Calving Difficulty of Two-year-old Hereford Dams
and Performance of Calves Sired by Angus and
Hereford Bulls

B. R. Eller and J. A. B. McArthur

Summary

Difficulty in calving two-year-old Hereford heifers
was not reduced by the use of Angus bulls, since the
variability in birth weights of calves between sires of the
Angus and Hereford breeds was less than the variability
of birth weights of calves between sires within each
breed. On the other hand, crossbreeding was found to
be a practical method for increasing the live performance
of calves, especially in heifer calves. Significant improve-
ment in suckling gain, conformation score at weaning,
feedlot gain, and carcass grade were noted in crossbred
heifers compared to the straightbred heifers. As a result
of the increased performance of the crossbred heifers,
almost fifteen dollars more per head were received for
the crossbred calves than for the straightbred Hereford
calves when they were marketed for slaughter.

Introduction

Heifers bred to calve at two years of age frequently
have difficulty during parturition, and calves often die
when assistance is not administered. Since Angus calves
are usually smaller at birth than Hereford calves, many
livestock operators producing Hereford cattle have at-
ttempted to reduce calving troubles by mating Angus
bulls with Hereford heifers. However, variability in
birth weights of calves from sires of the same breed,
whether Hereford or Angus, sometimes limits the effec-
tiveness of reducing difficulties in calving by such means.
Moreover, studies of the performance of crossbred
calves compared to straightbred calves from birth to
slaughter have been conducted with conflicting results.
Even though it is most commonly reported that cross-
bred calves grow more rapidly than the straightbreds,
some controversy still exists.

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Procedure

An experiment was initiated to 1) study the effect of
breed of sire upon birth weight and its relationship with
calving difficulty of two-year-old Hereford heifers; 2) compare the performance of crossbred calves with
straightbred Hereford calves during the suckling period
and during a finishing period in the feedlot; and 3) study the effect of sire and sex of calf as related to
calving difficulty of the dam and the performance of the
crossbred calves and the straightbred Hereford calves
from birth to slaughter.

Data were collected over a period of three years in
which 52 yearling Hereford heifers were mated with
two Angus bulls and 52 yearling Hereford heifers were
mated to three Hereford bulls. The Angus bulls were
purchased from Angus herds which were not related by
breeding. The Hereford bulls were from the same herd
as the yearling heifers to which they were mated, and
half-sibs of the Hereford bulls were automatically sorted
into the Angus breeding groups. All other heifers were
randomly sorted into both the Angus and Hereford
breeding groups.

The bulls were mated with the heifers for six weeks
each year beginning in the early part of May. A total of
85 calvings (45 from Angus sires and 40 from Hereford
sires) were involved in the study, and the difficulty ob-
served in calving, the birth weight, sex, and individual
identification of calves were recorded. Male calves were
castrated at birth by the use of elastrator rings.

The calves and their dams were confined to meadow
pastures until the last of June and then were moved to
summer range located in the foothills of the Blue Moun-
tains of eastern Oregon. No supplemental feeding was
provided for either the calves or their dams while on
pasture. Calves were weaned each year in the first week
of September because of the seasonal decline in the nu-
tritional value of the range forages. Individual weights
and scores for body conformation were recorded at
weaning, when the average age of the calves was about
185 days. After weaning, the calves were allowed to
Results and Discussion

Birth weight of calves was not significantly affected by breed of sire, but there were marked differences due to individual sires (regardless of breed) and sex of calf. Moreover, most of the differences in birth weight of calves between sires were noted in heifer calves (Table 1). Heifer calves were smaller at birth than bull calves, and greater differences in birth weight between sexes occurred in the straightbred than in the crossbred calves. Since bull calves were heavier than heifer calves at birth and a greater percentage of the total number of cows giving birth to bull calves were assisted at calving time compared to the number of cows assisted in giving birth to heifer calves, birth weight and its relationship to sex appear to be more responsible for calving difficulty than breed of sire in this experiment.

Crossbred calves exhibited significantly greater rates of gain during the suckling period and were heavier at weaning. However, most of the increased performance was observed in heifer calves. The crossbred heifer calves gained .19 pound per day more during the suckling period and weighed 44.2 pounds heavier at weaning time than straightbred heifer calves, whereas the performance of the straightbred steer calves was equal to that of the crossbred steer calves (Table 2). These results agree with other reported data, which show the effect of heterosis to be greater in heifers than in steers (Stonaker, 1963 and Gregory et al., 1965). Suckling gain and weaning weight were not significantly affected in this experiment by individual sires of the same breed.

Calves born during the third year of the study were not fed in dry lot but were sold after being weaned. Therefore, data on the progeny of one of the Hereford sires (3x112) were collected only through weaning. Crossbred calves born the third year of the study were also sold after being weaned, but progeny of the Angus sire (762) had been tested in the feedlot the preceding year.

The performance in the feedlot of the progeny of two sires of each of the Angus and Hereford breeds (Table 3) shows that the straightbred Hereford heifers were lighter in weight going into the feedlot and at the con-
clusion of the feeding period than the Hereford steers, crossbred heifers, and crossbred steers. Moreover, rate of gain during the feeding period was less for the straightbred heifers than for the crossbred heifers, straightbred steers, or crossbred steers. Although the straightbred and crossbred steers gained at a faster rate than the straightbred and crossbred heifers, some of the increased growth rate in steers could have been attributed to the response from DES. On the other hand, the .15 pound per day advantage of the crossbred heifers over the straightbred heifers was apparently due to the response obtained from crossbreeding. Difference in rate of gain in the feedlot between straightbred and crossbred steers was not statistically significant, which further indicates that in the feedlot, as well as during the suckling period, the effect of crossbreeding was more pronounced in heifers than in steers.

