

Update on the surveillance of **avian Influenza** and **Newcastle disease** in France in 2014

Isabelle Guerry* (1), Audrey Schmitz (2), Séverine Rautureau (1), Eric Niqueux (2), François-Xavier Briand (2), Véronique Jestin (2)

(1) Directorate General for Food, Animal Health Office, Paris, France

(2) ANSES, Ploufragan Plouzané Laboratory, NRL for avian influenza/Newcastle disease, France

* Management team member of the French National Epidemiological Surveillance Platform for Animal Health (ESA Platform)

Abstract

In 2014, France maintained its status as "free from high and low pathogenic avian *Influenza*" and "free from Newcastle disease", as defined by the OIE Animal Health Code. The end of the year was marked by the circulation of high pathogenic avian *Influenza* H5N8 in northern Europe and an outbreak in Italy. The health situation in neighbouring countries and the communication required improved the vigilance of the different stakeholders, resulting in a slight increase in programmed surveillance activity and in wild bird mortality monitoring. As in previous years, programmed surveillance of avian *influenza* in farms revealed batches of H5-seropositive birds in waterfowl farms, although the virus remained undetected. The surveillance protocols were amended at the end of the year in order to increase their efficiency, with the introduction of a graded system for suspicions.

Keywords

Category 1 health hazard, Regulated disease, Avian *Influenza*, Newcastle disease, Pigeon paramyxovirus, Poultry, Birds, France

Résumé

Bilan de la surveillance de l'*Influenza* aviaire et de la maladie de Newcastle en France en 2014

*La France a conservé en 2014 son statut indemne vis-à-vis de l'*Influenza* aviaire hautement et faiblement pathogène et de la maladie de Newcastle au sens du code sanitaire de l'OIE. La fin d'année 2014 a été marquée par un contexte de circulation d'*Influenza* aviaire hautement pathogène (IAHP) à H5N8 dans le nord de l'Europe et l'apparition d'un foyer en Italie. Ce contexte sanitaire dans les pays voisins, et la nécessaire communication, ont permis d'accroître la vigilance des différents acteurs qui s'est traduite par une légère augmentation de l'activité de la surveillance événementielle et du suivi des mortalités chez les oiseaux sauvages. Comme les années précédentes, la surveillance programmée de l'*Influenza* aviaire en élevage a mis en évidence des lots d'animaux séropositifs pour le sous-type H5 au sein d'élevages de palmipèdes, sans pour autant mettre en évidence de virus. Les protocoles de surveillance ont fait l'objet de travaux en fin d'année, pour en augmenter l'efficacité, notamment par la gradation des suspicions.*

Mots-clés

*Danger sanitaire de 1^{ère} catégorie, maladie réglementée, *Influenza* aviaire, maladie de Newcastle, paramyxovirose du pigeon, volailles, oiseaux, France*

The aim of this article is to present the results of the surveillance scheme for avian influenza (AI) and Newcastle disease (ND) in France in 2014. The end of 2014 was marked by circulation of the HPAI H5N8 virus in the north of Europe, and the emergence of an outbreak in Italy (EFSA, 2014; OIE 2014b).

In France, following the ANSES Opinion (ANSES, 2014) and the confirmation of a case in birds in Germany (Harder *et al.*, 2014; OIE, 2014a), the level of risk of highly pathogenic avian influenza was increased from "negligible" to "moderate" on 27 November, which led to biosafety measures being enhanced and prohibition measures being taken, concerning for instance certain gatherings of birds.

Following the measures taken and the surveillance put in place, no cases of avian influenza or Newcastle disease were identified in 2014, enabling France to retain its disease-free status with regard to these two diseases.

This article details the results of surveillance in 2014: outbreak and programmed surveillance, and monitoring of wild bird mortality.

Outbreak surveillance of avian influenza and Newcastle disease in farmed and captive birds

Procedures

Outbreak surveillance in holdings involves the notification of clinical suspicions of AI or ND in accordance with the Ministerial Orders of 18 January 2008 for avian influenza (Box 1) and 8 June 1994 for Newcastle Disease (Box 2). It is based on the detection and characterisation of AI viruses or avian Type 1 paramyxoviruses in samples from suspect poultry.

Results

The change in the epidemiological context in France was reflected in a slight increase in the number of suspicions in domestic birds and avian influenza screening in birds found dead (Table 1), without any cases of HPAI being confirmed.

Fifteen suspicions of avian influenza were reported in poultry farms, and another five among amateur breeders of pigeons and doves, making a total of twenty suspicions investigated (sometimes a combination of HPAI and Newcastle disease). Laboratory tests ruled out infection by a regulated highly pathogenic virus (HPAI) of subtype H5 or H7.

Subtype H7 was not detected in France in 2014. In contrast, a low pathogenic AI virus of subtype H5 was identified following a non-negative test result from avian influenza screening. It was an LPAI virus of subtype H5N1, detected in the corpses of greylag geese in the framework of checks carried out by the aviation industry.

