Effects of Weaning Date and Retained Ownership on Cow and Calf Performance and Forage Disappearance in Spring Calving Beef Systems[1]

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Summary

Researchers in North Dakota, South Dakota and Wyoming are working together to evaluate the effect of weaning calves 75 days earlier than normal and are following the calves through finishing. This report summarizes accomplishments so far. Briefly, weaning calves 75 days early (mid-August) has improved cow weight and condition score compared to cows whose calves were weaned normally (early-November). Native range forage disappearance has tended to be lower when calves were weaned early. After weaning, backgrounded early weaned steers grew faster and were more efficient. However, early weaned steers required 61 more days on feed to reach final harvest.

Introduction

Cow/calf operations that are able to utilize early weaning of calves as part of their marketing and resource management strategies can add tremendous flexibility to their operations. The greatest concern of producers considering early weaning is selling a light calf and, as a result, losing revenue. Additional concerns may be availability and/or accessibility of facilities or operations to handle early weaned calves and apprehension to change. A number of post-weaning strategies may be useful in increasing the income from early weaned calves. Clearly it will be important to determine the decisions in the post-weaning system that have the greatest impact on net income (e.g. sale of calves at weaning versus retained ownership through backgrounding versus retained ownership through finish). These decisions have potential to add value to the calf crop as well as to forage and grain crops from the region. Other components of the ranching system will also be affected by weaning date, and these must be considered in any effort to determine the consequences of a weaning decision. Objectives of this study were to evaluate the effects of weaning date on cow performance during the fall, calf performance through backgrounding and finishing, and forage utilization.

Materials and Methods

Cow herds from the South Dakota State University Antelope Station (SDSU; 140 cows), the North Dakota State University Dickinson Research Extension Center (DREC; 88 cows), and the University of Wyoming Beef Unit (UW; 93 cows) were used in the study. At each location, spring-born calves were weaned from cows at approximately 140 days (mid-August) or 215 days of age (early-November). Cow body weight and body condition score change were monitored between the August and November weaning dates to determine impacts of weaning on cow performance.

Calf weaning weights were recorded at each location. Steer calves from SDSU and DREC were transported immediately after weaning to the NDSU Hettinger Research Extension Center for backgrounding. Steers were backgrounded either 49 (early weaned) or 54 (normal weaned) days using a diet consisting of locally grown forage and a commercial pellet consisting of regionally available co-product feedstuffs (soyhulls, wheat middlings, barley malt sprouts). Two to four weeks prior to each weaning date, calves were vaccinated against clostridial and respiratory diseases (Ultrabac 7/Somubac®-

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killed, Bovi-Shield 4®-modified live, One Shot®-modified live). Calves were boostered with Ultrabac 7/Somubac® and Bovi-Shield 4® at weaning. Following the 7-8 week backgrounding phase, calves were transported to a commercial feedyard for finishing. An electronic cattle management system was employed to determine final end point, based on an external fat depth of 0.40 inch. While at the feed yard, morbidity and mortality frequency and distribution was monitored. Steers from DREC and SDSU facilities were slaughtered at Excel Packing and carcass data was collected by plant personnel.

Both steers and heifers from UW were managed in a similar protocol as described for SDSU and DREC steers. Cattle were backgrounded at the UW Beef Unit, Laramie, for 43 (early weaned) and 40 (normal weaned) days, respectively. Following the backgrounding period, cattle remained at the UW Beef Unit for the experiment's finishing phase. Cattle were marketed in three groups, March 29, May 10, and May 25, 2004. Final harvest was at Swift Packing Company, Greeley, Colorado.

Grazing, backgrounding, and finishing performance were analyzed by ANOVA using a PROC GLM procedure of SAS. Since treatment by location interactions were identified, treatment means were compared within location. Animal was used as the experimental unit for the cow data and pen was used as the experimental unit for the calf data (since SDSU and DREC cattle were finished using individual cattle management, animal was the experimental unit for the finishing data at those locations).

