

SEXED SEMEN FOR DAIRY AND BEEF CATTLE

Increased efficiency and productivity are survival goals of every industry. Brutal economics demands it. While there are always some risks involved with emerging technologies, early adopters generally reap the largest financial benefits. Efficiencies in livestock reproduction are no exception.

The history of modern Artificial Insemination (AI) is not old. Progressive cattlemen began artificially inseminating their cows to outstanding bulls in the late 1930s. There was a fair amount of resistance to that practice early on, but it soon became apparent that genetic progress could be accelerated dramatically. The development of frozen semen in the 1950s enhanced the opportunity for owners to have more of their cows inseminated by trained technicians. Much effort was made to understand the reproductive processes of the cow and progressive owners learned to successfully inseminate their own cows. Semen from an increasing number of proven bulls soon became available and more dairy and beef producers adapted this proven technology. A review of growth rates in artificially sired beef cattle and levels of milk production in dairy cattle produced by means of AI is rather impressive. That genetic progress would not have been possible with natural service alone.

The development of synchronization of estrus in the late 1970s and early 1980s enhanced the use of AI in beef herds. Using this technology, a high percentage of the herd could be inseminated to superior sires during a short period of time. The uniformity of the resulting calf crop, along with impressive growth rates and carcass qualities has proven economically beneficial to cattlemen who have adapted this practice.

Estrus synchronization and Embryo Transfer has provided the opportunity to multiply the genetics of superior female cattle, just as artificial insemination made "a little good bull go a long way". It is now a common practice to super ovulate an outstanding cow, inducing her to produce multiple eggs for fertilization. That cow is then inseminated to an exceptional bull, resulting in several embryos from a single mating. Soon those embryos are harvested and transplanted into recipient cows or heifers that have been carefully synchronized to accept an embryo. Approximately nine months later, several cows deliver those embryos as healthy calves that contain the genetics of a single superior cow and a superior sire. It is not uncommon, now, for exceptional cows to have dozens of offspring and great bulls can sire thousands.

The latest breakthrough in bovine reproduction is Sexed Semen. The process of sorting semen by gender was developed in the late 1980s. The technology

has been gradually improving since then. The main problem with gender-sorting is that the process, called Flow Cytometry, is extremely slow. The semen is stained with a fluorescent dye and sent through the flow-cytometer at 60 mph, under 40-60 psi of pressure. The X-chromosome is 3-4% larger than the Y-chromosome, so it emits more light. An internal laser beam detects the gender of the sperm, and the X and Y chromosomes are separated. This procedure separates sperm of the two sexes with approximately 90 percent purity.

As mentioned above, the process is slow, and only about 30% of the sperm are properly oriented to pass through the machine. Of the 30%, only half are females. Therefore, only 15% of the sperm passing through the machine can be used as a marketable product. As a result, sperm numbers per straw are lower and sexed semen is more expensive than non-sexed semen. Conception rates are generally lower with sexed semen, but that is improving quickly. It is recommended that sexed semen be used in virgin heifers only, and that only highly experienced technicians inseminate said heifers.

There are obvious benefits of using sexed semen. It increases the chances of heifer calves for dairy producers from about 50% to 90%. This is especially significant for Jersey dairies, where the bull calves are virtually worthless. More heifer calves being born on the dairy is a fast way to grow a herd internally. There is also the added benefit of bio-security. Additionally, heifer calves are usually easier to deliver than bulls, so calving ease is another benefit. Beef ranchers can also enhance the percentage of bull calves born in their respective herds by using semen sexed for bull calves.

All indications lead us to believe that this new technology will continue to be perfected and will offer a return on investment that will be commercially sustainable for the cattle industry.