or (2) late-weaned at 300 d of age in July (Treatment=LW) and randomly assigned within weaning treatment to two levels of endectocide treatment post-weaning: (1) heifers receiving endectocide application (1% ivermectin and 10% clorsulon in a sterile solution) at the onset of the study (d=0) and reapplication on d 28 (Treatment=TREATED) and (2) heifers that did not receive endectocide application (Treatment=CONTROL). All heifers received protein supplementation equivalent to 1 lb/head per day of cottonseed meal and grazed native range as a contemporary group throughout the 84-d trial. A significant interaction between deworming and weaning treatment was detected for BW and BCS at the end of the breeding season; however, no interaction was detected for any other measurements. Overall, no significant effect of deworming was detected, likely due to minimal initial parasite load. Additionally, time of weaning did not affect heifer weight, although ADG during the study period was greater for normal-weaned heifers.

Keywords: Beef Heifers, Performance, Grazing, Protein, Deworming, Weaning

Introduction

Development of fall-born replacement heifers requires that heifers continue to gain weight during the late-summer and early-fall when quality of native forage is declining. To ensure adequate weight gain, heifers are frequently provided a protein supplement. Previous research demonstrates that growing cattle treated with an endectocide treatment in mid- to late-summer grow faster than untreated cattle (Purvis et al., 1996; Smith and Claywell, 1996). Additionally, Oklahoma producers increasingly wean their fall-born calves later in the summer. It is not known whether increased weight gain achieved by later weaning is maintained through the fall and winter months when heifers are retained as herd replacements. This experiment was designed to evaluate the effect of late-summer endectocide treatment and prior weaning management of yearling beef heifers grazing native range and receiving a protein supplement.

Materials and Methods

Cattle and Treatments. This experiment was conducted at the OSU Range Cow Research Center, North Range Unit located 15 mi west of Stillwater, OK, using predominantly Angus fall-born heifers. In two successive years (2005 and 2006), sixty-three predominantly Angus heifers were allotted to a 2 x 2 factorial comprised of two weaning dates: (1) normally-weaned at 210 d of age in April (Treatment=NW) or (2) late-weaned at 300 d of age in July (Treatment=LW) and randomly assigned within weaning treatment to two levels of endectocide treatment post-weaning: (1) heifers receiving endectocide application (1% ivermectin and 10% clorsulon in a sterile solution) at the onset of the study in early August each year (d=0) and reapplication on d 28 (Treatment=TREATED) and (2) heifers that did not receive endectocide application (Treatment=CONTROL). These cattle are progeny of the OSU Range Cow Research Center herd and are relatively uniform in age and biological type.

Management and Weighing Procedures. Initial weights were recorded on d 0, and heifers randomly assigned to receive endectocide treatment were subcutaneously injected with an anthelmintic at a dosage of 1 mL / 110 lb (50 kg) body weight. TREATED heifers received a second dosage of anthelmintic on d 28. Weights were recorded at 28-d intervals through d 84.

All heifers grazed as a contemporary group throughout this trial and forage was abundant at all times through d 84. Heifers were supplemented with 2.33 lb of a 41% crude protein (as-fed) cottonseed meal supplement on Mondays, Wednesdays, and Fridays in individual feeding stanchions. This feeding rate equates to 1 lb/hd per day. At the conclusion of the summer/fall treatment period (prior to breeding) all heifers were treated with an anthelmintic to ensure a low worm burden going into the breeding season.

Immediately following the 84-d growing period, approximately 77% of the heifers were selected as replacements each year. The heifers selected for culling were removed from the herd before the breeding season began. Culling decisions were made without regard to previous experimental treatment. One fertile Angus bull was turned out with the heifers beginning in late November and removed from the herd in late January resulting in a 63-d breeding season. Weights and body condition scores (1=emaciated, 9=obese) were recorded at the beginning and end of the breeding season. Pregnancy was determined via rectal palpation during May each year.

Statistical Analysis

Data were analyzed using the MIXED model procedure of SAS. The model included terms for the fixed effects of weaning treatment, endectocide treatment, the interaction between treatments, and cow age class. Birth date and birth weight were included in the model as covariates. Year did not interact with weaning treatment or endectocide treatment, therefore year was treated as a random variable. Data presented in tables are least square means.

Results and Discussion

Fecal egg counts did not differ due to endectocide treatment as measured on d 84 of the study (Table 1). These values are similar to those reported by Lalman et al. (2005) for fall-born calves grazing native range during late summer and fall. However, in that study, October fecal egg counts were reduced for calves that had been previously treated using a similar treatment regimen, compared to calves that were not treated. Perhaps reinfestation during the 2005 and 2006 summer grazing period occurred at a more rapid rate compared to the previous 2 yr.

Table 1. Fecal egg counts of heifers assigned to two post-weaning levels of endectocide treatment.

		Endectocide Treatment			
Item	n=	Control	Treated	SEM	P-value
Strongyles[a]	32	54.4	53.6	21.0	.98
Eimeria[a]	32	82.3	139.3	41.9	.32
Nematodirun[a]	32	2.2	0	2.5	.44

[a] Eggs per gram feces.

Table 2 reports the interaction p-values, as well as those associated with weaning treatment and deworming treatment. A significant interaction between weaning and endectocide treatments was detected for BW and BCS at the end of the breeding season. However, no other interactions were detected for the other measurements.

