Post-Weaning Performance by Spring and Fall-Born Steers Weaned from Full Access, Limited Access, or No Access to ‘Wild-Type’ Endophyte-Infected Tall Fescue Pastures – 2 Year Summary

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Story in Brief

Replacing ‘wild-type’ endophyte-infected tall fescue (E+) with non-toxic endophyte-infected fescue (NE+) may improve calf BW at weaning, but data addressing those impacts on post-weaning performance are limited. Our objective was to determine to what extent having limited access to NE+ prior to weaning will affect post-weaning performance by spring (S) and fall-born calves (F). Gelbvieh × Angus crossbred cows were used in a study that resulted in 204 steers representing 5 treatments: 1) F on 100% E+ (F100; 3 replications); 2) S on 100% E+ (S100; 3 replications); 3) F on 75% E+ and 25% NE+ (F75; 3 replications); 4) S on 75% E+ and 25% NE+ (S75; 3 replications); and 5) S on 100% NE+ (SNE100; 2 replications). Steer actual and adjusted weaning BW, feedlot gain, age at harvest, dressing percent, and marbling scores were greater (P < 0.01) from F vs. S, but BW at shipping to the feedlot, feedlot ADG, ribeye area, and YG were greater (P < 0.01) from S vs. F. Steer actual and adjusted weaning BW were greater (P < 0.05) from S75 and F75 vs. S100 and F100 steers. Steer actual and adjusted weaning BW, BW at shipping to the feedlot, harvest BW, feedlot ADG, and hot carcass wt. were greater (P < 0.05) from SNE100 vs. S75. Therefore, after two years of post-weaning measurements, fall calving may benefit steer BW through weaning, and limited use of NE+ may benefit steer BW through weaning but may not improve performance through the feedlot phase.

Introduction

It is well documented that the ‘wild-type’ endophyte-infected tall fescue (E+) produces toxins that reduce grazing animal performance (Nihsen et al., 2004), but the impact of these toxins on cattle after removal from E+ have been highly variable both in length and severity, making it a concern to mitigate the negative effects of E+ through later stages of production. One alternative to grazing E+ is to graze a non-toxic novel endophyte-infected fescue (NE+) that has improved spring-calving cow performance (Coffey et al., 2007). However, data addressing those impacts on post-weaning performance of calves are limited. Our objective was to compare post-weaning performance by spring (S) and fall-born calves (F) weaned from cows grazing either E+ or NE+ at different percentages of the total pasture area to determine to what extent having limited access to NE+ prior to weaning will affect post-weaning performance.

Experimental Procedures

At the start of the study, 178 Gelbvieh × Angus crossbred spring and fall-calving cows (1128 ± 11.3 lb initial BW) from the cowherd at the University of Arkansas Livestock and Forestry Branch Experimental Station (LFBES) near Batesville, Ark. were stratified by weight and age within calving season and allocated randomly to 1 of 14 groups representing 5 treatments: 1) F on 100% E+ (F100; 3 replications); 2) S on 100% E+ (S100; 3 replications); 3) F on 75% E+ and 25% NE+ (F75; 3 replications); 4) S on 75% E+ and 25% NE+ (S75; 3 replications); and 5) S on 100% NE+ (SNE100; 2 replications). Steer actual and adjusted weaning BW, feedlot gain, age at harvest, dressing percent, and marbling scores were greater (P < 0.01) from F vs. S, but BW at shipping to the feedlot, feedlot ADG, ribeye area, and YG were greater (P < 0.01) from S vs. F. Steer actual and adjusted weaning BW were greater (P < 0.05) from S75 and F75 vs. S100 and F100 steers. Steer actual and adjusted weaning BW, BW at shipping to the feedlot, harvest BW, feedlot ADG, and hot carcass wt. were greater (P < 0.05) from SNE100 vs. S75. Therefore, after two years of post-weaning measurements, fall calving may benefit steer BW through weaning, and limited use of NE+ may benefit steer BW through weaning but may not improve performance through the feedlot phase.

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at a commercial slaughter facility and carcass data were collected following a 24 to 48-h chill.

Calf performance measurements were analyzed using PROC MIXED of SAS (SAS Inst., Inc., Cary, N.C.) with each group of animals in a specific pasture considered the experimental unit. Planned orthogonal contrasts were used to compare 1) mean of F with the mean of the S (not including SNE100), 2) mean of S75 and F75 with the mean of S100 and F100, 3) S75 with SNE100, and 4) interaction between S and F in their response to having 25% of their pasture area as NE+. Steer weaning weights were analyzed separately as actual and adjusted 205-d weaning weights. Weaning weights were adjusted for calf age but not for age of cow. Percent choice were analyzed with the Chi-square procedure of SAS. Treatment means are reported as least squares means.

**Results and Discussion**

Steer actual and adjusted weaning BW, feedlot gain, age at harvest, dressing percent, and marbling score were greater \((P < 0.05)\) from F compared with S, but BW at shipping to the feedlot, feedlot ADG, ribeye area, and YG were greater \((P < 0.01)\) from S compared with F (Table 1). This likely reflects differences in post-weaning forage quality and environmental conditions between grazing bermudagrass during the summer compared with winter annual forages during the winter. Steer actual and adjusted BW at weaning were greater \((P < 0.05)\) from F75 and S75 compared with F100 and S100, but these differences were not maintained through subsequent production phases. Actual and adjusted BW at weaning, BW at shipping to the feedlot, harvest BW, feedlot ADG, and hot carcass wt were greater \((P < 0.05)\) from SNE100 compared with S75. Backfat thickness did not differ \((P \geq 0.27)\) across treatments.

