FRIEDRICH-LOEFFLER-INSTITUT
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Rapid Risk Assessment

on highly pathogenic avian influenza H5 (HPAI H5) clade 2.3.4.4b

Update on the basis of the period
September (01.-30.9.) 2023

High pathogenic avian influenza H5 (HPAI H5) risk assessment clade 2.3.4.4b

Situation in Germany

No HPAIV H5 outbreaks have been detected in domestic poultry or captive birds in Germany between 01 and 30 September 2023.

The number of cases in wild birds has continued to decline. A total of ten HPAIV H5 cases were reported to the Animal Disease Notification System (TSN). Nine of the ten cases involved wild birds from the coastal federal states of Lower Saxony (n=7) and Schleswig-Holstein (n=2), and one case came from Saxony. Affected wild birds were gulls (n=6), birds of prey (n=2), a cormorant and a swan (Tab.1).

Increased mortalities of seabirds and gulls have not been recorded since the seasonal break-up of breeding colonies.

In Germany, only the HPAIV subtype H5N1 was detected.

HPAIV infections in mammals were not reported in Germany for the month of September.

Table 1: Number of reported HPAIV H5 wild bird cases, affected bird groups and locations for the period 01-30 September 2023 by federal state. Data source: TSN, FLI. Data status: 19.10.2023

State (August/September)	County	Location	Wild birds (number of HPAIV notifications)	Date Confirmation
Lower Saxony (11/7)	Aurich	Osteel	Peregrine falcon (1)	20.09.
		Norderney	Gull (1), Cormorant (1)	11.+14.09.
		Krummhörn	Gull (1)	01.09.
	Friesland	Wangerooge	Gull (2)	14.09.
	Verden	Thedinghausen	Gull (1)	01.09.
Saxony (0/1)	Vogtlandkreis	Neumark	Peregrine falcon	26.09.
Schleswig-Holstein (2/2)	Pinneberg	Heligoland	Herring Gull (1)	07.09.
	Ostholstein	Fehmarn		07.09.

Figure 1: Outbreaks of HPAIV H5N1 in Germany in poultry (dots), other captive birds (zoo/wildlife sanctuary; squares), cases in wild birds (triangles) since 01.10.2022. In colour outbreaks and cases for September 2023. Different colours: see legend. Data status: 19.10.2023; data source: TSN, FLI.

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Situation in Europe

Across Europe, the number of **outbreaks** in **domestic poultry** continued to decline in September. Only Denmark reported one outbreak in a small holding of chickens and ducks and the United Kingdom five outbreaks in domestic poultry.

In **captive birds,** one outbreak was detected in Slovenia and two outbreaks in the United Kingdom in September. In the Faroe Islands, an outbreak was reported in early September in a private small holding.

With the disbanding of shorebird breeding colonies, reports of mass mortalities and HPAIV-H5 detections in Europe have also declined sharply. Besides Germany, Denmark (n=4), Iceland (n=1), Ireland (n=1), Norway (n=3), Finland (n=3), the United Kingdom (UK; n=12), France (n=1), Belgium (n=1), Slovenia (n=2), Sweden (n=2), the Netherlands (n=3) and the Faroe Islands (n=3) only isolated HPAIV H5 cases in gulls and waders (n=17), swans (n=7), white-tailed eagles (n=3), (migratory) hawks (n=2), eagle owls (n=1), crows (n=1) and pheasants (n=5, all UK) were reported (Fig.2).

In most cases, the subtype H5N1 was determined, but Iceland and Norway reported a detection of HPAIV H5N5 in one wading bird (Norway) and one white-tailed eagle (Iceland).

