SexedULTRA™, a new method of processing sex-sorted bovine sperm improves conception rates

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Introduction

The gap in fertility between conventional and sex sorted bovine sperm, known to be in the order of 10 percentage points, has never been bridged, even by increasing the number of sex sorted sperm per inseminate. A concerted effort in the last few years has resulted in substantial changes in all stages of the sex sorting process to develop an improved sex sorted product branded "SexedULTRA™". *In vitro* tests showed that SexedULTRA™ maintained sperm integrity better than the previous XY method, and field trials were conducted to determine if this translated into improved field fertility.

Material and Methods

FIELD TRIAL 1 – Ejaculates from 8 bulls located at Select Sires in Plain City (Ohio, USA) were split in two aliquots that were then processed following the XY and SexedULTRA™ methods. A total of 6,930 Holstein heifers were inseminated across 41 commercial herds in the USA demonstrating equal distribution of the number of inseminations by herd, sire and service. Conception rate results (Figure 1) were analyzed using mixed model analysis of variance with fixed effects of treatment, bull, bull by treatment interaction and the random effect of herd.

FIELD TRIAL 2 – Ejaculates from 5 bulls located at German Genetics International GmbH in Cloppenburg (Germany) were split four ways: XY 2.1 million/straw, SexedULTRA™ 2.1 million/straw, SexedULTRA™ 3.0 million/straw and SexedULTRA™ 4.0 million/straw. 7,855 heifers were inseminated with sex-sorted frozen sperm, while 62,398 heifers were inseminated with conventional frozen straws produced using contemporary ejaculates from the same bulls. 56 day non return rate was calculated by sire and treatment combination, and assigned a weight based on the total number of AI for each combination thereof. Results (Table 1) were analyzed using a mixed model analysis of variance with treatment and bull as fixed effects.

Results

Figure 1. FIELD TRIAL 1 - Select Sires conception rate resulting from sex-sorted semen processed by the XY (open bars) or SexedULTRA™ (closed bars) methods. Sperm sex sorted following the SexedULTRA™ method resulted in a greater ($P < 0.001$) conception rate compared to the XY method sperm (45.7 ± 1.7% vs. 41.2 ± 1.6%).

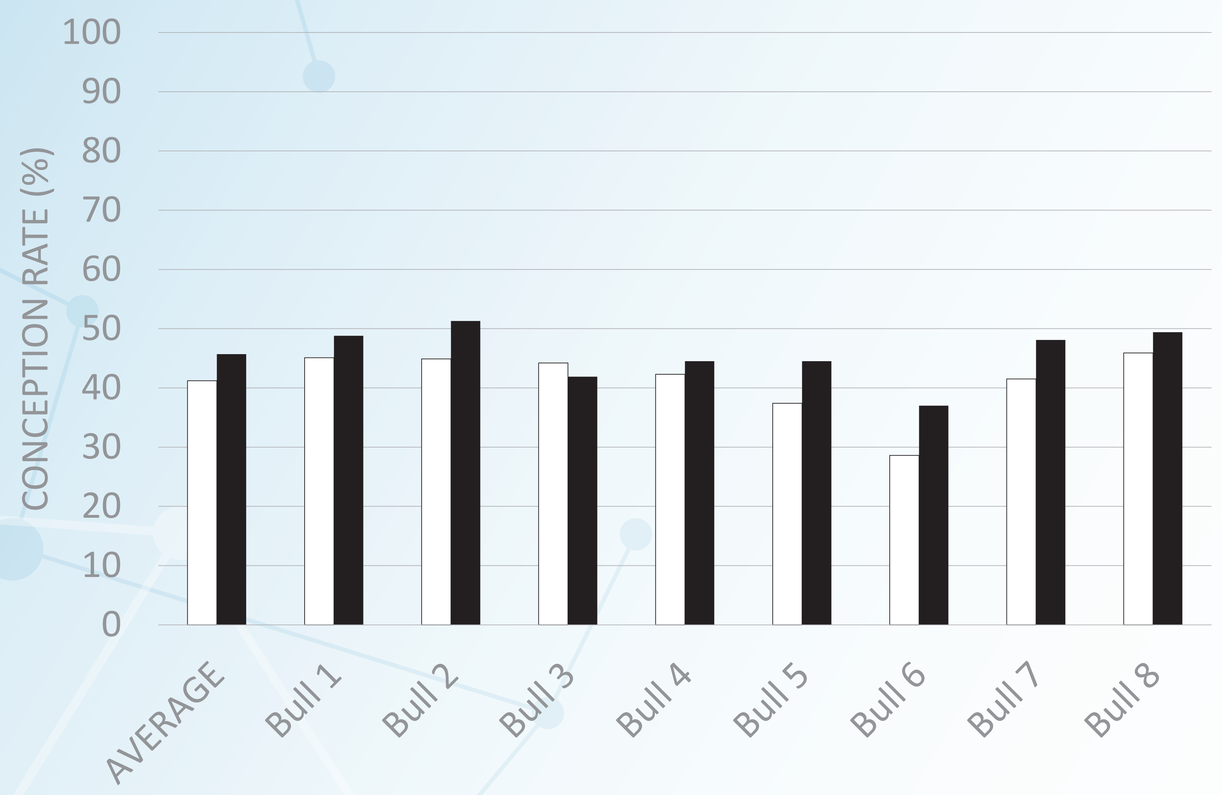

Table 1. FIELD TRIAL 2 - GGI field trial inseminations, 56 day non return rate weighted means and relative fertility compared to conventional sperm. SexedULTRA™ 4.0 sperm presented the greatest ($P < 0.001$) 56 day non return rate followed by conventional 15.0 (66.73% vs. 65.66%). XY 2.1 presented the lowest ($P < 0.001$) non return rate.

Treatment	Number of inseminations	56 day NRR weighted means (%)	Relative fertility (%)
XY 2.1	1953	55.89^{A}	85%
SexedULTRA™ 2.1	1999	59.95^{B}	91%
SexedULTRA™ 3.0	2013	60.02^{B}	91%
SexedULTRA™ 4.0	1890	66.73^{C}	**102%**
Conventional 15.0	62398	65.66^{C}	

*NRR with different superscripts are significantly different ($P < 0.01$)

Conclusion

This is the first report of an improvement in conception rates as well as a dose response effect with sex sorted bovine sperm. This study demonstrates SexedULTRA™ sperm parity in conception rates with conventional semen after a decade since sex sorted sperm became commercially available.

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