EFFECT OF ON-FARM STORAGE TEMPERATURE ON STORED SEMEN QUALITY

On-farm boar semen storage on 28 farms in Ontario was evaluated by researchers from the University of Guelph in Canada to determine whether proper storage temperatures were being maintained and what impact storage temperature has on the quality of the stored semen. The results were presented at the recent meetings of the American Association of Swine Veterinarians.

Herds were first visited on the day a fresh batch of semen was delivered to or collected on a farm. One dose from the fresh batch was collected and transported to the lab for evaluation using Spermvision™, a computer-assisted sperm analysis system. Information recorded for each sample included source, total and progressive sperm motility, sperm abnormalities, sperm concentration, volume of dose, and total sperm/dose. Before leaving the farm, an air temperature-logging device was placed in the semen storage unit, and the producers were asked to record on a log sheet the date, time, and reason for opening every time the storage unit door was opened. The device recorded air temperature at one-minute intervals. The log sheet was used to determine if recorded temperature changes corresponded with events recorded by the producer. Each herd was revisited 72 hours after the first visit, and a second dose of semen from the batch that was initially evaluated was collected and analyzed in the same manner.

Semen storage unit temperatures that fell outside the 15-20°C range for a period of at least 40 minutes were considered unacceptable. Storage unit temperatures that fluctuated by 2°C or more for at least 40 minutes were also considered unacceptable. Minimum acceptable values for semen quality were 60 percent total motility, 705 normal morphology, 25x10⁶ sperm/ml concentration, 70 ml per dose in volume, and 2.5x10⁷ total sperm/dose. semen samples from the first visit (Day 1) and the second visit (Day 4) that had at least one parameter below the minimum acceptable value were considered poor quality.

Unacceptable semen storage temperatures were recorded in 36 percent of the units examined. Of the 10 problem units, 4 units went above 20°C, and 6 units dropped below 15°C. In one unit, temperatures both above 20°C and below 15°C were recorded. In 90 percent of the problem storage units, temperature fluctuations of at least 2°C were recorded.

In 3 of the unacceptable cases, high temperatures occurred when warm, fresh semen was put into the storage unit. In 2 of these 3 cases, the semen had been collected, extended, and packaged on-farm. Other events that triggered unacceptable storage temperatures included turning the semen, placing frozen ice packs in the storage unit, and, in one case, a faulty electrical cord, leading to failure of the storage unit. In 40 percent of the storage units that recorded unacceptable temperatures, a specific cause could not be determined.

Thirty percent of the semen samples were determined to be of poor quality on Day 1. There was no difference in the percentage of poor quality samples, whether from boar studs or on-farm collection. More Day 1 semen samples stored in units that produced unacceptable temperatures were of poor quality on Day 1 (55 percent vs. 16 percent). This suggests that sperm damage due to storage in inappropriate conditions may have already occurred prior to collection for examination.

By Day 4, the number of poor quality samples had increased to 40 percent. Again, no difference was observed between boar stud and on-farm collection. The percent poor quality samples stored in units with unacceptable temperatures had increased to 64 percent, with that of samples stored in correct-temperature units being 26 percent.

Storage of semen in units with unacceptable temperature control resulted in 9 percent lower motility, 9.4 percent lower progressive motility, 6.6x10⁶ fewer sperm/ml concentration, 0.54x10⁶ fewer sperm/dose, and 4.3 percent fewer abnormalities.

The decline in total sperm/dose under inappropriate storage was partly due to sperm agglutination. The effect of agglutination on fertility is unclear. It is known that temperature fluctuation, bacterial contamination, and trauma during collection and processing all contribute to increased agglutination.

The reason for the increase in percent abnormalities in semen stored under optimal temperature is unclear. However, all samples had greater than 70 percent normal sperm and were, therefore, not considered poor quality due to high sperm abnormalities.


-Todd See
SOW HOUSING SYSTEMS

Two studies that evaluated the effect of sow housing systems on longevity, performance, and behavior have been completed by researchers at the University of Minnesota. Results were reported at the recent Midwestern meeting of the American Society of Animal Science in Des Moines, Iowa.

In the first study researchers compared the longevity and culling of gilts and sows housed in conventional gestation stalls with those group-housed in pens with electronic sow feeders over the three-year period. Eighty-seven gilts and 243 sows were housed in pens, and 168 gilts and 232 sows were housed in crates. Both systems had fully slatted floors.

No difference was observed in the proportion of culling and mortality in gilts in the two housing systems. However, for sows, the proportion culled was significantly higher in stalls, and the proportion of mortality was higher in the pen housing. The most common removal reason after reproductive performance in both housing systems was locomotor (downer, lameness, and joint infection). The proportion of females removed for locomotor problems was significantly higher in the pens with electronic sow feeding.

Table 1. Farrowing performance of sows housed in gestation crates vs. pens with electronic sow feeders.

<table>
<thead>
<tr>
<th></th>
<th>Pen</th>
<th>SE</th>
<th>Crate</th>
<th>SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestation length, d</td>
<td>116.0</td>
<td>0.1</td>
<td>116.6</td>
<td>0.1</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Weaning wt, lb</td>
<td>509.3</td>
<td>3.1</td>
<td>476.7</td>
<td>2.6</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Number born alive</td>
<td>10.3</td>
<td>0.2</td>
<td>10.5</td>
<td>0.2</td>
<td>NS</td>
</tr>
<tr>
<td>Litter birth weight, lb</td>
<td>36.4</td>
<td>0.4</td>
<td>35.0</td>
<td>0.4</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Number weaned</td>
<td>9.4</td>
<td>0.2</td>
<td>9.6</td>
<td>0.2</td>
<td>NS</td>
</tr>
<tr>
<td>Litter wean weight, lb</td>
<td>134.0</td>
<td>1.3</td>
<td>129.4</td>
<td>1.3</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Days to estrus &lt; 10 d</td>
<td>5.1</td>
<td>0.05</td>
<td>4.9</td>
<td>0.05</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>% Delayed estrus, &gt; 10 d</td>
<td>3.0</td>
<td>0.9</td>
<td>6.3</td>
<td>1.3</td>
<td>&lt; 0.05</td>
</tr>
</tbody>
</table>

In the second study, farrowing performance from March through October 2004 was compared for sows of parity 2 to 9 housed during gestation in crates (n = 334) and sows housed during gestation in pens with electronic feeders (n = 333). Gestation crates were 14.3 square feet in size, while each pen housed 50 to 60 sows with 20.3 square feet per sow.