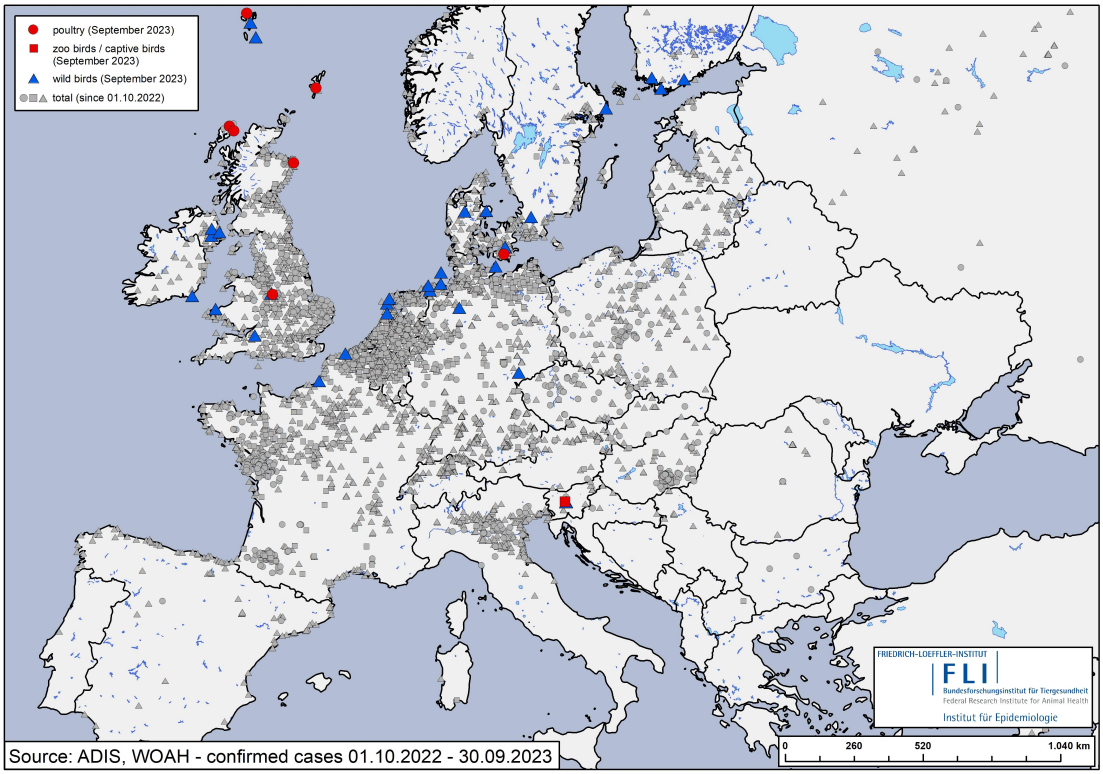

Figure 2: HPAI cases in poultry, captive birds and wild birds reported in ADIS and to WOAH from 01 October 2022 to 30 September 2023. Cases for September in red and blue; poultry = (domestic) poultry kept for commercial purposes; zoo birds/other birds = other captive birds. Data query status: 19.10.2023, data source: ADIS, WOAH.

The HPAI H5N1 viruses in gulls studied so far in Europe belong exclusively to the gull-like BB genotype of clade 2.3.4.4b HPAIV H5, which emerged (presumably in France) from a reassortment event of H5N1 and a gull-adapted AIV of subtype H13 and has been spread across Europe since June 2022. This genotype dominated events in Germany and Europe in 2023 and was also responsible for many of the mammalian fatalities in Europe.

While Poland reported an unusual occurrence of dozens of deaths in domestic cats in the summer of 2023 with HPAIV H5N1 detected in 38 of the samples tested, Finland reported HPAIV H5N1 infections in diseased foxes, minks or racoon dogs in a total of 26 fur farms from the end of June up to and including September (Fig. 3). The Finnish authorities ordered culling in the affected farms and active surveillance of all major fur farms in the country. In September, Denmark reported HPAIV-H5N1 infected seals found dead in waters on the (Baltic) island of Funen. At the same time, more HPAIV-associated deaths of mute swans were detected there; more detailed data on the number of affected seals were not currently available.

A survey for H5 antibodies in sera from wild carnivores in the Netherlands indicates a considerable number of asymptomatic or mild infections in mammals.

