Influence of Reproductive Tract Score on Pregnancy in Angus Heifers


Story in Brief

The objective of this study was to determine if the use of reproductive tract scoring influences pregnancy status in Angus heifers (n = 104). Reproductive tract scoring was accomplished with transrectal ultrasonography. At the time of scoring and breeding, heifers were approximately 65% of their mature body weight (BW = 764 lb). All heifers were exposed to fertile bulls and bred by natural service over a 63-day period. Pregnancy status was determined with the use of transrectal ultrasonography after breeding. This study identified a difference between the pregnancy rates of Angus heifers with a low reproductive tract score and those with a higher reproductive tract score (P < 0.05).

Introduction

The selection and development of replacement heifers is a major economic burden to the beef cattle industry. Management of replacement heifers is a costly and intensive process. Heifers that breed early during their first breeding season calve earlier and wean heavier calves than those that conceive later in the breeding season (Short and Bellows, 1971). Furthermore, heifers that conceive earlier in the breeding season tend to consecutively breed early throughout the rest of their productive lives (Lesmeister et al., 1973). Pregnancy rates were higher for heifers that had already begun cycling compared to heifers that had only had one estrus cycle when exposed to fertile bulls (Byerley et al., 1987). Therefore, it is important to utilize early determination of the heifers that will likely be sound productive replacements versus the heifers that will not be sound replacements.

Researchers at Colorado State University established a 5-point reproductive tract score (RTS: see Table 1) as an evaluation tool of reproductive status in pubertal heifers (Anderson et al., 1991). The development of this technique allows heifers to be evaluated prior to breeding, and heifers with poor breeding potential can be culled before producers incur further costs associated with their management. The objective of this study was to determine if the use of reproductive tract scoring influences pregnancy status on Angus heifers born in Arkansas.

Experimental Procedures

Reproductive tract scores were assigned to all replacement heifers prior to fertile bull exposure on the first day of breeding. Heifers were of predominately Angus breeding and had an average weight of 764 lb which was approximately 65% of their mature body weight. All heifers were born between September 3 and December 27, 2005. Animals were housed and cared for in compliance with the Animal Care Protocol #06052 for cattle experimentation issued by the University of Arkansas Animal Care and Use Committee.

Each heifer was weighed, then assigned an RTS via transrectal ultrasonography examination (Aloka™ Inc., Tokyo, Japan, 500V portable linear scanner with a 5.0 MHz transrectal transducer). Reproductive tract scores were ranked from 1 to 5 with 1 being the lowest (Table 1). An RTS of 1 is described as an immature reproductive tract, no uterine tone, and no palpable ovarian structures. An RTS 2 is described as ovaries exhibiting 8 mm follicles, and a uterine horn diameter of 20-25 mm with no uterine tone. An RTS 3 has an ovarian follicle from 8-10 mm, with uterine tone and a uterine horn diameter of 25-30 mm. An RTS 4 exhibits uterine horns 30 mm in diameter with good tone, ovarian follicles that are > 10 mm and a corpus luteum also is possible. The highest RTS is a 5 which is described as a cycling heifer with a functional corpus luteum.

Once the tract scores were assigned, heifers were housed in four adjacent pastures of similar size. Each pasture contained one intact fertile bull (approximately one bull per 25 heifers) for natural service breeding, and pregnancy status was determined via transrectal ultrasonography 63 days after the initiation of breeding. Statistical analysis of the data was determined using SAS (SAS Inst., Inc., Cary, N.C.). A comparison of RTS by pregnancy status was accomplished using a Chi-Square test. Each RTS group was compared to other individual RTS groups using a Chi-Square test to determine significant differences between groups.

Results and Discussion

Reproductive tract scores were obtained from 102 heifers. Two heifers had to be removed from the data set because they were unable to be palpated for a RTS. Overall pregnancy rate was 77%.

Data showed a positive relationship between RTS and pregnancy status with a Chi-square value of 16.8 indicating a difference (P < 0.01) in probability of pregnancy was related to reproductive tract score. Each RTS was then compared to each of the other RTS categories by a Chi-square test to determine differences between groups. Heifers with a RTS of 1 (n = 12) were less likely (P < 0.05) to be pregnant compared with heifers assigned a RTS of 2 (n = 8), 4 (n = 14), or 5 (n = 60), but not less likely to be pregnant than heifers with an RTS of 3 (n = 8). Although numerical values were different, heifers with a RTS of 3 were not more or less likely to be pregnant than heifers with a RTS of 1, 2, 4, or 5 (Fig. 1).

1 All authors are associated with the Department of Animal Science, Fayetteville.
These data were similar to results found by LeFever and Odde (1986) as well as Pence et al. (1999) when studies were conducted examining reproductive tract scoring. Both this study and the other studies show that a lower RTS is correlated with a decreased likelihood of pregnancy. All studies observed lower pregnancy rates in heifers that were assigned lower reproductive tract scores.

Implications

Development of replacement heifers can be one of the most costly expenses to a beef cattle producer. Decisions to cull poor performing animals early could likely decrease losses associated with their further management. Utilizing reproductive tract scoring can be a useful tool for assessing pregnancy outcome. This effective procedure could be utilized by cattlemen in Arkansas to make culling decisions before the breeding season begins. Therefore, heifers with poor reproductive potential could be eliminated from the herd increasing overall profitability of the operation.

Acknowledgments

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Literature Cited


Table 1. Reproductive Tract Score*.

<table>
<thead>
<tr>
<th>Reproductive Tract Score</th>
<th>Uterine Horns (diameter)</th>
<th>Length (mm)</th>
<th>Height (mm)</th>
<th>Width (mm)</th>
<th>Ovarian Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Immature &lt; 20mm</td>
<td>15</td>
<td>10</td>
<td>8</td>
<td>No palpable follicles, no tone</td>
</tr>
<tr>
<td>2</td>
<td>20-25 mm</td>
<td>18</td>
<td>12</td>
<td>10</td>
<td>8 mm follicle, no tone</td>
</tr>
<tr>
<td>3</td>
<td>25-30 mm</td>
<td>22</td>
<td>15</td>
<td>10</td>
<td>8-10 mm follicle, slight tone</td>
</tr>
<tr>
<td>4</td>
<td>30 mm</td>
<td>30</td>
<td>16</td>
<td>12</td>
<td>&gt;10 mm follicle, good tone, Corpus luteum possible</td>
</tr>
<tr>
<td>5</td>
<td>&gt;30 mm</td>
<td>&gt;32</td>
<td>20</td>
<td>15</td>
<td>&gt;10 mm follicle, good tone, Corpus luteum present</td>
</tr>
</tbody>
</table>


Fig. 1. Pregnancy percentages by reproductive tract score. 
\[a,b\] Percentages with no common superscript differ (\(P < 0.05\)).