

Sexed Semen - Will it Work for You?

At some point, nearly every dairy producer has had a run of heifer calves and wondered just how long his or her good luck would last. For the dairy producer that uses sexed semen, that run could last substantially longer since the technology delivers a heifer calf at least 90% of the time.

Several A.I. organizations and private companies now market sexed Jersey semen - semen that has been sorted to produce either female or male offspring. And though sexed semen has predominantly been from young sires in the past, it is becoming easier to find sexed semen from proven sires.

So, is sexed semen right for your operation? It can be an effective tool to increase heifer numbers, improve voluntary culling rates and make genetic gains from the most promising cow families. It can also be a challenge to justify the practice because of its higher cost and lower conception rates when not used properly.

Like many new technologies, sexed semen will not be useful for herds across the board. However, many will learn how to use it, tailor it to their operations and reap its rewards.

Some Background

The potential to determine the gender of a calf at breeding has seemingly been just around the corner for decades. In the late 1980s, flow cytometry was first used to sort bovine sperm cells by gender. The technology was impractical at that point because field tests yielded very low conception rates.

"There were drawbacks with the medium and the concentration of sperm in the sample early on," said Gustavo Toro, Marketing Director for Genetic Resources International (GRI) and Sexing Technologies, Navasota, Texas. The sister companies were the first to sex Jersey semen domestically and today produce sexed semen for a number of Jersey bulls.

"There also were issues with the age of the animals that were inseminated and timing of insemination," he continued. "We learned too that bulls go through the sorting machine differently."

Since then, work in the laboratory and the field has improved the results. The first gender-selected calf using frozen semen and artificial insemination was produced in 1999 and sexed semen became commercially available in the United States in 2004.

The Basics

The process to sort semen for gender is slow and complex. First, the semen is stained with a fluorescent dye and then is passed through a flow cytometer as single droplets of liquid.

"The X-chromosomes (female) shine brighter than the Y-chromosomes (male) because they are 3.8% larger and have absorbed more dye," explained Toro.

The flow cytometer's laser determines



A flow cytometer is the machine that sorts semen into X-bearing semen and Y-bearing semen after it has been stained with fluorescent dye.

the gender of the sperm based on the amount of light it emits. Sperm is charged either positively for X-bearing chromosomes or negatively for Y-bearing chromosomes. X-bearing sperm are sorted in one direction; Y-bearing sperm are sorted in another direction; and anything of undefined sex passes straight through as waste.

Sperm passes through the flow cytometer at 60 miles per hour. And though this is fast by laboratory standards, the process is relatively slow for commercial application. It takes about 3-4 times longer to process sexed semen than conventional semen. As well, the ejaculate yields a smaller number of straws and thus justifies a higher price.

The Challenges

Although sexed semen fertility is greatly improved, it still lags behind that of conventional semen and is the single greatest obstacle standing in the way of its widespread adoption.

Dairy producers that use sexed semen should expect conception rates to be about 70-75% of those achieved with conventional semen. And because of the lower fertility rates, it is recommended that only virgin heifers be bred using sexed semen.

The need for improved heat detection among his heifers was the reason Kelly Moss, Mountain Shadow Dairy, Litchfield Park, Ariz., forewent the practice early on. The REAP herd milks about 1,300 cows, raises an equal number of replacements, and breeds heifers in pens of 60-70 head.

"We used sexed semen one time as a test herd about a year and a half ago," Moss commented. "But we weren't satisfied with the results, so figured we'd wait to use sexed semen until we got a new heat detection system."

Today his heifer conception rates hover around 70%. In early July, he will use tailhead mount detectors with computer chips that report activity to his computer in real time. Moss plans to breed at least half of the heifer crop using sexed semen on first services, then use conventional semen for repeat breedings. He also plans to begin breeding earlier with sexed semen, at 12 months-of-age rather than 13 or 14 months-of-age.

