

Rapid Risk Assessment

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



Update for January based on the period
December (01 - 31 December) 2023

Situation in Germany

Between 1 and 31 December 2023, 13 HPAIV H5 outbreaks were detected in domestic poultry in Germany (Table 1, Fig. 1).

On 31 December 2023, HPAIV H5N1 was detected in Black-necked swans and an Eider duck at Cottbus Zoo (Brandenburg) (Fig. 1).

The number of cases in wild birds continued to rise in December. A total of 29 cases of HPAIV H5 in wild birds were reported to the Animal Disease Notification System (TSN). Barnacle geese were particularly affected (n=10) and Grey cranes (n=6) in central and southern Germany (Thuringia, Bavaria and Baden-Württemberg) at the beginning of the month (Table 2). The virus detections were distributed throughout Germany (Fig. 1), with six federal states newly affected in December (Tab. 2).

The H5N1 subtype was confirmed in all cases. A total of four new HPAI genotypes have been detected in Germany since November 2023. The previously dominant genotype (Ger-02-23-N1.1, EU BB) was last detected in September and has not reappeared since then. The new genotypes each show their own distribution patterns. One genotype (Ger-11-23-N1.1, EU “DB”) currently appears to dominate in wild birds. Another genotype Ger-11-23-N1.3, EU “DG” has so far only been found in poultry farms.

No HPAIV infections in mammals were reported from Germany for the month of December.

Table 1: Confirmed HPAIV H5 outbreaks in poultry, including captive birds, for the period from 1 to 31 December 2023 in Germany. Data source: TSN, FLI. Data status: 08.01.2024

Federal state	County	Type poultry	of Usage	Number of birds kept	Date confirmation
Mecklenburg-Western Pomerania (2)	Mecklenburg Lake District	Turkey	Fattening	>2.000	21.12.
	Northwest Mecklenburg	Goose	Fattening	>5.000	06.12.
Lower Saxony (5)	Oldenburg	Turkey	Fattening	4.000	21.12.
		Turkey	Fattening	>14.000	16.12.
	Cuxhaven	Turkey	Fattening	>30.000	06.12.
	Emsland	Turkey	Fattening	>16.500	01.12.
	Wittmund	Duck	Fattening	>12.000	22.12.
North Rhine-Westphalia (2)	Gütersloh	Duck	Chick rearing	29.000	14.12.
		Duck	Fattening	>28.000	12.12.
Saxony-Anhalt (n=1)	Salzland district	Chicken	Breeding	>20.000	21.12.
Schleswig-Holstein (3)	Schleswig-Flensburg	Chicken/duck	backyard	50	19.12.
	North Friesland	Chicken	Egg production	>16.000	19.12.
	Plön	Chicken	Egg production	>14.000	20.12.

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Table 2: Number of reported HPAIV H5 cases in wild birds, affected bird groups and locations in the period 1 - 31 December 2023 per federal state. Data source: TSN, FLI. Data status: 08.01.2024

Federal state (November/December)	County	Municipality	Wild birds (number of HPAIV notifications)	Date confirmation
Baden-Württemberg (0/1)	Rottweil	Epfendorf	Crane (1)	11.12.
Bavaria (3/4)	Danube-Ries	Mertingen	Crane (1)	07.12.
	Erding	Finsing	Crane (1)	04.12.
	Landsberg a. Lech	Dießen a. Ammersee	Crane (2)	01.12.
Berlin (0/1)	Berlin	Berlin City	Wild goose (1)	13.12.
Hamburg (4/4)	Hamburg	City	Peregrine falcon (1), Swan (1)	01.12.
			Herring gull (1), gull (1)	27.12.
Lower Saxony (5/6)	Cuxhaven	Hagen	wigeon (1)	14.12.
	Wittmund	Langeoog	Great black-backed Gull (1)	05.12.
	Hanover	Hanover	Swan (1)	22.12.
	Diepholz	Diepholz	Wild goose (1)	01.12.
	Empty	Moormerland	Owl (1)	01.12.
	Harburg	Seevetal	White-fronted goose (1)	18.12.
North Rhine-Westphalia (0/1)	Minden- Lübbecke	Minden	Kestrel (1)	15.12.
Saxony-Anhalt (0/1)	Stendal	Tangermünde	Mallard (1)	14.12.
Schleswig-Holstein (12/10)	Dithmarschen	Brunsbüttel	Common buzzard (1), Barnacle goose (4)	18.+20.12.
		Heath	Herring gull (1)	
		Linden trees	Eurasian curlew (1), Barnacle goose (1)	
	Pinneberg	Wedel	Barnacle goose (1)	20.12.
	Schleswig- Flensburg	Silberstedt	Barnacle goose (1)	20.12.
Thuringia (0/1)	Kyffhäuserkreis	Sondershausen	Crane (1)	22.12.