Vegetation samples were collected at DREC to determine the magnitude of biomass disappearance among cows suckling calves from August to November (normal weaning; n=3 pasture groups) versus dry cows grazing from August to November (early weaning; n=3 pasture groups). A 640 acre pasture was subdivided into twelve 50 acre pastures in a wagon wheel configuration with central watering sites and a 23 acre center cell where cattle handling procedures were conducted. Three pen replicates per treatment were randomly assigned to half of the pastures in June where the cow-calf pairs grazed until the first weaning in mid-August. At the mid-August early weaning date, replicated groups of early and normal weaned cows were rotated and randomly assigned to the remaining six ungrazed pastures. Ungrazed pastures were sampled just prior to the mid-August rotation to estimate total available biomass and again at the end of grazing in November to estimate residual biomass. Fifty 0.25 meter samples were taken per 50 acre pasture. Forage biomass remaining after grazing compared to that measured prior to grazing was used to estimate native range forage disappearance for each weaning treatment. Growth during the August to November period was assumed to be negligible. Analysis of variance was used to evaluate weaning treatment effect on biomass disappearance with pasture as the experimental unit.

Results and Discussion

Early weaning impacted cows positively by maintaining or improving body weight ($P < 0.01$) and body condition score ($P < 0.01$) at each location (Table 1).

Normally weaned steers were heavier at the end of the backgrounding phase ($P < 0.01$) at each location (Table 2). Early weaned calves from DREC had higher ($P < 0.01$) average daily gain during backgrounding than normally weaned calves, whereas calves from SDSU had similar gains across weaning dates. In contrast, early weaned calves from UW gained less than those weaned in November ($P < 0.01$). Dry matter intake ($P < 0.05$) and F:G ($P < 0.01$) of early weaned calves were improved compared to normal weaned at SDSU and DREC.

During the finishing phase, normal weaned steers were an average 77 kg heavier on arrival ($P < 0.01$); however, final harvest weight did not differ (Table 3). On average, normal weaned steers required 61 fewer days on feed ($P < 0.01$), and SDSU's normal weaned steers were less efficient during finishing ($P < 0.01$).

Fat depth at UW was 2.75 mm greater ($P < 0.05$) for the early weaned steers. Yield and quality grades did not differ at SDSU and DREC. Hot carcass weight and rib-eye area did not differ between treatments. However, early weaned steers had greater yield ($P < 0.05$) and quality grades ($P < 0.10$) at UW that resulted when the early weaned group was fed to a higher degree of finish. Number of steers

grading Choice was low for DREC and SDSU cattle, indicating that steers finished with the electronic cattle management system needed to be on feed longer.

Morbidity was monitored based on treatment rate during the backgrounding and finishing phases of the study. Incidence of BRD was minimal among early weaned steers. However, normal weaned steers broke with BRD near the end of the backgrounding phase. Death loss was 3.95% (3 of 76). Initial feed yard pulls and re-pulls at the commercial feed yard (NDSU and SDSU) are shown in Figures 1 and 2. While steers in early weaned groups exhibited minimal BRD during backgrounding, incidence of BRD during the finishing phase for steers originating from both North and South Dakota was higher than expected.

The August weaning system utilized 72% of the available biomass when compared to the November system. Forage disappearance for cows that had calves weaned early was estimated to be 803 kg per ha, whereas forage disappearance among cows that continued to nurse their calves for an additional 75 days was estimated to be 1109 kg per ha (P = 0.15). The difference in forage utilization was attributed to calf removal.

Implications

Early weaning was advantageous to cow body condition score and early weaned calves performed adequately post-weaning. Early-weaned calves performed very well during the backgrounding phase. Early weaning resulted in sparing a significant amount of forage. Time of weaning decisions should include all of these factors and ultimately be based on net return. A beef systems economic analysis is in progress; however, the analysis is dependent upon complete summarization of the second year's data and is not included in this report.