The additional tests conducted by the NRL on the suspicions that had been reported to it led to the detection of other non-regulated influenza viruses and thereby contributed to a better understanding of the viruses circulating in France. As a result, in 2014, the NRL identified the 2009 pandemic AI virus (H1N1) in two breeder turkey farms where a drop in egg laying had been observed.

With regard to Newcastle disease, viruses were detected in the birds of three private owners. Two of the cases concerned owners of

Table 1. Number of suspected cases of avian influenza in France in wild birds and poultry between 2012 and 2014

	2012	2013	2014
Wild birds	49	61	79
Poultry	2	14	15

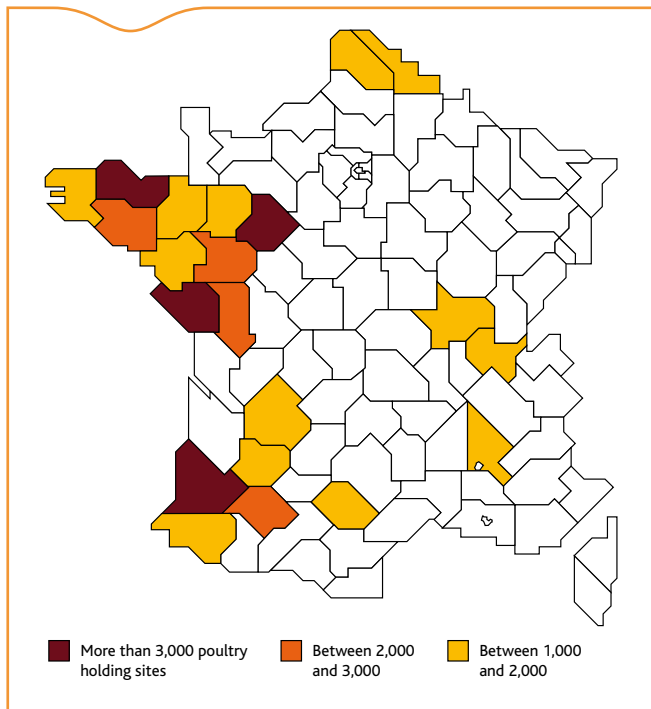


Figure 1. Distribution of poultry holdings (all species) in France registered in the national database in 2014 (source: SIGAL)

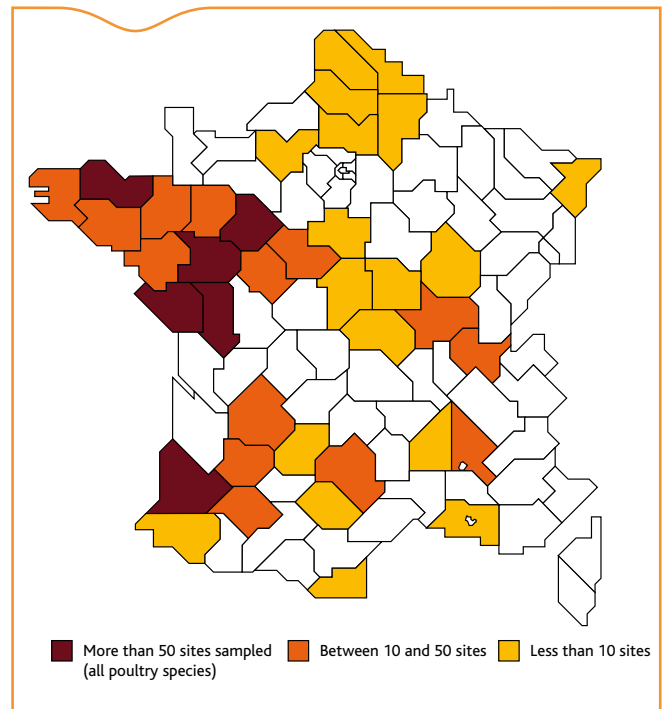


Figure 2. Distribution of poultry holdings in France sampled for annual serological testing in 2014 (source: Memorandum DGAL/SDSPA/N2014-433)

captive pigeons (birds not included in the poultry category according to the guidelines of the OIE and the European Commission) and detection of type 1 paramyxovirus (PPMV1), the pigeon variant of Newcastle disease. The third concerned the owner of a backyard flock comprising Galliformes and water fowl. The type 1 paramyxovirus (PPMV1) detected in samples taken from chickens (*Gallus gallus*) was an avirulent strain that may be a vaccine strain.

Discussion

Due to the fact that no regulated IA or ND viruses were found in poultry, the health status of the country has not been called into question. However, because of the circulation of highly pathogenic avian influenza in Europe in November 2014, the need for vigilance was reiterated by Memorandum DGAL/SDSPA/2014-902 of 19 November.

On 27 November 2014, following the identification of an HPAI virus in a wild bird in Germany, the risk level was increased from "negligible" to "moderate". This increase in the risk level led to enhanced biosafety measures, a ban on certain events, an increase in the level of vigilance and the sensitivity of surveillance, and greater efforts to monitor mortalities in wild birds, although the number of birds actually tested remains low. No cases of HPAI were detected in 2014.

Programmed surveillance on farms

As it has done every year since 2002, France participated in the European surveillance programme for avian influenza both in farms and among wild birds.

