

Avian Influenza: H5 and H7 outbreak update report

10 March 2023



agriculture, land reform
& rural development

Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

Report compiled by:
Directorate: Animal Health

Please note: This report includes all information as available by close of business on 10 March 2023. *Avian Influenza update reports will from now on be issued on a fortnightly basis.*

1. Introduction and Background

Avian influenza is a highly contagious viral disease that affects several species of food producing birds, pet birds and wild birds. Occasionally other mammals, including humans, may also contract avian influenza. H5 and H7 avian influenza are classified into two categories according to the severity of disease it causes in poultry namely low pathogenic avian influenza (LPAI) and highly pathogenic avian influenza (HPAI). LPAI strains cause few or no clinical signs in poultry while HPAI strains may cause severe clinical signs and potentially high mortality rates among poultry. Both categories had to be reported to the World Organisation for Animal Health (WOAH, founded as OIE). This was reviewed and since 1 January 2022, only HPAI in poultry and birds other than poultry are reportable to the WOAH. LPAI has to be reported only when there is proof that natural transmission with severe consequences in humans occurred.

Poultry is defined by the WOAH as all domesticated birds, used for the production of meat or eggs for consumption, for the production of other commercial products, for restocking supplies of game, or for breeding these categories of birds, as well as fighting cocks used for any purpose. Backyard poultry is excluded from the WOAH definition of poultry only if the birds are kept in a single household, the products of which are used within the same household exclusively with no direct or indirect contact with poultry or poultry facilities (2021 OIE Terrestrial Animal Health Code).

Outbreaks of HPAI in poultry may result in trade bans on the export of poultry and poultry products. Reporting of HPAI outbreaks in non-poultry (e.g. wild birds, pet birds, birds kept as a hobby, backyard poultry as defined by the 2021 OIE Terrestrial Animal Health Code), to the WOAH do not have trade implications.

In South Africa, avian influenza of any subtype is a controlled animal disease in terms of the Animal Diseases Act, 1984 (Act No 35 of 1984). Any suspect or confirmed case of avian influenza of any subtype must be reported immediately to the responsible state veterinarian in terms of the Animal Diseases Act, 1984 (Act No 35 of 1984). Both passive and active surveillance for avian influenza are conducted across the country in order to detect any incursion of avian influenza. Passive and active surveillance in backyard and commercial chickens is continuing across the country. A number of backyard chicken holdings in all Provinces are included in the six monthly active surveillance. Active surveillance in commercial chickens is conducted every six months with monthly surveillance in NAI free compartments. Active surveillance in commercial ostriches is conducted six monthly with additional pre-movement, pre-slaughter and 28 days post-movement testing.

In 2017 the first case of Highly Pathogenic Avian Influenza (HPAI) was confirmed in commercial chickens in South Africa. This was confirmed as HPAI H5N8. No new HPAI outbreaks were reported in commercial and backyard chickens since June 2018 until the detection in April 2021 of a HPAI H5N1 in commercial chickens. A HPAI H5N2 was detected in October 2022 in chickens of a small scale farmer facility in KwaZulu-Natal Province in 2022. This is the first ever HPAI H5N2 in chickens in the country. HPAI H5N2 was detected in ostriches during 2004, 2006 and 2011.

Current H5 and H7 avian influenza outbreaks within the country are summarised in this report and are categorised according to pathogenicity (HPAI, LPAI or undefined). The HPAI outbreaks are discussed under point 2 and LPAI is discussed in point 3.

2. Highly pathogenic avian influenza (HPAI)

Currently HPAI H5N2 and HPAI H5N1 strains are circulating within the country. Suspect HPAI outbreaks in ostriches in the Western Cape Province are under investigation. Routine follow-up samples on a poultry compartment in North West Province had one out of twelve PCR pools test low positive for avian influenza matrix gene – we are awaiting further diagnostics.

All HPAI suspect farms are immediately placed under quarantine and no movement of birds, eggs or products are allowed on, off or through these farms. Samples are collected for verification of the suspicion and back and forward tracing is implemented to detect any possible spread of disease. So far most of the affected properties have culled out the chickens and carcasses were disposed of by dumping at an approved hazardous dump site, incineration, rendering or composting on farm; or on farm burial where allowed by the Environmental Affairs Department. Eggs are either taken under veterinary supervision for pasteurisation, or moved after double fumigation or fogging.

Passive surveillance in the whole country is ongoing, and all veterinarians have been notified to remain on high alert and place HPAI at the top of the differential diagnostic list for any increased mortalities. Listed NAI free compartments are continuing with the monthly surveillance. Press releases are sent out continuously to update and remind the public to report any increased mortalities in poultry and wild birds to their nearest State Veterinarian for immediate investigation.

