



AVIAN POX

ANIMAL GROUP AFFECTED	TRANSMISSION	CLINICAL SIGNS	FATAL DISEASE ?	TREATMENT	PREVENTION & CONTROL
Birds	Biting arthropods, direct and indirect via skin wounds	Skin lesions, skin tumors, mouth mucosal lesions, septicaemia, CNS-symptoms	In many cases only local lesions; fatal only when septicaemia or CNS- form occurs, or when secondary infections complicate untreated skin lesions	Removal of lesions and disinfection with 2% iodine solution, Antibiotics, burning of early skin pox lesions	<i>In houses</i> <i>in zoos</i> Quarantine, Hygiene in houses, insect control, vaccination (only a few species)

Fact sheet compiled by Michael Lierz, Institute for Poultry Diseases, Free University of Berlin, Germany	Last update March 2002
Fact sheet reviewed by H. M. Hafez, Institute for Poultry Diseases, Free University of Berlin, Germany G. M. Dorrestein, Dept. Pathology, Utrecht University, The Netherlands N. Majó i Masferrer, Faculty of Veterinary Medicine, Universitat Autònoma de Barcelona, Spain	
Susceptible animal groups Most bird species regardless age or sex. Described in 26 different avian families. Different pox strains are found in different bird species and it is suggested that they are host specific. Infection trials showed that species cross-overs are possible. Infection leaves a life long immunity if the immune system is not weakened and if the birds are not infected by different strains. Some bird groups like canaries, pigeons, falcons or galliforms seems to be more susceptible.	
Causative organism Avipoxvirus up to 300nm size. DNA-virus replicating in the cytoplasm. 10 strains described so far, but many more identified. Strains morphologically similar but exhibit host-specificity. Placed in groups according to the host species. Strains do have more or less cross-reactivity. Avipoxvirus is environmentally stable and can survive for years in dried organic material (blood, faeces etc.). Resistant against several disinfectants.	
Zoonotic potential An infection of mammals with Avipoxvirus has not yet been described.	
Distribution World-wide among wild and captive birds and poultry.	
Transmission Avipoxvirus is unable to penetrate healthy skin. Transmission through biting arthropods or through contact between contaminated material or latent infected birds and wounds. Replication at portal of entry followed by a primary viraemia. Virus distributed to liver and kidney followed by another replication and secondary viraemia. Persistent infections in recovered birds seem to be possible.	
Incubation period 7 days to one month depending on strain and infected host.	
Clinical symptoms <u>Cutaneous form (Dry Pox):</u> Often in falcons, pigeons, psittaciformes, passeriformes, waterfowl, chicken and turkeys. Several papules developing to vesicles that open and form erosions. Healing with scabs. Self-limiting infections in case no secondary bacterial infection occur in the skin lesions. <u>Diphtheric form (Wet Pox):</u> Common in pigeons, pheasants and quail. Diphtheric lesions on mucous membranes on mouth, trachea and oesophagus resulting in breathing and feeding problems. If diphtheric membrane is removed, bleeding occurs. Moderate mortality. <u>Septicaemic form:</u> Especially canaries and finches. Acute depression, anorexia, dyspnoea, death. High	



mortality.

Tumour form: In falcons, Stone curlew, buzzards, columbiformes. Solitary skin tumors, humped and grooved with a high tendency to bleed.

CNS form: In falcons, mourning doves. Lost of equilibrium, head turning.

The reason why a certain clinical form is expressed is unknown. Different forms can occur separately or together. It might be related to the strain, immune status or infected species.

Post mortem findings

See Clinical symptoms.

Septicemic form: Severe tracheitis and desquamative pneumonia with occlusion of the air capillaries. Foci of haemorrhages in the lung, fatty liver degeneration and jejunitis.

Histological examination: Intracytoplasmatic inclusion bodies (Bollinger bodies) in affected cells.