Surveillance procedures for 2014 are detailed in [Box 1](#).

As in previous years, the farms and the poultry species identified in the national database ([Figure 1](#)) do not correspond to the definition of farms given by Commission Decision 2010/367/EC. Consequently, the sampling plan announced is not always suited to the farms in the various *départements*.

In 2014, the categories of farms to be sampled were taken into account to more closely correspond to Decision 2010/367/EC, mainly by grouping together holdings previously classified in two categories. Thus, only one category of "fattening turkeys" has been retained,

limited to free-range turkeys; "fattening ducks" includes both ready-for-gavage and broiler ducks; and pheasant and partridge holdings have been grouped together in the "gallinaceous game birds" category, equating to 140 fewer farms (22%) compared to the 2013 sampling objectives for these production holdings (Memorandum DGAL/SSDPA/N2014-433 of 5 June 2014). In contrast, the sampling plan provided for an increase in the number of goose farms to be sampled. Lastly, the "other" category, which cannot be sorted for the current European-level survey, includes flocks of guinea fowl, which are more easily found in the open air, to the detriment of quail, which are systematically kept indoors and are difficult to sample because of their small size.

Results of programmed surveillance on farms

The survey was implemented between 17 June and 10 December 2014 in 721 poultry farms according to the distribution shown in [Figure 2](#).

In total, 17 water fowl farms (breeder ducks and geese, ready-for-gavage and broiler ducks) were thus confirmed as H5 seropositive, while one breeder duck farm obtained an ambiguous H5 result. Of these 18 holdings, nine underwent additional virological sampling in the same batches as the ones that had yielded the positive or ambiguous results. All the results were negative. The nine remaining farms could not be sampled for virology, because the batches concerned had been slaughtered before receipt of the screening results.

In a context of circulation of the H5N8 virus (at least from November 2014 in Europe) and identification by the EURL of major antigenic differences of the H5N8 virus compared to the antigens recommended until 2014 for the European serological surveys ("2014 recommended antigens"), sera collected at the end of autumn 2014 were analysed retrospectively with an H5N8 antigen provided by the EURL. Thus, the sera of five H5 seropositive domestic water fowl flocks with the "2014 recommended antigens" (three from ready-for-gavage ducks and two from breeder geese) as well as one H5 seronegative breeder duck flock with these same antigens, all collected between 22 October and 17 November 2014, were also selected for analysis with the H5N8 antigen. No increase was observed in antibody titres or number of sera reacting to the H5N8 antigen. Consequently, no traces of infection by an H5N8 virus were detected in these holdings.

Objectives of the surveillance programme

- To confirm and maintain France's disease-free status (as defined by the OIE Health Code).
- To provide early warning of any introduction or circulation of a strain of avian influenza.
- To ensure the reporting and investigation of suspected cases of avian influenza.
- To detect the circulation of strains of low pathogenic avian influenza (LPAI) subtypes H5 and H7 in domestic poultry in order to prevent the spread of these low pathogenic strains and avoid the risk of mutation into highly pathogenic strains.
- To ensure programmed surveillance of avian influenza in poultry and wild birds.

The population monitored

Poultry, captive birds and wild birds found in France.

Surveillance procedures

Outbreak surveillance

- **In poultry holdings:** notification to the DDecPP of clinical suspicion based on alert criteria (Ministerial Order of 18/01/2008).
- **Wild birds:** notification of mortality and collection of dead wild birds according to instructions dependent on the level of epizootic risk of highly pathogenic avian influenza (HPAI). With a negligible level of risk, the definition of abnormal mortality is one swan carcass or five dead birds on a given site within a period of seven days or less (Memorandum DGAL/SDSPA/N2007-8056 of 28 February 2007), while with a moderate level of risk, collection takes place from two Anatidae instead of five (Memorandum DGAL/SDSPA/2014-964 of 4 December 2014).
- **Decoy ducks:** obligation for any holder of decoy ducks for hunting waterfowl to declare, either to their veterinarian or to their local departmental hunting association (FDC), all cases of clustered deaths of decoy ducks or grouped cases of symptoms affecting the nervous system (lack of coordination, tremor, twisted neck, etc.) except for cases of flaccid paralysis (possibility of botulism) (Memorandum DGAL/SDSPA/N2011-8007 of 4 January 2011).

Programmed surveillance

In poultry holdings

European Union measures stress the importance of detecting and controlling outbreaks of low pathogenic avian influenza (LPAI) caused by subtypes H5 and H7 in farms, in order to prevent the spread of these low pathogenic strains and to prevent the risk of mutation to highly pathogenic strains.

The method adopted for farms in France is surveillance based on the risk of exposure to infection by AI. It focuses on areas near wetlands and where wild birds congregate, and also *départements* with a high density of poultry holdings (Figures 1 and 2).

Programmed surveillance in livestock holdings is specified in Memorandum DGAL/SDSPA/2014-433 of 6 June 2014 and is based on: (i) the detection of antibodies to AI viruses of subtypes H5 and H7 in a sample of sera from the flocks of poultry concerned, and then ii) in the event of positive results, the detection and characterisation of the corresponding viruses in oro-pharyngeal and cloacal swabs taken from birds in the same flocks, if they have not already been slaughtered. The sampling advocated in Commission Decision 2010/367/EC is intended to detect with a probability of 95% (99% for duck and goose farms) at least one infected poultry holding, when the prevalence of infected poultry holdings is at least 5%.

