THE MASCHHOFFS

ACHIEVING DAY 0 IN LARGE SWINE OPERATIONS

AEROSOL MYCOPLASMA EXPOSURE

2017 LEMAN CONFERENCE
DR. ELISE TOOHILL

Progressive Farming. Family Style.

The Problem

- 35 Week Herd Closures on 55,000+ Sows
  - ALL incoming gilts MUST be positive at start of closure
  - ~15,000 gilts to make positive

- Current Myco Exposure Techniques
  - CIDR Model
    - Not an option in our scenario due to gilt source and timelines
  - Intratracheal Innoculation
    - Labor intense
      - 12-15 people can expose ~1,000 gilts in one day
      - Requires some technical skill
    - Safety Concerns
    - Biosecurity Risk

Potential Solution?

Aerosolize Lung Homogenate in Confined Air Space

HARVESTING LUNG HOMOGENATE

- Identify clinical animals 3 days prior to harvest
  - Administer antibiotic (ceftiofur) IM per label starting 3 days prior to harvest
- Euthanize Donors 1 At a Time
  - As sterile as possible
  - Do not use pig if any gross pathology other than consolidation
  - Collect sections of consolidated lung tissue
- Submit small fresh lung tissue
  - Individual MhP and PRRS PCR
  - Other tests?

Processing/Storing Lung Homogenate

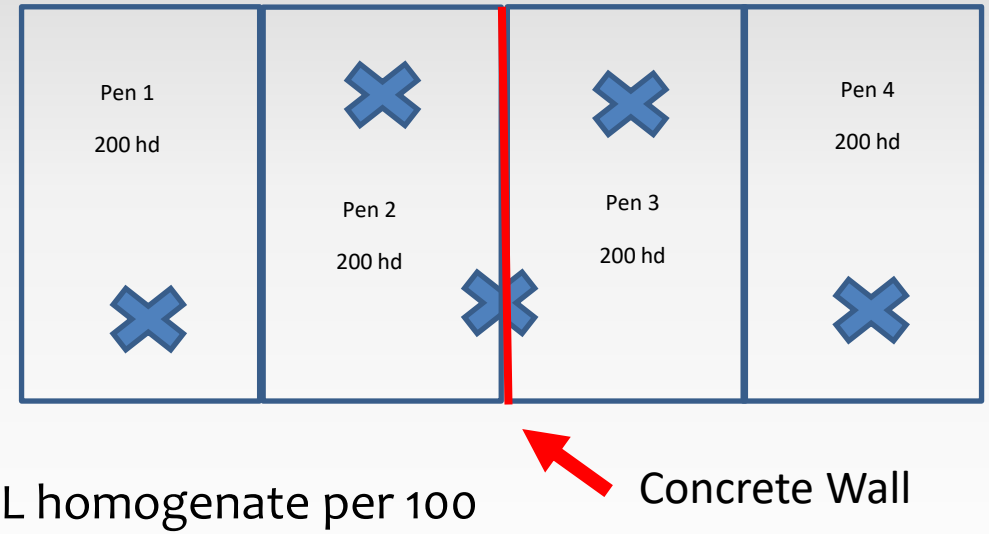
- Storage
  - Homogenate stored in -30 C freezer and on dry ice from time of collection until inoculation – targeted -80 C
  - Sections of lung stored froze for 2+ days prior to further processing
- Processing
  - Thaw lungs in cold running water
  - Homogenize the lung in blender with Friis Broth
    - Target 60% tissue to 40% broth
    - Strain homogenate (pantyhose work best)
  - Store in 50 mL conical tubes
    - ~15 tubes (35 mL each) per 100 lb donor

Aerosol Exposure Procedures

- Hot nursery converted to Wean to Market Barn
- Shallow Pit
- Short 7 ft Ceilings
  - 5 ft high concrete wall dividing rooms
  - 2 rooms make one air space
- Curtain/fans on opposite sides of each air space
- All pigs exposed at 5-7 WPW

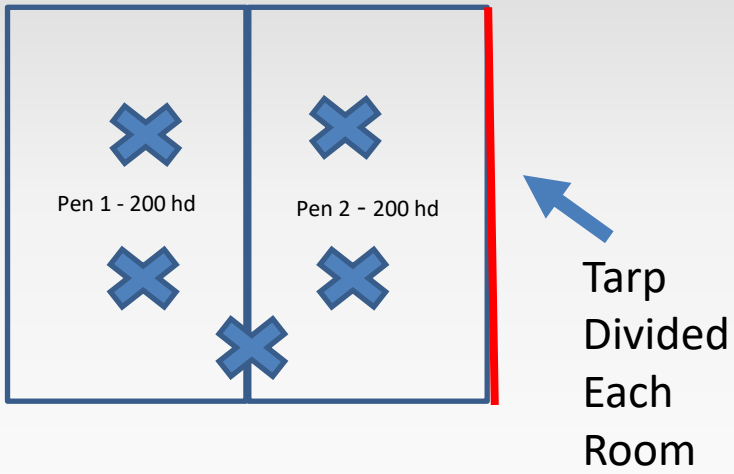
Aerosol Exposure Procedures

- Group 1
  - 1600 total gilts
    - Split into 2 replicates
  - 800 gilts per air space
    - 200 head per pen
  - 5 foggers
    - 100 mL Friis media + 35 mL homogenate per 100 gilts + lung tissue from 3 more donor gilts for each replicate
    - Foggers ran for 30 minutes
  - Curtains Up, All Fans Off
    - Entire fog period +15-30 minutes
    - Room temp monitored
      - Start at 70-75 degrees, peaked at 85 degrees



Aerosol Exposure Procedures

- Group 2
  - 1600 total gilts
    - Split into 4 replicates
  - 400 gilts per air space
    - 200 head per pen
  - 5 foggers
    - 100 mL Friis media + 35 mL homogenate per 100 gilts
    - Foggers ran for 30 minutes
  - Curtains Up, All Fans Off
    - Entire fog period +15-30 minutes
    - Room temp monitored
      - Start at 70-75 degrees, peaked at 85 degrees



Results

- Clinical Signs
  - Zero mortality due to ventilation challenge
  - Moderate cough detectable 4-5 weeks post exposure
  - Morbidity and mortality decreased significantly compared to intratracheal exposure
- Air Samples
  - All 4/4 PCR Positive During Each Exposure – 27-28 CT
  - 5 Weeks Post Exposure – 2/2 rooms PCR positive at 32.86 and 32.04 CT

RESULTS

- MhP PCRs
  - Collected by deep tracheal catheter
  - Percent positive by weeks post exposure

	0	2	4	6
Group 1	0% 0/40	95% 38/40	98% 39/40	98% 39/40
Group 2	0% 0/40	85% 34/40	100% 40/40	

Summary

- Aerosol Exposure of Mycoplasma Can Be Successful
  - Low labor requirement and minimal safety concern
  - Based on our results we consider "Day 0" at 4-8 weeks post exposure depending on testing within the group
  - Appears to be more natural exposure with fewer secondary bacterial complications and severity of infection post exposure

Now We Have a Lot More To Learn

- Can you decrease the dose?
- How important is heat stress?
- Does the air space have to be small?
- Do you have to freeze the sections of lung from donor prior to making homogenate?
- Do you have to use Friis broth?
- Can you decrease the number of foggers?
- Does the variant/strain impact ability to spread via aerosol?

Special Thanks!

- Paul Yeske
- Maria Pieters
- Boehringer-Ingelheim

QUESTIONS ? THOUGHTS?