Traditionally, many cattlemen have selected replacement heifers based largely on which heifers look the best. While this selection practice emphasizes genetics for growth and tends to pick heifers from the earliest-calving cows, it may not result in sufficient focus on genetics for expressed fertility, calving ease, optimum levels of milk production, sensible maintenance requirements and adequate longevity. Present-day genetic information affords producers the ability to produce and select replacements with a higher likelihood of success, as compared to traditional approaches.

What Makes a Successful Replacement Heifer?

What does a replacement heifer need to do in order to achieve production success? Most producers would agree that successful replacements:

- reach puberty and become pregnant early in the first breeding season;
- calve unassisted each year;
- breed back early in the second breeding season as wet two-year-olds, with high levels of sustained fertility thereafter;
- have optimum milk and fleshing ability, so as to wean profitable calves, yet maintain sufficient body condition for early annual rebreeding;
- have sensible maintenance requirements as a result of mature size and milk production levels which are matched to available feed resources;
- have sound teats, udders, feet and legs as well as calm temperament and as much longevity as possible to minimize annual replacement rates;
- represent genetics for optimum levels of growth, efficiency and carcass merit for the purpose of producing profitable feeder and feed cattle as well as replacements; and
- possess high salvage value so as to offset replacement costs.

Given the demanding list of attributes required of replacement heifers, it is useful to consider how genetic information might be used to select for success. Opportunities to take advantage of genetic information exist at three points of heifer production:

1. When sires are selected to produce replacement heifers
2. When heifers are selected from the pool of replacements
3. When sires are selected to breed replacements

Selecting Sires to Produce Replacements

The better the pool of potential heifers from which to select, the better the odds of selecting a productive group of replacements. For commercial cattlemen, there are at least two keys to producing a superior pool of replacements: 1) a well-designed crossbreeding program that generates maternal heterosis and uses breeds well adapted to the production environment and 2) use of EPDs to select sires with genetics for the combination of items listed above.
Choosing which breeds to use in crossbreeding starts with an evaluation of your present cowherd and feed resources, as well as a determination of the targeted end-product market. Selecting breeds from which to produce replacements should also go beyond evaluation of only puberty and level of milk production. Selection should include consideration of breed comparison data related to maternal calving ease, calf vigor and survivability, cow maintenance energy requirements, mature cow size, optimum milk production, convenience traits such as teat and udder soundness, longevity, and traits contributing to life cycle production efficiency.

**Selecting Replacements Heifers**

In addition to known pedigree and performance information from the sires and dams of replacements, performance data can be collected from yearling-age heifers when they are processed prior to breeding as part of the herd health program. Collection of the following information can help guide selection of heifers toward genetics for early puberty, maternal calving ease and growth, as well as moderate mature size and adequate fleshing ability.

**Reproductive Tract Scores** - The reproductive tract scoring system estimates a heifer’s pubertal status via rectal palpation of the uterine horns and ovaries. Tract scores range from one to five, with heifers scored as four and five believed to be cycling based on the presence of a corpus luteum or large follicle on the ovaries and good uterine tone. Heifers scored as three are thought to be on the verge of cycling, while those scored as one and two have more infantile, less developed reproductive tracts and are not yet cycling. Research has indicated that heifers scored as three, four or five generally have higher pregnancy rates and earlier conception dates as compared to heifers scored as one or two. In addition to serving as a heifer selection tool, reproductive tract scores can be used to determine if a group of heifers is sexually mature enough to respond favorably to a synchronization and A.I. program. Palpation of the reproductive tract can identify freemartins or heifers which might already be pregnant prior to the start of the breeding season. Many large animal vets can evaluate reproductive tracts of replacement heifers.

**Pelvic Measurements** - Calving difficulty primarily occurs among first-calf heifers as a result of “heavy” calf birth weight in relation to the size of the dam’s pelvic area. While birth weight is unquestionably the key direct factor related to calving ease, pelvic area appears to be the highest ranking maternal variable. Colorado State University research has shown that as birth weight of calves increases and pelvic area of replacement heifers decreases, the incidence of assisted births also increases. Depending upon the average pelvic size of the group, culling heifers with the smallest pelvic areas (i.e., smallest 5 to 10 percent) has been shown to help reduce the incidence of assisted births.

**Yearling Weight, Hip Height and Condition Score** - Weight, height and condition information can be used to select heifers with adequate early growth and fleshing ability but help avoid selecting heifers that might be too big and hard fleshing later in life. Avoiding heifers that are too extreme, either excessively big or small, is expected to contribute to greater cowherd uniformity.

The accuracy of replacement heifer selection can be improved by combining these yearling data with knowledge of pedigree information from sires and dams for appropriate levels of maternal traits (i.e., milk) and longevity, with incorporation of a visual evaluation of soundness and doing ability.

**Selecting Sires for Replacement Heifers**

While the first test of a replacement heifer is becoming pregnant early in the first breeding season, the next major hurdle is the heifer’s ability to give unassisted birth to a live, vigorous calf. In addition to avoiding production and selection of heifers with genetics for high birth weights themselves, selection of service sires on the basis of their EPDs for low birth weight, high expected calving ease and short gestation length is the most reliable way to minimize calving problems.

Calving ease in first-calf heifers is also related to reproductive performance during the second breeding season. Research has demonstrated that heifers that do not require assistance at calving tend to have higher pregnancy rates following the second breeding season by 3 to 5 percent and are about a week earlier in terms of day of second calving, as compared to heifers that require assistance. This is most meaningful when you consider that the number one reason cows are prematurely culled at young ages is because of reproductive failure (open at the end of the breeding season).

