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Rapid Risk Assessment

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

Update for the period
April (1.-30.) 2023

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

Situation in Germany

Between 01 and 30 April 2023, 3 HPAI outbreaks were detected in poultry in Germany (Table 1). The outbreaks affected two private mixed holdings, including a small holding, in Jerichow, Saxony-Anhalt, where chickens and ducks were affected, as well as a turkey fattening farm with approx. 9,000 birds (Schwäbisch Hall district, Baden-Württemberg) (Tab. 1, Fig. 1). All outbreaks were caused by the HPAIV subtype H5N1.

In North Rhine-Westphalia, HPAIV H5N1 was detected in a juvenile crane in a zoo in Rheine on 13 April 2023.

After the number of cases in wild birds had stagnated at a high level in recent months, there was now an overall decline in the number of cases in the reporting period (n=97 compared to 185 in the previous month). Most cases were reported from Bavaria (Tab. 1, Fig. 1). Similar to the previous month, the most frequent reports concerned gulls (60), followed by wild geese (25), birds of prey (9), swans (2) and wild ducks (1). Reports of mass mortalities of black-headed gulls in German inland breeding colonies in Zwillbrocker Venn (North Rhine-Westphalia), Plessenteich (Neu-Ulm, Bavaria), at Lake Constance (Baden-Württemberg and adjacent Vorarlberg nature reserve Rheindelta in Austria) and since May also in Rehbach near Leipzig (Saxony) suggest local, epizootic events. Since not all dead birds at a site are tested for HPAIV, the total number of HPAIV-infected birds is estimated to be many times higher. Only the HPAIV subtype H5N1 was detected.

In addition to four cases of HPAIV H5N1 in foxes and a grey seal in March, two more HPAIV H5N1 cases were found in red foxes in Hamburg and North Rhine-Westphalia in April (Tab. 1).

***Table 1**: Number of reported HPAI outbreaks in poultry flocks (includes commercial and non-commercial holdings), captive birds (zoos or wildlife sanctuaries), wild birds and mammals for the period 1 to 30 April 2023 by federal state. The number in brackets quantifies the number of outbreaks in March 2023. Unlabelled cells mean: 0(0).Data source: TSN, FLI.*

Federal State	Poultry	Captive birds (Zoo)	Wild birds	Mammal
Baden-Wuerttemberg	1 (1)	0 (1)	14 (62)	
Bavaria	0 (1)		40 (32)	
Brandenburg			2 (2)	
Hamburg			7 (11)	1* (0)
Mecklenburg-Western Pomerania	0 (2)		6 (0)	
Lower Saxony			1 (6)	0 (4)
North Rhine-Westphalia		1 (0)	8 (47)	1* (0)
Saxony-Anhalt	2 (0)		0 (1)	
Schleswig-Holstein	0 (1)		18 (24)	0 (1**)
Thuringia	0 (1)		1 (0)	
Total	**3 (7)**	**1 (1)**	**97 (185)**	**2 (5)**