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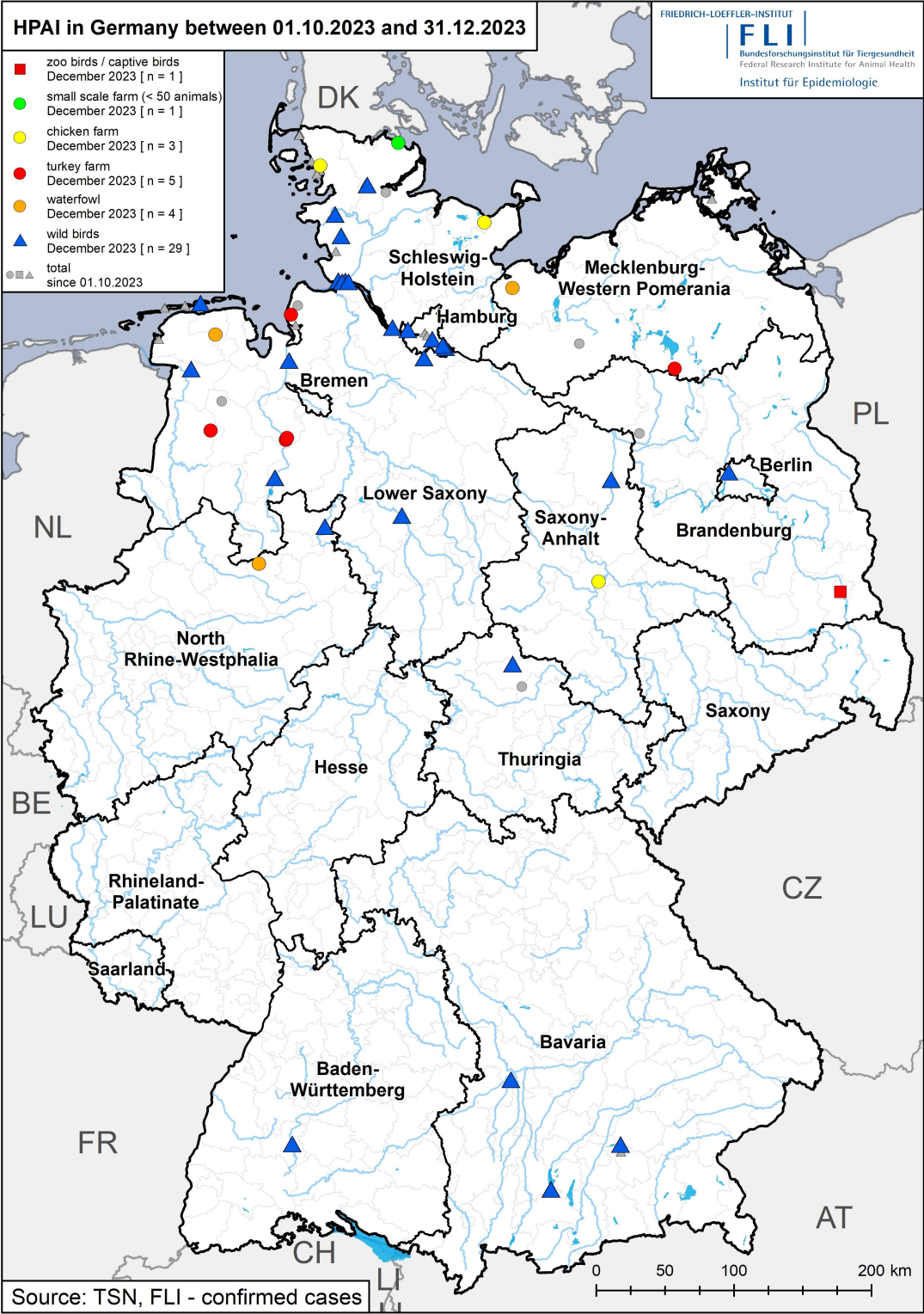


Figure 1: Outbreaks of HPAIV H5N1 in Germany in poultry (dots), other captive birds (zoo/wildlife sanctuary; squares) and cases in wild birds (triangles) since 01.10.2023. In colour current outbreaks and cases for the period 01.- 31.12.2023. Different colours: see legend. Data source: TSN, FLI; data status: 08/01/2024.

Situation in Europe

The number of HPAIV H5 outbreaks in **domestic poultry** in Europe (n=56, excluding Germany) in December was similar to the previous month. Hungary remains a focus with numerous secondary outbreaks (mainly waterfowl) (Fig. 2, 4). In total, more than 1.7 million birds (turkeys, chickens, waterfowl) were affected by outbreaks across Europe in December alone (1.6 million in the previous month). At the beginning of January, France reported an outbreak in waterfowl (ducks) from a flock vaccinated against HPAIV H5N1 in November 2023.

