

SHIC Investigates SVA Outbreak that Threatened a Plant's Operations

Senecavirus A (SVA or Seneca Valley Virus) infection is indistinguishable from foot-and-mouth disease (FMD) and other swine vesicular disease, so every outbreak, including at harvesting plants, must be investigated. This takes significant state, federal, and producer time and resources. But the biggest risk of SVA is potential disruption of marketing chains during investigations at plants and other facilities. It was a close call in 2017. This investigation, funded by the Swine Health Information Center (SHIC) with in-kind contributions from the National Pork Board, reports about an incident where so many pigs needed to be held for investigation in the abattoir it threatened plant operations.

Introduction. On June 8, 2017, 10 loads of finishing pigs were tested by PCR for (SVA) at a packing plant in the Midwest United States. Six of the 10 were positive. Subsequently, a total of 74 lots from 61 suppliers tested positive for SVA between June 8, 2017, and July 10, 2017. This prompted an investigation to describe the outbreak and to identify factors that may have contributed to the spread of the virus during the outbreak. The investigation term was broken down to three time periods, the PreOutbreak Period from April 24 to June 7 (45 days), the Outbreak Period when positive cases were reported from June 8 to July 10 (32 days), and the PostOutbreak Period, after the last positive case was reported, from July 11 to August 8 (35 days).

SVA causes vesicular lesions around the snout, mouth, and hooves of infected pigs, but symptoms are rarely fatal and don't last long. Clinically, SVA is indistinguishable from FMD and other swine vesicular diseases. These investigations take time and resources plus pigs and products can't move until tests confirm the absence of FMD virus.

Methods. Data on lots of pigs sent to the packing plant during the investigation period were obtained from the plant records and satellite images of each supplier address via Google Earth. Weather data was obtained from Mesonet and Weatherunderground. A survey of biosecurity and management practices was also conducted on a small number of suppliers to the plant. Logistic regression was used to evaluate risk factors, QGIS software to map the locations of pigs delivered to the plant, and SatScan to detect and evaluate spatio-temporal (time and space) clusters of SVA cases. Descriptive analysis of weather data during the investigation period was also conducted.

Results. The timing of SVA cases for the outbreak investigated were consistent with a seasonal peak in cases reported by the Iowa State University Veterinary Diagnostic Lab since 2015, where the number of SVA cases peaks in summer months and declines in the winter. The most relevant findings were:

1. Arriving at the plant through buying stations did not affect the odds of a lot being tested positive for SVA. The odds a lot tested positive from suppliers raising pigs outdoors were lower compared to suppliers raising pigs indoors. The odds of testing positive were

lower for lots identified by the plant as being from suppliers with a single site compared to those from suppliers with multiple sites.

2. The weather just before and during the outbreak was favorable for the multiplication and movement of mosquitos as well as flies and other insects. Temperature, humidity, and wind speeds were higher than normal just before the first positive case of SVA. A period of heavy rainfall (5.5 inches) during the first 27 days of the PreOutbreak period was followed by an extended dry period (25 days) before and immediately after the first positive case at the plant.
3. The presence of a cluster of SVA positive sites around the packing plant where the incidence was higher than expected suggests that proximity to the packing plant was associated with the higher than expected incidence.

Conclusion. The findings indicate weather conditions in the PreOutbreak Period were favorable for multiplication of mosquitoes, and potentially flies and other insects, which may have contributed to the spread of SVA between sites. Whether mosquitos can serve as a vector for SVA has not been explored but the results of this investigation suggest it should. Single site suppliers with the presence of outdoor facilities had lower odds to be positive for SVA, suggesting multiple sites suppliers with contact with large production systems (e.g., shared equipment, trucks, etc.) may facilitate the transmission and spread of the disease. In addition, the presence of the packing plant inside the cluster suggests it may serve as a contact between the sites and act as a source of the virus.

Funded by America's pork producers to protect and enhance the health of the US swine herd, the Swine Health Information Center focuses its efforts on prevention, preparedness, and response. As a conduit of information and research, SHIC encourages sharing of its publications and research for the benefit of swine health. Forward, reprint, and quote SHIC material freely. For more information, visit <http://www.swinehealth.org> or contact Dr. Paul Sundberg at psundberg@swinehealth.org.