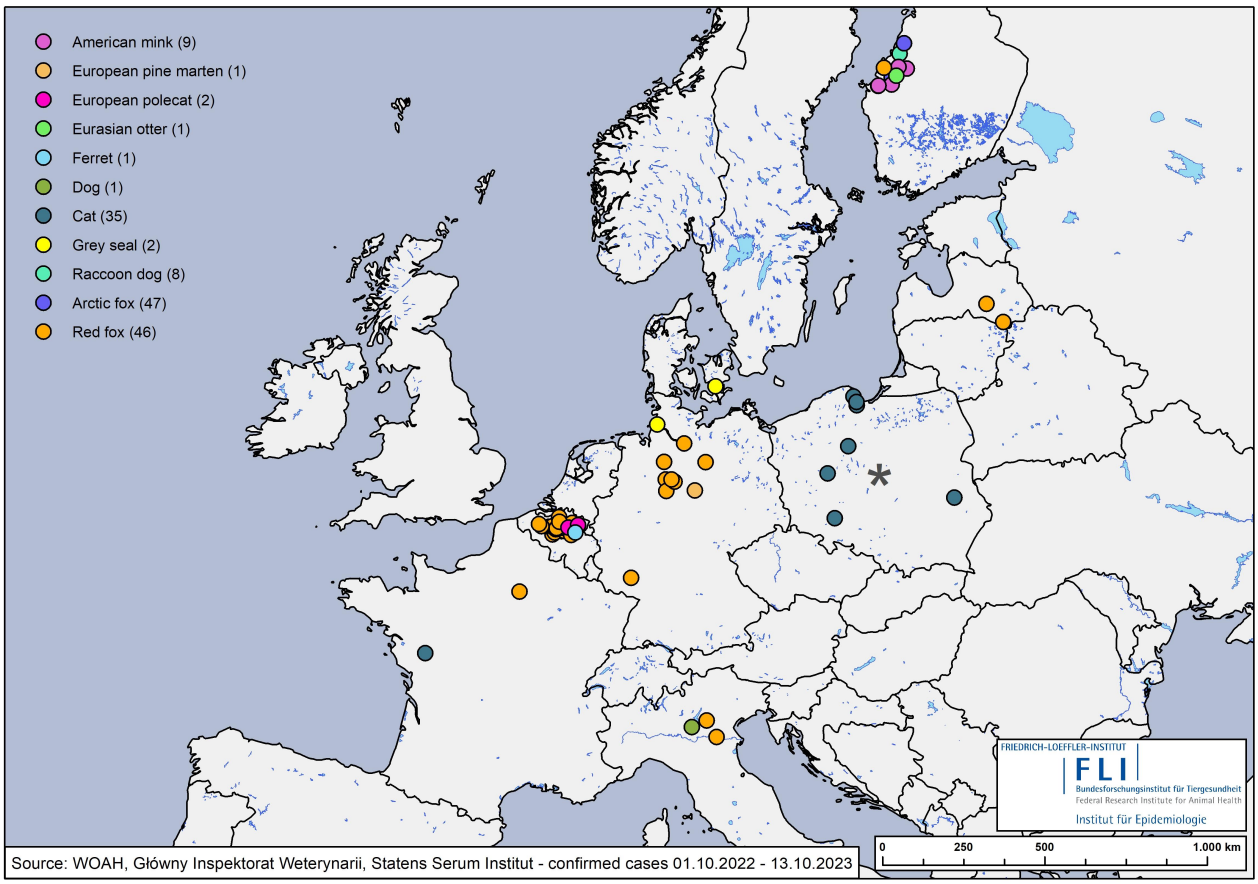

*Figure 3: HPAIV H5 infections in mammals in Europe reported to WOAH since 01.10.2022. *Polish mammalian cases concern 33 cats and 1 caracal and are described on the homepage of the "Main Veterinary Inspectorate" in Poland. Data query: 19.10.2023.*

Situation in the world/special events

Outbreaks in domestic poultry and wild birds caused by HPAIV H5 clade 2.3.4.4b continue to be reported worldwide:

