The Basics of Grow-Finish Biosecurity

PorkBridge

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Goals

- Discuss the foundations for biosecurity
- Provide some science behind recommendations
- Provide some resources

Biosecurity

- Definition: The steps or process for disease prevention.
  - External - Introduction
  - Internal - Spread
- Not all risk can be eliminated!
- Work to minimize the opportunities

Biosecurity - Foundation

- Disease triad

Biosecurity - Foundation

- There are three basic things to consider:
  1) Need to have a disease agent
     - Live
     - Numbers
  2) Need to have a susceptible host
  3) The host must become exposed to the agent in sufficient numbers so as to cause disease
     - Routes of transmission
Routes of transmission
- Aerosol
- Fomite
- Oral
- Vector
- Direct contact

PRRS transmission

<table>
<thead>
<tr>
<th>Route</th>
<th>ID_{50}</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQ (parenteral)</td>
<td>~10</td>
</tr>
<tr>
<td>Intranasal</td>
<td>~8,000</td>
</tr>
<tr>
<td>Artificial Insemination</td>
<td>~31,600</td>
</tr>
<tr>
<td>Oral</td>
<td>~158,500</td>
</tr>
<tr>
<td>Aerosol</td>
<td>??</td>
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</tbody>
</table>

Zimmerman 2005

Aerosol Transmission

- Large numbers of pathogens being shed by a large population of animals
- Ideal temperature for pathogen (low)
- Ideal humidity (high)
- Low wind speeds
- Smooth topography
- Low sunlight

Glaster et al. 1981, Christensen et al 1990, Grant et al. 1994; Stark 1999

Aerosol Requirements

- Agent specific
  - Yes
    - Pseudorabies, Mycoplasma
  - No
    - APP
  - Questionable
    - PRRS – strain specific

Aerosol transmission
- Area spread
  - Aerosol = via the air
  - Area spread = not specific to air, but more related to location
Aerosol - Biosecurity practices

- **Location**
  - Low pig density area
  - Preferably at least 2 miles from other swine or manure spreading areas

- **Ventilation**
  - Proper maintenance
  - Use dust reduction protocols (1% fat in feed)
  - Maintain relative humidity <60%

- **Air filtration system?**

Aerosol

- **Air filters**

Fomites & Oral

People

- **How many people/vehicles enter your farm operation every month?**
  - A study in 2001 reported that larger (>2,000 head) swine herds had contact with people and vehicles who had contact with other livestock facilities an average of 807 times each month.

  \[
  \text{Risk} = \text{Frequency} \times \text{Consequence}
  \]

- **E. coli** Amass et al 2003
- **FMDV** Amass et al 2003
- **TGEV** Alvarez et al. 2002

- **Showering and putting on clean outerwear prevented transmission in ALL cases!**
People
- Risk is the same for sow units as well as nursery and finishing sites.
- Large systems implement showering at all phases.

Boot Changing Stations

Boots & Coveralls

Boots & Coveralls

Hand Washing
- Hand washing decreases contamination
- Availability
  - Location
  - Fully stocked
- Gloves are not a substitute for hand washing
- Signage

Downtime
- 48hrs better than 36 than 24 ..... ?????
- But ...... no science behind it
- Very costly “tradition”
- Hard to move away from it
- Under experimental conditions, decontamination methods were sufficient to prevent transmission without the need for down time
- Down time might be needed for zoonotic pathogens (Influenza, Salmonella)
Vehicles
- Clean vehicles only
- Designated parking
- Proper signage
- TQA program

http://www.biosecuritycenter.org/truckwash.php

Hog Movements
- Offsite
  - Load-out/transfer facility
  - Rendering
- Chutes
  - Separate/Separated
  - Dirty vs. Clean
  - Mark with a line
- Do not let pigs/driver run on and off truck
- Know your driver!

Truck wash/heat treatment

Do we know how to clean?
1. Removal of visible organic material
   - Power washing
     - Pressure vs. volume
     - Hot vs. cold
2. Disinfection
3. Drying

Disinfect
1. Read the product label
   - Wear protective gear if needed
2. Disinfect
   - Use label dilutions
   - Allow label contact times (10 minutes)
3. Final rinse
   - Low pressure to remove residue
4. Dry before allowing animals to return

Which one?
Cleaning and disinfecting

- **Clean right before** next group
  - If it’s dirty, it will stay dirty no matter how long you wait
  - Hard on equipment
  - Harder to clean
  - Environment for insects and/or rodents

- **Clean right after** this group
  - If it’s clean, it will eventually get dirty if you wait long enough
  - Easier to “re-clean” if necessary
  - Long drying time
  - Have more time to do the job right!
Hot vs. Cold water

- **Cold**
  - Cheaper
  - Easy to see (no fog)
  - Less sweating
  - **Laundry study** showed 160 °F was just as effective as 72 °F in reducing bacterial counts (Blazer et al, 1984)

- **Hot**
  - Reduction of labor time!

Monitoring

- Regular veterinary herd health visits
  - May include biosecurity audits
  - Cleaning and disinfection checks
- Cultures for specific bacterial organisms
- Testing for specific agents
  - Routine testing
  - Sentinel animals

Vectors

- [Image]

Pest control

- **Sanitation**
  - Garbage
  - Feed spills
  - Manure spills
- Insecticides
- Rodent control
- Pets
  - Cats & dogs

Rodent Control

- [Image]
  - [http://rodent.swine.unl.edu/](http://rodent.swine.unl.edu/)
- Gravel perimeter
  - 2 - 3 feet wide
  - 6 inches deep
  - ½ - 1 inch rock
- Bait stations
  - Location
  - Maintenance
    - Professionals?
    - Records

Direct contact

- [Image]
Pigs are #1

- Know source
- Minimize sources
  - Average vs. Lowest
- Testing
- Herd health program

Summary

Best Biosecurity

- Look at pigs daily preferably 2x/day
- Maximize
  - Management
  - Nutrition
  - Environment
  - Health program (vaccination)
- Routes of transmission

BIOSECURITY

Don't Forget!

Frequency

\[ \text{Risk} = \text{Frequency} \times \text{Consequence} \]

Resources

- [www.cfsph.iastate.edu/BRM/disinfectants.htm](http://www.cfsph.iastate.edu/BRM/disinfectants.htm)
- [www.biosecuritycenter.org](http://www.biosecuritycenter.org)
- [www.porkboard.org/securityBiosecurity.asp](http://www.porkboard.org/securityBiosecurity.asp)
- [www.omafra.gov.on.ca/english/livestock/swine/health.html](http://www.omafra.gov.on.ca/english/livestock/swine/health.html)
- [http://rodent.swine.unl.edu/](http://rodent.swine.unl.edu/)
National Pork Board

Questions?

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