Biosecurity and Health Assurance at a Boar Stud

Introduction

Preventing the introduction of disease agents is a continuous challenge for pork producers and veterinarians. When a farm or site is affected by disease, the impact can be devastating to the health of the swine and the producer’s bottom line. If a foreign animal disease were to overcome the biosecurity safeguards in place on our farms and our country, it would have a devastating effect on all pork producers. One route of disease entry to a farm is through introduction of genetic material. Artificial insemination can lessen this risk; however, biosecurity still is very important because bacteria and viruses can spread from infected boars to females through semen. Consequently, it is recommended that producers and veterinarians develop farm-specific biosecurity protocols for purchased or delivered semen.

Detection of bacteria and viruses in semen does not necessarily correlate with transmission of those agents through semen. In fact, most bacterial and at least some viruses present in semen can be the result of contamination during collection and processing and not actual shedding by the boars.

Biosecurity Considerations for the Stud Facility

The following questions can be used as a framework to assist pork producers and their veterinarians in assessing the biosecurity risk associated with a potential new semen supplier for their herd or to evaluate the biosecurity of their current semen supplier. More detailed, farm-specific questions may evolve from these questions through active participation by your veterinarian. As you work through this exercise, keep the following questions in mind:

1. Has the semen supplier been able to answer your questions?
2. Are you satisfied with the answers you received?

### Bacteria Found in Boar Semen*

<table>
<thead>
<tr>
<th>Common</th>
<th>Infrequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus spp.</td>
<td>Corynebacterium spp.</td>
</tr>
<tr>
<td>Pseudomonas spp.</td>
<td>Streptococcus spp.</td>
</tr>
<tr>
<td>Escherichia spp.</td>
<td>Proteus spp.</td>
</tr>
<tr>
<td>Klebsiella spp.</td>
<td>Bacillus spp.</td>
</tr>
<tr>
<td>Citrobacter spp.</td>
<td>Enterobacter spp.</td>
</tr>
<tr>
<td>Micrococcus spp.</td>
<td>Aerobacter spp.</td>
</tr>
<tr>
<td>Eubacterium spp.</td>
<td>Bordetella spp.</td>
</tr>
<tr>
<td></td>
<td>Mycoplasma spp.</td>
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</tbody>
</table>

### Viruses Found in Boar Semen*

<table>
<thead>
<tr>
<th>Common</th>
<th>Infrequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenovirus</td>
<td>Pseudorabies virus**</td>
</tr>
<tr>
<td>African swine fever**</td>
<td>Porcine parvovirus**</td>
</tr>
<tr>
<td>Classical swine fever virus**</td>
<td>Porcine reproductive respiratory syndrome virus**</td>
</tr>
<tr>
<td>Cytomegalovirus</td>
<td>Reovirus</td>
</tr>
<tr>
<td>Enteroviruses</td>
<td>Swine vesicular disease virus</td>
</tr>
<tr>
<td>Foot-and-mouth disease virus</td>
<td>Transmissible genital papilloma virus</td>
</tr>
<tr>
<td>Japanese encephalitis virus</td>
<td></td>
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</tbody>
</table>

**Known to be transmissible through semen; *Source: The Swine AI Book: Second Edition, Chapter 3; Publisher: Dr. Morgan Morrow, NCSU**
Figure 1 is designed to assist readers in understanding some of the terminology used in the suggested questions that follow.

**General Inquiries for Boar Stud**

1. What is the number of source herd(s) from which the current boar population at the stud originated?
2. What is the number of source herd(s) that have contributed to the population at the boar stud since its original stocking?
3. Does the boar stud utilize an isolation facility for replacement boars?
4. How far is the boar stud away from other swine? From a major highway?
5. Are biosecurity procedures for the boar stud in written format and available for review?
6. Do you have a written visitor policy that is available for review?
7. Is the boar stud a shower-in, shower-out facility?
8. Is downtime from pig contact required before people can enter the facility? If yes, what is the length of the downtime required?
9. Are employees allowed to raise pigs on their home farm?
10. Please provide documentation to indicate the status of the boar stud for the following diseases: porcine reproductive and respiratory syndrome (PRRSV), pseudorabies (PRV), brucellosis, and leptospirosis.
11. Have there been any clinical signs of disease within the boar stud in the last 12 months? If yes, please provide diagnostic information and the actions taken.
12. Is semen ever collected from boars that have been allowed to serve naturally?
13. Has the boar stud ever been depopulated? If yes, for what reason?
14. Does semen shipped from the processing center originate from a single stud or multiple studs?
15. Where is feed for the boar stud produced? Are biosecurity protocols in place at the mill?
16. Are animal by-products allowed as a feed ingredient?
17. Is the feed delivered to the stud in meal form or is it pelleted?