- Israel: Two outbreaks in domestic poultry and captive birds at the end of September;
- USA: Since the end of September, increased cases in wild birds and outbreaks in domestic poultry in various states in the USA;
- South America: HPAIV H5 cases in wild birds in Argentina, Uruguay and Brazil (mainly terns, but also penguins); HPAIV H5 outbreaks (n=2) in Peru; HPAIV H5 detections in frigatebirds and red-footed boobies (*Sula Sula*) on the Galapagos Islands are of concern: Punta Pit in the eastern part of San Cristóbal Island and Genovesa Island;
- In the meantime (in October), HPAIV H5 has also reached the Antarctic region: On Bird Island of the South Georgia archipelago, subantarctic skuas (*Catharacta antarctica*) have been affected so far. Bird Island is home to one of the largest seabird colonies in the world (notification of 23.10.2023).

Fatal mammalian infections with HPAIV H5 also continue to be reported:

- Uruguay and Brazil: Infected sea lions and fur seals found dead;
- Argentina: elephant seal, sea lion (108 fatalities);

Despite the high number of outbreaks in poultry worldwide and likely multiple contacts between humans and infected birds, **HPAIV H5 clade 2.3.4.4b infections in humans** still appear to be very rare events, but are closely monitored and documented. Since 2020, fewer than 10 human infections with mild or asymptomatic courses have occurred in Europe and North America, although severe courses have been reported in two individuals from Ecuador and Chile following infection with HPAIV H5. In September, there were no further reports of human infections with clade 2.3.4.4b-HPAIV H5.

According to an assessment by the European Centre for Disease Prevention and Control (ECDC), the risk of zoonotic transmission of HPAIV H5N1 clade 2.3.4.4b and the associated public health impact is still considered low. However, a moderate risk is assumed for occupationally exposed groups who have close contact with infected poultry or who have been exposed to infected and diseased cats (e.g. in Poland) (source).

Summary and risk assessment

The current global HPAI H5N1 epidemic has not completely resolved for the third year in a row, despite the summer in Europe. Thus, the year-round presence of the virus can also be confirmed this year. Although the number of outbreaks in poultry in Europe has decreased significantly, the virus is still present in wild birds across northern Europe.

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A new subtype (H5N5) has probably emerged from reassortment with a low pathogenic influenza virus in wild birds in northern Europe. The possibility of further reassortment events is likely in autumn and winter when waterfowl, which are often infected with low pathogenic influenza viruses at this time, congregate at resting sites.

In many parts of Germany there are well-suited resting or wintering areas for a large number of water birds, mainly from Scandinavia, the Baltic States, but also from northern and western Russia, and in some cases even from Siberia. In the course of the autumn migration, which has already started in July for waders and will increase in September/October for *Anseriformes* (geese, swans and ducks), an increased movement dynamic (also over long distances) and in some places a higher population density of the resting population can be expected. During this period, small- to medium-scale movements of roosting waterfowl (geese), cranes and gulls between inland feeding areas (grain fields) and overnight roosting areas in shallow-water coastal areas will occur and promote virus spread over short distances to other populations. Depending on temperatures, waterbird populations are expected to peak around mid-to end October.

In addition, cooler temperatures and weaker UV radiation favour persistence of HPAI viruses in the environment. This provides favourable conditions for both new virus introductions from Scandinavia, the Baltic States and eastern and central Russia, as well as for possible reassortment events between HPAIV H5 and various low pathogenic avian influenza viruses, which occur in high diversity and cluster in wild waterbirds from September onwards. Local breeding birds (e.g. terns, some gulls) have already largely moved to their resting and wintering areas further south. In this context, countries in North and West Africa should be aware of introduction of the virus from Europe.

The risk of entry and spread of HPAI H5 viruses in and between waterbird populations associated with increasing population densities of waterbirds at staging areas within Germany is considered ***high***. The Bird Flu Radar (EFSA) indicates the highest HPAIV H5 introduction probability for areas of the German North Sea coast, followed by areas along the western Baltic Sea coast for the end of October.