Wild birds and decoy ducks

Active surveillance ended for these categories in 2012 and 2011, respectively. Programmed surveillance of decoys, with swabs being taken, which is considered from a moderate level of epizootic HPAI risk, was not implemented in 2014.

Vaccination

Vaccination is prohibited in France except for any vaccination programme approved by the European Commission.

Definitions (Ministerial Order of 18/01/2008)

HPAI: Infection caused by an avian influenza virus:

- belonging to subtypes H5 or H7 with genomic sequences coding for multiple basic amino acids at the haemagglutinin cleavage site, similar to those observed for other HPAI viruses, indicating that haemagglutinin can undergo cleavage by a ubiquitous host protease,
- or showing, in six-week old chickens, an intravenous pathogenicity index greater than 1.2.

LPAI: infection caused by avian influenza virus subtype H5 or H7 that does not fit the previous definition.

Suspicion of avian influenza (highly or low pathogenic): based on:

- epidemiological or clinical evidence or lesions. Depending on the evidence, suspicion can be oriented towards either LPAI or HPAI, and/or
- non-negative results in laboratory tests leading to suspicion of infection by an AI virus (positive H5 or H7 serology or positive PCR for the M or H5 or H7 gene in an accredited laboratory).

Confirmation of avian influenza: confirmation of infection by an LPAI or HPAI virus by the NRL.

Health control measures

- In the case of (clinical or analytical) suspicion:
 - > Holding is placed under an APMS order,
 - > Samples are taken for virological PCR analyses in an accredited laboratory or sent to the NRL for confirmation of a positive PCR obtained in an accredited laboratory and determination of LPAI and HPAI strains.
- In the case of analytical suspicion from a waterfowl holding without clinical symptoms (positive serological tests for H5 or H7 confirmed by the NRL), additional samples are taken for virological screening if the original flock is still present in the holding (Memorandum DGAL/SDSPA/N2008-8287 of 18 November 2008).

A trace-back/trace-forward epidemiological survey is conducted whose objective is to:

- > date the infection event and identify the source of infection,
- > estimate the risk of the virus spreading and thus take control measures according to this risk,
- > determine which holdings are at risk, i.e. holdings with epidemiological connections with a suspect holding, as well as poultry farms located near the suspect holding.
- In the case of a confirmed outbreak, the holding is placed under an APDI order, animals are slaughtered (or sent to a slaughterhouse if infection with LPAI), cleansing and disinfection operations are undertaken, protection and surveillance zones are set up for HPAI (3 and 10 km, respectively) and for LPAI (1 km).

Regulations

Council Directive 2005/94/EC of 20 December 2005 on Community measures for the control of avian influenza and repealing Directive 92/40/EEC

Commission Decision 2010/367/EU of 25 June 2010 on the implementation by Member States of surveillance programmes for avian influenza in poultry and wild birds

Ministerial Order of 18 January 2008 laying down the technical and administrative measures for the control of avian influenza

Ministerial Order of 24 January 2008 regarding the level of epizootic risk due to infection of birds by a highly pathogenic avian influenza virus and the surveillance system and control measures for captive birds

Operational indicators of Programmed surveillance

Time to results

In 2014, 38 batches of poultry were received at the NRL for confirmatory analyses by H5 and/or H7 haemagglutination inhibition (HI) assay.

As shown in Table 2, the cumulative time frames for sending samples and conducting sampling and analyses may explain why, when further investigations were needed, the incriminated batch was no longer present in the holding. For this reason, only half of the seropositive flocks were available for additional sampling for detection of the virus.

As in previous years, the longest intervals corresponded to the period between sampling in the farms and receipt by the NRL for confirmation, with an average of 50.9 days and a maximum of 126 calendar days (storage of samples in nearby laboratories was for an average of 10.4 days and a maximum of 73 days, and conducting the screening tests in accredited laboratories and then shipping the batches of sera presumed positive from these laboratories to the NRL took an average of 40.5 days and a maximum of 102 days). These results are worse than those from the previous year and fail to meet the original objectives of the 2014 campaign.

Other data on this interval between conducting sampling in the holdings and receipt of samples at the NRL for confirmation were provided by the SIGAL national database for the 38 batches sent to the NRL:

- the average storage time of blood samples until receipt by the accredited laboratory concerned varies according to the *départements*, ranging from 2.7 days to 20.3 days,
- the average time for receiving the results varies greatly depending on the screening laboratories, ranging from 6.4 days to 57.3 days on average (with a maximum of 11 to 91 days),
- the time taken to send samples screened as positive candidates to the NRL ranges from five to 35 days.

The time between receipt by the NRL of the samples for confirmation, and sending of the corresponding test reports was 6.7 calendar days on average (an improvement compared to 2013), which is fast considering the non-urgent nature of these analyses.

