

# Duck virus enteritis



Wetlands supporting  
groups of susceptible  
animals

Wildlife ✓  
Livestock ✓  
Human ✗

Synonyms: Anatid herpesvirus, duck plague, DVE, endenpest, entenpest, peste du canard

## KEY FACTS

<b>What is duck virus enteritis?</b>	Duck virus enteritis (DVE) is a contagious disease of ducks, geese and swans (order Anseriformes) caused by a herpesvirus. It can result in internal bleeding, diarrhoea and death but surviving birds can become carriers of the virus and intermittently excrete it for years. Disease appears to vary according to several factors, such as age, management practices and the presence of con-current disease agents.
<b>Causal agent</b>	Duck virus herpesvirus.
<b>Species affected</b>	Only ducks, geese, and swans are susceptible and species vary in their susceptibility to infection. During a disease outbreak, DVE may be suspected if there is no mortality in other shorebirds or waterbirds as it does not affect these species. DVE has not been reported in mammals, humans or other avian species.
<b>Geographic distribution</b>	DVE has been recorded in North America, countries in Asia, including India and China, and several countries in Europe.
<b>Environment</b>	Any environment supporting susceptible species.

## TRANSMISSION AND SPREAD

<b>Vector(s)</b>	The disease is not vector-borne but may be spread through contact between birds or <i>via</i> exposure to contaminated objects/environments – see below.
<b>How is the disease transmitted to animals?</b>	Spread is by bird to bird contact or <i>via</i> exposure to a contaminated environment. Infected waterfowl shed and spread the virus in their droppings. The virus can persist in polluted and stagnant water and slow-moving pools, waterways and ponds. Swimming in and/or drinking infected water, or eating contaminated food, may infect susceptible birds as the virus may enter through breaks in the skin, the mouth, nose or cloaca. Some surviving birds may become carriers. These birds can shed the virus at other locations and therefore trigger future outbreaks. The disease occurs mostly in April, May, and June in Europe and North America, but can occur in any season. DVE in susceptible birds is linked to weather extremes and factors such as stress during breeding seasons. A DVE outbreak is perpetuated by environmental contamination, for example, from tissues and body fluids of decaying infected birds and also bird to bird contact.
<b>How does the disease spread between groups of animals?</b>	Carriers of DVE may shed the virus in faeces or on the surface of eggs, or fluids from decaying carcasses of infected birds may contaminate the environment.
<b>How is the disease transmitted to humans?</b>	DVE is not transmitted to humans.

## IDENTIFICATION AND RESPONSE

### Field signs

DVE infected birds show variable signs which can include a combination of the following:

- loss of appetite
- listlessness, weakness and depression
- weight loss
- dehydration
- excessive water intake
- watery diarrhoea
- eye watering, and pasted eye-lids, associated with avoidance of bright light
- nasal discharge
- ruffled feathers and soiled vents
- a blue colouration to the bill
- prolapsed penis
- an ulcerative “cold sore” lesion under the tongue
- drop in egg production
- impaired movement, lack of muscle control and inability to fly
- bloody discharge from the bill and vent
- series of convulsions
- sudden death.

It is not possible to diagnose DVE on clinical signs alone but the disease should be suspected when acute deaths are seen in susceptible species of ducks, geese and swans. It is important to differentiate field signs from those of pesticide poisoning or other diseases such as avian cholera.

### Recommended action if suspected

This is a potentially important poultry disease and if suspected a veterinary diagnostic laboratory should be contacted and submission of samples discussed. This may involve submitting freshly dead birds, recently euthanased birds or tissue samples.

Where possible whole birds should be submitted as opposed to tissues, but where this is not an option, remove the bird's liver, wrap in clean aluminium foil and place frozen in a plastic bag for shipping. Great care should be taken when packaging specimens to avoid contamination of packing materials and decomposition en route.

Any carcasses should be incinerated and the area used to process the carcasses and associated equipment disinfected.

In livestock settings, quarantine, depopulation, cleaning and disinfection of affected premises are crucial to prevent disease spread.

### Diagnosis

Presumptive diagnosis of DVE is based on clinical signs, gross pathology and histopathology. Confirmation requires identification of the virus by viral isolation or PCR. The herpesvirus may be isolated from the liver, spleen and kidneys of infected birds. DVE carriers are in a state known as latency. It is during this period that the virus cannot be detected by standard methods of virus isolation.

