Contemporary Grouping for Beef
Cattle Genetic Evaluation

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Improvement Federation Guidelines

Every weight or measurement of an animal is an observation of its phenotype. However, not all of an animal’s phenotypic superiority or inferiority for a trait is caused by genetics; part is due to environmental circumstances. A calf’s superiority or inferiority for weaning weight, for example, is dependent not only upon its genetic potential for growth but also upon the environment that it experienced, including the herd, year, and season in which it was born, its weaning age, its access to nutrition, and the milk yield of its dam.

Proper genetic evaluation of beef cattle is complex. However, the basic initial premise is simple. Individual animals are evaluated based upon how well they performed in comparison to herd mates raised under comparable environmental conditions. In other words, how well did each animal perform within its contemporary group? Contemporary grouping in beef cattle genetic evaluations is an attempt to account for environmental effects so that remaining differences among animals more closely reflect heritable differences among them. A contemporary group is defined as a group of cattle that are of the same breed composition and sex, are similar in age, and have been raised under the same management conditions. More simply put, a contemporary group is a group of animals that have had an equal opportunity to perform.

Breed registries generally define rules for effective contemporary grouping according to breed composition, herd, sex, season, and the age range between the oldest and youngest calf within the group. After proper consideration of these factors, producers must still account for other management and environmental effects. For example, parts of the herd exposed to different levels of nutrition should be assigned to distinct contemporary groups, as should calves whose performance has been compromised by ill health or injury.

In theory, contemporary grouping is easy, but the application of contemporary grouping in real life can present many challenging decisions. A common error in building contemporary groups is breeders not assigning enough groupings to accommodate calves that have received unequal treatment. Just as damaging, some breeders create too many contemporary groups. Assignments should be as simple as possible while still accounting for major differences in management. A useful method to aid in contemporary grouping is to assign distinct contemporary group codes to animals that are exceptions to regular management practices. For
example, calves that received preferential treatment (cattle being fitted for show, for example) should be placed within their own contemporary group.

It is important to note that contemporary groups never increase in size after the calving season is over. A contemporary group may, however, decrease in size. As calves get older, contemporary groups often will decrease in size due to culling, injury, sickness, death, or assignment of calves to different sub-groups that reflect different management treatments. Contemporary groups cannot be recombined once animals have been defined to be members of separate groups.

Reporting data from all eligible animals is an important aspect of contemporary grouping that deserves special attention. Breeders may be tempted to economize by recording and registering only the better performing calves within their herd. They might also worry that recording data on poorer performing calves will reflect unfavorably on their herd. Both of these conclusions are incorrect. Unless inventory and performance data are submitted on every calf born in a herd, subsequent genetic evaluations will be based on less information and consequently will be less accurate than would otherwise have been possible.

Even worse, genetic evaluations may be biased. If only calves with good performance are reported, they may not get the credit they truly deserve. Suppose, for example, that a contemporary group of 10 bull calves had adjusted weaning weights as shown in the following table. Average weaning weight is 625 pounds. The lightest calf is 101 lb. below the group average (ratio of 84), while the heaviest calf is 117 lb. above the average (ratio of 119). Calf number 6 is 14 pounds above group average (ratio of 102). It is important to remember that National Cattle Evaluation programs focus on the deviation (or difference) of calf weights from the contemporary group average rather than each calf’s adjusted weight.

Suppose now that the producer had reported only highest ranking 50% of calves for weaning weight. That group average would have been 675 lb. Within this new, highly selected contemporary group, the heaviest calf would have a deviation of only +67 lb and a ratio of only 110. Calf 6, close to average performance in the original contemporary group, would have a deviation of -36 pounds and a ratio of 84. When data are submitted only on selected calves, subsequent selection, culling, and merchandizing decisions will be flawed.
Weaning Weight Contemporary Example

<table>
<thead>
<tr>
<th>Calf ID</th>
<th>Adjusted 205 Day Weight</th>
<th>All Calves Reported</th>
<th>Top Half Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deviation</td>
<td>Ratio</td>
<td>Deviation</td>
</tr>
<tr>
<td>1</td>
<td>524</td>
<td>-101</td>
<td>84</td>
</tr>
<tr>
<td>2</td>
<td>562</td>
<td>-63</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>578</td>
<td>-47</td>
<td>93</td>
</tr>
<tr>
<td>4</td>
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<td>606</td>
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<td>105</td>
</tr>
<tr>
<td>9</td>
<td>694</td>
<td>69</td>
<td>111</td>
</tr>
<tr>
<td>10</td>
<td>742</td>
<td>117</td>
<td>119</td>
</tr>
<tr>
<td>Avg. Deviation and Ratio</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Avg. Weight</td>
<td>625</td>
<td>675</td>
<td></td>
</tr>
</tbody>
</table>

Many national cattle evaluations now include the option to include performance data from Embryo Transfer (ET) calves, and special contemporary grouping criteria apply to them. Each ET calf is raised on a recipient dam rather than its own genetic dam. In this case, breed composition of the recipient dam become part of the contemporary group definition, thus separating ET calves into contemporary groups in which all recipient dams share the same breed composition. Each recipient dam should be assigned a permanent ID so that she can properly be accounted for in subsequent evaluations. Many sire evaluation programs, particularly those for carcass merit, also consider breed composition of dam as part of the contemporary group definition.