At the end of December, Ukraine reported an outbreak in **captive birds** in the North of the country near the Russian border. The Slovak Republic reported two cases in captive owls (Fig. 4).

The number of **wild bird** cases in Europe also remained high in December with over 150 cases. While Grey cranes were mainly affected in November, wild waterfowl were increasingly affected in December (Fig. 3), particularly Mute and Whooper swans and Barnacle geese. According to an [EFSA](#) report, 20,000-30,000 dead cranes had been collected and disposed of in Hungary alone and 600 in Serbia by 06 December. At the end of December, the Republic of Moldova reported more than 400 dead swans from various locations in the North of the country. In the same period, Ukraine and Romania also reported dead Whooper and Mute swans near the Black Sea or not far from the Moldovan border (Fig. 4).

The **H5N1 subtype** was identified in the majority of cases. Deviating from this, Iceland reported evidence of HPAIV H5N5 in two ravens.

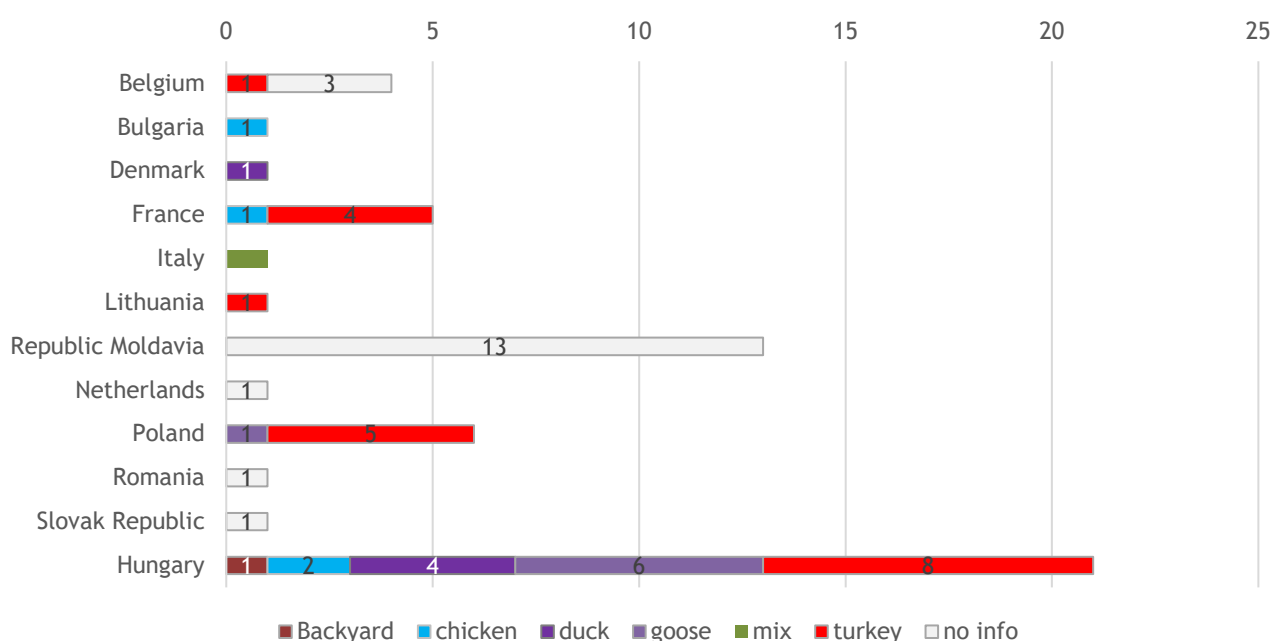


Figure 2: Notifications of HPAIV H5 outbreaks in poultry for December 2023 in Europe (Germany not included). Data source: ADIS; data status: 08/01/2024.

