Sex sorting sperm gets sexy

By Geoff Geddes

In spite of its name, the process of sex sorting sperm in the pork industry was never a sexy topic. That may be changing with the recent acquisition of Fast Genetics – a global leader in the pig genetics business based in Saskatoon – by Sexing Technologies from HyLife. The move is adding new lustre to a technique long-established in other species, applying it to the pig industry and making sex sorting sperm, well, sexy.

In the beginning...

The discovery of sex predetermination in swine and other livestock is not a new one. In 1989, an effective method of separating X from Y-chromosome-bearing sperm was developed and reported by Dr. Larry Johnson and his team of scientists at the U.S. Department of Agriculture's Germplasm and Gamete Physiology Laboratory in Beltsville, Maryland.

The method uses the greater DNA content of the X-bearing sperm (3.6 per cent in the pig) to differentiate it from the Y-bearing sperm. This method is known as the Beltsville Sperm Sexing Technology and has been applied to most farm animals with a resultant shift in the sex ratio so that 90 per cent or more of the offspring are of the predetermined sex.

Go with the flow

According to Sexing Technologies, the process relies on the use of flow cytometric analysis and cell sorting. Each sperm is identified for the amount of DNA it contains as it passes a laser beam. The sperm are then directed to collecting tubes, one tube for X sperm and one for Y sperm. The sperm are differentiated according to how much light is detected from the fluorescent dye that is proportionally bound to the sperm's DNA.

Consequently, X-bearing sperm with more total DNA glow brighter than the Y-bearing sperm when hit by the laser beam. It doesn't sound sexy, but the implications for agriculture were downright steamy.

As is often the case with science though, it was a long way from the lab to the real world. Even as the process evolved, it wasn't commercially viable until Sexing Technologies took it over.

"Working with an engineering firm they owned, the company improved the process and enabled its application on a large scale in the cattle industry," said Grant Wilson, marketing manager for Fast Genetics.

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Wilson explained that Sexing Technologies then wanted to bring this same technology to the pig business.

"They went looking for a leading genetics company in the pork sector and found it in Fast Genetics."

Sorting equipment is now in place at Fast Genetics and sows are being inseminated with sex-sorted sperm.

"Step two is to implement it at the multiplication level," Wilson explained. "If you have a gilt multiplier and you're making 50 per cent females with a by-product of barrows as the other 50 per cent, you can change that, for example, to all gilts and increase production efficiency."

The final phase is the commercial stage, where Wilson said it's easy to imagine the benefits of a single-gendered offspring.

Pick a sex, any sex

While the exact process used is proprietary and therefore confidential, Wilson is happy to share the benefits.

"Overall, it will allow us to create a better product and have faster genetic gain at the nucleus by skewing gender."

For producers, the payoff is more than just the chance to use some really cool technology.

"There's always an economic difference between raising males and females, but producers could further capitalize on it depending on their packing plant relationships."

Q & A

Other industry players can also see the potential of the Sexing Technologies system.

"What's exciting is that this technology is evolving as we speak," said Andrew Beusekom, manager of Magnum Swine Genetics in Fort Macleod, Alberta. "The old method was very slow and speed was a major stumbling block."

As an illustration, Beusekom pointed out that 10 years ago, everyone was at about three billion sperm cells per dose of semen with a sorting speed of 10 million per hour.

"That's only one dose of semen, so if you have a farm with 1,000 sows requiring 200 doses, there's a lot of waiting around."

With Sexing Technologies, he sees a much faster approach with low dose, low concentration insemination.

Still, Beusekom said that while the new technology may hold some promising answers, it also raises questions.

"The main questions are around the cost and application. For example, proponents point to eliminating castration by producing only females, but we already have the ability to eliminate smell issues with intact males and we know the cost of that."

Dare to dream

Grant Wilson is also intrigued by the prospects, and he can't help getting caught up in the excitement.

"To be pioneering this technology in the pig business is really something. Our company is growing and hiring a lot of new people, and it's amazing to be filling roles we never thought we'd have, hiring for positions we never dreamt of, that are specifically related to sorting sperm."

Down the road, Wilson foresees customers being able to purchase gender-sorted semen so they can specify the gender of their herd's offspring, but that would be the third phase. At this time, he's pleased to see progress at the nucleus and multiplication levels.

"If we can implement this at the nucleus level, it will trickle all the way down and benefit everyone."

In the pork industry, it doesn't get much sexier than that. ■