

# Beef Sire Selection for Cattle Genetic Improvement Program

(Updated January 30, 2023)

## Introduction

The overall goal of the beef operation should be to increase net income. Net income is a balance between how much is spent on the operation and how much income the operation generates. Therefore, beef producers need to focus on increasing income while minimizing additional cost or reducing costs while trying to maintain income. Although this practice pertains to the entire beef operation, this program is to assist in selecting a bull that helps achieve this goal.

Two practices are available to improve the genetics of commercial beef operations: crossbreeding and individual bull selection. Crossbreeding has a major economic impact on your herd and should be practiced by commercial cattlemen (additional information is available in ASC-168, available at your county Extension office); however, this program does not require crossbreeding.

When looking for a bull to purchase for your operation it is important to realize that as you make progress to improve one trait you often lose ground in another trait. For example, as we select for increased growth, which has a positive impact on income, we usually inadvertently increase the mature size and maintenance costs of our cows through retaining replacements. Finding the balance between the productivity level of the cow (growth and milk) and the required energy to maintain her is very difficult and, if not done properly, will likely result in decreased reproduction. Research has shown that cow efficiency is dependent on the level of nutrition that they receive. Larger high-producing cows are the most efficient in very lush, high nutritional environments (Average Kentucky forages would not support this level of productivity) and smaller low-producing cows are the most efficient in limited nutritional situations. Under optimum nutrition there are very little differences between the breed types. Before you buy a bull, it is important to consider what you want to produce and what resources (primarily nutrition) you have available.

## Bull Purchasing

When purchasing a bull there are four primary characteristics that should be assessed: reproductive soundness; structural soundness; visual evaluation; and performance characteristics.

*Reproductive Soundness* – For a bull to have any value to a beef producer he must be reproductively sound.

The best means to determine the reproductive soundness of a bull is through a breeding soundness examination (BSE). If a bull passes his BSE he should have the physical capability to breed and settle cows. This exam does not measure desire and bulls should be observed for their interest in females in heat. ***To receive cost-share money bulls must pass a BSE.***

*Structural Soundness* – To be an efficient breeder a bull must be structurally sound. This means that he should move without pain or discomfort and should have appropriate angles at weight bearing joints.

***There are no requirements for structural soundness; however, producers should evaluate bulls for soundness to avoid problems with breeding and future problems in replacement females.***

*Visual Evaluation* – Many traits that are important to beef producers can only be evaluated through visual observation. These include, but are not limited to: disposition, horned/polled, color, muscling, body capacity, structure, sheath, and testicular development. ***There are no requirements for visual appraisal; however, producers are encouraged to carefully evaluate bulls for visual traits that are of economic or functional importance to them.***

*Performance Characteristics* – The primary reason for purchasing a bull is the expected performance of his calves. If replacement females will be retained then this decision should not be short sided, because the impact will be long lasting. Breeds differ in their level of productivity; therefore, the first decision will be on breed type. Once a breed is determined, selection between bulls for performance should be based on the Expected Progeny Differences (EPDs), whenever possible (For more information on EPDs please see ASC-141). There is no such thing as the “Best Bull”; each individual beef producer must make that determination based on what they want to get from the bull. ***Guidelines have been developed for four specific bull types. Producers must select what type of bull they will purchase (2 choices can be made) on their application then purchase a bull that meets the requirements for that bull type.***

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## Conclusions

Crossbreeding and bull selection have very important long-term economical impact on your herd. Selecting the right bull for your operation is a decision that includes setting production goals, analyzing your resources and management, and then locating the bull that best fits your situation. If done properly this process will take time and effort on your part, but the rewards can be significant.

