

Pathogenic H5N1 Avian Influenza in Waterfowl and Wild birds, Final Report

Hong Kong, China

Report date: 30 July 2003

Nature of diagnosis: clinico-pathology plus laboratory (viral culture, influenza A antigen detection, immunoperoxidase test with H5 avian influenza specific monoclonal antibodies, H5 genome detection). Virus genomic characterisation by partial sequencing of all gene segments.

Date of initial detection of animal health incident:

A. Reports of waterfowl dying in nature park were made to management on 3/12/2002 but first deaths noted on 30/11/2002.

Date of first sampling: 4/12/2002

Date of Report: 9/12/2002

Estimated date of first infection: 27/11/2002

Date of last case: 10/12/2002 when all remaining waterfowl were depopulated.

B. Dead ducks in zoological garden waterfowl collection were necropsied on 17/12/2002 and samples were submitted for diagnostic testing including virology on 18/12/2002

Date of first sampling: 17/12/2002

Date of Report: 19/12/2002 rapid tests and 21/12/2002 virus isolation

Estimated date of first infection: 14/12/2002

Date of last case: Last H5N1 virus positive duck died on 2/1/2003.

C. Wild birds: Individual dead grey herons were found dead at a pond reclamation area on 17/12/2002 and 27/12/2002 adjacent to a construction site and were submitted as part of surveillance of wild birds in ponds and marshes. Dead black headed gull submitted on 6/1/2003 was H5N1 virus positive. Dead peregrine falcon submitted on 9/3/2003 was positive for H5N1 virus

Date of first sampling: 17/12/2002

Date of Report: 20/12/2002

Estimated date of first infection: 14/12/2002

Date of last case: 9/3/2003.

Outbreaks:

Location	No of outbreaks
A. Penfold Park, Shatin, Hong Kong	1 [resident waterfowl (ducks, geese and swans) and wild little egret (<i>Egretta garzetta</i>)]
B. Kowloon Park, Kowloon, Hong Kong	1 [resident waterfowl]

	(ducks, geese and swans) and greater flamingo (<i>Phoenicopterus ruber</i>)
C. Wild birds	
Lok Ma Chau, New Territories, Hong Kong	1 [individual wild grey heron (<i>Ardea cinerea</i>)]
Chek Lap Kok, Lantau, Hong Kong	1 [individual black headed gull (<i>Larus ridibundus</i>)]
Hong Kong Island, Hong Kong	1 [individual peregrine falcon (<i>Falco peregrinus</i>)]

Description of affected population: Resident waterfowl (including ducks geese, swans) and wild little egrets that roost in Penfold Park in the evenings in outbreak A. Resident waterfowl and greater flamingo population in outbreak B. The wild bird cases involved grey heron that migrate to ponds in the New Territories, Hong Kong from the north in the winter months, migratory black headed gull that feed around Hong Kong Islands and the peregrine falcon appeared to have been an abandoned bird that was showing nervous signs when found in a park.

Total number of animals in the outbreak:

Susceptible	Cases	Deaths	Destroyed	Slaughtered
A. 95 waterfowl & >500 egrets	31	31	64	0
B. 207 waterfowl & 144 flamingo	105	89	0	0
C. unknown	4	4	0	0

Diagnosis:

The viruses were all characterised as highly pathogenic H5N1 avian influenza viruses but the virus from the waterfowl and little egrets at Penfold Park were genetically distinct from the viruses from Kowloon Park and the other wild bird viruses.

A. Laboratory where diagnosis was made: Tai Lung Veterinary Laboratory, Agriculture Fisheries and Conservation Department, Hong Kong and further virus characterization at Department of Microbiology, Hong Kong University

B. Diagnostic tests used: Chick embryo inoculation with haemagglutination inhibition testing by specific reference sera from CVL Weybridge. Immunoperoxidase staining of tissues by H5 specific monoclonal antibodies from Professor Nancy Cox and genome detection by RRT-PCR tests using H5 specific primer sets from SEPRL, Atlanta, Georgia, USA. Virus genomic characterization by gene sequencing using specific primer sets for all 8 gene segments at HKU.

Epidemiology:

A: Source of agent / origin of infection: Wild bird introduction for outbreaks A and C. Wild bird introduction or spread from retail poultry markets in close proximity to the park in outbreak B.

B: Mode of spread: Remained within the pond systems in outbreaks A and B. Individual birds affected only in C.

C: Control measures used:

For A - All remaining waterfowl were depopulated and the park was closed for disinfection. Ponds were disinfected with strong hypochlorite solution and the park was closed for one month. Waterfowl have not been restocked in this park.

For B – (this was a valuable collection of rare waterfowl species). All waterfowl and flamingo birds were placed in segregated quarantine facilities away from the public on-site and kept under treatment and close observation by veterinary staff. Vaccinations using killed H5N2 avian influenza vaccines were given to resident waterfowl and flamingo. Sick birds were to moved to an isolation area with separated individual pens. All ponds were emptied and disinfected with hypochlorite solution on several occasions and strict biosecurity procedures were being followed by staff. The ponds were kept empty and the remaining birds were kept in quarantine for one month after the last H5N1 infected bird died on 2 January 2003. The bird ponds have now reopened without any problems

For C – The reclamation ponds had barrier lines strung across the pond, water levels were raised and feeding was stopped to discourage wild birds from entering this pond system to feed. This was continued for one month after the second grey heron died.

D: Surveillance system:

After the outbreaks a comprehensive surveillance system of wild birds and waterfowl ponds has been conducted including, trapping and swabbing water birds at wetland areas around Hong Kong, faecal swabbing at roosting sites for egrets, faecal and environmental swabbing at all waterfowl and bird parks, and conducting necropsies and viral culture on dead wild bird submissions. This is in addition to the ongoing viral surveillance system conducted on local poultry farms, wholesale and retail poultry markets in Hong Kong that conducts virus cultures on over 6,000 birds per month. No further cases of H5N1 avian influenza have been detected in waterfowl parks or wild birds in Hong Kong.