An evaluation of timing of AI with frozen sex-sorted semen in lactating dairy cows in pasture-based seasonal-calving herds

Evelyn Drake[1], Victoria Aublet[1], Shauna A. Holden[1], Chloe Millar[1], Stephen G. Moore[1], Clio Maicas[1], Andrew R. Cromie [4], Federico Randi [3], Patrick Lonergan[2], Stephen T. Butler[1]

[1]Teagasc, Animal and Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork
[2]School of Agriculture and Food Science, University College Dublin
[3] Ceva Sante Animale. Libourne (France)
[4] Irish Cattle Breeding Federation

Objective

The objective was to use ovulation synchronization with a PRID-Ovsynch protocol for timed artificial insemination (TAI), to evaluate the effect of timing of insemination (16 h or 22 h after the second GnRH) with frozen sex-sorted semen on fertility performance in pasture-based seasonal calving herds.

Materials and methods

- Ejaculates from 3 different bulls were split and processed to provide frozen sex-sorted semen at $4x10^6$ sperm per straw (SexedUltra-4M; SS) and frozen conventional semen at $15x10^6$ sperm per straw (CONV).
- A modified PRID-Ovsynch protocol was used for estrous synchronization (Fig 1)
- TAI occurred 16 h after the second GnRH injection for cows assigned to CONV and 16 h sexed semen (SS-16) treatment, cows in (SS-22) received TAI with sexed semen 22 h following the second GnRH injection.
- Pregnancy diagnosis was conducted by ultrasound scanning 35-40 d after FTAI (n = 2175 records available for analysis).

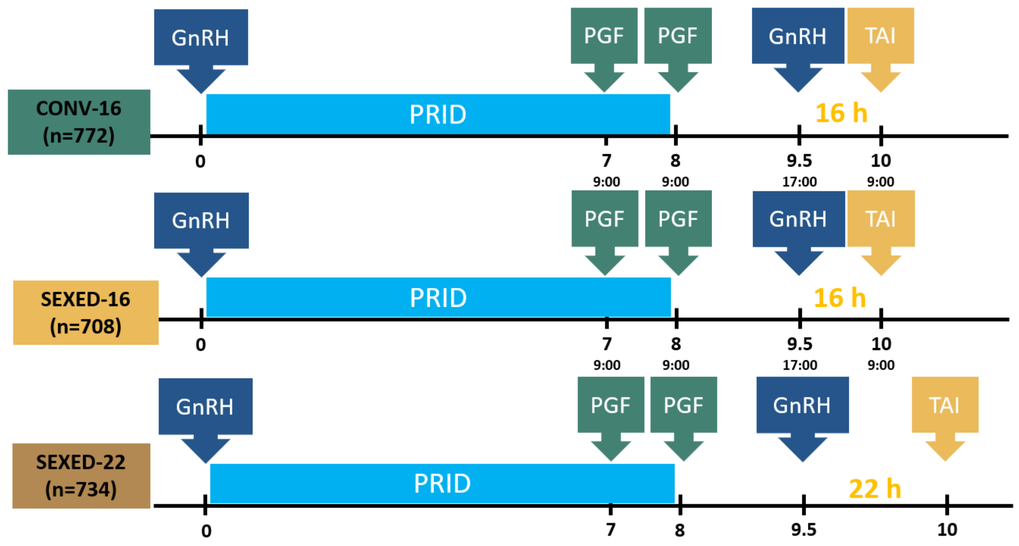
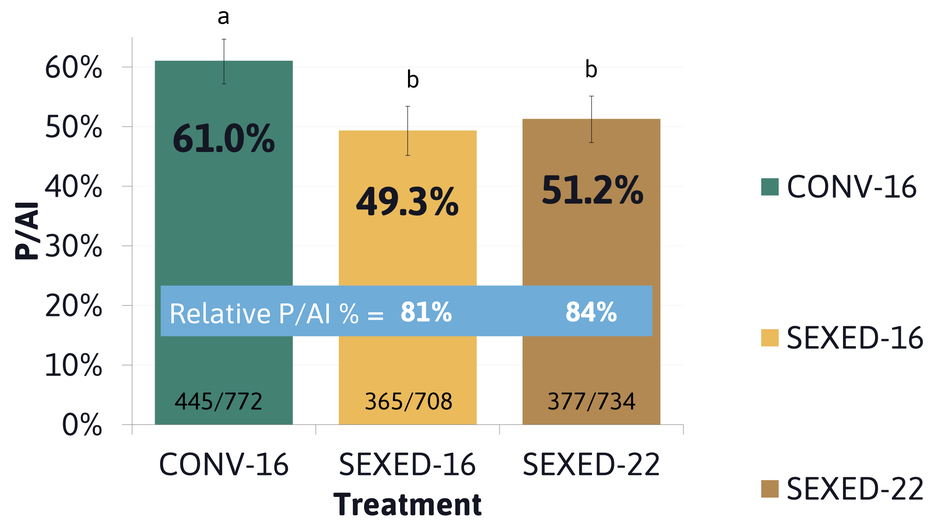


Figure 1. **Protocols outline.** *PRID® Delta, 1,55g of P4, Ceva Sante Animale, Libourne, France,. GnRH: 2 ml Cystoreline®/Ovarelin®, Ceva. PGF: 5 ml Enzaprost® T, Ceva. TAI: Timed AI*

Results

- P/AI was greater for CONV compared to both SS-16 and SS-22 (Fig. 2)
- The relative P/AI for SS-16 and SS-22 vs. CONV were 81% and 84%, respectively
- There were significant bull and treatment by bull interaction effects
- The study identified a marked herd to herd variation (the relative P/AI for the combined SS treatments vs. CONV ranged from 50.9% to 116.8%).
- The best third of herds achieved a mean relative P/AI of 101.5% (range = 93.9% to 116.8%), indicating that P/AI equivalent to CONV is achievable with SS.
- Conversely, the lower third of herds achieved a mean relative P/AI of 67.4% (range = 50.9% to 76.9%).
- Interestingly, the third of herds with the poorest relative P/AI had greater P/AI with CONV than the third of herds with the best relative P/AI, indicating a satisfactory response to the synchronization protocol on the induction of a fertile ovulation event in these herds.



Conclusions

- **The use of PRID-Ovsynch protocol for FTAI allowed for satisfactory P/AI varying between 60% for CONV to ~50% for SS.**
- **Marked variation existed between herds, however, with one third of herds achieving P/AI results equal to CONVENTIONAL**