Diagnosis

Clinical symptoms suggestive but need confirmation:

- Histological demonstration of Bollinger bodies.
- Electron-microscopy demonstration of Avipoxvirus (typical morphology)
- Isolation of avipoxvirus on cell culture (chicken-embryo-fibroblasts) or Chorioallantois-membrane (CAM) of chicken embryos (typical focal areas of thickening and necrosis on the CAM 5-7 days after inoculation). Inoculation on CAM has to be preferred, as cell cultures do not show always a cytopathogenic effect.
- Demonstration of virus antigen to confirm Avipoxvirus in AGP, ELISA or PCR.
- Detection of antibodies in the AGP, ELISA or hemagglutination-inhibiting test. CAVE: Antibody-production against Avipoxvirus is poor. Negative results cannot rule out an infection. Always rely on Antigen-diagnosis, virus isolation or demonstration.

Material required for laboratory analysis

For virus isolation or virus detection (PCR): Material of lesions (Skin, diphteric mucosal membranes with surrounding cells, tumours), lung in suspected septicaemic form, brain in CNS form. Fresh, frozen or in virus transport medium.

For histological examination or electron microscopy: Small pieces in 10% formalin solution.

Relevant diagnostic laboratories

- Institute for Poultry Diseases, Free University of Berlin, Koserstrasse 21, 14195 Berlin, Germany, Tel: +49-30-83853862, Fax: +49-30-83855824
- Dept. Veterinary Pathology, Section Diseases of Special Animals and Wildlife, Yalelaan 1, 3584 CI Utrecht, The Netherlands

Treatment

Skin form: Systemic antibiotics and treatment of lesions with 2% iodine or antiseptic watery solution to prevent a secondary infection. Early form of skin lesions can be burned to prevent viraemia. Avoid burning subepithelial tissue.

Diphteric form: Systemic antibiotics, antiseptic fluids on the lesions to avoid secondary bacterial infections. Removal of diphteric membranes in case of breathing or feeding problems.

Tumour form: Surgical removal of tumours.

Septicaemia and **CNS-form:** No treatment for affected birds. Systemic antibiotics might help in a very few cases.

Prevention and control in zoos

- For pigeons, chickens, turkeys and canaries, a commercial vaccine is available (in the USA also for psittacines). The use of these vaccines in other bird species is very questionable as other bird species do have other avipox-strains. Cross-reactions are limited. Vaccination via wing web or on fresh plucked feather follicles with a 6-12 month protection. Vaccination success must be controlled by demonstration of vaccinal takes. Vaccination into a collection of affected birds (emergency vaccination) is very questionable.
- For new birds, quarantine is highly recommended for 3-4 weeks.
- Control of arthropods in the environment is very important for transmission.
- Affected birds should immediately isolated from the rest of the group and all birds of the affected species should be kept in house and separated from other birds.
- Cleaning and disinfecting of cages.
- Prevention and reduction of stress, especially overcrowding, to prevent a weak immune system and traumatic injuries of the skin.
- Proper disposal of contaminated ground.
- Only essential staff should be in contact with affected animals.
- Feed and clean healthy birds of affected species first, then the affected separated birds.
- Change clothes before entering and leaving the cage.
- In larger collections, disposal of infected animals can be recommended to prevent latent infected virus-



shedders in the future.

Suggested disinfectant for housing facilities

Several disinfectants are shown to be very effective against avian pox. They are tested and listed by the German Veterinary Society (Frankfurter Str. 89, 35392 Giessen, Germany). Resistant against ether, and some strains also against chloroform. Inactivation is possible with 1% potassium hydroxide, 2% NaOH or 5% phenol.

Notification

Yes (Germany).

Guarantees required under EU Legislation**Guarantees required by EAZA Zoos****Measures required under the Animal Disease Surveillance Plan****Measures required for introducing animals from non-approved sources**

Quarantine and vaccination after arrival if possible.

Measures to be taken in case of disease outbreak or positive laboratory findings

Notification, isolation of affected birds, cleaning and disinfection of premises and boxes, treatment of single birds, insect control.

Conditions for restoring disease-free status after an outbreak**Experts who may be consulted**

Clinic: Prof. H. M. Hafez, Institute for Poultry Diseases, Free University Berlin, Germany

PCR-Diagnosis: Dr. D. Lueschow, Institute for Poultry Diseases, Free University Berlin, Germany

Histology: Prof. H. Gerlach, c/o Dr. Bomhardt, Hartelstr. 30, 80689 Munich, Germany

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