

Dear Dr. Croney,
Director, Center for Animal Welfare Science (CAWS),
Purdue University

I would like to express my sincere gratitude to the Center of Animal Welfare Science (CAWS) at Purdue University for awarding me with travel grant for my poster presentation at the CAWS symposium, and also for selecting my application for travel grant to present our research findings at the Joint Annual Meeting of American Dairy Science Association and American Society of Animal Science organized at Orlando during July 12-16, 2015.

Title: Identification of the most likely classical swine fever outbreak scenarios in the swine industry of Indiana

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Abstract

The objectives of this study were to develop metrics using empirical data for the identification of the most likely outbreak scenarios of classical swine fever (CSF) in Indiana and to describe the characteristics of the outbreaks.

Methods: Three types of CSF outbreak scenarios were considered: single, multiple, and outbreak due to delay in detection. The data sources included Indiana premise identification data (USAHerds), feral hog population, and US census data. The attributes included in the metrics were distribution of swine premise and operation types, import frequencies (domestic & international), import origins, number of imported pigs, proximity to feral hogs, and immigrant population. Different weights were assigned to each of the attributes based on their importance. The metrics were used to identify the top ten Indiana's counties that were most likely to initiate a CSF outbreak; premises with high risk of outbreak were identified within the top ten counties. The identified swine premises represented a single outbreak scenario. The swine import data of the identified premises were used for identifying the multiple outbreak scenarios while the export data for identifying the outbreak due to delay in detection scenarios. These identified outbreak scenarios were simulated to derive the outbreak-related measures.

Results: In 2012, there were 8,589 swine premises in Indiana. A total of 3,145 import shipments from 27 US states and 3 Canadian provinces were received. Similarly, 3,154 export shipments of live pigs were sent to 41 US states. Nineteen single and 15 multiple outbreak scenarios were identified, while no outbreak due to delay in detection was identified. The number of initial outbreak locations in multiple outbreak scenarios ranged from 4 to 32. Altogether, 6 and 61 swine premises were estimated to be in the infected and movement restriction zones in the single outbreak scenarios, whereas 91 and 572 swine premises were found in the infected and movement restriction zones in the multiple outbreak scenarios, respectively. The median (5th, 95th percentiles) epidemic duration (days) of the CSF outbreaks were 222 (23, 351) and 195 (160, 293) in the single and multiple outbreak scenarios, respectively. The proportion of infected premises was nearly twice in the multiple outbreak scenarios (6% of total swine premises) than the proportion in the single outbreak scenarios (4%). In the single outbreak scenarios, proportion of swine premises depopulated was 16% and was 25% in the multiple outbreaks.

Conclusion: The identified most likely CSF outbreak scenarios can be used to estimate epidemic duration and magnitude of an outbreak, and provide guidance for developing a risk-based surveillance for CSF in Indiana.