If HPAI is suspected/detected in poultry, there is no scientific justification in placing a radius around the affected farms as a controlled/protection zone due to the mode of transmission, primarily by wild birds. However, all neighbouring farms are immediately visited, and all epidemiologically linked properties to an affected farm are immediately placed under quarantine until preliminary investigations can be conducted.

2.1 Overview of the HPAI H5N2 poultry event

The index case was detected on samples collected on 25 October 2022. The samples were collected from chickens from a small scale farmer in the Msunduzi Local Municipality of KwaZulu-Natal Province. The sample was confirmed by PCR to be HPAI H5.

A second outbreak was detected on samples collected on 29 November 2022 in commercial chickens in Mkhambathini Local Municipality in KwaZulu-Natal Province.

Samples from both these outbreaks yielded a sequence characteristic of HP H5 AIV and the HA genes had genetic similarities to viruses isolated from chickens in South Africa and Nigeria. The NA genes yielded an N2 subtype having genetic similarities to H6N2 viruses previously isolated in chickens in South Africa.

A complete genome with deep coverage identified the Mkhambathini Local Municipality outbreak strain as a clade 2.3.4.4b highly pathogenic H5N2 subtype. Bioinformatic analysis of all eight genome segments indicate that the virus is a reassortant where the parental H5N1 virus shares a recent common ancestor with strains detected in KwaZulu-Natal and Gauteng Provinces in 2021-2022 and the parental H6N2 LPAI virus shares a recent common ancestor with sub-lineage I H6N2 strains known to be endemic in poultry in South African poultry.

The index case has been resolved with the WOH.

Full genome sequencing is in progress as well as further diagnostics of the polymerase gene to determine the zoonotic potential of this particular strain. The affected Local Municipalities are represented in Table 1 below.

Province	Local Municipality with total number of outbreaks within this Local Municipality	Details of Outbreak
KwaZulu Natal	Msunduzi (n=1) 1 out of 1 outbreak resolved	Small-scale farmer

1 out of 2 outbreaks resolved	Mkhambathini (n=1) 0 out of 1 outbreak resolved	Commercial chicken layer farm
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TABLE 1: AFFECTED LOCAL MUNICIPALITIES PER PROVINCE FOR HPAI H5N2

2.1.1 Spatial distribution of the HPAI H5N2 poultry event

The spatial distribution of the HPAI H5N2 poultry outbreaks is represented in Figure 1 below.

