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R. J. Pruitt
South Dakota State University

W. B. Epperson
South Dakota State University

V. N. Owens
South Dakota State University

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R. J. Pruitt[1]*, W. B. Epperson[1†] and V. N. Owens[2, 3‡]
Departments of Animal and Range Sciences*, Veterinary Science[†], and Plant Science[‡]

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Summary

In a two-year study at the SDSU Cow/Calf Teaching and Research Unit, Brookings, SD, heifer calves were allotted to two weaning management treatments in early October at an average age of 202 days. The pasture-weaned group was separated from their dams and grazed grass pasture across the fence from their dams for two weeks. Then, until early December, they grazed "Robust" barley (forage type) that had been no-till planted into oat stubble in early August. The drylot-weaned group was fed a traditional weaning diet of grass hay, corn, and protein supplement from weaning until early December. The effect of management on heifer weight gain depended on year. In the first year, pasture-weaned heifers gained more than the drylot group during the first two weeks after weaning. Due to less than ideal pasture conditions in the second year, the drylot group gained more than the pasture weaned group for two and four weeks after weaning. In both years, gains from weaning to the end of the grazing period in December and to the following April were similar between management systems. Pasture weaning appeared to cause less stress for both cows and calves, but no differences in disease symptoms were observed. Antibody titers for IBR, BVD type 1 and BVD type 2 were determined at weaning and two and four weeks after weaning to measure the development of immunity from vaccinations administered two months prior to and at weaning. At two weeks after weaning in the second year of the study, antibody titer for BVD type 1 was greater for the drylot group than the pasture-weaned group. By four weeks after weaning the pasture-weaned heifers had antibody titers similar to the drylot group. The results of this study indicate that pasture weaning combined with small grain pasture to extend the grazing system can be an effective alternative for managing replacement heifers compared to a traditional drylot weaning system.

Introduction

Some cowherd owners report that weaning calves on pasture greatly reduces the stress on the cow and the calf. The reduction in stress has potential to improve the health of weaned calves. It is common in southern areas of the US to graze calves on small grain pasture in the fall and winter. In South Dakota, combining pasture weaning and an extended grazing season has potential to reduce cost and labor associated with feeding, maintaining drylot facilities, and manure management. Small grains such as wheat, oats, rye, barley, and triticale are potential sources of high quality forage for calves. The objectives of this study were: 1) Evaluate pasture weaning compared to traditional drylot weaning for calves and 2) Evaluate forage barley for pasture to extend the grazing season of weaned calves.

Materials and Methods

In each of 2 years, heifer calves averaging 201 days of age were allotted by breed and weight to two weaning treatments in early October. On weaning day the heifers in the pasture-weaned group were separated from their dams and allowed to graze grass pasture across the fence from their dams for two weeks. Two weeks after weaning they grazed 30 acres of forage barley until early December. The pasture consisted of "Robust" barley (forage type) that had been no-till planted into oat stubble in early August. They had access to a salt, phosphorous, trace mineral supplement offered free choice. The heifers in the drylot-weaned group were transported to pens two miles from their dams and bunk fed a diet of corn, protein supplement, and grass hay (Table 1). Beginning in early December, all heifers were fed and managed as one group until yearling weights were recorded in April.

[1] Professor
[2] Associate Professor
[3] Project funded by USDA Multi-State Feed Barley Grant

Two months prior to weaning (64 days the first year and 58 days the second year) all heifers were administered a modified live virus vaccine containing IBR, BVD type 1, BVD type 2, PI_3, BRSV, as well as a Haemophilus somnus bactrin (Resvac 4/Somubac from Pfizer Animal Health). On the day of weaning, heifers were weighed and re-vaccinated with the same vaccine. At weaning and two and four weeks after weaning, a blood sample was collected from each heifer by jugular venipuncture. Using standard procedures, IBR, BVD type 1, and BVD type 2 titers were determined by the South Dakota Animal Disease Research and Diagnostic Laboratory, Brookings, SD. At two and four weeks after weaning and again in early December, all heifers were weighed following removal from feed and water overnight. For 28 days following weaning, heifers were observed twice daily for disease symptoms (depression, gauntness, eye or nose discharge, increased respiratory rate, coughing, diarrhea, and lameness).

