SOUTH AFRICAN POULTRY ASSOCIATION
Founded 1904

REPORT ON AVIAN INFLUENZA (AI)

SURVEILLANCE MONITORING FOR THE SURVEILLANCE PERIOD
July to September 2023
(3Q2023)

CONTENTS			Page
1		**INTRODUCTION**	3
	1.1	World highly pathogenic avian influenza (HPAI) situation	3
	1.2	South Africa	3
	1.3	Control of HPAI	4
2		**RESULTS OF AI SURVEILLANCE MONITORING**	4
	2.1	Reported HPAI outbreaks	4
	2.2	Temporal and spatial distribution of the HPAI H5N1 outbreaks	9
	2.3	Temporal and spatial distribution of the HPAI H7N6 outbreaks	12
	2.4	AI surveillance programme	15
3		**AVIAN INFLUENZA MONITORING IN SOUTH AFRICA**	18
4		**CONCLUSION**	18

1. INTRODUCTION

1.1 World HPAI situation

As can be seen from the map obtained from the website of the Food and Agriculture Organization (FAO) of the United Nations (Figure 1), HPAI outbreaks have been relatively quiet during the Northern Hemisphere summer months – the majority of the outbreaks shown here are cases reported in wild birds and probably reflect the amount of wild bird surveillance going on more than they reflect the overall scale of the problem. Brazilian cases reported are also all in wild birds – but there has to be a risk of commercial poultry infections. As we all know, there have been a large number of cases reported in South Africa – some H5N1, mostly in the coastal areas with more severe outbreaks of H7N6 in the inland areas centred around Gauteng.

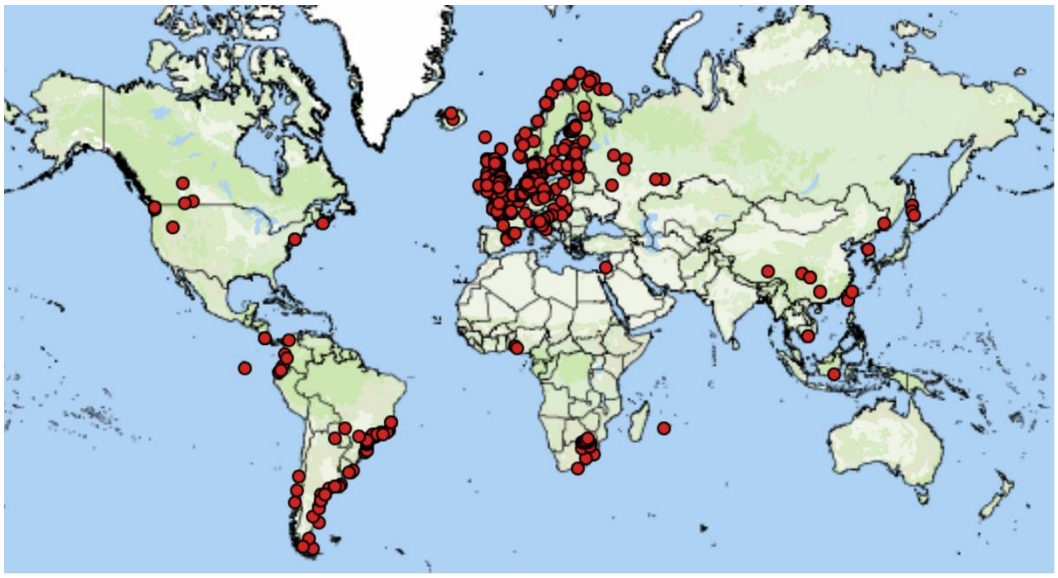

Figure 1: Global map showing reported cases of HPAI (1 July 2023–30 September 2023) (source: FAO)

1.2 South Africa

Starting in April 2023 in South Africa there have been cases of **H5N1** (Clade 2.3.4.4b) in chickens – the viruses are closely related to the majority of HPAI outbreaks reported globally. The first cases in chickens were reported from the Paarl Valley (which was also badly affected in previous outbreaks) with later cases in George and most recently, a couple in KwaZulu-Natal. To date about 1.77 million commercial chickens (mostly commercial layers) have died or been culled in this outbreak.

More recently, starting on 29 May – there has been an outbreak of **H7N6** in commercial poultry centred in Gauteng and Mpumalanga. This virus has adapted locally to infect chickens from wild bird strains present in the surrounding areas. This has developed into the largest outbreak of avian influenza to date in South Africa – possibly infecting more than 10 million birds and leading to the death of almost 6 million chickens.

The numbers around the outbreaks have been broken down further in this document – see Tables 7 and 8 – they show that 94% of broiler breeders and 78% of commercial layer hens in Gauteng have been affected

(although they have not necessarily died) by the outbreak – no wonder there are currently egg shortages, and poultry meat shortages are expected.

1.3 Control of HPAI

The H7N6 strain of HPAI has proven very difficult to control using conventional biosecurity approaches. While biosecurity remains an important part of any AI control strategy additional tools are needed. On 11 September the Director of Animal Health agreed that vaccination against avian influenza would be allowed in South Africa. Since then, a lot of work has been done to make this a reality, the process has not progressed as quickly as one might have hoped when we started – but a lot of work is needed before vaccination can actually begin.

Vaccine evaluation, approval and registration with Act 36

All AI vaccines must be assessed by technical evaluators to ensure they are safe for use and effective in immunising chickens against the local strains of AI. A number of good vaccines are available internationally against H5N1 influenza strains as these are encountered across much of the world and are all quite similar. Because of this, it is likely that vaccines against H5 will be the first vaccines available for use in South Africa.

The H7N6 strain of AI occurs only in South Africa and is not closely similar to any other AI strains in the rest of the world – this means that the few vaccines that have been developed against H7 may only have limited efficacy against South African strains. Before these vaccines can be registered, they will need to be carefully assessed and may even require local trial work to confirm their efficacy – this all may delay their registration. Locally produced vaccines are being developed but this is a process that will also take some time to complete.

Approval of farms for AI vaccination

Once AI vaccines have been registered for use, individual farms will need to be approved for vaccination by the Director of Animal Health and her team. The criteria for farm evaluations and approvals have not yet been finalised but it is very likely that vaccinated farms will have to demonstrate a high level of biosecurity and will have to perform increased surveillance for AI as well as agree not to sell live end-of-lay birds into the cull bird market. The SAPA technical team has engaged government on these issues in the past month and we hope that a reasonable approach can be agreed to. It is also not clear what will happen to vaccinated flocks in the event they become infected with AI – if they still need to be culled, this will add further costs to the process.