### How to determine if a bull qualifies for the program:

1. All bulls must have genomically enhanced EPD\* or have a minimum accuracy value of .25 for the Calving Ease Direct EPD. Contact the breed association if you are unsure of the bull's status.  
\*If the breed you wish to purchase does not have genomically enhanced EPDs they will be exempt from this requirement through 2023. If your breed does offer genomically enhanced EPDs there are no exceptions. Starting in 2024 all bulls of all breeds will be required to have genomically enhanced EPDs.
2. All categories require that the bull meet a minimum Calving Ease or maximum Birth Weight EPD. If the breed you are using computes Calving Ease EPDs then that is the EPD that must be used. The bulls EPD must be equal to or be greater than the value listed for that category. If the breed does not compute Calving Ease EPDs then Birth Weight EPDs will be used. The breeds that use Birth Weight have parentheses around their values. The bulls Birth Weight EPD must be equal to or less than this value.
3. All categories, except Carcass Merit, have a requirement for growth. For Heifer Acceptable and Terminal Sire categories the bull's Weaning Weight **OR** Yearling Weight EPD must be equal to or greater than the value listed. For the Balanced Trait category, the bull's Weaning Weight **OR** Yearling Weight EPD must be equal to or above the minimum EPD **AND** be below the maximum Yearling Weight Value.
4. Only Balanced Trait bulls have a Milk EPD requirement. Bulls must have an EPD that is in between the two values listed. The other three categories have no requirement for milk. If you are purchasing a Heifer Acceptable or Carcass Merit bull and will be keeping back replacement daughters, you should consider the Milk EPD of the bull when making your selection decision. Remember, females that milk more have higher nutritional requirements and should be fed appropriately to maintain good reproduction.
5. Carcass Merit bulls will be evaluated based on their selection index values that reward improved carcass characteristics. Only breeds that offer a selection index that stresses feedlot and carcass merits will qualify for this category. A minimum Calving Ease value is also required.
6. For the Balanced Trait category there is an alternative method that can be used for some breeds. If a breed has a selection index that focuses on performance through weaning with the intent of retaining replacement females, then that index may be used. The bull must meet the minimum Calving Ease value and must meet the minimum Index value. **Using a selection index is the best selection tool available because it is based on the economic value of the bulls for that category.**

For more information there is a video available at your county Extension office or contact your county agent for Agriculture and Natural Resources or Darrh Bullock, University of Kentucky Beef Extension Specialist (859-257-7514 or [dbullock@uky.edu](mailto:dbullock@uky.edu)).

## **Bull Calculator**

An online tool has been developed to assist producers to determine if a bull qualifies for their desired category. The website is: <http://afs.ca.uky.edu/beef/KBAT>

From the launch page above, you can choose whether you plan to use the calculator to assist in purchasing a bull or if you are a seedstock producer that would like to identify which categories the bulls being sold qualify for. These tools are for your convenience, but you are responsible for putting in the correct values and the University of Kentucky and Kentucky Ag Development Fund is not liable for incorrect designations for any reason.

# Heifer Acceptable Bulls

| Breed               | Calving Ease<br>or (BW) <sup>1</sup> | Growth (either) <sup>2</sup> |                              |
|---------------------|--------------------------------------|------------------------------|------------------------------|
|                     |                                      | Weaning Weight<br>Not Below  | Yearling Weight<br>Not Below |
| Angus               | 6                                    | 35                           | 62                           |
| Beefmaster          | 6                                    | 11                           | 26                           |
| Black Hereford      | 12                                   | 45                           | 55                           |
| Brangus             | 8                                    | 11                           | 18                           |
| Braunvieh           | 14                                   | 33                           | 50                           |
| Charolais           | 10                                   | 44                           | 80                           |
| Chianina/Chi-Angus  | 14                                   | 36                           | 52                           |
| Gelbvieh/Balancer   | 16                                   | 53                           | 74                           |
| Hereford            | 4                                    | 40                           | 64                           |
| Limousin/Lim-Flex   | 15                                   | 50                           | 72                           |
| Maine-Anjou         | 12                                   | 36                           | 45                           |
| Piedmontese         | 3                                    | 18                           | 43                           |
| Red Angus/AngusPlus | 13                                   | 43                           | 64                           |
| Red Poll            | (1.0)                                | 7                            | 13                           |
| Salers              | 15                                   | 35                           | 47                           |
| Santa Gertrudis     | (-1.4)                               | -6                           | -8                           |
| Senepol             | (-2.3)                               | 2                            | 3                            |
| Shorthorn           | 15                                   | 41                           | 59                           |
| Simmental/SimAngus  | 11                                   | 58                           | 83                           |
| Tarentaise          | 1                                    | -7                           | -4                           |
| Wagyu               | (-1)                                 | -11                          | -15                          |

<sup>1</sup>Calving Ease EPDs are to be used unless the value is in parentheses which indicate that the Birth Weight EPD should be used. Remember: Calving Ease EPDs are the listed value or greater; Birth Weight EPDs are the listed value or less.

<sup>2</sup>The bull must meet the EPD requirement for either Weaning Weight or Yearling Weight. The bull's EPD must be equal to or greater than the listed value.

