CEDAR GROVE VETERINARY SERVICE NEWSLETTER

SEPTEMBER 2018

USING HISTORY TO APPROACH NEW TECHNOLOGY AND THE DAIRY INDUSTRY

It is without saying that the dairy industry is in a bit of a crisis right now. Moreover, no one can quite predict what the industry will look like in the future. What does seem certain is that technology will continue to play a big role in shaping the industry. It can be hard for some to accept technology because it is new, different, and often untested. It is a risk. So, this month instead of focusing on some of the new technology out there, we will look back.

"*The agricultural community is outraged. It could lead to abnormalities and destroy the current dairy industry as a whole.*" This quote could very easily fit into several different aspects of new technology in agriculture today including GMO's or cloning. But this was in fact the public's reaction to artificial insemination when it was first introduced into the dairy cattle industry. Eventually, the many positive aspects of using AI outweighed the fear, but it didn't happen right away.

The story of the AI industry starts with a priest, which sounds like the start of a bad joke. His name was Spallanzani and in the 1700's he conducted experiments with sperm. He was the first person to successfully inseminate a dog that resulted in puppies. He was also a weirdly fascinating fellow. His religious background made him wonder if sperm had souls. He also conducted experiments to determine if spermatic vapors could result in pregnancy. Spoiler, they didn't. He did many of his experiments with toads. You may wonder how he collected sperm from toads. Spallanzani would dress male frogs up in tiny trousers that were waterproofed and place them with female toads. When they ejaculated he was able to collect sperm from the toad's pants. None of this has anything to do with the dairy cattle industry directly, but it is a fun fact to share with friends.

A 100 years would pass before Russian scientists were able to establish techniques that were closer to the ones we use today for AI. They made enormous improvements in semen collection and developing extenders for semen. Danish veterinarians took this research and established the first organized cooperative dairy AI

TEST YOUR DAIRY FARMING KNOWLEDGE

1) What year has been projected as the tipping point for a global food crisis if approaches to agriculture worldwide don't change?
   a) 2061
   b) 2050
   c) 2035
   d) 2027

2) How many pounds of semen are collected on average from a single bull housed at an AI facility per year?
   a) 45 lbs.
   b) 454 lbs.
   c) 1015 lbs.
   d) 165 lbs.

3) For mastitis, what percentage of antibiotic treatments will be of no benefit to the cow when the organism is not determined prior to treatment?
   a) 5-10%
   b) 15-30%
   c) 35-60%
   d) 75-90%

Answers on back

organization in Denmark in 1936. They were the first to use rectal palpation to locate the cervix/uterus for deposition of the semen and to use "straws" of semen as the delivery method. The results of the Danish scientists were what led the way for AI in dairy cattle to travel across the ocean to the USA.

In the USA, the first research and use of AI started by 1936 in New York, Minnesota, and Wisconsin. Soon after, the first AI cooperative in the US was developed in 1938 and went by the name of New York Artificial Breeders, Cooperative Inc. This company was a precursor to today's AI company Genex/CRI. An important advancement to arise was the standardization of semen evaluation by morphology, motility and volume.

The next major improvement the AI industry made would give it a distinct advantage over natural service and a 15% improvement in fertility. Around 1950, the extender that was used to protect sperm was re-adjusted to include the addition of antibiotics. This addition is credited with significantly reducing the spread of venereal diseases in cattle. Cornell developed the mix, but never filed a patent to reap the benefit from the hundreds of millions of dollars that this has benefited the ag industry. They did it for the "service of agriculture."

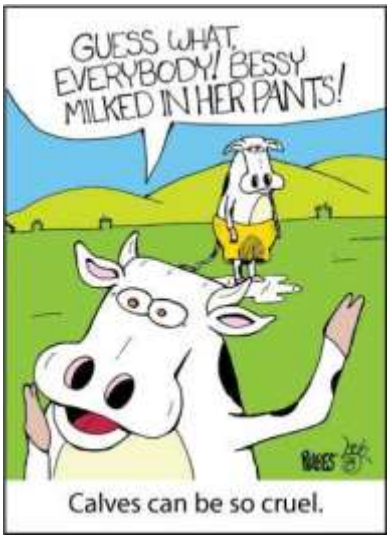
As AI started to become the industry standard, research focused on how to maximize every collection from the bulls. In 1978, it was determined that AI required only a few million sperm to be successful. Therefore, each collection could be stretched farther without affecting fertility. The result was that each collection could be split around 25 ways without affecting any quality or conception.

With the ability to split semen collections from bulls, the refinement of the industry could really begin. One of the major reasons for the start of the AI industry was that superior genetics could be available to all and not to the wealthy few. Extensive research was used to fine-tune sire selection methods with proofs, family lineage, and environmental factors all proving to have major roles.

Finally, frozen sperm was the last hurdle to really spread AI technology to the world. It was found that adding glycerol to the extender would allow for cryopreservation. Packaging with liquid nitrogen was more of a problem. Ampules would often break in the typical container packed with dry ice. The use of plastic straws improved matters but storing them for extended periods of time was not easy. Finally, the newly formed American Breeders Service (ABS) convinced a ceramics company to develop the first nitrogen tank that had improved insulation and was designed to properly store straws.

Modern changes to the industry have been the addition of timed AI programs such as Ovsynch, Double Ovsynch, G6G, and CIDR syncs. These have improved upon the AM/PM rule to allow a better prediction of when to breed cows. Additionally, sexed semen has also changed the way in which cows are bred and the inventory of cattle on farms. Finally, genetic testing has been used in combination with all of these techniques to really refine an industry that started with a priest and some toads.

Even though the AI industry is a staple of dairy farms, it is important to see that it took a long time for it to become refined into the industry that it is today. So, when you are considering things like robotic milking systems, automatic calf feeders, activity monitors, etc. don't automatically assume that because it is new and not yet quite refined that it will be bad for the industry. AI certainly didn't ruin the dairy cattle industry like they thought it would back in the 1940's, it just changed the way we made decisions.



Dairy Farm Knowledge Answers
1: d 2: b 3: c