The Benefits

Sexed semen is especially useful for dairies in expansion and producers who merchandise breeding stock.

"With our new dairy coming into operation later this year, our need for Jersey females is great," said Scott Wickstrom, who operates Wickstrom Jersey Farms Inc. with his father, Duane, and brother, Michael, in Hilmar, Calif. "Using sexed semen on our existing females is the most economical way for us to stock the new facility."

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Sexed Semen Technology

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The Wickstroms began using sexed semen in March 2005 and now breed about 90% of their 2,000-plus virgin heifers with sexed semen. The REAP herd begins breeding its heifers at 13 months-of-age and repeat services are made using conventional semen. Two employees handle all the breeding and heat detection work.

"In the first group of five semen-sexed bulls from GRI, there was quite a variance in first conception rate," noted Wickstrom. "Their conception rate ranged from 31% to 67%. Currently we are averaging 50% first conception rate, but there is still quite a range from bull to bull."

Ron Kutz, Jefferson, Wis., is another Jersey breeder who is counting on sexed semen to help him expand his herd from within. Kutz Dairy has been growing over the past 10 years and plans to continue expansion for the next 10 years as well.

The Kutzes currently milk 850 cows and raise 400 replacement heifers. The REAP herd plans to milk at least 1,100 head of Registered Jerseys™.

Sexed semen helps them breed their own replacements and become less reliant on outside sources for growth. "As well, we've been able to cut down on some of the health issues we experienced before, when we were bringing in 200 head from 30 or 40 different herds," said Kutz.

Kutz Dairy has been using sexed semen since last fall and has a conception rate of 50-55% among heifers. They begin breeding heifers at 11-12 months-of-age, or when they reach 550 pounds. Sexed semen is used on the first and second services and may be used on additional breedings if the mating has merit.

For other Jersey breeders, like Gary de Graaf and his sons, Dustin and Daniel, Pixley, Calif., merchandising potential is one of the most promising benefits of sexed semen. The family's Jer-Z-Boyz Ranch milks 3,500 cows in two facilities

and raises a similar number of replacement heifers.

Four trained employees handle the breeding program. Heifers are bred when tails are chalked and the heifer shows secondary signs of heat.

"We detect our first heats at 10 1/2 months and are looking to breed heifers at 11 months, when they weight 550 pounds," said de Graaf. "Eighty-five percent of our heifers are calving between 20-21 months-of-age."

Like most dairy producers, de Graaf experienced lower fertility rates when he started using sexed semen. He then began breeding AM/PM and fertility rates improved. For de Graaf, the improvements in fertility warrant the extra labor.

"We use aAa for matings and every heifer that meets the code gets bred using sexed semen," said de Graaf. About 80% of the heifers are mated with sexed semen and the remaining 20% with conventional semen.

"We see tremendous potential for Jersey replacements and growth of the national Jersey herd," commented de Graaf. "Sexed semen fits our business plan right now because it helps us supply Jerseys for regions of the country where cheese production is expanding."

Future Implications

Short term, there are tremendous benefits for dairy producers who learn how to use sexed semen in their operations. Sexed semen can lessen the challenges and costs for dairy producers expanding their herds. The technology can help dairy producers cull more selectively from their herds; no longer will they be forced to hang onto unproductive, unhealthy cows to keep the tank full. And sexed semen can help meet the growing demand for Jersey genetics across the country.

Long term, the prognosis is mixed. All dairy producers are keenly aware of the fact that the industry has too many cows and too much milk already. The demand for Jersey replacements may be balanced by supply down the road. On a brighter note, the dairy industry may find other opportunities to use the technology. Jersey breeders have always been progressive in finding niche markets for their product.

As well, advances in the technology itself may help determine its own fate.

Because sexed semen is still in its infancy, there are more questions than answers. Only time will determine how widely the technology is adopted. And only you can balance the pros and cons to determine whether or not sexed semen suits your operation

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