*Red Fox;**Grey Seal

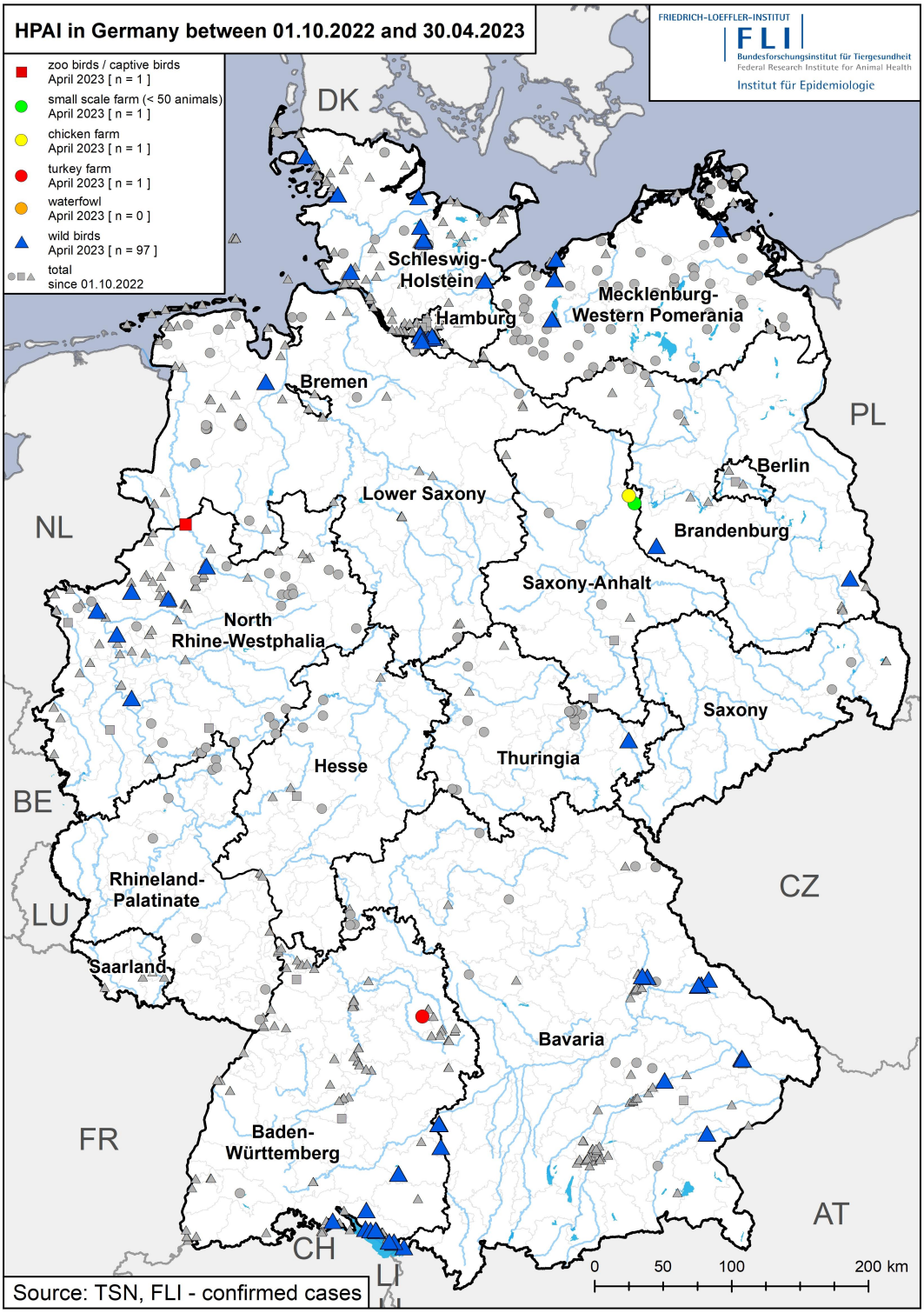

***Figure 1**: Outbreaks of HPAIV H5N1 in Germany in poultry (dots), other kept birds (zoo/wildlife sanctuary; squares) and cases in wild birds (triangles) since 1 October 2022. In colour current outbreaks and cases 1-30 April 2023. Different colours: see legend. Data status: 5 May 2023; data source: TSN, FLI.*

Situation in Europa

Across Europe, the number of **outbreaks in poultry** increased in April compared to the previous month. Between 01 and 30 April 2023, Hungary reported the most outbreaks (39), while Italy reported 6, the United Kingdom 3, and Denmark and the Czech Republic one each (Fig. 2). In Hungary, outbreaks are confined to the southern region of Bács-Kiskun, where large numbers of ducks and geese are kept for *foie gras* production. In total, half a million ducks and geese have been killed in Hungary since the beginning of the year due to HPAI outbreaks, 70% of which occurred in April. In Italy, poultry farms in the Po Valley are affected. Elsewhere, the number of outbreaks in poultry has decreased.

In **captive birds**, one outbreak each was reported in Norway and Belgium in April.

Not only in Germany, but also in England and Wales, Belgium, the Netherlands, Denmark and Poland, there have been clustered deaths in black-headed gull colonies, which is also reflected in the HPAIV-H5N1 detections in **wild birds** examined: Almost 70% of all HPAIV-H5N1 positive wild bird samples from 17 European countries come from gulls (Fig. 3), of which black-headed gulls predominate, 14% from birds of prey, most frequently peregrine falcons, while detections in swans and geese but especially ducks have declined sharply. The investigation numbers for gulls do not represent the current mortality in gulls, as only a fraction of dead animals per site are examined. All infections are due to the HPAIV H5N1 subtype.

The HPAI H5N1 viruses in gulls studied so far in Europe predominantly belong to the genotype "gull-like BB" 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 was also responsible for HPAIV cases in mink in Spain.

In the mammalian HPAI H5N1 viruses, mutations have been detected in some cases (e.g. PB2 E627K), which indicate an adaptation to mammals.

