

# Bulls vs. Timed A.I.

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If bulls are part of your reproductive program, you're not alone. Various producer surveys show that 55 to 96 percent of dairies employ bulls to some degree; use depends on the dairy. Some use bulls for all breeding, some just for heifers, and some only for those cows that did not breed with AI.



When asked why, most producers say they use bulls because natural-service sires do a better job of finding cows in heat than people. Or they assert that it is cheaper than hiring employees to perform reproductive protocols, less difficult than enforcing protocol compliance and easier than training employees to heat-detect.

But research doesn't corroborate this conventional wisdom.

Here's why you should focus on timed AI - as part of a synchronization protocol - to breed cows, rather than bulls.

## **Financial factors**

Incorporating a timed-AI program (or synchronization protocol) into your dairy's reproductive-management program reduces labor for estrus detection, and improves overall reproductive performance and maximizes profit, says Carlos Risco, University of Florida veterinarian and professor of theriogenology.

For example, thanks to improved genetic merit, cows from AI-proven bulls produce about 3,086 pounds more herd lifetime milk and are \$148 more profitable than natural-service daughters.

And a Greek study published in the March 2007 issue of *The International Journal of Animal Biosciences* concluded that even under less-than-average management conditions, AI is more profitable than the best natural-service scenario.

This is consistent with research conducted at the University of California and published in the August 2005 issue of *Theriogenology*. The study used a partial budget to compare a highly managed natural-service program that featured the use of breeding-soundness exams, strict vaccination protocols and a rotational-breeding system with an AI program that featured a modified Presynch-Ovsynch protocol. Lactating-ration cost, bull cost, milk price, market value of bulls and net-merit gains were factored into the equation.

In the end, the researchers found that natural service cost about \$10 more per cow per year versus AI. That's a difference of \$5,000 for every 500 cows on your dairy. The

figure may vary a bit, depending on the genetic merit of bulls used, milk price and other factors, but it's a good benchmark to use. Even when you shift these numbers, AI comes out on top economically 66 percent of the time.

### **Reproductive efficiency**

But even if they are a little more expensive, bulls are still more efficient at finding cows in heat and getting them bred than any AI program, you say.

In a 2002 California study, researchers did find that in herds with poor estrus detection, use of natural-service sires did result in a higher pregnancy rate than an AI program. However, during periods of heat stress, overall pregnancy rate dropped for cows bred by either method and there was no difference in pregnancy rate.

According to Dairy Herd Information Association herd summary information, actual calving interval was shorter in herds that use natural-service sires, says Risco. However, herds using a combination of AI and bulls or mostly bulls had longer dry periods. "And overall efficiency assessed by the percentage of cows in milk and herd milk yield was higher for herds that used all AI, and declined as the percentage of natural-service sires increased," he adds.

Research at the University of California, also published in the August 2005 issue of *Theriogenology*, shows that cows in AI pens have a higher risk of pregnancy across all days in milk than cows in bull pens. The study looked at records from 10 Western dairy herds with an average herd size of 2,058 cows. It concluded that you may be better off to leave cows in the AI pen for at least an extra breeding or two before moving them to the bull pen.

Furthermore, researchers have been able to show that timed AI can out-perform bulls when it comes to breeding sub-fertile cows.

A 2006 field observation by University of Florida reproductive specialist Bill Thatcher and Risco examined the ability of timed AI, as well as re-synchronization to timed AI, to get cows pregnant in a 2,000-cow herd that used bulls extensively. Cows more than 127 days in milk (and as high as 700 days in milk) and still not pregnant were identified as participants. Cows considered infertile or not pregnant after ample exposure to bulls were enrolled in a timed-AI protocol. Thatcher found that 38 percent of these cows - the same cows that did not conceive after bull exposure - became pregnant with the use of timed AI. These data were published in the *Journal of Reproduction and Development* 2006 supplement.

"We were pleasantly surprised that we were able to get cows this far along pregnant using timed AI," says Thatcher.

### **Preliminary head-to-head results**

These findings led to the University of Florida's large, carefully designed, head-to-head comparison study begun in December 2006 between timed-AI and natural-service sires as part of Fabio Lima's graduate and residency program. Neither system features heat detection.

Each treatment follows strict management protocols. For example, bulls must undergo breeding-soundness exams, vaccination protocols, and be used at proper bull-to-cow ratios with adequate rest.

However, preliminary data from the December 2006 to May 2007 portion of the study indicate that cows in the timed-AI program become pregnant faster at first service - about 11 days sooner than those in the bull-bred program. And these cows achieved a 45 percent pregnancy rate. "We believe that this is due to excellent timed-AI management, and not due to better cow fertility," explains Risco.

Meanwhile, cows in the natural-service program did achieve good pregnancy rates of about 40 percent to first service. "But we attribute the good reproductive performance of natural-service sires to stringent bull-management practices," he says. "Probably less than 15 percent of dairies follow these practices."

Still, much analysis remains. The study continued through the summer of 2007 to obtain data during heat stress, and the results need to be evaluated.

Even without these final results available yet, it is possible from previous research to conclude that natural-service breeding programs are expensive when direct and indirect cost is considered. In addition, timed AI allows for immediate submission of all cows at the designated waiting period.

"Plus, the potential for venereal disease from natural-service sires can result in catastrophic economic losses due to infertility," says Risco.

### **Bull session**

Although bulls are widely used on dairy farms, often little is known about them. Most producers assume their bulls are fertile and will do a good job of breeding cows.



However, that may not be the case. Seldom do dairy bulls receive breeding-soundness exams. And vaccinations for venereal disease are often undocumented or incomplete. In addition, dairies may or may not offer heat-abatement or follow adequate bull-to-cow ratios, followed by proper resting periods for bulls.

If one or more of these areas isn't managed properly, bulls may not provide the reproductive services you desire.

Management guidelines for dairy bulls are lacking, says Carlos Risco, University of Florida veterinarian and professor of theriogenology. "Most of the information we have is extrapolated from beef research, and dairy bulls are not managed under the same conditions."

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