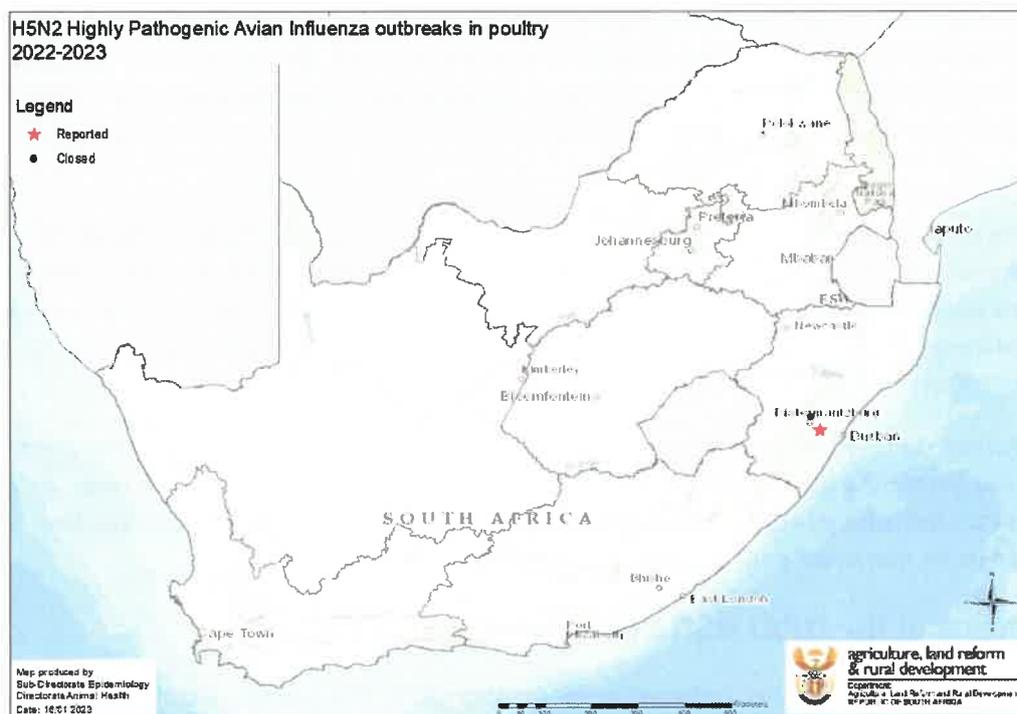


FIGURE 1: SPATIAL DISTRIBUTION OF HPAI H5N2 OUTBREAKS IN POULTRY

2.2 Overview of the HPAI H5N1 events

2.2.1 Overview of the HPAI H5N1 poultry event

The index case was detected on 11 April 2021 in Gauteng Province. Up to date, a total of ninety four (n=94) outbreaks were reported across Gauteng, North West, Western Cape, Mpumalanga, Free State, KwaZulu Natal and Eastern Cape Provinces. The affected Local Municipalities in each Province are represented in Table 2 below.

Province	Local Municipality with total number of outbreaks within this Local Municipality	Details of Outbreak
Gauteng 26 out of 27 outbreaks resolved	City of Johannesburg (n=1) 0 out of 1 outbreak resolved	Small scale farmers
	City of Tshwane (n=6) 6 out of the 6 outbreaks resolved	Commercial chicken layer farm ^{6,*}
		Commercial chicken layer farm
		Commercial chicken layer farm ⁶
		Commercial chicken layer farm ²
		Commercial chicken broiler breeder
		Small scale farmer
	Ekurhuleni (n=7) 7 out of the 7 outbreaks resolved	Commercial chicken layer farm ^{6,*}
		Commercial chicken broiler breeder farm ²
		Small scale farmer
	Commercial chicken layer farm ²	

		Commercial chicken layer farm*
		Small-scale farmer
		Speculator [®]
	Emfuleni (n=4) 4 out of 4 outbreaks resolved	Small-scale farmer*
		Small-scale farmer
		Small-scale farmer
		Small-scale farmer
	Lesedi (n=1) 1 out of 1 outbreak resolved	Small-scale farmer
	Merafong City (n=1) 1 out of 1 outbreak resolved	Commercial chicken layer farm
	Midvaal (n=4) 4 out of the 4 outbreaks resolved	Small-scale farmer*
		Small-scale farmer
		Small-scale farmer [®]
		Small-scale farmer
	Mogale City (n=2) 2 out of 2 outbreaks resolved	Backyard facility
		Small-scale farmer [®]
	Randfontein (n=1) 1 out of 1 outbreak resolved	Small-scale farmer
Eastern Cape Province 6 out of 6 outbreaks resolved	Nelson Mandela Bay (4) 4 out of 4 outbreaks resolved	Developing chicken broiler and layer farm*
		Backyard facility*
		Backyard facility
		Backyard facility
	Inxuba Yethemba (n=1) 1 out of 1 outbreak resolved	Commercial ostrich
	Walter Sisulu (n=1) (previous name—Gariap) 1 out of 1 outbreak resolved	Commercial ostrich
Free State Province 3 out of 4 outbreaks resolved	Letsemeng (n=1) 0 out of 1 outbreak resolved	Commercial ostrich
	Mafube (n=1) 1 out of 1 outbreaks resolved	Commercial chicken broiler farm
	Nala (n=1) 1 out of 1 outbreak resolved	Backyard facility*
	Ngwathe (n=1) 1 out of 1 outbreak resolved	Commercial chicken layer breeder farm* Paperwork was received and it will be resolved during the next reporting to WOAHA
KwaZulu Natal 18 out of 21 outbreaks resolved	Alfred Duma (n=1) (previous name—Ladysmith) 1 out of 1 outbreak resolved	Small-scale farmer
	Dannhauser (n=1) 1 out of 1 outbreak resolved	Commercial chicken layer farm
	Maphumulo (n=1) 0 out of 1 outbreak resolved	Small scale farmer
	Mkhambathini (n=4) 3 out of 4 outbreaks resolved	Commercial chicken broiler breeder farm
		Commercial chicken layer farm
		Commercial chicken layer farm
		Commercial chicken broiler breeder farm
	Msunduzi (n=9) (previous name—Mkhombathini) 9 out of 9 outbreaks resolved	Commercial chicken layer farm*
		Commercial chicken broiler breeder farm*
		Commercial chicken layer farm*
		Commercial chicken layer farm*
		Commercial chicken broiler breeder farm
		Commercial chicken broiler breeder farm*
		Commercial chicken layer farm*
		Small-scale farmer
		Small-scale farmer [®]
	Mtubatuba (n=1) 1 out of 1 outbreak resolved	Small-scale farmer [®]
	Newcastle (n=1) 1 out of 1 outbreak resolved	Small-scale farmer*
	Ulundi (n=1) 1 out of 1 outbreak resolved	Small scale farmer
	Umkhlatuze (n=1) 1 out of 1 outbreak resolved	Small-scale farmer
	Umzimkhulu (n=1) 0 out of 1 outbreak resolved	Small scale farmer
Mpumalanga	Lekwa (n=1)	Commercial chicken laying and rearing breeder farm