The time between sending test reports for seropositive cases and their return to the source holding was on average 10.1 calendar days, which is quick, and slightly shorter than the average time frame estimated in 2013, proving the high level of responsiveness among the different services involved.

Coverage rate

Table 3 shows the number of samples taken by category of farm as well as the testing rates compared to the objectives for the year. In 2014, the overall sampling rate in the different poultry production holdings (excluding ratites) was 90.1%.

The coverage rate by species varied from 44% to 138%, without taking ratites into account, for which samples were only taken at two farms.

The testing rate in breeder and pre-adult breeder geese – for which the sampling plan had been modified in 2014, from 20 farms to be sampled to 80 – was the lowest in this campaign with only 44% of samples taken. It can be explained by the lack of corresponding holdings for this category. In ostrich farms, samples were taken at the slaughterhouse for safety reasons, and their *ad hoc* slaughter required repeated trips to obtain the necessary samples.

The other species had coverage rates higher than 70%.

It should be noted that results are lacking for ten batches of sera, which were obtained within the deadlines, but sent for analysis after the completion of the survey.

Comparison with previous years

Over the past three serological survey campaigns in holdings, the seropositivity rates were calculated for H5 by production type and by year, as well as the 95% confidence interval obtained by following either the normal or binomial (in the event of small sample sizes) distribution (Table 4).

For breeder geese, ready-for-gavage duck and broiler duck holdings, the confidence intervals show overlapping values for the three years surveyed. There is therefore no significant difference in seropositivity rates between the last three serological surveys.

Lastly, a difference was highlighted between 2013 and 2014 for the production of breeder ducks: only 10.4% of farms were detected H5 seropositive in 2014, whereas 30.8% had been detected in 2013 with non-overlapping confidence intervals. However, in this type of production, the proportion of positive flocks in 2014 was not significantly different from that observed in 2012. Initial analyses have not highlighted any factor concerning the age of the ducks or the sampling date that might explain this change. Various assumptions can be made, in particular, an effect related to the year, a lack of representativeness of the antigens used, or a change in farming practice. A similar phenomenon has been observed at European level (Breed *et al.*, 2015), although no additional explanatory information has been provided to date.

Surveillance of mortality in wild birds

Objectives and design of the surveillance programme

The goal of the surveillance programme for wild birds is the early detection of the highly pathogenic H5N1 subtype in order to protect poultry in farms and public health. It is based on the search for the virus by PCR from oro-pharyngeal and cloacal swabs taken from birds following clustered fatalities (at least five dead birds on the same site in less than a week) or for any swan carcass, as specified in Memorandum

Table 2. Intervals expressed as calendar days during programmed serological surveillance of avian *Influenza* in 2014. In order to compare, number in brackets refers to the 2013 intervals.

BS ¹ → received at screening lab. → received at NRL ² → test report sent (NRL) ³ → return to holding ⁴					
	Period 1	Period 2	Period 1+2	Period 3	Period 4
	Blood sampling → received at screening lab.	Received at screening lab. → received at NRL for confirmation, after screening	Blood sampling → received at NRL for confirmation, after screening (comparative 2013 data)	Received at NRL → NRL test report sent (comparative 2013 data)	NRL test report sent → return to holding (comparative 2013 data)
Mean	10.4	40.5	50.9 (43.5)	6.7 (11.4)	10.1 (12.2)
Minimum	0	6	10 (11)	3 (5)	4 (2)
Maximum	73	102	126 (85)	10 (19)	26 (21)

Box 2. Newcastle disease (ND) surveillance and health control measures

Objectives of the surveillance programme

- To ensure France's ND-free status (as defined by the OIE Health Code).
- To detect as early as possible any evidence of type 1 paramyxovirus virus circulation in poultry and captive birds.
- To ensure the reporting and investigation of suspected cases of Newcastle disease.

The population monitored

Poultry species and captive birds throughout France.

Surveillance procedures

- Outbreak surveillance: notification of clinical suspicions in poultry and captive birds to the DDecPP.
- Programmed surveillance: none.

Vaccination

Mandatory vaccination in pigeons (Memorandum DGAL/SDSPA/N2012-8145 of 9 July 2012).

Definitions

- **Newcastle disease:** infection caused by any strain of Type 1 avian paramyxovirus in day-old chicks with an intracerebral pathogenicity index (ICPI) greater than 0.7.
- **Poultry:** chickens, turkeys, guinea fowl, ducks, geese, quails, pigeons, pheasants, partridges and flightless birds (ratites), raised or kept in captivity for the purposes of reproduction, production of meat or table eggs or restocking game supplies.
- **Confirmed case of Newcastle disease:** confirmation by the NRL of the presence of a type 1 avian paramyxovirus showing the characteristics of a virulent strain.

Health control measures

In the case of suspicion:

- The holding is placed under an APMS surveillance order, samples (organs) are taken for virological analyses that entail inoculation on embryonated eggs, and are sent to one of the two laboratories accredited for virus isolation.
- Trace-back/trace-forward epidemiological survey: traceability of animals introduced to or leaving the holding during the risk period (21 days before the onset of clinical signs). The objective of this investigation is to:
 - > date the infection event and identify the source of infection,
 - > estimate the risk of the virus spreading and thus take control measures according to this risk,
 - > determine which holdings are at risk, i.e. holdings with epidemiological connections with a suspect holding, as well as poultry farms located near the suspect holding.

