

Stressed Over Problem Breeders?

Understand the Concept and Target the Correct Management Areas

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Perhaps one of the most frequent topics I am asked to speak to dairy producers about is how to get the "problem cows" in a herd pregnant. Framing the question in this way tells me a lot about how people think about dairy cattle reproduction and the factors that affect the rate at which cows become pregnant in a dairy herd.

The concept of "problem cows" implies that a dairy herd is comprised of two groups of cows: 1-high fertility cows (i.e., those cows that settle to first or second A.I. services) and 2-low fertility cows (i.e., those cows that fail to conceive after three or more A.I. services). If both high and low fertility cows exist in a herd, then it follows that the problem cows in a herd require a different reproductive management strategy to become pregnant compared to the high fertility cows.

I want to challenge the high fertility versus low fertility cow assumption, and then outline two areas of reproductive management that should be emphasized to maximize the rate at which cows become pregnant in a dairy herd.

High Fertility vs. Low Fertility

Let me begin by pointing out that every dairy herd may have a few cows that are functionally infertile; however, on most farms this represents very few cows. Remember, all lactating cows conceived at least once as non-lactating heifers, so they had all of the appropriate reproductive organs and physiology to successfully reproduce at that time in their life.

If we assume there is a substantial number of high and low fertility cows in a herd and track conception rate by number of times bred, we should see a decline in conception rate by service number because the group of low fertility cows comprises a larger and larger proportion of the remaining cows as the high fertility cows become pregnant. In fact, conception rate in Holsteins remains fairly constant across the first four to five A.I. services. This may or may not be observed at an individual farm level, but it is

observed when large numbers of cows are analyzed in a single data set, and this observation argues against the concept of problem cows. Thus, at a given A.I. service, a certain proportion of cows will conceive on a given farm. This calculation is called the conception rate.

Let's take an example of a 100-cow farm with a 30% conception rate at each A.I. service and look at the rate at which cows become pregnant in that herd by number of times bred (*Table 1*).

Number of Times Bred	Number of Cows Bred	Pregnant Cows	Total Pregnancies
1	100	30	30
2	70	21	51
3	49	15	66
4	34	10	76
5	24	7	83
6	17	5	88

Most dairy farmers define problem cows as those cows in their herd that require three or more A.I. services. Based on the mathematical example in Table 1, 34% of the cows in the herd will require a fourth A.I. service and 24% (nearly one in four cows in the herd) will require a fifth A.I. service based on the mathematics of conception rate alone. By changing our thinking from problem cows to the mathematical example in Table 1, we can conclude what the cows failing to conceive to third A.I. service really require is a fourth A.I. service. Fortunately, A.I. service rate is a reproductive management factor that can be closely controlled on dairies.

If this mathematical relationship accurately defines the rate at which cows become pregnant in a herd, we can outline two areas of reproductive management to emphasize that will lead to improved reproductive performance.

Improving Conception Rate

First, cows in herds with better fertility require fewer overall A.I. services to become pregnant than herds with poorer fertility. Thus, one way to improve the rate at which cows become pregnant in a dairy herd is to improve the conception rate of the herd. Unfortunately, improving conception rate in a dairy herd is challenging, mostly because a large array of environmental, management and physiologic factors affect fertility in dairy cows.

Conception rate varies widely among dairy herds, but averages somewhere between 30% and 40% for lactating cows. Herds with average conception rates below 30% on an annualized basis have much to gain by improving herd fertility, and need to troubleshoot that aspect of reproductive management.

Four general factors that determine conception rate in a dairy herd include: cow fertility, bull fertility, accuracy of heats and A.I. efficiency. Cow fertility refers to any cow-related factors that influence establishment of pregnancy and include factors such as inadequate nutrition and environmental stresses. Bull fertility refers to male fertility and is not an issue when using artificial insemination. Accuracy of heats refers to the timing of A.I. relative to estrus or ovulation. A.I. efficiency refers to factors due to semen handling and A.I. technique. Each of these areas needs to be carefully evaluated when addressing a conception rate issue on a dairy.

Examine A.I. Service Rate

The second area of reproductive management to emphasize is the A.I. service rate in the herd. Cows that fail to receive an A.I. service never have a chance to become pregnant. Similarly, cows that receive their first postpartum A.I. service at 180 days or more post calving have no chance to become pregnant before 180 days in milk.

Poor A.I. service rates have been problematic and limiting to dairy cattle reproduction since the adoption of A.I. Although dairy producers have traditionally been blamed for poor detection of estrous behavior, cows also display estrous behavior poorly due to environmental and physiologic issues. The development of hormonal protocols that synchronize ovulation and allow for timed A.I. in lactating dairy cows have provided dairy producers with a powerful tool for improving the A.I. service rate in their herds.

There are several different ways to implement synchronization protocols into a reproductive management strategy on a dairy that provide a proven and cost effective solution to improving the rate at which cows become pregnant. The physiology that underlies the hormonal protocols that allow for timed A.I. such as Ovsynch® and Presynch has been researched extensively and continues to be a topic of active investigation among dairy scientists studying reproductive biology. To achieve success with these hormonal protocols, each farm has to develop a system to administer the correct injections to the correct cows on the correct days, then subsequently A.I. the correct cows.

A standard Presynch/Ovsynch protocol for submitting cows for first A.I. service requires that each individual cow receive five consecutive injections at the appropriate injection intervals. Failure to administer any one of these five injections dramatically or completely reduces the conception risk to timed A.I. and will ultimately result in a delay in establishing pregnancy. For a farm that achieves an injection protocol accuracy of 95% on any given injection day (e.g., 95% of the cows that should get an injection actually get the correct one), on average nearly one in four cows will not successfully complete the five injections of the Presynch/Ovsynch protocol (e.g. $0.95 \times 0.95 \times 0.95 \times 0.95 \times 0.95 = 77$ percent). Thus, maximizing protocol compliance should be the primary point of emphasis for herds using synchronized breeding protocols to improve A.I. service rate.

Author Bio: *Dr. Paul Fricke is an Associate Professor and Extension Specialist in Dairy Reproduction. His goal is to develop practical on-farm programs, based on scientific research, to improve reproductive efficiency. Dr. Fricke's research has been published in numerous publications, and he has spoken to dairy audiences in several U.S. states and on five continents*