<i>1 out of 1 outbreak resolved</i>	<i>1 out of 1 outbreak resolved</i>	
North West Province	JB Marks (n=4)	Commercial chicken breeder farm [§]
<i>3 out of 4 outbreaks resolved</i>	<i>(Includes the old Thlokwe City and Ventersdorp Local Municipalities)</i>	Commercial chicken layer farm
	<i>3 out of 4 outbreaks resolved</i>	Commercial chicken layer farm
		Commercial chicken layer farm*
Western Cape Province	Bergrivier (n=1)	Backyard facility
<i>31 out of 31 outbreaks resolved</i>	<i>1 out of 1 outbreak resolved</i>	
	Breede Valley (n=3)	Commercial chicken broiler-breeder farm*
	<i>3 out of 3 outbreaks resolved</i>	Commercial chicken broiler farm
		Commercial chicken rearing farm
	City of Cape Town (n=2)	Backyard facility*
	<i>2 out of 2 outbreaks resolved</i>	Backyard facility
	Drakenstein (n=3)	Commercial chicken layer farm
	<i>3 out of 3 outbreaks resolved</i>	Commercial chicken layer rearing farm*
		Commercial chicken layer farm
	George (n=2)	Commercial chicken layer farm*
	<i>2 out of 2 outbreaks resolved</i>	Commercial chicken layer farm*
	Hessequa (n=6)	Commercial ostrich*
	<i>6 out of 6 outbreaks resolved</i>	Commercial ostrich
		Commercial ostrich
	Kannaland (n=1)	Commercial ostrich
	<i>1 out of 1 outbreak resolved</i>	
	Qudtshoorn (n=2)	Commercial ostrich
	<i>3 out of 3 outbreaks resolved</i>	Commercial ostrich
		Commercial ostrich
	Saldanha (n=1)	Commercial chicken layer farm*
	<i>1 out of 1 outbreak resolved</i>	
	Stellenbosch (n=1)	Commercial chicken layer farm*
	<i>1 out of 1 outbreak resolved</i>	
	Swartland (n=5)	Commercial chicken broiler-breeder farm*
	<i>5 out of 5 outbreaks resolved</i>	Commercial chicken layer farm*
		Non-commercial, backyard
		Commercial chicken broiler-breeder farm*
		Commercial chicken layer farm*
	Theewaterskloof (n=1)	Commercial chicken broiler farm*
	<i>1 out of 1 outbreak resolved</i>	
	Witzenberg (n=2)	Commercial ostrich
	<i>2 out of 2 outbreaks resolved</i>	Commercial ostrich

TABLE 2: AFFECTED LOCAL MUNICIPALITIES PER PROVINCE FOR HPAI H5N1

Where all the outbreaks within a Local Municipality were resolved, that Local Municipality with the outbreaks were indicated by strikethrough in Table 1 above. Eighty seven (n=87) out of the ninety four outbreaks were resolved with the WOH and a further one (n=1) is in the process of being resolved which will bring the total to eighty eight (n=88) out of the ninety four outbreaks.

Sequencing conducted up to date confirmed that the current HPAI H5N1 is a Clade 2.3.4.4 virus. The HPAI H5N8 was also a Clade 2.3.4.4. virus. The sequencing of the current HPAI H5 virus however confirms that it is not genetically identical to the HPAI H5N8 virus of 2017, with several nucleotide differences between the two viruses. The latest HPAI H5 virus is genetically similar to HPAI Clade 2.3.4.4 strains currently circulating in wild birds in Europe and West Africa as determined by phylogenetic analysis. Further sequencing confirmed the N type to be N1. No human infection due to these circulating avian influenza strains were reported in Europe and the zoonotic risk is therefore low.

The following genetic information was obtained for the current H5N1 outbreak by gene sequencing:

- The outbreaks indicated with “§” in Table 1 above yielded HA and NA gene sequences that have genetic similarities to viruses isolated from wild birds in Europe.

