Optimal use of sex-sorted semen
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Summary
- Delay timing of AI with sex-sorted semen to improve fertility.
- Avoid using sex-sorted semen on low fertility potential cows.
- Timed AI at mating start date mitigates against reduced fertility.

Introduction

Heifers should be bred with dairy AI because they are the most fertile animals in the herd and they generally have the best EBI. Good fertility with sexed semen can also be achieved in young, healthy cows that are at least 50 days in milk. Sex-sorted semen use on the most fertile heifers and cows allows faster genetic gain, reduces calving difficulty, increases the proportion of replacement heifers born at the start of the calving period, and facilitates greater AI use with high DBI sires on the remaining dairy cows. Having all heifer calves born at the start of calving insures a uniform group of heifers for easier management.

Heifer timed AI sex-sorted semen study

Sexed semen has a shorter duration of viability in the female reproductive tract (12–16 hours) compared with conventional semen (>24 hours) and may benefit from AI closer to the time of ovulation. In 2021 and 2022, a sexed semen trial was conducted on 11 herds to compare the reproductive performance of altering the timing of AI in 816 heifers. Heifers received the same sequence of hormone treatments outlined in Figure 1. Half the heifers received AI and an injection of GnRH 48 hours after the second PG injection and progesterone device removal (TAI_0). For the other half of the heifers, the hormone treatments were identical and the only change was that AI was delayed until 8 hours after the injection of GnRH (TAI_8). The pregnancy per AI was 50% and 59% for TAI_0 and TAI_8 heifers, respectively (Figure 2A).
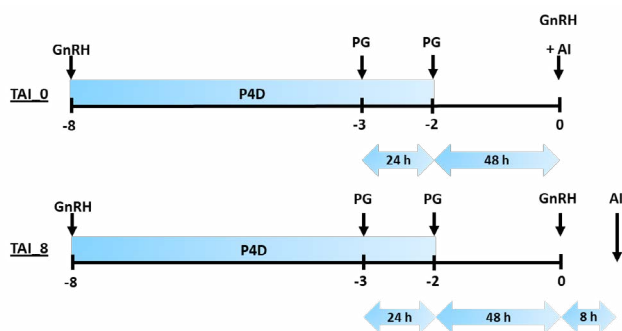

Figure 1. *Synchronisation protocols for TAI of heifers*

Factors affecting the success of sex-sorted semen

Heifers selected for sex-sorted semen must have reached target liveweight, be cycling regularly, and be in good body condition score (≥3.25). Cows selected for sex-sorted semen should be parity 1-4, ≥50 days in milk, BCS ≥3.0, cycling regularly, and free of any health issues. Correct timing of AI is critical and should occur 14-20 hours after the onset of standing heat. Sex-sorted semen is more sensitive to environmental conditions and has a shorter life-span compared with conventional semen. It is important that sex-sorted semen is thawed and inseminated within five minutes of its removal from the AI tank.

In 2018, a trial was undertaken on 142 Irish dairy herds to evaluate the reproductive performance of cows inseminated with conventional and sex-sorted semen. Of the 7,246 cows enrolled on the study, a subset of cows with either high fertility potential (n=813; ≥70 days in milk, first or second lactation, > €60 fertility subindex) or low fertility potential (n=718; <70 days in milk, third or greater lactation, <€60 fertility subindex) were evaluated. Pregnancy per AI was greater in the cows with the high fertility potential compared with the low fertility potential cows inseminated with conventional (65 vs. 52%) or sex-sorted (50 vs. 30%) semen (Figure 2B).
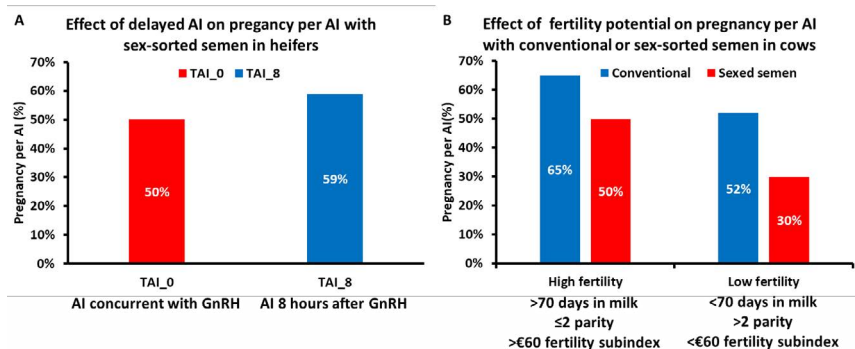

Figure 2. *Pregnancy rate in heifers (A) and cows (B)*

Conclusions

These studies indicate a considerable benefit to delaying timed AI in heifers by 8 h after the final GnRH (18% increase) and highlight the importance of targeting sex-sorted semen in cows with high fertility potential. The use of timed AI synchronisation protocols with sex-sorted semen at mating start date mean that the majority of the repeat heats occur three weeks later, thereby mitigating any reduced pregnancy rate to the first service. Generating more heifer replacements from maiden heifers and high fertility cows accelerates genetic gain, and facilitates greater use of high DBI sires on the remainder of cows in the herd.