Data collected after slaughter show carcass weight and pounds of carcass produced per day of age were related to growth rate of the live animal (Table 3). Since steers were fed for a longer period of time and also gained at a faster rate, their carcasses were heavier than carcasses from heifers, and they produced more pounds of carcass per day of age. Differences in the same char-

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**Table 2. Performance of Calves to Weaning According to Breed of Sire and Sex of Calf**

<table>
<thead>
<tr>
<th>Breed of Sire</th>
<th>Sex of Calf</th>
<th>Avg. weaning wt., lbs.</th>
<th>Avg. suckling gain, lbs./day</th>
<th>Avg. weaner grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angus</td>
<td>M</td>
<td>374.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.62&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.8&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>382.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.65&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.8&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Angus</td>
<td>All</td>
<td>369.6&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>1.61&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.8&lt;sup&gt;ab&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hereford</td>
<td>M</td>
<td>353.5&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>1.54&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.6&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>356.5&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>1.57&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>14.9&lt;sup)b&lt;/sup&gt;</td>
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<tr>
<td>Hereford</td>
<td>All</td>
<td>328.9&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>1.44&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>15.4&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Hereford</td>
<td>M</td>
<td>380.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.61&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.4&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>321.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.37&lt;sup&gt;b&lt;/sup&gt;</td>
<td>15.0&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hereford</td>
<td>All</td>
<td>364.7&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>1.62&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.3&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

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**Table 3. Feedlot Performance, Carcass Grade, and Value of Calves According to Breed of Sire and Sex of Calf**

<table>
<thead>
<tr>
<th>Breed of Sire</th>
<th>Sex of Calf</th>
<th>Number head</th>
<th>Days on feed</th>
<th>Avg. initial wt., lbs.</th>
<th>Avg. final wt., lbs.</th>
<th>Avg. gain, lbs./day</th>
<th>Avg. carcass wt., lbs.</th>
<th>Avg. carcass yield, %</th>
<th>Avg. lb. carcass/day of age, lbs.</th>
<th>Avg. carcass grade, USDA&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Avg. feed/lb. gain, lbs.</th>
<th>Avg. feed cost/lb. of gain, cents&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Avg. price received/100 lbs. of carcass, dollars&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Avg. carcass value, dollars&lt;sup&gt;4&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angus</td>
<td>M</td>
<td>6</td>
<td>223</td>
<td>468.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1055.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.14&lt;sup&gt;a&lt;/sup&gt;</td>
<td>507.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>56.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.20&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.5</td>
<td>15.94</td>
<td>210.82</td>
<td>195.95</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>13</td>
<td>217</td>
<td>448.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>989.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.07&lt;sup&gt;b&lt;/sup&gt;</td>
<td>504.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>56.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.10&lt;sup&gt;b&lt;/sup&gt;</td>
<td>17.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.7</td>
<td>16.38</td>
<td>39.82</td>
<td>195.95</td>
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<tr>
<td>Angus</td>
<td>M&amp;F</td>
<td>19</td>
<td>223</td>
<td>454.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>932.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.18&lt;sup&gt;a&lt;/sup&gt;</td>
<td>524.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>56.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.13&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16.8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.5</td>
<td>15.94</td>
<td>210.82</td>
<td>195.95</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>13</td>
<td>217</td>
<td>476.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>998.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.33&lt;sup&gt;a&lt;/sup&gt;</td>
<td>564.8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>56.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.20&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.5</td>
<td>15.94</td>
<td>210.82</td>
<td>195.95</td>
</tr>
<tr>
<td>Hereford</td>
<td>M</td>
<td>6</td>
<td>223</td>
<td>426.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>842.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.92&lt;sup&gt;b&lt;/sup&gt;</td>
<td>458.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>54.3&lt;sup&gt;b&lt;/sup&gt;</td>
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<td></td>
<td>F</td>
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<td>217</td>
<td>442.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>891.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.05&lt;sup&gt;b&lt;/sup&gt;</td>
<td>492.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>55.1&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>16.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.5</td>
<td>15.94</td>
<td>210.82</td>
<td>195.95</td>
</tr>
</tbody>
</table>

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1. M and F refer to sex of calf. Male calves were castrated at birth with elastrator rings.
2. Weaning weights and conformation scores were recorded when calves were about 185 days of age.
3. Weaner grade for conformation: good, 14; choice, 17.
4. Means on the same line within breed of sire followed by different superscripts differ statistically (P < .05).
5. ** Means on the same line within breed of sire followed by different superscripts differ statistically (P < .01).
acteristics due to breed of sire were also significant because of the increased live performance of the crossbred heifers over the straightbred heifers. The lower carcass yields of straightbred heifers also accounted for statistically significant differences in carcass yield due to sex of calf and breed of sire. Although carcass grade was not significantly affected by breed of sire or sex of calf, interaction of the two factors was significant. Carcasses from crossbred heifers graded higher than those from crossbred or straightbred steers and straightbred heifers. The straightbred heifers produced the lowest grading carcasses.

Since steers and heifers were fed in the same lots, the economic return from steers versus heifers could not be compared. Crossbred calves and straightbred calves were fed in different lots, and the gross return per animal within each lot is presented in Table 3. The results of this experiment show an advantage of almost fifteen dollars per head in gross return in favor of the crossbred calves.

**Literature Cited**

