impact

Applications of gender-sorted semen in commercial beef operations

AT A GLANCE

Using sex-sorted semen may give producers an advantage. Technical limitations hampered its use in beef production. Our research found methods to make sexed-sorted semen an option for producers.

The Situation

Gender-sorted semen, or sex-sorted semen, for artificial insemination (AI) has been commercially available to beef producers since 2008. Sex-sorted semen reliably produces calves that are 90% + of the desired sex. This technology may be advantageous for several reasons: 1) Steers produce more beef than heifers and are worth more at all points in the beef chain, 2) Ensuring the best maternal cows produce females and 3) mixed gender loads of calves create a marketing disadvantage.

Sex-sorted semen offers great potential to improve efficiency of beef production. However, AI pregnancy rates to sex-sorted semen were initially 10% to 20% less than conventional semen. It also appeared that the normal estrous synchronization protocols fixed-time AI were not as effective for sex-sorted semen.

Our Response

Since 2008, we have conducted multiple experiments using sex-sorted semen. These experiments focused on:

- Estrous synchronization protocols for sex-sorted semen.

Over 500 calves have been produced from sex-sorted semen at the U of I Nancy M. Cummings center. Photo by JB Hall.

- Ability to shift gender ratios.
- Timing of insemination in fixed-time AI (FTAI) protocols.
- Potential economic impact.

These experiments also provided insight into differences among bulls.

Program Outcomes

Our research determined several factors that makes sex-sorted semen an option for producers.

The primary FTAI estrous synchronization systems used were: 14-d CIDR – PG (heifers), 5-d CIDR + CO-Synch (heifers and cows) and 7-d CIDR + CO-Synch

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(cows). For specific on these protocols, producers should consult https://beefrepro.org/arsbc/.

Using sex-sorted semen resulted in FTAI pregnancy rates of 40% to 50% — Over the 12 years, we have researched or used sex-sorted semen, we feel comfortable with the pregnancy rates stated above. This is a combination of the management changes as a result of our research and improvements in semen sorting technology.

Gender ratios can be successfully skewed by using sex-sorted semen — A single FTAI to sex-sorted semen followed by clean-up natural service resulted in sex ratios of 65:35. By using a combination of techniques that ratio can approach 70:30.
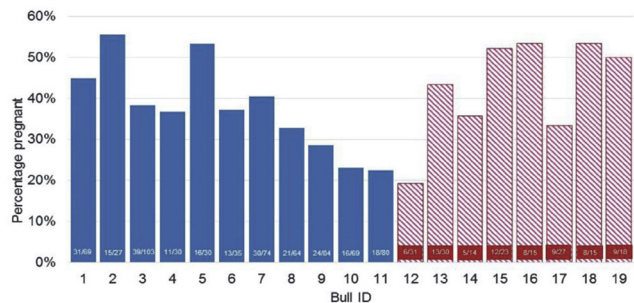
Split-time AI reduces the difference between sex-sorted and conventional semen — Split-time AI time (developed by University of Missouri) has an advantage in sex-sorted semen. In split-time AI, all animals are fitted with estrus detection aids. Any animal with an activated patch at the normal FTAI time are inseminated. Those with inactivated patches are inseminated 24 hours later with sex-sorted semen if patches are activated.

Bulls vary in fertility after sex-sorting — Our research demonstrated a high variation in pregnancy rates (20% to 56%) to sex-sorted semen with small numbers of insemination per bull. There was no difference in fertility between X-sorted and y-sorted semen. Bull genetic companies now have a better understanding on which bulls work well after sex-sorting. So ask.

In fixed-time AI systems, there was no advantage to delaying insemination times — Delaying insemination by 12 hours in the 5-d CIDR + CO-Synch protocol did not improve AI pregnancy rates to sex-sorted semen. Similar results have been observed in FTAI systems by other researchers.

The greatest economic advantage may be to smaller producers that have to sell split-sex loads — Our research, and reports by others, indicated that FTAI pregnancy rates to sex-sorted semen need to approach 50% to garner the advantage to producing more steers. If FTAI pregnancy rates fall below 50% then the advantage of more steers is offset by calves being born later and being lighter at weaning. However, if a split-sex load can be eliminated, even a 65:35 ratio of steers to heifers could increase income by $2,000 to $3,000 per load over additional costs.

After sex-sorting, bulls may vary greatly in fertility. Blue = Y-sorted. Pink = X-sorted. Ask AI companies which bulls are working best for sex-sorted semen applications.

The Future

Research into heifer-heifer systems will continue. We are ready to launch large scale on-ranch projects with sex-sorted semen to assist producers with adopting this technology and examining the economic impact of sex-sorted semen.

Cooperators and Co-Sponsors

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ABS Global, Accelerated Genetics, American Simmental Association, AgriBeef Co., Genex CRI, NW Simmental Breeders, Select Sires, ST Genetics and University of Idaho Agricultural Experiment Station.