**Pre-Entry or Source Herd Inquiries**

1. Are there any specific health procedures and requirements of the source farm(s) prior to shipment of individual animals to the boar stud?
2. Does the source herd(s) have a written herd health assurance program(s) that is available for review?
3. Does the source herd(s) have a designated herd veterinarian? Does the herd veterinarian make regular visits to observe the animals?
4. How frequent are the visits? Please provide the contact information in the event my veterinarian wishes to initiate a vet-to-vet health communication.
5. Describe the current health status of each source herd(s).
6. Are biosecurity procedures to prevent disease introduction, including isolation protocols, available from the source herd(s) in a written format?
7. Please identify any vaccines used in the past 24 months. What is the current vaccination protocol at the source herd(s)?
8. Is any diagnostic testing performed on a routine basis? If yes, what tests are performed?
9. Does a veterinarian interpret all diagnostic test results?
10. How frequently does communication occur between the source herd veterinarian and the boar stud veterinarian?
11. What transportation biosecurity protocols are used when delivering boars to the boar stud?

**Isolation Procedures**

Isolation allows time to observe new boars for signs of disease before entry to the stud. Isolation provides the opportunity to test animals for exposure to certain diseases and to acclimate or vaccinate animals.
Continuous pig flow through an isolation facility cannot be considered proper isolation. Failure to isolate new boars offers the greatest risk of disease introduction into the boar stud, and subsequently into your herd.

1. Does the boar stud utilize isolation procedures?
2. Is pig flow through isolation managed in an all-in, all-out manner?
3. Is the isolation building cleaned and disinfected between groups of boars?
4. Are boars in the isolation unit exposed to the outdoors or totally enclosed?
5. Is the isolation facility on-site or off-site?
6. How far is the isolation facility from other swine, including the main stud?
7. What is the length of the isolation period?
8. Does the isolation facility serve more than one boar stud or swine farm?
9. What vaccination and parasite control protocols are used during isolation?
10. Are the boars in isolation routinely monitored for signs of clinical disease? If yes, how often and by whom?
11. Are boars in isolation routinely monitored for seroconversion to specific pathogens? If yes, which pathogens?
12. Please describe the timing and frequency of diagnostic testing in isolation as it relates to boar entry dates and vaccinations.

Serological testing at the time of entry may provide a source herd baseline for interpreting results and can indicate exposure to diseases in the past. Testing two to three weeks after entry into isolation gives the boar’s immune system time to produce the antibodies that are detected by the test. Contamination during transportation may not become serologically evident until two to three weeks into isolation. It requires ten days to three weeks after exposure before a boar will test serologically positive to most diseases.

1. If routine serological testing is performed in isolation, is this testing performed on the entire population or on a subset of the entire population?
2. If a subset (percentage) of the boars is tested, how is the number of boars to be tested determined?
3. Does a veterinarian review and interpret all test results?
4. Are any boars ever moved to the main stud before diagnostic results are received and interpreted? What is the policy if a boar in isolation tests positive for a pathogen on a diagnostic test?
   - Is the sample rerun utilizing the same test?
   - Are other tests for the same pathogen run?
   - Is the boar retested?
   - Are any other boars in isolation retested? If yes, how many, how long after the positive result?
   - If the positive boar continues to test positive, then what is the protocol?
     - Is the boar removed from isolation?
     - Does a veterinarian perform a post-mortem on the boar?
     - Is a complete work-up performed with samples submitted to an accredited diagnostic lab?
     - What health assurance measures are taken on the remaining boars?
5. What is the protocol if a boar dies in isolation?
   - Does a veterinarian perform a post-mortem on the boar?
   - Is a complete diagnostic work-up performed with samples submitted to an accredited diagnostic lab?
6. What transportation biosecurity protocols are used when delivering boars from isolation to the boar stud?