2 RESULTS OF AI SURVEILLANCE MONITORING

2.1 Reported HPAI outbreaks

Sequencing data that became available in April 2023 indicated the existence of a new strain of HPAI H5N1 in the country. This was linked to samples collected in Free State back in November 2022. The outbreaks occurring in wild birds in March 2023 and the 18 April 2023 outbreak on a poultry farm in Drakenstein, Western Cape are therefore being reported to the World Organisation for Animal Health (WOAH) as a new event.

This report covers the period from week 1 (commencing on 6 March 2023) to week 31 (commencing on 2 October 2023). In total 47 epidemiologic units were affected during this period, with 35 reports in wild birds and 12 in domestic birds. The provincial distribution of cases is shown in Table 1.

With the emergence of H7N6 on a laying farm in Mpumalanga, reported on 1 June 2023, the strain is being monitored and recorded separately. The week commencing 29 May 2023 is considered to be week 1 and separate epidemic curves and spatial analyses have been added to this report (see section 2.3). In the first 19 weeks of the outbreak a total of 89 cases were reported, all in domestic birds (Table 1).

Table 1: Provincial breakdown of epidemiologic units affected by HPAI

Province	H5N1		H7N6	
	Wild	Domestic	Wild	Domestic
E. Cape	4			
Free State				1
Gauteng	10			60
KwaZulu-Natal	5	2		
Limpopo				6
Mpumalanga	1			13
North West				9
N. Cape				
W. Cape	15	10		
Total	**35**	**12**	**0**	**89**

According to the Department of Agriculture, Land Reform and Rural Development (DALRRD) there have been 10 outbreaks of H5N1 on commercial farms across the country, 7 in Western Cape and 3 in KwaZulu-Natal (Table 2). The affected local municipalities are City of Cape Town (2), Drakenstein (2), George (2), Swartland (1), Msunduzi (2) and Mkhambathini (1). Six of the cases in Western Cape had been resolved with WOAH at the time of publishing their report. In addition, 38 outbreaks have been reported in wild birds and shore birds and 1 in backyard chickens since the start of the new HPAI H5 event.

Table 2: Categorical breakdown of HPAI H5N1 outbreaks per province

Province	Backyard/ small scale	Layer breeders	Pullets in rear	Comm. layers	Broiler breeders	Wild birds	Ostriches	Total
E. Cape	1					5		6
Free State								0
Gauteng						10		10
KZN					3	5		8
Limpopo								0
Mpumal.						1		1
N. West						2		2
N. Cape								0
W. Cape				7		15		22
Total cases	**1**	**0**	**0**	**7**	**3**	**38**	**0**	**49**

Source: DALRRD, 29 September 2023. *Avian Influenza: H5 and H7 outbreak update report*

The report by DALRRD also provides information on the H7N6 outbreaks, as shown in Table 3. At the time of publishing, none of the outbreaks had been resolved with WOAH. The allocation of cases to layer breeder and broiler breeder farms may not be entirely correct because of the ambiguous terms (such as parent stock laying and chicken breeder) used in the DALRRD report. Unless clearly stated, the outbreak is assumed to be in broiler breeders. The figures reported by DALRRD in Table 3 are slightly behind those of SAPA.

Table 3: Categorical breakdown of HPAI H7N6 outbreaks per province

Province	Backyard/ small scale	Layer breeders	Pullets in rear	Comm. layers	Broiler breeders	Wild birds	Ostriches	Total
E. Cape								0
Free State				1				1
Gauteng	2	2	3	31	13			51
KZN								0
Limpopo				1	3			4
Mpumal.	1		3	6	1			11
N. West				2	3			5
N. Cape								0
W. Cape								0
Total cases	**3**	**2**	**6**	**41**	**20**	**0**	**0**	**72**

Source: DALRRD, 29 September 2023. *Avian Influenza: H5 and H7 outbreak update report*

Tables 4 and 5 summarise the cumulative number of birds per epidemiologic unit that have died due to the H5N1 and H7N6 sub-types respectively, from 8 March 2023 to 6 October 2023 (source: poultry veterinarians and industry members).

Table 4: Dead birds per province due to H5N1

Province	Broiler industry		Egg industry				Total
	Breeders in rear	Breeders in lay	Breeders in rear	Breeders in lay	Pullets in rear	Hens in lay	
E. Cape							
Free State							
Gauteng							
KwaZulu-Natal		80 519					80 519
Limpopo							
Mpumalanga							
North West							
N. Cape							
W. Cape					41 632	1 648 114	1 689 746
National	**0**	**80 519**	**0**	**0**	**41 632**	**1 648 114**	**1 770 265**

Table 5: Dead birds per province due to H7N6							
Province	Broiler industry		Egg industry				Total
	Breeders in rear	Breeders in lay	Breeders in rear	Breeders in lay	Pullets in rear	Hens in lay	
E. Cape							
Free State						400 000	400 000
Gauteng	95 291	1 030 086		85 492	110 260	2 172 657	3 493 786
KwaZulu-Natal							
Limpopo	126 000	410 000				97 000	633 000
Mpumalanga		296 872	2 000	7 900	94 559	408 281	809 612
North West		485 595				152 052	637 647
N. Cape							
W. Cape							
National	**221 291**	**2 222 553**	**2 000**	**93 392**	**204 819**	**3 229 990**	**5 974 045**

Table 6 gives the distribution of bird numbers per province and per bird type. These statistics were provided by producers during the course of the AI surveillance monitoring. The numbers were used to calculate the percentage of the flocks that have died due to HPAI (Table 7). The great-grandparent, grandparent and broiler flock numbers are not shown in the table because these flocks have not been affected by HPAI.

Table 6: Distribution of birds by province and bird type							
Province	Broiler industry		Egg industry				Total
	Breeders in rear	Breeders in lay	Breeders in rear	Breeders in lay	Pullets in rear	Hens in lay	
E. Cape	264 000	581 525	0	8 000	112 620	1 061 009	2 027 154
Free State	124 309	257 136	0	37 000	1 113 005	3 959 138	5 490 588
Gauteng	865 053	1 093 415	103 374	176 705	2 373 644	5 326 538	9 938 729
KwaZulu-Natal	466 479	1 391 857	0	30 000	492 768	3 362 004	5 743 108
Limpopo	325 248	838 496	0	60 000	591 456	1 676 619	3 491 819
Mpumalanga	375 420	949 441	78 650	45 942	565 000	1 283 300	3 297 753
North West	584 365	1 498 199	89 000	80 988	1 027 812	2 791 075	6 071 439
N. Cape	0	0	0	0	0	96 300	96 300
W. Cape	302 701	933 284	0	60 000	1 482 104	3 678 436	6 456 525
National	**3 307 575**	**7 543 353**	**271 024**	**498 635**	**7 758 409**	**23 234 419**	**42 613 415**

In order to calculate the percentages of each category (province and bird type) that have been affected by HPAI, the mortality figures in Tables 4 and 5 were combined to give the total number of dead birds per category. This data was divided by the bird numbers for each category in Table 6. The results are shown in Table 7.

