

Contribution to the management of incidences of disease outbreaks in waterbirds in the Prespa National Park

General information and answers to Frequently Asked Questions (FAQs)



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Why is a plan for co-ordinated action necessary for the management of incidences of disease outbreaks in waterbirds in the Prespa National Park?

Mass mortality of birds can occur as a result of natural phenomena, evolving slowly or rapidly. Such phenomena include disease outbreaks like avian flu or exposure to toxins developing in lake waters, as in the case of botulism when specific environmental conditions occur. Such phenomena can have extensive negative impacts on the natural environment and especially on waterbirds; in some cases, also on the anthropogenic environment, such as on farms.

The Prespa area, on the north-western edge of the country, consists of two lakes; Lesser Prespa Lake and Great Prespa Lake and the mountains surrounding them. The transboundary area is shared among three countries: Albania, the former Yugoslav Republic of Macedonia, and Greece. Most of the residents in the area work in the primary sector, mostly in agriculture and also in livestock farming and fishing. The lakes host the largest colony of the Dalmatian pelican in the world and significant populations of many other rare waterbirds. Despite the existing laws and regulations relating to diseases occurring in wild birds, there is no adequately detailed plan to date defining the actions that must be taken and their sequence, as well as the necessary co-ordination between the various users of the wetland on a local level when there is a disease outbreak, or prior to an outbreak. Moreover, the veterinary authorities are located far away from the area and are not adequately staffed in order to respond immediately and be physically present in cases of emergency.

The Society for the Protection of Prespa (SPP) has been active in the area for many years, working on the management and protection of the natural and cultural heritage of the Prespa since 1992. In the context of the LIFE15 NAT/GR/000936 – Prespa Waterbirds project <https://www.prespawaterbirds.gr/>, the SPP has implemented the activity “Contribution to the management of incidences of disease outbreaks in waterbirds in the Prespa National Park”, aiming to ensure efficient collaboration between local agencies and to co-ordinate their efforts, as well as assisting the local veterinary authorities in case of zoonotic diseases which may affect the populations of pelicans and/or other waterbirds in the Prespa area. Emphasis is placed on the management of publicizing the cases, mostly among the residents and the users of the area, in order to avoid potential secondary threats to pelicans, such as hunting, killing, destruction of colonies or other unpredictable actions that might be caused by panic and confusion. All the actions and the measures that must be taken are included, both on a preventative basis and upon the occurrence of mass mortality of waterbirds, taking into consideration national and international legislation and regulations, as well as national, regional and local particularities. We consider this to be a useful tool for all wetlands hosting large numbers of waterbirds.

About avian flu

Avian flu is a highly contagious bird disease caused by viruses. The viruses causing severe flu cases in birds belong to the subtypes H5 and H7. With a few exceptions (notably H5N1 and H7N9 subtypes) they only infect birds. These are viruses with low tolerance to high temperatures, and thus epizootic diseases usually occur during the winter months. The disease occurs all over the world; it was first identified in 1878 and mass infections of birds are relatively common. Wild waterbirds are the major carriers of avian flu. They often carry the virus but do not get sick. Within bird populations the virus is transmitted through saliva, faeces and nasal secretions, either directly or through contaminated water. Domestic poultry are usually very vulnerable to the disease, which can cause high mortality in such flocks. Avian flu generally does not pose a risk to humans, however there have been some cases reported where the virus has infected humans, mostly in the countries of Southeast Asia. The human cases reported to date occurred in people who were in close contact with poultry, such as workers at poultry facilities and veterinarians. Ordinary people can protect themselves by following basic hygiene rules such as proper hand washing, especially after contact with poultry or poultry products. An epizootic outbreak of avian flu can have significant ecological and economic impacts, having a severe impact on the local wild waterbird population and causing damage to poultry facilities and in domestic/traditional poultry farming.

Until a few years ago, the two species of European pelicans, the Dalmatian pelican *Pelecanus crispus* and the great white pelican *Pelecanus onocrotalus* were not included in the list of wild bird species considered to be potential carriers of the disease. However, in 2015, there were several cases of avian flu identified among Dalmatian pelicans in the colonies of this species in Bulgaria, Romania, and Russia. In March 2015, 21 Dalmatian pelicans were found dead in the protected area of Srebarna, in northern Bulgaria, which was the only colony of the species in the country at the time. All were adult pelicans in breeding plumage and with no external

