Repro Tracks

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Getting started right with AI

This issue of the Angus Journal *focuses on three keys to success: 1) getting started, 2) securing a land resource and 3) your health. From a reproductive management standpoint, it makes sense to focus on questions that I have received with regard to implementing an artificial insemination (AI) program. Getting started right with reproduction is essential for the future success of every beef cattle operation.*

Question No. 1

Is there a difference between conception rate and pregnancy rate?

Before discussing what you should expect from an AI program, it is important to understand a few definitions that are frequently used but often misinterpreted when talking about the success of a program. These definitions are:

1) Synchronization rate: the percentage of females detected in heat compared to the number of females synchronized.

2) Conception rate: the percentage of females pregnant compared to the number of females detected in heat.

3) Pregnancy rate: the percentage of females pregnant compared to the total number of females synchronized.

For example, consider if a producer synchronizes 100 females, detects 75 females in heat and inseminates those 75 cows. Fifty pregnancies result. The synchronization rate would be 75% (75 females in heat compared to 100 total females synchronized), the conception rate would be 67% (50 females pregnant compared to 75 females inseminated), and the pregnancy rate would be 50% (50 females pregnant compared to 100 females synchronized).

Question No. 2

How are these definitions important to evaluating the success of your AI program?

Determining how successful your synchronization and AI program is will help you identify the pitfalls and correct them; you can't administer what you don't measure. Essentially, synchronization rate is important if you use an estrous-synchronization system that requires heat detection. The more females you detect in heat will result in more females to inseminate and potentially become pregnant to AI.

Conception rate is somewhat meaningless to the success of an AI program; however, it is frequently used by producers when sharing how successful they were. The primary issue with conception rate is that you do not take into account females that were synchronized and that were not detected in heat.

Therefore, pregnancy rate is a far better assessment of the success of an AI program than conception rate. However, keep in mind that generally pregnancy rates will be lower than conception rates unless a fixed-time AI program is used or every female is detected in heat.

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Question No. 3

**If I implement an AI program, what pregnancy rates should I expect?**

In most cases, using a fixed-time AI program will yield greater pregnancy rates than heat-detection systems because every female will have a chance to become pregnant. Producers should consider fixed-time AI as an option, especially if time and labor are potential pitfalls to implementing an AI program.

Fixed-time AI will help reduce the time and labor associated with the AI system, and all females can be inseminated on the same day. Producers who synchronize and AI for the first time should not expect to obtain similar pregnancy rates to producers who have implemented an AI program for one or more years.

Frequently, synchronization and AI is oversold, and first-time users have unrealistic expectations of what they should expect for pregnancy rates. From our experience, we know that the advantages of implementing a synchronization and AI program go further than simply obtaining good pregnancy rates.

In a recent study performed at multiple locations using the same estrous-synchronization system, the pregnancy rates ranged from 44.4% to 65.8% (see Fig. 1). After evaluating each of these operations for multiple factors that may have affected

Fig. 1: Pregnancy rates among eight herds synchronized with the same fixed-time AI protocol
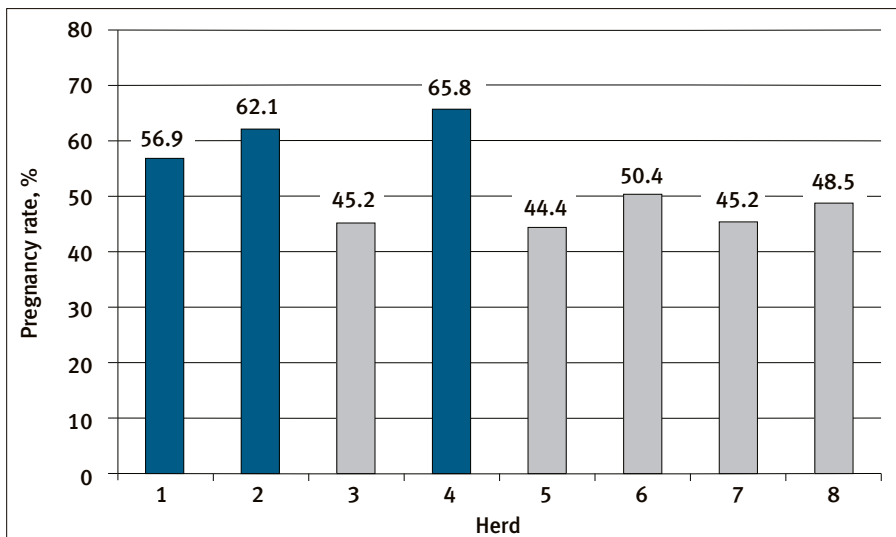
Filled bars represent herds that had been previously exposed to estrous synchronization and AI for at least eight years.