A staggering 94.2% of the broiler breeders and 48.4% of the layer breeders in Gauteng have been decimated by the virus. Nationally, an estimated 30.5% of broiler breeders have died. The egg industry has suffered severe setbacks in Gauteng and Western Cape, with 40.8% and 44.8% of laying hens having died in these provinces respectively.

Table 7: Percentage of birds that have died from HPAI

Province	Broiler industry		Egg industry				Total
	Breeders in rear	Breeders in lay	Breeders in rear	Breeders in lay	Pullets in rear	Hens in lay	
E. Cape	0	0	0	0	0	0	0
Free State	0	0	0	0	0	10.1	7.3
Gauteng	11.0	94.2	0	48.4	4.6	40.8	35.2
KwaZulu-Natal	0	5.8	0	0	0	0	1.4
Limpopo	38.7	48.9	0	0	0	5.8	18.1
Mpumalanga	0	31.3	2.5	17.2	16.7	31.8	24.6
North West	0	32.4	0	0	0	5.4	10.5
N. Cape	0	0	0	0	0	0	0
W. Cape	0	0	0	0	2.8	44.8	26.2
National	**6.7**	**30.5**	**0.7**	**18.7**	**3.2**	**21.0**	**18.2**

A worst case scenario is presented in Table 8, where the susceptible birds are calculated as a percentage of total birds. Susceptible birds are defined as the total number of birds on the farm at the time of the outbreak. It paints a devastating picture of the damage that the avian influenza virus may wreak on the poultry industry if these susceptible birds do not survive. Nationally, an estimated 28.8% of the chicken population is under threat. Of great concern is the significant loss of breeders in rear and lay because this will have long-term consequences for the poultry supply chains.

Table 8: Percentage of birds affected by HPAI

Province	Broiler industry		Egg industry				Total
	Breeders in rear	Breeders in lay	Breeders in rear	Breeders in lay	Pullets in rear	Hens in lay	
E. Cape	0	0	0	0	0	0	0
Free State	0	0	0	0	0	10.1	7.3
Gauteng	38.2	94.2	0	80.7	17.8	78.1	61.2
KwaZulu-Natal	0	5.8	0	0	0	0	1.4
Limpopo	38.7	48.9	0	0	0	38.5	33.8
Mpumalanga	0	70.5	61.0	32.6	66.8	67.3	59.8
North West	0	32.4	0	0	0	14.1	14.5
N. Cape	0	0	0	0	0	0	0
W. Cape	0	0	0	0	2.8	44.8	26.2
National	**13.8**	**35.5**	**17.7**	**31.6**	**10.8**	**34.9**	**28.8**

2.2 Temporal and spatial distribution of the HPAI H5N1 outbreaks in South Africa

Epidemic curves allow the analysis of outbreaks in time; in other words, a temporal analysis of data. While the output of an epidemic curve is relatively straightforward, the benefit of such analysis allows the determination of:

- Establishing the probability of the detection of the actual first case in the outbreak;
- Establishing the rate of progression and trend of outbreak;
- Establishing the secondary spread of infection;
- Establishing the effect of control measures**.**

Figures 2 to 5 show the epidemic curves for the 2023 H5N1 outbreak classified by farm type, bird type, province and municipality respectively (source: JDATA/PDMA). These curves are based on information that has been reported to the PDMA by private veterinarians and industry sources.

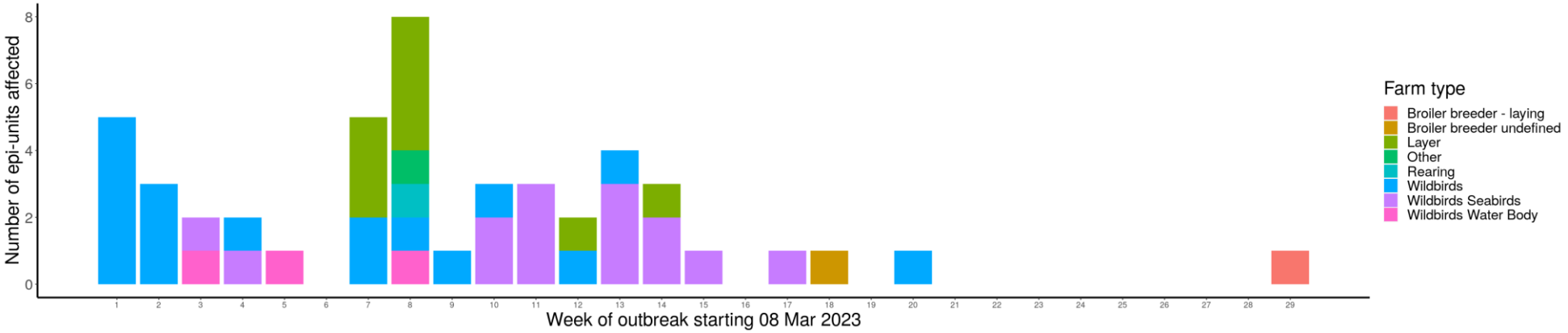

Figure 2: **H5N1** epidemic curve classified according to **farm type** (08 March 2023 to 20 September 2023) (weeks 1–29)

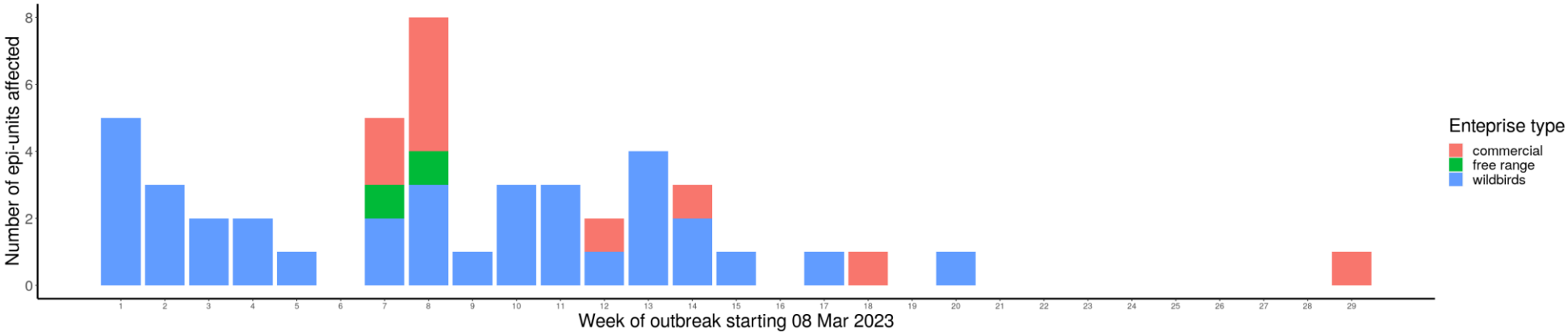

Figure 3: **H5N1** epidemic curve classified according to **bird type** (08 March 2023 to 20 September 2023) (weeks 1–29)

