Sexed semen is not just for big herds

By **FRAN O'LEARY**

THANKS to sexed semen, calf hutches at Arden Ballweg's farm near Dane in northern Dane County are filling up fast with heifer calves.

Arden, 53, and his 30-year-old son, Matt, farm 160 acres, milk 90 Holstein cows, and raise 80 heifers and calves. They began using Select Sires sexed semen on virgin heifers last winter.

"At first the semen they had available was from mediocre bulls," Arden says. "In the last six months we've been using semen from a wide selection of bulls, including some very good bulls."

Through the end of November, Arden reports that they bred 30 heifers with sexed semen and 20 were confirmed pregnant, which translates into a 66% first-service conception rate.

"We average around 70% with conventional AI semen," he says. "We've had good luck with it."

Heifer calves from sexed semen began arriving to their farm at the end of October.

"In the past 10 years we've had a 60-40 bull-to-heifer calf ratio," Arden notes. "I'd like to get above that mark."

He says sexed semen costs him between $20 and $25 more per straw, but it's an investment he feels is worth it.

"It [using sexed semen] takes almost three years to get a return on your investment, but it's a quick way to improve the genetics of our herd," Arden says. "Before we started using sexed semen, getting heifer calves was just luck. We'd breed our best cows to the best bulls and get bull calves. Now at least we can breed our heifers and know we're going to get heifer calves."

The father and son aren't exactly sure what they will do with a lot more heifer calves.

"We'll probably milk the best and sell the rest," Arden says. "With sexed semen, we'll have a greater selection of heifers for replacements. I'd like the option to sell them as calves, open heifers or springers. We may have to expand our heifer barn."

That prospect doesn't bother him.

"A heifer calf is worth about 4-to-1 what a bull calf is worth," he explains. "A week-old calf brings $600, and you only get about $150 now for a bull calf."

Arden believes if he does sell some of his surplus heifers as springers, they'll be worth more because they'll be carrying heifer calves.

The Ballwegs currently milk 90 cows in the old stanchion barn. They are housed in a freestall barn with 96 stalls. "We could milk a few more cows," he says.

Arden believes there's an additional benefit to using sexed semen on heifers. "You're getting heifer calves that are 10 to 15 pounds smaller than bulls, and they have smaller bones," he notes. "Even if you use calving-ease bulls, once in a while you'll still get a really big bull calf. Calving heifers in with heifer calves minimizes calving difficulties and metabolic problems and just makes sense."

Arden is looking forward to being able to use sexed semen on his cows someday.

"Like any technology, they will just keep improving it," he says

ARDEN BALLWEG of Dane may have to expand his heifer facility if he chooses to raise all of the extra heifer calves he's getting from using sexed semen.

Photo courtesy USDA

New gene may explain decline in cow fertility

THE discovery of a lethal gene may explain why pregnancy rates in dairy cattle have dropped sharply in recent years, a University of Wisconsin-Madison researcher says.

Hasan Khatib, an assistant professor in the College of Agricultural and Life Sciences, has found a gene that causes embryonic death in cattle around the fifth day of pregnancy. This problem is especially acute among higher-producing cows. Getting cows pregnant once a year is a critical part of the milk production cycle on commercial farms.

"In the last 20 years, there has been a 20% drop in pregnancy rates in Holstein dairy cattle," says Khatib. "Based on our preliminary data for in vitro fertilization experiments, we believe these problems can be attributed to this gene."

Key Points

- UW researcher discovered lethal gene that causes embryonic death.
- Gene may be why pregnancy rates have dropped.
- Gene is more common in high-producing cows.

Both parents must have gene

The gene is only lethal when it's homozygous — when both parents contribute the lethal variant of the gene. In fact, Khatib's data show the frequency of the gene in its heterozygous form — where a cow carries both the lethal variant and the nonlethal variant — is as high as 50% among Holsteins, the most common dairy cow breed.

Khatib figured that if this gene is so frequent, there must be a genetic advantage. Otherwise, genetic selection would have eliminated it. This proved to be the case. Through further analysis, he found the gene also increases milk production, and fat and protein content in milk.

"Based on a study with 2,000 individuals, we believe that 65% to 70% of the Holstein population has the heterozygous genotype," says Khatib.

"We don't want to eliminate the lethal variant because it is linked with milk production traits, but we want to eliminate the homozygous effect that causes early embryonic death," he says.

Since the homozygous condition only occurs if both parents carry the gene (in that case, the odds of a homozygous embryo are 25%), the solution is to avoid breeding heterozygous cows to heterozygous bulls.

"It is easy to predict, with simple DNA testing, if the cow will have dead embryos or not," Khatib says.

The high frequency of the gene may be attributed to the narrow genetic base of cow families, says Kent Weigel, an associate professor and Extension dairy genetics specialist who works closely with cattle breeding firms. "According to the data at hand, if a commonly used dairy bull had this gene, then it would have likely carried on through his daughters and sons."

Weigel says there should be a positive correlation between the frequency of this gene and the pregnancy rate of a cow's daughters.

"Since the embryonic loss occurs so early during pregnancy, you would never really detect a pregnancy, so it looks like that cow would have a longer number of days open," says Weigel.

Khatib says there is interest from a variety of companies — breeding firms in particular — in potential applications for this gene. He intends to continue research to better understand the gene and provide information that will be useful to both breeding firms and dairy producers in the near future.

Sheep, pigs have gene

That research extends beyond cattle. Khatib has confirmed the presence of the gene in sheep and is investigating whether it is present in pigs.

Khatib's research focuses on two major areas of study. "My first objective is to identify genes of economic importance in dairy cattle, including ones that affect fertility, milk components, longevity, somatic cell count and other health traits," he says. "I [also] spend a lot of time looking for imprinted genes — those expressed according to the parent of origin — meaning the [gene from one parent] is expressed while the [gene from the other] is silent."

Khatib also teaches undergraduate courses in animal breeding and genetics. For more information, call Khatib at (608) 263-3484.