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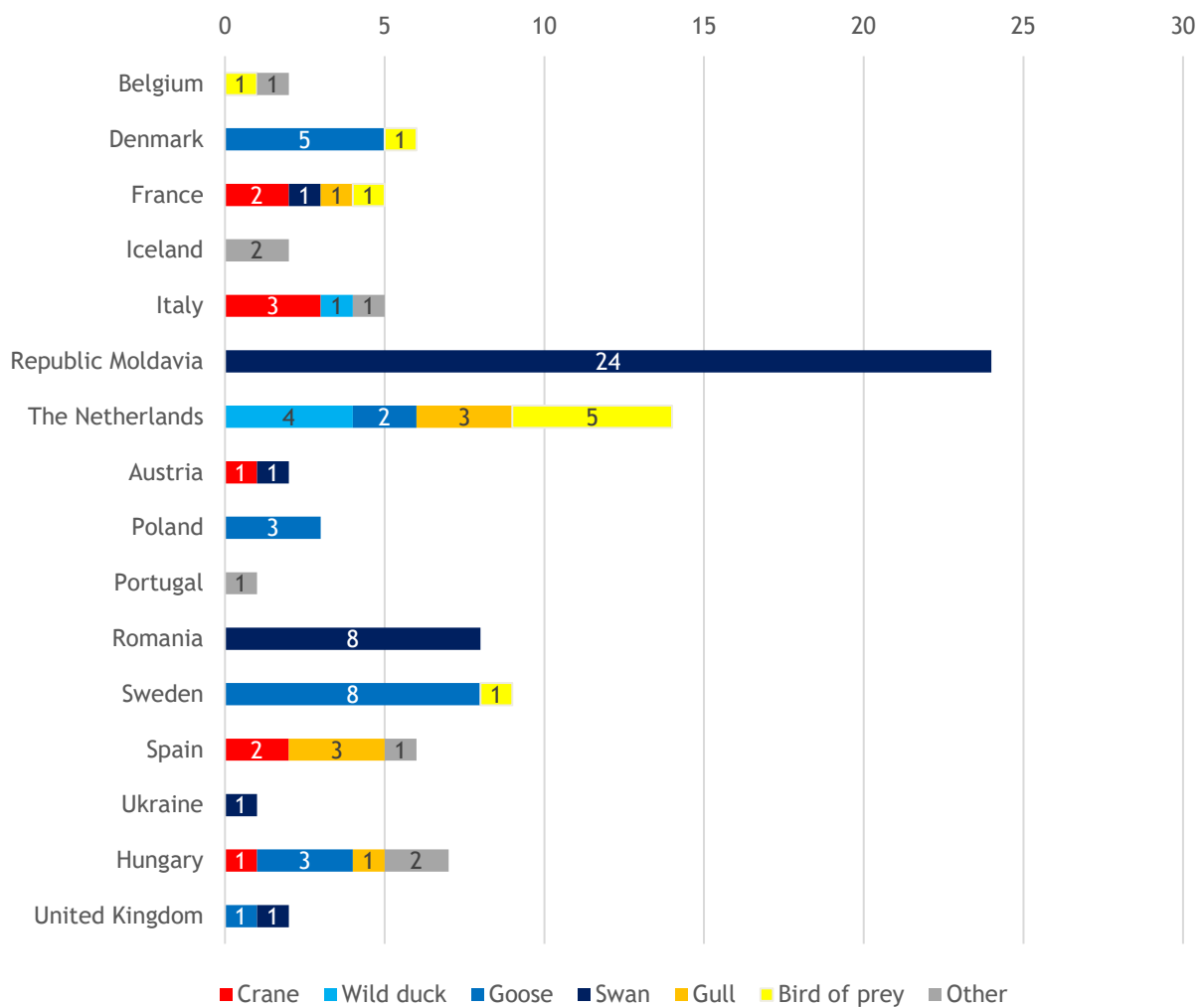


Figure 3: Notifications of confirmed HPAIV H5 cases in wild birds for December 2023 in Europe (Germany not included). The wild bird numbers are only the number of individual reports of tested animals to ADIS, which often conceal a much higher number of affected (dead) birds. Data source: ADIS, WOA; data status: 08/01/2024.