sign of illness. The laboratory test results identified the highly pathogenic strain of H5N1 avian flu virus as the cause of death of these pelicans. Two days later, 108 Dalmatian pelicans were found dead in their colony at the Danube River Delta, in Romania. Seven samples that were tested again confirmed the H5N1 avian flu virus strain as the cause of death. In the following days more Dalmatian pelicans were found dead in both Romania and Bulgaria. One more incident with five Dalmatian pelicans found dead due to H5N1 avian flu was reported on April 17th, 2015, at the Volga River Delta in Russia. It is worth mentioning that the Danube River Delta is home to approximately 300-400 pairs of Dalmatian pelicans, while Srebarna is home to another 100 pairs. The two colonies are approximately 160 kilometres away from each other while the Volga River Delta is located 1,700 kilometres away from these two colonies. In total, 167 Dalmatian pelicans were found dead in these three areas during the disease outbreak of March-April 2015, thus a very severe loss, especially to the colonies of the species in Bulgaria and Romania.

The table below lists all the incidents of avian flu reported in wild bird species in Greece over the last fifteen years (2004-2017). Swans represent the majority of the reported birds, both because they are vulnerable to the disease and because, due to their size and colour, they are easily seen by observers.

Table 1. Cases of avian flu in wild birds in Greece over the period of 2004-2017

(Source: OIE-World Organization for Animal Health/Avian Influenza Portal <http://www.oie.int/en/animal-health-in-the-world/update-on-avian-influenza/2018/>).

Year	Date	Region	Area	Species
2017	6/2/2017	Peloponnese	Lake Taka	Mute Swan (2)
2017	1/2/2017	East Macedonia & Thrace	Lake Vistonida	Mute Swan (3)
2017	1/2/2017	East Macedonia & Thrace	Alexandroupoli	Mute Swan (1)
2017	27/1/2017	South Aegean	Rhodes	Mute Swan (1)
2017	26/1/2017	West Macedonia	Prespa National Park	Greylag Goose (1)
2017	26/1/2017	Peloponnese	Lake Moustou, Arcadia	Mute Swan (1)
2017	26/1/2017	Peloponnese	Milia, Arcadia	Magpie (1)
2017	16/1/2017	East Macedonia & Thrace	Sostis, Rodopi	Mute Swan (1)
2016	14/12/2016	East Macedonia & Thrace	Evros Delta	Mute Swan (1)
2006	4/3/2006	Central Macedonia	Alikes, Epanomi	Mute Swan (1)
2006	14/2/2006	Central Macedonia	Alikes, Amouliani, Halkidiki	Mute Swan (2)
2006	13/2/2006	Central Macedonia	Loudias river, Pella	Mute Swan (1)
2006	13/2/2006	Central Macedonia	Epanomi, Thessaloniki	Mute Swan (1)
2006	12/2/2006	Central Macedonia	Stavros, Thessaloniki	Mute Swan (1)
2006	11/2/2006	Central Macedonia	Makrigialos, Pieria	Mute Swan (1)
2006	11/2/2006	Central Macedonia	Katerini beach	Mute Swan (1)
2006	10/2/2006	Central Macedonia	Polichrono, Halkidiki	Mute Swan (1)
2006	6/2/2006	East Macedonia & Thrace	Xirolimni, Rodopi	Mute Swan (2)
2006	3/2/2006	Central Greece (Sterea)	Skyros	Red-breasted goose (1)
2006	3/2/2006	Central Macedonia	Thessaloniki	Swan* (1)
2006	3/2/2006	Central Macedonia	Asprovalta, Thessaloniki	Swan* (1)
2006	1/2/2006	Central Macedonia	Neoi Epivates, Thessaloniki	Swan* (1)
2006	31/1/2006	Central Macedonia	Stavros, Thessaloniki	Swan* (1)
2006	30/1/2006	Central Macedonia	Katerini beach	Swan* (1)

* Species not mentioned.

About avian botulism

Avian botulism is one of the three major diseases of wild birds. It is a paralytic and lethal intoxication caused by a toxin produced by the harmful botulism bacterium *Clostridium botulinum*. These bacteria are very common in wetlands, usually without creating any problems. They can only develop and produce the dangerous toxin under specific conditions: low oxygen levels in the water, high temperatures (above 35°C) and eutrophication (abundance of nutrients and phytoplankton). Cases of botulism usually occur in the summer months when temperatures are high. Avian botulism can cause mass mortality of fish and wild birds, but it is not transmitted between birds and thus domestic poultry are not at risk if they do not come in contact with the wetland. It is extremely difficult to identify the disease before the occurrence of mass mortality and, in order to identify it in a timely manner, wetlands at risk must be regularly monitored in order to take action and remove any dead birds to prevent further spread of the disease. The presence of pesticides and other agricultural chemicals in the water, or the inflow of unprocessed urban waste water, contributes to the creation of conditions fostering the occurrence of avian botulism in a wetland. Avian botulism can cause extensive ecological damage to a wetland and it can also have a significant economic impact, such as for example the depletion of fish, temporary fishing bans and the potential need to repair the harm caused to the ecosystem.