The risk of HPAIV H5 introduction into German poultry farms and captive bird populations (e.g. zoological gardens) through direct and indirect contact with wild birds is nevertheless considered ***moderate***, as reports of wild bird cases are currently limited.

The risk of introduction through the sale of live poultry in the travel trade or poultry exhibitions within Germany and Europe is considered ***low***, but would increase accordingly with a possible increase in outbreaks in poultry.

The number of outbreaks in poultry and captive birds in Europe declined over August and September. There is currently a ***low*** risk of introduction of the virus between holdings (secondary outbreaks) within Germany.

For waterfowl farms in Germany the risk of undetected circulation of HPAI H5 viruses and consequently of spread between poultry flocks is estimated to be ***moderate***.

Current recommendation

The top priority is to protect poultry from the introduction and possible further spread of HPAIV infections. To this end, the relevant recommended biosecurity measures and surveillance or clarification examinations must be checked and consistently adhered to. Poultry farmers are legally obliged to comply with basic biosecurity rules. The reporting of deaths in poultry keeping to the veterinary authority with subsequent official investigation is considered a measure for early detection of the disease, which is fatal in chickens and turkeys.

Poultry or bird exhibitions or the sale of live poultry (in travel trade) should only be allowed if high biosecurity rules are observed and, if necessary, subject to a coordinated regional risk assessment. Bringing together (pedigree) poultry of different origins and keeping them for several days at the exhibition site should be avoided at all costs.

Increased attention to compliance with biosecurity measures must also be paid to intra-Community movements of poultry, especially to or from EU countries with current outbreaks. Careful cleaning and disinfection must be carried out on poultry transport vehicles returning from affected countries.

In the vicinity of clustered cases of HPAIV-infected wild birds, a risk-based restriction of free-range poultry keeping (stabling) is recommended. The use of TSIS to view wild bird cases in the counties (TSIS query) is available to every citizen.

In poultry farms, zoos and animal parks, especially those with open-air and free-range systems, prevention and biosecurity measures should be urgently reviewed and, if necessary, optimised. Livestock keepers can check the biosecurity of their farms anonymously and free of charge using the so-called "AI risk traffic light" (https://risikoampel.uni-vechta.de/), among other things. In particular, it should be possible to prove that farmers had already taken effective measures to prevent the entry and spread of HPAIV *before* an HPAIV case occurred. A photo book with examples of biosecurity in poultry flocks has been published by the UK authorities (Photo book).

Even though EU Regulation 2023/361 has made vaccination of poultry against HPAI possible since February 2023, there are still no suitable, approved commercial vaccines on the European market. In this respect, considerations of vaccination as a further preventive protective measure flanking the known biosecurity precautions must remain theoretical (Benefits and risks of vaccinating poultry against highly pathogenic avian influenza - DGS MAGAZIN (dgs-magazin.de)). Vaccination of poultry is linked to considerable monitoring requirements, which are financially costly and will also place a heavy burden on personnel capacities in veterinary offices and testing facilities.

Surveillance of wild mammals for HPAIV H5 infection (see below), but also captive mammals (fur animals), should be strengthened following the clustering of HPAIV findings in cats in Poland and fur animals in Finland. Similarly, dogs, cats and pigs kept on farms with poultry with HPAI outbreaks should be included in testing (swab and serum samples).

It is hardly possible to influence the course and spread of HPAIV infections in wild bird populations. The collection of carcasses has proven to be a useful measure against further food-chain-related transmission (especially mammals and birds of prey such as white-tailed eagles). Conservationists, national park rangers, bird wardens, bird ringers, etc. should be prepared to handle sick and dead birds in cooperation with the competent veterinary authorities, and the possible collection and disposal of dead birds should be planned in advance. The registration of the number of dead birds found and the associated communication between environmental and veterinary authorities should be intensified. A detailed document with instructions for action and background information can be found here: https://www.waddensea-worldheritage.org/sites/default/files/2023_Avian%20flu%20management%20guidelines_vers2.pdf.

