Effects of two-stage weaning duration on beef cattle growth and vocalization

*Ashley N. Deller, *Emery O. Clark, Drs. Flint Harrelson and Patricia Harrelson

Mentors, Department of Agricultural Sciences, College of Science

Abstract

Stress during weaning is two-fold, physical separation of the calf and dam along with the alteration of the calf’s nutrition due to the prevention of nursing. At weaning, the calf will exhibit increased vocalizations and decreased appetite. One way to reduce the stress at weaning is to use a two-stage weaning method, where an anti-suckling device is placed in the nostrils of the calf for 4-7 days prior to weaning. This allows the calf to remain beside their dam, able to nurse. The use of this device has been shown to reduce the stress of the calf, however, has negatively impacted the calf’s growth rate. During this study, anti-suckling devices were placed on calves either 4 or 2 days prior to weaning or no device was placed. We measured vocalizations and calf body weights. We observed a linear effect (P=0.006) in post-weaning average daily gain, as calves with no anti-suckling devices displayed the highest, and calves in 4-day treatment exhibited the lowest growth rate. We found a treatment by day interaction as calves without anti-suckling devices, vocalized more starting on the day of weaning and continued 3 days after (P<0.0001). This research was supported by MSU Undergraduate Research Fellowship.

Introduction

Weaning in beef cattle is a very stressful event for both calf and dam. Traditionally, calves were abruptly removed from the dams and transported to a separate location, resulting in increased vocalization (Veissier and Le Neindre, 1989). One common strategy currently practiced to reduce stress and alleviate these behavioral and physical changes is fence-line weaning. This strategy involves physical separation also, but calves are placed in pastures or pens adjacent to their dams preventing suckling while still allowing visual and auditory contact between pairs (Stookey et al., 1997; Price et al., 2003). A more recent technology is utilizing an anti-suckling nose-clip (Haley et al, 2005) which allows the calf to maintain physical contact with the dam while preventing suckling. After a set number of days weaning the clip (recommended 4 – 7 days), the calves are physically separated from the dam with the intention that the lack of suckling will decrease stress, behavioral, and physical changes associated with weaning. Haley et al. (2005) conducted one of the first reported studies using the two-stage weaning technique. These authors utilized anti-suckling nose-flaps inserted for multiple different lengths of time (3, 4, 5, or 14 days) to evaluate behavior and growth rate responses. When they utilized the nose flaps it was observed that the calves gained less weight prior to weaning, but gained weight faster following weaning (P<0.001) than those weaned without. They also found that calves were weaned using the nose flaps vocalized less than those weaned traditionally. Our objective was to determine if utilizing the nose flaps for only 2 days was comparable to 4 days on performance and vocalizations.

Materials & Methods

- Research conducted from 10-1-15 through 10-30-15
- Trial conducted at the Derrickson Agricultural Complex
- 45 Angus cow/calf pairs; included both bull and heifer calves (initital weight 603 ± 73 lb)
- Calves were randomly placed in 3 treatment groups: anti-suckling device placed four days prior to weaning (4D; day -4), two days prior to weaning (2D; day -2), or no device placed on calf (CON)
- Anti-suckling devices were removed at weaning
- Calves were weaned on 10-9-15, average age at weaning = 228.2 ± 23.9 days
- All calves were weaned using the fence-line method in the same pen
- Observations measured from day -6 (10-3-15) through day 6 (10-14-15) at 15 minute intervals within 2 hour blocks starting at 7AM and 5PM
- No observations were taken on day 0 (weaning day)
- Vocalizations were recorded within each time block
- Calf weights were taken weekly prior to weaning (2D; day -2), or no device was worn
- Post-weaning average daily gain (ADG) was measured from day 0 to 21
- Statistical analysis was completed using MIXED procedures of SAS (SAS version 9.2, SAS Inc., Cary, NC)
- Linear and quadratic treatment effects were evaluated following significant treatment effects

Results

- Day x Treatment effect P<0.0001
- SE = 0.42

Results Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>2D</th>
<th>4D</th>
<th>SE2</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial weight, lbs</td>
<td>610</td>
<td>607</td>
<td>601</td>
<td>17</td>
<td>0.92</td>
</tr>
<tr>
<td>Weaning weight, lbs</td>
<td>624</td>
<td>622</td>
<td>627</td>
<td>18</td>
<td>0.98</td>
</tr>
<tr>
<td>Day 21 weight, lbs</td>
<td>691</td>
<td>682</td>
<td>679</td>
<td>18</td>
<td>0.88</td>
</tr>
<tr>
<td>Post-weaning ADG, lbs/d</td>
<td>3.2</td>
<td>2.9</td>
<td>2.5</td>
<td>0.2</td>
<td>0.006*</td>
</tr>
</tbody>
</table>

1 Treatments: CON = control (no device); 2D = device placed on day -2; 4D = device placed on day -4
2 SE = highest standard error of the mean
3 ADG = average daily gain

*Linear effect of treatment

Conclusion

The results suggest that the use of anti-suckling devices at weaning has a positive impact on the amount of vocalizations and lowers stress level of weaned calves. We observed a treatment by day interaction as calves without anti-suckling devices, vocalized more starting on the day of weaning and continued 3 days after. We found no significant differences in vocalizations between the 2D and 4D groups. The results depict that the longer the anti-suckling devices were worn the lower the growth rate. The use of the anti-suckling devices had no effect on weaning weight, however, we observed a linear effect (P=0.006) in post-weaning average daily gain, as calves with no anti-suckling devices displayed the highest, and calves in 4-day treatment exhibited the lowest growth rate. Overall, this suggests that the two-stage weaning process should be implemented to reduce stress levels of weaned calves, however the use of anti-suckling devices did have a negative impact on growth rate.

References


Acknowledgement

This research was supported by MSU Undergraduate Research Fellowship.