When an outbreak is confirmed:

- The holding is placed under an APDI order.
- Birds are slaughtered, cleansing and disinfection measures are implemented, along with protection and surveillance zones of 3 and 10 km, respectively.
- Waiver possible for ornamental birds with a 60-day containment period.

Regulatory References

Ministerial Order of 8 June 1994 laying down the control measures for Newcastle disease

Table 3. Statement of the 2014 avian Influenza surveillance in farms

Production	Data extracted from SIGAL on 07-01-2015				Data from the NRL				Additional analyses: molecular analyses according to results reported to the NRL	
	No. batches sampled	No. holdings in which batches were sampled	Target no. Holdings (see Memorandum DGAL/SDSPA/N2014-433)	Coverage rate (farms sampled compared to target - in %)	No. batches sent to the NRL	No. AI positive holdings (IDG)	No. H5 seropositive holdings	No. H7 seropositive holdings	No. retested batches ^a	No. positive batches ^a
Broiler duck	35	35	40	88	2	/	2	0	0/2	/
Mallard duck	14	14	15	93	0	/	0	0	/	/
Breeder and pre-adult breeder duck	79	77	80	96	14	/	7 + 1 ambiguous	0	3/8	0/3
incl. Pre-adult breeder Muscovy (≤24 weeks)	13	13			1	/	0	0	/	/
incl. Muscovy breeder	23	22			2	/	0	0	/	/
incl. Pre-adult Peking breeder (≤18 weeks)	6	6			/	/	0	0	/	/
incl. Peking breeder	37	36			11	/	7 + 1 ambiguous	0	3/8	0/3
Ready-for-gavage duck	60	59	50	118	6	/	3	0	1/3	0/1
Free-range turkey	53	53	60	88	0	0	/	/	/	/
Breeder turkey	50	46	53	87	1	1	0	0	/	/
Pheasant	19	19	20	95	1	/	0	0	/	/
Breeder and pre-adult breeder goose	36	35	80	44	7	/	5	0	5/5 ^b	0/5
incl. pre-adult breeder goose (≤24 weeks)					0	/	0	0	/	/
incl. breeder goose					7	/	5	0	5/5 ^b	0/5
Partridge	30	30	40	75	1	/	0 ^c	0	/	/
Guinea fowl	65	65	60	108	6	/	0	0	/	/
Caged laying hen	44	44	60	73	0	0	/	/	/	/
Free-range laying hen	63	63	60	105	0	0	/	/	/	/
Breeder hen	57	53	60	88	0	0	/	/	/	/
Free-range broiler	83	83	60	138	0	0	/	/	/	/
Slaughterhouse ^d	43	43	60	72	0	0	/	/	/	/
Ratite	2	2	exhaustif		0	/	0	0	/	/
TOTAL	733	721	-	90,1^e	38	1	17 + 1 ambiguous	0	9/18	0/9

/ : not applicable

a: tested with rRT-PCR for the H5 gene

b: 1 batch tested with rRT-PCR for the M gene

c: 1 batch could not be interpreted

d: samples were only taken from Gallus gallus

e: excluding ratites, the total coverage rate was 719 / 798 = 90.1%

DGAL/SDSPA/N2007-8056 of 28 February 2007. It is carried out in collaboration with the agents of the ONCFS, hunting associations, organisations responsible for the observation, study or protection of wild birds, and also all those who frequent natural environments and the managers of public spaces.

Given the likely role of wild birds in the introduction of the highly pathogenic H5N8 virus in Europe (ANSES, 2014; EFSA, 2014), surveillance of HPAI H5N1 has been extended to detection of the H5N8 subtype. In addition, in priority areas of particular risk (as defined in the Ministerial Order of 24 January 2008), the above-mentioned virological analyses are triggered any time that two dead Anatidae species or one dead swan are discovered, to compensate for the reduction in mortality linked to the low virulence of the HPAI H5N8 virus in Anatidae (Memorandum DGAL/SDSPA/2014-964 of 4 December 2014 on the measures applicable to the moderate level of risk of HPAI).

In addition, AI viruses detected by the accredited laboratories in the framework of research programmes involving wildlife can be sent as necessary to the NRL for typing.

Results of surveillance of wild birds

In 2014, the DGAL was informed of 79 wild birds found dead (Table 1). All were screened for Avian Influenza H5/H7 by PCR, with negative results.

