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SDEC Partners Research Update

Project Update: Optimal seeder-to-naïve ratio for successful exposure of gilts to *Mycoplasma hyopneumoniae*

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Background

- *Mycoplasma hyopneumoniae* (*M. hyopneumoniae*) has a significant role in Enzootic Pneumonia and the Porcine Respiratory Disease Complex, causing impactful economic losses in the swine industry.
- Mainly transmitted by direct contact, *M. hyopneumoniae* infection can last up to 7 months after experimental inoculation and dam shedding status is considered the main risk factor for high prevalence of *M. hyopneumoniae* colonization at weaning.
- Acclimation of gilts from negative sources to *M. hyopneumoniae* positive breeding farms can decrease the detrimental effects of infection during nursery and finishing periods by decreasing prevalence at weaning and vertical transmission to piglets.

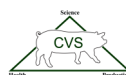
Objective

To identify the most successful seeder-to-naïve ratio to safely expose young gilts to *M. hyopneumoniae* in a 4-week period

Methods

Sixty 2-week old gilts were divided in two groups, 21 seeders were intra-tracheally inoculated with *M. hyopneumoniae* (strain 232) four weeks prior and 39 naïve gilts were exposed to seeders in groups of 10, and 6 different ratios, from 1:9 (seeders:naïve) up to 6:4 in a 4-week period.

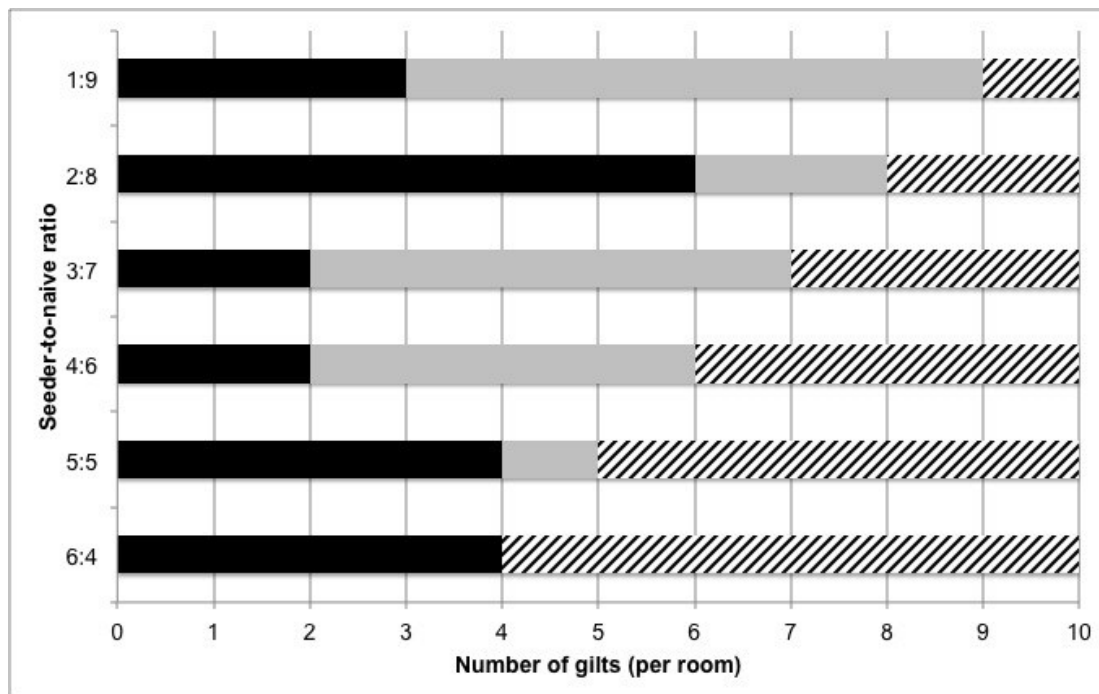
- Laryngeal swabs, oral fluids and blood samples were collected prior to inoculation/exposure and every 14 days thereafter.
- At euthanasia, bronchial swabs and lung tissue samples were collected, and lung lesion scoring was performed.
- Swabs were tested by species specific *M. hyopneumoniae* qPCR, blood samples by IDEXX ELISA to detect circulating antibodies, and lung tissue samples by histopathology and IHC.
- Diagnostic criteria to consider a naïve gilt positive for *M. hyopneumoniae* infection was based on results of qPCR on bronchial swabs and IHC.
- The *M. hyopneumoniae* transmission rate was estimated using the S-I model.



Results

In this study, exposure to *M. hyopneumoniae* in all gilts in a room was achieved in the ratio of 6 seeders and 4 naïve gilts (Figure 1). The estimated transmission rate was 1.28 per pig/week, which implies that after one *M. hyopneumoniae* positive shedding gilt is introduced in a naïve population, within a week, overall 1.28 gilts will get colonized in experimental conditions.

Figure 1. Number of *M. hyopneumoniae* positive and negative naïve gilts per seeder-to-naïve ratio (six ratios). Solid black boxes represent positive naïve gilts, solid grey boxes represent negative naïve gilts and striped boxes represent seeder gilts



Conclusions

- Under the conditions of this study, six seeder gilts in a group of ten resulted in a successful ratio for exposure of all gilts in the group to *M. hyopneumoniae*.
- Transmission assessment of *M. hyopneumoniae* is expected to be variable.
- When adequately performed, gilt acclimation can be a complementary strategy to vaccination for control of *M. hyopneumoniae* infection in breeding herds.
- This study is a first step in the development of a standard protocol for acclimation of gilts to *M. hyopneumoniae* prior entering the breeding herd.