Tables

Table 1. Body weight and condition score change among early and normal weaned cows located at the NDSU-Dickinson Research and Extension Center, SDSU- Antelope Station and UW - Beef Unit (2003)

Item	DREC Weaning period		SDSU Weaning period		UW Weaning period	
	Early	Normal	Early	Normal	Early	Normal
August cow wt., lb	1285	1332	1341	1329	1207	1242
November cow wt., lb[a]	1273	1135	1375	1281	1228	1178
Cow wt. change, lb[a]	-12	-197	36	-47	21	-65
August BCS	5.52	5.52	5.63	5.65	5.43	5.59
November BCS[a]	5.91	4.32	5.97	5.63	5.38	4.82
BCS change[a]	0.39	-1.20	0.34	-0.02	-.05	-.78
August calf wt., lb[b]	386	405	407	403	443	436
November calf wt., lb	-	543	-	582	-	607

[a]Treatments at each location differ ($P < 0.01$).
[b]Treatments at DREC location differ ($P < 0.10$).

Table 2. Summary of backgrounding performance for early and normal weaned steers at the NDSU - Dickinson Research and Extension Center (DREC), SDSU - Antelope Station and UW - Beef Unit (2003)

	DREC		SDSU		UW	
Item	Early	Normal	Early	Normal	Early	Normal
No. steers	40	38	36	35	26	23
Days on feed	49	54	49	54	43	40
Start wt., lb[a]	407	553	414	600	445	622
End wt., lb[a]	578	715	568	765	536	718
ADG, lb[b]	3.50	2.99	3.12	3.05	2.13	2.56
DM intake, lb[c]	12.0	12.5	11.7	13.2		
Feed:Gain, lb[d]	3.44	4.16	3.76	4.35		

[a]Treatments at each location differ (*P < 0.01*).
[b]Treatments at DREC and UW locations differ (*P < 0.01*).
[c]Treatments at DREC and SDSU locations differ (*P < 0.05*).
[d]Treatments at DREC and SDSU locations differ (*P < 0.01*).

Table 3. Feedlot finishing performance and carcass measurements for early and normal weaned steers from the NDSU-Dickinson Research and Extension Center (DREC), SDSU- Antelope Station and UW - Beef Unit (2003)

	DREC		SDSU		UW	
Item	Early[a]	Normal	Early	Normal	Early	Normal
Receiving wt., lb[b]	559.02	699.99	561.64	743.91	536	718
Harvest wt., lb.	1136.42	1173.5	1109.72	1174.4	1219	1229
Days at feed yard, da[b]	188.45	129.06	182.94	133.0	224	150
ADG, lb.[b]	3.08	3.69	2.99	3.22	3.08	3.42
F:G, lb.[c]	5.20	5.18	5.18	5.86		
Hot carcass wt., lb.	718.47	719.81	701.64	725.2	735	734
Rib eye area, sq. in.	12.19	12.83	12.15	12.41	11.57	12.17
Fat depth, in.[d]					.55	.44
Yield Grade[d]	2.61	2.54	2.68	2.7	2.76	2.45
Quality Grade[e]	2.95	2.78	3.00	2.8	4.95	4.38
Percent Choice, %	26.4	25.71	13.9	23.53	85.7	59.1

[a] Two steers died of bloat during finishing.
[b] Treatments at each location differ (P < 0.01).
[c] Treatments at the SDSU location differ (P < 0.01).
[d] Tratments at the UW Beef Unit differ (P < 0.05).
[e] Treatments at the UW Beef Unit differ (P < 0.10).