- The NA gene analysis are identical for the two outbreaks in Gauteng indicated with “#” in Table 1 above. Further sequencing of 5 more genes from these two farms also indicate that it is the same virus. The same group owns the two farms and hence secondary spread is suspected.
- Outbreaks indicated with “*” in Table 1 above were sequenced as HPAI H5N1 with both the HA and NA genes having genetic similarities to viruses isolated from chickens in South Africa and Nigeria.
- The outbreaks indicated with “&” in Table 1 above were sequenced as HPAI H5N1 and we are awaiting subsequent reports on the phylogenetic relationships with other recent cases.
- The outbreaks indicated with “@” in Table 1 above were sequenced as HPAI H5 where the sequence has genetic similarities to viruses isolated from chickens in South Africa and Nigeria.

The reported outbreak on a commercial chicken layer farm in the Swartland Local Municipality in the Western Cape Province with start date of 27 January 2022, was sequenced and the analysis shows that the strain appears to be related to the 2021 HPAI H5N1 that was seen in the wild birds in the Western Cape Province, having only 1 or 2 base pair differences in both the HA and the NA genes. Next Generation Sequencing concluded that the strain also shares a recent common ancestor with viruses detected at other commercial poultry operations in the Western Cape Province in mid-October 2021.

The following outbreaks were confirmed by PCR to be HPAI H5 and N1:

- The reported outbreak in the small scale farmer in the Midvaal Local Municipality in Gauteng Province with start date of 19 April 2022.
- The reported outbreak in the speculator in the Ekurhuleni Local Municipality in Gauteng Province with start date of 15 March 2022 Both the HA and NA genes have genetic similarities to viruses isolated from chickens in South Africa.
- The reported outbreak in the commercial chicken layer farm in the Mkhambathini Local Municipality in KwaZulu Natal Province with start date of 9 September 2022.
- The reported outbreak in the commercial chicken broiler breeder farm in the Mkhambathini Local Municipality in KwaZulu Natal Province with start date of 15 September 2022. This outbreak was also sequenced to confirm it to be Clade 2.3.4.4b HPAI H5N1 with phylogenetic analysis of all 8 genome segments indicating that the most recent common ancestor is the Gauteng wild bird outbreak during February 2022 and that no reassortment occurred with other viruses detected since the start of the outbreak in 2021. This suggest that this particular subtype continued to circulate in Gauteng wild birds after February and subsequently spread to the KwaZulu-Natal Province.
- The reported outbreak in the small scale farmer in the Lesedi Local Municipality in Gauteng Province with start date of 4 October 2022.
- The reported outbreak in the small scale farmer in the Umzimkhulu Local Municipality in KwaZulu Natal Province with start date of 3 October 2022.
- The reported outbreak in the small scale farmer in the Maphumulo Local Municipality in KwaZulu Natal Province with start date of 11 November 2022.
- The reported outbreak in the commercial ostrich in the Letsemeng Local Municipality in Free State Province with start date of 15 November 2022.
- The reported outbreak in the small scale farmers in City of Johannesburg Local Municipality in Gauteng Province with start date of 6 January 2023.

Published information on the spread of the Clade 2.3.4.4b strains currently circulating in Europe, indicated that secondary spread by fomites (e.g. vehicles, people, equipment) between poultry facilities was a big contributing factor in the spread of the European outbreaks. The commercial chicken layer breeder farm in Ngwathe Local Municipality in the Free State Province was linked via secondary spread to a commercial chicken layer farm in JB Marks Local Municipality in North West Province and a commercial chicken layer farm in City of Tshwane

Local Municipality in Gauteng Province. It is of utmost importance that all poultry facilities ensure that the best possible biosecurity is being maintained and that morbidity and mortality are closely monitored with no chickens being moved if there is a slight increase in morbidity and mortality.

2.2.2 Overview of the HPAI H5N1 non-poultry (wild bird) event

A total of seventy four (n=74) non-poultry outbreaks were reported and these include wild birds and birds kept as hobby or zoo purposes. Backyard poultry as per the WOAHP definition specified the introduction and background in point 1 are now reported as part of the wild bird event since the publishing of the 2021 OIE Terrestrial Animal Health Code. Sixty nine (n=69) of these non-poultry outbreaks were resolved with the WOAHP. A further three (n=3) are in the process of being resolved which will bring the total to seventy two (n=72) outbreaks being resolved.

The wild bird outbreak in City of Cape Town Local Municipality with start date of 21 November 2022 was confirmed to be H5 and N1 by PCR.

The wild bird outbreak in City of Cape Town Local Municipality with start date of 11 November 2022 was confirmed to be HPAI H5 and N1 by PCR.

The wild bird outbreak in Saldanha Bay Local Municipality with start date of 19 October 2022 was confirmed to be HPAI H5 and N1 by PCR.