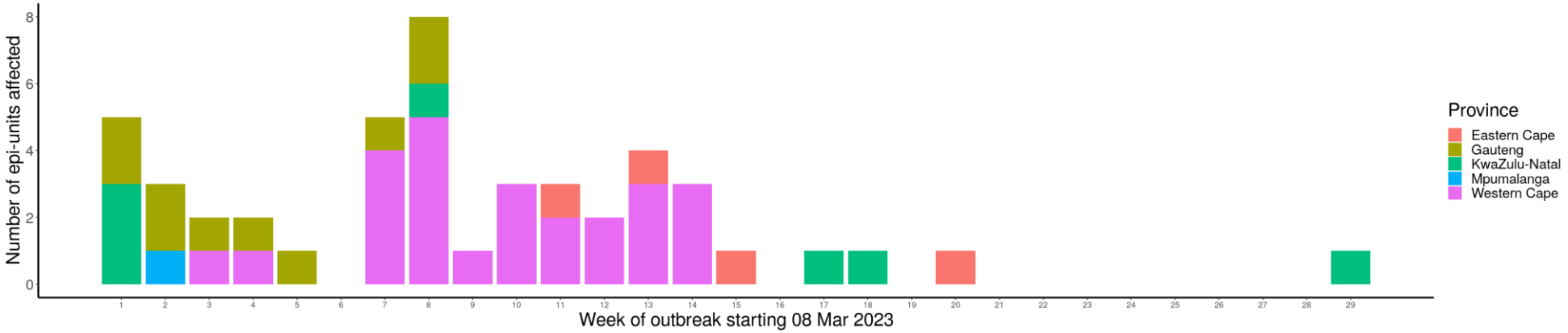

Figure 4: **H5N1** epidemic curve classified according to **province** (08 March 2023 to 20 September 2023) (weeks 1–29)

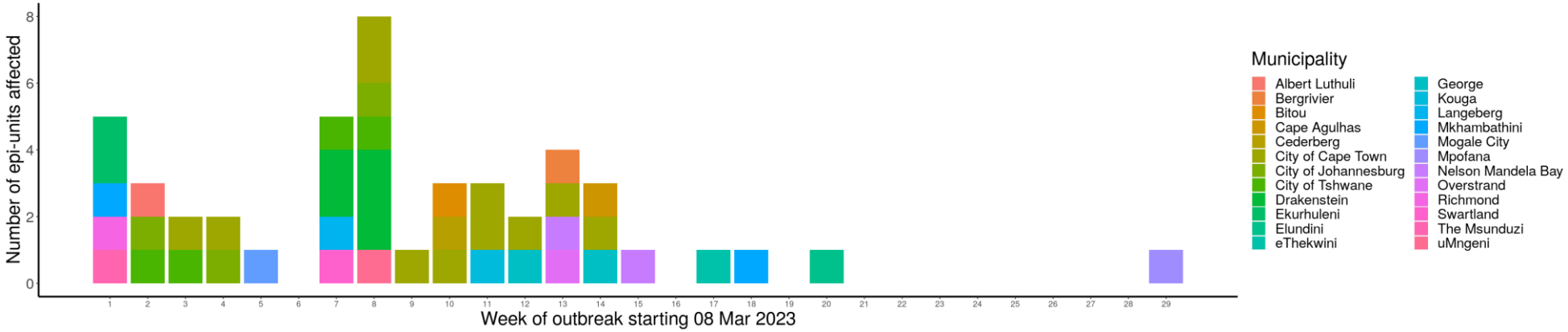

Figure 5: **H5N1** epidemic curve classified according to **municipality** (08 March 2023 to 20 September 2023) (weeks 1–29)

Spatial analyses give an indication of how an outbreak spreads throughout a country and its impact on specific areas. Figure 6 indicates the geographic spread of the HPAI H5N1 infections in poultry flocks and wild birds since 8 March 2023. The first outbreaks were recorded in Ekurhuleni in Gauteng, and Richmond, Mkhambathini and Msunduzi in KwaZulu-Natal (week 1). The most recent first case was recorded in Mpofana in week 29. (source: JDATA/PDMA).

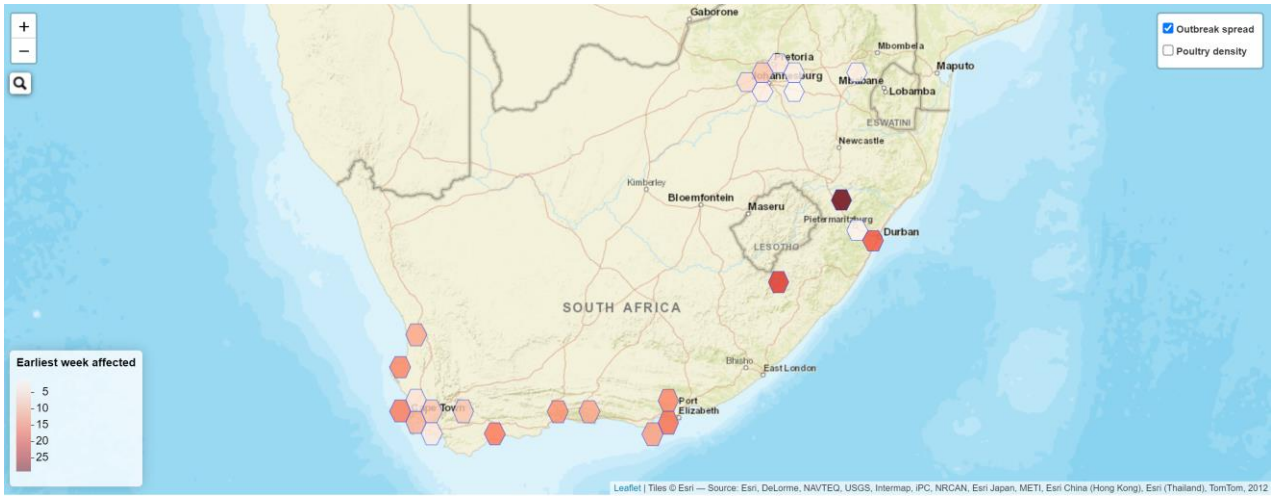

Figure 6: **H5N1** outbreak spread (08 March 2023 to 20 September 2023)

Figure 7 shows the density of the HPAI H5N1 infections. Drakenstein has reported outbreaks in 6 epidemiologic units; 1 in pullets and 5 in commercial layers (2 of them being free range flocks) (source: JDATA/PDMA).