As shown in Table 1, pen-housed sows had shorter gestation lengths, were heavier at weaning, and had heavier litters at birth and weaning. Pen-housed sows took longer to return to estrus than sows housed in gestation crates. However, a higher percentage of crated sows had a delayed return to estrus following weaning. There was no significant difference in pigs born alive or pigs weaned between housing systems.

These studies, when taken together, suggest that in this production setting, pen gestation combined with electronic sow feeders keeps sows in better condition for farrowing, resulting in larger pigs born and weaned. However, in the pen-gestation system, there is concern that mortality was higher and more females were culled for downer, lameness, and joint infection problems.

-Air Emissions

CONSENT AGREEMENT

Individuals who wish to comment on the consent agreement may do so through May 2.

Producers who wish to participate in the air emissions consent agreement have until July 1 to sign up.

The agreement involves a two-year benchmark study of air emissions from livestock and poultry operations across the country. Based on the findings of the study, the federal Environmental Protection Agency will set national air policies, identify farm emissions thresholds, and regulate higher levels. A key part of the agreement provides legal protections from the effects of past emissions if participating producers meet all the requirements of the agreement and comply with the subsequent regulatory policies for applicable requirements.

For more information on the air emissions consent agreement and instructions for signing up, go to the National Pork Producer Council’s website:


You may also contact your local extension office or Tommy Stevens at the North Carolina Pork Council at 919-781-0361 or tommy@ncpork.org. -Todd See
RISK FACTORS ASSOCIATED WITH SHOULDER ULCERS

Shoulder ulcers in sows can develop over the scapula when the animals lie on their sides for extended periods and move less, for instance, during lactation. Researchers from the Royal Veterinary and Agricultural University in Denmark described the risk factors associated with the development of these ulcers at the recent meeting of the American Association of Swine Veterinarians.

For this study, sows on 18 farms were sampled and evaluated for prevalence of shoulder ulcers. A case-control study was also completed where all or the first 25 cases of shoulder ulcers were selected along with a matched control, which was a sow without a shoulder ulcer that was the closest to the right. Parity, farrowing/wean date, barn location, number of piglets, height of piglet bar, width of farrowing crate, nurse-sow status, body condition score, lameness, size of ulcer, injury to legs, and treatments were recorded for each case and control sow.

Should ulcers were observed in 8 percent of the sows sampled. On-farm prevalence ranged from 1 percent to 22 percent, and prevalence in the farrowing room ranged from 2 percent to 36 percent. Results from the case-control study showed that the 3 most important risk factors for presence of shoulder ulcers were:

1) Body condition score
2) Parity
3) Lameness

Sows with a body condition score of 1 or 2 were 4.96 times more likely to have a shoulder lesion compared to sows with a body condition score of 3. Those sows with body condition scores of 4 or 5 were 0.12 times more likely to have a shoulder lesion than the body condition 3 sows. Sows with lower body condition scores were also observed to have more severe ulcers than those with body condition scores of 3 or greater. Thin sows were also more likely to have ulcers on both shoulders.

A quadratic relationship was observed between parity and prevalence of shoulder lesions. This showed there was an increasing risk of shoulder ulcers from parity 0 to parity 6, after which risk began to decline. Parity 6 sows were 4.94 times more likely to develop shoulder ulcers than younger sows.

Sows with lameness were also at much higher risk of having shoulder ulcers than those without lameness, 16.78 times more likely. Sows with lameness probably spend a greater amount of time lying on their sides and therefore expose the scapula to pressure for a greater amount of time. However, this study cannot show that the shoulder ulcer was not the cause of the lameness.

The other measured factors in this study, such as number of days a sow is in the farrowing crate, size of farrowing crate, number of piglets in litter, and type of gestation housing, were not significant.


-Todd See
ON-FARM PERFORMANCE TESTING: The following breeders with validated herds have tested animals in the past 30 days.

<table>
<thead>
<tr>
<th>Breeder</th>
<th>Address</th>
<th>Breed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bob Ivey*</td>
<td>314 N.C. 111 S, Goldsboro 27530</td>
<td>L,D,Y,CW</td>
</tr>
<tr>
<td>Wesley Looper*</td>
<td>4695 Petra Mill Road, Granite Falls 28630</td>
<td>Y,L,H,D,X</td>
</tr>
<tr>
<td>Thad Sharp, Jr. &amp; Sons</td>
<td>5171 N.C. 581 Hwy., Sims 27880</td>
<td>Y,D,X</td>
</tr>
<tr>
<td>Thomas Farms</td>
<td>8251 Oxford Road, Timberlake 27583</td>
<td>X</td>
</tr>
<tr>
<td>Tidewater Research Station</td>
<td>207 Research Station Rd. Plymouth 27962</td>
<td>X</td>
</tr>
</tbody>
</table>

*Realtime Ultrasound

3000 copies of this document were printed at a cost of $659.15 or $.21 per copy.

—Frank Hollowell, David Lee