



Repro Tracks

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Lifetime productivity

There is no production “trait” more important to a commercial cattleman than pregnancy. Yet, for some reason we generally and frequently take this trait for granted. However, putting more pressure on the herd for pregnancy may have greater economic impacts to the average operation than spending significant resources to incorporate many of the new technologies available to beef cattle producers. Heifers and cows that become pregnant early in the breeding season and calve early in the calving season usually remain in the herd longer and have greater lifetime productivity.

Select for pregnancy

Almost every production system or operation has a unique management (i.e., nutrition, labor, herd health, etc.) and environment (climate, animal handling, stress, etc.). Therefore, there is no single recipe to determine which females will become pregnant and calve earlier in the breeding season for all beef producers. Some females may respond differently under one management system and others may respond more favorably under another system.

Therefore, it is important for cattlemen to focus on their own criteria to select for pregnancy for their own operations. Keep in mind that herds having a greater percentage of calves born early in the calving season are generally the most profitable herds. Let us address some questions associated with fertility and lifetime productivity.

What is the primary factor affecting when a heifer becomes pregnant during the breeding season?

A replacement heifer must wean between three and five calves to recoup the costs incurred in her development, and the primary reason that a cow leaves the production herd is reproductive failure. A replacement heifer that fails to wean a calf will usually incur a net loss for a producer.

Heifers that attain puberty earlier become pregnant earlier in their first breeding season and continue to do so as cows, resulting in increased lifetime production rates. Thus, cow-calf producers are in need of technologies to measure the reproductive potential of replacement heifers as early as possible in order to choose the best replacement heifers and to best allocate resources to manage them in preparation for their first breeding season. Therefore, identification and selection of

heifers destined to attain puberty at a younger age will enhance the overall fertility and subsequent longevity of cows in beef cattle operations.

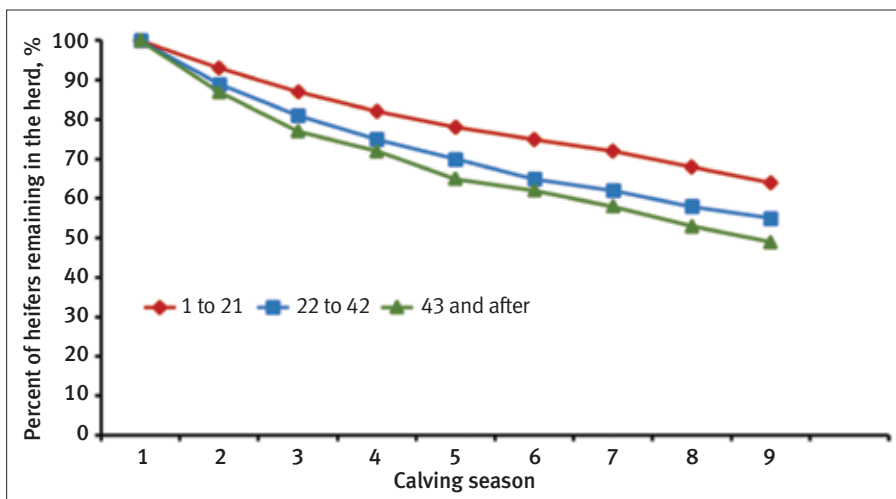
To calve by 24 months of age, heifers must reach puberty and conceive by 15 months of age. Age at puberty is controlled by several genetic and environmental factors, including breed composition, nutrition, body weight and bull exposure.

What is the influence of calving day on lifetime productivity?

Replacement heifers that calve early in their first calving season have greater longevity in the herd than heifers that calve later in their first breeding season. There are many data sets that demonstrate the impact of early calving on lifetime productivity, but the most robust data set comes from a collaboration between Bob Cushman and George Perry, who examined the performance of 16,549 heifers during a 21-year period at the U.S. Meat Animal Research Center.

They demonstrated that heifers that calved in the first 21 days of their first calving season were more likely to produce a fifth calf or more calves than those that calved later as a heifer in their first year (see Fig. 1). These heifers also weaned a heavier calf through their sixth calving season. This indicates that identifying replacement heifers that will calve early is of great economic benefit to the cow-calf producer.

Fig. 1: Herd survival analysis for heifers based on calving period during the first calving season as a heifer



Note: Heifers that calved in the first 21 days of their first calving season were more likely to remain in the herd to produce a fifth calf ($P < 0.01$).

What may be influencing heifers that become pregnant to calve earlier in the calving season?

A more recent experiment reported by Cushman determined age at puberty in crossbred beef heifers. Before the yearling heifers initiated the breeding season, they were evaluated for antral follicle count by transrectal ultrasonographic examination of the ovaries.

Antral follicle count is an indicator of the number of primordial follicles in the ovary and an indicator of fertility in beef heifers.

Heifers were placed with fertile bulls for 60 days and allowed to calve normally. Heifers that calved in the first 21 days had greater numbers of antral follicles at ultrasonography than those that calved in the last one-third of the calving season. There was no difference in age at puberty between the three calving

groups. Thus, there appears to be a relationship between the ovarian reserve and calving day.

Can we select for puberty in beef heifers?

Clearly, age at puberty is a reproductive trait with a moderate heritability, making it amenable for the identification of genetic selection tools. Researchers focusing on the genetic parameters of age at puberty have reported an average heritability of age at puberty of between 0.30 and 0.40, which tends to be greater than many other fertility estimates. Thus, there are clearly genes that influence the onset of reproductive cycles in

beef heifers, and the heritability indicates that advancements could be made in heifer reproductive performance by understanding the gene pathways involved with this trait.

However, we still do not have a good reliable method of selecting for onset of puberty in field conditions. Therefore, more research is necessary to assist in developing selection tools to enhance the opportunity for selecting replacement heifers for earlier onset of puberty.

Nonetheless, sound nutrition, herd health and reproductive management can overcome delayed onset of puberty and enhance opportunities for longevity in the herd. Using

sound management and selecting females that become pregnant early in the breeding season will ultimately result in a more efficient production system while maintaining females that have a greater ability to adapt to each individual operation.



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