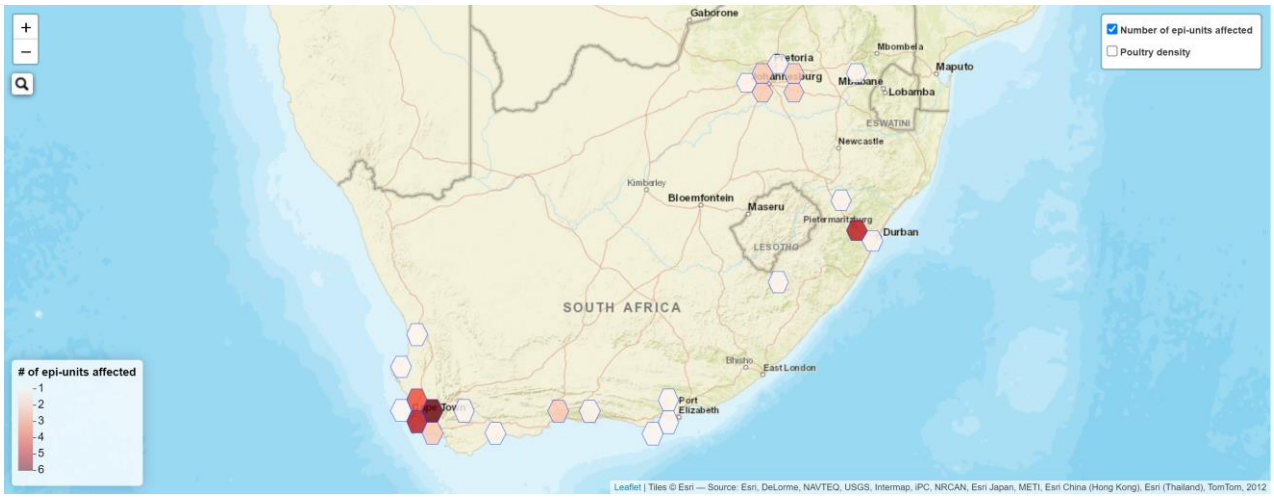

Figure 7: **H5N1** outbreak density (08 March 2023 to 20 September 2023)

2.3 Temporal and spatial distribution of the HPAI H7N6 outbreaks in South Africa

The H7N6 strain of the virus was first isolated in South Africa on a farm in Mpumalanga and officially reported on 1 June 2023. The week starting on Monday 29 May 2023 therefore serves as week 1 for the purposes of monitoring this outbreak.

Figures 8 to 11 show the epidemic curves for the H7N6 2023 outbreak classified by farm type, bird type, province and municipality respectively (source: JDATA/PDMA). The information was sourced from public and private veterinarians as well as industry stakeholders. A smallholder is defined as a poultry producer with less than 10 000 birds.

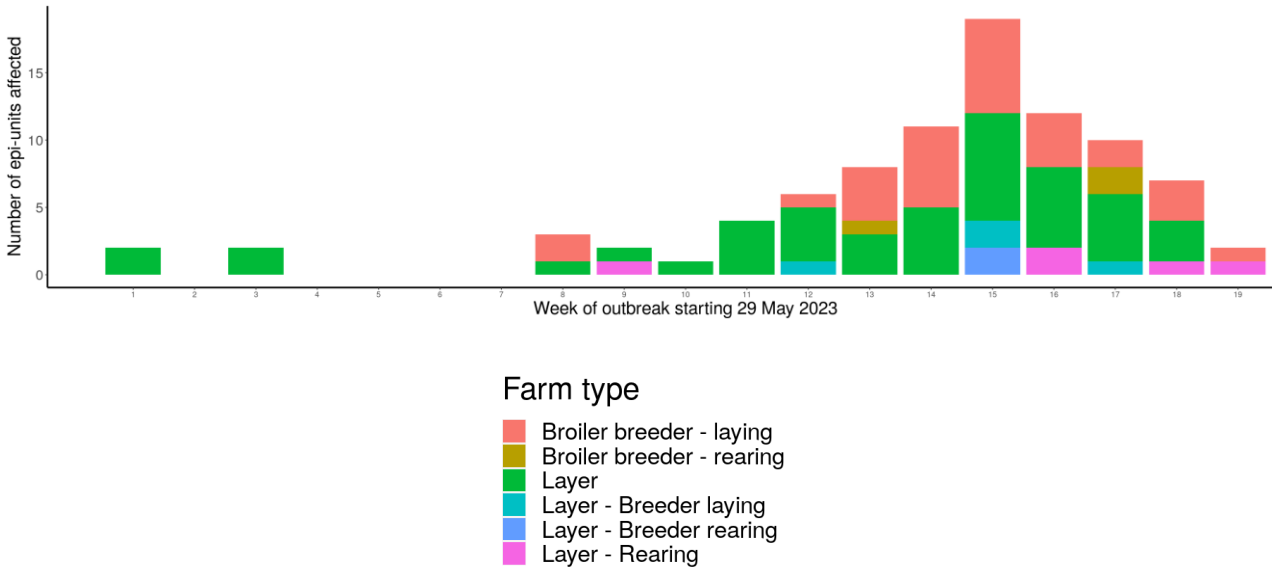

Figure 8: **H7N6** epidemic curve classified according to **farm type** (29 May 2023 to 6 October 2023)

