

Consequences of Long-term Commitment to Estrus Synchronization

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The use of estrus synchronization programs has substantially increased over the last few decades. These programs allow cattle producers to manipulate the estrous cycle of cows and heifers, facilitating the adoption of biotechnologies such as artificial insemination (AI). Cow-calf operations can combine estrus synchronization with fixed-time artificial insemination (FTAI) and AI all cows from a given herd at a pre-determined time without the need of estrus detection. The development of these estrus synchronization protocols has significantly impacted reproductive management commercially, leading to a remarkable global increase in the use of AI by beef cattle producers. In fact, the number of beef semen straws sold yearly in the United States increased by 145% between 1990 to 2017.

Studies have repeatedly evaluated the effectiveness of estrus synchronization protocols in combination with FTAI, and pregnancy rates usually range between 40-60%. These are great numbers considering that approximately half of our females are becoming pregnant on the first day of the breeding season. Nevertheless, there is still some variation in results between herds enrolled in these programs. For this reason, cattle producers and research groups across the globe are often trying to understand which factors drive these differences in fertility between herds utilizing FTAI. We now know that a variety of factors such as nutrition, semen quality, AI technician, and vaccinations (to name a few) can influence the success of a FTAI program. To further explore some of these factors, our research group compared the fertility records of 8 different operations in a study led by Dr. Cliff Lamb. Overall, this study had more than 1,500 insemination records that were obtained within the same breeding season. All herds were comprised of predominantly Angus or Angus crossbred cows and utilized the same estrus synchronization protocol. The length of the breeding season was approximately 60 days, and the same personnel conducted the estrus synchronization and FTAI procedures at all operations. The pregnancy rates to FTAI for each herd are summarized in the Figure 1.

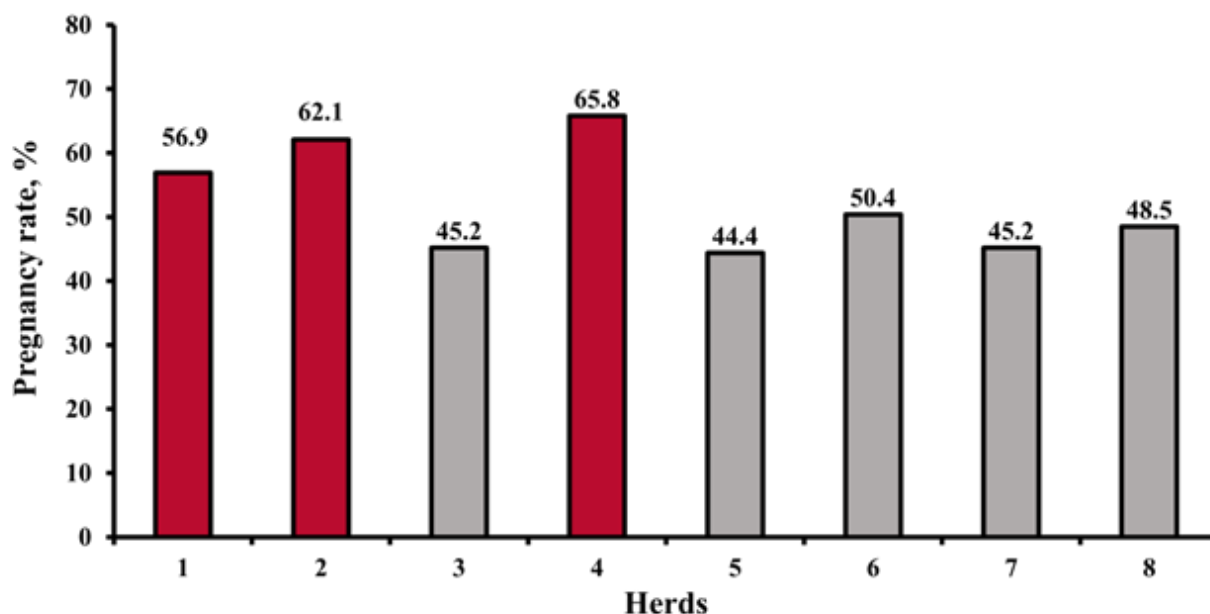


Figure 1. Differences in pregnancy rates from 8 different herds (n = 1541) exposed to estrus synchronization and fixed-time artificial insemination.

