

Semen Analysis: At the farm gate

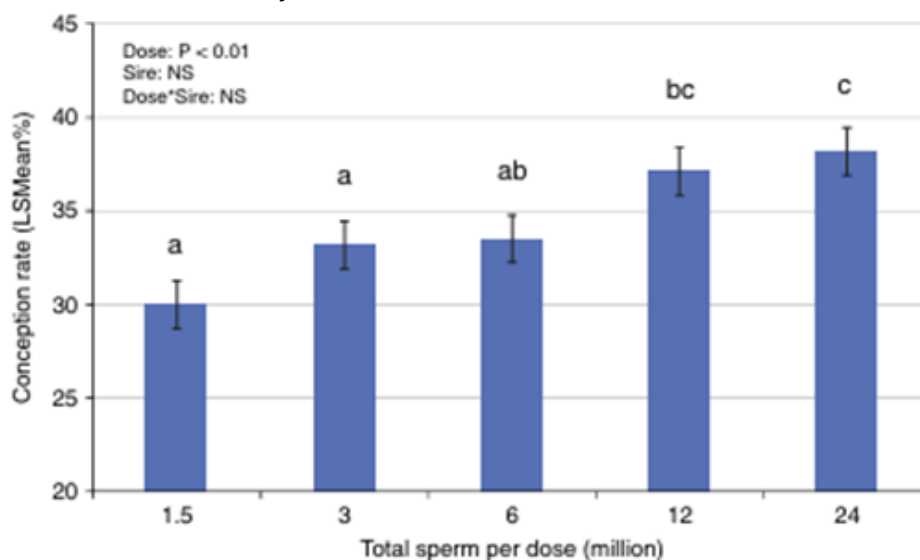
- AUGUST 25



Many factors contribute towards AI success; cow management, inseminator technique and seasonality are all crucial variables, regardless of semen quality. However, the viability of thawed frozen semen is a pivotal factor in producing pregnancies at a cost-effective rate that ultimately contributes to business stability in the long-term. Field semen analysis is a quantitative method to get one step ahead of potential 'fertility holes' and make pro-active decisions before the damage is done.

The last 40 years has seen huge advancements in semen analysis technology with many bottlenecks and pitfalls navigated along the way. All semen sold commercially undergoes strict quality control for marketing and legislative purposes however, large scale studies indicate the natural variability of bovine semen creates a notoriously difficult product to replicate in large quantities. Studies have shown as much as 10% variation in viability metrics between bulls across collection days (batches) and 12.5% variation between cryopreserved (frozen) semen arising from natural bull variability. Even with the most rigorous of quality control systems in place, the post-control process (shipping, storage, handling and movement of semen) further introduces an inherent discrepancy between the estimate of a straw's fertility potential and the outcome¹.

A key question when looking at semen analysis is to ask what should we be measuring; as technology has developed a large array of metrics ranging from simple numbers to physiological measures of DNA viability have been produced. Whilst research has thrown conflicting results, there is strong evidence to suggest that concentration and motility are two measures that contribute to fertility success in conception rates. In particular, recent meta-analysis has identified sexed semen straw concentration accounting for an 8% difference in overall pregnancy success³. Other measures such as sperm cell abnormalities, structural changes or DNA damage are key metrics that will likely develop into more routine 'field' assessments of semen variability.



¹ B.R. Harstine, M.D. Utt, J.M. DeJarnette. Review: Integrating a semen quality control program and sire fertility at a large artificial insemination organization. *Animal*, Volume 12, Supplement 1, 2018, Pages s63-s74, ISSN 1751-7311.

² Matthew D. Utt. Prediction of bull fertility, *Animal Reproduction Science*, Volume 169, 2016, Pages 37-44.

³ Reese, S., Pirez, M.C., Steele, H. et al. The reproductive success of bovine sperm after sex-sorting: a meta-analysis. *Sci Rep* 11, 17366 (2021).

Recently, we have been utilizing a new dynamic in-house system for semen analysis, Dynescan. This provides real-time assessments of thawed or fresh semen producing prolonged measures of concentration and motility that we interpret to provide in-depth informed advice for management decisions. In particular, the AI software allows much more accurate interpretation of sexed semen straws, which have been previously very difficult to assess due to their lower concentration. We would strongly advocate the testing of straws from new batches of semen or in cases where on farm concerns with storage or handling have occurred to maintain quality control through to farm-gate.

Straw collection can be easily arranged through one of us on delivery of a new batch, transported back to the practice in liquid nitrogen shippers and test results produced within 24 hours to provide a rapid indication of performance on farm.

DYNESCAN
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