

# Avian Paramyxoviruses (other than those listed by the OIE)(Infection with)

Aetiology Epidemiology Diagnosis Prevention and Control  
Potential Impacts of Disease Agent Beyond Clinical Illness References

## AETIOLOGY

### **Classification of the causative agent**

Avian paramyxoviruses (APMV) are enveloped, single-stranded negative-sense RNA viruses in the genus *Avulvavirus* (family *Paramyxoviridae*). APMV-1, the causative agent of Newcastle Disease (ND), is particularly detrimental to commercial poultry operations due to respiratory and neurologic disease as well as decreased egg production. Wild birds serve as reservoirs for several other APMV serotypes and do not appear to develop significant pathology. However, poultry infected with these serotypes may experience decreased egg production and respiratory problems.

For the purpose of voluntary reporting on non OIE-listed diseases in wildlife, “avian paramyxoviruses” **excludes Newcastle disease virus in wild birds**. Information on infections of **Newcastle disease virus in wild birds** is discussed individually in a separate technical card.

### **Resistance to physical and chemical action**

Temperature: Not well determined; APMV-1 is inactivated at 56°C after 3 hours or at 60° after 30 minutes

pH: Not well determined; APMV-1 is inactivated at pH <3

Chemicals/Disinfectants: Sensitive to 30 minutes contact time with 0.5-2.0% of the following: bleach, ethanol, glutaraldehyde, formic acid, peracetic acid, phenol compounds, dimethyl ether, isopropanol, quaternary ammonium compounds

Survival: Not well determined; APMV-1 is stable in organic material at ambient temperature, but persistence varies with environmental conditions

## EPIDEMIOLOGY

### **Hosts**

There are at least 20 known APMV serotypes that can infect different bird species; several examples are provided below. APMV strains 2-7 have the potential to cause clinical disease in several avian species. There is limited information on the clinical relevance of APMV strains 8-12.

- APMV-2
  - African grey parrots (*Psittacus erithacus*)
  - Cynomolgus monkeys (*Macaca fascicularis*)
  - Domestic chickens (*Gallus gallus domesticus*)
  - Gulls (family *Laridae*)
  - Magellanic penguins (*Spheniscus magellanicus*)
  - Orange-collared sparrows (*Zonotrichia capensis*)
  - Passerines (order *Passeriformes*)
  - Rails (family *Rallidae*)
  - Ruddy turnstones (*Arenaria interpres*)
  - Shorebirds (order *Charadriiformes*)

- Southern house wrens (*Troglodytes musculus*)
- Turkeys (*Meleagris gallopavo*)
- Woodchat shrikes (*Lanius senator*)
- Woodpigeons (*Columba palumbus*)
- APMV-3
  - Domestic pigeons (*Columba livia domestica*)
  - Grass parrots (*Neophema* spp.)
  - House sparrows (*Passer domesticus*)
  - Ostriches (*Struthio camelus*)
  - Rosellas (*Platycercus* spp.)
  - Turkeys (*Meleagris gallopavo*)
  - Woodchat shrikes (*Lanius senator*)
- APMV-4
  - American wigeons (*Anas americana*)
  - Blue-winged teal ducks (*Anas discors*)
  - Gadwalls (*Mareca strepera*)
  - Geese (*Anser* spp.)
  - Green-winged teal ducks (*Anas carolinensis*)
  - Mallards (*Anas platyrhynchos*)
  - Northern pintails (*Anas acuta*)
  - Northern shovelers (*Anas clypeata*)
  - Ruddy ducks (*Oxyura jamaicensis*)
  - Wood ducks (*Aix sponsa*)
- APMV-5
  - Budgerigars (*Melopsittacus* spp.)
  - Rainbow lorikeets (*Trichoglossus moluccanus*)
- APMV-6
  - Ducks
    - Blue-winged teal (*Anas discors*)
    - Green-winged teal (*Anas carolinensis*)
    - Northern pintails (*Anas acuta*)
  - Geese (*Anser* spp.)
  - Rails (family *Rallidae*)
  - Turkeys (*Meleagris gallopavo*)
- APMV-7
  - Doves and pigeons (*Columba* spp.)
  - House sparrows (*Passer domesticus*)
  - Ostriches (*Struthio camelus*)
  - Turkeys (*Meleagris gallopavo*)
- APMV-8
  - Mallards (*Anas platyrhynchos*)
  - Geese (*Anser* spp.)
  - House sparrows (*Passer domesticus*)
- APMV-9
  - Ducks (family *Anatidae*)
  - Hoopoes (*Upupa epops*)
- APMV-10
  - Magellanic penguins (*Spheniscus magellanicus*)
  - Rockhopper penguins (*Eudyptes* spp.)
- APMV-11
  - Common snipes (*Gallinago gallinago*)
- APMV-12
  - Eurasian wigeons (*Anas penelope*)

### **Transmission**

- The mechanism of transmission is not well-established for APMV serotypes other than APMV-1. It is suspected that contact with excreta from infected birds may spread the viruses.

## Sources

- Excreta from infected birds

## Occurrence

APMV serotypes have a worldwide distribution. There have not been significant die-offs of wild birds due to APMV serotypes other than APMV-1.

