



Repro Tracks

► by **Bill Beal**, beef cattle reproductive physiologist, Virginia Tech

Sexed semen: How? What? Where? When?

Sexed semen is available, and its use in the dairy industry is increasing rapidly. Two artificial insemination (AI) companies in the United States have contracted to provide large quantities of sexed semen from dairy bulls. The sale of sex-sorted Angus semen from AI companies does not appear to be on the horizon. However, custom semen collection and semen sorting is available.

Breeder question No. 1

My neighbor is a dairyman and he has been using sexed semen to breed his heifers. Is sexed semen from Angus bulls available? How much more will it cost me to use sexed semen instead of regular semen?

Response: Sexed semen is a reality (finally). Several AI companies have experimented with the sale of sexed semen. Select Sires and American Breeders Service (ABS) have signed agreements to sort semen on a routine basis.

To separate X- and Y-chromosome-bearing sperm, the cells are stained with a fluorescent dye so that the X-bearing sperm, containing 4% more DNA, can be sorted from the Y-bearing sperm using a flow cytometer.

The process is 90% successful, but it is painstakingly slow and quite inefficient. Only 5% of the sperm cells in an ejaculate are successfully sorted per desired sex. Furthermore, operating a flow cytometer 24 hours a day results in the production of only about 150-200 units of male- or female-selected semen.

Consequently, the cost of sexed semen will be higher than unsorted semen from the same sire. If unsorted semen from a sire sells for \$20 per unit, expect the sex-selected semen from the AI company to cost \$50-55 per unit.

The other issue with sexed semen is that its use usually results in lower conception rates than unsorted semen. Preliminary results from AI companies indicate that conception rates with sexed semen should be expected to be 75% as high as those with the use of unsorted semen. This means that if you achieve a first-service pregnancy rate of 65% with regular semen, you should expect it to drop to 49% (65×0.75) if you choose to use sexed semen. The reduced fertility with sexed semen adds an additional

expense because it will require more inseminations per pregnancy, and cows will become pregnant later in the breeding season.

The prospect of sexed semen from Angus bulls being available through AI companies any time soon is unlikely. The primary economic incentive for using sexed semen is the "differential value" of male vs. female offspring. The \$150 value of Holstein bull calves vs. the \$700 value of Holstein heifers at a day of age (\$550 differential) provides the dairy producer with an incentive to tolerate reduced conception and higher semen costs. However, the \$75 to \$150 differentials between heifers and bulls in the commercial beef industry limits the opportunity for return on investment to beef producers.

Purebred Angus breeders probably will not benefit from sexed semen distributed by AI companies. The reason being that it is unlikely that the high-demand bulls popular with Angus breeders would ever be the source of sexed semen. It is not in the best interest of an AI company or purebred breeders who desire offspring from high-demand sires to subject those bulls to sorting procedures, and thereby further limit their semen that is already in short supply.

Furthermore, considering that the AI company has to discard more than 80% of the semen during the sorting process, the price of sexed semen from high-demand bulls would be very high. If sexed semen from sires of beef breeds does become available through AI companies, it is more likely to be from moderate-demand bulls that are attractive to large-scale commercial breeding projects.

Bottom line — don't hold your breath waiting for sexed semen from the popular Angus sires. Furthermore, if sexed semen from Angus bulls does become available, be sure the direct (increased semen cost) and indirect (lower fertility) costs are justified by

the advantage of selecting the sex of the calves.

Breeder question No. 2

Is there a service that will custom-collect and freeze sexed semen from my bulls? What is the cost per straw, and what pregnancy rate should I expect?

Response: Sexing Technologies, located in Navasota, Texas, is the only firm in the U.S. licensed to produce sex-selected bovine semen. Sexing Technologies is offering sperm-sorting services along with complete custom bull collection in conjunction with their partner, Genetic Resources International (GRI).

GRI will board bulls for long-term semen collection or allow breeders to "ship in" bulls for one-day semen collection. Bulls collected on a single day typically produce 120-150 units of semen of one sex (2.1×10^6 sperm per unit). The sexed semen costs the breeder \$60 per unit. Single-service pregnancy rates using custom-collected, sexed semen have been 70%-80% as high as those following the use of unsorted semen.

Breeders can agree to a yearly contract with GRI to produce more units of sexed semen. The cost per unit decreases as the number of units increases (e.g., 250 units = \$50 per unit; 500 units = \$40 per unit; 3,000 units = \$38 per unit, etc). Boarding bulls, health testing, storing and shipping semen are extra costs to the breeder.

Most of the bulls custom-collected at GRI have been Holstein, but Brahman, Simmental, Hereford, Beefmaster and Brangus bulls have also been collected for semen sorting. At this point, no Angus bulls have been brought to the center for production of sexed semen.

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Editor's Note: Bill Beal is a beef cattle reproductive physiologist at Virginia Tech. He conducts research involving estrus synchronization, AI, embryo transfer and the use of ultrasound technology. This column is designed to provide answers to questions about reproductive management commonly posed by commercial and purebred breeders. If you have questions or comments related to the reproductive management of cows or bulls, e-mail them to him at wbeal@vt.edu or mail them to him at the Dept. of Animal & Poultry Sciences, Virginia Tech, Blacksburg, VA 24061-0306.