Recent Research Results in Breed Evaluation

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Crossbreeding offers beef producers opportunities to utilize heterosis in lowly heritable traits and to utilize the benefits of selection in highly heritable traits. Selection benefits can be gained through selection of individual breeding animals on their own performance as well as through selection of breeds to be used in the crossbreeding system on the basis of their highly heritable strong points. Dearborn (1969) summarized available research information for breed comparisons up to that time and his table and references are included in the appendix. The purpose of this paper is to update that report and present results of published experiments from 1970 through 1974.

The accompanying table contains only straightbred information and is constructed in the same manner used by Dearborn. For all traits except quality grade the Hereford is set equal to 100. All breed comparisons available are presented by dividing the other breed trait by the average of the Hereford breed for that trait and multiplying by 100. Thus, entries in the table that are lower than 100 indicate the breed average for that trait was less than the Hereford average and entries higher than 100 indicate that the breed was superior to the Hereford in that trait. In the case of quality grade, the Hereford was set at low Choice and the fraction of a grade above or below this point is indicated for the other breeds. The small numbers indicate the references to the experiments that contributed to the value in that cell. Where Herefords were not included in an experiment, another commonly used breed was used to tie to the Hereford. Further details concerning methods are available in Dearborn's (1969) original article. Some comparisons are based on relatively few data and should be given less weight in decision making, e.g., Jersey, Red Poll, Milking Shorthorn.

The primary usefulness of this table along with the earlier one will be in matching breeds entering a crossbreeding program so that each of the important traits will have as high a level as possible in the breeds entering the crossbreeding system. In addition these tables will allow the counterbalancing of weaknesses in one breed with strong points of another breed. The heterosis advantages of crossbreeding have generally been emphasized in most writings on crossbreeding. However, it appears that there is more to be gained in crossbreeding through the combining effect available in the selection of breeds to be used and in the selection of individual animals to be used. Because of this producers are encouraged to study the tables and make other evaluations on whatever information is available from well-controlled experiments as they are completed and reported. In this regard caution will have to be exercised whenever crossbred data are used to evaluate a breed, since the effects of heterosis

will be present. Unless straightbred performance is available on all of the breeds entering the cross, separation of heterosis from combining effect will be very difficult. Failure to separate heterosis and combining effect, however, could lead to inaccurate evaluation of purebred performance and thus inaccurate prediction of crossbred performance.

Some evaluation of breeds not in the table might be obtained by using the performance of a physiologically similar breed that is in the table. In this way breeds might be matched on size and milk production to obtain some estimate for a breed not in the table. This estimate could be adjusted by whatever other bits of information might be available in the way of breed comparison.

Producers are encouraged to plan their crossbreeding programs in advance and to utilize straightbred performance of the type presented in the table in making their plans. Consideration should be given to balancing the weak point of one breed against the strong point of another breed for highly heritable traits and utilizing breeds that are unrelated in order to obtain heterosis in the lowly heritable traits. The use of crossbred cows in the crossbreeding system cannot be overemphasized in view of the importance of heterosis in maternal traits such as fertility and milking ability.
## Research Summary of Breed Evaluation, 1970-74

Average Breed Performance Expressed as a Percent of Hereford Average Performance

<table>
<thead>
<tr>
<th>Breed</th>
<th>Fertility Male</th>
<th>Fertility Female</th>
<th>% calf crop weaned</th>
<th>Weaning weight Overall average</th>
<th>Overall ADG</th>
<th>Cutsability</th>
<th>Quality grade</th>
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</thead>
<tbody>
<tr>
<td><strong>Her</strong></td>
<td>100 100 100</td>
<td>100 100 100</td>
<td>100 100 100</td>
<td>100 100 100</td>
<td>100 100 100</td>
<td>Ch-</td>
<td>+.47</td>
</tr>
<tr>
<td></td>
<td>21 21,33 19,21,36</td>
<td>36 36 36</td>
<td>5,10,11, 21,29,35, 36</td>
<td>5,10,11, 21,29,35, 36</td>
<td>5,6,7,10, 11,12,19, 32,35,36</td>
<td>4,7,8,12, 15,18,19, 36,37,39</td>
<td>1,3,8,12, 3,8,11, 35,36,38</td>
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<tr>
<td><strong>Ang</strong></td>
<td>99 101 100</td>
<td>100 100 100</td>
<td>100 104 106</td>
<td>96 99</td>
<td>99</td>
<td>+.47</td>
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<td>79 27,31,36</td>
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<td>5,10,11, 21,24,26, 35</td>
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<tr>
<td><strong>Char</strong></td>
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<td>109 118 110</td>
<td>117</td>
<td>- .25</td>
<td></td>
<td></td>
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<td>31 26,27,31</td>
<td>29,31</td>
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<td>25,31,32</td>
<td>13,31,34, 38</td>
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<td><strong>Milk Short</strong></td>
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<td>112 113 110</td>
<td>100</td>
<td>-.61</td>
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<td>24 24 24</td>
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<td>3,9,14</td>
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<td>110 96</td>
<td>95</td>
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<td>3,36,38</td>
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<td>92 98 90</td>
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<td>5 5 5</td>
<td>3,14</td>
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<td><strong>Red Poll</strong></td>
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<td>111</td>
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1 Small numbers refer to references included in the average just above them.
References


APPENDIX
Breed Evaluation table and corresponding Literature Cited
Average Breed Performance Expressed as a Percent of Hereford Average Performance

<table>
<thead>
<tr>
<th>Trait</th>
<th>Breed</th>
<th>Male Fertility</th>
<th>Female Fertility</th>
<th>Calf Crop Weaned</th>
<th>Individual Weaning Gain</th>
<th>Weaning Height Maternal Average</th>
<th>Over all Average</th>
<th>Post Weaning Gain</th>
<th>Carcass Cutability</th>
<th>Carcass Grade</th>
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<td>102.9</td>
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<td>98.0</td>
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<td>98.6</td>
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<td>117.2</td>
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<td>123.0</td>
<td>110.5</td>
<td>105.0</td>
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<td>Brown Swiss</td>
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<td>103.8</td>
<td>100.7</td>
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<td>- 1.3</td>
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</table>

2 Small numbers refer to references included in the average just below them.
Literature Cited