The wild bird outbreak in Merafong City with start date of 1 December 2022 was confirmed to be H5 and N1 by PCR. Viral levels were too low for pathotyping by PCR and may also be too low for pathotyping by sequencing.

2.2.3 Spatial distribution of the poultry HPAI H5N1 event

The spatial distribution of the currently resolved (closed) and unresolved (reported) HPAI H5N1 outbreaks in poultry is represented in Figure 2 below. The outbreak in the Free State that is in the process of being resolved, has not been marked as closed yet on the below map.

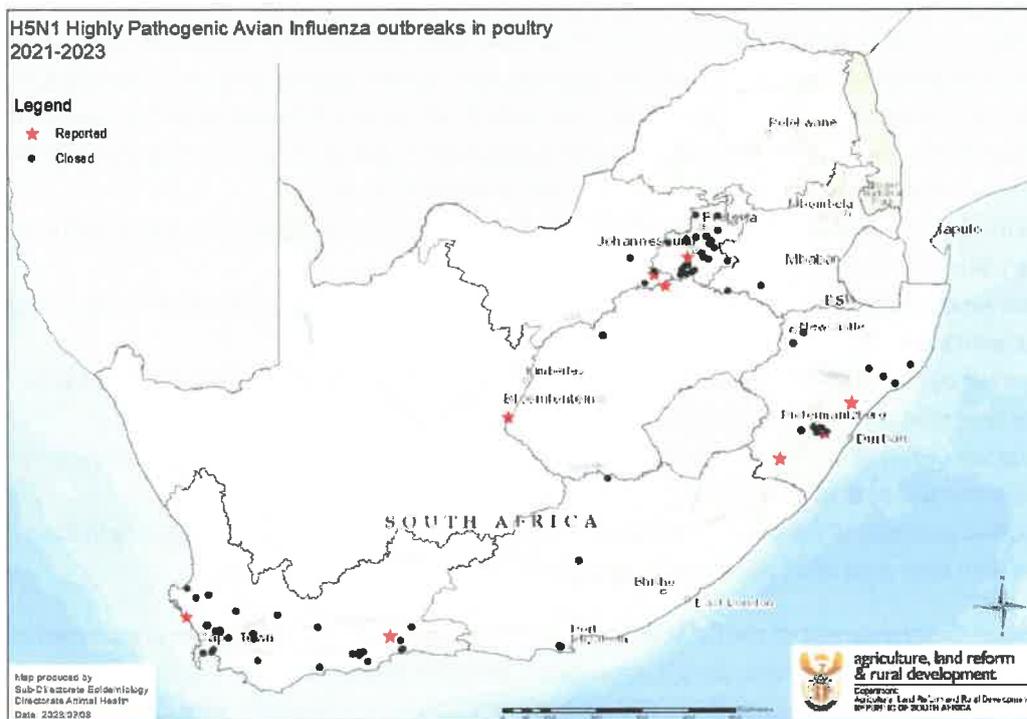


FIGURE 2: SPATIAL DISTRIBUTION OF HPAI H5N1 OUTBREAKS IN POULTRY

2.2.4 Spatial distribution of the non-poultry HPAI H5N1 event

The spatial distribution of the currently resolved (closed) and unresolved (reported) HPAI H5N1 outbreaks in non-poultry is represented in Figure 3 below. The three outbreaks that are in the process of being resolved with WOAH have not been indicated as closed yet on the below map.