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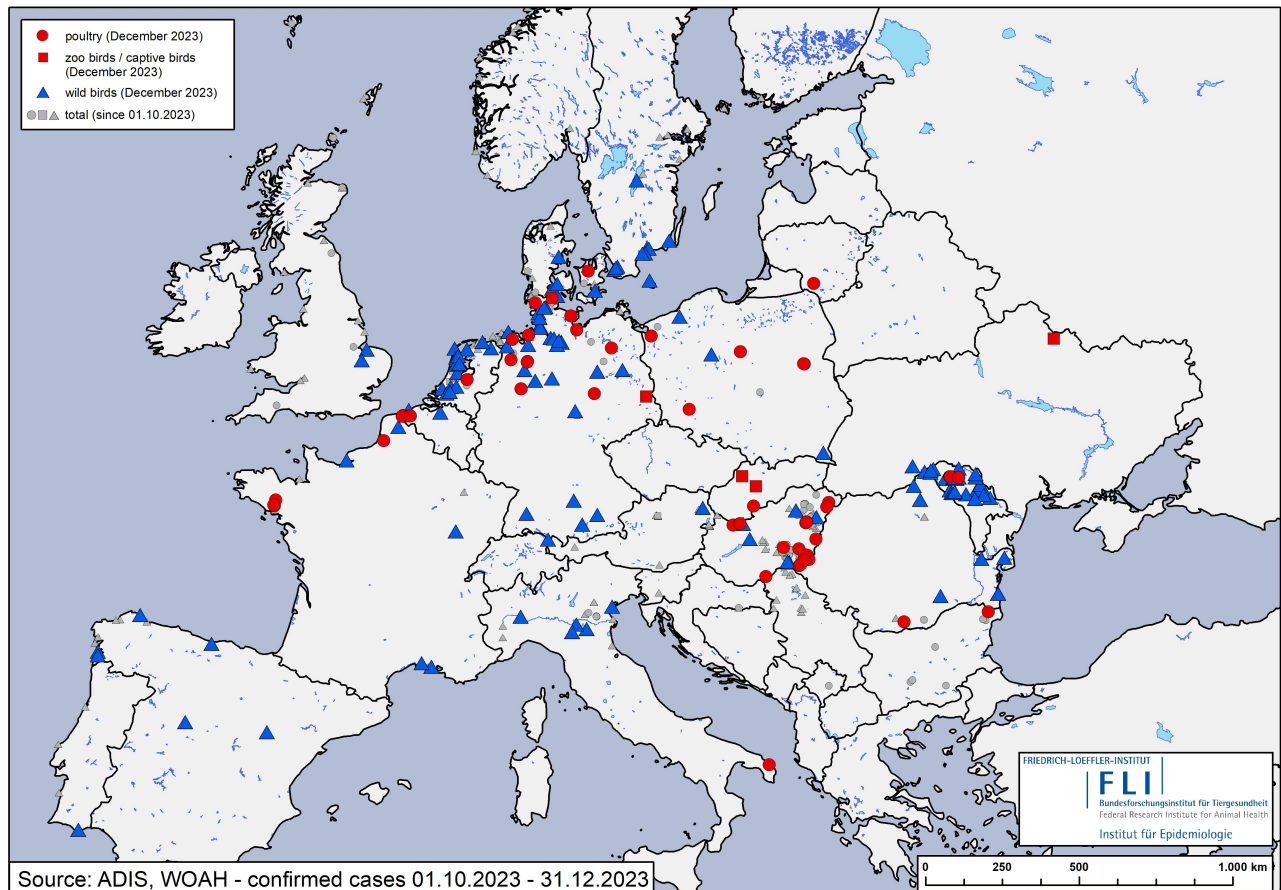


Figure 4: HPAI cases in poultry, captive birds and wild birds reported to ADIS and WOA from 1 October to 31 December 2023. Cases for December in red and blue; poultry = commercial (domestic) poultry; zoo/other privately kept birds = other captive birds. Data source: ADIS, WOA; status of data query: 08/01/2024.

The H5N1 HPAI viruses of clade 2.3.4.4.b characterised in Europe since October 2023 have new and different genotypes, which presumably arose through reassortment of circulating HPAI viruses with various local LPAI viruses. There is an increased number of new genotypes with a renewed trend towards more regionality. The BB genotype, which has been dominant since 2022 and was mainly found in gulls and various seabird species, now appears to have been displaced.

Individual H5N5 viruses have been characterised in Norway, England and Iceland since September 2023. The genotype underlying these viruses was already characterised in 2021, but has not been found since the first quarter of 2022.

In December, the WOA was notified of 7 detections of HPAIV H5 in mammals exclusively from Finnish fur farms (Arctic fox, red fox, American mink, raccoon dog; Fig. 5).