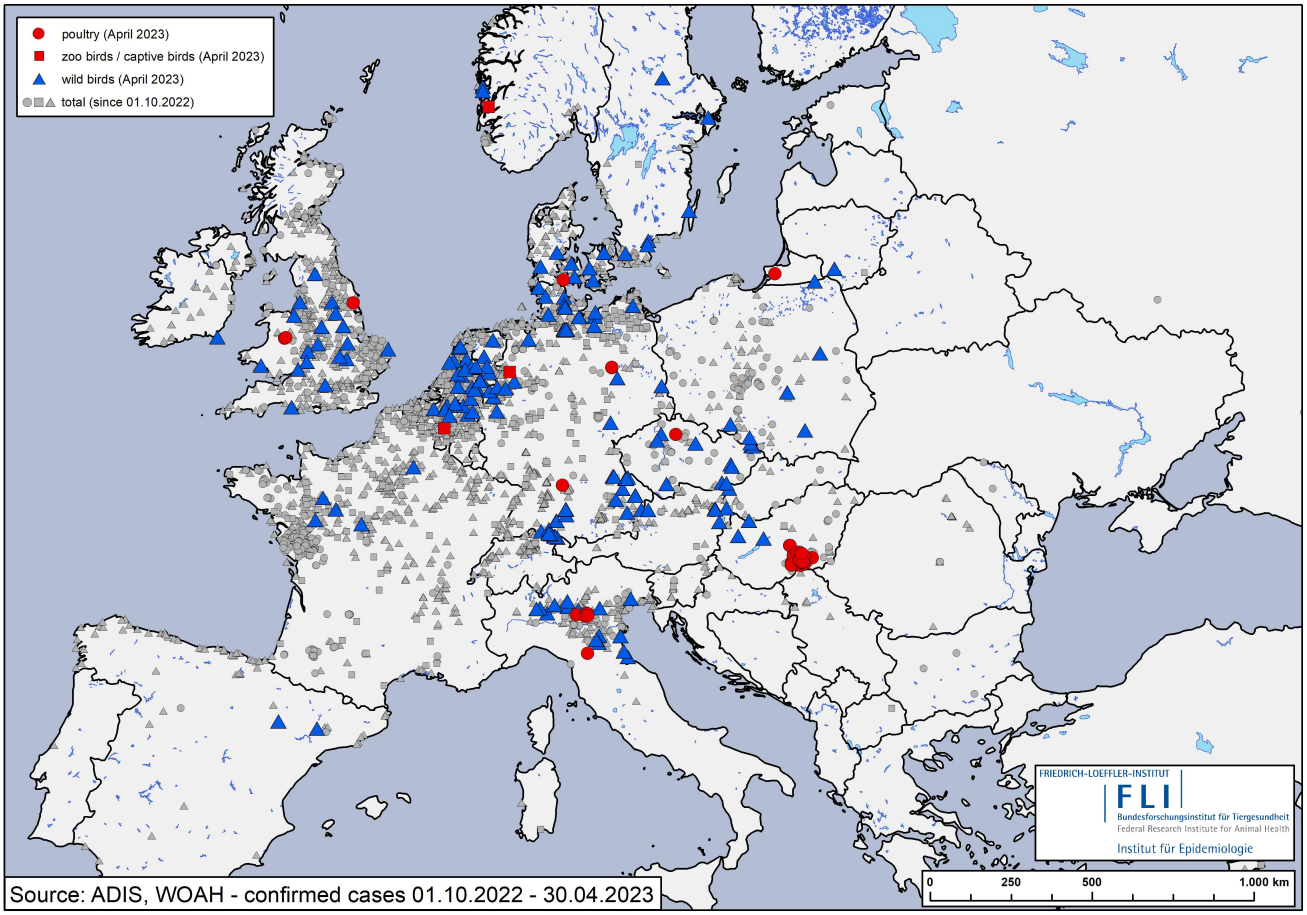

***Figure 2**: HPAI cases in poultry, captive birds and wild birds reported in ADIS and to WOAH from 1 October 2022 to 30 April 2023. Current cases as of 1 April 2023 in red and blue; poultry = (domestic) poultry kept for commercial purposes; zoo birds / other birds = other captive birds. Data update: 5 May 2023.*