## PREVENTION AND CONTROL IN WETLANDS

### Environment

DVE virus is resilient and can remain viable in the environment for many weeks under certain conditions. However, at pH 3 and below and at pH 11

and above, the virus is inactivated. Therefore, **decontamination** in domestic birds may be conducted e.g. by chlorination of contaminated water or by raising the pH or burning contaminated land. Burning of outbreak site materials and decontamination (including physical structures) should also be carried out. The **collection and disposal of carcasses** by incineration should be meticulous and systematic. Personnel and equipment associated with carcase disposal should be decontaminated using chlorine bleach and phenol-based **disinfectants** before leaving the outbreak site to prevent mechanical spread to other waterfowl locations.

#### Livestock

The risks to commercial ducks and geese and captive wildfowl are greatest in free-range or open field systems especially if free-living wildfowl have access. To date no effective treatment for DVE exists.

In order to prevent rapid disease spread DVE requires rapid response and aggressive actions. The aim is to reduce exposure of the virus to populations of birds at risk, both as a source for potential infection and during outbreaks. Birds in a state of latency pose the greatest problem for disease prevention and control and being asymptomatic they are difficult to detect. Due to the fact that surviving birds are likely to become carriers, **eradication** of infected flocks (including eggs) may be required, and appropriate veterinary advice should be obtained.

A live **vaccine** is available to control DVE in birds over 2 weeks of age and ducks gain active immunity when vaccinated subcutaneously or intramuscularly.

#### Wildlife

The presence of domestic wildfowl in wetlands (especially highly susceptible muscovy ducks) greatly increases the risk of disease transmission to free-living wildfowl, hence this practice should be avoided if at all possible. Control in wildlife necessitates a system of rapid response to prevent spread by reducing exposure to the virus both in the environment and specifically at an outbreak site. Control actions include appropriate **disinfection** of an outbreak site, possible **drainage** of water bodies if appropriate and correct disposal of carcases.

In response to the potential devastating effects of DVE to continental wildfowl populations by direct losses and impaired reproductive capability, one of the wildlife agencies of the USA has developed a monitoring and control plan for DVE. Control measures in place for outbreak areas include: **disinfection** of contaminated soil, **chlorination** of affected waters, **quarantine** of epidemic areas, **removal and disposal of infected carcases** and **depopulation** of any captive flocks. Site specific responses are coordinated by a national DVE monitoring system in the USA, which includes state and federal agricultural and wildlife specialists. Although a live vaccine may be considered for control of captive flocks this is not an option in wild birds.

Any release or reintroduction programmes should not use birds or eggs from flocks with previous history of DVE unless certified DVE-free. Birds selected for release should be confined 2 weeks prior to liberating and any that die during that period should be submitted to a veterinary disease diagnostic laboratory. If DVE is confirmed then no remaining birds should be released.

<b>Humans</b>	Not required.
<b>IMPORTANCE</b>	
<b>Effect on wildlife</b>	In wild waterfowl populations, DVE may cause high mortality, together with secondary reproductive impairment. DVE effects may be endemic in wild species, although little information exists regarding the responses of wild waterfowl to different DVE strains.
<b>Effect on livestock</b>	In susceptible domestic waterfowl flocks this highly contagious disease can result in high mortality and reduced egg production. Flocks under the stress of egg production may suffer higher mortality compared with immature breeders. Although most commercial duck flock outbreaks have been in eastern Asia it has been recorded that migratory waterfowl are the source of DVE for captive waterfowl in regions such as North America and parts of Europe.
<b>Effect on humans</b>	DVE is not infectious to humans.
<b>Economic importance</b>	Significant economic losses may result from fatal outbreaks in commercial flocks and a drop in egg production.

## FURTHER INFORMATION

- Useful publications and websites**
- Friend, M. & Franson, J.C. (2001). **Duck plague**. In: Field manual of wildlife diseases: general field procedures and diseases of birds. E. A. Ciganovich (ed.). pp. 141-152. U.S. Department of the Interior and U.S. Geological Survey, Washington, DC.  
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