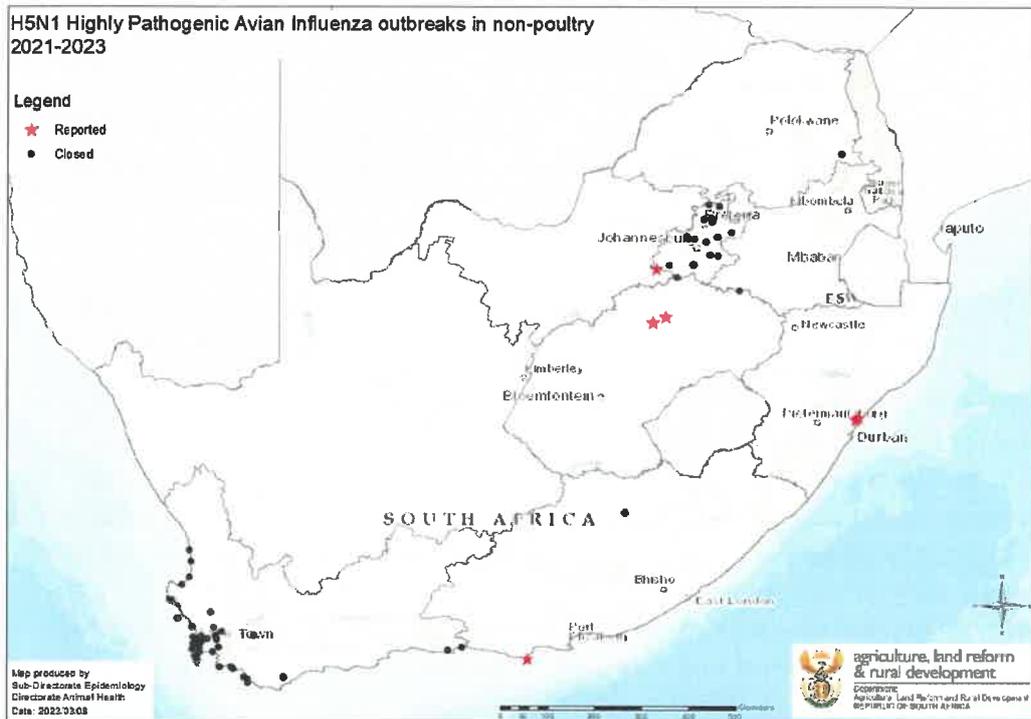


FIGURE 3: SPATIAL DISTRIBUTION OF HPAI H5N1 OUTBREAKS IN NON-POULTRY

2.2.5 Temporal distribution of the HPAI H5N1 event

We have entered the second year of the HPAI H5N1 event. The temporal distribution of the HPAI H5N1 event in poultry is depicted in Figure 4 below, while the temporal distribution in non-poultry is depicted in Figure 5. It should be noted that we are seeing an increase in the number of avian influenza positive samples.