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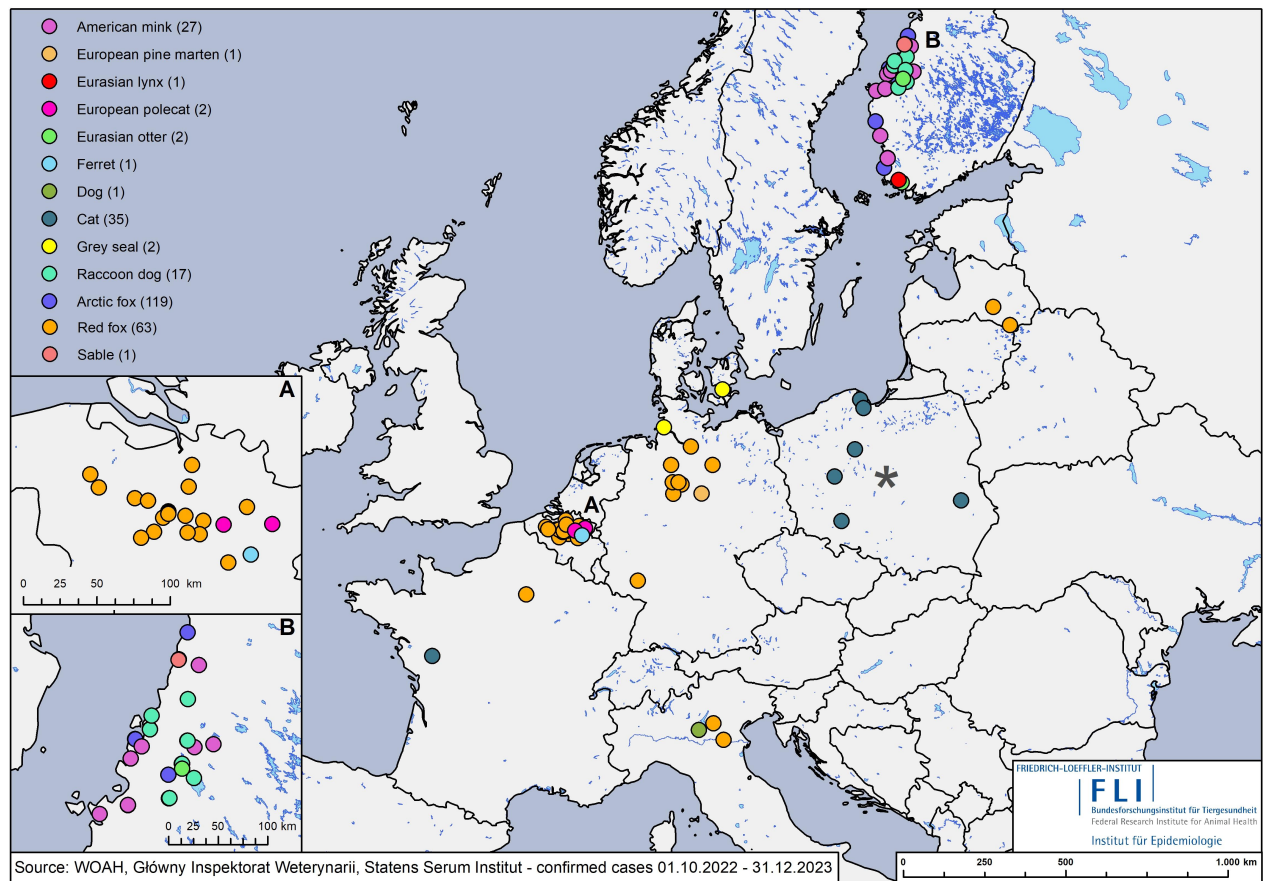


Figure 5: HPAIV H5 infections in mammals in Europe reported to WOA since 01.10.2022. *Polish mammal cases concern 33 cats and 1 caracal and are described on the homepage of the "Main Veterinary Inspectorate" in Poland. Data query: 08/01/2024.

Situation in the world/Special events

Worldwide, outbreaks in **domestic poultry and wild bird cases** caused by HPAIV H5 of clade 2.3.4.4b continued to be reported to the WOA in December, particularly in Asia and the Americas.

- Israel: An outbreak in poultry in Haifa at the beginning of December.
- Kazakhstan: A mass mortality of Mute swans was reported at Lake Karakol at the end of December, in which HPAIV H5N1 was confirmed.
- Southeast Asia: Dozens of outbreaks in domestic poultry and cases in wild birds have been detected in southeast China (Hong Kong), Cambodia, Japan, South Korea and Taiwan.
- Antarctic Region: The first cases of HPAI in a number of wild bird species on South Georgia, a group of islands in the South Atlantic of the Antarctic Region, have continued to spread since October; since December there have been suspected cases in Skuas on Heroína Island and the Orcadas Archipelago.
- From South America, Ecuador, Peru, Colombia and Brazil reported a few outbreaks in domestic poultry and wild bird cases.
- North America: A number of outbreaks in poultry and cases in wild birds were reported in the colder regions of North America (USA and Canada) in December:
 - o Canada: 10 outbreaks in domestic poultry, particularly affecting British Columbia and Alberta.
 - o USA, 21 states: 45 outbreaks in domestic poultry, 33 outbreaks in kept poultry (private farms); a total of over 11.5 million animal losses in December. Over 500 wild birds tested positive in December alone, well over half of them hunted ducks (Teal, Mallard, Northern pintail, Shoveller).

Fatal infections with HPAIV H5 in non-human mammals were reported in December: For the first time in a squirrel, an Abert's squirrel (*Sciurus aberti*), which was sampled in Arizona on 26 August, and in a polar bear in northern Alaska, which was found dead in October. In southern Brazil (Rio Grande do Sul), almost 1,000 seals and sea lions died from an HPAIV H5N1 infection.

Despite the high number of outbreaks in poultry worldwide and an assumed multiple contact between humans and infected birds, **infections with HPAIV H5 clade 2.3.4.4b in humans** still appear to be very rare events that 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 December, China reported the infection of a 33-year-old woman with HPAIV H5N6, which was linked to a visit to a poultry market in Sichuan province. The

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woman had developed symptoms in October and died in November. Genetic analyses showed that it was a clade that does not circulate in Europe.

