Canadian AgriSafety Applied Science Program
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Testing the New Swine Transport Trailer
Part 2 - Disease Challenge Tests

A new prototype livestock trailer (Figure 1) was developed in order to maintain a pathogen-free and welfare-friendly environment for pigs during transport. Following the enhancement and optimization of the trailer, the research team leading the *Improving the biosecurity and welfare of animals during transportation* project planned a series of road and disease-challenge tests. The preliminary tests have just been completed and the results will be presented in a two-part series continuing with the disease-challenge tests.

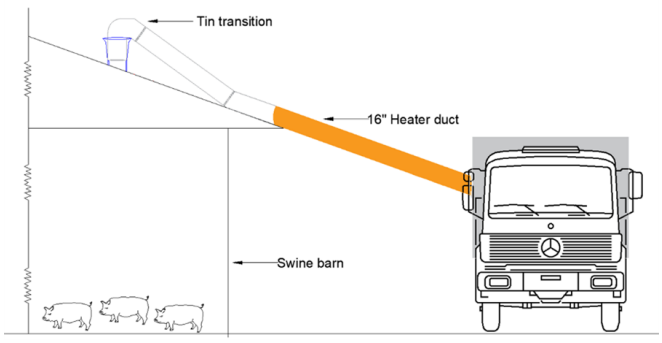
For the preliminary disease-challenge test, 10 out of 40 pigs utilized in the road test were randomly selected to remain inside the animal compartment. The pigs were exposed to the ventilation exhaust air from a barn infected with the swine Influenza Virus (IAV), and then brought to another location for observation of infection onset while housed in the trailer.


Figure 1: Prototype livestock trailer


Figure 2: Transition from barn exhaust to trailer's air inlet

Exposure period

Two 16" flexible ducts were used to connect the exhaust tubes of the ventilation fans of the nursery rooms in the IAV-infected barn to the inlets of the trailer air filtration system (Figure 2). Air filter cassettes with sampling pumps (Figure 3) were also set up at the start of the exposure period for 12 hours. During the exposure period, feed and water were provided to the animals, and the trailer ancillary systems were in operation. In addition, oral fluid samples were taken from the pigs inside the infected barn for confirmation of their IAV-status.



The air and oral fluid samples were taken to a specialized laboratory for qPCR analysis. Unfortunately, the oral fluid samples came back negative for IAV and only one upstream air sample was categorized as "Suspect", indicating only a very low concentration of IAV was detected in sampled barn air.

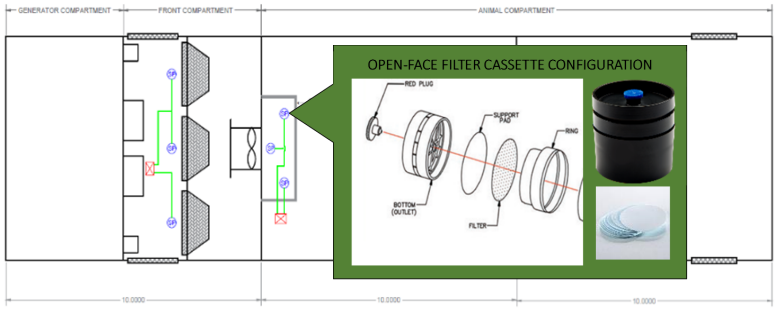


Figure 3: Air sampling setup

Legend:
SP - location of Air Sampler
- Gast Air Pump

Figure 4: Monitoring of pigs from the video camera

Figure 5: Conducting health checks (pig weighing shown here)

Observation period

During the 14-day observation period, the pigs were given feed and water *ad libitum* and beddings were changed daily to maintain a clean and dry pen in the animal compartment. The trailer's ancillary systems were in operation during the monitoring period to maintain the recommended environmental condition for weaned pigs. The pigs were also monitored using the installed video camera (Figure 4), which allowed remote checking on the pigs at any time of the day.

Pig health checks (Figure 5) were done twice a day. On Day 7, blood samples, rectal temperature, and body weight were collected to assess the status of the pigs. Laboratory results from ELISA and qPCR analysis showed all pigs were seronegative; average rectal temperature and average daily gain (ADG) were 39.37 ^{o}C, and 0.88 g/day, respectively. Similar sampling done on day 14 showed all pigs were seronegative, average rectal temperature was 39.80 ^{o}C, and average daily gain was 0.83 g/day. The trial was terminated at Day 14, and since all pigs were healthy, no pigs were euthanized and they were donated to the cooperating barn where they will be appropriately cared for and raised until attaining market size.

This preliminary disease challenge test proved the feasibility of using the trailer for housing the exposed animals during the observation period and allowed the research team to develop and refine the test procedures to be used in subsequent trials. The next test is currently being planned; close monitoring of the health status of the pigs in the cooperating barn has been initiated and air sampling will be conducted in the barn to confirm the presence of sufficient viral loads in the barn exhaust air.

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