ARTIFICIAL INSEMINATION...WHAT’S NEW?

What’s new with artificial insemination? This month Dr. Darwin Reicks reviews current information about boar fertility and post cervical insemination.

Boar fertility

What new technologies have been implemented to improve boar fertility in the last 15 years or so? If you are a regular SVC boar stud client, not much. Most of our clients have been doing motility and morphological assessments on every ejaculate in addition to acrosomal ridge evaluations for 15 years or more.

Something that has received more emphasis for the last 8 years has been end product monitoring. This was started in 2003 at Swine Vet Center with the idea of monitoring the semen doses after full processing to determine sperm counts, variation in sperm counts, and bacterial contamination. There are about 40 boar studs that send samples to SVC’s lab technician Jason on a daily or weekly basis. Sperm counts are adjusted to maintain counts in the 3.0-3.5 billion range, based on some published research from Drs. Darwin Reicks and Don Levis. Variation is monitored and is as important as the counts themselves. Many studs are able to consistently achieve standard deviations around 0.3-0.4 billion. When numbers fall out of range, interventions can be made early, to minimize any negative impact on fertility. Bacteriology is also done on each ejaculate, so that interventions can be made as problems arise. Since 2003, the SVC lab has evaluated over 37,000 doses of semen from all over the USA and world.

What does the future hold? We are on the verge of some breakthroughs with boar fertility assessments. The gold standard has always been to do single sire matings to most accurately determine boar fertility. However, it takes about 50 bred sows per boar to identify a sub-fertile boar with a reasonable degree of confidence. To get 50 matings on a young boar (which often don’t produce much) it may take up to 8 weeks. If we add the 16 weeks of pregnancy, this means a boar will be in use for about 6 months before his fertility can be determined. However, a lot of sows have been bred with that boar in the meantime.
There are some new tests being developed using flow cytometry. In addition to evaluating acrosomes and viability, there are tests evaluating the chromatin structure in the sperm cell nucleus, DNA fragmentation, mitochondrial status, and other tests that may flag boars that otherwise appear totally normal by conventional microscopic analysis. If these boars could be screened on arrival to the boar studs, there could be much more confidence in reducing sperm counts to 1.0-1.5 billion. Studies are underway and some of these are being conducted at SVC with Dr. Darwin Reicks. There is also some research being done to evaluate sperm nucleus shape as another method to identify sub-fertile boars.

Post cervical artificial insemination (PCAI)

You may remember when DUI (deep uterine insemination) or IUI (intrauterine insemination) were being looked at about 10 years ago. A number of farms experimented with this procedure. Today, the term post cervical AI is being used most commonly. A number of studies were done around 10 years ago and frankly, the results were mixed. This, plus the higher cost of the catheters caused the technique to never really take hold among producers. So why are we hearing more about it now? There are two main reasons:

1) The desire to leverage higher indexing boars across more doses.
2) The desire for reduced labor input at the sow farm.

What is different from 10 years ago? At that time, PCAI was mainly being done with a boar in front like a conventional insemination. Today, most are heat checking with a boar, then coming back after about an hour, inserting the regular catheter, and then putting the post cervical catheter inside and passing it through the cervix. With no boar, the cervix is more relaxed so it is faster and easier to pass the inner catheter. The semen is then simply squeezed into the uterus. This results in more free time for “heat check specialists” to cover more animals and then other staff to team breed and work through the sows in heat more systematically and efficiently.

The other change compared to 10 years ago is that there is much more emphasis on boar EBV’s (estimated breeding values) with today’s feed costs. With PCAI, the sperm count per dose could be reduced so that boars producing the most efficient and fastest growing pigs can be spread over twice as many pigs. There is some risk in reducing the sperm counts, but new developments that are being evaluated (as discussed above) will hopefully reduce this risk. They may even result in getting better fertility results with PCAI at 1.0-1.5 billion than we would get with conventional AI at 3.0-3.5 billion.