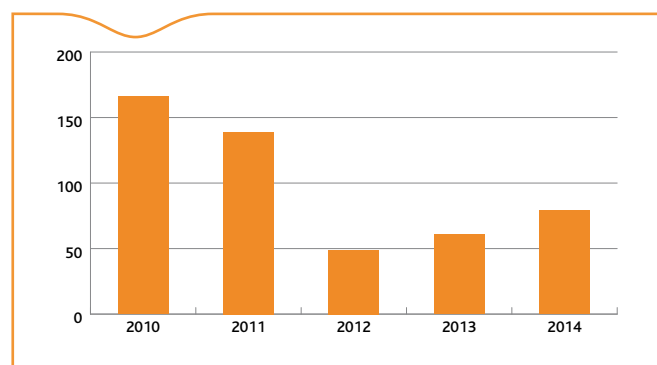


Figure 3. Annual numbers of birds found dead and screened for the AI virus using PCR

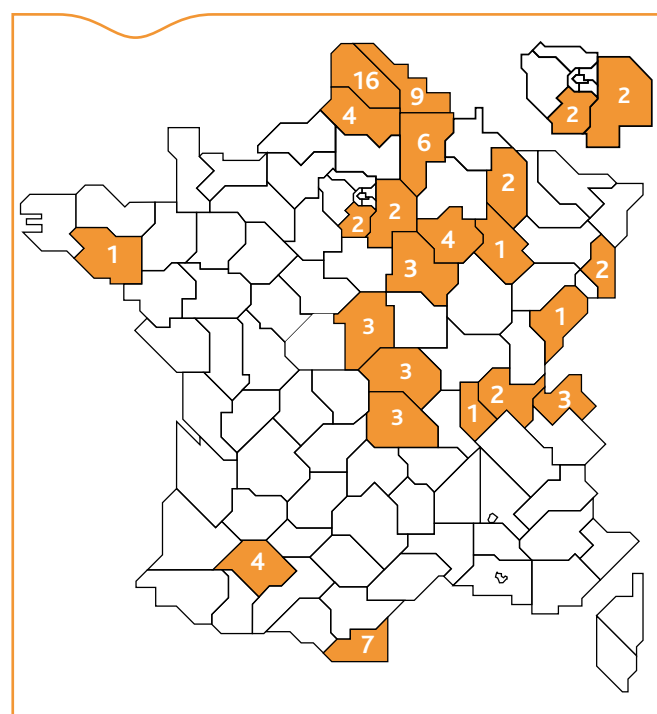


Figure 4. Distribution of dead wild birds analysed by département in 2014

Nevertheless, AI viruses not belonging to subtypes H5/H7 were detected. Firstly, subtypes H11N2 and H3N8 were found in mallard ducks in the Pas-de-Calais *département*, respectively in August and October, and secondly, subtype H1N1 was found in Seine-et-Marne in November, in a mallard duck and a swan. In addition, in Columbiformes, type 1 avian paramyxoviruses belonging to three subgroups of the genotype VI were identified.

The number of mortalities reported in the framework of wild bird surveillance rose slightly compared to the 61 birds tested in 2013, with 79 dead birds being analysed in 2014, including 23 in November and December (Figure 3).

Figure 4 shows the distribution of dead birds analysed per *département* in 2014.

Conclusions and outlook

Since the last HPAI outbreak in holdings in 2006, and the summer outbreaks involving wild birds in Moselle in 2007, no HPAI viruses have been detected in France.

Memorandum DGAL/SDSPA/2014-902 of 19 November 2014 reported on the circulation of HPAI H5N8 in Europe and called for vigilance. This memorandum was issued just before the increase in the risk level set by the Decree of 27 November 2014 and for which the applicable measures were specified by Memorandum DGAL/SDSPA/2014-964 of 4 December 2014.

Biosafety measures, such as the containment of farms in priority areas of particular risk, and prohibition measures, including bans on gatherings of birds in areas through which migratory birds pass, have helped reduce the risk of the HPAI virus being introduced in farms from wildlife. However, the Ministerial Order of 24 January 2008 has shown limitations in terms of the clarity and grading of measures, in situations that can involve low-zoonotic or non-zoonotic strains, and a revision of this text is planned.

Due to both: i) the significant antigenic differences of the H5N8 virus compared to the antigens recommended in 2014 for the serological surveys in holdings and ii) the low virulence of this virus in Anseriformes, the European Commission has asked Member States to use the H5N8 antigen as a supplement for the serological tests in ducks and geese during the 2015 survey (Van Goethem, 2015).

In the framework of the Epidemiological Surveillance Platform for Animal Health (ESA Platform), the assessment of HPAI surveillance by the Oasis method recommended standardising and clarifying certain procedures. The development of new surveillance protocols progressed in 2014, both for domestic birds and wildlife, in particular with the description of new forms of HPAI outbreak surveillance in domestic birds in Memorandum DGAL/SDSPA/2015-127 of 12 February 2015.

As regards Newcastle disease and pigeon paramyxovirus, as in previous years the results show that virulent PPMV1 continues to circulate in enzootic mode, especially in wildlife, which concurs with the observations of the other European countries and confirms the need to vaccinate captive pigeons.

Acknowledgements

The authors wish to thank all those who took part in the serological surveys conducted in holdings and in the surveillance of wild birds and live decoy ducks: farmers, mandated veterinarians, DDecPP staff, ONCFS staff, departmental and national hunting associations, departmental veterinary services and the NRL.

