

Improving Reproductive Performance

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According to DHIA records, U.S. dairy herds have increased days open from 128.2 days in 1989 to 149.7 days in 1998. What could have happened in the last ten years to cause this 20 plus day increase? Most people take it for granted that as dairies get larger and produce more milk their reproductive efficiency has to suffer. The excuses used to explain this poor performance include:

"We are just too big to do a good job on reproduction"

"Now that we use BST, we don't need to be as concerned about reproduction in order to maintain production"

"I can reduce early post-partum disease if I increase my day's open and calving interval".

While these excuses may sound acceptable, it is in the producer's best interest to monitor herd reproductive performance and make efforts to improve upon these existing levels. Since 1994, the use of bovine somatotropin (BST) has allowed some producers to neglect reproduction and still maintain or increase milk production. Herds that use BST can still benefit economically by reducing days open and thus reducing the median days in milk (DIM) resulting in even greater milk production. As long as fresh cows are monitored properly, the increased number of cows with early post-partum disease that occurs simply by having more fresh cows can be managed quite effectively.

Poor reproductive efficiency and a longer calving interval also contribute to the reduction in replacement heifers born on the farm. This reduction in farm-raised heifers entering the herd limits the speed of genetic progress that can be made. Introduction of heifers from other farms presents a biosecurity risk, not to mention an added expense. Until sexed semen is commercially available to our industry, we need to focus on reducing our calving interval in order to produce enough heifers to maintain current cow numbers, let alone enough to expand.

If you are not happy with your herd's reproductive efficiency and would like to do something about it, then what do you do? First, you have to identify what your reproductive problems are before trying to apply any quick fix. In the past, when producers and veterinarians talked about a herd's reproduction, they discussed heat detection rates (HDR) and conception rates (CR) independent of one another. Lately, there has been much use of a measure that incorporates both HDR and CR, termed the pregnancy rate (PR). Pregnancy rate is calculated by multiplying the heat detection rate in one cycle (21 days) by the conception rate. The pregnancy rate represents the proportion of eligible open cows which become pregnant every 21 days within a breeding period. This formula enables us to look at HDR and CR combined into one reproductive measure, because both work together to reduce days open. Pregnancy rate along with days in milk to first breeding combine to determine days open and ultimately the calving interval. Currently, the average efficiency of heat detection for U.S dairy herds is about

40%. This means that out of 100 cows eligible for breeding, the producer only detects 40 heats during that one estrous cycle. Conception rates in the U.S dairy industry hover around the 40% level. By taking the percentage of cows detected in heat (40%) and multiplying it by our conception rate (40%), we come up with a pregnancy rate of 16%. In other words, of the 100 cows that were eligible for breeding, only 16 cows became pregnant in this reproductive cycle. The point of this math lesson is to make you think about your reproductive performance in new ways, that enable you to determine your problem areas. As I mentioned before, there are three factors that go into determining the days open and calving interval: the DIM at first breeding, the conception rate, and the heat detection rate. So then, where did the 21.5 days come from that we have added to our days open in the last ten years? The DIM at first breeding has increased in the U.S from 80.8 days in 1989 to 84.8 in 1998, an increase of only 4 days. Services per conception (another way to look at conception rate) has increased from 2.04 to 2.25. This reduction in fertility accounts for an additional 4.4 days to days open. If 8.4 days of the 21.5 day increase in days open can be attributed to decreased conception rates and DIM to first breeding, then that means 13.5 days must be due to failure in heat detection.

Now we have identified our main problem, heat detection. You are all grumbling that there are just too many pens to check, the cows hardly show heats anymore now that they are on concrete all day, or I hardly have enough labor to milk the cows let alone check heats. They are all great excuses, but they are just that, excuses. Don't let these obstacles in heat detection overcome your desire to improve your herd's reproductive efficiency.

There are many options available today that can overcome problems in heat detection, such as estrous synchronization programs that utilize timed artificial insemination (which I will discuss in detail later). By using such a program, you can essentially increase your heat detection rate to 100%. Let us use our example again of 100 cows eligible for breeding, and incorporate them into our timed AI program. With this timed AI, we will be inseminating all 100 cows (100% HDR), and if you multiply this by our conception rate of 40%, we have attained a pregnancy rate of 40%. Several studies have shown a slight decrease in conception rates when using these timed AI programs. However, even if the CR were to drop to 30 or 35%, the pregnancy rate would still be between 30 and 35%. This is still twice as high as the 16% U.S average. Ferguson and Galligan show that an increase in pregnancy rate from 20% to 25% is associated with an increase in gross income of \$100 to \$150 per cow per year.

It is probably a combination of fewer hours being devoted to heat detection and cows showing less estrous behavior that have contributed to the decrease in heat detection. If we are so bad at heat detection, perhaps we should stop doing it or at least not rely on it exclusively for conception to occur. The beauty of the timed AI programs is that estrous is not synchronized, ovulation is. While estrous is a variable period during which a cow stands to be mounted by another cow or bull, ovulation is a specific event, which enables us to deposit semen at the proper hour. There are many different synchrony programs available that utilize timed AI, and it is up to you to determine which works best on your operation.

There are many factors that will determine the success or failure of timed AI programs on your farm. First, all timed AI programs depend on following strict schedules. If you are unwilling to follow these schedules precisely and keep adequate records, then using timed AI will be a waste of your time and money. Second, cows must be cycling in order for these programs to work. Therefore, make sure nutrition is not limiting the reproductive efficiency of your herd before you introduce any timed AI. The third factor in determining the success of these programs is the insemination/thawing technique. If semen is not handled or deposited properly, then using these programs will fail to improve reproductive efficiency.

There are options available to you to improve your reproductive efficiency. Even with the use of BST, there are still potential profits to be made by reducing days open and increasing your pregnancy rate. Determine where your problem areas are first, and then implement a plan to correct it. If you are like the rest of the country, then heat detection is where the problem is found. In the supplement I have outlined two synchrony programs that utilize timed AI. By using one of these programs or a variation of them, you will be able to improve your heat detection rate without even heat detecting. By improving the HDR the pregnancy rate will improve and so will your return.