Repro Tracks

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

Sexed semen and embryo transfer

Sexed semen is available, and its use to inseminate single-ovulating cows is increasing in the dairy industry. Breeders using embryo transfer (ET) are interested in the use of sexed semen to breed superovulated donor cows. The research done on the use of sexed semen to breed ET donors suggests the number of embryos collected will be reduced by using sexed semen, but recent discoveries may limit that reduction to only one less embryo per donor collection.

Breeder Question:

I have read articles on the use of sexed semen to breed cows, but have not seen information on breeding superovulated donor cows. In my ET program, the heifers that I produce are worth much more than the bulls. I would like to use sexed semen to increase the percentage of heifer embryos. Can I use sexed semen on my donor cows?

Response: Sexed semen use is becoming more common in the dairy industry. Two major artificial insemination (AI) companies have contracted to provide sexed semen to dairy producers. The sorting of semen from beef bulls has been limited to custom collections by private bull owners, and no Angus bulls have had semen collected and sorted. Sexed semen is likely to cost twice as much per insemination as unsexed semen and will most likely result in a conception rate that is only 75% as high as that achieved using unsexed semen on single-ovulating cows.

The potential for using sexed semen to breed superovulated donor cows seems to be improving; however, its use by Angus breeders still appears to be a long way off.

When used to breed superovulated donor cows, sexed semen has yielded variable results. A study done at the University of Wisconsin indicated that when superovulated Holstein heifers were inseminated 12 and 24 hours after heat detection with 10 million sexed or unsexed sperm at each insemination, the fertilization rate in donors bred with sexed semen (62%) was 29% lower than the fertilization rate in donors bred with unsexed semen from the same sires (91%).

The number of transferable embryos per flush in that study was also much lower for donors inseminated with sexed semen (2.3 embryos per flush) when compared to those bred with unsexed semen (6.3 embryos per flush). Obviously, the results of that study reported in 2004 were very discouraging.

More recently, Sexing Technologies, the only firm in the United States licensed to produce sex-selected bovine semen, has released data that are more encouraging. The company reported that 27 Brahman heifers treated with Folltropin® V for superovulation and inseminated twice with 5 million sexed sperm at each insemination produced only slightly fewer embryos than 54 superovulated heifers inseminated twice with 20 million unsexed sperm per insemination (5.5 and 7.0 embryos per flush, respectively).

Research done by Sexing Technologies indicated that differences in transferable embryos collected after insemination of donors with sexed or unsexed semen was reduced if insemination of donors with sexed semen was performed closer to the time of ovulation. They reported that donors bred with sexed semen 20 hours after heat detection had a higher number of embryos collected per flush (7.2 embryos per flush) than donors bred with sexed semen at 12 or 16 hours after heat detection (3.5 and 4.8 embryos per flush, respectively). Their current recommendation is to breed donors twice with 5 million sexed sperm per insemination. They suggest that the first insemination should occur at 18-20 hours after heat detection, with the second insemination 6-8 hours later.

Pregnancy rates following the transfer of embryos made with sexed or unsexed semen have been reported to be similar. When practitioners at Sexing Technologies transferred 931 fresh embryos from donors inseminated with sexed semen and 431 fresh embryos from donors inseminated with unsexed semen, the pregnancy rates (68% and 66%, respectively) were not significantly different. These data indicate that once a high-quality embryo is produced using either sexed or unsexed semen, it has an equal chance of establishing a pregnancy following a fresh transfer.

While the potential of using sexed semen to breed superovulated donor cows appears brighter than after the initial experiments, there are still many factors that may act as barriers to its use. Foremost among these factors is the lack of understanding as to what caused the difference in results between early experiments and those reported more recently.

Furthermore, differences in conception rates (35% to 65%) of single-ovulating cows bred with sexed semen from different bulls has been reported, and it is likely that differences in fertilization rate and the number of transferable embryos collected among donor cows bred with sexed semen from different bulls may be even greater.

Finally, it is unlikely that the high-demand Angus bulls desired most for breeding donor cows will be made available by the AI studs. Therefore, the potential for using sexed semen to breed superovulated donor cows seems to be improving; however, its use by Angus breeders still appears to be a long way off.

For more information on custom-sexed semen collection or the use of sexed semen in an ET program, contact Sexing Technologies at (936) 870-3960 or visit their Web site at *www.griglobal.com*.

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Editor's Note: *Beal is a beef cattle reproductive physiologist at Virginia Tech. He conducts research involving estrus synchronization, AI, ET 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 Beal at wbeal@vt.edu or mail them to him at the Dept. of Animal & Poultry Sciences, Virginia Tech, Blacksburg, VA 24061-0306.*