



Cattle Producer's Handbook

Reproduction Section

455

Sexed Semen: The Newest Reproductive Technology for the Beef Industry

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Although available commercially in the dairy industry for almost a decade, gender-selected semen, or sexed semen, is one of the newest reproductive technologies available to the beef producer. The availability of sexed semen from beef bulls along with concerns about success of the technology at the ranch level has limited the use of sexed semen in purebred and commercial beef operations. Recent changes in semen availability combined with ongoing research into improved success in beef operations make consideration of sexed semen a reality for some beef producers.

As sorting capacity increased, the number of beef bulls with gender selected semen available increased exponentially as well in recent years. For the majority of U.S. artificial insemination (A.I.) studs, the number of beef bulls with gender-sorted semen available increased from 0 to 70 from 2008 to 2011. Sexing Technologies, the major semen sexing company, lists more than 45 sires with sexed semen in its catalog. In addition, it appears that custom collection of bulls with subsequent semen sexing will be available in the near future. While not an overwhelming selection of bulls and genetics, numbers of beef bulls with sexed semen are now sufficient to begin to meet the needs of the seedstock sector and to provide desirable traits to the commercial producer.

Sorting Process Increases Cost and Limits Availability

Many different techniques for sorting Y and X bearing sperm were tried over the past 20 to 30 years. Only one, flow cytometry, is effective. This process consistently results in semen sorted with 90 percent of the desired sex. While the accuracy is great, the speed and yield of the process is slow and low. In addition, the required

equipment is expensive, and specially trained technicians are needed to assure sorting accuracy. Sexing of semen to bull studs is a service provided by independent companies such as Sexing Technologies (Select Sires, Genex, Accelerated Genetics, ABS Global, etc.). Therefore, a fixed cost is associated with sorting above the normal semen price.

To reduce costs and maximize availability of sexed semen, the volume and number of cells per unit are decreased. Gender selected semen is packaged in one-quarter ($\frac{1}{4}$) cc straws with 2.1 million sperm cells per straw. In contrast, conventional semen is distributed in one-half ($\frac{1}{2}$) cc straws containing 10 to 20 million cells per straw. Currently, sexed semen is available for \$25 to \$75 per straw.

Semen is actually sorted one sperm at a time and yield is low. Sperm with an X chromosome (results in females) has slightly more DNA than Y-bearing sperm (results in males). The sperm is treated with a fluorescent dye that allows differentiation of the amount of DNA in the sperm. Sperm is then diluted and placed in droplets so each individual sperm is in a droplet. The droplets enter the detector where a laser is used to energize the dye.

During the sorting process the machine identifies the sperm as X or Y, and it puts a charge on the drop in which the sperm is placed for sorting. An electrical field deflects the sperm toward the collection vessel. The sperm hits the fluid in the collection vessel at about 50 kph (30 mph). The sorted sperm is then centrifuged to concentrate the sperm and re-suspended to the correct dilution. Although the sorting process is 90 percent accurate, approximately half the sperm cannot be sorted because it is damaged or the machine could not determine X or Y. Therefore, 50 percent of the ejaculate is discarded.