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 impact on public health is classified as **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

Following a sharp decline in HPAIV outbreaks and cases across Europe in August and September, there has been a sharp increase since November. This is being driven by new genotypes of HPAIV H5N1 2.3.4.4b, which are replacing the genotypes that have dominated since 2022.

Since November, a considerable number of outbreaks in poultry (n=147) have been reported in Europe, whereby an independent event with secondary outbreaks has developed, particularly in regions with a high density of poultry (Hungary). From this period alone, the number of poultry losses across Europe amounts to almost 4 million.

The range of wild bird species affected now includes an increasing number of waterfowl again (in spring and summer it was gulls). An increased number of Mute and Whooper swans were reported from South-east Europe and Kazakhstan in December.

The H5N1 HPAI viruses of clade 2.3.4.4.b characterised in Europe since October 2023 show new and different genotypes, which presumably arose through reassortment of circulating HPAI viruses with various LPAI viruses. A further subtype (H5N5) is circulating in northern Europe and was also detected in a Great black-backed gull in northern Germany in November, in addition to Norway and Iceland.

In many parts of Germany there are suitable resting and wintering areas for a large number of waterfowl. In winter, weather conditions lead to increased movement dynamics (even over long distances) and in some places to high numbers of resting populations. At the same time, small to medium-scale movements of resting waterfowl species favour the spread of the virus to other populations, even over short distances.

Cold temperatures and weaker UV radiation are favourable conditions for the survival of HPAI viruses. Further reassortment events are likely in the coming weeks when waterfowl, which are often infected with low pathogenic influenza viruses at this time, meet at resting places. The presence of H5 antibodies in adult wild birds after surviving infection in recent years could have a positive impact on the overall situation for affected wild birds, but leave circulation unrecognised.

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The risk of HPAI H5 virus introduction and spreading further in waterfowl populations in connection with high waterfowl densities at resting sites within Germany is classified as **high**. The "Bird Flu Radar" (EFSA) shows a high probability of HPAIV H5 being introduced into northern Germany, central Germany and the region around Lake Constance in mid-January. The risk is generally elevated for the whole of Germany.

The risk of HPAIV H5 entering German poultry farms and bird populations in zoological facilities through direct and indirect contact with wild birds is still classified as **high** for January, as reports of wild bird cases continue to be frequent. An increasing number of outbreaks in poultry and captive birds in Europe indicates an elevated risk potential.

It is currently assumed that there is a **high** risk of the virus spreading between holdings (secondary outbreaks) within the EU and also within Germany. The intra-Community movement of poultry from countries with a pronounced outbreak represents a particular risk factor. Turkey and waterfowl flocks in particular are currently affected throughout Europe.

The risk of introduction through the sale of live poultry in the travelling trade or at poultry exhibitions within Germany and Europe is also considered to be **high**.

The risk of undetected circulation of HPAI H5 viruses in waterfowl holdings in Germany is also classified as **high**, especially as waterfowl holdings in Germany were also affected in December.

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 monitoring and clarification tests must be reviewed and strictly adhered to. Poultry farmers are legally obliged to comply with the basic rules of biosecurity. The reporting of deaths in poultry farming to the veterinary authorities, followed by an official investigation, is considered a measure for the early detection of the fatal disease in chickens and turkeys.

Prevention and [biosecurity measures](#) in poultry farms, animal parks and zoos, especially those with outdoor and free-range systems, should be urgently reviewed and optimised where necessary. Livestock farmers 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/>). 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 HPAI case occurred. The British authorities have published a photo book with examples of biosecurity in poultry flocks ([photo book](#)).

Direct or indirect contact between poultry and wild waterfowl or natural bodies of water should be completely avoided in order to prevent the introduction of the disease. A risk-based restriction of the free-range keeping of poultry (stabling) is recommended in the vicinity of frequent cases

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of HPAIV-infected wild birds. Every citizen can use TSIS to view wild bird cases in the districts ([TSIS query](#)).

Increased vigilance for the rapid detection of suspected cases in poultry and the immediate initiation of diagnostic clarification with regard to HPAIV would also include the early testing of sick birds in waterfowl holdings and fallen stock for AIV in order to detect the circulation of HPAI at an early stage.

To avoid secondary outbreaks, at least the following precautions should be taken:

- No shared use of equipment, carcass bins and vehicles by several poultry farms.
- Restriction of vehicle and passenger traffic on poultry farms to an absolute minimum.
- Staff looking after poultry should only work on a single farm.
- Veterinarians and other persons visiting poultry flocks on a professional basis should break off their tour and observe a 48-hour waiting period if they have entered a flock in which clinical signs, including increased mortality, indicate HPAI.

Poultry or bird exhibitions or the sale of live poultry (travelling trade), including supra-regional trade, should be prohibited or effectively monitored. Bringing together (pedigree) poultry of different origins and keeping them for several days at the exhibition venue should be avoided at all costs.

