Sheep AI – It's Not What You Think

Sheep AI is not artificial intelligence…really….sheep are a lot smarter than you think already. Instead we are trying to do sheep artificial insemination to improve our genetics much like the cattle industry has done for years. Unfortunately it's not as easy in sheep. The cervix in sheep is not a straight shot through into the uterus like it is in cows. Therefore the extended semen needs to be deposited outside the cervix and the sperm have to swim through. It turns out frozen semen doesn't swim very well so if frozen semen is used, the ewe is laid on her back and anesthetized and a hole is made in the flank and the semen is inserted directly into the horn of the uterus (Laparoscopic AI or LAI). All this requires good synchronization techniques and lots of coordination with a vet and technician.

Meanwhile, in Europe they have been using fresh semen AI to improve their milking and meat sheep for years. With synchronizing and heat checking the results are 60-80% pregnancy and much less stress for the sheep and the farmer. Farmers synchronize their sheep, order the semen they want for the day the ewes will be in heat and then basically breed them with a syringe at a specific time (Vaginal AI or VAI). Some places they wait for the second heat and breed them on the natural heat. This is a little trickier since you have to heat check and have semen ready for two or three days.

The ideal is probably what is being done in Iceland. The farmers all raise the same kind of sheep and there are specific measurements taken to figure out which ones are the best ones to use for future genetic progress. In the USA, there are many breeds of sheep and many markets and not much of a system for feedback. We could do progeny testing like they do in France but there is a big expense involved with that. Genomics offer a solution in the future, if we can get the markets and producers to agree on what the ideal will be (growth? Rib-eye area? Wool quality? Feed efficiency?). Then we need to find the genetic markers for those traits.

The National Sheep Improvement Program is available but designed mostly for purebred sheep. Commercial animals can be enrolled but there needs to be similar animals for comparison in order to get predicted differences in performance. We hope to enroll the Extension flock and I hope to enroll my home flock of hair sheep as well since we are keeping good records and NSIP would be a better way to make use of them. Many of the rams that have been purchased for the Extension flock, from out of state, had predicted differences for weaning weight, for weight gain after weaning, prolificacy and more. It isn't as hard to pay good money for a ram that has some numbers backing him up.

In Canton, at the Extension Farm, we have been practicing our fresh semen AI techniques for the last 5 years. After a trip to France where I was lucky enough to see how their system works I wrote a grant to do some work with local farmers. We did a workshop with LAI and VAI and got some ewes pregnant and shared those genetics from Australia and New Zealand around the state in the form of ram offspring.

Over the next few years we tried doing VAI with fresh semen from our own rams – just to test the process. We (Ron Kuck from CC Jefferson, various interns and I) succeeded in getting a few ewes pregnant every year despite our questionable semen handling techniques. We were getting lots of ideas but not much concrete info on temperatures, semen extenders, etc. The grant we received earlier had provided some much needed lab equipment so we could play around with our techniques.

We recently met up with Dr. Jim Weber, a vet from the University of Maine, who was also impressed by the progress made in Europe. He has taken a personal interest in fresh semen AI and is doing small pilot

projects around the northeast. We hope someday to be able to collect semen, extend it and ship it to a farm over night or drive it somewhere and use it on some synchronized ewes. In order for this to be useful, we have to know which rams are worth the effort.

In the meantime, we tried Dr Weber's techniques on 15 ewes at the Extension Farm and 12 at my home farm. If they took, they should lamb around the 1st of April. We have the rams in with the flock now and the first natural lambs should be about April 22 so we should be able to tell which are which. So far a few that we bred have been marked but most have not.

Dr. Weber's technique involves breeding on the first natural heat after synchronizing so we had to learn to heat check the ewes. The ram was led to an area where the ewes could see him and then we watched for staring, tail wiggling and general interest in the ram. Then we bred the ewes 12 hours later with semen we collected from the rams once daily. The rams were cooperative and we had good semen and good extender provided by Dr. Weber. We used a thermos for carrying around the straws we made. Fortunately we had good student help despite it being Halloween weekend (a day earlier than we were expecting the ewes to come into heat). You might also remember that we got 4 inches of rain that weekend just to make things interesting.

I'm excited to have a protocol to follow which made it easier to AI more ewes. The heat watching is time consuming but I am wondering if we could breed them on the synchronized heat but also do heat watching to try to get the timing right but over a shorter period of time. We are looking for flocks that might be willing to try synchronizing a few ewes and having us travel there to do the breeding with fresh semen from our rams next fall.

The long term goal of AI would be to produce uniform desirable carcasses for the meat market or more milk production for the sheep cheese makers. We have a long way to go before we reach that goal but we have to start somewhere. Now we just need to make a trip to France or Iceland and learn more about how they are already doing it….