In times of high risk or when HPAIV cases or outbreaks are known in an area, suspension of hunting of waterfowl should be considered, both to reduce disturbance to wild bird populations and to reduce the possibility of spread of infection from the wild to domestic areas when killed infected birds are moved.

After close personal contact with dead or sick birds, a doctor should be consulted immediately if the bird's own (even mild) symptoms of disease appear, in order to clarify a possible HPAIV human infection.

The same precautions should be taken when finding dead wild carnivores (especially foxes). Carnivores found alive with neurological changes may also be infected with HPAIV H5N1. If foxes or other carnivores are examined at state testing facilities as part of rabies screening, tissue samples of the CNS and lungs should always also be tested for influenza virus RNA.

Conspicuous behaviour and fatalities in wild birds and mammals in connection with wild bird deaths should be reported immediately to the veterinary authorities for recovery and, if necessary, investigation.

Correct species identification of dead birds is required and, in addition to the total number of non-investigated dead birds, must be reported via TSN. This is the only way to ensure that the extent of the incident can be realistically estimated and documented.

For an overview of further options for action, a catalogue of recommendations can be found here.

Data sources: Tierseuchennachrichtensystem (TSN), Animal Disease Information System (ADIS), World Organisation for Animal Health (WOAH), Empres-I, European Food Safety Agency (EFSA), Scientific publications (here: https://*www.biorxiv.org/content/10.1101/2023.05.12.540493v1.full.pdf); For the Polish cats:* Communication VII GLW on Feline Diseases | Chief Veterinary Inspectorate (wetgiw.gov.pl*).*

Query period: 01.09.2023–30.09.2023.
Query date: 19.10.2023

Further notes

The data in the databases is dynamic and changes daily. Therefore, there are shifts in the figures if they are queried at other times.

The European Food Safety Authority (EFSA) provides an update on the scientific assessment of what is happening in Europe: Avian influenza overview June - September 2023 | EFSA (europa.eu).

In addition to weekly updated outbreak maps, the FLI also provides information on molecular virological investigations of HPAI viruses in Germany (HPAIV genotypes in Germany | Zenodo) and a questionnaire (FAQ).

The Radar Bulletin Germany is published at monthly intervals on the FLI website.

The Poultry Business Magazine (DGS) has set up an Avian Influenza Radar, which lists avian influenza outbreaks chronologically with details of species and locations. Avian Influenza Radar - Specialist Information for Poultry Business - DGS MAGAZIN (dgs-magazin.de)

The European Reference Laboratory for Avian Influenza has launched a new HPAI Dashboard (https://eurlaidata.izsvenezie.it/) regarding HPAI detection in the EU.

EFSA has also set up an HPAI dashboard where the figures in Europe can be viewed in real time. EFSA HPAI dashboard (aus.vet).

EFSA has set up a Bird Flu Radar together with Euring, Eurobird Portal and Ausvet: https://app.bto.org/mmt/avian_influenza_map/avian_influenza_map.jsp

The WHO published a risk assessment on 21.12.2022. Assessment of risk associated with recent influenza A(H5N1) clade 2.3.4.4b viruses (who.int)

Information on HPAI outbreaks in domestic poultry and wild birds in the USA can be found on the USDA APHIS website: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/hpai-2022/2022-hpai-commercial-backyard-flocks
The US authorities publish mammalian cases on a daily basis on a website: USDA APHIS | 2022-2023 Detections of Highly Pathogenic Avian Influenza in Mammals.

The British Trust of Ornithology (BTO) has published helpful advice for bird ringers: https://www.bto.org/sites/default/files/bto_hpai_guidance_to_ringers_v04.pdf.

Meanwhile, the FAO Scientific Task Force on Avian Influenza in Wild Birds, among others, is calling on authorities to consider HPAI as a problem for biodiversity conservation as well, and to take action to reduce its impact.
To gear monitoring and control measures also to the protection of wild fauna
https://www.fao.org/3/cc6936en/cc6936en.pdf

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