Data were analyzed using the general linear model (GLM) procedure of SAS, and means were separated using the predicted difference (PDIFF) option. For average daily gain and weight, the statistical model included weaning treatment, year, weaning treatment x year, and breed. The logarithm base 2 of blood titers for IBR, BVD type 1 and BVD type 2 were analyzed with weaning treatment, year, and weaning treatment x year in the statistical model. The logarithm base 2 titer at weaning was included as a covariate to analyze titers at two and four weeks after weaning.

Results & Discussion

The impact of weaning management on weight gain for the 4 weeks after weaning was dependent on year (Table 2). In the first year of the study, forage conditions were excellent, and heifers weaned on pasture out gained the drylot group during the first 2 weeks following weaning ($P < 0.05$). In the second year, moisture conditions were less favorable, and the amount of grass pasture and forage barley was less than during the first year. The drylot group out gained the pasture group ($P < 0.05$). In both years, gains from weaning to the end of the grazing period in December and the following April were similar between management systems.

The drylot-weaned group exhibited typical weaning behavior by walking the fence and bawling for about a week following weaning. The pasture-weaned group appeared to be less stressed. No bawling or walking the fence was observed. Weather conditions were near ideal to minimize stress in each year, and no disease symptoms were observed for either group.

Management treatment did not affect IBR or BVD type 2 titer at any of the three sampling times (Table 2). There was a year x weaning treatment interaction ($P = 0.06$) for BVD type 1 titer at 2 weeks after weaning. Although not affected the first year, during the second year the drylot group had a higher mean BVD type 1 titer than the pasture group (140 versus 75; $P = 0.06$). This may have been due to the lower gains of the pasture group than the drylot group for the first 2 weeks due to less ideal pasture conditions. By four weeks after weaning the pasture-weaned heifers had antibody titers similar to the drylot group. This data indicates that weaning management may affect the response to vaccination.

Implications

Similar weight gains from weaning to December and to April indicate that weaning on pasture followed by grazing forage barley is an alternative for development of replacement heifers compared to feeding harvested feeds in drylot. Nutrition and management after weaning can affect the titer response to vaccination.

Tables

Table 1. Average daily intake of drylot heifers from weaning to early December

Grass hay, lb DM	6.7
Cracked corn, lb DM	4.4
Protein supplement, lb DM[a]	1.1
Rumensin supplement, lb DM[b]	0.9
Crude protein, lb	1.6
ME, mcal	14.5

[a]Provided 27.4% CP and Ca, P, and trace minerals to exceed NRC (1996) requirements.
[b]To provide 100 mg monensin per head daily.

Table 2. Weaning management and heifer performance

Year	2002		2003	
Weaning treatment	Drylot	Pasture	Drylot	Pasture
No. heifers	23	22	21	21
Weaning weight, lb	585	577	575	572
Average daily gain after weaning, lb				
First 2 weeks[a]	-0.54[b]	0.10[c]	0.42[c]	-0.80[b]
First 4 weeks[a]	0.58[d]	0.69[d]	1.27[e]	-0.07[f]
To December	1.42	1.49	1.49	1.44
To April	1.96	1.96	1.87	1.78

[a] There was a year x treatment interaction ($P < 0.05$) for average daily gain during the first 2 weeks and first 4 weeks after weaning.
[b,c] Means with uncommon superscripts differ ($P < 0.05$).
[d,e,f] Means with uncommon superscripts differ ($P < 0.001$).

Table 3. Effect of weaning management on IBR and BVD titers.

			P – Value	
Management treatment	Drylot	Pasture	Treatment	Treatment x year
No. heifers	44	44		
Age at weaning, days	201	202		
IBR titer				
Weaning	5.6	5.4	0.83	0.51
2 weeks after weaning	81.3	91.1	0.65	0.99
4 weeks after weaning	59.1	69.5	0.56	0.34
BVD type 1 titer				
Weaning	44.8	48.3	0.80	0.80
2 weeks after weaning	85.4	69.6	0.37	0.06
4 weeks after weaning	87.6	99.6	0.66	0.15
BVD type 2 titer				
Weaning	5.5	6.0	0.48	0.65
2 weeks after weaning	7.5	6.7	0.35	0.51
4 weeks after weaning	7.0	8.1	0.36	0.79