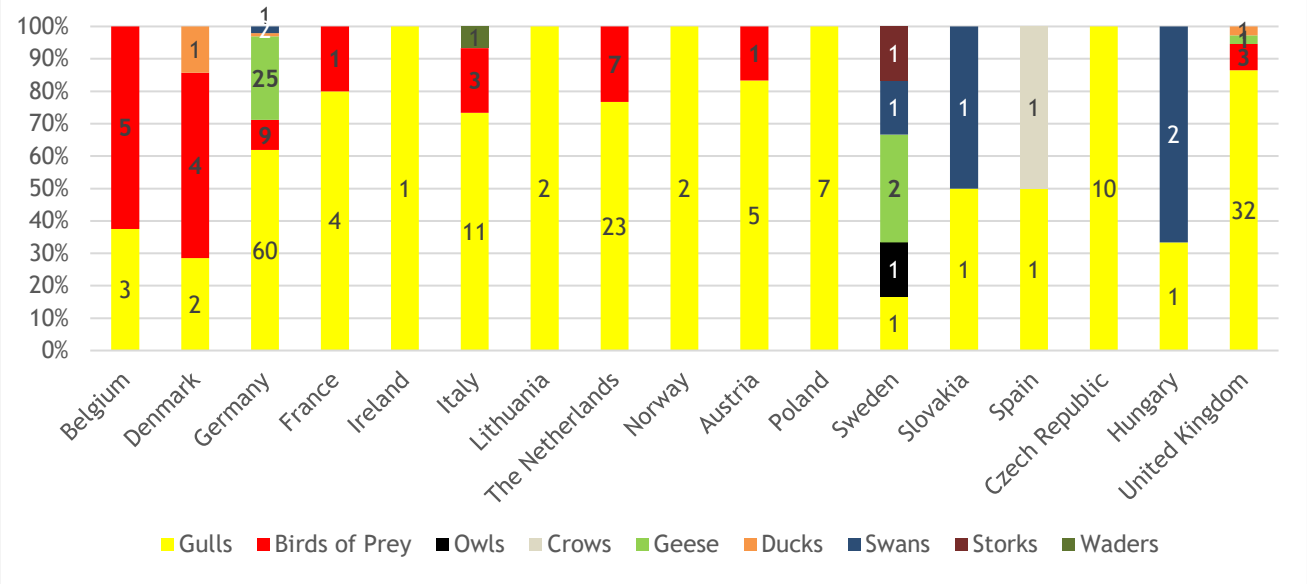

***Figure 3**: Percentage shares of affected bird groups in the positively tested investigation material per country for April 2023. Source: ADIS, TSN.*

Situation in the world/special events

Globally, outbreaks of HPAIV H5 clade 2.3.4.4b are slowly declining, but there are still detections in Asia (Japan and Korea), Africa (see below) and the American double continent: In Chile, new regions and species are affected by HPAIV H5N1, including Humboldt penguins, in which about 1,000 deaths (10 % of the total Humboldt penguin population in Chile) have been recorded so far. In the USA (Arizona), HPAIV H5N1 has been detected in a total of 20 dead California condors (*Gymnogyps californianus*), representing 3.6% of the global population. In Uruguay, authorities reported outbreaks in poultry. In Africa, the virus spread to previously unaffected areas. In Gambia, for example, HPAIV H5N1 was detected in a wild bird sanctuary and led to mass mortality among terns and gulls, similar to what happened in neighbouring Senegal in March.

In **terrestrial (*carnivorous*) and marine (*ichthyovorous*) mammals**, the number of reported cases is increasing worldwide in the course of the panzootic ("pandemic among animals"). In addition to the above-mentioned foxes in Germany, the following reports of mammals newly affected by HPAIV H5N1 clade 2.3.4.4b were published in April:

In the USA, three dead domestic cats from Nebraska and Wyoming, which had presumably eaten infected wild birds, tested positive for HPAIV H5N1. In addition, in the USA, a total of 12 red foxes (including 6 from New York State alone), 5 mountain cats, 3 striped skunks and one opossum have tested HPAIV H5N1 positive in the states of Montana, California, Colorado, New York, Pennsylvania, New Mexico and Wyoming since 01.04.2023.

From South America, Chile reported a "historically high number" of thousands of dead stranded marine mammals since the beginning of 2023. This compares to only 160 dead stranded marine mammals recorded in all of 2022. A sample of the dead chungungos (sea otters), sea lions, harbour porpoises and Chilean dolphins found dead were HPAIV H5N1 positive.

Japan reported an HPAIV-infected fox from Sapporo (Hokkaido).

Despite the very 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** remain very rare events, but are closely monitored and documented. In addition to four cases of human infection with a mild course in Europe and North America, a clade 2.3.4.4b infection with a severe course was detected in a girl from Ecuador in January. In addition, Chilean authorities reported HPAIV H5N1 infection in a 53-year-old man from northern Chile on 29 March 2023, who was severely ill. The virus contained two specific mutations in genome segments indicating mammalian adaptation.

According to a risk assessment by the European Centre for Disease Prevention and Control (ECDC), the risk of zoonotic influenza virus transmission to humans with public health implications is still considered low, but a moderate risk is assumed for occupationally exposed groups having close contact with infected poultry (Source).

