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Artificial Insemination and Estrus Synchronization in Swine

W. P. Jackson, V. B. Mayrose, H. W. Jones, and C. W. Foley, Animal Sciences Department

Artificial insemination

Artificial insemination (AI) of swine has been practiced on an experimental scale in several countries for a good many years. Early work on swine AI in the United States was initiated at the Missouri Experiment Station in the late 1930's and early 1940's. Shortly following this time a limited amount of research was conducted by the Wisconsin Station. For all practical purposes very little effort was devoted to research until 1955 when H. L. Self of Wisconsin (now Iowa State) started a series of studies that has been carried on to the present. Similar projects are now in progress at several research stations. To date artificial insemination in swine has been much less successful than in cattle. At present, our inability with present information to preserve boar spermatozoa for prolonged periods of time blocks all attempts to incorporate the maximum advantages possible through the use of artificial insemination into practical use in the swine industry. As with other species, the primary objective of artificial insemination in swine is a more widespread use of boars with proven genetic worth. It is hoped by use of such tools as swine evaluation stations, and so forth, these animals can be identified. Of secondary importance will be advantages such as disease control. The spread of certain diseases which are transferred from the boar to the sow upon contact can be almost completely eliminated.

Artificial insemination will allow producers interested in maintaining a SPF herd to breed their sows to any boar with less danger of losing their SPF status. The boar cost of breeding intermediate to large numbers of sows could be greatly reduced. A smaller number of expensive boars will be required. The greatest disadvantage to this technique is that if AI is to be successful, good management will be required.

Although semen can be purchased commercially in certain areas, the collection of the boar, the processing of the semen and the insemination of the sow could be accomplished by most swine producers; thereby, making AI a do-it-yourself technique, which can be used on each individual farm.

The simplest and most practical method of collecting a boar is called the gloved hand technique.

In order to collect the boar he must mount either a sow in heat or a so-called dummy sow. It is much more convenient to train a boar to mount the dummy sow than to try and keep a sow in heat at all times. The time required to train the boar to mount depends upon the boar. Most breeding boars take to the mount quickly, many mounting it the first time they are exposed to it. Other boars require some coaxing, and occasionally

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1/ The authors wish to acknowledge Mr. Larry Lee, Progressive Farmer, Birmingham, Alabama, for photographs used, assistance, and suggestions.
a boar will refuse to serve the dummy sow. If the boars do not seem interested in the mount, soak a sponge with urine from a sow in heat and fasten it to one end of the mount. This usually stimulates their interest.

Prior to insemination or storage of boar semen, the semen should be evaluated. If one is collecting a mature boar that has been settling sows regularly and producing good litters, his semen is usually satisfactory. However, the ejaculate should be checked for concentration so one can extend it properly. For young boars and boars which have been inactive for a period of time, semen definitely should be checked. Semen should be checked for motility (movement) and concentration (number of cells per cc). After several collections one should have an idea of the particular boar’s semen. High quality semen should resemble milk in color. For assistance in semen evaluation consult the local veterinarian or county extension workers.

If the semen is to be stored, it should be diluted or extended immediately following collection. Also if one wishes to breed more than 2 or 3 sows per collection the semen should be extended. When the semen is mixed with the extender, the extender should be at the exact temperature as the semen. For storage, initially extend the semen (one part semen to one part extender), cool slowly in a water bath, and store at 55-60°C. Prior to use, (either stored or otherwise) if necessary the semen may be extended further according to the concentration of cells. If semen is to be used immediately, extend according to the number of sows to be bred.

An extender which has previously given good results at Purdue University is as follows: 1.3 gram glucose, 1.4 gram Na citrate, .029 gram KC1, .15 gram NaHCO3, .3 gram streptomycin, and .3 gram penicillin.

Add distilled water up to 100 cc. If you plan to store semen, also add 10 per cent fresh egg yolk by volume.

The extender can be made up in large quantities and frozen for further use.
Artificially inseminating a sow.

Sows should be inseminated with 50 cc (better 100 cc) of semen or extended semen containing 4-5 billion motile sperm. The semen should be 80°F - 90°F before insemination. Cow insemination rods may be modified by slowly heating the rod and bending the end 25 - 30° upward approximately 3/4 inch for the tip. This will aid in penetration of the cervix. First place the rod in the vagina, crook pointed up, and slowly insert it for 6-8 inches. Do not force it. Twist or turn it gently. It should travel about 6 inches before stopping again. Attach syringe with semen to inseminating rod and inject slowly.

Heat detection and estrus control

Determining if the sow is in estrus and when is the proper time during estrus to breed has long been a handicap in swine production. A sow in heat will usually stand when pressure is applied to her back. Most sows will prick up their ears when pressure is applied to her back if she is in heat. Do not restrain the sow to breed. Conception rates have been improved 35 percent by careful heat detection. Surveys of commercial studies have shown that when 4,500 sows and gilts were bred, 3,500 conceived with a 9.4 litter average for sows and 8.45 for gilts.

Some of the problems of heat detection could be overcome with estrus control. A relatively new compound called ICI 33828 (MATCH, AIMIX) has been used satisfactorily by a number of swine producers and research stations. The following table is a brief summary of a Purdue University demonstrational experiment using this compound. First it should be pointed out that the number of animals on trial were insufficient to draw definite conclusions. The data should only be considered to indicate trends.
Table 1. Comparative reproductive performance of control (no. treatment) and estrus synchronized gilts.

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of gilts</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Percent cycling before treatment</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>Percent of total exhibiting estrus after compound withdrawal</td>
<td>---</td>
<td>100</td>
</tr>
<tr>
<td>Average estrus inhibition (days after treatment)</td>
<td>---</td>
<td>4.3</td>
</tr>
<tr>
<td>Percent of total in estrus within 5 days withdrawal</td>
<td>---</td>
<td>100</td>
</tr>
<tr>
<td>Percent conceived first post-treatment estrus</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>Percent conceived second post-treatment estrus</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Percent pregnant at slaughter</td>
<td>88.8</td>
<td>88.8</td>
</tr>
<tr>
<td>Total litter size</td>
<td>11.6</td>
<td>9.9</td>
</tr>
<tr>
<td>Total live pigs</td>
<td>11.1</td>
<td>9.9</td>
</tr>
</tbody>
</table>