Outbreak of Influenza A Virus in Farmed Mink

Mariann Chriél,
T. H. Jensen, C. Hjulsager, L. E. Larsen, J.F. Harslund,
L. Rangstrup-Christensen, B. Pedersen, A. S. Hammer

Center for Fur Animal and Wildlife disease
National Veterinary Institute, Technical University of Denmark

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Mink production in Denmark

- Organized in a cooperative
  - Danish Fur Breeders Association
    Auction house
- 1,700 mink farms
- 2,7 mill breeders
- 13,5 mill mink skin produced
- 5.5 kits per female
- 9 % barren females
Mink feed production in Denmark

- 14 producers of fresh mink feed (12 cooperatives)
- Main ingredients: fish, chicken, and wheat
- Complete declaration
- Use of raw pig slaughter plucks ceased by October 2010

Previously reported clinical outbreaks in mink

- Japan (1981)
  - H3N2, H1N1 (serology)
  - Human(?) (contact)

- Sweden (1984)
  - H10N4
  - Avian (contact mallard and fowl)

- Canada (2007)
  - H3N2
  - Porcine (feed)
Clinical findings in Danish outbreak 2009

- Increased number of submissions to VET-DTU in August 2009
- Farmers report sneezing and coughing mink
- Carcasses in normal condition for the time of year
- Macroscopic finding: pneumonia associated with isolation of haemolytic E. coli
- Resembles post-mortem findings associated with Pseudomonas Aeruginosa hemorrhagic pneumonia with necrotic areas
- Histological indications of a primary viral infection
- No impact of antimicrobial treatments

Lungs from affected mink
Diagnostic tests for Influenza in 2009

• 29. September Carcasses received at VET-DTU

• 2. October PCR-positive tests (conventional PCR and real-time PCR). Culturing in SPF eggs initiated

• 3. October Sequenced material show high similarity to the matrixgene of influenza. Highest similarity is to A/swine/Sweden/1021/2009(H1N2) but inconclusive

• 8. October Culture of virus in eggs is not possible due to massive growth of E. coli in samples. Cell culture is tried. Samples are submitted to SSI for full-genome sequencing and typing.

• 16. October Confirmation of Influenza type A (H3N2). The result demonstrated human/swine reassortant.

Impact of outbreak

• A total of 25 farms have been diagnosed with Influenza in 2009. No serology have been carried out

• Initial cases associated with one feed producer. The remaining farms not associated around first cluster
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- High morbidity rate but low case fatality rate
- No reports of human spread
- Restrictions put on all infected farms until clinical symptoms were absent
Conclusion

- Based on experimental studies from Japan in the 70-ies and 80-ies mink are susceptible to most Influenza types
- However, rare to observe clinical symptoms in farmed mink
- Negative association between farm size and the mortality rate
- Suspected mink feed was contaminated with porcine influenza virus after use of raw slaughter swine plucks
- No reported spread to humans