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Summary and risk assessment

The current global HPAI H5N1 epidemic continues to be dynamic, although case numbers in sampled birds in Europe are currently decreasing. The virus continues to spread in the Americas from Canada to southern Chile and Argentina and continues to infect mammals.

Genetic analyses of the circulating H5N1 subtype virus strain show that the virus persisted year-round in domestic wild birds in Europe in 2022. The number of outbreaks in poultry in the EU between December 2022 and April 2023 has now decreased sharply from the peak in November 2022. In wild birds, a shift of affected bird species towards gull-birds is evident. The black-headed gull is currently particularly affected, with breeding population densities rising seasonally and thousands of them dying in their breeding colonies across Europe.

Large waterfowl aggregations (e.g. swans and ducks during winter rest) have dispersed, but waterfowl and wader bird movements are still expected in coastal areas in May due to birds migrating home to their breeding grounds. Colony-breeding birds (terns, gulls, boobies, cormorants) have returned to their breeding grounds from wintering areas in Africa and southern Europe during April, densities may continue to increase slightly. Small- to medium-scale movements of waterbird species and gulls towards inland freshwater areas or coastal areas for breeding continue to occur and promote short-distance virus spread to other populations and breeding colonies. Rising temperatures and increased UV radiation can contribute to accelerated inactivation of influenza viruses.

The risk of HPAI H5 viruses spreading to breeding colonies of shorebirds and gulls within Germany is considered ***high***, especially due to the continuing high infection rates, especially among black-headed gulls in northern and central Europe.

The risk of HPAIV H5 introduction into German poultry farms and bird populations in zoological facilities through direct and indirect contacts with wild birds is considered ***high***, inter alia because black-headed gulls in particular are also found inland at all times of the year and their habitats may overlap with poultry production areas. As bridging species, gulls may bring poultry production sites and waterbird habitats into contact with each other.

The number of outbreaks in poultry and captive birds in Europe is decreasing, but remains high localised in certain regions and poultry production sectors (e.g. Hungary *foie gras* poduction in waterfowl). Therefore, a ***low risk*** of introduction through spread of the virus between holdings (secondary outbreaks) within Germany is assumed.

The risk of entry through the sale of live poultry in the travel trade or poultry exhibitions/fairs within Germany and Europe is considered as ***moderate***.

For waterfowl farms in Germany, the risk of undetected circulation of HPAI H5 viruses and consequently of spread between flocks is also assessed as ***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 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 absolutely avoided.

Greater attention should also be paid to compliance with biosecurity measures in the case of intra-Community movements of poultry, especially to or from EU countries where outbreaks are currently widespread. Careful cleaning and disinfection should be carried out on poultry transport vehicles returning from affected countries.

In the vicinity of HPAIV-infected wild birds (black-headed gull colonies), a risk-based restriction of free-range poultry (stabling) is recommended. The use of TSIS to view wild bird cases in the counties (TSIS-Abfrage) is possible.

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.

It is hardly possible to influence the course and spread of HPAIV infections in wild bird populations. However, the collection of carcasses has proven to be useful, especially in affected breeding colonies. However, it may trigger a disturbance for sensitive bird species and lead to a spatial distribution of the virus if infected animals migrate and spread the virus to other colonies. The protection of colony-breeding rare bird species is a high priority. 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. Communication between veterinary and environmental authorities should be strengthened. A detailed and newly published document on action advice and background information on the current situation can be found here: https://www.waddensea-worldheritage.org/resources/management-guidelines-mitigation-and-data-collection-strategies-avian-influenza-bird.

Similar 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 should always also be tested for influenza virus RNA.

Abnormal behaviour and the occurrence of dead wild birds and mammals associated with wild bird mortalities should be reported immediately to the veterinary authorities for recovery and investigation if necessary. Correct species identification of dead birds should be made and reported, along with an indication of the total number of non-investigated dead animals.

For an overview of further options for action, a catalogue of recommendations is available here.

Data sources: TSN, ADIS, WOAH, FLI
Query period 01.04.2023-30.04.2023.
Query date: 05.05.2023

Further references

The data situation 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) offers an up-to-date edition of the scientific evaluation of what is happening in Europe: Avian influenza overview December 2022 – March 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) and a questionnaire (FAQ).

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

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

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

The WHO published a risk assessment on 21 December 2022. Assessment of risk associated with recent influenza A(H5N1) clade 2.3.4.4b viruses (who.int)

US authorities publish daily mammal cases on a website: USDA APHIS | 2022-2023 Detections of Highly Pathogenic Avian Influenza in Mammals