**Heifer Acceptable** – This is a specialty-type bull that should be used when a high percentage of first-calf heifers are to be bred. For larger, heavier birth weight breeds it may be difficult to find a Heifer Acceptable bull. Typically, easy calving bulls do not express as much growth in their calves. *To maintain an acceptable level of growth, bulls with extremely low weaning and/or yearling weight EPDs should be avoided.*

# Terminal Bulls

| Breed               | Calving Ease<br>or (BW) | Growth (either) <sup>2</sup> |                              |
|---------------------|-------------------------|------------------------------|------------------------------|
|                     |                         | Weaning Weight<br>Not Below  | Yearling Weight<br>Not Below |
| Angus               | -4                      | 61                           | 109                          |
| Beefmaster          | 0                       | 22                           | 41                           |
| Black Hereford      | 7                       | 59                           | 77                           |
| Brangus             | 2                       | 24                           | 44                           |
| Braunvieh           | 2                       | 54                           | 75                           |
| Charolais           | -3                      | 58                           | 104                          |
| Chianina/Chi-Angus  | 4                       | 49                           | 75                           |
| Gelbvieh/Balancer   | 6                       | 69                           | 103                          |
| Hereford            | -7                      | 58                           | 93                           |
| Limousin/Lim-Flex   | 5                       | 67                           | 100                          |
| Maine-Anjou         | 2                       | 51                           | 69                           |
| Piedmontese         | -5                      | 35                           | 75                           |
| Red Angus/AngusPlus | 6                       | 62                           | 99                           |
| Red Poll            | (2.8)                   | 14                           | 23                           |
| Salers              | 6                       | 53                           | 74                           |
| Santa Gertrudis     | (1.0)                   | 10                           | 12                           |
| Senepol             | (2.7)                   | 12                           | 15                           |
| Shorthorn           | 1                       | 51                           | 76                           |
| Simmental/SimAngus  | 3                       | 78                           | 116                          |
| Tarentaise          | -8                      | 12                           | 23                           |
| Wagyu               | (2.9)                   | 0                            | 0                            |

<sup>1</sup>Calving Ease EPDs are to be used unless the value is in parentheses which indicate that the Birth Weight EPD should be used. Remember: Calving Ease EPDs are the listed value or greater; Birth Weight EPDs are the listed value or less.

<sup>2</sup>The bull must meet the EPD requirement for either Weaning Weight or Yearling Weight. The bull's EPD must be equal to or greater than the listed value.

**Terminal** – This is a specialty-type bull that should be used when replacement females will not be retained. The purpose of this bull is to produce calves with exceptional feeder calf performance. Therefore, milk can be disregarded, and growth should be emphasized. *Upper extremes should be avoided if the cow size is large and there is danger of producing carcasses that are heavier than the accepted standard.*

The values listed for Calving Ease/Birth Weight in this category only eliminate the very worst calving difficulty bulls. Producers should consider how many first-calf heifers are to be bred when determining their level of Calving Ease/Birth Weight. For increased security, choose a bull that meets the Heifer Acceptable category. If any heifers are to be bred then it is recommended to use the Calving Ease/Birth Weight guidelines for a Balanced Trait Bull.

# Balanced Trait Bulls

| Breed                | Calving Ease or (BW) | Growth (either) <sup>2</sup> |                 | Yearling Weight | Milk      |           |
|----------------------|----------------------|------------------------------|-----------------|-----------------|-----------|-----------|
|                      |                      | Weaning Weight               | Yearling Weight |                 | Not Above | Not Below |
|                      |                      | Not Below                    | Not Below       |                 |           |           |
| Angus*               | 3                    | 51                           | 91              | 125             | 20        | 30        |
| Beefmaster*          | 2                    | 14                           | 30              | 53              | 8         | 12        |
| Black Hereford       | 9                    | 50                           | 64              | 85              | 18        | 26        |
| Brangus*             | 5                    | 15                           | 33              | 64              | 7         | 14        |
| Braunvieh            | 10                   | 48                           | 65              | 88              | 6         | 13        |
| Charolais            | 4                    | 51                           | 93              | 118             | 17        | 31        |
| Chianina/Chi-Angus   | 8                    | 43                           | 64              | 86              | 11        | 20        |
| Gelbvieh/ Balancer*  | 11                   | 62                           | 90              | 116             | 19        | 27        |
| Hereford*            | 0                    | 49                           | 79              | 105             | 21        | 33        |
| Limousin/ LimFlex    | 9                    | 59                           | 85              | 113             | 19        | 27        |
| Maine-Anjou          | 7                    | 41                           | 53              | 80              | 17        | 26        |
| Piedmontese          | 2                    | 25                           | 53              | 86              | -4        | 7         |
| Red Angus/ AngusPlus | 11                   | 54                           | 86              | 112             | 21        | 29        |
| Red Poll             | (1.4)                | 10                           | 19              | 28              | 5         | 8         |
| Salers               | 11                   | 45                           | 63              | 87              | 15        | 25        |
| Santa Gertrudis*     | (-.5)                | 3                            | 3               | 22              | -1        | 4         |
| Senepol              | (.6)                 | 5                            | 6               | 21              | 3         | 9         |
| Shorthorn            | 7                    | 43                           | 62              | 87              | 16        | 23        |
| Simmental/SimAngus   | 10                   | 72                           | 105             | 128             | 19        | 25        |
| Tarentaise           | 0                    | -4                           | 1               | 38              | -1        | 3         |
| Wagyu                | (.1)                 | -6                           | -8              | 22              | -3        | 3         |