Cases of botulism have been identified in various wetlands across the country in recent years. The most characteristic example is Lake Koroneia, where from the end of July up until the beginning of September 2004, thousands of dead birds were found in the water, in the reed beds, in the mud, on the banks and in the fields around the lake. There are estimates of over 30,000 dead birds from 39 species, among which are many rare and threatened species: more than 230 Dalmatian pelicans, and other species such as pied avocets, black-winged stilts, terns, gulls and ducks. The lack of oxygen in the lake water and the small quantity of water

favoured the production of the botulinum toxin, which poisoned and caused the death of fish and birds living at the lake. Similar mass mortality of fish and birds had also been reported in Koroneia in August 1995, as a result of lake water level reduction in combination with cases of acute industrial pollution and heavy loads of unprocessed urban waste. Moreover, in 2007, i.e. three years after the mass mortality occurring in 2004, toxins in extremely high levels were again identified in the lake water and, as a result, there was again mass mortality of fish and birds, mostly flamingos, avocets and grebes. Avian botulism is also considered to be a possible cause for mass mortality of fish and birds in other wetlands of the country, such as Lake Kastoria and Karla Reservoir.

Answers to Frequently Asked Questions (FAQs)

AVIAN FLU

LOW TEMPERATURES / WINTER – EARLY SPRING

What is avian flu?

Avian flu is a contagious disease of birds, caused by viruses. The disease occurs throughout the world and it is not new: it was first identified in 1878 and epizootic (the respective term for epidemics in animals) outbreaks in birds are relatively frequent. In recent years there has been a re-activation which began in the Far East with the H5N1 virus strain, which is highly pathogenic for birds. However, to date several forms of the virus (called subtypes and identified through various numerical combinations of the letters H and N) have been identified as causes of avian flu.

Which bird species are prone to avian flu?

All bird species are considered vulnerable and, according to the official reports, avian flu has been identified in more than 140 species. Many species of waterbirds (especially geese, ducks and swans) carry low pathogenic (harmless) versions of the avian flu virus, which can be precursors of the highly pathogenic strains to which domestic poultry are very vulnerable, developing various symptoms and high mortality. Often waterbirds which carry the virus do not develop symptoms of the disease.

How is avian flu transmitted and spread?

It is transmitted between birds through direct contact with faeces, saliva or nasal secretions, or with infected media including water or soil. Transmission between domestic and wild birds takes place through direct or indirect contact, e.g. during pasture farming. It spreads from country to country through migratory birds and through the live poultry trade. The

viruses of avian flu can survive for a long period of time in the environment, especially when the temperature is low.

Can avian flu be transmitted to humans?

In principle it cannot. However, there have been some cases reported where the virus has infected humans, mainly in Southeast Asian countries. The cases reported in humans to date exclusively involved people who were in close contact with poultry, such as workers in poultry facilities and veterinarians. Avian flu can be transmitted from birds to humans through direct contact with infected birds or with surfaces soiled with their faeces or secretions.

How long can these viruses survive in the environment?

Avian flu viruses can live for a long period of time in very low temperatures. In the faeces of infected birds, they can survive up to 105 days in the winter. They remain infectious for 30-35 days at 4°C and for 7 days at 20°C. This persistence is very variable among subtypes.

How long does it take for a bird to present the first symptoms of the disease following infection (incubation period)?

Symptoms (if displayed) can appear after a few hours, up to a maximum of 14 days.

How can we tell whether a wild bird has been infected by avian flu?

Infected wild birds do not usually present any symptoms and thus you cannot tell, unless laboratory tests are performed. Mass mortality of wild birds during the winter or early spring may be an indication of avian flu, but, in any case, laboratory tests are necessary to confirm a case.

How can the transmission of the virus between wild and domestic birds be reduced?

The only way is to prevent direct and indirect contact of domestic birds with wild birds. This can be achieved only if the open space where domestic birds are kept is protected with a thin, tightly meshed net, and if poultry have no access to the wetlands where wild birds live.

What are the symptoms in domestic poultry?

