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Creating a SIV negative sow herd

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Introduction

In the stocking of a new farm complex it was necessary to use two different health sources. One of the sources (Farm 1) had sero-converted to SIV (H1N1) in 2005 but had never expressed clinical signs. This facility was AIAO by room but had a growing population on the sow site. There was serologic evidence that SIV was circulating in the growing population but the virus had never been isolated. The second source (Farm 2) was serologically negative and no influenza had been identified in any diagnostic submissions. Desiring to have the new complex (Farm 3) established with the highest health status possible an attempt was made to stock it SIV negative. As a secondary goal if the initial stocking could not be stocked SIV negative to at least produce piglet flow from the sow site (Site 1) that would be negative. Both of the stocking sources were closed systems.

Diagnostic background

To confirm influenza was circulating in Farm 1, a cross-sectional serologic sampling was conducted across the growing pig population. Fifteen samples were taken from seven age groups, five to twenty-three weeks, to identify where sero-conversion was taking place (Table 1). Early in 2008, an attempt was made to isolate the virus. Lungs from no-value pigs at weaning were sampled for eight consecutive weeks. The first week a PCR (+) sample was found but virus isolation was negative. Sampling continued for another 7 weeks. During the eighth week a sample from Week 6 was positive on virus isolation and it was sequenced. This sample was 98.5% similar to the original virus found over two years earlier. Dr. Marie Gramer considered this to be normal antigenic drift for a virus that had no vaccine pressure.[1] Comparison of this sequence to commercial vaccines was not similar enough to provide adequate protection to attempt an elimination program. The decision was made to develop an autogenous H1N1 vaccine.[2]

Vaccination protocol Farm 1 only

- Gestating females, two doses pre-farrow.
  - First dose 4 weeks pre-farrow
  - Second dose 2 weeks pre-farrow
- Replacement gilts pre-breeding
  - First dose 4 weeks pre-breeding
  - Second dose 2 weeks pre-breeding
  - These vaccinations were flexible in the timing of them as long as there was at least 2 weeks between doses and the gilts had their second dose 2 weeks pre-breeding
- Once a female had the first two doses, gilts or sows, one booster vaccination was to be given 2 to 3 weeks pre-farrow.

Table 1

	Homologous SIV titers (HI)							
Weeks of age:	**Negative**	**10**	**20**	**40**	**80**	**160**	**320**	**640**
5	7	7	1					
8	9	3	2	1				
11	9	4	2					
14	2	8	3	2				
17			7	2	4	1	1	
20		1	6	1	1	3	2	1
23	1	4	5	2	3			

- Example: P2 sow receives 2 doses of vaccine per-farrow; on her third parity she would receive one booster vaccination.
- Gilt example: receives 2 doses of vaccine pre-breeding; she would receive one booster vaccination two to three weeks pre-farrow.

Stocking procedure

Minimum wean age of piglets to be shipped for the stocking was 15 days with a maximum age of 21 days. Weekly shipments were made to the isolation unit for 34 weeks. Primarily gilts were shipped each week from both sources, Tuesday from Farm 1 and Thursday from Farm 2. The isolation facility was a four room motel style facility. Each room was a separate air space with the pit walled off below the slats. Personnel changed coveralls and boots between rooms and wore disposable gloves or used an alcohol hand sanitizer. Piglets were isolated for 25 days after arrival of the piglets from Farm 2. The same air- filtered trailer moved each group of piglets and was dedicated to this stocking for the entire time. Weekly a random statistical sample was collected for the group to be moved to Farm 3's Site II (nursery and finishing). This occurred one week prior to movement. With negative results for PRRS PCR and ELISA piglets moved from isolation to the Site II nursery for another 21 days. At 14 days post entry to Site II nursery these animals were bled and tested for PRRS PCR and ELISA, mycoplasma, TGE/PRCV plus piglets from Farm 2 were also tested with the homologous SIV strain from Farm 1. Test results for SIV are listed in Table 2.

Clinical observations and diagnostics

In February a slight cough started in 15 week old gilts along with an occasional mortality for unknown reasons. Post mortems identified gross lung lesions suggestive of A. suis. Tissues were submitted for diagnostic work-up and for several submissions the results were negative for viruses and bacteria. Finally on a 2/11/09 submission an A. suis was isolated. Serology for the homologous SIV strain was still negative on 2/3/09 with the results in Table 3.

In March serology samples were run against the homologous SIV strain. These results were suggestive SIV might be circulating; but when we looked at the source of the gilts, they were all from Farm 1 so could have been maternal antibodies.[3] The week of 6/29/09 source Farm 2 gilts were specifically targeted to test for the homologous SIV strain, these gilts were 19 and 24 weeks of age. This testing confirmed the homologous strain was circulating in the population (15/29 with titers ≥ 80).

Discussion

This example shows the difficulty in creating a SIV negative population. Weekly shipments for 34 weeks from a continuous flow site, Farm 1, with replacement gilts entering the sow herd on a regular basis was a long shot. We thought with the use of the autogenous strain of virus and multiple vaccinations, we could suppress the virus circulation.[4] In Farm 1 we recorded improved growth rates and decreased mortalities in both nurseries and on-site finishers. At Farm 3 we still have an opportunity to succeed in the SIV elimination because the population is closed and Site II will be completely depopulated when the gilts are

Table 2

Case #	Date	Premise ID	Strain	Results
D08-061916	26-Nov-08	00GR7WP	SIV H1 (HI)	15; 14 @ Neg; 1 @20;
D08-060516	19-Nov-08	00GR7WP	SIV H1 (HI)	15; 15 @ Neg;
D08-062658	02-Dec-08	00GR7WP	SIV H1 (HI)	15; 15 @ Neg;
D08-064059	10-Dec-08	00GR7WP	SIV H1 (HI)	15; 15 @ Neg;

Table 3

Case no.	Date	Strain	Results
D09-005362	03-Feb-09	SIV H1 (HI)	30; 25 @ Neg; @ 10; 3 @ 20;
D09-012098 Farm 1	12- Mar-09	SIV H1 (HI)	30; 7 @ Neg; 8 @ 10; 7 @ 20; 5 @ 40; 2 @ 80; 1@ 160;
D09-031690 Farm 2	25-Jun-09	SIV H1 (HI)	29; 14 @ 40; 12 @ 80; 3 @ 160

moved into Site I (breeding, gestation and farrowing). Weaned pigs from Site I will flow into new nurseries and finishers on Site I and the empty Site II facility.

References

1. Gramer, M. (2008) Personal communication.

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3. Desrosiers R, Boutin R, Broes A (2004) *Persistence of antibodies after natural infection with swine influenza virus and epidemiology of the infection in a herd previously considered influenza-negative* Journal of Swine Health and Production p. 78.

4. Rossow, K. (2008) *Swine influenza virus infection in systems* Proceedings AASV p 571.