Figures

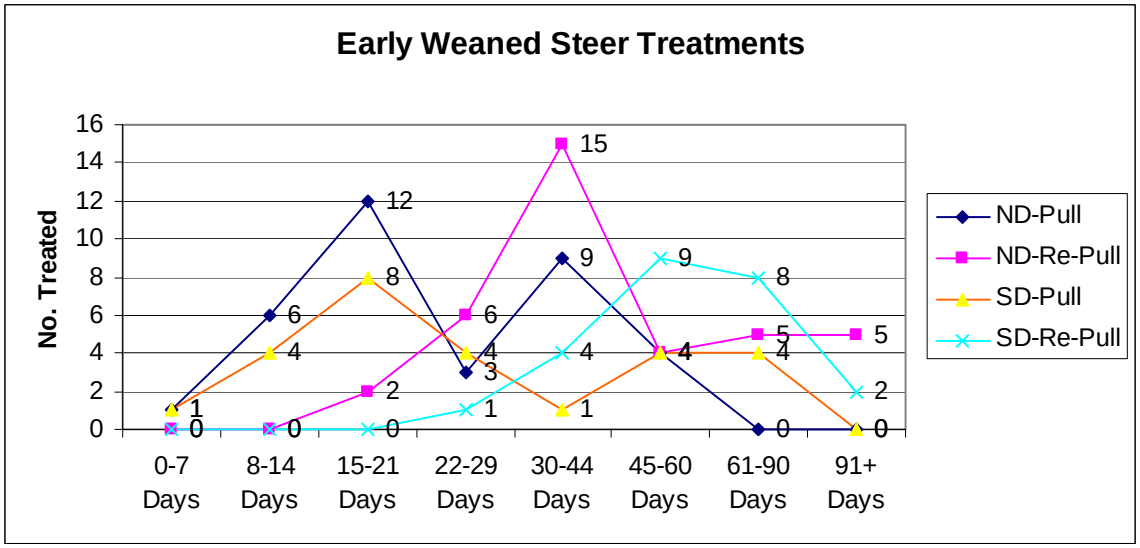

Figure 1. Distribution of BRD among early weaned steers from NDSU-Dickinson Research and Extension Center and SDSU-Antelope Station that required intervention at the feed yard (2003).

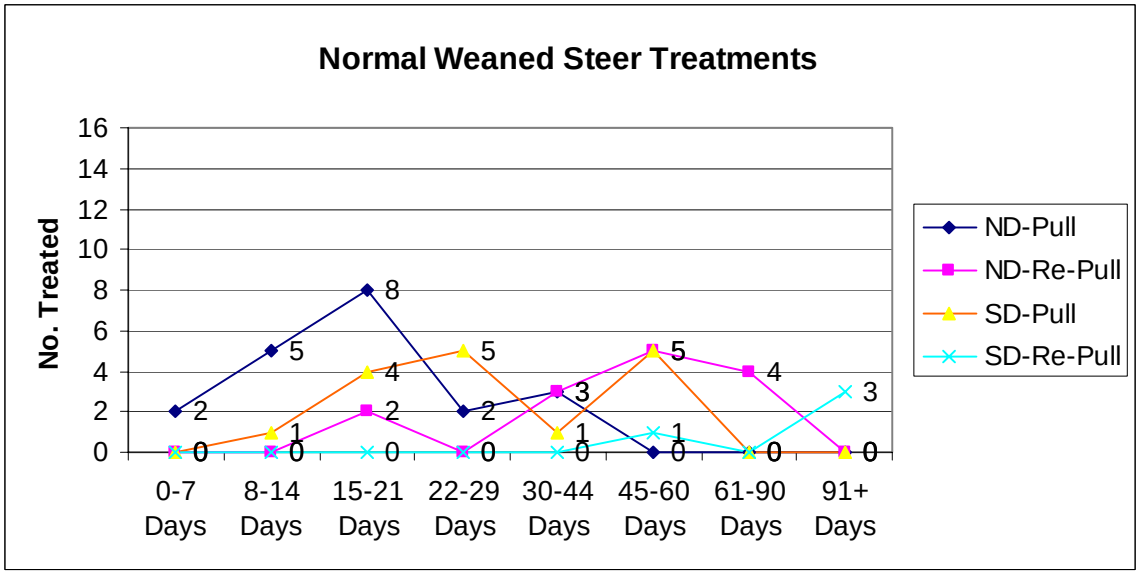

Figure 2. Distribution of BRD among normal weaned steers from NDSU-Dickinson Research and Extension Center and SDSU-Antelope Station that required intervention at the feed yard (2003).