Sudden mass mortality, respiratory problems, swelling of the head and legs, blue-coloured combs, and diarrhoea. Poultry look tired and have no appetite; the production of eggs is reduced or discontinued.



Common symptoms of avian flu

What to do if an infection in domestic poultry is suspected?

Avoid contact with poultry and notify the area's veterinary authorities or police department.

What can I do to protect myself?

- ⦿ Thoroughly wash your hands with soap/detergent and water following each contact with poultry or poultry products.
- ⦿ Change your clothes and shoes after each contact with poultry and store them in a designated space outside your home.
- ⦿ Do not touch anything with dirty hands or gloves, especially your face or eyes.
- ⦿ Always keep poultry in a separate space, away from your home.
- ⦿ Do not allow poultry to enter your home.
- ⦿ Keep ducks and geese separated from other types of poultry.
- ⦿ Use mesh screens and cover your poultry coop to prevent contact of your poultry with wild animals and wild birds.
- ⦿ Always use plastic/latex single-use gloves and mask (surgical mask) to handle dead poultry and place them in a double plastic bag.
- ⦿ Never discard dead poultry or other birds (domestic or wild), or their waste, in lakes or rivers.



What can I do to prevent the spread of the virus from one wetland to another?

In order to prevent the spread of the virus, special attention is required by the usual users of a wetland, as well as by occasional users (visitors, scientists), especially when they move around other areas as well. For example, if you find yourself in a wetland where a case of avian flu has recently been confirmed and you move along the lakeside or into the water (e.g. with boots) it is necessary to clean and carefully disinfect your boots or your equipment before entering another wetland.

Which disinfectants destroy the avian flu virus?

All regular household disinfectants destroy the virus.

What does legislation say about **domestic poultry?**

Keeping domestic poultry in unenclosed areas is prohibited throughout Greece. Especially in areas located at a distance of less than 2 km from lakes, rivers and any type of body of water, keeping poultry in open spaces (yards, fields etc.) is prohibited. Poultry should be kept **ONLY** in enclosed spaces and measures preventing their contact with wild birds must be taken. Ducks and geese on domestic farms should be kept separated from other types of poultry (chicken, turkeys etc.). Owners of domestic poultry must monitor and record the health status of poultry on a daily basis and immediately inform veterinary authorities of any suspicious symptoms (e.g. large number of sick and dead birds).

Which measures are taken in case avian flu occurs in poultry farms (domestic or commercial)?

In the case that avian flu is confirmed in a domestic or commercial poultry farm, all poultry must be immediately culled to prevent further spread of the disease. Moreover, their products, feed, bedding and all materials and waste that may have been infected must also be destroyed, followed by cleaning and disinfection. Also, for the infected farm and for all farms within a specific zone around it, limitations on the trading of poultry and poultry products are imposed.

Are humans at risk from consuming meat or eggs of poultry that may have been exposed to the avian flu virus?

Cooked meat and cooked eggs are harmless for consumers. The virus is destroyed when cooked at 70°C for 2-3 seconds and thus, through proper cooking, the virus is destroyed. Hands should always be carefully washed after contact with such raw products.

Are humans at risk from consuming fish in case of avian flu in a wetland where fishing activities are performed?

No, there is no risk. However, it is recommended that fish are cooked at a temperature of at least 70°C for a minimum of 10 minutes.

What should hunters know about avian flu?

Hunters who, during hunting season, come in contact with wild birds which could potentially be infected with avian flu viruses:

- a) must strictly take personal hygiene measures during cleaning, preparing and cooking bird game,

- b)** must clean and disinfect their vehicles and hunting equipment (clothes, shoes etc.) in order to prevent spread of avian flu viruses from wild birds to poultry,
- c)** must not feed poultry or domestic animals (dogs, cats) with raw bird game or remains,
- d)** must not discard wild bird carcasses or remains in the countryside.

AVIAN BOTULISM

HIGH TEMPERATURES / SUMMER – EARLY AUTUMN

What is avian botulism?

