

Don't fall for the bulls-are-cheaper, more-fertile myth

by Paul Fricke and Don Niles, D.V.M.

WHY are dairy managers incorporating natural-service bulls into their A.I. breeding programs? Better yet, why are people abandoning A.I. all together in favor of natural-service bulls?

Many managers believe that bulls are an inexpensive, foolproof, and convenient alternative to A.I. Others assume that a bull's innate ability to identify and service females in estrus will lower days open and reduce calving intervals in their herd.

Bulls aren't cheaper . . .

Frequently, producers assume that natural-service bulls are practically free after their initial purchase expense is handled. Bulls also are perceived to save money and time by eliminating inefficient estrus detection programs that often hinder the A.I. success. Both of these assumptions should be reexamined.

First, for those who raise their own replacement heifers, costs of estrus detection should be considered an investment rather than an expense due to A.I.'s proven advantages. Second, many of the costs of managing bulls are hidden within the overall expenses of a dairy operation.

Feed costs. For example, a bull that consumes \$2 worth of feed per day costs \$730 per year in feed maintenance costs. At the commonly used bull-to-female ratio of 1:25 (1 bull for every 25 females), the cost per pregnancy when using bulls is nearly \$30 in feed costs alone. Of course, this cost depends on the bull-to-female ratio and ultimately on the number of pregnancies a bull produces per year. Feed maintenance costs for bulls also incur opportunity costs because this feed could be used to produce milk if fed to lactating cows.

Less milk. Introducing bulls into housing facilities for lactating cows also reduces the farm's overall capacity to produce milk. Each lactating cow on the farm represents an op-

portunity to produce milk and, when housing facilities are full, the maximum capacity to produce milk is realized, thereby maximizing return on capital investment. When natural-service bulls enter the milking cow pens, those bulls displace an equal number of productive cows.

As mentioned above, bulls eat feed that could be converted to milk and occupy free stalls meant for lactating cows, thereby reducing the farm's ability to produce milk.

Vet and facility costs. Bulls require special holding pens during periods

of bull fertility, libido, mating ability, and venereal diseases into a breeding program. Those four pitfalls are eliminated or controlled when using A.I.

Bull fertility. Conception rate to natural service is a product of the bull's fertility and the fertility of the cows he services. That means, one subfertile or infertile bull affects the conception rate of every cow he is expected to service. Bull fertility varies widely, and, if breeding soundness and semen quality is not periodically evaluated to identify subfertile or infertile bulls, poor conception rates may

Producers who report using natural-service bulls

	1990	1992	1994	1996	1998	2000
Use a bull for breeding dairy cows	34.9%	36.2%	38.8%	41.7%	33.0%	36.6%
Use a bull for breeding dairy heifers	44.0%	46.9%	47.0%	49.9%	40.4%	46.8%

Source: Hoard's Dairyman Continuing Market Study 2000

of nonuse. Bulls are no angels. They accelerate wear and tear on facilities, adding to repair costs when housed in free stall barns designed for cows.

Veterinary costs shouldn't be overlooked. They include vaccinations, periodic breeding soundness and semen quality examinations, and treatment for sicknesses and injuries. Head gates and squeeze chutes also should be purchased for safe handling and restraint of bulls during these activities.

Danger. The nuisance that bulls present to a dairy operation is difficult to assess monetarily but should be considered nonetheless. Bulls frequently disrupt daily feeding, cleaning, and milking routines. The havoc a bull can cause upon pursuing a cow in estrus into a milking parlor is a safety hazard to other cows and to farm personnel. In Wisconsin alone, dairy bulls were responsible for one fatality per year during the past 10 years, a poignant reminder of the danger dairy bulls pose to humans.

Bulls aren't more fertile . . .

Many managers assume that all sexually mature bulls can successfully identify, service, and impregnate cows that come into estrus. Bulls, however, introduce variables, including

occur. Furthermore, injuries and sicknesses can reduce the fertility of an otherwise fertile bull.

Synch programs. For those who view bulls as the only solution for breeding cows that are never detected in estrus, alternatives such as Ovsynch or Presynch, protocols for timed A.I. without regard to estrus behavior in lactating dairy cows, are now available. Recent studies have shown that a high proportion (30 percent) of lactating dairy cows in a herd are anovulatory (not cycling) at the end of a 50- to 60-day voluntary waiting period. Placing these anovular cows on a synchronization protocol in conjunction with exposure to exogenous progesterone allows many of them to establish a pregnancy. On the flip side, exposing these cows to natural-service bulls and simply allowing the bull to "get the job done" would result in poor reproductive performance unless these cows somehow returned to cyclicity after being exposed to the bulls.

Mating ability. Libido and mating ability also affect fertility. Both vary widely among bulls. Libido is a bull's desire to locate and attempt to service females in estrus, whereas mating ability is a bull's ability to complete those services. Unfortunately, the most fertile bulls may not always exhibit

Fricke is an assistant professor and extension specialist in dairy reproduction in the Department of Dairy Science, University of Wisconsin-Madison; Niles is managing partner for Dairy Dreams LLC, Casco, Wis.

acceptable libido and vice versa.

Younger, inexperienced bulls may exhibit adequate libido but often lack mating ability. Larger dairies often require many bulls to service a large group of cows. Whenever two or more bulls interact socially within a herd, a pecking order is established with the dominant bull servicing a disproportionate percentage of eligible females. If the dominant bull is subfertile or infertile, poor conception rates may occur despite an adequate or excessive bull-to-female ratio. In contrast, an inadequate bull-to-female ratio can exhaust the breeding capacity of a bull.