pregnancy rates (such as age, body condition score, days postpartum, etc.), the primary factor that appeared to have the largest impact on success was whether the herd had been previously exposed to estrous synchronization and AI or not.

The three herds that had previously been exposed to estrous synchronization and AI for eight or more years had pregnancy rates of 56.9% to 65.8%; whereas, those herds that had not previously been exposed to estrous

synchronization and AI had pregnancy rates ranging from 44.4% to 50.4%. Therefore, obtaining pregnancy rates that may be deemed good or acceptable may require a long-term commitment rather than expecting excellent results from the start.

Question No. 4

What are the long-term effects of implementing an estrous-synchronization and AI program?

Frequently when introducing an estrous-synchronization and AI program, the focus is on pregnancy rates to AI, but the

impacts are far greater than simply focusing on pregnancy rates. In fact, the primary focus should be on the changes to calving distribution, economic impacts and other positive indicators of fertility.

In a long-term study at the University of Florida North Florida Research and Education Center (NFREC), we introduced an intensive estrous-synchronization and AI program with a goal to reduce the length of the breeding season and ultimately expose every cow to AI on the first day of the breeding season.

Implementing such a program requires

Table 1: Breeding season characteristics and change in calf value by incorporating a fixed-time (TAI) program into the NFREC beef herd.

Item	Year						
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Overall breeding season pregnancy rate, %	81	86	84	86	82	94	92
Mean calving day[a]	79.2	80.9	59.2	56.2	53.7	47.2	39.5
Breeding season length, days	120	120	110	88	80	75	70
Difference from 2006-2007, days	0	0	21.7	24.7	27.2	33.7	41.4
Per calf increase in value[b], $	0	0	$65	$74	$82	$101	$124
Per herd increase in value[c], x $1,000	0	0	$19	$22	$24	$30	$37
[a]Mean calving day from initiation of the calving season.							
[b]Increased calf value based on increased weaning weight compared to 2006-2007 mean calving day.							
[c]Increased calf value based on 300-head cow herd.							

commitment and increases demands on time and labor, especially during the first two or three years. However, after refining the program, the benefits of estrous synchronization and AI became significant. Table 1 demonstrates the overall breeding-season pregnancy rates, reduction in breeding-season length, and economic impacts of committing to estrous synchronization to this herd in 2008. The years 2006 and 2007 are included as a reference.

During the first five years of implementing the AI program, the average length of the breeding season was reduced by 50 days, from 120 to 70 days. In addition, the overall breeding-season pregnancy rates increased 5% -10%.

However, the greatest benefit of implementing the AI program is the increase in value of the calf crop to the operation. In five years the increase in value to the herd was greater than $37,000, based on 300 cows. Committing to an AI program in this herd has obviously resulted in significant benefits.

Summary

To get started right, producers should consider all of the benefits of estrous synchronization and AI rather than simply focusing on pregnancy rates to AI. A long-term commitment means that there may be breeding seasons that pregnancy rates are less than what might be expected, but committing to such a program will yield significant benefits. For the herd in the above example, pregnancy rates to AI have ranged from 39% to 56% during the five years that cows have been exposed to AI. If we had changed course when pregnancy rates were low, we may have lost the more important metrics that affect the productivity of our operation, such as overall breeding-season pregnancy rates, breeding-season length and increased calf value.

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