

Ancient documents show that nearly 700 years ago, an Arab chieftain snuck into an enemy's camp and stole a semen sample from his rival's prized stallion to impregnate his own mare. The theft may have been the world's first successful artificial insemination (AI). Today, AI is an important part of some cattle farms' management strategies. However, it remains an underutilized tool on many – possibly most - commercial cattle operations.

“How much AI'ing is being used right now [in Alberta] is a hard number to peg down. There's more uptake over the last few years in commercial herds but there's definitely untapped opportunity: lots of opportunity to improve a beef herd through AI,” says Dr. Justin Kristjansson, a veterinarian with Bow Valley Genetics.

Kristjansson believes the main reason that there isn't more uptake is a lack of understanding among producers about how much it actually costs in dollars and time to get your cows bred. “There's a perception that AI'ing is expensive, but then so is the cost of a good bull. Anybody that says AI is too expensive for a commercial herd isn't looking at the pure numbers from both sides. You can source semen for \$15-20 [per straw]. The protocol – the hormone injections to synchronize your herd – costs in the \$20-\$30 range per cow. If you're willing to spend \$5000 on an average bull, you can get a lot of cows AI'ed to a genetically superior bull for that same investment, and without the risk of actually owning a bull.”

And, he adds, the added labour hours of an AI program are easily made up with a shorter calving season and less bull management, not to mention paying for themselves with the positive returns of an improved calf crop.

Travis Olson of Ole Farms, Alberta's largest purebred red and black Angus operation, sees huge benefit from AI'ing on his farm. This past spring, he and his family AI'ed 1170 cows (about 400 of which were heifers) and implanted about 150 embryos. He believes most of the benefits he enjoys make financial sense on a commercial herd too.

“Most of the industry is still buying bulls. But you gotta do the math: you can buy really good semen for \$20,” says Olson. “The bull it came from could be worth a lot of money. If you figure out what it costs to buy a quality bull, the semen component is pretty cheap.”

Both Olson and Kristjansson list a long list of key benefits from AI. The first, of course, is access to superior bull genetics. “Genetic improvement is the hallmark of AI,” says Kristjansson. Calf consistency, due primarily to genetics but also supported by a short calving window, is another key benefit.

“If you can get a 60% conception rate from AI'ing, that's 60% of your calves out of one bull, which makes for way more uniform calves,” says Olson. “Consistency is very high on calf buyers' lists of priorities. It's not the only priority for them, obviously, but it's very important because it means the calves can all go in one pen and they'll all finish at the same time without a lot of sorting.”

There is, of course, one caveat to consistency: you need a bull that throw consistently good calves. One of the big challenges of conventional breeding is that you simply don't know whether a bull will throw good calves until years after you've started using him.

“If you're breeding conventionally, by the time you realize you've got a good bull, that bull is dead and gone. It takes years to know what your bulls really throw. With AI, you can use a bull that

already has 3000 daughters, so you know what you're going to get," says Olson. This knowledge about previous progeny, EPDs, and more means producers can choose bulls to maximize heterosis and/or to solve specific issues in their herd.

"If you've got cows that are too frail, you can breed in some muscle. If you're looking for specific maternal traits, you can breed those in. AI'ing gives you much more control over your genetics," says Olson.

Virtually all commercial herd AI'ing in Alberta occurs in heifers. Olson says he highly recommends AI'ing heifers, regardless of whether they are purebred or commercial. Not only does AI'ing eliminate heifer injury at breeding, it translates to better live calf rates over not one but two seasons.

"If you're AI'ing to the right bulls, you're going to get shorter gestation. On our heifers, we're down to 275 days instead of 283 days," says Olson. Shorter gestation is the number one factor in reducing birth weights, he says, which translates to more live calves from your heifer herd.

What few producers consider, however, is that a shorter gestation for a heifer's first calf also translates to a higher calving rate the next year as well, he adds. "Heifers are going through the most difficult year of their life. Having them calve at 275 days means they've got 8 extra days to get ready to conceive again. You're going to get better breed back the next year anytime she has any extra days."

Artificial insemination works well in closed herds and/or in any herd where disease management is a primary concern. All semen purchased from an official semen distribution company will be screened for transmittable diseases.

Cattlemen who opt to use a synchronization system gain in less obvious ways too: A synchronized program translates to higher breeding rates due to simple mathematics. If you're breeding for 65 days, conventional breeding would allow three 21-day cycles. However, if you run a synchro program, your first cycle would occur on day 0 or 1, which would allow four cycles in a 65-day breeding period.

Synchronization medication can reset cattle with polycystic ovaries. "Giving the synchro drug is a benefit in and of itself right there because some of those problem cows will start cycling when they otherwise wouldn't. Sometimes you won't get cows pregnant on that heat, but they might catch naturally on the next heat. It just resets them and gets them back onto a normal cycle," says Olson.

Synchronization can also help producers select which animals to retain, he adds. "One of the things we've noticed with the synchro program is there's usually about 15% of cows that don't show estrus. If you were in a drought or facing hard times for whatever reason and you had to get rid of cattle, those are the ones to get rid of."

Not only are they less likely to become pregnant at any time, but if they do end up conceiving, they'll likely wean out a lighter calf. "If she's not healthy enough to breed easily, she's not usually healthy enough to milk well either," says Olson. "And that's a problem that continues multi-year: the calf's going to be lighter because it got less milk and it's going to be lighter because it's younger than the ones that were conceived via AI. So it's going to be smaller at breeding and less likely to conceive itself."

Who should consider adding AI to their management strategy? “Probably everyone,” says Kristjansson. “Young upstart producers can definitely benefit from the genetic diversity that’s available through AI, and being able to improve their herd rapidly. Seasoned cattlemen with a closed herd can bring in external genetics confidently. There’s an avenue that makes sense for pretty much every aspect of the commercial beef industry.”