As discussed in Chapter 5, multi-breed genetic evaluations are becoming more common. It is not necessary to define contemporary groups based on breed composition in such evaluations. Rather, proportions of breed ancestry must accurately be documented for each individual and dam.

The livestock producer or herd manager is the only person that knows exactly how calves have been managed. It is their responsibility to ensure that contemporary groupings accurately reflect that knowledge. Common contemporary grouping criteria used in genetic evaluations for various traits are listed below. Helpful tips are then provided for breeders to use in creating contemporary groups.
Contemporary Grouping Criteria for Various Traits

*Calving Ease (Direct), Calving Ease (Maternal), and Birth Weight*

1. Breeder-Herd Code
2. Year
3. Season (January-June, July-December)
4. Sex (Bull, Heifer)
5. Breed Composition
7. Service Type (Embryo Transfer Calves)

*Weaning Weight*

1. Birth Weight Contemporary Group Criteria
2. Management/Pasture Code
3. Date Weighed
4. Weaning Sex (Bull, Heifer, Steer)
5. Breed Composition
6. Service Type (Embryo Transfer Calves)

*Yearling Weight and Frame Score*

1. Weaning Weight Contemporary Group Criteria
2. Management/Feeding Unit Code
3. Date Weighed
4. Yearling Sex (Bull, Heifer, Steer)

*Carcass Traits*

1. Weaning or Yearling Weight Contemporary Group Criteria
2. Management/Pen/Feeding Unit
3. Days on Feed
4. Harvest Date
5. Grading Date
6. Carcass Sex (Bull, Heifer, Steer)
7. Date on Feed
8. Breed of Dam

*Ultrasound Body Composition Traits*

1. Weaning or Yearling Weight Contemporary Group Criteria
2. Management/Feeding Unit Code
3. Date Scanned
4. Sex (Bull, Heifer, Steer)
Heifer Pregnancy

1. Yearling Weight Contemporary Group Criteria
2. Heifer Pregnancy Management Code
3. Breeding Season Start and End Dates
4. Exposure
5. Breeding Pasture and/or Sire Effect

Mature Cow Weight, Height, and Body Condition Score

1. Breeder-Herd Code
2. Year
3. Date Measured
4. Age at Measurement (Years)
5. Breed Composition

Stayability

1. Breeder-Herd Code
2. Birth Year
3. Code of the Breeder-Herd in which the Cow Produced a Calf
4. Breed Composition

Feed Efficiency

1. Weaning or Yearling Weight Contemporary Group Criteria
2. Feed Efficiency Management/Feeding Unit Code
3. Days on Feed (or Date on Feed)
4. Date Scanned or Harvested
5. Sex (Bull, Heifer, Steer)
6. Breed Composition

A Guide to Contemporary Grouping

1. Use group codes on registration application or performance data submission forms to assign calves to contemporary groups.
2. Use the group codes to put a sick or injured calf into a single animal contemporary group if the illness or injury affected the calf’s performance.
3. Take weaning weights and measurements on all calves on the same day (when a majority of the calves are between 160 and 250 days of age), including as many calves in each contemporary group as legitimately possible.
4. Weigh all animals in a group before separating them, especially before separating show calves or bulls for a test station.
5. If the age spread of calves is greater than 90 days, choose two or more weigh dates, using as few as possible.
6. Have progeny from two or more sires in each contemporary group (although not necessary when using the animal model for genetic evaluation).
7. When calves are within an appropriate age range for each trait, record yearling weight, height, scrotal circumference, pelvic area, and ultrasound measurements on the same day.
8. If carcass data are to be collected on cull bulls, heifers, or steers, report weaning weights on all animals. These data allow selection of replacement females and bulls to be accounted for in genetic evaluations and help prevent bias in the predictions.
9. Do not weigh each calf individually as it reaches 205 days of age. Rather weigh each calf individually when calves in a group average approximately 205 days of age.
10. Do not include calves receiving special treatment (show, bull test, and sale) in the same group with those that did not receive an equal opportunity to perform.