Use of test and removal strategy to contain an ASFV outbreak in a farm

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Introduction

Since being reported in China on August 04, 2018, the African Swine Fever virus (ASFV) has spread across the country. The impacts of this disease are enormous, and it continues to challenge veterinarians and the swine industry because of the heightened transmission risk and lethality. Here we describe the implementation of a test and removal strategy on an ASFV infected farm.

Background

Following upgrades in the biosecurity infrastructure, the case farm was used as a temporary isolation facility for incoming gilts for a large sow production compound located 300 km away. This isolation facility has five barns, each containing 12 pens with a central hallway. Each pen can house 40-45 pigs and had solid separations not allowing nose-to-nose contact between pigs in different pens.

Case Description

Between September 8th and 20th, a total of 11 trucks transported 1,400 gilts to this facility. Ten out of 11 trucks were third party trucks that had been contracted for this process. All trucks were tested for ASFV by PCR before admission. These trucks underwent a thorough cleaning and disinfection process and were baked for 70 minutes at 56℃ at a dedicated truck wash facility.

At day post-arrival (DPA) 13, one gilt was found dead in one pen (pen 4) of barn #1. Nasal swabs, fecal swabs, and inguinal lymph node samples were collected. Two more gilts were seen off-feed. All these gilts were from the same truckload. At 14 DPA, nasal swabs from each pig in pens 3, 4 and 5 of barn #1 were collected. Oral fluids were collected daily from each pen throughout the facility from then on. Swab sampling was conducted frequently focusing on farm workers (e.g. clothes, boots, hair), environment (e.g. floor, feeders, drinkers) and equipment and supplies. Samples were sent to a company owned diagnostic laboratory for ASFV PCR testing. Results were available within 24 to 48 hours. Results indicated that the dead pig found on DPA 13, and the 6 nasal swab samples from three different pens in barn 1 were ASFV PCR positive.

Fig 1. The use of plastic canvas to create separations and remove pigs from barn #1

On DPA 14 the 6 ASFV PCR positive pigs were humanely euthanized (electrocution), placed in impermeable plastic bags and moved out of the farm for incineration. The barn hallway was sealed with impermeable plastics to avoid dissemination of potentially contaminated organic material to other pens. Then the left half of barn #1 (pens 1-6) was depopulated. After partially depopulating this barn, empty pens and hallways were covered with caustic soda, and disinfected with formaldehyde. During this process farm employees were not allowed to enter the positive barn and internal and external biosecurity was strictly reviewed and implemented to prevent further contamination. Oral fluids continued to be collected every 3 days throughout the whole quarantine process, and a total of 1,840 samples were tested for presence of ASFV nucleic acids to monitor the presence of virus. After the partial depopulation of the barn 1, there were no further positives detected in the whole facility. The remainder of the gilts stayed healthy in the isolation facility for 55 days before they were moved into the sow herds. At the time of this publication the pigs and the recipient sow herd have stayed healthy for a period of over 220 days after the introduction.

Discussions and Conclusions

As ASFV normally transmits slowly, and primarily via direct nose-to-nose contact or contact with ASFV contaminated fomites, early detection and rapid and responses are key to containing the virus in a population especially if using a test and removal approach. It is critical to avoid missing positive pigs by using a robust surveillance plan and preventing contamination and spread of the virus from the infected and contaminated areas via fomites. Therefore, thorough cleaning and disinfection, combined with the proper removal of fomites are pivotal to protect other pigs in the facility. The fact that there were separate barns together with pens with solid separations, further transmission of the virus could have been hindered.

In this case study the team performed a thorough investigation for the source of the virus. Key risk factors such as people, supplies and equipment entry, feed, medicines, etc were all assessed. It was determined that in this case, the transport posed the most likely source of introduction, with a single specific truck being the most likely source of virus. The contamination of the truck could have happened either on the road, at the rest stations or perhaps the driver had contact with contaminated fomites that then contaminated the truck.

Based upon this case study transportation improvements were recommended. It was decided that future shipments strictly follow the biosecurity protocol, and that drivers need to be further trained and know what the right practices and behaviors are to avoid contamination.