APMV-2 has been found in birds in several countries around the world, including the United States, Costa Rica, Canada, China, Japan, Russia, France, Italy, Spain, and Scotland. A 2010 study found that 0.6% of ruddy turnstones were seropositive APMV-2 in Delaware Bay, in the United States. APMV-3 has been found in Canada, United States, and the Netherlands. APMV-4 has been isolated from birds in Hong Kong, the Republic of Korea, Belgium, and South Africa. APMV-5 has been reported in the United Kingdom, Japan, and Australia. APMV-6 has been reported in Russia, Hong Kong, and Taiwan; it appears to be enzootic in ducks and geese. APMV-7 and -8 have been found in the United States.

## DIAGNOSIS

The pathogenesis of APMV serotypes (excluding APMV-1) is not well understood. APMV-2, -3, -4, -6, and -7 cause decreased egg production in affected production birds. Mortality rate of budgerigars infected with APMV-5 can be 95-100%.

## Clinical diagnosis

While most of the clinical signs of APMV infection have been observed in commercial poultry, it is assumed that similar clinical manifestations occur in wild avian species.

APMV-2 may result in mild respiratory signs in chickens and turkeys; chickens may develop laryngotracheitis. Turkeys infected with APMV-3 develop a cough, nasal discharge, and infraorbital sinus swelling. In broiler chickens, central nervous system (CNS) signs may develop; stunted growth and decreased egg production may also occur. Finches develop yellow diarrhoea, conjunctivitis, and dyspnoea. Parrots develop bloody nasal exudate, torticollis, opisthotonus, paralysis, and wing drooping. Domestic pigeons become emaciated and excrete white or yellow chalky stool. APMV-4 in chickens presents as catarrhal tracheitis, interstitial pneumonia, and results in an increase in white-shelled egg production.

Clinical signs of APMV-5 in budgerigars include torticollis, vomiting, depression, dyspnoea, and diarrhoea. For APMV-6 and -7 in turkeys, clinical signs include decreased egg production and respiratory disease.

## Lesions

- APMV-2, -4, -6
  - Chickens
    - Mild enteritis
    - Catarrhal tracheitis
    - Gastrointestinal associated lymphoid tissue (GALT) hyperplasia
    - Mild interstitial pneumonia (APMV-2, -6)
    - Lymphocytic infiltrates in pancreas
- APMV-3
  - Turkeys
    - Encephalitis
  - Parakeets

- Lymphocyte infiltration of kidneys, lungs, and liver
    - Parrots
      - Pancreatitis
    - Finches
      - Haemorrhagic enteritis
  - APMV-5
    - Budgerigars
      - Intestinal wall oedema
      - Mucosal epithelium loss
  - APMV-7
    - Turkeys
      - Hepatomegaly
      - Splenomegaly
      - Mild multifocal or nodular lymphocytic airsacculitis

### ***Differential diagnoses***

- Bacterial hepatitis
- *Campylobacter* spp.
- *Chlamydophila* spp.
- *Escherichia coli*
- Laryngotracheitis
- Listeriosis
- Low-pathogenicity avian influenza virus
- Mycotoxicosis
- Ornithosis
- Psittacine adenovirus
- Psittacine herpes viruses
- *Salmonella* spp.
- Twirling syndrome
- *Yersinia pseudotuberculosis*

### ***Laboratory diagnosis***

#### **Samples**

*For isolation of agent*

- Cloacal or oropharyngeal swabs

*Serological tests*

- Serum

#### **Procedures**

*Identification of the agent*

- No known tests are available for viral identification.

*Serological tests*

- Commercial serological tests are generally only validated for use in poultry
- Antibody capture enzyme-linked immunosorbent assay (ELISA)
- Haemagglutination inhibition (HI) using antiserum or antigens specific to serotype
- APMV-1 and -3 may cross-react in ELISA and HI tests

## **PREVENTION AND CONTROL**

### **Sanitary prophylaxis**

- Bird-proof poultry housing to prevent interaction with wild birds
- Regularly disinfect bird feeders and baths to minimise APMV transmission among wild bird species
- Properly dispose of carcasses utilising methods such as incineration or burial to prevent wild bird exposure
- Utilise proper biosecurity practices on poultry operations, such as sanitising trucks between farm visits, disinfecting tools and instruments between uses, disinfecting bird houses, wearing personal protective equipment, and changing clothes and shoes when entering and exiting poultry facilities
- Quarantine birds suspected to be infected with APMV for at least two weeks before introducing to a flock

### **Medical prophylaxis**

- Oil-emulsion vaccines for APMV-3 may be used in turkey breeder flocks
  - Vaccinate birds twice, 4 weeks apart, prior to laying eggs
- Autogenous vaccines for several APMV serotypes have been used in poultry operations

## **POTENTIAL IMPACTS OF DISEASE AGENT BEYOND CLINICAL ILLNESS**

### **Risks to public health**

- APMV serotypes (with the exception of APMV-1) have not been known to cause clinical symptoms in humans
  - APMV-2 has been isolated from laboratory cynomolgus monkeys (*Macaca fascicularis*) with respiratory signs

### **Risks to agriculture**

- Poultry operations are at risk for infection with several serotypes of APMV that can cause significant production loss
  - APMV-2, -3, -6, and -7 are most commonly associated with outbreaks in commercial poultry operations
  - In many parts of the world, people rely heavily on poultry for sustenance; outbreaks in these communities can have potentially devastating effects, especially if interaction with wild bird reservoirs is common

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<p>The OIE will periodically update the OIE Technical Disease Cards. Please send relevant new references and proposed modifications to the OIE Science Department (<a href="mailto:scientific.dept@oie.int">scientific.dept@oie.int</a>). Last updated 2020. Written by Samantha Gieger and Erin Furmaga with assistance from the USGS National Wildlife Health Center.</p>
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