Less active sperm. Summer heat stress found in most U.S. regions can impair bull fertility. Semen quality in dairy bulls is reduced by continual exposure to ambient temperatures of 86° F for five weeks or 100° F for two weeks. And it can fool you since libido is rarely affected. Heat stress impairs bull fertility by lowering sperm concentration, lowering sperm motility, and raising the percentage of morphologically abnormal sperm in an ejaculate. Once hit by heat stress, semen quality does not return to prestress conditions for two months. The prolonged effect of heat stress on bull fertility interacts with reduced conception rates of cows experiencing heat stress to further decrease herd fertility.

Disease. Finally, bulls can transmit venereal diseases. Reputable A.I. organizations not only ensure their bulls are free of venereal diseases by periodic testing and through addition of antibiotics to semen, but also screen bulls for known recessive genetic defects such as BLAD and CVM.

Bulls don't outperform A.I. . . .

A common misconception among many dairy producers is that bulls outperform A.I. with regard to the rate at which cows become pregnant per unit time, a reproductive measure commonly called the pregnancy rate. Reproductive records from 85 large dairies in California were used to compare pregnancy rates of cows in bull pens versus A.I. pens to examine the performance of bulls versus A.I.

85 farms compared. Results of this analysis are shown in Figure 1. Within each of the 85 farms, the 21-d pregnancy rate for the bull pens was subtracted from the 21-d pregnancy rate of the A.I. pens. As shown in Figure

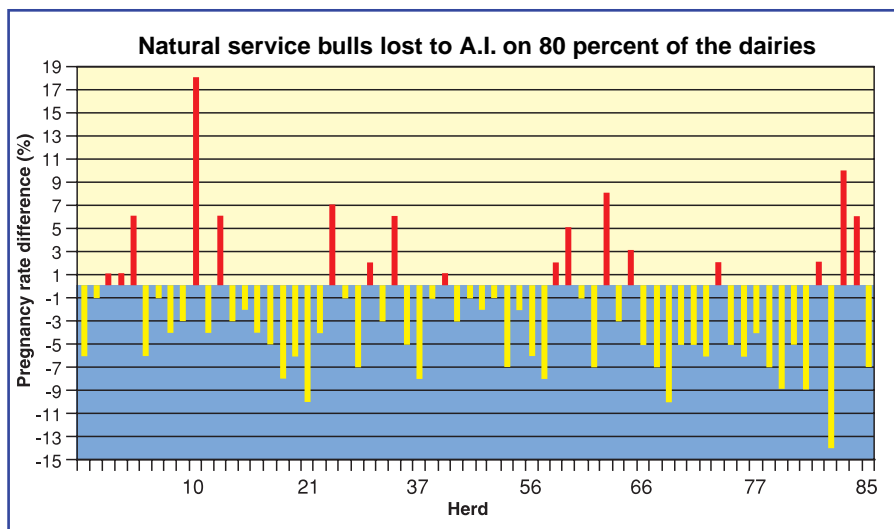


FIGURE 1. Within-farm comparison of pregnancy rates in bull versus A.I. pens for 85 California dairy farms. For each farm, pregnancy rate difference (percent) was calculated by subtracting the pregnancy rate of cows in A.I. pens from the pregnancy rate of cows in bull pens.

1, bulls outperformed A.I. on only 20 percent of these farms. What's more, for 80 percent of these farms, cows actually became pregnant at a slower rate in the bull pens, compared with the A.I. pens. Thus, a decision to move a cow from the A.I. pen to the bull pen would result in less pregnant cows per unit time.

Several issues must be considered before interpreting this information. First, this is not a direct comparison of farms using A.I. versus natural-service bulls. Most of these farms first exposed cows to A.I. breeding pens and then moved cows to bull breeding pens at a predetermined stage of lactation. Although this is not a scientific comparison between these reproductive management programs, bulls were used aggressively in these herds. The average stage of lactation when cows were exposed to bulls in this data set was 144 DIM (range = 85 to 225 DIM).

Bulls don't win. Why don't bulls compete better with A.I.? Although specific reasons for the poor performance of bulls are not known, several factors may be considered. The poor reproductive performance of bulls was not a result of a low bull-to-cow ratio; these farms generally had plenty of bulls in the bull breeding pens at any given time.

Lameness. Fertility issues with natural-service bulls discussed previously may play a role on these farms; however, another common cause of bull underperformance may be attributed to bull lameness. Transition feeding pro-

grams for cows are meant to slowly adapt the rumen from the high-fiber, low-energy dry cow ration to a lower-fiber, high-energy lactating cow ration balanced for high milk production.

Bulls are ruminants, just like cows, but without the energy requirements of lactation. Furthermore, bulls often are moved directly from resting pens to cow pens with no transition ration feeding period. Many of these bulls experience acidosis and laminitis, causing illness and lameness problems that interfere with mounting ability and resulting in poor reproductive performance.

Reconsider your position . . .

Hidden expenses and problems with natural-service bulls should be considered carefully before choosing to introduce bulls into a breeding program or to abandon A.I. altogether. In many cases, bulls are not an inexpensive, foolproof, and convenient method for breeding dairy cows and heifers. Cost of maintaining bulls can approach or exceed that of A.I. without considering the long-term genetic advantages of A.I. Bulls introduce variables such as bull fertility, libido, mating ability, lameness, and venereal diseases that are controlled or eliminated when using A.I. Rather than eliminating management and labor costs, bulls require added facilities, equipment, and careful attention to husbandry practices. Finally, data support that bulls rarely outperform a well-managed A.I. program with regard to pregnancy rate. 🐮