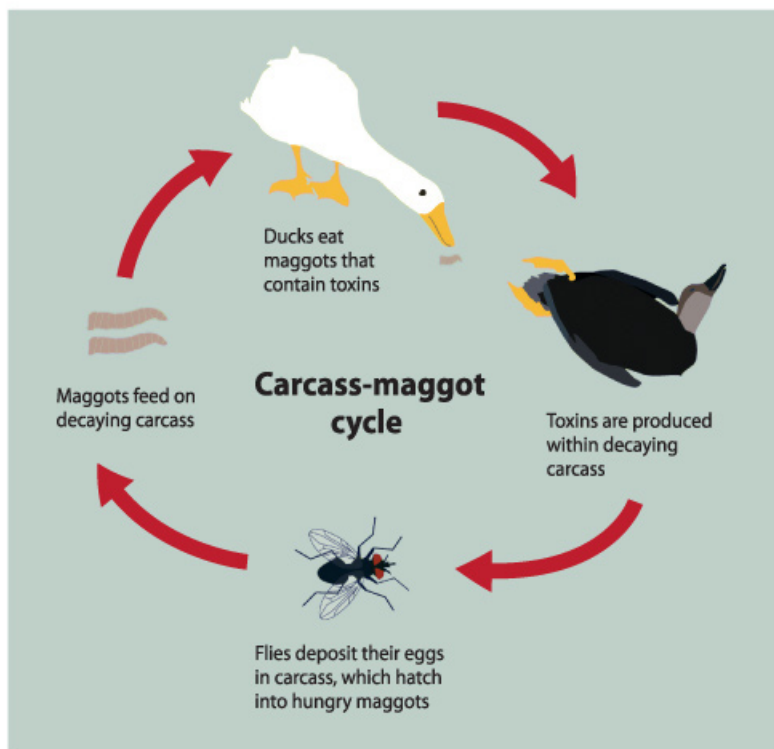
Avian botulism is one of the three major diseases related to wild birds. It is a paralytic intoxication which is caused by the exponential growth of a bacterium into the water under favourable conditions. The bacterium is the clostridium of botulism, *Clostridium botulinum*, which produces a powerful toxin. These bacteria are very common in wetlands but generally do not create problems. They can develop and produce the dangerous toxin only under special conditions: botulism is related to low oxygen levels in the water, high temperatures and eutrophication (i.e. abundance of nutrients in the water). Cases of botulism usually occur in the summer months when the temperatures are high.

Which species are affected by avian botulism?

Among wild birds, the most frequently affected species include ducks, geese and swans, as well as those living close to the water (e.g. waders).

How do birds get intoxicated?

Birds either directly ingest the toxin from the wetland or they may eat the fly larvae (maggots) which emerge on the carcasses of birds who have died from the disease, and which contain the toxin. The larvae are not affected by the toxin and store it into their bodies. The following cycle is created during an avian botulism outbreak: Flies lay eggs on the carcasses of birds that have died from botulism, the hatched fly larvae feed on the carcasses of the waterbirds (e.g. ducks) and ingest the toxin. Then, other ducks may develop botulism simply by ingesting 3-4 of these larvae.



What can avian botulism cause?

It may cause mass mortality of wild birds. The disease is not transmitted between birds and thus domestic poultry are not at risk if they do not come in contact with the wetland.

What are the symptoms of avian botulism in birds?

The first symptoms are ataxia in walking and then paresis (partial paralysis). Then inability to chew and swallow occurs, and the paralysis spreads gradually until death occurs. Characteristic signs: infected wild birds (usu-

ally waterbirds like ducks, pelicans, cormorants) have weak muscle tone, with signs of paralysis in their legs and wings, and are unable to hold their head up.

How long does it take from a bird being intoxicated with botulinum toxin until the first symptoms appear (incubation period)?

The incubation period lasts 2-10 days and the entire course of the disease spans from a few hours to 5 days.

How can avian botulism be prevented and controlled?

It is extremely difficult to identify the disease before the occurrence of mass mortality. For timely identification wetlands at risk must be regularly monitored in order to take action and remove any dead birds to prevent further spread of the disease.

Which human activities can contribute to the occurrence of avian botulism in wetlands?

Activities which either directly lead to the death of aquatic organisms, such as the uncontrolled inflow of pesticides and other agricultural chemicals into a wetland, or activities leading to an increase of nutrients and consequently to a decrease of oxygen levels in a wetland, such as the inflow of urban waste that has not been processed.

Is avian botulism a risk for humans?

In general, no. Humans and domestic animals are at risk only if they consume infected birds or fish. Cattle drinking water from the lake are rarely at risk.

Is it safe to fish during an outbreak of avian botulism?

Generally, fishing or hunting in a wetland during a botulism outbreak, or less than one month after a botulism outbreak, is not advised. The competent veterinary authorities will provide related information.



*For more information, you can contact
the local competent veterinary authorities.*

**Telephone numbers for the Department
of Rural Economy and Veterinary Medicine
Florina region:**

23850 54556, 54558, 54565

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