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Source: Journal of Wildlife Diseases, 45(3) : 874-876

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-45.3.874

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Journal of Wildlife Diseases, 45(3), 2009, pp. 874–876
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First Record of Pseudorabies in Feral Swine in Nebraska

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ABSTRACT: In 2007, two new populations of feral swine were discovered in Nance and Valley counties, Nebraska, USA. Necropsies and serologic testing was done on two individuals from the Nance County herd. Results indicated that a lactating sow had positive antibodies for pseudorabies virus (PRV). Investigations conducted by Nebraska Game and Parks Commission Law Enforcement division confirmed that the infected individual was transported illegally to Nebraska, USA, from Texas, USA. All domestic swine herds located within an 8 km radius of the infected individual tested negative for antibodies to PRV. Our results provide a clear example of how diseases can spread because of anthropogenic activities and highlight the need for disease surveillance and monitoring in the import of invasive species.

Key words: Feral swine, invasive species, Nebraska, pseudorabies, *Sus scrofa*.

Populations of feral swine present a threat to commercial swine herds because they can act as a reservoir for several infectious diseases that can be transmitted to domestic swine. Of these pathogens, *Pseudorabies virus* (PRV) is of great concern. Feral swine were first reported in Nebraska, USA, in Harlan and Seward counties, in 2003 and 2004, respectively (Gipson et al., in press). In 2007, two new populations of feral swine were discovered in Nance and Valley counties, Nebraska, USA.

In January 2007, one adult, lactating, female and eight juvenile, feral swine were captured and killed 1.6 km south of Genoa, Nance County, Nebraska, USA (41.4341N, 97.7346W). The adult, lactating female and one piglet were submitted to the Veterinary Diagnostic Center at the University of Nebraska (Lincoln, Nebraska, USA), for necropsy and diagnostic evaluation. Other than the traumatic lesions induced by gun shot, gross lesions were not observed. We collected samples of lung, spleen, tonsil, and brain for microscopic evaluation. Serum samples were tested for antibodies of PRV using a glucose-6-phosphate isomerase enzyme-linked immunosorbent assay (gpI ELISA) with a HerdCheck® pseudorabies virus gpI antibody test kit (Idexx Laboratories, Inc., Westbrook, Maine, USA). Testing for *West Nile virus* (WNV) antibodies was done using a serum-virus neutralization test performed at the Animal Health Diagnostic Center (Cornell University, Ithaca, New York, USA). The HerdCheck® *Mycoplasma hyopneumoniae* Antibody Test Kit (Idexx Laboratories, Inc., Westbrook, Maine, USA) was used to test for the presence of *Mycoplasma hyopneumoniae*. Testing for antibodies to swine influenza viruses (SIV, H_1N_1 and H_3N_2) and *Leptospira interrogans* serovars Bratislava, Canicula, Grippotyphosa, Hardjo, Icterohaemorrhagiae, and Pomona were done using standard operating procedures (SOP) outlined in the National Veterinary Services Laboratories documents (US Department of Agriculture, Ames, Iowa, USA). Tests for *Brucella suis antibodies* were performed at the State Federal Brucellosis Laboratory (Topeka, Kansas, USA), and tests for *Transmissible gastroenteritis virus* (TGEV) and *Porcine respiratory coronavirus* (PRCV) antibodies were performed at the National Veterinary Services Laboratory (Ames, Iowa, USA). Polymerase chain reaction (PCR) was used to test for *Classical swine fever virus*

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(CSFV) using standard procedures outlined in the National Veterinary Services Laboratories SOP documents (US Department of Agriculture) and *Porcine reproductive and respiratory syndrome virus* (PRRSV; Allende et al., 2000). Immunohistochemistry (IHC) was used to test for *Porcine circovirus* following procedures outlined in the Veterinary Diagnostic Center SOP document (Veterinary Diagnostic Center).

The adult female tested positive for antibodies for PRV, which is the first case of PRV detected in a feral swine in Nebraska, USA. We also detected antibodies to WNV, SIV (H_1N_1), and PRCV. Significant microscopic lesions were not observed. All other tests on the adult female were negative, and no antibodies were detected in the piglet.

Investigations into the origin of the infected individual by Nebraska Game and Parks Commission Law Enforcement division determined that the feral pig was one of approximately 180 captured in Texas and illegally transported to Erikson, Nebraska in May 2006 and then transported to Genoa, Nebraska in October 2006. The pigs were held in confinement near Genoa to be finished and sold for slaughter. A small number of feral pigs ($n<10$) escaped during collection for transport and were first observed living in the wild in November 2006. In response to the PRV positive results, the Nebraska Department of Agriculture surveyed all domestic swine herds located within a 8 km radius of where the infected feral pig was collected and determined that all herds were free of PRV (D. Hughes, pers. comm.).

Until recently, feral swine had not been identified as sentinels for WNV. However, Gibbs et al. (2006) reported antibodies to WNV in 22.5% of 222 feral swine sampled throughout the southeastern United States and Texas. Our positive WNV antibody result from Nance County, Nebraska is the first documentation of WNV antibodies in feral swine outside of the southeastern United States. The individual may have been exposed to WNV in Texas before it was transported to Nebraska. In 2007, Nebraska ranked eighth among all states for the most number of WNV cases in humans, while Texas ranked third (Center for Disease Control, 2008).

In addition to the individual that tested positive for PRV, 38 feral swine have been submitted for serologic testing in Nebraska. In 2005, seven pigs from Seward County were evaluated with one individual testing positive for SIV (H_1N_1) antibodies. In 2007, one pig from Harlan County tested positive for antibodies to PRRSV. In 2008, 29 pigs from Harlan County were evaluated with one individual testing positive for SIV (H_1N_1) antibodies.

Our results are an example of how the illegal translocation of feral swine can aid in the spread of diseases and highlights the need for close surveillance on the import of nonendemic species. The Nebraska Game and Parks Commission is charged with controlling populations of feral swine in Nebraska. They have been aggressive in their attempts to eradicate feral swine and so far, have removed approximately 95 feral swine from populations in Harlan County. While eradication efforts appear to be effective in Nebraska, continued monitoring of populations and associated diseases are necessary for proper control.

ACKNOWLEDGMENTS

Resources for the study were provided by the Nebraska Game and Parks Commission, the University of Nebraska-Lincoln Veterinary Diagnostic Center, and the University of Nebraska-Lincoln School of Natural Resources. We thank D. Hughes of the Nebraska Department of Agriculture for providing details on disease surveillance in domestic swine herds in Nebraska.

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Received for publication 7 August 2008.

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