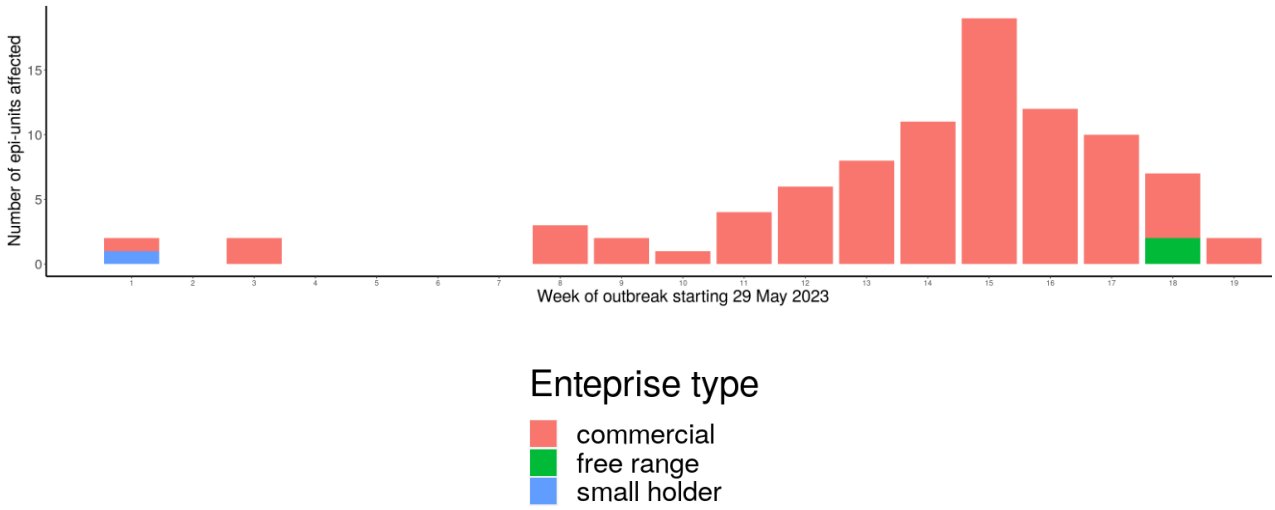

Figure 9: **H7N6** epidemic curve classified according to **bird type** (29 May 2023 to 6 October 2023)

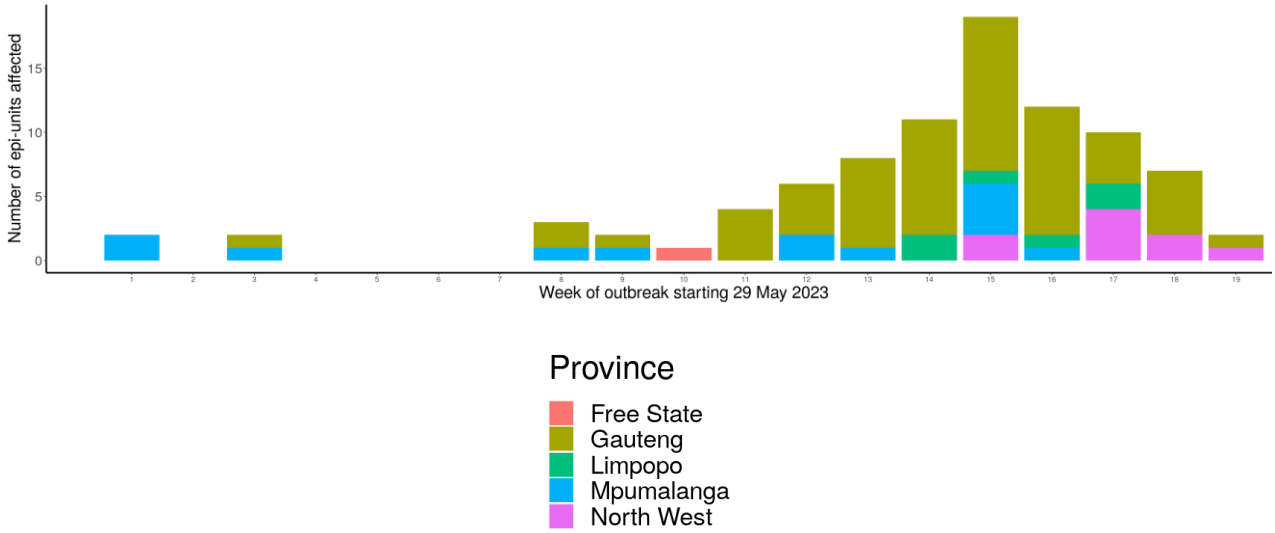

Figure 10: **H7N6** epidemic curve classified according to **province** (29 May 2023 to 6 October 2023)

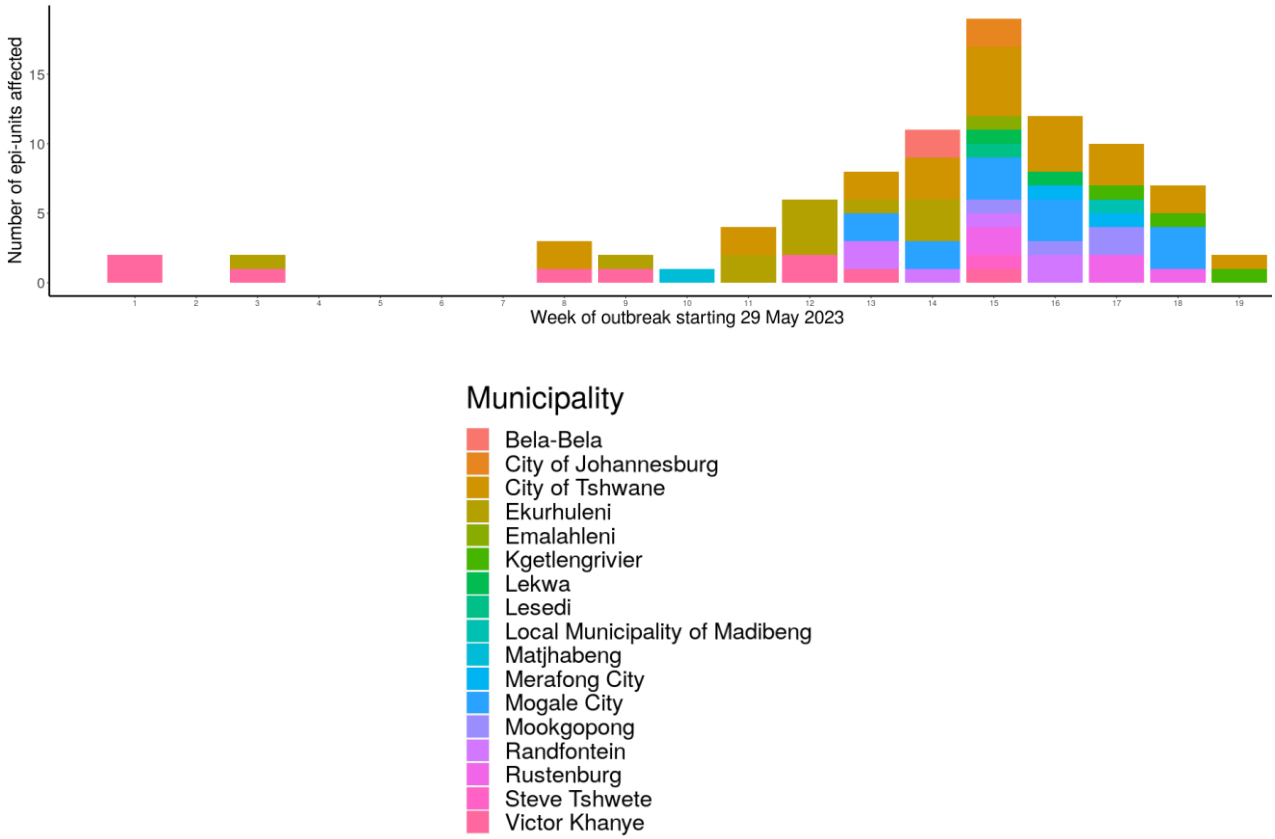

Figure 11: **H7N6** epidemic curve classified according to **municipality** (29 May 2023 to 6 October 2023)