Increased attention must also be paid to compliance with biosecurity measures for intra-Community movements of poultry, particularly to or from EU countries with a current outbreak. Careful cleaning and disinfection must be ensured for poultry transport vehicles returning from affected countries.

Even though EU Regulation 2023/361 has made it possible to vaccinate poultry against HPAI since February 2023, there is still a lack of suitable commercial vaccines authorised for use throughout Europe. In this respect, [considerations](#) of vaccination as a further preventive protective measure in addition to the known biosecurity precautions must remain largely theoretical. France, which has started vaccinating commercial duck farms under a national derogation, was immediately banned from trading poultry with the USA and Japan. This also has consequences for the entire European trading area. Vaccination of poultry would also be linked to considerable monitoring requirements, which are financially costly and would also place a heavy burden on the personnel capacities of veterinary offices and testing facilities.

Persons exposed to potentially infected poultry or captive birds, e.g. during killing or evacuation, or who have come into contact with infected wild birds, must be adequately protected and actively monitored or self-monitored for at least 10 days after exposure for respiratory symptoms or conjunctivitis and immediately inform local health and occupational health services to initiate testing and follow-up. Antiviral pre- or post-exposure prophylaxis should be considered and stocked for exposed individuals in accordance [with national recommendations](#).

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Surveillance of wild mammals for HPAIV H5 infection (see below), but also mammals kept in captivity (fur animals) should be intensified. Similarly, dogs, cats and pigs kept on farms with poultry with HPAIV outbreaks should be included in environmental testing (swab and serum samples).

In times of high risk or when HPAIV cases or outbreaks are known in an area, consideration should be given to suspending hunting of waterfowl, both to reduce disturbance to wild bird populations and to reduce the possibility of spreading infection from the wild to the domestic environment when infected birds are transported. In addition, there is an increased risk of infection of humans or domestic animals (dogs, cats) when handling raw, infected meat.

It is virtually impossible 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 sea eagles). Conservationists, national park rangers, bird wardens, bird ringers etc. should be prepared to deal with sick and dead birds in co-operation with the relevant veterinary authorities, and the possible collection and disposal of dead birds should be planned in advance. The public is called upon to report dead finds and conspicuous cases of illness (neurological symptoms) to the veterinary authorities. 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 and background information can be found [here](#).

Close personal and unprotected contact with dead or sick birds should be avoided; in general, if your own (even mild) symptoms of illness occur as a result of such contact, a doctor must be consulted immediately 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 centres as part of rabies screening, tissue samples from the CNS and lungs should always be tested for influenza virus RNA.

Abnormal behaviour and deaths of wild birds and mammals in connection with wild bird mortality 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 information on the total number of non-investigated dead finds, 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](#).

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Data sources: Animal Disease Notification System (TSN), Animal Disease Information System (ADIS), World Organisation for Animal Health (WOAH), EMPRES-I, European Food Safety Agency (EFSA), [Scientific Committee on Antarctic Research](#); [Canadian Food Inspection Agency](#); [USDA APHIS | Animal Health Landing Page](#)

Query period: 01.-31.12.2023;

Query date: 08.01.2024

Further information

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

The European Food Safety Authority (EFSA) provides an updated edition of the scientific assessment of what is happening in Europe: [Avian influenza overview September-December 2023 | EFSA \(europa.eu\)](#).

In addition to weekly updated [maps of the outbreaks](#), the FLI also provides information on molecular-virological investigations of HPAI viruses in Germany ([HPAIV genotypes in Germany | Zenodo](#)) and a catalogue of questions ([FAQ](#)).

The [Radar](#) Bulletin Germany is published at monthly intervals on the FLI website.

The magazine for the poultry industry (DGS) has set up an [avian influenza radar](#) in which avian influenza outbreaks are listed chronologically with details of species, numbers and locations.

The European Reference Laboratory for Avian Influenza has launched a new [HPAI dashboard](#) on HPAI detections in the EU.

The EFSA has also set up an [HPAI dashboard](#) in which the figures in Europe can be displayed in real time.

Together with Euring, Eurobird Portal and Ausvet, EFSA has set up a [Bird Flu Radar](#).

The WHO published a [risk assessment](#) on 21 December 2022.

The British Trust of Ornithology (BTO) has published helpful [tips](#) for bird ringers.

Meanwhile, the FAO's Scientific Task Force on Avian Influenza in Wild Birds and others are calling on authorities to recognise HPAI as a problem for the conservation of biodiversity and to [Monitoring and control measures](#) should also be geared towards the protection of wild fauna.

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"[Offlu](#)" published an overview of HPAI cases in wild birds and mammals in South America and the Antarctic region in December with an assessment of the risk of entry into Oceania and the Antarctic penguin population. The document also refers to management options.