Table 2. P-values associated with weaning treatment and deworming treatment, as well as the interaction.

			P-value	
Item	n=	Interaction	Weaning Treatment	Deworming Treatment
Initial BW (d=0)	63	.27	.17	.73
BW, d-28	63	.26	.27	.69
BW, d-56	63	.26	.13	.75
Final BW (d=84)	63	.28	.40	.90
ADG, d-0 to d-28	63	.85	.17	.20
ADG, d-28 to d-56	63	.82	.46	.95
ADG, d-56 to d-84	63	.65	.58	.31
Cumulative ADG, d-0 to d-84	63	.87	.01	.09
Pre-breeding BW	63	.16	.53	.78
Pre-breeding BCS	27	.24	.49	.20
Post-breeding BW	47	.02	.44	.59
Post-breeding BCS	47	.02	.78	.60
Retained, %	63	.77	.89	.98
Pregnant, %	63	.65	.10	.96

Table 3 illustrates the LS means for the treatment interaction observed for post-breeding BW and BCS. Late-weaned heifers not treated with endectocide and NW-Treated heifers were heavier than LW-Treated and NW-Control heifers. Normal-weaned heifers treated with endectocide had greater fat reserves than NW-Control heifers (5.68 vs 5.43; P<.05); however, no other differences were noted between treatment combinations.

Table 3. Least squares means for treatment interactions between time of weaning and post-weaning endectocide treatment.

	Treatment Combinations[a]				
Item	LW-Control	LW-Treated	NW-Control	NW-Treated	SEM
Post-breeding BW	817[a]	767[b]	761[b]	793[ab]	32.2
Post-breeding BCS	5.62[ab]	5.46[ab]	5.43[b]	5.68[a]	.12

[ab] Values within a row without a common superscript differ at P<.05.

Endectocide treatment tended (P=.09) to improve BW gain during the 84-d study period (Table 4). This tendency for a growth response is in agreement with results of Lalman et al (2005) in an experiment conducted at the same site and under very similar management conditions. Perhaps the parasite load during the hot dry summers of 2005 and 2006 resulted in minimal parasite load and therefore, reduced growth response compared to previous years (Lalman, et al., 2005).

Table 4. Least squares means for performance of yearling, fall-born heifers assigned to two levels of endectocide treatement.

	Endectocide Treatment			
Item	Control	Treated	SEM	P-value
Initial BW (d=0)	598	592	12.4	.73
BW, d-28	631	624	12.6	.69
BW, d-56	664	662	12.3	.90
Final BW (d=84)	682	683	12.3	.95
ADG, d-0 to d-28	1.14	1.11	.07	.75
ADG, d-28 to d-56	1.03	1.17	.08	.20
ADG, d-56 to d-84	.87	1.0	.92	.31
Cumulative ADG, d-0 to d-84	.97	1.06	.04	.09
Pre-breeding BW	698	703	12.0	.78
Pre-breeding BCS	5.13	5.02	.06	.20
Retained, %	77.3	77.5	7.5	.98
Pregnant, %	76.4	77.1	9.5	.96

When evaluating the effects of time of weaning for the measurements without a significant interaction, only ADG for the 84-d period was affected (Table 5). During that time, NW heifers more rapidly gained weight (1.08 vs 0.95 lb). This response is possibly due to a compensatory gain mechanism. A tendency (P=.10) was detected for percent pregnant. Eighty-seven percent of LW heifers became pregnant compared to only 66.1% of NW heifers.

Table 5. Least squares means for performance of yearling, fall-born heifers weaned at two different dates.

	Weaning Date			
Item	LW	NW	SEM	P-value
Initial BW (d=0)	607	583	12.1	.17
BW, d-28	637	617	12.9	.27
BW, d-56	670	656	12.5	.40
Final BW (d=84)	689	676	12.6	.46
ADG, d-0 to d-28	1.05	1.20	.70	.13
ADG, d-28 to d-56	1.03	1.18	.08	.17
ADG, d-56 to d-84	.90	.97	.09	.58
Cumulative ADG, d-0 to d-84	.95	1.08	.04	.01
Pre-breeding BW	706	695	12.2	.53
Pre-breeding BCS	5.10	5.04	.07	.49
Retained, %	78.2	76.7	7.5	.89
Pregnant, %	87.4	66.1	9.5	.10

Conclusions

Response to endectocide treatment at the Range Cow Research Center is apparently inconsistent, ostensibly due to environmental factors outside of experimental control, as based on the results of this experiment and those previously reported (Lalman et al., 2005). Heifers weaned during April did gain at a slightly faster rate during late-summer and fall compared to heifers weaned during July. The tendency for July-weaned heifers to have higher pregnancy rate suggests the need for further investigation.

Literature Cited

Lalman et al., 2005. Okla. Ag. Exp. Sta. Res. Rep.

Purvis II, H.T. et al. 1996. Okla. Ag. Exp. Sta. Res. Rep. P-951:245-248.

Smith, S.C. and G.C. Claywell. 1996. Okla. Ag. Exp. Sta. Res. Rep. P-951:216-217.

Acknowledgments

The authors would like to thank Duane Williams, Gant Mourer and all undergraduate help for management and feeding of the heifers throughout the study and assistance with data collection.

Authors

Hudson, M.D. – Graduate Student

Lalman, D.L. – Associate Professor