Figure 12 indicates the geographic spread of the HPAI H7N6 infections in poultry flocks and wild birds since 29 May 2023. The first case was reported in Victor Khanye in week 1 and the virus spread to Ekurhuleni in

week 3. The most recent first outbreak occurred in week 17. (source: JDATA/PDMA). Figure 13 shows the density of the HPAI H7N6 infections (source: JDATA/PDMA).

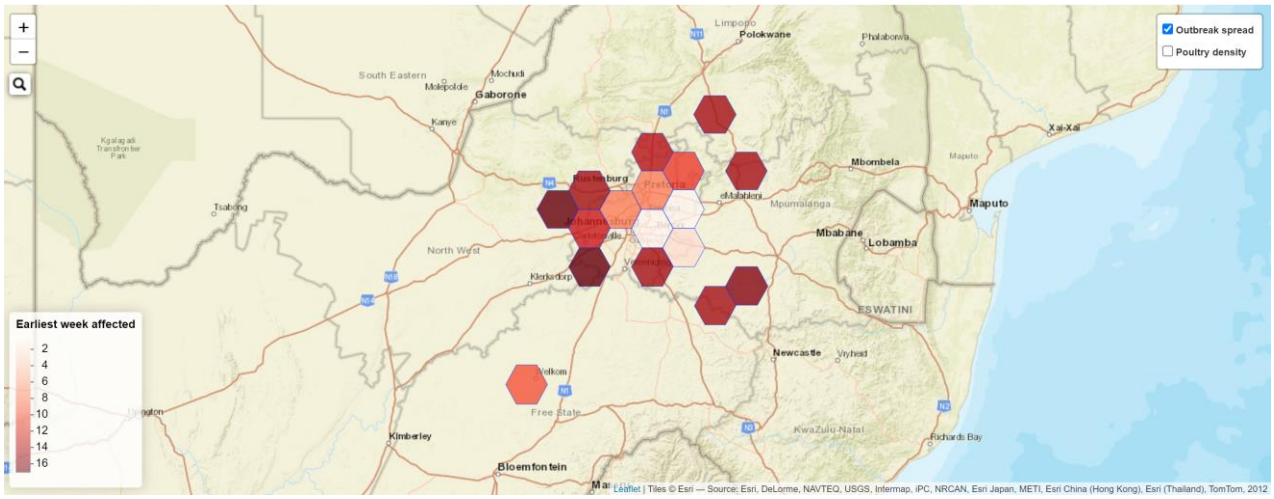

Figure 12: **H7N6** outbreak spread (29 May to 6 October 2023)

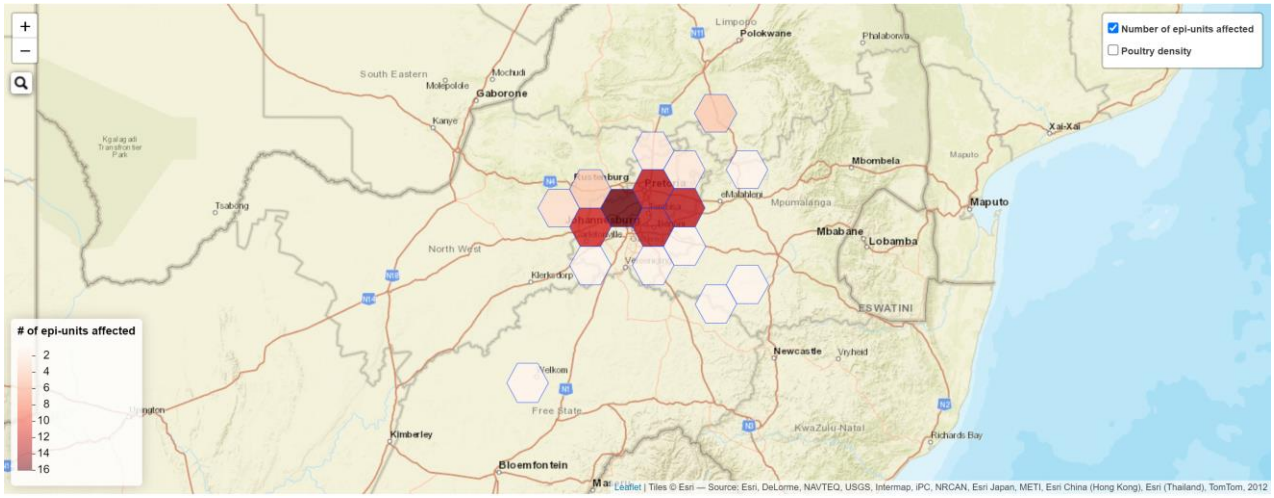

Figure 13: **H7N6** outbreak density (29 May to 6 October 2023)

2.4 AI surveillance programme

Table 9 summarises the AI test results of farms that submitted data during the reporting period of 3Q2023. The total number of samples tested decreased from 53 136 in 2Q2023 to 45 432. (Note: These figures change from time to time due to ongoing submissions of data.) The number of broiler industry farms submitting samples decreased from 386 in 2Q2023 to 292, and the number of egg industry farms submitting samples decreased from 41 to 33. Of the samples tested during 3Q2023, 1 997 (4.4%) were positive.

A positive ELISA test does not necessarily indicate an outbreak. A confirmation is required through either viral isolation or the haemagglutination inhibition (HI) test as well as molecular screening using polymerase chain reaction (PCR). It must also be noted that some of the positives may be due to laboratory error. In addition, about 1–2% false positive results are expected even with a very reliable serological test.