As expected, pregnancy rates to FTAI averaged 50% across all 8 herds. However, notice that pregnancy rates varied from 44.4 (Herd 5) to 65.8% (Herd 4). To explore these differences in fertility, we split these herds into two categories: 1) Herds with pregnancy rates greater than 50% (red bars), or 2) herds with less than 50% pregnancy rates (gray bars), and calculated the interval between the day of calving and the day of FTAI for each cow in the study. Cows from the herds with greater fertility had on average 2 extra weeks to recover between parturition and FTAI compared with cows from the less fertile herds. We have known for a long time that late-calving cows that have fewer days between calving and breeding are less likely to become pregnant. These cows have less time for their reproductive tracts to recover from the process of parturition and usually reach their peak of lactation during the breeding season. Therefore, these cows are metabolically challenged due to their greater nutritional requirements and are often not cycling at the beginning of the breeding season. For these reasons, regardless of the estrus synchronization protocol or how good our AI technicians were, cows from the less fertile herds were already “programed” to have decreased fertility. The calving distribution from the high (Panel A) versus low (Panel B) fertility herds are summarized in Figure 2. Notice that most cows in the more fertile herds calve within the first 21 days of the calving season and, therefore, have more time to prepare themselves for the upcoming breeding season.

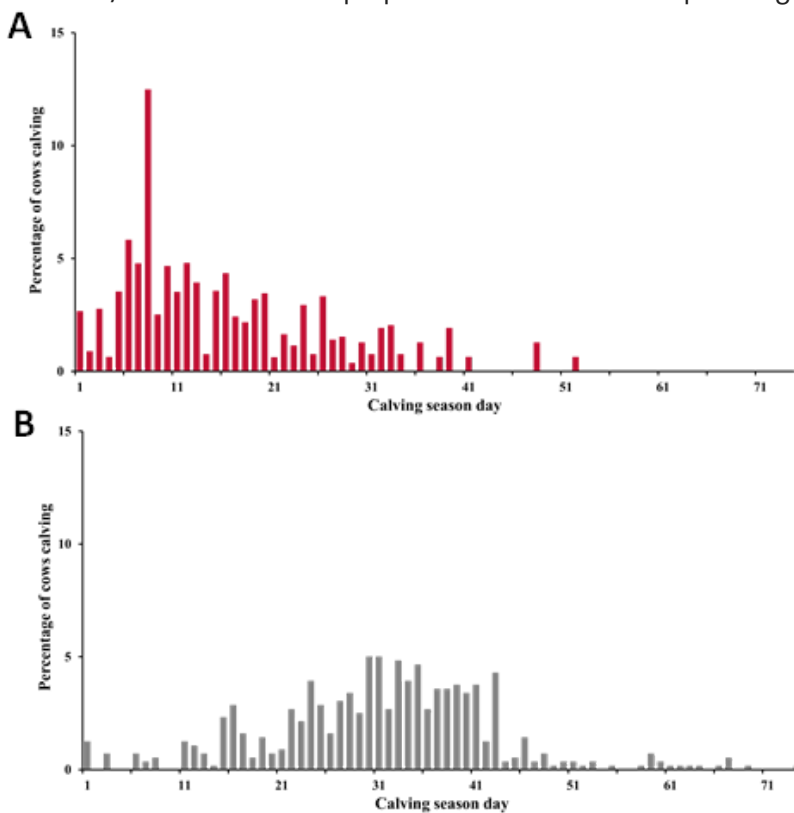


Figure 2. Calving distribution of high (Panel A) and low (Panel B) fertility herds.

After realizing how different the calving distributions were when comparing the high versus the low fertility herds, we decided to evaluate what these herds were doing differently to increase the number of early-calving cows and decrease the number of late-calving cows. It turned out that Herds 1, 2 and 4 (Figure 1) had been utilizing estrus synchronization and FTAI for at least 5 years, whereas Herds 3, 5, 6, 7 and 8 were utilizing these programs for the first time when this data was collected. This clearly highlights the importance of sticking with the technology. Some producers might get discouraged after having lower pregnancy rates when they utilize estrus synchronization and FTAI for the first time. We know that estrus synchronization protocols that make use of progesterone can induce cyclicity in cows that have not resumed their normal estrous cycles before the breeding season. Consequently, these

programs gradually change when our cows are becoming pregnant, shifting the calving distribution over the years, and resulting in more cows calving earlier. Therefore, producers that stick to the technology usually observe a gradual increase in pregnancy rates to FTAI as they decrease the number of late-calving cows in their herds over time. *This article was also printed at the Georgia Cattleman Magazine.*



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