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The Effects of Cold Shock on Boar Semen

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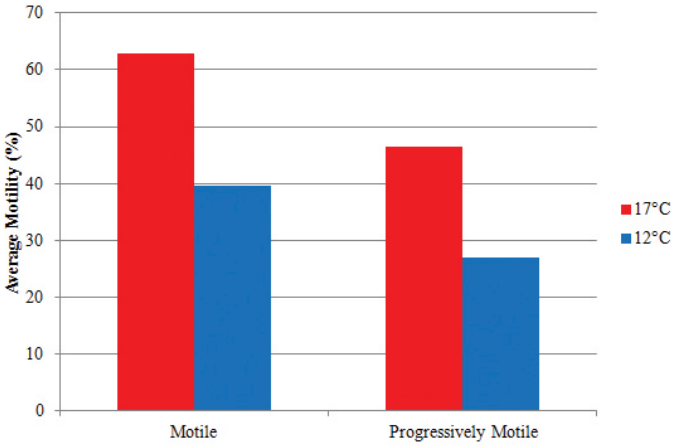
There is a growing interest and need in having the ability to stabilize, freeze, and/or store boar semen for an extended period of time. The first step in researching is to look at the effects of various temperatures on the stability of the sperm cell. A two-by-two factorial design was used where boar semen was collected, extended in either a short-term or long-term extender (BTS and Androhep), and stored at either 17°C or 12°C for 7 days. For evaluation, a semen sample was warmed to 37°C for 30 minutes prior to evaluation using a computer-assisted semen evaluation system to record motility and progressive motility of the sperm cells on days 0 (day of collection), 1, 2, 5, and 7. A phase-contrast microscope was used to visually examine the sperm cells for morphological abnormalities on the same days. Data was analyzed using analysis of variance for repeated measures in SAS v9.3. The figure shows that motility and progressive motility were decreased in the 12°C treatment at all time points ($p \leq 0.0001$ for both). Motility and progressive motility were greater on day 0 and day 2 compared to day 1, day 5, and day 7. There were no differences in extender, temperature, or time in the percentage of coiled tails or distal droplets. The percentage of normal cells was greater on day 0 compared to day 1 ($p = 0.01$) and day 2 ($p = 0.03$). The percentage of bent tails was greater on day 0 compared to day 5 ($p=0.02$) and day 7 ($p = 0.009$). The percentage of DMRs was greater on day 1 compared to day 0, day 2, day 5, and day 7 ($p \leq 0.0001$ for all). The percentage of DMRs was greater in the 12°C treatment compared to the 17°C treatment ($p = 0.0346$). The percentage of proximal droplets was greater on day 2, day 5, and day 7 compared to day 0 and day 1. Overall, it appears that storage temperature impacts motility and progressive motility of sperm cells, despite being warmed to 37°C.

Research advisor Kara Stewart explains, "Over the past twenty years many improvements have been made to commercial semen extenders for use in the swine industry. As the industry moves to adopt new reproductive technologies, revisiting basic aspects of semen processing with the newer extenders is warranted. Megan was an outstanding researcher and her work demonstrated that the improved extenders cannot adequately protect sperm from cold temperatures."



The relationship of both average motility and average progressive motility with respect to temperature. There is a clear decrease in both motility and progressive motility between 17°C and 12°C.

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