Table 9: AI test results					
PROVINCE	FARM TYPE		SAMPLES		
	Broiler industry	Egg industry	Tested	Positive (ELISA)	Negative
Eastern Cape	26	0	2 641	0	2 641
Free State	26	4	5 016	0	5 016
Gauteng	33	15	7 622	392	7 230
KwaZulu-Natal	54	1	7 740	505	7 235
Limpopo	15	4	2 904	56	2 848
Mpumalanga	39	2	7 349	939	6 410
North West	79	7	10 950	105	10 845
Northern Cape	0	0	0	0	0
Western Cape	20	0	1 210	0	1 210
National	**292**	**33**	**45 432**	**1 997**	**43 435**

Table 10 gives a breakdown of the number of chicken farms that participated in the AI surveillance monitoring during the quarter under review.

Table 10: Number of farms that participated	
BROILER INDUSTRY	
GGP and grandparent farms	13
Parent rearing farms	0
Broiler breeder farms	113
Broiler rearing farms	166
TOTAL	292
EGG INDUSTRY	
Grandparent farms	3
Parent rearing farms	2
Layer breeder farms	7
Pullet rearing farms	9
Layers (table egg production)	0
TOTAL	21
BROILER AND EGG INDUSTRIES	**313**

Table 11 indicates the total number of farms that did not participate during the quarter under review. Farms that are not exporting are only required to submit samples twice a year. The reluctance of egg producers to submit samples for testing may be due to the lack of compensation for the culling of healthy but at risk birds.

Table 11: Number of farms that did not submit AI test results		
PROVINCE	**FARM TYPE**	
	Broiler industry	**Egg industry**
Eastern Cape	16	14
Free State	40	28
Gauteng	57	53
KwaZulu-Natal	36	34
Limpopo	19	13
Mpumalanga	112	21
North West	80	33
Northern Cape	2	5
Western Cape	79	38
National	**441**	**239**

Figure 14 shows the density of chicken farms weighted according to the number of birds on each farm. The heat map has been generated by specifying that an area be coloured according to the vicinity of neighbouring farms within a 20 km radius. Adding further weight to this area is the number of birds on each farm. The purpose of this map is to identify potential hotspots where the possibility for transmission of the avian influenza virus is higher. The relative risk of transmission is low in the green areas, moderate in the yellow areas and high in the red areas. It is interesting to note that the H7N6 outbreak started in the Delmas region which is located in the red area east of Gauteng.

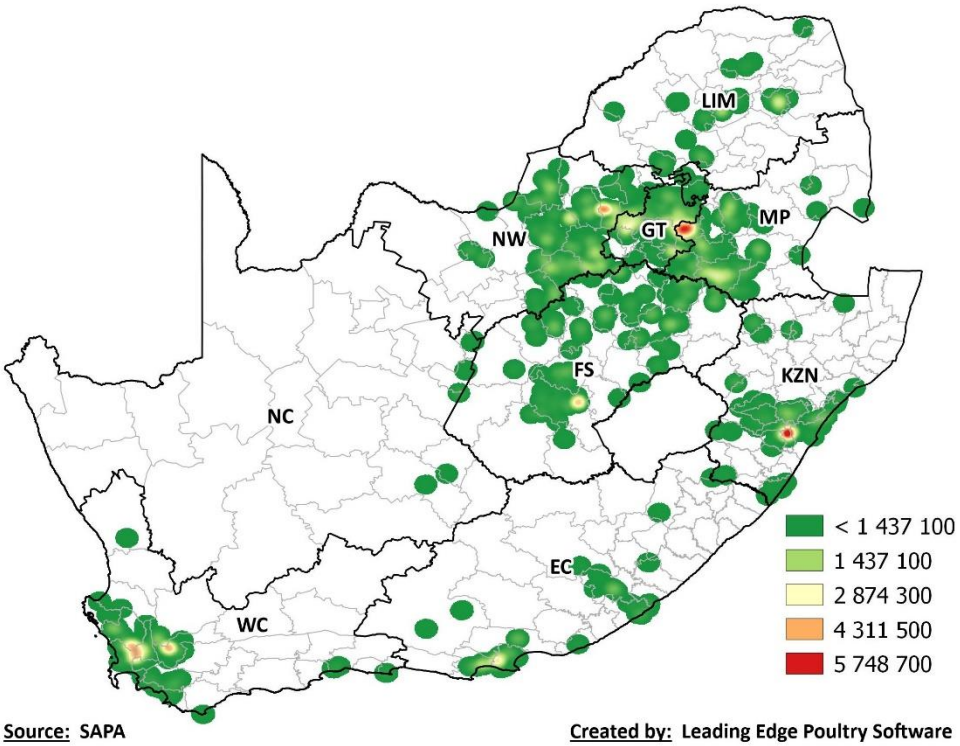

Figure 14: Heat map illustrating the density of chicken farms

3. AVIAN INFLUENZA MONITORING IN SOUTH AFRICA

SAPA is an active participant in the surveillance monitoring process for avian influenza in the national poultry flock. Surveillance is conducted on a monthly basis for ZA compartments (export facilities) and on a six-monthly basis for non-ZA compartments, according to a prescribed protocol. All producers are encouraged to participate in this programme.

Producers are requested to ensure that the **AI monitoring database update input sheet** is filled in accurately with every submission. Of particular importance are:

- the geographical location (gps coordinates) of the farm;
- the type of poultry; and
- **the average number of chickens currently on the farm**.

Silverpath Consulting continues to focus on improving the quality of the information in the AI database.

4 CONCLUSION

With the rapid spread of the H7N6 sub-type of the avian influenza virus and its catastrophic effect, producers are advised to remain on the alert and continue to comply with HPAI protocols. The routine submission of test results to SAPA is an important part of the surveillance programme.

SAPA contact details

Silverpath Consulting is contracted to SAPA to collate the information regarding avian influenza and thus to contact poultry farmers in order to solicit the required information. Ms Idah Mosweu conducts these surveys and we request the industry to cooperate with the process. She can be contacted at 079 871 9085 during working hours, and via e-mail: diseasereports@sapoultry.co.za.

Data collated by Silverpath Consulting
Report compiled by Leading Edge Poultry Software
Technical input provided by Dr Shahn Bisschop and Dr John Grewar

Disclaimer: *The views expressed in SAPA STATS reports reflect those of SAPA in collaboration with its independent consultants and do not constitute any specific advice as to decisions or actions that should be taken. While every care has been taken in preparing documents no representation nor warranty or any expressed or implied undertaking is given and no responsibility or liability is accepted by SAPA as to the accuracy or completeness of the information contained herein whether as electronic data or as a finished report. SAPA or its independent consultants do not accept responsibility or liability for any damages of whatsoever nature which any person may suffer as a result of any decision or action taken on the basis of the information contained herein. All opinions and estimates contained in the reports may be changed after publication without notice.*

These statistical reports and/or electronic data are placed in the public domain and may be used by other parties conditional to the source of the data/ report being attributed to SAPA.