

Changes in sperm motility as an indicator of boar fertility

A.L. Ruiz-Sánchez¹, R. O'Donoghue¹, G. Lebowa²,
G.R. Foxcroft¹, W.T. Dixon¹ and M.K. Dyck¹

¹Swine Reproduction-Development Program, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB, T6G 2P5; ²Alberta Swine Genetics Corporation, Nisku, AB; **Email:** george.foxcroft@ualberta.ca

The routine semen evaluation commonly used by commercial AI centers during semen processing (concentration, morphology, viability, and motility) detects male reproductive disorders that result in low fertility, but is limited in its ability to estimate potential fertility of individual boars. Therefore, the objectives of the present study were to: 1) Identify sub-populations of potentially superior and inferior fertility boars based on motility of stored extended semen at day 0 (d0), d3, d7 and d10 from a population of young boars collected during their quarantine period (High and Low motility boars); 2) Determine the relative fertility of these boars using *in vitro* fertilization (IVF) techniques; 3) Evaluate correlations between the motility of stored extended semen and IVF results. Sperm motility differed between High and Low motility boars at d7 and d10 of storage (75.5 ± 4.3 vs. 63.0 ± 2.7 ; 66.0 ± 3.2 vs. 48 ± 2.0 , respectively; $P < 0.005$). A strong positive correlation between d7 and d10 motility, and IVF results was detected (penetration rate: $r = 0.84$, $P = 0.009$; $r = 0.88$, $P = 0.01$, respectively). This study demonstrates that when using a short-term extender (BTS), measuring motility of extended semen at d7 and d10 of storage offers a practical and inexpensive approach to identify less fertile boars. These results highlight new opportunities to develop timely and cost-effective procedures for assessing boar fertility and further evaluation of these procedures at a commercial level are needed.

Implications:

The ability to differentiate relative fertility amongst boars would have significant potential at a commercial level. It would have considerable economic impact, by eliminating or limiting the use of less fertile boars. It would also allow the use of lower sperm AI doses for the most fertile and genetically high-indexed boars, without any loss in productivity.