Implementation of an A.I. program and synchronization, whereby sires can be reliably selected for calving ease in addition to adequate performance in other traits, is the most sure-fire way to genetically manage for a successful first calf from replacements. Through the use of A.I., unique service sires can be used that not only minimize calving difficulty but also pass on genetics for the desired combination of maternal, growth and carcass merit. Considerable risk can be managed through the use of synchronization and A.I. in replacement heifers.

**Summary**

Successful replacement heifer selection begins with wise selection of the sires from which heifers are
produced. Once a superior pool of replacements is developed, use of performance information collected on yearling heifers, as well as information known about the sires (or group of sires) and dams of heifers, can be used in conjunction with visual evaluation to improve the odds of selecting the most productive heifers. Finally, smart selection of sires to breed to heifers can help ensure calving ease and production of a profitable first calf from replacements. Through planned crossbreeding and disciplined use of available genetic information, heifers can be produced, selected and bred with more confidence and less risk, as compared to traditional practices.

Source: Dr. Kent Anderson, North American Limousin Foundation

Trichomoniasis Testing Requirements Are Changing for Arkansas

Jeremy Powell

Beginning May 15, 2009, any breeding bull entering Arkansas from another state must either be a virgin bull under 24 months of age or must be accompanied by a negative test for trichomoniasis conducted within 30 days prior to entry. These requirements have been adopted as an emergency regulation by the Arkansas Livestock and Poultry Commission, the regulatory agency for livestock in the state.

Trichomoniasis testing requirements

Trichomoniasis or “Trich” is a venereal disease of cattle caused by the protozoan organism, Tritrichomonas foetus. The disease is not a human health issue, but it leads to infertility, abortions, an extended breeding season and a diminished calf crop, which is very costly to cattle producers. Trichomoniasis is currently a reportable disease in Arkansas. These new regulations are similar to requirements that have been developed by at least 15 other states in the western and southern United States to address this disease.

Trichomoniasis causes very few outward signs of illness in infected bulls. Therefore, it can often be present in a bull for a considerable time before it is suspected and diagnosed. Infected cows, however, will experience infertility, causing the cow to return to heat multiple times and, subsequently, leading to poor pregnancy rates and an extended breeding season. This causes devastating losses due to reduced calf crops and prolonged calving seasons. Infected cows may display a thick, yellowish vaginal discharge while infected, but in many cases, no outward signs may be apparent in infected cows. The majority of infected cows will clear the infection if given 120-150 days of sexual rest. A vaccine can also be administered to cows to aid in the control and prevention of this disease. Vaccination requires two injections, typically administered two to four weeks apart.

Currently, there is no effective treatment or vaccine for breeding bulls, and as bulls age, their reproductive organs become more hospitable for a Trich infection. This disease has few adverse effects in the bull, but the bull acts as the main source of transmission for the rest of the herd. Once infected, bulls (especially bulls over 4 years of age) often stay infected for life.

The new regulations for Arkansas indicate that all breeding bulls entering Arkansas must be officially identified with one of the following: a permanent metal tag, an RFID tag, an official breed registry brand or tattoo or an official state of origin trichomoniasis tag.

Bulls brought to Arkansas from other states must be accompanied by a veterinary inspection certificate, and bulls less than 24 months of age must be certified as virgins and must be accompanied by a certificate of virgin status signed by the breeder/owner of the bull or an authorized veterinarian. Breeding bulls over 24 months of age or any non-virgin bull must test negative for trichomoniasis within 30 days of shipment via a polymerase chain reaction (PCR) test or by three separate culture tests conducted not less than one week apart. All samples collected for testing must be collected by an accredited veterinarian and the test performed by an approved laboratory. Some bulls are exempted from testing – exhibition or rodeo bulls temporarily in the state only for the purpose of the event that will leave the state after the event or any bull consigned to go directly to slaughter.
Breeding season is right around the corner for spring calving operations. Proper bull management is crucial for a successful breeding season. However, according to the 2008 U.S. Department of Agriculture’s National Animal Health Monitoring System (NAHMS), only 27 percent of beef cattle operations annually test bulls before turning them out for the breeding season. Bulls can differ in their reproductive capabilities, and research studies show that approximately 20 percent (1 in 5 beef bulls) that undergo a breeding soundness evaluation are not satisfactory breeders.

Obviously, results from using an infertile bull could be very disappointing. The risk of experiencing problems with bull fertility can be minimized through the use of a breeding soundness evaluation (BSE). A BSE is a practical method to identify bulls with less than satisfactory breeding potential. This evaluation should be conducted on every bull at least 30 days before each breeding season to allow enough time for replacement of deferred or unsatisfactory bulls. The first step in a BSE is to select a veterinarian in your area who is competent in conducting a complete BSE. You cannot afford to use a bull that is not a satisfactory potential breeder.

The exam includes an evaluation of the bull’s physical ability to successfully mate. Both internal and external portions of the reproductive tract are examined or palpated for abnormalities. A measurement of scrotal circumference is included as an indicator of the production of high-quality sperm. A semen sample is also evaluated for sperm motility and morphology. Bulls still need to be observed during the breeding season for normal libido, but a breeding soundness exam prior to turn out will greatly reduce risks associated with infertile bulls. For more information on determining fertility of bulls, see a University of Arkansas Cooperative Extension Service fact sheet at http://www.uaex.edu/Other_Areas/publications/PDF/FSA-3046.pdf.

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