An overall difference \((P < 0.001)\) in quality grade distribution was detected (Table 2) across treatments. The percentage of USDA Choice carcasses was greater \((P < 0.05)\) from F compared with S and tended to be greater \((P = 0.10)\) from F100 and S100 compared with F75 and S75.

Therefore, after two years of a three year study, it appears that fall calving may benefit steer BW at weaning and may improve the number of calves grading choice at harvest. Furthermore, weaning steer calves that have limited access to NE+ during the grazing season may improve steer BW at weaning but those benefits may not persist through the feedlot period.

**Implications**

Based on these results, producers having predominantly E+ pastures for their cows should consider a fall-calving season if the emphasis is on weaning weights, but availability of other forages should be considered if producers are interested in retained ownership of weaned calves. Optimal benefits beyond weaning may be achieved by avoiding exposure of calves to E+ prior to weaning, but costs of establishment of NE+ must be considered in that decision.

**Acknowledgements**

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**Literature Cited**

Table 1. Post-weaning performance and carcass measurements by spring (S) and fall-born steer calves (F) weaned from full access (S100 or F100), limited access (S75 or F75), or no access (SNE100) to 'wild-type' endophyte-infected tall fescue pastures.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>F100</th>
<th>F75</th>
<th>SNE100</th>
<th>S100</th>
<th>S75</th>
<th>SEM</th>
<th>Contrasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf BW, lb</td>
<td>555</td>
<td>585</td>
<td>623</td>
<td>483</td>
<td>522</td>
<td>25.2</td>
<td>W,X,Y</td>
</tr>
<tr>
<td>Adj. weaning wt.</td>
<td>497</td>
<td>525</td>
<td>557</td>
<td>436</td>
<td>481</td>
<td>16.3</td>
<td>W,X,Y</td>
</tr>
<tr>
<td>Harvest weight</td>
<td>669</td>
<td>682</td>
<td>954</td>
<td>855</td>
<td>864</td>
<td>32.0</td>
<td>W,Y</td>
</tr>
<tr>
<td>Feedlot gain</td>
<td>1306</td>
<td>1330</td>
<td>1458</td>
<td>1344</td>
<td>1336</td>
<td>34.3</td>
<td>Y</td>
</tr>
<tr>
<td>Feedlot ADG</td>
<td>3.4</td>
<td>3.4</td>
<td>4.1</td>
<td>4.0</td>
<td>3.8</td>
<td>0.24</td>
<td>W,Y</td>
</tr>
<tr>
<td>Age at harvest</td>
<td>585</td>
<td>585</td>
<td>560</td>
<td>556</td>
<td>553</td>
<td>12.1</td>
<td>W</td>
</tr>
</tbody>
</table>

Carcass measurements

<table>
<thead>
<tr>
<th>Item</th>
<th>F100</th>
<th>F75</th>
<th>SNE100</th>
<th>S100</th>
<th>S75</th>
<th>SEM</th>
<th>Contrasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCW, lb</td>
<td>793</td>
<td>804</td>
<td>867</td>
<td>795</td>
<td>791</td>
<td>23.2</td>
<td>Y</td>
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<tr>
<td>Dressing, %</td>
<td>60.7</td>
<td>60.4</td>
<td>59.4</td>
<td>58.8</td>
<td>59.4</td>
<td>0.66</td>
<td>W</td>
</tr>
<tr>
<td>Ribeye area, in²</td>
<td>13.0</td>
<td>13.2</td>
<td>15.0</td>
<td>14.2</td>
<td>14.3</td>
<td>0.55</td>
<td>W</td>
</tr>
<tr>
<td>Backfat, in.</td>
<td>0.47</td>
<td>0.47</td>
<td>0.45</td>
<td>0.47</td>
<td>0.49</td>
<td>0.029</td>
<td>ns</td>
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<tr>
<td>Yield grade</td>
<td>2.7</td>
<td>2.6</td>
<td>2.9</td>
<td>2.8</td>
<td>3.0</td>
<td>0.19</td>
<td>W</td>
</tr>
<tr>
<td>Marbling score</td>
<td>458</td>
<td>432</td>
<td>407</td>
<td>388</td>
<td>386</td>
<td>14.4</td>
<td>W</td>
</tr>
</tbody>
</table>

SEM = Pooled standard error of the mean.

Contrasts:
W = mean of F compared with the mean of S (not including SNE100; P < 0.05).
X = mean of S75 and F75 compared with the mean of S100 and F100 (P < 0.05).
Y = mean of SNE100 compared with the mean of S75 (P < 0.05).
s = no significant difference.

204 steer calves were used over 2 years.

eweening weights were adjusted for age of calf, but additive factors for age of dam were not used.

Shipping wt was the wt measured prior to calves being shipped to the OSU feedlot.

Age from birth to harvest.

HCW = Hot carcass weight.

300 = Slight, 400 = Small.