Does the extra effort of A.I. pay off?

by Nate Zwald

NEARLY every dairy producer agrees that artificial insemination leads to greater genetic progress. However, when it comes to heat detection and conception rates, there is a good number of producers who believe the bull can do better. Is this true?

Putting genetic improvement, costs, and safety aside, we tried to determine if herds leaving the reproduction program up to a bull really outperform herds that use A.I.

With proper training regarding heat detection and insemination techniques, artificial insemination can be just as efficient, if not more efficient, as natural-service bulls. And herds that use good A.I. bulls will have genetic superiority that will lead to more milk per cow than their neighbors using natural-service bulls. However, our objective was to determine how the **average herd** in each category was performing.

Compared over 8,000 herds

The Dairy Metrics program, developed by DRMS (Dairy Records Management Systems), includes over 50 percent of the herds and approximately 44 percent of cows currently on official DHI test in the United States. Using this program, we could compare A.I. bred herds (more than 90 percent of services were by A.I.) to non-A.I. herds (more than 90 percent of services were natural).

Approximately 11 percent of the 14,500 herds analyzed used A.I. on fewer than 10 percent of their cows, while 50 percent of herds used A.I. on more than 90 percent of their cows. That means that approximately half of the herds still rely on "Jumper Joe" to solve at least some of their reproduction problems.

What about reproduction?

Many producers use natural-service bulls because they think the reproduction program will be easier and more efficient when delegated to bulls. Although herds that used primarily natural-service bulls had a slightly shorter calving interval (about nine fewer days open per lactation), these herds also had shorter voluntary waiting period by two days. Therefore, only seven days separate these groups of herds, on **average**. With careful heat detection and a sound reproduction plan including heat synchronization, your individual reproductive efficiency can exceed that of an average non-A.I. herd.

Exact breeding dates

Since a veterinarian must estimate breeding dates in most natural-service herds at the time of pregnancy check, more cows will fall outside the optimal dry period length of 40 to 70 days. Extended dry periods keep cows out of production, and short dry periods will have a negative effect on milk production in the following lactation. Significantly more cows have both extended dry periods (17 percent vs. 11 percent) and abbreviated dry periods (34 percent vs. 24 percent) in natural-service herds.

Modern tools for managing prefreshening groups require known breeding dates, and errors will lead to too much time on an expensive diet or too little time to avoid metabolic disorders. If a 100-cow herd can reduce the percentage of cows dry more than 70 days from 34 percent to 24 percent, they will realize another 5,000 pounds milk each year. This assumes 50 pounds milk per cow each day from simply having more accurate breeding dates. Accurate breeding dates are an obvious, although hidden, advantage for A.I.

Production: Advantage A.I.!

The biggest advantage in using A.I. is enhanced milk production. As shown in the table, A.I. herds outproduce natural-service herds by about 2,700 pounds of milk per cow per year. Peak yield was 7 pounds greater in the first lactation and 12 pounds greater in later lactations. Because the average percent fat and percent protein is constant between the two groups (at 3.6 percent and 2.9 percent, respectively), the greater milk volume also leads to an additional 96 pounds of fat per cow each year, and 76 pounds of protein per cow each year. Using a take-home price of $12.50 per hundredweight, this leads to an additional $337 from each cow. That's real money. The A.I.-bred herds also had a considerably lower somatic cell count (by 58,000 cells/ml) over natural-service herds. That leads to higher milk checks, as well.

The genetic advantage of A.I. is clear – production and income rise dramatically. Because you're getting more milk per lactation, the 7-day extension in calving intervals is offset by the increases in production. Overall, there is no doubt that money put into the semen tank will lead to more milk in the bulk tank and more profit on the bottom line.

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A.I. and natural-service herds compared

	>90% A.I. breeding	<10% A.I. breeding	Difference
Number of herds	7,367	1,544	5,823
Herd size	115	135	-20
Age at first calving	26	26	0
Turnover rate	34	34	0
305 day ME milk	23,019	20,006	3,013
RHA-milk	20,881	18,194	2,687
RHA-fat	775	679	96
RHA-protein	634	558	76
Daily milk (milking cows)	65	58	7
Peak milk (1st lactation)	68	61	7
Peak milk (later lactations)	89	77	12
150 day milk	72	63	9
Calving interval	14.1	13.8	0.3
Days open	149	140	9
Voluntary waiting period (days)	58	56	2
% cows dry less than 40 days	11	17	-6
% cows dry more than 70 days	24	34	-10
Actual SCC	377,000	435,000	-58,000