

The search continues to make frozen sperm more viable

Research is ongoing to see whether adding different levels of seminal plasma can provide increased fertilization that will hold through to farrowing

BY
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In terms of pregnancy rates and litter sizes, Artificial Insemination (AI) with fresh boar sperm is usually as good as having the boar on the farm.

The downside is that fresh sperm is often untested and could transmit viruses the same way a real boar could if it entered your barn without first being quarantined and tested. On the other hand, samples of sperm that are to be frozen can be taken and analyzed before the sperm is released, eliminating the possibility of disease transmission. That's why research that could improve the viability of frozen/thawed (FT) sperm is crucial.

Roy Kirkwood, a researcher from Michigan State University, has just completed trials that looked promising at first, but the end result was that more research is going to be required.

"The reason that I'm interested in frozen sperm," says Kirkwood, "is that every time you bring semen onto the farm, even if it's from your own system, you're bringing boars onto your farm with zero quarantine once or twice a week." He says the practice could devastate herds province-wide with the spread of Porcine Reproductive and Respiratory Syndrome (PRRS) or other viruses such as PCV-2. "The disease risk is phenomenal," he warns.

The problem with frozen sperm is that it has to be given at the time of ovulation. "Unless you've got an egg there, you miss it," Kirkwood says.

Fresh sperm is non-capacitated, meaning it is incapable of fertilizing an egg. While it matures, it is taken into the sow's sperm reservoir, ready to be forwarded to the egg site when the time is right. Because freezing and thawing capacitates or ages sperm, it is already mature and bypasses the reservoir. If there is no egg, there is no conception.

Usually, FT sperm is separated from the seminal

plasma which is part of the boar ejaculate. Kirkwood's research investigated whether adding seminal plasma would reverse freeze/thaw aging and give FT sperm a better chance of being there to meet the arrival of the egg.

"What we'd shown previously," Kirkwood says, "was that thawed sperm was essentially capacitated (aged), not true capacitation but prematurely aged so



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they won't go into the sperm reservoir, meaning your timing has to be absolutely perfect or you're lost."

To get around the problem, Kirkwood's research team did trials adding 10 per cent seminal plasma and then 50 per cent seminal plasma. "With 10 per cent seminal plasma, we showed that we could reverse the capacitation which means, theoretically, they could be candidates for the sperm reservoir."

He says the tests did well in the test tube but, in the sow, the sperm still didn't form in the sperm reservoir. Increasing the level to 50 per cent showed even more positive results in the test tube. "Everything on the in-vitro (test tube) test said, 'Well, we've cracked it, we need 50 per cent.'" The success with 50 per cent continued with the sows.

"We got an increase in litter size and an increased pregnancy rate, but it didn't go through to farrowing," Kirkwood says. "We increased fertilization, so we had the potential to increase farrowing rate and litter size but, fairly early on in the pregnancy, the pregnancy was lost. We got an increased pregnancy rate, but we had no effect on farrowing rate. Too many sows that were pregnant lost the pregnancy."

Kirkwood says they speculate that aged sperm may not form a viable embryo leading to early embryo mortality.

The trials, conducted at the Technologic Centre of Artificial Insemination, Campo de Villavidel, Leon, Spain, involved 82 sows receiving sperm from a pool of five boars. Thirty sows were inseminated with fresh sperm, 26 with FT sperm with 10 per cent seminal plasma and 26 with FT sperm in 50 per cent seminal plasma.

Kirkwood says results might change with more sows, but further studies depend on finding research money, something Kirkwood feels is hard to achieve in this economic climate. ■