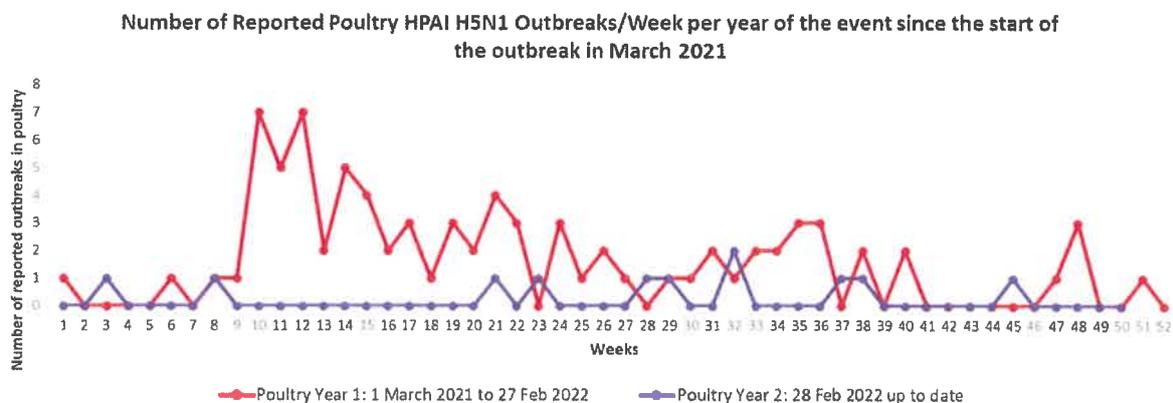


FIGURE 4: TEMPORAL DISTRIBUTION OF HPAI H5N1 OUTBREAKS IN POULTRY

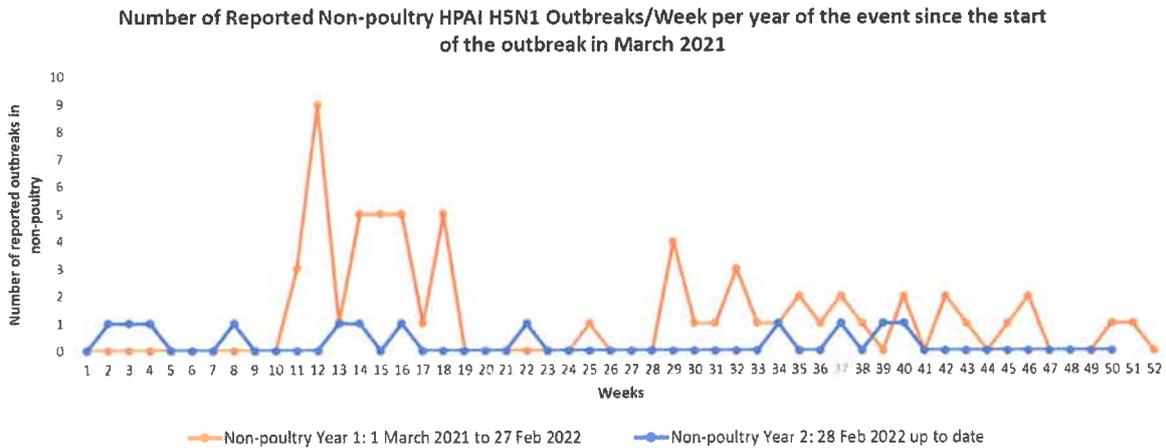


FIGURE 5: TEMPORAL DISTRIBUTION OF HPAI H5N1 OUTBREAKS IN NON-POULTRY

The temporal distribution per category (commercial chickens; small scale farmers/speculators; backyard poultry; commercial ostriches; and wild birds/hobbyists/zoos) per months is represented in Figure 6 below. The outbreaks in the commercial chickens, small scale farmers/speculators and commercial ostriches categories are currently being reported as part of the poultry event to the WOA. The outbreaks in the backyard poultry and the wild birds/hobbyists/zoos categories are currently being reported as part of the non-poultry event to the WOA. Although the currently reported backyard poultry outbreaks may not have trade implications, these outbreaks are still important as an early warning system of risk to commercial operations. It is important to note that the detection of new wild bird cases at an already reported location will not be reported as a new outbreak, the cases will simply be updated with the WOA.

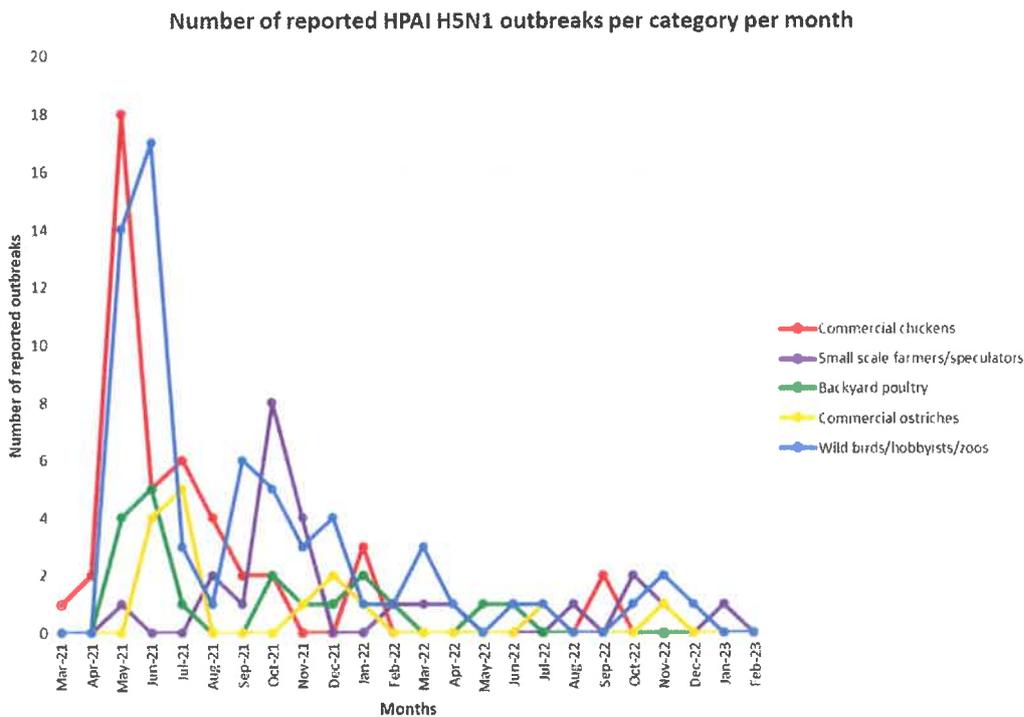


FIGURE 6: TEMPORAL DISTRIBUTION OF HPAI H5N1 OUTBREAKS PER CATEGORY PER MONTH

3. Low pathogenic avian influenza (LPAI)

In accordance with Chapter 1.3 of the OIE Terrestrial Animal Health Code, the “low pathogenic avian influenza (poultry)” disease code has been delisted. The WOHAI has requested that South Africa thus resolve the currently unresolved LPAI H7, Undefined H7 and LPAI H5 events before 31 December 2021. As of 1 January 2022 only HPAI are to be reported to the WOHAI.

All LPAI strains however remain controlled animal diseases in terms of the Animal Diseases Act, 1984 (Act No 35 of 1984) and control measures and reporting will remain unaltered until reviewed.


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2023-03-10

