

News Column

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## **Strategic Replacement Heifer Production and Selection**

For cow calf producers that sell their calves at weaning, **reproductive performance has five times more impact than growth and ten times more impact than carcass traits on profitability** of your enterprise. Therefore building and selecting as replacement females those individuals which have superior reproductive traits has a huge impact on the economic viability of a cow calf operation. The key traits that impact reproductive performance are fertility, longevity, calving ease, amount of milk, docility, mature weight, and growth to weaning or yearling endpoints. Other attributes may include coat color, polled, breed or breed combinations to generate maternal heterosis.

Because most commercial heifers won't have EPDs for the above mentioned traits and because some of these any of these traits are lowly heritable they are largely influenced by the **sire selection that occurs in a herd over time**. Repeated selection for growth and milk can result in females that can't meet their nutritional needs on forage resources provided. In other words the sire that produces the best terminal calves may not be the sire of choice for replacement females.

The American Angus Association provides a valuable tool for evaluating nutrient availability and selecting optimal ranges of Milk EPDs for sires of replacement heifers at <http://www.angus.org/Performance/OptimalMilkMain.aspx> Use of selection indexes that heavily weight terminal traits are strongly discouraged for use as selection tools for sires of replacement heifers.

Heifers that represent **optimal combinations of breeds** known for superior maternal performance are a better alternative to straight bred heifers of equal quality. Maternal heterosis has been demonstrated in numerous studies to be very beneficial to commercial cow-calf production. About two-thirds of the economic benefit of crossbreeding comes from having crossbred cows and one-third from having crossbred calves. The bulk of the benefit of maternal heterosis is driven by improved maternal calving ease, fertility and longevity of crossbred females. First cross (F1) crossbred cows typically last about 1.5 years longer in herd and have 23-30% improvement in weaning weight per cow exposed thus improving production efficiency dramatically.

Due to the above mentioned items, if possible replacement female selection should start with **selection of sires**. Sires should be selected to produce heifers that meet the replacement female breeding objective outlined above. Use of fixed time AI to proven sires with high accuracy EPDs for maternal traits makes for an effective breeding/selection system that works well in tandem

with using your terminal bull as a terminal sire. Select sires to produce replacements that optimize traits of cows so they fit your production environment.

Replacement heifers that are born to **cows that have been reproductively successful** under your management for a long period of time are natural candidates as replacement. It's likely these cows are among the more fertile cows in your herd and are of appropriate mature size and lactation potential for your environment. Although selecting replacements from older cows increases your generation interval, it also buffers rapid changes in the genetic trend in your herd for other traits under selection that may be antagonistic to longevity and fertility. (**Note:** if you desire rapid change in traits, selection of replacements from younger cows will speed up change by shortening generation interval.)

Heifers born early in the calving season will be older at the initiation of their first breeding season than calves born later in calving season. They have a better chance reaching puberty by start of breeding season and therefore have a greater likelihood of breeding early in the season. These heifers are also likely from dams that conceived early in the breeding season and "fit" in your management system and environment.

If your cows are bigger than you would like to fit your environment, consider selecting replacement heifers from the middle part of the weaning weight distribution. Keeping the biggest, fleshiest heifers from your herd over time contributes to increases in mature cow weights and increased nutrient demand as cows. You should use age-of-dam adjusted 205 d. weaning weights to classify your heifers' potential for growth. Selection of heifers born early in calving season (see above) and selection for moderation of mature size/growth need not be independent events. For instance, one could compute adj. 205 weaning weights for all calves, select the middle half of the heifers as candidates, then chose the oldest heifers among these as replacements. This approach would optimize selection for moderate size and calved early.

A handy K-State Beef worksheet to compute adjusted performance measure for beef cattle is available here: <http://goo.gl/Leq5Jc> or you can contact me for a copy. More information of beef cattle selection can be found in the NBCEC Beef Sire Selection Manual here (from KSUbeef.org): <http://goo.gl/Zrc9pL>

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