References

ANSES, 2014. Avis de l'Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail relatif à une évaluation du niveau de risque d'introduction en France du virus IAHP H5N8 via l'avifaune et du risque potentiel pour la santé publique lié à cette circulation d'IAHP [Opinion of the French Agency for Food, Environmental and Occupational

Table 4. Comparison of results obtained during the 2012, 2013 and 2014 campaigns

	2014			2013			2012		
	No. holdings sampled	No. H5 seropositive holdings	Proportion of H5 positive holdings (in %, [95 % CI])	No. holdings sampled	No. H5 seropositive holdings	Proportion of H5 positive holdings (in %, [95 % CI])	No. holdings sampled	No. H5 seropositive holdings	Proportion of H5 positive holdings (in %, [95 % CI])
Breeder quail ^a	/	/	/	15	0	0 [0.0-21.8]	15	0	0 [0.0-21.8]
Broiler duck	35	2	5.7 [0.7-19.2]	82	0	0 [0.0-4.4]	76	0	0 [0.0-4.7]
Mallard duck	14	0	0 [0.0-23.2]	20	0	0 [0.0-16.8]	18	0	0 [0.0-18.5]
Breeder and pre-adult breeder duck	77	7 + 1 ambiguous	10.4 [4.6-19.5]	78	22 + 2 ambiguous	30.8 [20.8-42.2]	72	13 ^a + 1 ambiguous	19.4 [10.3-28.6]
RFG duck ^d	59	3	5.1 [1.1-14.2]	93	5	5.4 [1.8-12.1]	93	3 + 2 ambiguous	5.4 [1.8-12.1]
Caged turkey ^c	/	/	/	66	0	0 [0.0-5.4]	69	0	0 [0.0-5.2]
Free-range turkey	53	0	0 [0.0-6.7]	59	0	0 [0.0-6.1]	58	0	0 [0.0-6.2]
Breeder turkey	46	0	0 [0.0-7.7]	64	0	0 [0.0-5.6]	49	0	0 [0.0-7.3]
Pheasant	19	0	0 [0.0-17.7]	34	0	0 [0.0-10.3]	37	0	0 [0.0-9.5]
Breeder and pre-adult breeder goose	35	5	14.3 [4.8-30.3]	16	4	25.0 [7.3-52.4]	16	2	12.5 [1.6-38.6]
Partridge	30	0 ^b	0 [0.0-11.6]	33	0	0 [0.0-10.6]	28	0	0 [0.0-12.3]
Guinea fowl	65	0	0 [0.0-5.5]	49	0	0 [0.0-7.3]	56	0	0 [0.0-6.4]
Caged laying hen	44	0	0 [0.0-8.0]	46	0	0 [0.0-7.7]	47	0	0 [0.0-7.6]
Free-range laying hen	63	0	0 [0.0-5.7]	79	0	0 [0.0-4.6]	67	0	0 [0.0-5.4]
Breeder hen	53	0	0 [0.0-6.7]	59	0	0 [0.0-6.1]	60	0 ^b	0 [0.0-6.0]
Free-range broiler	83	0	0 [0.0-4.4]	87	0	0 [0.0-4.2]	91	0	0 [0.0-4.0]
Slaughterhouse	43	0	0 [0.0-8.2]	53	0	0 [0.0-6.7]	46	0	0 [0.0-7.7]
Ratite	2	0	0 [0.0-84.2]	2	0	0 [0.0-84.2]	4	0	0 [0.0-60.2]
TOTAL	721	17 + 1 ambiguous		935	31 + 2 ambiguous		902	18a + 3 ambiguous	

a: 1 flock both H5 seropositive and H7 ambiguous

b: with 1 batch that could not be interpreted

c: quails and caged fattening turkeys were sampled and analysed until 2013. These two production types were not targeted in 2014.

d: ready-for-gavage

The 95% confidence intervals were calculated for a binomial distribution, according to the statistical test applied (i.e. depending on sample size).

The ambiguous flocks are regarded as positive.

Health & Safety on an assessment of the level of risk of introduction in France of the HPAI H5N8 virus *via* birds and the potential risk to public health linked to this circulation of HPAI] Request No 2014-SA-0239 21 November 2014, 11pp.

Breed, A., Wittmann, E., Duncan, D., Brouwer, A., Arnold, M., Slomka, M., Tye, J., Brown, I., 2015. Surveillance for Avian *Influenza* in Europe and implications following recent HPAI events. Communication 21st Annual NRL meeting for AI and ND, 2nd-4th June 2015, Budapest, Hungary.

EFSA, 2014. Highly pathogenic avian *influenza* A subtype H5N8. Scientific report of EFSA. EFSA Journal 2014;12(12):3941; 32pp.

Harder, T., Beer, M., Mettenleiter, T., 2014. Avian *influenza*, Germany, HPAI H5N8, migratory birds. ProMed-mail 22 November 2014, archive no. 20141122-2982721.

OIE, 2014a. Highly pathogenic avian *influenza*, Germany Health Information Follow-up report No. 1 of 25 November 2014. http://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?reportid=16576

Van Goethem, B., 2015. Avian *influenza* surveillance in poultry. Use of an additional antigen. Letter to CVOs. CE SANTE/G2/MP/dj (2015) 1234231.