**Health Assurance of the Main Stud**

Disease monitoring is often a routine part of health maintenance at a boar stud. Testing of boars and semen can be useful in the detection of disease. In addition to concern about new diseases entering the stud, attention must be paid to the overall well-being of individual boars and their freedom from common diseases and injuries. These questions will define the normal standard of care for boars once they have entered the main stud.

1. How often are boars entered into the stud?
2. Does a formal and written health assurance plan exist for the main stud?
3. Are boars routinely monitored for specific pathogens through serological testing or other diagnostic procedures? If yes, describe which pathogens and the method, timing, and frequency of the diagnostic testing.

4. If serological testing is used, is it performed on the entire population or on a subset of the entire population?

5. If a subset (percentage) of boars is tested, how is the number of boars to be tested determined?

6. What percentage of the boar stud population is tested...
   - on a monthly basis?
   - on an annual basis?
   - other?

7. Are diagnostic tests performed on semen? If yes, which tests and how often?

8. Has the boar stud ever been determined to be positive for Porcine Reproductive and Respiratory (PRRS) virus? If yes, please describe the status today.

9. Does a veterinarian review and interpret all test results?

10. Please identify any vaccines used in the past 24 months. What is the current vaccination protocol for the boar stud?

11. Is a new needle used for each boar that is vaccinated or treated?

12. What is the protocol if a boar in the main stud tests positive for a pathogen on a diagnostic test?
   • Is the sample rerun utilizing the same test? Are other tests for the same pathogen run?
   • Is the boar retested?
   • Are any other boars in the main stud retested? If yes, how many, how long after the positive result?
   • If the positive boar continues to test positive, then what is the protocol?
     - Is the boar removed from the main stud?
     - Does a veterinarian perform a post-mortem on the boar?
     - Is a complete work-up performed with samples submitted to an accredited diagnostic lab?
     - What health assurance measures are taken on the remaining boars?

13. What is the protocol if a semen sample tests positive for a pathogen on a diagnostic test?

14. What is the protocol if a boar dies in the main stud?
   • Does a veterinarian performs a post-mortem on the boar?
   • Is a complete diagnostic work-up performed with samples submitted to an accredited diagnostic lab?

**Herd Closure**

Herd closure occurs when a confirmed or suspected disease situation occurs at a boar stud that requires the termination of all semen deliveries from the stud. Customers should be aware of the criteria that would initiate a herd closure event, understand how and when they would be contacted by the semen supplier, and have plans for alternative sources of semen before they enter into any arrangement with a single boar stud.

1. What constitutes closure of the boar stud for semen shipments? Is this protocol formal and written? If so, please provide a copy of this protocol.

2. Who decides the stud should close for shipments...
   - herd veterinarian?
   - manager?
   - genetic supplier?
   - other?

3. Is there a written communication plan to quickly notify customers in the event of a closure? Please explain the procedure.

4. Is there a back-up plan to supply semen from an alternative source in the event that the boar stud is closed for health or any other reason? Is this plan formal and written? If so, please provide a copy of that plan.

5. If the back-up plan involves another stud or semen supplier, is that alternative source compatible in the areas of health status and quality assurance?

**Semen Processing Center or Lab**

The semen laboratory processes are critical to successful implementation of an artificial insemination program. Semen quality from even the healthiest boars can be compromised if proper technique is not
followed in the laboratory.

1. Please describe the minimum standards for a dose of semen in regards to concentration (number of sperm per dose), motility, and morphology.
2. Is there a designated clean area and clean sterile equipment for semen, collection, processing, and storage?
3. Is there a written protocol available to determine if a boar is eligible or ineligible for collection?
4. Does the stud have written procedures available for semen collection, processing and storage?
5. Does the semen processing area have written sanitation protocols available?
6. Is there a written protocol for monitoring the quality and bacterial contamination levels of semen samples? If yes, please provide.
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