<sup>1</sup>Calving Ease EPDs are to be used unless the value is in parentheses which indicate that the Birth Weight EPD should be used. Remember: Calving Ease EPDs are the listed value or greater; Birth Weight EPDs are the listed value or less.

<sup>2</sup>The bull must meet the minimum EPD requirement for either Weaning Weight or Yearling Weight but must not exceed the Yearling Weight Maximum. Milk must also be within the described range.

**Balanced Trait** –Bulls that fit these recommendations should provide moderation for calving ease, growth and milking ability. This bull would be used to produce calves that are acceptable feeder calves, while keeping the mature size and milk level of replacement females in moderation.

**\*Alternative – Can use the values below instead of table for these breeds. Values must not be below both CE and Index Values. Using an Index is the preferred selection method for this category, higher values mean more economic benefit!**

| Breed               | Calving Ease | Index Value | Index Name  |
|---------------------|--------------|-------------|-------------|
| Angus               | 3            | 60          | \$M         |
| Beefmaster          | 2            | 13          | M           |
| Brangus             | 5            | 2.3         | Fertility   |
| Gelbvieh/ Balancer  | 11           | 102         | \$Cow       |
| Hereford            | 0            | 341         | BMI         |
| Red Angus/AngusPlus | 11           | 55          | HerdBuilder |
| Santa Gertrudis     | (-.5)        | 18          | Cow/Calf    |

# Carcass Merit Bulls

| Breed*              | Calving Ease | Terminal Index <sup>1</sup> | Index Name    |
|---------------------|--------------|-----------------------------|---------------|
|                     | Not Below    | Not Below                   |               |
| Angus               | -4           | 134                         | \$B           |
| Beefmaster          | 0            | 67                          | \$T           |
| Black Hereford      | 7            | 68                          | TI            |
| Brangus             | 2            | 2.1                         | Terminal      |
| Charolais           | -3           | 248                         | TSI           |
| Gelbvieh/ Balancer  | 6            | 77                          | FPI           |
| Hereford            | -7           | 113                         | CHB           |
| Limousin/Lim-Flex   | 5            | 52                          | MTI           |
| Red Angus/AngusPlus | 6            | 35                          | GridMaster    |
| Shorthorn           | 1            | 49                          | Feedlot Index |
| Simmental/SimAngus  | 3            | 78                          | TI            |
| Santa Gertrudis     | (1)          | 10                          | Terminal      |

<sup>1</sup>Based on the specific index value for that breed that includes feedlot and carcass traits. Specific information relating to the index should be available through the breed association.

**Carcass Merit** – Producers that will be retaining ownership of their calves and/or being paid for carcass merit should place additional emphasis on those traits. A Carcass Merit bull may easily fit one of the other categories, but would also produce calves with acceptable carcass characteristics. Some of the indexes listed include maternal traits that would be important if retaining replacement females, others do not.

The values listed for Calving Ease in this category only eliminate the very worst calving difficulty bulls. Producers should consider how many first-calf heifers are to be bred when determining their level of Calving Ease. If a high percentage of heifers are to be bred, then it is recommended to use the Calving Ease value in the Heifer Acceptable category. If any heifers are to be bred, then it is recommended to use the Calving Ease/Birth Weight guidelines for a Balanced Trait Bull.

\*If breed not listed then an appropriate carcass related index is not available.